Research Progress on the Schrödinger Equation that Can Describe the Earth's Revolution and its Applications

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ABSTRACT

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In the scientific community, the traditional concept has been formed that 'quantum mechanics is only applicable to microscopic systems, classical mechanics is only applicable to macroscopic systems, and the Schrödinger equation cannot be used to describe macroscopic objects'. Under the constraints of this traditional concept, there has been no attempt for a long time to establish and apply the Schrödinger equation of gravitational potential energy to describe the motion of the Earth. By replacing the potential energy in the Hamiltonian operator from electromagnetic interaction potential energy to gravitational interaction potential energy, the Schrödinger equation that can describe planetary motion was successfully obtained. Many examples provided can prove that classical mechanics and quantum mechanics are compatible. We can combine classical mechanics and quantum mechanics to describe the same system. For describing an object, mass size is no longer an important determining factor in choosing between classical mechanics and quantum mechanics methods. Establishing the Schrödinger equation for gravitational potential energy can prompt us to change our mindset and liberate our minds. The idea that classical mechanics and quantum mechanics are opposed to each other and should be mutually exclusive can be transformed into the idea that they coexist due to complementarity.

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I. INTRODUCTION

Can quantum mechanics and classical mechanics be compatible? It's a fascinating question. We haven't found anyone else exploring, but we can be sure that there are many people who hope the answer is yes and have a desire to explore this question.We believe that this compatibility has a certain theoretical foundation and strive to find or establish such a foundation. Ehrenfest's law proves that "taking the classical limit, the laws of quantum mechanics will be reduced to the laws of classical mechanics" [1,2]. In principle, this allows wave me mechanics to be used to describe macroscopic objects under certain conditions. When the scale of quantum systems becomes very large or quantum effects become less apparent, the description of quantum mechanics (QM) approaches the results of classical mechanics. This is the characteristic of quantum decoherence. Although there is no macroscopic object in the object it describes, there are manifestations (features) that contain macroscopic objects. If the two different behaviors of particles before and after quantum decoherence are determined by their composition, structure, and external conditions, then the two extreme cases of Ehrenfest's theorem (microscopic particles and macroscopic matter) and the starting and ending points of the quantum decoherence process are interconnected. This connection is also the connection between classical states and quantum states. The compatibility between quantum mechanics and classical mechanics has a structural foundation. Previously, people used two methods (& the ideas and concepts determined by them) to sever this connection: the changes in microscopic particles did not conform to the law of causality; The process of quantum decoherence and other microscopic changes is an instantaneous process, and there is no causal relationship in between (non local realism changes, without real signals and matter maintaining causal relationships or connections). It is not difficult to see that this "disconnection operation" is largely artificial or subjective. The deeper you delve, the more you feel that it is unreliable. The Ehrenfest's law only indicates that the described object is not limited by mass when using de Broglie waves. This happens to be useful for the theme of this article.

I hope the above analysis can lead people to explore the possibility of establishing localized realism QM) and weaken the dominant position of existing quantum mechanics, especially the explanatory system of QM. This anticipated new theory cannot completely exclude existing quantum theories, and can only seek compatibility between classical and quantum theories. introduced my own established Schrödinger equation (SE) for gravitational potential energy in references [3-5]. This equation is obviously not unique to quantum theory, nor is it unique to classical theory. It can be said that local reality quantum mechanics requires such equations. This equation also need the support of the application results of local reality quantum mechanics. In references [3-5], the introduction of this equation is relatively rough. This article will review the establishment process of this equation and provide a detailed introduction to the application scope, theoretical basis, application examples, and practical significance of this equation. The SE for the Earth's revolution also refers to it. Sometimes it is also called the 'SE for macroscopic objects'. The classical system SE (the SE of local realism). For convenience, we refer to this type of equation as the "Schrödinger-Tu equation". We will also discuss how to handle the contradictions between existing quantum mechanics and classical mechanics.

I have made significant efforts in establishing local realism quantum mechanics [6-9]. I found that this research work lacks something that is currently unclear to me in theory. After the SE that can describe macroscopic objects has been established, I knew that this equation was one of the things I lacked.

