Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Thermodynamics of the 3D Hubbard model on approach to the Neel transition LODE POLLET, ETH Zurich, SEBASTIAN FUCHS, University of Goettingen, EMANUEL GULL, Columbia University, EVGENY BUROVKSI, Lancaster University, EVGENY KOZIK, ETH Zurich, THOMAS PRUSCHKE, University of Goettingen, MATTHIAS TROYER, ETH Zurich — We study the thermodynamic properties of the 3D Hubbard model for temperatures down to the Néel temperature using cluster dynamical mean-field theory. In particular we calculate the energy, entropy, density, double occupancy and nearest-neighbor spin correlations as a function of chemical potential, temperature and repulsion strength. To make contact with cold-gas experiments, we also compute properties of the system subject to an external trap in the local density approximation. We find that an entropy per particle $S/N \approx 0.65(6)$ at $U/t = 8$ is sufficient to achieve a Néel state in the center of the trap, substantially higher than the entropy required in a homogeneous system. Precursors to antiferromagnetism can clearly be observed in nearest-neighbor spin correlators.

Lode Pollet
ETH Zurich

Date submitted: 20 Dec 2010 Electronic form version 1.4