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Universal Thermodynamic and Spin Transport Properties of Strongly Interacting Fermi Gases¹ ARIEL SOMMER, MARK KU, LAWRENCE CHEUK, MARTIN W. ZWIERLEIN, Department of Physics, MIT-Harvard Center for Ultracold Atoms, and Research Laboratory of Electronics, MIT, Cambridge, Massachusetts 02139, USA — We perform a high-precision measurement of the equation of state of a Fermi gas with unitarity limited interactions by in-situ imaging of ultracold ^6Li at a Feshbach resonance. We observe the superfluid phase transition in the chemical potential, entropy, compressibility and heat capacity, and provide a new value of the Bertsch parameter ξ_S . In a separate set of measurements, we determine the spin transport properties of strongly interacting Fermi gases by spatially separating the two spin components and allowing the system to relax to equilibrium (arXiv:1101.0780v1). We find that the spin diffusivity approaches a universal minimum value set by the ratio of Planck's constant to the atomic mass, and determine the spin susceptibility from spin transport properties.

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