

Abstract Submitted
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On thermalization in a nonintegrable quantum system: who thermalizes? HYUNGWON KIM, Princeton University, MARI CARMEN BANULS, Max-Planck-Institute for Quantum Optics, DAVID HUSE, Princeton University, IGNACIO CIRAC, Max-Planck-Institute for Quantum Optics — We study properties of local operators with a nonintegrable Hamiltonian. We look for the cases where non-thermal (nonequilibrium) behaviors may be persistent even in the long time limit. First, we consider eigenstates which do not obey the Eigenstate Thermalization Hypothesis (ETH) in a finite size system. We show that the expectation values of local observable of these “outliers” converge to the scenario of ETH as we increase the system size. Next, we construct a local operator that gives the smallest value of commutator with the Hamiltonian. As we increase the range of the operator, the commutator quickly decreases with the range. This may imply the existence of local operators which may take fairly long to thermalize.

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