

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Chiral Spin Waves in Fermi Liquids with Spin-Orbit Coupling**

ALI ASHRAFI, DMITRII MASLOV, University of Florida — We predict the existence of chiral spin waves—collective modes in a two-dimensional Fermi liquid with the Rashba or Dresselhaus spin-orbit coupling. Starting from the phenomenological Landau theory, we show that the long-wavelength dynamics of magnetization is governed by the Klein-Gordon equations. The standing-wave solutions of these equations describe “particles” with effective masses, whose magnitudes and *signs* depend on the strength of the electron-electron interaction. The spectrum of the spin-chiral modes for arbitrary wavelengths is determined from the Dyson equation for the interaction vertex. We propose to observe spin-chiral modes via microwave absorption of standing waves confined by an in-plane profile of the spin-orbit splitting.

Ali Ashrafi  
University of Florida

Date submitted: 07 Nov 2012

Electronic form version 1.4