Magnetic properties of the Hubbard model on the fcc lattice

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As a possible model for ferromagnetism, we study the magnetic properties of the Hubbard model on an fcc lattice. Near-neighbor and next-near-neighbor hopping parameters are included to examine the effect of band structure. We use exact diagonalization and the Constraint Path Monte Carlo (CPMC) methods. Several methodological improvements in CPMC, for example the release of the constraint, will be discussed. We present benchmark quality results on the paramagnetic ground state and partially polarized states, as a function of interaction strength. A magnetic phase diagram is obtained from our many-body calculations, and comparison will be made with results from Dynamical Mean Field theory.

1Supported by ARO and NSF.