Preliminary ideas on localized realism has been gradually proposed through the development of material structure theory. Its conceptual system and mathematical logic system are both obtained by transforming the existing theoretical system. The biggest feature is the ability to simultaneously use fluctuation mechanics and classical mechanics to describe microsystems [4-9], which recognizes and applies the compatibility of fluctuation mechanics and classical mechanics in terms of ideological concepts and logic. The newly established SE for gravitational potential energy and the original SE may form a system of SEs. Under appropriate conditions, entities as small as elementary particles and as large as planets can be described using this equation, and both the objects of local realism and non local realism can be described using this set of SEs. For convenience, we refer to the group SE as the Schrödinger-Tu equation. The theoretical system of local realism (including conceptual system, explanatory system, and mathematical formal system) has been relatively complete. However, some details still need to be continuously supplemented and improved. One of the imperfections is that the SE cannot be used to describe macroscopic systems, but the Schrödinger–Tu equation can describe the Earth's revolution in references. Thus, the theoretical system of local realism QM has been further perfected. That is to say, the macroscopic SE is an important component of the theoretical system of local realism QM (after establishing the macroscopic SE, we can see this intuitively). This article has introduced the theoretical basis (background), application achievements, and significance of the macroscopic SE.

This work demonstrates the compatibility between classical mechanics and fluctuation mechanics, suggesting that there is no insurmountable gap between them, and briefly explains how classical theory and quantum theory are combined in the context of this study briefly explains how classical theory and quantum theory are combined in the context of this study.

Define or derive the relationship between various physical quantities of macroscopic objects (such as momentum, energy, wavelength, frequency, velocity, wave function) and de Broglie waves. Replace the electromagnetic potential energy function in SE with the gravitational potential energy function, and then derive the SE for the background of gravitational potential energy. We will clarify that the equation can simultaneously or separately describe macroscopic objects and microscopic objects. As long as classical theory and quantum theory are compatible, we can combine them for use. We can also avoid considering the quality of the described object as an important factor in choosing which method to use.If the application effect can be relatively ideal, it indicates that the "compatibility" and "combination" mentioned above have been basically successful in theory and practice. Readers can make judgments after reading the following chapters.

II. THE THEORETICAL BASIS OF THE SECHRÖDINGER EQUATION THAT CAN BE USED TO DESCRIBE THE EARTH'S REVOLUTION

The existing theories of quantum mechanics and material structure cannot explain the source of electron spin magnetic moment. What kind of intrinsic composition structure and motion lead to the wave particle duality of microscopic particles? What are the wave functions widely used in quantum mechanics and the essence of de Broglie waves? Is the frequency of de Broglie waves on Earth determined by its actual vibrations? What is the relationship between the kinetic energy of physical particles and the energy E in the wave function? Is a moving elementary particle also a wave packet composed of multiple waves of different wavelengths? Will the wave packet collapse when it encounters the instrument? If the answer is yes, why can diffraction still occur after the wave packet collapses when the elementary particle flow passes through the slit? For the sake of convenience, we refer to these questions as the first set of unsolved mysteries concerning the structure, properties, and waves of matter. Once any of these questions are clarified, it will definitely lead to significant progress in theoretical research in physics. The thinking method of local realism is obviously the theoretical basis for describing macroscopic and microscopic objects using quantum mechanics and classical mechanics methods. The theory of wave element material structure and the macroscopic object SE are mutually necessary and mutually confirmed.

Reference [6] proposes a wave element material structure theory (whose core argument is that particles are composed of waves. For convenience, we refer to it as Hypothesis 1). That is, assuming that electrons are localized entities composed of waves. The formation method is that the wave propagates along a very small circle, and the wave can propagate forward, but the center of gravity of the circular solid formed by the "head tail connected wave" can be stationary. Assumption 1 provides a good explanation for the source of electron spin magnetic moment. In the context of assumption 1, an electron is a small charged wave ring that can expand according to Huygens' principle and form a hydrogen atom with a proton. Such hydrogen atoms are particles with planetary structures. This also smoothly explains why the calculation results of Bohr hydrogen atoms (planetary structure type hydrogen atoms) are very close to the facts. Under the same material structure framework, this calculation method can be extended to diatomic small molecules such as hydrogen molecular ions and hydrogen molecules. The calculation method is simple, but the results are close to the experimental values [7-10]. The approach of local realism is clearly the theoretical basis for directly describing macroscopic objects using quantum mechanics methods. The theory of wave element material structure and the macroscopic object SE are mutually necessary and mutually confirmed. Because the macroscopic object SE is an equation that can describe the "real object in the local domain".

