

Abstract Submitted  
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**Experimental Probe of Antiferromagnetic Ordering of  ${}^6\text{Li}$  in an Optical Lattice**<sup>1</sup> J.H. HITCHCOCK, P.M. DUARTE, T.A. CORCOVILOS, R.G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston, TX 77005 — We have developed an apparatus to probe magnetic ordering in  ${}^6\text{Li}$  using a spin mixture of magnetic sub-levels from the lowest hyperfine state. The degenerate Fermi gas is prepared all optically by loading and evaporative cooling in a high-power optical trap. Our primary goal is the observation of antiferromagnetic (AFM) ordering predicted for an equal spin mixture in a three dimensional lattice with one fermion per site. To identify the AFM phase we will use a near resonant laser to Bragg scatter from the  $(\frac{1}{2} \frac{1}{2} \frac{1}{2})$  lattice plane. A robust control system has been established to vary parameters such as spin polarization, atomic interaction, and lattice depth to extend this system in the future to different lattice geometries.

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James Hitchcock  
Rice University

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