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и переданных в Международную систему INIS  
(*International Atomic Energy Agency IAEA-INIS*)  
в 2016 году

Часть 2

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*International Atomic Energy Agency*



## **Monitoring sensor of oxygen in sodium**

**S37**

*Blokhin, V.A.; Borisov, V.V.; Il'icheva, N.S. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)) (and others)*

### **Thermal physics of new generation reactors (Thermal physics-2015)**

Obninsk (RU)

6-9 Oct 2015

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3 refs., 4 figs.

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

Predpriyatie Goskorporatsii Rosatom AO Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

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274 p.

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**S42**

*Kebadze, B.V.; Lagutin, A.A.; Shurupov, V.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)) (and others)*

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2 refs.

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

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274 p.

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*Arnol'dov, M.N.; Loginov, N.I. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

#### **Thermal physics of new generation reactors (Thermal physics-2015)**

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2015

274 p.

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**S22**

*Belozеров, V.I.; Titarenko, V.A.; Milinchuk, V.K.; Klinshpont, Eh.R. (IATEh NIYaU MIFI, Obninsk (RU))*

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*Vinogradov, A.V.; Kamaev, A.A.; Drobyshev, A.V.; Kryuchkov, E.A.; Pakhomov, I.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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ISBN 978-5-906512-70-3

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274 p.

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**S22**

*Anikina, L.V.; Kuznetsov, A.A. (Beloyarskaya AEhS, Zarechnyj Sverdlovskoj Obl. (RU))*

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ISBN 978-5-906512-70-3

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*Orlova, E.A.; Orlov, A.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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ISBN 978-5-906512-70-3

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**S37**

*Krasikova, E.A.; Nizovtsev, A.A.; Il'icheva, N.S. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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274 p.

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*Voronin, I.A.; Papovyants, A.K.; Posazhennikov, A.M.; Skomorokhova, S.N.; Nikolaev, A.N.; Matveev, K.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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2 refs.

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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ISBN 978-5-906512-70-3  
Obninsk (RU)  
AO GNTs RF - FEhI  
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274 p.  
LIQUID METALS; SODIUM; COOLANTS; OXYGEN COMPOUNDS; PURIFICATION;  
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*Kozlov, F.A.; Konovalov, M.A.; Sorokin, A.P. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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274 p.

LMFBR TYPE REACTORS; REACTOR SAFETY; COOLANT CLEANUP SYSTEMS;  
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*Kozlov, F.A.; Konovalov, M.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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2 refs., 1 fig.

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ISBN 978-5-906512-70-3

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**S42**

*Varseev, E.V.; Konovalov, M.A.; Alekseev, V.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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2 refs.

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

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*Sadovnichij, R.P. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk*



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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

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**S36**

*Alekseev, V.V.; Orlova, E.A.; Varseev, E.V.; Torbenkova, I.Yu. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

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## **Investigation of physicochemical processes in surface oxide coatings of metals at chemical, thermal and radiation action**

**S36**

*Struchkov, A.A.; Berlozerov, V.I.; Yarkin, A.N. (IAEh NIYaU MIFI, Obninsk (RU))*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

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AO GNTs RF - FEhI

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274 p.

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**S42**

*Mitrofanova, O.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov  
ISBN 978-5-906512-70-3  
Obninsk (RU)  
AO GNTs RF - FEhI  
2015  
274 p.  
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**S42**

*Kolomiets, D.O.; Levchenko, Yu.D. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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1 fig.

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### **Experimental investigations of two-phase flow structure and determination of its hydrodynamic characteristics in conditions of natural circulation in vertical channels**

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*Isakov, N.Sh. (MGTU im. N.Eh. Baumana, Moscow (RU))*

#### **Thermal physics of new generation reactors (Thermal physics-2015)**

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### **Structural characteristics of two-phase gas-liquid flows in conditions of periodic shear forces action**

**S42**

*Perevezentsev, V.V.; Kuzero, V.B. (MGTU im. N.Eh. Baumana, Moscow (RU))*

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### **Calculational and experimental justification of flow rate reduction in pipeline at one-phase or two-phase jet inlet**

**S42**

*Avdeev, E.F.; Chusov, I.A.; Ustyuzhanin, A.Ya.; Maksimovskij, V.V. (IATEh NIYaU MIFI, Obninsk (RU))*

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ISBN 978-5-906512-70-3

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**Hydraulic impact initiation in pipeline by inlet of superheated or steam water jet with critical velocity**

**S42**

*Avdeev, E.F.; Tumanov, V.A.; Chusov, I.A. (IATEh NIYaU MIFI, Obninsk (RU))*

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*Samolysov, A.V.; Marchevskaya, O.A.; Kaplunov, S.M. (FGBUN Inst. Mashinovedeniya im. A.A. Blagonravova RAN, Moscow (RU))*

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### **Added mass and effective density of disperse media**

**S42**

*Vereshchagina, T.N.; Fedotovskij, V.S. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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### **Effective properties of disperse media under vibrational and acoustic action S42**

*Fedotovskij, V.S.; Mikhajlova, T.A.; Lunina, S.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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ISBN 978-5-906512-70-3

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### **On free group vibrations of rod bundles and fuel assemblies in reactor facilities S42**

*Fedotovskij, V.S.; Nikulina, A.N.; Ivanova, E.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

#### **Thermal physics of new generation reactors (Thermal physics-2015)**

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ISBN 978-5-906512-70-3  
Obninsk (RU)  
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### **Effect of coolant turbulent flow structure at inlet of WWER fuel assembly on hydrodynamic loads and fuel element clusters vibrations**

**S42**

*Perevezentsev, V.V. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Baumana, Moscow (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

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### **Simulation models of application subsystems of closed nuclear fuel cycle as a means of analysis and properties (knowledge) management**

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*Alekseev, P.N.; Subbotin, S.A.; Ignatov, A.A.; Bulanova, T.M.; Mordashev, V.M. (NITs Kurchatovskij Inst., Moscow (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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ISBN 978-5-906512-70-3

Obninsk (RU)

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## **Development of mathematical models and design analysis of fast reactor severe accidents**

**S21**

*Ashurko, Yu.M.; Kashcheev, M.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

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## **Models of severe-emergency module used for analysis of core disruptive accident S21**

*Zhdanov, V.S.; Usov, Eh.V.; Kuznetsova, M.E.; Kalashnikova, A.A. (Novosibirskij Filial Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki, Novosibirsk (RU)); Strizhov, V.F.; Kiselev, A.E. (Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki, Moscow (RU))*

### **Thermal physics of new generation reactors (Thermal physics-2015)**

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ISBN 978-5-906512-70-3

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## **Calculational simulation of experiments on investigation of submerged perforated sheet leveling properties done with the use of improved STEG code S42**

*Melikhov, O.I.; Melikhov, V.I.; Nikonov, S.M. (AO EhNITs, Ehlektrogorsk (RU)); Parfenov, Yu.V.; Emel'yanov, D.A.; Nerovnov, A.A. (NIU MEhI, Moscow (RU))*

### **Thermal physics of new generation reactors (Thermal physics-2015)**

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ISBN 978-5-906512-70-3

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AO GNTs RF - FEhI

2015

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**Non-isothermal parabolized model of coolant flow in cores of reactor facilities**  
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*Avdeev, E.F.; Chusov, I.A.; Shelegov, A.S.; Yunusova, L.K. (IA TEh NIYaU MIFI, Obninsk (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

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**Analysis of main causes of design heat-ups uncertainties in core channels of reactor plant with fuel rods and HLMC**

**S22**

*Golub, E.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov  
ISBN 978-5-906512-70-3  
Obninsk (RU)  
AO GNTs RF - FEhI  
2015  
274 p.  
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### **Dispersion and shift in average of nonlinear function of random arguments in respect to NPP elements design**

**S97**

*Golub, E.V. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

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### **Program module of HYDRA-IBRAE/LM/V1 code for calculation of small leak in water-sodium steam generator**

**S22**

*Butov, A.A.; Usov, Eh.V.; Lezhnin, S.I.; Kutlimetov, A.Eh. (Novosibirskij Filial Federal'nogo Gosudarstvennogo Byudzhetnogo Uchrezhdeniya Nauki Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki RAN, Novosibirsk (RU)); Mosunova, N.A.; Strizhov, V.F. (Federal'noe Gosudarstvennoe Byudzhetnoe Uchrezhdenie Nauki Inst. Problem Bezopasnogo Razvitiya*

*Atomnoj Ehnergetiki, Moscow (RU)*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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2 refs., 1 fig., 1 tab.

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Predpriyatie Goskorporatsii Rosatom AO Gosudarstvennyj Nauchnyj Tsentr Rossijskoj

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

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AO GNTs RF - FEhI

2015

274 p.

LMFBR TYPE REACTORS; SODIUM COOLED REACTORS; STEAM GENERATORS; LEAKS; H CODES; HYDROGEN; REACTOR SAFETY; SECONDARY COOLANT CIRCUITS; THERMAL HYDRAULICS; CONCENTRATION RATIO; MATHEMATICAL MODELS

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**Development of procedure for criterial assessments of area boundary initial point of density wave vibrations in the system of parallel channels**

**S42**

*Kornienko, Yu.N. (FGUP GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

Obninsk (RU)

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Razrabotka metodiki kriterial'nykh otsenok nachal'noj točki granitsy oblasti kolebanij voln plotnosti v sisteme paralel'nykh kanalov

p. 236

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

DENSITY; THERMAL HYDRAULICS; MATHEMATICAL MODELS; OSCILLATIONS;  
EQUILIBRIUM; COMPARATIVE EVALUATIONS

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**Development of TRIANA-6/Ver2.0 program for justification of dynamics and safety of reactor unit with HLMC, including accidents with interloop leaks of steam generator**

**S22**

*Rogov, A.A. (AO OKB GIDROPRESS, Podol'sk (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

Obninsk (RU)

6-9 Oct 2015

Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015)

Razrabotka programmy TRIANA-6/Ver2.0 dlya obosnovaniya dinamiki i bezopasnosti RU s TZhMT, v tom chisle v avariyaakh s mezhkonturnymi techami parogeneratora

p. 237-238

(RU)

3 refs.

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

LIQUID METAL COOLED REACTORS; REACTOR ACCIDENT SIMULATION; T CODES;  
VERIFICATION; MATHEMATICAL MODELS; TWO-PHASE FLOW; THERMAL  
HYDRAULICS; REACTOR COMPONENTS; LEAKS

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**Verification of HYDRA-IBRAE/LM/V1 code models using for calculation of pressure losses and heat transfer in one- and two-phase modes of sodium flow as well as for evolution of steam space in bundle of fuel elements**

**S42**

*Dugarov, G.A.; Kudashov, I.G.; Butov, A.A.; Usov, Eh.V.; Pribaturin, N.A. (Novosibirskij Filial FGBUN - Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki RAN, Novosibirsk (RU));*

*Mosunova, N.A.; Strizhov, V.F. (Federal'noe Gosudarstvennoe Byudzhethoe Uchrezhdenie Nauki Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki RAN, Moscow (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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Verifikatsiya modelej koda HYDRA-IBRAE/LM/V1, ispol'zuemykh dlya rascheta poter' davleniya i teploobmena v odno- i dvukhfaznykh rezhimakh techeniya natriya, a takzhe

ehvolyutsii parovogo ob"ema v puchkakh tvehlov

p. 239-240

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ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

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## **Main results of HYDRA-IBRAE/LM/V1 code verification on experimental conditions of RU BN-600**

**S42**

*Anfimov, A.M.; Gorbunov, V.S.; Kuznetsov, D.B.; Osipov, S.L. (AO OKBM Afrikantov, Nizhnij Novgorod (RU)); Ivanov, E.N.; Klimonov, I.A.; Kudashov, I.G.; Mosunova, N.A.; Usov, Eh.V. (Federal'noe Gosudarstvennoe Byudzhethnoe Uchrezhdenie Nauki Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki RAN, Moscow (RU))*

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Osnovnye rezul'taty verifikatsii koda HYDRA-IBRAE/LM/V1 na ehksperimental'nykh rezhimakh RU BN-600

p. 241-243

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7 refs., 1 fig.

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ISBN 978-5-906512-70-3

Obninsk (RU)

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2015

274 p.

THERMAL HYDRAULICS; H CODES; VERIFICATION; BELOYARSK-3 REACTOR; REACTOR SAFETY; NATURAL CONVECTION; AFTER-HEAT REMOVAL;

**Development of related version of DYN3D neutronic code and ATHLET 3.0 thermohydraulic code for analysis of transition processes in liquid metal fast reactors**

**S97**

*Khrennikov, N.N.; Danicheva, I.A.; Ivanov, V.S.; Samokhin, A.G.; Velkov, K.; Pasechnik, I.; Busket, D.; Klim, S. (FBU NTTs YaRB, Moscow (RU))*

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Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015)

Razrabotka svyazannoj versii nejtronno-fizicheskogo koda DYN3D i teplogidravlicheskogo koda ATHLET 3.0 dlya analiza perekhodnykh protsessov v bystrykh reaktorakh s zhidkometallicheskimy teplonositel'yami

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

LIQUID METAL COOLED REACTORS; D CODES; A CODES; THERMAL HYDRAULICS;  
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DATA COLLECTIONS

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**NPP CPCS functional software development methodology with the use of model-oriented approach in SimInTech**

**S97**

*Shchekaturov, A.M.; Kozlov, O.S.; Timofeev, K.A. (MGTU im. N.Eh. Baumana, Fakul'tet Ehnergomashinostroenie, Moscow (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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p. 245-246

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov  
ISBN 978-5-906512-70-3  
Obninsk (RU)  
AO GNTs RF - FEhI  
2015  
274 p.  
NUCLEAR POWER PLANTS; ALGORITHMS; COMPUTER CODES; PROGRAMMING;  
REACTOR COMMISSIONING; COMPUTERIZED CONTROL SYSTEMS

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### **Calculation analysis by SOKRAT-BN code of experiment on after-heat removal performed on EBR-II reactor unit**

**S21**

*Rtishchev, N.A.; Tarasov, A.E.; Semenov, V.N.; Chalyj, R.V. (IBRAE RAN, Moscow (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

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Raschetnyj analiz kodom SOKRAT-BN ehksperimenta po otvodu ostatochnykh ehnergovydelenij, vypolnennogo na reaktornoj ustanovke EBR-II

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

EBR-2 REACTOR; REACTOR SAFETY; S CODES; VERIFICATION; REACTOR COOLING SYSTEMS; BENCHMARKS; AFTER-HEAT REMOVAL; REACTOR ACCIDENT SIMULATION; COMPARATIVE EVALUATIONS; ACCURACY; ERRORS

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### **Experimental and numerical simulation of hydrodynamics and heat transfer in fuel assembly with coated balls**

**S42**

*Borozdin, A.V.; Varava, A.N.; Dedov, A.V.; Komov, A.T.; Malakhovskij, S.A.; Smorchkova, Yu.V. (Natsional'nyj Issledovatel'skij Univ. MEhI, Moscow (RU))*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

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## **Realization of lithium closed circulation concept on T-11M tokamak**

**S70**

*Vertkov, A.V.; Berlov, A.V. (OAO Krasnaya Zvezda, Moscow (RU)); Zharkov, M.Yu. (OAO Krasnaya Zvezda, Moscow (RU)); MIEhM NIU VShEh, Moscow (RU))*

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Realizatsiya kontseptsii zamknutoj tsirkulyatsii litiya na tokamake T-11M

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5 refs., 2 figs.

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ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

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## **Prospects of direct-contact liquid-metal heat transfer for wide class production fabrication**

**S42**

*Ul'yanov, V.V.; Martynov, P.N.; Askhadullin, R.Sh.; Storozhenko, A.N.; Gulevskij, V.A.; Kharchuk, S.E. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

### **Thermal physics of new generation reactors (Thermal physics-2015)**

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Perspektivy pryamokontaktного zhidkometallicheskogo perenosa tepla dlya polucheniya shirikogo klassa produktsii

p. 254-255

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4 refs.

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

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## **LRWC reprocessing technique using activated pyrolusite. Problem of RW management**

**S12**

*Legkikh, K.G.; Smykov, V.B. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

### **Thermal physics of new generation reactors (Thermal physics-2015)**

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Metod pererabotki ZhRK s ispol'zovaniem aktivirovannogo piroluzita. Problema obrashcheniya s RAO

p. 256-258

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov  
ISBN 978-5-906512-70-3  
Obninsk (RU)  
AO GNTs RF - FEhI  
2015  
274 p.  
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KINETICS; PRESSURE RANGE MEGA PA 10-100; RADIOACTIVE WASTE DISPOSAL;  
SOLIDIFICATION

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### **Development of microporous materials for formation of HLMC parameters checkers**

**S36**

*Skobeev, D.A.; Shelemet'ev, V.M.; Sadovnichij, R.P. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

#### **Thermal physics of new generation reactors (Thermal physics-2015)**

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Razrabotka mikroporistykh materialov dlya sozdaniya sredstva kontrolya parametrov TZhMT  
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3 refs.

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

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2015

274 p.

LIQUID METALS; COOLANTS; IMPURITIES; HYDROGEN; POROUS MATERIALS;  
CONTROL; STAINLESS STEELS; WETTABILITY; CORROSION RESISTANCE

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### **Application of HLMC for heat removal from vessel of melting facility for metal radioactive waste reprocessing**

**S42**

*Martynov, P.N.; Askhadullin, R.Sh.; Mel'nikov, V.P.; Storozhenko, A.N.; Legkikh, A.Yu. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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Primenenie TZhMT dlya otvoda tepla ot korpusa plavil'nogo agregata pererabotki metallicheskih radioaktivnykh otkhodov

p. 261

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1 fig.

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

RADIOACTIVE WASTE PROCESSING; MELTING; EQUIPMENT; COOLING; LIQUID METALS; COOLANTS; SODIUM; LEAD ALLOYS; BISMUTH ALLOYS; COMPARATIVE EVALUATIONS

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## **Thermohydraulic calculations of HLMC cooling circuit of melting facility for metal radioactive waste reprocessing**

**S42**

*Martynov, P.N.; Askhadullin, R.Sh.; Legkikh, A.Yu. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Leskin, S.T.; Shelegov, A.S.; Slobodchuk, V.I. (IATEh NIYaU MIFI, Obninsk (RU))*

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Teplogidravlicheskie raschety kontura okhlazhdeniya s TZhMT plavil'nogo agregata dlya pererabotki metallicheskih radioaktivnykh otkhodov

p. 263

(RU)

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

RADIOACTIVE WASTE PROCESSING; MELTING; EQUIPMENT; COOLANTS; LEAD ALLOYS; BISMUTH ALLOYS; COOLING SYSTEMS; THERMAL HYDRAULICS

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## Liquid-metal technology of nanostructures synthesis

S77

*Martynov, P.N.; Askhadullin, R.Sh.; Osipov, A.A.; Skobeev, D.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

NANOSTRUCTURES; NANOCHEMISTRY; OXIDATION; LIQUID METALS; OXIDES; SYNTHESIS

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## Reprocessing of phosphate manufacturing wastes using liquid metals

S37

*Orlova, E.A.; Alekseev, V.V.; Sorokin, A.P.; Zhmurin, V.G.; Zagrebaev, S.A.; Zasorin, I.I. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

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Pererabotka otkhodov fosfatnogo proizvodstva s ispol'zovaniem zhidkikh metallov

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*Trufanov, A.A.; Sorokin, A.P. (eds.)*

Predpriyatie Goskorporatsii Rosatom AO Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Scientific-technical conference Thermal physics of new generation reactors (Thermal physics-2015). Book of abstracts

Nauchno-tehnicheskaya konferentsiya Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

FERTILIZERS; PHOSPHATES; WASTES; REPROCESSING; LIQUID METALS;  
COOLANTS; SILICON FLUORIDES; IMPURITIES; SILICON; DEPOSITION;  
SUBSTRATES; ISOTOPE RATIO

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**State-of-the-art analysis of used ion exchange resin reprocessing technologies  
S12**

*Askhadullin, R.Sh.; Nikolaev, A.N.; Sitnikov, I.V.; Poplavskij, D.A. (AO GNTs RF - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

**Thermal physics of new generation reactors (Thermal physics-2015)**

Obninsk (RU)

6-9 Oct 2015

Teplofizika reaktorov novogo pokoleniya (Teplofizika-2015)

Analiz sovremennogo sostoyaniya tekhnologij pererabotki otrabotannykh ionnoobmennykh smol  
p. 267-268

(RU)

*Trufanov, A.A.; Sorokin, A.P. (eds.)*

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Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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2015). Tezisy dokladov

ISBN 978-5-906512-70-3

Obninsk (RU)

AO GNTs RF - FEhI

2015

274 p.

ORGANIC ION EXCHANGERS; RADIOACTIVE WASTES; RADIOACTIVE WASTE  
PROCESSING; LIQUID METALS; COOLANTS; TEMPERATURE RANGE 0400-1000 K

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**The Ninth International scientific and technical conference Safety, efficiency and  
economy of atomic energy. Book of abstracts**

**S21;S42;S12**

Otkrytoe Aktsionernoe Obshchestvo Rossijskij Kontsern po Proizvodstvu Ehlektricheskoy i  
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Devyataya mezhdunarodnaya nauchno-tekhnicheskaya konferentsiya Bezopasnost',  
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INIS-RU--599

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284 p.

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LEADING ABSTRACT; MEETINGS; REACTORS; NUCLEAR POWER PLANTS;  
REACTOR ACCIDENTS; REACTOR OPERATION; REACTOR MAINTENANCE;  
RADIATION PROTECTION; REACTOR SAFETY; REPAIR; FUEL CYCLE; SPENT FUEL  
CASKS; RADIOACTIVE WASTE PROCESSING

The abstracts of the Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy are present. The conference took place in Moscow, 21-23 May, 2014. The problems of WWER, RBMK, BN and EhGP-6 NPPs operation, maintenance and repair; materials testing and metallic structures control; radioactive wastes and spent fuel management; NPP decommissioning; radiation safety, NPP ecology, emergency preparedness were discussed on the conference. The great attention was paid to the problems of atomic energy economy and its developing, international cooperation for NPP safety and young NPP specialists training

Представлены тезисы докладов 9-й международной научно-технической конференции Безопасность, эффективность и экономика атомной энергетики, проходившей в Москве 21-23 мая 2014 года. На конференции обсуждались вопросы эксплуатации, технического обслуживания и ремонта АЭС с ВВЭР, РБМК, БН и ЭГП-6; материаловедения и контроля металлических конструкций; обращения с радиоактивными отходами и отработавшим ядерным топливом; вывода из эксплуатации энергоблоков АЭС; радиационной безопасности, экологии АЭС, противоаварийной готовности. Большое внимание уделено вопросам экономики атомной энергетики и ее развитию, международному сотрудничеству в целях обеспечения безопасности АЭС и подготовке молодых специалистов для АЭС

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## **Safety ensuring and raising of atomic energetics efficiency in Russia**

**S21**

*Asmolv, V.G. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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Devyataya mezhdunarodnaya nauchno-tehnicheskaya konferentsiya Bezopasnost', ehffektivnost' i ehkonomika atomnoj ehnergetiki

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RUSSIAN FEDERATION; NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTOR SAFETY; EFFICIENCY; REACTOR OPERATION; REACTOR DECOMMISSIONING; SERVICE LIFE



## **Semicentennial operating experience of Novovoronezh NPP**

**S21**

*Fedorov, A.I.; Shchukin, A.P.; Vitkovskij, S.L. (Novovoronezhskaya AEhS, Novovoronezh (RU)); Sidorenko, V.A.; Zhurbenko, A.V. (FGBU NITs Kurchatovskij Inst., Moscow (RU)); Topchiyan, R.M. (AEhP, Moscow (RU)); Nikitenko, M.P. (OAO OKB Gidropress, Podol'sk (RU))*

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## **Solution of scientific and technical problems of fast reactors operation - from BN-600 to BN-800**

**S21**

*Bakanov, M.V. (Beloyarskaya AEhS, Zarechnyj (RU))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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---

### **Recovery of resource characteristics of graphite stack of Leningrad-1 reactor S21**

*Pereguda, V.I.; Kudryavtsev, K.G. (Leningradskaya AEhS, Sosnovyy Bor (RU))*

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### **Operation of Balakovo NPP power units using 18-month fuel cycle S21**

*Bessonov, V.N. (Balakovskaya AEhS, Balakovo (RU))*

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## **Development and improvement of nuclear fuel for reactor cores of power plants S11**

*Lavrenyuk, P.I.; Dolgov, A.B. (OAO TVEhL, Moscow (RU))*

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## **Problems of nuclear power safety**

**S21**

*Bol'shov, L.A. (Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki RAN, Moscow (RU))*

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## **Development and implementation perspectives of closed fuel cycle**

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*Ponomarev-Stepnoj, N.N. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Operation of nuclear power plant units on higher power level. Perspectives of further power increasing up to 107-110%**

**S21**

*Shutikov, A.V. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

**The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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21-23 May 2014

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NUCLEAR POWER; REACTOR SAFETY; POWER GENERATION; BALAKOVO-4 REACTOR; REACTOR OPERATION

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## **Medium power WWER reactor units**

**S21**

*Berkovich, V.Ya.; Nikitenko, M.P.; Shchekin, I.G.; Petrov, V.V.; Shmelev, S.V.; Veselov, D.O. (ОАО ОКБ ГИДРОПРЕСС, Подол'ск (RU))*

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## **WWER with spectral control - the way to effective use of uranium-238**

## S21

*Semchenkov, Yu.M. (NITs Kurchatovskij Inst., Moscow (RU)); Mokhov, V.A. (OAO OKB GIDROPRESS, Podol'sk (RU))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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REACTOR OPERATION; REACTOR CONTROL SYSTEMS; REACTIVITY;  
SPECTROSCOPY

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## **Development of nuclear power in China**

### S21

*Chehn' Chzhaobo (Gosudarstvennaya Korporatsiya Yaderno-Ehnergeticheskikh Tekhnologij, Pekin (CN))*

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## **Scientific and technical problems solution of the final stage of RBMK reactor operation**

**S21**

*Dragunov, Yu.G.; Petrov, A.A. (OAO NIKIEhT, Moscow (RU))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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LWGR TYPE REACTORS; REACTOR OPERATION; REACTOR CHANNELS; GRAPHITE; RADIATION EFFECTS; REACTOR COMPONENTS; REACTOR MAINTENANCE; REPAIR; REACTOR SAFETY

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## **IAEA about Fukushima accident and realization of IAEA action plan on nuclear safety**

**S21**

*Karuzo, G. (MAGATEh, Vena (AT))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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FUKUSHIMA DAIICHI NUCLEAR POWER STATION; REACTOR ACCIDENTS; IAEA; IAEA SAFEGUARDS; SAFETY REPORTS; ENVIRONMENTAL EFFECTS

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## **Cost management of OJSC Kontsern Rosehnergoatom NPPs in conditions of rise in tariffs**

**S21**

*Arkhangel'skaya, A.I. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Problems of Russian projects promotion on foreign markets**

**S21**

*Laaksonen, Yu. (Rusatom Oversis, Moscow (RU))*

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### **Calculated forecast of RBMK-1000 channel bends at the stage of graphite cracking**

**S97**

*Tutnov, A.A.; Kiselev, A.S.; Krut'ko, E.S.; Burlakov, E.V.; Tkachev, V.V.; Fedosov, A.M. (NITs Kurchatovskij Inst., Moscow (RU))*

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### **Safety and efficiency of spent nuclear fuel management at FSUP MCC**

**S12**

*Gavrilov, P.M.; Merkulov, I.A.; Kravchenko, V.A.; Matselya, V.I.; Seelev, I.N. (FGUP Gorno-Khimicheskij Kombinat, Zheleznogorsk (RU))*

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**Scientific-methodological basis of calculational and experimental estimation of residual operating life using technical diagnostics means**

**S21**

*Makhutov, N.A. (Inst. Mashinovedeniya im. A.A. Blagonravova RAN, Moscow (RU))*

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## **Basic results of operation and prospects of new generation fuel application**

**S11**

*Adeev, V.A.; Panov, A.E.; Melenchuk, I.S. (Kol'skaya AEhS, Polyarnye Zori (RU))*

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## **Analysis of emergency processes in WWER reactors related with reactivity disturbance**

**S21**

*Kotsarev, A.V. (NITs Kurchatovskij Inst., Moscow (RU))*

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### **Design solutions on reactor core for save operation of WWER-1000 reactor unit S21**

*Vasil'chenko, I.N.; Kushmanov, S.A.; V'yalitsyn, V.V.; Medvedev, V.S. (OAO OKB  
GIDROPRESS, Podol'sk (RU))*

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### **Water chemistry regime of the secondary circuit on power unit without copper-containing alloys**

S21

*Tyapkov, V.F.; Erpyleva, S.F.; Bykova, V.V.; Kafarova, E.V. (OAO VNIIAEhS, Moscow (RU))*

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## **Development and implementation of manuals on severe accident management in light of Fukushima accident**

**S21**

*Suslov, A.I. (NITs Kurchatovskij Inst., Moscow (RU))*

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## **Influence of dynamic impact on channel tubes integrity and stability of graphite stack of RBMK units after repair**

**S22**

*Tkachev, V.V.; Zheltukhin, K.K. (NITs Kurchatovskij Inst., Moscow (RU))*

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## **Analysis of graphite stack deformation according to stochastic model**

**S22**

*Fedosov, A.M. (NITs Kurchatovskij Inst., Moscow (RU))*

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## **GEFEST800 software system for conducting operation calculations of RU BN-800 neutronics**

**S97**

*Seleznev, E.F.; Asatryan, D.S.; Belov, A.A. (IBRAEh RAN, Moscow (RU)) (and others)*

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## **Simulation of Black Out-type accident for RBMK-1000 and use of mobile equipment for prevention severe consequences**

**S21**

*Krayushkin, A.V.; Mikhajlov, D.A.; Tkachev, V.V. (NITs Kurchatovskij Inst., Moscow (RU))*

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**Prediction estimate of neutronics and thermohydraulic characteristics of RBMK-1000 blocks after the works on recovering life characteristics of graphite stack**

**S21**

*Danicheva, I.A.; Khrennikov, N.N. (FBU Nauchno-Tekhnicheskij Tsentri po Yadernoj i Radiatsionnoj Bezopasnosti, Moscow (RU)); Malofeev, V.M. (NITs Kurchatovskij Inst., Moscow (RU))*

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**Investigations in justification of thermotechnical reliability (critical power ratio) of fuel elements operation in RBMK-1000 oversized fuel channels with account for possible distortions**

**S42**

*Brus, N.A.; Sergeeva, S.S.; Sokolov, K.V. (OAO EhNITs, Ehlektrogorsk (RU))*

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## **Solution of scientific and technical problems of final stage of RBMK reactors operation**

**S21**

*Dragunov, Yu.G.; Petrov, A.A. (OAO NIKIEhT, Moscow (RU))*

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## **Performance assurance of RBMK-1000 fuel assembly at the final stage of power units operation**

**S21**

*Petrov, A.A.; Cherepnin, Yu.S.; Ivanov, A.V.; Roslov, G.I.; Dmitrieva, I.A.; Lopatin, I.P. (OAO NIKIEhT, Moscow (RU))*

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## **Optimization of technological operations using Rosatom production system at Smolensk NPP units repair**

**S21**

*Aputin, V.M. (Smolenskaya AEhS, Desnogorsk (RU))*

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**Equipment and welding process of PCP pipelines (d 850) of WWER-1200 NPP into narrow cuts**

**S42;S36**

*Khodakov, V.D.; Danilov, A.I.; Khodakov, D.V.; Praliev, D.A.; Abrosin, A.A. (OAo NPO TsNIITMASH, Moscow (RU))*

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**Development and certification of repair technique of joint welds of bimetallic pipelines (d 800) of RBMK-1000 repeated forced circulation circuit using single welding**

**S42**

*Khodakov, V.D.; Durynin, V.A.; Khodakov, D.V.; Bazanov, M.A.; Lukicheva, S.V. (OAo NPO TsNIITMASH, Moscow (RU))*

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## **Repair equipment for primary circuit boundary fittings below MCP main joint without core unloading on WWER-1000 power unit with RU V-320**

**S21**

*Markelov, D.A. (Balakovskaya AEhS, Balakovo (RU))*

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Prisposoblenie dlya remonta granichnoj armatury pervogo kontura, raspolozhennoj nizhe glavnogo raz"ema GNTs bez vygruzki aktivnoj zony na ehnergobloke VVEhR-1000 s RU V-320  
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## **Industrial technologies of recovering life characteristics (RLC) of RBMK-1000**

## **graphite stacks**

**S21**

*Batarev, E.S.; Zhelonkin, D.V.; Kuchin, S.A.; Malykhin, S.A.; Mikhal'tsov, A.V.; Shevtsov, I.A. (OOO Prolog, Obninsk (RU))*

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## **Development of production reserves norms of supplies for repair and operational needs**

**S21**

*Yanchenko, Yu.A.; Tkachuk, S.A.; Gurinovich, V.D. (OAO VNIAEhS, Moscow (RU))*

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**Prevention of formation and development of intergranular stress corrosion cracking under the strain in welded joints of austenitic pipelines (d 300) at RU RBMK 1000 NPP**

**S36**

*Babkin, L.B.; Babenko, T.S.; Osipova, T.A.; Tarasov, A.V. (OAO VNIIEhS, Moscow (RU)); Karas', V.A. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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**Experience in solving the problem of development and provision of equipment for NPP new power units with the package of repair documentation**

**S22**

*Trebunskij, E.N. (VF OAO VNIIEhS, Volgodonsk (RU))*

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### **Implementation of pneumohydropulse method of cleaning up NPP turbogenerating sets oil pipelines**

**S42**

*Lukin, V.A.; Novikov, A.V. (OAO VNIAEhS, Moscow (RU))*

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### **Development and implementation of the complex of special tooling for NPP equipment and pipelines repair**

**S42**

*Lebedev, N.V. (ZAO GMZ KhIMMASH, Moscow (RU))*

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**Information system #Left-Pointing Double Angle Quotation Mark#Support portal of commissioning#Right-Pointing Double Angle Quotation Mark# S97**

*Pleshakova, N.V. (Smolenskij Uchebno-Trenirovochnyj Tsentri Atomtekhehnergo OAO Atomtekhehnergo, Smolensk (RU))*

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**Simulators of repair processes of NPP equipment on the base of virtual reality  
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*Slonimskij, V.M.; Simonenko, S.I. (Leningradskaya AEhS, Sosnovyj Bor (RU))*

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**Place of ICS MRO in preset asset management system. Standards of ISO 5500X  
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**S42;S97**

*Kharchuk, E.S. (ООО NPP SpetsTek, Sankt-Peterburg (RU))*

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**Intelligent system of nondestructive control and technical diagnostics - the base of NPP safe operation**

**S42**

*Klyuev, V.V.; Kuzelev, N.R. (ZAO NIIIN MNPO Spektr, Moscow (RU))*

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**Implementation of residual life automated control system (RLACS) on the stage of power unit service life extension**

**S21**

*Berkovich, V.Ya.; Bogachev, A.V.; Merkun, A.V.; Nagornyj, A.O.; Shagov, E.V. (OAO OKB Gidropress, Podol'sk (RU))*

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DOCUMENTATION; NONDESTRUCTIVE ANALYSIS; ON-LINE CONTROL SYSTEMS

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## **NPP engineering structures, buildings and constructions monitoring**

**S42**

*Shirokov, A.M.; Saraev, R.V.; Krivdin, D.G. (OAO VNIAEhS, Moscow (RU))*

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RELIABILITY

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## **Technical diagnostics as the element of NPP life cycle control**

**S42**

*Kozyrev, V.D. (Rostovskij Filial Rostovatomtekhehnergo, Volgodonsk (RU)); Myntsov, A.A. (ZAO Promservis, Dimitrovgrad (RU))*

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NUCLEAR POWER PLANTS; LIFETIME EXTENSION; REACTOR COMPONENTS;  
REACTOR INSTRUMENTATION; BUILDINGS; MONITORING; SERVICE LIFE

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### **Three-dimensional information models of NPP power unit as the base of solving the problem of branch system foundation of diagnostics and NPP power units life characteristics control**

**S42**

*Tikhonovskij, V.L. (ZAO NEOLANT, Moscow (RU))*

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Trekhmernye informatsionnye modeli ehnergobloka AEhS kak osnova dlya resheniya zadachi sozdaniya otraslevoj sistemy diagnostiki i upravleniya resursnymi kharakteristikami ehnergoblokov AEhS

p. 66-67

(RU)

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AGING; STANDARDS; TOPOLOGY; REACTOR OPERATION; INFORMATION  
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### **New diagnostic characteristics in Kontsern Rosehnergoatom branch diagnostic system**

**S42**

*Pavelko, V.I.; Svezhintseva, P.Yu.; Finkel', B.M. (ZAO Nauchno-Tekhnicheskij Tsentr Diaprom,*

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p. 67-68

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**RU WWER coolant leakage monitoring complex system**

**S21**

*Dvornikov, P.A.; Kovtun, S.N.; Budarin, A.A.; Kondratovich, F.V.; Kudryaev, A.A.; Polionov, V.P.; Titarenko, N.N.; Shutov, P.S.; Khryachkov, V.A. (GNTs RF FEhI, Obninsk (RU))*

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## **Development of knoware for LCS of pipelines and equipment of NPP pressure circuits**

**S42**

*Matveev, E.L. (OOO ITsD NIKIEhT, Moscow (RU)); Matveev, A.L.; Strelkov, P.B. (OAO NIKIEhT, Moscow (RU))*

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## **Evolution of diagnostic systems on the experience of WWER NPP operation**

**S21**

*Kalinin, A.N.; Pavelko, V.I.; Finkel', B.M. (ZAO Nauchno-Tekhnicheskij Tsentr Diaprom, Moscow (RU))*

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## **NPP power units lifetime extension in Russia**

**S21**

*Gilev, V.A. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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POWER PLANTS; RUSSIAN FEDERATION

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## **WWER NPP lifetime extension up to 60 years**

**S21**

*Potapov, V.V.; Loginov, A.M.; Ovcharov, O.V.; Il'in, V.A.; Nemytov, D.S.; Shirokov, A.M. (OAO VNIIEhS, Moscow (RU))*

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REACTOR OPERATION; LIFETIME EXTENSION; WWER TYPE REACTORS; NUCLEAR POWER PLANTS; DOCUMENTATION; MONITORING; MATERIALS; AGING; INFORMATION SYSTEMS

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## **Integrated survey of real condition of equipment and buildings of Kozloduy NPP reactors #Numero Sign# 5, 6**

**S21**

*Tret'yakov, S.V. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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KOZLODUY-5 REACTOR; KOZLODUY-6 REACTOR; REACTOR OPERATION; LIFETIME EXTENSION; INSPECTION; DOCUMENTATION; BUILDINGS; INTERNATIONAL COOPERATION

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## **Life extension of Leningrad NPP spent fuel storage facility**

**S12**

*Anan'ev, A.N.; Simonov, V.N.; Kononenko, I.P.; Kalinin, V.G.; Zaika, A.V.; Rozhdestvenskij, A.M. (Leningradskaya AEhS, Sosnovyj Bor (RU))*

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DOCUMENTATION; RUSSIAN FEDERATION

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## **Program of Ukrainian NPPs safety upgrade**

**S22**

*Prokhorov, V.L. (GP NAEhK Ehnergoatom, Kiev (UA))*

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## **On the experience of implementation of microprocessor-based power system protection in NPP electrical installations**

**S22**

*Karaulov, A.A. (OAO VNIAEhS, Moscow (RU))*

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### **Management of life characteristics of cables on nuclear power stations: certification and diagnostics**

**S42**

*Kononenko, A.I. (FGUP NIIP, Lytkarino (RU))*

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NUCLEAR POWER PLANTS; ELECTRIC CABLES; SERVICE LIFE; CERTIFICATION; TESTING

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## **Diagnostics of technical condition of impregnated power cables at nuclear power plants**

S42

*Kononenko, A.I.; Khokhryakov, A.V. (FGUP NIIP, Lytkarino (RU))*

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NUCLEAR POWER PLANTS; ELECTRIC CABLES; TESTING; DEFECTS; DOCUMENTATION

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## **Results of technical condition monitoring of turbogenerators and power transformers with measuring and locating vibrational and electric discharge defects on non-current-carrying earthed parts in operational conditions by potable diagnostic tools**

S42

*Aksenov, Yu.P.; Rabotalov, N.N.; Mel'nikov, M.Yu.; Yaroshenko, I.V. (ZAO DIAKS, Moscow (RU))*

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Rezul'taty monitoringa tekhnicheskogo sostoyaniya turbogeneratorov i silovykh transformatorov s izmereniyami i lokatsiej vibratsionnykh i ehlektrozryadnykh defektov na netokonesushchikh zazemlennykh chastyakh v ehkspluatatsionnykh usloviyakh perenosnymi sredstvami diagnostiki

p. 81

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**Experience of implementation and operation of EhKRA-SKI isolation control system in the systems of automated direct current of Russia power facilities**  
**S42**

*Alimov, Yu.N.; Bykov, K.V.; Galkin, I.A.; Ivanov, A.B. (OOO NPP EhKRA, Cheboksary (RU))*

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NUCLEAR POWER PLANTS; DIRECT CURRENT; SENSORS; CONTROL SYSTEMS; ELECTRICAL INSULATION; ELECTRIC CURRENTS

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**Frame protection of electrical equipment**

**S42**

*Vitsinskij, S.A.; Mokeev, A.S. (ZAO Ehlektro, Moscow (RU))*

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**Refinement of MCP head and rate specification, determination of additive corrections of loop thermal control at power rating (determination of coolant bulk temperature in MCC loops) for careful calculation of reactor facility thermal power according to the primary circuit parameters**

**S42**

*Arutyunyan, A.Kh. (OAO Atomtekhehnergo, Mytishchi (RU))*

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**Measurement of feedwater flow using attachable ultrasonic flowmeters Fluxus**

**S42**

*Chugunov, S.N. (ZAO Tekknou, Sankt-Peterburg (RU))*

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Izmerenie raskhoda pitatel'noj vody s pomoshch'yu nakladnykh ul'trazvukovykh raskhodomerov Fluxus

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(RU)

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**Magnetic resonance flowmeters-relaxometers for control of heavy water parameters in cooling system**

**S42**

*Davydov, V.V.; Karseev, A.Yu. (Sankt-Peterburgskij Gosudarstvennyj Politehnicheskij Univ., Sankt-Peterburg (RU))*

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p. 86-87

(RU)

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### **Control of operation characteristics of current ionization chambers as a component of RBMK-1000 type reactors CPS**

**S46**

*Kuzerin, V.V. (KuAEhS, Kurchatov (RU))*

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### **Control of CPS electrical equipment aging**

**S42**

*Kalashnikov, A.V.; Kulakov, G.V.; Latypov, A.G. (Korporatsiya VNIIEhM, Moscow (RU))*

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Kontrol' protsessa stareniya ehlektrooborudovaniya SUZ

p. 89-90

(RU)

2 refs.

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NUCLEAR POWER PLANTS

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### **Construction of diagnostic system of in-core monitoring system of information-measuring channels state of WWER NPP in on-line mode**

S22

*Saunin, Yu.V.; Dobrotvorskij, A.N.; Semenikhin, A.V. (OAO Atomtekhehnergo, Mytishchi (RU));  
Musikhin, A.M. (NITs Kurchatovskij Inst., Moscow (RU))*

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### **Realization of variety in neutron flux control apparatus**

S22

*Sergeev, I.A.; Strikovskij, V.I. (OOO CKU-Atom, Moscow (RU)); Yakushev, A.G.; Ermolaev, P.A. (OAO VNIIEhS, Moscow (RU)); Pogorelov, I.V. (OAO OKB Hidrogress, Podol'sk (RU))*

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### **Complex solutions for NPP APCS projects**

**S42**

*Safonov, S.I. (OOO Moskovskij Zavod FIZPRIBOR, Moscow (RU))*

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CERTIFICATION; PROGRAMMING

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### **Deterministic approach to safety and risk assessment of information-control systems for nuclear power plants**

**S21**

*Korobkin, V.V. (NII MVS YuFU, Taganrog (RU)); Kolodenkova, A.E. (UGATU, Ufa (RU))*

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p. 93-94

(RU)

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**Application of wireless passive transducers with piezoelectric elements of radiation resistant piezo quartz for NPP instrumentation and control systems reliability growth**

**S22**

*Kovalev, A.S. (OAO Atomenergoproekt, Moscow (RU)); Fedyaev, S.L. (OAO NPK Dedal, Dubna (RU))*

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## **Results of reliability and safety analysis of NPP CPS electrical equipment operation**

**S22**

*Kalashnikov, A.V.; Latypov, A.G.; Kulakov, G.V. (OAO Korporatsiya VNIIEhM, Moscow (RU))*

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## **Innovation solutions increasing safety and test quality of primary equipment**

**S42**

*Solov'ev, M.Yu. (OOO NPP EhKRA, Cheboksary (RU))*

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TESTING; SAFETY

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**Development of techniques and nondestructive in-service control means of welding joints of coolant collector to PGV-1000 steam generators branch pipe (d 1200)**

**S42**

*Vopilkin, A.Kh.; Tikhonov, D.S. (ООО NPTs EhKhO+, Moscow (RU))*

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Sovershenstvovanie metodik i sredstv ehkspluatatsionnogo nerazrushayushchego kontrolya uzla privarki kollektora teplonositelya k patrubku Du1200 parogeneratorov PGV-1000

p. 98

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**Information-analytical system the subsystem of analytical level of nondestructive in-service control of NPP equipment and pipelines metal**

**S22**

*Aleksandrov, A.E. (ООО NPP Sigma IT, Moscow (RU))*

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### **Assurance of operational erosion-corrosion resistance of NPP power units welded joints**

**S22**

*Tomarov, G.V.; Shipkov, A.A. (ZAO Geoterm-EhM, Moscow (RU)); Potapov, V.V.; Ovcharov, O.V. (OAO VNIIEhS, Moscow (RU))*

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### **Recovery annealing practice of WWER-1000 reactor vessels**

**S22;S36**

*Gurovich, B.A. (NITs Kurchatovskij Inst., Moscow (RU)); Dub, A.V. (OAO NPO Tsniitmash, Moscow (RU))*

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## **Improvement of technique for strength and residual life design of WWER-1000 in-vessel devices at lifetime extension up to 60 years**

**S22**

*Margolin, B.Z.; Sorokin, A.A.; Fedorova, V.A.; Minkin, A.I. (FGUP TsNII KM Prometej (RU)); Piminov, V.A.; Evdokimenko, V.V. (OAO OKB GIDROPRESS, Podol'sk (RU)); Vasil'ev, V.G. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Two-parameter criterion of heat-exchanging tubes damping in WWER NPP steam generators**

**S42**

*Lunin, V.P.; Zhdanov, A.G.; Chegodaev, V.V. (NIU MEhI, Moscow (RU)); Lovchev, V.N.; Gutsev, D.F.; Khramova, E.S. (OAO Kontsern Rosehnergoatom, Moscow (RU)); Zhukov, R.Yu. (OAO OKB GIDROPRESS, Podol'sk (RU))*

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## **Development and implementation of the procedure for evaluating service life of welding joint of coolant collector to steam generators PGV-1000 branch (d 1200)**

**S42**

*Kazantsev, A.G. (NPO TsNIITMASH, Moscow (RU)); Kurdin, M.E. (OAO OKB GIDROPRESS, Podol'sk (RU))*

### **The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

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Devyataya mezhdunarodnaya nauchno-tehnicheskaya konferentsiya Bezopasnost', ehffektivnost' i ehkonomika atomnoj ehnergetiki

Razrabotka i vnedrenie metodiki otsenki sroka sluzhby uzla privarki kollektora teplonositelya k patrubku Du1200 parogeneratorov PGV-1000

p. 105-106

(RU)

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284 p.

STEAM GENERATORS; WELDED JOINTS; CORROSION; MANGANESE STEELS; ULTRASONIC TESTING; CRACKS; SECONDARY COOLANT CIRCUITS

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## **Development of manual on application of leak before break safety conception to pipelines of operating nuclear power units**

**S22**

*Evropin, S.V.; Kiselev, V.A. (OAO NIKIEhT, Moscow (RU))*

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Razrabotka rukovodstva po primeneniyu kontseptsii bezopasnosti #Left-Pointing Double Angle Quotation Mark#tech' pered razrusheniem#Right-Pointing Double Angle Quotation Mark# k truboprovodam dejstvuyushchikh AEhU

p. 106

(RU)

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WWER TYPE REACTORS; LWGR TYPE REACTORS; REACTOR SAFETY; LEAKS; MANUALS; REACTOR ACCIDENTS; TUBES

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## **Change of WWER-1000 reactor vessel materials properties at operating up to 60 years**

**S42;S36**

*Shtrombakh, Ya.I.; Gurovich, B.A.; Erak, D.Yu.; Zhurko, D.A.; Kuleshova, E.A.; Chernobaeva, A.A.; Zabusov, O.O.; Khodan, A.N. (NITs Kurchatovskij Inst., Moscow (RU))*

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Izmenenie svojstv materialov korpusov reaktorov VVEhR-1000 pri ehkspluatatsii do 60 let  
p. 106-108  
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## **Development and certification of eddy current testing system for heat exchange tubes of WWER NPP steam generators using matrix-type sensors**

**S42**

*Salishchev, S.A.; Pogoda, A.V. (ООО ТsVK Politest, Obninsk (RU))*

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Razrabotka i attestatsiya sistemy VTK t/o trubok parogeneratorov AEhS s VVEhR s ispol'zovaniem datchikov matrichnogo tipa

p. 108-109

(RU)

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WWER TYPE REACTORS; STEAM GENERATORS; TUBES; EDDY CURRENT TESTING; REACTOR SAFETY; PROBES; REACTOR MONITORING SYSTEMS; MANIPULATORS; CERTIFICATION

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## **Application of calculational-analytical approach EDB GIDROPRESS in**

## **justification of increasing the control period of primary circuit WWER reactor unit equipment and pipeline metal**

**S42**

*Golubeva, O.V.; Akbashev, I.F.; Akimov, P.A. (OKB GIDROPRESS, Podol'sk (RU)) (and others)*

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Ispol'zovanie raschetno-analiticheskogo podkhoda OKB GIDROPRESS po obosnovaniyu uvelicheniya perioda mezhdru kontrolem metalla oborudovaniya i truboprovodov pervogo kontura RU s VVEhR

p. 109-110

(RU)

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---

## **Preparation of Leningrad NPP power units decommissioning**

**S12;S21**

*Kuznetsov, A.N.; Kotykov, R.N. (LAEhS, Sosnovyj Bor (RU))*

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p. 111-112

(RU)

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## **Approach to solving the problem of arrangement of data sheets for radwastes at Russian NPPs**

**S12**

*Korotkov, A.S.; Pyrkov, I.V. (OAO VNIAEhS, Moscow (RU))*

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p. 112-114

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RADIOACTIVE WASTES; CERTIFICATION; RADIOISOTOPES; RADIATION DETECTION; MONITORING; RADIOACTIVE WASTE STORAGE

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## **Variants of ion exchange resins handling at NPP**

**S12**

*Savkin, A.E. (FGUP RADON, Sergiev Posad (RU))*

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Varianty obrashcheniya s ionoobmennymi smolami na AEhS

p. 114-115

(RU)

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ORGANIC ION EXCHANGERS; RADIOACTIVE WASTES; RADIOACTIVE WASTE PROCESSING; COMPARATIVE EVALUATIONS; ECONOMIC ANALYSIS; RUSSIAN FEDERATION

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## **Technical and economical assessment of liquid radwaste handling variants at Beloyarsk NPP**

**S12**

*Sobko, A.A.; Doil'nitsyna, V.V.; Ovchinnikova, D.V. (OAO RAOPROEKT, Sankt-Peterburg (RU)); Roslyakov, V.F. (BelAEhS, Zarechnyj (RU))*

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Tekhniko-ehkonomicheskaya otsenka variantov obrashcheniya s ZhRO na Beloyarskoj AEhS p. 115-117

(RU)

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RADIOACTIVE WASTES; LIQUID WASTES; RADIOACTIVE WASTE STORAGE; NUCLEAR POWER PLANTS; RADIOACTIVITY; RADIOACTIVE WASTE PROCESSING; COMPARATIVE EVALUATIONS; ECONOMIC ANALYSIS

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## **Development of information system of governmental accounting and control of radioactive substances and radwastes in SC Rosatom and integrated with it information support system of the radwaste handling system in JSC Kontsern Rosehnergoatom**

**S12**

*Morozov, M.A. (OAO NEOLANT, Moscow (RU))*

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Sozdanie informatsionnoj sistemy gosudarstvennogo ucheta i kontrolya RV i RAO v GK

Rosatom i integrirovannoj s nej informatsionnoj sistemy podderzhki sistemy obrashcheniya s RAO v OAO Kontsern Rosehnergoatom

p. 117-118

(RU)

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RADIOACTIVE WASTES; INFORMATION SYSTEMS; ACCOUNTING; CONTROL;  
RUSSIAN FEDERATION

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## **Complex of Novovoronezh NPP radioactive wastes plasma reprocessing. Assembly and commissioning**

**S12**

*Shchukin, A.P.; Sharov, A.N. (ODITs, Novovoronezh (RU)); Arustamov, A.Eh.; Semenov, K.N.*

*(ZAO AG, Sergiev Posad (RU)); Polkanov, M.A. (FGUP Radon, Sergiev Posad (RU));*

*Shiryaevskij, V.L. (VNIIEhS, Moscow (RU))*

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Kompleks plazmennoj pererabotki radioaktivnykh otkhodov Novovoronezhskoj AEhS. Montazh i pusk v ehkspluatatsiyu

p. 119-120

(RU)

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CASKS; MATHEMATICAL MODELS; OPTIMIZATION; RADIATION PROTECTION;  
NUCLEAR POWER PLANTS

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## **Solid and liquid combustible radwaste incinerators at NPPs and fuel cycle plants** **S12**

*Kornev, V.I.; Semenov, K.N.; Solomatina, I.Yu.; Kadyrov, I.I. (ZAO Al'yans-Gamma, Sergiev Posad (RU))*

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p. 120-121

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RADIOACTIVE WASTES; LIQUID WASTES; SOLID WASTES; COMBUSTION;  
FURNACES; RADIOACTIVE WASTE PROCESSING; EQUIPMENT; CASKS;  
SOLIDIFICATION

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## **Experience of radiation survey of shutdown uranium-graphite production reactors**

**S21**

*Pavlyuk, A.O.; Izmet'ev, A.M.; Kotlyarevskij, S.G. (OAO Opytno-Demonstratsionnyj Tsentr Vyvoda iz Ehkspluatatsii Uran-Grafitovykh Reaktorov, Seversk (RU))*

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Opyt radiatsionnogo obsledovaniya ostanovlennykh promyshlennykh uran-grafitovykh reaktorov

p. 121-122

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## **Objective restrictions of radioactive concentrates deep processing technology and the ways of problem solution**

S12

*Chugunov, A.S.; Rumyantsev, A.V.; Vinnitskij, V.A.; Nechaev, A.F. (SPbGTI (TU), Sankt-Peterburg (RU))*

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Ob'ektivnye ogranicheniya tekhnologii glubokoj pererabotki radioaktivnykh kontsentratov i puti resheniya problemy

p. 122-123

(RU)

2 refs.

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RADIOACTIVE WASTES; CHEMICAL COMPOSITION; LIGANDS; INORGANIC ACIDS; LIQUID WASTES; RADIOACTIVE WASTE PROCESSING

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## **Experience of application of solid radwaste ultrasonic decontamination technology and equipment at NPP decommissioning**

S12

*Lebedev, N.M.; Krasil'nikov, D.A.; Aref'eva, A.N. (OOO Aleksandra-Plyus, Vologda (RU)) (and others)*

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p. 124-125

(RU)

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RADIOACTIVE WASTES; SOLID WASTES; DECONTAMINATION; ULTRASONIC MACHINING; NUCLEAR POWER PLANTS; DECOMMISSIONING

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## **Leningrad NPP automated radioactive substances and radwastes accounting and control system**

**S12**

*Terekhov, K.A.; Konevtsov, S.A.; Mikhan'ko, L.A.; Arbuзов, A.N. (Leningradskaya AEhS, Sosnovyj Bor (RU)); Uzhakhov, T.S.; Mitin, A.N. (ZAO SOKB Sistem i Sredstv Izmerenij Vektor, Moscow (RU))*

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p. 125-126

(RU)

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NUCLEAR POWER PLANTS; RADIOACTIVE WASTES; ACCOUNTING; MONITORING; RADIOACTIVE WASTE MANAGEMENT; DATA BASE MANAGEMENT; CASKS; DATA ACQUISITION SYSTEMS; DOCUMENTATION



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## **Simulation model for cost estimate of WWER-TOI NPP power unit decommissioning**

**S12**

*Merkulov, E.V. (PKF OAO VNIAEhS, Moscow (RU)); Noskov, A.A. (PKF OAO Kontsern Rosehnergoatom, Moscow (RU)); Zverkov, Yu.A. (NITs Kurchatovskij Inst., Moscow (RU))*

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Imitatsionnaya model' dlya otsenki zatrat na vyvod iz ehkspluatatsii ehnergobloka AEhS VVEhR-TOI

p. 126-127

(RU)

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## **Development of the system of radwaste characterization and radwaste taking out from regulatory control in JSC Kontsern Rosehnergoatom**

**S12**

*Anon*

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Sozdanie sistemy kharakterizatsii RAO i vyvedeniya RAO iz-pod reguliruyushchego kontrolya v OAO Kontsern Rosehnergoatom

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**Investigation of affecting factors and error assessment at measuring solid plutonium-containing radioactive wastes using neutron coincidence counter S12**

*Yashikhin, D.S. (KlnAEhS, Udomlya (RU))*

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Issledovanie vliyayushchikh faktorov i otsenka pogreshnostej pri izmerenii tverdykh radioaktivnykh otkhodov, sodержashchikh plutonij, s pomoshch'yu schetchika nejtronnykh sovpadenij

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**Decontamination of high-salt liquid radioactive wastes containing organic complexes S12**

**S12**

*Lokshin, Eh.P.; Ivanenko, V.I.; Kornejkov, R.I. (FGBU Nauki Inst. Khimii i Tekhnologii Redkikh Ehlementov i Mineral'nogo Syr'ya im. I.V. Tananaeva Kol'skogo Nauchnogo Tsentra Rossijskoj Akademii Nauk, Apatity (RU)); Marakulin, I.V.; Avezniyazov, S.R.; Petrov, A.M. (KolaEhS, Polyarnye Zori (RU))*

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DECONTAMINATION; PH VALUE; COMPARATIVE EVALUATIONS; COST

---

### **General solutions on liquid radwastes cementation in cask NZK-150-1,5P with mixing mechanism**

**S12**

*Sorokin, V.T.; Demin, A.V.; Kashcheev, V.V.; Koroleva, A.A. (OAO Golovnoj Inst. VNIPIEhT, Sankt-Peterburg (RU)); Gataullin, R.M.; Medelyaev, I.A. (OAO 345 Mekhanicheskij Zavod, Balashikha (RU))*

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### **New material for still bottoms immobilization**

**S12**

*Muratov, O.Eh. (OOO TVEhLL, Sankt-Peterburg (RU))*

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### **Technologies and equipment for conditioning liquid radwastes of BN-reactors with heavy coolants (HLMC)**

**S12**

*Skomorokhova, S.N.; Bogdanovich, N.G.; Martynov, P.N.; Askhadullin, R.Sh.; Yagodkin, I.V.; Nikolaev, A.N.; Trifanova, E.M.; Grushicheva, E.A.; Sitnikov, I.V. (FGUP GNTs RF - FEhI imeni A.I. Lejpunskogo, Obninsk (RU))*

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---

### **Developing of single-stage vitrification technology by the method of induction melting in cold crucible at low current frequency**

**S12**

*Krushinov, E.V.; Aniskevich, Yu.N.; Vitol', S.A.; Epimakhov, V.N.; Sulatskij, A.A.; Kotova, S.Yu.; Kalyago, E.K. (FGUP NITI im. A.P. Aleksandrova, Sosnovyj Bor (RU)); Lopukh, D.B.; Martynov, A.P.; Vavilov, A.V. (SPbGhTU LEhTI, Sankt-Peterburg (RU))*

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### **Production prospects of transport packages with cases from ductile cast iron in Russia**

**S42**

*Andreev, V.V.; Kovalevich, E.V.; Nuraliev, F.A. (OAO NPO TsNIITMASH, Moscow (RU));*

*Kirillov, Yu.A.; Orintsev, V.V. (ZAO Petrozavodskmash, Petrozavodsk (RU))*

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**Determination of burnup, isotope composition and WWER-1000 reactor spent nuclear fuel afterheat using MKS 01 WWER and MKS-03 WWER facilities S21**

*Chernov, V.A.; Nikolaev, S.A.; Somov, I.E. (FGUP GNTs RF - FEhI, Obninsk (RU)) (and others)*

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MEASURING INSTRUMENTS; EQUIPMENT; ERRORS

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## **Calculation of vacuum drying duration of spent fuel transfer and storage metal-concrete cask**

**S42**

*Karyakin, Yu.E.; Pletnev, A.A.; Fedorovich, E.D. (SPbGPU, Sankt-Peterburg (RU))*

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## **Heat-resistant neutron shielding material**

**S36**

*Kazeev, V.G.; Chernukhin, Yu.I.; Nevzorov, V.A.; Dolgorukova, A.G. (FGUP RFYaTs-VNIITF im. akadem. E.I. Zababakhina, Snezhinsk (RU))*

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## **Calculational and experimental works in safety justification during light water graphite reactor spent nuclear fuel handling**

**S12**

*Nikolaev, S.A.; Somov, I.E.; Chernov, V.A. (FGUP GNTs RF-FEhI, Obninsk (RU)) (and others)*

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## **Problems of pilot operation of spent nuclear fuel container storage complex and their solutions**

**S12**

*Simonov, V.N.; Buzinov, N.V.; Kopylov, A.M. (Leningradskaya AEhS, Sosnovyj Bor (RU))*

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## **Subcriticality control of Leningrad NPP spent fuel pool at spent fuel assemblies transfer to dry storage**

**S21;S12**

*Kalyazin, N.N.; Borodich, S.S. (Leningradskaya AEhS, Sosnovyj Bor (RU)); Artemov, V.G.;*

*Zinatullin, R.Eh.; Piskarev, A.V. (FGUP NITI im. A.P. Aleksandrova, Sosnovyj Bor (RU))*

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## **Use of mobile robotic system in pools of 1 stage Beloyarsk NPP**

## **S21;S12**

*Abitov, R.Ya. (Beloyarskaya AEhS, Zarechnyj (RU))*

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### **Water purification technology of Beloyarsk NPP AMT reactor spent fuel assemblies dismantling pool**

## **S12**

*Kornev, V.I.; Polkanova, N.L.; Minakov, V.A. (ZAO Al'yans-Gamma, Sergiev Posad (RU));*

*Belinskij, L.L. (FGUP PO MAYaK, Ozersk (RU))*

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## **Development of emission tomographs for spent nuclear fuel control**

**S12**

*Podgornov, V.A.; Vlasov, V.V.; Konovalov, A.B.; Fedorov, V.V. (FGUP RFYaTs-VNIITF im. akademika E.I. Zababakhina, Snezhinsk (RU))*

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## **Incorporation of automated process control system for spent nuclear fuel handling**

**S12**

*Podgornov, V.A (FGUP RFYaTs-VNIITF im. akademika E.I. Zababakhina, Snezhinsk (RU))*

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p. 148-149

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## **Fire protection condition of NPP and general branches of activities in the field of fire safety improvement**

**S21**

*Nikiforov, V.V. (TF OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Application of mobile fire-extinguishing means for fire suppression on NPP at extremely low environmental temperatures**

**S21**

*Aleshkov, M.V. (Akademiya Gosudarstvennoj Protivopozharnoj Sluzhby, Moscow (RU))*

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### **Fire risk assesment on NPP in Slovakia**

**S21**

*Kandrach, Ya. (OOO RISK CONSULT, Bratislava (SK))*

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### **Organization of fire brigades on NPP. Performance of Decisions and Agreements on interaction with EMERCOM of Russia**

**S21**

*Kharevskij, V.A. (TF OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Instrumentation and control system of nuclear power plants fireproofing Global-AEhS**

**S21**

*Kabeda, S.A. (Gruppa Kompanij Rubezh, Saratov (RU))*

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## **Application aquafog systems for NPP objects**

**S21**

*Lanin, D.G.; Sazykin, V.I.; Nikiforov, V.V. (TF OAO Kontsern Rosehnergoatom, Moscow (RU))*  
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### **Fire alarm units of Smolensk NPP (carried out modernization and general operation problems)**

**S21**

*Shvedov, V.V. (Smolenskaya AEhS, Desnogorsk (RU))*

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**Ensuring of fire safety at lifetime extension of Kursk NPP power unit four**  
**S21**

*Usik, V.V. (Kurskaya AEhS, Kurchatov (RU))*

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**Complex of innovation technologies of ensuring NPP fire safety**  
**S21**

*Fedyayev, S.L. (OAO Nauchno-Proizvodstvennyj Kompleks Dedal, Dubna (RU))*

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## **Complex assessment of NPP radiation-ecological effect according to the data of radiation integrated monitoring**

**S21**

*Kryshev, I.I.; Sazykina, T.G.; Kryshev, A.I.; Skakunova, M.A.; Luneva, K.V. (FGBU NPO Tajfun Rosgidrometa, Obninsk (RU))*

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## **Environmental protection on Russian NPPs - state of the art and prospects**

**S21**

*Pechkurov, A.V.; Palitskaya, T.A. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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### **Three-dimensional simulation models of radioactive substances distribution in surface air for NPP AO**

**S21**

*Bunto, P.A.*

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### **Sources, accumulation and migration of tritium and carbon-14 at WWER NPP**

**S21**

*Zadonskij, N.V.; Zadonskaya, Yu.N. (NITs Kurchatovskij Inst., Moscow (RU))*

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VERIFICATION; RADIATION PROTECTION

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## **Peculiarities of nano- and microfibre materials application for radioactive aerosol analysis**

**S46**

*Kapustin, I.A.; Filatov, Yu.N.; Filatov, I.Yu. (OAO Nauchno-Issledovatel'skij Fiziko-Khimicheskij Inst. im. L.Ya. Karpova, Moscow (RU))*

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VENTILATION SYSTEMS; AEROSOL MONITORING; EFFICIENCY; RADIATION  
MONITORING

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## **Development of equipment-methodological complex for radioactive aerosols inhalation intake control**

**S61**

*Tsov'yanov, A.G.; Karev, A.E. (FGBU GNTs FMBTs im. A.I. Burnazyana FMBA Rossii, Moscow (RU))*

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## **Modernization of Rosgidromet radiation monitoring network in the framework of Integrated national automated radiation situation monitoring system**

**S54**

*Katkova, M.N.; Kozlova, E.G. (FGBU NPO Tajfun, Obninsk (RU))*

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**Peculiarities of application up-to-date regional weather forecast of COSMO-Ru system for ensuring on-line computation of impurity dispersion in atmosphere**  
**S54**

*Kosykh, V.S.; Klepikova, N.V.; Den'kin, V.A.; Stogova, I.V.; Frejmundt, G.N.; Khachaturova, L.M.; Krylova, A.V. (FGBU NPO Tajfun, Obninsk (RU))*

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**Problems and equipment for tritium and carbon-14 monitoring**

**S21**

*Kryuchkova, L.M. (OOO NPP RADIKO, Obninsk (RU))*

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### **Ecological monitoring of natural reservoirs using for NPP service water supply before its commissioning**

**S54**

*Luneva, E.V. (Filial OAO Kontsern Rosehnergoatom Direktsiya Stroyashchejsya Baltijskoj Atomnoj Stantsii, Malomozhajskoe (RU))*

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### **Actual problems of forecasting and assessing NPP radiation effects on water objects**

**S21**

*Chionov, V.G.; Kazakov, S.V.; Nosov, A.V.; Kocher'yan, V.M. (OAO Atomenergoproekt, Moscow (RU))*

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## **Problem questions and prospects of ARSMS development in NPP location areas S21**

*Ivanov, E.A.; Kosov, A.D.; Orekhov, A.A. (OAO VNIIEhS, Moscow (RU))*

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## **EDF quick-reacting nuclear forces: status on May, 2014**

S21

*Dirlik, B. (Electricite de France, Paris (FR))*

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**Microclimate change in the region of NPP cooling pond**

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*Turundaev, A.Eh. (IATEh NiYaU MIFI, Obninsk (RU))*

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## **JSC Kontsern Rosehnergoatom participation in advanced models of wholesale electricity and power market**

**S21**

*Khval'ko, A.A. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Estimated liabilities on radwastes and spent nuclear fuels**

**S21**

*Shalimov, A.V.; Lyumar', V.V. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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### **Criteria of investment efficiency in nuclear engineering**

**S21**

*Kharitonov, V.V.; Kurel'chuk, U.N. (NIYaU MIFI, Moscow (RU)); Molokanov, N.A. (OAO NIKIEhT, Moscow (RU))*

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### **Procedure for cost estimate of NPP construction abroad on pre-design stage**

**S21**

*Vikhanskij, N.I. (Goskorporatsiya Rosatom, Moscow (RU))*

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## **Example of economic cross method use in calculations on innovative nuclear fuel for nuclear energetics**

S21

*Putilov, A.V.; Timokhin, D.V.; Razorenov, M.Yu.; Galkin, D.V. (NIYaU MIFI, Moscow (RU))*

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## **Quality objectives of human capital assets in work stream of nuclear energetics: safety, efficiency and economy**

S21

*Abramova, V.N. (NIYaU MIFI, Moscow (RU))*

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## **General aspects of work on NPP energy efficiency growth**

**S21**

*Kruglikov, P.A.; Smolkin, Yu.V. (OAO NPO TsKTI, Sankt-Peterburg (RU))*

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## **Cost-effectiveness analysis of the works on RBMK power units graphite stack life characteristics restoration**

**S21**

*Molokanov, N.A. (OAO NIKIEhT, Moscow (RU))*

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## **NPP in Russian model of power joint market**

**S21**

*Smirnova, L.S.; Rodionova, E.V. (NITs Kurchatovskij Inst., Moscow (RU))*

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## **Application of simulation modeling for cost estimation of decommissioning at NPP power units designing**

**S21**

*Noskov, A.A. (PKF OAO Kontsern Rosehnergoatom, Moscow (RU))*

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**Calculation procedure of production costs and release tariffs on the products of energetics from the standpoint of energy balance****S21**

*Budylov, E.G. (FGUP GNTs RF-FEhI, Obninsk (RU))*

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### **Optimization of logistic system of nuclear power plants**

**S99**

*Portnov, A.S. (Konsaltingovaya Kompaniya A DAN DZO, Moscow (RU))*

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### **Effect of NPP incident rate on the electric power cost under conditions of the world insurance pool**

**S21**

*Zhuravlev, I.B. (OAO Tekhsnabehksport, Moscow (RU)); Kabashev, K.V.; Kharitonov, V.V. (NIYaU MIFI, Moscow (RU))*

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EFFICIENCY; RISK ASSESSMENT

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### **Simulation model for cost estimation of NPP WWER-TOI power unit decommissioning**

**S21**

*Merkulov, E.V.; Noskov, A.A (PKF OAO Kontsern Rosehnergoatom, Moscow (RU)); Zverkov, Yu.A. (NITs Kurchatovskij Inst., Moscow (RU))*

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SIMULATION

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### **On the influence of natural uranium mining dynamics on the strategy of nuclear industry development**

**S11**

*Kharitonov, V.V.; Kabashev, K.V.; Kurel'chuk, U.N. (NIYaU MIFI, Moscow (RU))*

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## **Optimization of approaches to commissioning NPP power units**

**S21**

*Derij, V.P. (OAO Atomtekhehnergo, Mytishchi (RU)); Shestakov, N.B. (OAO Atomtekhehnergo, Kalininskij Filial Kalininatomtekhehnergo, Udomlya (RU))*

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## **Optimization of RU BN-800 equipment installation processes**

**S21**

*Sedakov, V.Yu. (OAO OKBM Afrikantov, Nizhnij Novgorod (RU)); Saraev, O.M. (OAO Kontsern Rosehnergoatom, Moscow (RU)); Mitin, V.V. (PO Uralehnergomontazh, Ekaterinburg (RU)); Noskov, Yu.B. (Beloyarskaya AEhS, Zarechnyj (RU))*

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BN-800 REACTOR; CONSTRUCTION; INSTALLATION; OPTIMIZATION; EQUIPMENT

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## **Development of new NPP mid-size units**

**S21**

*Yashkin, A.V.; Tolstov, E.V. (OAO NIAEhP, Nizhnij Novgorod (RU))*

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Razrabotka novykh ehnergoblokov AEhS srednej moshchnosti

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**Developments of turbo-installations for NPP according to the WWER TOI project on the base of equipment of JSC #Left-Pointing Double Angle Quotation Mark#Silovye Mashiny#Right-Pointing Double Angle Quotation Mark#**

**S42**

*Ivanov, S.A.; Zabrodov, S.Yu. (OAO Silovye Mashiny, Sankt-Peterburg (RU))*

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**Technical diagnosis as the element of NPP life-cycle management**

**S21**

*Kozyrev, V.D. (Rostovskij Filial OAO Atomtekhehnergo, Volgodonsk (RU))*

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## **Topical problems of diagnostic tracking of armature and rotating mechanisms at preoperational stage of NPP life cycle**

**S42**

*Rachkov, V.L. (Rostovskij Filial OAO Atomtekhehnergo, Volgodonsk (RU))*

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## **Providing of design service life of NPP equipment and pipelines under conditions of long-term operation**

**S22**

*Arzhaev, A.I.; Makhanev, V.O.; Pavlovich, A.A. (OAO Atomtekhehnergo, Moscow (RU)) (and others)*

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## **Providing of safe operation of NPP power unit pipelines and equipment potentially subjected to flow accelerated corrosion**

**S22**

*Arzhaev, A.I.; Makhanev, V.O.; Pavlovich, A.A.; Podlatov, M.A. (OAO Atomtekhehnergo, Moscow (RU)); Ivanov, A.I.; Rogozhkin, V.V. (OAO GI VNIPIEhT, Sankt-Peterburg (RU)); Durynin, V.A.; Razygraev, A.N.; Razygraev, N.P. (OAO NPO TsNIITMASH, Moscow (RU)); Butorin, S.L. (ANO MTsYaB, Moscow (RU))*

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## **Selection of methodology for proofing NPP equipment seismic resistance**

**S21**

*Ryasnyj, S.I.; Kaznovskij, P.S.; Shchugorev, A.V. (OAO Atomtekhehnergo, Mytishchi (RU))*

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### **Analysis of the results of Rostov NPP power unit #Numero Sign#3 containment shell prestressing**

**S22**

*Medvedev, V.N.; Ul'yanov, A.N.; Strizhov, V.F.; Kiselev, A.S. (Inst. Problem Bezopasnogo Razvitiya Atomnoj Ehnergetiki, Moscow (RU))*

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### **Structural materials for power unit with BN-1200 reactor facility**

**S21;S36**

*Karzov, G.P.; Markov, V.G.; Kudryavtsev, A.S.; Sazonov, V.N.; Shcherbinina, N.B. (FGUP*

*TsNII KM Prometej, Sankt-Peterburg (RU)*

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**Material aspects of WWER-type power units save operation growth on the base of reactor vessel steel improvement**

**S21;S36**

*Karzov, G.P.; Margolin, B.Z.; Teplukhina, I.V. (FGUP TsNII KM Prometej, Sankt-Peterburg (RU)); Piminov, V.A. (ОАО ОКБ Гидропресс, Подол'sk (RU))*

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Materialovedcheskie aspekty povysheniya bezopasnosti ehkspluatatsii ehnergeticheskikh ustanovok tipa VVEhR na osnove sovershenstvovaniya stali dlya korpusov reaktorov

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STAINLESS STEELS; HEAT RESISTANT MATERIALS; COMPARATIVE  
EVALUATIONS; REACTOR OPERATION

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## **Risk management when passing to unshop organization structure of NPP**

**S21**

*Khmelev, A.A. (OAO VNIAEhS, Moscow (RU))*

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ORGANIZATIONAL MODELS; HUMAN FACTORS

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## **Training of the personnel carrying out SUA W on NPP power units commissioning**

**S96**

*Ivakin, V.P. (Novovoronezhskij Uchebno-Trenirovochnyj Tsentr Atomtekhehnergo, Novovoronezh (RU))*

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**Information system #Left-Pointing Double Angle Quotation Mark#Support portal of start-up and adjustment works#Right-Pointing Double Angle Quotation Mark#**

**S96**

*Pleshakova, N.V. (Smolenskij Uchebno-Trenirovochnyj Tsentri Atomtekhehnergo, Desnogorsk (RU))*

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**Personnel training with the use of distance education system #Left-Pointing Double Angle Quotation Mark#Professional#Right-Pointing Double Angle Quotation Mark#**

**S96**

*Serdyuk, A.V.; Kirienko, A.V.; Trigub, M.Yu. (Smolenskij Filial Uchebno-Trenirovochnyj Tsentri Atomtekhehnergo, Smolensk (RU))*

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## **Mathematical model of reactor core thermal hydraulics of supercritical coolant-cooled reactors**

**S42**

*Chusov, I.A.; Zuborev, E.V. (IAEh NIYaU MIFI, Obninsk (RU)); Trevgoda, M.M. (GNTs RF-FEhI, Obninsk (RU))*

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p. 218-219

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## **Model of coolant flow in reactor cores of reactor facilities**

**S42**

*Avdeev, E.F.; Chusov, I.A.; Altukhov, Yu.V. (IATEh NIYaU MIFI, Obninsk (RU)); Trevgoda, M.M. (GNTs RF-FEhI, Obninsk (RU))*

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**Optimization of concrete compositions of new generation NPP radiation protection**

**S21;S36**

*Engovatov, I.A. (GBOU VPO MGSU, Moscow (RU)); Bylkin, B.K.; Kozhevnikov, A.V. (RNTs Kurchatovskij Inst., Moscow (RU))*

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## **Characteristics of WWER-1000 reactor core under multiple REMIX-fuel recycling**

**S21**

*Bobrov, E.A.; Alekseev, P.N.; Chibinyaev, A.V.; Teplov, P.S.; Dudnikov, A.A. (NITs Kurchatovskij Inst., Moscow (RU))*

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COMPARATIVE EVALUATIONS; FUEL CYCLE; RADIATION PROTECTION

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## **Development of reactor block vessel structure of lead-cooled fast reactor facility BREST-OD-300**

**S21**

*Shchekin, M.V. (OAD Konstruktorskoe Byuro Spetsial'nogo Mashinostroeniya, Sankt-Peterburg (RU))*

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REACTOR VESSELS; REACTOR SAFETY

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### **Suggestions on setting requirements on structure and composition of operation limits and conditions, among others on limits and conditions of safe operation S21**

*Statsura, D.B.; Sevast'yanov, V.S. (Novovoronezhskaya AEhS, Novovoronezh (RU))*

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Predlozheniya po ustanovleniyu trebovanij po strukture i sostavu ehkspluatatsionnykh predelov i uslovij, v tom chisle po predelam i usloviyam bezopasnoj ehkspluatatsii

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### **Information system of ORNIS operation experience use**

**S21**

*Surov, M.V.; Trigub, M.Yu. (Smolenskij Filial Uchebno-Trenirovochnyj Tsentr Atomtekhehnergo, Desnogorsk (RU))*

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### **Experimental justification of working ability of passive safety systems in new WWER NPP projects**

