

Abstract Submitted
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Transport measurements of the unitary Fermi gas¹ PARTH PATEL, ZHENJIE YAN, BISWAROOP MUKHERJEE, CEDRIC WILSON, AIRLIA SHAFFER, Massachusetts Institute of Technology MIT, JULIAN STRUCK, Ecole Normale Suprieure / PSL Research University, CNRS, RICHARD FLETCHER, MARTIN ZWIERLEIN, Massachusetts Institute of Technology MIT — Understanding transport in strongly interacting Fermi gases is one of the most significant challenges of many-body physics. Here, we present recent measurements of the transport properties of a homogeneous, strongly interacting Fermi gas of ^6Li atoms in the unitarity limit. We study the coupled transport of momentum and heat through the attenuation of the first-(density wave) and second-sound (entropy wave). Using a novel local thermometer, we observe the local temperature variations of second sound and measure the thermal diffusivity as well as the superfluid fraction. These results exclude a Fermi liquid description for the unitary Fermi gas and instead reveal a diffusivity attaining the Heisenberg limit, given by \hbar/m .

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