Analysis and Differential Geometry Seminar

Recovery of time-dependent coefficients in hyperbolic equations on conformally transversally anisotropic manifolds from partial data

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Abstract: In this talk we discuss inverse problems of determining time-dependent coefficients appearing in the wave equation in a compact Riemannian manifold of dimension three or higher. More specifically, we are concerned with the case of conformally transversally anisotropic manifolds, or in other words, compact Riemannian manifolds with boundary conformally embedded in a product of the Euclidean line and a transversal manifold. With an additional assumption of the attenuated geodesic ray transform being injective on the transversal manifold, we prove that the knowledge of a certain partial Cauchy data set determines time-dependent coefficients of the wave equation uniquely on a space-time cylinder. We shall discuss two problems: (1) Recovery of a potential appearing in the wave equation, with the Dirichlet value, in the Cauchy data, measured on only part of the lateral boundary of the space-time cylinder. (2) Recovery of both a damping coefficient and a potential appearing in the wave equation, with the Dirichlet value measured on the whole lateral boundary. This talk is based on joint works with Teemu Saksala (NC State University) and Lili Yan (University of Minnesota).

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Mathematics
Emory University