Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 06, pp.52490-52496, June, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

PARTICLE-WAVE SYMMETRY IN QUANTUM MECHANICS AND SPECIAL RELATIVITY THEORY

***XiaoLin Li**

Chongqin, China

ARTICLE INFO

Article History:
Received 24th March, 2017
Received in revised form
06th April, 2017
Accepted 11th May, 2017
Published online 30th June, 2017

Key words:

5-dimensional space-time, particle-wave, phase velocity, group velocity, particle-wave symmetry, Lorentz symmetry, Special Relativity Theory, quasi-particle, obsolute space-time, speed quantization, mass-energy equation, inertial mass, gravitational mass, dark matter, radio burst, Schrodinger equation.

ABSTRACT

In 5-dimensional space-time, Quantum Mechanics have a special particle-wave symmetry. To particle wave, its phase velocity is equal with its group velocity, and the two speed value is invariant. This is very similar with the light speed C in Special Relativity Theory. We mark this speed with V_c. But, different particle has different V_c, not all particles have same V_c. To one V_c value, there exist one kind of particle. Particle satisfying Special Relativity Theory is just one kind of these particles. In Special Relativity Theory, V_c = C. Light speed C is just a special instance of V_c. Quasi-particle in Condensed Matter Physics, is another sample of V_c. The new particle-wave symmetry contains the Lorentz symmetry. The new particle-wave symmetry is a extension to Lorentz symmetry. The Lorentz symmetry is just a special instance of particle-wave symmetry. But the new particle-wave symmetry no longer is limited by speed light C. The particle-wave symmetry has variable speed V_c. So, Special Relativity Theory will be just a derived result of Quantum Mechanics. In 5-dimensional space-time, in the new theory, space and time is not relative, space and time is obsolute. The new particle-wave symmetry can be seen as speed quantization. In Quantum Mechanics, there may exist speed quantization possibly. We need rethink about these physical concepts, mass-energy equation, rest mass, inertial mass, gravitational mass. From the new symmetry, we can get new kind of particle which perhaps have relationship with cosmic dark matter and radio burst. At last, discuss the particle-wave symmetry about Schrodinger equation.

Citation: XiaoLin Li, 2017. "Particle-wave symmetry in quantum mechanics and special relativity theory", *International Journal of Current Research*, 9, (06), 52490-52496.

INTRODUCTION

In author first paper (XiaoLin Li, 2016), author introduce a new physics model. If we assume that the particle wave is present in 5-dimensional space-time in Quantum Mechanics, then we can derive out all results in Special Relativity Theory. But, in the first paper, this description is the first step toward a new theory. What is the essence of this new model? How to extend the model? So author be continue to describe the model in this paper. We extend the model, then we will get a new theory model. The new theory is a new symmetry in Quantum Mechanics. This is the particle-wave symmetry. Then we will explain the new theory in detail.

Particle-wave symmetry in Quantum Mechanics

In author first paper (XiaoLin Li, 2016), author introduce a new physics model. In this new model, there exist three concepts. First. In Quantum Mechanics, particle wave is present in 5-dimensional space-time. One dimension is time. Four dimensions is space. The new 4th dimension space, and 3-dimensional space, forming orthogonal relationships. Total of 4-dimensional space, like 3-dimensional space, is Hilbert space. This like Figure 1.

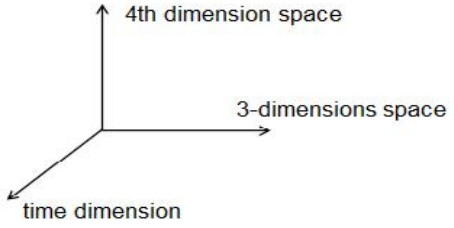

Figure 1.

Two. In 5-dimensional space-time, to particle wave, De.Broglie equation still holds. Three. In 5-dimensional space-time, to particle wave, its phase velocity, and its group velocity, must be equal. And to the two velocity, its speed

***Corresponding author:* XiaoLin Li,**
Chongqin, China.

value is invariant. The invariant speed value is light speed C. There exist a formula (1.1).

$$V_g = c \qquad V_p = c \tag{1.1}$$

From above three concepts, we can derive out all results in Special Relativity Theory. For example, mass-energy equation, Lorentz symmetry, Lorentz transformation. In 5-dimensional space-time, one dimension is time, four dimension is space. In 5-dimensional space-time, to particle wave, its phase velocity and its group velocity, all are 4-dimensional vector, not 3-dimensional vector. The velocity value is invariant always. And the value is light speed C. This like Figure 2.

