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Local spectral asymptotics for $2D$-Schrödinger operators with strong magnetic field near the boundary. (English) Zbl 1222.35134

Braverman, Maxim (ed.) et al., Spectral theory and geometric analysis. International conference in honor of Mikhail Shubin's 65th birthday, Northeastern University, Boston, MA, USA, July 29–August 2, 2009. Providence, RI: American Mathematical Society (AMS) (ISBN 978-0-8218-4948-4/pbk). Contemporary Mathematics 535, 95-108 (2011).

From the introduction and abstract: "It is well known that spectral asymptotics are closely related to quantum dynamics which in turn is closely related to classical dynamics. The 2-dimensional Schrödinger operator with strong magnetic field seems to be the best object to demonstrate these relationships."

"We consider [the operator] A in a domain $X \subset \mathbb{R}^2$ with either Dirichlet or Neumann boundary conditions and assume that A is a self-adjoint operator in $\mathcal{L}^2(X)$."

"Our goal is to derive spectral asymptotics near the boundary. So we basically want to generalize the results of Chapter 6 of [the author, Microlocal analysis and precise spectral asymptotics. Springer Monographs in Mathematics. Berlin: Springer. (1998; Zbl 0906.35003)] as $d = 2$."

"We consider a 2D-Schrödinger operator with a strong magnetic field (coupling constant $\mu \gg 1$) and with the Planck parameter $h \ll 1$ near the boundary and derive sharp asymptotics with the remainder estimate as which could be as good $O(\mu^{-1}h^{-1} + 1)$ or a bit worse but much better than $O(h^{-1})$. The classical dynamics plays a crucial role in our analysis."

For the entire collection see [Zbl 1207.58001].

Reviewer: Nils Ackermann (Mexico City)

MSC:

35P20	Asymptotic distributions of eigenvalues in context of PDEs
35J10	Schrödinger operator, Schrödinger equation
81Q10	Selfadjoint operator theory in quantum theory, including spectral analysis

Cited in **2** Documents

Keywords:

magnetic Schrödinger operator; strong magnetic field; spectral asymptotics; quantum dynamics; classical dynamics; cyclotron movement; hop movement

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