

Abstract Submitted
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Photo-Induced Kerr Rotation in the Bulk and Surface of a Topological Insulator FAHAD MAHMOOD, DAVID HSIEH, JAMES MCIVER, DILLON GARDNER, YOUNG LEE, NUH GEDIK, Department of Physics, Massachusetts Institute of Technology, Cambridge MA 02139 — We report ultrafast bulk- and surface-sensitive optical pump-probe spectroscopy from Bi_2Se_3 (111). Using second harmonic generation, we demonstrate that the bulk and surface electronic contributions can be separated and exhibit qualitatively different relaxation dynamics. Ultrafast surface-sensitive optical measurements reveal a large photo-induced Kerr rotation from the surface that is dependent on the helicity of the circularly polarized excitation pulse. We will discuss the microscopic origin of this observation and how it relates to the strong spin-charge coupling on the surface of a topological insulator.

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