

# **Local Realism Quantum Mechanics Can Be Established: A Book Review of Quantum Mechanics' Return to Local Realism**

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The concept of wave function is widely used in existing quantum mechanics. However, the nature of the wave function is unanswerable. Many people are dissatisfied with the quantum mechanics of non-local realism and want to establish the quantum mechanics of local realism. But they did not break through the bottleneck. The model of "real wave curling inside the particle" determines that the wave function is the motion equation of localized real wave. The model of "real wave curling inside the particle" determines that the wave function is the motion equation of localized real wave. The wave mechanics based on such wave functions is quantum mechanics of localized realism. Explanation of double slit diffraction can be experiment by directional quantization.

On September 1, 2018, Cambridge Scholars Publishing published the theoretical work — "Quantum Mechanics' Return to Local Realism" (Runsheng Tu. Newcastle upon Tyne, Cambridge Scholars Publishing. 1 Sept 2018. ISBN 978-1-5275-1337-2) written by Runsheng Tu. One of the highlights is "the idea that the wave is curled inside the material object particle"(Note: The "wave" is the wave corresponding to the wave function used in the quantum mechanics of elementary particles). The theme of the book is to establish the quantum mechanics of local realism, and succeeded by breaking through the bottleneck by the finishing touch (highlights). The mathematical logic system of local realism quantum mechanics is the same as that of the original quantum mechanics. The interpretation system of quantum mechanics is different from the original one. The local realism quantum mechanics has great advantages in application and understanding.

The author's main measures are: to explain the diffraction experimental phenomena of material object particles by directional quantization; to establish the light-knot model of particles structure; and to establish the theory of quantum inverse measurement. The key to establishing a complete system of quantum mechanics of local realism is to reveal the essence of the wave function using the particle structure model of light-knot. The light-knot electronic structure model considers that the plane polarized light is decomposed into circularly polarized light and then propagates along a closed path to form a localized particle. In this model, the wave is curled inside the particle and is a real wave. The electron wave function in an atom or molecule is the functional equation of motion of such a real wave. Since the real wave propagates along a small closed path to form a particle, the whole (or entity) of the particle is localized. It is not difficult to see that such microscopic particles must be both local and real. The reason is: the wave constituting the particle and its equation of motion (wave function) are real; the wave curl is no longer discrete in a small space, and the whole does not appear in many different places at the same time. When it moves as a whole, the curled wave is moved, and its center of mass must have a certain motion path. The reality of the wave function and the locality of the particle determine that the quantum mechanics established is the quantum theory of local realism.

The method of establishing the mathematical logic system of quantum mechanics is to make appropriate partial differentiation of the wave functions of the waves constituting the particles and

combine them as needed. The obtained mathematical logic system of quantum mechanics is consistent with the existing mathematical logic system of quantum mechanics in content. The establishment of the interpretation

system of quantum mechanics of local realism depends on the nature of the wave function (localized reality) mentioned above.

The application of local realism quantum mechanics in quantum chemistry has great advantages — the calculation process is greatly simplified, and the meaning of the calculation steps becomes very clear. The book introduces this application in two chapters. More than a dozen molecules and hundreds of atoms and atoms were calculated. The calculated results are in agreement with the experimental values. To what extent is the calculation process of the quantum mechanics of local realism simplified? Taking the calculation of hydrogen molecules as an example, a senior middle school student can also complete the dissociation energy and bond length calculation of hydrogen molecules within half an hour. The hat of the semi-empirical method was completely removed. Until then, the same calculations cost a lot of energy for college graduates, and the must not use computers and other people's programmed and semi-empirical methods.

Perhaps the work of the author of this book conflicts with the ideas in the existing quantum theory. However, the quantum mechanics of local realism established by the author of this book has an absolute advantage in practicality. This point determines the value of the book is undeniable.

The double slit diffraction experimental phenomenon can be explained by the direction quantization. It is also provable that the concept of quantum entanglement and wave packet collapse can be avoided. Retaining these two concepts can neither destroy the established mathematical system of quantum mechanics of local realism, nor can it block the application of the established theoretical system of quantum mechanics. Those who are not willing to abandon the concepts of quantum entanglement and quantum decoherence can treat these two concepts as special cases and no longer consider them to be universal and essential.

In summary, the concept of wave function is used in existing quantum mechanics theory, but do not know the nature of the wave function. The non-locality and non-reality of existing quantum mechanics are related to the non-locality and non-reality of the wave function used. Therefore, the bottleneck of establishing local realism quantum mechanics is to reveal the localized realism nature of wave functions. The author of the book has broken through this bottleneck and deserves congratulations!

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