

XXXIX Fortov International Conference on Equations of State for Matter  
March 1–6, 2024, Elbrus, Kabardino-Balkaria, Russia



## Conference Program, March 1, 2024

### Opening Ceremony 15:00

Introduction by P. R. Levashov, K. V. Khishchenko

Chairperson

*Prof. G. V. Shpatakovskaya*

- 15:30 Academician Vladimir Fortov (plenary)  
*Fortova Svetlana Vladimirovna (ICAD RAS, Moscow, Russia)*
- 16:00 Bushman equations of state: Thirty years after (plenary)  
*Khishchenko Konstantin Vladimirovich (JIHT RAS, Moscow, Russia)*
- 16:30 Method for studying the states of condensed matter near the cold compression curve at ultra-high pressures  
*Degtyarev Alexandr Vladimirovich (FSUE RFNC-VNIIEF, Sarov, Russia), Arinin V. A., Blikov A. O., Georgievskaya A. B., Gordeev A. Yu., Davydov N. B., Erunov S. V., Knyazev V. N., Korshunov S. A., Kulakov E. V., Manachkin S. F., Profe A. B., Pupkov A. S., Tilkunov R. V., Tyupanova O. A.*

16:45  **CONFERENCE PHOTO (OUTSIDE)**

17:00  **COFFEE-BREAK**

Chairman

*Prof. P. R. Levashov*

- 17:15 Atomic volume estimation of the heavy actinoids (plenary)  
*Shpatakovskaya Galina Vasilievna (KIAM RAS, Moscow, Russia)*
- 17:45 Calculation of the equation of state, composition and transport properties of dense lead plasma  
*Shumikhin Aleksey Sergeevich (JIHT RAS, Moscow, Russia)*
- 18:00 Algorithm for calculating equation of state parameters based on the particle swarm optimization  
*Boyarsskikh Kseniya Aleksandrovna (JIHT RAS, Moscow, Russia), Khishchenko K. V.*
- 18:15 High-density hydrogen gas in hollow silica nanospheres  
*Efimchenko Vadim Sergeevich (ISSP RAS, Chernogolovka, Russia), Korotkova M. A., Meletov K. P., Suhinina N. S., Masalov V. M., Emelchenko G. A.*
- 18:30 High-pressure effect on crystal, magnetic structure and vibrational spectra of van der Waals CrBr<sub>3</sub>  
*Lis Olga Nikolaevna (JINR, Dubna, Russia), Kozlenko D. P., Kichanov S. E., Lukin E. V., Zel I. Yu.*
- 18:45–19:00 Pressure-induced phase transition in nanostructured ferrite  
*Rutkauskas Anton Vladimirovich (JINR, Dubna, Russia), Lis O. N., Belozeroval N. M., Lukin E. V., Zhaludkevich A. L.*

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*Conference Program, March 2, 2024*

*Oral Session 15:00*

Chairman

*Dr. K. V. Khishchenko*

- 15:00 Experimental investigation of thermal expansion of molybdenum and vanadium carbides at high temperatures  
*Senchenko Vladimir Nikolayevich (JIHT RAS, Moscow, Russia), Melnikov S. A.*
- 15:15 Thermodynamic, transport and optical properties of nickel in the vicinity of melting from *ab initio* calculations and pulse heating experiment  
*Galtsov Ilya Sergeyeovich (JIHT RAS, Moscow, Russia), Fokin V. B., Minakov D. V., Dorovatovskiy A. V., Sheindlin M. A.*
- 15:30 Research of high-temperature thermophysical properties of iron by first-principle calculations  
*Paramonov Mikhail Anatolevich (JIHT RAS, Moscow, Russia), Minakov D. V., Galtsov I. S., Fokin V. B., Levashov P. R.*
- 15:45 Resolving the inconsistency between the virial and thermodynamic pressure of Coulomb systems  
*Onegin A. S., Demyanov G. S., Levashov Pavel Remirovich (JIHT RAS, Moscow, Russia)*
- 16:00 Finite-size effects in one-component plasma with and without long-range interactions  
*Demyanov Georgy Sergeyeovich (JIHT RAS, Moscow, Russia), Onegin A. S., Levashov P. R.*
- 16:15 Metastable states of fluid hydrogen at high pressures: Influence of nuclear quantum effects  
*Lukianchuk Vyacheslav Georgievich (MIPT, Dolgoprudny, Russia), Kondratyuk N. D., Saitov I. M.*
- 16:30 “GasThermo” code for calculation of thermodynamic functions of diatomic ideal gases  
*Maltsev Maxim Alexandrovich (JIHT RAS, Moscow, Russia), Kravchenko A. V.*

