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Electron relaxation via interaction with optical phonons in disordered metals and semiconductors ANDREI SERGEEV, MICHAEL REIZER, VLADIMIR MITIN, University at Buffalo — Using the Green function formalism we study the energy transfer from hot electrons to phonons due to interference between inelastic electron scattering on optical phonons and elastic scattering from impurities and defects. We calculated the electron-phonon relaxation time and the electron-phonon thermal conductance as a function of the electron mean free path with respect to elastic electron scattering. We also investigate concentration dependencies of the relaxation processes. The results show that while in semiconductors and in semiconductor structures the relaxation is enhanced by disorder, in metals and metallic structures the interference effect is strongly depends on vibrations of impurities and defects.

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