Since there are the unsolved mysteries above, they leave a huge imagination space for explorers. We can boldly choose the relationship between the physical quantities of macroscopic and microscopic entities (such as kinetic energy, velocity, etc.) and the energy, velocity, wavelength, frequency, and momentum of de Broglie waves based on some clues. We define the displacement velocity of the center of mass of a macroscopic object in motion as equal to the phase velocity of its de Broglie waves, and the kinetic energy as equal to the wave energy of its de Broglie waves. The wave energy corresponding to the wave function used is currently not very clear, but can be selected based on some facts. We define the displacement velocity of the center of mass of a macroscopic object in motion as equal to the phase velocity of its de Broglie waves, and the kinetic energy as equal to the "wave energy" of its de Broglie waves:

$$\upsilon_{centroid} = \upsilon_{phase} = \upsilon_d = \lambda_d \nu_d. \tag{1}$$

$$2E_k = m\upsilon_{centroid}^2 = h\nu_d. \tag{2}$$

In the equation, ν_d is the frequency of the de Broglie wave of a moving object.Equation (2) represents that the de Broglie wave of a moving object with non-zero stationary mass is a “kinetic wave”, and the intrinsic energy (internal energy, which corresponds to the stationary mass of the object) of the object does not belong to the wave energy component of its de Broglie wave. That is to say, when an object with non-zero stationary mass is in motion, its de Broglie waves resemble a moving spring harmonic oscillator (or vibration propagating on a string or water waves). These are examples where the energy converted from static mass does not belong to wave energy. By doing so, we can solve the problem of de Broglie's phase velocity exceeding the speed of light without using the concept of group velocity. Establishing two Eqs. (1) and (2) is a key step in deriving the SE for gravitational potential energy. It is currently unclear whether the essence of de Broglie waves used for counting is the same type of wave. It is not clear whether the three different energies of E contained in the SE are the same. Therefore, Eqs. (1) and (2) are defined as tools. If readers want to investigate the falsity of equations (1) and (2), please include this project in the research plan for further exploration. The first equation of Eq. (2) is the relationship between wave energy and kinetic energy, as well as the relationship between macroscopic material entities and de Broglie waves. The physical quantity of classical motion represented on its right side, and the wave energy of the corresponding de Broglie wave (or wave energy in the wave function) on its left side. In this way, we can say that the de Broglie wave of a moving object is not a real wave. It is highly likely to be a virtual wave, or more accurately, a tool for computation. All the energy of fluctuations is provided by their motion, and static energy does not contribute. It is obvious that Eqs. (1) and (2) are all components of the theoretical basis of the macroscopic object SE. The successful application of the calculation method for microscopic particles established based on hypothesis 1 is the practical basis for the macroscopic object SE.

If you do not believe that the wave energy of de Broglie waves is only the kinetic energy of moving particles and does not include the static energy of moving particles, or if you do not believe in Eqs. (1) and (2), please take a look at the logical proof below. Assuming the potential energy of the system is zero, the kinetic energy of the moving object is calculated according to the SE. This can be seen from any SE. After the potential energy increases and becomes a bound system, the energy attribute classification previously obtained by logical methods remains unchanged.

One of the SE for the Earth's revolution established by references [3-5] is:

$$-\frac{i\hbar}{2}\frac{\partial}{\partial t}\left|\psi\right\rangle = \hat{H}\left|\psi\right\rangle. \tag{3}$$

In Eq. (1), there is an additional – (1/2) coefficient compared to the original SE. From now on, we will carefully explain how it was obtained. How was this coefficient obtained?

III. VERIFICATION OF THE SCHRÖDINGER EQUATION OF THE EARTH'S REVOLUTION

In mechanics, the potential energy of phase interactions takes negative values, while the kinetic energy takes positive values. Therefore, the algebraic symbol V is used to represent the interaction potential energy, and there is no negative sign before V. If a specific potential energy calculation formula is used instead of V, a negative sign needs to be added before the formula. The universal Hamiltonian operator is $\hat{H} =-\left[\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2} - V\right]$. Considering gravitational potential energy is a negative value, the Hamiltonian operator for gravitational potential energy is:

$$\hat{H} =-\left[\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2} + \frac{GMm}{R}\right] \tag{4}$$

Equation (3) uses the Hamiltonian operator shown in Eq. (4). One of the widely used forms of wave functions is:

$$\psi(x, t) = Ae^{-i2\pi(\nu t - x/\lambda)}. \tag{5}$$

Where, ψ is often called wave function. This is a frequently used function in quantum mechanics. We also use it in the SE of gravitational potential energy. The reason is that moving macroscopic objects can also be seen as de Broglie waves.

