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NONLINEAR QUANTUM MECHANICS IS A NECESSARY RESULT OF DEVELOPMENT OF QUANTUM MECHANICS

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We here exhibited first the basic theorem of quantum mechanics and its features. From these investigations we know that the quantum mechanics is only a linear and wave theory because the dynamic equation or Schrödinger equation can only give a wave feature, cannot embody the wave-corpuscle duality of microscopic particles. These results directly contradict with the experimental results, the latter exhibited clearly the wave-corpuscle duality of microscopic particles. This showed obviously that quantum mechanics is only a linear and approximate theory, cannot represent the real properties of microscopic particles. This implies that quantum mechanics need to be transformed and developed. In order to find the direction and method of transformation and development, we investigate and analyze completely and deeply the reasons of wave feature appeared by microscopic particles. The reasons are due to the missing or neglecting or lacking the nonlinear interactions among the particles or between the particle and ground fields. Thus the properties and natures of microscopic particles are only controlled and determined by the kinetic term in the dynamic equation because its potential are not related with the wave function of the particle, then it cannot change the features and natures of the particles. Thus the particles have only wave feature due to the dispersing effect of the kinetic term. Based on this reason we added a nonlinear interaction related the wave function of the particles, such as into the dynamic equation of the particles or the Hamilton operator of the systems. In this case the nonlinear interaction can also deform the wave features of microscopic particles, Hence it can obstruct and suppress this dispersing effect of the kinetic term in the dynamic equation. Thus the microscopic particles can be localized, and have the wave-corpuscle duality, which are consisted with the experiment results, then their difficulties and contradictions were eliminated completely. These investigations and results affirm and confirm that introducing the nonlinear interactions in quantum mechanics and establishing the nonlinear quantum mechanics is a prefect and correct direction and method of eliminating the difficulties and contradictions of quantum mechanics. Therefore we can affirm and confirm that the establishment of nonlinear quantum mechanics is a necessary result of development of quantum mechanics.

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