1023-35-5 **Andras Vasy***, Stanford University, Department of Mathematics, 450 Serra Mall, Building 380, Stanford, CA 94305-2125. *Diffraction by edges.*

A widely known picture of the manner in which light propagates is that it obeys the laws of 'geometric optics'. That is, it behaves like billiard balls, moving in straight lines (or geodesics on Riemannian manifolds) until encountering obstacles or interfaces, where it reflects/refracts according to Snell's law. Physicists usually understand this as a high frequency approximation to wave propagation. A mathematically attractive version is that *singularities* of solutions of the wave equation follow such geometric optics trajectories.

Like classical mechanics, such a description is best phrased in 'phase space', which is the cotangent bundle for manifolds without boundary. The area of mathematics analyzing solutions of differential equations based on such phase space methods is called 'microlocal analysis', and its current form owes much to Hörmander. Although there is a long history of attacking this problem in applied mathematics, this approach was rather heuristic except in very special settings, and the expected behavior of singularities of waves when they hit smooth boundaries was only proved in some generality in the 1970's by Melrose and Sjöstrand, and Taylor. More recently, Lebeau and the speaker extended these results to manifolds with corners (or domains with corners) in the analytic, resp. smooth setting, and Melrose, Wunsch and the speaker analyzed more refined aspects of diffraction by conic points and edges, showing that typically a large 'non-geometric' part of the diffracted wave is less singular than the incident wave.

Apart from stating the results in relatively non-technical terms, I shall try to give an overview of microlocal analysis, as related to wave propagation, perhaps indicating how such results can be proved in the simplest setting of manifolds without boundary.

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