Pair and three-particle correlation functions of spherical dust clusters HAUKE THOMSEN, PATRICK LUDWIG, MICHAEL BONITZ, Christian-Albrechts University Kiel, ITAP — Dust particles in a complex plasma usually accumulate a high negative charge inside a plasma which is responsible for their strong repulsive interaction and high coupling. When confined in a parabolic trap, these particles form spherical clusters with a characteristic shell structure. In recent years the phase transition-like crossover from a crystal to a liquid-like state has attracted high interest, e.g. [1]. While the radial melting is now well understood, here we concentrate on the loss of intra-shell order. The radial pair correlation function $\rho(r_{ij})$ is well suited for homogeneous system but has to be adapted to the spherical symmetry for finite clusters. Here, we present the Center-Two-Particle correlation function that is equally sensitive to intra-shell as well as inter-shell correlation [2,3]. As a second quantity, we present the Triple Correlation function that is calculated from the "bonding angles" of three particles. This quantity is particularly well suited to investigate the orientational order within spherical cluster shells.

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[2] P. Ludwig et al., Plasma Phys. Control. Fusion **52**, 124013 (2010)
[3] A. Schella et al., Phys. Rev. E **84**, 056402 (2011)

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