

## PROGRAM

of the Annual Workshop on the "Non-ideal Plasma Physics"  
(26-27 November 2008, Presidium RAS, Gagarina sq, 32a, Moscow)  
Chair - academician Valdimir Fortov

26 November - 9.30 - 13.00 (перерыв 13.00-14.00)

**FORTOV V.** - Opening talk

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### Physics of extreme state of matter

1. EQUATION OF STATE OF FULLY IONIZED ELECTRON-ION PLASMAS: ANALYTICAL APPROXIMATIONS FOR ASTROPHYSICAL APPLICATIONS

– **Potekhin A.Y. (1), G. Chabrier (2), F.J. Rogers (3)**

(1) *Ioffe Physical-Technical Institute, Saint-Petersburg, Russia,*

(2) *Ecole Normale Supérieure de Lyon, CRAL (UMR CNRS No. 5574), Lyon, France,*

(3) *Lawrence Livermore National Laboratory, Livermore, USA*

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2. FUSION REACTIONS IN DENSE MATTER: EFFECTS OF PLASMA SCREENING

– **Chugunov A.I. (1), H.E. DeWitt (2),**

(1) *Ioffe Physical-Technical Institute, Saint-Petersburg, Russia*

(2) *Lawrence Livermore National Laboratory*

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3. PHASE DIAGRAM OF HOT DENSE QUARK MATTER

– **Blaschke D.** - *Wroclaw University, Poland // Joint Inst. Nuclear Research, Dubna, Moscow.*

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4. FEATURES OF PHASE TRANSITIONS IN HIGH ENERGY DENSITY MATTER

– **Iosilevskiy I.** – *Moscow Institute of Physics and Technology (State University)*

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5. STATUS OF HIGH ENERGY DENSITY PHYSICS AT GSI

– **Varentsov D.** – *GSI, Darmstadt, Germany*

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6. COLD PLASMA IN SOLID XENON

– **E.B.Gordon (1), V.I.Matyushenko (2), V.D.Sizov (2), B.M.Smirnov (3)**

(1) *Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia.*

(2) *Institute of Energy Problems of Chemical Physics RAS, Chernogolovka, Russia.*

(3) *Joint Institute for High Temperatures RAS, Moscow, Russia..*

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7. HYDRODYNAMICS AND TRANSPORT IN MOM-IDEAL PLASMA OF EXTREME STATE

– **Son E.E.** – *Moscow Institute of Physics and Technology; JIHT RAS*

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### Experimental studies of non-ideal plasmas

8. METALLIZATION OF ALUMINUM HYDRIDE  $\text{AlH}_3$  AT HIGH MULTI SHOCK PRESSURES

**A.M. Molodets (1),\* D.V. Shakhrai (1), A.G. Khrapak (2),**

(1) *Institute of Problem of Chemical Physics, RAS, 142432 Chernogolovka, Moscow District, Russia,*

(2) *Joint Institute for High Temperatures, RAS, 125412 Moscow, Russia*

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9. OPTICAL CHARACTERISTICS OF ALUMINUM WITH THE HOT ELECTRONS AND THE KINETICS OF MELTING UNDER THE ACTION OF ULTRASHORT LASER PULSE

– **S.I. Anisimov (1), N.A. Inogamov (1), Yu.V. Petrov (1), V.A. Khokhlov (1), M.B. Agranat (2), S.I. Ashitkov (2), V.V. Zhakhovskii (2,3), K. Nishikhara (3)**

(1) *L.D. Landau Institute of Theoretical Physics RAS, Chernogolovka, Russia*

(2) *Joint Institute of High Temperatures RAS, Moscow, Russia*

(3) *Institute of Laser Engineering, Osaka University, Osaka, Japan*

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**10. RADIATION CHARACTERISTICS OF HIGH CURRENT PULSED DISCHARGE IN HIGH DENSITY HYDROGEN IN VISIBLE AND SOFT X-RAY SPECTRAL RANGES**

– **M.E. Pinchuk(1)**, **A.A. Bogomaz(1)**, **A.V. Budin(1)**, **I.V. Kuznetsova(2)**, **S.Yu. Losev(1)**, **M.V. Petrenko(2)**, **A.A. Pozubenkov(1)** and **Ph.G. Rutberg(1)**

