Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Resolved-sideband RF spectroscopy on weakly bound $^6Li_2$ molecules[1] S. JOCHIM, G. ZÜRN, A.N. WENZ, T. LOMPE, Heidelberg University, Germany, P.S. JULIENNE, JQI/NIST, J.M. HUTSON, Durham University, UK — In a unitary Fermi gas, the scattering length is tuned to infinity, leaving the interparticle spacing as the only length scale remaining. Recent measurements of the equation of state in an ultracold gas of ^{6}Li at a Feshbach resonance are so precise that the derivation of universal constants such as the Bertsch parameter is limited by the present knowledge of the resonance position [1]. We have performed RF spectroscopy measurements of the binding energies of weakly bound $^6Li_2$ molecules near the broad Feshbach resonance at ∼834 G. To avoid density dependent shifts we start from thermal samples of 30-60 molecules. Resolving sidebands resulting from the quantized relative motion of the dissociated molecules in a cigar-shaped trap with a radial trap frequency of about 349 Hz allows us to measure binding energies with an unprecedented precision of ∼60 Hz. Our results allow for a much more accurate determination of the Feshbach resonance position compared to previous measurements.

[1] M. Bartenstein et al., PRL **94**, 103201 (2005)

[1]Supported by the Heidelberg Center for Quantum Dynamics and the European Research Council.

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Date submitted: 30 Jan 2012 Electronic form version 1.4