

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Faraday rotation due to surface states in the topological insulator $(Bi, Sb)_2Te_3$ YINMING SHAO, Columbia University, KIRK POST, JIHH-SHENG WU, SIYUAN DAI, ALEX FRENZEL, University of California San Diego, ANTHONY RICHARDELLA, JOON SUE LEE, The Pennsylvania State University, MICHAEL FOGLER, University of California San Diego, NITIN SAMARTH, The Pennsylvania State University, ALEXANDER BALATSKY, Los Alamos National Laboratory, DMITRI KHARZEEV, Brookhaven National Laboratory and Stony Brook University, DIMITRI BASOV, Columbia University — Using magneto-infrared spectroscopy, we have explored the charge dynamics of $(Bi, Sb)_2Te_3$ thin films on InP substrates. From the magneto-transmission data we extracted three distinct cyclotron resonance (CR) energies that are all apparent in the broad band Faraday rotation (FR) spectra. This comprehensive FR-CR data set has allowed us to isolate the response of the bulk states from the intrinsic surface states associated with both the top and bottom surfaces of the film. The FR data uncovered that the electron- and hole-type Dirac fermions reside on opposite surfaces of our films, which paves the way for observing many exotic quantum phenomena in topological insulators.

Yinming Shao
Columbia University

Date submitted: 13 Oct 2017

Electronic form version 1.4