

Abstract

The Quantum Chaos Conjecture has long captivated the scientific community, proposing a crucial spectral phase transition demarcating integrable systems from chaotic systems in quantum mechanics. In integrable systems, eigenvectors typically exhibit localization with local eigenvalue statistics adhering to the Poisson distribution. In contrast, chaotic systems are characterized by delocalized eigenvectors, and their local eigenvalue statistics reflect the Sine kernel distribution reminiscent of the conventional random matrix ensembles GOE/GUE. Similarly, the Anderson conjecture reveals comparable phenomena in the context of disordered systems. This talk delves into the heart of this phenomenon, presenting a novel approach through the lens of random matrix models. By utilizing these models we aim to provide a clear and intuitive demonstration of the same phenomenon shedding light on the intricacies of these long-standing conjectures.