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

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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. We will show that under suitable hypotheses the scattering matrix "quantizes" the scattering map. The scattering map κ and its domain are determined by the Hamilton flow of $|\xi|^2 + V \restriction_{h=0}$, 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.

The goal of this talk will be to introduce the audience to the big picture: the setting, the objects of the interest, general questions, and some of the challenges involved, rather than giving proofs.

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