# Mutual friction in a strongly interacting Fermi superfluid

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The motion of a quantized vortex is intimately connected with its microscopic structure and the elementary excitations of the surrounding fluid. In this work, we investigate the two-dimensional motion of a single vortex orbiting a pinned anti-vortex in a unitary Fermi superfluid at varying temperature. By analyzing its trajectory, we measure the yet-unknown longitudinal and transverse mutual friction coefficients, which quantify the vortex-mediated coupling between the normal and superfluid components. Both coefficients increase while approaching the superfluid transition. They provide access to the vortex Hall angle, which is linked to the relaxation time of the localized quasiparticles occupying Andreev bound states within the vortex core, as well as the intrinsic superfluid parameter associated with the transition from laminar to quantum turbulent flows. We compare our results with numerical simulations and an analytic model originally formulated for superfluid $^3$He in the low-temperature limit, finding good agreement. Our work highlights the interplay between vortex-bound quasiparticles and delocalized thermal excitations in shaping vortex dynamics in unitary Fermi superfluids. Further, it provides a novel testbed for studying out-of-equilibrium vortex matter at finite temperatures.