MR925257 (89c:35033) 35J10 (58G25)

Sjöstrand, J. [Sjöstrand, Johannes] (F-PARIS11)

Tunnel effects for semiclassical Schrödinger operators.

Hyperbolic equations and related topics (*Katata/Kyoto*, 1984), 347–362, *Academic Press*, *Boston*, *MA*, 1986.

This is a survey of recent results, obtained jointly with B. Helffer, about the semiclassical Schrödinger operator $P = -h^2\Delta + V(x)$ on a compact Riemannian manifold M or on $M = \mathbf{R}^n$. The first ones were already published in the Parts I and II of a joint paper [Comm. Partial Differential Equations **9** (1984), no. 4, 337–408; MR0740094 (86c:35113); Ann. Inst. H. Poincaré Phys. Théor. **42** (1985), no. 2, 127–212; MR0798695 (87a:35142)]. The sections are: General abstract results; The case of nondegenerate point wells; Wells formed by submanifolds; Resonances. That last section gives new and very recent results. There $M = \mathbf{R}^n$; it is not certain that P has a selfadjoint realization and even if so that the spectrum of P is discrete near 0. Instead other function spaces will be constructed where again P will have discrete spectrum near 0. The machinery is heavy to build up and is not completely described here.

Reviewed by *Jean Leray*