Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Effective transient states for nonequilibrium charge density wave systems under ultrafast control pulses BIN HWANG, JENNI PORTMAN, PHILLIP DUXBURY, Michigan State University — A central challenge for implementing Mott-insulator transition in nonequilibruim time-dependent charge density wave systems is finding an effective pulse to achieve the goal. Effective ultra laser pulses have been found for the transient states in nonequilibruim time-dependent charge density wave systems based on a promising optimal-control method. Intense ultrafast laser pulses allow the preparation of transient states of matter exhibiting strong non-equilibrium between electrons and lattice. By controlling 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. Nonequilibrium techniques can be used to qualitatively describe the common short-time experimental features. Through simulations based on non-equilibrium Green's function formalism we show how to achieve effective transient states for nonequilibrium systems under ultrafast control pulses.

Bin Hwang
Michigan State University

Date submitted: 09 Nov 2014 Electronic form version 1.4