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Out-of-equilibrium dynamics of ultracold bosons in time- dependent random potentials[1] MILAN RADONJIĆ, University of Kaiserslautern, Germany, AXEL PELSTER, University of Kaiserslautern — We investigate perturbatively the impact of time-dependent random potentials on a weakly interacting Bose gas at zero temperature. Generically, a random potential yields, on the ensemble average, a depletion of the condensate. It stems from the localization of bosons in the respective minima of the disordered landscape and is usually quantified by a Bose-glass order parameter [1] in close analogy to the well-known Edwards-Anderson order parameter for spin-glasses [2]. A time dependence of the random potential leads in addition to an out-of-equilibrium dynamics of the condensate depletion.
Here we study a smooth quench of a spatially delta-correlated disordered potential from an initial disorder-free state of a uniform Bose gas. Depending on the quench rise time we focus on two limiting cases: adiabatic and sudden quench. In the long-time limit the former scenario reproduces the static disorder equilibrium case [3], while the latter leads to the formation of a non-equilibrium steady state, which turns out to have an even larger condensate depletion.

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