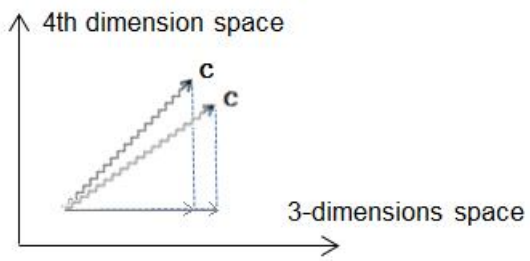

Figure 2.

Please read author first paper (XiaoLin Li, 2016), to know detailed derivation of the new model. In this paper, don't descript it repeatedly. In the first paper, author just descript this model and its derivation. But don't point out these questions answer. What is the essence of this new model? How to extend the model? So author be continue to describe these answers in this paper. In fact, the new model means that exist a new physics symmetry. As long as that the new physics symmetry existence is true, we can get this new model, then get results in Special Relativity Theory. The new physics symmetry is particle-wave symmetry. We know, in current 4-dimensional space-time, to particle wave, its phase velocity is $V_p = \frac{c^2}{V}$, and its group velocity is V_g =V. Phase velocity is not equal with group velocity. Only to the photon wave in vacuum, phase velocity is equal with group velocity, $V_p = V_g = C$.

In fact, to particle wave, its phase velocity is not equal with its group velocity. This phenomenon will take a physical paradox. In Quantum Mechanics, particle and wave is accompanying. Particle velocity is particle movement speed. Phase velocity is wave movement speed. To particle wave duality, this property will force that the two speeds must be equal at anywhere. They must have the same pace. This is particle-wave special property. Other wave not has this special requirement, because other wave not has the special particle wave duality. To particle wave, if its phase velocity is not equal with its group velocity, not have same pace. This will lead to a bad result. Particle move to a point, but wave not move to that point. On the other hand, wave move to a point, but particle not move to that point. We compute a wave function, get the chance finding the particle at a point, but can't find any particle at that point. Because particle movement speed is not equal with wave speed, particle can't move to that point. So this phenomenon will take a physical paradox. So, In order to avoid this paradox, phase velocity must be equal with group velocity. But in current 4-dimensional space-time, phase velocity is not equal with group velocity, this is a fact result. To this paradox, how to explain it? We how to solve this problem? In fact, exist this paradox, this means that 4-dimensional space-time view have defective. The 4-dimensional space-time view does not reflect the real physics space-time. If we watch the particle wave in 5-dimensional space-time, we can find that this paradox does not exist. In 5-dimensional space-time, to particle wave, phase velocity is equal with group velocity. To this result, author first paper (XiaoLin Li, 2016) have detailed description. In 5-dimensional space-time, to particle-wave, there exist formula (1.1). Use this formula, we can derive out all results in Special Relativity Theory. So, it prove that this view (in 4-dimensional space-time, to particle wave, phase velocity is not equal with group velocity) is an illusion. This illusion is from dimensional observation limited. Human only can sense three space dimensions, human cannot sense four space dimensions. But fact physics process is happen in 4 space dimensions. So we get this illusion. In 5-dimensional space-time, take formula (1.1) and De. Broglie equation, we can derive out results in Special Relativity Theory. Then we will ask a question. To phase velocity and group velocity, in real physics world, does there only have one speed value, light speed C? There does not exist other speed value? Instead, if only exist one speed value, this is the very surprising thing. The light speed C must not be a special position in real physics world.

In formula (1.1), if phase velocity and group velocity is other speed value, so we can cross Special Relativity Theory. The light speed C, is just one speed value between total possible value. The light speed C, no longer is in a special position. So, we can extend theory. Human thinking, no longer be limited by light speed C.

