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Excited-state electron-dynamics probed by A1g phonons in Bi, Sb, and Bi2Te3 CRYSTAL BRAY, Stanford University, PULSE Institute, EAMONN MURRAY, Tyndall National Institute, Cork, Ireland, STEPHEN FAHY, Tyndall National Institute; University College Cork, Ireland, DAVID REIS, Stanford University, PULSE Institute — We report on dynamics of photo-excited electronic states in bismuth, antimony and bismuth telluride as a function of photon energy and carrier density using the coherent A1g phonon as a probe. Previous experimental and first principle theoretical studies on group V semimetals show strong softening of the mode with photo-excitation associated with electronic softening and a reduction in the Peierls distortion. By carefully controlling the total energy deposition and the incident photon number as a function of different pump wavelengths, we are able to further the experimental results producing constraints on relaxation and population mechanism to model an exited system to help reconcile differences between the one- and two-chemical potential theories that use various Fermi Dirac distributions to describe thermalization of electron and hole populations.

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