

Abstract Submitted
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Ultrafast

Dynamics of Bi_{1.5}Sb_{0.5}Te_{1.8}Se_{1.2} Topological Insulator¹ LIANG CHENG, CHI-SIN TANG, SARITHA KRISHNANKUTTY NAIR, BIN XIA, LAN WANG, Nanyang Tech Univ, JIAN-XIN ZHU, Los Alamos Natl Lab, EE MIN ELBERT CHIA, Nanyang Tech Univ — Bi_{1.5}Sb_{0.5}Te_{1.8}Se_{1.2} (BSTS) is a type of topological insulator, which is an insulator in bulk but surface states are gapless. In this work, we took optical pump-probe data on BSTS crystal to analyze the dynamics of phonons and charge carriers. The ultrafast dynamics were obtained as a function of temperature ranging from 10K to 300K, as well as fluence ranging from 1 $\mu\text{J}/\text{cm}^2$ to 10 $\mu\text{J}/\text{cm}^2$. In addition to the coherent optical phonon mode found in other topological insulators, acoustic phonon mode was observed in our experiment. We also observed phonon softening and the temperature dependence of carrier lifetime in BSTS.

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