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Quantum degenerate Bose and Fermi dipolar gases of dysprosium
NATHANIEL BURDICK, MINGWU LU, KRISTIAN BAUMANN, 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 quantum degenerate gases of the most magnetic element, dysprosium, which should allow investigations of quantum liquid crystals. 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.

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