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Exact nonequilibrium model for time-resolved photoemission spectroscopy of an electronic charge density wave insulator at zero temperature WEN SHEN, JAMES FREERICKS, Georgetown University — We exactly solve the nonequilibrium problem of electrons moving in a lattice potential that corresponds to a checkerboard ordered charge density wave at zero temperature. The exact solution can be found in arbitrary dimensions by calculating a series of two-by-two evolution operators with the Trotter formula. We examine how the charge density wave responds to being excited into nonequilibrium by a large electric field femtosecond pulse. We find that the order parameter is rapidly reduced (but not to zero) and then rings with an oscillation frequency given by the potential scattering energy U. The density of states shows evidence of gap closing for short times, which then reforms for long times. We discuss the implications of the solution of this model for the nonequilibrium melting of charge density waves observed in recent experiments.

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