

Fermi Gases with Tunable Interactions

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Optically-trapped mixtures of spin 1/2-up and spin 1/2-down Fermi atoms are a new paradigm for exploring interacting Fermi systems in nature. Even though it is dilute, a Fermi gas tuned near a Feshbach resonance is currently the most strongly interacting nonrelativistic system known, enabling tests of nonperturbative many-body theories in disciplines from high temperature superconductors to nuclear matter. Our studies of universal thermodynamics and quantum viscosity reveal nearly perfect fluidity, of great interest in the quark-gluon plasma and string theory communities. In the weakly interacting regime, we observe anomalous spin waves in coherently prepared clouds.