**S22**

*Morozov, A.V.; Remizov, O.V.; Kalyakin, D.S. (GNTs RF-FEhI, Obninsk (RU))*

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### **Technical specifications on the safety parameters representation system in the project of new NPP power units**

**S21**

*Statsura, D.B.; Sevast'yanov, V.S. (Novovoronezhskaya AEhS, Novovoronezh (RU))*

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Tekhnicheskie trebovaniya na sistemu predstavleniya parametrov bezopasnosti v proekte novykh ehnergoblokov AEhS

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**Certain development prospects of nuclear power industry on the base of water-cooled reactors use**

**S21**

*Blagoveshchenskij, A.Ya.; Bor, S.M.; Mityukov, V.N. (Sankt-Peterburgskij Gosudarstvennyj Politekhnikeskij Univ., Sankt-Peterburg (RU))*

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Nekotorye perspektivy razvitiya atomnoj ehnergetiki na baze ispol'zovaniya reaktorov s vodyanym teplonositelem

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COMPARATIVE EVALUATIONS; REACTOR ACCIDENTS; SUPERCRITICAL STATE;  
COOLANTS; RESEARCH PROGRAMS

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**Maintenance of WWER power unit NPP in load followings and load following (100-50-100)% from P<sub>n\_o\_m</sub> without sacrificing main parameters of energy efficiency on the base of combined application of high-voltage variable-frequency electric drive on energy-consuming process equipment (PCPS, FEP, CEP and CP) in automatic mode**

S21

*Zykov, A.S.; Plakseev, A.A.; Vorob'ev, P.S. (OAO Atomenergoproekt, Moscow (RU))*

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Obespechenie raboty ehnergobloka AEhS s VVEhR v manevrennykh rezhimakh i sledovaniya za nagruzkoy (100-50-100)% ot P<sub>n\_o\_m</sub> s sokhraneniem osnovnykh parametrov ehnergoehffektivnosti na osnove kompleksnogo primeneniya vysokovol'nogo chastotno-reguliruemogo ehlektroprivoda na ehnergoemkom tekhnologicheskom oborudovanii (GTsNA, PEhN, KEhN i TsN) v avtomaticheskom rezhime

p. 229-231

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**Optimization of concretes composition of new generation NPP radiation protection**

S21

*Engovatov, I.A. (GBOU VPO MGSU, Moscow (RU)); Bylkin, B.K.; Kozhevnikov, A.V. (RNTs Kurchatovskij Inst., Moscow (RU))*

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OPTIMIZATION; CONTAMINATION; DECOMMISSIONING; RADIOACTIVE WASTES

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## **Technical performances of WWER-1250 with spectral regulation (WWER-S-1250)**

**S21**

*Alekseev, P.N.; Bobrov, E.A.; Teplov, P.S.; Chibinyaev, A.V. (NITs Kurchatovskij Inst., Moscow (RU))*

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EFFICIENCY; FUEL CYCLE; NUCLEAR FUELS; REACTOR SAFETY; BURNUP;

REACTOR OPERATION

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## **Reactor unit autonomic passive emergency cooling systems on the base of two-phase thermosyphons**

**S22**

*Sviridenko, D.V. (Sevastopol'skij Natsional'nyj Tekhnicheskij Univ., Sevastopol' (UA)); Shevelev, D.V. (OP NTTs NAEhK Ehnergoatom, Sevastopol' (UA)); Vybornov, S.S. (OP Atomproektinzhiniring NAEhK Ehnergoatom, Kiev (UA)); Sviridenko, N.N. (Mezhdunarodnyj Inzhiniringovyj Tsentri Peredovykh Tekhnologij, Sevastopol' (UA))*

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REACTOR COOLING SYSTEMS; THERMOSYPHONS; NATURAL CONVECTION; HEAT TRANSFER; PIPES; REACTOR SAFETY

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**International scientific and technological cooperation - effective way of acquiring of new knowledge and experience**

**S96**

*Antipov, S.I. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Activities of WANO Moscow center on safety improving**

**S21**

*Chudakov, M.V. (Moskovskij Tsentr VAO AEhS, Moscow (RU))*

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## **On cooperation with NEA OECD**

**S21**

*Andreeva-Andrievskaya, L.N. (Goskorporatsiya Rosatom, Moscow (RU))*

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## **Review of EdF activities and Post-Fukushima safety improvement - practical realization and challenges**

**S21**

*Debes, M. (Otdelenie Yadernoj Generatsii i Inzhiniringa EhdF, Parizh (FR))*

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## **Lessons to learn after severe accident on Fukushima Daiichi NPP**

**S21**

*Aparkin, F.M. (MAGATEh, Vena (AT))*

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## **Nuclear liability: problems of international cooperation**

**S21**

*Arsent'ev, S.V. (NIYaU MIFI, Moscow (RU)); Ol'binskaya, N.I. (OAO Kontsern Rosehnergoatom, Moscow (RU))*

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## **Completion of the first cycle of insurance inspections on the objects of JSC #Left-Pointing Double Angle Quotation Mark#Kontsern Rosehnergoatom#Right-Pointing Double Angle Quotation Mark#**

**S21**

*Babenko, S.V. (NASAO, Moscow (RU))*

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## **Safety culture. Peculiarities of implantation for various professional communities and countries of Asia-Pacific region (APR)**

**S22**

*Khaletskaya, M.V.; Seleznev, Yu.N.; Artisyuk, V.V. (NOU DPO TsIPK Rosatoma, Obninsk (RU))*

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**About the Materials Aging Institute (MAI)**

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*Li, Ya. Van Der (MAI, Otdelenie NIOKR EhdF, Parizh (FR)); Debes, M. (Otdelenie Proizvodstva i Inzhiniringa EhdF, Parizh (FR))*

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**International cooperation on safety enhancement under conditions of severe accidents using the IVMR strategy for WWER-1000 power units**

**S21**

*Zdarek, J.; Duspiva, J. (Inst. Yadernykh Issledovaniy, Rzhesh (CZ))*

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## **Organization of support service on foreign WWER NPP**

**S21**

*Kuz'min, V.P.; Dement'ev, V.N.; Zabavin, V.A. (ZAO Rusatom Servis, Moscow (RU))*

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## **Innovation training model of specialists for nuclear energetics**

**S96**

*Lebedev, Yu.V. (Rostovskaya AEhS, Volgodonsk (RU)); Rudenko, V.A.; Bublikova, I.A.; Zayarov, Yu.V. (Volgodonskij Inzhenerno-Tehnicheskij Inst. - Filial NIYaU MIFI, Volgodonsk (RU))*

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**Organization of practical training on Kalinin NPP: the 8th semester project  
S96**

*Zhuravleva, V.S. (Kalininskaya AEhS, Udomlya (RU))*

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FACILITIES; COOPERATION

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**Program of human resources rapid development #Left-Pointing Double Angle  
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Quotation Mark# of JSC #Left-Pointing Double Angle Quotation  
Mark#RusHydro#Right-Pointing Double Angle Quotation Mark#  
S96**

*Venidiktov, V.V. (ANO Korporativnaya Akademiya Rosatoma, Moscow (RU))*

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### **The role of trainer in NPP safety**

**S96**

*Ovdak, K.V. (Novovoronezhskaya AEhS, Novovoronezh (RU))*

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### **New approaches at simulator training of operational personnel**

**S96**

*Serednev, V.V. (Balakovskaya AEhS, Balakovo (RU))*

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**State-of-the-art means of simulation modelling, information simulators and virtual reality for efficiency improvement of young NPP specialists training S96**

*Ozerov, K.I.; Bunto, P.A. (ZAO Neolant, Moscow (RU))*

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Sovremennye sredstva imitatsionnogo modelirovaniya, informatsionnykh trenazherov i

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**Training in the context of realistic agreements with IAEA: lessons and**

## **experience gleaned in Rosatom Central institute for continuing education and training**

**S96**

*Seleznev, Yu.N.; Aspidov, V.V.; Artisyuk, V.V. (NOU DPO TsIPK Rosatoma, Obninsk (RU))*

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## **Organization of the work on young specialists onboarding in the Kola nuclear power plant the branch of JSC Kontsern Rosehnergoatom**

**S96**

*Berezyuk, S.V. (Kol'skaya AEhS, Polyarnye Zori (RU))*

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Organizatsiya raboty po adaptatsii molodykh spetsialistov v filiale OAO #Left-Pointing Double Angle Quotation Mark#Kontsern Rosehnergoatom#Right-Pointing Double Angle Quotation Mark# #Left-Pointing Double Angle Quotation Mark#Kol'skaya atomnaya stantsiya#Right-Pointing Double Angle Quotation Mark#

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## **Current trends of nuclear specialists training in the Thermal and atomic power engineering institute of NRU MPEI**

**S96**

*Dedov, A.V. (NIU MEhI, Moscow (RU))*

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Sovremennye tendentsii podgotovki spetsialistov atomnoj otrasli v Institute teplovoj i atomnoj ehnergetiki NIU MEhI

p. 261-263

(RU)

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NUCLEAR POWER PLANTS; PERSONNEL; TRAINING; EDUCATION; EDUCATIONAL FACILITIES; RUSSIAN ORGANIZATIONS; PLANNING

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## **Psychological support of training of young NPP specialists**

**S96**

*Leonova, E.V. (Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

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p. 233

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PERSONNEL; EDUCATION; NUCLEAR POWER PLANTS; HUMAN FACTORS

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## **Inviting, choosing and onboarding of young specialists on Leningrad NPP**

**S96**

*Poskotina, Yu.V.; Reznikova, A.A. (Leningradskaya AEhS, Sosnovyj Bor (RU))*

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p. 263-264

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NUCLEAR POWER PLANTS; PERSONNEL; MANPOWER; EDUCATION; TRAINING; EFFICIENCY

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## **Grounding the safety culture of the students oriented on the work in nuclear power industry**

**S96**

*Rudenko, V.A.; Vasilenko, N.P. (Volgodonskij Inzhenerno-Tekhnicheskij Inst. - Filial NIYaU MIFI, Volgodonsk (RU))*

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Obuchenie osnovam kul'tury bezopasnosti studentov, orientirovannykh na raboty v atomnoj ehnergetike

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(RU)

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### **Innovation approaches to specialist training for fast reactors safe operation**

**S96**

*Tashlykov, O.L.; Shcheklein, S.E.; Karpenko, A.I. (Ural'skij Federal'nyj Univ., Ekaterinburg (RU)); Bel'tyukov, A.I.; Tuchkov, A.M. (Beloyarskaya AEhS, Zarechnyj (RU)); Bystrikov, A.A.; Egorov, A.K.; Gorshenin, S.V. (OAO Kontsern Rosatom, Moscow (RU))*

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Innovatsionnye podkhody k podgotovke spetsialistov dlya obespecheniya bezopasnoj ehkspluatatsii reaktorov na bystrykh nejtronakh

p. 265-266

(RU)

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### **Young specialist training for disassembling during NPP power units decommissioning**

**S96**

*Berela, A.I.; Tomilin, S.A.; Fedotov, A.G.; Yakubenko, I.A. (Volgodonskij Inzhenerno-Tekhnicheskij Inst. - Filial NIYaU MIFI, Volgodonsk (RU))*

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Podgotovka molodykh spetsialistov dlya proizvodstva demontazhnykh rabot pri vyvode iz ehkspluatatsii blokov AEhS

p. 266-268

(RU)

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REACTOR DECOMMISSIONING; PERSONNEL; TRAINING; REACTOR DISMANTLING; EDUCATION; EDUCATIONAL FACILITIES; EDUCATIONAL TOOLS

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**Revealing of relationships of production plants young specialists psychophysiological examination data with their professional advancement**  
**S96**

*Tyutina, V.D. (Kaliniskaya AEhS, Udomlya (RU))*

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p. 268-270

(RU)

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**Human resources development: advantages and disadvantages of ECVET approach in comparison with Russian professional standards**

**S96**

*Shulepova, N.A.; Aspidov, V.V. (NOU DPO TsIPK Rosatoma, Obninsk (RU))*

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**Fifty-year experience of specialist training in the field of corrosion protection of metals on NRU MPEI Nuclear power plants department**

**S96**

*Gorbatykh, V.P.; Ivanov, S.O.; Nguen Tkhi Nguen Kha; Yas'kiv, V.M. (NIU MEhI, Moscow (RU))*

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Pyatidesyatiletnij opyt podgotovki spetsialistov v oblasti zashchity metallov ot korrozii na kafedre atomnykh ehlektricheskikh stantsij NIU MEhI

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### **Energy-efficient technology of natural light transmission by Solatube#Registered Sign# Daylighting Systems through enclosures - guarantee of comfort and safety of NPP personnel**

**S99**

*Kazakov, V.A. (OOO RITM-2, Moscow (RU))*

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p. 271-272

(RU)

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NUCLEAR POWER PLANTS; PERSONNEL; LIGHTING SYSTEMS; WORKING CONDITIONS; HUMAN FACTORS ENGINEERING

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### **Continuity of generations - economical efficiency growth of SC Rosatom activities**

**S96**

*Morozova, A.A. (MSOO MSVAEhP, Moscow (RU))*

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ORGANIZATIONS; NUCLEAR ENGINEERING; BUSINESS

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## **Lifetime extension of technological pipelines on NPP**

**S42**

*Petukhov, V.S.; Savel'ev, V.N.; Sidorenko, V.G. (ZAO Katod", Razvilka, Moskovskaya Obl. (RU);  
OOO Pradikom, Sankt-Peterburg (RU))*

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Prodlenie sroka sluzhby tekhnologicheskikh truboprovodov na AEhS

p. 274-275

(RU)

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NUCLEAR POWER PLANTS; PIPES; REACTOR COMPONENTS; LIFETIME  
EXTENSION; CORROSION; ACOUSTIC EMISSION TESTING; WELDED JOINTS;  
CATHODIC PROTECTION

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## **On expediency and necessity of Russian nuclear industry veterans participation in international cooperation**

**S96**

*Porojkov, V.S. (MSOO MSVAEhP, Moscow (RU))*

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p. 275

(RU)

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INTERNATIONAL ORGANIZATIONS; NUCLEAR POWER PLANTS; PERSONNEL; PLANNING; CONSTRUCTION; INTERNATIONAL COOPERATION

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**Forming of predesign suggestions for development of Technical specifications on realization of the project #Left-Pointing Double Angle Quotation Mark#System of Kalinin NPP technological pipelines electrochemical corrosion protection by pulse currents#Right-Pointing Double Angle Quotation Mark# (method of cathode protection of underground pipelines by pulse currents)**

S42

*Terekhin, Yu.K. (Sekretariat MSVAEhP, Moscow (RU))*

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Formirovanie predproektnykh predlozhenij dlya razrabotki Tekhnicheskikh Trebovanij na realizatsiyu proekta #Left-Pointing Double Angle Quotation Mark#Sistema

ehlektrokhimicheskoy zashchity ot korrozii impul'snymi tokami truboprovodov

tekhnologicheskikh sistem Kalininskoj AEhS#Right-Pointing Double Angle Quotation Mark# (metod katodnoj zashchity podzemnykh truboprovodov impul'snymi tokami)

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## **Treatment of waste - the key of nuclear progress**

**S12**

*Kiss, Z.J. (KGL Globus, Hungary (HU))*

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284 p.

RADIOACTIVE WASTES; RADIOACTIVE WASTE PROCESSING; RADIOACTIVE WASTE DISPOSAL

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## **The necessity of implementation of inspection instrument #Left-Pointing Double Angle Quotation Mark#Omniskan#Right-Pointing Double Angle Quotation Mark# on the base of phased arrays for equipment and pipeline metal control on NPP**

**S42**

*Kozin, Yu.N. (MSOO MSVAEhP, Moscow (RU))*

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Neobkhodimost' vnedreniya na AEhS defektoskopov #Left-Pointing Double Angle Quotation Mark#Omniskan#Right-Pointing Double Angle Quotation Mark# na baze fazirovannykh reshetok dlya kontrolya metalla oborudovaniya i truboprovodov

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STAINLESS STEELS; WELDED JOINTS; NONDESTRUCTIVE TESTING; ULTRASONIC TESTING; CONTROL EQUIPMENT; NUCLEAR POWER PLANTS

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## **Creation of nuclear knowledge management system in JSC All-Russian Research Institute for Nuclear Power Plants Operation**

**S96**

*Bozhenkov, O.L.; Tolstenkov, A.N. (OAO VNIAEhS, Moscow (RU))*

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(RU)

Otkrytoe Aktsionernoe Obshchestvo Rossijskij Kontsern po Proizvodstvu Ehlektricheskoy i Teplovoj Ehnergii na Atomnykh Stantsiyakh, Ehlektrogorsk Moskovskoj Obl. (RU)

The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy. Book of abstracts

Devyataya mezhdunarodnaya nauchno-tehnicheskaya konferentsiya Bezopasnost', ehffektivnost' i ehkonomika atomnoj ehnergetiki. Tezisy dokladov

INIS-RU--599

Ehlektrogorsk Moskovskoj Obl. (RU)

OAO EhNITs

2014

284 p.

RUSSIAN ORGANIZATIONS; KNOWLEDGE MANAGEMENT; INFORMATION SYSTEMS; KNOWLEDGE BASE; PERSONNEL

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## **Providing of preservation and transfer of knowledge on NPP power unit configuration**

**S96**

*Tikhonovskij, V.L.; Shkarin, A.V.; Sal'nikov, N.V.; Chujko, D.V. (ZAO NEOLANT, Moscow (RU))*

**The Ninth International scientific and technical conference Safety, efficiency and economy**

**of atomic energy**

Moscow (RU)

21-23 May 2014

Devyataya mezhdunarodnaya nauchno-tekhnicheskaya konferentsiya Bezopasnost', ehffektivnost' i ehkonomika atomnoj ehnergetiki

Obespechenie sokhraneniya i peredachi znanij o konfiguratsii ehnergobloka AEhS  
p. 280-281

(RU)

Otkrytoe Aktsionernoe Obshchestvo Rossijskij Kontsern po Proizvodstvu Ehlektricheskoy i Teplovoj Ehnergii na Atomnykh Stantsiyakh, Ehlektrogorsk Moskovskoj Obl. (RU)

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284 p.

NUCLEAR POWER PLANTS; REACTORS; KNOWLEDGE PRESERVATION;  
KNOWLEDGE MANAGEMENT; PERSONNEL; REACTOR DECOMMISSIONING;  
RADIOACTIVE WASTES; RADIOACTIVE WASTE DISPOSAL; RADIOACTIVE WASTE  
PROCESSING; DATA BASE MANAGEMENT

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**Professional-orientational excursion for upper-formers to NRC Kurchatov Institute, the World's first NPP, INPE MEPHI, Lyceum 1547 in October, 2013 and practical conclusions**

**S99**

*Kalinin, V.P.; Cherkasov, V.G. (MOOVK, Moscow (RU))*

**The Ninth International scientific and technical conference Safety, efficiency and economy of atomic energy**

Moscow (RU)

21-23 May 2014

Devyataya mezhdunarodnaya nauchno-tekhnicheskaya konferentsiya Bezopasnost', ehffektivnost' i ehkonomika atomnoj ehnergetiki

Proforientatsionnaya ehkursiya starsheklassnikov v IA Eh im. I.V. Kurchatova, na Pervuyu v mire AEhS, IATEh MIFI, Litsej 1547 v oktyabre 2013 goda i prakticheskie vyvody

p. 281-282

(RU)

Otkrytoe Aktsionernoe Obshchestvo Rossijskij Kontsern po Proizvodstvu Ehlektricheskoy i Teplovoj Ehnergii na Atomnykh Stantsiyakh, Ehlektrogorsk Moskovskoj Obl. (RU)

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INIS-RU--599

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OAO EhNITs

2014

284 p.

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students. Book of abstracts**

**S38;S12**

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students**

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19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov. Sbornik tezisev dokladov

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Tomsk (RU)

ООО Grafika

2015

68 p.

(RU)

LEADING ABSTRACT; MEETINGS; ISOTOPE PRODUCTION; RARE EARTH NUCLEI; ISOTOPE APPLICATIONS; ISOTOPES; RADIOACTIVE WASTES; MATERIALS; MODIFICATIONS; CHEMICAL COMPOSITION

The collection contains materials of abstracts of the conference participants to sum up the experience of research and development in the field of isotope production technologies, the use of compounds specified isotopic composition in different sectors of the economy, as well as the disposal and storage technology of the isotope production wastes. Advanced ideas produce isotopes of rare elements for medicine, microelectronics and nuclear industries are presented. Prospectively projects of scientists of Tomsk Polytechnic University in isotope modifying substances are discussed

Сборник содержит материалы тезисов докладов участников конференции, посвященной обобщению опыта исследований и разработок в области технологий получения изотопов, использования соединений заданного изотопного состава в различных отраслях народного хозяйства, а также технологий утилизации и хранения отходов изотопных производств. Представлены передовые идеи получения изотопов редких элементов для медицины, микроэлектроники и атомной промышленности. Обсуждаются перспективные проекты ученых Томского политехнического университета в области изотопной модификации веществ

---

**Dialectics of rotor: history of gas centrifuges**

**S07;S38**

*Skorynin, G.M. (AO PO EhKhZ, Zelenogorsk (RU)), E-mail: ckorynin@gmail.com*



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Dialektika rotora: istoriya sozdaniya gazovoj tsentrifugi

p. 11

(RU)

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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OOO Grafika

2015

68 p.

REVIEWS; GAS CENTRIFUGATION; URANIUM ISOTOPES; ISOTOPE SEPARATION; RESEARCH PROGRAMS; INDUSTRY

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**Mathematical model of non-stationary hydraulic processes occurring in the cascade of gas centrifuges in the separation of multicomponent isotopic mixtures S97;S37**

*Ushakov, A.A.; Sovach, V.P. (AO PO EhKhZ, Zelenogorsk (RU)), E-mail:*

*ushakov2015@sibmail.com; Orlov, A.A. (Natsional'nyj Issledovatel'skij Tomskij*

*Politekhnikeskij Univ., Tomsk (RU)), E-mail: orlovaa@tpu.ru*

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Matematicheskaya model' nestatsionarnykh gidravlicheskikh protsessov, protekayushchikh v kaskade gazovykh tsentrifug pri razdelenii mnogokomponentnykh izotopnykh smesey

p. 13

(RU)

1 ref.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

MATHEMATICAL MODELS; ISOTOPE SEPARATION; ISOTOPES; SILICON FLUORIDES; GAS CENTRIFUGES; NUMERICAL ANALYSIS; HYDRAULICS; OPTIMIZATION

---

### **Mathematical model of gaseous UF<sub>6</sub> desublimation**

**S97;S11**

*Malyugin, R.V.; Orlov, A.A.; Tsimbalyuk, A.F. (Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: malyugin@tpu.ru*

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Matematicheskaya model' protsessa desublimatsii gazoobraznogo UF<sub>6</sub>

p. 14

(RU)

2 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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2015

68 p.

MATHEMATICAL MODELS; URANIUM HEXAFLUORIDE; OPTIMIZATION; SEPARATION PROCESSES; HEAT TRANSFER; SUBLIMATION; GAS FLOW

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### **Preparation of highly enriched isotope silicon-28 in a cascade of gas centrifuges for international project #Left Double Quotation Mark#Kilogram-2#Right Double Quotation Mark#**

**S37**

*Ushakov, A.A.; Sovach, V.P. (AO PO Ehlektrokhimicheskij Zavod, Zelenogorsk (RU)), E-mail: ushakovaa2015@sibmail.com*

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Poluchenie vysokoobogashchennogo izotopa kremnij-28 v kaskade gazovykh tsentrifug dlya mezhdunarodnogo proekta #Left Double Quotation Mark#Kilogramm-2#Right Double

Quotation Mark#

p. 15

(RU)

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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2015

68 p.

SILICON 28; ISOTOPE RATIO; SILICON 29; SILICON 30; SILICON FLUORIDES; MATHEMATICAL MODELS; CHEMICAL COMPOSITION

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## **Peculiarities of microbiological treatment of uranium production wastes**

**S12**

*Derbasova, N.M.; Shagova, Yu.V.; Gavrish, V.M. (Sevastopol'skij Gosudarstvennyj Univ., Sevastopol' (RU)), E-mail: derbmaks@mail.ru*

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Osobennosti mikrobiologicheskoy pererabotki otkhodov uranovogo proizvodstva

p. 16

(RU)

2 tabs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600

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2015

68 p.

RADIOACTIVE WASTE PROCESSING; MICROBIAL LEACHING; URANIUM ORES; ISOTOPE SEPARATION; BACKGROUND RADIATION; CONCENTRATION RATIO

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## **Analysis of advanced cascade interconnecting networks of three-flow separating elements with three selections**

**S97**

*Gadel'shin, V.M.; Aleksandrov, O.E.; Seleznev, V.D. (Ural'skij Federal'nyj Univ. im. Pervogo Prezidenta Rossii B.N. El'tsina, Ekaterinburg (RU)), E-mail: gadelshinvm@mail.ru*

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Analiz perspektivnykh kaskadnykh skhem soedineniya chetyrekhpotochnykh razdelitel'nykh ehlementov s tremya otborami

p. 17

(RU)

2 refs., 2 figs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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2015

68 p.

MATHEMATICAL MODELS; ISOTOPE SEPARATION; LIQUID FLOW; COMPUTER CALCULATIONS; MASS TRANSFER; COUNTERFLOW SYSTEMS; HYDRODYNAMICS; EFFICIENCY

---

**Use of graph theory for calculating the parameters of the separation cascade S97**

*Neklyudov, A.A.; Butov, V.G.; Timchenko, S.N. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: timsn@tpu.ru*

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Ispol'zovanie teorii grafov dlya rascheta parametrov razdelitel'nogo kaskada

p. 18

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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2015  
68 p.

GRAPH THEORY; ISOTOPE SEPARATION; COUNTERFLOW SYSTEMS;  
ALGORITHMS; HYDRAULICS; LIQUID FLOW; MASS TRANSFER; COMPUTER  
CALCULATIONS

---

## **Methods of uranium recycling in nuclear fuel cycle**

**S11**

*Alyukov, E.S.; Orlov, A.A. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: orlova@tpu.ru*

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Metody retsirkulyatsii urana v yaderno-toplivnom tsikle

p. 19

(RU)

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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Tomsk (RU)

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68 p.

URANIUM RECYCLE; SPENT FUELS; PLUTONIUM RECYCLE; ISOTOPE  
SEPARATION; CLOSED-CYCLE SYSTEMS; OPEN-CYCLE SYSTEMS; FISSILE  
MATERIALS

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## **Correlation of speed sensor signal spectrum with the process of corrosion deposits formation in gas centrifuge rotors**

**S37**

*Kovalenko, D.S.; Levchuk, R.V.; Orlov, A.A. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: dskov.tsk@gmail.com*

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Korrelyatsiya spektra signala datchika oborotov s protsessom obrazovaniya korrozionnykh otlozhenij v rotore gazovoj tsentrifugi

p. 20

(RU)

2 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

CORROSION; CORRELATIONS; GAS CENTRIFUGATION; MECHANICAL VIBRATIONS; AMPLITUDES; SPECTRA; DEPOSITION

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## **Computer simulators of ISP #Left-Pointing Double Angle Quotation**

**Mark#SCC#Right-Pointing Double Angle Quotation Mark#**

**S11**

*Timchenko, S.N.; Sidorenko, V.S.; Orlov, A.A. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: orlova@tpu.ru*

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Komp'yuternyj trenazher ZRI AO #Left-Pointing Double Angle Quotation Mark#SKhK#Right-Pointing Double Angle Quotation Mark#

p. 21

(RU)

5 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

URANIUM ISOTOPES; ISOTOPE SEPARATION PLANTS; SAFETY; GAS CENTRIFUGATION; TRAINING; SIMULATION

---

## **Optimization of target heat operation of LU-8-2 electron accelerator**

## Bremsstrahlung

S43

*Khromyak, M.I.; Kurapov, N.N.; Sharavina, M.V.; Tel'nov, A.V. (Federal'noe Gosudarstvennoe Unitarnoe Predpriyatie Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij Nauchno-Issledovatel'skij Inst. Eksperimental'noj Fiziki, Sarov (RU)), E-mail: otd4@expd.vniief.ru*

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Optimizatsiya teplovogo rezhima raboty misheni tormoznogo izlucheniya ehlektronnogo uskoritelya LU-8-2

p. 23

(RU)

4 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

ELECTRON BEAM TARGETS; OPTIMIZATION; ACCELERATORS;

BREMSSTRAHLUNG; COMPUTERIZED SIMULATION; TEMPERATURE DEPENDENCE

---

## Study of isotopic composition of the products of sulfur hexafluoride plasma chemical conversion

S37

*Sosnovskij, C.A.; Kazaryan, M.A.; Obkhodskaya, E.V.; Sachkov, V.I. (Sibirskij Fiziko-Tekhnicheskij Inst. im. akad. V.D. Kuznetsova Tomskogo Gosudarstvennogo Univ., Tomsk (RU)), E-mail: ssa777@mail.ru*

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Issledovanie izotopnogo sostava produktov plazmokhimicheskoy konversii geksaftorida sery

p. 24

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov. Sbornik tezisov dokladov  
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Tomsk (RU)  
OOO Grafika  
2015  
68 p.  
SULFUR FLUORIDES; CHEMICAL COMPOSITION; PLASMA; ELECTRON BEAMS; ISOTOPE EFFECTS; DECOMPOSITION; SULFUR OXIDES; SULFUR 34; DISSOCIATION; ISOTOPE SEPARATORS

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### **Calculation of temperature field inside of plasma chemical reactor for carbon isotope separation**

**S37**

*Bespala, E.V.; Titov, E.S.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: bespala\_evgeny@mail.ru*

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Raschet temperaturnogo polya vnutri plazmokhimicheskogo reaktora dlya razdeleniya izotopov ugleroda

p. 25

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

CARBON 14; GRAPHITE; ISOTOPE SEPARATION; MAGNETIC FIELDS; CARBON 13; ISOTOPE EFFECTS; TEMPERATURE RANGE 0065-0273 K; PLASMA; TEMPERATURE DISTRIBUTION

---

### **Formation of plasma flow in spin separation of carbon isotopes**

**S37**

*Bespala, E.V.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: bespala\_evgeny@mail.ru; Pavlyuk, A.O.; Kotlyarevskij, S.G. (LSiYaFI TU AO ODTs UGR, ZATO Seversk, Tomskaya Obl. (RU))*

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Formirovanie plazmennogo potoka pri spinovoj separatsii izotopov ugleroda

p. 26

(RU)

1 ref.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

CARBON 14; ISOTOPE SEPARATION; TEMPERATURE RANGE 0065-0273 K; PLASMA; MAGNETIC FIELDS; TEMPERATURE RANGE 0400-1000 K; LIMITERS

---

**Separation of carbon isotopes in arc discharge plasma by the magnetic field**

**S37**

*Ushakov, I.A.; Grigor'ev, A.S.; Babaev, R.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: mamay2008@bk.ru*

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Separatsiya izotopov ugleroda v plazme dugovogo razryada pod dejstviem magnitnogo polya

p. 27

(RU)

1 ref., 2 figs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

## **Determination of sorption properties of nanosized materials**

**S37**

*Boretskij, E.A.; Vidyaev, D.G.; Verkhorubov, D.L. (Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: eboretsky@mail.ru*

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Opredelenie sorbtionnykh svoystv nanorazmernykh materialov

p. 28

(RU)

1 ref., 1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

NANOCOMPOSITES; SORPTIVE PROPERTIES; HYDROGEN; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K; CARBON; SORPTION; KINETICS

---

## **Stability of a pair of interacting ions during acceleration and transport**

**S43**

*Shamanin, V.I.; Remnev, G.E. (Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU))*

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Ustojchivost' pary vzaimodejstvuyushchikh ionov pri uskorenii i transportirovke

p. 29

(RU)

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68 p.  
PARTICLE INTERACTIONS; IONS; STABILITY; EQUATIONS OF MOTION;  
ACCELERATION; ION BEAMS; ION PAIRS

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**Laser control of dispersity of condensed phase formed in the plasma processes  
S75**

*Perekrestov, R.V.; Kudrna, P. (Univ. in Prague, Faculty of Mathematics and Physics, Prague (CZ)), E-mail: perekrestov-r@mail.ru*

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Lazernyj kontrol' dispersnosti kondensirovannoj fazy, obrazuyushchejsya v plazmennyykh protsessakh

p. 30

(RU)

2 figs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

PLASMA ARC SPRAYING; TITANIUM OXIDES; DISPERSIONS; SEMICONDUCTOR LASERS; ATOMS; TEMPERATURE RANGE 0065-0273 K

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**Study on crystallization isotope effect in a magnetic field from an aqueous solution  
S37**

*Makarevich, S.V.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: gos100@tpu.ru*

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molodykh uchenykh, aspirantov i studentov  
Issledovanie izotopnogo ehffekta pri kristallizatsii v magnitnom pole iz vodnogo rastvora  
p. 31

(RU)

1 fig., 1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

ISOTOPE EFFECTS; SODIUM CHLORIDES; MAGNETIC FIELDS; CHLORINE 37;  
ISOTOPE SEPARATION; CRYSTAL GROWTH; AQUEOUS SOLUTIONS

---

## **Efficiency evaluation NPP construction based on reactors of medium and high capacity for nuclear energetics of the republic Kazakhstan**

**S21**

*Ausenov, K.Zh. (Assotsiatsiya Yadernoe Obshchestvo Kazakhstana, Almaty (KZ)), E-mail: kaussenov@mail.ru; Shamanin, I.V. (Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: shiva@tpu.ru*

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Otsenka ehffektivnosti stroitel'stva AEhS na baze reaktorov srednej i bol'shoj moshchnosti dlya yadernoj ehnergetiki Respubliki Kazakhstan

p. 33

(RU)

8 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

KAZAKHSTAN; WWER TYPE REACTORS; NUCLEAR POWER PLANTS; REACTOR SAFETY; PLANNING; ENERGY POLICY; RESEARCH PROGRAMS; CANDU TYPE REACTORS

---

### **Simulation and research of plasma processing of contaminated water and salt wastes in the form of nitric acid extraction raffinates**

**S12**

*Pavlenko, A.P.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: moroziknastia94@mail.ru*

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Modelirovanie i issledovanie protsessa plazmennoj obrabotki radiatsionno-zagryaznennykh vodno-solevykh otkhodov v vide azotnokislykh ehkstraktsionnykh rafinатов

p. 34

(RU)

3 refs.

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68 p.

FUEL CYCLE; LOW-LEVEL RADIOACTIVE WASTES; INTERMEDIATE-LEVEL RADIOACTIVE WASTES; RADIOACTIVE EFFLUENTS; NITRIC ACID; SIMULATION; SOLVENT EXTRACTION; DECONTAMINATION; RADIOACTIVE WASTE MANAGEMENT; PLASMA

---

### **Simulation and investigation into plasma treatment of wastes as ammoniac mother liquors**

**S12**

*Peshekhonova, A.S.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: anastasiya.peshekhonova@mail.ru*

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Modelirovanie i issledovanie protsessa plazmennoj obrabotki otkhodov v vide ammiachnykh

matochnykh rastvorov

p. 35

(RU)

5 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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FUEL CYCLE; SIMULATION; LOW-LEVEL RADIOACTIVE WASTES; INTERMEDIATE-LEVEL RADIOACTIVE WASTES; AMMONIUM CHLORIDES; SOLVENT EXTRACTION; PLASMA; RADIOACTIVE WASTE MANAGEMENT; OPTIMIZATION; DECONTAMINATION

---

## **Simulation and investigation into treatment of contaminated silt sediments of storage pools as a water-salt organic compositions in air plasma**

**S12**

*Shekhovtsova, A.P.; Oreshkin, E.A.; Novoselov, I.Yu.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: egor\_ores@mail.ru*

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Modelirovanie i issledovanie protsessa obrabotki v vozdushnoj plazme radiatsionno-zagryaznennykh ilovykh otlozhenij bassejnov-khranilishch v vide vodnosoleorganicheskikh kompozitsij

p. 36

(RU)

4 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

**Isotope ratio of radioactivity in hypothetical accident at the RR WWR-K with low-enriched fuel**

**S21**

*Shajmerdenov, A.A.; Chekushina, L.V.; Koltochnik, S.N. (RGP Inst. Yadernoj Fiziki, Almaty (KZ)), E-mail: aashaimerdenov@gmail.com; Shamanin, I.V. (FGBOU VPO NI Tomskij Politekhnikeskij Univ., Tomsk (RU))*

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Izotopnyj sostav radioaktivnosti pri gipoteticheskoj avarii na IR VVR-K s nizkoobogashchennym toplivom

p. 37

(RU)

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WWR TYPE REACTORS; REACTOR ACCIDENT SIMULATION; HYPOTHETICAL ACCIDENTS; REACTOR SAFETY; MELTDOWN; MODERATELY ENRICHED URANIUM; FUEL ASSEMBLIES; ISOTOPE RATIO

---

**Problem of nuclei buildup - neutron absorbers in the secondary and tertiary recycling of nuclear fuel**

**S11**

*Gromov, V.O. (FGUP Gorno-Khimicheskij Kombinat, Zheleznogorsk (RU)); Shamanin, I.V. (Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: Drak-08@mail.ru*

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Problema nakopleniya yader - poglotitelej nejtronov pri vtorichnom i tretichnom retsiklirovanii yadernogo topliva

p. 38

(RU)

1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

NUCLEAR FUELS; ISOTOPE RATIO; URANIUM RECYCLE; PLUTONIUM RECYCLE; URANIUM 236; PLUTONIUM 240; NEUTRON ABSORBERS; BUILDUP

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**Study on decontamination of irradiated graphite at FSUE #Left-Pointing Double Angle Quotation Mark#MCC#Right-Pointing Double Angle Quotation Mark# S12**

*Grigor'ev, A.S.; Myshkin, V.F. (FGUP Gorno-Khimicheskij Kombinat, Zheleznogorsk (RU); Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: Alexsandr92\_15@mail.ru*

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Issledovanie po oчитке obluchennogo grafita na FGUP #Left-Pointing Double Angle Quotation Mark#GKhK#Right-Pointing Double Angle Quotation Mark#

p. 39

(RU)

1 fig.

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68 p.

GRAPHITE; DECONTAMINATION; CARBON 14; RADIOACTIVE WASTE DISPOSAL; GRAPHITE MODERATED REACTORS; REACTOR DECOMMISSIONING; RADIOACTIVE WASTE PROCESSING

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## **Simulation of processing kinetics of contaminated water-salt wastes into the air-plasma flow as dispersed combustible water salt-organic compositions**

**S12**

*Pavlenko, A.P.; Karengin, A.A.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)),  
E-mail: moroziknastia94@mail.ru*

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Modelirovanie kinetiki obrabotki radiatsionnozagryaznennykh vodno-solevykh otkhodov v vozdušnoplazmennom potoke v vide dispergirovannykh goryuchikh vodno-soleorganicheskikh kompozitsij

p. 40

(RU)

4 refs., 1 fig.

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68 p.

SIMULATION; PLASMA; DECONTAMINATION; RADIOACTIVE WASTE

MANAGEMENT; KINETICS; RADIOACTIVE EFFLUENTS; FUEL CYCLE; SPENT FUELS

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## **Simulation and investigation into plasma treatment of platinum group metals reextracts after spent fuel reprocessing**

**S12**

*Gosteva, I.V.; Pirozhenko, T.E.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)),  
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Modelirovanie i issledovanie protsessa plazmennoj obrabotki reehkstraktov platinoidov posle pererabotki OYaT

p. 41

(RU)

2 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)  
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INIS-RU--600  
Tomsk (RU)  
OOO Grafika  
2015  
68 p.  
SPENT FUELS; SIMULATION; PLASMA; RHODIUM; PALLADIUM; RADIOACTIVE WASTE PROCESSING; EXTRACTION; AQUEOUS SOLUTIONS

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### **Application of high-frequency flare plasmotrons for plasma treatment of contaminated water-salt wastes**

**S12**

*Piunova, K.G.; Karengin, A.A.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)),  
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Primenenie VChF-plazmotronov dlya plazmennoj obrabotki radiatsionno-zagryaznennykh vodno-solevykh otkhodov

p. 42

(RU)

4 refs., 1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

FUEL CYCLE; PLASMATRONS; PLASMA; RADIOACTIVE EFFLUENTS; DECONTAMINATION; OPTIMIZATION; SPENT FUELS; RADIOACTIVE WASTE PROCESSING; REPROCESSING

---

### **Model of reactor for processing of NFC water and salt wastes in air-plasma flow as dispersed combustible water-salt-organic composition**

**S12**

*Novoselov, I.Yu.; Poberezhnikov, A.D.; Karengin, A.G. (Tomskij Politehnicheskij Univ., Tomsk (RU)), E-mail: inovoselov@tpu.ru*

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Model' reaktora dlya obrabotki vodno-solevykh otkhodov YaTTs v vozdušno-plazmennom potoke v vide dispergirovannykh goryuchikh vodno-soleorganicheskikh kompozitsij

p. 43

(RU)

2 refs., 1 fig.

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68 p.

FUEL CYCLE; PLASMATRONS; SPENT FUELS; RADIOACTIVE WASTE PROCESSING; RADIOACTIVE EFFLUENTS; PUREX PROCESS; OPTIMIZATION

---

## **Collimation and neutron extraction on a horizontal experimental channel HEC-8 of research reactor IRT-T**

**S21**

*Savanyuk, S.N.; Shamanin, I.V. (Natsional'nyj Issledovatel'skij Tomskij Politehnicheskij Univ., Tomsk (RU)), E-mail: savvans@gmail.com*

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Kollimatsiya i vyvod nejtronov na GEhK-8 issledovatel'skogo reaktora IRT-T

p. 45

(RU)

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politehnicheskij Univ., Tomsk (RU)

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2015  
68 p.

RESEARCH REACTORS; ATOMIC DISPLACEMENTS; TEMPERATURE RANGE 0065-0273 K; SIMULATION; COLLIMATORS; NEUTRON FLUX; BEAM EXTRACTION

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## **Simulation and investigation into producing of uranium and thorium oxide compositions from water-salt-organic compositions in the air plasma**

**S11**

*Zubov, V.V.; Kadochnikov, S.S.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: moroziknastia94@mail.ru*

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Modelirovanie i issledovanie protsessa polucheniya v vozduшной plazme oksidnykh kompozitsij urana i toriya iz vodno-soleorganicheskikh kompozitsij

p. 46

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vyshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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URANIUM DIOXIDE; THORIUM OXIDES; THERMAL REACTORS; NUCLEAR FUELS; SIMULATION; PLASMA; CHEMICAL COMPOSITION; OPTIMIZATION

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## **Simulation and investigation into producing of uranium and plutonium oxide compositions from water-salt-organic compositions in the air plasma**

**S11**

*Tundeshev, N.V.; Lemeshenko, T.I.; Karengin, A.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: tundeshev93@mail.ru*

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Modelirovanie i issledovanie protsessa polucheniya v vozdushnoj plazme oksidnykh kompozitsij urana i plutoniya iz vodno-soleorganicheskikh kompozitsij

p. 47

(RU)

6 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

URANIUM OXIDES; PLUTONIUM OXIDES; SIMULATION; REACTOR ACCIDENT SIMULATION; SPENT FUELS; PLASMA; CHEMICAL COMPOSITION; OPTIMIZATION; MIXED OXIDE FUELS

---

## **Measurement and analysis of values used in evaluation of radon danger areas in the Russian Federation and the Czech Republic**

**S54**

*Shilova, K.O.; Klyuchnikova, Yu.O.; Ryzhakova, N.K. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: kos1@tpu.ru*

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Izmerenie i analiz velichin, ispol'zuemykh pri otsenke radonoopasnosti territorij v Rossijskoj Federatsii i Cheshskoj Respublike

p. 48

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

ISOTOPE EFFECTS; CZECH REPUBLIC; ENVIRONMENTAL TRANSPORT; DANGER COEFFICIENT; ENVIRONMENTAL EXPOSURE; IONIZING RADIATIONS; RADON; NATURAL RADIOACTIVITY

---

### **Production possibilities of isotopes on the IRT-T TPU**

**S21**

*Zukau, V.V.; Kabanov, D.V.; Chibisov, E.V.; Shamanin, I.V. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: zukau@tpu.ru*

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Vozmozhnosti proizvodstva izotopnoj produktsii na IRT-T TPU

p. 49

(RU)

Isotopes: tungsten-188, rhenium-188, lutetium-177, iridium-192, phosphorus-32,33, nickel-63

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe

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68 p.

ISOTOPE PRODUCTION; NEUTRON REACTIONS; CAPTURE; RESEARCH REACTORS; RESEARCH PROGRAMS; ISOTOPES; ISOTOPE RATIO

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### **Investigation into isotope effects during contact of the substances in a magnetic field**

**S37**

*Semchenko, I.C.; Babaev, R.G.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: semchenko.igor@mail.ru*

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Issledovanie izotopnykh ehffektov pri kontakte veshchestv v magnitnom pole

p. 50

(RU)

2 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe

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2015  
68 p.  
ISOTOPE EFFECTS; MAGNETIC FIELDS; SODIUM CHLORIDES; POTASSIUM CHLORIDES; COPPER SULFATES; TEMPERATURE RANGE 0273-0400 K; FORMATION HEAT

---

### **Features of extraction of mercury from industrial sludges**

**S12**

*Lemyakin, A.Eh.; Vidyaev, D.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: nekapb@sibmail.com*

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Osobennosti izvlecheniya rtuti iz proizvodstvennykh shlamov

p. 51

(RU)

1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

SLUDGES; INDUSTRIAL WASTES; MERCURY; EXTRACTION; CENTRIFUGATION; APPROPRIATE TECHNOLOGY; RADIOACTIVE WASTE PROCESSING; ABUNDANCE

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### **Prospects for lithium neutron capture therapy**

**S62**

*Tyudelekov, E.A.; Vidyaev, D.G. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: tyudelekov\_evgenii@mail.ru*

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Perspektivy ispol'zovaniya litiya dlya nejtron-zakhvatnoj terapii

p. 52

(RU)

3 refs., 1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

NEUTRON CAPTURE THERAPY; DIAGNOSTIC USES; LITHIUM 6; BORON 10; COMPARATIVE EVALUATIONS; NEOPLASMS

---

### **Development, simulation of flexible separation processes using ion exchangers S37**

*Balashkov, V.S.; Drogalev, A.S.; Vergun, A.P. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: balashkov\_vit@mail.ru*

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Razrabotka, modelirovanie gibkikh razdelitel'nykh protsessov s primeneniem ionitov

p. 54

(RU)

3 refs.

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68 p.

ISOTOPE SEPARATION; COMPUTERIZED SIMULATION; ION EXCHANGE; ION EXCHANGE MATERIALS; MEMBRANES; AUTOMATION; OPTIMIZATION

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## **Lithium isotope change during zone recrystallization**

**S37**

*Akimov, D.V.; Egorov, N.B.; Zhuravlev, N.A. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: akimov@tpu.ru*

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Izmenenie izotopnogo sostava litiya v protsesse zonnoj perekristallizatsii

p. 55

(RU)

3 refs., 1 fig.

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68 p.

ISOTOPE SEPARATION; LITHIUM 6; LITHIUM 7; OPTIMIZATION; ISOTOPE RATIO; CRYSTALLIZATION

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## **Investigation into separation of rare earth elements by zone recrystallization**

**S37**

*Obmurch, K.V.; Akimov, D.V.; Egorov, N.B. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: kvo@tpu.ru*

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Issledovanie razdeleniya redkozemel'nykh ehlementov metodom zonnoj perekristallizatsii

p. 56

(RU)

2 refs., 1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

CRYSTALLIZATION; MELTING; HOLMIUM CHLORIDES; CERIUM CHLORIDES;  
SEPARATION PROCESSES; PURIFICATION

---

### **Recovery of gold (III) from hydrochloric acid solutions by sorbents based on benzo-15-crown-5**

**S37**

*Vydysh, A.A.; Fateeva, A.S.; Dovgij, I.I. (Sevastopol'skij Gosudarstvennyj Univ., Sevastopol' (RU)), E-mail: dovhyi.illarion@yandex.ru*

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Iz vlechenie zolota(III) iz solyanokislykh rastvorov sorbentami na osnove benzo-15-kraun-5 p. 57

(RU)

3 refs., 1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vyshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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68 p.

GOLD 198; GOLD CHLORIDES; CROWN ETHERS; ADSORPTION; SORPTIVE PROPERTIES; DISTRIBUTION FUNCTIONS; ISOTOPE SEPARATION; CHEMICAL COMPOSITION

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### **Recovery of cesium by sorbents based on clips-crown of biphenylglycoluril and benzo-15-crown-5 derivatives**

**S37**

*Dovgij, I.I.; Guba, L.V. (Sevastopol'skij Gosudarstvennyj Univ., Sevastopol' (RU)), E-mail: dovhyi.illarion@yandex.ru; Lyapunov, A.Yu. (Fiziko-Khimicheskij Inst. im. A.V. Bogatskogo, Odessa (UA))*

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Iz vlechenie tseziya sorbentami na osnove klipso-krauna proizvodnogo difenilglikol'urila i benzo-15-kraun-5  
p. 58  
(RU)  
3 refs., 1 fig., 1 tab.  
Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)  
Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students. Book of abstracts  
Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov. Sbornik tezisov dokladov  
INIS-RU--600  
Tomsk (RU)  
OOO Grafika  
2015  
68 p.  
ISOTOPE SEPARATION; CROWN ETHERS; CHEMICAL COMPOSITION; SORPTION; SORPTIVE PROPERTIES; ADSORBENTS; CESIUM ISOTOPES

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### **Recovery of strontium from nitric acid solutions by sorbents based on di-tert-butyl dicyclohexyl-18-crown-6**

**S37**

*Bezhin, N.A.; Polishchuk, S.A.; Dvorgij, I.I. (FGAOU VO Sevastopol'skij Gosudarstvennyj Univ., Sevastopol' (RU)), E-mail: nickbezhin@yandex.ru*

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19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Iz vlechenie strontsiya iz azotnokislykh rastvorov sorbentami na osnove di-tret-butilditsiklogeksil-18-kraun-6

p. 59

(RU)

2 refs., 1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600

Tomsk (RU)

OOO Grafika

2015

68 p.

**Recovery of cobalt by sorbents based on di-tert-butyl-dicyclohexyl-18-crown-6**  
**S37**

*Yankovskaya, V.S.; Dovgij, I.I. (Sevastopol'skij Gosudarstvennyj Univ., Sevastopol' (RU)), E-mail: dovhyi.illarion@yandex.ru; Lyapunov, A.Yu. (Fiziko-Khimicheskij Inst. im. A.V. Bogatskogo, Odessa (UA))*

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Tomsk (RU)

19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Izvlечение kopal'ta sorbentami na osnove ditretbutil-ditsiklogeksil-18-kraun-6

p. 60

(RU)

3 refs., 1 tab.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600

Tomsk (RU)

OOO Grafika

2015

68 p.

ISOTOPE SEPARATION; CROWN ETHERS; ADSORBENTS; CHEMICAL COMPOSITION; CYCLOALKANES; COBALT ISOTOPES; OCTANOLS; NITROBENZENE; OPTIMIZATION

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**Radical processes during dissolution of ozone in water in a magnetic field**  
**S37**

*Tskhe, A.A.; Nejman, V.A.; Myshkin, V.F. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: anny0393@mail.ru*

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students**

Tomsk (RU)

19-23 Oct 2015

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Radikal'nye protsessy pri rastvorenii ozona v vode, nakhodyashchejsya v magnitnom pole

p. 61

(RU)

2 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya

Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)  
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Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov. Sbornik tezisov dokladov  
INIS-RU--600  
Tomsk (RU)  
OOO Grafika  
2015  
68 p.  
WATER TREATMENT; OZONE; OZONIZATION; MAGNETIC FIELDS; WATER; RADICALS

---

### **Radiation-chemical and thermal grafting of PVDF thin films for functional membrane**

**S37**

*Il', A.P.; Dyusembekova, A.A.; Sokhoreva, V.V. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: nastya\_Il1993@mail.ru*

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students**

Tomsk (RU)

19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Radiatsionno-khimicheskaya i termicheskaya privivka tonkikh plenok PVDF dlya funktsional'noj membrany

p. 62

(RU)

1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600

Tomsk (RU)

OOO Grafika

2015

68 p.

THIN FILMS; MEMBRANES; GRAFT POLYMERS; ION EXCHANGE MATERIALS; ORGANIC FLUORINE COMPOUNDS; HELIUM IONS; IRRADIATION; CHEMICAL RADIATION EFFECTS; STYRENE

---

### **Industrial application of electro-baromembrane processes for production of highly refined water**

**S37**

*Drogalev, A.S.; Vergun, A.P.; Balashkov, V.S. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-*

mail: drogalev@tpu.ru

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students**

Tomsk (RU)

19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Promyshlennoe primenenie ehlektrobaromembrannykh protsessov dlya polucheniya vody vysokoj stepeni ochistki

p. 63

(RU)

1 fig.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600

Tomsk (RU)

OOO Grafika

2015

68 p.

WATER TREATMENT; WATER; MEMBRANES; PURIFICATION; PRESSURE RANGE; OSMOSIS; MASS TRANSFER

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**Investigation into properties of polypropylene track membranes with a thin layer of polymer produced by electron-beam dispersion of polytetrafluoroethylene in vacuum**

S37

Dyusembekova, A.A.; Sokhoreva, V.V. (Tomskij Politekhnikeskij Univ., Tomsk (RU)), E-mail: aad38@tpu.ru; Kravets, L.I. (Ob''edinennyj Inst. Yadernykh Issledovanij, Lab. Yadernykh Reaktsij im. G.N. Flerova, Dubna (XJ))

**Isotopes: technologies, materials and application. II International scientific conference of young scientists, post-graduate students and students**

Tomsk (RU)

19-23 Oct 2015

Izotopy: tekhnologii, materialy i primenenie. II Mezhdunarodnaya nauchnaya konferentsiya molodykh uchenykh, aspirantov i studentov

Issledovanie svojstv polipropilenovykh trekovykh membran s tonkim sloem polimera, poluchennykh metodom ehlektronno-lucheвого dispergirovaniya politetraftorehtilena v vakuume

p. 64

(RU)

3 refs.

Ministerstvo Obrazovaniya i Nauki Rossijskoj Federatsii, Moscow (RU); Federal'noe Gosudarstvennoe Avtonomnoe Obrazovatel'noe Uchrezhdenie Vysshego Obrazovaniya Natsional'nyj Issledovatel'skij Tomskij Politekhnikeskij Univ., Tomsk (RU)

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INIS-RU--600  
Tomsk (RU)  
OOO Grafika  
2015  
68 p.  
MEMBRANES; POLYETHYLENES; POLYTETRAFLUROETHYLENE;  
NANOSTRUCTURES; ELECTRON BEAMS; CHEMICAL RADIATION EFFECTS;  
COMPOSITE MATERIALS

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**Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection**  
**S21**

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Itogi nauchno-tekhnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

(RU)

LEADING ABSTRACT; REACTOR PHYSICS; REACTOR SAFETY; WWER TYPE REACTORS; LMFBR TYPE REACTORS; REACTOR COOLING SYSTEMS; FUEL CYCLE; SODIUM COOLED REACTORS; LEAD; RESEARCH AND TEST REACTORS; RESEARCH PROGRAMS; EXPERIMENT PLANNING; REACTOR TECHNOLOGY

The main results of the complex research and development carried out in 2013 by the Nuclear Reactors Physics Institute are presented. The bulk of studies was carried out in the framework of the Federal Target Program #Left Double Quotation Mark#Nuclear Power Technologies of New Generation in 2010-2015 and until 2020#Right Double Quotation Mark#. The calculation and experimental substantiation of projects BN-1200 with sodium coolant, BREST-OD-300 lead-cooled, multi-purpose research reactor MFRR, SVBR-100 lead-cooled and other projects are included in the scope of investigations. The results of the work obtained in the following areas of activity of experts: design validation of NPP with reactor installations WWER-1000 (NPP-2006), physics and technology of space NPU, efficient nuclear-optical energy converters of pulse action are discussed. The collection contains materials on substantiation of conceptual innovation projects of NPP, technical and economic studies of the nuclear fuel cycle. The problem of further studies are formulated and discussed

Представлены основные результаты комплексных НИОКР, выполненные в 2013 году сотрудниками Института ядерных реакторов и теплофизики. Основной объем исследований выполнен в рамках Федеральной целевой программы #Left Double Quotation Mark#Ядерные энерготехнологии нового поколения на период 2010-2015 годов и на перспективу до 2020 года#Right Double Quotation Mark#. Расчетно-экспериментальное обоснование проектов РУ БН-1200 с натриевым теплоносителем, РУ БРЕСТ-ОД-300 со свинцовым теплоносителем, многоцелевого исследовательского реактора МБИР, РУ СВБР-100 со свинцовым теплоносителем и другие проекты включены в сферу

исследований. Обсуждаются итоги работ, полученные по следующим направлениям деятельности специалистов: обоснование проекта АЭС с реакторными установками ВВЭР-1000 (АЭС-2006), физика и техника космических ЯЭУ, эффективные ядерно-оптические преобразователи энергии импульсного действия. Сборник содержит материалы по обоснованию концептуальных инновационных проектов ЯЭУ, технико-экономическим исследованиям ядерного топливного цикла. Сформулированы и обсуждаются задачи дальнейших исследований

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## **Main results of activity of the Nuclear Reactors Physics Institute by the decision of scientific and technical problems of nuclear power development in 2013**

**S21**

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A.; Chernonog, V.L.*

Osnovnye itogi deyatelnosti Instituta yadernykh reaktorov i teplofiziki po resheniyu nauchno-tekhnicheskikh zadach razvitiya atomnoj ehnergetiki v 2013 godu

p. 6-26

(RU)

38 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tekhnicheskoy deyatelnosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**RUSSIAN ORGANIZATIONS; WWER TYPE REACTORS; LMFBR TYPE REACTORS; NUCLEAR POWER PLANTS; RESEARCH PROGRAMS; HISTORICAL ASPECTS; RECOMMENDATIONS; REVIEWS; REACTOR SAFETY; RADIATION PROTECTION; REACTOR TECHNOLOGY**

The results of the thr Nuclear Reactors Physics Institute for the year 2013 are discussed. The main areas of new generation research units with the fast reactor BN-1200 with sodium coolant are presented. Development of materials, safety studies, neutron-physical and thermal-hydraulic characteristics of the power unit BREST-OD-300 of the new generation is an important direction in the activities of the Institute. Issues of increasing the effectiveness of existing and future nuclear power plants are solved, study of nuclear and radiation safety at the NPP Beloyarsk and Bilibino is considered. The recommendations on the physics and technology of space NPU are elaborated. The concepts for innovative projects - WWER-SCP, molten salt reactor; high-temperature sodium technologies are presented. The Institute focuses on innovative exchange, best practice and knowledge preservation

Обсуждаются итоги деятельности Института ядерных реакторов и теплофизики за 2013 год. Представлены основные направления исследований энергоблоков нового поколения с реактором на быстрых нейтронах с натриевым теплоносителем БН-1200. Разработка материалов, обоснование безопасности, нейтронно-физических и теплогидравлических характеристик энергоблока нового поколения БРЕСТ-ОД-300 являются важными



направлениями в деятельности Института. Решаются вопросы повышения эффективности действующих и перспективных АЭС, рассмотрены обоснования ядерной и радиационной безопасности на Белоярской и Билибинской АЭС. Разработаны рекомендации по физике и технике космических ЯЭУ. Представлены концепции по инновационным проектам - ВВЭР-СКД, жидкосолевному реактору, высокотемпературным натриевым технологиям. В институте уделяется внимание инновационному обмену, обобщению опыта и сохранению знаний

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## **Electronuclear subcritical blanket on a modular principle of constructing the reactor core with molten salt melts of fissile uranium fluorides (UF<sub>4</sub>) and plutonium fluoride (PuF<sub>3</sub>) in fluoride solution FLINAK**

S21

*Goverdovskij, A.A.; Ovcharenko, M.K.; Belinskij, V.S.; Pyshko, A.P.; Sulim, A.T.; Shcherbakov, S.I.*

Ehlektrjadernyj podkriticheskiy blanket na modul'nom printsipe postroeniya aktivnoj zony s zhidkosolevymi pasplavami delyashchikhsya ftoridov urana (UF<sub>4</sub>) i plutoniya (PuF<sub>3</sub>) vo ftoridnom rastvore FLINAK

p. 27-41

(RU)

5 refs., 21 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskiy Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tekhnicheskoj deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

REACTOR CORES; URANIUM FLUORIDES; PLUTONIUM FLUORIDES; MOLTEN SALTS; SPENT FUELS; REACTOR PHYSICS; REACTOR SAFETY; SUBCRITICAL ASSEMBLIES; RESEARCH PROGRAMS; OPTIMIZATION; WWER TYPE REACTORS; FUEL CYCLE

The concept of electronuclear molten salt subcritical blanket (EN MSSB) is explained. The results of calculations to determine the material and shape of the target, which is being implemented for the neutron current included in the core blanket are given. Neutron-physical characteristics of subcritical blanket, radiation protection are estimated. Results of research of flow and temperature distribution in a fuel module are reviewed. Design solutions of EN MSSB are presented. The main advantages of modular circuit for subcritical blanket construction to simulate closure of the nuclear fuel cycle with WWER type reactor are discussed

Изложена концепция электроядерного жидкосолевого подкритического blankets (ЭЯ ЖСПБ). Приведены результаты расчетов по определению материала и формы мишени, для которой реализуется ток нейтронов, входящих в активную зону blankets. Даны оценки нейтронно-физических характеристик подкритического blankets, радиационной

защиты. Приведены результаты исследования течения и распределения температур в тепловыделяющем модуле. Представлены конструкторские решения ЭЯ ЖСПБ. Обсуждаются главные преимущества модульной схемы построения подкритического blankets по отработке замыкания топливного цикла с реакторами типа ВВЭР

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## **Research in support of high-temperature nuclear energy technology with sodium-cooled fast reactor for the hydrogen production and other innovative applications**

**S21**

*Kalyakin, S.G.; Kozlov, F.A.; Sorokin, A.P.; Alekseev, V.V.; Bogoslovskaya, G.P.; Ivanov, A.P.; Konovalov, M.A.; Morozov, A.V.; Orlova, E.A.; Stogov, V.Yu.*

Issledovaniya v obosnovanie vysokotemperaturnoj yadernoj ehnergotekhnologii s reaktorom na bystrykh nejtronakh s natrievym teplonosotelem dlya proizvodstva vodoroda i drugih innovatsionnykh primenenij

p. 42-57

(RU)

32 refs., 3 figs., 8 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatие Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tekhnicheskoj deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**LMFBR TYPE REACTORS; REACTOR SAFETY; STAINLESS STEELS; CORROSION PROTECTION; HYDROGEN; OPTIMIZATION; HYDROGEN PRODUCTION; RESEARCH PROGRAMS; SODIUM COOLED REACTORS; TEMPERATURE RANGE 1000-4000 K; REACTOR TECHNOLOGY**

The results of studies on the creation of sodium coolant technology at high temperatures and hydrogen concentrations to solution of tasks on creating a large-scale atomic hydrogen energetics are discussed. The application of heat-resistant radiation-resistant high-temperature structural materials, ensuring their corrosion resistance is treated. Materials on the composition and technical characteristics of high temperature fast reactor (BN-HT) are presented. Based on the results of high-temperature tests ( $T=900$  deg C and  $750$  deg C) is requested to be cooled to the appropriate temperature of sodium while holding the corrosion products on the surface of the mass transfer, including filters

Обсуждаются результаты исследований по созданию технологии натриевого теплоносителя при высоких температурах и концентрациях водорода для решения задач по созданию крупномасштабной атомно-водородной энергетики. Рассматриваются вопросы применения жаропрочных радиационно-стойких высокотемпературных конструкционных материалов, обеспечения их коррозионной стойкости. Представлены материалы по составу и техническим характеристикам РУ БН-ВТ. С учетом результатов

высокотемпературных опытов ( $T=900$  град С и  $750$  град С) предложено охлаждать натрий до необходимой температуры с одновременным удержанием продуктов коррозии на поверхности массообмена, включая фильтры

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## **Effect of tritium mass transfer on the parameters of sodium purification system from the hydrogen and tritium, behavior of corrosion products and purification from them in the fast reactor with sodium coolant to produce hydrogen**

**S21**

*Kozlov, F.A.; Sorokin, A.P.; Konovalov, M.A.; Alekseev, V.V.; Varseev, E.V.*

Vliyanie massoperenosa tritiya na parametry sistemy ochistki natriya ot vodoroda i tritiya, povedenie produktov korrozii i ochistka ot nikh v reaktore na bystrykh nejtronakh s natrievym teplonositelem dlya proizvodstva vodoroda

p. 58-72

(RU)

14 refs., 7 figs., 4 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itoги nauchno-tekhnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**SODIUM COOLED REACTORS; MASS TRANSFER; TRITIUM; COOLANT CLEANUP SYSTEMS; CORROSION PRODUCTS; TEMPERATURE RANGE 1000-4000 K; TEMPERATURE DEPENDENCE; HYDROGEN; HYDROGEN PRODUCTION**

The technique of calculating the characteristics of sodium purification system from the hydrogen and tritium with a view to ensuring the MLC of tritium in the finished product is performed. In view of the available results of high-temperature experiments (up to  $750$  deg C) a high retention efficiency of corrosion products suspensions on the filters installed in the low-temperature zone is shown. It is proposed to use a principle of the cold traps in the development of treatment systems. Sodium should be cooled to the required temperature with simultaneous retention of corrosion products on surfaces located in the devices. The minimum temperature in the cleaning systems from corrosion products is taken to be  $650$  deg C

Представлена методика расчета характеристик системы очистки натрия от водорода и трития с учетом обеспечения ПДК трития в готовом продукте. С учетом имеющихся результатов высокотемпературных опытов (до  $750$  град С) показана высокая эффективность удержания взвесей продуктов коррозии на фильтрах, установленных в низкотемпературной зоне. Предложено при разработке системы очистки использовать принцип работы холодных ловушек. Следует охлаждать натрий до необходимой температуры с одновременным удержанием продуктов коррозии на поверхностях, расположенных в устройствах. Минимальная температура в системах очистки от продуктов коррозии принята равной  $650$  град С

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## Mass transfer and corrosion of steel in sodium at high concentrations of hydrogen

S21

*Alekseev, V.V.; Sorokin, A.P.; Varseev, E.V.; Orlova, E.A.; Kondrat'ev, A.S.; Torbenkova, I.Yu.*

Massoperenos i korroziya stali v natrii pri vysokikh kontsentratsiyakh vodoroda

p. 73-83

(RU)

11 refs., 8 figs., 3 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

CORROSION PRODUCTS; MASS TRANSFER; TEMPERATURE RANGE 1000-4000 K; HYDROGEN; HYDROGEN PRODUCTION; TEMPERATURE DEPENDENCE; CONCENTRATION RATIO; STEEL-CR18NI10TI; CHROMIUM; NICKEL; SODIUM COOLED REACTORS

The results of the experimental investigations into the mass transfer in the cooling channel with increased hydrogen content in sodium at temperatures up to 750 deg C are discussed. The values of the critical pressures of methane depending on the hydrogen pressure over the steel and chromium content of the steel for different temperatures are calculated. Investigations into the rate of corrosion of steel Cr18Ni10T demonstrate that it exceeds the rate of corrosion calculated for pure sodium to hydrogen at the hydrogen content in sodium 6 million  $\cdot 10^{-1}$  value. The distribution of the flux density of corrosion products on the surface of the channel, which is consistent with the calculated values for chromium at a relative low content of oxygen, hydrogen and sodium is obtained. An increasing nickel deposited on the surface with increasing hydrogen content in sodium till 6 million  $\cdot 10^{-1}$  value at a temperature below 600 deg C is noted

Обсуждаются результаты экспериментального исследования массопереноса в охлаждаемом канале при повышенном содержании водорода в натрии при температуре до 750 град С. Рассчитаны значения критических давлений метана в зависимости от давления водорода над сталью и содержания хрома в стали для различных температур.

Исследования скорости коррозии образцов стали X18N10T показали, что при содержании водорода в натрии 6 млн  $\cdot 10^{-1}$  она превышает скорость коррозии, рассчитанную для чистого по водороду натрия. Получено распределение плотности потока продуктов коррозии на поверхности канала, которое согласуется с расчетными данными для хрома при относительном низком содержании кислорода и водорода в натрии. Отмечено увеличение никеля, осаждающегося на поверхности, при увеличении содержания водорода в натрии до 6 млн  $\cdot 10^{-1}$  при температуре ниже 600 град С

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## **Development of supercritical water reactors in Russia and abroad**

**S21**

*Glebov, A.P.; Klushin, A.V.*

Razvitie reaktorov, okhlazhdaemykh vodoj sverkhkriticheskikh parametrov, v Rossii i za rubezhom

p. 84-93

(RU)

13 refs., 8 figs., 3 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

WWER TYPE REACTORS; TEMPERATURE RANGE 0400-1000 K; REVIEWS; REACTOR CORES; FUEL CYCLE; REACTOR TECHNOLOGY; REACTOR SAFETY; PRESSURE RANGE MEGA PA 10-100; NUCLEAR FUELS

The results of Russian and foreign studies on the water-cooled high critical parameters reactors are analyzed. Developments on this subject are conducted in more than 15 countries. The advantages of WWER- SCP and characteristics of experimental reactor of WWER-SCP-30 are discussed. It is noted that priority task is to develop a reactor with thermal neutron spectrum with a subsequent transition to the reactor with a fast neutron spectrum

Проанализированы результаты зарубежных и российских исследований, посвященных реакторам, охлаждаемым водой высоккритических параметров. Разработки по данной тематике ведутся более чем в 15 странах. Обсуждаются преимущества ВВЭР-СКД и особенности экспериментального реактора ВВЭР-СКД-30. Отмечается, что первоочередной задачей является разработка реактора с тепловым спектром нейтронов с последующим переходом к реактору с быстрым спектром нейтронов

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## **Intensification of heat transfer in rod bundles in relation to the SCWR**

**S21**

*Bogoslovskaya, G.P.; Kirillov, P.L.*

Intensifikatsiya teploobmena v puchkakh sterzhnej primenitel'no k reaktoru VVEhR-SKD

p. 94-110

(RU)

36 refs., 10 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik  
ISBN 978-5-906512-53-6

Obninsk (RU)  
GNTs RF - FEhI

2014

352 p.

WWER TYPE REACTORS; HEAT TRANSFER; FUEL ELEMENTS; OPTIMIZATION;  
FUEL ASSEMBLIES; BELOYARSK-3 REACTOR; TEMPERATURE DEPENDENCE;  
REACTOR COOLING SYSTEMS; RESEARCH PROGRAMS

Effect of wire winding on the fuel elements on heat transfer rate and the level of heat fuel-element cladding, as well as the onset of the degraded mode of heat transfer in the flow of supercritical water was studied on the basis of available technical solutions and physics calculations. Estimates have shown that the presence of a wire winding increases heat exchange intensity in the 1.1-1.7 times. The greatest effect is achieved in the field of crossing over pseudocritical area. Thermal-hydraulic calculation of the experimental reactor WWER-SCP-30 core fuel assembly showed that the temperature of the fuel rod surface in the median section of the central zone of FA with upflow coolant will be lower by 55-70 deg C

Влияние проволочной навивки на ТВЭлах на интенсивность теплообмена и уровень температур оболочек ТВЭлов, а также на наступление режима ухудшенного теплообмена при течении воды сверхкритических параметров исследовано на основании имеющихся технических решений и физических расчетов. Оценки показали, что наличие проволочной навивки увеличивает интенсивность теплообмена в 1.1-1.7 раз. Наибольший эффект достигается в области перехода через псевдокритическую область. Теплогидравлический расчет ТВС активной зоны экспериментального реактора ВВЭР-СКД-30 показал, что температура поверхности ТВЭлов в срединном сечении центральной зоны ТВС с восходящим потоком теплоносителя будет ниже на 55-70 град С

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## **On thermal emission in the applied and fundamental research and development** **S21**

*Yarygin, V.I.; Pyshko, A.P.*

O meste termoechmissii v prikladnykh i fundamental'nykh issledovaniyakh i razrabotkakh  
p. 111-119

(RU)

15 refs., 8 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)  
GNTs RF - FEhI

2014

352 p.

SPACE VEHICLES; THERMIONIC EMISSION; SPACE POWER REACTORS; RESEARCH PROGRAMS; OPTIMIZATION; ELECTRIC CONDUCTIVITY; FUEL ELEMENTS; REACTOR TECHNOLOGY; THERMIONIC CONVERTERS

Work continues analytical studies realizing in Russia and abroad in the field of research and development of space nuclear power and radionuclide energetics. The questions of creation and justification of characteristics of thermionic nuclear power unit of the 2nd generation are treated. To satisfy the tactical and technical requirements of NPP 2nd generation is necessary to modernize the current design solutions with unified electrogenerating channels (EGC) with separated fuel element and interelectrode gap. Lowering voltage EGC is possible on the basis of single-channel and multi-element combination of EGC

Работа продолжает аналитические исследования ведущихся в России и за рубежом НИОКР в области космической ядерной и радионуклидной энергетики. Рассмотрены вопросы создания и обоснования характеристик термоэмиссионных ЯЭУ 2-го поколения. Для удовлетворения тактико-технических требований ЯЭУ 2-го поколения необходима модернизация текущих проектных решений с использованием унифицированного электрогенерирующего канала (ЭГК) с разделенными ТВЭЛ и межэлектродным зазором. Снижение электронапряженности ЭГК возможно на базе одноканального многоэлементного и комбинированного ЭГК

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**Fission energy conversion in the optical radiation in condensed matter**  
**S75**

*Seregin, A.A.; Seregina, E.A.; Tikhonov, G.V.*

Преобразование энергии деления атомных ядер в оптическое излучение в конденсированных средах

p. 120-130

(RU)

32 refs., 5 figs., 1 tab.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatие Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tekhnicheskoj deyatel'nosti Instituta yadernyx reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

RADIOLUMINESCENCE; CRYSTALS; YTTRIUM OXIDES; ALUMINIUM OXIDES; PLUTONIUM 239; SPECTRA; CONVERSION; URANIUM 235; DYSPROSIUM COMPLEXES; NEODYMIUM COMPLEXES

This work comprises two parts. The first part is devoted to the study of the impact of high-energy excitation by heavy charged particles on the spectral properties of the neodymium in the solid-state laser materials. The second part presents the results of a study of dysprosium radioluminescence in uranium-containing inorganic liquids. Obtaining experimental data and analyzing the properties of laser crystal Y<sub>3</sub>Al<sub>5</sub>O<sub>12</sub>: Nd<sup>3+</sup> and neodymium phosphate

glasses when they are irradiated with  $\alpha$ -particles  $^{239}\text{Pu}$  and spontaneous fission fragments  $^{252}\text{Cf}$  is considered. Comparative analysis of experimental and theoretical data showed the possibility of creating a uranium-containing heavy water active medium based on  $\text{Dy}^{3+}$  decavanadate complexes to convert the energy of the uranium nuclei fission fragments in the optical radiation of predetermined wavelength range

Представленная работа содержит две части. Первая часть посвящена исследованию влияния высокоэнергетического возбуждения тяжелыми заряженными частицами на спектральные свойства неодима в твердотельных лазерных материалах. Во второй части представлены результаты исследования радиolumинесценции диспрозия в урансодержащих неорганических жидкостях. Рассматривается получение экспериментальных данных и проведение анализа лазерных свойств кристалла  $\text{Y}_3\text{Al}_5\text{O}_{12}:\text{Nd}^{3+}$  и неодимовых фосфатных стекол при их облучении  $\alpha$ -частицами  $^{239}\text{Pu}$  и осколками спонтанного деления  $^{252}\text{Cf}$ . Сравнительный анализ экспериментальных и расчетных данных показал возможность создания урансодержащей тяжеловодной активной среды на основе декаванадатных комплексов  $\text{Dy}^{3+}$  для преобразования энергии осколков деления ядер урана в оптическое излучение в заданном диапазоне длин волн

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## **Radioluminescent method for measuring the energy deposition radial distribution of the fission fragments in a cylindrical laser-active element**

### **S75**

*Dyuzhov, Yu.A.; Poletaev, E.D.; Smol'skij, V.N.; Suvorov, A.A.*

Radioluminescentnyj metod izmereniya radial'nogo raspredeleniya ehnergovklada oskolkov deleniya v tsilindricheskom lazerno-aktivnom ehlemente

p. 131-141

(RU)

25 refs., 4 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**RADIOLUMINESCENCE; SPATIAL DISTRIBUTION; NUCLEAR PUMPING; LASERS; FISSION PRODUCTS; EXCITATION; IONIZATION; MONTE CARLO METHOD**

The experimental method for measuring the radial profile of the fission fragments energy deposition in the gas medium of laser-active element (LAEL) is investigated. Application of radioluminescent method is based on the assumption that the radioluminescence brightness depends linearly on the energy deposition of the fission fragments. The experiments were performed using a pulsed nuclear reactor BARS-6. Comparing radial distributions of the luminescence measured for a mixture of He:Ar=3:1 at a pressure of 1.03 atm and laser mixtures He:Ar:Xe=600:200:1 at the same pressure indicated their essential difference. The simulation of



Monte Carlo method shows satisfactory agreement between registered and received calculated model of profiles using the square law of fission fragments slowdown

Исследовался экспериментальный метод измерения радиального профиля энерговклада осколков деления в газовую среду лазерно-активного элемента (ЛАЭЛ). Применение радиолюминесцентного метода основано на предположении, что яркость радиолюминесценции линейно зависит от энерговклада осколков деления. Эксперименты проводились на импульсном ядерном реакторе БАРС-6. Сравнение радиальных распределений люминесценции, измеренных для смеси He:Ar=3:1 при давлении 1.03 атм и лазерной смеси He:Ar:Xe=600:200:1, при том же давлении показало их существенное различие. Проведенное моделирование методом Монте-Карло показывает удовлетворительное согласие регистрируемых и получаемых расчетных модельных профилей при использовании квадратичного закона торможения осколков деления

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## **Adaptation of GAMOS software package to solving problems of calculating radiation protection of space NPU**

**S21**

*Ekhlakov, I.A.; Alekseev, P.A.; Plotnikov, A.Yu.; Pyshko, A.P.*

Adaptatsiya programmnoy kompleksa GAMOS k resheniyu zadach rascheta radiatsionnoy zashchity YaEhU kosmicheskogo naznacheniya

p. 142-148

(RU)

11 refs., 2 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyy Nauchnyy Tsentr Rossiyskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**RADIATION PROTECTION; SPACE POWER REACTORS; COMPUTERIZED SIMULATION; PROGRAMMING; REACTOR SAFETY**

To solve the problems of calculation of space NPU radiation protection the possibility of using complex software GAMOS, based on GEANT4 library system is considered. User modules, embedded in GAMOS are offered. A comparison of the calculations results of the characteristics of the reactor radiation fields, including local assessment of flow in GAMOS architecture and certified MCNP software complex is conducted. The high availability of the modified GAMOS to the calculations of radiation protection of space NPU is demonstrated

Для решения задач расчета радиационной защиты космических ЯЭУ рассмотрена возможность применения программного комплекса GAMOS, основанной на системе библиотек GEANT4. Предложены пользовательские модули, встраиваемые в GAMOS. Проведено сравнение результатов расчетов характеристик полей реакторных излучений, включая локальную оценку потока в архитектуре GAMOS и аттестованном программном

комплексе MCNP. Показана высокая пригодность модифицированной GAMOS к расчетам радиационной защиты космических ЯЭУ

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## **Improving indirect methods for determining heat output of thermionic power generation assembly**

**S21**

*Vinogradov, E.G.; Linnik, V.A.; Pyshko, A.P.; Yarygin, V.I.*

Sovershenstvovanie kosvennykh metodov opredeleniya teplovoj moshchnosti termoemissionnoj ehlektrogeneriruyuhchej sborki

p. 149-154

(RU)

6 refs., 1 fig.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

SPACE POWER REACTORS; THERMIONIC EMISSION; THERMIONIC CONVERSION; THERMIONIC FUEL ELEMENTS; FUEL ASSEMBLIES; ELECTRIC CONDUCTIVITY; OPTIMIZATION

A method for determining the thermal power of thermionic electric generating assembly (EGA) just for her isothermal experimental current-voltage characteristic (CVC) without involving indications of direct charging sensor is provided. To analyze the experimental isothermal and isopower CVC the analytical formula of CVC is displayed for one electricity generating element. These experiments allow to design the device, showing the thermal power of thermionic assembly

Предложен способ определения тепловой мощности термоэмиссионной электрогенерирующей сборки (ЭГС) только по ее изотермической экспериментальной вольтамперной характеристике (ВАХ) без привлечения показаний датчика прямой зарядки. Для анализа экспериментальных изотермических и изомощностных ВАХ выводится аналитическая формула ВАХ одного электрогенерирующего элемента. Проведенные исследования позволяют спроектировать прибор, показывающий тепловую мощность термоэмиссионной сборки

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## **Features of the closure of the nuclear fuel cycle in Russia**

**S21**

*Glebov, A.P.; Klushin, A.V.; Baranaev, Yu.D.*

Osobennosti realizatsii zamykaniya toplivnogo tsikla v Rossii

p. 155-168

(RU)

17 refs., 6 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itoги nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

WWER TYPE REACTORS; LMFBR TYPE REACTORS; NUCLEAR POWER; REVIEWS; CHINA; FRANCE; INDIA; JAPAN; REPUBLIC OF KOREA; FUEL CYCLE; REACTOR COOLING SYSTEMS

The strategy for the development of nuclear energy and a closed fuel cycle (CFC) in such foreign countries as China, France, India, Japan, Korea, as well as the features of the development of nuclear energy and CFC in Russia is discussed. When using the BN and BREST reactors are not solved all the problems with CFC. The introduction of the WWER-SCP reactor will help solve problems with CFC. Improving the economy, the implementation of a deep burning of minor actinides, a significant reduction in nuclear hazardous work, the use of the produced during the processing of spent nuclear fuel (U+Pu) - prospects for using WWER-SCP

Обсуждается стратегия развития атомной энергетики и замкнутого топливного цикла (ЗТЦ) в таких зарубежных странах, как Китай, Франция, Индия, Япония, Корея, а также особенности развития атомной энергетики и ЗТЦ в России. При использовании реакторов БН и БРЕСТ решаются не все проблемы с ЗТЦ. Внедрение реактора ВВЭР-СКД поможет решению проблем с ЗТЦ. Улучшение экономики, осуществление глубокого выжигания младших актинидов, существенное сокращение ядерно-опасных работ, использование нарабатываемых в процессе переработки О (U+Pu) - перспективы применения реактора ВВЭР-СКД

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## **Analysis of radiation aspects of uranium recycle in a closed fuel cycle of high-power BN-type reactor**

**S21**

*Klinov, D.A.; Levanova, M.V.; Khokhlov, G.N.; Tsikunov, A.G.*

Analiz radiatsionnykh aspektov retsikla urana v zamknutom toplivnom tsikle reaktora tipa BN bol'shoj moshchnosti

p. 169-176

(RU)

4 refs., 4 figs., 5 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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god. Nauchno-tehnicheskij sbornik  
ISBN 978-5-906512-53-6

Obninsk (RU)  
GNTs RF - FEhI

2014

352 p.