16:45



**COFFEE-BREAK**

Chairman

*Prof. A. V. Eremin*

- 17:00 Electron beams with table top high repetition rate lasers: Mechanisms, schemes and applications (plenary)  
*Savel'ev Andrei Borisovich (MSU, DP, Moscow, Russia), Tsymbalov I., Gorlova D., Ivanov K., Starodubtseva E., Volkov R., Zavorotny A.*
- 17:30 On neutral stability of shock waves with the first-order phase transition  
*Konyukhov Andrey Victorovich (JIHT RAS, Moscow, Russia)*
- 17:45 Propagation of waves in the medium at the intersection of zones of anomalous thermodynamics  
*Shutov Aleksandr Vladimirovich (FRC PCP MC RAS, Chernogolovka, Russia)*

- 18:00 Numeral modeling of transformation of the particle flow from the free surface of Pb and Sn samples into gas medium  
*Georgievskaya A. B., Gamov A. L., Karsanova Tatiana Vladimirovna (FSUE RFNC-VNIIEF, Sarov, Russia)*
- 18:15 Study of the boundary layer interaction with the bow shock at supersonic flow around a blunt body  
*Lapushkina Tatiana Alexeievna (Ioffe Institute, Saint-Petersburg, Russia), Kolesnik E. V., Popov P. A., Monahov N. A., Belov K. I.*
- 18:30 Detailed numerical analysis of flame instability development in a channel for tabulated chemistry approach  
*Vvedensky P. P., Mikhalchenko E. V., Yakovenko Ivan Sergeevich (JIHT RAS, Moscow, Russia)*
- 18:45 Atomistic simulation of shock compression of metal single crystals with preexisting dislocations  
*Bryukhanov Ilya Aleksandrovich (MSU, IMEC, Moscow, Russia)*

19:00



**SUPPER**

20:00–

**POSTER SESSION**

23:00

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*Conference Program, March 3, 2024*

*Oral Session 15:00*

Chairman

*Prof. O. B. Naimark*

- 15:00 Optical and x-ray laser-induced phenomena in condensed media (plenary)  
*Inogamov Nail Alimovich (ITP RAS, Chernogolovka, Russia)*
- 15:30 Formation of a cylindrical cavity under the action of a narrow beam hard x-ray laser  
*Khokhlov Victor Aleksandrovich (ITP RAS, Chernogolovka, Russia), Inogamov N. A., Grigoryev S. Yu.*
- 15:45 Investigation of impact of a double beam nanosecond laser exposure on a titanium target through a water layer  
*Isakov Vladimir Vladimirovich (CIAM, Moscow, Russia), Golubkin V. S., Novikov I. A., Shibaev S. A., Petrov M. A.*
- 16:00 Validation of the results of numerical simulation of laser shock peening using computer tomograph and microhardness measurements  
*Petrov Mikhail Alexandrovich (MPU, Moscow, Russia), Elesin D. A., Isakov V. V.*
- 16:15 End-to-end calculation of thermomechanical phenomena in a solid with dynamic control of the aggregate state  
*Boykov Dmitry Sergeevich (KIAM RAS, Moscow, Russia)*
- 16:30 Optimization of hard radiation sources based on direct laser acceleration electron bunches  
*Umarov I. R., Veysman M. E., Popov V. S., Rosmej O. N., Andreev Nikolay Evgen'evich (JIHT RAS, Moscow, Russia)*
- 16:45 On estimation of spatial and energy characteristics of direct laser accelerated electrons in near-critical-density plasma and their synchrotron radiation  
*Veysman Mikhail Efimovich (JIHT RAS, Moscow, Russia), Popov V. S., Pugachev L. P., Andreev N. E.*

17:00



**COFFEE-BREAK**

Chairman

*Prof. S. I. Kudryashov*

- 17:15 Increasing the efficiency of laser acceleration of charged particles and generation of radiation from targets with preplasma  
*Brantov Andrey Vladimirovich (LPI RAS, Moscow, Russia), Glazyrin S. I., Rakitina M. A.*
- 17:30 Simulation of plasma expansion under the action of a pre-pulse for effective acceleration of charged particles  
*Rakitina Maria Aleksandrovna (LPI RAS, Moscow, Russia), Brantov A. V., Glazyrin S. I.*

