

Abstract Submitted
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Itinerant ferromagnetism in a Fermi gas with contact interaction: Magnetic properties in a dilute Hubbard model¹ CHIA-CHEN CHANG, SHIWEI ZHANG, Department of Physics, College of William and Mary, DAVID M. CEPERLEY, Department of Physics, University of Illinois Urbana-Champaign — Motivated by recent experiments addressing the issue of itinerant ferromagnetism in a dilute ultra-cold Fermi gas with contact interaction, we examine ground state properties of the repulsive Hubbard model on a cubic lattice [1] by means of a very accurate auxiliary-field quantum Monte Carlo method [2]. We focus on low-density systems with varying on-site interaction U/t , in the range relevant to the experiments. Twist-averaged boundary conditions are used to eliminate open-shell effects and large lattice sizes are studied to reduce finite-size effects. The sign problem is controlled by a generalized constrained path approximation [2]. We find no ferromagnetic phase transition in this model. The ground-state correlations are consistent with those of a paramagnetic Fermi liquid.

[1] Chia-Chen Chang, Shiwei Zhang, and David M. Ceperley, arXiv:1009.1409

[2] Chia-Chen Chang and Shiwei Zhang, Phys. Rev. B 78, 165101 (2008).

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