

# ANOMALIES OF SPATIAL IONS DISTRIBUTION IN TRAP IN LOCAL EQUATION OF STATE APPROXIMATION

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Impressive appearance of discontinuities in equilibrium spatial charge profiles in non-uniform Coulomb systems is under discussions in wide number of thermo-electrostatics problems. Such discontinuities are considered as peculiar micro-level manifestation of phase transitions and of intrinsic macro-level non-ideality effects in local equation of state (EOS), which should be used for description of non-ideal ionic subsystem in frames of local-density approximation (LDA or "pseudo fluid", or "jellium" etc) [1,2]. Such discontinuities were discussed already by the authors for electronic subsystems [3]. Special emphasis is made in present paper on the mentioned above non-ideality effects in non-uniform ionic subsystems, such as micro-ions profile within screening "cloud" around macro-ion in complex plasmas (dusty, colloid etc), in equilibrium ion distributions in ionic traps or/and in the neighborhood vicinity of "charged wall" etc. Multi-phase EOS for simplified ionic model of classical charged hard spheres on uniformly compressible electrostatic compensating background (HS-OCP) was constructed in present work and several illustrative examples of discussed discontinuous ionic profiles in traps with different external potential were calculated with the use of this EOS in LDA approximation.

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1. Iosilevski I 1985 High Temperature 23 807
  2. Chigvintsev A and Iosilevskiy I 2012 Contrib. Plasma Phys. 52 22
  3. I. Iosilevski and A. Chigvintsev, in: Physics of Strongly Coupled Plasmas, edited by W. Kraeft and M. Schlanges, (World Scientific, Singapore-London, 1996) pp. 145; arXiv:0902.2353.