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The potential energy of a ^{40}K Fermi gas in the BCS-BEC crossover[1] JOHN STEWART, University of Colorado, Boulder, JOHN GAEBLER, CINDY REGAL, DEBORAH JIN — We present a measurement of the potential energy of an ultracold trapped gas of ^{40}K atoms in the BCS-BEC crossover and investigate the temperature dependence of this energy at a wide Feshbach resonance, where the gas is in the unitarity limit. In particular, we study the ratio of the potential energy in the region of the unitarity limit to that of a non-interacting gas, and in the $T = 0$ limit we extract the universal many-body parameter β. We find $\beta = -0.54^{+0.05}_{-0.12}$; this value is consistent with previous measurements using ^{6}Li atoms and also with recent theory and Monte Carlo calculations. This result demonstrates the universality of ultracold Fermi gases in the strongly interacting regime.

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