QUANTUM CHAOS IN THE BENJAMINI-SCHRAMM LIMIT

by

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One of the fundamental problems in quantum chaos is to understand how high-frequency waves behave in chaotic environments. A famous but vague conjecture of Michael Berry predicts that they should look on small scales like Gaussian random fields. We will first give an overview of this question and introduce the notion of Benjamini-Schramm convergence of manifolds, explaining how it can give a precise formulation of Berry's conjecture. The Benjamini-Schramm convergence includes the high-frequency limit as a special case but provides a much more general framework. Based on this generalised formulation, we will expand the scope and consider a case where the frequencies stay bounded and the size of the manifold increases instead. In this alternative setting we will explain the proof of a quantum ergodicity theorem and how it relates to the random wave conjecture.