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PUMP-PROBE PHOTOEMISSION AND NONEQUILIBRIUM ELECTRONIC RESPONSE

Ultrafast pump-probe techniques, including time-resolved photoemission spectroscopy, are becoming increasingly important tools for uncovering the physics of condensed matter materials. We describe a computational approach for evaluating the time-resolved photoemission response of electronic systems as well as extension of the approach to other electronic response functions. Simple model examples serve to illustrate the method. We focus on the phenomena of high-harmonic generation in weakly interacting materials, the effect of phonons on relaxation of a system driven out of equilibrium by intense pulsed fields and their influence on the photoemission response, and the characterization of the out-of-equilibrium behavior of a model correlated electronic system with particular emphasis on differences between metallic and insulating regimes.