DAMOP12-2012-000019

Abstract for an Invited Paper
for the DAMOP12 Meeting of
the American Physical Society

Quantum degenerate Bose and Fermi gases of dysprosium[1]

BENJAMIN LEV, Stanford University

Advances in the quantum manipulation of ultracold atomic gases are opening a new frontier in the quest to better understand strongly correlated matter. By exploiting the long-range and anisotropic character of the dipole-dipole interaction, we hope to create novel forms of soft quantum matter, phases intermediate between canonical states of order and disorder. Our group recently created Bose and Fermi degenerate gases of the most magnetic atom, dysprosium, which should allow investigations of quantum liquid crystals, analogs to the electron nematics and smectics thought to exist in, e.g., high-Tc cuprate superconductors. We present details of recent experiments that created the first degenerate dipolar Fermi gas as well as the first strongly dipolar BEC in low field.

[1]We thank AFOSR, NSF, and ARO/MURI for funding.