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Jared Wunsch* (jwunsch@math.northwestern.edu), Northwestern University, Department of Mathematics, 2033 Sheridan Road, Evanston, IL 60208-2730. *Geometry and analysis of diffracted waves.*

The principle of geometric optics tells us that in some regimes, solutions to the Schrödinger or the wave equation are closely related to the motion of classical particles. This relationship, which explains the physical principle of wave-particle duality, gives rise to a very effective method for producing approximate solutions to the wave and Schrödinger equations (often known as the “WKB method”).

When the geometry of particle trajectories is affected by singularities, however, the structure of solutions to the wave equation becomes intriguingly complex, and the relationship to classical mechanics becomes subtle. For instance, to see how a wave behaves on a domain or manifold with corners, we need to allow one geodesic ray striking a corner to explode into a whole family of rays leaving it. This is the phenomenon of *diffraction*. I will discuss some recent progress in understanding the relationship of particle and wave motion in such singular settings. (Received September 07, 2010)