

Abstract Submitted
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Current induced Optical Activity in Topological Insulator Bi₂Te₂Se₁ NIRAJAN MANDAL¹, IREK MITKOWSKI, Department of Physics and Astronomy, Purdue University, West Lafayette, IN 47907, MIKHAIL GLAZOV, Ioffe Institute, Polytechnicheskaya 26, 194021 St. Petersburg, Russia, YONG CHEN², Department of Physics and Astronomy, Purdue University, West Lafayette, IN 47907 — Current induced polarization rotation of light (provided by a laser with wavelength=635nm) was studied from topological insulator (TI), Bi₂Te₂Se₁, grown by Bridgman method. The magnitude of the observed response increases linearly with the applied current and reverses sign upon reversing the current direction. Possible origins of the rotation can include the linear electro-optic Pockels effect (linear birefringence) and spin-Kerr effect due to the current induced spin polarization (e.g, resulting from the spin momentum locking of the surface states) at the sample surface. At room temperature, the rotation was measured as a function of the angle of incidence and laser polarization. Dependence of the rotation angle on the polarization of light (S or P) was used to isolate contributions from these two effects. The contribution from the electro optic effect was found to dominate over that from the current-induced spin- Kerr effect.

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