In fact, in formula (1.1), the speed value, can be extended to other value. phase velocity and group velocity, can be any const speed value. These other status, is consistent with Quantum Mechanics principle also. These other speed particle wave, is possible particle wave in real physics world. So, we get formula (1.2).

$$V_p = V_g = const \tag{1.2}$$

In (1.2), for ease of identification and extension, similar light speed C, we identify the const speed with V_c. So get formula (1.3). The flag c in lower right corner, be used to identify this speed is a special role, like the light speed C. But different with light speed, this V_c speed value is variable. There exist many V_c speed value. To each V_c speed value, there exist one kind of particles. Different kind of particles, have different V_c speed value. Particles in Special Relativity Theory, is just one kind, just V_c = C. The human detected world, is just a small area. There is still a broad range for humans to discover.

$$V_g = V_c \qquad V_p = V_c \tag{1.3}$$

The formula (1.3) will take a new model into physics. In 5-dimensional space-time, to particle-wave, its phase velocity is equal with its group velocity, and its speed value is invariant.

This is a new symmetry between particle and wave. Simply call it by particle-wave symmetry. This like Figure 3.

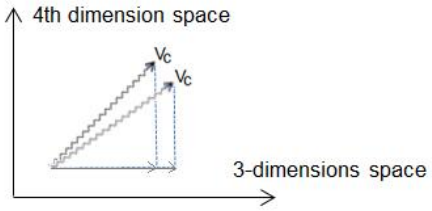

Figure 3.

To each kind particle wave, to its particle-wave symmetry, the invariant V_c , is a absolute speed. At any time, in any point, is this speed value. This speed, its value does not change when inertia coordinates transform. In any inertia coordinates, we only can take the same speed value. This is similar with light speed C in Special Relativity Theory. But, there exist a important difference between Special Relativity Theory. In Special Relativity Theory, all particles have the same invariant light speed C. But, in particle-wave symmetry theory, each kind of particles have its own invariant V_c, there exist different V_c . Please attention another important difference. In particle-wave symmetry, there exist two speed, phase velocity and group velocity, not one speed. The special dual property, will take many difference between Special Relativity Theory.

In Special Relativity Theory, all particles have the same invariant light speed C. But, in particle-wave symmetry theory, each kind of particles have its own invariant V_c , there exist different V_c .So, in fact, particle-wave symmetry is a extension to Lorentz symmetry. But, the theory physics essence is changed. The particle-wave symmetry is derived from particle wave duality. Particle wave duality produce this particle-wave symmetry. This symmetry, does not have association with light speed C. This symmetry, its physical source is particle wave duality property. Its source is not space-time symmetry. This is the biggest difference between particle-wave symmetry theory an Special Relativity Theory.

In fact, the Lorentz symmetry in Special Relativity Theory, is only a special instance of particle-wave symmetry. When V_c = C , we can derive out results of Special Relativity Theory from particle-wave symmetry.

The particle-wave symmetry, is a more wide range symmetry than Lorentz symmetry. Particle-wave symmetry is not inconsistent with Lorentz symmetry. Lorentz symmetry is still valid. But Lorentz symmetry is only a special instance of particle-wave symmetry now. In the new particle-wave symmetry model, the mass-energy equation in Special Relativity Theory, need extended also. Replace the light speed C with V_c , we get a new mass-energy equation, it is formula (1.4). Please attention this fact. This new mass-energy equation have meaning only when we observe physical processes in 4-dimensional space-time. In 5-dimensional space-time, there does not exist rest mass.

$$E^2 = m^2V_c^4 = P^2V_c^2 + m_0^2V_c^4$$
$$P = mV \qquad (1.4)$$

When we observe particle in 5-dimensional space-time, the particle is completely similar to the photon. Just replace C with V_c . So we get formula (1.5). Similar to photon, particle not have rest mass also.

$$E = mV_c^2 = PV_c$$
$$P = mV_c \qquad (1.5)$$
$$V = V_c$$

Please distinguish carefully. In formula (1.4), physical quantity is in 4-dimansional space-time. In formula (1.5), physical quantity is in 5-dimansional space-time. In different space-time frame, the physical quantity has great difference. If you feel confused, please read author first paper (XiaoLin Li, 2016) carefully. This paper explains the difference carefully. In 5-dimensional space-time, to particle wave, De.Broglie equation still holds. It is formula (1.6). But, in this formula, physical quantity is in 5-dimansional space-time, not in 4-dimensional space-time. Only energy and frequency is same between 5-dimansional space-time and 4-dimensional space-time, because they are scalar. To momentum, it is not same in different space-time system, because it is a vector. To wavelength, it is also not same in different space-time frame.

