Abstract Submitted
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Anomalous minimum in the shear viscosity of a Fermi gas JAMES JOSEPH, North Carolina State University, ETHAN ELLIOTT, Duke University, JOHN THOMAS, North Carolina State University — We measure the static shear viscosity in a two-component Fermi gas near a broad collisional (Feshbach) resonance as a function of the interaction strength and energy. We implement new and more precise methods in comparison to our previous measurement of shear viscosity by utilizing an elliptical trap with a 1:2.7:33 aspect ratio and imaging the expanding atom cloud from two orthogonal directions. We investigate the dependence of the shear viscosity η as a function of the interaction strength $1/(k_F\ a)$, where a is the s-wave scattering length and k_F is the Fermi wave vector for an ideal gas at the trap center. We find that near resonance at constant energy, η has both a quadratic and linear dependence on $1/(k_F\ a)$. Further, we find the linear contribution diminishes as a function of energy while the quadratic dependence remains constant. At low energy just above the critical temperature we find the minimum in shear viscosity is less than the resonant value and is significantly shifted toward the BEC side of resonance to $1/(k_F\ a) \approx 0.2$. http://arxiv.org/abs/1311.2049

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