15th International Conference on
the Physics of Non-Ideal Plasmas
Almaty, August 30- September 4,
2015

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Book of Abstracts

15th International Conference on
the Physics of Non-Ideal Plasmas
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Al-Farabi Kazakh
National University

Institute of Experimental
and Theoretical Physics

National Laboratory
of Nanotechnology

TNS-INTEC

Insitute of Applied Sciences
and Information Technologies

IASIT

Laboratory of
Engineering Profile

Abstracts of posters: Session I

Tuesday 01.09.2015, 17:10 – 19:10

- ◊ statistical physics and ab-initio simulations
- ◊ equilibrium properties, equations of state and phase transitions – Part 1
- ◊ dense astrophysical and ICF plasmas
- ◊ dusty plasmas – Part 1

Nr.	Name	Surname	Title of Contribution
P1.1	Sebastien	Hamel	First-principles calculations of the high-pressure melting line of SiO2 and strenght of H2O: planetary science implications
P1.2	Ayatola	Gabdulin	MD Simulation of 2D System of Polarized Dust Particles
P1.3	Anatoly	Kupchishin	Cascade-Probability Method and Relationship with Markov Chains
P1.4	Alexandr	Larkin	Numerical Calculation of Thermodynamical Calculation of Thermodynamical Properties of Relativistic Particle in Potential Field
P1.5	Yaroslav	Lavrinenko	Boundary condition problem for atomistic simulations of classical and quantum strongly coupled systems of charged particles
P1.6	Péter	Magyar	Quadratic static response of the classical One-Component Plasma
P1.7	Alexey	Andreyev	Foundation of thermodynamics within the laws of the classical mechanics
P1.8	Yuriy	Arkhipov	Effective potentials in semiclassical two-component plasmas
P1.9	Asel	Ashikbayeva	Dynamic properties of Dirac plasmas in the random-phase approximation
P1.10	Alexander	Chigvintsev	Anomalous Phase Diagram in Simplest Plasma Model
P1.11	Yultuz	Omarbakiyeva	Cluster virial expansion of the equation of state for hydrogen plasma with $e - H_2$ contributions
P1.12	Jean-Christophe	Pain	Multi-configuration modeling of ionization potential depression in dense plasmas
P1.13	Aleksey	Shumikhin	The distinguishing features of the vapor-liquid (dielectric-metal) phase transition in metal vapors, semiconductors and rare gases
P1.14	Moldir	Issanova	Transport properties of inertial confinement fusion dense plasmas
P1.15	Nadine	Nettelmann	Warm Dense Hydrogen and Helium in Jupiter and Saturn: exploration of He sedimentation
P1.16	Nuriya	Bastykova	Controlled levitation of dust particles in rf+dc gas discharges
P1.17	Didar	Batryshev	Extraction of nano- and small dispersed microparticles in the plasma of radio-frequency discharge
P1.18	Lidia	Deputatova	Measurement of the charge of a single particle confined by the electrodynamic trap
P1.19	Merlan	Dosbolayev	The influence of the ionic composition of the plasma on dust structures in the combined discharge of radiofrequency and electrostatic fields
P1.20	Young-Dae	Jung	Nonthermal and geometric effects on the dual-mode surface waves in a Lorentzian dusty plasma slab
P1.21	Irina	Filatova	Plasma-assisted Functionalization of ZnO Nanoparticles and Production of Nanocrystalline ZnO Structures
P1.22	Alexey	Khrapak	Complex plasma research under microgravity conditions: PK-3 Plus laboratory on the International Space Station
P1.23	Ranna	Masheyeva	Effect of buffer gas induced friction on the cage correlation function of dust particles
P1.24	Vladimir	Messerle	Plasma for Fuel Processing
P1.25	Mukhit	Muratov	Influence of dipole interaction on the thermodynamic properties of dusty plasma

P1.25

Influence of dipole interaction on the thermodynamic properties of dusty plasma

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This work is devoted to a theoretical consideration of the influence of dipole interaction between dust grains on the thermodynamic properties of plasma-dust systems. Equation of state (pressure) was derived in the framework of the investigation of the thermodynamics of dusty plasma. Pair correlation functions of dusty plasma's particles are calculated for system of particles interacting through the effective potential [1]. Effective interaction potential is for particles with dipole moment and takes into account screening effects at large distance. On the basis of the mentioned calucations investigation of the influence of dipole interaction on the thermodynamic properties is presented. Also, the comparisions of obtained results with data based on the experimental pair correlation functions, and also with previous theoretical and calculated results are presented [2-4].

References

[1] T.S. Ramazanov, Zh.A. Moldabekov, K.N. Dzhumagulova and M.M. Muratov, *Phys. Plasmas,* **18** (2011), P.103705.
[2] T.S. Ramazanov, K.N. Dzhumagulova et al., Contrib. Plasma Phys. **49**, No.1-2, pp. 15-20 (2009).
[3] P.Hartman, G.J. Kalman, Z. Donko, K. Kutasi, *Phys.Rev. E.,* **72** (2005), P. 026409.
[4] H.Totsuji, M.Liman, C.Totsuji and K.Tsuruta, *Phys.Rev. E.*, **70** (2004), P. 016405.