PROGRAM

Scientific-Coordination Session on "Non-Ideal Plasma Physics"

December 4-5, 2024

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10:00. Petrov O.F. Introductory words

Thermodynamic properties and equation of state of non-ideal plasmas

Chairman: Igor Iosilevskiy

1. 10:20–10:40 **Shpatakovskaya Galina Vasilievna** (KIAM RAS, Moscow, Russia) *Characteristics of the atom and the first ion of f-metals*
2. 10:40–11:00 **Khishchenko Konstantin Vladimirovich** (JIHT RAS, Moscow, Russia) *Construction of the equation of state for silica at high energy densities*
3. 11:00–11:20 **Shumikhin Aleksey Sergeevich** (JIHT RAS, Moscow, Russia) *Calculation of the thermodynamic and transport properties of dense lead plasma*
4. 11:20–11:40 **Seredkin Nikolai Nikolaievich** (JIHT RAS, Moscow, Russia), Khishchenko K.V. *Equation of state for a mixture of SiO_2 and H_2O at high energy densities in shock waves*

Ab initio methods for simulation of non-ideal plasmas

Chairman: Pavel Levashov

5. 11:40–12:05 **Roepke Gerd** (Independent Researcher, Rostock, Germany) *Electrical conductivity of warm dense matter based on density functional theory: low-density benchmarks and virial expansion including electron-electron collisions*
6. 12:05–12:25 **Filinov Vladimir Sergeevich** (JIHT RAS, Moscow, Russia), Levashov P.R., Larkin A.S. *Wigner path integral representation of density of states and response functions. Monte Carlo simulation of the one- and two-component plasma media*
7. 12:25–12:45 **Demyanov G.S.** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Levashov P.R. *Kelbg-matrix with Long Interactions Package for path integral Monte Carlo and quasiclassical dynamics simulations*
8. 12:45–13:05 **Larkin Alexander Sergeevich** (JIHT RAS, Moscow, Russia), Filinov V.S., Levashov P.R. *Numerical calculation of density of states of classical non-ideal many-particle system with modified Wang–Landau algorithm*

13:05–14:05 **LUNCH**

Transport and optical properties of non-ideal plasmas

Chairman: Evgeniy Apfelbaum

9. 14:05–14:25 **Kulish Mikhail Ivanovich** (FRC PCP MC RAS, Chernogolovka, Russia), Dudin S.V., Mintsev V.B. *Thermal radiation of an unloaded copper target*

10. 14:25–14:45 **Zaporozhets Yuri Borisovich** (FRC PCP MC RAS, Chernogolovka, Russia), Mintsev V.B., Gryaznov V.K. *Studying the optics of dense krypton plasma in the long-wavelength region of the optical spectrum*

11. 14:45–15:05 **Rakhel Anatolii Dmitrievich** (JIHT RAS, Moscow, Russia), Shumikhin A.S. *Dependence of the electrical conductivity of dense plasmas with ionization degree of the order of unity on the Coulomb-coupling parameter*

12. 15:05–15:25 **Gorbunov Nikolay Arkadievich** (GUMRF, Saint-Petersburg, Russia) *Experimental study of the parameters of aerosol particles in a heat pipe*

13. 15:25–15:45 **Fairushin Ilnaz Izailovich** (KFU, Kazan, Russia), Mokshin A.V. *Transverse collective dynamics of ions in strongly coupled Yukawa plasmas. Self-consistent relaxation theory*

14. 15:45–16:05 **Dobrovenskis Roman Vladimirovich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Lankin A.V., Norman G.E. *Smooth decrease of spectral series lines intensity when approaching the ionization threshold in a dense equilibrium plasma. Part I. Theory.*

15. 16:05–16:25 **Kavyrshin Dmitry Igorevich** (JIHT RAS, Moscow, Russia; MPEI (TU), Moscow, Russia), Chinnov V.F. *Smooth decrease of spectral series lines intensity when approaching the ionization threshold in a dense equilibrium plasma. Part II. Experiment*

Phase and electrophysical properties of non-ideal plasmas

Chairman: Pavel Levashov

16. 16:25–16:45 **Vandyshev Georgii Konstantinovich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Lankin A. V., Norman H. E. *The limit of applicability of the ideal solution model for describing a double electric layer*