The SE for time-dependent gravitational potential energy obtained by combining Eqs. (3) and (4) is:

$$-\frac{i\hbar}{2}\frac{\partial}{\partial t}\psi=-\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2}\psi - \frac{GMm}{R}\psi = E\psi. \tag{6}$$

The standard orbital motion of the Earth conforms to this equation.

To verify equation (6), Eqs. (1) and (2) are required for each calculation. In planetary systems, Viry's theorem holds. This classical mechanics theorem ensures that the absolute value of the third term from the left in Eq. (6) is twice that of the second term. By solving the equation by taking partial derivatives (also using Viry's theorem), the result obtained by solving Eq. (6) is: the first term from the left is $-(1/2)m\upsilon^2$ (the total energy of the system, excluding m_0c^2), the second term is $(1/2)m\upsilon^2$ (kinetic energy), the third term is $V=-$ (GMm)/R$=-m\upsilon^2$ (potential energy), and the fourth term is $-(1/2)m\upsilon^2$ (the energy eigenvalue of the system, excluding m_0c^2). Let $f(x)\frac{\partial}{\partial t}\psi=-(1/2)m\upsilon^2\psi$, The solution is $f(x)= -\frac{i\hbar}{2}$. We have already explained the source of Eq. (3) or Eq. (6) clearly. In fact, Eq. (6) can be verified based on Eqs. (1) and (2).

IV. TYPICAL APPLICATION EXAMPLES OF THE SCHRÖDINGER EQUATION FOR GRAVITATIONAAL POTENTIAL ENERGY

It is worth noting that the de Broglie wave is not the same type of wave as the eigenwave of the wave function (The essence of the wave function is not matter waves). The relationship between some physical quantities is inconsistent, therefore, the relationship between hν and E or E_k. The reasons behind this are not very clear and are worth exploring in depth. Reference [8] discusses this situation from the perspective of material structure and proposes a solution: choose one of the two sets of relationship equations based on different situations.

Bohr had already done the work of calculating hydrogen atoms using planetary models (*i.e.* classical mechanics methods). Now, let's first establish a planetary model of hydrogen atoms like Bohr did, and then use the SE to calculate the energy of hydrogen atoms. In the context of planetary models, the radius of the ground state hydrogen atom is the planetary orbit of an electron, with the the alue is a_0, and is a constant value, the solution of the SE for this hydrogen atom is easy to obtain, which is E= $\left(-Ze^2/a_0\right)$. For hydrogen atoms, the combination of classical mechanics and quantum mechanics has both advantages and disadvantages. The advantage is that the solving process is simple and fast. The stronghold cannot obtain an ideal solution. The combination of classical mechanics and quantum mechanics has other advantages. That is, after hydrogen atoms combine to form hydrogen molecules, the combination of quantum mechanics and classical mechanics can generate new quantum chemistry calculation methods (to be introduced later, readers can refer to references [7,10] for details).

From a purely mathematical perspective, the use of the SE is not limited by the mass of the object being described (the value of mass has no discontinuous points). There are two lampshade balls with opposite charges, one of which rotates around the other. If someone believes that the original SE for electromagnetic potential energy cannot describe this bound system, what is the reason? Is it non locality and uncertainty? From a purely mathematical perspective, that's not the reason! The use of the SE is limited by the mass of the described object "is a subjective conclusion. The conclusion (If available) that non local realism and non deterministic objects cannot be described by the SE is also subjectively obtained by some people. Let's discuss the situation where the constraint system is scaled. Continuously shrinking the solar system, it eventually became a microscopic system with a mass similar to that of fluorine atoms. Logically speaking, Eq. (6) can still be used to describe the miniature planets involved. Amplify a hydrogen atom (by increasing its mass and charge in the same proportion) to a mass close to the Earth, and the applicability of Eq. 6 should change in the same way as in the case of the bulb above. Can the SE be used to describe these two hypothetical systems, and which SE to use? The choice method and limitations cannot be seen from the SE itself. This is a logical method for explaining the applicability of the gravitational potential SE and the original SE. The macroscopic system cannot be described using the SE, which is determined based on ideological concepts rather than mathematical logic. Some people may believe that it was determined based on experimental facts. However, we have not seen any reports on determining the applicability of the SE through experimental methods.

