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Modeling lattice interaction in non-equilibrium pump-probe experiments A.F. KEMPER, MICHAEL SENTEF, BRIAN MORITZ, T.P. DEVEREAUX, Stanford Institute for Materials and Energy Science — In past years, advances is experimental laser technology have allowed for the study of materials at ever shorter timescales. In these pump-probe experiments, after excitation by the pulse, the systems evolve back to equilibrium through its inherent relaxation processes, which are typically temporally separated by their characteristic timescales. Among the slower processes are the electron-phonon interactions, which carry the majority of the energy transferred to the electrons away into the lattice. We present a direct calculation of the characteristic timescales for systems driven out of equilibrium via a short pulse and allowed to relax via electron-phonon interactions. We make a direct connection between the observable timescales and the microscopic specifics, both via decay rates and oscillations in various photon-spectroscopies.

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