IP/DIFFERENTIAL GEOMETRY/PDE SEMINAR

Asymptotics for the wave equation on differential forms on Kerr-de Sitter space

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As the simplest model for non-scalar waves on a geometric class of spacetimes including Schwarzschild-de Sitter and Kerr-de Sitter black holes, we study the wave equation on differential forms of any degree, which as a very special case includes Maxwell's equations. We prove that waves decay exponentially in time to stationary, 'resonant' states, and identify the space of resonant states in a canonical way with certain cohomology groups of the underlying spacetime. Combined with a framework developed in a recent paper, this immediately implies the global solvability of suitable quasilinear wave equations on differential forms, and is strongly tied to the black hole stability problem. Joint work with Andras Vasy.

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