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Concentration around a sphere for a singularly perturbed Schrödinger equation.


The behaviour as \( h \to 0 \) of positive radially symmetric solutions \( u = u_h \) to
\[
-h^2 \Delta u + V(x)u = |u|^{p-2}u
\]
is studied. Here \( x \in \mathbb{R}^n \) with \( n \geq 3 \), \( 2 < p < 2n/(n-2) \), and the potential \( V(x) = V(|x|) \in C^1(\mathbb{R}^n, \mathbb{R}) \) is radially symmetric and such that \( \inf_{x \in \mathbb{R}} V(x) > 0 \). Under additional assumptions on \( V \), which basically require that \( V = V(r) \) is sufficiently large in some interval \( r \in [r_1, r_2] \), it is shown that in the semiclassical limit \( h \to 0 \) (along a subsequence) the functions \( u_h \) will concentrate on a sphere of positive radius. Thus the potential barrier prevents concentration at the origin, as is normally found in these kinds of problems.

Reviewed by *Markus Kunze*

**References**

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