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Abstract

Plenary

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Control of eigenfunctions on negatively curved surfaces

Joint with Long Jin and Stéphane Nonnenmacher

Given an L^2-normalized eigenfunction with eigenvalue λ^2 on a compact Riemannian manifold (M, g) and a nonempty open set $\Omega \subset M$, what lower bound can we prove on the L^2-mass of the eigenfunction on Ω? The unique continuation principle gives a bound for any Ω which is exponentially small as $\lambda \to \infty$. On the other hand, microlocal analysis gives a λ-independent lower bound if Ω is large enough, i.e. it satisfies the geometric control condition.

This talk presents a λ-independent lower bound for any set Ω in the case when M is a negatively curved surface, or more generally a surface with Anosov geodesic flow. The proof uses microlocal analysis, the chaotic behavior of the geodesic flow, and a new ingredient from harmonic analysis called the Fractal Uncertainty Principle. Applications include control for Schrödinger equation and exponential decay of damped waves.