Effective thermalization of a many-body dynamically localized Bose gas

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In the quantum kicked-rotor, the alternation of kicks and free propagation gives rise to exponentially localized single-particle wave-functions in momentum space [1], known as dynamical localization, which is the quantum chaos analog of the well-known Anderson localization predicted in disordered system [2].

The consequences of adding interactions in such periodically driven system remains unclear, especially for one dimensional system where mean-field theory breaks down. We study the many-body dynamical localization of a kicked Bose gas in the Tonks regime (strong interactions). We will show that the steady-state of such system at long time can be described by a thermal density matrix, with an effective temperature depending on the kicking parameters and the number of particles, while a loss of decoherence is enlightened by the one-body reduced density matrix.

References

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