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Modeling time domain spectroscopy of electron-phonon coupled systems out of equilibrium MICHAEL SENTEF, A.F. KEMPER, BRIAN MORITZ, T.P. DEVEREAUX, Stanford Institute for Materials and Energy Science, SLAC National Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, CA 94025, USA — Recent advances in Terahertz large-electric field generation and pump-probe spectroscopies resolving pico- and even femtosecond time scales allow to study the behavior of photoexcited solids out of equilibrium. The relaxation after the pump pulse typically involves very fast processes related to purely electronic degrees of freedom, but for the slower return back to equilibrium it is essential to understand the interplay of electronic and lattice degrees of freedom. We present a theoretical investigation of electron-phonon coupled systems out of equilibrium, with results for various quantities (electronic distribution function, time-resolved angle-resolved photoemission, charge current). Our results show that the experimentally observed behavior can be related to the underlying microscopic properties of the system.

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