

# MSRI–Evans Talk

Monday, 4:10–5:00pm, 60 Evans

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Sept. 22    **Dr. Jared Wunsch**

*Geometric optics and its limitations*

It is a commonplace of modern science that in certain regimes, wave propagation is influenced by the trajectories of point particles: we are by now used to the idea that light or even elementary particles are waves that mimic particle behavior in their propagation. The computational manifestation of this relationship between wave propagation and classical mechanics is the method of geometric optics. This gives approximate descriptions of wave motion which are valid for classical (e.g. sound or light) waves at high frequency and in the quantum world in the 'semiclassical' limit.

On the other hand, it is easy to observe that waves turn corners, while particles cannot. An observer on one side of an obstacle will certainly hear the shock waves emanating from an explosion on the other side. This is due to the phenomenon of diffraction. I will review some of the mathematics behind the propagation and diffraction of wavefronts, and discuss some regimes in which naive geometric optics fails or requires modification.