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Chazarain, J.

Sur le comportement semi-classique de l'amplitude de diffusion d'un hamiltonien quantique. (French) [On the semiclassical behavior of the scattering amplitude of a quantum Hamiltonian]

Goulaouic-Meyer-Schwartz Seminar, 1980–1981, *Exp. No. V*, 8 *pp.*, *École Polytech., Palaiseau*, 1981.

Let $-h^2\Delta + V(x)$ be an operator in $\mathbf{R}^n$, where h is a small parameter; the potential V is C^∞ and zero outside the ball B: $|x| < R$, and is not assumed to be radial. The author uses semiclassical approximation to study the scattering of the plane wave $\exp(ih^{-1}kx\cdot\omega)$, where $\omega \in S^{n-1}$. Let P be the tangent plane at $-R\omega$ to the sphere ∂B: $|x| = R$, and let $x(t,y)$, $\xi(t,y)$ be the trajectory, defined by the Cauchy data $x(0,y) = y \in P$, $\xi(0,y) = k\omega$, of the field of the Hamiltonian $|\xi|^2 + V(x)$. For all $y \in P$, this trajectory is assumed to exit from B for sufficiently large t. For the Hamiltonian $|\xi|^2 + V(x) - k$, the radii leaving B are the elements of a Lagrangian manifold Λ_0. Theorem: The scattering amplitude in the direction $\theta \in S^{n-1}$ is an oscillating Maslov function of degree 0 with respect to the Lagrangian manifold Λ_0. The introduction of a caustic allows the author to make this result explicit.

Reviewed by *Jean Leray*