Contribution submission to the conference Kiel 2011

The Three Particle Correlation Function as a Tool for Angle Resolved Structural Analysis of Spherical Clusters — •Hauke Thomsen[1], Patrick Ludwig[1], Michael Bonitz[1], and Gabor Kalman[2] — [1]Christian-Albrechts Universität zu Kiel — [2]Boston College, USA

Finite charged particle ensembles in externally controlled confinement geometries allow for a systematic investigation of strong correlation effects over broad ranges of plasma parameters. Additionally, the formation of distinct shells emerges as a governing finite-size effect in systems of trapped ions and dusty plasma as well [1].

As a sensitve tool to study the internal cluster structure, we introduce the 'Three Particle Correlation Function' (TPCF), which allows for an angle resolved structure analysis.[2] The TPCF can not only resolve the transition probability of particles between shells, but also structural modifications within the shells. In particular this quantity is not affected by rotational invariance.

Using the TPCF we study the effect of Coulomb screening, temperature, and cluster symmetry of different ground and metastable states with respect to the exact particle number as well as the limiting case of large N.

[1] M. Bonitz, C. Henning, and D. Block, Reports on Progress in Physics 73, 066501 (2010) [2] P. Ludwig, H. Thomsen, K. Balzer, A. Filinov, and M. Bonitz, Plasma Phys. Control. Fusion 52, 124013 (2010)

Part: P
Type: Poster
Topic: Staubige Plasmen; Dusty Plasmas
Email: thomsen@theo-physik.uni-kiel.de