

Abstract Submitted
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Classical representation of quantum systems at equilibrium¹

SANDIPAN DUTTA, JAMES DUFTY, University of Florida — A classical system has been constructed that reproduces the thermodynamics of a quantum system at equilibrium. The classical system has an effective temperature, local chemical potential, and pair interaction that are defined by requiring equivalence of the pressure, density and pair correlation functions for the classical and quantum systems. The thermodynamic parameters of the classical system are determined such that the ideal gas and weak coupling RPA limits are preserved. The pair correlations predicted from this model are in excellent agreement with Diffusion Monte Carlo results at $T = 0$ and with the finite-temperature results from the Perrot-Dharmawardana model [1]. Systems in harmonic confinement have also been studied to look into the quantum effects on shell formation. [1] M. W. C. Dharmawardana and F. Perrot, Phys. Rev. Lett. 84, 959 (2000).

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