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Initial-state dependence of the quench dynamics in integrable quantum systems at finite temperature KAI HE, Georgetown University, MARCOS RIGOL, Georgetown University, Penn State University — We study properties of isolated integrable quantum systems after a sudden quench starting from thermal states. We show that, even if the system is initially in equilibrium at finite temperature, the diagonal entropy after a quench remains a fraction of the entropy in the generalized ensembles introduced to describe integrable systems after relaxation. The latter is also, in general, different from the entropy in thermal equilibrium. Furthermore, we examine the difference between the distribution of conserved quantities in the thermal and generalized ensembles after a quench and show that they are also, in general, different from each other. This explains why these systems fail to thermalize in the usual sense. A finite size scaling analysis is presented for each quantity, which allows us making predictions for thermodynamically large lattice sizes.

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