Can the explanatory system of quantum mechanics be used as a determining factor in selecting the applicable scope of the SE? Worth further discussion. It is not difficult to see that when deriving the SE (including the later gravitational potential SE), "non locality" and "uncertainty" were not used. Only when using the SE did quantum mechanics scientists consider the characteristics of microscopic particles (for example, when solving the equation, they consider the radius r that determines potential energy to be uncertain, that is, the motion state and mode of particles are uncertain).

The framework structure of localized realistic hydrogen molecular ions established using classical electrodynamics and planetary models is similar to the wheels of a unicycle [7-10]. This skeletal structure can achieve classical electrodynamic equilibrium. Merge the similar terms of the potential energy function and establish a SE using the merged potential energy function (merging the potential energy of multiple particles into similar terms yields a merged potential energy, equivalent to the potential energy of a virtual object). Solving this equation can yield bond length and dissociation energy data [7-10]. Multiple examples of simultaneously using classical mechanics and quantum mechanics to calculate a microscopic object are presented in references [7,8,10]. A common feature of the calculation methods in these examples is that they first provide the composition and structural framework of the system based on the idea of local realism, then find the potential energy function, establish the Schrödinger method, and finally solve the established SE. In the process of calculating the same molecule, classical mechanics and quantum mechanics methods are used successively (this is a combination of quantum mechanics and classical mechanics methods). For hydrogen atoms, their skeletal structure is a planetary model. The calculation of hydrogen atoms based on planetary models and classical mechanics methods has long been done by Bohr. Later on, people felt that it was not very useful and ultimately had to use quantum mechanics methods for precise calculations. We found in references [7-10] that although the planetary skeleton of hydrogen atoms is not very useful for calculating hydrogen atoms, it is very helpful for calculating hydrogen molecular ions and hydrogen molecules (which can greatly simplify the calculation process and make it clearer). The planetary model SE (classical system SE) is the theoretical basis of this method.

Both the SE and the planetary model can be used simultaneously or separately to describe macroscopic objects such as The Earth. There is no reason to restrict the simultaneous use of the SE and classical mechanical models". We have no reason to restrict the simultaneous and separate use of the SE and classical mechanical models. When we calculating hydrogen molecular ions hydrogen molecules and hydrogen molecules, the combination of classical mechanics and quantum mechanics methods is more evident and successful [7,8].

V. ANALY AND EXPLAIN

The second section points out that there is a set of unsolved mysteries in physics. Equation (2) serves as a bridge between classical mechanics and quantum mechanics (or micro and macro). There are two such bridges: Equation 2 and the de Broglie relationship. Like the de Broglie relationship, Eq. (2) can also strengthen the connection between waves and particles (or macroscopic and microscopic). This also reduces obstacles for the hybrid use of classical mechanics and quantum mechanics.

The establishment and application of this equation [Eq. (2)] further confirms that the de Broglie waves of physical particles are not real waves but tools. The wave of wave function (the noumenon of wave function) is more like a computational tool of quantum mechanics (or a tool that can be more widely applied). Because the objects of local realism and determinism can also be described using the methods of quantum mechanics. If the wave of the wave function is not a real wave but a tool, then in the context of the widespread application of de Broglie waves, we cannot say that de Broglie waves and Schrödinger equations cannot be used to describe macroscopic objects. When an electron is stationary, its fluctuation energy is zero (Due to $\upsilon = \lambda\nu$, therefore, when υ equals zero, the frequency is zero, and the fluctuation energy is zero). But the internal energy of electrons is still a non-zero constant value m_0c^2. This fully demonstrates that the energy of the de Broglie waves of moving electrons is not the total energy including internal energy of the electrons.

What is the relationship between the wave of wave function and de Broglie wave? No one dares to confidently say that the de Broglie wave of the nuclear tooth electron of a hydrogen atom is the wave of wave function used to describe electrons in the SE. After completing the solution process of the SE for the hydrogen atom, the wave function was set aside. Because none of the values obtained for some physical quantities belong to the ontological wave of the wavefunction. Because none of the values obtained for some physical quantities belong to the wave of wave function. This makes people believe that the wave function in the SE is just a computational tool. It is not unique to microsystems. As long as it can be demonstrated that wave functions can also be confidently used by macroscopic objects, the compatibility-remixed use of classical mechanics and quantum mechanics eliminates an important subjective barrier.

