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Quantum thermodynamics at the breakdown of integrability PJORS GRISINS, Vienna University of Technology, SHAINEN DAVIDSON, ANATOLI POLKOVNIKOV, Boston University — We present a numerical study (exact diagonalization) of thermalization of a one-dimensional Bose-Hubbard model after a quantum quench to a highly non-equilibrium state. In contrast to the existing studies, which mostly concentrate on integrable limiting cases of either non-interacting or hard-core bosons, we study the system in the crossover regime of integrability breaking. We show that non-integrable phase is characterized with increased entanglement entropy in the eigenbasis, meaning that in this regime the system retains less memory about its initial state. Additionally we identify the region of small integrability breaking where the momentum modes are close to being in Gaussian state, supporting the claim that close-to-integrable systems relax to the generalized Gibbs ensemble, which in turn allows kinetic theory applications. In the end we verify the eigenstate thermalization hypothesis and argue about the possibility of semiclassical description of quantum quenches.

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