LMFBR TYPE REACTORS; FUEL ASSEMBLIES; URANIUM RECYCLE; MIXED OXIDE  
FUELS; URANIUM 235; URANIUM 237; ISOTOPE RATIO; DOSE RATES

The radiation exposure of personnel during manufacturing operations with non-irradiated fuel assemblies based on reprocessed uranium under conditions of MOX fuel multiple recycling of the reactor core and depleted uranium of the reactor BN reproducing screens is considered. Artificial radionuclides  $^{235}\text{U}$  and  $^{237}\text{U}$  in the recovered uranium are the most significant. The results of calculations of the isotopic composition of the recovered uranium fuel and breeding fuel assemblies, dose rates of fresh fuel and breeding fuel assemblies from reprocessed uranium are given

Рассматривается радиационное воздействие на персонал при проведении технологических операций с необлученными ТВС на основе регенерированного урана в условиях многократного рецикла МОХ-топлива активной зоны и обедненного урана воспроизводящих экранов реактора типа БН. Наиболее значимыми являются искусственные радионуклиды  $^{235}\text{U}$  и  $^{237}\text{U}$  в регенерированном уране. Приведены результаты расчетов изотопного состава регенерированного урана топливных и воспроизводящих ТВС, мощностей доз от свежих топливных и воспроизводящих сборок из регенерированного урана

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## **On the need for alignment of the isotopic composition of plutonium for the starting load of fast reactors**

**S21**

*Korobejnikova, L.V.; Eliseev, V.A.; Makulin, P.A.; Bur'evskij, I.V.; Demeneva, I.V.*

O neobkhodimosti vyravnivaniya izotopnogo sostava plutoniya dlya startovoj zagruzki bystrykh reaktorov

p. 177-181

(RU)

5 refs., 1 fig., 3 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)  
GNTs RF - FEhI

2014

352 p.

PLUTONIUM ISOTOPES; ISOTOPE RATIO; FAST REACTORS; FUEL ASSEMBLIES;  
REACTOR FUELING; REACTOR OPERATION; REACTOR CORES; REACTOR SAFETY

On the example of model of reactor BREST-300 investigations are performed, which shows that the averaging composition of plutonium for the manufacture of the starting load is not necessarily even at very high deviations of the isotope ratio. Various ways of placing the fuel assembly with deviations of plutonium composition are treated. It is shown that close to the chaotic (rotational) location of the fuel assembly with the core deviations practically no effect on the characteristics. With the help of the central-peripheral location of the fuel assembly can be even within a small range to adjust the reactivity of the reactor, but this have weak effect on heat emission and fuel burnup

На примере модели реактора БРЕСТ-300 выполнены исследования, которые показали, что усреднение состава плутония для изготовления стартовой загрузки не обязательно даже при очень высоких отклонениях содержания изотопов. Рассмотрены различные способы расстановки ТВС с отклонениями состава плутония. Показано, что близко к хаотичному (чередующееся) расположение ТВС с отклонениями по активной зоне практически не сказывается на характеристиках. С помощью центрально-периферийного расположения ТВС можно даже в небольших пределах корректировать реактивность реактора, но на тепловыделениях и выгорании топлива это сказывается слабо

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## **Ways to improve the inherent safety of sodium fast reactors on the oxide and nitride fuel**

**S21**

*Matveev, V.I.; Eliseev, V.A.; Malysheva, I.V.; Bur'evskij, I.V.; Maslov, P.A.*

Puti povyshebiya vnutrennej samozashchishchennosti bystrykh natrievykh reaktorov na oksidnom i nitridnom toplive

p. 182-188

(RU)

11 refs., 1 fig., 4 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**SODIUM COOLED REACTORS; FAST REACTORS; MIXED NITRIDE FUELS; MIXED OXIDE FUELS; REACTOR SAFETY; REACTOR CORES; REACTOR TECHNOLOGY**

It is shown that a necessary precondition for the internal safety of the reactor is the simultaneous achievement of near zero values of the sodium void effect of radioactivity and reactivity margin to burn, that possibly and nitride, and oxide fuel. In both cases it is necessary to increase the volume fraction of the fuel in the core: in the case of oxide fuel - up to 0.51, in the case of a nitride - up to 0.50 and to expand active core to the maximum size (468 FA). For nitride core all requirements to improve the self-protection of reactors, including nuclear non-proliferation are in progress. All requirements of #Left Double Quotation Mark#Nuclear Safety Rules#Right Double

Quotation Mark# are performed in all cases, except for the basic version of the core, for which compensatory measures are designed

Показано, что необходимым для внутренней безопасности реактора условием является одновременное достижение близких к нулю значений натриевого пустотного эффекта радиоактивности и запаса реактивности на выгорание, что возможно и на нитридном, и на оксидном топливе. В обоих случаях необходимо увеличить объемную долю топлива в активной зоне (в случае оксидного топлива - до 0.51, в случае нитридного - до 0.50) и расширить активную зону до максимально допустимого размера (468 ТВС). Для нитридной активной зоны выполняются все требования по повышению самозащищенности реакторов, включая ядерное нераспространение. Все требования #Left Double Quotation Mark#Правил ядерной безопасности#Right Double Quotation Mark# выполняются во всех случаях, кроме базового варианта активной зоны, для которого разработаны компенсирующие мероприятия

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## **Computational-experimental substitution of nitride fuel for the high-power BN-type reactor**

**S21**

*Eliseev, V.A.; Klinov, D.A.; Manturov, G.N.; Mikhajlov, G.N.; Surov, S.V.*

Raschetno-ehksperimental'noe obosnovanie nitridnogo topliva dlya reaktora tipa BN bol'shoj moshchnosti

p. 189-193

(RU)

9 refs., 5 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**BELOYARSK-3 REACTOR; COMPUTER CALCULATIONS; MIXED NITRIDE FUELS; MIXED OXIDE FUELS; FUEL ASSEMBLIES; VERIFICATION; ERRORS; FUEL RODS**

In support of the program justification of nitride fuel researches and calculations of the combined experimental fuel assembly (CEFA) in the active area of the BN-600 are conducted. Combined experimental assemblies comprise 4 nitride fuel elements, the remaining fuel elements are oxides. Cross-verification calculations of fuel rods exposure parameters are made using the codes for the calculations of neutron-physical characteristics of the nitride fuel. Three experimental models: the base assembly (without nitride FA); assembly with the layout of the FA with uranium nitride fuel; assembly with the layout of the FA with uranium-plutonium nitride (MNUP) fuel are considered. It is shown that the ratios of fission cross sections are within the errors, and do not depend on fuel CEFA

В поддержку программы обоснования нитридного топлива проведены исследования и расчеты комбинированной экспериментальной сборки (КЭТВС) в активной зоне БН-600. Комбинированные экспериментальные сборки содержат по 4 нитридных твэла, остальные твэлы оксидные. Кросс-верификационные расчеты параметров облучения твэлов выполнены с использованием кодов для расчетов нейтронно-физических характеристик нитридного топлива. Рассматривались три экспериментальные модели: базовая сборка (без нитридной ТВС); сборка с макетом ТВС с нитридным урановым топливом; сборка с макетом ТВС с нитридным уран-плутониевым (СНУП) топливом. Показано, что отношения сечений деления находятся в пределах погрешности и не зависят от топлива КЭТВС

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## **Feasibility study in support of the high-power BN-type reactor project**

### **S21**

*Dekusar, V.M.; Kolesnikova, M.S.; Chizhikova, Z.N.; Reshetnikova, L.N.*

Tekhniko-ehkonomicheskie issledovaniya v obosnovanie proekta reaktora tipa BN bol'shoj moshchnosti

p. 194-207

(RU)

5 refs., 2 figs., 4 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatие Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**LMFBR TYPE REACTORS; LIQUID METAL COOLED REACTORS; FEASIBILITY STUDIES; REACTOR OPERATION; NUCLEAR FUELS; URANIUM; PLUTONIUM; FUEL CYCLE; LIFE-CYCLE COST**

Investigations into constant (for the whole operation cycle of the reactor) fuel factor of cost (FFC) of electricity production at NPP with fast reactor BN of high power on mixed uranium-plutonium fuel in a closed nuclear fuel cycle are conducted. Technique of total costs (discounted cash flow), and based on its computer FCCBNN code was used for the purpose of the correct account time difference fuel costs during its operation cycle. The analysis of prices for the main process stages of nuclear fuel cycle, resulting from the implementation of feasibility studies in support of the closed fuel cycle of fast reactors is conducted. It is shown that a decisive contribution to FFC makes the cost of nuclear fuel fabrication

Проведены исследования постоянной (за весь жизненный цикл реактора) топливной составляющей стоимости (ТСС) производства электроэнергии на АЭС с быстрым реактором БН большой мощности на смешанном уран-плутониевом топливе в замкнутом ядерном топливном цикле. С целью корректного учета разновременности затрат на топливо в процессе его жизненного цикла использовалась методика приведенных затрат (дисконтирование денежных потоков) и основанный на ней компьютерный код FCCBNN.

Проведен анализ цен на основные переделы ЯТЦ, полученных в результате выполнения технико-экономических исследований в обоснование замкнутого топливного цикла быстрых реакторов. Показано, что решающий вклад в ТСС вносит стоимость изготовления ядерного топлива

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## **The method of equivalent difference of the boundary value problems reduction of neutron transport theory to systems of nonlinear algebraic equations**

**S97**

*Abramov, B.D.*

Metod ehkvivalentnykh raznostej redukcii kraevykh zadach teorii perenosa nejtronov k sistemam nelinejnykh algebraicheskikh uravnenij

p. 208-218

(RU)

10 refs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**NEUTRON TRANSPORT THEORY; NONLINEAR PROBLEMS; INTEGRAL EQUATIONS; MATHEMATICS; REACTOR SAFETY; REACTOR KINETICS; FUNCTIONALS**

New methods of numerical solution of stationary and non-stationary problems of neutron transport theory and the theory of nuclear reactors by reduction to systems of nonlinear algebraic equations in the most important reactor functionals of integral type to the spatial cells of the reactor, the energetic groups and time intervals, neutron flux, integral unilateral flux through the faces of cells, reaction rates are viewed. Circuits of methods for solving inhomogeneous boundary problems such as protection of nuclear reactor, calculation of accelerator driven reactors are presented. Schemes of method for solving homogeneous conditionally critical tasks are given. Schemes of method for unsteady flows are described

Рассмотрены новые методы численного решения стационарных и нестационарных задач теории переноса нейтронов и теории ядерных реакторов путем редукции к системам нелинейных алгебраических уравнений относительно важнейших реакторных функционалов типа интегральных по пространственным ячейкам реактора, энергетическим группам и интервалам времени, потокам нейтронов, интегральных односторонних токов через грани ячеек, скорости реакций. Излагаются схемы методов для решения неоднородных краевых задач типа защиты ядерного реактора, расчета электроядерных реакторов. Приводятся схемы метода для решения однородных условно критических задач. Описаны схемы метода для решения нестационарных задач

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## **The activity of technological media of the primary coolant circuit in high-power BN-type reactor**

**S21**

*Zhilkin, A.S.; Zabrodskaya, S.V.; Popov, E.P.; Boltunov, A.N.; Mikhajlov, A.N.*

Aktivnost' tekhnologicheskikh sred pervogo kontura reaktora tipa BN bol'shoj moshchnosti p. 219-223

(RU)

3 refs., 2 figs., 2 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**BELOYARSK-3 REACTOR; WWER TYPE REACTORS; COMPARATIVE EVALUATIONS; FEASIBILITY STUDIES; PRIMARY COOLANT CIRCUITS; REACTOR SAFETY; DOSE RATES; NEON 23; ARGON 41; ENVIRONMENTAL EFFECTS; SECONDARY COOLANT CIRCUITS**

Comparison of the project of last development reactor with earlier projects, such as the BN-800 in connection with activity of technological media was produced. It is noted that the totality of the technical solutions ensure the competitiveness of the developed power unit on the technical-economic indicators with WWER similar power. The adopted technical solutions in the field of radiation protection provide a reduction in its own activity of coolant in the primary coolant circuit is about 2 times, and a reduction in the dose rate of gamma radiation from the secondary coolant circuit is approximately 2 times. Specific activity of Ar<sup>41</sup> in a gas cavity of reactor (GCR) for high power reactor is about 5 times less than for BN-800. For more short-lived nuclide of Ne<sup>23</sup> decrease of specific activity in the GCR was 30 times. Therefore it is possible to expect reduction of emissions into the atmosphere for large power reactors

Произведено сравнение проекта реактора последней разработки с более ранними проектами, такими как БН-800, по активности технологических сред. Отмечается, что совокупность принятых технических решений обеспечивает конкурентоспособность разрабатываемого энергоблока по технико-экономическим показателям с энергоблоками ВВЭР аналогичной мощности. Принятые технические решения в области радиационной защиты обеспечивают снижение собственной активности теплоносителя в первом контуре реактора примерно в 2 раза, а также снижение мощности дозы гамма-излучения от оборудования второго контура примерно в 2 раза. Удельная активность Ar<sup>41</sup> в газовой полости реактора (ГПР) для реактора большой мощности примерно в 5 раз меньше, чем для БН-800. Для более короткоживущего нуклида Ne<sup>23</sup> уменьшение удельной активности в ГПР составило 30 раз. Поэтому для реакторов большой мощности можно ожидать снижения выбросов в атмосферу

## Characterization of polonium output from heavy liquid metal coolants into the gas phase according to experimental data of SSC RF IPPE

S22

*Gonchar, N.I.*

Opređenje kharakteristik vykhoda poloniya iz TZhMT v gazovuyu fazu po ehksperimental'nym dannym GNTs RF-FEhI

p. 224-235

(RU)

15 refs., 7 figs., 1 tab.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

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ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

POLONIUM 210; LIQUID METALS; EVAPORATION; REACTOR COOLING SYSTEMS; LEAD; BISMUTH; LITHIUM; COMPARATIVE EVALUATIONS; TEMPERATURE RANGE 0400-1000 K; TEMPERATURE RANGE 1000-4000 K; REACTOR SAFETY

The analysis of experimental data of SSC RF IPPE to determine the exit velocity of  $^{210}\text{Po}$  from heavy liquid metal coolants (HLMC), including from the lead is conducted. Comparison of characteristics of the  $^{210}\text{Po}$  output from lead-bismuth and lead-lithium eutectic derived from the SSC RF IPPE data confirms the accuracy of these results. Based on the analysis of experimental data formula for the temperature dependence of the thermodynamic activity of polonium in the lead was derived. In the temperature range 500-800#Degree Sign# C the good convergence of polonium effective pressure values in the lead-bismuth eutectic obtained by different researchers is marked. There is a significant excess of the measured rate of evaporation of polonium from all considered HLMC at 300-400#Degree Sign# C over the estimated

Проведен анализ экспериментальных данных ГНЦ РФ-ФЭИ по определению скорости выхода  $^{210}\text{Po}$  из тяжелых жидкометаллических теплоносителей (ТЖМТ), в том числе из свинца. Сравнение характеристик выхода  $^{210}\text{Po}$  из свинцово-висмутовой и свинцово-литиевой эвтектики, полученных из данных ГНЦ РФ-ФЭИ, подтверждает достоверность этих результатов. На основании анализа экспериментальных данных выведена формула температурной зависимости коэффициента термодинамической активности полония в свинце. В области температур 500-800#Degree Sign# C отмечена хорошая сходимость значений эффективного давления полония в свинцово-висмутовой эвтектике, полученных различными исследователями. Наблюдается заметное превышение измеренной скорости испарения полония из всех рассмотренных ТЖМТ при 300-400#Degree Sign# C над расчетной

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**The problem of feasibility of graphite stack resource of Bilibino NPP EGL-6**

## reactors

### S21

*Baranaev, Yu.D.; Kharizomentov, Yu.V.*

Problemy obosnovaniya resursa grafitovoj kladki reaktorov EhGP-6 ehnerglobokov Bilibinskoj AEhS

p. 236-250

(RU)

3 refs., 6 figs., 3 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tekhnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**BILIBIN REACTOR; REACTOR CORES; FEASIBILITY STUDIES; REACTOR OPERATION; NUCLEAR POWER PLANTS; STRAIN AGING; GRAPHITE**

Methodical bases of determining the state of the graphite stack Bilibino NPP reactor and an assessment of its current state are explained. To evaluate the technical condition and forecasting of a residual resource of graphite stack following tools were used: direct systematic observation, selection of graphite samples. Estimates in the description of temperature and radiation mode of operation of the graphite stack and analysis of stress-strain state of the graphite blocks are carried out. The analysis of the curvature measurements of graphite columns of stack EGP-6 reactor are given. Measurements of values of the telescopic connection of tracts (TCT) and the forecast of changes in TCT of reactor EGP-6 are conducted

Изложены методические основы определения состояния графитовой кладки реактора Билибинской АЭС и представлена оценка ее текущего состояния. Для оценки технического состояния и прогнозирования остаточного ресурса графитовой кладки применялись следующие средства: прямое систематическое наблюдение, отбор проб графита. Проведены расчетные оценки при описании температурного и радиационного режима эксплуатации графитовой кладки и анализ напряженно-деформированного состояния графитовых блоков. Представлен анализ измерений кривизны графитовых колонн кладки реактора ЭГП-6. Проведены измерения величины телескопического соединения трактов (ТСТ) и дан прогноз изменения ТСТ реактора ЭГП-6

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## **The temperature fields and heat transfer of fuel rods ribbed simulators cooled by liquid metal (finning #Left Double Quotation Mark#edge on edge#Right Double Quotation Mark#)**

### S22

*Zhukov, A.V.; Kuzina, Yu.A.; Privezentsev, V.V.; Sorokin, A.P.; Rymkevich, K.S.; Burkova, I.V.*

Temperaturnye polya i teplootdacha orebrennykh imitatorov tvehlov, okhlazhdaemykh zhidkim metallom (orebrenie #Left Double Quotation Mark#rebro po rebru#Right Double Quotation

Mark#)

p. 251-262

(RU)

9 refs., 9 figs., 1 tab.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

HEAT TRANSFER; THERMAL HYDRAULICS; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE DEPENDENCE; FUEL RODS; SIMULATION; SIMULATORS

The heat transfer, the overall temperature rises and the temperature rise under the distancing ribs of fuel elements measuring simulators in the assembly model with  $s/d=1.33$  are considered. Recommendations are given for the calculation of temperature rise under the ribs, the overall varying temperature of the central, lateral, angular imitators of fuel elements, formula for heat transfer coefficients of imitators of fuel elements and the maximum varying temperature of coolant along the radius of model assembly. The effect of the fall of the heat transfer coefficient of the finned fuel elements is negligible at small relative steps of fuel elements ( $s/d < 1.15$ ), when the distancing ribs on the fuel rods are small and almost no effect on the temperature rise below the ribs

Рассматриваются теплоотдача, общие подъемы температуры и подъем температуры под дистанцирующими ребрами измерительных имитаторов твэлов в модельной сборке с  $s/d=1.33$ . Даны рекомендации для расчетов подъема температуры под ребрами, общих неравномерностей температуры центрального, бокового, углового имитаторов твэлов, формулы для коэффициентов теплоотдачи имитаторов твэлов, а также максимальных неравномерностей температуры теплоносителя по радиусу модельной сборки. Эффект падения коэффициента теплоотдачи оребренных твэлов незаметен при малых относительных шагах твэлов ( $s/d < 1.15$ ), когда дистанцирующие ребра на твэлах малы и практически не оказывают влияния на подъемы температуры под ребрами

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## **Experimental investigations of sodium boiling in the model of fuel assemblies in support of the fast reactors safety of the new generation**

**S21**

*Khafizov, R.R.; Ivanov, E.F.; Privezentsev, V.V.; Sorokin, A.P.; Volkov, A.V.; Ashurko, Yu.M.; Kumskoj, V.V.*

Ehksperimental'nye issledovaniya kipeniya natriya v modeli TVS v obosnovanie bezopasnosti reaktorov na bystrykh nejtronakh novogo pokoleniya

p. 263-270

(RU)

17 refs., 3 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*  
Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)  
Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection  
Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik  
ISBN 978-5-906512-53-6  
Obninsk (RU)  
GNTs RF - FEhI  
2014  
352 p.  
FAST REACTORS; FUEL ASSEMBLIES; REACTOR SAFETY; SODIUM; LIQUID METALS; BOILING; LOSS OF FLOW; CRITICAL FLOW

For the analysis and validation of the promising fast reactor safety, enquiry of design solutions, obtaining data for verification of computer code COREMLET in SSC RF IPPE preparations to series of experiments on the study of heat transfer in the event of modes with boiling sodium coolant in model fuel assemblies of the fast reactor core are carried out. It is shown that due to the intense heat transfer at boiling lengthy heat removal is carried out from the fast nuclear reactor core in emergency conditions. The next phase of experiments devoted to the study of two-phase flow of liquid metal coolant at moderate heat fluxes applied to the fuel assembly geometry with sodium cavity

Для анализа и обоснования безопасности перспективных реакторных установок на быстрых нейтронах, проверки конструкционных решений, получения данных для верификации расчетного кода COREMLET в ГИЦ РФ-ФЭИ проведена подготовка к серии экспериментов по изучению теплообмена при возникновении режимов с кипением натриевого теплоносителя в модельных ТВС активной зоны реактора на быстрых нейтронах. Показано, что за счет интенсивного теплообмена при кипении осуществляется длительный отвод тепла из активной зоны реакторов на быстрых нейтронах в аварийных условиях работы. Следующий этап экспериментов посвящен исследованию течения двухфазного потока жидкометаллического теплоносителя при умеренных тепловых потоках применительно к геометрии ТВС с натриевой полостью

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## **Laws of formation and methods for determining the hydraulic unevenness at the outlet from the heat exchangers axisymmetric collector systems and NPU reactors**

**S21**

*Gabrianovich, B.N.; Del'nov, V.N.*

Zakonomernosti formirovaniya i metodiki opredeleniya gidravlicheskih neravnomernostej na vykhode iz osesimmetrichnykh kollektornykh sistem teploobmennikov i reaktorov YaEhU  
p. 271-290  
(RU)

36 refs., 8 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)  
Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the

year 2013. Scientific and technical collection

Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

HYDRODYNAMICS; LIQUID FLOW; DUAL CYCLE COOLING SYSTEMS; LMFBR TYPE REACTORS; OPTIMIZATION; WWER TYPE REACTORS; HEAT EXCHANGERS; HYDRAULIC FLUIDS

The results of experimental studies of hydrodynamic flow parts of collector systems (CS) on the flat and cylindrical shape models are presented. Semiempirical correlations to determine the mass rate of the coolant at the outlet of the CS and the previously unknown general pattern of forming hydraulic irregularities at the exit from CS of intermediate heat exchanger of the second circuit of the reactor unit (RU) BN, and CS RU WWER are given. Received results allow to provide the hydrodynamic optimization of flow parts of the axisymmetric CS of reactors and heat exchangers of NPP

Представлены результаты экспериментальных исследований гидродинамически проточных частей коллекторных систем (КС) на моделях плоской и цилиндрической формы. Приведены полуэмпирические соотношения по определению распределения массового расхода теплоносителя на выходе из КС и неизвестная ранее общая закономерность формирования гидравлических неравномерностей на выходе из КС промежуточного теплообменника второго контура реакторной установки (РУ) типа БН и КС РУ типа ВВЭР. Полученные результаты позволяют обеспечить гидродинамическую оптимизацию проточных частей осесимметричных КС реакторов и теплообменников ЯЭУ

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## **Experimental study of heat transfer in a transverse flow around the heat exchanger tubes bank by lead**

**S22**

*Berezin, A.N.; Grabezhnaya, V.A.; Mikheev, A.S.; Parfenov, A.S.*

Ehksperimental'noe issledovanie teploobmena pri poperechnom obtekaniy svintsom puchka teploobmennykh trub

p. 291-301

(RU)

9 refs., 7 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

## HEAT TRANSFER; FLUID FLOW; REACTOR COOLING SYSTEMS; HEAT EXCHANGERS; TUBES; LEAD; LIQUID METALS

The results of the work to determine the heat transfer coefficient in crossflow by lead of pipes are presented. The study was conducted at supercritical pressure in the water circuit. There was a significant inequality in the distribution of the heat flow in different rows of the bundle of heat exchange tubes of corridor location at crossflow their lead. The experimentally determined heat transfer coefficients from the lead differ substantially from those generally accepted recommendations for the calculation of heat transfer at cross flow of rod bundle by liquid metal. The experimental results are close to those obtained earlier on the model with cross flow of heat exchanger tubes bundle by lead alloy with bismuth

Представлены результаты работ по определению коэффициента теплообмена при поперечном обтекании свинцом труб. Исследование проводилось при сверхкритическом давлении в контуре воды. Отмечена существенная неравномерность в распределении теплового потока в разных рядах пучка теплообменных труб коридорного расположения при поперечном обтекании их свинцом. Экспериментально определенные коэффициенты теплообмена со стороны свинца существенно отличаются от общепринятых рекомендаций по расчету теплообмена при поперечном обтекании пучка стержней жидким металлом. Результаты экспериментов близки к данным, полученным ранее на модели с поперечным обтеканием пучка теплообменных труб сплавом свинца с висмутом

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### **Influence of #Left Double Quotation Mark#whirlwind#Right Double Quotation Mark# mixing grids on the critical power of WWER fuel assembly** **S21**

*Selivanov, Yu.F.; Pomet'ko, R.S.; Volkov, S.E.*

Vliyanie peremeshivayushchikh reshetok tipa #Left Double Quotation Mark#vikhr'#Right Double Quotation Mark# na kriticheskuyu moshchnost' TVS VVEhR  
p. 302-314  
(RU)

1 ref., 14 figs., 4 tabs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)  
Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection  
Itogi nauchno-tekhneskoj deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tekhneskij sbornik  
ISBN 978-5-906512-53-6  
Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

## WWER TYPE REACTORS; FUEL ASSEMBLIES; FREONS; BOILING; REACTOR LATTICES; CONFIGURATION; REACTOR CELLS; OPTIMIZATION; CRITICAL FLOW

The problem of optimizing the number and placement of lattices in different types assemblies is discussed. The effect of the amount of mixing lattices and their locations in assemblies on the conditions of occurrence of boiling crisis in the fuel assembly on its critical power (power of assembly in case of boiling crisis) is studied. Experiments were carried out with the use of freon

as a coolant. It is recommended simultaneous use in the assembly of lattices of #Left Double Quotation Mark#whirlwind#Right Double Quotation Mark# type, well-intensifying heat exchange, and cell lattices of #Left Double Quotation Mark#pass#Right Double Quotation Mark# type (or lattices with deflectors) affecting on moving flow, provided the optimal location of lattices in the assembly

Обсуждается проблема оптимизации количества и мест размещения в сборках решеток разного типа. Изучается влияние количества перемешивающих решеток и мест их расположения в сборках на условиях возникновения кризиса теплообмена в ТВС на ее критическую мощность (мощность сборки при возникновении кризиса теплообмена).

Эксперименты проведены с применением фреона в качестве теплоносителя.

Рекомендовано совместное использование в сборке решеток типа #Left Double Quotation Mark#вихрь#Right Double Quotation Mark#, хорошо интенсифицирующих теплообмен, и сотовых решеток типа #Left Double Quotation Mark#прогонка#Right Double Quotation Mark# (или решеток с дефлекторами), влияющих на перемещение потока, при условии оптимального расположения решеток в сборке

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## **Experimental research work air-cooled finned heat exchangers in the passive safety systems of NPP WWER**

**S21**

*Morozov, A.V.; Remizov, O.V.; Kalyakin, D.S.; Ragulin, S.V.; Sakhipgareev, A.R.; Soshkina, A.S.; Shlepkin, A.S.*

Экспериментальное исследование работы воздухоохладителей орбренных теплообменников в пассивных системах безопасности АЭС с ВВЕР

р. 315-328

(RU)

5 refs., 10 figs., 1 tab.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Предприятие Госкорпорации Росатом ФГУП Государственный Научный Центр Российской Федерации - Физико-Энергетический Инст. имени А.И. Лепунского, Обнинск (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Итоги научно-технической деятельности Института ядерных реакторов и теплотехники за 2013 год. Научно-технический сборник

ISBN 978-5-906512-53-6

Обнинск (RU)

GNTs RF - FEhI

2014

352 p.

**WWER TYPE REACTORS; HEAT EXCHANGERS; HEAT TRANSFER; SURFACES; POLLUTION; REACTOR COOLING SYSTEMS; AFTER-HEAT REMOVAL**

Investigations into work of heat exchange surfaces with different fins are performed. Using finning of heat-exchange tubes results in an increase of plant capacity to 30%. Increased consumption of steam gas mixture supplied to the input of the heat exchanger reduces the duration of the installation work to 45%. It is concluded that the insignificant influence of bioorganic and dust pollution takes place on the power characteristics of a passive heat removal system (PHRS) and characteristics of the heat exchanger valve of PHRS WWER, and cooling mode



Проведены исследования работы теплообменных поверхностей с различным оребрением. Использование оребрения теплообменных труб приводит к увеличению мощности установки до 30%. Повышенный расход парогазовой смеси, поступающей на вход теплообменника, приводит к снижению длительности работы установки до 45%. Сделан вывод о незначительном влиянии биоорганического и пылевого загрязнения на мощностную характеристику системы пассивного отвода тепла (СПОТ) и характеристики затвора теплообменника СПОТ РУ ВВЭР и режим охлаждения

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## **Bending vibrations of rod bundles in the fluid**

**S22**

*Fedotovskij, V.S.; Lunina, S.V.; Ivanova, E.A.; Nikulina, A.N.*

*Izhibnye kolebaniya puchkov sterzhnej v zhidkosti*

p. 329-335

(RU)

7 refs., 2 figs.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

*Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)*

*Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection*

*Itogi nauchno-tehnicheskoy deyatel'nosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik*

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**MECHANICAL VIBRATIONS; AMPLITUDES; HEAT EXCHANGERS; REACTOR COOLING SYSTEMS; WORKING FLUIDS; FUEL RODS; COMPUTERIZED SIMULATION; FUEL ELEMENT CLUSTERS**

A calculation and theoretical study of the rod bundles bending vibrations in the fluid simulating fuel rods and fuel assemblies is performed. It is assumed that the oscillation amplitude is small, and the oscillating movement of the coolant in the space between the rod occurs in a plane normal to the axis of the rod. The numerical simulation data of connecting mass of fluid for rod bundles with triangular and square lattices are given. The test results are in satisfactory agreement with the approximate analytical models

Проведено расчетно-теоретическое исследование изгибных колебаний пучков стержней в жидкости, моделирующих твэлы и тепловыделяющие сборки. Предполагается, что амплитуды колебаний малы, и колебательное движение теплоносителя в межстержневом пространстве происходит в плоскости, нормальной осям стержня. Приведены результаты численного моделирования присоединительных масс жидкости для пучков стержней с треугольной и квадратной решетками. Результаты анализов удовлетворительно согласуются с приближенными аналитическими моделями

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## **Dynamic simulation of parameters during a large water leak in the sodium in the**

## **secondary circuit of a fast reactor**

**S21**

*Perevoznikov, S.V.; Shvetsov, Yu.E.; Kamaev, A.A.; Pakhomov, I.A.; Borisov, V.V.; Pazin, G.N.; Mirzeabasov, O.A.*

Modelirovanie dinamiki parametrov pri bol'shoj techi vody v natrij vo vtorom konture bystrogo reaktora

p. 336-349

(RU)

5 refs., 5 figs., 1 tab.

*Kukharchuk, O.F.; Sorokin, A.P.; Trufanov, A.A. (eds.)*

Predpriyatie Goskorporatsii Rosatom FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)

Results of the scientific and technical activities of the Nuclear Reactors Physics Institute for the year 2013. Scientific and technical collection

Itogi nauchno-tehnicheskoy deyatelnosti Instituta yadernykh reaktorov i teplofiziki za 2013 god. Nauchno-tehnicheskij sbornik

ISBN 978-5-906512-53-6

Obninsk (RU)

GNTs RF - FEhI

2014

352 p.

**FAST REACTORS; SODIUM COOLED REACTORS; MATHEMATICAL MODELS; DUAL CYCLE COOLING SYSTEMS; SODIUM; LEAKS; EQUILIBRIUM; COMPUTERIZED SIMULATION; FLUID FLOW; STEAM GENERATORS**

Physical and mathematical model of the processes occurring in sodium circulating loop of variable passage flow at the water leaks into the sodium is presented. Processes occurring in sodium circulation loop when the event of water leaks are expressed in the terms of the model of thermally non-equilibrium three-component gas-liquid flow (sodium-hydrogen-sodium hydroxide). The results of numerical simulation of experiments on water vapor injection in the sodium loop of the interloop leak stand using computer code that implements the proposed model are presented. Techniques for the analysis of the consequences of such leak to the sodium-water steam generators of fast reactor units are possible

Изложена физико-математическая модель процессов, происходящих в натриевом циркуляционном контуре переменного проходного сечения при течи воды в натрий. Процессы, протекающие в натриевом циркуляционном контуре при возникновении течи воды, выражены в рамках модели термически неравновесного трехкомпонентного газожидкостного потока (натрий-водород-гидроокись натрия). Приводятся результаты расчетного моделирования экспериментов по инъекции водяного пара в натриевом контуре стенда межконтурной течи с помощью расчетного кода, реализующего предложенную модель. Возможно применение методики для анализа последствий такой течи к парогенераторам натрий-вода реакторных установок на быстрых нейтронах

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## **XLII International Zvenigorod conference on plasma physics and controlled fusion. Book of abstracts**

**S70;S42**

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu

XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

(RU, EN)

HOT PLASMA; THERMONUCLEAR REACTIONS; MAGNETIC CONFINEMENT; INERTIAL CONFINEMENT; ITER TOKAMAK; COLD PLASMA; TECHNOLOGY UTILIZATION; LEADING ABSTRACT; MEETINGS

This book includes the abstracts on plasma physics and controlled fusion presented for the XLII International Zvenigorod Conference on plasma physics and controlled fusion which took place in February 9-13, 2015. The recent results and research projects in the field of plasma physics and controlled fusion are discussed. The abstracts presented on the Conference cover the following problems: magnetic confinement of high-temperature plasma, inertial fusion, physical processes in low-temperature plasma, physical basis for plasma and beam technologies and ITER project

В сборник включены тезисы докладов по физике плазмы и управляемому термоядерному синтезу, представленные на XLII Международной Звенигородской конференции по физике плазмы и УТС, которая проходила 9-13 февраля 2015 г. Обсуждаются последние результаты и научные проекты в области физики плазмы и УТС. Представленные на конференции доклады охватывают следующие проблемы: магнитное удержание высокотемпературной плазмы, инерциальный термоядерный синтез, физические процессы в низкотемпературной плазме, физические основы плазменной и лучевой технологий, проект ИТЕР

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**VD and GSE. Bibliography and scientific heritage of the Academician Shafranov**  
**S70**

*Il'gisonis, V.I. (NITs Kurchatovskij Inst., Moscow (RU); RUDN, Moscow (RU)), e-mail: ilgisonis\_vi@nrcki.ru*

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VD i UGSh. Momenty biografii i nauchnogo naslediya akademika Shafranova

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(RU)

2 refs.

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

GRAD-SHAFRANOV EQUATION; HOT PLASMA; MAGNETIC CONFINEMENT;  
PLASMA FLUID EQUATIONS; MAGNETOHYDRODYNAMICS; HISTORICAL ASPECTS

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## **Progress in fusion research in Europe**

**S70**

*Ongena, Dzh. (Lab. Fiziki Plazmy, Bryussel' (BE))*

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Progress v issledovanii termoyadernogo sinteza v Evrope

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

JET TOKAMAK; ITER TOKAMAK; WALL LOADING; FIRST WALL; ICR HEATING; H-MODE PLASMA CONFINEMENT; EDGE LOCALIZED MODES; TUNGSTEN;  
WENDELSTEIN-7 STELLARATOR; EXPERIMENTAL DATA

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## **Microwave discharges at reduced pressure and peculiarities of processes in strongly inhomogeneous plasma**

**S70**

*Lebedev, Yu.A. (FGBUN Inst. Neftekhimicheskogo Sinteza im. A.V. Topchieva RAN (INKhS RAN), Moscow (RU)), e-mail: lebedev@ips.ac.ru*

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SVCh razryady pri ponizhennykh davleniyakh i osobennosti protsessov v sil'no neodnorodnoj plazme

p. 49

(RU)

16 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

**INHOMOGENEOUS PLASMA; HIGH-FREQUENCY DISCHARGES; PLASMA PRODUCTION; MICROWAVE HEATING; ECR HEATING**

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## **Development of ITER project**

**S70**

*Krasil'nikov, A.V.; Khimchenko, L.N. (Chastnoe Uchrezhdenie GK Rosatom Proektnyj Tsentr ITEhR, Moscow (RU)), e-mail: l.khimchenko@iterrf.ru*

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p. 50

(RU)

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433 p.

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**S70;S96**

*Rukhadze, A.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: rukh@fpl.gpi.ru*

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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**Recent results and research projects for spherical Globus-M and Globus-M2 tokamaks experiments**

**S70**

*Patrov, M.I.; Gusev, V.K.; D'yachenko, V.V. (FTI im. A.F. Ioffe, Sankt-Peterburg (RU)) (and others)*

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p. 52

(RU)

6 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

GLOBUS-M SPHEROMAK; EXPERIMENT PLANNING; RESEARCH PROGRAMS; ICR HEATING; CURRENT-DRIVE HEATING; WALL EFFECTS; ALFVEN WAVES; PLASMA INSTABILITY; PLASMA SIMULATION; EXPERIMENTAL DATA; THEORETICAL DATA

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## **Fusion neutron source based on axisymmetric mirror trap: key physical problems and their solutions**

**S70**

*Bagryanskij, P.A.; Anikeev, A.V.; Beklemishev, A.D. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: P.A.Bagryansky@inp.nsk.su (and others)*

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9-13 Feb 2015

XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov  
ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
OPEN CONFIGURATIONS; GOL-3 DEVICE; NEUTRON GENERATORS;  
THERMONUCLEAR REACTIONS; PLASMA CONFINEMENT; PLASMA  
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### **Thermonuclear power energetics. 60 years of researches, what next?**

**S70**

*Strelkov, V.S. (NITs Kurchatovskij Inst., Moscow (RU))*

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Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; PLASMA CONFINEMENT; CONFINEMENT TIME; Q-VALUE; FIRST WALL; PLASMA HEATING

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### **Nonequilibrium radiation of strong shock waves in Earth, Mars and Titan atmospheres**

**S70**

*Surzhirov, S.T. (Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU))*

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Neravnovesnoe izluchenie sil'nykh udarnykh voln v atmosferakh Zemli, Marsa i Titana

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(RU)

1 ref., 1 fig.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

SHOCK WAVES; GASES; BINARY MIXTURES; NITROGEN; METHANE; ELECTRON TEMPERATURE; NON-EQUILIBRIUM PLASMA; BOLTZMANN STATISTICS; PLASMA SIMULATION; DIAGRAMS; THEORETICAL DATA

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## **Non-congruent phase transitions in plasmas of cosmic and terrestrial applications**

**S70**

*Iosilevskij, I.L. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Moskovskij Fiziko-Tekhnicheskij Inst. - GU, Moscow (RU)), e-mail: ilios@orc.ru*

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Nekongruentnye fazovye perekhody v plazme zemnykh i kosmicheskikh prilozhenij

p. 56

(RU)

12 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA; PHASE TRANSFORMATIONS; ELECTROCHEMISTRY; PYROLYSIS;  
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EQUILIBRIUM

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## **Physical and chemical processes in cold plasma jets**

**S70**

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p. 57

(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Quantum statistic models and computation techniques of thermodynamic and optical properties of dense plasma**

**S70**

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ISBN 978-5-9903264-5-3

Moscow (RU)

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433 p.

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## **Maxwell plasma and quantum fluctuations**

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(RU)

4 refs.

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**High energy density physics with petawatt class laser at GSI-Darmstadt  
S70**

*Rosmej, O.N. (Plasma Physics Dept., Helmholtz Zentrum fuer Schwerrionenforschung GSI-Darmstadt, Darmstadt (DE); Goethe Univ. of Frankfurt, Inst. of Applied Physics, Frankfurt am Main (DE)); Suslov, N.; Martsovenko, D. (Russian Federal Nuclear Centre, All Russian Scientific Research Inst. of Experimental Physics, Sarov, Nizhnii Novgorod Region (RU)) (and others)*

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**Source development and novel applications of coherent X-rays and energetic particle beams using high peak power lasers in Japan atomic energy agency  
S07**

*Kawachi, T.; Nishikino, M.; Ishino, M. (Quantum Beam Science Center, Japan Atomic Energy Agency, Kizugawa-city, Kyoto (JP)), e-mail: Tetsuya.Kawachi@jaea.go.jp (and others)*

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(EN)

1 ref.

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## **Review of on laser experiments with low-density targets developed in Physical Institute of Russian Academy of Sciences**

**S70**

*Borisenko, N.G.; Merkul'ev, Yu.A.; Orekhov, A.S. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: ngbor@sci.lebedev.ru*

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p. 62

(RU)

8 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Progress in studies of gigabar shock wave generation in laboratory experiment**  
**S70**

*Gus'kov, S.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: guskov@sci.lebedev.ru*

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**Concept of cryogenic target factory for inertial fusion**

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*Aleksandrova, I.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Koresheva, E.R. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: koresh@sci.lebedev.ru; Osipov, I.E. (OOO Tsentr Ehnergoehffektivnosti INTER RAO EEhS, Moscow (RU))*

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## **Evolution of concept of steady-state tokamak**

**S70**

*Mirnov, S.V. (FGUP GNTs RF TRINITI, Moscow, Troitsk (RU)), e-mail: mirnov@triniti.ru*

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(RU)

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## **T-15 tokamak upgrading: status and plans**

**S70**

*Azizov, Eh.A.; Alfimov, D.E.; Anashkin, I.O. (NITs Kurchatovskij Inst., Moscow (RU)) (and others)*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Simulation of plasma density in transient regime on the T-10 tokamak**

**S70**

*Dnestrovskij, Yu.N.; Vershkov, V.A.; Danilov, A.V.; Dnestrovskij, A.Yu.; Lysenko, S.E.; Shelukhin, D.A.; Subbotin, G.F.; Cherkasov, S.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Dnestrovskiy\_YN@nrcki.ru*

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1 ref., 2 figs.

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov  
ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
T-10 TOKAMAK; PLASMA DENSITY; PLASMA SIMULATION; JOULE HEATING; TRANSIENTS; PLASMA CONFINEMENT; TIME DEPENDENCE; DIAGRAMS; COMPUTERIZED SIMULATION; THEORETICAL DATA

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### **Density fluctuations as intrinsic mechanism to keep self-consistent pressure profile**

**S70**

*Vershkov, V.A.; Shelukhin, D.A.; Subbotin, G.F. (NITs Kurchatovskij Inst. (NITs KI), Moscow (RU)), e-mail: V.Vershkov@fc.iterru.ru (and others)*

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3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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## **Isotope effect in GAM-turbulence interaction and anomalous transport in tokamak**

**S70**

*Gusakov, E.Z.; Gurchenko, A.D.; Altukhov, A.B. (FTI im. A.F. Ioffe RAN, Sankt-Peterburg (RU)) (and others)*

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4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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433 p.

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## **Simulation of evolution of turbulent transport processes and energy confinement time in tokamaks devices at ECR heating turn-on and turn-off, comparison with T-10 experiments**

**S70**

*Pastukhov, V.P.; Smirnov, D.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Smirnov\_DV@nrcki.ru*

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(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

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## **Features of plasma confinement in L-2M stellarator during ECR plasma heating at power level up to 1 MW**

**S70**

*Meshcheryakov, A.I.; Batanov, G.M.; Berezhetskij, M.S. (Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: meshch@fpl.gpi.ru (and others)*

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(RU)

2 refs.

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## **Local and nonlocal processes of intrinsic transport barrier shaping near surface $q=1$ in T-10 tokamak plasma**

**S70**

*Neudachin, S.V.; Shelukhin, D.A.; Borshchegovskij, A.A.; Mal'tsev, C.G.; Mustafin, N.A.; Myalton, T.B. (IFT NITs Kurchatovskij Inst., Moscow (RU))*

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(RU)

10 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

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## **Project of neutron source based on open trap with taking into account of recent experimental results in the Budker Nuclear Physics Institute SD RAS**

**S70**

*Anikeev, A.V.; Arzhannikov, A.V.; Bagryanskij, P.A.; Beklemishev, A.D.; Ivanov, A.A.; Prikhod'ko, V.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU));*

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p. 75

(RU)

3 refs.

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**Global sound mode in a trap with sloshing ions**

S70

*Beklemishev, A.D.; Skovorodin, D.I.; Zajtsev, K.V. (Inst. Yadernoj Fiziki SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU)), e-mail: bekl@bk.ru*

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(RU)

5 refs.

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## **Oscillating mirror instability in plasma with sloshing ions**

**S70**

*Skovorodin, D.I.; Beklemishev, A.D. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU))*

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(RU)

3 refs.

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## **Quasi-optical simulation of ECR plasma heating in gas dynamic trap GDT**

**S70**

*Khusainov, T.A.; Balakin, A.A.; Gospodchikov, E.D.; Shalashov, A.G. (Inst. Prikladnoj Fiziki RAN, Nizhnij Novgorod (RU); Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: HTA@appl.sci-nnov.ru; Solomakhin, A.L. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU))*

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(RU)

4 refs.

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## **Software and hardware complex of multiparametric data processing on L-2M stellarator**

**S70**

*Malakhov, D.V.; Skvortsova, N.N.; Vasil'kov, D.G.; Chernousov, A.D. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: malakhov@fpl.gpi.ru; Chirkov, A.Yu.; Tedtoev, B.A. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Baumana, Moscow (RU)); Smirnov, V.A. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. Radiotekhniki, Ehlektroniki i Avtomatiki, Moscow (RU)); Gorshenin, A.K. (Inst. Problem Informatiki RAN, Moscow (RU))*

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(RU)

1 ref.

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### **Concept of fuel system of DEMO-FNS tokamak**

**S70**

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(RU)

3 refs.

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### **Iceland tearing structure in tokamak without tearing instability**

**S70**

*Arsenin, V.V.; Skovoroda, A.A. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: Arsenin\_VV@nrcki.ru, Skovoroda\_AA@nrcki.ru*

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(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Experimental study of lithium transport in shadow of longitudinal and vertical lithium limiters on T-11M tokamak**

**S70**

*Belov, A.M.; Dzhigajlo, N.T.; Kravchuk, S.I.; Lazarev, V.B.; Mirnov, S.V.; Shcherbak, A.N. (FGUP GNTs RF TRINITI, Moscow, Troitsk (RU)), e-mail: shcherbak@triniti.ru; Vertkov, A.V.; Zharkov, M.Yu.; Lyublinskij, I.E. (OAO Krasnaya Zvezda, Moscow (RU))*

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(RU)

1 ref., 1 fig.

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ISBN 978-5-9903264-5-3

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433 p.

TOKAMAK DEVICES; LITHIUM; LIMITERS; PLASMA; WALL EFFECTS;  
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## **Registration and analysis of molecular radiation of deuterium plasma at T-10 tokamak**

**S70**

*Zimin, A.M.; Trojnov, V.I.; Den'shchikov, D.S.; Fomin, F.V. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Baumana, Moscow (RU)), e-mail: zimin@power.bmstu.ru; Krupin, V.A.; Klyuchnikov, L.A.; Korobov, K.V.; Nemets, A.R.; Nurgaliev, M.R. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: krupin\_va@nrcki.ru*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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433 p.

T-10 TOKAMAK; DEUTERIUM; WALL EFFECTS; PLASMA; PLASMA DIAGNOSTICS;  
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SPECTRA; EXPERIMENTAL DATA

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## **Simulation of fluxes of charge exchange atoms for multichord particle diagnostics in case of ion distribution function with angular anisotropy**

**S70**

*Tolmacheva, V.V.; Goncharov, P.R.; Sergeev, V.Yu. (FGAOU VO SPbPU, Sankt-Peterburg (RU)), e-mail: v.tolmacheva@spbstu.ru; Bakharev, N.N.; Mel'nik, A.D. (FGBUN FTI im. A.F. Ioffe, Sankt-Peterburg (RU))*

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(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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## **Search of stable to displacement along axis and to plane angular displacement positions of superconducting myxini of GALATEA-traps levitating in field of fixed ring with direct current**

**S70**

*Bishaev, A.M.; Bush, A.A.; Voronchenko, S.A.; D'yakonitsa, O.Yu.; Kamentsev, K.E.; Kozintseva, M.V.; Shapovalov, M.M. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. Radiotekhniki, Ehlektroniki i Avtomatiki, Moscow (RU)), e-mail: kozintseva@mirea.ru; Gavrikov, M.B. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU)), e-mail: ssvvvv@rambler.ru; Savel'ev, V.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU); NIYaU MIFI, Moscow (RU)), e-mail: ssvvvv@rambler.ru; Smirnov, P.G. (Moskovskij Aviatsionnyj Inst. (Natsional'nyj Issledovatel'skij Univ.), Moscow (RU)), e-mail: mctitejl@yandex.ru*

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4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

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## **Influence of finite magnetic field gradients on drift-cyclotron instabilities in magnetic mirror with high ion pressure**

**S70**

*Tsidulko, Yu.A. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)); Chernoshtanov, I.S. (Novosibirskij Natsional'nyj Issledovatel'skij Gosudarstvennyj Univ., Novosibirsk (RU)), e-mail: cherivn@ngs.ru*

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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## **Optimization of the equilibrium plasma configurations with high elongation and triangularity for T-15 upgrade tokamak**

**S70**

*Kas'yanova, N.V.; Mel'nikov, A.V.; Sushkov, A.V. (NITs Kurchatovskij Inst., Moscow (RU)); Sychugov, D.Yu. (VMiK MGU im. M.V. Lomonosova, Moscow (RU)); Sadykov, A.D. (Filial Inst. Atomnoj Ehnergii RGP NYaTs RK, Kurchatov (KZ))*

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1 ref., 1 fig.

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## **About mechanism of excitation of turbulent fluctuations by instable drift wave in shear plasma fluid in magnetic field**

**S70**

*Karbushev, D.N.; Khvesyuk, V.I.; Chirkov, A.Yu. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Bauman, Moscow (RU)), e-mail: khves@power.bmstu.ru*

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Energy efficiency of combined heated neutron source**

**S70**

*Chirkov, A.Yu.; Yatsukhno, D.S. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Baumana, Moscow (RU)), e-mail: chirkov@bmstu.ru*

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p. 89

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Electron temperature measurements in a cyclotron resonance plasma heating experiment in the GDT**

**S70**

*Maksimov, V.V.; Soldatkina, E.I.; Solomakhin, A.L.; Yakovlev, D.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU)), e-mail: V.V.Maximov@inp.nsk.su*

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3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Comparative statistical analysis of fluctuations in peripheral and central plasma in T-10 tokamak**

**S70**

*Dzyatko, E.V.; Budaev, V.P.; Grashin, S.A.; Solomatin, R.Yu.; Mel'nikov, A.V.; Eliseev, L.G.*

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(RU)

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Investigation of microwave radiation during relaxation of subrelativistic electron beam in plasma**

**S70**

*Arzhannikov, A.V.; Burmasov, V.S.; Vyacheslavov, L.N. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU)) (and others)*

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### **Electron cyclotron resonance plasma heating in the gas dynamic trap**

**S70**

*Solomakhin, A.L.; Bagryanskij, P.A.; Kovalenko, Yu.V.; Maksimov, V.V.; Savkin, V.Ya.;*

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(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow

(RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

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### **Study of tungsten in helium plasma jet**

## S70

Voronin, A.V.; Aleksandrov, S.E.; Ber, B.Ya.; Bormatov, A.A.; Gusev, V.K.; Novokhatskij, A.N.; Sotnikova, G.Yu. (*Federal'noe Gosudarstvennoe Byudzhethnoe Uchrezhdenie Nauki Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe Rossijskoj Akademii Nauk, Sankt-Peterburg (RU)*), e-mail: voronin.mhd@mail.ioffe.ru; Demina, E.V. (*Federal'noe Gosudarstvennoe Byudzhethnoe Uchrezhdenie Nauki Inst. Metallurgii i Materialovedeniya im. A.A. Bajkova Rossijskoj Akademii Nauk, Moscow (RU)*), e-mail: elenadyom@mail.ru

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

ITER TOKAMAK; HELIUM; TUNGSTEN; PLASMA JETS; THERMONUCLEAR REACTOR MATERIALS; DIVERTORS; NANOSTRUCTURES; MORPHOLOGY; SURFACE PROPERTIES; PHYSICAL RADIATION EFFECTS; WALL EFFECTS; EXPERIMENTAL DATA

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## **Modernized CXRS diagnostics of T-10 tokamak**

### S70

Klyuchnikov, L.A.; Krupin, V.A.; Korobov, K.V. (*NITs Kurchatovskij Inst. (NITs KI), Moscow (RU)*), e-mail: lklyuchnikov@list.ru (and others)

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Modernizirovannaya CXRS diagnostika tokamaka T-10

p. 95

(RU)

1 ref., 1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

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ISBN 978-5-9903264-5-3

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433 p.

T-10 TOKAMAK; PLASMA DIAGNOSTICS; ION TEMPERATURE; SPECTROSCOPY; CHARGE EXCHANGE; PLASMA IMPURITIES; LINE BROADENING; FLOWSHEETS; EXPERIMENTAL DATA

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### **Spectroscopic diagnostic complex for measurements of absolute value and radial distribution of effective ion charge of T-10 tokamak plasma**

**S70**

*Nemets, A.R.; Den'shchikov, D.S.; Klyuchnikov, L.A.; Korobov, K.V.; Krupin, V.A.; Nurgaliev, M.R.; Trojnov, V.I.; Fomin, F.V. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst. (NITs KI), Moscow (RU)), e-mail: Nemets\_AR@nrcki.ru*

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(RU)

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Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

T-10 TOKAMAK; PLASMA DIAGNOSTICS; EFFECTIVE CHARGE; ECR HEATING; JOULE HEATING; BREMSSTRAHLUNG; MONOCHROMATORS; PHOTOMULTIPLIERS;

## **Study of atomic beam-driven current generation in the Globus-M spherical tokamak**

**S70**

*Shchegolev, P.B.; Bakharev, N.N.; Gusev, V.K.; Kurskiev, G.S.; Minaev, V.B.; Petrov, Yu.V.; Sakharov, N.V. (Federal'noe Gosudarstvennoe Byudzhethnoe Uchrezhdenie Nauki Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe Rossijskoj Akademii Nauk, Sankt-Peterburg (RU)), e-mail: peter\_shchegolev@mail.ioffe.ru*

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Issledovanie generatsii tokov uvlecheniya atomnym puchkom v sfericheskom tokamake Globus-M

p. 97

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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## **Results of ion temperature and impurity nuclei density measurements by upgraded CXRS diagnostics at the T-10 tokamak**

**S70**

*Nurgaliev, M.R.; Krupin, V.A.; Klyuchnikov, L.A.; Korobov, K.V.; Nemets, A.R.; Dnestrovskij, A.Yu.; Barsukov, A.G.; Trojnov, V.I.; Fomin, F.V.; Den'shchikov, D.C. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: maxim.nurgaliev@gmail.com*

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(RU)

2 refs., 2 figs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

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## **Development of magnetic system of open trap with helicoidal mirrors**

**S70**

*Sudnikov, A.V.; Beklemishev, A.D.; Postupaev, V.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU)), e-mail: A.V.Sudnikov@inp.nsk.su*

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p. 99

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

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## **Simulation of fast particle behaviour in the Globus-M tokamak**

**S70**

*Bakharev, N.N.; Gusev, V.K.; Iblyaminova, A.D. (FTI im. A.F. Ioffe, Sankt-Peterburg (RU)), e-mail: bakharev@mail.ioffe.ru (and others)*

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p. 100

(RU)

3 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Development of high-speed video recording method of plasma interaction with lithium limiter on the T-11M tokamak**

**S70**

*Dzhurik, A.S.; Belov, A.M.; Lazarev, V.B. (FGUP GNTs RF Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Moscow, Troitsk (RU)), e-mail: adzhurik@triniti.ru*

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p. 101

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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Moscow (RU)

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TOKAMAK DEVICES; HOT PLASMA; PLASMA DIAGNOSTICS; LITHIUM; WALL EFFECTS; VIDEO TAPES; DATA VISUALIZATION; ULTRAHIGH-SPEED PHOTOGRAPHY; CAMERAS; SPATIAL RESOLUTION; EXPERIMENTAL DATA

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## **Device for study of plasmoids with transverse magnetic barrier**

**S70**

*Astashinskij, V.M.; Khramtsov, P.P. (Inst. Teplo- i Massoobmena im. A.V. Lykova NAN Belarusi, Minsk (BY)), e-mail: iceret@list.ru; Bishaev, A.M.; Kozintseva, M.V. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. Radiotekhniki, Ehlektroniki i Avtomatiki, Moscow (RU)), e-mail: bishaev@mirea.ru; Gavrikov, M.B. (Inst. Prikladnoj Matematiki im. M.V. Keldysha Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: ssvvvv@rambler.ru; Savel'ev, V.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU); NIYaU MIFI, Moscow (RU)), e-mail: ssvvvv@rambler.ru*

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p. 102

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

PLASMOIDS; MAGNETIC FIELDS; PENETRATION DEPTH; MAGNET COILS;

MAGNETIC MIRRORS; PLASMA DRIFT; EXPERIMENTAL DATA

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## **Characteristics of electric fields and turbulence in the periphery plasma of the T-10 tokamak**

**S70**

*Solomatin, R.Yu.; Budaev, V.P.; Grashin, S.A.; Dzyatko, E.V.; Eliseev, L.G.; Zenin, V.N.; Mel'nikov, A.V.; Perfilov, S.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail:*

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p. 103

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow

(RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

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termoyadernomu sintezu. Sbornik tezisov dokladov

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2015

433 p.

T-10 TOKAMAK; ELECTRIC FIELDS; TURBULENCE; MAGNETIC SURFACES;

LANGMUIR PROBE; PLASMA DIAGNOSTICS; HOT PLASMA; PLASMA FILAMENT;

PLASMA DENSITY; PLASMA POTENTIAL; PLASMA DRIFT; PLASMA WAVES;

EXPERIMENTAL DATA

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## **Study of frequency structure of geodesic acoustic mode in the T-10 tokamak**

**S70**

*Zenin, V.N.; Mel'nikov, A.V.; Grashin, C.A.; Eliseev, L.G.; Lysenko, S.E.; Solomatin, R.Yu.;*

*Perfilov, S.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: vitalyzenin@mail.ru*



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p. 104

(RU)

3 refs., 1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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2015

433 p.

T-10 TOKAMAK; PLASMA DIAGNOSTICS; ION ACOUSTIC WAVES; OSCILLATION MODES; SOUND WAVES; ELECTRON TEMPERATURE; ION TEMPERATURE; PLASMA EATERS; DIAGRAMS; EXPERIMENTAL DATA

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## **Tangential Thomson scattering system for the T-15 tokamak**

**S70**

*Asadulin, G.M. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Bel'bas, I.S.; Gorshkov, A.V. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU))*

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p. 105

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

T-15 TOKAMAK; THOMSON SCATTERING; PLASMA DIAGNOSTICS; HOT PLASMA; ELECTRON TEMPERATURE; PLASMA DENSITY; SPATIAL DISTRIBUTION; NEODYMIUM LASERS; SPATIAL RESOLUTION; ELECTRON DENSITY; ACCURACY; EXPERIMENTAL DATA

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## **The X-ray emission at the counter collision of high-speed neon plasma fluxes**

**S70**

*Es'kov, A.G.; Zhitlukhin, A.M.; Kochnev, D.M.; Poznyak, I.M.; Toporkov, D.A.; Umrikhin, N.M. (FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Moscow, Troitsk (RU)), e-mail: dimich17@mail.ru*

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p. 106

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Study of low-frequency large-scale MHD modes in the T-10 tokamak**

**S70**

*Eliseev, L.G.; Mel'nikov, A.V.; Ivanov, N.V.; Kakurin, A.M.; Perfilov, S.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: reonid@yahoo.com*

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Issledovanie krupnomasshtabnykh nizkochastotnykh MGD kolebanij v tokamake T-10

p. 107

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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## **Magnetic islands and charged particle confinement in tokamak**

**S70**

*Podturova, O.I.; Il'gisonis, V.I.; Sorokina, E.A. (NITs Kurchatovskij Inst., Moscow (RU); Rossijskij Univ. Druzhyby Narodov, Moscow (RU)), e-mail: Podturova\_OI@nrcki.ru, olga\_podturova@list.ru*

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(RU)

2 refs.

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## **Study of GAM radial structure by means of multislit heavy ion analyzer**

**S70**

*Lysenko, S.E.; Eliseev, L.G.; Mel'nikov, A.V.; Perfilov, S.V.; Zenin, V.N. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Lysenko\_SE@nrcki.ru*

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Issledovanie radial'noj struktury GAM s pomoshch'yu mnogoshchelevogo analizatora tyazhelykh ionov

p. 109

(RU)

2 refs., 1 fig.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Study of radiation losses of the Globus-M tokamak plasma**

**S70**

*Alekseev, A.G.; Panov, A.I. (FGUP GNTs RF TRINITI, Troitsk, Moscow (RU)), e-mail: andy.phy@gmail.com; Bakharev, N.N. (Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe RAN, Sankt-Peterburg (RU)), e-mail: a.iblyaminova@mail.ioffe.ru (and others)*

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p. 110

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokih Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Complex study of geodesic acoustic mode on the Globus-M spheromak**

**S70**

*Bulanin, V.V.; Petrov, A.V.; Yashin, A.Yu. (Sankt-Peterburgskij Gosudarstvennyj Politehnicheskij Univ., Sankt-Peterburg (RU)), e-mail: A.Yashin@spbstu.ru (and others)*

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p. 111

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokih Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Observable phenomenon of thermal plasma insulation and features of diamagnetic measurements in the L-2M stellarator at ECR heating and ECR + ohmic heating**

**S70**

*Khol'nov, Yu.V. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: hol@fpl.gpi.ru*

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p. 112

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Diagnostic complex of upgrade T-15 tokamak**

**S70**

*Sushkov, A.V.; Kirneva, N.A.; Korobov, K.V.; Krupin, V.A.; Mel'nikov, A.V.; Roj, I.N. (NITs Kurchatovskij Inst., Moscow (RU))*

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p. 113

(RU)

2 refs., 1 tab.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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Moscow (RU)

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433 p.

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## **Beam tracing calculations in plasmas beyond the Eikonal regime**

**S70**

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(EN)

5 refs.

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## **Transport transitions in the L-2M stellarator plasma at different ECR heating conditions**

**S70**

*Vasil'eva, A.A.; Vasil'kov, D.G.; Anoshin, A.A.; Vafin, I.Yu.; Meshcheryakov, A.I.; Khol'nov, Yu.V.; Shchepetov, S.V. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: anna\_vasiljeva@bk.ru*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

L-2 STELLARATOR; HOT PLASMA; ECR HEATING; MICROWAVE AMPLIFIERS; PLASMA DIAGNOSTICS; PLASMA FILAMENT; SOFT X RADIATION; ELECTRON DENSITY; PLASMA DIAMAGNETISM; BORON ADDITIONS; WALL EFFECTS; PLASMA POTENTIAL; EXPERIMENTAL DATA

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## **Study of tungsten in stationary plasma flow: radiation damage, erosion, hydrogen isotope accumulation**

**S70**

*Danelyan, L.S.; Kojdan, V.S.; Kornienko, S.N. (NITs Kurchatovskij Inst., Moscow (RU)) (and others)*



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(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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## **Redeposition of carbon in working and training discharges in the T-10 tokamak**

**S70**

*Grashin, S.A.; Budaev, V.P.; Vukolov, K.Yu.; Ishevskij, O.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Grashin\_SA@nrcki.ru; Arkhipov, I.I. (Inst. Fizicheskoy Khimii i Ehlektrokhimii im. A.N. Frumkina RAN, Moscow (RU))*

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Pereosazhdenie ugleroda v rabochikh i trenirovochnykh razryadakh tokamaka T-10

p. 117

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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2015

433 p.

T-10 TOKAMAK; WALL EFFECTS; CARBON; EROSION; DEPOSITION; SILICON; STAINLESS STEELS; MOLYBDENUM; ELECTRIC DISCHARGES; TEMPERATURE DEPENDENCE; MASS SPECTROSCOPY; EXPERIMENTAL DATA

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### **Plasma stability in inhomogeneous field of alternating curvature**

**S70**

*Tsvetukh, M.M. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Krashevskaya, G.V.;*

*Prishvitsyn, A.S. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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p. 118

(RU)

4 refs., 1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow

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### **Features of behavior of toroidal plasma at ECH jumps and their analogs in bounded media with fixed thermal conduction**

**S70**

*Danilkin, I.S. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU))*

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(RU)

4 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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433 p.

PLASMA; TOROIDAL CONFIGURATION; ECR HEATING; TRANSIENTS; THERMAL CONDUCTIVITY; HEAT TRANSFER; FOURIER HEAT EQUATION; ANALYTICAL SOLUTION; THEORETICAL DATA

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## **Study of microwave heating effect and current generation on sawtooth oscillations in the T-10 tokamak plasma**

**S70**

*Mustafin, N.A.; Kirneva, N.A. (NITs Kurchatovskij Inst. (NITs KI), Moscow (RU); NIYaU MIFI, Moscow (RU)), e-mail: nikitamustafin@gmail.com; Kislov, D.A.; Mal'tsev, S.G.; Pavlov, Yu.D.; Sushkov, A.V.; Trukhina, E.V. (NITs Kurchatovskij Inst. (NITs KI), Moscow (RU))*

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p. 120

(RU)

4 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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433 p.

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### **Wavelet analysis of evolution of spectral characteristics of edge plasma fluctuations in the L-2M stellarator under fast transport transitions**

**S70**

*Maslov, S.A. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. Radiotekhniki, Ehlektroniki i Avtomatiki, Moscow (RU)); Vasil'kov, D.G.; Khol'nov, Yu.V. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)); Skvortsova, N.N. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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4 refs.

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### **Current asymmetries during disruptions on COMPASS tokamak**

**S70**

*Dvornova, A.A. (NIYaU MIFI, Moscow (RU)), e-mail: a.dvornova@gmail.com; Gerasimov, S.N. (Kalehmskij Nauchnyj Tsentr, Abingdon (GB)); Khavlichek, J. (Inst. Fiziki Plazmy, Praga (CZ); Karlov Univ., Praga (CZ)); Khronova, O.; Panek, R. (Inst. Fiziki Plazmy, Praga (CZ))*

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p. 122

(RU)

3 refs.

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ISBN 978-5-9903264-5-3

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2015

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**Influence of source location of massive gas injection on evolution of discharge disruption in the T-10 tokamak**

**S70**

*Kapralov, V.G.; Skokov, V.G.; Solokha, V.V.; Borovov, A.E.; Egorov, S.M.; Elagin, V.V.; Kostyukov, A.Yu.; Tret'yakov, P.M. (SPbPU, Sankt-Peterburg (RU)), e-mail:*

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p. 123

(RU)

2 refs.

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### **Distinctions of electron density of the L-2M stellarator plasma in cases central and off-center ECR heating at high input power**

**S70**

*Letunov, A.A.; Voronova, E.V.; Grebenshchikov, S.E.; Logvinenko, V.P. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: let@fpl.gpi.ru*

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(RU)

3 refs.

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### **Results of Doppler reflectometry diagnostics in the L-2M stellarator under EC**

## heating conditions

S70

*Kharchevskij, A.A.; Malakhov, D.V.; Skvortsova, N.N. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: kharchevsky@yandex.ru; Smirnov, V.A. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. Radiotekhniki, Ehlektroniki i Avtomatiki, Moscow (RU))*

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(RU)

4 refs.

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## Influence of magnetic field on dust charge in divertor plasma

S70

*Golyatina, R.I.; Majorov, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: mayorov\_sa@mail.ru; Bastykova, N.Kh.; Kodanova, S.K.; Ramazanov, T.S. (NIIET, KazNU im. Al'-Farabi, Almaty (KZ)), e-mail: kodanova@mail.ru*

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(RU)

6 refs.

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### **The short-wave plasma turbulence - transition processes at electron-cyclotron plasma heating on the L-2M stellarator**

**S70**

*Batanov, G.M.; Borzosekov, V.D.; Vasil'kov, D.G.; Konchekov, E.M.; Malakhov, D.V.; Sarksyant, K.A.; Stepakhin, V.D.; Kharchev, N.K. (Inst. Obshchej Fiziki im A.M. Prokhorova RAN, Moscow (RU))*

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(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Effect of external resonant magnetic fields on plasma stability in T-10 and T-15 tokamaks**

**S70**

*Shestakov, E.A.; Ermolaeva, A.I.; Savrukhin, P.V.; Sushkov, A.V. (NITs Kurchatovskij Inst., Moscow (RU))*

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433 p.

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## **Measurements of plasma electron temperature by soft X radiation at noncentral ECR heating in the L-2M stellarator**

**S70**

*Meshcheryakov, A.I.; Vafin, I.Yu.; Burdakov, Yu.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: meshch@fpl.gpi.ru*

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## **Direct drive fusion targets under laser pulse of a megajoule level**

**S70**

*Zmitrenko, N.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)), e-mail: zmitrenko@imamod.ru; Vergunova, G.A.; Gus'kov, S.Yu.; Demchenko, N.N.; Doskoch, I.Ya.; Rozanov, V.B.; Stepanov, R.V.; Yakhin, R.A. (Fizicheskij Inst. im. P.N. Lebedeva, Moscow (RU)); Kuchugov, P.A. (Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)); Fizicheskij Inst. im. P.N. Lebedeva, Moscow (RU))*

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433 p.

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DISTRIBUTION; COMPUTER CALCULATIONS; THEORETICAL DATA

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### **Fast central ignition of inertial confinement targets by ion beams**

**S70**

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p. 134

(RU)

3 refs.

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CODES; T CODES; DEUTERIUM; TRITIUM; THERMONUCLEAR FUELS; BERYLLIUM  
HYDRIDES; CARBON IONS; VANADIUM IONS; GOLD IONS; ION BEAMS;  
THERMONUCLEAR IGNITION; AMPLIFICATION; THEORETICAL DATA

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### **Simple model for indirect target compression under conditions close to the NIF laser facility at 1.5 MJ energy**

**S70**

*Rozanov, V.B.; Vergunova, G.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-  
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## **Formation of collimated fast electron beam under interaction of 100-ns UF laser pulses with targets**

**S70**

*Zvorykin, V.D. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail:*

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## **Laser triggered proton acceleration from low-dense target and new radiation sources for medical application**

**S07;S62**

*Brantov, A.V.; Bychenkov, V.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: brantov@sci.lebedev.ru*

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1 ref.

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## **Amplification of electromagnetic radiation by plasma layer with anisotropic electron velocity distribution**

**S70**

*Vagin, K.Yu.; Uryupin, S.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail:*

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1 ref., 1 fig.

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**Generation of nonlinear currents in the plasma by ultrashort pulse of laser radiation**

**S70**

*Grishkov, V.E.; Uryupin, S.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: uryupin@sci.lebedev.ru*

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### **Experimental research of the mega-ampere Z-pinches dynamics using the autoperionization effects on the Angara-5-1 facility**

**S70**

*Aleksandrov, V.V.; Volkov, G.S.; Grabovskij, E.V.; Gritsuk, A.N.; Medovshchikov, S.F.; Olejnik, G.M.; Frolov, I.N. (GNTs RF Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Moscow, Troitsk (RU)), e-mail: volkov@triniti.ru; Rupasov, A.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU))*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Measurement of the penetration rate of the field induced by current inside the tubular electrode for submicrosecond current pulse at linear density of 1-3**

**MA/cm**

**S70**

*Grabovskij, E.V.; Dzhangobegov, V.V.; Olejnik, G.M. (FGUP GNTs TRINITI, Moscow (RU)), e-mail: oleinik@triniti.ru; Sasorov, P.V. (IMP im. M.V. Keldysha RAN, Moscow (RU));*

*Tkachenko, S.I. (MFTI, Dolgoprudnyj, Moskovskaya Obl. (RU); OIVT RAN, Moscow (RU))*

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**On mechanism of stratification upon nanosecond electrical explosion of thin wires**

**S70**

*Romanova, V.M.; Ivanenkov, G.V.; Mingaleev, A.R.; Pikuz, S.A.; Ter-Oganes'yan, A.E.; Shelkovenko, T.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail:*

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### **Study of gas-puff Z-pinch parameters by means of X-ray spectroscopy**

**S70**

*Shelkovenko, T.A.; Pikuz, S.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Chi, N.; DeGrushi, F.; Khammer, D.A. (Kornel'skij Univ., Itaka (US))*

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1 ref., 1 fig.

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**Three-dimensional simulation of capillary discharge for the BELLA project**  
**S70**

*Bagdasarov, G.A.; Sasorov, P.V.; Ol'khovskaya, O.G. (Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)), e-mail: pavel.sasorov@gmail.com*

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(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Plasma focus as an effective tool for laboratory simulation of astrophysical jets**  
**S70**

*Krauz, V.I.; Myalton, V.V.; Vinogradov, V.P. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: krauz\_vi@nrcki.ru (and others)*

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### **Distribution of the trapped magnetic fields in plasma flow at the PF-3 facility** **S70**

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p. 146

(RU)

1 ref.

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### **Laser spherical targets for ICF/IFE projects in XXI century**

**S70**

*Akunets, A.A.; Aleksandrova, I.V.; Borisenko, L.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)) (and others)*

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Problems of monitoring of ultradispersed low-density layers for ITF targets**

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*Gromov, A.I.; Akimova, I.V.; Akunets, A.A.; Borisenko, L.A.; Merkul'ev, Yu.A.; Orekhov, A.S.; Shapkin, A.A.; Borisenko, N.G. (Federal'noe Gosudarstvennoe Byudzhetnoe Uchrezhdenie Nauki Fizicheskij Inst. im. P.N. Lebedeva Rossijskoj Akademii Nauk (FIAN), Moscow (RU)), e-mail: agrom@sci.lebedev.ru*

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3 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

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**S70**

*Izgorodin, V.M.; Solomatina, E.Yu.; Pepelyaev, A.P.; Osetrov, E.I.; Kajgorodova, M.A.*

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**S70**

Zmitrenko, N.V.; Kuchugov, P.A. (*Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)*), e-mail: pkuchugov@gmail.com; Rozanov, V.B.; Stepanov, R.V.; Yakhin, R.A. (*Fizicheskij Inst. im. P.N. Lebedeva, Moscow (RU)*)

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**S70**

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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**S70**

*Yusupaliev, U.; Cysoev, N.N.; Shuteev, S.A.; Elenskij, V.G. (Fizicheskij Fakul'tet MGU im. M.V. Lomonosova, Moscow (RU)), e-mail: nesu@phys.msu.ru*

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(RU)

7 refs.

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## **Standard and combined effects in the concept of magneto-inertial fusion**

**S70**

*Kuzenov, V.V. (MGTU im. N.Eh. Baumana, Moscow (RU); Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU)), e-mail: kuzenov@ipmnet.ru; Ryzhkov, S.V.; Froloko, P.A. (MGTU im. N.Eh. Baumana, Moscow (RU)), e-mail: ryzhkov@power.bmstu.ru*

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(RU)

5 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**S70**

*Shumaev, V.V.; Ryzhkov, S.V. (MGTU im. N.Eh. Baumana, Moscow (RU)), e-mail: chubchic@gmail.com; Kuzenov, V.V. (MGTU im. N.Eh. Baumana, Moscow (RU); Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU)), e-mail: vik.kuzenov@gmail.com*

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(RU)

9 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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**S70**

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(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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(RU)

8 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

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*Metel'skij, I.I.; Bychenkov, V.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: metelski@lebedev.ru; Kovalev, V.F. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU))*

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(RU)

4 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

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**S70**

*Govras, E.A.; Bychenkov, V.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: egovras@lebedev.ru*

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(RU)

4 refs.

