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Title

Photocarrier-induced reduction of the lifetime of acoustic phonons in semiconductor superlattices

Source

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Abstract

We present an experimental analysis of the role of the electron-phonon interaction in the lifetime of coherent longitudinal acoustic phonons in a sample based on the GaAs/AlAs superlattice structure. Sub-terahertz phonons are generated and detected through an ultra fast pump-probe technique. In order to supply with different scenarios for the electron phonon interaction, two experimental configurations are proposed, either with a high or a nil density of photo-excited carriers in the spatial region where the phonon detection takes place. We observe a one-order-of-magnitude reduction in the phonon lifetime in the first case with respect to the second. (26 References).