Abstract Submitted
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Observation of the Leggett-Rice effect in an ensemble of 2D Fermi gases CHRISTOPHER LUCIUK, SCOTT SMALE, STEFAN TROTZKY, HAILLE SHARUM, University of Toronto, TILMAN ENSS, Universität Heidelberg, JOSEPH THYWISSEN, University of Toronto — Transport properties of unitary Fermi gases have been studied extensively in the past few years. Because of strong interparticle scattering at unitarity, many transport phenomenon, in particular the spin diffusivity, are observed to be bounded [1-4]. However, anomalously slow spin diffusion has been observed in two dimensions [2] and remains to be understood. Here we study the spin currents that arise as a result of a non-equilibrium magnetization in an ensemble of two dimensional Fermi gases. Spin currents possess both a dissipative and reactive component. The dissipative component parameterized by the spin diffusivity is a measure of the scattering rate. The reactive component describes a part of the spin current that precesses around the local magnetization known as the Leggett-Rice effect. Using a spin-echo sequence we measure both the amplitude and phase of magnetization dynamics to extract these two transport parameters at a range of interaction strengths near a Feshbach resonance. [1] A. Sommer, M. Ku, G. Roati, and M.W. Zwierlein, Nature 472, 201 (2011). [2] M. Koschorreck, D. Pertot, E. Vogt, and M. Kohl, Nat. Phys. 9, 405 (2013). [3] A.B. Bardon, et al., Science 344, 722 (2014). [4] S. Trotzky, et al., PRL 114, 015301 (2015).

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