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The Energy Eigenvalue for the Singular Wave Function of the Three Dimensional Dirac Delta Schrodinger Potential via Distributionally Generalized Quantum Mechanics MICHAEL MAROUN, None — In order to generalize models of frequency combs to frequency brushes (2d) and frequency lattices (3d or more), one must be able to model first one delta function. These generalizations are known in classical signal theory. However in the quantum case, the problem is significantly different. In a quantum model where the Schrodinger equation is used as the quantum analogue, the obstruction in 3d for the Schrodinger equation, with the Dirac delta as a pseudo-potential (PP), comes from the bound state being singular at the point support of the delta PP. The problem is solved here in a mathematically rigorous manner that does not use renormalization or regularization. There is no appeal to self-adjoint extensions because the method involves a distributionally generalized version of the Schrodinger theory as developed by the author, which regards the formal symbol "$H\psi$" as an element of the space of distributions. Two main facts come to light. The first is the bound state energy of such a system can be calculated in a well-posed context, the value of which agrees with both the mathematics and theoretical physics literature. The second fact is that there is then a rigorous distributional version of the Hellmann-Feynman theorem.

Michael Maroun
None

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