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Observation of Spin Diffusion in the 2D Fermi-Hubbard Model MATTHEW NICHOLS, MELIH OKAN, Massachusetts Institute of Technology, LAWRENCE CHEUK, Harvard University, ENRIQUE MENDEZ, THOMAS HARTKE, HAO ZHANG, Massachusetts Institute of Technology, EHSAN KHATAMI, San Jose State University, MARTIN ZWIERLEIN, Massachusetts Institute of Technology — Quantum gas microscopy of Fermionic systems has allowed for rapid advances in the study of equilibrium properties of the 2D Fermi-Hubbard model. For example, site-resolved measurements have enabled investigations of spatial correlations at variable doping strengths, revealing the intricate interplay between the spin and charge degrees of freedom in these systems. In this talk, we report on a study of spin transport in the Hubbard model using a Fermi gas microscope of ultracold ^{40}K atoms trapped in a square optical lattice. Specifically, by preparing a homogeneous Mott-insulating sample at half-filling in the presence of a magnetic gradient, we are able to observe spin dynamics in this strongly correlated regime. By varying the relative strength of the on-site interactions, we explore how they can affect the transport of spin in the system. For a wide range of experimental parameters, we find that the spin dynamics are diffusive in nature, and we can extract the spin diffusion coefficient. These findings are compared with novel numerical linked-cluster expansion (NLCE) calculations.

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