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Deformation Electron-Phonon Coupling in Disordered Semiconductors and Nanostructures ANDREI SERGEEV, University at Buffalo, MICHAEL REIZER, Chemical Abstracts Service, Columbus OH, VLADIMIR MITIN, University at Buffalo — We study the effective electron-phonon interaction, which is determined by the interference of electron scattering via the deformation potential and elastic electron scattering from impurities and defects. We have found that in contrast to the destructive interference in metals, which results in the Pippard ineffectiveness condition for the electron-phonon interaction, the interference in semiconducting structures substantially enhances the effective electron-phonon coupling. The interference also significantly changes temperature dependence of the electron-phonon relaxation (dephasing) rate in disordered semiconductors and low-dimensional structures. The obtained results provide an explanation of energy relaxation measurements in Si δ-layers.

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