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**On the issue of Bremsstrahlung from electrons at foil rear side under powerful laser pulse irradiation**

**S70**

*Bochkarev, S.G.; Bychenkov, V.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: bochkar@sci.lebedev.ru*

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ISBN 978-5-9903264-5-3

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BREMSSTRAHLUNG; ELECTRONS

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**On the issue of spectra of nonlinear Thomson scattering of strongly focused powerful laser pulse**

**S70**

*Vajs, O.E. (Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU));  
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## **Features of charged particle acceleration by short laser pulse from the near critical dense targets**

**S70**

*Brantov, A.V.; Bychenkov, V.Yu.; Ksenofontov, P.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: ksenofontov@sci.lebedev.ru; Savel'ev-Trofimov, A.B.; Tsymbalov, I.N. (Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU)), e-mail: abst@physics.msu.ru*

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### **Selfinjection of electrons into wake wave during passage of laser pulse through plasma boundary**

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p. 162

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### **Experimental study of femtosecond laser plasma radiative properties in ultrasoft X-ray spectral range**

**S70**

*Nosulenko, D.S.; Vikhlyaev, D.A.; Gavrilov, D.S.; Eliseev, M.V.; Potapov, A.V.; Tishchenko, A.S.; Shamraev, A.L. (Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij NII Tekhnicheskoy Fiziki imeni akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: dep5@vniitf.ru*

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p. 163

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2 refs.

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## **Investigation of laser plasma continuous X-radiation with the use of X-ray optics** **S70**

*Vikhlyaev, D.A.; Gavrilov, D.S.; Eliseev, M.V.; Nosulenko, D.S.; Potapov, A.V.; Safronov, K.V.; Tolstoukhov, P.A. (Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij NII Tekhnicheskoy Fiziki imeni akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: dep5@vniitf.ru*

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## **Measurement by subpicosecond laser facility of hard X-ray yield in dependence on atomic number of target material**

**S70**

*Tolstoukhov, P.A.; Vikhlyaev, D.A.; Gavrilov, D.S.; Kakshin, A.G.; Loboda, E.A.; Potapov, A.V.; Safronov, K.V. (Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij NII Tekhnicheskoy Fiziki imeni akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: dep5@vniitf.ru*

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## **Generation of the characteristic X-rays under the vacuum heating of electrons near the surface of nanocylinders**

**S70**

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p. 166

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**On the integrability of the motion equations of a charged particle in a quasimonochromatic electromagnetic wave**

**S71**

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### **Averaged forces influencing on a charged particle in the field of laser radiation beat wave**

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### **On the description of laser radiation in paraxial approximation**

**S70**

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**Calculation of temperature in fully ionized plasma of positronium, hydrogen and helium by the molecular dynamics method**

**S70**

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## **Neutron spectra in Z pinches**

**S70**

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p. 171

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3 refs.

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## **Study of compression dynamics of condensed Z pinch on the Angara-5-1 device**

**S70**

*Aleksandrov, V.V.; Grabovskij, E.V.; Gritsuk, A.N. (GNTs Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Troitsk Moskovskoj Obl. (RU)), e-mail: angara@triniti.ru (and others)*

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433 p.

LONGITUDINAL PINCH; ANGARA-5 DEVICE; COMPRESSION; PLASMA DIAGNOSTICS; SPATIAL DISTRIBUTION; HOT PLASMA; NEUTRON FLUX; SOFT X RADIATION; PLASMA DISRUPTION; EXPERIMENTAL DATA; TIME DEPENDENCE

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## **Study of X radiation of Z pinch at fiber assembly implosion on the Angara-5-1 device**

**S70**

*Aleksandrov, V.V.; Volkov, G.S.; Grabovskij, E.V.; Gritsuk, A.N.; Malyutin, I.G.; Mitrofanov, K.N.; Olejnik, G.M. (GNTs RF Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Troitsk, Moscow (RU)), e-mail: griar@triniti.ru; Shevel'ko, A.P. (FIAN Fizicheskij Inst. imeni P.N. Lebedeva Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: shevelko@rambler.ru*

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu

Issledovanie rentgenovskogo izlucheniya Z-pincha pri implozii volokonnykh sborok na ustanovke Angara-5-1

p. 173

(RU)

2 refs., 1 fig.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov  
ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
ANGARA-5 DEVICE; LONGITUDINAL PINCH; IMPLOSIONS; SOFT X RADIATION; LINERS; ALUMINIUM; INDIUM; TIN; BISMUTH; TIME DEPENDENCE; ENERGY SPECTRA; PLASMA DIAGNOSTICS; DIAGRAMS; EXPERIMENTAL DATA; HOT PLASMA; SPATIAL DISTRIBUTION

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### **Three-dimensional MHD simulation of Z pinch compression inhomogeneities on the Angara-5-1 device**

**S70**

*Gasilov, V.A.; Ol'khovskaya, O.G.; Smirnova, N.S. (Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)), e-mail: olkhovsk@gmail.com*

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3D MGD modelirovanie neodnorodnostej szhatiya Z-pinchej na ustanovke Angara-5-1

p. 174

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ANGARA-5 DEVICE; THREE-DIMENSIONAL CALCULATIONS; COMPUTERIZED SIMULATION; M CODES; LONGITUDINAL PINCH; IMPLOSIONS; WIRES; LINERS; MAGNETIC COMPRESSION; MAGNETIC FLUX; SPATIAL DISTRIBUTION; PLASMA MACROINSTABILITIES; MAGNETOHYDRODYNAMICS; TIME DEPENDENCE; THEORETICAL DATA

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### **Numerical experiment of superhigh pressure production in the multiwire Z-#Greek Capital Letter Theta# configuration**

**S70**

*Repin, B.G.; Orlov, A.P. (Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij Nauchno-Issledovatel'skij Inst. Eksperimental'noj Fiziki, Sarov (RU)), e-mail: repinbg@mail.ru*

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mnogoprovolchnogo Z-#Greek Capital Letter Theta# pincha

p. 175

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

LONGITUDINAL PINCH; THETA PINCH; IMPLOSIONS; WIRES; MAGNETIC COMPRESSION; LINERS; THREE-DIMENSIONAL CALCULATIONS; F CODES; PRESSURE RANGE GIGA PA; DIMENSIONS; TUNGSTEN; MAGNETIC FIELD CONFIGURATIONS; THEORETICAL DATA; HOT PLASMA; COMPUTERIZED SIMULATION

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**Reconstruction of radial profile of plasma density from chord distribution: algorithm and numerical code**

**S97;S70**

*Baronova, E.O.; Stepanenko, A.M. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: baronova04@mail.ru*

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p. 176

(RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov  
ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
PLASMA RADIAL PROFILES; PINCH EFFECT; INTERFEROMETRY; PATTERN RECOGNITION; ALGORITHMS; POLYNOMIALS; MESH GENERATION; COMPUTER CALCULATIONS; THEORETICAL DATA

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### **Investigation of plasma jet on the Tulip device**

**S70**

*Baronova, E.O.; Stepanenko, A.M.; Suslin, S.V. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: baronova04@mail.ru; Vovchenko, E.D. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Nikulin, V.Ya.; Silin, P.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU))*

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(RU)

1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA FOCUS DEVICES; PLASMA JETS; INTERFEROMETRY; DEUTERIUM; NEON; ARGON; HOT PLASMA; PLASMA PRODUCTION; ELECTRIC DISCHARGES; IMAGES; EXPERIMENTAL DATA

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## **Investigation of plasma fluxes on the KPF-4 Phenix device**

**S70**

*Vojtenko, D.A.; Astapenko, G.I. (GNPO Sukhumskij Fiziko-Tekhnicheskij Inst., Sukhum, Abkhaziya (GE)), e-mail: opti-sfti@yandex.ru; Krauz, V.I.; Myalton, V.V.; Anan'ev, S.S. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: krauz\_vi@nrcki.ru; Mitrofanov, K.N. (FGUP GNTs RF TRINITI, Moscow (RU)), e-mail: mitrofan@triniti.ru*

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(RU)

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA FOCUS DEVICES; PLASMA FOCUS; PLASMA JETS; VELOCITY; MAGNETIC FLUX; HYDROGEN; ARGON; PLASMA DIAGNOSTICS; PLASMA EATERS; EXPERIMENTAL DATA

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## **Study of plasma flow formation and dynamics in plasma focus discharge**

**S70**

*Krauz, V.I.; Myalton, V.V.; Anan'ev, S.S.; Vinogradov, V.P.; Vinogradova, Yu.V.; Dan'ko, S.A.; Kalinin, Yu.G.; Kharrasov, A.M. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: krauz\_vi@nrcki.ru*

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p. 179

(RU)

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA FOCUS DEVICES; PLASMA FOCUS; ELECTRIC DISCHARGES; PLASMA SHEATH; PLASMA JETS; HYDROGEN; DEUTERIUM; HELIUM; NEON; ARGON; PLASMA DIAGNOSTICS; PLASMA EATERS; PLASMA PRODUCTION; PLASMA MACROINSTABILITIES; PHOTODETECTORS; VELOCITY; EXPERIMENTAL DATA

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## **Jet production in plasma focus**

**S70**

*Vikhrev, V.V.; Suslin, S.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail:*

*SuslinSV@yandex.ru*

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p. 180

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA JETS; PLASMA FOCUS; DEUTERIUM; PLASMA FOCUS DEVICES; PINCH EFFECT; VELOCITY; TWO-DIMENSIONAL CALCULATIONS; MAGNETOHYDRODYNAMICS; MAGNETIC FIELDS; COMPUTERIZED SIMULATION; THEORETICAL DATA

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## **Spectroscopic measurement of parameters of plasmoids generated in plasma focus**

**S70**

Anan'ev, S.S.; Dan'ko, S.A.; Myalton, V.V.; Zhuzhunashvili, A.I.; Kalinin, Yu.G.; Krauz, V.I. (*Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)*), e-mail: Ananyev\_SS@nrcki.ru; Ladygina, M.S.; Marchenko, A.K. (*Inst. Fiziki Plazmy NNTs Khar'kovskij Fiziko-Tekhnicheskij Inst., Khar'kov (UA)*), e-mail: ladyginams@kipt.kharkov.ua

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p. 181

(RU)

1 fig.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMOIDS; PLASMA FOCUS; PLASMA DIAGNOSTICS; PLASMA JETS; SPECTROMETERS; LIGHT PIPES; TIME DEPENDENCE; IMAGE INTENSIFIERS; VISIBLE SPECTRA; ELECTRON DENSITY; HELIUM; ION TEMPERATURE; TIME-OF-FLIGHT METHOD; IMAGES; EXPERIMENTAL DATA

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## **Study of explosive electron emission of needle cathode by point-projection X-ray radiography**

**S70**

Parkevich, E.V.; Tilikin, I.N.; Agafonov, A.V.; Mingaleev, A.R.; Shelkovenko, T.A.; Pikuz, S.A. (*Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)*), e-mail: v754@rambler.ru

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Issledovanie vzryvnoj ehlektronnoj ehmissii igol'chatogo katoda metodom tochechnoj proektsionnoj rentgenografii

p. 182

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ELECTRON EMISSION; CATHODES; PINCH EFFECT; X-RAY RADIOGRAPHY; COPPER; MOLYBDENUM; PLASMA; EXPLODING WIRES; EXPLOSIONS; TIME DEPENDENCE; SPATIAL DISTRIBUTION; SPATIAL RESOLUTION; ELECTRIC CURRENTS; HARD X RADIATION; X-RAY DETECTION; EXPERIMENTAL DATA

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## **Study of X-ray generation of hybrid X-pinchs on the KING generator**

**S07;S70**

*Tilikin, I.N.; Shelkovenko, T.A.; Zorin, V.B.; Pikuz, S.A.; Romanova, V.M.; Mishin, S.N.; Mingaleev, A.R. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Chajkovskij, S.A. (Inst. Sil'notochnoj Ehlektroniki SO RAN, Tomsk (RU))*

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p. 183

(RU)

2 refs., 1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

X-RAY SOURCES; SOFT X RADIATION; PINCH EFFECT; HIGH-VOLTAGE PULSE GENERATORS; X-RAY RADIOGRAPHY; IMAGES; WIRES; COPPER; SILVER; IMPLOSIONS; EXPERIMENTAL DATA

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### **Magnetized X-pinch**

**S70**

*Pikuz, S.A.; Gordan, P.A.; Shelkovenko, T.A.; Tilikin, I.N. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Grinli, D.B.; Atoyan, L.A.; Khammer, D.A. (Kornel'skij Univ., Itaka (US))*

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Zamagnichennyj X-pinch

p. 184

(RU)

2 refs., 1 fig.

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

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### **MHD calculation of X-pinch hot point explosion**

**S70**

*Ivanenkov, G.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN (FIAN), Moscow (RU)), e-mail: ivanenkov.gv@mail.ru; Stepnevski, V. (Inst. Fiziki Plazmy i Lazernogo Mikrosinteza (IFPiLM), Varshava (PL))*

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p. 185

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PINCH EFFECT; HOT PLASMA; EXPLOSIONS; MAGNETOHYDRODYNAMICS; ION DENSITY; ELECTRON DENSITY; RADIATION TRANSPORT; IONIZATION POTENTIAL; JOULE HEATING; CALCULATION METHODS; THEORETICAL DATA

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## **Numerical study of Z-pinch parameters in vacuum diode with laser-induced discharge**

**S70**

*Gasilov, V.A.; Krukovskij, A.Yu.; Novikov, V.G.; Tsygvintsev, I.P. (Inst. Prikladnoj Matematiki im. M.V. Keldysha, Moscow (RU)), e-mail: iliatsygvintsev@gmail.com; Romanov, I.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: romanov@sci.lebedev.ru*

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p. 186

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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Moscow (RU)

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2015

433 p.

LONGITUDINAL PINCH; LASER-PRODUCED PLASMA; ELECTRIC CURRENTS;  
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MAGNETOHYDRODYNAMICS; IONIZATION; PARTICLE LOSSES; ENERGY LOSSES;  
THEORETICAL DATA

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### **Experimental study of diode plasma dynamics at interaction of REB with polymer materials**

**S70**

*Anan'ev, S.S.; Dan'ko, S.A.; Kazakov, E.D.; Kalinin, Yu.G.; Strizhakov, M.G. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: kazakoved82@gmail.com; Kurilo, A.A.; Mineeva, T.A. (Natsional'nyj Issledovatel'skij Univ. MEhI, Moscow (RU)), e-mail: mister.kurilo@mail.ru; Potapenko, A.I. (12 Tsentral'nyj Nauchno-Issledovatel'skij Inst. MO RF, Sergiev Posad (RU)), e-mail: a.potapenko@mail.ru*

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p. 187

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Measurement of sizes of emitting range of heavy-current Z-pinch on final stage of its compression in soft X radiation energy range**

**S70**

*Khil'ko, M.V.; Volkov, G.S.; Frolov, I.N.; Gritsuk, A.N. (FGUP GNTs RF TRINITI, Troitsk, Moscow (RU)), e-mail: liner@triniti.ru*

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433 p.

LONGITUDINAL PINCH; HOT PLASMA; SOFT X RADIATION; IMPLOSIONS; ANGARA-5 DEVICE; EV RANGE 10-100; EV RANGE 100-1000; KEV RANGE 01-10; SIZE; PLASMA SHEATH; COMPRESSION; SHOCK WAVES; ION DENSITY; PLASMA DIAGNOSTICS; PLASMA DENSITY; IMAGES; EXPERIMENTAL DATA

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## **Azimuth current distribution in cylindrical part of vacuum transport line of the Angara-5-1 device**

**S70**

*Grabovskij, E.V.; Gribov, A.N.; Shishlov, A.O. (GNTs RF Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovanij, Moscow, Troitsk (RU)), e-mail: Shishlov@triniti.ru*

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(RU)

1 ref., 1 fig.

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### **PIC simulation of nuclear proton-boron burning in potential well of virtual cathode of nanosecond vacuum discharge**

**S70**

*Kurilenkov, Yu.K.; Tarakanov, V.P. (OIVT RAN, Moscow (RU)); Gus'kov, S.Yu. (FI RAN, Moscow (RU))*

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(RU)

8 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Laboratory astrophysics based on nuclear burning in deep potential well of**

## **virtual cathode of nanosecond vacuum discharge**

**S70**

*Kurilenkov, Yu.K.; Tarakanov, V.P.; Karpukhin, V.T. (OIVT RAN, Moscow (RU)); Gus'kov, S.Yu. (FI RAN, Moscow (RU))*

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p. 191

(RU)

7 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Correlation of neutron yield from plasma focus with energy variation of magnetic field of discharge loop**

**S70**

*Ablesimov, V.E.; Dolin, Yu.N.; Kalinychev, A.E.; Tsibikov, Z.S. (RFYaTs-VNIIEhF, Sarov (RU)), e-mail: ablesimov.v@gmail.com*

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(RU)

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ISBN 978-5-9903264-5-3

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433 p.

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## **Development of transportable plasma focus neutron source induced by explosive magnetic generator**

**S70**

*Ablesimov, V.E.; Andrianov, A.V.; Bazanov, A.A. (RFYaTs-VNIEhF, Sarov (RU)), e-mail: kalinychev@inbox.ru (and others)*

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## **Calculation of electron transport coefficients and pressure in nickel plasma S36;S70**

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p. 197

(RU)

8 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

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433 p.

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## **About temperature dependence of contribution of shell effects in plasma characteristics**

**S71**

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(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob''edinennyj

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ISBN 978-5-9903264-5-3

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433 p.

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## **Phase transformation of dielectric-metal in vapors of alkaline and base metals, hydrogen and excitons**

**S75**

*Khomkin, A.L.; Shumikhin, A.S. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: alhomkin@mail.ru*

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(RU)

3 refs.

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ISBN 978-5-9903264-5-3

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433 p.

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## **Model of ionization-recombination balance in strongly nonideal Rydberg plasma**

**S70**

*Dumin, Yu.V. (MGU im. M.V. Lomonosova, Moscow (RU); IKI RAN, Moscow (RU)), e-mail: dumin@yahoo.com*

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COLD PLASMA; IONIZATION; PLASMA DISRUPTION; RECOMBINATION; COULOMB FIELD; RYDBERG STATES; ELECTRONS; ELECTRON GAS; MATHEMATICAL MODELS; THEORETICAL DATA

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## **Study of possibility of warm dense matter production by electroimplosion of metallic foils by means of mega-ampere currents**

**S70**

*Garanin, S.F.; Kuznetsov, S.D. (FGUP RFYaTs-VNIIEhF, Sarov (RU)), e-mail: sfgar@vniief.ru; Rejnovski, R.E. (Los-Alamoskaya Natsional'naya Lab., Los-Alamos (US))*

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Issledovanie vozmozhnosti polucheniya teplogo plotnogo veshchestva pri ehlektrovzryve metallicheskih fol'g s pomoshch'yu megaampernykh tokov

p. 201

(RU)

3 refs.

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov  
ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
COLD PLASMA; FOILS; ELECTRIC CURRENTS; DENSITY; MAGNETIC ENERGY STORAGE EQUIPMENT; CAPACITIVE ENERGY STORAGE EQUIPMENT; EXPLOSIONS; EXPLODING WIRES; EXPERIMENTAL DATA; MATTER; PLASMA PRODUCTION

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**Molecular dynamics study of electron oscillations in laser-ionized clusters**  
**S70**

*Bystryj, R.G.; Morozov, I.V. (Ob"edinennyj Inst. Vysokikh Temperatur RAN (OIVT RAN), Moscow (RU))*

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p. 202

(RU)

4 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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## **Transport equations for multicomponent chemically active partially ionized plasma in magnetic field**

**S70**

Zhdanov, V.M.; Stepanenko, A.A. (*Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)*), e-mail: vmzhdanov@mail.ru

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p. 203

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **About plasma phase transformation in cerium under high pressure**

**S36;S70**

Vorob'ev, V.S. (*Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)*), e-mail: vrbv@mail.ru; Grushin, A.S.; Novikov, V.G. (*Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU)*)

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## **Dynamics of Hall currents and oscillations of the peripheral regions of a current sheet**

**S70**

*Satunin, S.N.; Frank, A.G. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: annfrank@fpl.gpi.ru*

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6 refs.

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DEPENDENCE; OSCILLATIONS; SPATIAL DISTRIBUTION; PLASMA SHEATH

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## **Investigations of the magnetized plasma rotating in crossed fields**

**S70**

*Gorkunov, A.A.; Gorkunov, M.A.; Gorshunov, N.M. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: gorshunov\_nm@nrcki.ru; Potanin, E.P. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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## **Experimental study of VUV generation by mercury discharge at pressure of buffer gas below 1 Torr**

**S07**

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p. 207

(RU)

3 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj

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ISBN 978-5-9903264-5-3

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433 p.

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## **Dependence of radial potential profile on pressure and magnetic field in the reflex discharge of large size**

**S70**

*Gavrikov, A.V.; Lizyakin, G.D.; Usmanov, R.A.; Samokhin, A.A.; Smirnov, V.P. (OIVT RAN, Moscow (RU)), e-mail: glizyakin@gmail.com*

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p. 208

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

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**Dependence of of radial profiles of metastable Ar(1S\_5) and Ar(1S\_3) atom density in glow discharge in argon on gas pressure and surface material of tube wall**

**S70**

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(RU)

1 ref., 2 figs.

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2015

433 p.

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**Dark phase of atmospheric discharge: from radio-frequency radiation up to neutrons**

**S70**

*Agafonov, A.V.; Bogachenkov, V.A.; Oginov, A.V.; Rusetskij, A.S.; Ryabov, V.A.; Chubenko, A.P.; Shpakov, K.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: agafonov@sci.lebedev.ru*

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p. 210

(RU)

4 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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## **Numerical investigation of high-frequency capacitive discharge at low pressure S70**

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Chislennoe issledovanie vysokochastotnogo emkostnogo razryada ponizhennogo davleniya

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5 refs.

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433 p.

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### **Spectral characteristics of plasma antennas (amplitude modulation)**

**S70**

*Kuz'min, G.P.; Minaev, I.M.; Rukhadze, A.A.; Tikhonovich, O.V. (Federal'noe Gosudarstvennoe Byudzhetnoe Uchrezhdenie Nauki Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: minaev1945@mail.ru, rukh@fpl.gpi.ru*

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(RU)

2 refs., 1 fig.

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### **Dynamics of dust particles in gas mixture in magnetic fields**

**S70**

*Dzlieva, E.C.; Ermolenko, M.A.; Karasev, V.Yu.; Pavlov, S.I.; Novikov, L.A. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: plasmadust@yandex.ru; Majorov, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: mayorov\_sa@mail.ru*

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(RU)

5 refs.

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### **Some plasma chemical applications of discharges with liquid nonmetal electrodes S37**

*Titov, V.A. (Inst. Khimii Rastvorov im. G.A. Krestova RAN, Ivanovo (RU)), e-mail: titov25@gmail.com*

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**The role of electric field and recombination in the formation of Sun atmosphere**  
**S79**

*Kostrov, A.V. (IPF RAN, Nizhnij Novgorod (RU)), e-mail: kstr@appl.scinnov.ru*

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**Electron movement under recombination in hydrogen plasma**

**S70**

*Vikhrev, V.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: vikhrev@mail.ru*

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(RU)

1 ref.

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### **Ionization-field instability HF discharge at arbitrary boundary conditions** **S70**

*Dvinin, S.A. (Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: s\_dvinin@mail.ru; Dovzhenko, V.A. (Inst. Fiziki Atmosfery im. A.M. Obukhova RAN, Moscow (RU)); Sinkevich, O.A. (Natsional'nyj Issledovatel'skij Univ. Moskovskij Ehnergeticheskij Inst., Moscow (RU)), e-mail: oleg.sinkevich@itf.mpei.ac.ru*

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(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Investigation of vacuum arc with diffusive cathode binding as a plasma source**

## **for purposes of SNF plasma separation**

**S12;S70**

*Amirov, R.Kh.; Vorona, N.A.; Gavrikov, A.V.; Lizyakin, G.D.; Polishchuk, V.P.; Samojlov, I.S.; Smirnov, V.P.; Yartsev, I.M. (OIVT RAN, Moscow (RU)), e-mail: gavrikov@ihed.ras.ru; Usmanov, R.A. (MFTI, Dolgoprudnyj (RU)), e-mail: ravus46@yandex.ru*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Current pinch formation of atmospheric pressure discharge**

**S70**

*Medvedev, A.Eh. (Inst. Lazernoj Fiziki SO RAN, Novosibirsk (RU)), e-mail: medvedev@laser.nsc.ru*

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(RU)

5 refs., 1 fig.

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ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
COLD PLASMA; PLASMA FILAMENT; PRESSURE RANGE KILO PA; ELECTRIC DISCHARGES; DIFFUSION; RECOMBINATION; PLASMA SHEATH; ELECTRIC CONDUCTIVITY; ELECTRIC CURRENTS; DIAGRAMS; DIFFUSION EQUATIONS; PLASMA DENSITY; ANALYTICAL SOLUTION; THEORETICAL DATA

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### **Current density in electrolytic cathode**

**S37**

*Akhatov, M.F.; Kayumov, R.R.; Gajsin, A.F. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva - KAI, Kazan' (RU)), e-mail: Akhatov.81@yandex.ru; Shamsemukhametova, G.F. (MBOU Sikertanskaya Osnovnaya Obshcheobrazovatel'naya Shkola im. G. Kamala, selo Sikertan (RU)), e-mail: shamsemukhametova.gulnaz@yandex.ru*

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(RU)

2 refs., 1 fig.

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### **Cluster model of mercury vapor plasma along saturation curve**

**S42;S70**

*Khomkin, A.L.; Shumikhin, A.S. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: alhomkin@mail.ru*

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p. 221

(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Numerical simulation of two-dimensional structure of Penning discharge in molecular hydrogen at pressure 0.1-5 Torr**

**S70**

*Storozhev, D.A. (Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU)); Surzhikov, S.T. (Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU)); Kuratov, S.E. (Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki im. N.L. Dukhova, Moscow (RU))*

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1 ref., 4 figs.

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433 p.

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## **Numerical simulation of molecular hydrogen ionization dissociation in Penning discharge**

**S70**

*Storozhev, D.A. (Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU); Inst. Problem Mekhaniki RAN, Moscow (RU); Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki im. N.L. Dukhova, Moscow (RU)), e-mail: dmitry.stor@gmail.com*

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(RU)

5 refs.

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**On the applicability of the actinometry method in nonuniform nonequilibrium gas-discharge plasma**

**S70**

*Lebedev, Yu.A.; Tatarinov, A.V.; Ehpshstejn, I.L.; Titov, A.Yu. (INKhS RAN, Moscow (RU)), e-mail: lebedev@ips.ac.ru*

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(RU)

5 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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**Influence of geometric parameters of cell of surface dielectric barrier discharge on the energy price of ozone synthesis**

**S37;S70**

*Andreev, V.V.; Vasil'eva, L.A.; Pichugin, Yu.P. (Chuvashskij Gosudarstvennyj Univ. im. I.N. Ul'yanova, Cheboksary (RU)), e-mail: andreev\_vsevolod@mail.ru*

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## **Universe - expansion dynamics under the unbounded Planck-vacuum energy S79;S70**

*Gordeev, A.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: alexandergordeev@yandex.ru*

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4 refs.

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## **Electrostatic model of a dark energy and the cosmic ray acceleration**

**S79**

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p. 227

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4 refs.

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## **Discharge processes associated with engine-drive electrization of helicopters**

**S42**

*Gushchin, M.E.; Korobkov, S.V.; Kostrov, A.V.; Priver, S.Eh.; Odzerikho, D.A.; Strikovskij, A.V. (IPF RAN, Nizhnij Novgorod (RU)), e-mail: kstr@appl.sci-nnov.ru*

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### **Ionospheric effect induced by Chelyabinsk meteorite fall**

**S79;S58**

*Kuz'micheva, M.Yu.; Loseva, T.V.; Lyakhov, A.N. (Inst. Dinamiki Geosfer RAN, Moscow (RU)), e-mail: losseva@idg.chph.ras.ru*

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### **Mechanism of electron diffusion into the SPT channel**

**S70**

*Veselovzorov, A.N.; Pogorelov, A.A.; Svirskij, Eh.B.; Smirnov, V.A. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Smirnov\_VA@nrcki.ru*

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## **Simulation of whistlers propagation in magneto-active plasma with small-scale irregularities**

**S70;S58**

*Ajdakina, N.A.; Gushchin, M.E.; Zudin, I.Yu.; Korobkov, S.V.; Kostrov, A.V. (IPF RAN, Nizhnij Novgorod (RU)), e-mail: zudiniy@appl.scinnov.ru*

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p. 231

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **On multi-charge ion plasma formation in directed gas flow**

**S70**

*Abramov, I.S.; Gospodchikov, E.D.; Shalashov, A.G. (Inst. Prikladnoj Fiziki RAN, Nizhnij Novgorod (RU); Nizhegorodskij Gosudarstvennyj Univ. im. N.I. Lobachevskogo, Nizhnij Novgorod (RU)), e-mail: abramov19940103i@gmail.com*

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3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **On the problem of dust particles charging under the influence of high-energy electron beam**

**S70**

*Kopnin, S.I.; Popel', S.I. (FGBUN Inst. Kosmicheskikh Issledovaniy Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: serg\_kopnin@mail.ru*

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## **On dust particle charging at the dark side of the Moon**

**S79**

*Kopnin, S.I.; Popel', S.I.; Morozova, T.I. (FGBUN Inst. Kosmicheskikh Issledovanij Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: serg\_kopnin@mail.ru*

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### **Characteristics of weakly ionized photoplasma**

**S70**

*Kurbanismalov, V.S.; Omarov, O.A.; Ragimkhanov, G.B.; Khachalov, M.B. (Dagestanskij Gosudarstvennyj Univ., Makhachkala (RU)), e-mail: vali\_60@mail.ru*

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### **Energy dissipation on shock wave front**

**S70**

*Kurbanismalov, V.S.; Omarov, O.A.; Ragimkhanov, G.B.; Khachalov, M.B.; Arslanbekov, M.A.; Abakarova, Kh.M. (Dagestanskij Gosudarstvennyj Univ., Makhachkala (RU)), e-mail: vali\_60@mail.ru*

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## **The role of current filaments in a long spark in air**

**S70**

*Oginov, A.V.; Rodionov, A.A.; Shpakov, K.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: oginov@lebedev.ru*

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### **3D-reconstruction of high-voltage discharge channel by means of multi-angle shooting**

**S70**

*Oginov, A.V.; Rodionov, A.A.; Shpakov, K.V. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: oginov@lebedev.ru*

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4 refs., 1 fig.

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### **Multi-channel scintillation diagnostics of various radiations in prepulse stage for extended atmospheric discharge in the ERG installation**

**S70**

*Rodionov, A.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU); Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU)), e-mail: ra1231@gmail.com;*

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4 refs., 1 fig.

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## **Mechanism of formic acid degradation under the action of dielectric barrier discharge in oxygen plasma**

**S37**

*Bobkova, E.S.; Shishkina, A.I.; Borzova, A.A.; Nevedomyj, R.A.; Ivanova, E.S. (Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Ivanovo (RU)), e-mail: esbobkova@isuct.ru*

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(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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433 p.

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ELECTROCHEMISTRY; EXPERIMENTAL DATA

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### **Oxidative sulfonol degradation under the action dielectric barrier discharge in oxygen plasma**

**S37**

*Bobkova, E.S.; Shishkina, A.I.; Borzova, A.A.; Smirnova, K.A. (Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Ivanovo (RU)), e-mail: esbobkova@isuct.ru*

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(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Study of process of chromium removing from aqueous solution in direct-current discharge with electrolytic cathode**

**S37**

*Bobkova, E.S.; Sungurova, A.V.; Kobeleva, N.A.; Borzova, A.A.; Smirnova, D.Eh. (Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Inst. Termodinamiki i Kinetiki Khimicheskikh Protsessov, Ivanovo (RU)), e-mail: esbobkova@isuct.ru*

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1 ref., 1 fig.

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## **Influence of inelastic particle collisions on transport processes in partially ionized multicomponent plasma in magnetic field**

**S70**

*Stepanenko, A.A.; Zhdanov, V.M. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: stepanenko.mephi@mail.ru*

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2 refs.

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### **Optical studies of supersonic plasma jet created in pulsed capillary discharge** S70

*Andriyanova, Yu.N.; Efimov, A.V.; Pashchina, A.S.; Chinnov, V.F. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU))*

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(RU)

3 refs.

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### **Taking into account of spatial distribution inhomogeneity of electron density and temperature** S70

*Omarov, O.A.; Ehl'darov, Sh.Sh.; Ehl'darov, M.Sh. (Dagestanskij Gosudarstvennyj Univ.,*

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**Spatial distribution of microdischarge plasma parameters in air**

**S70**

*Bekasov, V.S.; Eliseev, S.I.; Kirsanov, G.V.; Kudryavtsev, A.A.; Stepanova, O.M. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: step.eliseev@yandex.ru*

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(RU)

3 refs., 1 fig.

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## **Calculations and measurements of the ion velocity distribution function in strong plasma fields**

**S70**

*Mustafaev, A.S.; Grabovskij, A.Yu. (Natsional'nyj Mineral'no-Syr'evoj Univ. Gornyj, Sankt-Peterburg (RU)), e-mail: rectorat@spmi.ru; Sukhomlinov, V.S. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU))*

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7 refs., 1 fig.

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2015

433 p.

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## **Influence of ambipolar electric field on the EDF formation and characteristics of electron emission in gas discharge plasma**

**S70**

*Kapustin, K.D. (Sankt-Peterburgskij Univ. ITMO, Sankt-Peterburg (RU)); Krasil'nikov, M.V.; Kudryavtsev, A.A. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: akud@ak2138.spb.edu*

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(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Argon and helium ion temperature distributions along the width of current sheets formed in 2D- and 3D-configurations**

**S70**

*Kirij, N.P.; Markov, V.S.; Frank, A.G.; Vasil'kov, D.G.; Voronova, E.V. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: kyrie@fpl.gpi.ru*

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(RU)

6 refs.

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### **Computerized analysis of emission spectra of highly ionized helium plasma** **S70**

*Isakaev, Eh.Kh.; Chinnov, V.F.; Kavyrshin, D.I.; Sargsyan, M.A.; Ageev, A.G. (OIVT RAN, Moscow (RU)), e-mail: dimakav@rambler.ru, makhach@mail.ru*

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p. 250

(RU)

6 refs.

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## **Dynamics of of near UV radiation in the near-electrode region at pre-breakdown stage of long spark**

**S70**

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p. 251

(RU)

2 refs.

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## **Continuous optical discharges sustained by near-IR laser radiation**

**S70**

*Zimakov, V.P.; Kuznetsov, V.A.; Solov'ev, N.G.; Shemyakin, A.N.; Shilov, A.O.; Yakimov, M.Yu. (Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU)), e-mail: yakimov@lantanlaser.ru*

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p. 252

(RU)

3 refs.



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Moscow (RU)

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**The similar dimensionless similarity invariants and invariants for pulsed high-current electric discharges in dense gases, shock waves and toroidal vortices**  
**S70**

*Yusupaliev, U. (Fizicheskij Fakul'tet MGU im. M.V. Lomonosova, Moscow (RU)), e-mail: nesu@phys.msu.ru*

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p. 253

(RU)

3 refs.

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## About some peculiarities of the phase diagram in the asymmetrical Coulomb macrocharge system

S70

*Martynova, I.A.; Iosilevskij, I.L. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU)), e-mail: martina1204@yandex.ru*

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p. 254

(RU)

1 ref.

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## Sivukhin problem and left media

S71

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p. 255

(RU)

5 refs.

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### **3D-diagnostics of anisotropic electron and ion distribution functions in plasma S70**

*Mustafaev, A.S.; Grabovskij, A.Yu.; Ainov, M.A.; Strakhova, A.A. (Natsional'nyj Mineral'no-Syr'evoj Univ. Gornyj, Sankt-Peterburg (RU)), e-mail: rectorat@spmi.ru*

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(RU)

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### **Kinetics of excitation of inert gas atoms in gas discharge plasma**

**S70**

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p. 257

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Quasi-continuous xenon plasma sustenance by means of pulsed-periodic laser radiation**

**S70**

*Rudoj, I.G. (OOO MagAlTek, Moscow (RU)); Solov'ev, N.G.; Shilov, A.O.; Yakimov, M.Yu.*

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p. 258

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

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### **Calculation of component composition of cold microdischarge plasma in air S70**

*Bekasov, V.S.; Kirsanov, G.V.; Kudryavtsev, A.A.; Eliseev, S.I.; Stepanova, O.M. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: Shico92@inbox.ru, gennady\_kirsanov@mail.ru*

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p. 259

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Dense plasma production by the method of electric explosion of toroidal installed copper spirals and creation submillisecond generator with peak current up to 400 kA**

**S70**

*Vlasov, A.N.; Dubkov, M.V.; Burobin, M.A.; Manoshkin, A.B. (Ryazanskij Gosudarstvennyj Radiotekhnicheskij Univ., Ryazan' (RU)), e-mail: anv@fulcra.ryazan.ru*

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(RU)

4 refs., 1 fig.

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CURRENTS; IMAGES; EXPERIMENTAL DATA

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**Plasma source for working off the plasma separation method on model substance S12;S70**

*Antonov, N.N.; Vorona, N.A.; Gavrikov, A.V.; Zhabin, S.N. (OIVT RAN, Moscow (RU); MFTI, Dolgoprudnyj (RU)), e-mail: antonovnickola@gmail.com; Samokhin, A.A.; Smirnov, V.P. (OIVT RAN, Moscow (RU))*

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(RU)

1 ref., 1 fig.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

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433 p.

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## **X-ray generation in CERA-RX(C) under reduced pressure**

**S07;S70**

*Balmashnov, A.A.; Kalashnikov, A.V.; Kalashnikov, V.V.; Stepina, S.P.; Umnov, A.M. (RUDN, Moscow (RU)), e-mail: abalmashnov@rambler.ru*

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(RU)

1 ref.

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**Influence of pulsed electric field with frequency of 12.5 MHz on ECR heating in CERA-RX(C)**

**S07;S70**

*Balmashnov, A.A.; Kalashnikov, A.V.; Kalashnikov, V.V.; Stepina, S.P.; Umnov, A.M. (RUDN, Moscow (RU)), e-mail: abalmashnov@rambler.ru*

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3 refs., 1 fig.

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**Energy efficiency of plasma production in coaxial resonator with a spiral waveguide structure**

**S70**

*Balmashnov, A.A.; Buangujas, V.A.G.; Butko, N.B.; Stepina, S.P.; Umnov, A.M. (RUDN, Moscow (RU)), e-mail: abalmashnov@rambler.ru*

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2 refs., 1 fig., 1 tab.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Parameters of ECR plasma produced in the coaxial resonator with spiral waveguide structure**

**S70**

*Balmashnov, A.A.; Butko, N.B.; Stepina, S.P.; Umnov, A.M.; Khimenes, M.Kh.; Chapurin, A.V. (RUDN, Moscow (RU)), e-mail: abalmashnov@rambler.ru*

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(RU)

1 ref., 1 fig.

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## **Description of mutual diffusion of rarefield heavy impurities in plasma**

**S70**

*Bobrova, N.A. (Inst. Teoreticheskoy i Eksperimental'noj Fiziki im. A.I. Alikhanova, Moscow (RU)), e-mail: nabobrova@gmail.com; Sasorov, P.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: pavel.sasorov@gmail.com; Fomin, I.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha Rossijskoj Akademii Nauk, Moscow (RU); Moskovskij Fiziko-Tekhnicheskij Inst. - Gosudarstvennyj Univ., Dolgoprudnyj (RU)), e-mail: fominalsha@gmail.com*

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(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Plasma acceleration in plane channel in two-liquid MHD approximation**

**S70**

*Gavrikov, M.B.; Savel'ev, V.V. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU)), e-mail: nadya\_p@cognitive.ru, ssvvvv@rambler.ru*

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(RU)

2 refs., 1 fig.

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**Estimates of gas temperature distribution inside the plasmatron channel based on electron temperature**

**S70**

*Gerasimov, A.V.; Kirpichnikov, A.P.; Rachevskij, L.A. (Kazanskiy Natsional'nyj Issledovatel'skij Tekhnologicheskij Univ., Kazan' (RU)), e-mail: gerasimov@kstu.ru*

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(RU)

1 ref.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **About dynamics of anode spots and macroparticles in electric arc on graphite electrodes**

**S70**

*German, V.O.; Glinov, A.P.; Golovin, A.P.; Kozlov, P.V. (NII Mekhaniki MGU, Moscow (RU)), e-mail: krestytroitsk@mail.ru*

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(RU)

6 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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### **Memory effect of the discharge gap in argon-nitrogen mixture**

**S70**

*Meshchanov, A.V.; Korshunov, A.N.; Ionikh, Yu.Z.; Sushentsev, D.M. (SPbGU, Sankt-Peterburg*

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p. 270

(RU)

2 refs., 1 fig.

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**Method of controlling by ion entrainment in dusty plasma**

**S70**

*Pavlov, S.I.; Dзлиeva, E.C.; Ermolenko, M.A.; Karasev, V.Yu.; Novikov, L.A. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: [plasmadust@yandex.ru](mailto:plasmadust@yandex.ru); Majorov, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: [mayorov\\_sa@mail.ru](mailto:mayorov_sa@mail.ru)*

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p. 271

(RU)

10 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Characteristics and parameters of injector beam in magnetic trap of plasma accelerator**

**S70**

*Andreev, V.V.; Novitskij, A.A.; Ndong, D. (RUDN, Kafedra Eksperimental'noj Fiziki, Moscow (RU)), e-mail: temple18@mail.ru*

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(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Experimental and theoretical investigation of recombination dynamics of**

## **nonequilibrium plasma in oxygen mixture**

**S70**

*Aleksandrov, N.L.; Anokhin, E.M.; Popov, M.A.; Kindysheva, S.V. (Moskovskij Fiziko-Tekhnicheskij Inst., Dolgoprudnyj (RU)), e-mail: anjohn@mail.ru*

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(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Nonlinear processes and dust flux generation in Earth ionosphere**

**S70;S58**

*Izvekova, Yu.N.; Popel', S.I. (IKI RAN, Moscow (RU); MFTI, Dolgoprudnyj, Moskovskaya Obl. (RU)), e-mail: besedina\_yn@mail.ru; Stenflo, L. (Univ. Linkepinga, Linkeping (SE))*

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(RU)

4 refs.

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ISBN 978-5-9903264-5-3  
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2015  
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### **Radiation characteristics of multicomponent plasma of alkali metals, mercury and rare gases**

**S74;S70**

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Radiatsionnye kharakteristiki mnogokomponentnoj plazmy shchelochnykh metallov, rtuti i inertnykh gazov

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(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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**Effect of gaseous products produced by destruction of polyethylene film due to plasma oxidation on air plasma parameters**

**S37;S70**

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**The study of peculiarities of charged particles beam transport in ion-optical system of neutron tube**

**S43;S70**

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(RU)

3 refs.

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### **Kinetic mechanisms of polycarbonate etching in nonequilibrium plasma**

**S37**

*Ovtsyn, A.A.; Smirnov, S.A. (FGBOU VPO Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Ivanovo (RU)), e-mail: moose2004@inbox.ru*

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p. 278

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Multichannel electric discharge between aluminium electrode and electrolyte S37;S70**

*Petryakov, S.Yu.; Gajsin, Az.F.; Shegaj, M.I.; Gajsin, F.M. (Kazanskiy Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva - KAI, Kazan' (RU)), e-mail: serioga\_com@mail.ru*

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2 refs., 1 fig.

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**Features of dynamics of fast Z-pinch founded at research of polarization X radiation of multicharged ions and Bremsstrahlung continuum S70**

*Dolgov, A.N.; Prokhorovich, D.E. (FGUP VNIIA, Moscow (RU)), e-mail: vniia4@vniia.ru*

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(RU)

4 refs.

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## **Microwave discharge with liquid electrodes**

**S70**

*Sadriev, R.Sh. (Naberezhnochelninskij Inst. (Filial) KFU, Naberezhnye Chelny (RU)), e-mail: chelny@kpfu.ru; Gajsin, F.M.; Bagautdinova, L.N. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva, Kazan' (RU)), e-mail: tf@kai.ru*

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(RU)

1 ref., 1 fig.

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### **Investigation of ionization oscillations in the Hall thruster discharge in different operating conditions by means of one-dimensional hybrid model**

**S30**

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(RU)

9 refs.

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### **Kinetic features of polypropylene film etching in argon plasma**

**S37**

*Shibaev, S.A.; Kadnikov, D.V.; Smirnov, S.A. (Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Ivanovo (RU)), e-mail: sas@isuct.ru*

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(RU)

1 ref.

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## **The research of properties of noncongruent phase transformations in Coulomb systems by means of the binary ion mixture model**

**S37;S70**

*Stroev, N.E.; Iosilevskij, I.L. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: nikita.stroev@phystech.edu, iosilevskiy@gmail.com*

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(RU)

7 refs.

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### **The features of gas discharge with liquid electrolytic cathode in difficult conditions of combustion**

**S37**

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ISBN 978-5-9903264-5-3

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### **The numerical simulation of formation of gas bubbles in liquid n-heptane during the microwave discharge ignition inside liquid volume**

**S42;S70**

*Lebedev, Yu.A.; Tatarinov, A.V.; Ehpshtejn, I.L. (FGBUN INKhS RAN, Moscow (RU)), e-mail: lebedev@ips.ac.ru; Mukhamadieva, A.R. (MFTI - Gosudarstvennyj Univ., Dolgoprudnyj (RU))*

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(RU)

5 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Multichannel discharges between porous electrodes**

**S37;S70**

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2 refs., 1 fig.

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### **Mathematical model of capacitive RF discharge with liquid electrodes**

**S37**

*Zheltukhin, V.S.; Abdullin, I.Sh. (Kazanskiy Natsional'nyj Issledovatel'skij Tekhnologicheskij Univ., Kazan' (RU)), e-mail: vzheltukhin@gmail.com, abdullin\_i@kstu.ru; Gajsin, A.F. (Kazanskiy Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva - KAI, Kazan' (RU)), e-mail: almaz87@mail.ru; Chebakova, V.Yu. (Kazanskiy (Privolzhskij) Federal'nyj Univ., Kazan' (RU)), e-mail: vchebakova@mail.ru*

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7 refs.

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### **High-frequency capacitive discharge with liquid electrodes**

**S37**

*Gajsin, A.F. (Kazanskiy Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva -*

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1 ref., 1 fig.

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## **Calculation of distribution of electric field potential and electron concentration in discharge with liquid anode**

**S70**

*Gajsin, A.F.; Basyrov, R.Sh. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva, Kazan' (RU)), e-mail:rafikbasyrov@mail.ru*

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### **Probe study of the structure of non-uniform microwave discharge in nitrogen S70**

*Krashevskaya, G.V. (FGBUN Inst. Neftekhimicheskogo Sinteza im. A.V. Topchieva RAN (INKhS RAN), Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Lebedev, Yu.A.; Gogoleva, M.A. (FGBUN Inst. Neftekhimicheskogo Sinteza im. A.V. Topchieva RAN (INKhS RAN), Moscow (RU)), e-mail: lebedev@ips.ac.ru*

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(RU)

3 refs.

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### **Expansion of negative ion plasma into vacuum**

**S70**

*Medvedev, Yu.V. (FGBUN Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: medve@mail.ru*

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(RU)

3 refs.

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**The flow of negative ion plasma near the boundary with electron-ion plasma**

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*Medvedev, Yu.V. (FGBUN Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: medve@mail.ru*

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(RU)

3 refs.

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### **Research of nonlinear effects generated by powerful radio whistler pulse propagation in magnetized plasma**

**S70;S58**

*Ajdakina, N.A.; Gushchin, M.E.; Zudin, I.Yu.; Korobkov, S.V.; Kostrov, A.V.; Strikovskij, A.V. (IPF RAN, Nizhnij Novgorod (RU)), e-mail: aidakina@appl.sci-nnov.ru*

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(RU)

1 ref.

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### **Self-organization of discharge flame dynamics and cathode erosion surface**

## **topography in negative corona discharge**

**S70**

*Amirov, R.Kh.; Samojlov, I.S. (Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)); Barendol'ts, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)); Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Korostylev, E.V. (Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU)); Pestovskij, N.V.; Petrov, A.A.; Savinov, S.Yu. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Moscow (RU))*

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(RU)

1 ref., 2 figs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Critical point parameters of vapor-liquid phase transition in semiconductors**

**S37;S70**

*Khomkin, A.L.; Shumikhin, A.S. (Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: alhomkin@mail.ru*

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4 refs.

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## **Characteristics of electron drift in helium-xenon mixture**

**S70**

*Golyatina, R.I.; Majorov, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: mayorov\_sa@mail.ru*

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6 refs.

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## **Simulation of ultracold plasma by the molecular dynamics method**

**S70**

*Majorov, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: mayorov\_sa@mail.ru*

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(RU)

6 refs.

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## **Dynamics and thermodynamics of Newton-Wigner particles in external potential field**

**S71**

*Larkin, A.S. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU))*

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3 refs., 2 figs.

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ISBN 978-5-9903264-5-3

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2015

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### **Diagnosics of non-equilibrium plasma accompanying the ignition of methane-oxygen mixtures by means of 2,45 GHz microwave radiation**

**S37;S70**

*Artem'ev, K.V.; Davydov, A.M.; Kossyj, I.A.; Misakyan, M.A.; Tarasova, N.M. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU))*

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Diagnostika termoneravnesnoj plazmy, soprovozhdayushchej vosplamnenie metan-kislorodnykh smesej, s pomoshcho'yu mikrovolnovogo izlucheniya s chastotoj 2,45 GGts  
p. 300

(RU)

3 refs., 1 fig.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

COLD PLASMA; NON-EQUILIBRIUM PLASMA; IGNITION; BINARY MIXTURES; METHANE; OXYGEN; PLASMA DIAGNOSTICS; ELECTRON DENSITY; MICROWAVE RADIATION; CHEMICAL REACTIONS; CHEMICAL REACTION KINETICS; PRESSURE RANGE KILO PA; DIAGRAMS; ELECTRIC DISCHARGES; EXPERIMENTAL DATA

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## **Generation of extended microwave torch in strongly subthreshold fields in air** **S70**

*Artem'ev, K.V.; Batanov, G.M.; Berezhetskaya, N.K.; Davydov, A.M.; Konchekov, E.M.; Kossyj, I.A.; Sarksyian, K.A.; Stepakhin, V.D.; Kharchev, N.K. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU))*

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Generatsiya protyazhennogo mikrovolnovogo fakela v sil'no podporogovykh polyakh v vozdushnoj atmosfere

p. 301

(RU)

2 refs., 1 fig.

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433 p.

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## **Explosive emission cells of cathode spot of vacuum discharge**

### **S70**

*Tsvetukh, M.M.; Mesyats, G.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)); Barenjol'ts, S.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova, Moscow (RU))*

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p. 302

(RU)

8 refs.

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### **Manifestation of Langmuir oscillations in numerical model of plasma antenna S70**

*Bogachev, N.N. (MGTU MIREhA, Moscow (RU); IOF RAN, Moscow (RU)), e-mail: bgniknik@yandex.ru; Bogdankevich, I.L.; Gusejnzade, N.G. (IOF RAN, Moscow (RU); GBOU VPO RNIMU im. N.I. Pirogova Minzdrava Rossii, Moscow (RU)), e-mail: ira.bogdankevich@mail.ru, ngus@mail.ru*

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p. 305

(RU)

5 refs.

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### **Generator of THz range based on intensive beam-plasma interaction**

**S70**

*Arzhannikov, A.V.; Astrelin, V.T.; Burmasov, V.S. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Univ., Novosibirsk (RU)), e-mail: A.V.Arzhannikov@inp.nsk.su (and others)*

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p. 306

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Contraction of nanosecond surface barrier discharge in air at pressure P=1-6 atm**

**S70**

*Popov, N.A. (NII Yadernoj Fiziki im. D.V. Skobel'tsyna, MGU im. M.V. Lomonosova, Moscow (RU)); Starikovskaya, S.M.; Stepanyan, S.A. (LPP Ecole Polytechnique, Univ. Paris-Sud, Paris (FR)); Starikovskij, A.Yu. (Mechanical and Aerospace Engineering Dept., Princeton Univ., Princeton (US))*

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p. 307

(RU)

2 refs.

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## **Formation of long streamers along the surface of a liquid**

**S70**

*Akishev, Yu.S. (GNTs RF TRINITI, Troitsk (RU); NIYaU MIFI, Moscow (RU)), e-mail:*

*akishev@triniti.ru; Karal'nik, V.B.; Petryakov, A.V.; Trushkin, N.I. (GNTs RF TRINITI, Troitsk (RU)); Medvedev, M.A.; Shafikov, A.G. (MFTI, Moscow (RU))*

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p. 308

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433 p.

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## **Results of separation of three-component ion mixtures by plasma optical mass separation**

**S70**

*Bardakov, V.M. (Irkutskij Gosudarstvennyj Univ. Putej Soobshcheniya, Irkutsk (RU)), e-mail: vmbardakov38@mail.ru; Ivanov, S.D.; Kazantsev, A.V.; Strokin, N.A. (Natsional'nyj Issledovatel'skij Irkutskij Gosudarstvennyj Tekhnicheskij Univ., Irkutsk (RU)), e-mail: ivsd55@yandex.ru, kazanets@gmail.com, strokin85@inbox.ru*

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Rezultaty razdeleniya trekhkomponentnykh smesey ionov v protsesse plazmoopticheskoy mass-separatsii

p. 309

(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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2015

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PLASMA; SEPARATION PROCESSES; IONS; MASS; PRESSURE RANGE MILLI PA; DISTRIBUTION FUNCTIONS; NITROGEN IONS; ARGON IONS; KRYPTON IONS; TRAJECTORIES; PLASMA POTENTIAL; EXPERIMENTAL DATA

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## **Verification of computer model for calculation of ion-optical systems**

**S97;S70**

*Dikalyuk, A.S.; Surzhikov, S.T.; Kuratov, S.E. (Vserossiyskij Nauchno-Issledovatel'skij Inst. Avtomatiki im. N.L. Dukhova, Moscow (RU); Inst. Problem Mekhaniki RAN im. A.Yu. Ishlinskogo, Moscow (RU); Moskovskij Fiziko-Tekhnicheskij Inst. (Gosudarstvennyj Univ.), Dolgoprudnyj (RU)), e-mail: aleks.dikalyuk@gmail.com*

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Verifikatsiya komp'yuternoj modeli dlya rascheta ionno-opticheskikh sistem

p. 310

(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

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433 p.

C CODES; S CODES; TRAJECTORIES; IONS; ELECTROSTATICS; ELECTRIC FIELDS; SPACE CHARGE; POISSON EQUATION; COMPUTERIZED SIMULATION; VERIFICATION; CALCULATION METHODS; ION DRIFT; PLASMA; PLASMA SIMULATION; THEORETICAL DATA; MATHEMATICAL MODELS

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## **Construction and study of air plasmatron with power up to 1 MW**

**S70**

*Isakaev, Eh.Kh.; Chinnov, V.F.; Tyuftyaev, A.S.; Gadzhiev, M.Kh.; Sargsyan, M.A.; Konovalov, P.V. (OIVT RAN, Moscow (RU)), e-mail: m.sargsyan86@mail.ru*

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Sozdanie i issledovanie vozdushnogo plazmotrona moshchnost'yu do 1 MVt

p. 311

(RU)

1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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2015

433 p.

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### **Effect of ion energy on the plasma assisted synthesis of graphene**

**S37;S36**

*Shustin, E.G.; Isaev, N.V.; Kotelyanskij, I.M.; Luzanov, V.A.; Mirgorodskaya, E.N.; Temiryazeva, M.P. (Inst. Radiotekhniki i Ehlektroniki RAN im. V.A. Kotel'nikova, Fryazinskij Filial, Fryazino (RU))*

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Vliyanie ehnergii ionov na protsess plazmokhimicheskogo sinteza grafena

p. 312

(RU)

1 ref.

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

GRAPHENE; CHEMICAL VAPOR DEPOSITION; PLASMA; THIN FILMS; IONS; SAPPHIRE; SYNTHESIS; NICKEL; TEMPERATURE RANGE 0400-1000 K; PLASMA POTENTIAL; ENERGY DEPENDENCE; EV RANGE 10-100; CRYSTAL STRUCTURE; EXPERIMENTAL DATA

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### **Molecular dynamics simulation of ion treatment in RF low-pressure plasma of high-molecular materials with nonuniform random structure (by example of polyethylene)**

**S36**

*Zheltukhin, V.S.; Borodaev, I.A. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnologicheskij Univ., Kazan' (RU))*

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Molekulyarno-dinamicheskoe modelirovanie ionnoj obrabotki v VCh-plazme ponizhennogo davleniya vysokomolekulyarnykh materialov sluchajno-neodnorodnoj struktury (na primere poliehtilena)

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(RU)

3 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

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## **Investigation of graphene materials synthesis by means of pyrolysis of hydrocarbons in thermal plasma**

**S37;S36**

*Amirov, R.Kh.; Isakaev, Eh.Kh.; Shavelkina, M.B. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: mshavelkina@gmail.com; Shatalova, T.B. (Moskovskij Gosudarstvennyj Univ., Moscow (RU)), e-mail: shatalova@inorg.chem.msu.ru*

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Issledovanie sinteza grafenovykh materialov pri pirolize uglevodorodov v termicheskoj plazme

p. 314

(RU)

2 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
GRAPHENE; PYROLYSIS; PLASMA; SYNTHESIS; PLASMATRONS; EFFICIENCY;  
ARGON; PRESSURE RANGE KILO PA; HELIUM; STRUCTURAL CHEMICAL  
ANALYSIS; MORPHOLOGY; EXPERIMENTAL DATA

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**Formation of wearproof nanodiffusion layers on the surface of metals and analysis of physical mechanical properties of cutting and machining tools exposed to low-pressure RF plasma**

**S36**

*Abdullin, I.Sh.; Khubatkhuzin, A.A.; Khristolyubova, V.I. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnologicheskij Univ., Kazan' (RU)), e-mail: al\_kstu@mail.ru*

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ISBN 978-5-9903264-5-3

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**Peculiarities of flame propagation in non-premixed hot mixture under electric discharge activation of oxidizer. Numerical simulation**

**S37**

*Filimonova, E.A.; Bocharov, A.N.; Bityurin, V.A. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: helpfil@mail.ru*

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## **Kinetics of porosity formation and change of materials properties in numerical models**

**S36**

*Zmievskaia, G.I.; Bondareva, A.L. (Inst. Prikladnoj Matematiki im. M.V. Keldysha RAN, Moscow (RU))*

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(RU)

3 refs.

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**Thermophysical processes taking place during quartz particle processing into polycrystalline silicon within disperse plasma-gas hydrogen-containing flows**  
**S37**

*Grishin, Yu.M.; Kozlov, N.P.; Skryabin, A.S. (FGBOU VPO Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Bauman, Moscow (RU))*

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2 refs.

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433 p.

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## **Quasi TEM electromagnetic waves in plasma waveguides with multiply connected cross section in finite external magnetic field**

**S70**

*Kartashov, I.N.; Kuzelev, M.V. (Fizicheskij Fakul'tet MGU, Moscow (RU)), e-mail: kartashov@ph-elec.phys.msu.ru*

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## **Spectroscopy of argon plasma excited by pulse-periodic resonance microwave discharge**

**S70**

*Andreev, V.V.; Vasileska, I.; Korneeva, M.A. (Rossijskij Univ. Druzhy Narodov, Moscow (RU)), e-mail: airc@inbox.ru*

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433 p.

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## **Study of transparent structure visualization by means of short pulses**

**S70**

*Korytin, A.I.; Stepanov, A.N.; Bubis, E.L.; Mal'kov, Yu.A.; Murzanev, A.A.; Yashunin, D.A. (Inst. Prikladnoj Fiziki RAN, Nizhnij Novgorod (RU)), e-mail: bel@appl.sci-nnov.ru*

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(RU)

8 refs.

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ISBN 978-5-9903264-5-3

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433 p.

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**Study of nonlinear switching of image structure by laser radiation probing**  
**S70**

*Bubis, E.L.; Gusev, S.A.; Lozhkarev, V.V.; Stepanov, A.N. (Inst. Prikladnoj Fiziki RAN, Nizhnij Novgorod (RU); Inst. Fiziki Mikrostruktur RAN, Nizhnij Novgorod (RU)), e-mail: bel@appl.sci-nnov.ru, gusev@ipm.sci-nnov.ru*

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(RU)

6 refs., 1 fig.

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ISBN 978-5-9903264-5-3

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2015

433 p.

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**Generation of low-frequency radiation and surface waves under exposure by focused laser pulse on the conductor**

**S75**

*Uryupin, S.A. (Fizicheskij Inst. im. P.N. Lebedeva RAN, Moscow (RU)), e-mail: uryupin@sci.lebedev.ru; Frolov, A.A. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: frolov@ihed.ras.ru*

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Generatsiya nizkochastotnogo izlucheniya i poverkhnostnykh voln pri vozdejstvii na provodnik sfokusirovannogo lazernogo impul'sa

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433 p.

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## **Study of dust structures formed in vacuum arc discharge during cathode sputtering of titanium**

**S75**

*Smolanov, N.A.; Neverov, V.A.; Mishkin, V.P.; Pan'kin, N.A. (Mordovskij Gosudarstvennyj Univ. imeni N.P. Ogareva, Saransk (RU)), e-mail: smolanovna@yandex.ru*

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ISBN 978-5-9903264-5-3

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### **Effects of charging under plasma exposure on structure of microconductor-on-insulator type in plasma chemical technologies**

**S75**

*Tarakanov, V.P. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU)); Shustin, E.G. (Inst. Radiotekhniki i Ehlektroniki im. V.A. Kotel'nikova RAN, Fryazinskij Filial, Fryazino (RU))*

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### **Modified drift-diffusion model of the Penning discharge at 1.0 mtorr**

**S70**

*Surzhikov, S.T. (Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU)); Kuratov, S.E. (Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki im. N.L. Dukhova, Moscow (RU))*

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## **Generation of ion flow by laser-produced plasma of atmospheric pressure in microwave field**

**S36**

*Medvedev, A.Eh.; Grachev, G.N. (Inst. Lazernoj Fiziki SO RAN, Novosibirsk (RU)), e-mail: medvedev@laser.nsc.ru*

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## **Impurity analysis on energy spectra of Penning electrons in plasma by means of a wall probe**

**S70**

*Kudryavtsev, A.A.; Sajfutdinov, A.I.; Sysoev, S.S.; Belyaev, V.Yu.; Khromov, N.A. (Sankt-Peterburgskij Gosudarstvennyj Univ., Sankt-Peterburg (RU)), e-mail: akud53@gmail.com, as.uav@bk.ru*

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## **Stimulated Mandelstam-Brillouin scattering in the field of the two-dimensional localized pumping wave for contradirectional interacting waves**

**S71**

*Solikhov, D.K. (Tadzhikskij Natsional'nyj Univ., Fizicheskij Fakul'tet, Dushanbe (TJ)), e-mail: davlat56@mail.ru; Dvinin, S.A. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: dvinin@phys.msu.ru*

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## **Pulsed barrierless discharge cell**

**S37**

*Andreev, V.V.; Pichugin, Yu.P. (Chuvashskij Gosudarstvennyj Univ. im. I.N. Ul'yanova, Cheboksary (RU)), e-mail: andreev\_vsevolod@mail.ru*

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2 refs.

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## **Spatial distribution of plasma bunch obtained under gyromagnetic resonance in mirror magnetic trap**

**S70**

*Andreev, V.V.; Novitskij, A.A.; Umnov, A.M.; Chuprov, D.V. (RUDN, Kafedra Eksperimental'noj Fiziki, Moscow (RU)), e-mail: chu\_d@mail.ru*

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1 ref.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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## **Ionization of large areas of air**

**S70;S58**

*Ardelyan, N.V.; Kosmachevskij, K.V. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fakul'tet Vychislitel'noj Matematiki i Kibernetiki, Moscow (RU)), e-mail:*

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433 p.

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## **Rise of ions created by a source in dry air into troposphere under the influence of the Earth electric field**

**S70;S58**

*Bychkov, V.L.; Maksimov, D.S. (Moskovskij Radiotekhnicheskij Inst. Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: mrti@mrtiran.ru; Savenkova, N.P.; Shobukhov, A.V. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fakul'tet Vychislitel'noj Matematiki i Kibernetiki, Moscow (RU)), e-mail: cmc@cs.msu.ru*

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433 p.

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### **Long-lived glowing formations created with the capillary discharge**

**S70**

*Bychkov, V.L.; Osokin, A.S.; Stepanov, A.I.; Stepanov, I.G.; Chernikov, V.A. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU); Moskovskij Radiotekhnicheskij Inst. Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: bychvl@gmail.com, mrti@mrtiran.ru*

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### **Hydrodynamic analogies in electronics and plasma**

**S71;S70**

*Bychkov, V.L. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fizicheskij*

*Fakul'tet, Moscow (RU); Moskovskij Radiotekhnicheskij Inst. Rossijskoj Akademii Nauk, Moscow (RU)), e-mail: bychvl@gmail.com*

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**Implementation of particle-in-cell method of plasma physics on general purpose graphical processors units**

**S70;S97**

*Perepelkina, A.Yu.; Levchenko, V.D.; Goryachev, I.A. (IPM im. M.V. Keldysha RAN, Moscow (RU)), e-mail: mogmi@narod.ru*

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### **Numerical study of multiscale instabilities in magnetized plasma**

**S70;S97**

*Perepelkina, A.Yu.; Levchenko, V.D.; Goryachev, I.A. (IPM im. M.V. Keldysha RAN, Moscow (RU)), e-mail: mogmi@narod.ru*

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4 refs.

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### **Tunneling spectroscopy of metal-nanocarbon heterostructure**

**S75;S77**

*Ivanenko, I.P.; Streletskij, O.A.; Guseva, M.B. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Moscow (RU)), e-mail: ivanenko@physics.msu.ru*

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**Optical properties of microwave discharges in mixtures of powders of titanium magnesium with dielectrics**

**S77;S70**

*Batanov, G.M.; Borzosekov, V.D.; Kolik, L.V. (IOF RAN, Moscow (RU)) (and others)*

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## **Field-emission properties of nanocrystalline carbon films deposited by the CVD method**

**S36**

*Streletskij, O.A.; Nikitin, D.V.; Kushkina, K.D. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Moscow (RU)), e-mail: enchanter@land.ru*

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## **Comparative study of polypropylene modification in afterglow of atmospheric**

## **pressure discharges with metallic and liquid electrolytic cathodes**

**S36**

*Titov, V.A.; Kuz'micheva, L.A. (Inst. Khimii Rastvorov im. G.A. Krestova RAN, Ivanovo (RU)), e-mail: lak@isc-ras.ru; Nikitin, D.I.; Shikova, T.G.; Smirnova, K.V. (Ivanovskij Gosudarstvennyj Khimiko-Tekhnologicheskij Univ., Ivanovo (RU))*

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## **Modification of natural cellulose materials using plasma in electrolyte solutions**

**S37**

*Titova, Yu.V.; Stokozenko, V.G.; Titov, V.A.; Kuz'micheva, L.A. (Inst. Khimii Rastvorov im. G.A. Krestova RAN, Ivanovo (RU)), e-mail: jvt@isc-ras.ru*

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EFFICIENCY; EXPERIMENTAL DATA

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### **Comparative study of thermal and plasma-assisted ignition of C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>6</sub> and C<sub>2</sub>H<sub>5</sub>OH mixtures with oxygen**

**S37**

*Kosarev, I.N.; Kindysheva, S.V.; Aleksandrov, N.L. (MFTI, Moscow (RU)), e-mail: ilyakosarev@gmail.com; Starikovskij, A.Yu. (Prinstonskij Univ., Princeton (US)), e-mail: astariko@princeton.edu*

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**Selective elements the physical-mathematical model of helicon discharge**  
**S70;S97**

*Kuzenov, V.V. (MGTU im. N.Eh. Baumana, Moscow (RU); Inst. Problem Mekhaniki im. A.Yu. Ishlinskogo RAN, Moscow (RU); Federal'noe Gosudarstvennoe Unitarnoe Predpriyatie Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki imeni N.L. Dukhova - Predpriyatie Goskorporatsii ROSATOM, Moscow (RU)), e-mail: vik.kuzenov@gmail.com; Ryzhkov, S.V. (MGTU im. N.Eh. Baumana, Moscow (RU)), e-mail: svryzhkov@gmail.com*

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**Plasma electrolytic surface modification of metals and alloys**

**S36**

*Bagautdinova, L.N.; Gajsin, F.M.; Mastjukov, Sh.Ch. (Kazanskij Natsional'nyj Issledovatel'skij Tekhnicheskij Univ. im. A.N. Tupoleva - KAI, Kazan' (RU)), e-mail: lilup@bk.ru*

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## **Combined plasma optical method for destruction of complexones contained in liquid radioactive wastes**

**S12**

*Kamrukov, A.S.; Kozlov, N.P.; Malkov, K.N.; Novikov, D.O.; Shashkovskij, S.G. (MGTU im. N.Eh. Baumana, Moscow (RU)); Lagunova, Yu.O.; Seliverstov, A.F. (IFKhEh RAN, Moscow (RU)), e-mail: zerooo@list.ru*

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## **Study of tungsten evaporation in high-power ablative pulsed plasma flow**

**S70**

*Kazeev, M.N.; Kozlov, V.F.; Kojdan, V.S.; Tolstov, Yu.S. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: Koidan\_VS@nrcki.ru*

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## **Pulsed magneto-hydraulic deformation of strong cylindrical samples**

**S36**

*Grigor'ev, G.Yu.; Kazeev, M.N.; Kozlov, V.F.; Kojdan, V.S.; Senchenkov, S.A.; Tolstov, Yu.S. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail:*

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## **Interaction of photoplasma in air with shock wave**

**S70**

*Kurbanismalov, V.S.; Ragimkhanov, G.B.; Khachalov, M.B.; Ali Rafid Abbas Ali (Dagestanskij Gosudarstvennyj Univ., Makhachkala (RU)), e-mail: vali\_60@mail.ru*

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## **Formation of solid microrelief on steel 45 sample with microplasma discharges**

**S36**

*Ivanov, V.A.; Konyzhev, M.E.; Dorofeyuk, A.A.; Kamolova, T.I. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: ivanov@fpl.gpi.ru; Kuksenova, L.I.; Lapteva, V.G.; Khrennikova, I.A. (Inst. Mashinovedeniya im. A.A. Blagonravova RAN, Moscow (RU))*

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(RU)

3 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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**Investigation of atmospheric pressure discharges with optical emission spectroscopy****S37**

*Mavlyudov, T.B. (Inst. Metallurgii i Materialovedeniya im. A.A. Bajkova RAN, Moscow (RU)), e-mail: mavlyudov@gmail.com; Shakhatov, V.A. (Inst. Neftekhimicheskogo Sinteza im. A.V. Topchieva RAN, Moscow (RU)); Vereshchagin, K.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU))*

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p. 351

(RU)

4 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy,

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### **Stabilization of plasma-stimulated supersonic combustion of propane-air fuel in a smooth expanding aerodynamic channel**

**S37**

*Shibkov, V.M.; Shibkova, L.V.; Kopyl, P.V.; Surkont, O.S. (MGU imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: shibkov@phys.msu.ru*

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

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COLD PLASMA; BINARY MIXTURES; AIR; PROPANE; COMBUSTION; CHEMICAL REACTION KINETICS; STABILIZATION; SUPERSONIC FLOW; AERODYNAMIC HEATING; RECORDING SYSTEMS; REAL TIME SYSTEMS; EMISSION SPECTROSCOPY; TEMPERATURE RANGE 1000-4000 K; EXPERIMENTAL DATA

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## **Parameters of the flame initiated by the low-temperature plasma under conditions of supersonic propane-air flow**

**S37**

*Shibkova, L.V.; Shibkov, V.M.; Kopyl, P.V.; Surkont, O.S.; Andrienko, A.A.; Baurov, A.Yu.; Gavrilov, E.A.; Morozov, R.A.; Sukhorukov, V.I. (MGU imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: shibkov@phys.msu.ru*

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## **Gasdynamic characteristics of supersonic flow under conditions of distributed energy supply inside a duct of variable cross-section**

**S37**

*Shibkova, L.V.; Shibkov, V.M.; Kopyl, P.V.; Surkont, O.S.; Andrienko, A.A.; Gavrilov, E.A.; Morozov, R.A.; Sukhorukov, V.I. (MGU imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: shibkov@phys.msu.ru*

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## **Efficiency of using charged microdrops for transformation of electric energy into kinetic energy of air flow**

**S42**

*Luk'yanchikov, G.S.; Khaziev, T.R. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: genluk1@rambler.ru*

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(RU)

4 refs.

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EXPERIMENTAL DATA; ELECTROHYDRODYNAMICS

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### **Optimization of characteristics of planar inductive antenna for HF discharge excitation**

**S70**

*Dvinin, S.A.; Busleev, N.I. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: dvinin@phys.msu.ru*

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(RU)

4 refs.

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433 p.

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### **Ignition of high-speed air-hydrocarbon mixture with low-power pulsed plasmatron plasma**

**S37**

*Alekseev, A.I.; Vaulin, D.N.; Isaev, A.R.; Chernikov, V.A. (MGU imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Kafedra Fizicheskoy Ehlektroniki, Moscow (RU)), e-mail: info@physics.msu.ru*

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(RU)

1 ref., 1 fig.

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## **Magnetic field influence on the ignition specification of the high-speed air-hydrocarbon mixture**

**S37**

*Alekseev, A.I.; Vaulin, D.N.; Chernikov, V.A. (MGU imeni M.V. Lomonosova, Fizicheskij Fakul'tet, Kafedra Fizicheskoy Ehlektroniki, Moscow (RU)), e-mail: info@physics.msu.ru*

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(RU)

1 ref., 1 fig.

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termoyadernomu sintezu. Sbornik tezisov dokladov

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### **Study of resource of thermoemission cathodes generating nitrogen plasma**

**S70**

*Belevtsev, A.A.; Goryachev, S.V.; Isakaev, Eh.Kh.; Chinnov, V.F. (OIVT RAN, Moscow (RU)), e-mail: v\_chinnov@oivtran.ru, makhach@mail.ru*

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Issledovanie resursa termoeemissionnykh katodov - generatorov azotnoj plazmy

p. 359

(RU)

2 refs.

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ISBN 978-5-9903264-5-3

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2015

433 p.

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### **Influence of external conditions on the radial distribution of plasma parameters in Ar and Ar/O<sub>2</sub> mixture in the 46-cm-diameter inductive HF plasma sources**

**S70**

*Aleksandrov, A.F.; Vavilin, K.V.; Kozlov, G.P.; Kral'kina, E.A.; Neklyudova, P.A.; Pavlov, V.B. (MGU im. M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail:*

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ISBN 978-5-9903264-5-3

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433 p.

PLASMA; HIGH-FREQUENCY DISCHARGES; ARGON; BINARY MIXTURES; OXYGEN; INDUCTION; MAGNETIC FIELDS; ANTENNAS; PLASMA PRODUCTION; SPATIAL DISTRIBUTION; PRESSURE RANGE MILLI PA; ELECTRIC CURRENTS; HOMOGENEOUS PLASMA; IONIC COMPOSITION; EXPERIMENTAL DATA

## **Resonant nature of the inductive HF discharge placed into an external magnetic field**

**S70**

*Vavilin, K.V.; Kral'kina, E.A.; Nikonov, A.M.; Pavlov, V.B.; Petrov, A.K. (MGU im. M.V. Lomonosova, Fizicheskij Fakul'tet, Moscow (RU)), e-mail: alpetrov57@gmail.com*

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PLASMA PRODUCTION; ARGON; HELIUM; PRESSURE RANGE MILLI PA; ELECTRON  
DENSITY; EXPERIMENTAL DATA

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## **Effects of incremental nonequilibrium in shock waves in heterogeneous media as applied to microbubble technologies**

**S42**

*Velikodnyj, V.Yu.; Dyrenkov, A.V.; Son, Eh.E. (Ob''edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU))*

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THEORETICAL DATA

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## **Nonstationary effects during torch and jet propagation at ignition by high-voltage electric discharge**

**S42;S70**

*Bityurin, V.A.; Velikodnyj, V.Yu.; Dyrenkov, A.V. (Ob''edinennyj Inst. Vysokikh Temperatur*

RAN, Moscow (RU))

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2 refs., 1 fig.

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**Plasma-assisted magnetically self-insulated SHF generator**

**S70**

*Bogdankevich, I.L. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: ira.bogdankevich@mail.ru; Litvin, V.O.; Loza, O.T. (Rossijskij Univ. Druzhyby Narodov, Moscow (RU))*

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3 refs., 3 figs.

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### **Power microwave radiation source with electronic frequency retuning in wide frequency range**

**S70**

*Andreev, S.E.; Bogdankevich, I.L.; Ernyleva, S.E.; Ivanov, I.E.; Strelkov, P.S.; Ul'yanov, D.K. (FGBUN Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU))*

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### **Dynamics of high-current relativistic electron beam**

**S70;S16**

*Strelkov, P.S.; Ivanov, I.E.; Shumejko, D.V. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN,*

Moscow (RU)), e-mail: [strelkov@fpl.gpi.ru](mailto:strelkov@fpl.gpi.ru), [iei@fpl.gpi.ru](mailto:iei@fpl.gpi.ru), [shumeiko@fpl.gpi.ru](mailto:shumeiko@fpl.gpi.ru); Tarakanov, V.P. (Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: [karat@gmail.ru](mailto:karat@gmail.ru)

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(RU)

1 ref.

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**Active control of near-wall flow in subsonic diffuser under the influence of microwave discharges**

**S70**

Vinogradov, V.A.; Komratov, D.V.; Makarov, A.Yu. (FGUP TsIAM im. P.I. Baranova, Moscow (RU)), e-mail: [slavavino@ciam.ru](mailto:slavavino@ciam.ru), [komratovdv@gmail.com](mailto:komratovdv@gmail.com), [mmkeeper@mail.ru](mailto:mmkeeper@mail.ru); Esakov, I.I. (FNPTs OAO MRTI RAN, Moscow (RU)), e-mail: [ira.mrti@mail.ru](mailto:ira.mrti@mail.ru)

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Aktivnoe upravlenie techeniem v pristenochnoj oblasti dozvukovykh diffuzorov initsiirovannymi SVCh-razryadami

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### **Production of NO<sub>x</sub> and N<sub>2</sub>O<sub>2</sub> by repetitive high-voltage discharge sliding along the water-gas interface**

**S37**

*Anpilov, A.M.; Barkhudarov, Eh.M.; Kossyj, I.A.; Taktakishvili, M.I.; Temchin, S.M. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: anpilov56@gmail.com; Kozlov, Yu.N. (Inst. Khimicheskoy Fiziki im. N.N. Semenova RAN, Moscow (RU)), e-mail: yunkoz@mail.ru*

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Generatsiya NO<sub>x</sub> i N<sub>2</sub>O<sub>2</sub> vysokovol'tnym impul'sno-periodicheskim skol'zyashchim razryadom vdol' granitsy razdela voda - gaz

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3 refs., 1 fig.

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### **Multi-electrode high-voltage ring pulsed discharge for water treatment**

**S37**

*Anpilov, A.M.; Barkhudarov, Eh.M.; Kossyj, I.A.; Misakyan, M.A.; Moryakov, I.V.; Taktakishvili, M.I. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: anpilov56@gmail.com; Dvoenko, A.V.; Khabeev, R.R. (OOO Plazma-SK, Saratov (RU)), e-mail: avdvoenko@gmail.com*

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Mnogoehlektrodnij vysokovol'tnyj kol'tsevoj impul'snyj razryad dlya obrabotki vody

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2 refs., 1 fig.

