WHEN DOES A QUANTUM MANY-BODY SYSTEM MIX RAPIDLY?

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The evolution of an open quantum many-body system in a thermal bath with which it weakly interacts can be modelled by a quantum Markov semigroup. The time that it takes for an initial state on the system to reach the equilibrium with the bath is called mixing time. The mixing time of these Markovian dissipative evolutions of open quantum many-body systems can be bounded using optimal constants of certain quantum functional inequalities, such as the logarithmic Sobolev constant. For classical spin systems, the positivity of such constants follows from a mixing condition on the Gibbs measure, via quasi-factorization results for the entropy. Inspired by the classical case, I'll present a strategy to derive the positivity of the logarithmic Sobolev constant associated to the dynamics of certain quantum systems from some clustering conditions on the Gibbs state of a local, commuting Hamiltonian.