THE UNIVERSITY
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at CHAPEL HILL

Mathematics Colloquium

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3:30-4:30 p.m.
Phillips Hall 332

Eigenfunction concentration and Weyl Laws via geodesic beams

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Abstract. A broad spectrum of physical phenomena, including the localization of quantum particles, is governed by the behavior of Laplace eigenvalues and eigenfunctions. This behavior is intrinsically connected to that of the geodesic flow, reflecting the deep correspondence between quantum and classical dynamics. To exploit this connection, in collaboration with J. Galkowski, we have developed a framework that hinges on decomposing eigenfunctions into a superposition of geodesic beams. In this talk, I will introduce these techniques and explain how to use them to derive refined bounds on the standard estimates for the eigenfunction's pointwise behavior and the Weyl Law for the eigenvalue counting function. A significant consequence of this method is that a quantitatively improved Weyl Law holds on most manifolds.