

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin Liquid Phase in the Hubbard Model on the Honeycomb Lattice ZI YANG MENG, STEFAN WESSEL, ALEJANDRO MURAMATSU, Institut für Theoretische Physik III, Universität Stuttgart, THOMAS LANG, FAKHER ASSAAD, Institut fuer Theoretische Physik & Astrophysik, Universitaet Wuerzburg — Using projective ($T = 0$) quantum Monte Carlo simulations, we investigate the ground-state properties of the half-filled Hubbard model on the honeycomb lattice. We provide evidence for a gapped phase separating the weak-coupling semi-metal and the antiferromagnetically ordered phase at strong coupling. Exploring quasi-particle and spin excitation gaps, flux quantization as well as probing for various correlation functions, we conclude that in this intermediate interaction region the system exhibits no long-range magnetic or bond-order nor superconductivity. Several proposals on novel phases in related models have been put forward, whereas our simulations establish a spin liquid - even in the absence of magnetic frustration.

Zi Yang Meng
Institut für Theoretische Physik III, Universität Stuttgart

Date submitted: 23 Nov 2009

Electronic form version 1.4