- 17:45 Processes of preplasma formation to increase the efficiency of laser radiation sources  
*Glazyrin Semyon Igorevich (VNIIA(S), Moscow, Russia), Brantov A. V., Rakitina M. A.*
- 18:00 Laser-plasma acceleration of electrons and generation of x-rays in an optimized gas-cluster target  
*Nazarov Maxim Mikhailovich (NRC KI, Moscow, Russia), Semenov T. A., Shcheglov P. A., Chaschin M. V., Mitrofanov A. V., Sidorov-Birykov D. A., Gordienko V. M., Panchenko V. Ya.*
- 18:15 Study of homogenization processes of microstructure low-density materials  
*Danilov Andrey Evgenyevich (FSUE RFNC-VNIIEF, Sarov, Russia), Golovkin S. Yu., Derkach V. N., Dushina L. A., Pugacheva V. N., Starodubtsev P. V., Voronin A. Yu., Vylomov L. P.*
- 18:30 Laboratory modelling of equatorial accretion channels in young stellar objects  
*Burdonov Konstantin Feliksovich (IAP RAS, Nizhny Novgorod, Russia), Zemskov R. S., Sladkov A. D., Korzhimanov A. V., Soloviev A. A., Starodubtsev M. V.*
- 18:45 Self-assembly of optical resonators with Casimir and electrostatic forces  
*Baranov Denis Grigoryevich (MIPT, Dolgoprudny, Russia)*

19:00



**SUPPER**

20:00–

**POSTER SESSION**

23:00

XXXIX Fortov International Conference on Equations of State for Matter  
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*Conference Program, March 4, 2024*

*Oral Session 15:00*

Chairman

*Prof. N. A. Inogamov*

- 15:00 Instantaneous in situ Raman probing of femtosecond laser-excited hot electrons, optical phonons and atomistic damage dynamics in diamond  
*Kudryashov Sergey Ivanovich (LPI RAS, Moscow, Russia)*
- 15:15 Modification of photoluminescent nitrogen optical centers by femtosecond laser pulses in treated natural diamond  
*Gorevoy Alexey Vladimirovich (LPI RAS, Moscow, Russia), Danilov P. A., Smirnov N. A., Paholchuk P. P., Pomazkin D. A., Vins V. G., Kudryashov S. I.*
- 15:30 Stress in diamond bulk induced by laser stimulated graphitization  
*Pomazkin Daniil Andreyevich (LPI RAS, Moscow, Russia), Danilov P. A., Kudryashov S. I., Ermolayev I. V., Smolsky A. P., Matyaev I. D.*
- 15:45 Solid-state nonlinear highly refractive immersion medium for femtosecond laser micromodification of diamond  
*Kuzmin Evgeny Viktorovich (LPI RAS, Moscow, Russia), Krasin G. K., Gulina Y. S., Danilov P. A., Pomazkin D. A., Gorevoy A. V., Kuznetsov S. V., Voronov V. V., Kovalev V. U., Kudryashov S. I., Levchenko A. O., Karaksina E. V., Shiryayev V. S.*
- 16:00 Simulation of the interaction of an ultrashort high-intensity laser pulse with a structured medium of large volume  
*Bochkarev Sergey Gennad'evich (VNIIA(L), Moscow, Russia), Gozhev D. A., Lobok M. G., Brantov A. V., Bychenkov V. Yu.*
- 16:15 Selective reflection study of excitation dependent dipole-dipole broadening in dense optical medium  
*Bobrov Andrei Alexandrovich (JIHT RAS, Moscow, Russia), Saakyan S. A., Sautenkov V. A., Zelener B. B.*
- 16:30 Critical and transport properties of composite fuels  
*Volosnikov Dmitriy Vladimirovich (ITP UB RAS, Ekaterinburg, Russia), Povolotskiy I. I., Skripov P. V.*
- 16:45 Variation of character of motion in a sphere-like system of active Brownian particles under laser radiation  
*Senoshenko Rada Vladimirovna (JIHT RAS, Moscow, Russia), Kononov E. A., Vasiliev M. M., Petrov O. F.*

17:00



**COFFEE-BREAK**

Chairman

Prof. N. E. Andreev

- 17:15 Obtaining high-temperature plasma by two field-reversed configuration colliding  
*Mozgovoy Alexander Grigorievich (LPI RAS, Moscow, Russia), Baidin I. S., Eriskin A. A., Oginov A. V., Parkevich E. V., Tilikin I. N., Rodionov A. A.*
- 17:30 On aneutronic proton–boron fusion in oscillating plasmas  
*Kurilenkov Yuri Konstantinovich (JIHT RAS, Moscow, Russia)*
- 17:45 Overview of modern nanosecond, picosecond and femtosecond lasers for pulsed applications  
*Chuprov Andrei Evgenievich (LLC “Special Systems. Photonics”, Saint-Petersburg, Russia)*
- 18:00 Assessing the impact of laser-induced plasma parameters on the physical and mechanical characteristics of the surface layer  
*Kozhevnikov Gleb Denisovich (MAI, Moscow, Russia), Korolev D. D., Lyakhovetskiy M. A., Tokachev D. A.*
- 18:15 Gapped momentum states in analysis of mechanical models of viscoelasticity  
*Knyazev Nikita Andreyevich (ICMM UB RAS, Perm, Russia), Nikityuk A. S., Naimark O. B.*
- 18:30 Calculation of point defect formation free energy in multicomponent crystals  
*Lobashev Egor Andreyevich (JIHT RAS, Moscow, Russia), Fominykh N. A., Antropov A. S., Stegailov V. V.*
- 18:45 Polaron hopping in nickel ferrite spinel  $\text{NiFe}_2\text{O}_4$   
*Fominykh Nikita Alekseyevich (JIHT RAS, Moscow, Russia), Stegailov V. V.*
- 19:00– Prediction of new materials for solid-state batteries
- 19:15 *Chepkasov Ilya Vasilyevich (Skoltech, Moscow, Russia), Maltsev A. P., Oganov A. R.*

