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Nonequilibrium steady state for strongly-correlated many-body systems: a variational cluster approach[1] MICHAEL KNAP, WOLFGANG VON DER LINDEN, ENRICO ARRIGONI, Graz University of Technology — The understanding of the nonequilibrium behavior of strongly correlated quantum many-body systems is a long standing challenge, both in theory as well as in experiments. Here, we present a new numerical approach that allows to calculate nonequilibrium steady state properties of strongly correlated quantum many-body systems. The approach is formulated in the framework of Keldysh Green's functions and is based on the ideas of the variational cluster approach (VCA), which has been successfully applied to a variety of strongly correlated many-body systems in equilibrium. As in equilibrium VCA, one crucial aspect appears to be the variational procedure, consisting in a self-consistent adjustment of the equilibrium reference system to the nonequilibrium target state. We apply the presented approach to non-linear transport across a strongly correlated quantum wire described by the fermionic Hubbard model.

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