

Parametric resonance of acoustic and optical phonons in a doped semiconductor superlattice

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Abstract: The parametric resonance of acoustic and optical phonons in a doped superlattice with a non-degenerative electron gas in the presence of a laser field is theoretically predicted by using a set of quantum transport equations for the phonons. Dispersions of the resonant phonon frequency and the threshold amplitude of the field for parametric amplification of the acoustic phonons are obtained. The amplitude is also estimated for realistic semiconductor models.

Author Keywords: Acoustic phonon; Doped semiconductor superlattice; Optical phonon; Parametric resonance

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