Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Observation of a collective mode of the helical liquid on the surface of Bi_2Se_3 ANSHUL KOGAR, SEAN D. VIG, ALEXANDER THALER, MAN-HONG WONG, TAI-CHANG CHIANG, GREGORY J. MACDOUGALL, Univ of Illinois - Urbana, LUC VENEMA, University of Groenigen, PETER ABBAMONTE, Univ of Illinois - Urbana — The helical Dirac band structure at the surface of three-dimensional topological insulators has been theoretically predicted to give rise to unusual surface collective modes. Of particular interest is the "spin-plasmon," a coupled collective excitation involving both the spin and charge degrees of freedom. In this talk, I will present data suggesting that we have observed this excitation on the surface of Bi2Se3 using angle-resolved inelastic electron scattering from the surface. In our study, we have grown samples of different dopings and shown, using angle-resolved photoemission, that we can suppress the Fermi Level into the bulk band gap. The evolution from a bulk-band free-carrier surface plasmon into a Dirac band surface spin-plasmon has been observed as a function of doping. The dependence of the spin-plasmon on momentum transfer as well as time will also be discussed.

Anshul Kogar
Univ of Illinois - Urbana

Date submitted: 15 Nov 2013 Electronic form version 1.4