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SPINOR EQUATION AND OPERATOR ALGEBRA

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Relativity and quantum theory are two epoch-making theories of 20th century physics, which not only established modern material civilization, but also changed people's world view. However, the Copenhagen interpretation of quantum mechanics remains a controversial issue. The Copenhagen interpretation holds that the motion of the microscopic particles is uncertain, and the module square of the wave function is the probability density to discover a particle. As a matter of fact, the wave function is a concept much more abundant than probability density. A wave function or a spinor field completely describes all the properties of a fundamental particle and can define all the mechanical quantities of the particle, and the spinor equation logically implies both classical and quantum mechanics of the particle. The wide application of abstract operator algebra in quantum theories further increases the mystery and puzzles, but the description of microscopic particles by operator algebra is incomplete. In this paper, we take spinor equation as the logical premise to establish and explain the basic principles and conclusions of the quantum theory, including the details of origin and limitations of the operator algebra, the logical relation between the spinor equation and Newtonian and quantum mechanics. We consistently derive all the correct principles and conclusions and suggest some new topics worthy of further study. These discussions should be important in clarifying the nature of the controversial issues.

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Contents