Abstract Submitted
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All-optically injected photocurrents in topologically insulating Bi2Se3[1] DEREK BAS, West Virginia University, RODRIGO MUNIZ, University of Toronto, SERCAN BABAKIRAY, TUDOR STANESCU, DAVID LEDERMAN, West Virginia University, JOHN SIPE, University of Toronto, ALAN BRISTOW, West Virginia University — Nonlinear optics techniques have been employed to provide an all-optical method to generate and control photocurrents in semiconductors. Inevitably arises the challenge of distinguishing various processes that contribute to the photocurrent. This talk reports the generation of shift and injection currents simultaneously in topologically insulating bismuth selenide (Bi2Se3) thin films. A near-infrared pump and its phase-related frequency-doubled counterpart excite the currents, which are detected through their terahertz radiation. The properties of the photocurrents, such as their magnitude and direction relative to the polarization of the incident fields, are compared to theoretical predictions based on the symmetries of the crystal lattice, allowing the different photocurrents to be isolated. This work thus presents a comprehensive all-optical method for analyzing the optoelectronic properties of topological insulators.

[1]All-optically injected photocurrents in topologically insulating Bi2Se3

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