

Phonon dynamics of exotic materials Bi_2Se_3 , Bi_2Te_3 , Sb_2Te_3 and WSe_2

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There will be donuts!

ABSTRACT: Raman and Brillouin spectroscopy have been employed to investigate the phonon dynamics of Bi_2Se_3 , Bi_2Te_3 , Sb_2Te_3 (all topological insulators) and WSe_2 (a 2D semiconductor). In the frequency range studied, two peaks were observed in the Raman spectra of Bi_2Se_3 , Bi_2Te_3 , and Sb_2Te_3 . Polarization studies were done to study the nature of these peaks and assign them to particular vibrational modes. Raman scattering studies of WSe_2 have generated lots of controversy with regards mode assignment and the shifts at which spectral peaks appear. Our experiment shows that the Raman active E_{2g}^1 and A_{1g} modes in WSe_2 initially thought to be degenerate are not degenerate. This was verified by collecting spectra at different polarization configurations. Last, we report results from Brillouin scattering studies of WSe_2 . The velocity of the Rayleigh surface wave extracted was found to compare well with those previously reported for related materials.

ALL ARE WELCOME!!!