

Abstract Submitted
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Molecular Fraction of the BEC-BCS Crossover State G. B. PARTRIDGE, R. I. KAMAR, K. E. STRECKER¹, M. W. JACK, R. G. HULET², Department of Physics and Astronomy and Rice Quantum Institute, Rice University, Houston TX, 77251 — We have created a molecular Bose-Einstein Condensate (BEC) from pairs of fermionic ⁶Li atoms. This BEC is used as a starting point to probe the many body wavefunction of the molecules/pairs in the BEC-BCS crossover regime in proximity to the broad Feshbach resonance near 837 G. These molecules/pairs are superpositions of atoms in an electronic triplet state and deeply-bound singlet molecules. A laser tuned to an excited singlet molecular state projects out the singlet component, which results in a loss. This loss is measured for fields between 680 G and 850 G. We find that the molecular contribution is more than ~10% inside the strongly interacting regime. This is orders of magnitude larger than that expected from two-body physics. We have also observed coherent oscillations between atoms and molecules.

¹Now at Sandia National Laboratories (kstreck@sandia.gov)

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Guthrie Partridge
Rice University

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