

Multiple semiclassical states for singular nonlinear Schroedinger equations with electromagnetic potentials

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By means of a finite-dimensional reduction, we show a multiplicity result of semiclassical solutions $u : \mathbb{R}^N \rightarrow \mathbb{C}$ to the singular nonlinear Schrödinger equation

$$\left(\frac{\varepsilon}{i}\nabla - A(x)\right)^2 u + u + (V(x) - \gamma(\varepsilon)W(x))u = K(x)|u|^{p-1}u, \quad x \in \mathbb{R}^N,$$

where $N \geq 2$, $1 < p < 2^* - 1$, $A(x)$, $V(x)$ and $K(x)$ are bounded potentials. Such solutions concentrate near (non-degenerate) *local* extrema or a (non-degenerate) *manifold* of stationary points of an auxiliary function Λ related to the unperturbed electric field $V(x)$ and the coefficient $K(x)$ of the nonlinear term.