Abstract Submitted
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Dynamics of isolated quantum systems: many-body localization and thermalization[1] E. JONATHAN TORRES-HERRERA, Institute of Physics, Universidad Autonoma de Puebla, MARCO TAVORA, LEA F. SANTOS, Department of Physics, Yeshiva University — We show that the transition to a many-body localized phase and the onset of thermalization can be inferred from the analysis of the dynamics of isolated quantum systems taken out of equilibrium abruptly. The systems considered are described by one-dimensional spin-1/2 models with static random magnetic fields and by power-law band random matrices. We find that the short-time decay of the survival probability of the initial state is faster than exponential for sufficiently strong perturbations. This initial evolution does not depend on whether the system is integrable or chaotic, disordered or clean. At long-times, the dynamics necessarily slows down and shows a power-law behavior. The value of the power-law exponent indicates whether the system will reach thermal equilibrium or not. We present how the properties of the spectrum, structure of the initial state, and number of particles that interact simultaneously affect the value of the power-law exponent. We also compare the results for the survival probability with those for few-body observables.

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