Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Entanglement Thermalization and Local Conservation Laws LIANGSHENG ZHANG, Princeton University, HYUNGWON KIM, Rutgers University, DAVID HUSE, Princeton University — We study the thermalization of entanglement entropy in one-dimensional spin chains under the unitary dynamics of a nonintegrable Hamiltonian or periodic driving by Floquet operators. Using full diagonalization of the Hamiltonian matrix and the Floquet operators, we analyze the time evolution of entanglement entropy starting from various initial conditions, including initial states with entanglement in excess of the thermal equilibrium value. It is found that the thermalization of entanglement entropy is coupled to local conservation laws when approaching equilibrium, and the absence of conservation laws in the Floquet system allows the entanglement entropy to thermalize more rapidly than it does in the corresponding Hamiltonian.

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Date submitted: 13 Nov 2014 Electronic form version 1.4