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A Measurement of the s-Wave Scattering Length in a ^{7}Li Bose-Einstein Condensate[1] D. DRIES, M. JUNKER, J. HITCHCOCK, C. WELFORD, Y.P. CHEN, R.G. HULET, Department of Physics and Astronomy and Rice Quantum Institute, Rice University — The s-wave scattering length, a_s, parameterizes the effective interatomic interactions in a Bose-Einstein condensate (BEC). The sign and magnitude of a_s have important consequences for the observable properties of the condensate and, consequently, a_s needs to be accurately known in order to correctly interpret many experimental results. In our experiment, we create an optically trapped ^{7}Li BEC in the $F = 1$, $m_F = 1$ hyperfine state. Using a Feshbach resonance, we are able to change the value of a_s by nearly two orders of magnitude over the magnetic field range of 507-730 G. We extract a_s from absorption images of the condensate by fitting to the Thomas-Fermi radius. Furthermore, the condensate suddenly disappears at fields above 730 ± 1 G, placing a lower bound on the location of the Feshbach resonance.

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