Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Optical Molecular Spectroscopy of the BEC/BCS Crossover in ^{6}Li R. I. KAMAR, G. B. PARTRIDGE, K. E. STRECKER[1], M. W. JACK, R. G. HULET[2], Department of Physics and Astronomy and Rice Quantum Institute — The many-body state of fermionic ^{6}Li near a Feshbach resonance is probed using optical molecular spectroscopy. We evaporatively cool a degenerate spin mixture of fermionic ^{6}Li in an optical trap to form a condensate of dressed molecules at 754 G. The condensate is detected by absorption imaging. The dressed molecules are a superposition of singlet molecules and triplet free atoms. A laser is used to project the dressed molecules onto an excited molecular state, in order to measure the singlet component. The bare singlet molecule fraction is determined by measuring the resulting loss of atoms. Our results show that the molecular contribution to the dressed molecule superposition is orders of magnitude larger than predicted by two-body physics. We have also observed coherent oscillations between atoms and molecules induced by the optical probe when tuned to the bare molecular resonance.

[1]Now at Sandia National Laboratories (kstreck@sandia.gov)
[2]Supported by NSF, ONR, NASA, and The Welch Foundation

R. I. Kamar

Date submitted: 28 Jan 2005 Electronic form version 1.4