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### **Evaluation of electron temperature of microplasma discharges excited on surface of steel examples at pulsed electric current with the amplitude of 700 A**

**S36**

*Ivanov, V.A.; Konyzhev, M.E.; Kamolova, T.I.; Letunov, A.A. (Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU)), e-mail: ivanov@fpl.gpi.ru; Zimin, A.M.; Trojnov, V.I. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. im. N.Eh. Baumana, Moscow (RU))*

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Otsenka ehlektronnoj temperatury mikroplazmennykh razryadov, vobuzhdaemykh na poverkhnosti obraztsov iz stali pri impul'snom ehlektricheskom toke amplitudoj 700 A  
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2 refs.

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TEMPERATURE; SPECTROSCOPY; VISIBLE RADIATION; IRON IONS;  
EXPERIMENTAL DATA

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## **Development of magnetic systems for demonstration fusion reactors**

**S70**

*Lelekhov, S.A. (Chastnoe Uchrezhdenie GK Rosatom Proektnyj Tsentr ITEhR, Moscow (RU)), e-mail: s.lelekhov@iterrf.ru*

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Razrabotka magnitnykh sistem dlya demonstratsionnykh termoyadernykh reaktorov

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433 p.

ITER TOKAMAK; DEMONSTRATION PLANTS; HIGH-TC SUPERCONDUCTORS;  
SUPERCONDUCTING MAGNETIC ENERGY STORAGE; REVIEWS

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## **Development of divertor dome design (DDD) for neutronic phase of ITER operation**

**S70**

*Aleksandrov, I.V.; Marinin, G.V. (OOO Russkie Tekhnologii, Sankt-Peterburg (RU)), e-mail: rtechster@gmail.com; Gordienko, M.V.; Labusov, A.N.; Makhan'kov, A.N.; Mironov, I.A.; Tanchuk, V.N. (OAO NIEhFA, Sankt-Peterburg (RU)), e-mail: amakh@sintez.niefa.spb.su*

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Razrabotka konstruktivnoy sborki divertora (TsSD) ITEhR, rabotosposobnoy na nejtronnoj faze raboty reaktora

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## **Test of ITER divertor elements facing to plasma of external and internal vertical targets by means of high-energy flows of the test facility JSC NIEFA**

**S70**

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9-13 Feb 2015

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termoyadernomu sintezu

Ispytaniya vysokoehnergetichnymi potokami ehlementov, obrashchennykh k plazme vneshnej i vnutrennej vertikal'nykh mishenej i tsentral'noj sborki divertora ITEhR na ustanovke IDTF  
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(RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; DIVERTORS; WALL LOADING; FIRST WALL; ELECTRON BEAMS; BENCH-SCALE EXPERIMENTS; THERMAL TESTING; EXPERIMENTAL DATA

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## **Work on the ITER project in Budker Institute of Nuclear Physics SB RAS**

**S70**

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p. 376

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

**Some instrumentation and control design features of diagnostic systems delivered by Russian Federation to ITER project**

**S70**

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

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SYSTEMS

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**State of the Thomson scattering diagnostics for ITER divertor**

**S70**

*Bazhenov, A.N.; Bukreev, I.M.; Dmitriev, A.M. (FGBUN Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe RAN, Sankt-Peterburg (RU)), e-mail: Sergey.Tolstyakov@mail.ioffe.ru (and others)*

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p. 378

(RU)

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## **ITER HFS reflectometry: development status**

**S70**

*Vershkov, V.A.; Shelukhin, D.A.; Sarychev, D.V.; Luk'yanov, V.V.; Subbotin, G.F. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: D.Shelukhin@fc.iterru.ru*

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; SCATTERING; PLASMA DIAGNOSTICS; ANTENNAS; RF SYSTEMS; WAVEGUIDES; HETERODYNE RECEIVERS; GHZ RANGE 01-100; TIME RESOLUTION; SPATIAL RESOLUTION; EXPERIMENTAL DATA

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**Verification of Balmer-alpha spectroscopy interpretation method for near-wall plasma with account of divertor stray light using the predictive modelling data**

## for ITER

S70

*Neverov, V.S.; Alekseev, A.G. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: vs-never@hotmail.com; Kukushkin, A.B. (NITs Kurchatovskij Inst., Moscow (RU); NIYaU MIFI, Moscow (RU))*

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Proverka metoda interpretatsii bal'mer-al'fa spektroskopii dlya pristenochnoj plazmy tokamaka s uchetom rasseyannogo divertornogo sveta na dannykh predskazatel'nogo modelirovaniya ITEhR p. 380

(RU)

7 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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433 p.

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## **Development of manufacturing process for tungsten armour of plasma facing components**

S70

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; DIVERTORS; CLADDING; TUNGSTEN; BRONZE; WALL LOADING; MATRIX MATERIALS; LINING PROCESSES; THERMAL CYCLING; WEAR RESISTANCE

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### **Development of manufacturing process of support structure for ITER divertor dome design (DDD)**

**S70**

*Akimov, S.M.; Marinin, G.V. (OOO Russkie Tekhnologii, Sankt-Peterburg (RU)), e-mail: rtechster@gmail.com; Lapin, A.V.; Mazaev, S.N.; Makhan'kov, A.N.; Mirgorodskij, V.A. (OAO NIIeFA, Sankt-Peterburg (RU)), e-mail: mazaev@sintez.niiefa.spb.su*

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(RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

ITER TOKAMAK; DIVERTORS; POWERED SUPPORTS; CONSTRUCTION; STAINLESS STEEL-316L; BRONZE; LASER WELDING; ARC WELDING; QUALITY CONTROL

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### **Results of thermohydraulic calculation of the first wall panel of blanket**

## **#Numero Sign#14 of the NDL type**

**S70**

*Trapeznikova, O.V.; Tomilov, S.N.; Sviridenko, M.N.; Razmerov, A.V.; Leshukov, A.Yu. (AO NIKIEhT, Moscow (RU)), e-mail: zolotuhina@nikiet.ru*

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Rezultaty teplogidravlicheskogo rascheta paneli pervoj stenki modulya blanketa #Numero Sign#14 tipa NDL

p. 383

(RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; FIRST WALL; WALL LOADING; BREEDING BLANKETS; SHIELDING; JOINTS; SWITCHES; THERMONUCLEAR REACTOR COOLING SYSTEMS; THERMAL HYDRAULICS

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## **Comparative analysis of helium cooling systems for test blanket modules developed by Russian Federation and India**

**S70**

*Murtazina, D.R.; Sysoev, A.G.; Sviridenko, M.N.; Leshukov, A.Yu. (AO NIKIEhT, Moscow (RU)), e-mail: murtazina@nikiet.ru*

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(RU)

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ISBN 978-5-9903264-5-3

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2015

433 p.

ITER TOKAMAK; THERMONUCLEAR REACTOR COOLING SYSTEMS; HELIUM;  
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SIMULATION; THEORETICAL DATA

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### **Conjugated thermal hydraulic analysis of first wall panel of ITER blanket module**

**S70**

*Tomilov, S.N.; Sviridenko, M.N.; Razmerov, A.V.; Leshukov, A.Yu. (AO NIKIEhT, Moscow (RU)), e-mail: Tomilov@nikiet.ru*

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Sopryazhennyj teplogidravlicheskiy analiz paneli pervoj stenki modulya blanketa ITEhR

p. 385

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

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ZAO NTTs PLAZMAIOFAN

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433 p.

ITER TOKAMAK; FIRST WALL; THERMAL HYDRAULICS; BREEDING BLANKETS;  
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SIMULATION; THEORETICAL DATA

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### **Protecting B<sub>4</sub>C coating for ITER divertor tiles. Deposition, operation, removal of erosion products**



**S70**

*Begrambekov, L.B.; Ajrapetov, A.A.; Gordeev, A.A.; Grunin, A.V.; Zakharov, A.M.; Kurnaev, V.A.; Sadovskij, Ya.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Azizov, Eh.A.; Buzhinskij, O.I. (Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy TRINITI, Troitsk (RU)); Mazul', I.V. (OAO NIEhFA im. D.V. Efremova, Sankt-Peterburg (RU))*

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Zashchitnoe B<sub>4</sub>C pokrytie dlya divertornykh tajlov ITEhR. Napylenie, ispol'zovanie, udalenie produktov ehrozii

p. 386

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; PROTECTIVE COATINGS; BORON CARBIDES; TUNGSTEN; DEPOSITION; EROSION; NONDESTRUCTIVE TESTING; COMPUTERIZED CONTROL SYSTEMS; EXPERIMENTAL DATA

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**Programs of experiments on the T-10 tokamak for the sake of ITER tungsten divertor**

**S70**

*Budaev, V.P.; Martynenko, Yu.V.; Grashin, S.A.; Karpov, A.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: budaev@nfi.kiae.ru; Khimchenko, L.N. (Chastnoe Uchrezhdenie ITEhR-Tsentr, Moscow (RU)); Mazul', I.V.; Giniyatulin, R.N. (FGUP NIEhFA im. D.V. Efremova, Sankt-Peterburg (RU)); Zhitlukhin, A.M. (GNTs RF TRINITI, Troitsk, Moskovskaya Obl. (RU)); Begrambekov, L.B. (NIYaU MIFI, Moscow (RU))*

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Programma ehksperimentov na tokamake T-10 v podderzhku vol'framovogo divertora ITEhR

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(RU)

1 ref.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; T-10 TOKAMAK; DIVERTORS; TUNGSTEN; PROTECTIVE COATINGS; CRACKS; RECRYSTALLIZATION; EMBRITTLEMENT; WALL LOADING; EXPERIMENT PLANNING; RESEARCH PROGRAMS

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## **Investigation of radiation losses of tungsten target plasma under conditions relevant to transient processes in ITER**

**S70**

*Arkhipov, N.I.; Karelov, S.V.; Poznyak, I.M.; Toporkov, D.A. (Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy, Troitsk, Moscow (RU)), e-mail: teufida@gmail.com; Safronov, V.M. (Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy, Troitsk, Moscow (RU); Proektnyj Tsentr ITEhR, Moscow (RU)), e-mail: v.safronov@iterrf.ru*

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Issledovanie radiatsionnykh poter' mishennoj plazmy vol'frama v usloviyakh, kharakternykh dlya perekhodnykh protsessov ITEhR

p. 388

(RU)

5 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; TUNGSTEN; TARGETS; WALL LOADING; ENERGY LOSSES;  
PLASMA; TRANSIENTS; EDGE LOCALIZED MODES; BOLOMETERS; PHOTODIODES;  
SPATIAL DISTRIBUTION; PLASMA DIAGNOSTICS; EXPERIMENTAL DATA

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## **Beryllium erosion under exposure to radiation flux typical for ITER mitigated disruption**

**S70**

*Kovalenko, D.V.; Podkovyrov, V.L.; Klimov, N.S.; Muzychenko, A.D. (FGUP Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy, Troitsk, Moscow (RU)), e-mail: kovalenko@triniti.ru; Safronov, V.M. (Chastnoe Uchrezhdenie Gosudarstvennoj Korporatsii Rosatom Proektnyj Tsentr ITEhR, Moscow (RU)); Kupriyanov, I.B.; Porezanov, N.P.; Nikolaev, G.N. (OAO Vysokotekhnologicheskij Nauchno-Issledovatel'skij Inst. Neorganicheskikh Materialov im. A.A. Bochvara, Moscow (RU))*

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p. 389

(RU)

1 ref., 1 fig.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; BERYLLIUM; EROSION; FIRST WALL; PROTECTIVE COATINGS;  
PLASMA DISRUPTION; BINARY MIXTURES; HYDROGEN; ARGON; HOT PLASMA;  
WALL LOADING; TEMPERATURE RANGE 0400-1000 K; IMAGES; CRACKS;  
MICROSTRUCTURE; MORPHOLOGY; EXPERIMENTAL DATA

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## **Motion of melt metallic layer under conditions typical for transient plasma processes in ITER**

**S70**

*Poznyak, I.M. (Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy, Troitsk, Moscow (RU)); Safronov, V.M. (Troitskij Inst. Innovatsionnykh i Termoyadernykh Issledovaniy, Troitsk, Moscow (RU)); Proektnyj Tsentr ITEhR, Moscow (RU)); Tsybenko, V.Yu. (Troitskij Inst.*

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p. 390

(RU)

3 refs.

Rossiyskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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433 p.

ITER TOKAMAK; TRANSIENTS; HOT PLASMA; TARGETS; COMPOSITE MATERIALS; COPPER; STEELS; MELTING; WALL LOADING; VISCOUS FLOW; FLUID MECHANICS; EROSION; PRESSURE GRADIENTS; EXPERIMENTAL DATA; HYDROGEN

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**Development and test of electronic devices providing the operation of high-current switching equipment for ITER power supply**

**S70**

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

ITER TOKAMAK; POWER SUPPLIES; SWITCHES; CAPACITIVE ENERGY STORAGE EQUIPMENT; PERFORMANCE TESTING; EXPERIMENTAL DATA

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## **Development of control system for executive current switching units of ITER superconducting coils**

**S70**

*Leont'eva, A.B. (OAO NIEhFA, Sankt-Peterburg (RU)), e-mail: leontyeva@sintez.niefa.spb.su*

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Moscow (RU)

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433 p.

ITER TOKAMAK; SUPERCONDUCTING MAGNETS; SWITCHES; CIRCUIT BREAKERS; COMPUTER ARCHITECTURE; ELECTRIC CONTROLLERS; COMPUTERIZED CONTROL SYSTEMS; REAL TIME SYSTEMS; PROCESS COMPUTERS; PLASMA DIAGNOSTICS

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## **Computerized control by T-10 tokamak diagnostic systems based on programmable logic controllers S7**

**S46;S70**

*Shestakov, E.A.; Ermolaeva, A.I.; Kuteev, B.V. (NITs Kurchatovskij Inst., Moscow (RU));*

*Savrukhin, P.V. (NITs Kurchatovskij Inst., Moscow (RU); Proektnyj Tsentr ITEhR, Moscow (RU))*

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ISBN 978-5-9903264-5-3

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ZAO NTTs PLAZMAIOFAN

2015

433 p.

T-10 TOKAMAK; REAL TIME SYSTEMS; COMPUTERIZED CONTROL SYSTEMS; ELECTRIC CONTROLLERS; EQUIPMENT INTERFACES; POWER SUPPLIES; DIAGRAMS; PROCESS COMPUTERS; COMPUTER ARCHITECTURE; DATA ACQUISITION SYSTEMS; PLASMA DIAGNOSTICS

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**Development of russian ITER computerized control subsystems in 2014**

**S70**

*Marusov, N.L.; Mironova, E.Yu.; Portone, S.S.; Semenov, I.B. (Chastnoe Uchrezhdenie ITEhR-Tsentr, Moscow (RU)), e-mail: support@iterrf.ru*

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; COORDINATED RESEARCH PROGRAMS; INTERNATIONAL COOPERATION; COMPUTERIZED CONTROL SYSTEMS; PLASMA EATERS; PLASMA DIAGNOSTICS; DATA ACQUISITION SYSTEMS

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## **Nonresonance photon neutralizer for powerful negative ion beams of ITER**

**S70**

*Popov, S.S.; Atlukhanov, M.G.; Burdakov, A.V.; Ivanov, A.A.; Kotel'nikov, I.A.; Listopad, A.A. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail:*

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Nerezonansnyj fotonnyj nejtralizator moshchnykh puchkov otritsatel'nykh ionov dlya ITEhR  
p. 395

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; BEAM INJECTION HEATING; BEAM NEUTRALIZATION; ION BEAMS; ANIONS; PHOTONS; MIRRORS; LASERS; EFFICIENCY; EXPERIMENTAL DATA

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## **Experimental photon storage device for laser neutralizer of negative ion beams**

**S70**

*Atlukhanov, M.G.; Kasatov, A.A.; Popov, S.S. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: atluhanov.m@gmail.com; Ushkova, M.Yu. (Novosibirskij*

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Ehksperimental'nyj fotonnyj nakopitel' dlya lazernogo nejtralizatora puchkov otritsatel'nykh ionov

p. 396

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; BEAM NEUTRALIZATION; LASERS; ION BEAMS; ANIONS;

PHOTONS; MIRRORS; EFFICIENCY; EXPERIMENTAL DATA; FEASIBILITY STUDIES

## **Powerful RF source of negative hydrogen ions for neutral beam injector of controlled fusion**

**S70**

*Abdrashitov, G.F.; Bel'chenko, Yu.I.; Ivanov, A.A.; Kondakov, A.A.; Sanin, A.L.; Selivanov, A.N.; Sotnikov, O.Z.; Tiunov, M.A.; Shikhovtsev, I.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: Sotnikov@inp.nsk.su*

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p. 397

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; HYDROGEN IONS 1 MINUS; ION SOURCES; PLASMA; CESIUM;  
HYDROGEN 1 MINUS BEAMS; AMP BEAM CURRENTS; KEV RANGE 10-100; BEAM  
PROFILES; EXPERIMENTAL DATA

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## **Method for measurement of stationary neutral beam profile in power injector**

**S70**

*Panasenkov, A.A.; Smirnov, V.A. (NITs Kurchatovskij Inst., Moscow (RU))*

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Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; NEUTRAL ATOM BEAM INJECTION; BEAM PROFILES; BEAM  
INJECTION HEATING; CALORIMETERS; HYDROGEN IONS 1 PLUS; KEV RANGE 10-  
100; AMP BEAM CURRENTS; BEAM MONITORS; DIAGRAMS; EXPERIMENTAL  
DATA; THEORETICAL DATA; COMPARATIVE EVALUATIONS

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## **Design work on integration of the equatorial port #Numero Sign#11**

**S70**

*Ivantsivskij, M.V.; Burdakov, A.V.; Pishchinskij, K.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU); Novosibirskij Gosudarstvennyj Tekhnicheskij Univ., Novosibirsk (RU)), e-mail: M.V.Ivantsivsky@inp.nsk.su; Aleksandrov, E.V.; Lyublin, B.V. (Chastnoe Uchrezhdenie GK Rosatom Proektnyj Tsentr ITEhR, Moscow (RU)); Gorbovskij, A.I.; Zolotukhina, N.A.; Shiyankov, S.V. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)); Sulyaev,*

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ISBN 978-5-9903264-5-3

Moscow (RU)

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2015

433 p.

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**Design works on integration of the upper ports #Numero Sign#02 and #Numero Sign#08**

**S70**

*Aleksandrov, E.V. (Proektnyj Tsentr ITEhR, Moscow (RU)), e-mail: e.alexandrov@iterrf.ru; Burdakov, A.V.; Vil'kin, A.I. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)) (and others)*

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p. 400

(RU)

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

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## **Strength analysis for modernization of the diagnostic shield module (DSM) of the ITER upper ports**

**S70**

*Aleksandrov, E.V. (Proektnyj Tsentri ITEhR, Moscow (RU)), e-mail: e.alexandrov@iterrf.ru; Buslakov, I.V.; Mikhalyuk, D.S.; Modestov, V.S.; Pivkov, A.V.; Shimanskij, S.A. (Sankt-Peterburgskij Gosudarstvennyj Politehnicheskij Univ., Sankt-Peterburg (RU)), e-mail: vmodestov@spbstu.ru; Listopad, A.A. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: a.a.listopad@inp.nsk.su*

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## **Final design stage of test facilities for ITER port-plugs**

**S70**

*Romannikov, A.N.; Krasil'nikov, A.V. (Proektnyj Tsentri ITEhR, Moscow (RU)); Mitrofanova, E.G.; Minakov, V.S.; Rumyantsev, Yu.N.; Rosales, N.N. (OAO Kriogenmash, Balashikha,*

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**Measurement of D/T ratio in ITER plasma on atomic analyzer data and taking into account the radial distribution of fuel ions**

**S70**

*Timokhin, V.M.; Sergeev, V.Yu.; Bakhareva, O.A. (FGAOU VO SPbPU, Sankt-Peterburg (RU)), e-mail: v.timokhin@spbstu.ru; Afanas'ev, V.I.; Mironov, M.I.; Nesenevich, V.G.; Petrov, M.P.; Petrov, C.Ya. (FTI im. A.F. Ioffe, Sankt-Peterburg (RU)), e-mail: vnesenevich@npd.ioffe.ru*

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6 refs.

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ISBN 978-5-9903264-5-3  
Moscow (RU)  
ZAO NTTs PLAZMAIOFAN  
2015  
433 p.  
ITER TOKAMAK; THERMONUCLEAR FUELS; DEUTERIUM IONS; TRITIUM IONS; ISOTOPE RATIO; HOT PLASMA; SPATIAL DISTRIBUTION; ION DENSITY; PLASMA DIAGNOSTICS; COMPUTERIZED SIMULATION; MAGNETIC FIELDS; ION DRIFT; PLASMA RADIAL PROFILES; THEORETICAL DATA

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### **Numerical simulation of energy spectra of charge exchange atoms for ITER analyzers taking into account of neutral beam injection**

**S70**

*Goncharov, P.R.; Sergeev, V.Yu.; Tolmacheva, V.V. (FGAOU VO SPbPU, Sankt-Peterburg (RU)), e-mail: p.goncharov@spbstu.ru; Afanas'ev, V.I.; Mironov, M.I.; Nesenevich, V.G.; Petrov, M.P.; Petrov, C.Ya. (FTI im. A.F. Ioffe, Sankt-Peterburg (RU)), e-mail: vnesenevich@npd.ioffe.ru*

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p. 404

(RU)

3 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; HOT PLASMA; CHARGE EXCHANGE; ENERGY SPECTRA; PLASMA DIAGNOSTICS; COMPUTERIZED SIMULATION; NEUTRAL PARTICLE ANALYZERS;

## **Project of LIF diagnostics for the Globus-M spheric tokamak**

**S70**

*Gorbunov, A.V.; Vukolov, K.Yu. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: alexeygor@mail.ru; Kurskiev, G.S.; Tolstyakov, S.Yu.; Chernakov, A.P.; Mukhin, E.E. (FTI im. A.F. Ioffe, Sankt-Peterburg (RU)), e-mail: gleb.kurskiev@gmail.com; Berik, E.B. (ESTLA Ltd., Tartu (EE)), e-mail: estla@estla.com*

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(RU)

5 refs.

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ISBN 978-5-9903264-5-3

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433 p.

GLOBUS-M SPHEROMAK; PLASMA DIAGNOSTICS; FLUORESCENCE; NEODYMIUM LASERS; ION DENSITY; ION TEMPERATURE; DYE LASERS; HELIUM; PLASMA IMPURITIES; DIVERTORS; THOMSON SCATTERING

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## **Phenomenological simulation of epithermal electrons during development of plasma disruption instability**

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

TOKAMAK DEVICES; PLASMA DISRUPTION; X RADIATION; ACCELERATION;  
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## **Comparative analysis of the role of energy losses on electron cyclotron radiation in IGNITOR and ITER tokamaks**

**S70**

*Minashin, P.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: Minashin\_PV@nrcki.ru; Kukushkin, A.B. (NITs Kurchatovskij Inst., Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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p. 407

(RU)

7 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)  
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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

INTOR TOKAMAK; ITER TOKAMAK; JOULE HEATING; MAGNETIC FIELDS; OPTIMIZATION; ELECTRON CYCLOTRON-RESONANCE; ENERGY LOSSES; ECR HEATING; BOLTZMANN STATISTICS; DISTRIBUTION FUNCTIONS; ELECTRONS; COMPARATIVE EVALUATIONS; THEORETICAL DATA

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### **Method of evaluating the accuracy of Thomson diagnostics of non-Maxwell plasma in tokamak-reactors**

**S70**

*Sdvizhenskij, P.A. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: sdvinpt@gmail.com; Kukushkin, A.B. (NITs Kurchatovskij Inst., Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Kurskiev, G.S.; Mukhin, E.E. (Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe, Sankt-Peterburg (RU)); Bassan, M. (ITER Organization, Route de Vinon sur Verdon, Saint-Paul-lez-Durance (FR))*

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2 refs.

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### **On the problem of ITER realization. Anomaly fast electron transport: explanation of its reason and method of its suppression**

**S70**

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ISBN 978-5-9903264-5-3

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**Dynamic recording method of SOL lines on the background noise of intensive divertor radiation**

**S70**

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4 refs.

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XLII Mezhdunarodnaya Zvenigorodskaya konferentsiya po fizike plazmy i upravlyaemomu termoyadernomu sintezu. Sbornik tezisov dokladov

ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

PLASMA SCRAPE-OFF LAYER; ITER TOKAMAK; DIVERTORS; BALMER LINES; HYDROGEN; PLASMA DIAGNOSTICS; SIGNALS; BACKGROUND NOISE; VISIBLE RADIATION; SPECTROSCOPY; THEORETICAL DATA

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### **The calculation of changing the scattered light spectrum for D-alpha line as result of reflection from optical traps in ITER**

**S70**

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6 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; PLASMA DIAGNOSTICS; PLASMA SCRAPE-OFF LAYER; HYDROGEN; DIVERTORS; Z CODES; B CODES; BALMER LINES; SPECTRA; VISIBLE RADIATION; SCATTERING; THEORETICAL DATA

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### **Conceptual design of the vertical gamma camera of ITER**

**S70**

*Khil'kevich, E.M.; Shevelev, A.E.; Chugunov, I.N.; Gin, D.B.; Dojnikov, D.N.; Najdenov, V.O.; Polunovskij, I.A.; Nersesyan, N.S. (Federal'noe Gosudarstvennoe Byudzhetnoe Uchrezhdenie Nauki Fiziko-Tekhnicheskij Inst. im. A.F. Ioffe Rossijskoj Akademii Nauk, Sankt-Peterburg (RU)), e-mail: e.khilkevitch@mail.ioffe.ru*

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2 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; GAMMA CAMERAS; PLASMA DIAGNOSTICS; GAMMA SPECTROMETERS; HYDROGEN; HELIUM; SOLID SCINTILLATION DETECTORS; PERFORMANCE TESTING

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**Simulation and processing of active spectroscopy spectra of T-10 tokamak**

**S70**

*Serov, S.V.; Tugarinov, S.N. (FGUP GNTs RF TRINITI, Moscow, Troitsk (RU)); Klyuchnikov, L.A.; Krupin, V.A. (NITs Kurchatovskij Inst., Moscow (RU)); Von Hellermann, M. (FOM Inst. for Plasma Physics Rijnhuizen, Association EURATOM-FOM, Nieuwegein (NL))*

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p. 413

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

T-10 TOKAMAK; SPECTRA UNFOLDING; COMPUTERIZED SIMULATION; M CODES; PLASMA DIAGNOSTICS; BEAM INJECTION HEATING; HYDROGEN; C CODES; SPECTRA; CARBON; THEORETICAL DATA

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### **Expansion of possibilities of ITER HFS reflectometer for measuring in the regime of refractometer**

**S70**

*Petrov, V.G.; Skopintsev, D.A.; Petrov, A.A. (FGUP GNTs RF TRINITI, Troitsk, Moscow (RU)), e-mail: vpetrov@triniti.ru; Shelukhin, D.A.; Vershkov, V.A. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: D.Shelukhin@fc.iterru.ru*

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Rasshirenie vozmozhnostej HFS-reflektometra ITEhR izmereniyami v rezhime refraktometra p. 414

(RU)

2 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLAZMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; PLASMA DIAGNOSTICS; PLASMA RADIAL PROFILES; ANTENNAS; MICROWAVE RADIATION; HOT PLASMA; WAVE PROPAGATION; SIGNAL-TO-NOISE RATIO; COMPUTER CALCULATIONS; THEORETICAL DATA

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### **Comparative analysis of measuring methods #Single Left-Pointing Angle**

**Quotation Mark#N#Asterisk Operator#l#Single Right-Pointing Angle Quotation Mark# on expansion of ITER HFS reflectometer**

**S70**

*Petrov, A.A.; Petrov, V.G. (FGUP GNTs RF TRINITI, Troitsk, Moscow (RU)), e-mail: petroff@triniti.ru; Vershkov, V.A.; Shelukhin, D.A.; Sarychev, D.V. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: D.Shelukhin@fc.iterru.ru*

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Sravnitel'nyj analiz metodov izmereniya #Single Left-Pointing Angle Quotation

Mark#N#Asterisk Operator#l#Single Right-Pointing Angle Quotation Mark# pri rasshirenii HFS-reflektometra ITEhR

p. 415

(RU)

4 refs.

Rossijskaya Akademiya Nauk, Moscow (RU); Nauchnyj Sovet RAN po Fizike Plazmy, Moscow (RU); Nauchnyj Sovet RAN po Kompleksnoj Probleme Fizika Nizkotemperaturnoj Plazmy, Moscow (RU); Inst. Obshchej Fiziki im. A.M. Prokhorova RAN, Moscow (RU); Ob"edinennyj Inst. Vysokikh Temperatur RAN, Moscow (RU); Nauchno-Tekhnologicheskij Tsentr PLASMAIOFAN, Moscow (RU); Moskovskij Gosudarstvennyj Univ. im. M.V. Lomonosova, Moscow (RU); Tsentr Lazernoj Tekhnologii i Materialovedeniya, Moscow (RU)

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

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433 p.

ITER TOKAMAK; PLASMA DIAGNOSTICS; REFRACTION; PLASMA DENSITY; PLASMA RADIAL PROFILES; PLASMA FILAMENT; HOT PLASMA; SIGNAL-TO-NOISE RATIO; MAGNETIC FIELDS; TIME-OF-FLIGHT METHOD; COMPARATIVE EVALUATIONS

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**Cleaning system based on DC-discharge with magnetic insulated anode for mirrors that are parallel to the magnetic field**

**S70**

*Rogov, A.V.; Kapustin, Yu.V. (NITs Kurchatovskij Inst., Moscow (RU); Koordinatsionnyj Tsentr Upravlyaemyj Termoyadernyj Sintez - Mezhdunarodnye Proekty, Moscow (RU)), e-mail: alex-rogov@yandex.ru*

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2 refs., 1 fig.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; MIRRORS; MOLYBDENUM; SURFACE CLEANING; PENNING DISCHARGES; MAGNETIC FIELDS; EFFICIENCY; X-RAY FLUORESCENCE ANALYSIS; OPTICAL PROPERTIES; ROUGHNESS; DIAGRAMS; EXPERIMENTAL DATA

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## **Gas method for mirror cleaning: experiment and simulation**

**S70**

*Alekseev, A.G.; Panov, A.I.; Tobengauz, A.M. (UTS-Tsentr, Moscow (RU)), e-mail: andy.phy@gmail.com*

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p. 417

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; MIRRORS; PLASMA DIAGNOSTICS; BALMER LINES; BERYLLIUM;  
HELIUM; NEON; BENCH-SCALE EXPERIMENTS; SURFACE CLEANING; T CODES;  
DIAGRAMS; EXPERIMENTAL DATA; THEORETICAL DATA; COMPARATIVE  
EVALUATIONS

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### **Works on fabrication and test of DMNF model**

**S70**

*Gavrilenko, D.E.; Abdrashitov, G.F.; Anan'in, V.A. (Inst. Yadernoj Fiziki im. G.I. Budkera SO RAN, Novosibirsk (RU)), e-mail: D.E.Gavrilenko@inp.nsk.su (and others)*

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Raboty po proizvodstvu i ispytaniyam modeli DMNP

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; DIVERTORS; NEUTRON MONITORS; NEUTRON FLUX; PLASMA DIAGNOSTICS; FISSION CHAMBERS; PROCESS DEVELOPMENT UNITS; PERFORMANCE; DIAGRAMS

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### **Absolute calibration of ITER diverter neutron flux monitor**

**S70**

*Borisov, A.A. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)); Kashchuk, Yu.A.; Obudovskij, S.Yu.; Portnov, D.V. (FGUP GNTs RF TRINITI, Moscow, Troitsk (RU))*

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Absolyutnaya kalibrovka divertornogo monitora nejtronnykh potokov ITEhR

p. 419

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3 refs.

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.

ITER TOKAMAK; PLASMA DIAGNOSTICS; NEUTRON FLUX; NEUTRON MONITORS; CALIBRATION; FLUX DENSITY; HOT PLASMA; ERRORS; BREEDING BLANKETS

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## **Connectors of ITER blanket modules. Calculated and experimental decision validation**

**S70**

*Vlasov, D.A.; Danilov, I.V.; Zhmakin, A.V.; Kolganov, V.Yu.; Parshutin, E.V.; Poddubnyj, I.I.; Khomyakov, S.Eh.; Chernova, A.A. (AO NIKIEhT, Moscow (RU)), e-mail: poddubnyii@nikiet.ru*

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ISBN 978-5-9903264-5-3

Moscow (RU)

ZAO NTTs PLAZMAIOFAN

2015

433 p.



ITER TOKAMAK; SHIELDS; WEAR RESISTANCE; FATIGUE; BENCH-SCALE EXPERIMENTS; MECHANICAL TESTS; THERMONUCLEAR REACTOR MATERIALS; BREEDING BLANKETS; NEUTRON FLUX; PLASMA DISRUPTION; DESIGN; JOINTS; CONNECTORS

---

### **Indirect method of determining the efficiency of a thermionic reactor for space S22**

*Brezhnev, A.I.; Vinogradov, E.G.; Linnik, V.A.; Ovcharenko, M.K.; Pyshko, A.P.; Yur'ev, Yu.S.; Yarygin, V.I. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU)), E-mail: brezhand@gmail.com*

Kosvennyj sposob opredeleniya koehffitsienta poleznogo dejstviya termoehmisionnogo reaktora-preobrazovatela kosmicheskogo naznacheniya

p. 5-13

(RU)

4 refs., 1 fig.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

REACTORS; POWER REACTORS; THERMIONIC REACTORS; THERMIONIC FUEL ELEMENTS; THERMAL POWER PLANTS; EFFICIENCY; THERMAL EFFICIENCY; NEUTRON FLUX

The method of determining the efficiency of the space nuclear thermionic power plant by the set of current-voltage characteristics without the direct measurement of the reactor thermal power, yet with fixing the relative thermal power for various current-voltage characteristics is described in this paper

Описан способ определения коэффициента полезного действия термоэмиссионного реактора-преобразователя по трем вольт-амперным характеристикам (одной изотермической и двум изомощностным) и отношению показаний датчика нейтронного потока, соответствующего изомощностной вольт-амперной характеристике. Предложен алгоритм измерения вольт-амперных характеристик

---

### **On ADS subcritical reactor operation in the reactivity modulation mode S22**

S22

*Gulevich, A.V.; Kukharchuk, O.F.; Brezhnev, A.I. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU)), E-mail: brezhand@gmail.com*

O rabote podkriticheskogo reaktora uskoritel'no-upravlyaemoj sistemy v rezhime modulyatsii reaktivnosti

p. 14-20

(RU)

9 refs., 4 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; IBR-2 REACTOR; ACCELERATORS; PROTONS

The possibility of applying a pulsed reactor as a neutron-breeding target for accelerator-driven systems is discussed in the present paper. It is assumed that such a reactor operates in the reactivity modulation mode similar to that of the IBR-2 reactor. In theory, it enables energy requirements for the accelerator beam to be reduced, while enhancing the safety of installations of this type

Рассматривается возможность применения импульсного реактора в качестве размножающей нейтроны мишени для ускорительно-управляемых систем. Предполагается, что такой реактор работает в режиме модуляции реактивности, аналогично тому, как это организовано в реакторе ИБР-2. Теоретически это позволяет снизить энергетические требования к пучку ускорителя и повысить безопасность для такого рода установок

---

## **Analysis of the BOR-60 cells utilization to carry out experiments**

**S22**

*Zhemkov, I.Yu.; Nabojschchikov, Yu.V. (OAO GNTs RF NIIAR, Dimitrovgrad (RU)), E-mail: ziu@niiar.ru*

Analiz ispol'zovaniya yacheek reaktora BOR-60 dlya provedeniya ehksperimental'nykh issledovaniy

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(RU)

6 refs., 12 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

REACTORS; EXPERIMENTAL REACTORS; BOR-60 REACTOR; REACTOR CORES; BREEDING BLANKETS; REACTOR CELLS; FUEL ASSEMBLIES; FLUX DENSITY

The efficiency of BOR-60 core cells and blanket utilization to carry out experiments was analyzed for the 40-year operating period. Reactor cells that used the most often to carry out experiments as well as the parameters influencing their attractiveness have been identified in the paper

Выполнен анализ эффективности использования ячеек активной зоны и бокового экрана реактора БОР-60 для проведения экспериментальных исследований за 40 лет эксплуатации. Определены наиболее часто используемые ячейки реактора и основные параметры, влияющие на привлекательность ячеек для проведения экспериментальных исследований

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## **Methodology of conversion of plutonium of various isotopic compositions to the equivalent plutonium as applied to system studies in nuclear power**

**S22**

*Yatsenko, E.M.; Chebeskov, A.N.; Kagramanyan, V.S.; Kalashnikov, A.G. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU)), E-mail: kagramanyan@ippe.ru*

Metodika ehkvivalentirovaniya plutoniya razlichnogo izotopnogo sostava primenitel'no k sistemnym issledovaniyam v atomnoj ehnergetike

p. 31-41

(RU)

10 refs., 3 figs., 6 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; BN-800 REACTOR; ISOTOPE ENRICHED MATERIALS; ENRICHMENT; ISOTOPE RATIO; PLUTONIUM

It is shown that the developed methodology, possessing comprehensible accuracy, allows not only to correct enrichment, but also to lower uncertainty degree at carrying out the system researches of atomic engineering taking into account dynamics of change of fuel isotopic composition at its multiple recycle in fast reactors

Предлагается упрощенная методика корректировки начального обогащения, основанная на эквивалентировании изотопов урана, плутония, америция, нептуния, кюрия по загрузке. Разработанная методика, обладая приемлемой точностью, позволяет не только корректировать обогащение, но и понизить степень неопределенности при проведении системных исследований атомной энергетики с учетом динамики изменения изотопного состава топлива при его многократном рецикле в быстрых реакторах

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## **Software analysis of in-core monitoring system and reporting on the state of the reactor core of WWER-1000 KARUND**

**S22**

*Alyev, R.R.; Leskin, S.T. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Programmnyj kompleks analiza sostoyaniya SVRK i predstavleniya informatsii o sostoyanii aktivnoj zony reaktora VVEhR-1000 KARUND

p. 42-50

(RU)

13 refs., 5 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; WWER TYPE REACTORS; REACTOR CORES; REACTOR CONTROL SYSTEMS; ON-LINE MEASUREMENT SYSTEMS

On the basis of algorithms developed a software system KARUND whose function is to monitor the state of the measuring system of RMC, software in-core monitoring system, core WWER-1000 reactor, and visual representation in the form of information to the operator. Completed description of the main modes of operation of the program and. Partially, describes the interface software system KARUND and some results

На основе алгоритмов разработан программный комплекс КАРУНД, функциями которого является контроль за состоянием измерительной системы внутриреакторного контроля (СВРК), программного обеспечения СВРК, активной зоны реактора ВВЭР-1000 и предоставление в наглядном виде информации оператору. Приведены основные режимы работы программы

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## **Lifetime NPP equipment management under ageing by system analysis procedures**

**S22**

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Upravljenie resursom oborudovaniya AEhS v usloviyakh stareniya metodami sistemnogo analiza dannykh

p. 51-56

(RU)

6 refs., 1 fig.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR FACILITIES; REACTORS; SERVICE LIFE; REACTOR SAFETY; SAFETY ANALYSIS; MATHEMATICAL MODELS

Mathematical model of linear stochastic filter is developed for NPP equipment under ageing. The theory of martingales usage to predict the technical state of equipment is substantiated. The optimum principle for choice of preventive actions to decrease damage processes rate is also formulated

Разработана математическая модель линейного стохастического фильтра для оборудования АЭС в условиях старения с учетом разнородной информации об объекте в условиях растущей коррозионной трещины. Обосновано применение теории мартигалов для прогнозирования технического состояния оборудования. Сформулирован принцип оптимальности для выбора последовательности превентивных действий, направленных на снижение интенсивности процессов старения

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## **Prediction of NPP equipment lifetime under flow-accelerated corrosion by using of empirical model**

**S22**

*Gulina, O.M.; Frolova, O.O. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: olga@iate.obninsk.ru*

Prognozirovanie resursa oborudovaniya AEhS v usloviyakh ehrozionno-korrozionnogo iznosa na osnove ehmpiricheskoy modeli

p. 57-65

(RU)

8 refs., 6 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTORS; SERVICE LIFE; LIFE CYCLE; CORROSION PROTECTION; AGE ESTIMATION

The stochastic characteristics of Keller coefficients are obtained in the paper. To estimate the error connected with admixture content in metal on erosion-corrosion wear rate, the comparison of wear rate is calculated using Durex equation

В работе для расчета коэффициента Келлера и оценки его статистических характеристик по данным эксплуатации и материалам российских блоков разработана процедура, получены оценки скорости эрозионно-коррозионного износа по данным оперативного контроля, и на основании прогноза по эмпирической модели выполнена оценка вероятностных характеристик коэффициентов Келлера для различных элементов трубопроводов разных типоразмеров

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## **Efficiency criteria for high reliability measured system structures**

**S22**

*Sal'nikov, N.L. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: salnikov@iate.obninsk.ru*

Kriterij ehffektivnosti struktur izmeritel'nykh sistem povyshennoj nadezhnosti

p. 66-70

(RU)

3 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR POWER PLANTS; RADIATION PROTECTION; ON-LINE MEASUREMENT SYSTEMS; THERMOELECTRIC CONVERSION; THERMOELECTRIC GENERATORS

The procedures of structural redundancy are usually used to develop high reliability measured systems. To estimate efficiency of such structures the criteria to compare different systems has been developed. So it is possible to develop more exact system by inspection of redundant system data unit stochastic characteristics in accordance with the developed criteria

При построении измерительных систем высокой надежности применяются методы структурной избыточности. Для оценки эффективности таких структур разработан критерий, позволяющий сравнивать различные системы. Путем подбора стохастических характеристик датчиков избыточной системы, удовлетворяющих критерию, можно априори спроектировать более точную систему

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## **Application of the method of electrophysical impact on the disperse medium in high performance filtering gases devices from aerosols of various origin**

**S22**

*Yagodkin, I.V.; Posazhennikov, A.M.; Grishin, A.G.; Mel'nikov, V.P. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU))*

Primenenie metoda ehlektrofizicheskogo vozdejstviya na dispersnyuyu sredu v ustrojstvakh vysokoehffektivnoj fil'tratsii gazovykh sred ot aehrozolej razlichnogo proiskhozhdeniya

p. 71-79

(RU)

3 refs., 6 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR FACILITIES; REACTORS; REACTOR SAFETY;  
AEROSOL MONITORING; GAS FLOW; AIR FILTERS

The problems of experimental investigation of the effect of intensive aeronization on catching of aerosol particles from the air flow using combined filtering systems are discussed in this paper

В работе освещаются вопросы экспериментального исследования воздействия аэронизации на процессы улавливания аэрозольных частиц из воздушного потока при использовании комбинированных фильтрующих систем

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### **Experimental study of flow hydrodynamics lead coolant and water through the experimental section throttle clearance-ring**

**S22**

*Beznosov, A.V.; Antonenkov, M.A.; Bokova, T.A.; Yarmonov, M.V.; Makhov, K.A.; Molodtsov, A.A. (Nizhegorodskij Gosudarstvennyj Tehnicheskij Univ. im. R.E. Alekseeva, Nizhnij Novgorod (RU)), E-mail: besnosov@nntu.nnov.ru*

Ehksperimental'noe issledovanie gidrodinamiki techeniya svintsovogo teplonositelya i vody cherez ehksperimental'nyj uchastok #Left Double Quotation Mark#drossel' - kol'tsevoj zazor#Right Double Quotation Mark#

p. 80-90

(RU)

2 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTORS; HYDRODYNAMICS;  
COOLANTS; LIQUID METALS; REYNOLDS NUMBER

The results of the experimental research have shown that the difference between hydraulic characteristics of water and heavy liquid metal coolant (HLMC) in the experimental plot Throttle-Annular gap exists. It makes the usage of the traditional lubricating fluid in the methods of analysis of the hydrostatic sliding bearings for the pumps in the HLMC to be incorrect

В работе показано, что существует различие гидравлических характеристик на водяном и свинцовом теплоносителях экспериментального участка #Left Double Quotation Mark#дроссель - кольцевой зазор#Right Double Quotation Mark#, моделирующего один из основных элементов главного циркуляционного насоса реакторного контура со свинцовым теплоносителем. Это делает некорректным использование расчетных методик для традиционных смазочных жидкостей при проектировании гидростатических опор скольжения насосов, работающих в среде тяжелых жидкометаллических теплоносителей

## **Calculations and experimental investigation of irradiation heat rate in BOR-60 reactor**

**S22**

*Varivtsev, A.V.; Zhemkov, I.Yu.; Ishunina, O.V.; Nabojshchikov, Yu.V.; Neverov, V.A. (OAO GNTs NIAR, Dimitrovgrad (RU)), E-mail: ziu@niiar.ru*

Raschetno-eksperimental'nye issledovaniya radiatsionnogo teplovydeleniya v reaktore BOR-60 p. 91-98

(RU)

6 refs., 4 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

REACTORS; EXPERIMENTAL REACTORS; BOR-60 REACTOR; IRRADIATION; GAMMA RADIATION; HEAT RATE

Calculations and experimental investigation of irradiation heat rate in reactor BOR-60 reveal drawbacks of modern calculation methods. Authors propose the algorithm for irradiation heat rate calculations, which allows to eliminate these drawbacks

В результате расчетно-экспериментальных исследований по определению величины радиационного тепловыделения в реакторе БОР-60 выявлены недостатки используемых в настоящее время расчетных методов. Предложен алгоритм расчетного определения радиационного тепловыделения, устраняющий найденные недостатки

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## **The substantiation of the correlation for critical heat flux calculation for alternative design fuel assemblies with mixing spacer grids in WWER-1000**

**S22**

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Obosnovanie korrelyatsii dlya rascheta kriticheskogo teplovogo potoka v teplovydelyayushchikh sborkakh al'ternativnoj konstruksii s peremeshivayushchimi reshetkami-intensifikatorami dlya VVEhR-1000

p. 99-108

(RU)

6 refs., 8 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR FACILITIES; WWER TYPE REACTORS; HEAT FLUX; CRITICAL HEAT FLUX; FUEL ASSEMBLIES; REACTOR LATTICES

The results of the experimental investigations of coolant mixing and transfer from nucleate boiling in alternative design fuel assemblies (ADFA) with combined spacer grids and mixing grids on aerodynamic and thermal test facilities are presented in the paper. As a result of the obtained experimental data, the determination of mixing coefficient was carried out and the

correlation for the critical heat flux calculation was developed. The applicability of correlation for critical heat flux calculation for ADFA of WWER-1000 was substantiated

Представлены результаты экспериментальных исследований перемешивания теплоносителя и кризиса теплоотдачи в тепловыделяющих сборках альтернативной конструкции (ТВСА-Т) с комбинированными дистанционирующими и перемешивающими решетками-интенсификаторами на аэродинамическом и теплофизических стендах. На основании полученных результатов выполнено уточнение коэффициента межъячейкового перемешивания теплоносителя и разработана корреляция для расчета критического теплового потока. Обоснована применимость корреляции для расчета критического теплового потока в ТВСА-Т ВВЭР-1000

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## **The method based on electromagnetic sensor for measuring of sodium flow rate in a heat pipe**

**S22**

*Loginov, N.I.; Mikheev, A.S.; Mukhlynin, A.A. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU)), E-mail: loginov@ippe.ru*

Metod izmereniya raskhoda natriya v teplovoj trube na osnove ehlektromagnitnogo datchika  
p. 109-116

(RU)

6 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; NUCLEAR FACILITIES; MOLTEN METAL-WATER REACTIONS;  
SODIUM; FUELS; COOLING SYSTEMS; HEAT PIPES

The electromagnetic sensor design and method of liquid flow measuring in the vertical sodium heat pipe of 100 mm diameter and 10 m length at operating temperature of 550-650 Deg C are described in the paper

В работе описаны конструкция электромагнитного преобразователя и метод измерения расхода натрия в вертикальной тепловой трубе диаметром 100 мм и длиной 10 м с рабочей температурой 550-650 град. С

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## **The intensification of mass transfer in LWR rods bundles by cellular mixing grids**

**S22**

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Intensifikatsiya peremeshivaniya v TVS vodookhlazhdaemykh reaktorov sotovymi peremeshivayushchimi reshetkami

p. 117-125

(RU)

6 refs., 5 figs., 4 tabs.



Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; WATER COOLED REACTORS; THERMAL HYDRAULICS; FUEL ASSEMBLIES; FUEL RODS; COMPUTERIZED SIMULATION

The CFD-models of 7 rods and 19 rods bundle with mixing grid was developed. The flow field in rods bundles was investigated. A series of CFD analyses were performed to obtain hydraulic and mixing properties of mixing cellular grids

Созданы CFD-модели семи- и 19-стержневых пучков с различными сотовыми перемешивающими решетками, индуцирующими направленный конвективный перенос. Исследовано течение теплоносителя, формируемое каналами решеток. Проведены расчеты гидравлических и перемешивающих характеристик сотовых решеток

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### **Integrated approach to proliferation risk assessment based on multiple objective analysis framework**

**S98**

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Integrirovannye podkhody k otsenke riskov nesanktsionirovannogo rasprostraneniya

p. 126-134

(RU)

7 refs., 6 figs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NATIONAL SECURITY; NUCLEAR DETERRENCE; PROLIFERATION; RISK ASSESSMENT; CONTROL SYSTEMS; DETECTION

The approach to the assessment of proliferation risk using the methods of multi-criteria decision making and multi-objective optimization are presented in the paper. The approach allows to take into account the specifics features of the national nuclear infrastructure, and possible proliferator strategies (motivations, intentions, and capabilities)

Представлена методика и приведены примеры использования подхода к оценке привлекательности сценариев пролиферации с использованием методов поддержки принятия решений при многих критериях, сформулированной в виде задачи многокритериальной оптимизации, позволяющей учесть как особенности национальной ядерной инфраструктуры, так и возможные стратегии поведения пролифератора

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### **On the issues of uranium reprocessed from high burnup fuels**

**S12**

*D'yachenko, A.I. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)); Balagurov, N.A.; Artisyuk, V.V. (Negosudarstvennoe Obrazovatel'noe Uchrezhdenie Tsentral'nyj Inst.*

*Povysheniya Kvalifikatsii, Obninsk (RU)*

Ispol'zovanie regenerirovannogo urana iz topliva s glubokim vygoraniem

p. 135-143

(RU)

13 refs., 6 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

FUEL CYCLE; WASTES; SPENT FUELS; BURNUP; ISOTOPE RATIO; URANIUM;  
URANIUM RECYCLE

The authors present an analysis of nuclide composition in spent fuel of WWER-1000 reactors from the view point of uranium reprocessing. The consideration is given to even uranium isotopes compensation, savings of separate work units, associated saving of uranium resources and economics

Проведен анализ изотопного состава урана отработавшего топлива реактора ВВЭР-1000 с целью его возможного использования для производства свежего топлива на основе регенерированного урана. Рассмотрены вопросы оптимизации компенсации начального присутствия четных изотопов урана с приведением количественных оценок работы деления и экономии урановых ресурсов в зависимости от глубины выгорания и степени рециклирования урана

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## **Control uniform distribution of plutonium by fuel pin length BN-800**

**S22**

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Izmerenie massy plutoniya v tvehle reaktora BN-800

p. 144-148

(RU)

4 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; BN-800 REACTOR; FUEL RODS;  
PLUTONIUM; GRANULAR MATERIALS

A method of determining the mass of plutonium and getter (additive in the form of uranium metal) in a fragment of a fuel pin of BN-800 reactor by mathematical modeling is presented by the authors. The method is based on measuring the intrinsic emission of granulated MOX fuel

Смоделирован метод определения массы плутония в фрагменте твэла реактора БН-800, основанный на измерении собственного излучения гранулированного МОКС-топлива. Проведены исследования по влиянию наличия геттера (добавка в виде металлического урана), колебания внутреннего радиуса и толщины оболочки твэла на определение массы плутония

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## **Residual resource estimation of the fuel pins cover of austenitic stainless steel ChS-68 of the reactor BN-600**

**S22**

*Konovalov, I.I.; Mityurev, K.V. (IPYaT NIYaU MIFI, Moscow (RU)); Popov, V.V.; Ganina, S.M. (GNTs RF - Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU))*

Otsenka ostatochnogo resursa obolochek teplovydelyayushchikh ehlementov reaktora BN-600 iz austenitnoj stali ChS-68

p. 149-158

(RU)

14 refs., 7 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; BN-800 REACTOR; FUEL RODS; MATERIALS; AUSTENITIC STEELS; SWELLING

The authors give calculation of ChS-68 austenitic stainless steel swelling and diameter profiles of fuel pins cladding from this steel after operation in BN-600 reactor core, having reached the values of a damaging dose exceeding the regular values

Проведен расчет распухания аустенитной стали ЧС68-ИД и формоизменения оболочек тепловыделяющих элементов (ТВЭЛОВ) из этой стали, прошедших эксплуатацию в активной зоне реактора БН-600, достигнув значений повреждающей дозы, превышающих штатные

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## **Computational analysis and estimation of LWR cladding radioactivity**

**S22**

*Korzunin, A.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Raschetnaya otsenka i analiz aktivatsii obolochek tvehlov legkovodnykh reaktorov

p. 159-163

(RU)

5 refs., 2 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

NUCLEAR POWER; REACTORS; WATER COOLED REACTORS; FUEL ELEMENTS; BUILDING MATERIALS; COMPUTER CALCULATIONS

Time evolution of specific radioactivity and gamma watts for four types of zirconium-based structural activation products materials of light elements have been estimated in this paper

Оценена и проанализирована временная зависимость удельных активности и мощности гамма-квантов продуктов активации легких элементов для четырех вариантов состава конструкционных материалов ТВС легководных реакторов на основе циркония

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## **Personnel training at the Training and Retraining at Department of the INPE NRNU MEPhI**

**S29**

*Tkachenko, V.V.; Saakyan, S.P. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: s\_saakian@mail.ru*

Podgotovka kadrov na fakul'tete povysheniya kvalifikatsii i professional'noj perepodgotovki IATEh NIYaU MIFI

p. 164-170

(RU)

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.1)

PLANNING; RESEARCH PROGRAMS; PERSONNEL; SCIENTIFIC PERSONNEL;  
TRAINING; EDUCATION; LEARNING

The history of the organization and formation of the Training and Advanced Training Department of the Obninsk Atomic Power Institute of the National Research University MEPhI. The functioning of the faculty to train specialists for nuclear industry using advanced professional training programs is described in the paper

Изложена история организации и становления Факультета повышения квалификации и профессиональной переподготовки ИАТЭ НИЯУ МИФИ. Описана работа факультета по обучению специалистов атомной отрасли по программам дополнительного профессионального образования

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## **Assessment of consequences of hypothetical nuclear accident of the MARS reactor installation**

**S22**

*Kazanskij, Yu.A.; Matusевич, E.S. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: matusевич@iate.obninsk.ru*

Otsenka posledstvij gipoteticheskoy (zaproektnoj) yadernoj avarii reaktornoj ustanovki MARS

p. 5-10

(RU)

3 refs., 3 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

REACTORS; ACCIDENTS; HYPOTHETICAL ACCIDENTS; MARS REACTOR;  
RADIATION PROTECTION; ABSORBED RADIATION DOSES; ENVIRONMENTAL  
IMPACTS

The assessment of radiation consequences of a hypothetical nuclear accident of the medical reactor MARS is given in the article. It is shown that there is no significant irradiation of the population and environmental pollution, and the personnel is able to eliminate its consequences by their own efforts

В статье приведена оценка радиационных последствий запроектной ядерной аварии на мгновенных нейтронах медицинского реактора МАРС. Показано, что не происходит значимого облучения населения и загрязнения окружающей среды, а персонал своими силами способен устранить ее последствия

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## **The mathematical model of prompt-critical disassembly excursion of LMFBR** **S22**

*Kashcheev, M.V.; Kuznetsov, I.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: kmv@ippe.ru*

Matematicheskaya model' razgona reaktora na mgnovennykh nejtronakh

p. 11-21

(RU)

12 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; REACTORS; FAST REACTORS; BELOYARSK-3 REACTOR;  
RADIATION HAZARDS; REACTOR ACCIDENTS; CRITICALITY; MATHEMATICAL  
MODELS; LAGRANGIAN FUNCTION

The mathematical model of the processes of prompt critical disassembly excursion of an LMFBR reactor has been developed. The model is realized in the framework of the ANPEX program allowing to calculate an accident development at occurrence of secondary criticality in the melted core. The description of results of testing of the program and results of calculation of stage of instant criticality by means of code ANPEX for BN-600 is given in the paper

Разработана математическая модель процессов разгона реактора на мгновенных нейтронах. Модель реализована в программе ANPEX, которая позволяет рассчитать развитие аварии при возникновении вторичной критичности в расплавленной активной зоне. Дано описание результатов тестирования программы и расчета стадии мгновенной критичности с помощью кода ANPEX для реактора БН-600

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## **The beryllium reflector effects on neutron-physical characteristics of the WWR-c** **reactor core**

**S22**

*Kochnov, O.Yu. (Obninskij Filial GNTs RF NIFKhI imeni L.Ya. Karpova, Obninsk (RU)), E-mail: kochnov2000@mail.ru; Kolesov, V.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Vliyanie berillievogo otrazhatelya, pomeshchennogo v aktivnuyu zonu reaktora VVR-ts, na ee nejtronno-fizicheskie kharakteristiki

p. 22-25

(RU)

1 ref., 1 fig., 7 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

POWER REACTORS; WWR TYPE REACTORS; WWR-S-MOSCOW REACTOR;  
NEUTRON REFLECTORS; REACTOR CORES; REACTIVITY; NEUTRON FLUX

The paper presents the results of neutron-physical calculations of the modified reactor core of the WWR-c reactor. As a result of computational research, authors have found a significant increase of the reactivity margin when beryllium reflector blocks are introduced into the reactor core of the WWR-c reactor

Приводятся результаты нейтронно-физических расчетов модифицированной активной зоны реактора ВВР-ц, на основании которых обнаружено значительное увеличение запаса реактивности при введении в активную зону блоков бериллиевого отражателя

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### **Possibility of the usage of the lead enriched with the isotope lead-208 from thorium ores and minerals for nuclear energy needs**

S11

*Khorasanov, G.L.; Blokhin, A.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Val'ter, A.A. (Inst. Prikladnoj Fiziki Natsional'noj Akademii Nauk Ukrainy, Sumy (UA)), E-mail: valter@iop.kiev.ua*

Vozmozhnost' ispol'zovaniya svintsa, obogashchennogo izotopom svintsa-208, iz torijsoderzhashchikh rud i mineralov dlya nuzhd atomnoj ehnergetiki

p. 26-38

(RU)

26 refs., 8 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; POWER REACTORS; FAST REACTORS; LIQUID METALS; LEAD  
208; THORIUM; THORIUM ORES; THORIUM MINERALS

Authors have investigated the usage of radiogenic lead recovered from thorium ores and minerals as a possible liquid heavy metal coolant for fast reactors and accelerator driven systems. This radiogenic lead is strongly enriched with Pb-208 isotope, which is characterized by very low neutron capture cross sections at low and intermediate energies

Исследуется возможность использования в качестве теплоносителя быстрых реакторов и ускорительно-управляемых систем радиогенного свинца, который может быть извлечен из торийсодержащих руд и минералов. В этих природных образованиях радиогенный свинец, продукт радиоактивного распада тория, высоко обогащен стабильным изотопом свинца-208, который обладает чрезвычайно низким сечением радиационного захвата нейтронов в области малых и промежуточных энергий нейтронов

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### **Optimal management by NPP equipment lifetime. Calculation procedures**

S22

*Gulina, O.M.; Sal'nikov, N.L.; Polityukov, V.P.; Aref'ev, V.S. (Obninskij Inst. Atomnoj*

*Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: olga@iate.obninsk.ru*

Osobennosti vychislenij v modeli optimal'nogo upravleniya resursom trubnogo puchka parogeneratora

p. 39-47

(RU)

7 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; EQUIPMENT; STEAM GENERATION; LIFETIME; FILTRATION; FILTERS; MATHEMATICAL MODELS

Linear stochastic filter algorithm has been developed for steam generator heat-exchanged tubes assembly. Due to large dimension of mathematical model, some criteria are formulated, and Excel is choose as media for filter algorithm realization

Разработан алгоритм, реализующий математическую модель линейного стохастического фильтра для сборки теплообменных трубок парогенератора. В силу большой размерности задачи сформулированы критерии и выбран Excel как среда реализации алгоритма фильтра. Проведено исследование модели на основе специально поставленных экспериментов

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## **Innovative ultrasonic technology to improve the life of NPP equipment at its manufacturing**

**S22**

*Trofimov, A.I.; Minin, S.I.; Trofimov, M.A. (NIYaU MIFI OOO Ul'trazvukovye Tekhnologii, Obninsk (RU)); Kirillov, Yu.A. (ZAO Petrozavodskmash, Petrozavodsk (RU)), E-mail: j.Kirillov@pzm.su*

Innovatsionnye ul'trazvukovye tekhnologii povysheniya resursa oborudovaniya AEhS pri ego izgotovlenii

p. 48-54

(RU)

2 refs., 11 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; POWER REACTORS; WWER TYPE REACTORS; WELDED JOINTS; ULTRASONIC WELDING; LIFETIME EXTENSION

The paper presents a theoretical and experimental justification for the effects of ultrasound on the welds during welding the equipment of nuclear power plants. Impact of ultrasound technology on the process of welding and surfacing is described as well

Приведено теоретическое и экспериментальное обоснование воздействия ультразвука на сварные соединения в процессе сварки оборудования атомных станций. Также приведены технологии воздействия ультразвука на процессы сварки и наплавки

## **Defining the tension of metal elements of the power equipment of the nuclear power plants by acoustic method**

**S22;S36**

*Khudasko, V.V.; Trofimov, A.I.; Kurkin, S.A.; Malynkin, V.G. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: i.e.trofimova@iate.obninsk.ru*

K opredeleniyu napryazhennogo sostoyaniya metalla ehlementov ehnergeticheskogo oborudovaniya AEhS akusticheskim metodom

p. 55-64

(RU)

18 refs., 2 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; REACTORS; WWER TYPE REACTORS; METALS; ACOUSTIC TESTING; ULTRASONIC TESTING; SURFACE TENSION; DEFORMATION

A new acoustic method of defining the metal element tension of the nuclear power plant equipment is presented in the paper. The method allows to raise accuracy of measurement of the metal element tension of the nuclear power plant equipment

Представлен обобщенный метод определения напряженного состояния металла элементов оборудования АЭС, основанный на эффекте акустической упругости с учетом изменения температуры и деформации микроплощадок и микроотрезков и являющийся более точным по сравнению с существующими методами для определения модулей третьего порядка

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## **A method for detecting failure data flow heterogeneity of nuclear power plant equipment in failure flow**

**S22**

*Chepurko, V.A.; Chepurko, S.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: chepurko@iate.obninsk.ru*

Ob odnom metode obnaruzheniya neodnorodnosti potoka otkazov oborudovaniya AEhS

p. 65-73

(RU)

14 refs., 2 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; POWER REACTORS; NOVovoronezh-5 REACTOR; EQUIPMENT; FAILURES; DAMAGE; MATHEMATICAL SOLUTIONS

Authors describe the methodology allowing to evaluate the non-homogeneity parameter flow of failures of NPP equipment. Along with the point estimate of the reliability index, an algorithm of constructing its interval estimate allowing to check the statistical significance of hypotheses about the parameter has been proposed



Описывается методика, позволяющая оценивать параметр неоднородности потока отказов оборудования АЭС. Наряду с точечной оценкой этого показателя надежности предложен алгоритм построения его интервальной оценки, позволяющий проверять статистические гипотезы о значимости параметра

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**Validation of the volume flow rate measurements of RBMK technological channels obtained with the #Left-Pointing Double Angle Quotation Mark# Shadr-32M#Right-Pointing Double Angle Quotation Mark# flowmeter S22**

*Avdeev, E.F.; Belozеров, V.I.; Ustyuzhanin, A.Ya.; Maksimovskij, V.V.; Razenkov, N.D.; Yushchenko, N.E. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Verifikatsiya izmereniya ob'emnykh raskhodov v tekhnologicheskikh kanalakh reaktorov RBMK raskhodomerami #Left-Pointing Double Angle Quotation Mark# Shadr-32M#Right-Pointing Double Angle Quotation Mark#

p. 74-79

(RU)

6 refs., 2 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; POWER REACTORS; LWGR TYPE REACTORS; REACTOR CHANNELS; WATER; FLOW RATE; FLOW COUNTERS; VISCOSITY

Authors describe experimentally obtained corrections to the readings of #Left-Pointing Double Angle Quotation Mark# Shadr-32M#Right-Pointing Double Angle Quotation Mark# flowmeters, which can be used to determine the real water consumption in technological channels of RBMK reactors. These corrections take into account the dependence of the flowmeters readings on the pumped water temperature

Экспериментальным путем получены поправки к показаниям расходомеров #Left-Pointing Double Angle Quotation Mark# Шадр-32M#Right-Pointing Double Angle Quotation Mark#, которые могут быть использованы для определения действительных расходов воды в технологических каналах реакторов РБМК. Эти поправки учитывают зависимость показаний расходомеров от температуры прокачиваемой воды

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**Optimization of welding the NPP equipment and piping by modeling of welded joints**

**S22**

*Trofimov, A.I.; Minin, S.I.; Trofimov, M.A.; Egorov, D.A. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Optimizatsiya protsessa svarki oborudovaniya i truboprovodov AEhS putem modelirovaniya svarnykh soedinenij

p. 80-84

(RU)

1 ref., 6 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Energetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; POWER REACTORS; PIPELINES; WELDING; WELDED JOINTS;  
ULTRASONIC WELDING; MARTENSITIC STEELS

Authors present the simulation of the thermal cycle of welding process with the aid of the SYSWELD program allowing to optimize the welding process, including the ultrasonic impact, that increases the strength properties of welded joints of NPP equipment

Представлено моделирование термического цикла процесса сварки с помощью программы SYSWELD, позволяющее оптимизировать процесс сварки с учетом воздействия ультразвука, что дает возможность повысить прочностные свойства сварных соединений оборудования АЭС

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### **Experimental study of the origin and characteristics of gas cavitation in lead coolant flow in innovative nuclear fast reactor**

**S22**

*Beznosov, A.V.; Bokov, P.A.; L'vov, A.V.; Novozhilova, O.O.; Novinskij, Eh.G. (Nizhegorodskij Gosudarstvennyj Tekhnicheskij Univ. imeni R.E. Alekseeva, Nizhnij Novgorod (RU)), E-mail: besnosov@nntu.nnov.ru; Lemekhov, V.V. (Nauchno-Issledovatel'skij i Konstruktorskij Inst. Ehnergotehniki imeni N.A. Dollezhalya, Moscow (RU))*

Ehksperimental'noe issledovanie uslovij vznikoveniya i kharakteristik gazovoj kavitatsii v potoke svintsovogo teplonosatelya innovatsionnykh yadernykh reaktorov na bystrykh nejtronakh p. 85-94

(RU)

1 ref., 6 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Energetika

ISSN 0204-3327

(2012)

(no.2)

POWER REACTORS; FAST REACTORS; CAVITATION; COOLANTS; LIQUID METALS

Authors argue that a new physical phenomenon, a property of the lead coolant flow to implement the process of pure gaseous cavitation, and the impossibility of traditional vapor cavitation, has been discovered and experimentally justified. A model of gas flow cavitation in the coolant lead flow under conditions of the reactor circuit has been proposed and experimentally substantiated by three independent methods

Авторы утверждают, что открыто и экспериментально обосновано новое физическое явление: свойство потока свинцового теплоносителя реализовывать процесс чисто газовой кавитации и невозможность процесса традиционной паровой кавитации. Предложена и экспериментально обоснована тремя независимыми методами модель газовой кавитации в потоке свинцового теплоносителя применительно к условиям реакторного контура

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### **Subchannel thermohydraulic calculations for fuel subassembly of reactor core on**

## **supercritical water**

**S22**

*Kartashov, K.V.; Bogoslavskaya, G.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: gpbogoslov@ippe.ru*

Provedenie raschetov po optimizatsii geometricheskikh i rezhimnykh parametrov TVS reaktorov VVEhR-SKD dlya razlichnykh rezhimov ehkspluatatsii reaktora na sverkhkriticheskikh parametrah vody

p. 95-101

(RU)

5 refs., 8 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; WWER TYPE REACTORS; REACTOR CORES; THERMAL HYDRAULICS; FUEL ASSEMBLIES; FUEL ELEMENTS; FUEL PINS

Results of thermohydraulic calculations with subchannel codes SUP and MIF-SKD are presented in the paper. Thermohydraulic parameters of the part of reactor core and fuel subassembly of WWER-SKD (1700 MWe) for different coolant flows within reactor core are also presented

Представлены результаты теплогидравлических расчетов по поканальным программам SUP и МИФ-СКД. Представлены теплогидравлические расчеты параметров сектора и ТВС реакторной установки ВВЭР-СКД мощностью 1700 МВт (эл.) при разных схемах течения теплоносителя

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## **Random hydrodynamic loads and the vibration of fuel elements in the turbulent coolant flow in WWER fuel assembly**

**S22**

*Perevezentsev, V.V. (Moskovskij Gosudarstvennyj Tekhnicheskij Univ. imeni N.Eh. Baumana, Moscow (RU)), E-mail: vpereves@power.bmstu.ru*

Sluchajnye gidrodinamicheskie nagruzki i vibratsii tvehlov v turbulentnom potoke teplonositelya v TVS VVEhR

p. 102-111

(RU)

8 refs., 8 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; WWER TYPE REACTORS; HYDRODYNAMICS; FUEL ASSEMBLIES; VARIATIONS; DYNAMIC LOADS

The generalizing empirical dependences of vibration movements on the random hydrodynamic loads have been obtained. Two characteristic regions of the influence of random hydrodynamic loads on the vibration movements have been discovered. With the values of random hydrodynamic loads more than 80 N/m, a considerable increase in the intensity of vibrations has been observed. It can be explained by the slippage of fuel element in the cell of the spacing lattice

Получены обобщающие эмпирические зависимости виброперемещений от случайных гидродинамических нагрузок. Обнаружены две характерные области влияния случайных гидродинамических нагрузок на виброперемещения. При значениях случайных гидродинамических нагрузок более 80 Н/м наблюдается существенное увеличение интенсивности вибраций, что объясняется проскальзыванием твэла в ячейке дистанционирующей решетки

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## **Examination of heat transfer in ceramic fuel elements at variable thermal loadings**

**S22**

*Popov, V.V.; Rummyantsev, V.N.; Kurina, I.S.; Mikheev, M.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: meofei@mail.ru*

Issledovanie teploperedachi v tvehlakh s keramicheskim toplivom pri peremennykh teplovykh nagruzkakh

p. 112-121

(RU)

18 refs., 8 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; WWER TYPE REACTORS; FUEL RODS; REACTOR COMPONENTS; URANIUM OXIDES; FUEL-CLADDING INTERACTIONS

The technique of measurement, under laboratory conditions, of contact pressure and heat conductance from UO<sub>2</sub> fuel pellets to fuel cladding at power variation is described in the paper. The results of the analysis of computational models for heat transfer from fuel to cladding are also presented and discussed

Приведено описание методики измерения в лабораторных условиях контактного давления и термической проводимости между топливными таблетками из UO<sub>2</sub> и оболочкой твэлов при изменении мощности. Изложены и обсуждены результаты анализа расчетных моделей теплопередачи между топливом и оболочкой

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## **Investigation of consequences of the leak from tank of VVR-c reactor (IBB.10M) after design modernization**

**S22;S37**

*Sergeev, V.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU));*

*Kochnov, O.Yu.; Kazantsev, A.A. (NIFKHI imeni L.Ya. Karpova, Obninsk (RU))*

Issledovanie posledstvij techi iz baka dlya modernizirovannogo proekta RU VVR-ts (IVV.10M)

p. 122-131

(RU)

4 refs., 9 figs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; WWER TYPE REACTORS; WWR-S-MOSCOW REACTOR;  
ACCIDENTS; SAFETY ANALYSIS; LEAKS; NATURAL CONVECTION;  
RADIOCHEMISTRY

The calculation results of transient cooling of reactor facility in the natural circulation mode under anticipated accident with coolant leak that is postulated by safety analysis report (SAR) are presented in the paper. Calculations were performed on the basis of TRAC code. International thermal hydraulic network code TRAC was designed for the safety analysis of water-cooled NPP

Представлены результаты расчетов динамики расхолаживания реакторной установки в режиме естественной циркуляции при гипотетической аварии с течью теплоносителя, постулируемой стандартами отчета по обоснованию безопасности. Расчеты выполнялись по международному теплогидравлическому контурному коду TRAC, предназначенному для анализа технической безопасности водоохлаждаемых ядерно-энергетических установок

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### **Panoramic plasma-optical mass separation of non- monoenergetic and multiply-charged ions**

**S70**

*Bardakov, V.M. (Irkutskij Gosudarstvennyj Univ. Putej Soobshcheniya, Irkutsk (RU)); Vo N'y Zan; Strokin, N.A. (NI Irkutskij Gosudarstvennyj Tekhnicheskij Univ., Irkutsk (RU))*

Panoramnaya plazmoopticheskaya mass-separatsiya nemonoehnergetichnykh i mnogozaryadnykh ionov

p. 132-142

(RU)

14 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

PLASMA; PLASMA WAVES; PLASMA ACCELERATION; MULTICHARGED IONS;  
ISOTOPE SEPARATION; SPENT FUELS

A method and installation, extending the functionality of the plasma separators that improve their performance and provide a panoramic multi-component separation of the plasma flow to the masses, have been proposed in the paper

Предложены способ и варианты установок плазмо-оптической масс-сепарации, расширяющие функциональные возможности существующих плазменных масс-сепараторов, повышающие их производительность и обеспечивающие панорамное разделение многокомпонентного потока плазмы по массам

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### **The synthesis and physicochemical investigation of gadolinium hydroxide powders for fuel pellets alloying**

**S22**

*Myakisheva, L.V.; Panov, V.S.; Lopatin, V.Yu.; Vlasovets, I.A. (Natsional'nyj Issledovatel'skij*

*Tekhnologicheskij Univ. MISiS, Moscow (RU)), E-mail: lopatin63@mail.ru*

Sintez i fiziko-khimicheskie issledovaniya poroshkov gidroksida gadoliniya dlya legirovaniya materialov toplivnykh tabletok

p. 143-150

(RU)

6 refs., 5 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; NUCLEAR FUELS; FUEL PELLETS; GADOLINIUM HYDROXIDES; PRECIPITATION; FUEL ASSEMBLIES

The authors have implemented researches on the production of fine powders of gadolinium hydroxide, and determination of their physical and chemical characteristics

Проведены исследования по получению высокодисперсных порошков гидроксида гадолиния и определению их физико-химических характеристик

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## **Program for three-dimensional numerical computation of thermal and electrical properties of a multicell thermionic fuel element for the direct energy conversion NPP**

**S22**

*Polous, M.A.; Yarygin, V.I. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU));*

*Vinogradov, E.G. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: m.polous.a@gmail.com*

Programmnyj kompleks dlya trekhmernogo chislennogo rascheta teplovykh i ehlektricheskikh kharakteristik mnogoehlementnogo ehlektrogeneriruyushchego kanala termoehmissionnoj YaEhU

p. 151-160

(RU)

11 refs., 8 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.2)

NUCLEAR POWER; NUCLEAR FACILITIES; FUEL ELEMENTS; ENERGY CONVERSION; THERMIONIC CONVERSION; THERMIONIC CONVERTERS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION

The existing COMSOL finite element analysis code has been modified to calculate the electro-thermophysical properties of a thermionic fuel element with a complex geometry of structural components for the direct energy conversion NPP of new generation on a basis of its three-dimensional mathematical model using the discreet experimental data on the current-voltage characteristics of a thermionic converter

Проведена модификация существующего программного кода конечно-элементного анализа COMSOL с целью расчета электротеплофизических характеристик термозмиссионного электрогенерирующего канала со сложной геометрией

**Application of the undetermined Lagrangian coefficients method in the analysis on consistency of experiments on the example of systems with high enriched uranium from ICSBEP Handbook**

**S97**

*Golovko, Yu.E. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Primenenie metoda neopredelennykh mnozhitel'ej Lagranzha v analize na neprotivorechivost' ehksperimentov na primere sistem s vysokoobogashchennym uranom

p. 5-17

(RU)

12 refs., 3 figs., 13 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

MATHEMATICS; MATHEMATICAL MODELS; MATHEMATICAL SOLUTIONS; EQUATIONS; LAGRANGE EQUATIONS; DIFFERENTIAL EQUATIONS

Authors present results of application of undetermined Lagrangian coefficients method in the analysis of consistency of experiments from ICSBEP Handbook. Amendment to the original terms of experimentation and cross sections on the basis of strict compliance with critical conditions have been obtained

Представлены результаты применения метода неопределенных множителей Лагранжа в анализе на непротиворечивость экспериментов из международного справочника ICSBEP Handbook. Получены поправки к исходным условиям экспериментов и сечениям на основании строгого соблюдения условия критичности

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**Some macroscopic characteristics of fast reactor cores of intermediate capacity**

**S22**

*Khorasanov, G.L.; Blokhin, A.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Nekotorye makrokharakteristiki aktivnykh zon bystrykh reaktorov srednej moshchnosti

p. 18-22

(RU)

13 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; REACTORS; FAST REACTORS; BELOYARSK-3 REACTOR; REACTOR CORES; COOLANTS; LEAD 208; URANIUM 238; AMERICIUM 241

For Russian average power reactors, BN-600, BREST-300 and RBETS-340 (RBETS-M), on the basis of calculated by MCNP5 neutron spectra, such core parameters as average energy of

neutrons, one-group cross sections of neutron capture by  $^{238}\text{U}$ , and the fission cross-section of  $^{241}\text{Am}$ , have been defined

Для российских реакторов средней мощности БН-600, БРЕСТ-300 и РБЕЦ-340 (РБЕЦ-М) на основе рассчитанных по MCNP5 нейтронных спектров определены такие параметры активных зон, как средняя энергия нейтронов, одногрупповые сечения радиационного захвата нейтронов  $^{238}\text{U}$  и сечения деления  $^{241}\text{Am}$

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## **Nuclear safety of melt localisator device for NPP with WWER-type reactor** **S22**

*Artamonov, N.V.; Sidorov, A.S. (OAO Atomenergoproekt, Moscow (RU))*

Obosnovanie yadernoj bezopasnosti ustrojstva lokalizatsii rasplava dlya AEhS s reaktorami tipa VVEhR

p. 23-31

(RU)

19 refs., 9 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER PLANTS; WWER TYPE REACTORS; SAFETY; ACCIDENTS;  
MELTDOWN; NUCLEAR DAMAGE; MULTIPLICATION FACTORS

Calculations of nuclear safety of melt localisator device for different types of NPP are given in the paper. On the basis of results analysis, recommendations regarding choice of sacrifice material for advanced melt localisator devices are also presented

Приведены результаты расчетов обоснования ядерной безопасности устройств локализации расплава для различных АЭС. На основании анализа полученных результатов даются рекомендации по жертвенному материалу для перспективных устройств локализации расплава с точки зрения ядерной безопасности

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## **The technique of ultrasonic testing of two-component metal of VK-50 reactor facility**

**S22**

*Globa, R.A. (OAO GNTs NIIAR, Dimitrovgrad (RU)); Trofimov, M.A. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Metodika provedeniya ul'trazvukovogo kontrolya dvukhkomponentnogo metalla reaktornoj ustanovki VK-50

p. 32-35

(RU)

