



Online Seminar

Spectral form factor: from quantum chaos to quantum thermalization

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Abstract

The eigenstate thermalization hypothesis suggests that quantum chaos plays a central role in the understanding of why and how isolated quantum interacting systems reach thermal equilibrium. In this talk, I will discuss the spectral form factor (SFF) as a probe of quantum chaos and its close connection to relaxation dynamics. I will begin with a dephasing mechanism, similar to that of weak localization, which underlies the emergence of the random matrix theory (RMT) level statistics in many-body quantum chaotic systems, characterized by the ramp-plateau structure in the SFF. Then, I will demonstrate how the temporal relaxation behaviors are related to the SFFs in two distinct types of Floquet random quantum circuits. In particular, one exhibits fast thermalization associated with its RMT SFF. The other - a glassy quantum circuit - displays a SFF different from those of chaotic and integrable systems, and it undergoes a two-step relaxation: an initial relaxation within weakly coupled sectors and a subsequent global thermalization with a tunable rate.

About the speaker

Yunxiang Liao is an assistant professor of physics at the KTH Royal Institute of Technology in Sweden. She received her Ph.D. from Rice University and worked as a postdoc at the University of Maryland prior to joining KTH. She is interested in a broad range of topics, including quantum thermalization, quantum chaos, nonequilibrium physics, disordered systems, and superconductivity.