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**Spin Drag and Spin-Charge Separation in Cold Fermi Gases**

MARCO POLINI, NEST-CNR-INFN and Scuola Normale Superiore, I-56126 Pisa, Italy, GIOVANNI VIGNALE, Department of Physics and Astronomy, University of Missouri, Columbia, Missouri 65211, USA — Low-energy spin and charge excitations of one-dimensional interacting fermions are completely decoupled and propagate with different velocities. These modes however do not live forever and can decay due to several possible mechanisms, even in the complete absence of impurities. In the spin channel the main mechanism of decay at finite temperature is related to a distinctive mechanism of friction that dominates spin transport: the spin drag. In this work we show how two component cold Fermi gases confined inside a tight atomic waveguide offer the unique opportunity to measure directly the spin-drag relaxation time that controls the broadening of a spin packet.

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