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Quantum quench from classical evolution: the fate of a soliton FABIO FRANCHINI, SISSA and INFN, Sezione di Trieste and Center for Theoretical Physics, Massachusetts Institute of Technology, ANDREY GROMOV, Stony Brook University, MANAS KULKARNI, Princeton University, ANDREA TROM-BETTONI, CNR-IOM DEMOCRITOS Simulation Center and SISSA and INFN, Sezione di Trieste — In a quantum quench, one prepares a system in an eigenstate of a given Hamiltonian, and then lets it evolve after suddenly changing a control parameter of the Hamiltonian. By observing this evolution, one tries to understand whether and how a quantum system reaches a (thermal) equilibrium. Normally, the initial state is taken to be the ground state: we propose a different experimentally feasible protocol, in which the system is prepared in an excited state corresponding to a collective solitonic excitation. If we are interested only in the single particle density, the time evolution can be reduced to the study of a semi-classical non-linear differential equation. We study both integrable and non-integrable systems, in a confining (parabolic) potential and on a ring. The short time dynamics is universal, while the long time configuration depends on the system.

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