4 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)



## NUCLEAR POWER; VK-50 REACTOR; REACTOR VESSELS; WELDING; MATERIALS TESTING; ULTRASONIC TESTING; MICROSTRUCTURE

During the ultrasound testing of the vessel of VK-50 boiling-type reactor facility, researchers found several problems: welding control; identification of the welding zone; control of base metal, located behind the welding. The developed technique provides a solution to these problems, which has found a practical application

В ходе ультразвукового контроля корпуса реакторной установки ВК-50 был выявлен ряд проблем: контроль наплавки; выявление зоны сплавления; контроль основного металла, расплавленного за наплавкой. В разработанной методике дается решение данных проблем, которое нашло практическое применение

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### **Simulation of dynamics of steam-gas front distribution in thermal insulation of power plants pipelines**

**S22**

*Dvornikov, P.A.; Kovtun, S.N.; Budarin, A.A.; Polionov, V.P.; Titarenko, N.N. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Roshchin, N.G.; Matveev, A.L.; Matveev, E.L. (Obshchestvo s Ogranichennoj Otvetstvennost'yu Inzhenerno-Servisnyj Tsentr Diagnostiki Oborudovaniya AEhS NIKIEhT, Moscow (RU)), E-mail: roschin@nikiet.ru*

Modelirovanie dinamiki rasprostraneniya parogazovogo fronta v teploizolyatsii truboprovoda ehnergeticheskikh ustanovok

p. 36-43

(RU)

9 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR FACILITIES; WWER TYPE REACTORS; REACTOR SAFETY; PIPELINES; LEAKS; LEAK DETECTORS

Dynamic processes in thermal insulation of power plants pipelines caused by depressurization have been the aim of the research. Simulation of various leaks have been realized using an adapted computer code KUPOLM developed in the Russian Institute of Physics and Power Engineering, Obninsk

Объектом исследования являются динамические процессы, происходящие в теплоизоляции при разгерметизации трубопровода энергетических установок. Моделирование всевозможных вариантов течи проводилось с помощью адаптированного расчетного кода КУПОЛМ, разработанного в Физико-энергетическом институте в Обнинске

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### **Assessment and prognosis of radio-ecological impact of the radioactive wastes storage sites of the North-West Territorial District Leningrad branch of FGUP RosRAO**

**S11**

*Kryshev, I.I.; Bulgakov, V.G.; Sazykina, T.G. (FGBU NPO Tajfun Rosgidrometa MPR, Obninsk (RU)) (and others)*

Otsenka i prognozirovanie radiatsionno-ehkologicheskogo vozdejstviya khranilishch radioaktivnykh otkhodov Leningradskogo otdeleniya filiala Severo-Zapadnyj territorial'nyj okrug FGUP RosRAO

p. 44-52

(RU)

11 refs., 2 figs., 7 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

RADIOACTIVE WASTE MANAGEMENT; RADIOACTIVE MATERIALS; RADIOACTIVE WASTES; RADIOACTIVE WASTE STORAGE; RADIOISOTOPES; HYPOTHETICAL ACCIDENTS; ENVIRONMENTAL IMPACTS

Authors discuss the analysis of radio-ecological situation that has been performed for the territories located near the radioactive waste storage sites of the North-West Territorial District of the Leningrad branch of FGUP RosRAO

В работе авторы анализируют радиоэкологическую ситуацию в районе расположения хранилищ радиоактивных отходов Лeningradского отделения филиала #Left-Pointing Double Angle Quotation Mark#Северо-Западный территориальный округ#Right-Pointing Double Angle Quotation Mark# ФГУП РосРАО

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## **Assessment of Russia's nuclear power development model sensitivity to possible changes of selected economic parameters**

**S22**

*Egorov, A.F.; Korobejnikov, V.V.; Poplavskaya, E.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Fesenko, G.A. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Otsenka chuvstvitel'nosti modeli razvitiya yadernoj ehnergetiki Rossii k vozmozhnym izmeneniyam vybrannykh ehkonomicheskikh parametrov

p. 53-61

(RU)

4 refs., 5 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; RUSSIAN FEDERATION; WWER TYPE REACTORS; FAST REACTORS; FUEL CYCLE; SENSITIVITY ANALYSIS

Different variants of Russia nuclear power development scenarios are compared in the paper. The major technical and economic indicators are taken into account. In scenarios at price change for separate components of the system, the balance between thermal and fast reactors is changing, quantity of plutonium, quantity of demanded natural uranium, spent fuel volumes and a radioactive waste are estimated

Оценивается чувствительность сценариев развития ядерной энергетики России к изменениям выбранных экономических индикаторов, влияющих на ее структуру. В модельных сценариях предполагается одинаковым вклад ядерной энергетики в энергетику России

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## **Iron oxide reference electrodes in solid electrolyte sensors designed to control the thermodynamic activity of oxygen**

**S37**

*Martynov, P.N.; Askhadullin, R.Sh.; Ivanov, K.D.; Chernov, M.E.; Ul'yanov, V.V.; Shelemet'ev, V.M.; Sadovnichij, R.P.; Cheporov, R.Yu.; Niyazov, S.-A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Osobennosti ispol'zovaniya zhelezooksidnykh ehlektrodov sravneniya v tverdoehlektrolitnykh datchikakh kontrolya termodinamicheskoj aktivnosti kisloroda

p. 62-67

(RU)

5 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

CHEMISTRY; ELECTROCHEMISTRY; PYROLYSIS; LIQUID METALS; ELECTRODES; OXYGEN

The paper presents results on the use of iron oxide reference electrode in the oxygen activity sensors used to measure the oxygen activity in heavy liquid metal coolants. The specific features of the operation of the sensor with iron oxide reference electrode are established and comparative characteristics with respect to other applicable reference electrodes are presented. Conclusions on the reasonability of its use for measurement of oxygen activity in liquid metal media are drawn

Представлены результаты по использованию железоксидного электрода сравнения в датчиках активности кислорода, применяемых для измерения активности кислорода в тяжелых жидкометаллических теплоносителях. Были выявлены особенности работы датчика с железоксидным электродом сравнения, приведены сравнительные характеристики по отношению к другим применяемым электродам сравнения, сделаны выводы по целесообразности его использования применительно к измерению активности кислорода в жидкометаллических средах

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## **Peculiarities of metrological calibration of oxygen activity sensors in liquid metal coolants**

**S22**

*Martynov, P.N.; Askhadullin, R.Sh.; Storozhenko, A.N.; Chernov, M.E.; Ul'yanov, V.V.; Shelemet'ev, V.M.; Sadovnichij, R.P.; Kuzin, P.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Osobennosti metrologicheskoy poverki datchikov aktivnosti kisloroda v zhidkometallicheskih teplonositelyakh

p. 68-74

(RU)

5 refs., 3 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; NUCLEAR FACILITIES; COOLANTS; LIQUID METALS; OXYGEN;  
THERMODYNAMIC ACTIVITY

Authors describe the peculiarities of metrological calibration of oxygen activity sensors in liquid metal coolants

В работе описаны особенности метрологической поверки датчиков активности кислорода в жидкометаллических теплоносителях

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### **Optimization of isotopic composition identification by program code MGAU using statistical methods**

**S07**

*Bojko, V.I.; Silaev, M.E.; Nedbajlo, Yu.V. (Natsional'nyj Issledovatel'skij Tomskij Politehnicheskij Univ., Tomsk (RU)), E-mail: boyko@tpu.ru*

Optimizatsiya protsessa opredeleniya izotopnogo sostava urana kodom MGAU s pomoshch'yu statisticheskikh metodov

p. 75-80

(RU)

8 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

ISOTOPES; ISOTOPE RATIO; ISOTOPE SEPARATION; URANIUM; URANIUM  
ISOTOPES; SPECTROSCOPY

This paper presents the statistical analysis of isotopic composition received with the aid of the program MGAU. A multivariate analysis has been chosen as a suitable statistical method. In accordance with the results of analysis, the recommendations have been made for using of this program code in combination with the Low Energy Germanium Detector. These recommendations give the opportunity to optimize the measurement process of uranium isotopic composition

Приведен статистический анализ результатов определения изотопного состава урана, полученных с помощью программы MGAU. В качестве статистического метода выбран многофакторный дисперсионный анализ. По результатам проведенного анализа составлены рекомендации по использованию данного программного кода в сочетании с низкоэнергетическим планарным детектором, позволяющие оптимизировать процесс измерения изотопного состава урана

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### **IRT research reactor burnup calculation for the analysis of conversion to low**

## **enrichment uranium fuel**

**S22**

*Ivakhin, S.V.; Radaev, A.I.; Tikhomirov, G.V.; Shchurovskaya, M.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

Raschetnoe modelirovanie vygoraniya topliva issledovatel'skogo reaktora IRT pri analize konversii na nizkoobogashchennoe uranovoe toplivo

p. 81-90

(RU)

8 refs., 4 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; RESEARCH REACTORS; NUCLEAR FUELS; ENRICHMENT; HIGHLY ENRICHED URANIUM; URANIUM-MOLYBDENUM FUELS; NUCLEAR FUEL CONVERSION; BURNUP

Neutron characteristics of IRT-3M fuel assembly with dioxide highly-enriched uranium fuel and uranium-molybdenum low-enriched uranium fuel are considered in the paper. Results of calculation of irradiated fuel isotope composition are presented

Рассматривается моделирование нейтронно-физических характеристик ТВС ИРТ-3М с диоксидным высокообогащенным урановым топливом и с уран-молибденовым низкообогащенным урановым топливом. Представлены результаты расчета изотопного состава отработавшего топлива

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## **Creation and application of multidimensional information models of NPP unit for decommissioning**

**S22**

*Bylkin, B.K. (NITs Kurchatovskij Inst., Moscow (RU)); Tikhonovskij, V.L.; Chujko, D.V. (ZAO NEOLANT, Moscow (RU))*

Sozdanie i primeneniye mnogomernykh informatsionnykh modelej bloka AEhS pri vyvode iz ehkspluatatsii

p. 91-101

(RU)

10 refs., 3 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; NUCLEAR POWER PLANTS; WWER TYPE REACTORS; DECOMMISSIONING; REACTOR DECOMMISSIONING; INFORMATION SYSTEMS; COMPUTERIZED SIMULATION

Basic principles of the imitational modeling application for the nuclear power plant decommissioning planning have been described in the paper

В работе изложены основные положения применения имитационного моделирования при планировании работ по выводу из эксплуатации АЭС

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## **The comparison of two approaches for calculation of the force interaction of the two-phase flow with tube bundle**

**S22**

*Asmollov, V.G.; Blinkov, V.N.; Melikhov, V.I.; Melikhov, O.I.; Nerovnov, A.A.; Parfenov, Yu.V. (Moskovskij Ehnergeticheskij Inst. (Natsional'nyj Issledovatel'skij Univ. MEhI-TU), Moscow (RU))*

Sravnenie dvukh podkhodov dlya rascheta silovogo vzaimodejstviya dvukhfaznogo potoka s trubnym puchkom

p. 102-107

(RU)

10 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; REACTORS; FLOW MODELS; GAS-FLOW PROCESSES; THERMAL HYDRAULICS; MATHEMATICAL MODELS

The comparison of the two different approaches for simulation of the force interaction of the two-phase flow with the external surfaces is presented in the paper. The two-velocity two-phase flow model has been developed for calculation of the two-phase pressure drop for the cross flow across tube bundle. The calculated results have been compared with the experimental ones

Выполнено сравнение различных подходов для описания силового взаимодействия двухфазного потока с внешними поверхностями, в частности, с пучком труб (трубчаткой). Для расчета перепада давления двухфазного потока при поперечном обтекании трубного пучка была разработана двухскоростная модель течения двухфазного потока. Полученные результаты расчетов были сопоставлены с опытными данными

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## **Experimental determination of power-release in the lead and uranium samples irradiated by high-energy proton**

**S43**

*Goverdovskij, A.A.; Kebabze, B.V.; Kovalev, D.M.; Chernov, R.R. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Ehksperimental'noe opredelenie ehnergovydeleniya v svintsovom i uranovom obraztsakh pri obluchenii protonami vysokikh ehnergij

p. 108-115

(RU)

2 refs., 9 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

ACCELERATORS; RADIATION SOURCES; POSITRON SOURCES; NEUTRON SOURCES; PROTON BEAMS; URANIUM 238; LEAD

The paper describes the development, laboratory tests and accelerator experiments of a measurement procedure of power-release in lead and uranium samples. The power-release data received in the lead and uranium sample are very important for tackling the problems of optimization of heat-removal from the irradiated target sample. The results obtained contributes to the development of accelerator driven systems

Работа посвящена разработке и испытанию в лабораторных условиях и в экспериментах на ускорителе методики измерения энерговыделения в образцах из урана и свинца. Полученные предварительные результаты по удельному энерговыделению в свинцовом и урановом образцах являются важными данными на пути решения проблем, связанных с оптимизацией теплоотвода от облучаемой мишени и дальнейшим развитием тематики ускорительно-управляемых систем

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## **Hydrodynamics and heat transfer in reactor installation MASTER**

**S22**

*Dorokhovich, S.L.; Koval'chuk, S.V.; Levchenko, A.V.; Levchenko, V.A. (EhNIMTs Modeliruyushchie Sistemy NIYaU MIFI, Obninsk (RU)); Kazanskij, Yu.A. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)); Kazantsev, A.A.; Yur'ev, Yu.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Gidrodinamika i teploobmen v reaktornoj ustanovke MASTER

p. 116-128

(RU)

6 refs., 10 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR FACILITIES; THERMAL POWER PLANTS; REACTOR CORES;  
HYDRODYNAMICS; HEAT EXCHANGERS; REYNOLDS NUMBER

Authors highlight the results of calculation investigations of heat and hydrodynamic processes in reactor installation MASTER. Designing and testing calculations using the CFD-code KANAL have been obtained

Приведены результаты расчетных исследований теплофизических и гидродинамических процессов, протекающих в реакторной установке МАСТЕР. Полученные результаты обеспечивают расчетное обоснование тепловой мощности, рабочего давления, геометрии и безопасного функционирования установки

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## **Verification of TECH-M and KORSAR/GP computer codes on the basis of experimental results obtained on large-scale test facility GE2M-PG**

**S22**

*Morozov, A.V.; Remizov, O.V.; Kalyakin, D.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Asyunin, V.I.; Shchekoldin, V.I.; Zajtsev, S.I.; Zakutaev, M.O. (OAO OKB Hidropress, Podol'sk (RU)), E-mail: asvi@mail.ru*

Verifikatsiya raschetnykh kodov TECH-M i KORSAR/GP po rezul'tatam ehksperimentov na kryptonmasshtabnom stende GE2M-PG

p. 129-139

(RU)

8 refs., 8 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; WWER TYPE REACTORS; NOVOVORONEZH-2 REACTOR; STEAM GENERATORS; VAPOR CONDENSATION; COMPUTER CODES

The purpose of the work was to conduct a posttest calculations and verification of computer codes TECH-M and KORSAR/GP in terms of modeling of heat transfer processes in a steam generator model at low heat fluxes in the presence of non-condensable gases, and without them. As a result of verification it is possible to conclude that the ability of computer codes to reproduce the phenomenon of non-condensable gases distribution, accumulation and their effects on heat transfer in a steam generator tube bundle is real

Целью работы являлось проведение посттестовых расчетов и верификация расчетных кодов ТЕЧЬ-М и КОРСАР/ГП в части моделирования теплообмена в модели парогенератора при низких тепловых потоках в присутствии неконденсирующихся газов и без них. По результатам верификации можно сделать вывод о способности расчетных кодов воспроизводить явления распространения неконденсирующихся газов с потоком теплоносителя, их накопление и влияние на теплообмен в трубном пучке парогенератора

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## **Calculation of heat transfer at the seven heated rod assembly upon supercritical fluid parameters**

**S22**

*Chusov, I.A.; Shelegov, A.S.; Slobodchuk, V.I.; Ukraintsev, V.F. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Raschet teplootdachi v semisterzhnevom puchke tvehlov pri sverkhkriticheskikh parametrahk teplonositelya

p. 140-147

(RU)

6 refs., 9 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; HEAT TRANSFER; FUEL ASSEMBLIES; FUEL ELEMENT CLUSTERS; FREONS; THERMAL HYDRAULICS; MATHEMATICAL MODELS

The results of calculation analysis of experiments on thermal hydraulic of the seven fuel pin assembly under supercritical coolant parameters are presented in the paper. Calculations have been done in accordance with experimental data on Freon-12 model coolant. Comparison between experimental and calculation results are given. Possible ways of improvement of calculation technique are discussed

Приведены результаты численного расчета теплогидравлики семистержневой тепловыделяющей сборки при сверхкритических параметрах теплоносителя. Расчет



проведен в соответствии с данными эксперимента на модельном теплоносителе фреон-12. Приводится сравнение результатов расчета и данными эксперимента

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## **The protection of steel surface at use of freon in NPP such as BREST**

**S22**

*Orlova, E.A.; Alekseev, V.V.; Zhmurin, V.G. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)) (and others)*

Zashchita poverkhnosti stali pri ispol'zovanii freonov v AEhS tipa BREST

p. 148-154

(RU)

7 refs., 5 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER; NUCLEAR POWER PLANTS; FAST REACTORS; COOLANTS; FREONS; MAGNESIUM FLUORIDES; LIQUID METALS; AUSTENITIC STEELS

Authors consider that the usage of fluorine-containing freon as a coolant in the second contour of fast reactors with heavy liquid-metal coolant of BREST type allows considerably decrease pressure and rise safety. There is a possibility of decreasing stability of freon which contacts with steel with raised content of silicon, using in heat-exchange equipment of such reactors and impoverishment of steel surface by silicon owing to formation of gaseous connection of silicon with fluorine of SiF<sub>4</sub>

Показана принципиальная возможность формирования защитного покрытия из MgF<sub>2</sub> на сталях ферритно-мартенситного и аустенитного классов при их контакте с жидким магнием и газообразным тетрафторидом кремния SiF<sub>4</sub>. Изгиб образцов сталей на 135 град. С не привел к растрескиванию поверхностной пленки, что свидетельствует о пластичности и плотном сцеплении покрытия из MgF<sub>2</sub> с поверхностью стали

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## **Calculation of permeability parameters for fibrous porous materials**

**S22**

*Titarenko, N.N.; Dvornikov, P.A.; Kovtun, S.N. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Pavlov, A.V.; Roshchin, N.G.; Matveev, E.L. (Obshchestvo s Ogranichennoj Otvetstvennost'yu Inzhenerno-Servisnyj Tsentr Diagnostiki Oborudovaniya AEhS NIKIEhT, Moscow (RU)), E-mail: pavlovav@nikiet.ru*

Opreделение parametrov pronitsaemosti voloknistykh poristykh materialov

p. 155-163

(RU)

33 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

NUCLEAR POWER PLANTS; PIPELINES; THERMAL INSULATION; POROUS MATERIALS; CONVECTION; HEAT TRANSFER

Authors have studied the recent publications in area of simulation of heat convection in a porous cylindrical layer. The calculation methods of determining the permeability factors for fibrous thermal insulation materials have been considered. Comparison of calculation and experimental data for power plants pipelines thermal insulation operating in a wide range of temperatures is given in the paper

Рассмотрены расчетные методы определения коэффициентов проницаемости волокнистых теплоизоляционных материалов. Приведено сопоставление расчетных и экспериментальных данных для тепловой изоляции трубопроводов энергетических установок, работающей в широком диапазоне температур

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### **Isotropic deformation hardening of alloy E110 at static and high rate magnetic-pulsed deformation**

**S36**

*Fedotov, P.V.; Loshmanov, L.P.; Kostyukhina, A.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Olevskij, E.A. (Powder Technology Lab., San Diego State Univ., San Diego (US))*

Izotropnost' deformatsionnogo uprochneniya splava Eh110 pri staticheskom i vysokoskorostnom magnitno-impul'snom nagruzhении

p. 164-170

(RU)

21 refs., 4 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.3)

**MATERIALS; ZIRCONIUM ALLOYS; DEFORMATION; FLOW STRESS; STRAIN HARDENING; ISOTROPY**

Tests of E110 alloy using a magnetic pulse and standard quasi-static methods have been conducted. The dependence of flow stress on the value of the true strain ring, and the tubular segment of samples made of the fuel cladding, as well as cylindrical specimens have also been defined

Проведены испытания сплава Э110 с применением магнитно-импульсных и стандартных квазистатических методов. Определены зависимости напряжения течения от величины истинной деформации кольцевых, трубчатых и сегментных образцов, изготовленных из оболочки ТВЭЛов, а также цилиндрических образцов

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### **New technique to reformat multigroup cross-sections for Monte Carlo calculation**

**S97**

*Suslov, I.R.; Tormyshev, I.V.; Mel'nikov, K.G. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Преобразование групповых макроскопических сечений для использования в программах метода Монте-Карло

p. 5-12

(RU)

21 refs., 2 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

MATHEMATICS; MATHEMATICAL MODELS; EQUATIONS; MONTE CARLO METHOD; STOCHASTIC PROCESSES; ANISOTROPY; NEUTRON TRANSPORT

A new method to calculate equiprobability bins from Legendre expansion scattering cross-sections is proposed. The method uses a correction of equiprobability bins boundaries to provide a conservation of the first angular moment. Numerical results show that the method significantly improves an agreement between deterministic and Monte-Carlo calculations

Предложен новый вариант алгоритма преобразования сечений рассеяния из разложения по полиномам Лежандра в представление равновероятных интервалов, включающий в себя корректировку границ равновероятных интервалов, сохраняющую первый угловой момент сечений рассеяния. На модельных задачах продемонстрировано существенное улучшение согласованности детерминистических расчетов и расчетов по Монте-Карло

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### **Boundary resonance effects in the fast reactor with the heterogeneous core**

**S22**

*Bezborodov, A.A.; Dolgov, E.V.; Klinov, D.A.; Stogov, V.Yu.; Suslov, I.R.; Folomeev, V.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Kolesov, V.V.*

*(Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Granichnye rezonansnye ehffekty v bystrom reaktore s geterogennoj aktivnoj zonoj

p. 13-22

(RU)

10 refs., 4 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR POWER; REACTORS; FAST REACTORS; BN-1600 REACTOR; HETEROGENEOUS REACTOR CORES; URANIUM 238; COMPUTER CODES

Boundary resonance effects have been considered with the application of the high-speed subgroup approximation technique employment in practical tasks for description of neutron cross-sections interactions with nuclides nuclei in resonance part of energy for physical simulation of the fast reactor plants with heterogeneous core

Исследовались граничные резонансные эффекты с применением быстродействующей методики использования подгруппового приближения в практических задачах описания сечений взаимодействия нейтронов с ядрами нуклидов в резонансной области энергий для физического моделирования реакторных установок на быстрых нейтронах с гетерогенной активной зоной

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### **Energy deposition evaluation in the target with uranium-containing material for**

## **the $^{99}\text{Mo}$ production in WWR-c**

**S22**

*Kochnov, O.Yu. (Obninskij Filial GNTs RF NIFKhI imeni L.Ya. Karpova, Obninsk (RU)); Kolesov, V.V.; Fomin, R.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Otsenka ehnergovydeleniya v misheni s uransoderzhashchim materialom pri proizvodstve  $^{99}\text{Mo}$  s ispol'zovaniem mishenej usovershenstvovannoj konstruktsii na reaktore WWR-ts p. 23-29

(RU)

2 refs., 9 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

POWER REACTORS; WWR TYPE REACTORS; WWR-S-MOSCOW REACTOR; REACTOR CORES; NEUTRON FLUX; MOLYBDENUM 99

The increased production of  $^{99}\text{Mo}$  in the context of rising global demand is an urgent task. The new type of a target for  $^{99}\text{Mo}$  production in WWR-c reactor technological channels has been developed. A series of calculations to estimate energy deposition for standard and modified target have been done. A considerable energy deposition increase in a modified target has also been found

Увеличение производства  $^{99}\text{Mo}$  в условиях мирового дефицита является актуальной задачей. При переходе на новую мишень проточного типа для наработки  $^{99}\text{Mo}$  возникла необходимость оценки энергосодержания для обоих типов мишеней. Результаты расчетов показали значительное увеличение энергосодержания для модернизированной мишени

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## **Method of $^{16}\text{N}$ generation for test of radiation controlled channels at nuclear power stations with water-cooled reactors**

**S22**

*Khryachkov, V.A.; Bondarenko, I.P.; Dvornikov, P.A.; Zhuravlev, B.V.; Kovtun, S.N.; Khromyleva, T.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: k7sn@mail.ru; Pavlov, A.V.; Roshchin, N.G. (Obshchestvo s Ogranichennoj Otvetstvennost'yu Inzhenerno-Servisnyj Tsentri Diagnostiki Oborudovaniya AEhS NIKIEhT, Moscow (RU))*

Metod generatsii  $^{16}\text{N}$  dlya poverki radiatsionnykh kanalov kontrolya na AEhS tipa VVEhR p. 30-34

(RU)

3 refs., 3 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

REACTORS; NUCLEAR POWER PLANTS; WWER TYPE REACTORS; RADIATION MONITORING; RADIOACTIVITY; LEAKS; FREONS

The preferences of nuclear reaction use for radiation control channels test in water-cooled power reactors have been analyzed in the paper. The new measurements for more accurate determination of reaction cross section energy dependence have been carried out. A set of new

methods for background reducing and improvement of events determination reliability has also been developed

Проанализированы преимущества использования ядерной реакции при генерации  $^{16}\text{N}$  для проверки радиационных каналов контроля на энергетических реакторах типа ВВЭР. Для уточнения энергетической зависимости сечения реакции выполнены измерения, в которых использован ряд новых методических приемов, позволяющих существенно снизить фон и улучшить надежность определения количества событий, соответствующих реакции

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## Calculation-based justification for the algorithm of pipelines leak control by air humidity

S22

*Dvornikov, P.A.; Kovtun, S.N.; Budarin, A.A.; Polionov, V.P.; Titarenko, N.N.; Shvetsov, D.M. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Roshchin, N.G.; Matveev, A.L.; Matveev, E.L. (Obshchestvo s Ogranichennoj Otvetstvennost'yu Inzhenerno-Servisnyj Tsentr Diagnostiki Oborudovaniya AEhS NIKIEhT, Moscow (RU)), E-mail: roschin@nikiet.ru*

Raschetnoe obosnovanie algoritma kontrolya techi truboprovodov po vlazhnosti vozdukha p. 35-44 (RU)

9 refs., 3 figs., 9 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR FACILITIES; WWER TYPE REACTORS; REACTOR SAFETY; PIPELINES; LEAK DETECTORS; THERMAL INSULATION; HUMIDITY CONTROL

Dynamic processes in thermal insulation of power plants pipelines caused by depressurization are the goal of the research. Simulation of various leaks have been realized by using an adapted computer code KUPOL-M

Объектом исследования являются динамические процессы, происходящие в теплоизоляции при разгерметизации трубопровода энергетических установок. Моделирование всевозможных вариантов течи проводилось с помощью адаптированного расчетного кода КУПОЛ-М

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## Analysis of errors committed by NPP MCR operators during implementation of operating procedures

S22

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Analiz oshibok, dopuskaemykh operatorami BShchU AEhS pri ispol'zovanii ehkspluatatsionnykh protsedur

p. 45-57

(RU)

22 refs., 2 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

POWER REACTORS; CONTROL ROOMS; REACTOR CONTROL SYSTEMS;  
PERFORMANCE; FAILURES; HUMAN FACTORS; ERRORS

The present paper concentrates on the problem of errors committed by NPP operators during implementation of operating procedures. It has been proposed to categorize such errors into four classes as follows: selection of inappropriate procedure, incorrect execution of procedure, navigation errors, and communication errors. These categories of errors have been described and analyzed in detail in the paper

Статья посвящена проблеме ошибок операторов АЭС, совершаемых при использовании эксплуатационных процедур. Предложено разбиение этих ошибок на четыре класса: ошибки выбора процедуры, ошибки исполнения процедуры, ошибки навигации и ошибки коммуникации. Подробно рассматриваются и анализируются выделенные классы ошибок. Ошибки каждого типа иллюстрируются реальными примерами

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### **Adsorption of molecular iodine from gas-aerosol environments and water solutions with a new type of aluminum-silicate sorbent**

S38

*Shilin, V.A. (Avtonomnaya Nekommercheskaya Organizatsiya Nauchno-Issledovatel'skij Tsentr Radiofizicheskie Testovye Tekhnologii, Moscow (RU)); Gordienko, A.B.; Shilina, A.S.; Milinchuk, V.K. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Adsorbtsiya molekulyarnogo joda iz gazoahrozol'nykh sred i vodnykh rastvorov novym tipom alyumosilikatnogo sorbenta

p. 58-66

(RU)

13 refs., 2 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

CHEMISTRY; NUCLEAR CHEMISTRY; ABSORBENTS; ALUMINIUM SILICATES;  
IODINE 131; SORPTION; AEROSOLS

Authors present the results of studies of sorption of iodine vapor from gaze-aerosol media on aluminosilicate sorbents in static and dynamic modes

Представлены результаты исследований сорбции алюмосиликатными сорбентами паров молекулярного йода из газоаэрозольных сред в статическом и динамическом режимах

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### **Experimental investigations of vertical turbomachine catcher bearings**

S22

*Belov, S.E.; Borovkov, M.N.; Kodochigov, N.G.; Novinskij, Eh.G. (OAO Opytnoe Konstruktorskoe Byuro Mashinostroeniya imeni I.I. Afrikantova, Nizhnij Novgorod (RU)), E-mail: novinskiy@okbm.nnov.ru*

Ehksperimental'nye issledovaniya konstruksii strakhovochnykh podshipnikov vertikal'noj turbomashiny

p. 67-74

(RU)

6 refs., 9 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR FACILITIES; TURBOMACHINERY; EQUIPMENT; ELECTRICAL EQUIPMENT; MAGNETIC BEARINGS; TURBOGENERATORS

This paper deals with the program of research activities aimed at development of catcher bearings for the GT-MHR turbomachine as well as some results of performed activities. The experience that has been gained as a result of this investigation program implementation can also be used in other mechanical engineering industries associated with development of vertical and dynamic machines

Рассматривается программа научно-исследовательских и опытно-конструкторских работ по созданию страховочных подшипников турбомшины реакторной установки ГТ-МГР. Накапливаемый опыт в результате реализации данной программы исследований может быть использован и в других отраслях машиностроения, связанных с созданием вертикальных динамических машин

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## **On electrode polarization of electrochemical oxygen sensor in liquid metal coolants**

**S21**

*Musikhin, Yu.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Ob ehlektrodnoj polyarizatsii ehlektrokhimicheskogo datchika kisloroda v zhidkometallicheskich teplonositelyakh

p. 75-84

(RU)

28 refs., 7 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

FAST REACTORS; BN-800 REACTOR; COOLANTS; LIQUID METALS; THERMODYNAMIC ACTIVITY; SOLID ELECTROLYTES

The paper considers the main provisions of thermodynamic oxygen activity control in liquid metal coolants by electromotive force method by means of a two-electrode electrochemical oxygen sensor with a solid oxygenated electrolyte which is in contact with the coolant and at the same time is a working electrode of the sensor. The analytical dependence values have been calculated for the electron work function from the solid electrolytes and metal oxides

Рассмотрены основные положения контроля термодинамической активности кислорода в жидкометаллических теплоносителях методом электродвижущих сил при помощи двухэлектродного электрохимического датчика кислорода с твердым кислородионным электролитом, контактирующим с теплоносителем, который одновременно является рабочим электродом датчика. Получены расчетные зависимости для работы выхода электрона из твердых электролитов и окислов металлов

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## **Thermodynamic cycles of NPPs operated with supercritical water**

**S22**

*Abdulkadyrov, V.M.; Bogoslovskaya, G.P.; Grabezhnaya, V.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: gva@ippe.ru*  
Termodinamicheskie tsikly AEhS, rabotayushchikh na sverkhkriticheskikh parametrah vody  
p. 85-91

(RU)

22 refs., 1 fig.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTOR CORES; SUPERCRITICAL STATE; THERMODYNAMIC CYCLES; STEAM SEPARATORS

Authors discuss issues of thermodynamic cycles of nuclear power plants operated with supercritical water parameters

Авторы статьи обсуждают проблемы термодинамических циклов АЭС, работающих на сверхкритических параметрах воды

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## **Experimental researches of the processes accompanying an accident The intercontour leak of a steam generator for fast reactor with HLHC**

**S21**

*Beznosov, A.V.; Bokova, T.A.; Novozhilova, O.O.; Matyunin, A.K.; Khimich, V.L.; Pichkov, S.N. (Nizhegorodskij Gosudarstvennyj Tekhnicheskij Univ. imeni R.E. Alekseeva, Nizhnij Novgorod (RU)), E-mail: besnosov@nntu.nnov.ru*

Ehksperimental'nye issledovaniya protsessov, soprovozhdayushchikh avariyu #Left-Pointing Double Angle Quotation Mark#mezhekonturnaya neplozhnost' PG#Right-Pointing Double Angle Quotation Mark# v RU s tyazhelyimi zhidkometallicheskimy teplonositel'yami

p. 92-101

(RU)

3 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

FAST REACTORS; NUCLEAR FACILITIES; STEAM GENERATORS; ACCIDENTS; COOLANTS; LEAKS



Results of experimental and theoretical studies of the processes accompanying an intercontour leak of a steam generator for power installations on lead or lead-bismuth coolants are presented in the paper. The results of researches of processes of appearing a micro-operational and acceptable, and a large leak of the working body in the reactor loop and recommendations of the actions for operational personnel in similar accidents are also given

Представлены результаты анализа экспериментов и расчетно-теоретических исследований процессов, сопровождающих потенциально опасную аварийную ситуацию с межконтурной неплотностью парогенератора в реакторных установках со свинцовым и свинцово-висмутовым теплоносителями. Приведены результаты исследований процессов при возникновении микротечей, эксплуатационно-допустимой и большой течи рабочего тела в реакторный контур

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### **The use of coolants Pb and Pb-Bi in the new technologies of recycling solid, liquid and gaseous media**

**S21**

*Ul'yanov, V.V.; Gulevskij, V.A.; Martynov, P.N.; Fomin, A.S.; Shelemet'ev, V.M.; Sadovnichij, R.P.; Niyazov, S.-A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: pmartinov@ippe.ru*

Применение теплоносителей Pb и Pb-Bi в новых технологиях переработки твердых, жидких и газообразных сред

p. 102-109

(RU)

7 refs., 5 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR POWER; NUCLEAR POWER PLANTS; DESALINATION REACTORS;  
COOLANTS; LIQUID METALS; HYDROGEN GENERATORS

The results of studies demonstrating a promising use of heavy liquid metal Pb and Pb-Bi in new technologies of producing steam, fresh water, light oil fractions, hydrogen, synthesis gas, and other technology products have been described in the paper

Приведены результаты исследований, доказывающие перспективность применения тяжелых жидкометаллических теплоносителей Pb и Pb-Bi в новых технологиях получения водяного пара, пресной воды, легких фракций нефтепродуктов, водорода, синтез-газа и других технологических продуктов

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### **Structural studies of 15X2NMFAA steel and its welds after long thermal exposures and irradiation at the operating temperature of reactor pressure vessel**

**S36**

*Gurovich, B.A.; Kuleshova, E.A.; Mal'tsev, D.A.; Fedotova, S.V.; Frolov, A.S.; Zabusov, O.O.; Saltykov, M.A. (NITs Kurchatovskij Inst., Moscow (RU))*

Strukturnye issledovaniya stali 15Kh2NMFAA i ee svarnykh soedinenij posle dlitel'nykh

termicheskikh vyderzhek i oblucheniya pri rabochej temperature korpusa reaktora  
p. 110-121  
(RU)

8 refs., 7 figs., 6 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

MATERIALS; STAINLESS STEELS; REACTOR VESSELS; EMBRITTLEMENT; PHASE TRANSFORMATIONS; IRRADIATION

In this paper authors present a complex of microstructural studies of WWER-1000 surveillance samples of the temperature sets in the initial state, after long thermal exposures and irradiation

В работе проведен комплекс микроструктурных исследований материалов образцов-свидетелей корпусов реакторов ВВЭР-1000 в исходном состоянии, после длительных термических выдержек и облучения

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### **Effect of pre-treatment on the oxidation rate steel in the lead-bismuth coolant S36**

*Martynov, P.N.; Ivanov, K.D.; Lavrova, O.V.; Niyazov, S.-A.S.; Shelemet'ev, V.M.; Ul'yanov, V.V.; Sadovnichij, R.P.; Fomin, A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: pmartinov@ippe.ru*

Vliyanie predvaritel'noj podgotovki poverkhnosti stali na skorost' okisleniya v svintsovo-vismutovom teplonositele

p. 122-129

(RU)

8 refs., 6 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

MATERIALS; STAINLESS STEELS; AUSTENITIC STEELS; METALLOGRAPHY; OXIDATION; BISMUTH; LEAD; CORROSION

Comparative tests on the oxidation of austenitic stainless steel samples as received and after mechanical polishing in gases (technical argon and water vapor) and in coolant Pb-Bi have been described in the paper

Проведены сравнительные испытания по окислению образцов нержавеющей аустенитной стали в состоянии поставки и после механической полировки в газовых средах (технический аргон и водяной пар) и теплоносителя Pb-Bi

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### **Chemical synthesis of neutron-detecting ultrathin optical materials S36**

*Sakharov, V.V.; Baskov, P.B.; Mosyagina, I.V.; Frolov, N.N.; Ivkina, O.V.; Sharipova, M.A. (OAO Vedushchij Nauchno-Issledovatel'skij Inst. Khimicheskoy Tekhnologii, Moscow (RU)); Kurbatkin, I.I.; Murav'eva, T.I.; Torskaya, E.V. (Inst. Problem Mekhaniki RAN imeni A.Yu.*

*Ishlinskogo, Moscow (RU)*

*Khimicheskij sintez nejtron-detektiruyushchikh ul'tratonkikh opticheskikh materialov*  
p. 130-142

(RU)

7 refs., 9 figs., 2 tabs.

*Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika*

ISSN 0204-3327

(2012)

(no.4)

**MATERIALS; OXIDES; COPPER OXIDES; ELASTICITY; CARBOXYLATION;  
CHEMICAL REACTIONS; NANOSTRUCTURES; OPTICS**

The results of problem-oriented researches on innovative low-temperature chemical thermo-decompositional surface modification technology for new radiation photonics materials (radiation fluorescent nanolayer oxide coatings) development have been presented in the paper. The elastic moduli of nanoscale oxide coatings are obtained using the two-layer body model

Представлены результаты проблемно ориентированных исследований по разработке технологии химического низкотемпературного термодеструкционного модифицирования поверхности для получения инновационных материалов радиационной фотоники - радиационно-люминесцентных наноразмерных оксидных покрытий. Определены модули упругости оксидных наноразмерных покрытий с учетом модели двухслойного тела

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## **Researches of crystallization processes under hardening of clamp material based on the magnesium oxide**

**S36**

*Sukhonosov, V.Ya.; Chernov, V.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I.*

*Lejpunskogo, Obninsk (RU)); Bogdanov, N.Yu. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

*Issledovanie protsessov kristallizatsii pri otverzhenii materiala-fiksatora na osnove oksida magniya*

p. 143-151

(RU)

5 refs., 7 figs., 2 tabs.

*Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika*

ISSN 0204-3327

(2012)

(no.4)

**MATERIALS; CRYSTALLIZATION; HARDENING; MAGNESIUM OXIDES;  
AMORPHOUS STATE; SOLIDIFICATION; POROUS MATERIALS**

Experimental researches of crystallization processes under hardening of clamp material received by mixing liquid alumophosphate binding with magnesium oxide powder have been conducted. It is shown that a primary stage of structurization of a clamp material is the structure of amorphous particles of magnesium hydroxide. The crystal structure of hard material is formed in an amorphous phase. The process of crystal phases accumulation is also presented in the paper

Проведены экспериментальные исследования процессов кристаллизации при отверждении материала-фиксатора, получаемого путем смешивания жидкого алюмофосфатного связующего с порошком оксида магния. Показано, что первичной стадией

структурообразования материала-фиксатора является коагуляционная структура аморфных частиц гидроокиси магния. Кристаллическая структура отвержденного материала формируется внутри аморфной фазы. Представлена кинетика накопления кристаллических фаз

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## **Radiation accidents analysis with the use of anthropomorphic voxel phantom** **S22**

*Moiseenko, D.N.; Kurachenko, Yu.A. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Analiz tyazhelykh radiatsionnykh avarij s pomoshch'yu voksel'nogo antropomorfnoho fantoma  
p. 152-160

(RU)

10 refs., 3 figs., 9 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2012)

(no.4)

NUCLEAR POWER; REACTOR SAFETY; ACCIDENTS; FUNCTIONAL MODELS;  
RADIATION TRANSPORT; NEUTRON LEAKAGE; MONTE CARLO METHOD

Authors give a detailed analysis of severe radiation accidents with the aid of anthropomorphic voxel phantom. As an example, three severe radiation accidents of the recent past are chosen. Calculated data for these accidents are, as a whole, in good agreement with these ones received by the world community. In cases of doses discrepancy with reference data, the possible reasons of divergences are offered

Авторы работы дают детальный анализ тяжелых радиационных аварий с помощью воксельного антропоморфного фантома. В качестве примера выбраны три тяжелых радиационных аварии недавнего прошлого. Полученные результаты в целом согласуются с данными, принятыми в мировом сообществе. В случаях отличия рассчитанных значений доз от литературных данных предложены возможные причины расхождений

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## **Innovative nuclear power technology - the basis of large-scale nuclear power engineering**

**S22**

*Rachkov, V.I.; Kalyakin, S.G. (GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: vrachkov@ippe.ru*

Innovatsionnaya yadernaya ehnergotekhnologiya - osnova krupnomasshtabnoj yadernoj ehnergetiki

p. 5-15

(RU)

10 refs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

## NUCLEAR POWER; NUCLEAR ENGINEERING; REACTORS; WWER TYPE REACTORS; FAST REACTORS; CLOSED-CYCLE SYSTEMS

Basic provisions for the implementation of nuclear power engineering development in Russia up to 2100 are described in the paper. Authors present the system research results of two scenarios with transition to the closed nuclear fuel cycle in launching inherently safe fast reactors fueled only with plutonium or enriched uranium

В работе описаны основные положения реализации стратегии развития ядерной энергетики России до 2100 г., авторы знакомят с результатами системного исследования двух сценариев с переходом к замкнутому ядерному топливному циклу при развертывании быстрых реакторов естественной безопасности только на плутонии либо на плутонии и обогащенном уране

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### **Innovative technology developed in SSC RF-IPPE**

**S22**

*Rachkov, V.I.; Martynov, P.N.; Askhadullin, R.Sh. (GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: vrachkov@ippe.ru (and others)*

Innovatsionnye tekhnologii, razvivaemye v GNTs RF-FEhI

p. 16-38

(RU)

27 refs., 12 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTOR TECHNOLOGY; COOLANTS; LIQUID METALS; LIQUID METAL COOLED REACTORS; LEAD; SODIUM

Results of researches and developments with the use of heavy liquid metal coolants carried out in the Russian Institute of Physics and Power Engineering in the field of direct-contact liquid metal technology for obtaining water vapor, sweet water and hydrogen, of liquid metal technology of nanostructured oxides are presented in the paper

В работе представлены результаты выполненных в Физико-энергетическом институте исследований и разработок с использованием тяжелых жидкометаллических теплоносителей в области прямо-контактных жидкометаллических технологий получения водяного пара, пресной воды и водорода, жидкометаллической технологии синтеза наноструктурных оксидов и другие исследования и разработки

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### **Thermo-hydraulic researches of NPP (the 60-th anniversary of the First NPP)**

**S22**

*Rachkov, V.I.; Efanov, A.D.; Zhukov, A.V.; Kalyakin, S.G.; Sorokin, A.P. (GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: vrachkov@ippe.ru*

Термогидравлические исследования ЯЭУ (к 60-летию пуска Первой АЭС)

p. 39-63

(RU)

70 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; NUCLEAR POWER PLANTS; REACTOR TECHNOLOGY;  
REACTORS; WWER TYPE REACTORS; BN-800 REACTOR; LIQUID METALS;  
THERMAL HYDRAULICS; REACTOR CORES

Authors report on the heat-hydraulic research and developments of nuclear power plants in Russia. The article is devoted to the commissioning of the Russia's First nuclear power plant

Авторы рассказывают о теплогидравлических прикладных исследованиях и разработках ядерно-энергетических установках в России. Статья посвящена пуску Первой в России АЭС

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### **Fast reactors and problem of nuclear non-proliferation**

**S22;S98**

*Avrorin, E.N. (RFYaTs-VNIITF imeni E.I. Zababakhina, Snezhinsk (RU)); Chebeskov, A.N. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: chebes@ippe.ru*

Bystrye reaktory i problema yadernogo nerasprostraneniya

p. 64-76

(RU)

12 refs., 1 fig., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

REACTORS; FAST REACTORS; THERMAL REACTORS; NUCLEAR FUELS; NON-  
PROLIFERATION POLICY; NUCLEAR WEAPONS; FISSILE MATERIALS; PLUTONIUM

The paper deals with various technological and institutional approaches to solve the problem of fast reactor blankets as far as provision of a reliable nuclear non-proliferation regime

В работе рассматриваются различные технологические и институциональные подходы к решению проблемы blankets быстрых реакторов с точки зрения обеспечения надежного режима ядерного нераспространения

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### **AR-1 experimental model and facility preparation for the purpose of experimental investigation of sodium boiling in fuel subassembly mockup for new generation fast reactor safety justification**

**S22**

*Khafizov, R.R.; Ashurko, Yu.M.; Volkov, A.V.; Ivanov, E.F.; Privezentsev, V.V.; Sorokin, A.P.; Kumskoj, V.V. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: rhafizov@ippe.ru*

Podgotovka ehksperimental'nogo stenda AR-1 i ehksperimental'noj modeli k provedeniyu issledovaniy protsessa kipeniya natriya v modeli TVS v obosnovanie bezopasnosti bystrogo reaktora novogo pokoleniya

p. 77-87

(RU)

20 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

REACTORS; FAST REACTORS; FUEL ASSEMBLIES; REACTOR CORES; SODIUM; COOLANTS; LOSS OF FLOW; REACTOR SAFETY

The article presents a brief review of the sodium cooled fast reactor accidental operating mode due to coolant boiling in a fuel subassembly channel by the example of Unprotected Loss of Flow (ULOF). Also the authors touch upon the issue of experimental investigations required for verification of two-phase liquid metal coolant models included in the COREMELT code

В статье на примере аварии ULOF кратко рассмотрен аварийный режим работы быстрого реактора с натриевым теплоносителем, связанный с вскипанием жидкого металла в канале с ТВС. Затронут вопрос об экспериментальных исследованиях, необходимых для верификации математических моделей процесса течения двухфазного теплоносителя, заложенных в коде COREMELT

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## **Research on the possibility of melted fuel containment in a fast reactor at a severe accident**

**S22**

*Kashcheev, M.V.; Ashurko, Yu.M. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: kmv@ippe.ru*

Issledovanie vozmozhnosti uderzhaniya rasplavlennogo topliva v bystrom reaktore pri tyazhelej аварии

p. 88-98

(RU)

12 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

REACTORS; FAST REACTORS; REACTOR VESSELS; COOLANTS; ACCIDENTS; MOLTEN SALT FUELS; MATHEMATICAL MODELS

A rather complete mathematical model for calculation analysis of severe beyond-design accidents in sodium cooled fast reactors has been developed for the first time. Unlike the current models, the developed model enables to answer the question of the possibility of containing melted fuel in the reactor vessel

Авторы рассказывают о разработке достаточно полной математической модели для расчетного анализа тяжелых запроектных аварий в быстрых реакторах с натриевым охлаждением. В отличие от существующих моделей разработанная модель позволяет ответить на вопрос о возможности удержания расплавленного топлива в корпусе реактора

## **Vibroacoustic dynamics of heterogeneous media and NPP structures**

**S22**

*Fedotovskij, V.S.; Vereshchagina, T.N.; Lunina, S.V.; Ivanova, E.A. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: fedotovsky@ippe.ru*

Vibroakusticheskaya dinamika geterogennykh sred i konstruksij YaEhU

p. 99-110

(RU)

13 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

**NUCLEAR POWER; REACTOR CORES; HETEROGENEOUS REACTOR CORES; FUEL ASSEMBLIES; DISPERSIONS; MATHEMATICAL MODELS**

The results of theoretical and experimental studies describing the dynamics of dispersed media and heterogeneous systems from the unified position are given in this paper. Thus, in particular, the dependencies for effective dynamic density and viscosity of liquid translational dispersion media reflecting a relaxation nature sound dispersion in suspensions emulsions and two-phase bubble media have been obtained

В работе приведены результаты теоретических и экспериментальных исследований, с единых позиций описывающих динамику дисперсных сред и гетерогенных систем. Получены зависимости для эффективной динамической плотности и трансляционной вязкости жидких дисперсных сред, отражающих релаксационный характер дисперсии звука в суспензиях, эмульсиях и двухфазных пузырьковых средах

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## **The UNICO multi-physics code to analyze transients in sodium fast reactors**

**S22**

*Shvetsov, Yu. E.; Ashurko, Yu.M.; Suslov, I.R.; Raskach, K.F.; Zabud'ko, L.M.; Marinenko, E.E. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: shvetsov@ippe.ru*

Mul'tifizichnyj kod UNICO dlya analiza perekhodnykh protsessov v bystrykh natrievykh reaktorakh

p. 111-120

(RU)

10 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

**REACTORS; FAST REACTORS; SODIUM; TRANSIENTS; THERMAL HYDRAULICS; REACTOR CORES; FUEL ASSEMBLIES; DYNAMICS**

The Russian multi-physics code UNICO is designed to analyze in detail the temperature and velocity fields in the fast reactor core, under transient conditions. The code is meant to make 3D coupled computation of neutronic, thermal-hydraulic and thermal-mechanic characteristics accurate to each separate core fuel assembly



Российский мультифизичный код UNICO предназначен для детального анализа полей скорости и температуры в активной зоне быстрого реактора в переходных режимах. В программе осуществляется трехмерный сопряженный расчет нейтронно-физических, теплогидравлических и термомеханических характеристик с точностью до каждой отдельной ТВС активной зоны

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## **Modeling services of International nuclear fuel cycle facility for Commonwealth of Independent States**

**S11;S22**

*Dekusar, V.M.; Egorov, A.F.; Kalashnikov, A.G.; Korobejnikov, V.V.; Korobitsyn, V.E.; Moseev, A.L.; Moseev, P.A. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: korob@ippe.ru*

Modelirovanie raboty mezhdunarodnogo yadernogo toplivnogo tsentra po predostavleniyu uslug stranam blizhnego zarubezh'ya

p. 121-135

(RU)

18 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

**NUCLEAR POWER; REACTORS; WATER COOLED REACTORS; FAST REACTORS; HEAVY WATER COOLED REACTORS; NUCLEAR FUELS; URANIUM; NATURAL URANIUM**

Authors give a description of a model of NFCC's activity (International Nuclear Fuel Cycle Center). Russia, Ukraine, Armenia and Belarus have been selected as the NFCC potential participants. The energy system planning code MESSAGE and the software tool NFC CYCLE have been chosen for implementing the model

В статье описано расчетное моделирование работы Международного ядерного топливного центра. В качестве потенциальных участников моделируемого центра были выбраны Россия, Украина, Армения и Белоруссия. Для расчетного моделирования использовались программа энергетического планирования общей энергетики MESSAGE и программное средство детального моделирования NFC CYCLE

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## **About knowledge management in nuclear organizations**

**S96**

*Vereshchagina, T.N. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: vtn@ippe.ru*

O sokhranenii znaniy v organizatsiyakh atomnoj otrasli

p. 136-148

(RU)

13 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

RUSSIAN ORGANIZATIONS; KNOWLEDGE MANAGEMENT; KNOWLEDGE PRESERVATION; INFORMATION SYSTEMS; EXPERT SYSTEMS; EDUCATION; TECHNOLOGY TRANSFER

The authors raise questions of knowledge preservation in the Russian nuclear industry organizations

Авторы ставят вопросы сохранения знаний в российских организациях атомной отрасли

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### **Experimental researches of thermal hydraulic characteristics in the model of sodium-air heat exchanger for fast reactor emergency cooling system**

**S22**

*Sorokin, A.P.; Ivanov, E.F.; Bogoslovskaya, G.P.; Levchenko, Yu.D.; Privezentsev, V.V.; Rymkevich, K.S.; Zueva, I.R. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: sorokin@ippe.ru*

Ehksperimental'nye issledovaniya teplogidravlicheskih kharakteristik modeli vozdušnogo teploobmennika sistemy avariynogo raskholazhivaniya reaktora na bystrykh nejtronakh p. 149-159

(RU)

11 refs., 4 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

REACTORS; FAST REACTORS; BELOYARSK-3 REACTOR; SODIUM; HEAT EXCHANGERS; HEAT TRANSFER; ECCS

Results of experimental researches of thermos-hydraulic characteristics in the bundle of finned tubes are presented in the paper. The test section represents a fragment of flow part of sodium-air heat exchanger in the emergency cooling system of a fast reactor, with sodium flow inside the tubes and cooled by lateral flow of air

В работе представлены результаты экспериментального исследования характеристик теплообмена пучка оребренных труб в экспериментальном рабочем участке, воспроизводящем фрагмент проточной части теплообменника натрия-воздух системы аварийного расхолаживания реактора на быстрых нейтронах при течении натрия внутри оребренных труб, охлаждаемых снаружи потоком воздуха

---

### **Calculation and experimental research in support of mass exchangers for providing specific oxygen regime in heavy liquid metal coolants (Pb, Pb-Bi)**

**S22**

*Askhadullin, R.Sh.; Martynov, P.N.; Rachkov, V.I.; Legkikh, A.Yu. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: raskhadullin@ippe.ru*

Raschetno-ehksperimental'nye issledovaniya v obosnovanie massoobmennyykh apparatov dlya obespecheniya zadannogo kislorodnogo rezhima v tyazhelykh zhidkometallicheskih

teplonositelyakh (Pb, Pb-Bi)

p. 160-171

(RU)

10 refs., 6 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; COOLANTS; LIQUID METALS; HEAVY METALS; OXYGEN; BISMUTH; LEAD

Approaches and results of computational and experimental studies in support of mass exchangers design with solid oxygen source are described. The performance of mass exchangers with an in-built pump and pneumatic type (discrete operating principle) has been studied

Представлены подходы и результаты расчетно-экспериментальных исследований в обоснование конструкций массообменных аппаратов с твердофазным источником кислорода (оксидом свинца). Исследовались характеристики массообменных аппаратов с собственным побудителем расхода теплоносителя через реакционную емкость и пневмодозаторного типа (с дискретным принципом работы)

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## **Experimental study on hydraulic resistance of the finned tube assembly of the air heat exchangers in fast reactors**

**S22**

*Kolomiets, D.O.; Levchenko, Yu.D.; Sorokin, A.P. (FGUP GNTs RF-FEhI imeni A.I.*

*Lejpunskogo, Obninsk (RU)), E-mail: dkolomiets@ippe.ru*

Ehksperimental'noe issledovanie gidravlicheskogo soprotivleniya paketa orebrennykh trub vozdushnykh teploobmennikov reaktorov na bystrykh nejtronakh

p. 172-182

(RU)

5 refs., 5 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; ECCS; HEAT EXCHANGERS; HYDRAULICS

Authors describe experimental study on hydraulic resistance of the finned tube assembly of the air heat exchangers in fast reactors

Авторы описывают проведенное экспериментальное исследование гидравлического сопротивления пакета оребранных труб воздушных теплообменников реакторов на быстрых нейтронах

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## **The concept of phased mastering of fast reactors technologies and closure of NFC under conditions of uncertainty of future knowledge**

## S22

*Kagramanyan, V.S.; Korobejnikov, V.V.; Rachkov, V.I. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: kagramanyan@ippe.ru*

Kontsepsiya poehtapnogo osvoeniya tekhnologij bystrykh reaktorov i zamykaniya yadernogo toplivnogo tsikla s uchetom neopredelennosti znaniy o budushchem

p. 183-203

(RU)

22 refs., 6 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; REACTORS; FAST REACTORS; PWR TYPE REACTORS; SPENT FUELS; MIXED OXIDE FUELS; HYDROMETALLURGY

In this paper, authors suggest that the nuclear industry should consider a new way to solve spent nuclear fuel (SNF) problems of the present-day nuclear power engineering on the basis of technologies already used in Russia: BN-reactors, MOX fuel and SNF hydrometallurgical reprocessing

Авторы предлагают ядерной индустрии рассмотреть новый вариант решения проблем отработанного ядерного топлива (ОЯТ) современной ядерной энергетики на основе использования уже продемонстрированных в России базовых технологий реакторов на быстрых нейтронах, МОКС-топлива и гидрометаллургической переработки ОЯТ

---

## Verification of neutron data for main reactor materials from ROSFOND neutron data library on integral experiments

### S21

*Koshcheev, V.N.; Manturov, G.N.; Nikolaev, M.N.; Tsibulya, A.M. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: tsib@ippe.ru*

Verifikatsiya nejtronnykh dannyx osnovnykh reaktornykh materialov iz biblioteki ROSFOND na integral'nykh ehksperimentakh

p. 204-214

(RU)

15 refs., 5 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

DATA; DATA ACQUISITION; NUCLEAR DATA COLLECTIONS; LIBRARIES; INFORMATION SYSTEMS; VERIFICATION; BENCHMARKS; EXPERIMENTAL DATA

At the first stage, the neutron data for  $^{235}\text{U}$ ,  $^{238}\text{U}$ ,  $^{239}\text{Pu}$  (resonance integrals, one-group cross-sections, cross-sections for neutron removal to the sub-threshold region) from four modern data libraries ENDF/B-VII.1, JEFF-3.1.1, JENDL-4.0 and RUSFOND are compared with experimental data in the paper

В статье представлены результаты тестирования данных для основных топливных реакторных материалов  $^{235}\text{U}$ ,  $^{238}\text{U}$ ,  $^{239}\text{Pu}$  наряду с традиционными расчетами критичности отобранных бенчмарк-моделей. На первом этапе нейтронные данные для

материалов  $^{235}\text{U}$ ,  $^{238}\text{U}$ ,  $^{239}\text{Pu}$  (резонансные интегралы, одногрупповые сечения, сечения увода под порог) для четырех современных библиотек ENDF/B-VII.1, JEFF-3.1.1, JENDL-4.0 и РОСФОНД сравнивались с экспериментальными данными

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## **Defining parameters of polonium release from hlmc into gas derived from IPPE experimental data**

**S21**

*Gonchar, N.I.; Pankratov, D.V. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: nigon@ippe.ru*

Opređenje kharakteristik vykhoda poloniya iz TZhMT v gazovuyu fazu po ehksperimental'nym dannym GNTs RF-FEhI

p. 215-223

(RU)

12 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

NUCLEAR POWER; COOLANTS; LIQUID METALS; HEAVY METALS; BISMUTH; POLONIUM 209; POLONIUM 210; THERMODYNAMIC ACTIVITY

The values of effective vapor pressure of polonium in heavy liquid metal coolant (HLMC) solution and thermodynamic activity coefficient for polonium in HLMC are presented in the paper. These values have been calculated on the basis of experimental data. The calculation results are compared with data on polonium release from liquid metals obtained by different authors

В работе представлены полученные по экспериментальным данным значения эффективного давления полония над расплавом и коэффициент термодинамической активности полония в теплоносителе. Сделано сравнение с полученными ранее результатами других исследователей

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## **The influence of impurities of the first loop on the activity of sodium in BN reactors**

**S21**

*Tykleeva, K.V.; Peregudov, A.A.; Zabrodskaya, S.V.; Koshcheev, V.N.; Shpakova, S.E. (FGUP GNTs RF-FEhI imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: ktikleeva@ippe.ru*

Vliyanie primesej natriya na aktivnost' v pervom konture reaktorov tipa BN

p. 224-233

(RU)

11 refs., 3 figs., 6 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2014)

(no.1)

REACTORS; FAST REACTORS; SODIUM; IMPURITIES; POLONIUM 210; BISMUTH; ARGON 41; ARGON 39

The purpose of this work has been to analyze accuracy of calculations on various programs and activity constants for activation products of bismuth, potassium and argon impurities in the primary circuit sodium coolant of a high power BN-type reactor

В работе анализируется точность расчетов по различным программам и константам активности продуктов активации примесей висмута, калия и аргона в натрии первого контура реактора на быстрых нейтронах большой мощности

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## **Fermi-Pasta-Ulam model and higher-order nonlinear evolution equations**

### **S97**

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Model' Fermi-Pasta-Ulama i nelinejnye ehvolyutsionnye uravneniya

p. 3-22

(RU)

39 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; EXACT SOLUTIONS; EQUATIONS; KORTEWEG-DE VRIES EQUATION

The paper shows that the fifth- and seventh-order nonlinear partial differential equations found from the Fermi-Pasta-Ulam model do not pass the Painleve test. However, there are some expansions of solutions into the Laurent series. The exact solutions of the fifth and the seventh ordered nonlinear differential equations have been found. The results of the numerical simulation of nonlinear wave processes have been presented and discussed

В работе показано, что нелинейные эволюционные уравнения пятого и седьмого порядка не проходят тест на свойство Пенлеве и не относятся к классу уравнений, интегрируемых методом обратной задачи рассеяния. Однако для этих уравнений выполняется необходимое условие существования мероморфных решений. Получены аналитические решения изучаемых нелинейных эволюционных уравнений. Приведены результаты численного моделирования волновых процессов, описываемых нелинейными уравнениями высокого порядка

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## **Parametrically defined nonlinear differential equations and their applications in boundary layer theory**

### **S97**

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Parametricheski zadannye nelinejnye differentsial'nye uravneniya i ikh prilozheniya v teorii pogranchnogo sloya

p. 23-31

(RU)

37 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS;  
DIFFERENTIAL EQUATIONS; BOUNDARY LAYERS

General solutions of a few new classes of nonlinear ordinary differential equations defined parametrically have been found. The results are used to construct new exact solutions (involving arbitrary functions) of partial differential equations describing an unsteady axisymmetric boundary layer on a body of revolution with an arbitrary shape

Построены общие решения некоторых классов уравнений первого и второго порядков. Полученные решения используются для построения новых точных решений уравнений нестационарного осесимметричного пограничного слоя с градиентом давления

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### **Study of the dynamics of an equation with two large different-order delays**

**S97**

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Issledovanie dinamiki uravneniya s dvumya bol'shimi raznopolyadkovymi zapazdyvaniyami

p. 32-37

(RU)

18 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS;  
STABILITY; ASYMPTOTIC SOLUTIONS

The case where the larger delay is proportional to the square of the smaller delay is studied in detail. Regions of stability and instability of the equilibrium state and critical cases are found. In all critical cases, special evolutionary equations (quasinormal forms) are constructed. Their non-local dynamics determines the local behavior of solutions of the original equation

В работе детально изучается случай, когда большее запаздывание пропорционально квадрату меньшего. Выделены области устойчивости и неустойчивости состояния равновесия, а также критические случаи. Во всех критических случаях построены специальные эволюционные уравнения (квазинормальные формы), глобальная динамика которых определяет локальное поведение решений исходного уравнения

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### **Conservation laws, symmetries, and exact solutions of the system of equations of shallow water over an irregular bottom**

**S97**

Aksenov, A.V.; Druzhevskiy, K.P. (*Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Moscow (RU)*), E-mail: [aksenov.av@gmail.com](mailto:aksenov.av@gmail.com), [Konstantin.Druzhevskiy@gmail.com](mailto:Konstantin.Druzhevskiy@gmail.com)

Zakony sokhraneniya, simmetrii i tochnye resheniya sistemy uravnenij melkoj vody nad nerovnym dnom

p. 38-46

(RU)

5 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

**MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS; HYDRODYNAMICS; CONSERVATION LAWS**

The system of equations of one-dimensional shallow water over an irregular bottom has been considered. All hydrodynamic conservation laws have been obtained and the group classification is performed. The new conservation law additional to the two basic conservation laws has been obtained

Рассматривается система уравнений одномерной мелкой воды над неровным дном. Найдены все гидродинамические законы сохранения, проведена групповая классификация. Получен новый закон сохранения, дополнительный к двум базовым законам сохранения

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**Main resonances in the Predator-Prey boundary value problem****S97**

Glyzin, S.D.; Kuznetsov, V.S. (*Yaroslavskij Gosudarstvennyj Univ. imeni P.G. Demidova, Yaroslavl' (RU)*), E-mail: [glyzin@uniyar.ac.ru](mailto:glyzin@uniyar.ac.ru), [grandrust@gmail.com](mailto:grandrust@gmail.com)

Glavnye rezonansy v prostranstvenno raspredelennoj zadache khishchnik-zhertva

p. 47-52

(RU)

20 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

**MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; EXACT SOLUTIONS; EQUATIONS; PREDATOR-PREY INTERACTIONS; BIFURCATION**

The dynamics of the predator-prey model in an inhomogeneous medium has been considered. The main resonances (1:1, 1:2, 2:1) have been studied for this boundary value problem. The normal forms have been constructed. The conditions of the applicability of the Tikhonov's theorem on dynamical systems have been obtained and studied

В работе рассмотрена система хищник-жертва с распределенными параметрами в случае главных резонансов 1:1, 1:2, 2:1. Построена нормальная форма изучаемой краевой задачи, и получены условия, при которых к ней применима теорема сведения Тихонова



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## **Interaction of natural and forced convection in the technologies of the nuclear fuel cycle**

**S97**

*Shvab, A.V.; Brendakov, R.V.; Zav'yalov, E.D. (Natsional'nyj Issledovatel'skij Tomskij Gosudarstvennyj Univ., Tomsk (RU)); Brendakov, V.N. (Severskij Tekhnologicheskij Inst. NIYaU MIFI, Seversk (RU)), E-mail: vnbrendakov@mephi.ru*

Vzaimodejstvie estestvennoj i vynuzhdennoj konveksii v tekhnologiyakh yaderno-toplivnogo tsikla

p. 53-58

(RU)

4 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

**MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; EQUATIONS; NAVIER-STOKES EQUATIONS; NUCLEAR FUELS**

The problem of an internal gas flow in the working volume of a complex geometric shape has been considered in the paper. The case of a spatial axisymmetric flow complicated by thermal effects near the axis of symmetry has been analyzed. The system of equations of momentum and heat transfer has been written in a dimensionless form

В работе рассмотрена внутренняя задача о течении газа в рабочем объеме сложной геометрической формы. Исследуется случай пространственного осесимметричного течения, осложненного тепловыми эффектами возле оси симметрии. Записана система уравнений переноса импульса и тепла в безразмерном виде, получены критерии подобия

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## **Development of an effective method of the reconstruction of paleotemperatures**

**S97**

*Nagornov, O.V.; Tyufilin, S.A.; Bukharova, T.I. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: nagornov@yandex.ru*

Razrabotka ehffektivnogo metoda rekonstruksii paleotemperatury

p. 59-64

(RU)

11 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

**MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS; PALEOTEMPERATURE; TEMPERATURE MEASUREMENT**

The problem of the reconstruction of past surface temperatures from the measured temperature depth profiles has been studied in the paper. The solution of this problem does not have properties of stability and uniqueness. An algorithm of the reconstruction of past surface temperatures that is stable and unique has been developed

Рассматривается задача реконструкции прошлых температур поверхности по данным измерений температуры в скважинах. Решение этой задачи в общем виде не обладает свойством единственности и устойчивости. В работе предложен алгоритм реконструкции прошлых температур, позволяющий получать решение, обладающее этими свойствами

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## **Forecasting of passenger traffic in Moscow metro applying artificial neural networks**

**S97**

*Ivanov, V.V. (Ob''edinennyj Inst. Yadernykh Issledovanij, Dubna (XJ); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Osetrov, E.S. (Ob''edinennyj Inst. Yadernykh Issledovanij, Dubna (XJ); FKU Rostransmodernizatsiya, Moscow (RU)), E-mail: ESOsetrov@gmail.com*

Prognozirovanie ob''emov passazhirskikh perevozok Moskovskim metropolitenom s pomoshch'yu iskusstvennykh nejronnykh setej

p. 65-74

(RU)

9 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; CALCULATION METHODS; EQUATIONS; TRAFFIC CONTROL; FORECASTING; NEURAL NETWORKS

Methods for the forecasting of passenger traffic in Moscow metro have been developed using artificial neural networks. To this end, the factors primarily determining passenger traffic in the subway have been analyzed and selected

В работе развита методика прогнозирования объемов пассажирских перевозок в Московском метрополитене с помощью искусственных нейронных сетей. С этой целью проведен анализ и отбор тех факторов, которые оказывают основное воздействие на пассажирский трафик в метрополитене

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## **Simulation of the detection of ethanol and ammonia in the exhaled air**

**S97**

*Levitskaya, E.A. (FGUP RFYaTs-NIITF imeni Akademika Zababakhina, Snezhinsk (RU)), E-mail: Laska\_kb@mail.ru*

Modelirovanie protsessa obnaruzheniya ehtanola i ammiaka v vydykhaemom vozdukhe

p. 75-80

(RU)

4 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION;  
MONTE CARLO METHOD; CALCULATION METHODS; SPECTROSCOPY; INFRARED  
RADIATION

The results of Monte Carlo simulation of the propagation of infrared radiation through the exhaled air in order to detect ethanol and ammonia have been reported. The measurement errors have been estimated

В данной работе представлены результаты моделирования процесса распространения инфракрасного излучения через выдыхаемый человеком воздух методом Монте-Карло с целью обнаружения в нем этанола и аммиака, проведены оценки погрешностей измерений

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### **Effect of the dimension of a substrate on the temperature field in an evaporating drop**

**S97**

*Dunin, S.Z.; Nagornov, O.V.; Starostin, N.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: nagornov@yandex.ru*

Vliyanie razmera podlozhki na temperaturnoe pole v isparayushchejsya kaple  
p. 81-86

(RU)

14 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION;  
EQUATIONS; DIFFERENTIAL EQUATIONS; DROPLET MODEL; EVAPORATION

The dependence of the evaporation of a drop lying on a horizontal substrate on the parameters and dimensions of a system has been studied. A mathematical model of this phenomenon has been developed for arbitrary dimensions of the drop and substrate

Исследуется характер испарения капли, покоящейся на горизонтальной подложке, от параметров и размеров системы. Построена математическая модель явления для произвольного размера капли и подложки

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### **Quasigradient method for the solution of multi-objective optimization problems**

**S97**

*Kudryashov, N.A.; Shil'nikov, K.E. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: nakudr@gmail.com*

Kvazigradientnyj metod resheniya zadach mnogokriterial'noj optimizatsii

p. 87-94

(RU)

7 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(1)

MATHEMATICS; MATHEMATICAL MODELS; EQUATIONS; NUMERICAL SOLUTION;  
MATHEMATICAL LOGIC; OPTIMIZATION

A quasigradient method for the numerical solution of multi-objective optimization problems with objective vector functions that are not defined analytically has been proposed. The iterative determination of the Pareto front as the solution of the problem is based on the construction of local convex continuations. As the result, the approximation of the boundary of criteria has the same dimensionality as the continuous solution of the problem

В работе предлагается квазиградиентный метод решения задач многокритериальной оптимизации с целевыми векторными функциями, априори не заданными в виде аналитической зависимости значений своих компонент от целевых переменных. С помощью построения локальных выпуклых продолжений задача оптимизации по Парето произвольного числа целевых функций сводится к последовательной оптимизации отклонений векторов нормали к соответствующим продолжениям

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### **Excitation of photons and phonons by an oriented particle in crystals**

**S71**

*Mazur, E.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: eugen\_mazur@mail.ru*

Vozbuzhdenie fotonov i fononov orientirovannoj chastitsej v kristallakh

p. 97-104

(RU)

8 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

PHYSICS; PHONONS; PLASMONS; EXCITATION; CHANNELING; ELECTRON  
CHANNELING

Processes of the generation of phonons and electronic excitations by an oriented quantum particle in a crystal have been considered. The probabilities of the excitation of phonons and plasmons by the channeled quantum particles have been calculated. The theory of the excitation of the crystal by the channeled particle with the simultaneous emission of photons has been developed

Рассмотрены процессы генерации фононов и электронных возбуждений квантовой ориентированной частицей в кристалле. Рассчитаны вероятности возбуждения фононов и плазмонов квантовой каналированной частицей. Построена теория возбуждения кристалла каналированной частицей с одновременной эмиссией фотонов

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### **Effective method of the immobilization of highly active waste**

**S12**

*Kataeva, O.I.; Sednev, D.A. (Natsional'nyj Issledovatel'skij Tomskij Gosudarstvennyj Univ., Tomsk (RU)), E-mail: o.i.kataeva@gmail.com*

Effektivnyj metod immobilizatsii vysokoaktivnykh otkhodov

p. 105-109

(RU)

2 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

RADIOACTIVE WASTE MANAGEMENT; WASTE DISPOSAL; SOLIDIFICATION;  
VITRIFICATION; G MATRIX; CERAMIC MELTERS; CERAMICS; ELECTRIC  
CONDUCTIVITY; FORSCHUNGSZENTRUM KARLSRUHE

A scheme of the immobilization of waste by means of a glass matrix has been described. The principle of the operation of a ceramic furnace has been considered. The temperature dependence of the electric resistivity has been calculated in the experimental part

В работе представлена схема иммобилизации отходов в стеклянную матрицу, рассмотрен принцип функционирования керамической печи. В экспериментальной части рассчитана зависимость удельного электрического сопротивления от температуры

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### **Reader of images on surface acoustic waves with the use of fan-shaped interdigital converters on a cadmium sulfide substrate**

S71

*Karapet'yan, G.Ya.; Dneprovskij, V.G. (NII Mekhaniki i Prikladnoj Matematiki Uzhnogo Federal'nogo Univ., Rostov-na-Donu (RU)); Kataev, V.F.; Ermolaeva, N.V. (Volgodonskij Inzhenerno-Tekhnicheskij Inst. NIYaU MIFI, Volgodonsk (RU)), E-mail: ermolv@mail.ru*

Ustrojstvo schityvaniya izobrazhenij na poverkhnostnykh akusticheskikh volnakh s pomoshch'yu veernykh vstrechno-shtyrevykh preobrazovatelej na podlozhke iz sul'fida kadmiya

p. 110-115

(RU)

3 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MECHANICS; CLASSICAL MECHANICS; PHYSICAL PROPERTIES; ACOUSTICS;  
SOUND WAVES; MATHEMATICAL MODELS

A device for image reading with the use of surface acoustic waves has been described. It is proposed to use this device for quality control of mirror surfaces, based on Newton's rings. The method for determining the coordinates of defects on the mirror surface, based on the analysis of the frequency response of the device, is given

Описано устройство на поверхностных акустических волнах для считывания изображений с применением поверхностных акустических волн. Предлагается использовать данное устройство для контроля качества зеркальных поверхностей по кольцам Ньютона. Приводится методика определения координат дефектов на зеркальной поверхности, основанная на анализе амплитудно-частотных характеристик устройства

## **On the solution of the system of Ginzburg-Landau equations**

**S97**

*Kudryashov, N.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: nakudr@gmail.com*

O reshenii sistemy uravnenij Ginzburga-Landau

p. 116-121

(RU)

12 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

**MATHEMATICS; MATHEMATICAL MODELS; MATHEMATICAL SOLUTIONS; EXACT SOLUTIONS; EQUATIONS; GINZBURG-LANDAU THEORY**

The system of the Ginzburg-Landau equations has been considered for the description of the surface of a type-II superconductor. The Painleve test has been used to check the integrability of this system of equations. It has been shown that the system of the Ginzburg-Landau equations does not pass the Painleve test and does not have the general solution

Рассматривается система уравнений Гинзбурга-Ландау для описания поверхности сверхпроводника второго рода. Используется тест для проверки системы уравнений на свойство Пенлеве. Показано, что система уравнений Гинзбурга-Ландау не обладает свойством Пенлеве и, следовательно, не относится к классу интегрируемых систем уравнений

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## **Overdetermined systems of nonlinear ordinary differential equations with parameters and their applications**

**S97**

*Polyanin, A.D. (Inst. Problem Mekhaniki imeni A.Yu. Ishlinskogo RAN, Moscow (RU); Moskovskij Gosudarstvennyj Tekhnicheskij Univ. imeni N.Eh. Baumana, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: polyanin@ipmnet.ru*

Pereopredelennye sistemy nelinejnykh obyknovennykh differentsial'nykh uravnenij s parametrami i ikh prilozheniya

p. 122-136

(RU)

44 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

**MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS; DIFFERENTIAL EQUATIONS; PARTIAL DIFFERENTIAL EQUATIONS**

Various cases where the construction of exact solutions of nonlinear equations of mathematical physics leads to overdetermined systems of ordinary differential equations with parameters that are not included in the original partial differential equation are described. An appropriate

nonclassical problem for ordinary differential equations with parameters is formulated and the new concept of the conditional cost of the exact solution is introduced

Описаны различные ситуации, когда построение точных решений нелинейных уравнений математической физики приводит к переопределенным системам обыкновенных дифференциальных уравнений с параметрами, которые не входят в исходное уравнение с частными производными. Сформулирована соответствующая неклассическая задача для обыкновенных дифференциальных уравнений с параметрами, и введено новое понятие **Left-Pointing Double Angle Quotation Mark** условная стоимость точного решения **Right-Pointing Double Angle Quotation Mark**

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## **Dynamics of a system of differential-difference equations modeling the immune response**

**S97**

*Kashchenko, S.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: kasch@uniyar.ac.ru*

Dinamika sistemy differentsial'no-raznostnykh uravnenij, modeliruyushchikh immunnyj otklik organizma

p. 137-140

(RU)

4 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; EXACT SOLUTIONS; EQUATIONS; DIFFERENTIAL EQUATIONS; IMMUNE REACTIONS

The asymptotic behaviors of solutions of differential-difference equations modeling the immune response have been studied. The existence of a stable cycle has been shown and its asymptotic behavior has been determined

Исследована асимптотика решений системы дифференциально-разностных уравнений, моделирующих иммунный отклик организма. Установлено существование устойчивого цикла, найдена его асимптотика

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## **Dissipative structures of a one-dimensional reaction-diffusion system with a cubic nonlinearity**

**S97**

*Sataev, E.A.; Yakushkin, N.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: yakush@mail.ru*

Dissipativnye struktury odnomernoj sistemy tipa reaktsiya-diffuziya s kubicheskoj nelinejnost'yu

p. 141-151

(RU)

15 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS;  
DIFFUSION; DIFFUSION EQUATIONS

Conditions of the soft and hard appearance of the diffusion instability of a stationary spatially homogeneous solution of a one-dimensional reaction-diffusion system with a cubic nonlinearity have been analyzed and numerical experiments revealing certain stable dissipative structures manifested at the soft appearance of diffusion instability have been described

В работе исследованы условия мягкого и жесткого возникновения диффузионной неустойчивости стационарного пространственно однородного решения одномерной системы типа реакция-диффузия с кубической нелинейностью и описаны численные эксперименты, позволившие обнаружить некоторые устойчивые диссипативные структуры, появляющиеся в случае, когда исследуемое возникновение диффузионной неустойчивости является мягким

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### **On the differential equations whose general solutions are algebraic functions of a constant**

**S97**

*Malykh, M.D. (Moskovskij Gosudarstvennyj Univ. imeni M.V. Lomonosova, Moscow (RU)), E-mail: malykhmd@yandex.ru*

O differentsial'nykh uravneniyakh, obshchee reshenie kotorykh yavlyaetsya algebraicheskoj funktsiej konstanty

p. 152-161

(RU)

29 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS;  
DIFFERENTIAL EQUATIONS; NUMERICAL ANALYSIS; ALGEBRA

The numerical and analytical integration of the first order differential equation, where the right-hand side is a rational function of  $y$  has been considered under the assumption that its general solution is an algebraic function of a constant

Рассмотрен вопрос о численном и аналитическом интегрировании дифференциального уравнения 1-го порядка с рациональной по правой частью в предположении, что его общее решение является алгебраической функцией константы

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### **Forecasting of the Moscow metro passenger traffic applying artificial neural networks with preliminary filtering analyzed data**

**S97**

*Ivanov, V.V. (Ob''edinennyj Inst. Yadernykh Issledovaniy, Dubna (XJ); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Osetrov, E.S. (Ob''edinennyj Inst.*



*Yadernykh Issledovaniy, Dubna (RU); FKV Rostransmodernizatsiya, Moscow (RU)), E-mail: ESOSetrov@gmail.com*

Prognozirovanie passazhiropotoka Moskovskogo metropolitena na osnove neyronnykh setej s predvaritel'noj fil'tratsiej analiziruemykh dannykh

p. 162-169

(RU)

13 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION; CALCULATION METHODS; EQUATIONS; TRAFFIC CONTROL; FORECASTING; NEURAL NETWORKS

The fundamental possibility of short-term forecasting with an acceptable accuracy was demonstrated in that work for data corresponding to the daily volume of passenger traffic in weekdays. In this work, it has been shown that the use of wavelet filtering for implemented daily traffic can significantly improve the accuracy of prediction and increase the prediction time horizon

На данных, отвечающих суточным объемам пассажирских перевозок в будние дни, продемонстрирована принципиальная возможность краткосрочного прогнозирования пассажиропотока с приемлемой точностью. В настоящей работе показано, что применение вейвлет-фильтрации к реализованным значениям суточных объемов пассажирских перевозок позволяет существенно повысить точность прогноза и увеличить горизонт прогнозирования

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## **Numerical simulation of the transmission of the blast load of a plastic explosive located on a cylindrical body**

**S97**

*Demenev, A.S.; Putilin, O.S. (FGUP RFYaTs VNII Tekhnicheskoy Fiziki imeni Akademika Zababakhina, Snezhinsk (RU)); Shakhmatov, E.V. (FGUP RFYaTs VNII Tekhnicheskoy Fiziki imeni Akademika Zababakhina, Snezhinsk (RU)); Snezhinskij Fiziko-Tekhnicheskij Inst. NIYaU MIFI, Snezhinsk (RU)), E-mail: sfti@mephi.ru*

Chislennoe modelirovanie peredachi vzryvnoj nagruzki plasticheskogo vzryvchatogo veshchestva, raspolozhennogo na tsilindricheskom tele

p. 170-173

(RU)

3 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EQUATIONS; NUMERICAL SOLUTION; SIMULATION; EXPLOSIVES

Modern computer software packages allow a computational experiment in gas-dynamic setting with the task of matching parameters of the equation of state of plastic explosives. To justify the

parameters of the equation of state, the experimental data of studies have been compared with the results of the corresponding gas-dynamic calculations

Современные компьютерные программные комплексы позволяют провести расчетный эксперимент в газодинамической постановке с заданием подходящих параметров уравнения состояния (УРС) пластического взрывчатого вещества (ПВВ). Для обоснования значений параметров УРС ПВВ выполнено сопоставление экспериментальных данных исследований с результатами соответствующих газодинамических расчетов

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## **Mathematical modeling of the formation of efficient portfolios on reinsurance markets**

**S97**

*Balashov, R.B.; Kryanev, A.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: avkryanev@mephi.ru*

Matematicheskoe modelirovanie formirovaniya ehffektivnykh portfelej na rynkakh perestrakhovaniya

p. 174-176

(RU)

8 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; EXACT SOLUTIONS; EXPERT SYSTEMS; PROGRAMMING; INSURANCE

A mathematical model of the formation of efficient portfolios on reinsurance markets, which provides the optimal ratio between the expected return and risk of low profitability, has been discussed in the paper

В настоящей работе рассматривается математическая модель для формирования эффективных портфелей на рынках перестрахования, обеспечивающая оптимальные соотношения между ожидаемым значением доходности и риском получения низких значений доходности

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## **Learning of spiking networks with different forms of long-term synaptic plasticity**

**S97**

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Obuchenie spajkovykh nejronnykh setej posredstvom razlichnykh form dolgovremennoj sinapticheskoy plastichnosti

p. 177-183

(RU)

9 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION;  
ANALYTICAL SOLUTION; NEURAL NETWORKS; EXPERT SYSTEMS; LEARNING;  
PLASTICITY

The possibility of modeling the learning process based on different forms of spike timing-dependent plasticity (STDP) has been studied. It has been shown that the learnability depends on the choice of the spike pairing scheme in the STDP rule and the type of the input signal used during learning

Исследована возможность моделирования процесса обучения на основе различных форм долговременной синаптической пластичности. Показано, что возможность обучения зависит от выбора схемы учета пар спайков и типа входного сигнала, использованного при обучении

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### **Some properties of numbers divisible by 9**

**S97**

*Kudryashov, N.A. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: nakudr@gmail.com*

Nekotorye svoystva chisel, kotorye delyatsya na devyat'

p. 184-188

(RU)

3 refs.

