Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quantized Faraday rotation of surface states in 3D topological insulator thin films LIANG WU, Department of Physics and Astronomy, The Johns Hopkins University, MARYAM SALEHI, Department of Materials Science and Engineering, Rutgers, The State University of New Jersey, NIKESH KOIRALA, SEONGSHIK OH, Department of Physics and Astronomy, Rutgers, The State University of New Jersey, N. PETER ARMITAGE, Department of Physics and Astronomy, The Johns Hopkins University, JOHNS HOPKINS UNIVERSITY TEAM, RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY TEAM — Axion electrodynamics of topological surface states have been predicted a while ago, but the experimental observation has not been realized yet. One of the consequences of axion electrodynamics is a topological magneto-electric effect. In my talk, I will talk about utilizing a charge-transfer-doping method to lower the chemical point near the Dirac point in thin films of the topological insulator Bi_2Se_3. Using time-domain THz spectroscopy, we observed a crossover from semi-classical cyclotron resonances from topological surface states in the low field regime to a quantum regime at higher fields. A quantized Faraday rotation in the units of the fine structure constant was observed at high fields, which may provide the evidence for the topological magneto-electric effect.

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Date submitted: 02 Nov 2015 Electronic form version 1.4