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

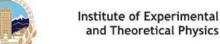




Book of Abstracts

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







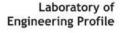
National Laboratory of Nanotechnology













15th International Conference on the Physics of Non-Ideal Plasmas 31 August – 4 September 2015 Almaty, Kazakhstan



Abstracts of talks Wednesday 02.09.2015, 9:00 – 12:30

I5: Wednesday 02.09.2015,9:00 - 9:40

Application of the method of moments in plasma physics: new developments

I.M. Tkachenko

Universidad Politécnica de Valencia, IUMPA, Valencia, Camino de Vera s/n, 46022 imtk@mat.upv.es

Yu.V. Arkhipov, A.B. Ashikbayeva, A. Askaruly, A.E. Davletov *Al-Farabi Kazakh National University, IETP, Almaty, al-Farabi 71, 050040*

The dielectric function of dense equilibrium two-component plasmas constructed within the classical method of moments [1] satisfies all convergent sum rules automatically. Since these sum rules are directly related to the coefficients of the (inverse) dielectric function asymptotic high-frequency expansion, the asymptotic properties of existing alternative models (the extended random-phase and Mermin approximations, the full-conserving model, etc.) are analyzed Some drawbacks and advantages of the above models with respect to the convergent sum rules are pointed out [2].

The influence of the electron-ion coupling in two-component target plasmas on the stopping power [3] and straggling properties of the latter, particularly their asymptotic forms corresponding to high projectile velocities, are studied within the moment approach and the above alternative models of the plasma dielectric function.

A model for the two-component plasma dynamic structure factor free of adjustment parameters is suggested and successfully tested [4] against the simulation data [5].

References

- [1] V.M. Adamyan, T. Meyer, I.M. Tkachenko, *Sov. J. Plasma Phys.*, 1985, 11, p 481; T. Meyer, I.M. Tkachenko, *Contrib. Plasma Phys.*, 1985, 25, p 437; V.M. Adamyan, T. Meyer, I.M. Tkachenko, *Contrib. Plasma Phys.*, 2003, 43, p 252; I.M. Tkachenko, Yu.V. Arkhipov, and A. Askaruly, The Method of Moments and its Applications in Plasma Physics (Lambert, Saarbrücken, 2012).
- [2] Yu.V. Arkhipov et al., Phys. Rev. E, 2014, 90, 053102; Phys. Rev. E, 2014, 91, 019903.
- [3] D. Ballester and I.M. Tkachenko, *Phys. Rev. Lett.*, 2008, 101, 075002; *J. Phys. A: Math. Theor.*, 2009, 42, 214035.
- [4] Yu.V. Arkhipov et al., Contrib. Plasma Phys., 2015, 55(4).
- [5] T. Pschiwul and G. Zwicknagel, J. Phys. A: Math. Gen., 2003, 36, p 6251; G. Zwicknagel and T. Pschiwul, Contr. Plasma Phys., 2003, 43, p 393.