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Time-resolved photoemission of a nonequilibrium charge-density-wave-ordered system OLEG MATVEEV[1], Department of Physics, Georgetown University, Washington, DC, ANDRIJ SHVAIKA, Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine, Lviv, Ukraine, THOMAS DEVEREAUX[2], Geballe Laboratory for Advanced Materials, Stanford University, Stanford, CA, USA, JAMES FREERICKS, Department of Physics, Georgetown University, Washington, DC — We examine the response of an electronic charge-density-wave-ordered (CDW) system in a time-resolved pump-probe photoemission spectroscopy experiment. In this experiment, the system is driven out of the equilibrium by a high intensity but low frequency pump pulse and then photoexcited by a low intensity but high frequency probe pulse. The system we examine is the half-filled Falicov-Kimball model, which has an exact solution within dynamical mean-field theory. This system has an interesting quantum critical point in the ordered phase, which is insulating at $T = 0$, but is metallic for all $T > 0$. Interestingly, the quantum critical CDW cannot be pumped easily — whatever energy is pumped in during the leading edge of the pump pulse is pumped out on the trailing edge. When one is in the weakly correlated insulator or the strongly correlated insulator, the system is much more easily pumped. These features occur only within the ordered phase.

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