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Interpreting Quantum Mechanics and the Role of Waves

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Abstract – Through studying we investigate the sense of the wave function of the mass and charge the density distributions of the quantum system. According to the protective calculation, a charged quantum system has effective distribution of mass and charging density in space, proportional to the square of the absolute value of its wave function. In a practical interpretation a wave function of the quantum system can be taken as a definition of either a physical field or the ergodic motion of a particle.

The main distinction among the ergodic movement of a sphere and a cell lies in the concurrent property; a sphere occurs simultaneously in space, while the agosic movement of a cell is spatially separated in time. If the wave function is a physical force, then the mass and charging density are simultaneously distributed in space to the charged quantum system and thus to the gravitational and electrostatic self-interactions of its wave function. This not only contradicts the superposition principle of quantum mechanics but also contradicts the findings of the experiments. Therefore, wave function is not a definition of a physical area, but rather a transient phase of a material.

Each moment has a single localized particle with mass and charge, so the wave function is not auto-introduced. Therefore, it has been argued that the classical ergodic model may not correspond to quantum mechanics for determining constant motion of the particles. Based on the negative result, we say the wave function is a random and unsatisfactory explanation of the particles' quantum motion in nature.

In this view, the square of the absolute value of the wave function not only gives the particles' potential in certain locations but also the potential where the cell is. The proposed Latest wave-function description offers a natural practical other than orthodox interpretation, and also suggests that the Broglie-Bohm theory and the interpretation of many worlds are incorrect, and the theories of dynamic collapse They are heading in the right direction by accepting collapse of wave function.

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INTRODUCTION

The wave motion is the fundamental interpretation of quantum mechanics.

The wave motion is amplitude of probability according to the normal probability interpretation and the inverse of its exact amount reflects the probability intensity of a molecule to be calculated at certain locations. However, this definition is unsatisfactory because of the recourse to calculation when referring to a fundamental theory. Given the problem, some alternative realistic wave function interpretations have been proposed and widely studied [1-4]. In general , there are two ways to view a single quantum system's wave function in a practical interpretation1. One view is to simultaneously Take the feature Wave as a physical object that exists all over space, such as a field [1, 2, 4].

The Another view is that the wave function should be taken as definition of a particle's some sort of ergodic motion[3]. In this paper2 we will suggest that these two definitions Can be used for wave function actually be verified by examining a quantum system's mass and charging density distributions, and experimental findings have already omitted the former. In addition, a further analysis may also determine what the wave function defines kind of ergodic motion of particles. In fact, the motion proves spontaneous and discontinuous.

PROTECTIVE MEASUREMENT AND DENSITY OF CHARGE

At every moment, the mass and charge of a charged classical device are often localized at a fixed location. Why propagate mass and charge in space for a charged quantum system? According to the probability interpretation of the wave function, this problem seems irrelevant in the practical interpretation of the wave function it should have a physical significance. By electromagnetic interaction we can calculate the total charge of a quantum system and after all find it in some region of space.

It can fairly be assumed that a quantum system, the vacuum has a mass and charge density distribution, proportional to the square of the absolute value of its wave function [5].

This is the evolution of the defense measure; For a single quantum system, mass and charge density can be measured by protective measurements as estimated values of certain measurements [6,7]. Find a quantum device in a safe , non-degenerate state of energy [(x)]. A safe calculation of an observable An, which is a generic projection operator for small regions Vn with volume n v, would give the following result [7]:

$$\langle A_n \rangle = \frac{1}{v_n} \int_{v_n} |\psi(x)|^2 dv = |\psi_n|^2 \qquad (1)$$

it is the average density 2 (x) above the small region V_n. When n v - 0 and after measuring in appropriate numbers of regions Vn we can consider the entire density distribution 2 component |ψ.. For a charged device with load Q, density (x) ^{2} times the load provides the effective load density |ψ (x) ^{2} In particular, a suitable adiabatic calculation of the Gauss flux from a certain area would yield the value of the total load within that region , i.e. the integral of the effective load density |ψ (x) ^{2} over that region.

Likewise, we can in theory calculate the system's effective mass density by proper adiabatic calculation of its gravitational field flux. Protective measurement therefore shows that the mass and load of a single quantum system described by the wave function is distributed across space with an effective mass density of 2 m (x) and an effective load density of |ψ (x) ^{2}

WHY THE WAVE FUNCTION

Despite strongly implying a practical understanding of function of waves, protective measurement does not tell us explicitly what the wave does is. The wave function may describe a particle being filed physically or some sort of ergodic motion.

Correspondingly, the density of Mass and Load may result from a physical field, or from a particle's ergodic motion. These two theories are fundamentally different in that a field occurs simultaneously throughout space while a particle's ergodic motion persists in a time-divided manner throughout space. If a quantum system's wave feature is a natural entity, so its volume and load density are concurrently distributed in space. As a result different spatial sections of the wave structure can have both gravitational and electrostatic effects, since these parts simultaneously have mass and charge.

