## Abstract Submitted for the DAMOP20 Meeting of The American Physical Society

Spin transport in a Heisenberg model with negative anisotropy JESSE AMATO-GRILL, NIKLAS JEPSEN, IVANA DIMITROVA, Massachusetts Institute of Technology MIT, WEN WEI HO, MIKHAIL LUKIN, EUGENE DEMLER, Harvard University, WOLFGANG KETTERLE, Massachusetts Institute of Technology MIT — Using ultracold atoms, we experimentally study for the first time a Heisenberg model with negative anisotropy: the longitudinal and transverse couplings in the Hamiltonian have opposite sign. Transport in this system shows qualitatively different behavior compared to positive anisotropy. We observe ballistic transport at short relaxation times and diffusive transport at long relaxation times for all measured negative anisotropies. However, we find that the diffusion coefficient is a strong function of anisotropy. This behavior, reminiscent of transport in a classical gas, is in contrast to the anomalous diffusion we previously observed for positive anisotropies.

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