Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Enhancing Antiferromagnetic Correlations of an Atomic Fermi Gas in a 3D Optical Lattice[1] YA-TING CHANG, DANYEL CAVAZOS-CAVAZOS, TSUNG-LIN YANG, ZHENGHAO ZHAO, RANDALL G. HULET, Department of Physics and Astronomy, Rice University, Houston, TX — The Fermi-Hubbard model provides crucial insights into strongly correlated fermionic systems. Despite its simplicity, an exact solution for more than a few particles remains an open question. Systems of ultracold atoms in optical lattices provide a way to address this challenge. For example, their interactions are remarkably tunable. We have previously realized the 3D Fermi-Hubbard model and detected short-range antiferromagnetic (AFM) spin correlations via Bragg scattering. However, to realize the long range ordered AFM phase we must reach at least 40% lower temperatures. We have replaced the IR fiber laser used to produce the lattice in the previous experiment with an ultralow noise monolithic ring cavity laser in order to reduce heating by the laser intensity noise. We furthermore control our lattice depth with a servo loop whose bandwidth is set to be lower than the lattice frequency. We will report the status of these efforts to enhance AFM correlations.

[1]Work supported by an ARO MURI grant, ONR, NSF, and the Welch Foundation.

Ya-Ting Chang
Department of Physics and Astronomy, Rice University, Houston, TX

Date submitted: 06 Feb 2018 Electronic form version 1.4