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Nonequilibrium Electron Transport in Mott Insulators K. A. AL-HASSANIEH, F. HEIDRICH-MEISNER, I. GONZALEZ, E. DAGOTTO, Oak Ridge National Laboratory, Oak Ridge TN, and University of Tennessee, Knoxville TN 37831, USA, A. E. FEIGUIN, Microsoft Project Q, The University of California at Santa Barbara, Santa Barbara, CA 93106, USA, M. J. ROZENBERG, Departamento de Física, FCEN, Universidad de Buenos Aires, Ciudad Universitaria Pabellón I, Buenos Aires 1428, Argentina — We study the nonequilibrium transport properties of a Mott insulator using a recently developed time-dependent DMRG procedure to study conductances [1]. As a setup, we use a Hubbard chain connected to two ideal leads. We find a simple functional form of the I-V characteristics, and a universal functional dependence of the current on the electric field and the Mott gap. A mechanism of transport is described based on these results. The properties of the conducting phase induced by a strong electric field are also studied. We compare these properties to those of the doped phase. We also compare the Mott insulator to the band insulator case and discuss the similarities and differences [2].

[1] K. A. Al-Hassanieh, A. E. Feiguin, J. A. Riera, C. A. Busser, and E. Dagotto, Phys. Rev. B 73, 195304 (2006). K. A. Al-Hassanieh, A. E. Feiguin, F. Heidrich-Meisner, I. Gonzalez, M. J. Rozenberg, and E. Dagotto, preprint.

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