$$E = h\neg$$
$$P = \frac{h}{\mathsf{a}} \qquad (1.6)$$

Particle-wave symmetry is independent with dimension. In Quantum Mechanics, in 3-dimensional space-time, and in 4-dimensional space-time, and in 5-dimensional space-time, all have particle wave. So, all particle wave have particle-wave symmetry. Particle-wave symmetry is derived from Quantum Mechanics. This is a another important difference between particle-wave symmetry and Special Relativity Theory. Special Relativity Theory only is valid in 4-dimensional space-time. Special Relativity Theory is dependent with space-time dimensions. But particle-wave symmetry is independent with space-time dimensions. Particle-wave can even appear in phase space. In Quantum Mechanics phase space, there exist particle-wave symmetry also. This question, will be discussed carefully in next chapter.

Since the V_c value is variable, but why human can't found other kind of particle. For now, human only can found Special Relativity Theory particles, V_c = C . This can be guessed from a fact. For now, all experiment must use electromagnetic technique. But all electromagnetic technique is limited by the light speed C. So human can't found these different particles. Human must create new experiment technique. But, in Condensed Matter Physics, there exist one special kind of virtual particle. It is Quasi-particle. For example, the phonon is one kind of Quasi-particle. The Quasi-particle, only is result of Quantization. Quasi-particle not be found in real space-time. It is not a real particle. But in Quantum Mechanics, Quasi-particle is a valid particle. Quasi-particle has particle wave also. Quasi-particle meet De.Broglie equation also. But, Quasi-particle have much smaller speed than the light speed C. Quasi-particle only have speed in 3-dimensional space, and not

have rest mass. It is very similar to the photon. But Quasi-particle is not Special Relativity Theory particle. In fact, Quasi-particle can be as a example of other V_c value. Quasi-particle have particle-wave symmetry also. To this topic, It is worthy of further study.

At above description, to one particle, its V_c value is invariant. So particle-wave is a linear symmetry. This is a sample status. But we can guess. To same kind particle, the V_c value may be variable. Perhaps, V_c value is variable with energy change, like $V_c = f(E)$. And perhaps, V_c value is variable with position change, like $V_c = f(t, x^i)$. These status can't be excluded. These status is nonlinear symmetry. But these status is particle-wave symmetry also. Phase velocity is equal with group velocity also. To this kind of nonlinear symmetry status, Special Relativity Theory can not be used completely. But we can use the particle-wave symmetry theory also. As long as these physics process keep that phase velocity is equal with group velocity, these physics process can perhaps happen, these process is not conflict with Quantum Mechanics principle. Quantum Mechanics does not forbid that these status happen. To this topic, It is worthy of further study. So, the particle-wave symmetry is a new concept. It have more wide range than Lorentz symmetry. Replace Lorentz symmetry with particle-wave symmetry, physical range will be extended greatly.

Absolute space-time in particle-wave symmetry

In the new particle-wave symmetry model, space and time, will be back to absolute space-time in Newtonian mechanics. Space is absolute, and time is absolute. Space-time system does not change when inertia coordinates transform. In first paper (XiaoLin Li, 2016), author's thinking is limited by Special Relativity Theory also. In first paper (XiaoLin Li, 2016), author think that time is absolute and space is relative. This conclusion is error. In this article, author corrected it. In Quantum Mechanics, to space-time frame, it either can be real world space time (5 dimensional space time frame, four dimensions space, one dimension time), or it can be virtual space-time (phase space and time frame). In virtual phase space time frame, there exist particle wave also. To virtual phase space time frame, we no longer can think that space-time is expanding or is shrinking. But, Quantum Mechanics is valid in real space-time frame or virtual space-time frame. So, in Quantum Mechanics, the space-time should be absolute, not is relative. In the new particle-wave symmetry model, space-time either can be real world space-time , or can be virtual phase space-time. In the two space-time frame, particle-wave symmetry model is valid. So, in particle-wave symmetry theory, space-time is absolute, not is relative. Space-time expanding or shrinking, in Special Relativity Theory, its essence is that, the frequency and wave-length of particle-wave have changed. If there not exist particle-wave, there not exist frequency and wave-length changing, human can't observe these effects of space-time expanding or shrinking. In fact, these effects in Special Relativity Theory, is effects of particle wave. Human only can observe the changes of material, can't observe the changes of space-time. Material is formed by particles. The frequency and wave-length changes of particle wave, is equivalent with changes of space-time. Human can't distinguish the difference between the two changes. So, Special Relativity Theory is correct also.

