

## **abstract**

ANALYSIS MATH-PHYSICS SEMINAR

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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We want to describe the eigenmodes of the Laplace-Beltrami operator on a compact Riemannian manifold of negative curvature, in the high-energy limit. In this aim, we study the semiclassical measures (a.k.a. quantum limits) associated with (infinite) sequences of eigenmodes.

Quantum Ergodicity asserts that almost all such sequence converges to the Liouville measure (that is, almost all high-energy eigenmodes are equidistributed on the manifold), but leaves open the possibility of "exceptional sequences" converging towards different invariant measures. The Quantum Unique Ergodicity conjecture claims that no such sequence exists. It has been proven on manifolds carrying a rich arithmetic structure, assuming the eigenmodes are joint eigenmodes of the Hecke operators.

Without any such structure, but using the Anosov property of the geodesic flow, we constrain the possible semiclassical measures by exhibiting a lower bound for their Kolmogorov-Sinai entropies. The latter gives a quantitative idea of the "complexity" of an invariant measure (it vanishes for a delta measure supported on a closed geodesic). In the constant curvature case, our lower bound equals half the entropy of the Liouville measure: high-energy eigenmodes are "at least half-delocalized".

This is joint work with Nalini Anantharaman and Herbert Koch.