Microscopic particles are either "completely waves" or "completely particles", which are subjective choices made by people in order to choose the "appropriate method".In fact, the state of objectively existing particles is not subject to people's subjective consciousness. Under constant external conditions, particles will not frequently jump between pure waves and pure particles. Logically speaking, the "duality (Double representation)" in wave particle duality should have existed from the beginning. Just like intersex individuals, different sexual organs are displayed and used depending on the gender of the sexual partner. Particles, like intersex individuals, manifest and utilize different sexual organs depending on the sexual object.

Let's analyze the properties of the energy of each term in equation (6). We will not discuss items that include time for now [That is, let's first discuss the latter equation in Eq.(6)]. In the case of V=0, whether based on the original SE or the Schrödinger-Tu equation, the energy of the term $-\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2}\psi$ can be calculated as $E_k=(1/2)m\upsilon^2$. In classical mechanics, this is the kinetic energy of a rotating object in a bound state system. Because in a bound state system, internal energy is excluded, and when the potential energy is zero, there is only kinetic energy in the system.In this way, according to the Viry theorem, the last term of the SE is the total energy of the system (excluding internal energy), which is the energy eigenvalue of the system.It is the sum of kinetic energy and potential energy. Now, let's discuss the first equation in Eq. (6). .

According to the Viry theorem, the absolute value V of potential energy in a bound system is twice the kinetic energy. In Eq. (6), V is $-mv^2$. The same result can also be calculated directly based on $V=-(GMm)/R$. The properties of these physical quantities calculated according to the SE will not change regardless of whether the object being calculated is macroscopic or microscopic. From this perspective, it cannot be said that the SE can only be enjoyed by the microscopic world. It is natural to conclude that classical mechanics and quantum mechanics are compatible.

The above discussion can experience the simultaneous or combined use of quantum mechanics and classical mechanics, either separately or separately. The SE has a Hamiltonian operator. The applicability of the SE is strongly correlated with the applicability of the Hamiltonian. And the Hamiltonian operator is not entirely within the scope of quantum mechanics (on the contrary, it is closer to classical mechanics). The Hamiltonian operator, potential energy function, Viry's theorem, etc. are closely related to classical theory, while the core content of quantum mechanics — the Schrödinger equation — is closely related to the Hamiltonian operator, potential energy function, Viry's theorem, etc. The problem explained by the combination of multiple factors is also that the SE is not unique to quantum mechanics.

The sharp contradiction between classical mechanics and quantum mechanics is not a dialectical conclusion, but a metaphysical conclusion. Dialectically speaking, the conflicting parties are interdependent. Even if we do not use dialectics, the two sides of the so-called contradiction are highly likely to be complementary. From the perspectives of philosophy, logic, and ideological concepts, and from the perspective of establishing Schrödinger's method, the "scope of application of the SE" and the "relationship between quantum mechanics and classical mechanics" have little to do with the explanatory system of quantum mechanics. The randomness of microscopic particles is highly likely the result of neglecting the detailed description of causal transmission due to the difficulty of calculating causal relationships step by step. If we don't care about details, we can also say that the weather in a place is random. We are not sure if anyone regards the randomness exhibited by particularly complex things as the absolute randomness of that thing. Similarly, it cannot be assumed that the characteristics of photons in a beam can represent all situations. This passage illustrates that the randomness of microscopic objects can sometimes also be related to subjective selection.

Pour a lot of sesame seeds into a bucket, and the direction of the sesame seeds' extension is random. If you believe that the randomness of sesame's stretching direction is an inherent characteristic of sesame, then the laws followed by sesame contradict those followed by macroscopic objects (sesame is definitely a macroscopic object). This is an example where randomness is sometimes related to subjective selection. Whether the nature of tiny particles (even the microscopic world) contradicts the inherent nature of common objects also depends on subjective opinions. Microscopic particles are too small and have many interfering factors, making spontaneous ordering difficult. It is extremely difficult to clarify the details of various small causal relationships. So that it can give others the illusion that the randomness of sesame is an inherent characteristic of sesame. The randomness of sesame extension direction is an inherent characteristic of sesame, which does not conform to determinism and causality. Although this is a rough analogy, we cannot deny that the situation with microscopic particles is not like this.

