Eigenvalue asymptotics in a twisted waveguide

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Abstract. I will consider a twisted quantum waveguide, i.e. a domain of the form $\Omega_\theta = r_\theta \omega \times \mathbb{R}$ where $\omega \subset \mathbb{R}^2$ is a bounded domain, and $r_\theta = r_\theta(x_3)$ is a rotation by the angle $\theta(x_3)$ depending on the longitudinal variable x_3. The talk will concern the spectral properties of the Dirichlet Laplacian H acting in $L^2(\Omega_\theta)$. It is supposed that $\dot\theta = \beta - \varepsilon$ where $\dot\theta$ is the derivative of the rotation angle θ, β is a positive constant, and the non-negative function ε obeys the asymptotics $\varepsilon(x) \sim L|x|^{-\alpha}$, $\alpha > 0$, as $|x| \to \infty$. I will show that if $L > 0$ and $\alpha \in (0, 2)$, or if $L > L_0 > 0$ and $\alpha = 2$, then generically there is an infinite sequence of discrete eigenvalues lying below the infimum of the essential spectrum of H, and will discuss the main asymptotic term of this sequence.

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