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Hydrodynamic Electron Flow and Hall Viscosity[1] THOMAS SCAFFIDI, UC Berkeley, PHILIP MOLL, PALLAVI KUSHWAHA, NABHANILA NANDI, BURKHARD SCHMIDT, ANDREW MACKENZIE, MPI Dresden, JOEL MOORE, UC Berkeley — In metallic samples of small enough size and sufficiently strong electron-electron scattering, the viscosity of the electron gas can become the dominant process governing transport. In this regime, momentum is a long-lived quantity whose evolution is described by an emergent hydrodynamical theory for which bounds on diffusion were conjectured based on an holographic correspondence. Furthermore, breaking time-reversal symmetry can lead to the appearance of an odd component to the viscosity called the Hall viscosity which has attracted a lot of attention recently due to its quantized nature in gapped systems but still eludes experimental confirmation. Based on microscopic calculations, we discuss how to measure the effects of both the even and odd components of the viscosity using hydrodynamic electronic transport in mesoscopic samples under applied magnetic fields.

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