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The Lyapunov spectrum of quantum thermalization

Abstract: Thermal properties of systems are believed to emerge differently in classical and quantum systems. Classical systems become thermal due to their chaotic nature leading to ergodic exploration of their phase space. In quantum systems the eigenstate thermalization hypothesis suggests that dephasing between eigenstates gradually reveals their underlying thermal properties.

A more unified picture can be obtained by studying quantum dynamics projected onto classical Hamiltonian mechanics using the time-dependent variational principle. We will explore how the chaotic behaviour of the projected dynamics - characterised by its Lyapunov spectrum - provides an alternative perspective on thermalizing quantum systems.