Vestnik Natsional'nogo Issledovatel'skogo Yadernogo Universiteta MIFI

ISSN 2304-487X

(2016)

v. 5(2)

MATHEMATICS; MATHEMATICAL MODELS; COMPUTERIZED SIMULATION;  
DIGITAL SYSTEMS; NUMERICAL SOLUTION; DIGITALIS

Some properties of numbers divisible by 9 have been considered. It has been shown that divisibility by 9 is a necessary condition of the representation of a number in the form of a sum written in terms of ten different digits. Examples of these numbers have been presented. It has been demonstrated that the solution of the problem under consideration, is not single

Изучаются свойства чисел, которые делятся на девять. Показано, что необходимым условием представления числа в виде суммы, записанной с помощью десяти неповторяющихся цифр, является его делимость на девять. Даны примеры чисел, которые представляются в виде сумм, записанных с помощью десяти неповторяющихся цифр. Демонстрируется неединственность решения рассматриваемой задачи

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### **Water cooled reactor WWER SCP (preliminary elaboration)**

**S22**

*Kirillov, P.L. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: kirillov@ippe.ru*

Vodookhlazhdaemyj reaktor VVEhR SKD (predvaritel'nye razrabotki)

p. 5-14

(RU)

22 refs., 6 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR POWER; REACTORS; WWER TYPE REACTORS; LWGR TYPE REACTORS; TURBULENT FLOW; COOLANTS; WATER

Brief review on the state of nuclear power engineering as of January, 1, 2013, is presented in the paper. The project of nuclear water-cooled reactor at supercritical pressure, WWER SCP, and scientific issues concerning its development is discussed

Представлен краткий обзор состояния атомной энергетики на 01.01.2013. Освещаются преимущества проекта реактора ВВЭР СКД и научно-технические проблемы, требующие решения при его разработке

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### **Effect of the diffusion of metal components out of steel through the oxide coating on mass transfer in flow circuit with heavy lead-containing coolants**

**S21**

*Martynov, P.N.; Ivanov, K.D.; Lavrova, O.V.; Niyazov, S.-A.S.; Shelemet'ev, V.M.; Ul'yanov, V.V.; Sadovnichij, R.P.; Fomin, A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Vliyanie diffuzionnogo vykhoda metallicheskih komponentov stalej cherez oksidnye pokrytiya na massoperenos v tsirkulyatsionnykh konturakh s tyazhelymi svinetssoederzhashchimi teplonositel'yami

p. 15-19

(RU)

2 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR FACILITIES; COOLANTS; LIQUID METALS; MASS TRANSFER; DIFFUSION; COATINGS

Article describe the interaction of structural steel with heavy lead-containing coolants on the definition of the diffusion effect of metal components steel output through the oxide coating on the mass transfer in the flow circuit. It is shown that under the nonisothermal conditions of the circulation circuit, their share could be 50% or more of the total intensity of the oxidation of the matrix of steel, which must be considered when developing cooling systems technologies

На основании анализа имеющихся экспериментальных данных вынесены количественные оценки интенсивности поступления металлических примесей непосредственно в теплоноситель. Показано, что в неизотермических условиях циркуляционного контура их

доля может составлять 50% и выше от общей интенсивности окисления матрицы стали, что необходимо учитывать при разработке систем технологии теплоносителя

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## **Mining conditions passivation on steel pipe heaters NPP steam generator**

**S22**

*Pavlenko, V.I.; Lebedev, L.L. (Belgorodskij Gosudarstvennyj Tekhnologicheskij Univ. imeni V.G. Shukhova, Belgorod (RU)), E-mail: kafnx@mail.ru; Prozorov, V.V. (Sosnovoborskij Proektno-Izyskatel'skij Inst. Vserossijskij Proektnyj i Nauchno-Issledovatel'skij Inst. Kompleksnoj Ehnergeticheskoy Tekhnologii, Sosnovyj Bor (RU)); Doil'nitsyn, V.A. (Sankt-Peterburgskij Gosudarstvennyj Tekhnologicheskij Inst. (TU), Sankt-Peterburg (RU))*

Otrabotka rezhimov passivatsii na stal'noj trubchatke parogeneratorov AEhS

p. 20-27

(RU)

4 refs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR POWER PLANTS; STEAM GENERATORS; PASSIVATION; CORROSION PROTECTION; CHELATES; STAINLESS STEELS

Authors describe electrochemical studies conducted on samples of pipe heaters steam generators made of steel 08X18H10T not used after washing with acid solutions and chelators with various additives followed by passivation or without passivation

Проведены электрохимические исследования на образцах трубки парогенераторов, изготовленных из стали 08Kh18H10T, не бывших в эксплуатации, после промывок растворами кислот и комплексонов с различными добавками с последующей пассивацией или без пассивации

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## **The titanosilicate glass matrix for immobilization of the wastes containing f-elements**

**S12**

*Aloy, A.S.; Barbanel', Yu.A.; Trofimenko, A.V. (FGUP NPO Radievyj Inst. imeni V.G. Khlopina, Sankt-Peterburg (RU)), E-mail: aloy@khlopin.ru*

Titanosilikatnaya steklomatritsa dlya otverzheniya otkhodov, sodержashchikh f-ehlementy

p. 28-34

(RU)

8 refs., 2 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

WASTE MANAGEMENT; RADIOACTIVE WASTE DISPOSAL; HIGH-LEVEL RADIOACTIVE WASTES; SOLIDIFICATION; PEROVSKITE; TITANIUM OXIDES

The compositions of titanosilicated glasses have been defined in the ternary system Na<sub>2</sub>O-TiO<sub>2</sub>-SiO<sub>2</sub>, which provide not only a perfect glasslike structure (body) formation, but also associative groups of mineral-like compounds: fresnoite (Ba<sub>2</sub>TiSi<sub>2</sub>O<sub>8</sub>) and perovskite (SrTiO<sub>3</sub>)

В тройной системе Na<sub>2</sub>O-TiO<sub>2</sub>-SiO<sub>2</sub> были определены составы титаносиликатных стекол, которые обеспечивают не только стеклоподобную структуру, но и образование в стекле ассоциативных групп минерально-подобных соединений - фресноита (Ba<sub>2</sub>TiSi<sub>2</sub>O<sub>8</sub>) и перовскита (SrTiO<sub>3</sub>)

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### **Use of generation of acoustic vibrations in chemical reaction and properties of the bubble medium in liquid to reveal through defects in claddings of slugs with sodium**

**S37**

*Titarenko, N.N.; Dvornikov, P.A.; Kovtun, S.N.; Polionov, V.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Ispol'zovanie generatsii akusticheskikh kolebanij v khimicheskoy reaktsii i svojstv puzyr'kovoj sredy v zhidkosti dlya vyyavleniya skvoznykh defektov obolochek blochkov s natriem  
p. 35-42

(RU)

23 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

CHEMISTRY; SODIUM; METALS; MOLTEN METAL-WATER REACTIONS; BUBBLES; HYDROGEN

An opportunity to use the acoustic emission method to control microdefects in the equipment has been considered in the paper. In particular, for the first time it is shown experimentally that while sodium is interacting with water, the acoustic emission parameters are determined by the size of the interacting area for reacting components of the reaction

Рассмотрена возможность использования метода акустической эмиссии для контроля микродефектов в оборудовании. В частности, впервые экспериментально показано, что в процессе взаимодействия натрия с водой параметры акустической эмиссии определяются величиной области взаимодействия реагирующих компонентов реакции

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### **The investigation of the acoustic level limit switch of coolant in the integrated stand of the KV-2**

**S22**

*Mel'nikov, V.I.; Ivanov, V.V. (Nizhegorodskij Gosudarstvennyj Tekhnicheskij Univ. imeni R.E. Alekseeva, Nizhnij Novgorod (RU)); Kiselev, Yu.A.; Kiselev, A.A.; Miryasov, K.M. (OAO Opytnoe Konstruktorskoe Byuro Mashinostroeniya imeni I.I. Afrikantova, Nizhnij Novgorod (RU))*

Issledovanie akustozondovykh signalizatorov urovnya teplonositelya v integral'nom stende KV-2  
p. 43-47

(RU)

4 refs., 3 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR FACILITIES; BENCH-SCALE EXPERIMENTS; COOLANTS; ACOUSTIC TESTING; THERMODYNAMICS; STEAM CONDENSERS

The results of three-year operation of the level switches based on 24-point acoustic probes at KV-2 bench are shown in the paper. It is emphasized that level switches have been operated satisfactorily

Приведены результаты трехлетней эксплуатации акустозондовых 24-х точечных сигнализаторов уровня на стенде КВ-2. Отмечено, что сигнализаторы в целом работали удовлетворительно

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### **Forecasting of nuclear reactor coolant state**

**S22**

*Malovik, K.N.; Nikishin, V.V. (Sevastopol'skij Natsional'nyj Univ. Yadernoj Ehnergii i Promyshlennosti, Sevastopol' (UA))*

Prognozirovanie sostoyaniya teplonositelya yadernykh reaktorov

p. 48-53

(RU)

15 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR POWER; WWER TYPE REACTORS; COOLANTS; VAPORS; STEAM GENERATION; VOLUMETRIC ANALYSIS

Authors consider an analytic forecasting of coolant and its limit conditions. Experimental data of physical modeling of volumetric steam content via improvement of machine vision system is also given

Рассматривается аналитическое прогнозирование предельного состояния теплоносителя. Показаны экспериментальные данные физического моделирования измерения объемного паросодержания с помощью усовершенствованной системы технического зрения

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### **Technique and software to calculate temperature field in the system of layered cylindrical fuel elements**

**S22**

*Starkov, V.A.; Marikhin, N.Yu. (OAO GNTs NIIAR, Dimitrovgrad (RU)), E-mail: sva@niiar.ru*

Metodika i programma rascheta stacionarnogo temperaturnogo polya v sisteme mnogozonnykh tsilindricheskikh tvehlov

p. 54-62

(RU)

5 refs., 4 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

FUEL ELEMENTS; FLUX DENSITY; HEAT EXCHANGERS; FUEL ASSEMBLIES;  
SUBCOOLED BOILING; HEAT TRANSFER

Authors propose a technique and analytically solve a thermal conductivity problem for the system of layered cylindrical fuel elements. Based on the results, an algorithm and FORTRAN software for the thermo-hydraulic calculation of a channel have been developed to calculate the temperature field and thermal flux density in a fuel assembly with layered cylindrical fuel element

Предложены методика и аналитическое решение стационарной задачи теплопроводности для системы многозонных цилиндрических тел. На их основе разработан алгоритм и написана инженерная ФОРТРАН-программа для расчета температурного поля, плотности теплового потока в тепловыделяющей сборке с многозонными кольцевыми твэлами

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### **The over-implicit scheme of incomplete factorization method for solving the three-dimensional difference equations of elliptic type**

**S97**

*Troyanova, N.M. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)); Ginkin, V.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: ginkinvp@mail.ru*

Sverkhneyavnaya skhema nepolnoj faktorizatsii dlya resheniya trekhmernykh raznostnykh uravnenij ehlipticheskogo tipa

p. 63-70

(RU)

8 refs., 4 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

MATHEMATICS; MATHEMATICAL MODELS; FACTORIZATION; EQUATIONS;  
CALCULATION METHODS; DIRICHLET PROBLEM

The over-implicit scheme of the incomplete factorization method (IFM) is proposed in the paper for solving the systems of linear algebraic equations that approximate the equations for neutron transport in the multigroup diffusion approximation. The variant of combined IFM schemes, in which the peripheral compensation is used in the even iterations and is absent in uneven iterations, is also proposed

В работе предложена сверхневная схема метода неполной факторизации (МНФ) для решения систем линейных разностных алгебраических уравнений, аппроксимирующих уравнения переноса нейтронов в многогрупповом диффузионном приближении, и вариант комбинированной схемы МНФ, в котором на четных итерациях используется периферийная компенсация итерируемых членов, а на нечетных она отсутствует



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## **On the conversion of thermal energy of nuclear reactor into directional flow energy of electromagnetic radiation in nuclear-photon engine**

**S22**

*Gulevich, A.V.; Kukharchuk, O.F.; Loginov, N.I.; Mikheev, A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: mikheev@ippe.ru*

O preobrazovanii teplovoj ehnergii yadernogo reaktora v ehnergiyu napravlennogo potoka ehlektromagnitnogo izlucheniya v yaderno-fotonnom dvizhitele

p. 71-79

(RU)

4 refs., 5 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR FACILITIES; REACTORS; DIRECT ENERGY CONVERSION;  
ELECTROMAGNETIC RADIATION; PHOTON EMISSION

Issues of direct conversion of thermal energy of the nuclear-photon engine into the energy of directional flow light radiation have been discussed in the paper. Possible design options of this converter differing in their irradiators geometrical forms have been highlighted, with comparative analysis of these options

В работе обсуждаются вопросы прямого преобразования тепловой энергии реактора ядерно-фотонного движителя в энергию направленного потока светового излучения. Рассмотрены возможные схемы такого конвертора, различающиеся геометрической формой излучателя и отражателя, и выполнен сравнительный расчетный анализ эффективности этих схем

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## **Calculation of mass exchangers for providing specific oxygen regime in heavy liquid metal coolant**

**S22**

*Legkikh, A.Yu.; Martynov, P.N.; Askhadullin, R.Sh. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Raschet massoobmennyykh apparatov dlya obespecheniya zadannogo kislorodnogo rezhima v tyazhelom zhidkometallicheskom teplonositele

p. 80-91

(RU)

5 refs., 5 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

REACTORS; COOLANTS; LIQUID METALS; BISMUTH OXIDES; LEAD OXIDES;  
THERMODYNAMIC ACTIVITY

Authors describe the calculation method of mass exchangers with solid-phase oxygen source (lead oxide) which allows to estimate the major features of apparatus and to predict it changes depending on operating time

В работе описана методика расчета массообменных аппаратов с твердофазным источником кислорода (оксидом свинца), которая позволяет оценить основные характеристики работы аппарата и прогнозировать их изменение в зависимости от времени эксплуатации. Приводятся результаты расчетов по разработанной методике

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## **The modeling of subheated coolant influence on temperature measurement at the exit of fuel rod assembly in WWER-1000 reactor**

**S22**

*Belozеров, V.I.; Varseev, E.V.; Kolesov, V.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

Modelirovanie vliyaniya nedogreva teplonosatelya v organakh regulirovaniya na izmerenie temperatury na vykhode iz TVS reaktora VVEhR-1000

p. 92-100

(RU)

15 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR FACILITIES; WWER TYPE REACTORS; FUEL ASSEMBLIES; ABSORBER PELLETS; REACTOR SAFETY; MONTE CARLO METHOD; THERMAL HYDRAULICS

Authors solve the problem of temperature field modeling at the exit from WWER-1000 reactor core in order to predict influence of the effect on thermocouple registrations along reactor radius at reactor measurements. The problem is solving in two stages. Energy release within the core elements of serial WWER-1000 reactor has been calculated using the Monte Carlo N-Particle Transport Code (MCNP)

В работе решена задача по моделированию поля температур на выходе из реактора ВВЭР-1000 с целью оценки влияния эффекта на показания термодатчиков по радиусу активной зоны при внутриреакторных измерениях. Задача решена в два этапа. Было рассчитано энерговыделение в элементах активной зоны серийного реактора ВВЭР-1000 с использованием нейтронно-физического кода MCNP

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## **Numerical and experimental investigation of the model steam generator reactor facility BREST-OD-300**

**S22**

*Grabezhnaya, V.A.; Mikheev, A.S.; Shtejn, Yu.Yu. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: gva@ippe.ru; Semchenkov, A.A. (OAO Nauchno-Issledovatel'skij i Konstruktorskij Inst. Ehnergotehniki imeni N.A. Dollezhalya, Moscow (RU)), E-mail: a.sem@nikiet.ru*

Raschetno-ehksperimental'noe issledovanie raboty modeli parogeneratora BREST-OD-300

p. 101-109

(RU)

5 refs., 6 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR POWER; FAST REACTORS; COOLANTS; STEAM GENERATORS; LEAD; TEMPERATURE DISTRIBUTION; CRITICAL PRESSURE; PRESSURE CONTROL

The paper presents the results of testing the three-tubes model of steam generator reactor facility BREST-OD-300, heated by liquid lead, at subcritical (18 MPa) and supercritical (25 MPa) pressure of the water at a flowrate 80, 100 and 120% of the nominal value

Приводятся результаты испытания трехтрубной модели парогенератора РУ БРЕСТ-ОД-300, обогреваемой свинцом, при докритическом (18 МПа) и сверхкритическом (25 МПа) давлении в водяном контуре при расходах воды 80, 100 и 120% от номинального значения

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### **Assessment of the increasing in $^{99}\text{Mo}$ production for different WWR-c reactor core compositions**

**S22**

*Kochnov, O.Yu. (Obninskij Filial GNTs RF NIFKhI imeni L.Ya. Karpova, Obninsk (RU));*

*Kolesov, V.V.; Fomin, R.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Otsenka uvelicheniya proizvodstva  $^{99}\text{Mo}$  pri razlichnykh komponovkakh aktivnoj zony na reaktore VVR-ts

p. 110-115

(RU)

3 refs., 6 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

POWER REACTORS; WWER TYPE REACTORS; WWR-S-MOSCOW REACTOR; REACTOR CORES; MOLYBDENUM 99; BERYLLIUM MODERATED REACTORS

The possibility of increasing in  $^{99}\text{Mo}$  production with WWR-c reactor core and uranium-containing targets modernization have been discussed in this paper. Authors have found a large possibility of increasing  $^{99}\text{Mo}$  production

Рассмотрены возможности увеличения наработки  $^{99}\text{Mo}$  с помощью модернизации урансодержащих мишеней и размещения бериллиевых блоков в активной зоне реактора ВВР-ц. Обнаружено, что существует резерв увеличения наработки изотопа медицинского назначения  $^{99}\text{Mo}$  для производства радиофармпрепаратов

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### **Study of the dependence of fluctuating asymmetry in plants on the size of radioactive contamination**

**S63**

*Gorshkova, T.A.; Karaguzova, R.S.; Amosova, N.V.; Pavlova, N.N.; Martirosyan, Yu.M.;*

*Vlasova, O.P.; Simakova, I.M. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)), E-mail: tgorshkova@yandex.ru; Churyukin, O.A. (Vserossijskij Nauchno-Issledovatel'skij Inst. Sel'skokhozyajstvennoj Radiologii i Agroehkologii, Obninsk (RU))*

Izuchenie zavisimosti fluktuiruyushchej asimmetrii u rastenij ot velichiny radioaktivnogo zagryazneniya territorii

p. 116-124

(RU)

11 refs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

CONTAMINATION; ENVIRONMENTAL PROTECTION; RADIATION PROTECTION; CESIUM; PLANTS; LEAVES; FLUCTUATIONS

Authors present the investigation of the dependence of fluctuating asymmetry of leaves of three plant species on background radiation and activity of radioactive cesium in the Ulyanovsk region, contaminated by the Chernobyl accident. A correlation analysis has found a similar reaction of plants in the contaminated area

Приведены результаты исследования показателя флуктуирующей асимметрии листьев трех видов растений в зависимости от радиационного фона и удельной активности радиоцезия на территории Ульяновского района, загрязненного в результате аварии на ЧАЭС. Проведен корреляционный анализ, обнаружена сходная реакция растений на радиоактивное загрязнение территории

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## **Nitrogenous explosives detection by neutron-radiation method using gamma radiation**

**S46**

*Yudov, A.A.; Sokolov, Yu.A. (FGUP RFYaTs-VNIITF imeni Akademika E.I. Zababakhina, Snezhinsk (RU)), E-mail: yudoff@mail.ru; Chernukhin, Yu.I. (SFTI NIYaU MIFI, Snezhinsk (RU))*

Geterogennyj stsintillyatsionnyj detektor gamma-izlucheniya dlya obnaruzheniya azotosoderzhashchikh vzryvchatykh veshchestv nejtronno-radiatsionnym metodom

p. 125-132

(RU)

6 refs., 6 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

RADIATION ABSORPTION ANALYSIS; RADIATION DETECTION; RADIATION EFFECTS; EXPLOSIVES; GAMMA DETECTION; GAMMA RADIATION; PLASTIC SCINTILLATION DETECTORS

The paper describes a heterogeneous scintillation detector (HSD) which can increase the sensitivity and reliability of explosives (HE) detection. The HSD consists of alternating layers of converting material where gamma quanta transform into electrons and positrons, and of detecting material where the energy of charged particles is transformed into light scintillations. The

calculations results of detection sensitivity of nitrogenous explosives by neutron-radiation method using HSD is presented

Авторы обсуждают гетерогенный сцинтилляционный детектор (ГСД), позволяющий повысить чувствительность и надежность обнаружения взрывчатых веществ (ВВ). Детектор представляет собой набор слоев конвертора гамма-излучения и примыкающих к ним слоев сцинтиллятора, детектирующих электроны и позитроны, возникающие в конверторе. Представлены результаты расчетов чувствительности обнаружения азотосодержащих ВВ нейтронно-радиационным методом с применением ГСД

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## **Modeling of hyperthermia at stabilizing percutaneous vertebroplasty**

**S62**

*Voznesenskij, N.K.; Bogdanov, N.V.; Matusevich, E.S.; Kurachenko, Yu.A.; Voznesenskaya, N.N. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)); Dorokhovich, S.L.; Zabaryanskij, Yu.G.; Levchenko, V.A. (EhNIMTs Modeliruyushchie Sistemy NIYaU MIFI, Obninsk (RU)); Mardynskij, Yu.S. (FGBU Meditsinskij Radiologicheskij Nauchnyj Tsentr, Obninsk (RU))*

Modelirovanie gipertermii pri stabiliziruyushchej vertebroplastike

p. 133-143

(RU)

20 refs., 9 figs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.1)

NUCLEAR MEDICINE; RADIOLOGY; RADIATIONS; VERTEBRAE; SPINAL CORD;  
BONE SEEKERS

Two groups of experiments involving the nonstationary temperatures distribution measurements have been described in the paper, namely, the cement polymerization: (a) in the isolated cuvette, and (b) in a vertebra. For experiments modeling, the 3D non-stationary KANAL code, applied in thermohydraulics of nuclear power installations, has been adapted

Выполнены две группы экспериментов по измерению нестационарного распределения температуры при полимеризации цемента: в изолированной кювете и в позвонке. Для моделирования экспериментов адаптирован 3D-нестационарный код КАНАЛ, применяемый в задачах термогидравлики ядерно-технических установок

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## **Nuclear power of direct conversion in space missions of the 21-st century**

**S21**

*Yarygin, V.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: esc-yar@ippe.ru*

Yadernaya ehnergetika pryamogo preobrazovaniya v kosmicheskikh missiyakh XXI v

p. 5-20

(RU)

30 refs., 13 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; REACTORS; SPACECRAFT POWER SUPPLIES; SPACE VEHICLES;  
THERMOELECTRIC GENERATORS

The short review of a current state of the scientific research and development activity in the field of creation of the space nuclear power plants of submegawatt and megawatt class with thermoelectric and thermionic converters of the thermal energy to electric for transport power modules and inter-orbital tows is presented in the paper

Представлен краткий обзор современного состояния НИОКР в области создания космических ядерных энергетических установок субмегаваттного и мегаваттного классов с термоэлектрическими и термоэмиссионными преобразователями тепловой энергии в электрическую для транспортно-энергетических модулей и межорбитальных буксиров

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### **The simulation of the process of sodium freezing in the tubes for the optimization of fast breeder reactor units maintenance**

S22

*Tashlykov, O.L.; Shcheklein, S.E.; Annikov, S.V. (FGAOU VPO Ural'skij Federal'nyj Univ. imeni Pervogo Prezidenta Rossii B.N. El'tsina, Ekaterinburg, (RU)), E-mail: oleg\_lt@rambler.ru*

Modelirovanie protsessa zamorazhivaniya natriya v truboprovodakh s tsel'yu optimizatsii remonta reaktornykh ustanovok na bystrykh nejtronakh

p. 21-26

(RU)

8 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

REACTORS; FAST REACTORS; COOLANTS; SODIUM; FREEZING; PIPELINES;  
NATURAL CONVECTION

The peculiarities of the repair works of the fast breeder reactor sodium systems are considered. The requirements for the sodium melting exclusion inside the equipment and piping during their opening and repair are given. The results of the sodium cooling process simulation with SolidWorks software are also described

Описаны особенности натриевого теплоносителя, требующие специфических условий для проведения работ на натриевых системах, в частности, исключаящие плавление натрия внутри оборудования и трубопроводов при их вскрытии или ремонте. Приведены результаты параметрических исследований процесса охлаждения натрия с использованием программного комплекса SolidWorks

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### **The choice of locking medium of the shaft seal of main circulation pumps reactor facility with lead and lead-bismuth coolants**

S22

*Beznosov, A.V.; Novinskij, Eh.G.; L'vov, A.V.; Bokov, P.A.; Bokova, T.A. (Nizhegorodskij Gosudarstvennyj Tekhnicheskij Univ. imeni R.E. Alekseeva, Nizhnij Novgorod (RU)), E-mail: novinskiy@okbm.nnov.ru*

Vybor zapirayushchej sredy uplotneniya vala glavnykh tsirkulyatsionnykh nasosov RU so svintsovim i svintsovo-vismutovym teplonositelyami

p. 27-32

(RU)

4 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; NUCLEAR FACILITIES; COOLANTS; LEAD; BISMUTH;  
CIRCULATING SYSTEMS

The paper discusses possible applications of locking media: oil, or high purity water in a rotating shaft seal system main circulation pumps of the main circuit with fast reactors cooled by lead and lead-bismuth coolant

Рассмотрены варианты применения возможных запирающих сред (масла или воды высокой чистоты) в системе уплотнения вращающегося вала главных циркуляционных насосов основных контуров с реакторами на быстрых нейтронах, охлаждаемых свинцовым и свинцово-висмутовым теплоносителями

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## **Research of processes and devices of hydrogen purification applied to the circulation loop with the heavy liquid metal coolants**

**S22**

*Ul'yanov, V.V.; Martynov, P.N.; Gulevskij, V.A.; Fomin, A.S.; Teplyakov, Yu.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail:*

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Issledovanie protsessov i ustrojstv vodorodnoj ochistki primenitel'no k tsirkulyatsionnym konturam s tyazhelymi zhidkometallicheskimy teplonositelyami

p. 33-38

(RU)

4 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; NUCLEAR FACILITIES; FAST REACTORS; COOLANTS; LIQUID METALS; CIRCULATING SYSTEMS; COOLANT LOOPS

The article deals with the problem of polluting the circulation circuits with heavy liquid metal coolant slag lead oxide-based deposits. The testing technique for it has been elaborated. The hydrogen purification of the circulation loop TT-2M using the dispersant has been carried out. Based on these results, the gas dispersant can be recommended not only for research stands, but also for the primary loops of promising fast reactors with heavy liquid metal coolant

Рассмотрена проблема загрязнения циркуляционных контуров с тяжелыми жидкометаллическими теплоносителями шлаковыми отложениями на основе оксида

свинца. Разработана методика его испытаний, проведена водородная очистка циркуляционного контура стенда ТТ-2М при помощи диспергатора. Результаты исследований позволяют рекомендовать диспергатор к использованию в первых контурах перспективных реакторных установок на быстрых нейтронах

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## **The study of hydrogen generation in the interaction of aluminum with aqueous solutions**

**S37**

*Milinchuk, V.K.; Belozеров, V.I.; Shilina, A.S.; Anan'eva, O.A.; Kunitsyna, T.E.; Gordienko, A.B. (Obninskij Inst. Atomnoj Ehnergetiki (IA TEh) NIYaU MIFI, Obninsk (RU))*

Issledovanie generatsii vodoroda pri vzaimodejstvii alyuminiya s vodnymi rastvorami

p. 39-46

(RU)

10 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

CHEMISTRY; AQUEOUS SOLUTIONS; HYDROGEN PRODUCTION; DECOMPOSITION; ALUMINIUM; ALUMINIUM OXIDES

The paper presents the results of research on hydrogen generation in heterogeneous compositions containing aluminum, liquid sodium glass, crystalline sodium meta-silicate and water of varying salinity. It has been found that silicon reagents remove the passivation oxide coating on the surface of aluminum and convert it into an activated state, effectively decomposing water into hydrogen

Изложены результаты исследований процесса генерации водорода в гетерогенных композициях, содержащих алюминий, жидкое натриевое стекло, кристаллогидраты метасиликата натрия и воду различной минерализации. Установлено, что кремнийсодержащие реагенты удаляют пассивирующее оксидное покрытие с поверхности алюминия и переводят его в активированное состояние, эффективно разлагающее воду на водород

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## **Application of computer codes RELAP\SCDAP and MELCOR for the analysis of management of WWER-1000 accidents**

**S22**

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Ispol'zovanie komp'yuternykh kodov RELAP\SCDAP i MELCOR dlya analiza upravleniya avariyami VVEhR-1000

p. 47-56

(RU)

7 refs., 5 figs., 4 tabs.



Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; REACTORS; WWER TYPE REACTORS; ACCIDENT  
MANAGEMENT; DAMAGE; COMPUTER CODES

The article describes the problem of shortage of significant information about the processes occurring in a nuclear reactor during heavy failure, about parameters of these processes, and as a result, absence of optimal actions for heavy failures management. The article gives a description of power plants, performed with the code MELCOR

Рассматриваемая проблема заключается в нехватке достоверной информации о процессах, происходящих в ядерном реакторе во время протекания тяжелой аварии, о параметрах этих процессов и, как следствие, отсутствии оптимальных мероприятий по управлению тяжелыми авариями. Приводится краткое описание модели энергоустановки, выполненной с использованием кода MELCOR

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### **On the nature of the course of BN reactor beyond design accidents under post-accident core materials relocation**

**S22**

*Vlasichev, G.N. (Nizhegorodskij Gosudarstvennyj Tekhnicheskij Univ. imeni R.E. Alekseeva, Nizhnij Novgorod (RU))*

O kharaktere protekaniya zaproektnykh avarij reaktora BN na stadii posleavarijnogo peremeshcheniya materialov aktivnoj zony

p. 57-63

(RU)

18 refs., 3 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; FAST REACTORS; ACCIDENTS; REACTOR ACCIDENTS;  
MELTDOWN; REACTOR CORES

Authors describe the nature and the course of fast reactor beyond design accidents under post-accident core materials relocation

Авторы статьи описывают характер протекания запроектных аварий реактора на быстрых нейтронах на стадии послеаварийного перемещения материалов активной зоны

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### **Mechanical properties of E110 alloy at temperature range up to 1273 K**

**S36**

*Izmailkov, I.N. (OAO VNIINM imeni Akademika A.A. Bochvara, Moscow (RU)); Loshmanov, L.P.; Kostyukhina, A.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

Mekhanicheskie svojstva splava Eh110 pri temperaturakh do 1273 K

p. 64-70

(RU)

22 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

MATERIALS; STAINLESS STEELS; ALLOYS; STRESSES; DEFORMATION; STRAIN RATE; METALS; WWER TYPE REACTORS

Authors describe the mechanical properties of E110 alloy at temperature range up to 1273 K. In researches, the ring samples manufactured from WWER fuel rod cladding have been tested

Авторы описывают механические свойства сплава Э110 при температурах до 1273 К. В экспериментах использовались кольцевые образцы, изготовленные из оболочки ТВЭЛ реактора ВВЭР

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### **Hybrid calculation technique for shielding on basis of CADIS**

**S97**

*Suslov, I.R.; Lyamtsev, I.A.; Chernov, S.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Gibridnyj metod rascheta zashchity YaEhU na osnove skhemy umen'sheniya dispersii CADIS p. 71-79

(RU)

20 refs., 3 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

MATHEMATICS; MATHEMATICAL MODELS; MONTE CARLO METHOD; CALCULATION METHODS; COMPUTER CODES; BENCHMARKS

A hybrid calculation technique for nuclear installation protection on the basis of Monte Carlo method with continuous dependence of cross sections on the energy and the method of characteristics. The method implements the scheme of automatic dispersion decreasing CADIS (Consistent Adjoint Driven Importance Sampling)

Представлен гибридный метод расчета защиты на основе совместного использования метода Монте-Карло с непрерывной зависимостью сечений от энергии и метода характеристик. Метод реализует схему автоматического уменьшения дисперсии CADIS

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### **Space-time calculation of transient processes in fast reactors**

**S22**

*Ginkin, V.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Troyanova, N.M. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail: n\_troyanova@mail.ru*

Prostranstvenno-vremennoj raschet perekhodnykh protsessov v bystrykh reaktorakh p. 80-87

(RU)

4 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; REACTORS; FAST REACTORS; TRANSIENTS; REACTOR CORES; ACCIDENTS; MELTING

Algorithms of 3D neutron physics simulating for fast transient abnormal conditions in BN-type reactors core have been developed in the GVA code. A quasi-static approximation is used for the solution of nonstationary equation of reactor physics. The results of test simulating in flow rate stop conditions and in self-movement of control rods conditions have been demonstrated by the authors

В работе описана организация вычислений в комплексе программ GVA для расчета быстрых переходных процессов в реакторах на быстрых нейтронах, моделирующем пространственно-временное поведение активной зоны реактора в случае возникновения аварийной ситуации. Приведены результаты демонстрационных расчетов, в которых в качестве исходных аварийных событий рассматриваются такие, как остановка насосов и самоход стержней органов регулирования

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## **The physical phenomenon of emission of electrons in metals under the action of ultrasound**

**S36**

*Trofimov, A.I. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Fizicheskoe yavlenie ehmissii ehlektronov v metallakh pod dejstviem ul'trazvuka

p. 88-95

(RU)

9 refs., 5 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

MATERIALS; METALS; EMISSION; ELECTRON EMISSION; HEATING; DEBYE TEMPERATURE

A theoretical and experimental study of a new physical phenomenon - the emission of electrons in metals under the influence of ultrasound - has been described in the paper. The similar mechanism of increasing the internal energy in metals at heating and the ultrasound impact has also been reflected

Приведено теоретическое и экспериментальное обоснование нового физического явления - эмиссии электронов в металлах под действием ультразвука. Показана аналогия механизмов повышения внутренней энергии в металлах при нагреве и действии ультразвука

## **Numerical and experimental investigations of thermohydraulic characteristics for fast reactor vessels on integral model SARH in different operation regimes**

### **S22**

*Zaryugin, D.G.; Kalyakin, S.G.; Opanasenko, A.N.; Sorokin, A.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: dkalyakin@ippe.ru; Leskin, S.T. (IATEh NIYaU MIFI, Obninsk (RU))*

Raschetno-eksperimental'nye issledovaniya teplogidravlicheskih kharakteristik v baze bystrogo reaktora na integral'noj modeli SARKh v razlichnykh rezhimakh raboty ustanovki p. 96-104

(RU)

4 refs., 8 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; NUCLEAR FACILITIES; FAST REACTORS; BELOYARSK-3 REACTOR; SODIUM; REACTOR VESSELS; THERMAL HYDRAULICS; AFTER-HEAT REMOVAL

Features of the stratified flows on examples of reactors on fast neutrons, possibility of their scale modelling have been considered in the paper. Some results of experimental and numerical researches in mixing chambers and pipelines have also been presented

Рассмотрены особенности стратифицированных течений на примерах реакторов на быстрых нейтронах и возможности их масштабного моделирования. Представлены некоторые результаты экспериментальных и численных исследований в смесительных камерах и трубопроводах

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## **Simulation of loop test conditions for the modified SM reactor fuel rods and test results in justification of their performance**

### **S22**

*Starkov, V.A.; Fedoseev, V.E.; Shishin, V.Yu. (OAO GNTs NIIAR, Dimitrovgrad (RU)), E-mail: sva@niiar.ru*

Modelirovanie uslovij i rezul'taty petlevykh ispytanj modifitsirovannykh tvehlov reaktora SM v obosnovanie ikh rabotosposobnosti

p. 105-113

(RU)

9 refs., 8 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR FACILITIES; PWR TYPE REACTORS; FUEL RODS; SINTERING; DENSITY; BURNUP; SWELLING

In order to test pilot modified fuel rods of the SM reactor under middle and maximal thermal load, the irradiation conditions have been simulated. Some post-irradiation results have been

presented. The material tests results have been used as a basis to propose and justify a phenomenological model of fuel rods swelling

Проведено моделирование условий реакторных испытаний модифицированных опытных твэлов реактора СМ при средних и максимальных тепловых нагрузках. Представлены некоторые результаты послереакторных исследований твэлов. Сделан вывод о работоспособности опытных твэлов СМ. Предложена и обоснована феноменологическая модель распухания твэлов

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## **Tests of experimental low neutron poisoning fuel assemblies in reactor SM**

**S22**

*Klinov, A.V.; Kalinina, N.K.; Marikhin, N.Yu.; Pimenov, V.V.; Petelin, A.L.; Starkov, V.A.; Fedoseev, V.E. (OAO GNTs NIIAR, Dimitrovgrad (RU)), E-mail: klinov@niiar.ru*

Isipyaniya ehksperimental'nykh TVS s malym vrednym pogloshcheniem nejtronov v reaktore SM

p. 114-122

(RU)

12 refs., 6 figs., 6 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR FACILITIES; PWR TYPE REACTORS; FUEL ASSEMBLIES; FUEL RODS; COOLANT LOOPS; POISONING; BURNUP; FLUX DENSITY

Authors present results of the heat rate distribution, thermal flux density and burnup for three experimental fuel assemblies containing low neutron poisoning fuel rods evaluated both experimentally, and by calculated simulation of their operation in the SM reactor loop facility

Приводятся результаты определения распределений энерговыделения, плотности теплового потока и выгорания по трем экспериментальным ТВС с твэлами с малым вредным поглощением нейтронов, полученные в эксперименте и при расчетном моделировании условий их работы в петлевой установке исследовательского реактора СМ

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## **Optimization of plutonium stores for closed fuel cycle with thermal and fast nuclear reactors**

**S22**

*Moseev, P.A.; Korobejnikov, V.V.; Moseev, A.L. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: korob@ippe.ru*

Optimizatsiya upravleniya skladskimi zapasami plutoniya v zamknutom toplivnom tsikle s reaktorami na teplovykh i bystrykh nejtronakh

p. 123-132

(RU)

9 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR ENERGY; NUCLEAR FACILITIES; FAST REACTORS; THERMAL REACTORS; CLOSED-CYCLE SYSTEMS; PLUTONIUM; PLUTONIUM 241; AMERICIUM 242; STORAGE FACILITIES

The algorithm for plutonium supplies minimization has been described in the paper. That algorithm is needed for nuclear power scenarios modeling. As an example, the test calculations for scenario of Russia nuclear power development on the basis of thermal and fast reactors are given

Дано описание алгоритма минимизации запасов плутония на складе при разработке сценариев развития ядерной энергетики. В качестве примера использования алгоритма приведены результаты моделирования сценария развития атомной энергетики России на основе тепловых и быстрых реакторов

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### **Ensuring of the design value of fuel burnup in high-temperature gas-cooled reactor with operability graphite**

**S22**

*Nesterov, V.N. (Fiziko-Tekhnicheskij Inst. FGBOU VPO Natsional'nyj Issledovatel'skij Tomskij Politeknicheskij Univ., Tomsk (RU))*

Obespechenie proektnogo znacheniya glubiny vygoraniya yadernogo topliva vysokotemperaturnykh gazoohlazhdaemykh reaktorov rabotosposobnost'yu grafita  
p. 133-142

(RU)

13 refs., 4 figs., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR POWER; REACTORS; GCFR REACTOR; IGR REACTOR; NUCLEAR FUELS; GRAPHITE; BURNUP; NEUTRON FLUX; CRITICAL HEAT FLUX

Authors describe a method of determining compliance of exhausted graphite's resource of fuel blocks in high temperature gas-cooled reactor with fuel burnup. The axial distributions of local values of exhausted resource of graphite of fuel blocks have been obtained

Приводится методика определения соответствия выработанного ресурса графита топливных блоков высокотемпературных газоохлаждаемых реакторов глубине выгорания ядерного топлива. Получены аксиальные распределения локальных значений выработанного ресурса графита топливных блоков

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### **Environmental risk management with the use of multi-criteria GIS for decision-making support**

**S22**

*Didenko, V.I.; Yatsalo, B.I.; Gritsyuk, S.V.; Mirzeabasov, O.A.; Pichugina, I.A. (IATEh NIYaU MIFI, Obninsk (RU))*

Upravlenie territoriyami na osnove analiza riskov s ispol'zovaniem mnogokriterial'noj GIS podderzhki prinyatiya reshenij

p. 143-152

(RU)

40 refs., 3 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

NUCLEAR ENERGY; RISK ASSESSMENT; CONTAMINATION; ENVIRONMENTAL PROTECTION; ACCIDENTS; ACCIDENT MANAGEMENT; GEOGRAPHIC INFORMATION SYSTEMS

The paper gives a brief review of methods and tools used in the Decision Evaluation in Complex Risk Network Systems (DECERNS). The application of DECERNS for a case study on multi-criteria risk management for contaminated land resulting from the Chernobyl disaster has also been presented

Представлено описание методов и средств, реализованных в рамках системы DECERNS, а также применение разработанной системы для решения конкретной задачи управления рисками (выбора систем защитных мероприятий) на радиоактивно загрязненной в результате Чернобыльской аварии территории

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### **The $^{16}\text{N}$ generator on the base of 14 MeV neutrons accelerator source S22;S43**

*Khryachkov, A.V.; Dvornikov, P.A.; Zhuravlev, B.V.; Kovtun, S.N.; Khromyleva, T.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)); Roshchin, N.G. (ООО Инженерно-Сервисный Центр Диагностики Оборудования АЭС НИКИЕИТ, Moscow (RU)), E-mail: roschin@nikiet.ru*

Generator  $^{16}\text{N}$  na baze uskoritel'nogo istochnika nejtronov s ehnergiej 14 MehV

p. 153-155

(RU)

2 refs., 2 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.2)

REACTORS; WWER TYPE REACTORS; NEUTRON SOURCES; LEAK DETECTORS; COOLANTS; ACCELERATION; ACCELERATOR FACILITIES

The  $^{16}\text{N}$  generator on the base of 14-MeV neutron accelerator source for calibration of leak detection and velocity of heat-transfer radiation channels in primary loop of WWER nuclear reactor on the base of  $^{16}\text{N}$  activity measurement has been presented in the paper

Предложен генератор  $^{16}\text{N}$  на базе ускорительного источника 14 МэВ нейтронов для калибровки радиационных каналов контроля течи и расхода теплоносителя в трубопроводах первого контура реакторов типа ВВЭР на основе измерения активности  $^{16}\text{N}$

## **Development of closed nuclear fuel cycle technologies of fast reactors for large scale nuclear energetic**

**S11**

*Rachkov, V.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)),  
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Razrabotka tekhnologij zakrytogo yadernogo toplivnogo tsikla s bystryimi reaktorami dlya krupnomasshtabnoj yadernoj ehnergetiki

p. 5-14

(RU)

11 refs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

FUEL CYCLE; CLOSED-CYCLE SYSTEMS; FAST REACTORS; NUCLEAR ENGINEERING; NUCLEAR INDUSTRY; WWER TYPE REACTORS; MIXED OXIDE FUELS

Problems of modern nuclear power engineering are brought up and described in the paper. Its possible solutions on the basis of closed nuclear fuel cycle with fast reactors meeting the requirements of inherent safety for large scale nuclear power industry are also highlighted

Актуализированы проблемы развития современной ядерной энергетики (ЯЭ) и пути их решения на основе замкнутого ядерного топливного цикла с быстрыми реакторами, удовлетворяющие требованиям приемлемой безопасности для крупномасштабной ЯЭ

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## **Model analysis of spent fuel pit severe accident for SUNPP (Unit 1) under blackout and heat removal failure using MELCOR**

**S22**

*Balashevskij, A.S. (Sevastopol'skij Natsional'nyj Univ. Yadernoj Ehnergii i Promyshlennosti, Sevastopol' (UA)); Shevelev, D.V.; Vlasenko, N.I.; Kozlov, V.Ya. (OP Nauchno-Tekhnicheskij Tsentr GP NAEhK Ehnergoatom, Kiev (UA))*

Modelirovanie s pomoshch'yu programmnoogo koda MELCOR avarii v bassejne vyderzhki OYaT ehnergobloka #Numero Sign#1 Yuzhno-Ukrainskoj AEhS pri narushenii teplootvoda

p. 15-23

(RU)

7 refs., 8 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; REACTORS; WWER TYPE REACTORS; ACCIDENT MANAGEMENT; HAZARDS; COMPUTER CODES; LOSS OF FLOW; AFTER-HEAT REMOVAL

The calculation model of the spent fuel pit for SUNPP (Unit 1) using MELCOR computer code has been elaborated. The loss of heat removal from spent fuel pit initiating event has been



analyzed. Consequences, fuel damage time limits, hydrogen volume generated during the event, and melt-concrete interaction have also been estimated

Разработана расчетная модель бассейна выдержки отработавшего ядерного топлива энергоблока #Numero Sign#1 Южно-Украинской АЭС для компьютерного кода MELCOR. Проанализировано исходное событие при потере теплоотвода от бассейна выдержки, определены последствия и временные рамки повреждения топлива, количество сгенерированного водорода и начало взаимодействия расплава с бетоном

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## **Methods for localization of failed fuel assemblies in MBIR reactor**

**S22**

*Dvornikov, P.A.; Kovtun, S.N.; Luk'yanov, D.A.; Shutov, S.S.; Zhilkin, A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: pador@ippe.ru*

Metody lokalizatsii defektnykh TVS v reaktore MBIR

p. 24-33

(RU)

6 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; REACTORS; FAST REACTORS; RESEARCH AND TEST REACTORS; FUEL ASSEMBLIES; FAILED ELEMENT DETECTION; FAILED ELEMENT MONITORS

The paper describes the designed fuel element monitoring system for MBIR fast research reactor. The method for localization of failed fuel assemblies on the power operating reactor is proposed. As a result, the time of failed fuel assemblies search on shutdown reactor can be reduced

Дается описание проектируемой системы контроля герметичности оболочек твэлов реактора МБИР. Предлагается метод локализации тепловыделяющей сборки (ТВС) с негерметичными твэлами на работающем реакторе для сокращения времени поиска дефектной ТВС на остановленном реакторе

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## **Simulation of irradiation of the personnel involved in the process of AMB SNF cutting under water**

**S61**

*Smirnov, V.P.; Gayazov, A.Z.; Kuz'min, I.V.; Leshchenko, A.Yu.; Semenovych, S.V. (OOO NPF Sosny, Dimitrovgrad (RU)), E-mail: vps@sosny.ru; Serebryakov, V.V.; Khrenov, A.S. (OAO GNTs NIAR, Dimitrovgrad (RU))*

Modelirovanie oblucheniya personala, zdejstvovannogo v tekhnologicheskom protsesse razdelki OYaT AMB pod vodoj

p. 34-41

(RU)

3 refs., 4 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

RADIATION PROTECTION; OCCUPATIONAL SAFETY; PERSONNEL; IRRADIATION;  
PERSONNEL DOSIMETRY; RADIOACTIVE WASTES; MAYAK PLANT

The basic approaches to develop the model of formation of radiation exposure of the personnel and results of calculation of the parameters of radiological situation at working places using newly developed model are presented in the paper

Представлены основные подходы к разработке модели формирования доз облучения персонала и результаты расчетов параметров дозиметрической обстановки на рабочих местах с применением вновь разработанной модели

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### **Method of accounting reliability of human-machine systems at NPP while decision-making, and the results of its application at Balakovo NPP as an example**

**S22**

*Volkov, Yu.V.; Sobolev, A.V. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU)),  
E-mail: volkov@iate.obninsk.ru*

Metod ucheta nadezhnosti cheloveko-mashinnykh kompleksov RU pri prinyatii upravlencheskikh reshenij i rezul'taty ego primeneniya na primere Balakovskoj AEhS

p. 42-47

(RU)

9 refs., 3 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; RELIABILITY; OCCUPATIONAL SAFETY; REACTOR SAFETY;  
MANAGEMENT; BALAKOVO-1 REACTOR; SAFETY ANALYSIS

Authors present the method of accounting reliability of equipment, personnel and facilities when making management decisions. The results of using the said method at Balakovo NPP, chosen as an example

Предложен метод учета надежности оборудования и персонала при принятии управленческих решений. Представлены результаты использования метода для выбранной в качестве примера Балаковской АЭС

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### **The 100-th anniversary of Bohr's atom model**

**S96**

*Kharitonov, V.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), E-mail:  
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К 100-летию атома Бора

p. 48-51

(RU)

4 refs., 1 fig.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

KNOWLEDGE MANAGEMENT; KNOWLEDGE PRESERVATION; INFORMATION;  
LIBRARIES; DOCUMENTATION; BIBLIOGRAPHIES

The article is dedicated to the 100-th anniversary of publication of Niels Bohr' paper #Left-Pointing Double Angle Quotation Mark#On the Constitution of Atoms and Molecules#Right-Pointing Double Angle Quotation Mark#. The author also describes the work of Russian scientist Boris Chicherin on the planetary model of the atom

Статья посвящена столетию со времени опубликования знаменитого труда Нильса Бора #Left-Pointing Double Angle Quotation Mark#О строении атомов и молекул#Right-Pointing Double Angle Quotation Mark#, также рассказывается о работах русского ученого Бориса Чичерина в области планетарной модели атома

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### **Behavior of E125 alloy under high-temperature oxidation**

**S36**

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Povedenie splava Eh125 pri vysokotemperaturnom okislenii

p. 52-61

(RU)

8 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

MATERIALS; STAINLESS STEELS; ALLOYS; OXIDATION; ZIRCONIUM; NIOBIUM;  
LWGR TYPE REACTORS

A comparative analysis of the data on the corrosion behavior of the E110 alloy and foreign Zr-2.5% Nb alloys has been carried out. Significant differences in the kinetic oxidation of the E125 and E110 alloys at 900-1000 Deg C have been revealed

Проведен сравнительный анализ с данными по коррозионному поведению сплава Э110 и зарубежных сплавов состава Zr-2,5%Nb. Обнаружены существенные различия в кинетике окисления сплавов Э125 и Э110 при температурах 900-1000 град С

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### **Verification of DYNCO code in HTGR core simulating**

**S22**

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Verifikatsiya koda DYNCO na osnove raschetnykh i ehksperimental'nykh dannykh aktivnoj

zony reaktorov VTGR

p. 62-69

(RU)

4 refs., 6 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; NUCLEAR FACILITIES; HTGR TYPE REACTORS; REACTOR CORES; SIMULATION; VERIFICATION; REACTIVITY

Authors present the results of verification of DYNCO code at HTGR core's neutron and physical characteristics simulation. It is indicated that 3-D DYNCO code can be applied for high-temperature reactors calculations, and the obtained results describe neutron characteristics with high accuracy

Приводятся результаты верификации кода DYNCO при моделировании нейтронно-физических характеристик активной зоны реактора ВТГР. Показано, что используемый трехмерный динамический код может применяться для расчетов высокотемпературных реакторов, причем результаты, полученные по коду DYNCO, с хорошей точностью описывают характеристики реактора данного типа

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## **On the experimental study of the converters of thermal energy into the parallel photon beam**

**S22**

*Gulevich, A.V.; Kukharchuk, O.F.; Loginov, N.I.; Mikheev, A.S. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: mikheev@ippe.ru*

Ob ehksperimental'nom obosnovanii preobrazovatelej teplovogo izlucheniya v parallel'nyj potok fotonov

p. 70-78

(RU)

5 refs., 8 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR FACILITIES; REACTORS; DIRECT ENERGY CONVERSION; ELECTROMAGNETIC RADIATION; PHOTON EMISSION

Authors consider the experimental study of conversion systems using some simulation plants, the obtained results are given. It is shown that efficiency of the direct conversion can be enough high, up to 90%

Рассматривается экспериментальное обоснование преобразовательных систем с использованием некоторых модельных установок, приводятся полученные на них результаты. Экспериментально показано, что эффективность преобразования может достигать 90%

## **Methodological principles of industrial enterprises personnel's psychological education for work under high-risk conditions**

**S61**

*Abramova, V.N. (Obninskij Inst. Atomnoj Ehnergetiki NIYaU MIFI, Obninsk (RU))*

Metodologicheskie osnovy psikhologicheskoy podgotovki personala promyshlennykh predpriyatij k rabote v usloviyakh povyshennogo riska

p. 79-87

(RU)

3 refs., 1 fig., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

SOCIOLOGY; EDUCATION; HUMAN FACTORS; BEHAVIOR; RISK ASSESSMENT; PERSONNEL; DOSIMETRY; RADIATION PROTECTION

The author discusses the issue and presents the methodological principles of industrial enterprises personnel's psychological education for work under high-risk conditions

Автор обсуждает и представляет методологические основы психологической подготовки персонала промышленных предприятий к работе в условиях повышенного риска

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## **Computational studies of global nuclear energy development under the assumption of the world's heterogeneous development**

**S21**

*Egorov, A.F.; Korobejnikov, V.V.; Poplavskaya, E.V.; Fesenko, G.A. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: korob@ippe.ru*

Raschetnye issledovaniya stsenariev razvitiya global'noj AEh v predpolozhenii neodnorodnogo razvitiya mira

p. 88-95

(RU)

4 refs., 3 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

FUEL CYCLE; CLOSED-CYCLE SYSTEMS; NUCLEAR ENGINEERING; NUCLEAR INDUSTRY; FAST REACTORS; WATER COOLED REACTORS; HEAVY WATER COOLED REACTORS

Authors study the mathematical model of Global nuclear energy development until the end of this century. For comparative scenarios analysis of transition to sustainable nuclear energy systems, the models of heterogeneous world with an allowance for specific national development are under investigation

Авторы исследуют модель развития мировой атомной энергетики до 2100 г. Для сравнительного анализа сценариев перехода к устойчивым ядерно-энергетическим

системам используются модели неоднородного развития мира с учетом специфики развития стран

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### **Minor actinides incineration in neutron spectra of uranium-235 or plutonium fission**

**S38**

*Khorasanov, G.L.; Blokhin, A.I. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Vyzhiganie mladshikh aktinidov v zhestkikh nejtronnykh spektrakh

p. 96-103

(RU)

10 refs., 1 fig., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

RADIATION CHEMISTRY; ACTINIDES; NEPTUNIUM; AMERICIUM; CURIUM;  
SPECTRAL HARDENING; NEUTRON SPECTRA; FAST REACTORS

With the aim to incinerate minor actinides (neptunium, americium and curium), the possible ways of increasing the mean energy of neutrons in nuclear power installations are considered in the paper

С целью уничтожения младших актинидов (нептуния, америция, кюрия) путем их деления авторы обсуждают возможные пути повышения средней энергии нейтронов в ядерных энергетических установках

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### **Special aspects of the initial fuel loading phase in BN-1200 reactor core**

**S22**

*Malysheva, I.V.; Tsarapkina, A.N.; Eliseev, V.A.; Egorov, A.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: eliseev@ippe.ru*

Osobennosti nachal'nogo ehtapa raboty aktivnoj zony reaktora BN-1200

p. 104-109

(RU)

4 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; REACTORS; FAST REACTORS; REACTOR CORES; REACTIVITY;  
FUEL ASSEMBLIES; CONTROL ELEMENTS

Different methods for excess reactivity reduction in the initial fuel loading phase as well as associated transients before the stable state of regular partial reloadings are presented in the paper. Different techniques for compensating excess reactivity are also analyzed

В работе представлены различные способы подавления избыточной реактивности в начальной загрузке активной зоны и связанные с ними переходные режимы до установившегося режима равномерно-частичных перегрузок ТВС. Анализируются различные способы компенсации избыточной реактивности

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## **Calculational-experimental research of irradiation heat rate in the BOR-60 side shield**

**S22**

*Varivtsev, A.V.; Zhemkov, I.Yu. (OAO GNTs NIAR, Dimitrovgrad (RU)), E-mail: ziu@niar.ru*  
Raschetno-ehksperimental'nye issledovaniya radiatsionnogo teplovydeleniya v bokovom ehkrane reaktora BOR-60

p. 110-116

(RU)

8 refs., 3 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; REACTORS; BOR-60 REACTOR; GAMMA RADIATION; HEAT RATE; SHIELDS

The improved method has been used to calculate irradiation heat rate in components of an experimental rig located in the first row of the BOR-60 side shield. It is shown that the computed values correlate satisfactorily with the experimental ones

Авторами рассчитаны значения радиационного тепловыделения в элементах экспериментального устройства, расположенного в первом ряду бокового экрана реактора БОР-60. Показано, что полученные расчетные значения удовлетворительно согласуются с экспериментальными данными

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## **Increasing maximum neutron flux in the core of MBIR reactor**

**S22**

*Chernyj, V.A.; Kochetkov, L.A.; Bur'evskij, I.V.; Stogov, V.Yu. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Povyshenie plotnosti potoka nejtronov v mnogotslevom bystrom issledovatel'skom reaktore

p. 117-123

(RU)

9 refs., 1 fig., 2 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.3)

NUCLEAR POWER; REACTORS; FAST REACTORS; RESEARCH AND TEST REACTORS; NEUTRON FLUX; NEUTRON DENSITY; FUEL PINS

Authors present data on the theoretical search of technical decisions, and their application for the core of the MBIR reactor installation under design now for the essential increase of maximum neutron flux

Представлена информация о расчетах поисковых технических решений, их адаптации к активной зоне проектируемого реактора МБИР для существенного повышения в ней максимальной величины плотности потока нейтронов

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## **Constants base for calculations of fast reactors. The path to the modern state of the problems of the further development**

**S22**

*Nikolaev, M.N. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)),  
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Konstantnoe obespechenie raschetov bystrykh reaktorov. Put' k sovremennomu sostoyaniyu i zadachi dal'nejshego razvitiya

p. 5-16

(RU)

14 refs., 1 fig.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

REACTORS; FAST REACTORS; BR-1 REACTOR; BR-2 REACTOR; BOR-60 REACTOR;  
BN-350 REACTOR; REACTOR CORES; COMPUTER CALCULATIONS

The author describes the history of the development of constant neutron and physical calculations of fast reactors. The current state impairment s are noted, and tasks for further development are formulated

Кратко изложена история развития константного обеспечения нейтронно-физических расчетов быстрых реакторов. Отмечены недостатки современного состояния, сформулированы задачи дальнейшего развития

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## **Can nuclear power be competitive in the free energy market?**

**S22**

*Klimenko, A.V. (NIYaU MIFI, Moscow (RU))*

Mozhet li yadernaya ehnergetika stat' konkurentosposobnoj na svobodnom rynke ehnergii

p. 17-28

(RU)

20 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; NUCLEAR POWER PLANTS; ECONOMICS; MARKET; ENERGY EFFICIENCY; MATHEMATICAL MODELS



On the basis of calculations obtained by TOBAS software system, it is shown that nuclear power plants (NPP) in the coming decades can be pushed out of the energy market by conventional stations on coal and natural gas. To make new NPPs competitive, they should be designed according to economic criteria with discount rates not less than 15% per year

На основании расчетов, полученных с помощью программного комплекса TOBAS, авторы показывают, что ядерно-энергетические установки (ЯЭУ) в ближайшие десятилетия могут быть вытеснены с рынка энергии традиционными станциями на угле и природном газе. Чтобы новые ЯЭУ имели запас экономической прочности, их следует проектировать по экономическому критерию со ставками дисконтирования не ниже 15% в год

---

## **Research of possibility of using thermal energy accumulators at the nuclear power plant at regulation of current frequency in the power network**

**S22**

*Bazhanov, V.V.; Loshchakov, I.I.; Shchuklinov, A.P. (OAO NPO TsKTI, FGBOU VPO SPbGPU, Sankt-Peterburg (RU))*

Issledovanie vozmozhnosti ispol'zovaniya na AEhS akkumulyatorov teplovoj ehnergii pri regulirovanii chastoty toka v seti

p. 29-36

(RU)

4 refs., 5 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; NUCLEAR FACILITIES; WWER TYPE REACTORS; THERMAL POWER PLANTS; HEAT PRODUCTION; MATHEMATICAL MODELS

The results of research proving possibility of using a system of accumulation of thermal energy in the nuclear power plant with the WWER-reactor for ensuring variable power of a turbogenerator with the participation of the nuclear power plant in regulation of frequency of current in a power network are presented in the article

В работе приводятся результаты аналитического исследования, обосновывающие использование системы аккумуляции тепловой энергии АЭС с реакторами ВВЭР как элемента, обеспечивающего переменную мощность турбогенератора при участии АЭС в регулировании частоты тока в сети

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## **Efficiency of small-power nuclear engineering for heat production**

**S22**

*Kurskij, A.S. (OAO VNIINM imeni Akademika A.A. Bochvara, Moscow (RU)), E-mail: kurskiyy.aleksandr@rambler.ru*

Ehffektivnost' ispol'zovaniya maloj atomnoj ehnergetiki dlya teplofikatsii

p. 37-44

(RU)

14 refs., 2 figs., 3 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; REACTORS; BWR TYPE REACTORS; SMALL-SCALE HYDROELECTRIC POWER PLANTS; DUAL-PURPOSE POWER PLANTS; COGENERATION; HEAT PRODUCTION

The paper presents the effectiveness and importance of the development of small nuclear energy. The technical and economic performance parameters of modern reactor are given. Such small reactor facilities are intended for regional energy systems

В работе обосновывается целесообразность и значимость развития малой атомной энергетики. Приводятся технико-экономические показатели современной реакторной установки, предназначенной для региональной энергетики

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**Study of the functioning of the gas phase electrochemical oxygen sensor with a solid oxygenated electrolyte under conditions which emulate process of hydrogen regeneration of circulation loops of perspective reactors with heavy liquid metal coolants**

**S22**

*Ivanov, I.I.; Storozhenko, A.N.; Ul'yanov, V.V.; Teplyakov, Yu.A.; Shelemet'ev, V.M.; Sadovnichij, R.P. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: vulyanov@ippe.ru*

Izuchenie raboty tverdoehlektrolitnogo datchika kisloroda v gazakh v usloviyakh, imitiruyushchikh protsessy vodorodnoj ochistki tsirkulyatsionnykh konturov perspektivnykh RU s tyazhelymi zhidkometallichesкими теплоносителями

p. 45-50

(RU)

4 refs., 6 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR FACILITIES; COOLANTS; LEAD; BISMUTH; SOLID ELECTROLYTES; CIRCULATING SYSTEMS

Authors describe the study of the functioning of the gas phase electrochemical oxygen sensor with a solid oxygenated electrolyte under conditions which emulate process of hydrogen regeneration of circulation loops of perspective reactors with heavy liquid metal coolants

В работе изучены работы твердо-электролитного датчика кислорода в газах в условиях, имитирующих процессы водородной очистки циркуляционных контуров перспективных РУ с тяжелыми жидко-металлическими теплоносителями

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**The study of temperature influence on the performance of conductometric hydrogen sensor element based on Pd-Ag alloy**

## S22

*Skomorokhov, A.N.; Shelemet'ev, V.M.; Askhadullin, R.Sh.; Storozhenko, A.N.; Skomorokhova, S.N.; Sitnikov, I.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: raskhadullin@ippe.ru*

Issledovanie vliyaniya temperaturnogo rezhima na rabotosposobnost' konduktometricheskogo chuvstvitel'nogo ehlementa datchika vodoroda na osnove splava palladij-serebro

p. 51-56

(RU)

8 refs., 4 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; REACTORS; BWR TYPE REACTORS; BN-800 REACTOR; COOLANTS; LIQUID METALS; SENSORS; PALLADIUM ALLOYS; SILVER ALLOYS

Authors present the study of temperature influence on the performance of conductometric hydrogen sensor element based on Pd-Ag alloy

Исследовано влияние температуры на время отклика и величину изменения электрического сопротивления чувствительного элемента кондуктометрического датчика водорода на основе сплава палладий-серебро в диапазоне температур от 180 до 310 град С

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## The methodical features of structural investigations for sodium cooling pins

### S22

*Kinev, E.A.; Tsygvintsev, V.A.; Barybin, A.V. (OAO Inst. Reaktornykh Materialov, Zarechnyj (RU)), E-mail: kinev007@yandex.ru*

Metodicheskie osobennosti strukturnykh issledovanij tvehlov s natrievym okhlazhdeniem

p. 57-63

(RU)

3 refs., 6 figs., 1 tab.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; FUEL ELEMENTS; FUEL ELEMENT FAILURE; MELTING; SODIUM; CESIUM; URANATES

The specificity of rupture of fault pins and gas flow leaking have been investigated in the paper. Authors prove the urgent need to use the waterless technology during preparation of faulty pins for post-reactor investigations

В работе рассматривается специфика дефектов твэлов с разрывом оболочки и газовой негерметичностью. Данные иллюстрируют насущную необходимость безводной технологии подготовки дефектных твэлов к послереакторным исследованиям

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## Analysis of approaches to the formation of radioactive deposits on fast neutron

## **reactors loops modeling**

**S21**

*Korsun, A.S.; Kharitonov, V.S.; Filippov, M.F. (NIYaU MIFI, Moscow (RU)), E-mail: philippov@ibrae.ac.ru*

Analiz podkhodov k modelirovaniyu protsessov formirovaniya radioaktivnykh otlozhenij na stenkakh konturov bystrykh natrievykh reaktorov

p. 64-68

(RU)

7 refs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

REACTORS; FAST REACTORS; BN-350 REACTOR; BELOYARSK-3 REACTOR; CORROSION PROTECTION; DEPOSITS; FISSION PRODUCTS

The paper presents an analysis of approaches to the simulations of the processes of radioactive deposits formations on the contour's walls of the fast sodium reactors

Авторы исследуют проблему моделирования процессов формирования радиоактивных отложений на стенках контуров быстрых натриевых реакторов

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## **Design substantiation of electricity-heated reactor model construction with supercritical parameters**

**S21**

*Avdeev, E.F.; Chusov, I.A.; Shelegov, A.S.; Ukraintsev, V.F.; Titov, D.M.; Ragulin, S.V. (IA TEh NIYaU MIFI, Obninsk (RU)), E-mail: igrch@mail.ru*

Raschetnoe obosnovanie konstruksii ehlektroobogrevaemoj modeli reaktornoj ustanovki na sverkhkriticheskikh parametrah

p. 69-77

(RU)

11 refs., 3 figs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR FACILITIES; WWER TYPE REACTORS; THERMAL REACTORS; THERMAL HYDRAULICS; FREONS; REACTOR CORES; BRAYTON CYCLE

The paper presents the Russian concept of electrically heated supercritical reactor model. Calculations have been performed for three types of media: water, carbon dioxide and Freon-134

Приводятся краткие сведения о российской концепции электрообогреваемой теплогидравлической модели реактора на сверхкритических параметрах. На основании интегрального подхода выполнены расчеты теплогидравлики модели активной зоны для сверхкритической воды, углекислого газа и фреона-134а

## **Numerical simulation of the coolant flow in the porous body model of a fast breeder reactor**

**S22**

*Leskin, S.T.; Slobodchuk, V.I.; Shelegov, A.S.; Yaurov, S.V.; Chistozvonova, E.A. (IATEh NIYaU MIFI, Obninsk (RU)); Sorokin, A.P.; Opanasenko, A.N.; Kalyakin, S.G.; Zaryugin, D.G. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail:*

*sorokin@ippe.ru*

Chislennoe modelirovanie neizotermicheskogo techeniya teplonosatelya v baze bystrogo reaktora p. 78-85

(RU)

6 refs., 8 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR FACILITIES; REACTORS; EXPERIMENTAL REACTORS; COOLANT LOOPS; PARTICLE-CORE COUPLING MODEL; MIR REACTOR

The results of numerical simulation of the coolant flow in the model of a fast breeder reactor are presented in the paper. The numerical results of thermohydraulic characteristics for the case of the coolant forced circulation as well as for the case of emergency cooling are also described

Авторами обсуждается численное моделирование неизотермического течения теплоносителя в модели реактора на быстрых нейтронах. Приведены результаты расчетов теплогидравлических процессов для режима принудительной циркуляции, которые согласуются с экспериментальными данными

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## **Conception design of intensive non-reactor neutron source based on hydrogen ion accelerator**

**S62**

*Kononov, O.E.; Kononov, V.N.; Bokhovko, M.V.; Gremyachkin, D.E. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU))*

Kontsepsiya sozdaniya bezreaktornogo intensivnogo istochnika nejtronov dlya luchevoj terapii na baze uskoritelya ionov vodoroda

p. 86-94

(RU)

26 refs., 7 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

MEDICINE; NUCLEAR MEDICINE; RADIOTHERAPY; NEUTRON THERAPY; NEUTRAL BEAM SOURCES; ACCELERATORS; HYDROGEN IONS

Creation of intensive neutron source for various types of neutron therapy is discussed in the paper. The way to generate intensive neutron beams is described. It has been shown that on the basis of the accelerator of 3-MeV beam energy, a neutron facility for oncological treatment can be constructed

Обсуждается создание интенсивного источника нейтронов для проведения на нем различных видов нейтронной терапии. Описываются способы генерации нейтронных пучков и их возможности. Показано, что на ускорителе с энергией до 3 МэВ возможно создание установки для нейтронной терапии с дальнейшим размещением ее в онкологической клинике

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## **Experimental analysis of flowrates distribution features in double-loop reactor channels**

**S22**

*Avdeev, E.F.; Chusov, I.A. (IA TEh NIYaU MIFI, Obninsk (RU)), E-mail: igrch@mail.ru*

Ehksperimental'noe issledovanie osobennostej raspredeleniya raskhodov v kanalakh modeli dvukhpetlevogo reaktora

p. 95-101

(RU)

5 refs., 5 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR FACILITIES; RESEARCH REACTORS; MIR REACTOR; COOLANT LOOPS; REACTOR CORES; HYDRODYNAMIC MODEL

Experimental data on the flowrate distribution in working channels dummies of a research reactor model with double-loop configuration are presented in the paper. The procedures of experiments and received experimental data processing are provided in details

Приводятся опытные данные по распределению расходов в имитаторах рабочих каналов экспериментального стенда-модели исследовательского реактора с двухпетлевой компоновкой. Изложены методики проведения экспериментов и обработки полученных опытных данных

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## **The equations and algorithms for the calculation of temperature fields of shells of revolution in aerodynamic flow considering dependence of its material properties on the temperature**

**S97**

*Rozman, L.S. (IA TEh NIYaU MIFI, Obninsk (RU))*

Uravneniya i algoritmy rascheta temperaturnykh polej obolochki vrashcheniya v aehrodinamicheskom potoke s uchetom zavisimosti svojstv ee materiala ot temperatury

p. 102-108

(RU)

6 refs., 4 figs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

MATHEMATICS; MATHEMATICAL MODELS; EQUATIONS; DIFFERENTIAL EQUATIONS; COMPUTER CALCULATIONS; ALGORITHMS; AERODYNAMICS; AERODYNAMIC HEATING

Author considers the formulation and algorithms of the nonstationary problem for calculation of temperature fields of shell of revolution in high-temperature aerodynamic flow with known temperature. The physical model and calculation of temperature fields in the frontal part and in circle sections of the shell of revolution are also proposed

В работе рассматриваются постановка и алгоритмы решения нестационарной задачи расчета температурных полей оболочки вращения в высокотемпературном аэродинамическом потоке с заданной температурой. Предлагаются физическая модель и алгоритмы расчета температурных полей в лобовой части и в окружных сечениях оболочки

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### **The comparison analyses of WWER REMIX-fuel characteristics at multiple recycling**

**S22**

*Dekusar, V.M.; Kagramanyan, V.S.; Kalashnikov, A.G.; Kapranova, Eh.N.; Korobitsyn, V.E.; Puzakov, A.Yu. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: kagramanyan@ippe.ru*

Analiz kharakteristik REMIKS-topliva pri mnogokratnom retsiklе v reaktorakh VVEhR  
p. 109-117  
(RU)

14 refs., 4 figs., 4 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika  
ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; WWER TYPE REACTORS; PLUTONIUM RECYCLE; URANIUM RECYCLE; FUELS; FUEL ASSEMBLIES; ACTINIDES; NATURAL URANIUM

The calculation studies on WWER-1000 fuel composition at manifold plutonium and uranium recycling alongside with 20%-uranium feeding (REMIX-fuel) have been carried out. The calculation results of natural uranium consumption, separation work, minor actinide accumulation, and the fuel assemblies dose rates with fresh fuel are presented

В работе выполнены расчетные исследования состава топлива в реакторе ВВЭР-1000 при многократном рецикле плутония и урана с подпиткой 20%-ураном (РЕМИКС-топливо). Даны результаты расчета потребления природного урана, работы разделения, накопления младших актинидов и мощности дозы от ТВС со свежим топливом

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### **Preliminary neutron-physical calculations of the research WWER-SKD-30 reactor**

**S22**

*Glebov, A.P.; Klushin, A.V. (GNTs RF-Fiziko-Ehnergeticheskij Inst. imeni A.I. Lejpunskogo, Obninsk (RU)), E-mail: glebov@ippe.ru*

Predvaritel'nye nejtronno-fizicheskie raschety ehksperimental'nogo reaktora VVEhR-SKD-30  
p. 118-127  
(RU)

10 refs., 2 figs., 8 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR POWER; WWER TYPE REACTORS; EXPERIMENTAL REACTORS;  
NEUTRON SPECTRA; AFTER-HEAT REMOVAL; COOLANTS

The features of experimental WWER-SKD-30 reactor cooled by water of supercritical parameters of 30-MWe power are considered. This reactor is characterized by fast resonance neutron spectrum and two-pass coolant flow scheme. Physical characteristics of WWER-SCD-30 reactor are given. The heat removal scheme of NPP with this reactor is also discussed

Рассматриваются особенности экспериментального реактора ВВЭР-СКД-30 мощностью 30 МВт, охлаждаемого водой сверхкритических параметров. Реактор характеризуется быстро-резонансным спектром нейтронов и двухходовой схемой охлаждения теплоносителем. Обсуждается схема теплоотвода АЭС с реактором ВВЭР-СКД-30

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## **Stochastic theory for zero-power nuclear reactors. Part 1. Physical and mathematical models**

**S97**

*Volkov, Yu.V. (IAEh NIYaU MIFI, Obninsk (RU)), E-mail: volkov@iate.obninsk.ru*

Stokhasticheskaya teoriya yadernykh reaktorov nulevoj moshchnosti. Chast' 1. Fizicheskaya i matematicheskaya modeli

p. 128-135

(RU)

16 refs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

MATHEMATICS; STOCHASTIC PROCESSES; MATHEMATICAL MODELS;  
STRUCTURAL MODELS; EQUATIONS; ZERO POWER REACTORS; DELAYED  
NEUTRONS

The author has constructed a stochastic theory for zero-power nuclear reactors. The equations have been obtained for the multidimensional generating and characteristic functions describing the probabilistic behavior in time branching process with several types of particles and migration

Автором построена стохастическая теория ядерных реакторов нулевой мощности. Получены уравнения для многомерных производящих и характеристических функций, описывающих вероятностное поведение во времени ветвящегося процесса с несколькими типами частиц и иммиграцией



## **Calculations in support of MIR research reactor conversion to low-enriched fuel S22**

*Izhutov, A.L.; Majnskov, S.V.; Pimenov, V.V.; Starkov, V.A.; Fedoseev, V.E. (OAO GNTs NIAR, Dimitrovgrad (RU)), E-mail: izhutov@niiar.ru*

Raschetnoe issledovanie vozmozhnosti perevoda issledovatel'skogo reaktora MIR na nizkoobogashchennoe toplivo

p. 136-144

(RU)

6 refs., 7 figs., 5 tabs.

