Study of power spectra of integrable and chaotic systems

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We present the study of the power spectra S(f) of discrete and finite series of eigenenergies of integrable and chaotic systems. We performed experiments in which we simulated quantum chaotic graphs with and without time reversal symmetry by microwave networks. This is possible due to an equivalency of the one-dimensional Schrödinger equation describing a quantum system and the telegraph equation describing an ideal microwave network. We also performed measurements for a rectangular microwave cavity, which simulated regular quantum billiard. In this case we use the analogy between the two-dimensional Schrödinger equation for quantum billiard and the Helmholtz equation describing the microwave system. We show that the power spectra S(f) can be use as a measure of the degree of chaos of a quantum system.

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