On the discrete spectrum of Schrödinger operators with strong magnetic fields of compact support

Rainer Hempel
TU Braunschweig, Germany

We continue our analysis of the discrete spectrum of magnetic Schrödinger operators

$$H(\lambda\vec{a}) = (-i\nabla - \lambda\vec{a})^2 + V(x), \qquad \lambda \geq 0,$$

acting in $L_2(\mathbf{R}^2)$; here V is a bounded potential and $\vec{a}$ a magnetic vector potential of class C^1 such that the associated magnetic field $\mathcal{B} = \operatorname{curl}\vec{a}$ has compact support $\overline{\Omega}$. The interesting case is when the fluxes through the connected components of $\overline{\Omega}$ are non-zero.

We can now give a fairly complete description of the behavior of the discrete eigenvalues of $H(\lambda\vec{a})$ at large coupling in the case where $\overline{\Omega}$ has a finite number of components. In the case of an infinite number of components, we need to make additional assumptions so far.