17. 16:45–17:05 **Filatkin Aleksei Andreevich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Saitov I.M., Norman G.E. *On the plasma phase transition in warm dense cesium*

18. 17:05–17:25 **LUKYANCHUK VYACHESLAV Georgievich** (MIPT, Dolgoprudny, Russia; JIHT RAS, Moscow, Russia), Saitov I.M., Kondratyuk N.D. *Metastable states of warm dense hydrogen*

17:25-18:05. Overview of Poster Presentations (3-minute presentations)

Chairman: Pavel Levashov

December 5, 2024

Phase transitions in non-ideal plasmas

19. 10:00–10:25 **Iosilevskiy Igor L'vovich** (JIHT RAS, Moscow, Russia), Gryaznov V.K. *General nature of non-congruent phase transitions*
20. 10:25–10:45 **Stegailov Vladimir Vladimirovich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Fedorov I.D., *Formation and dynamics of excitons in warm dense molecular nitrogen fluid under conditions of ultrafast heating experiments*
21. 10:45–11:05 **Boyarskikh Kseniya Aleksandrovna** (JIHT RAS, Moscow, Russia), Khishchenko K.V. *Modeling the evaporation of potassium–sodium mixtures at high temperatures*

Non-ideal plasma in astrophysical applications

22. 11:05–11:25 **Zemlyakov Nikita Aleksandrovich** (IPTI RAS, Saint-Petersburg, Russia), Chugunov A.I. *Shear modulus of neutron star crust: Hashin–Shtrikman bounds*
23. 11:25–11:45 **Vysikaylo Phiilipp Ivanovich** (MIPT, Dolgoprudny, Russia) *The role of Vysikaylo shock waves of the electric field and plasma nozzles in the formation of cumulative plasma cannon on the protection of the Earth from meteorites and small asteroids*
24. 11:45–12:05 **Kirillov Andrey Serafimovich** (PGI, Apatity, Russia) *The study of the kinetics of electronically excited molecular nitrogen in atmospheres of planets of the solar system*

Generation and diagnostics of non-ideal plasmas

25. 12:05–12:25 **Dumin Yurii Viktorovich** (MSU, SAI, Moscow, Russia; HSE, Moscow, Russia; IKI, Moscow, Russia) *What is the nature of subharmonics of the electron emission from ultracold plasmas?*
26. 12:25–12:45 **Bychkov D.V.** (MSU, Moscow, Russia), Bychkov V.L., Sorokovykh D.E., *Creation of ball lightning analogues under the influence of capillary plasma generator's plasma on metals*
27. 12:45–13:05 **Shutov Alexander Vladimirovich** (FRC PCP MC RAS, Chernogolovka, Russia), Iosilevskiy I.L. *Calculation of gas dynamics of a multilayer aluminum target*

13:05–14:05 **LUNCH**

Generation and diagnostics of non-ideal plasmas

28. 14:05–14:25 **Andreev S.N.** (MIPT, Dolgoprudny, Russia), Kurilenkov Yu.K., Oginov A.V., Gus'kov S.Yu., Samoylov I.S. *On scaling of aneutronic proton-boron fusion power in a nanosecond vacuum discharge*

29. 14:25–14:45 **Gimaletdinova Diana Ildarovna** (JIHT RAS, Moscow, Russia), Sedov M.V. *Electron acceleration and absorption of relativistic laser pulse in dense plasma*

Physics of dusty and colloidal plasmas

30. 14:45–15:05 **Zobnin Andrey Vjacheslavovich** (JIHT RAS, Moscow, Russia), Lipaev A.M., Naumkin V.N., Usachev A.D., Thoma M.H., Kretschmer M. *New results of the "Plasmakristall-4" space experiments*
31. 15:05–15:25 **Karasev Viktor Yurevich** (SPbSU, Saint Petersburg, Russia), Dzlieva E.S., Golubev M.S., Gasilov M.A., Novikov L.A., Pavlov S.I. *Dusty plasma in an inductive RF discharge*
32. 15:25–15:45 **Dyachkov Lev Gavriilovich** (JIHT RAS, Moscow, Russia), Dzlieva E.S., Novikov L.A., Pavlov S.I., Golubev M.S., Karasev V.Yu. *Dusty plasma in glow discharge in helium in magnetic fields up to 1.5 T*
33. 15:45–16:05 **Zhukhovitskii Dmitry Igorevich** (JIHT RAS, Moscow, Russia), Perevoshchikov E.E. *Structural transition in strongly coupled Coulomb clusters*
34. 16:05–16:25 **Kolotinskii D.A.** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Timofeev A.V. *Self-consistent calculation of dust particles charges in multi-scale simulation of dust dynamics*
35. 16:25–16:45 **Martynova Inna Aleksandrovna** (JIHT RAS, Moscow, Russia), Iosilevskiy I.L. *Asymmetric complex plasma pressure and isothermal compressibility in the framework of the Poisson–Boltzmann plus hole approximation*