In the process of deriving and applying the SE, both quantum mechanics methods (such as using wave functions and de Broglie relations, and solving equations using the uncertainty properties of electrons) and classical mechanics methods (such as using potential energy functions, Viry's theorem, classical interactions, mathematical logic, etc.) are used. In addition, there is a phenomenon of 'you have me, I have you' in terms of methods, features, and attributes. These phenomena can be considered as complementary or coexisting relationships, rather than a life and death contradictory relationship. For a particle to have multiple manifestations (such as wave and particle characteristics, coherent and decoherent states), it can be considered that "external conditions can determine which state the described object presents". It can also be considered that the phenomenon just mentioned is similar to the situation of intersex people, that is, similar to the "binary existence and single manifestation" of "male female duality". Existence does not equal expression. It is entirely possible that the (objectively existing) characteristics of microscopic particles are manifested, while another objectively existing characteristic is not manifested.

For the SE of gravitational potential energy, there are both classical mechanics and quantum mechanics methods for its derivation and application in quantum mechanics. The methods of quantum mechanics and classical mechanics coexist or complement each other. As mentioned earlier, there are some unsolved mysteries in quantum mechanics and material structure theory. Let's change our mindset and perhaps explain some of the unsolved mysteries. Simultaneously eliminating some contradictions and giving birth to new interpretations. The establishment of the SE for gravitational potential energy can promote work in this area.

We are not currently pursuing more accurate results calculated directly using the SE of gravitational potential energy, but rather using it to change some concepts (For example, changing the concept of "classical mechanics and quantum mechanics being mutually opposed and contradictory"), liberate people's minds, and develop physics theories and establish new methods. Furthermore, by utilizing its compatibility and complementarity with quantum mechanics, classical mechanics and quantum mechanics can be used simultaneously in quantum chemistry calculations, simplifying the calculation process and even improving the accuracy of calculations. The coexistence referred to in this article refers to the complementarity between the quantum mechanical properties and classical mechanical properties of particles or other physical objects, and/or the complementarity between classical mechanical theories and methods and quantum mechanical theories and methods. These calculation examples would help to explain in greater detail why and how these two can be used together without causing contradictions. "both the SE and the planetary model can be used simultaneously or separately to describe macroscopic objects such as Earth" and "there is no reason to restrict the simultaneous use of the SE and classical mechanical models".

VI. CONCLUSION

As mentioned above, our conclusion is that quantum mechanics and classical mechanics are compatible, and the contradiction between quantum theory and classical theory may be a misunderstanding that "these two theories are complementary and can coexist". Some contradictions can disappear or transform into complementary or coexisting relationships after changing one's mindset. By simultaneously utilizing quantum mechanics and classical mechanics to calculate microscopic systems such as hydrogen molecules, ideal results can be obtained, and the SE that can describe macroscopic systems has been established. This situation forces us to search for the essence of de Broglie waves and wave function ontology. From a theoretical (or logical) and practical perspective, the essence of the wave function and the de Broglie wave are not the same type of wave. This indicates that at least one of the ontologies of de Broglie waves and wave functions is imaginary. The difficulty in observing the wave characteristics of large objects suggests that moving large objects are unlikely to have clear and useful de Broglie waves. Most people believe that the volatility of large objects is extremely weak. Even if one believes in the existence of de Broglie waves, people do not know how the de Broglie waves of matter and the essence of wave functions fluctuate. However, the SE established using imaginary waves can yield accurate calculation results. The SE is like a calculation program distributed by God, which can calculate various physical quantities of microscopic systems without knowing the specific motion of microscopic particles (now it can also calculate some physical quantities of macroscopic systems). This leads one to speculate that it may not be the peculiar properties of microscopic particles, but rather the mystique of the SE as a tool and method, rather than the particles themselves. Perhaps both have a certain degree of mystery and wonder. As long as the tools of quantum mechanics have mystery (or wonderful properties), the mystery of microscopic particles is not as important as before. Cutting off the connection between quantum mechanics and classical mechanics, even putting them in opposition, is no longer as important as before. It is natural to use the appropriate form of the SE in both the micro and macro worlds.

