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Relativistic Non Hermitian Quantum Mechanics

We develop relativistic wave equations in the framework of the new non-hermitian PT quantum mechanics. The familiar hermitian Dirac equation emerges as an exact result; we also find new models with properties that have no counterpart in hermitian quantum mechanics. For example in an 8-dimensional representation of the PT-generalized Dirac equation, non-hermitian mass matrices allow for flavor ...

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Relativistic Non-Hermitian Quantum Mechanics

Relativistic Non-Hermitian Quantum Mechanics Katherine Jones-Smith and Harsh Mathur Department of Physics, Case Western Reserve University, 10900 Euclid Avenue, Cleveland OH 44106-7079 We develop relativistic wave equations in the framework of the new non-hermitian PT quantum mechanics.

Relativistic Non-Hermitian Quantum Mechanics

Abstract: We develop relativistic wave equations in the framework of the new non-hermitian \mathcal{PT} quantum mechanics. The familiar Hermitian Dirac equation emerges as an exact result of imposing the Dirac algebra, the criteria of \mathcal{PT} -symmetric quantum mechanics, and relativistic invariance. However, relaxing the constraint that in particular the mass matrix be Hermitian also allows for models that have no counterpart in conventional quantum mechanics.

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Non-relativistic quantum mechanics refers to the mathematical formulation of quantum mechanics applied in the context of Galilean relativity, more specifically quantizing the equations of classical mechanics by replacing dynamical variables by operators. Relativistic quantum mechanics (RQM) is quantum mechanics applied with special relativity.

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Mechanics

When quantum mechanics was originally formulated, it was applied to models whose correspondence limit was non-relativistic classical mechanics. For instance, the well-known model of the quantum harmonic oscillator uses an explicitly non-relativistic expression for the kinetic energy of the oscillator, and is thus a quantum version of the classical harmonic oscillator .

Quantum mechanics - Wikipedia

Non-Hermitian Quantum Mechanics A fundamental assumption of quantum mechanics is that operators are represented by Hermitian matrices. This guarantees that observable quantities, which are given by the eigenvalues of these matrix operators, are real-valued (as opposed to complex), and that quantum mechanical systems evolve in a manner that conserves probability.

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(Hermitian) formalism of quantum mechanics, enabling the solution of otherwise difficult problems. The first book to present this theory, it is useful to advanced undergraduate and graduate students and researchers in physics, chemistry and engineering.

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