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**Lightcone renormalization and quantum quenches in one-dimensional Hubbard models** JESKO SIRKER, TU Kaiserslautern, TILMAN ENSS, TU Muenchen — The Lieb-Robinson bound implies that the unitary time evolution of an operator can be restricted to an effective light cone for any Hamiltonian with short-range interactions. Here we present a very efficient new renormalization group algorithm based on this light cone structure to study the time evolution of prepared initial states in the thermodynamic limit in one-dimensional quantum systems. The algorithm does not require translational invariance and allows for an easy implementation of local conservation laws. We use the algorithm to investigate the relaxation dynamics of a doublon lattice in fermionic Hubbard models as well as a possible thermalization. Furthermore, we present results for a doublon impurity in a Néel background. We find that the excess charge and spin spread at different velocities, providing an example of spin-charge separation in a highly excited state.

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