Analysis and PDE Seminar

Scattering phase shifts on asymptotically hyperbolic manifolds

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Abstract: When a wave interacts with a perturbation it undergoes a phase shift, and one can observe this even for second order differential equations of one variable. This phenomenon has been well studied by physicists and mathematicians, (as far as I know) starting from the 1930's, largely for perturbations of the Euclidean Laplacian by real valued radially symmetric potentials. In the 1980's Birman and Yafaev studied the distribution of phase shifts for certain non-central potentials in Euclidean space for fixed energy. This was followed by the work of Bulger and Pushnitski in 2012 for the high energy limit still in Euclidean space. Nakamura studied the problem for fixed energies, but on manifolds. Datchev, Gell-Redmann, Hassell, Ingremeau, Zelditch and others studied the semiclassical problem, but still for perturbations of the Euclidean space. We discuss the high energy limit for potential perturbations of the hyperbolic space and more generally on (non-trapping) asymptotically hyperbolic manifolds. We also discuss the inverse problem of determining a potential from the high energy limit of scattering shifts.

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