(1) *IEE RAS (St. Petersburg)*

(2) *Ioffe Physicotechnical Institute of RAS (St. Petersburg)*

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**11. THE DYNAMICS OF SURFACE TARGET LAYERS IRRADIATED BY INTENSE CHARGED PARTICLE BEAMS**

– **Volkov N.B.(1)**, **A.Ya. Leyvi(1,2)**, **K.A. Talala(2)**, **A.P. Yalovets(1,2)**

(1) *Institute of Electrophysics, RAS, Ural Branch, Ekaterinburg, Russia*

(2) *South-Ural State University, Chelyabinsk, Russia*

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**26 november - 14.00 - 18.00**

Joint presentation:

**12. STUDY OF NON-IDEAL PLASMA IN EXPLOSION EXPERIMENTAL IN RFNC-VNIIEF**

– **Zhernokletov M.V.** – *RFNC-VNIIEF, Sarov, Russia*

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**13. PROPERTIES OF LIQUID NITROGEN AND GASEOUS HELIUM AT PRESSURES WITHIN 300 GPA** – **Mochalov M.A.** – *RFNC-VNIIEF, Sarov, Russia*

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**14. EXPERIMENTS ON ISENTROPIC COMPRESSION OF HYDROGEN AND DEUTERIUM IN MEGABAR PRESSURE** – **Boriskov G.V.** – *RFNC-VNIIEF, Sarov, Russia*

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**15. THE INTERACTION OF EXPLOSIVELY DRIVEN DENSE PLASMA WITH A LOW INTENSITY LASER RADIATION**

– **Zaporozhets Yu. (1)**, **V. Gryaznov(1)**, **H. Reinholz(3,4)**, **G. Röpke(3)**

(1) *Institute of Problems of Chemical Physics of RAS, Chernogolovka, Russia.*

(3) *Fachbereich Physik, Universität Rostock, Rostock, Germany*

(4) *School of Physics, University of Western Australia.*

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**16. ELECTRICAL CONDUCTIVITY OF NON-IDEAL ARGON PLASMA IN TRANSVERSE MAGNETIC FIELD**

– **Yuriev D.S.**, **Shilkin N.S.**, **Mintsev V.B.** – *IPCP RAS, Chernogolovka*

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**17. RESISTIVITY AND THERMODYNAMIC FUNCTIONS OF EXPANDED LIQUID IRON IN THE METAL-NONMETAL TRANSITION RANGE**

– **Korobenko V.N.**, **A.D. Rakhel** – *Joint Institute for High Temperature RAS*

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**18. DISTRIBUTION OF PLASMA PARAMETER UPON ELECTRICAL WIRE EXPLOSION**

– **Tkachenko S.I.** (1), **V.M. Romanova** (2), **A.R. Mingaleev(2)**, **A.E. Ter-Oganesyan** (2), **T.A. Shelkovenko** (2), **S.A. Pikuz** (2)

(1) *Moscow Institute of Physics and Technology, Russia*

(2) *P.N. Lebedev Physical Institute of RAS, Russia*

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**Theoretical studies of non-ideal plasmas**

**19. FLUCTUATION APPROACH IN THE THEORY OF NON-IDEAL PLASMAS**

– **Norman G.E.**, **Lankin A.V.**, *Joint Institute for High Temperatures of RAS*

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**20. MODELING OF SPECTRAL OPACITIES OF NEAR-LTE ALUMINUM PLASMAS**

– **Loboda P.A.**, **V.V. Popova**, **S.V. Koltchugin**, **A.V. Bessarab**, **N.A. Suslov**, **N.V. Zhidkov**  
*Russian Federal Nuclear Center (RFNC-VNIITF), Snezhinsk, Russia.*

*Russian Federal Nuclear Center (RFNC-VNIIEF), Sarov, Russia..*

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**21. AB INITIO MODELING OF METALS WITH HOT ELECTRON SUBSYSTEM**

– **Stegailov V.V.** – *Joint Institute for High Temperatures RAS; MIPT (State University)*

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22. CHARACTERISTIC X RAYS RESULTING FROM THE VACUUM HEATING OF ELECTRONS  
– **O.F. Kostenko**, **N.E. Andreev** – *Joint Institute for High Temperatures RAS, Moscow, Russia*

