Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

A long-lived spin-orbit-coupled dipolar Fermi gas YIJUN TANG, NATHANIEL BURDICK, WIL KAO, BENJAMIN LEV, Departments of Physics and Applied Physics, Stanford University — We report on the demonstration of spin-orbit coupling in a quantum degenerate dipolar Fermi gas of dysprosium. The $T/T_F = 0.4$ gas has a lifetime as large as 0.4 s under Raman dressing at densities exceeding 10^{13} cm^{-3}. The lifetime is limited not by spontaneous emission but by dipolar relaxation loss, and the effect of the dipolar interaction is also observed in the dephasing of Rabi oscillations. This spin-orbit-coupled dipolar gas will allow future studies of fermionic systems in the presence of synthetic gauge fields wherein long lifetimes are essential to observing collective effects.

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Date submitted: 02 May 2016 Electronic form version 1.4