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**Time-dependent DMRG study of the Hubbard model in strong electric fields** TAKASHI OKA, RYOTARO ARITA, HIDEO AOKI, Department of Physics, University of Tokyo — In order to explore transport properties of a correlated electron system out of equilibrium, we have studied transient behaviors of the one-dimensional Mott insulator in strong electric fields with the time-dependent DMRG method. The strong field drives the system away from the insulating ground state to a nonlinear regime, which is caused by successive non-adiabatic quantum tunneling processes. The decay rate of the ground state is estimated from its temporal evolution, and the nonequilibrium phase diagram is obtained. An intermediate phase is found where the dielectric breakdown is suppressed by a strong relaxation effect induced by the electron-electron interaction preventing charge excitations from moving freely. We have also looked into optical responses in the nonlinear regime by calculating the transient correlation function.

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