20:00–  
24:00



**BANQUET**

XXXIX Fortov International Conference on Equations of State for Matter  
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*Conference Program, March 5, 2024*

*Oral Session 15:00*

Chairman

*Prof. L. G. Dyachkov*

- 15:00 Model of the equation of state for the rock-forming mineral forsterite as a mixture of quartz and periclase at high pressures  
*Seredkin Nikolai Nikolaievich (JIHT RAS, Moscow, Russia), Khishchenko K. V.*
- 15:15 Contact smoothed particle hydrodynamics method with enhanced spatial accuracy  
*Rublev Georgii Dmitrievich (VNIIA(S), Moscow, Russia), Dyachkov S. A.*
- 15:30 The TPT3 program for parallel simulation of radiation transport  
*Galyuzov Andrey Andreyevich (VNIIA(S), Moscow, Russia)*
- 15:45 Formation of Pb–O in a disturbed flow of liquid lead: A molecular dynamic approach  
*Khankoian Georgy Vrezhovich (JIHT RAS, Moscow, Russia), Nikolaev V. S., Stegailov V. V.*
- 16:00 Large scale combustion of premixed hydrogen–air mixtures modeling using CABARET approach  
*Danilin Alexander Vadimovich (IBRAE RAS, Moscow, Russia), Gavrikov A. I.*
- 16:15 Steady subsonic and supersonic gas flows to condensation surface  
*Zhakhovsky Vasily Viktorovich (VNIIA(S), Moscow, Russia), Kryukov A. P., Levashov V. Yu.*
- 16:30 Nucleation in nonideal rapidly cooling vapor  
*Pervoshchikov Egor Evgen'evich (JIHT RAS, Moscow, Russia), Zhukhovitskii D. I.*
- 16:45 Ion beam dynamic simulation considering interaction with residual gas  
*Lobov Mikhail Sergeyeich (VNIIA(L), Moscow, Russia)*

17:00



**COFFEE-BREAK**

Chairman

*Dr. M. A. Maltsev*

- 17:15 Laser interferometry of living cell dynamics in oncological transformation and microgravity environment  
*Ignatyev Pavel Sergeyeich (JSC PA UOMP, Ekaterinburg, Russia), Naimark O. B.*
- 17:30 The PLM installation for plasma testing of heat-resistant materials  
*Kavyrshin Dmitry Igorevich (NRU MPEI, Moscow, Russia), Budaev V. P., Fedorovich S. D., Karpov A. V., Tran Q. V., Lukashevsky M. V., Rogozin K. A., Konkov A. A., Chinnov V. F.*
- 17:45 Fractal dimension of the trajectory of an active and a passive colloidal particle in plasmas in the numerical simulation  
*Koss Xeniya Georgievna (JIHT RAS, Moscow, Russia), Lisina I. I., Petrov O. F.*



- 18:00 Dust structure rotation under the magnetic field influence in the region of narrowing of the glow discharge current channel  
*Dyachkov Lev Gavriilovich (JIHT RAS, Moscow, Russia), Dzlieva E. S., Novikov L. A., Pavlov S. I., Karasev V. Yu.*
- 18:15 Anomalous kinetic heating of microparticles in plasma with a decrease in the temperature of the buffer gas  
*Sametov Eduard Aleksandrovich (JIHT RAS, Moscow, Russia), Lisin E. A., Boltnev R. E., Vasiliev M. M., Petrov O. F.*
- 18:30 Evolution of monolayer active Brownian system suspended in radio-frequency discharge  
*Zamorin Denis Alexandrovich (JIHT RAS, Moscow, Russia), Syrovatka R. A., Vasiliev M. M., Petrov O. F.*
- 18:45 The specific current action integral for high-frequency current exploded conductors  
*Oreshkin Evgeny Vladimirovich (LPI RAS, Moscow, Russia), Barengolts S. A., Khishchenko K. V., Oreshkin V. I.*
- 19:00 Laser diagnostics of the structure of a high-voltage atmospheric discharge  
*Smaznova H. T., Bolotov Ya. K., Medvedev M. A., Oginov Alexander Vladimirovich (LPI RAS, Moscow, Russia)*
- 19:15–                    **CLOSING CEREMONY**
- 19:30 Concluding words by P. R. Levashov, K. V. Khishchenko