But, the equivalence can only be limited in certain range, could not be unlimitedly expanded. If we expand the equivalence unlimitedly, this will get error results, and this will limit human thinking. For example, to photon, it only have momentum component in 3-dimensions space, not have momentum component in 4th space dimension. So, to this status, we can't use Lorentz transformation. If we use Lorentz transformation, then we will get a infinite delay time. In fact, the infinite delay time result is a flag that the theory is invalid in this status. To virtual phase space time system, the equivalence no longer is valid also. The phase space time system, is a virtual space time system created by human. In phase space time system, these virtual Quasi-particles is very similar to photon. Human does not have need to create a expanding or shrinking virtual space time system. Human does not have need to built a huge obstacle for themselves. So, human need a new theory model, to replace the expanding or shrinking space time in Special Relativity Theory. Particle-wave symmetry is this new theory model. Particle-wave symmetry can get all results in Special Relativity Theory, it is not conflict with Special Relativity Theory. And, if we use this new symmetry, we can extend theory to a more wide range. In any space time frame, as long as Quantum Mechanics is valid, particle-wave symmetry is valid also. Whether in real space-time frame, or in virtual phase space time frame, particle-wave symmetry is valid. This discussion will lead to a very interesting question. The human living world, the real world space time, whether it is a kind of virtual quantum phase space time also? If not, but why the two space-time system have same particle-wave symmetry? This topic is worthy of further study.

The particle mass in particle-wave symmetry

Because this topic is very important, so we discuss about it in a separate chapter.

From the first paper (XiaoLin Li, 2016), in the new 5-dimensional particle-wave model, the particle mass concept is derived from formula (2.1) below.

$$P = mV \tag{3.1}$$

In formula (2.1), speed V is particle speed in 4-dimensional (3 space dimension, one time dimension). This concept, is derived from Newtonian mechanics. Then we extended it into Quantum Mechanics. This mass, is inertial mass accurately. Similar to Special Relativity Theory, because particle-wave symmetry, there exist a formula (2.2). So, the inertial mass is associated with energy. So, the inertial mass, has another name, energy mass. In fact, the inertial mass, and the energy mass, is a same quantity.

$$E = mV_c^2 \tag{3.2}$$

In the new 5-dimensional space-time model, if particle only has the 4th dimension momentum component. That is, particle has zero momentum component in 3-dimensions. This status, is the static status in 3-dimensions. In this status, observing in 3-dimensions, the mass is just the rest mass. Either in Newtonian gravity, or in the general theory of relativity, there exist a concept of gravitational mass. In the two gravity theory, the rest mass is equal with gravitational mass. Because in

Special Relativity Theory, $E = mc^2$. So, this means that, same energy particle will have same gravity.

But, in particle-wave symmetry, V_c value is variable. Different kind particle, have different V_c value. From formula (2.2), this means that, same energy, different kind particle, will have different rest mass. So, the rest mass is equal with gravity mass, if this result is valid in particle-wave symmetry also. So, we can get a new result. If two particle have different kind, even if the two particle have same energy, but they have different gravity. So, this will take great change to gravity. Gravity question will change to be more complex. If particle-wave symmetry is true, and if there exist real particles which its $V_c \neq C$. So we will observe new gravity phenomenon. If there exist a new kind of particles, it have more less V_c value than the light speed C. Although this kind of particles have small energy, but it have great rest mass. So, it have great gravity. If human can found it, human can use it to change a gravity system. This result does make us to think about the cosmic dark matter easily. If there exist this kind particles in galaxy space, so only exist few of this kind particles, can take great gravity effects. This new particles perhaps is not involved in electromagnetism. Perhaps it is involved in electromagnetism, but its energy is small, so the electromagnetism effect is very small. So, for now, human does not find this kind particles. The cosmic dark matter perhaps is this kind of particle. On the other hand, there perhaps exist this kind particles, its V_c value is more than the light speed C. So, although it has great energy, but it has small rest mass. So, its gravity effects is small also. If there exist this kind particles in universe, only exist few of this kind particles, they can release great energy. This phenomenon is very similar to cosmic radio burst. This kind particles perhaps can explain it. This kind particle gravity does not have obvious great difference between ordinary particles which we have known. So, we can't distinguish it from ordinary particles. Only when it burst, we can distinguish it.