16:45-18:00. Chronicle. Closing Ceremony

Poster session

1. **Seitkozhanov Yeldos** (KazNU, Almaty, Kazakhstan; SU, Almaty, Kazakhstan), Shalenov E.O., Dzhumagulova K.N. *Ionization equilibrium of dense non-ideal plasmas*
2. **Onegin Aleksandr Sergeevich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Demyanov G.S., Levashov P.R. *Simulation of hydrogen plasmas using the improved Kelbg pseudopotential in the quasiclassical molecular dynamics framework*
3. **Galtsov Ilya Sergeevich** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Minakov D.V. *Skies: the program for solution of kinetic equation for solids from first principles using Allen's variational approximation method*
4. **Konyukhov A.V.** (JIHT RAS, Moscow, Russia), Likhachev A.P., Rostilov A.T. *Influence of thermodynamic non-ideality on cumulation in converging shock waves with symmetry violation*
5. **Orekhov Maksim Aleksandrovich** (JIHT RAS, Moscow, Russia) *Computational screening of solvents for Li-ion batteries*

6. **Senoshenko Rada Vladimirovna** (JIHT RAS, Moscow, Russia; MIPT, Dolgoprudny, Russia), Kononov E.A., Vasiliev M.M., Petrov O.F. *Formation and dynamics of active Brownian particles in gas-discharge plasma*
7. **Novikov Leontiy Aleksandrovich** (SPbSU, Saint Petersburg, Russia), Dzlieva E.S., Pavlov S.I., Karasev V.Yu. *Dust plasma in a helium discharge in a strong magnetic field*
8. **Myrzaly Murat** (KazNU, Almaty, Kazakhstan; SU, Almaty, Kazakhstan), Masheyeva R.U., Dzhumagulova K.N. *Charging of dusty plasma microparticles by ion and electron fluxes with kappa distribution in a collisional regime*
9. **Pavlov Sergey Ivanovich** (SPbSU, Saint Petersburg, Russia), Dzlieva E.S., Golubev M.S., Morozova M.B., Novikov L.A., Karasev V.Yu. *Study of plasma flows on dusty structures in different inert gases in a magnetic field*
10. **Kirillov Andrey Serafimovich** (PGI, Apatity, Russia), Ryurich-Andropov I.L. *Modeling of infrared glow of nitrogen oxide NO in the middle atmosphere of the earth during precipitation of high-energy particles*
11. **Tchernyi Vladimir V** (SAIBR, Moscow, Russia), Kapranov S.V. *The fundamental role of Saturn's magnetosphere in the origin of its visible dense rings. determination of the repulsion force between ice bodies in the visible dense rings, predicted by J. C. Maxwell in 1856*
12. **Dobroklonskaya Marina** (JIHT RAS, Moscow, Russia), Vasilyak L.M., Pecherkin V.Ya., Vladimirov V.I. *Trajectories of charged microparticles in a linear quadrupole trap with a rectangular potential*
13. **Chigvintsev Alexander** (MIPT, Dolgoprudny, Russia), Noginova L.Yu., Zorina I.G., Iosilevskiy I.L. *Anomalous spatial charge profiles of plasma as manifestation of phase transitions in modified one component plasma model*
14. **Golubev Maksim Sergeevich** (SPbSU, Saint Petersburg, Russia), Dzlieva E.S., Karasev V.Yu., Novikov L.A., Pavlov S.I., Mashek I.Ch. *Dusty plasmas in radio frequency induction discharge in magnetic field*
15. **Murzov S.A.** (JIHT RAS, Moscow, Russia; VNIIA, Moscow, Russia), Dyachkov S.A., Vyskvarko G.V., Levashov P.R. *Moving window technology for simulation of shock wave propagation in different media*