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Quantum ergodicity of boundary values of eigenfunctions

The purpose of my talk is to outline a proof of a new result obtained jointly with Andrew Hassell (ANU) that L^2-normalized boundary values (*i.e.* Cauchy data) $u_j^\flat$ of eigenfunctions of the Laplacian on piecewise smooth convex domains Ω with corners and with ergodic billiards are quantum ergodic. In other words, that

$$\langle A_{h_j} u_j^\flat, u_j^\flat \rangle \to \int_{B^* \partial\Omega} \sigma_A \, d\mu_B \quad \text{in density one,}$$

for all semiclassical pseudodifferential operators on $\partial\Omega$. The relevant notion of boundary values u_j^b depends on the boundary condition B, as does the classical limit measure $d\mu_B$. Our methods cover Dirichlet, Neumann, Robin and more general boundary conditions. The proof is based on the analysis of boundary layer potentials and their boundary restrictions as quantizations of the billiard map.