

The Heat Kernel on Asymptotically Hyperbolic Manifolds

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As it is well known, the heat kernel is a robust tool in the study of Atiyah-Singer index theorem and harmonic analysis. A natural question arising in this sort of application is how the heat kernel behaves on various geometric objects. This is generally well understood through Riemannian geometry on complete non-compact manifolds in a series of pioneering work due to Cheng-Li-Yau, Cheeger-Yau and Li-Yau. Following this manner, the speaker and his collaborator manage to understand the exact heat kernel bound on Cartan-Hadamard asymptotically hyperbolic manifolds. Such manifolds are of great interest and importance in a variety of mathematical subjects (conformal geometry, scattering theory, and spectral theory) as well as theoretical physics (AdS-CFT correspondence and general relativity). The speaker and his collaborator's approach is microlocal and based on the resolvent on AH manifolds constructed in the celebrated work of Mazzeo-Melrose as well as its high energy asymptotic due to Melrose-Sa Barreto-Vasy. This is a joint work with A. Hassell.