Meeting: 1001, Evanston, Illinois, SS 7A, Special Session on Geometric Partial Differential Equations

1001-58-48

Andras Vasy* (andras@math.mit.edu), MIT, Room 2-277, 77 Massachusetts Ave, Cambridge, MA 02141. *Geometric optics and the wave equation on manifolds with corners.*

I will describe the propagation of smooth (C^∞) and Sobolev singularities for the wave equation on smooth manifolds with corners M equipped with a Riemannian metric g. That is, for $X = M \times \mathbb{R}_t$, $P = D_t^2 - \Delta_M$, and $u \in H^1_{\mathrm{loc}}(X)$ solving $Pu = 0$ with homogeneous Dirichlet or Neumann boundary conditions, the appropriate wave front set $\mathrm{WF}_b(u)$ of u is a union of maximally extended generalized broken bicharacteristics. Since the latter follow the rules of geometric optics, i.e. those of classical dynamics, this result is a facet of the classical-quantum correspondence, namely that *singularities* of solutions of the wave equation follow geometric optics. This result is a smooth counterpart of Lebeau's results for the propagation of analytic singularities on real analytic manifolds with appropriately stratified boundary.

I will indicate the key ideas of the proof, such as microlocalization with respect to the appropriate ps.d.o. algebra, $\Psi_b(X)$, and gaining b-regularity (i.e. conormal regularity) relative to $H^1_{\mathrm{loc}}(X)$ via positive commutator estimates. Certain aspects of this problem are related to N-body scattering. (Received July 22, 2004)