

Prethermalization of entanglement entropies triggered by hidden symmetry breaking

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I consider the time evolution of the von Neumann and Rényi entropies of spin blocks after global quenches in a quantum XY model with interacting perturbations. I show that the entropies are sensitive to perturbations that break hidden symmetries behind the integrability of the model. At times much larger than the characteristic time of the well-known (Calabrese–Cardy, 2005) linear increase of the entropies, I identify a time window still characterized by linear growth followed by saturation. The typical time of the phenomenon is inversely proportional to the perturbation strength and the behavior is triggered off by the extinction of an infinite number of local conservation laws following a non-abelian algebra.

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