

Abstract Submitted  
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**Terahertz Kerr and Reflectivity Measurements on the Topological Insulator  $\text{Bi}_2\text{Se}_3$** <sup>1</sup> GREGORY S. JENKINS, A.B. SUSHKOV, D.C. SCHMADEL, N.P. BUTCH, P. SYERS, J. PAGLIONE, M.-H. KIM, H.D. DREW, Center for Nanophysics and Advanced Materials, University of Maryland, College Park, J.G. ANALYTIS, I.R. FISHER, Geballe Laboratory for Advanced Materials, Departments of Physics and Applied Physics, Stanford University, Stanford — We report the first terahertz Kerr measurements on bulk crystals of the topological insulator  $\text{Bi}_2\text{Se}_3$  with and without Fe doping at 4 K and magnetic fields up to 8 T. Transport evidence and characterization of the surface states will be presented. By employing a gate that creates a small depletion layer, the optical signals from the surface state carriers are modulated with no contribution arising from the bulk carriers. The real and imaginary parts of the Kerr angle yield the transport scattering rate, spectral weight, and mass of the surface state carriers. FTIR and magneto-optical measurements characterize the bulk carriers. Comparisons with ARPES and other transport measurements will be discussed.

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