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Non-equilibrium dynamics of the driven Hubbard model ADRIANO AMARICCI, CNR-IOM, uos SISSA Trieste, Via Bonomea 265, 34125 Italy, CEDRIC WEBER, Cavendish Laboratory, Cambridge University, J.J. Thomson Ave. , Cambridge, UK, MASSIMO CAPONE, CNR-IOM, uos SISSA Trieste, Via Bonomea 265, 34125 Italy/Physics Department, University "Sapienza", Piazzale A. Moro 2, 00185 Rome, Italy, GABRIEL KOTLIAR, Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA — We investigate the dynamics of a two-dimensional Hubbard model in a static electric field in order to identify the conditions to reach a non-equilibrium stationary state. For a generic electric field, the convergence to a stationary state requires the coupling to a thermostating bath absorbing the work done by the external force. Following the real-time dynamics of the system, we show that a non-equilibrium stationary state is reached for essentially any value of the coupling to the bath. We map out a phase diagram in terms of dissipation and electric field strengths and identify the dissipation values in which steady current is largest, and correspondingly a suitable entropy function is smallest, for a given field.

Adriano Amaricci
CNR-IOM, uos SISSA Trieste, Via Bonomea 265, 34125 Italy

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