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23. COLLISIONAL RECOMBINATION IN NON-IDEAL PLASMAS  
– **Lankin A.V.**, **G.E. Norman**, *Joint Institute for High Temperatures of RAS, Moscow*

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24 WIGNER DYNAMICS CALCULATIONS OF ELECTRICAL CONDUCTIVITY OF STRONGLY COUPLED QUANTUM PLASMA  
– **Levashov P.R.**<sup>1</sup>, **Filinov V.S.**<sup>1</sup>, **Bonitz M.**<sup>2</sup>, - *Joint Institute for High Temperatures of RAS, Moscow; - <sup>2</sup>Universität zu Kiel, Kiel, Germany*

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25. THERMODYNAMIC PROPERTIES OF NON-IDEAL HYDROGEN AND ALUMINUM PLASMA  
– **Gabadulin M.**, **Ramazanov T.**, **Dzhumagulova K.** – *NIETF, Kazakh University, Almaty*

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26. INFLUENCE OF ELECTRON DEGENERACY ON BUOND STATES PARTITION FUNCTION  
– **Starostin A.N.**, **V.K. Roerich** – *TRINITI, Troitsk, Moscow, Russia*

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27. THE DETERMINATION OF THE CRITICAL PARAMETERS OF SEVERAL METALS BY MEANS OF THEIR RELATION WITH THE ZENO-LINE PARAMETERS  
– **Vorob'ev V.S.**, **E.M. Apfelbaum** – *Joint Institute for High Temperature, RAS, Moscow*

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### **27 november - 9.30 - 13.00**

#### **The equation of state and phase transitions in non-ideal plasmas**

1. THERMODYNAMIC PROPERTIES OF DENSE NON-IDEAL DEUTERIUM PLASMA  
– **Gryaznov V.**, **Iosilevskiy I.** – *IPCP RAS, Chernogolovka, MIPT, Moscow*

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2. THE APPLICATION OF EMBEDDED ATOM MODEL TO LIQUID METALS. URANIUM  
– **Belashchenko D.K.**, **D.E. Smirnova**  
*State Technological University “Moscow Institute of Steel and Alloys”*

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3. HIGH-TEMPERATURE AND LOW-TEMPERATURE CHEMICAL MODELS OF DENSE METAL VAPOR PLASMA  
– **Khomkin A.L.**, **Shumikhin A.S.** – *Joint institute for high temperatures of RAS*

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### **27 november - 11.30 - 16.00**

#### **Dusty plasma investigations**

##### Joint presentation:

**D1. NEW RESULTS IN STUDYING DUSTY PLASMA UNDER MICROGRAVITY CONDITIONS**  
– **Molotkov V.I.**<sup>(1)</sup>, **Lipaev A.M.**<sup>(1)</sup>, **Naumkin V.N.**<sup>(1)</sup>, **Petrov O.F.**<sup>(1)</sup>, **Ivlev A.V.**<sup>(2)</sup>, **Morfill G.E.**<sup>(2)</sup>, **Thomas H.M.**<sup>(2)</sup>, **Khrapak S.A.**<sup>(2)</sup>, **Vinogradov P.V.**<sup>(3)</sup>, **Krikalev S.K.**<sup>(3)</sup>, **Turin M.V.**<sup>(3)</sup>, **Malenchenko Yu.I.**<sup>(4)</sup>, **Reiter T.**<sup>(5)</sup>

(1) *Joint Institute for High Temperatures, RAS, Moscow, Russia*

(2) *Max-Planck-Institute for Extraterrestrial Physics, Garching, Germany*

(3) *RSC Energia, Korolev, Russia*

(4) *Gagarin Cosmonaut Training Centre, Star City, Russia*

(5) *European Astronaut Centre, Koln, Germany*

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**D2. OBSERVATION OF A BOUNDARY-FREE DUST CLUSTER IN A HOMOGENEOUS GAS DISCHARGE PLASMA UNDER MICROGRAVITATION (EXPERIMENT PLASMA CRYSTAL-4)**  
– **Usachev A.D.**<sup>1</sup>, **A.V. Zobnin**<sup>1</sup>, **O.F. Petrov**<sup>1</sup>, **V.E. Fortov**<sup>1</sup>, **B.M. Anaratonne**<sup>2</sup>, **M.H. Thoma**<sup>2</sup>, **H. Höfner**<sup>2</sup>, **M. Kretschmer**<sup>2</sup>, **M. Fink**<sup>2</sup> and **G. E. Morfill**<sup>2</sup>

