

Abstract Submitted
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Finite Temperature Quantum Effects on Confined Charges¹ JEFFREY WRIGHTON, Physics, University of Florida, SANDIPAN DUTTA, Asia Pacific Center for Theoretical Physics, Korea, JAMES DUFTY, Physics, University of Florida — The equilibrium density profile for charges confined in a harmonic trap is described for a wide range of temperatures and densities, including the strong coupling classical limit of dusty ion plasmas and low temperature limit of electrons in warm, dense matter. The theoretical description is based on a classical density functional theory (liquid state HNC approximation [1]) using effective quantum charge-charge and confining potentials [2]. Attention is focused on the role of quantum effects in shell formation. These quantum effects range from quantitative modifications of structure due to classical Coulomb correlations to qualitatively different quantum origins of shell structure due to exchange at temperatures below the Fermi temperature.

[1] J. Wrighton, J. W. Dufty, H. Kählert, and M. Bonitz, Phys. Rev. E 80, 066405 (2009).

[2] Sandipan Dutta and James Dufty, Phys. Rev. E 87, 032102 (2013); EPL 102 67005 (2013).

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