DAMOP13-2013-000458

Abstract for an Invited Paper
for the DAMOP13 Meeting of
the American Physical Society

Two-dimensional Fermi liquid with attractive interactions and near scale-invariant dynamics[1]

MARCO KOSCHORRECK, University of Cambridge

We realize and study an attractively interacting two-dimensional Fermi liquid. Using momentum-resolved photoemission spectroscopy, we measure the self-energy, determine the contact parameter of the short-range interaction potential, and find their dependence on the interaction strength. Further, we investigate collective excitations of a harmonically trapped two-dimensional Fermi gas from the collisionless (zero sound) to the hydrodynamic (first sound) regime. The breathing mode, which is sensitive to the equation of state, is observed with an undamped amplitude at a frequency 2 times the dipole mode frequency for a large range of interaction strengths and different temperatures. This provides evidence for a dynamical SO(2,1) scaling symmetry of the two-dimensional Fermi gas. Moreover, we investigate the quadrupole mode to measure the shear viscosity of the two-dimensional gas and study its temperature dependence.

[1]The author acknowledges support from the Leverhulme Trust within the "Early Career Fellowship."