Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Interaction-Tuned Dynamical Transitions in a Rashba Spin-Orbit-Coupled Fermi Gas JURAJ RADIC, STEFAN NATU, VICTOR GALITSKI, University of Maryland, College Park — We consider the time evolution of the magnetization in a Rashba spin-orbit-coupled Fermi gas, starting from a fully-polarized initial state. We model the dynamics using a Boltzmann equation, which we solve in the Hartree-Fock approximation. The resulting non-linear system of equations gives rise to three distinct dynamical regimes with qualitatively different asymptotic behaviors of the magnetization at long times. The distinct regimes and the transitions between them are controlled by the interaction strength: for weakly interacting fermions, the magnetization decays to zero. For intermediate interactions, it displays undamped oscillations about zero and for strong interactions, a partially magnetized state is dynamically stabilized. The dynamics we find is a spin analog of interaction induced self-trapping in double-well Bose Einstein condensates. The predicted phenomena can be realized in trapped Fermi gases with synthetic spin-orbit interactions.

Juraj Radic
University of Maryland, College Park

Date submitted: 14 Nov 2013 Electronic form version 1.4