

The boundary condition for reduced radial wave function in the multi-dimensional Shrodinger equation

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Schrodinger equation, where the angular variables are separated. It is shown that the rigorous restriction at the origin - Dirichlet boundary condition follows only in three-dimensional space, whereas in other dimensions (more than three) some physical reasoning's are necessary in addition. According to our previous investigation [1-2] the most appropriate is the Hermiticity of Hamiltonian or, equivalently, the conservation of particle number. In the case the preferable is a Dirichlet condition again for regular potentials, but for singular potentials (not soft) other conditions (e.g. Robin) are also allowed together with it. In this meaning the three-dimensions is a peculiar one.

References

- [1] A. Khelashvili and T. Nadareishvili, What is the boundary condition for the radial function of the Schrodinger equation, Am. J. Physics, **79**, (2011) 668 - 671.
- [2] A. Khelashvili and T. Nadareishvili, Singular behavior of the Laplace operator in polar spherical coordinates and some of its consequences for the radial wave function at the origin of coordinates, Physics of Particles and Nuclei Letters., **12**, (2015) 11-25.