

Abstract Submitted
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Dynamics of high amplitude coherent phonons in photoexcited bismuth¹ DAVID REIS, FOCUS Center and Department of Physics, University of Michigan, DAVID FRITZ, FOCUS Center and Department of Physics, University of Michigan, EAMMON MURRAY, Department of Physics and Tyndall National Institute, University College, Cork, Ireland , STEPHEN FAHY, Department of Physics and Tyndall National Institute, University College, Cork, Ireland , JARED WAHLSTRAND, JILA/University of Colorado — We report on studies of high amplitude coherent phonons in photoexcited bismuth. All optical experiments, in which two pump pulses are used to coherently control the amplitude A_{1g} phonon at a fixed carrier density, allow us to separate the effects of carrier dynamics from anharmonicity. The results show that the the time dependent frequency of the phonon is dominated by electronic softening of the interatomic potential. Seperate first-principals theoretical calculations confirm these results for photoexcited carrier densities up to approximately 2% of the valence electrons. We comment on the possibility of x-ray diffraction and diffuse scattering as a means of measuring the detailed dynamics.

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