– <sup>1</sup>*Joint Institute for High Temperatures RAS;*

– <sup>2</sup>*Max-Planck-Institut für extraterrestrische Physik, D- 85740 Garching, Germany*

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##### Joint presentation:

**D3. NUMERICAL SIMULATION OF DUSTY PLASMA PROPERTIES**

- **Ramazanov T., Kodanova S., Dzhumagulova K., Daniyarov T., Omarbakieva Yu.,  
<sup>1</sup>Petrov O., <sup>1</sup>Antipov S., Dosbolayev M., Dzhumabekov A.**  
– *NIETF, Kazakh University, Almaty, Kazakhstan*  
– <sup>1</sup>*Joint Institute for High Temperatures, RAS, Moscow*
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**D4. DUSTY PLASMA STRUCTURES IN GASEOUS MIXTURES**

- **Daniyarov T., Dosbolayev M., Ramazanov T., Mayorov S.A.\*, Dzhumagulova K.,  
Dzhumabekov A., Zhankarashev E.**  
– *NIETF, Kazakh University, Almaty, Kazakhstan*  
– *\*Institute of General Physics RAS, Moscow, Russia*
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*Joint presentation:*

**D5. THERMODYNAMICS OF TWO-DIMENSIONAL SYSTEMS  
WITH ISOTROPIC PAIR INTERACTION POTENTIALS**

- **Koss X.G., Vaulina O.S.**  
– *Joint Institute for High Temperatures, RAS, Moscow, Russia*
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**D6. RECONSTRUCTION OF PAIR INTERACTION POTENTIAL IN NON-IDEAL DISSIPATIVE  
SYSTEMS – Lisin E.<sup>1,2</sup>, Vaulina O.C.<sup>1</sup> –**

- <sup>1</sup>*Joint Institute for High Temperatures RAS;* <sup>2</sup>*Moscow Inst. of Physics and Technology, Russia*
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**D7. ULTRAHIGH CHARGING OF PARTICLES AND COULOMB EXPLOSION IN DUSTY PLASMA  
INDUCED BY ELECTRON BEAM**

- **Gavrikov A.V., O.F. Petrov, N.A. Vorona, M.N. Vasil'ev\*** – *JIHT RAS, \*MIPT*
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**D8. PHASE COEXISTENCE AND HYSTERESIS IN PHASE TRANSITIONS OF METAL  
CLUSTERS.**

- **Smirnov B.M.<sup>(1)</sup>, Berry R.S. (2)**  
– (1) *Joint Institute for High Temperatures, RAS, Moscow;* (2) *University of Chicago*
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**D9. DENSITY OF DUSTY PARTICLES WITH YUKAWA INTERACTION IN  
ELECTRO-GRAVITATIONAL TRAP**

- **Trigger S.A.<sup>(1)</sup>, G.J.F. van Heijst<sup>(2)</sup>, O.F. Petrov<sup>(1)</sup>; P.P. Schram<sup>(2)</sup>**  
(1) *Joint Institute for High Temperatures, RAS, Moscow, Russia;*  
(2) *Eindhoven University of Technology, The Netherlands*
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**D10. THE MECHANISM OF ATTRACTION BETWEEN LIKE-CHARGED PARTICLES IN DUSTY  
PLASMA**

- **Shaikhitdinov R.Z.<sup>(1)</sup>, Shibkov W.M.<sup>(2)</sup>, Harrasov M.Kh.<sup>(1)</sup>,**  
(1) *Bashkirien State University, Russia,* (2) *M.V. Lomonosov Moscow State University*
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**D11. ELECTROSTATIC INTERACTION OF MACROPARTICLES AT SHORT DISTANCES**

- **Filippov A.V.,** *Troitsk Institute for Innovation and Fusion Research, Troitsk, Moscow, Russia*
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**D12. THE MODEL OF THE DC DISCHARGE POSITIVE COLUMN WITH A DUSTY COMPONENT**

- **Zobnin A.V.** – *Joint Institute for High Temperatures RAS*
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**27 November - 16.00 - 18.00**

*Chronicle and perspectives*

*General discussion*

*Closure*