

Abstract Submitted
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Cyclotron resonance and Faraday rotation in topological insulator $(Bi, Sb)_2Te_3$ YINMING SHAO, KIRK POST, JIHH-SHENG WU, Univ of California - San Diego, ANTHONY RICHARDELLA, JOON SUE LEE, The Pennsylvania State University, MICHAEL FOGLER, Univ of California - San Diego, NITIN SAMARTH, The Pennsylvania State University, DIMITRI BASOV, Univ of California - San Diego — Using magneto-optical spectroscopy, we have explored the complex electronic structure of $(Bi, Sb)_2Te_3$ (BST) film. From the magneto-optical transmission spectra, we extracted the cyclotron resonance (CR) energy, and subsequently measured the broadband Faraday rotation spectra (FR). From these complementary FR-CR datasets, we were able to identify the conducting channels associated with the topological surface states of the film at the interface with the substrate and with the amorphous capping layer on top of the film. According to the FR data the two surfaces are dominated by carriers of opposite sign, in accord with earlier transport measurements. These results elucidate the origin of the zero-field optical response, observed previously, and give direct evidence of significant SS contribution using a bulk sensitive probe.

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