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Quantum ergodicity for a class of non-generic systems

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Abstract

A quantum formulation of normal typicality and ergodic theorem was initially conducted by von Neumann for a closed quantum system evolving via a time-independent Hamiltonian. He proposed three sufficient conditions for these theorems to hold (non-degeneracy and non-resonance conditions on the Hamiltonian's spectrum in addition to some bounds on each Gibbs' cell's dimension and total number of Gibbs' cells). Although most systems in nature respect these conditions, there atypical systems evolving via Hamiltonians whose spectrum violate these conditions. In this talk we propose a modified definition of ergodic theorem, which reduces to conventional one in classical limit, and extend this property to atypical systems relaxing the conditions on Hamiltonian's spectrum.

- [1] Quantum ergodicity for a class of non-generic systems, P. Asadi, F. Bakhshinezhad, and A. T. Reza-khani, Accepted for publication in J. Phys. A, Preprint arXiv:1507.05643.
- [2] Normal typicality and von Neumann's quantum ergodic theorem, S. Goldstein, J. L. Lebowitz, C. Mastrodonato, R. Tumulka, and N. Zanghi, Proc. Roy. Soc. London Ser. A 466, 3203 (2010).