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Effective transient states for nonequilibrium systems under ultrafast control pulses BIN HWANG, JENNI PORTMAN, EDWARD ERSOY, PHILLIP DUXBURY[1], Michigan State Univ — We investigate the transient states in nonequilibruim time-dependent systems. Intense ultrafast laser pulses allow the preparation of transient states of matter exhibiting strong non-equilibrium between electrons and lattice. By controling the laser pulse, we are able to change the transient states of these quantum systems. The optical and structural properties as well as the temporal evolution of such states provide insight into the mutual dependence of electronic and atomic structure. We approach the problem by showing examples from charge-density-wave systems and model two level systems. In both of these, nonequilibrium techniques can be used to qualitatively describe the common short-time experimental features. Through simulations based on non-equilibrium Green's function formalism and time dependent master equations approaches we show how to achieve effective transient states for nonequilibrium systems under ultrafast control pulses.

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