

QUANTUM MECHANICS MUST BE REVISED DUE TO ITS DIFFICULTIES AND CONTRADICTIONS

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The difficulties and contradictions of quantum mechanics are exhibited and elucidated in detail by virtue of the comparisons between the experimental facts and theoretical results obtained from the solutions of Schrödinger equations with different potentials, which can only give the wave features of microscopic particles, but cannot always exhibit their corpuscle features. These difficulties and contradictions are intrinsic and inevitable for quantum mechanics and cannot be eliminated and overcome in its framework, no matter how of the quantum mechanics or external potentials. The difficulties and contradictions of quantum mechanics indicated clearly that quantum mechanics is only a linear and approximate theory and cannot be used to describe correctly and completely the duality of wave and corpuscle features of microscopic particles. Detailed investigations showed that the difficulties and contradictions are induced by the dispersed effect of microscopic particle arising from the kinetic energy in Hamiltonian of the systems and Schrödinger equations. This implies that the quantum mechanics must be remoulded, its direction or method remoulding are just to add a nonlinear interaction which can stop and restrain the dispersed effect, then the microscopic particles can be localized and have a wave-corpuscle duality in this case once the nonlinear interaction can balance the dispersed effect of the kinetic energy in Hamiltonian and dynamic equations in the systems, thus the difficulties and contradictions of quantum mechanics could be completely eliminated and overcome. The correctness of the conclusion was perfectly verified and confirmed by our investigations. Then the correct direction and way eliminating the difficulties and contradictions of quantum mechanics are found and affirmed, i.e., it is to establish the nonlinear quantum mechanics. In order to demonstrate that it can describe and represent really and exact the properties of microscopic particles, we found further the real mechanisms of the form of nonlinear interaction which is the self-interaction, self-trapping, self-focusing and self-localized in variously physical systems and gave further their concrete representations, which can be always represented by $b|\psi|^2\psi$ in non- relative case. Thus a correct theory of nonlinear quantum mechanics can be established, in which the duality of wave and corpuscle feature of microscopic particles can appear perfectly and naturally.

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