

Topological surface state dispersion measured using THz magneto-ellipsometry

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We present an ambient field and magneto-optical study of the three-dimensional topological insulator, strained HgTe. The ac conductance of the thin film is in good agreement with the dc transport data which show a quantum Hall effect of topological surface states at high field and low temperature. Using polarization-sensitive time-domain THz spectroscopy in a magnetic field, reliable information on the Drude weight and cyclotron resonance frequency severely constrain the details of surface state dispersion within 1meV of the Fermi level. Details of the technique and its prospect for future observation of axion electrodynamics using THz spectroscopy will also be discussed. C. Brune, et al, Phys. Rev. Lett. 106, 126803 (2011), Hancock, et al. Phys. Rev. Lett. 107, 136803 (2011)

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