

# Terahertz Response and Colossal Kerr Rotation from the Surface States of the Topological Insulator Bi<sub>2</sub>Se<sub>3</sub>

*Monday, 23 July 2012 20:00 (2 hours)*

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We report the THz response of thin films of the topological insulator Bi<sub>2</sub>Se<sub>3</sub>. At low frequencies, transport is essentially thickness independent showing the dominant contribution of the surface electrons. Despite their extended exposure to ambient conditions, these surfaces exhibit robust properties including narrow, almost thickness-independent Drude peaks, and an unprecedentedly large polarization rotation of linearly polarized light reflected in an applied magnetic field. This Kerr rotation can be as large as 65° and can be explained by a cyclotron resonance effect of the surface states. In addition, we will report on the long term effects of atmospheric exposure of thin films of Bi<sub>2</sub>Se<sub>3</sub>

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**Session Classification:** Poster Session 1

**Track Classification:** Topological Insulators