

25th Rencontres Itzykson - Many Body Chaos, Scrambling and Thermalization in Interacting Quantum Systems



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When is the onset of quantum chaos?

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In a chaotic quantum system matrix elements of local operators exhibit statistical properties captured by the Eigenstate Thermalization Hypothesis. It describes the equilibrium but not the approach to it. To describe equilibration dynamics correlations between matrix elements should be taken into account. At late times the correlations can be neglected: matrix elements with small energy differences behave as independent random variables, giving rise to Random Matrix Theory description. This marks the onset of quantum chaos. We show that corresponding timescale is parametrically longer than thermalization time, in a sharp distinction with the timescale marking the onset of RMT behavior of the energy spectrum.

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