Spectral statistics of negatively curved surface covers

Julien Moy

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In the early 1980s, Bohigas, Giannoni and Schmit formulated a conjecture (BGS) about the spectral distribution of quantum systems whose classical limit is chaotic. They proposed that generically, in the high energy limit, such systems should display spectral statistics predicted by Random Matrix Theory (RMT). Although some numerical experiments and heuristic arguments based on trace formulae support the BGS conjecture, little to no progress towards a rigorous proof has been made. Some recent developments have focused on random models of quantum systems, for which one may hope to prove results with high probability, e.g. for 99% of systems. In this talk, I will discuss some results on the spectral distribution of the Laplacian on random covers of a surface of variable negative curvature. In the limit of large degree, the (smoothed) counting function of eigenvalues is shown to display fluctuations predicted by RMT.