Izvestiya Vysshikh Uchebnykh Zavedenij. Yadernaya Ehnergetika

ISSN 0204-3327

(2013)

(no.4)

NUCLEAR FACILITIES; RESEARCH REACTORS; MIR REACTOR; FUEL ASSEMBLIES;  
NUCLEAR FUEL CONVERSION; ENRICHMENT

The paper presents the results of the calculations in support of MIR reactor conversion to low-enriched uranium fuel (LEU-fuel). It is concluded that the conversion of the MIR research reactor to LEU-fuel is feasible in principle with insignificant changes of the reactor experimental capabilities

Представлены результаты расчетного исследования возможности конверсии реактора МИР на низкообогащенное урановое топливо (НОУ-топливо). Авторы делают вывод о принципиальной возможности перевода реактора МИР на НОУ-топливо при несущественных изменениях экспериментальных возможностей реактора

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## **The Eleventh International Ural Seminar Radiation damage physics of metals and alloys. Abstracts**

**S36**

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

**The Eleventh International Ural Seminar Radiation damage physics of metals and alloys**

Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsat'j Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
Odinnadtsat'j Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov.

Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

(RU, EN)

LEADING ABSTRACT; MEETINGS; PHYSICAL RADIATION EFFECTS; STEELS;  
RADIATION SOURCES; ACTINIDES; DIELECTRIC MATERIALS; SEMICONDUCTOR  
MATERIALS; URALS

The book includes abstracts of the Eleventh International Ural Seminar Radiation damage physics of metals and alloys (Kyshtym, 23 February - 1 March, 2015). General issues of radiation damage physics of metals and alloys are discussed. Materials for nuclear and thermonuclear power engineering, new approaches to the development of radiation-resistant structural steels are in the view of participants. The new trends in the physics of strongly correlated d- and f-electron systems, radiation technologies for creating materials with desired properties are considered. Much attention is paid to the impact of external influences on the structural and phase changes in the actinides, areas related with the study of radiation effects in dielectrics and semiconductors, the development of new devices and techniques for carrying out experiments. During the seminar the traditional School of the young speaker is held

Сборник содержит материалы Одиннадцатого Международного Уральского Семинара Радиационная физика металлов и сплавов (Кыштым, 23 февраля - 1 марта 2015 г.). Обсуждаются общие вопросы физики радиационных повреждений металлов и сплавов. В поле зрения участников материалы для ядерной и термоядерной энергетики, новые подходы к созданию радиационно-стойких конструкционных сталей. Рассмотрены новые тенденции в физике сильно коррелированных d- и f-электронных систем, радиационные технологии создания материалов с заданными свойствами. Большое внимание уделяется влиянию внешних воздействий на структурно-фазовые изменения в актинидах, областям, связанным с исследованием радиационных эффектов в диэлектриках и полупроводниках, разработке новых приборов и техники для проведения экспериментов. В рамках семинара проводится традиционная Школа молодого докладчика

---

## **Interface in nanomaterials as effective sinks for radiation defects**

**S36**

*Andrievskij, R.A. (Inst. Problem Khimicheskoy Fiziki, Rossijskaya Akademiya Nauk, Chernogolovka Moskovskoj Obl. (RU)), e-mail: ara@icp.ac.ru*

### **The Eleventh International Ural Seminar Radiation damage physics of metals and alloys**

Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov Poverkhnosti razdela v nanomaterialakh kak ehffektivnye stoki dlya radiatsionnykh defektov p. 3

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

The Eleventh International Ural Seminar Radiation damage physics of metals and alloys.

Abstracts

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov.

Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

RADIATION HARDENING; NANOMATERIALS; SURFACES; MOLECULAR DYNAMICS METHOD; FCC LATTICES; CRYSTAL DEFECTS; SINKS

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## **Microstructure and mechanical properties of weakly activated vanadium alloys after thermomechanical treatments**

**S36**

*Grinyaev, K.V.; Tyumentsev, A.N. (Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Tomskij Gosudarstvennyj Univ., Tomsk (RU)), e-mail: kvgrinyaev@inbox.ru; Ditenberg, I.A. (Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU)); Smirnov, I.V. (Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Tomskij Gosudarstvennyj Univ., Tomsk (RU)); Chernov, V.M.; Potapenko, M.M. (OAO VNIINM im. A.A. Bochvara, Moscow (RU))*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

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Mikrostruktura i mekhanicheskie svojstva maloaktiviruemykh vanadievnykh splavov posle termomekhanicheskikh obrabotok

p. 3-4

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

VANADIUM BASE ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; ZIRCONIUM ALLOYS; TUNGSTEN ALLOYS; CHEMICAL COMPOSITION; THERMOMECHANICAL TREATMENTS; MICROSTRUCTURE; FLOW STRESS; MODIFICATIONS

---

## **Plastic deformation and fracture of fine crystalline alloys V-4Ti-4Cr**

**S36**

*Grinyaev, K.V.; Tyumentsev, A.N. (Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Tomskij Gosudarstvennyj Univ., Tomsk (RU)), e-mail: kvgrinyaev@inbox.ru; Ditenberg, I.A. (Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU)); Smirnov, I.V. (Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Tomskij Gosudarstvennyj Univ., Tomsk (RU)); Chernov, V.M.; Potapenko, M.M. (OAO VNIINM im. A.A. Bochvara, Moscow (RU))*

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Plasticheskaya deformatsiya i razrushenie melkokristallicheskogo splava sistemy V-4Ti-4Cr

p. 4-5

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Abstracts

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

VANADIUM BASE ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; CHEMICAL COMPOSITION; DEFORMATION; STRAINS; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K; MICROSTRUCTURE; POINT DEFECTS

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### **Effects of irradiation and heat treatment on solid solutions (SnSe)<sub>1-x</sub>(PrSe)<sub>x</sub> S36**

*Gusejnov, Dzh.I.; Murguzov, M.I.; Ismailov, Sh.S.; Mamedova, R.F. (Azerbajdzhanskij Gosudarstvennyj Pedagogicheskij Univ., Baku (AZ)), e-mail: cih\_58@mail.ru*

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Vliyanie oblucheniya i termoobrabotki na tverdye rastvory (SnSe)<sub>1-x</sub>(PrSe)<sub>x</sub>

p. 5-6

(RU)

1 fig.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Abstracts

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

SOLID SOLUTIONS; TIN SELENIDES; PRASEODYMIUM SELENIDES; CHEMICAL COMPOSITION; THERMOMECHANICAL TREATMENTS; PHYSICAL RADIATION EFFECTS; TEMPERATURE RANGE 0065-0273 K; ELECTRIC CONDUCTIVITY

---

### **Deformation microstructure and separation of radiation defects in nickel S36**

*Danilov, S.E.; Arbuzov, V.L.; Pecherkina, N.L.; Sagaradze, V.V. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: danilov@imp.uran.ru*

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Deformatsionnaya mikrostruktura i separatsiya radiatsionnykh defektov v nikele

p. 6-7

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

AUSTENITIC STEELS; MICROSTRUCTURE; TEMPERATURE RANGE 0273-0400 K;

TEMPERATURE RANGE 0400-1000 K; NICKEL ALLOYS; DEFORMATION; POINT

DEFECTS; PHYSICAL RADIATION EFFECTS

---

## **Influence of impurities on kinetic characteristics of radiation damage in iron and steel**

**S36**

*Demidov, D.N.; Smirnov, E.A. (NIYaU MIFI, Moscow (RU)), e-mail: easmirnov36@mail.ru*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

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Vliyanie primesej na kineticheskie kharakteristiki radiatsionnoj povrezhdaemosti zheleza i stalej

p. 8

(RU)

3 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

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2015

114 p.

AUSTENITIC STEELS; CRYSTAL DEFECTS; DIFFUSION; IMPURITIES; PHYSICAL

RADIATION EFFECTS; RECOMBINATION; SWELLING

---

## **The appearance of defects in the hard alloys Tb<sub>x</sub>Sn<sub>1-x</sub>Se at #gamma#-irradiation**

**S36**

*Dzhafarov, T.A.; Murguzov, M.I.; Gusejnov, Dzh.I.; Ismailov, Sh.S.; Gasanov, O.M.*

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23 Feb - 1 Mar 2015

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Poyavlenie defektov v tverdykh splavakh Tb<sub>x</sub>Sn<sub>1-x</sub>Se pri #gamma#-obluchenii

p. 8-9

(RU)

1 ref., 1 fig.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -

VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Abstracts

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

TIN SELENIDES; TERBIUM SELENIDES; CHEMICAL COMPOSITION; ALLOYS;

MONOCRYSTALS; ZONE MELTING; TEMPERATURE RANGE 0065-0273 K;

TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K;

PHYSICAL RADIATION EFFECTS; TEMPERATURE DEPENDENCE; FRENKEL

DEFECTS; GAMMA RADIATION

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**Positron-annihilation researches of phosphorus effect on the evolution of vacancy defects in electron irradiated Ni**

**S36**

*Druzhkov, A.P.; Danilov, S.E.; Perminov, D.A.; Arbutov, V.L. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: [druzhkov@imp.uran.ru](mailto:druzhkov@imp.uran.ru)*

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Pozitron-annigilyatsionnye issledovaniya vliyaniya fosfora na ehvolyutsiyu vakansionnykh defektov v ehlektronno-obluchennom Ni

p. 9-10

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -

VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Abstracts

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

ANNIHILATION; NICKEL BASE ALLOYS; PHOSPHORUS ADDITIONS; ELECTRON BEAMS; TEMPERATURE RANGE 0065-0273 K; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K; PHYSICAL RADIATION EFFECTS; NICKEL PHOSPHIDES; VACANCIES; TEMPERATURE DEPENDENCE

---

### **Molecular dynamics simulation of atomic displacements cascades near symmetric inclined grain boundaries in Zr**

**S36**

*Kapustin, P.E. (Nauchno-Issledovatel'skij Tekhnologicheskij Inst. im. S.P. Kapitsy Ul'yanovskogo Gosudarstvennogo Univ., Ul'yanovsk (RU)), e-mail: kapustinpe91@gmail.com*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
Molekulyarno-dinamicheskoe modelirovanie kaskadov atomnykh smeshchenij vblizi simmetrichnykh naklonnykh mezhzerennykh granits v Zr

p. 10-11

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

ZIRCONIUM ALLOYS; MOLECULAR DYNAMICS METHOD; ATOMIC DISPLACEMENTS; GRAIN BOUNDARIES; TEMPERATURE RANGE 0273-0400 K; COMPUTERIZED SIMULATION; POINT DEFECTS

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### **Equilibrium thermodynamics of helium in the $\delta$ -phase alloys Pu-Ga**

**S36**

*Karavaev, A.V.; Dremov, V.V.; Ionov, G.V. (FGUP Rossijskij Federal'nyj Yadernyj Tsentr - Vserossijskij Nauchno-Issledovatel'skij Inst. Tekhnicheskoy Fiziki im. akad. E.I. Zababakhina, Snezhinsk (RU)), e-mail: a.v.karavayev@vniitf.ru*

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Ravnesnaya termodinamika geliya v  $\delta$ -faznykh splavakh Pu-Ga

p. 11

(RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

PLUTONIUM BASE ALLOYS; GALLIUM ALLOYS; MOLECULAR DYNAMICS METHOD; FCC LATTICES; LTE; SELF-IRRADIATION; FREE ENERGY; COMPARATIVE EVALUATIONS; PHYSICAL RADIATION EFFECTS

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### **Atomic-scale research of phase decomposition Fe-22%Cr during thermal aging and subsequent heavy ion irradiation**

**S36**

*Korchuganova, O.A.; Aleev, A.A.; Rogozhkin, S.V. (FGBU GNTs RF ITEhF, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail:*

*KorchuganovaOA@gmail.com*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

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Atomno-masshtabnoe issledovanie fazovogo raspada Fe-22%Cr pri termicheskom starenii i posleduyushchem tyazheloionnom obluchenii

p. 11-12

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

IRON BASE ALLOYS; CHROMIUM ALLOYS; CHEMICAL COMPOSITION; PHYSICAL RADIATION EFFECTS; HEAVY IONS; ION BEAMS; SOLID SOLUTIONS; AGING; HEAT TREATMENTS; KINETICS

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### **Atomistic simulations of substitution element segregation at grain boundaries of various types**

**S36**

*Kuznetsov, A.R.; Kar'kina, L.E.; Kar'kin, I.N.; Razumov, I.K.; Gornostyrev, Yu.N. (IFM UrO RAN, Ekaterinburg (RU)), e-mail: a\_kuznetsov@imp.uran.ru; Korzhavyj, P.A. (KTH Royal Inst. of Technology, Stockholm (SE))*

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Kyshtym (RU)

23 Feb - 1 Mar 2015



Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
Atomisticheskoe modelirovanie segregatsij ehlementov zameshcheniya na granitsakh zeren  
razlichnykh tipov

p. 12-13

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

The Eleventh International Ural Seminar Radiation damage physics of metals and alloys.

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

GRAIN BOUNDARIES; DENSITY FUNCTIONAL METHOD; SEGREGATION;  
MOLECULAR DYNAMICS METHOD; ALUMINIUM BASE ALLOYS; MAGNESIUM  
ALLOYS; SILICON ADDITIONS; TITANIUM ALLOYS; ATOMIC DISPLACEMENTS

---

### **Processes of atomic redistribution at radiation- and deformation-induced dissolution of intermetallic compounds in the alloy Fe-Ni-Si**

**S36**

*Shabashov, V.A.; Sagaradze, V.V.; Litvinov, A.V. (Inst. Fiziki Metallov imeni M.N. Mikheeva  
UrO RAN, Ekaterinburg (RU)), e-mail: litvinov@imp.uran.ru*

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Protssesy atomnogo pereraspredeleniya pri radiatsionno- i deformatsionno-indutsirovannom  
rastvorenii intermetallidov v splave Fe-Ni-Si

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(RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

MOESSBAUER EFFECT; IRON BASE ALLOYS; NICKEL ALLOYS; SILICON  
ADDITIONS; TEMPERATURE RANGE 0273-0400 K; INTERMETALLIC COMPOUNDS;  
ATOMIC DISPLACEMENTS; DEFORMATION

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### **Kinetics of phase transformations in process of plastic deformation of neutron**

## **irradiated metastable 12Cr18Ni10Ti steel and AISI 304**

**S36**

*Merezhko, M.S.; Maksimkin, O.P.; Merezhko, D.A. (Inst. Yadernoj Fiziki, Almaty (KZ)), e-mail: merezhko.mihail@gmail.com*

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Kinetika fazovogo prevrashcheniya v protsesse plasticheskoy deformatsii obluchennykh  
nejtronami metastabil'nykh stalej 12Kh18N10T i AISI 304

p. 14

(RU)

2 refs.

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114 p.

STEEL-CR18NI10TI; STEEL-CR18NI10; KINETICS; DEFORMATION; NEUTRON  
BEAMS; ATOMIC DISPLACEMENTS; STRAINS

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## **Evolution of surface relief under the diffusion flow of point defects**

**S36**

*Novoselov, I.I.; Yanilkin, A.V. (FGUP Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki  
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Ehvoljutsiya rel'efa poverkhnosti pod dejstviem diffuzionnogo potoka tochechnykh defektov

p. 14-15

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2 refs.

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ATOMIC DISPLACEMENTS; MONTE CARLO METHOD; MOLECULAR DYNAMICS METHOD; VACANCIES; SWELLING; FORMATION HEAT; DIFFUSION; ALLOYS; METALS

---

### **Comparative study of ion bombing and shock-wave loading effects on the structure of aluminum alloys**

**S36**

*Ovchinnikov, V.V.; Gushchina, N.V. (Inst. Ehlektrofiziki, UrO RAN, Ekaterinburg (RU)), e-mail: viae05@rambler.ru; Kajgorodova, L.I. (Inst. Fiziki Metallov, UrO RAN, Ekaterinburg (RU)); Grigor'ev, A.N.; Pavlenko, A.V.; Plokhoy, V.V. (FGUP RFYaTs - VNIITF im. akadem. E.I. Zababakhina, Snezhinsk (RU))*

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Sravnitel'nye issledovaniya vozdeystviya ionnoj bombardirovki i udarno-volnovogo nagruzheniya na strukturu alyuminievykh splavov

p. 15-16

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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MICROSTRUCTURE; PHYSICAL RADIATION EFFECTS; MECHANICAL TESTS;  
ANNEALING; RADIOACTIVE ION BEAMS; ARGON IONS

---

### **Positron-annihilation study of the sulfur nanoclusters evolution in the irradiated and heat aged Ni-S system**

**S36**

*Perminov, D.A.; Druzhkov, A.P.; Arbutov, V.L. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: d\_perm@rambler.ru*

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Pozitron-annigilyatsionnye issledovaniya ehvolyutsii nanoklastero v sery v sisteme Ni-S pri obluchenii i termicheskom starenii

p. 17

(RU)

2 refs.

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ANNIHILATION; NICKEL BASE ALLOYS; SULFUR ADDITIONS; AGING;  
TEMPERATURE RANGE 0400-1000 K; PHYSICAL RADIATION EFFECTS; POSITRON  
BEAMS; NANOSTRUCTURES

---

### **Simulation of diffusion mass transfer in alloys under ion irradiation**

**S36**

*Pechenkin, V.A.; Chernova, A.D.; Molodtsov, V.L. (GNTs RF Fiziko-Ehnergeticheskij Inst. im. A.I. Lejpunskogo, Obninsk (RU)), e-mail: vap@ippe.ru; Garner, F.A. (Radiation Effects Consulting, Richland (US))*

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ATOMIC DISPLACEMENTS; NICKEL IONS; DOSE RATES; ION IMPLANTATION; ION  
BEAMS; CHROMIUM STEELS; SIMULATION

---

### **Temperature effects on the phase composition and physical mechanical properties of austenitic chromium-nickel stainless steels, irradiated with neutrons in a reactor WWER-K**

**S36**

*Ruban, S.V.; Rofman, O.V.; Maksimkin, O.P.; Tsaj, K.V. (Inst. Yadernoj Fiziki RK, Almaty (KZ)), e-mail: o.rofman@mail.ru*

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Vliyanie temperatury na fazovyj sostav i fiziko-mekhanicheskie svojstva austenitnykh  
khromonikelevykh nerzhaveyushchikh stalej, obluchennykh nejtronami v reaktore VVR-K  
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(RU)

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ANNEALING; TEMPERATURE RANGE 0400-1000 K; RADIATION HARDENING;  
TEMPERATURE DEPENDENCE

---

**Intensification of diffusion phase transformations in iron-based alloys in  
conditions of deformation generation of point defects at cryogenic temperatures  
S36**

*Sagaradze, V.V.; Shabashov, V.A.; Kozlov, K.A.; Kataeva, N.V.; Litvinov, A.V.; Zavalishin, V.A.  
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Intensifikatsiya diffuzionnykh fazovykh prevrashchenij v splavakh na osnove zheleza v  
usloviyakh deformatsionnoj generatsii tochechnykh defektov pri kriogennykh temperaturakh  
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(RU)

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AUSTENITIC STEELS; INTERMETALLIC COMPOUNDS; TITANIUM COMPOUNDS;  
NICKEL COMPOUNDS; AGING; QUENCHING; TEMPERATURE RANGE 1000-4000 K;  
MOESSBAUER EFFECT; POINT DEFECTS

---

## **Extension temperature effects on the features of plastic deformation and failure of internally oxidized alloy V-Cr-Zr-W**

**S36**

*Smirnov, I.V. (Tomskij Gosudarstvennyj Univ., Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU)), e-mail: smirnov\_iv@bk.ru; Ditenberg, I.A. (Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU)); Pinzhin, Yu.P. (Tomskij Gosudarstvennyj Univ., Tomsk (RU); Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU)); Grinyaev, K.V.; Tyumentsev, A.N. (Tomskij Gosudarstvennyj Univ., Tomsk (RU); Sibirskij Fiziko-Tekhnicheskij Inst. im. V.D. Kuznetsova, Tomsk (RU); Inst. Fiziki Prochnosti i Materialovedeniya SO RAN, Tomsk (RU)); Chernov, V.M. (OAO Vysokotekhnologicheskij Nauchno-Issledovatel'skij Inst. Neorganicheskikh Materialov im. akad. A.A. Bochvara, Moscow (RU))*

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Vliyanie temperatury rastyazheniya na osobennosti plasticheskoj deformatsii i razrusheniya  
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(RU)

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VANADIUM ALLOYS; CHROMIUM ALLOYS; ZIRCONIUM ALLOYS; TUNGSTEN  
ALLOYS; STRAINS; DEFORMATION; TEMPERATURE RANGE 1000-4000 K; CRACK  
PROPAGATION; TEMPERATURE DEPENDENCE

---

## **Radiation damage of FeCr binary alloy with symmetric inclined boundary under uniaxial stresses: molecular dynamic simulation**

**S36**

*Tikhonchev, M.Yu.; Svetukhin, V.V. (FGBOU VPO Ul'yanovskij Gosudarstvennyj Univ., Ul'yanovsk (RU)), e-mail: tikhonchev@sv.ulsu.ru*

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Molekulyarno-dinamicheskoe modelirovanie radiatsionnogo povrezhdeniya binarnogo splava  
FeCr s simmetrichnymi naklonnymi granitsami pod odnoosnym napryazheniem

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(RU)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)  
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114 p.  
BINARY ALLOY SYSTEMS; MOLECULAR DYNAMICS METHOD; GRAIN BOUNDARIES; SIMULATION; ATOMIC DISPLACEMENTS; TEMPERATURE RANGE 0273-0400 K

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### **Kinetic model of radiation-induced ageing alloys**

**S36**

*Khlebnikov, V.A.; Kuksin, A.Yu.; Yanilkin, A.V. (FGUP VNII Avtomatiki im. N.L. Dukhova, Moscow (RU)), e-mail: breadoff@gmail.com*

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Kineticheskaya model' radiatsionno-indutsirovannogo stareniya splavov

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(RU)

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114 p.

MONTE CARLO METHOD; AGING; ANNEALING; PHYSICAL RADIATION EFFECTS; KINETICS; CRYSTAL LATTICES; FRENKEL DEFECTS; ACTIVATION ENERGY

---

### **Recombination and clustering of point defects during the evolution of displacement cascade**

**S36**

*Kuksin, A.Yu.; Yanilkin, A.V. (FGUP Vserossijskij Nauchno-Issledovatel'skij Inst. Avtomatiki im. N.L. Dukhova, Moscow (RU); Ob'edinennyy Inst. Vysokikh Temperatur RAN, Moscow (RU)), e-mail: aleyanilkin@gmail.com*

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Rekombinatsiya i klasterizatsiya tochechnykh defektov pri ehvolyutsii kaskada smeshchenij  
p. 23-24  
(RU)

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RECOMBINATION; SOLID CLUSTERS; MONTE CARLO METHOD; MOLYBDENUM  
ALLOYS; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 1000-4000 K;  
CRYSTAL DEFECTS; ATOMIC DISPLACEMENTS

---

## **Measurement of void swelling in thick non-uniformly irradiated 304 stainless steel blocks using nondestructive ultrasonic techniques**

**S36**

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Sagisaka, M.; Matsunaga, T. (Nuclear Fuel Industries, Osaka (JP)); Freyer, P.D. (Westinghouse  
Electric Company, Pittsburgh, PA (US)); Huang, Y. (Univ. of Wisconsin, Madison, WI (US);  
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304 stainless steel - Cr18Ni10

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EMBRITTELEMENT; IRRADIATION; ATOMIC DISPLACEMENTS; MECHANICAL  
PROPERTIES; PWR TYPE REACTORS

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## **Microstructural characterization of AISI 316L tensile specimens from the second**



## **operational target module at the spallation neutron source**

**S36**

*Gussev, M.N.; McClintock, D.A. (Oak Ridge National Lab., Oak Ridge, TN (US)), e-mail: gussevmn@ornl.gov; Garner, F.A. (Radiation Effect Consulting, Richland, WA (US))*

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AISI 316L - Cr17Ni12Mo3-L

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NEUTRON SOURCES; STAINLESS STEEL-316L; TWINNING; STRAINS; SPALLATION;  
ATOMIC DISPLACEMENTS; MICROSTRUCTURE; TENSILE PROPERTIES;  
ELONGATION

---

## **Phase instability during plastic deformation of AISI 304L steel irradiated in light-water and fast reactors**

**S36**

*Gussev, M.N.; Field, K.G.; Busby, J.T. (Oak Ridge National Lab., Oak Ridge, TN (US)), e-mail: gussevmn@ornl.gov; Garner, F.A. (Radiation Effect Consulting, Richland, WA (US))*

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STAINLESS STEEL-304L; DEFORMATION; STAINLESS STEEL-316L; BOR-60  
REACTOR; WATER COOLED REACTORS; IRRADIATION; STRAINS; MORPHOLOGY

---

**Relationship of void swelling and depressed stability in various ODS ferritic-martensitic alloys irradiated with self-ions to very high dpa levels**

**S36**

*Garner, F.A. (Radiation Effects Consulting (US)), e-mail: frank.garner@dslextrreme.com; Shao, L. (Texas A and M Univ., Texas (US)); Ukai, S. (Hokkaido Univ., Hokkaido (JP)); Toloczko, M.B. (Pacific Northwest National Lab., Richland (US)); Voyevodin, V.; Bryk, V.; Borodin, O. (Kharkov Inst. of Physics and Technology, Kharkov (UA)); Hoelzer, D. (Oak Ridge National Lab., Oak Ridge (US))*

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SWELLING; ATOMIC DISPLACEMENTS; ALLOYS; OXIDES; DISPERSION

HARDENING; GRAIN BOUNDARIES; NANOSTRUCTURES; DEFORMATION

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**Tomographic atom probe study of ODS steel 12Cr-1.1W-0.2V-0.3Ti-0.3Y\_2O\_3**

**S36**

*Khomich, A.A.; Orlov, N.N.; Rogozhkin, S.V. (National Research Nuclear Univ. MEPhI, Moscow (RU); State Scientific Center of the Russian Federation - Inst. for Theoretical and Experimental Physics, Moscow (RU)), e-mail: artem.khomich@gmail.com*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
p. 29-30

(EN)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

YTTRIUM OXIDES; CHROMIUM STEELS; ATOMIC DISPLACEMENTS; DISPERSION  
HARDENING; ATOMIC CLUSTERS; NANOSTRUCTURES; SPATIAL DISTRIBUTION

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### **Detailed analysis of deformation waves in nonirradiated and irradiated metastable Cr18-Ni10-Ti steel**

**S36**

*Ruban, S.V.; Maksimkin, O.P.; Tsay, K.V. (Inst. of Nuclear Physics, Almaty (KZ)), e-mail: rubanserg@gmail.com; Gussev, M.N.; Busby, J.T. (Oak Ridge National Lab., Tennessee (US)); Garner, F.A. (Radiation Effects Consulting, Richland, WA (US))*

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Kyshtym (RU)

23 Feb - 1 Mar 2015

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p. 30-31

(EN)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

STEEL-CR18NI10TI; IRRADIATION; DEFORMATION; PWR TYPE REACTORS;  
ANNEALING; TEMPERATURE RANGE 1000-4000 K; WWER TYPE REACTORS;  
STRAINS; GRAIN ORIENTATION

---

### **Comparison of nanostructural state of oxide-dispersion-strengthened steel ODS Eurofer 97 under Fe and Cr heavy ion irradiation to fluence of $10^{19} \text{ cm}^{-2}$**

**S36**

*Aleev, A.A.; Rogozhkin, S.V.; Korchuganova, O.A.; Nikitin, A.A.; Orlov, N.N. (Gosudarstvennyj Nauchnyj Tsentr Rossijskoj Federatsii - Inst. Teoreticheskoy i Eksperimental'noj Fiziki, Moscow (RU)), e-mail: Andrey.Aleev@itep.ru*

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Sravnenie nanostrukturnogo sostoyaniya DUO stali ODS Eurofer 97 pri tyazheloionnom  
obluchenii Fe i Cr do flyuensa  $10^{19} \text{ cm}^{-2}$

p. 31-32

(RU)

ODS Eurofer 97 - 9Cr-1W-0.2V-0.1Ta

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

CHROMIUM STEELS; TUNGSTEN ALLOYS; VANADIUM ADDITIONS; TANTALUM ALLOYS; DISPERSION HARDENING; OXIDES; NANOSTRUCTURES; ATOMIC DISPLACEMENTS; HEAVY IONS; IRRADIATION; IRON IONS; CHROMIUM IONS; RADIOACTIVE ION BEAMS

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### **Accumulation and annealing of radiation defects in austenitic steel**

#### **16Cr15Ni3Mo1Ti under low-temperature neutron and electron irradiation**

**S36**

*Arbuzov, V.L.; Goshchitskij, B.N.; Danilov, S.E.; Kar'kin, A.E.; Parkhomenko, V.D.; Sagaradze, V.V. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: danilov@imp.uran.ru*

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Nakoplenie i otzhig radiatsionnykh defektov v austenitnoj stali 16Cr15Ni3Mo1Ti pri nizkotemperaturnom nejtronnom i ehlektronnom obluchenii

p. 32

(RU)

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INIS-RU--598

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IFM UrO RAN

2015

114 p.

AUSTENITIC STEELS; IRRADIATION; NEUTRON BEAMS; TEMPERATURE RANGE 0065-0273 K; NEUTRON FLUENCE; ELECTRON BEAMS; ANNEALING; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K; VACANCIES; ATOMIC DISPLACEMENTS

---

### **Metallographic examination of the meridional cross section of shell from uranium alloy with iron and germanium after explosive loading**

**S36**

*Belyaev, D.A.; Aleksandrov, A.S.; Zuev, Yu.N.; Kozlov, E.A.; Lekomtsev, S.A.; Nedosviti, A.S.;*

Svyatov, I.L.; Levi, E.A. (FGUP RFYaTs-VNIITF im. akadem. E.I. Zababakhina, Snezhinsk (RU)), e-mail: bad1331@mail.ru

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Metallograficheskoe issledovanie meridional'nogo secheniya obolochki iz splava urana s  
zhelezom i germaniem posle vzryvnogo nagruzheniya

p. 33-34

(RU)

6 refs., 1 fig.

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VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

CONTAINMENT SHELLS; MICROSTRUCTURE; DETONATION WAVES; IRON  
ALLOYS; GERMANIUM ALLOYS; INCLUSIONS; MICROHARDNESS; URANIUM BASE  
ALLOYS; DYNAMIC LOADS

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**Electron-microscopic studies of shell from alloy U-1.5Mo, saved after shock wave loading**

**S36**

Bondarchuk, S.V.; Svyatov, I.L.; Belyaev, D.A. (FGUP RFYaTs-VNIITF im. akadem. E.I. Zababakhina, Snezhinsk (RU)), e-mail: bsv.tomsk@mail.ru; Sagaradze, V.V.; Pecherkina, N.L. (IFM UrO RAN, Ekaterinburg (RU))

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Ehlektronnomikroskopicheskoe issledovanie obolochki iz splava U-1.5Mo, sokhranenoj posle  
udarno-volnovogo nagruzheniya

p. 34-35

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

URANIUM BASE ALLOYS; MOLYBDENUM ALLOYS; ELECTRON MICROSCOPY;  
CONTAINMENT SHELLS; DYNAMIC LOADS; CRYSTAL STRUCTURE; CRYSTAL-  
PHASE TRANSFORMATIONS

---

### **Study of the fuel elements structure of reactor BN-600 by the neutron diffraction method**

**S21**

*Voronin, V.I.; Valiev, Eh.Z. (Inst. Fiziki Metallov, UrO RAN, Ekaterinburg (RU)), e-mail: voronin@imp.uran.ru; Berger, I.F. (Inst. Fiziki Metallov, UrO RAN, Ekaterinburg (RU); Inst. Khimii Tverdogo Tela, UrO RAN, Ekaterinburg (RU)); Kozlov, A.V. (OAO Inst. Reaktornykh Materialov, Zarechnyj, Sverdlovskaya Obl. (RU))*

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Izuchenie struktury tvehlov reaktora BN-600 metodom nejtronnoj difraktsii

p. 35-36

(RU)

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INIS-RU--598

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IFM UrO RAN

2015

114 p.

BN-1600 REACTOR; FUEL ELEMENTS; NEUTRON DIFFRACTION; CHROMIUM-  
NICKEL STEELS; BORON ADDITIONS; FUEL ASSEMBLIES; ANISOTROPY;  
DISLOCATIONS; TEMPERATURE DEPENDENCE

---

### **Change in thin structures of steel ChS-68 under neutron irradiation**

**S36**

*Glushkova, N.V.; Tsygvintsev, V.A.; Portnykh, I.A.; Kozlov, A.V. (OAO IRM, Zarechnyj (RU)), e-mail: irm@irmatom.ru*

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23 Feb - 1 Mar 2015

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Izmenenie kharakteristik tonkoj struktury stali ChS-68 pri nejtronnom obluchenii

p. 36-37

(RU)

3 refs.

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

AUSTENITIC STEELS; TEMPERATURE RANGE 0400-1000 K; ATOMIC DISPLACEMENTS; OPTIMIZATION; IRRADIATION; NEUTRON BEAMS; BN-800 REACTOR; CHEMICAL COMPOSITION

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### **Radiation effect on the interactions in the system U-Mo-Al**

**S36**

*Golosov, O.A.; Lyutikova, M.S.; Bakhtina, E.A.; Semerikov, V.B.; Averin, S.A.; Panchenko, V.L. (OAO Inst. Reaktornykh Materialov, Zarechnyj (RU)), e-mail: irm@irmatom.ru*

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Vliyanie oblucheniya na vzaimodejstvie v sisteme U-Mo-Al

p. 37-38

(RU)

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INIS-RU--598

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IFM UrO RAN

2015

114 p.

URANIUM BASE ALLOYS; MOLYBDENUM ALLOYS; ALUMINIUM COMPOUNDS; INTERMETALLIC COMPOUNDS; IRRADIATION; PHYSICAL RADIATION EFFECTS; URANIUM-MOLYBDENUM FUELS

---

### **Radiation swelling of new generation austenitic steels - materials for fast reactor BN-600 fuel cans at high damaging doses. 3. Future steel EK164-ID c.d.**

**S36**

*Zolotov, I.P.; Chuev, V.V. (OAO Kontsern Rosehnergoatom, Filial Beloyarskaya Atomnaya Stantsiya, Zarechnyj (RU)), e-mail: ivanzolotov@ivanzolotov.ru*

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Radiatsionnoe raspukhanie austenitnykh stalej novogo pokoleniya - materialov obolochek

tvehlov bystrogo reaktora BN-600 pri vysokikh povrezhdayushchikh dozakh. 3. Perspektivnaya stal' EhK164-ID kh.d.

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(RU)

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

AUSTENITIC STEELS; SWELLING; BELOYARSK-3 REACTOR; FUEL CANS;  
TEMPERATURE RANGE 0400-1000 K

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## **Fe Ion radiation effects on the microstructure of ferritic-martensitic steel ChS-139**

**S36**

*Iskandarov, N.A.; Bogachev, A.A.; Nikitin, A.A.; Rogozhkin, S.V.; Kulevoj, T.V. (NITs Kurchatovskij Inst., FGBU GNTs RF ITEhF, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: Iskandarov@itep.ru; Kujbida, R.P.; Chalykh, B.B. (NITs Kurchatovskij Inst., FGBU GNTs RF ITEhF, Moscow (RU))*

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Kyshtym (RU)

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Vliyanie oblucheniya ionami Fe na mikrostrukturu ferritno-martensitnoj stali ChS-139

p. 38-39

(RU)

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Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

MARTENSITIC STEELS; REACTOR CORES; CHROMIUM STEELS; IRRADIATION;  
IRON IONS; RADIOACTIVE ION BEAMS; ATOMIC DISPLACEMENTS; DISLOCATIONS

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## **Orientation relationship between the structural components of eutectoid in the alloy U-1.5%Mo**

**S36**

*Kabanova, I.G.; Sagradze, V.V.; Pecherkina, N.L.; Klyukina, M.F. (Inst. Fiziki Metallov UrO*



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23 Feb - 1 Mar 2015

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p. 39-40

(RU)

3 refs., 1 fig.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

URANIUM BASE ALLOYS; MOLYBDENUM ALLOYS; EUTECTOIDS; TEMPERING; TEMPERATURE RANGE 1000-4000 K; DRAWING; TEMPERATURE RANGE 0400-1000 K

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**Transformation in structure and high temperature strength of ferrite-martensitic steels, including ODS modifications**

S36

Kochetkova, T.N.; Sagaradze, V.V.; Vil'danova, N.F.; Kataeva, N.V. (Inst. Fiziki Metallov imeni M.N. Mikheeva UrO RAN, Ekaterinburg (RU)), e-mail: kataeva@imp.uran.ru; Ageev, V.S. (VNIINM im. A.A. Bochvara, Moscow (RU))

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p. 40-41

(RU)

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INIS-RU--598

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2015

114 p.

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### **Connection between energy of vacancy migration in the austenitic steels with their resistance to radiation swelling**

**S36**

*Kozlov, A.V.; Portnykh, I.A.; Asiptsov, O.I.; Shilo, O.B. (OAO IRM, Zarechnyj (RU)), e-mail: kozlov\_av@irmatom.ru*

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Svyaz' ehnergii migratsii vakansij v austenitnykh stalyakh s ikh stojkost'yu k radiatsionnomu raspukhaniyu

p. 41-42

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INIS-RU--598

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2015

114 p.

SWELLING; AUSTENITIC STEELS; BELOYARSK-3 REACTOR; ATOMIC DISPLACEMENTS; VACANCIES; IRRADIATION

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### **Short-range atomic stratification in the bcc alloys Fe-Cr and Fe-Mn at megaplastic deformation in ball mill**

**S36**

*Shabashov, V.A.; Kozlov, K.A.; Pecherkina, N.L. (Inst. Fiziki Metallov imeni M.N. Mikheeva UrO RAN, Ekaterinburg (RU)), e-mail: shabashov@imp.uran.ru*

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Blizhnee atomnoe rassloenie v OTsK splavakh Fe-Cr i Fe-Mn pri megaplasticheskoj deformatsii v sharovoj mel'nitse

p. 42

(RU)

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Tezisy dokladov  
INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.  
MOESSBAUER EFFECT; ATOMIC DISPLACEMENTS; IRON BASE ALLOYS;  
CHROMIUM ALLOYS; MANGANESE ALLOYS; BCC LATTICES; DEFORMATION;  
MILLING MACHINES; MILLING

---

### **Mechanosynthesis of oxide dispersion strengthened iron, using a previously surface oxidation**

**S36**

*Kozlov, K.A.; Sagaradze, V.V.; Kataeva, N.V.; Shabashov, V.A.; Litvinov, A.V. (Inst. Fiziki Metallov imeni M.N. Mikheeva UrO RAN, Ekaterinburg (RU)), e-mail: kozlov@imp.uran.ru*

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Mekhanosintez zheleza, dispersno-uprochnennogo oksidami, s ispol'zovaniem predvaritel'nogo poverkhnostnogo okisleniya

p. 43

(RU)

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114 p.

DISPERSION HARDENING; IRON OXIDES; MILLING MACHINES; MILLING;  
OXIDATION; TEMPERATURE RANGE 1000-4000 K; ANNEALING; TIME DEPENDENCE

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### **Radiation annealing of radiation damage of reactor vessel steel**

**S36**

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23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
Radiatsionnyj otzhig radiatsionnogo povrezhdeniya stali korpusa reaktora

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(RU)

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INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.  
IRRADIATION; EMBRITTLEMENT; NEUTRON FLUENCE; NEUTRON FLUX;  
PHYSICAL RADIATION EFFECTS; ANNEALING; STEELS; COPPER ADDITIONS

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### **Materials development process for radioactive waste isolation during SNF reprocessing**

**S11**

*Kuryleva, Yu.N.; Zakhar'evich, D.A.; Izergin, D.B. (Chelyabinskij Gosudarstvennyj Univ., Chelyabinsk (RU)), e-mail: julieta-k@mail.ru*

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Razrabotka materialov dlya izolyatsii radioaktivnykh otkhodov v protsesse pererabotki OYaT  
p. 44-45

(RU)

2 refs.

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

SPENT FUELS; RADIOACTIVE WASTES; WASTE PROCESSING; SOLVENT  
EXTRACTION; SOLIDIFICATION; OPTIMIZATION; LIQUID WASTES; SAFETY

---

### **New technology for high-temperature treatment of melt for producing materials of nuclear energetics**

**S36**

*Lapin, M.V. (RFYaTs-VNIITF, Snezhinsk (RU)), e-mail: Max2046@yandex.ru; Sheshukov, O.Yu.; Nekrasov, I.V. (IMET UrO RAN, Ekaterinburg (RU))*

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Novaya tekhnologiya vysokotemperaturnoj obrabotki rasplava dlya proizvodstva materialov  
yadernoj ehnergetiki

p. 45-46

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4 refs.

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INIS-RU--598

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IFM UrO RAN

2015

114 p.

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METALLURGICAL EFFECTS; CHEMICAL COMPOSITION; APPROPRIATE  
TECHNOLOGY; NUCLEAR ENGINEERING

---

## **Study of anticorrosive cladding metal nanostructure of power reactor by neutron scattering methods**

**S36**

*Lebedev, V.M.; Lebedev, V.T. (NITs Kurchatovskij Inst., Peterburgskij Inst. Yadernoj Fiziki im. B.P. Konstantinova, Gatchina (RU)), e-mail: lebedev@pnpi.spb.ru; Margolin, B.Z.; Morozov, A.M. (Tsentral'nyj Nauchno-Issledovatel'skij Inst. Konstrukcionnykh Materialov Prometej, Sankt-Peterburg (RU))*

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Izuchenie nanostruktury metalla antikorrozionnoj naplavki korpusov ehnergeticheskikh  
reaktorov metodami nejtronnogo rasseyaniya

p. 46-47

(RU)

1 ref.

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INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

NANOSTRUCTURES; CORROSION PROTECTION; STEEL-CR18NI10TI;  
TEMPERATURE RANGE 0400-1000 K; NEUTRON DIFFRACTION; WELDING;  
PHYSICAL RADIATION EFFECTS

---

## **Materials science basis of nanostructuring fiction treatments of metastable austenitic steels**

**S36**

*Makarov, A.V. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU); Inst. Mashinovedeniya UrO RAN, Ekaterinburg (RU)), e-mail: avm@imp.uran.ru; Kuznetsov, V.P. (Ural'skij Federal'nyj Univ., Ekaterinburg (RU); Kurganskij Gosudarstvennyj Univ., Kurgan (RU)); Skorynina, P.A.; Osintseva, A.L. (Inst. Mashinovedeniya UrO RAN, Ekaterinburg (RU)); Yurovskikh, A.S. (Ural'skij Federal'nyj Univ., Ekaterinburg (RU))*

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p. 47-48

(RU)

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114 p.

NANOSTRUCTURES; STEEL-CR18NI10TI; STAINLESS STEEL-304; OPTIMIZATION;  
FRICTION; STRAIN HARDENING; HARDNESS

---

## **Mechanical properties and structure of steel 18Cr10NiTi irradiated as elements of the display assemblies in the BOR-60 reactor for a long time**

**S36**

*Makarov, E.I.; Neustroev, V.S.; Zhemkov, I.Yu.; Markelov, D.E. (OAO Gosudarstvennyj Nauchnyj Tsentr Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad-10 (RU)), e-mail: Evgeny\_m86@inbox.ru*

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Mekhanicheskie svojstva i struktura stali Kh18N10T, obluchennoj dlitel'noe vremya v reaktore BOR-60 v kachestve ehlementov ehkrannykh sborok

p. 48-49

(RU)

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INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.  
STEEL-CR18NI10TI; BOR-60 REACTOR; SWELLING; PHYSICAL RADIATION  
EFFECTS; WWER TYPE REACTORS; MICROSTRUCTURE

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### **Deformation of zirconium-niobium alloy E635 in submicrosecond duration shock waves**

**S36**

*Malyugina, S.N.; Pavlenko, A.V.; Mokrushin, S.S.; Majorova, A.S.; Kazakov, D.N.; Kozelkov, O.E. (RFYaTs-VNIITF im. Akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: svetlana\_malyugina@mail.ru*

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p. 49  
(RU)

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INIS-RU--598

Ekaterinburg (RU)

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2015

114 p.

ZIRCONIUM BASE ALLOYS; NIOBIUM ALLOYS; DYNAMIC LOADS; PRESSURE  
RANGE GIGA PA; TIME DEPENDENCE; ELASTICITY; DEFORMATION

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### **Structural changes in the steel 12Cr18Ni10Ti as a result of irradiation for 41 years in BOR-60**

**S36**

*Markelov, D.E.; Obukhov, A.V.; Makarov, E.I.; Neustroev, V.S.; Zhemkov, I.Yu. (OAO GNTs NIIAR, Dimitrovgrad, Ul'yanovskaya Obl. (RU)), e-mail: mitry.markl@yandex.ru*

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Strukturnye izmeneniya v stali 12Kh18N10T v rezul'tate oblucheniya v techenie 41 goda v reaktore BOR-60

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114 p.

BOR-60 REACTOR; STEEL-CR18NI10TI; IRRADIATION; TIME DEPENDENCE;  
PHYSICAL RADIATION EFFECTS; SWELLING; TEMPERATURE RANGE 0400-1000 K;  
WWER TYPE REACTORS

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## **Radiation swelling of new generation austenitic steels - materials for fast reactor BN-600 fuel cans at high damaging doses. 2. Established steel ChS68-ID c.d.**

**S36**

*Nesterenko, O.G.; Chuev, V.V. (OAO Kontsern Rosehnergoatom, Filial Beloyarskaya Atomnaya Stantsiya, Zarechnyj (RU)), e-mail: post@belnpp.ru*

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Radiatsionnoe raspukhanie austenitnykh stalej novogo pokoleniya - materialov obolochek

tvehlov bystrogo reaktora BN-600 pri vysokikh povrezhdayushchikh dozakh. 2. Shtatnaya stal' ChS68-ID kh.d.

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(RU)

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INIS-RU--598

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114 p.

AUSTENITIC STEELS; SWELLING; BELOYARSK-3 REACTOR; IRRADIATION;  
PHYSICAL RADIATION EFFECTS; TEMPERATURE RANGE 0400-1000 K; FUEL CANS

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## **Radiation effects in irradiated austenitic steels after prolonged irradiation in the BOR-60 reactor**

**S36**

*Neustroev, V.S.; Belozarov, S.V.; Makarov, E.I.; Markelov, D.E.; Obukhov, A.V. (OAO GNTs*



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reaktore BOR-60

p. 50-51

(RU)

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114 p.

STEEL-CR18NI9; BOR-60 REACTOR; PHYSICAL RADIATION EFFECTS;  
IRRADIATION; TIME DEPENDENCE; SWELLING; CREEP; MICROSTRUCTURE

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**Structure and phase composition in transition zone of three-layered material  
#Left Double Quotation Mark#steel - vanadium alloy#Right Double Quotation  
Mark# after strain-heat treatment**

**S36**

*Nechajkina, T.A.; Votinov, S.N.; Nikulin, S.A.; Rozhnov, A.B.; Rogachev, S.O. (Natsional'nyj  
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Struktura i fazovyy sostav perekhodnoj zony trekhslajnogo materiala #Left Double Quotation  
Mark#stal' - vanadievyy splav#Right Double Quotation Mark# posle deformatsionno-  
termicheskoj obrabotki

p. 51-52

(RU)

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114 p.

VANADIUM BASE ALLOYS; TITANIUM ALLOYS; CHROMIUM ALLOYS; FERRITIC STEELS; CORROSION RESISTANT ALLOYS; TEMPERATURE RANGE 1000-4000 K; DIFFUSION LENGTH; SOLID SOLUTIONS; CHEMICAL COMPOSITION; GRAIN SIZE

---

### **Influence of intensity of irradiation on embrittlement of reactor vessel steel**

**S36**

*Bachuchin, I.V.; Zhurko, D.A.; Krasikov, E.A.; Nikolaenko, V.A. (Natsional'nyj Issledovatel'skij Tsentr Kurchatovskij Inst., Moscow (RU)), e-mail: ekrasikov@mail.ru*

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Vliyanie intensivnosti oblucheniya na okhrupchivanie korpusnoj stali

p. 52-53

(RU)

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2015

114 p.

NEUTRON FLUX; EMBRITTLEMENT; DAMAGING NEUTRON FLUENCE; PHYSICAL RADIATION EFFECTS; STEELS; CHEMICAL COMPOSITION; RADIANT FLUX DENSITY

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### **Dynamic properties of the zirconium alloy E110 under shock-wave loading of sub-microsecond duration**

**S36**

*Pavlenko, A.V.; Malyugina, S.N.; Mokrushin, S.S.; Majorova, A.S.; Kazakov, D.N.; Kozelkov, O.E. (RFYaTs-VNIITF im. akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail:*

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Dinamicheskie svoystva tsirkonievogo splava Eh110 v usloviyakh udarno-volnovogo nagruzheniya submikrosekundnoj dlitel'nosti

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(RU)

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INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.

ZIRCONIUM BASE ALLOYS; DYNAMIC LOADS; DEFORMATION; CRYSTAL LATTICES; COMPRESSION STRENGTH; TIME DEPENDENCE; TEMPERATURE DEPENDENCE

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### **Features of structural phase transitions in ferritic-martensitic steels at high-temperature neutron irradiation**

**S36**

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Osobennosti strukturno-fazovykh prevrashchenij v ferritno-martensitnykh stalyakh pri vysokotemperaturnom nejtronnom obluchenii

p. 53-54

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598

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2015

114 p.

CHROMIUM-MOLYBDENUM STEELS; HEAT RESISTING ALLOYS; MARTENSITIC STEELS; FERRITIC STEELS; NEUTRON FLUX; SWELLING; TEMPERATURE RANGE 1000-4000 K; DISPERSION HARDENING; OXIDES; PHYSICAL RADIATION EFFECTS

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### **Subatomic structure of the ferritic-martensitic steels ChS139 and EK181 irradiated in a reactor BN-600**

**S36**

*Parkhomenko, V.D.; Bogdanov, S.G.; Goshchitskij, B.N. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: parkhomenko@imp.uran.ru*

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Nadatomnaya struktura ferritno-martensitnykh stalej ChS139 i EhK181 obluchennykh v reaktore BN-600

p. 54-55

(RU)

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INIS-RU--598

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2015

114 p.

CHROMIUM STEELS; FERRITIC STEELS; MARTENSITIC STEELS; BELOYARSK-3 REACTOR; DAMAGING NEUTRON FLUENCE; VACANCIES; TEMPERATURE RANGE 1000-4000 K; CARBIDES

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### **Interaction of fuel composition and liquid metal coolant with the fuel cans from EK164 steel after operation in the zone of small enrichment of reactor BN-600 at irradiation temperatures of 540...620 #Degree Sign#C**

**S36**

*Portnykh, I.A.; Pastukhov, V.I.; Kozlov, A.V. (OAO IRM, Zarechnyj (RU)), e-mail:*

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Vzaimodejstvie toplivnoj kompozitsii i zhidkometallicheskogo teplonosatelya s obolochkami tvehlov iz stali EhK164 posle ehkspluatatsii v zone malogo obogashcheniya reaktora BN-600 pri temperaturakh oblucheniya 540...620 #Degree Sign#C

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(RU)

1 ref.

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114 p.

BELOYARSK-3 REACTOR; FUEL CANS; CHROMIUM-MOLYBDENUM STEELS; FUEL-COOLANT INTERACTIONS; PHYSICAL RADIATION EFFECTS; TEMPERATURE RANGE 0400-1000 K; TEMPERATURE DEPENDENCE; DIFFUSION

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### **Tomographic atomic probe examinations of oxide-dispersion-strengthened steel**

## **12Cr-1.1W-0.2V-0.3Ti-0.3Y\_2O\_3**

**S36**

*Khomich, A.A.; Orlov, N.N.; Rogozhkin, S.V. (Natsional'nyj Yadernyj Univ. MIFI, Moscow (RU); NITs Kurchatovskij Inst., FGBU GNTs RF ITEhF, Moscow (RU)), e-mail: artem.khomich@gmail.com*

### **The Eleventh International Ural Seminar Radiation damage physics of metals and alloys**

Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov  
Tomograficheskoe atomno-zondovoe issledovanie dispersno-uprochnennoj oksidami stali 12Cr-1.1W-0.2V-0.3Ti-0.3Y\_2O\_3

p. 56-57

(RU)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

CHROMIUM STEELS; TUNGSTEN ALLOYS; VANADIUM ADDITIONS; TITANIUM ADDITIONS; YTTRIUM OXIDES; DISPERSION HARDENING; NANOSTRUCTURES; FERRITIC STEELS; MARTENSITIC STEELS

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## **Radiation swelling of new generation austenitic steels - materials for fast reactor BN-600 fuel cans at high damaging doses. 1. Experience and methodology of increasing resource characteristics in reactor assemblies**

**S21**

*Chuev, V.V. (Filial OAO Kontsern Rosehnergoatom Beloyarskaya Atomnaya Stantsiya, Zarechnyj (RU)), e-mail: nioltvs3@belnpp.ru*

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Radiatsionnoe raspukhanie austenitnykh stalej novogo pokoleniya - materialov obolochek tvehlov bystrogo reaktora BN-600 pri vysokikh povrezhdayushchikh dozakh. 1. Opyt i metodologiya povysheniya resursnykh kharakteristik reaktornykh sborok

p. 57

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.

BELOYARSK-3 REACTOR; SWELLING; AUSTENITIC STEELS; FUEL CANS; FUEL ASSEMBLIES; CHROMIUM-NICKEL-MOLYBDENUM STEELS; BURNUP

---

### **Local corrosion resistance of austenitic stainless steel 12Cr18Ni10Ti after irradiation by neutrons and static tensile strain**

**S36**

*Yarovchuk, A.V.; Maksimkin, O.P.; Tsaj, K.V.; Ruban, S.V. (Inst. Yadernoj Fiziki, Almaty (KZ)), e-mail: Yarovchuk@mail.ru, maksimkin@inp.kz*

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Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov Soprotivlenie lokal'noj korrozii austenitnoj nerzhaveyushchej stali 12Kh18N10T posle oblucheniya nejtronami i staticheskoj deformatsii rastyazheniem

p. 57-58

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

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2015

114 p.

STAINLESS STEEL-321; NEUTRON FLUX; DEFORMATION; DAMAGING NEUTRON FLUENCE; STRAINS; CORROSION PROTECTION; PITTING CORROSION; PHYSICAL RADIATION EFFECTS

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### **Neutron spectroscopy and features of main state in rare earth strongly correlated systems: Kondo undercompensation, spin fluctuations and magnetic order**

**S75**

*Alekseev, P.A. (NITs Kurchatovskij Inst., Moscow (RU)), e-mail: pavel\_alekseev-r@mail.ru*

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Nejtronnaya spektroskopiya i osobennosti osnovnogo sostoyaniya redkozemel'nykh

sil'nokorrelirovannykh sistem: kondovskaya nedokompensatsiya, spinovye fluktuatsii i

magnitnyj poryadok

p. 61-62

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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IFM UrO RAN

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114 p.

NEUTRON SPECTROSCOPY; YTTERBIUM BORIDES; CHEMICAL COMPOSITION; INTERMETALLIC COMPOUNDS; ATOMIC DISPLACEMENTS; ELECTRON CORRELATION; FLUCTUATIONS; SPIN

---

## **On the theoretical calculations of powder neutron diffraction resolution**

**S75**

*Bobrovskij, V.I. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail:*

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O teoreticheskikh raschetakh razresheniya poroshkovykh nejtronnykh difraktometrov

p. 62-63

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598

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IFM UrO RAN

2015

114 p.

NEUTRON DIFFRACTION; POWDERS; OPTIMIZATION; NEUTRON BEAMS; NEUTRON DIFFRACTOMETERS; GAUSS FUNCTION

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## **X-ray absorption spectroscopy (EXAFS) of high-temperature superconductors**

**S75**

*Menushenkov, A.P. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail:*

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Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov Rentgenovskaya spektroskopiya pogloshcheniya (EXAFS) vysokotemperaturnykh sverkhprovodnikov

p. 63-64

(RU)

2 refs., 1 fig.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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IFM UrO RAN

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114 p.

LANTHANUM OXIDES; STRONTIUM OXIDES; COPPER OXIDES; NEODYMIUM OXIDES; CERIUM OXIDES; CHEMICAL COMPOSITION; SUPERCONDUCTING COMPOSITES; X-RAY SPECTROSCOPY; ABSORPTION SPECTROSCOPY; GAUSS FUNCTION

---

## **Structural phase transitions with a jump in volume in strongly correlated f-electronic systems**

**S75**

*Mirmel'shtejn, A.V.; Matvienko, V.N.; Kerbel', O.V. (RFNTs-VNIITF, Snezhinsk (RU)), e-mail: mirmelstein@mail.ru; Podlesnyak, A.A. (Okridzhskaya Natsional'naya Lab., Okridzh (US))*

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Strukturnye fazovye perekhody so skachkom ob'ema v sil'no korrelirovannykh f-ehlektronnykh sistemakh

p. 64-65

(RU)

8 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

ELECTRON CORRELATION; CERIUM; AMERICIUM; PLUTONIUM; ELECTRONIC STRUCTURE

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## State of magnetic glass in layered cobaltite GdBaCo<sub>1-x</sub>8<sub>60</sub>5<sub>3</sub>2

S75

Arbuzova, T.I.; Naumov, S.V.; Telegin, S.V.; Korolev, A.V. (IFM UrO RAN, Ekaterinburg (RU)),  
e-mail: naumov@imp.uran.ru

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Sostoyanie magnitnogo stekla v sloistom kobal'tite GdBaCo<sub>1-x</sub>8<sub>60</sub>5<sub>3</sub>2

p. 69-70

(RU)

2 refs., 2 figs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

MONOCRYSTALS; ZONE MELTING; MAGNETIZATION; GADOLINIUM COMPOUNDS;  
BARIUM COMPOUNDS; COBALT COMPOUNDS; OXYGEN COMPOUNDS; CHEMICAL  
COMPOSITION; TEMPERATURE RANGE 0400-1000 K; TEMPERATURE DEPENDENCE;  
MAGNETIC FIELDS; FERROMAGNETISM; ANTIFERROMAGNETISM

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## Effect of high-energy radiation on parameters of quantum-size LED's

### AlGaInP/GaAs

S36

Brudnyj, V.N.; Prudaev, I.A.; Romanov, I.S. (Natsional'nyj Issledovatel'skij Tomskij  
Gosudarstvennyj Univ., Tomsk (RU)), e-mail: brudnyi@mail.tsu.ru; Gorlachuk, P.V.;  
Marmalyuk, A.A.; Ryaboshtan, Yu.L. (OAO NII Polyus im. M.F. Stel'makha, Moscow (RU))

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Vliyanie vysokoenergeticheskoy radiatsii na parametry kvantovo-razmernykh svetodiodov

AlGaInP/GaAs

p. 70-71

(RU)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

LIGHT EMITTING DIODES; GAMMA RADIATION; ELECTRON BEAMS; NEUTRON FLUX; ALUMINIUM COMPOUNDS; GALLIUM COMPOUNDS; INDIUM COMPOUNDS; PHOSPHORUS COMPOUNDS; ARSENIC COMPOUNDS; CHEMICAL COMPOSITION; INTERMETALLIC COMPOUNDS; QUANTUM EFFICIENCY; PHYSICAL RADIATION EFFECTS

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### **Hybrid structures based on silicon with a barrier Schottky: giant magnetotransport effects controlled by a voltage of displacement**

**S75**

*Volkov, N.V.; Tarasov, A.S.; Smolyakov, D.A.; Rautskij, M.V.; Varnakov, S.N.; Ovchinnikov, S.G. (Inst. Fiziki im. L.V. Kirenskogo SO RAN, Krasnoyarsk (RU)), e-mail: volk@iph.krasn.ru*

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Gibridnye struktury na osnove kremniya s bar'erom Shottki: gigantskie magnitotransportnye ehffekty, upravlyaemye napryazheniem smeshcheniya

p. 71-72

(RU)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsent - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

MAGNETIC SEMICONDUCTORS; SCHOTTKY BARRIER DIODES; MAGNETIC FIELDS; NANOSTRUCTURES; IONIZING RADIATIONS; MAGNETORESISTANCE; SILICON; SILICON OXIDES; LORENTZ FORCE

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### **Changes in the optical characteristics of the emitted structures based on GaN and GaAs under exposure to large doses of gamma-radiation**

**S36**

*Basargina, N.V.; Vorozhtsova, I.V.; Dubrovskikh, S.M.; Kupyrina, T.V.; Tkachev, O.V.; Shukajlo, V.P. (FGUP RFYaTs-VNIITF im. akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: dep5@vniitf.ru*

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Izmenenie opticheskikh kharakteristik izluchayushchikh struktur na baze GaN i GaAs pri vozdejstvii bol'shikh doz gamma-izlucheniya

p. 72-73

(RU)

1 ref., 2 figs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsent - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

COPPER NITRIDES; COPPER ARSENIDES; GAMMA RADIATION;

ELECTROLUMINESCENCE; PHYSICAL RADIATION EFFECTS; COMPARATIVE

EVALUATIONS; DOSE RATES; LIGHT EMITTING DIODES; THRESHOLD CURRENT

---

## **Synergetics of catastrophic radiation refusals of semiconductor devices: alternation mode**

**S75**

*Oksengendler, B.L.; Maksimov, S.E. (Inst. Ionno-Plazmennyykh i Lazernyykh Tekhnologij Akademii Nauk Respubliki Uzbekistan, Tashkent (UZ)), e-mail: oksengendlerbl@yandex.ru*

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Sinergetika katastroficheskikh radiatsionnykh otkazov poluprovodnikovyykh priborov: rezhim peremezhaemosti

p. 73-74

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsent - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

KINETICS; BIFURCATION; MATHEMATICAL MODELS; RADIATION EFFECTS;

SOLIDS; STRUCTURE FACTORS

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## **Accumulation of volume electric charges at electron irradiation of polymer**

## dielectrics

S75

*Sadovnichij, D.N.; Milekhin, Yu.M. (FGUP Federal'nyj Tsentr Dvojnykh Tekhnologij Soyuz, Dzerzhinskij, Moskovskaya Obl. (RU)), e-mail: fcdt@monnet.ru; Tyutnev, A.P. (Moskovskij Gosudarstvennyj Inst. Ehlektroniki i Matematiki, Moscow (RU))*

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Nakoplenie ob'emnykh ehlektricheskikh zaryadov pri ehlektronnom obluchenii polimernykh dielektrikov

p. 74-75

(RU)

8 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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INIS-RU--598

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114 p.

DIELECTRIC MATERIALS; ELECTRON BEAMS; ELECTRIC CONDUCTIVITY; PMMA; EPOXIDES; RUBBERS; CERAMICS; POLYSTYRENE; POLYTETRAFLUOROETHYLENE; KINETICS; PHYSICAL RADIATION EFFECTS; MONTE CARLO METHOD

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## **Changes in the composition and structure of coated St3 steel surface layers depending on energy of argon ion irradiation**

S36

*Bykov, P.V.; Vorob'ev, V.L.; Bayankin, V.Ya. (FGBUN Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Izmenenie sostava i struktury poverkhnostnykh sloev stali St3 s nanesenym pokrytiem v zavisimosti ot ehnergii oblucheniya ionami argona

p. 79

(RU)

7 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

ARGON IONS; CARBON STEELS; SPRAYED COATINGS; CHROMIUM; NICKEL COMPOUNDS; CHROMIUM COMPOUNDS; INTERMETALLIC COMPOUNDS; RADIATION HARDENING; MICROHARDNESS; WEAR RESISTANCE; ION IMPLANTATION

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### **Study of chemical composition and atomic structure of thin oxide films on ion-modified surface of Cu-Ni, Cu-Mn alloys**

**S36**

*Gil'mutdinov, F.Z.; Bakieva, O.R.; Vorob'ev, V.L.; Kolotov, A.A. (Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: vasily\_l.84@mail.ru*

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Issledovanie khimicheskogo sostava i atomnoj struktury tonkikh oksidnykh plenok na ionno-modifitsirovannoj poverkhnosti splavov Cu-Ni, Cu-Mn

p. 80

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

COPPER ALLOYS; NICKEL ALLOYS; CHEMICAL COMPOSITION; THIN FILMS; MANGANESE ALLOYS; TEMPERATURE RANGE 0273-0400 K; TEMPERATURE RANGE 0400-1000 K; ARGON IONS; ATOMIC DISPLACEMENTS; ION IMPLANTATION

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### **Modification of the composition, structure and physical mechanical properties of Armco iron by graphite films ion-beam mixing**

**S36**

*Gil'mutdinov, F.Z.; Vorob'ev, V.L.; Bakieva, O.R.; Bayankin, V.Ya. (Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: vasily\_l.84@mail.ru*

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Modifikatsiya sostava, struktury i fiziko-mekhanicheskikh svojstv armko-zheleza metodom ionno-luchevogo peremeshivaniya plenok grafita

p. 80-81

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

IRON BASE ALLOYS; CHEMICAL COMPOSITION; CARBON ADDITIONS;

NANOSTRUCTURES; GRAPHITE; RADIOACTIVE ION BEAMS; ARGON IONS; IRON

CARBIDES; PHYSICAL RADIATION EFFECTS

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### **Formation of surface layers of carbon steel depending on accelerating voltage of Cr<sup>+</sup> ion pulse irradiation**

**S36**

*Vorob'ev, V.L.; Bykov, P.V.; Bayankin, V.Ya. (Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: vasily\_1.84@mail.ru; Bureev, O.A. (Inst. Ehlektrofiziki UrO RAN, Ekaterinburg (RU))*

**The Eleventh International Ural Seminar Radiation damage physics of metals and alloys**

Kyshtym (RU)

23 Feb - 1 Mar 2015

Odinnadtsatyj Mezhdunarodnyj Ural'skij Seminar Radiatsionnaya fizika metallov i splavov

Formirovanie sostava pripoverkhnostnykh sloev uglerodistoj stali v zavisimosti ot

uskoryayushchego napryazheniya impul'snogo oblucheniya ionami Cr<sup>+</sup>

p. 81-82

(RU)

4 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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Tezisy dokladov

INIS-RU--598

Ekaterinburg (RU)

IFM UrO RAN

2015

114 p.

CARBON STEELS; CHROMIUM OXIDES; IRON OXIDES; PHYSICAL RADIATION

EFFECTS; IRRADIATION; ELECTRIC POTENTIAL; SURFACE AREA;

MICROHARDNESS; MORPHOLOGY

---

### **Simulation of shock wave in the amorphous alloy Fe<sub>80</sub>P<sub>20</sub>**

**S36**

*Drozдов, A.Yu.; Bayankin, V.Ya. (FGBUN Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)),*

*e-mail: less@ftiudm.ru; Sozonova, N.M. (FGBOU VPO Udmurtskij Gosudarstvennyj Univ., Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Modelirovanie udarnoj volny v amorfnom splave Fe\_8\_0P\_2\_0

p. 82-83

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

AMORPHOUS STATE; IRON BASE ALLOYS; PHOSPHORUS ADDITIONS; IRON PHOSPHIDES; CHEMICAL COMPOSITION; COMPUTERIZED SIMULATION; PULSED IRRADIATION; ATOMIC DISPLACEMENTS

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**Influence of laser radiation on changing the composition of surface layers in (Cu\_5\_0Ni\_5\_0) + C system**

S36

*Zhikharev, A.V.; Bayankin, V.Ya.; Klimova, I.N.; Bystrov, S.G. (Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Vliyanie lazernogo izlucheniya na izmenenie sostava poverkhnostnykh sloev sistemy (Cu\_5\_0Ni\_5\_0) + C

p. 83-84

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

LASER RADIATION; COPPER ALLOYS; NICKEL ALLOYS; CHEMICAL COMPOSITION;  
FOILS; TEMPERATURE RANGE 1000-4000 K; SURFACE AREA; PULSED  
IRRADIATION; PHYSICAL RADIATION EFFECTS

---

### **Formation of surface layer of amorphous materials based on iron under ion radiation**

**S36**

*Kolotov, A.A.; Klimova, I.N.; Drozdov, A.Yu.; Bayankin, V.Ya. (FGBUN Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Formirovanie poverkhnostnogo sloya amorfnykh materialov na osnove zheleza v usloviyakh  
ionnogo oblucheniya

p. 84-85

(RU)

Ions: Ar, He, N, O, B

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114 p.

IRON BASE ALLOYS; PHOSPHORUS ADDITIONS; BORON ADDITIONS; AMORPHOUS  
STATE; ION IMPLANTATION; ION BEAMS; ATOMIC DISPLACEMENTS; SURFACE  
AREA; SEGREGATION

---

### **Formation of copper-nickel alloy surface layer by severe plastic torsional deformation and ion radiation**

**S36**

*Novoselov, A.A.; Pechina, E.A.; Bayankin, V.Ya. (FTI UrO RAN, Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Formirovanie poverkhnostnogo sloya medno-nikelevogo splava putem intensivnoj plasticheskoj  
deformatsii krucheniem i ionnogo oblucheniya

p. 85-86

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)



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INIS-RU--598  
Ekaterinburg (RU)  
IFM UrO RAN  
2015  
114 p.  
COPPER ALLOYS; NICKEL ALLOYS; ION BEAMS; TORSION; SURFACE AREA;  
IRRADIATION; CHEMICAL COMPOSITION; ION IMPLANTATION; TEMPERATURE  
RANGE 0400-1000 K; ATOMIC DISPLACEMENTS

---

### **Restoration of plastic aluminum alloys with the use of dynamic effects of long-range under ion bombardment**

**S36**

*Ovchinnikov, V.V.; Gushchina, N.V.; Makhin'ko, F.F. (Inst. Ehlektrofiziki UrO RAN, Ekaterinburg (RU)), e-mail: viae05@rambler.ru; Kajgorodova, L.I. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU))*

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Vosstanovlenie plastichnosti alyuminiyevykh splavov s ispol'zovaniem dinamicheskikh ehffektov  
dal'nodejstviya pri ionnoj bombardirovke

p. 86-87

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

ALUMINIUM BASE ALLOYS; COPPER ALLOYS; MAGNESIUM ADDITIONS; LITHIUM ALLOYS; ZINC ALLOYS; ION BEAMS; IRRADIATION; ANNEALING; PHYSICAL RADIATION EFFECTS

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### **Study of ion implantation on the composition of the surface layers and microhardness of rolled titanium foils with a deposited layer of aluminium**

**S36**

*Tarasenkov, A.N. (FGBU Nauchno-Proizvodstvennyj Kompleks Tekhnologicheskij Tsentr MIEhT, Moscow (RU)), e-mail: A.Tarasenkov@tcen.ru; Bykov, P.V. (FGBUN Fiziko-Tekhnicheskij Inst. UrO RAN, Izhevsk (RU)), e-mail: less@ftiudm.ru*

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Issledovanie vliyaniya ionnoj implantatsii na sostav poverkhnostnykh sloev i mikrotverdost'  
prokatannykh titanovykh fol'g s napylennym sloem alyuminiya

p. 87-88

(RU)

2 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

TITANIUM BASE ALLOYS; SPRAYED COATINGS; ALUMINIUM; ARGON IONS;  
IRRADIATION; MICROHARDNESS; WEAR RESISTANCE; ION IMPLANTATION;  
FOILS; ATOMIC DISPLACEMENTS

---

## **Development of methods of atomic probe tomography in ITEP**

**S36**

*Aleev, A.A.; Rogozhkin, S.V.; Shutov, A.S.; Raznitsyn, O.A. (NITs KI, FGBU GNTs RF ITEhF, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: Andrey.Aleev@itep.ru; Luk'yanchuk, A.A.; Kirillov, S.E. (NITs KI, FGBU GNTs RF ITEhF, Moscow (RU))*

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Razvitie metodiki atomno-zondovoj tomografii v ITEhF

p. 91

(RU)

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INIS-RU--598

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114 p.

PROBES; LASER BEAM MACHINING; ATOMIC DISPLACEMENTS; EVAPORATION;  
MATERIALS; DETECTION

---

## **The possibility of EPR dosimetry in recording exposure dose of high-intensity photon radiation**

**S61**

*Berezovskij, A.G.; Pudov, V.P. (FGUP RFYaTs-VNIITF im. akademika E.I. Zababakhina, Snezhinsk (RU)), e-mail: dep5@vniitf.ru*

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O vozmozhnosti primeneniya EhPR-dozimetrii dlya izmereniya ehkspozitsionnoj dozy  
vysokointensivnogo fotonogo izlucheniya

p. 91-92

(RU)

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114 p.

PHOTON EMISSION; ELECTRON SPIN RESONANCE; DETECTION; IONIZING RADIATIONS; ACCURACY; RADIATION DOSES; ALANINES

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## **Study of dislocation structure of Cr-Ni-Mo-Ti austenitic steel after cold plastic deformation and irradiation by fast neutrons of neutron diffraction**

**S36**

*Valiev, Eh.Z.; Voronin, V.I.; Goshchitskij, B.N.; Sagaradze, V.V. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: valiev@imp.uran.ru; Berger, I.F. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU); Inst. Khimii Tverdogo Tela UrO RAN, Ekaterinburg (RU))*

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Izuchenie dislokatsionnoj struktury Cr-Ni-Mo-Ti austenitnoj stali posle kholodnoj plasticheskoy  
deformatsii i oblucheniya bystryimi nejtronami metodom nejtronnoj difraktsii

p. 92

(RU)

1 ref.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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IFM UrO RAN

2015

114 p.

AUSTENITIC STEELS; CHROMIUM-NICKEL-MOLYBDENUM STEELS;  
DISLOCATIONS; NEUTRON DIFFRACTION; CREEP; COLD WORKING; SOLID  
SOLUTIONS; FCC LATTICES; PHYSICAL RADIATION EFFECTS; FAST NEUTRONS

---

### **Features research of ferritic-martensitic steels at a stand of atomic probe tomography with laser evaporation**

**S36**

*Luk'yanchuk, A.A.; Kirillov, S.E. (NITs KI, FGBU GNTs RF ITEhF, Moscow (RU)), e-mail: Antchuk@gmail.com; Aleev, A.A.; Rogozhkin, S.V.; Raznitsyn, O.A.; Shutov, A.S. (NITs Kurchatovskij Inst., FGBU GNTs RF ITEhF, Moscow (RU); Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU))*

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Osobennosti issledovaniya ferritno-martensitnykh stalej na stende atomno-zondovoj tomografii s  
lazernym isparenijem

p. 93

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

FERRITIC STEELS; MARTENSITIC STEELS; PROBES; EVAPORATION; METAL VAPOR  
LASERS; NANOSTRUCTURES; SOLID CLUSTERS

---

### **Experimental determination of the energy released parameters in dense cascades of atomic displacements when ion irradiation**

**S36**

*Ovchinnikov, V.V.; Solomonov, V.I.; Makhin'ko, F.F. (Inst. Ehlektrofiziki UrO RAN, Ekaterinburg (RU)), e-mail: viae05@rambler.ru*

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Ehksperimental'noe opredelenie parametrov ehnergovydeleniya v plotnykh kaskadakh atomnykh  
smeshchenij pri ionnom obluchenii

p. 94-95

(RU)

3 refs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

ALUMINIUM BASE ALLOYS; ATOMIC DISPLACEMENTS; ARGON IONS; IRRADIATION; POWER DENSITY; ION BEAMS; ION IMPLANTATION; COMPARATIVE EVALUATIONS

---

### **Research of radiation porosity using a scanning electron microscope**

**S36**

*Pastukhov, V.I.; Averin, S.A.; Panchenko, V.L.; Portnykh, I.A. (OAO IRM, Zarechnyj (RU)), e-mail: irm@irmatom.ru*

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Issledovaniya radiatsionnoj poristosti s ispol'zovaniem skaniruyushchego ehlektronnogo mikroskopa

p. 95

(RU)

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

POROSITY; SCANNING ELECTRON MICROSCOPY; SAMPLING; PHYSICAL RADIATION EFFECTS; CONTAINMENT; MICROSTRUCTURE; ELECTRON BEAMS

---

### **Nonimpact imaging technique of electric current flow with high spatial resolution**

**S75**

*Rudnev, I.A.; Osipov, M.A.; Podlivaev, A.I.; Pokrovskij, S.V. (Natsional'nyj Issledovatel'skij Yadernyj Univ. MIFI, Moscow (RU)), e-mail: iarudnev@mephi.ru*

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Beskontaktnaya metodika vizualizatsii protekaniya ehlektricheskogo toka s vysokim  
prostranstvennym razresheniem

p. 96

(RU)

1 fig.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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2015

114 p.

ATOMIC FORCE MICROSCOPY; MAGNETIC FIELDS; ELECTRIC CURRENTS; FLOW  
VISUALIZATION; PHASE SHIFT; SPATIAL RESOLUTION; NANOSTRUCTURES

---

## **Effect of electromagnetic treatment of melt onto structure and properties of cast metal**

**S36**

*Shaburova, N.A. (FGBOU VPO YuUrGU (NIU), Chelyabinsk (RU)), e-mail:  
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Vliyanie ehlektromagnitnoj obrabotki rasplavov na strukturu i svojstva litogo metalla

p. 97-99

(RU)

10 refs., 2 tabs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr -  
VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

ALUMINIUM BASE ALLOYS; COPPER ALLOYS; ZINC ALLOYS; CASTINGS;  
CHEMICAL COMPOSITION; ELECTROMAGNETIC PULSES; MICROSTRUCTURE;  
COMPARATIVE EVALUATIONS; MECHANICAL PROPERTIES

---

## **Application of monocrystal diffractometer for registration of diffuse scattering**

**S75**

*Shestakov, A.E. (Rossijskij Federal'nyj Yadernyj Tsentr Vserossijskij Nauchno-Issledovatel'skij Inst. Tekhnicheskoy Fiziki im. akad. E.I. Zababakhina, Snezhinsk (RU)), e-mail: a.e.shestakov@vniitf.ru; Kassan-Ogly, F.A. (Inst. Fiziki Metallov UrO RAN, Ekaterinburg (RU)), e-mail: felix.kassan-ogly@imp.uran.ru*

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Primenenie monokristal'nogo difraktometra dlya registratsii diffuznogo rasseyaniya

p. 100

(RU)

3 refs., 2 figs.

Institut Fiziki Metallov UrO RAN, Ekaterinburg (RU); Rossijskij Federal'nyj Yadernyj Tsentr - VNIITF, Snezhinsk (RU); Nauchnyj Sovet RFTT OFN RAN, Moscow (RU)

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114 p.

DIFFUSE SCATTERING; MONOCRYSTALS; CRYSTAL STRUCTURE;  
DIFFRACTOMETERS; SPATIAL DISTRIBUTION; CROSS SECTIONS

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