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Title

Imaging Electron-Phonon Interactions

Source

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Abstract

Phonon Imaging provides insights into the interaction of electrons and phonons in crystals. The method was invented to understand spatial distributions of excitonic matter in semiconductors Ge and Si, involving the concept of "phonon wind." Images show "phonon focusing" in crystals, a concept that applies to vibrational waves from MHz to THz frequencies. Experimental methods are reviewed, beginning with the propagation of ultrasound and leading to analysis of lattice dynamics in compound semiconductors. This retrospective begins with electron-phonon scattering in the elemental superconductor Pb - a recent study that bears on a controversy concerning the superconducting ground state. Extensive references are provided for a deeper understanding of the phenomena. (44 References).