The semiclassical structure of the scattering matrix for a manifold with infinite cylindrical end

Tanya Christiansen

We study the microlocal properties of the scattering matrix associated to the semiclassical Schrödinger operator $P = h^2\Delta_X + V$ on a Riemannian manifold with an infinite cylindrical end. Let Y denote the cross section of the end, which is not necessarily connected. We show that under suitable hypotheses, microlocally the scattering matrix is a Fourier integral operator associated to the graph of the scattering map $\kappa : \mathcal{D}_\kappa \to T^*Y$, with $\mathcal{D}_\kappa \subset T^*Y$. The scattering map κ and its domain $\mathcal{D}_\kappa$ are determined by the Hamilton flow of the principal symbol of P. As an application we prove that, under additional hypotheses on the scattering map, the eigenvalues of the associated unitary scattering matrix are equidistributed on the unit circle.

This talk is based on joint work with A. Uribe.