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Characterizing the antiferromagnetic ordering of fermions in a compensated optical lattice[1] P.M. DUARTE, R.A. HART, T.L. YANG, X. LIU, R.G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston TX, T.C.L. PAIVA, Instituto de Fisica, Universidade Federal do Rio de Janeiro, Rio de Janeiro RJ, Brazil, D. HUSE, Department of Physics, Princeton University, Princeton NJ, R. SCALETTAR, Department of Physics, University of California, Davis, CA, N. TRIVEDI, Department of Physics, The Ohio State University, Columbus OH — We realize the Fermi-Hubbard model with fermionic ^{6}Li atoms in a three-dimensional, red-detuned optical lattice. The lattice is compensated by the addition of three blue-detuned gaussian beams which overlap each of the lattice laser beams, but are not retro-reflected. Using the compensated lattice potential, we have reached temperatures low enough to produce antiferromagnetic (AF) spin correlations, which we detect via Bragg scattering of light. The variation of the measured AF correlations as a function of the Hubbard interaction strength, U/t, provides a way to determine the temperature of the atoms in the lattice by comparison with quantum Monte Carlo calculations. This method suggests our temperature is in the range of 2-3 times the Néel ordering temperature. In this poster we present our Bragg scattering results along with our studies of the effect of the compensating potential in helping us cool the atoms in the lattice and also enlarge the size of the AF phase.[2]

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[2]C. J. M. Mathy et al., Phys. Rev. A **86**, 023606 (2011)

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