Advances in Mathematical Physics

Special Issue on
Advances in Relativistic Quantum Mechanics

Hindawi

CALL FOR PAPERS

Many problems in physics involve profound mathematical challenges. These challenges give sufficient justification for mathematicians and theoretical physicists to develop novel techniques that allow deeper analysis of the physics problems.Some historical innovative ideas in theoretical physics are now rooted in our modern technology and will play a vital part in future developments. This is in particular the case for quantum mechanics. Further contributions will strengthen our knowledge and improve on the existing technology. Many theories, for example, of relativistic and nonrelativistic quantum mechanics, special and general relativity, work successfully within their domain of applications. Developing and implementing new trends in relativistic quantum theory present some of the most challenging problems.The aim of the present special issue is to critically analyze some of the fundamental ideas of relativistic quantum mechanics in the light of recent developments in mathematical physics.

Potential topics include but are not limited to the following:

- ▶ Exact and approximate solutions of the Dirac equation and the Klein-Gordon equation
- ▶ Wave equations for particles with high spin
- ▶ Spectral theory in mathematical physics and applications in relativistic quantum mechanics
- ▶ The Rarita-Schwinger, Kemmer-Proca, and Bargmann-Wigner equations and integrable and superintegrable Hamiltonians
- ▶ Relativistic quantum mechanics in a curved spacetime
- ▶ Supersymmetric and quantum group approaches to pseudo-Hermitian Hamiltonians in relativistic quantum mechanics
- ▶ Quantum foundations and quantum information in gravitational fields and applications such as graphene models in mathematical physics
- ▶ Further contributions directed to the improvement of quantum foundations and applications to mathematical physics also encouraged

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