Then the Schrödinger equation with mass m and charge Q for a free quantum system would be

$$i\hbar \frac{\partial \psi(x,t)}{\partial t} = -\frac{\hbar^2}{2m}\frac{\partial^2 \psi(x,t)}{\partial^2 x} + (kQ^2 - Gm^2)\int \frac{|\psi(x',t)|^2}{|x-x'|} d^3x' \psi(x,t) \qquad (2)$$

Here the Coulomb constant is k, and Newton's gravitational constant is G. That has been proven for a free system with mass m[8], the calculation of the potential power of a gravitational self-interaction is 2 2 2 ? = (4Gm / hc). This quantity reflects the intensity of the wave function's effect of Self-interaction with normal wave feature transformation; the effect will be important when 1 2 p are concerned.

Likewise, the calculation of the potential intensity of the electrostatic self-interaction for a free charged device with charge Q is 2 2 2 p = (4kQ / hc). For instance, for a free electron, the potential intensity of the electrostatic self-interaction is 2 2 2 3 (4/) 1 10-µ = ke hc. This means that the electrostatic self-interaction will affect the evolution of its role on waves significantly. If such an interaction still exists, successful experiments would have detected this. Find the electron in the hydrogen atom as just another example. Since its electrostatic oneself-interaction potential is of the same order as the Coulomb potential provided by the nucleus, the energy levels of the hydrogen atoms will differ drastically from those accurately predicted by quantum theory and measured by experiments. So there can be no electrostatic self-interaction. Because the field definition of the wave function requires the presence of these electrostatic self-interactions, this cannot be right, i.e. the wave function cannot be a physical field description.

TOWARDS QUANTUM MOTION OF PARTICLES

Failure to understand the field leads us to the second view that Take wave function to describe some type of ergodic particle.

In this perspective, the effective mass and load density are calculated by the time average of the motion of a charged particle, and at various moments they disperse through different locations. While the wave function should have no self-interaction. In addition, if the density Mass and Load does not exist at the same time in different regions as the field definition holds, they can only exist in a time-divided manner in space. The wave function must therefore be a definition Through ergodic particle motion. It can also be claimed that the traditional ergodic models that presume continuous movement of particles could not be compatible with quantum mechanics.

The issues of infinite velocity, accelerated radiation and the presence of a finite time scale etc. haunt these models[5,7]. In consideration of this negative finding, it has been proposed that another separate kind of discontinuous motion-random motion will naturally produce the effective mass and charging volume observable by protective calculation, and what the wave function represents is possibly such motion of particle size, which is basically discrete and random [11,12] ..

When a particle's motion Is not continuous but discontinuous and unpredictable, it can then easily move through all possible sectors where the wave function spreads over an extremely short time period within the given time.

This addresses the problems of modern ergodic models[5]. In addition, Suppose the particle is a (complete) explanation for the actual motion of particles, we can more explicitly attain the random discontinuous motion. If the wave function) Is a definition of the motion state of a single photon, then the amount x t dx 2 ambient,) (will not only give the probability that the particle is located in the infinitesimal space interval dx near position x at instant t (as in normal quantum mechanics) but will also give the objective probability that the particle is present. It is in line with the rational assumption that the probability distribution of a property's measurement outcomes Is the same as the actual distribution of the property at the calculated state. Obviously this sort of motion is in fact accidental and discontinuous. The strict mathematical concept of random discontinuous motion (RDM henceforth) can be obtained with the measure theory. It has been proven the status measure density) ρ(x,t and the position measure flux density) j(□,t Include a complete definition of a single particle in the RDM [12].

Suppose the nonrelativistic evolution equation of RDM is the Schrödinger equation, the wave function) ψ(x,t Can be represented similarly by □(x, t and) □(x, t), thus providing a complete definition of the RDM of a single particle. The current understanding of the wave function in the form of the RDM of particles offers a natural, practical alternative to the orthodox perspective.

The square of the absolute value of the wave function on this interpretation not only indicates the probability of an object being located at some locations, but also provides the empirical likelihood of the specimen being there. Certainly, the transition process from “being” to “being found”, which is closely related to the notorious quantum measurement problem, also needs to be explained. This issue will be discussed in the next section.

CONCLUSION

The de Broglie-Bohm hypothesis is going to be incorrect first. The theory takes the role of the wave as a physical sphere (i.e. a sphere) and incorporates the non-ergoic motion of Bohmian particles to explain quantum mechanics further. Obviously this is inconsistent with the result given above.

Therefore, because the wave function has charge density distribution in space for a charged quantum system, an electromagnetic interaction between it and the Bohmian particles may also occur. It is also at odds with quantum mechanics4. Next, the ontology of understanding of the many-worlds and the theories of dynamic collapse must be updated from field to particle. It can also be claimed that there is only one world, and that quantum theory is merely a theory of a single planet.

The primary idea is that quantum superposition occurs by particle RDM in a process of time division, and there is only once investigator (as well as one quantic machine and one measuring device) in a continuous flow of time during quantum evolution[5] all along. And the definition of other worlds would be incorrect too. In fact, an objective mechanism of collapse of the wavefunction must occur, which is responsible for the transformation from microscopic uncertainty to macroscopic (approximate) certainty.

And the complex hypotheses of collapse should be in the right direction. It was argued that the concreteness of space and time could inevitably cause the collapse of the wave function and the competition of RDM evolution law in discrete space-time must necessarily include the wave function 's dynamic collapse. Particulate motion in particular only provides the random source for the wave function to collapse [11,12].

That could be a very promising start. Yet further research is still needed before we can solve the problem of quantum measurement (e.g. preferred problem with the basis) and eventually understand the significance of the quantum theory.

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