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Title:

Spin Transport Analogues in Quantum Gases

Abstract:

"Ultracold fermionic atomic gasses with strong interactions obey the same kind of physics as strongly correlated electrons. The study of atomic gas analogs allows easier access to tunable parameters that are difficult to study in solids. The dynamic time scales are slower in atomic gases which make non-equilibrium measurements easier and the interaction strength between atoms can be tuned. To study an atomic gas with very strong interactions we use a Feshbach resonance. By starting with an initially magnetized gas, a non-equilibrium state, we can probe the dynamics as a function of time by measuring the aggregate spin of the cloud. Recently we have found that the demagnetization of a transversely magnetized ultracold fermionic gas with strong interactions is caused by diffusive spin transport with a diffusion constant that plateaus at ~hbar/m for low temperatures. We are working on studying this behaviour for a variety of parameters."