Quantum Physics

Semiclassical description of quantum perturbations

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The effect of a perturbation over a quantum system is described by the local density of states (LDOS), a distribution of the overlaps square between the unperturbed and perturbed eigenstates. Its witdh measures the spread of an unperturbed state in the perturbed basis and it is related to fundamental problems such as the sensitivity of quantum evolutions or dissipation when the perturbation varies with time. We derive a semiclassical expression for the width of the LDOS, σ_{sc}, for generic chaotic systems. We show that σ_{sc} is very accurate to describe the width of the LDOS of paradigmatic systems of quantum chaos as the cat maps and the Stadium billiard.

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