The important significance of establishing the SE for a macroscopic system is to change ideas, liberate thoughts, create more new methods and establish new theories, thereby promoting the development and progress of theory and methods. The existing quantum mechanics is not without any problems [7,12]. This clearly leaves us with space for research and exploration. It also indicates that we cannot use the existing quantum mechanics theory as an absolute criterion for judgment. Let non local realism and local realism coexist and complement each other. For problems that cannot be perfectly solved by the ideas and methods of local realism, use the original Schr ö dinger equation and the ideas and methods of non local realism to solve them. For example, the hydrogen atom can solve quantization and electron spin problems, as well as fine structure problems, using planetary models, the original SE and non local realism methods. Another excellent example is the calculation of helium atoms. Assuming that the two s-electrons of the atom are completely overlapping 'double electrons'. Calculate the energy of this pair of electrons using quantum mechanics methods, and then use a prepared regression equation to determine the interaction energy between the electrons. Finally seeking peace. You can obtain the energy and bond length of helium molecules.

Another question that needs to be explored is whether the SE, which is used to describe macroscopic systems, can be extended to three-dimensional space like the original SE to perform unique functions, thereby calculating quantized orbits and specific orbital radii? If possible, the significance of establishing the SE for gravitational potential energy would rapidly increase. What new ideas, methods, and theories will emerge when ideas change and thoughts are liberated?

VII. DISCUSSION

Comment from group member "Little Stone": The description is not quite accurate, you can go and learn about quantum decoherence. When the scale of quantum systems becomes very large or quantum effects become less apparent, the description of quantum mechanics approaches the results of classical mechanics. Teacher Chen said: After looking at it, I feel that it is of the same type as Gan Yongchao's innovative ideas (Note: Gan Yongchao's behavior is to combine the de Broglie relationship and uncertainty relationship into a matrix, and then say that this action has great significance). My group friend Yue Shandong said to me: Personally, I think this is a very creative and inspiring path. The opinion of an anonymous reviewer is as follows: This manuscript is important to the scientific community. The paper explains The direct significance of establishing and applying SEs and the use of classical mechanics and fluctuation mechanics to describe all objects (no longer limited by the mass of the objects), simplifying the calculation process of quantum mechanics.

In today's world, scholars have two drastically different ways of evaluating a newly emerging theory or idea. One approach is to use current mainstream theories and concepts to measure newly emerging things (evaluating new theories based on old theories). Anything that does not conform to existing old theories and ideas is considered wrong and unacceptable. It seems that innovation has original sin. Another approach is not to pay much attention to whether newly emerging theories and ideas are completely consistent with old theories and ideas (whether they conflict with each other), but to focus on whether there are differences between newly emerging theories and ideas and methods and existing ones. Next, pay attention to whether the new theory can achieve logical consistency. In other words, the latter type of scholars are concerned about whether new theories, ideas, concepts, and methods can be interesting and arouse their interest (in physics, they are concerned about whether what they see can cause their body to secrete more dopamine, increase their excitability points, and enhance their excitement level). The third step is to care about the usefulness of new things. Including whether it has enlightening effects, development prospects, characteristics that can change human concepts, and storage value. The first type of commentator belongs to the static conservative category, while the second type belongs to the dynamic reformist category.

Use the commenting style of dynamic reformist commentators to comment. The research work introduced in this article has two innovative points: the first innovative point (highlight) is the incorporation of gravitational potential energy into the SE. The second innovation point (highlight) is the first use of the SE to describe the ideal orbital motion of the Earth, calculating the energy eigenvalues of the Earth's ideal orbital motion, and changing the old concept that humans have persisted in for many years that the SE is limited to describing microscopic objects. The significance or value of this work is to improve the theoretical system of local realism QM.

Once the Schrödinger-Tu equation is established, it has nothing to do with quantum decoherence. As long as the method of establishing the SE conforms to rigorous logic, the existence of quantum decoherence phenomena cannot interfere with the use of the SE. Because macroscopic matter is not generated by quantum decoherence. They can, in fact, make up a macro world. Schrödinger-Tu equation is used in this macroscopic world without being affected by quantum coherence.

VIII. DISCLAIMER

This paper is an extended version of a preprint document of the same author. The preprint document is available in this link: https://vixra.org/abs/2411.0133 [As per journal policy, preprint /repository article can be published as a journal article, provided it is not published in any other journal].

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