So, if the new particle-wave symmetry is true, we need to rethink about these concepts, mass, rest mass, inertial mass, gravity mass, gravity.

Speed quantization

Observe in 5-dimensional space-time, the new particle-wave symmetry can be seen as speed quantization actually. Each kind of particle, it have a invariant V_c value. Different kind of particle, have different V_c value. So, to multi kind of particle, there exist multi V_c value. It like, $V_{c1}, V_{c2}, V_{c3}, V_{c4}, V_{c5}$,…, These different V_c value, form a set of discrete speed values. This is similar to one quantized attribute. So it can be seen as one form of quantization. So observe in 5-dimensional space-time, the particle speed have quantized property also. The light speed C, can be seen as one quantized speed value. So the light speed C, is invariant. These exist multi intrinsi speed value. The light speed C, is only one of these intrinsi speed values.

So, the Lorentz symmetry, can be seen as a result of speed quantization. But this result, only can be observed in 5-dimensional space-time. In 4-dimensional space-time, can not observe this situation. This is a very important topic, so the author specifically discusses it in a separate chapter. Author simply raises the possibility. This is just the beginning about this topic. It is worthy of further study.

Particle-wave symmetry in Schrodinger equation

Since the particle-wave symmetry is a universal attribute, then whether exist this symmetry attribute in particle-wave which be described by Schrodinger equation? If the particle-wave which be described by Schrodinger equation have the particle-wave symmetry also, this can further proves particle-wave symmetry existence. The rest mass m_0, the rest energy m_0c^2, can be seen as the motion component at 4th space dimension. Follow the same approach, we extend the Schrodinger equation into 5-dimensional space-time.

In vacuum, exist formula (5.1).

$$E = \frac{1}{2} m_0 V^2 \tag{5.1}$$

We add rest mass and rest energy into it. Extend it into 5-dimensional space-time. This can be seen as Schrodinger equation in 5-dimensional space-time.

$$E = \frac{1}{2} m_0 V^2 + m_0 C^2 \tag{5.2}$$

So get (5.3).

$$E = m_0 (\frac{V^2}{2} + C^2) \tag{5.3}$$

We set,

$$u^2 = \frac{V^2}{2} + C^2 \tag{5.4}$$

So get.

$$u = \sqrt{\frac{V^2}{2} + C^2} \tag{5.5}$$

So the new speed can be seen as a speed in 5-dimensional space-time. There exist 4 space dimensions. So the speed u have 4 component. The component at 4th space dimension is C. The component at 3-dimensional space is $\sqrt{\frac{V^2}{2}}$. This like Figure 4.

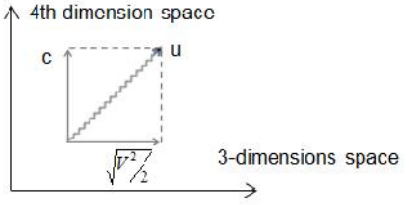

Figure 4.

In 5-dimensional space-time, to particle energy, exists formula (5.6).

$$E = m_0(\frac{V^2}{2} + C^2) = m_0 u^2 \tag{5.6}$$

In 5-dimensional space-time, to particle momentum, exists formula (5.7).

$$P = m_0 u = m_0 \sqrt{\frac{V^2}{2} + C^2} \tag{5.7}$$

In 5-dimensional space-time, we set these. U is particle movement speed, and U_g is particle wave group velocity. The two speed value is equal. So get formula (5.8).

$$P = m_0 U = m_0 U_g = m_0 u \tag{5.8}$$

In 5-dimensional space-time, we set this. U_p is particle wave phase velocity. The particle wave satisfies the Schrodinger equation. So get formula (5.9).

$$U_p = \neg^{\mathsf{a}} = \frac{E}{h}\frac{h}{P} = \frac{E}{P} = \frac{m_0(\frac{V^2}{2} + C^2)}{m_0\sqrt{\frac{V^2}{2} + C^2}} = \frac{u^2}{u} = u \tag{5.9}$$

So we get this result. In 5-dimensional space-time, to particle wave, group velocity is equal with phase velocity. So get formula (5.10).

$$U_g = U_p = u \tag{5.10}$$

So we prove this result. Follow the same approach, we extend the Schrodinger equation into 5-dimensional space-time, we can found that particle wave group velocity is equal with phase velocity. So there exist particle-wave symmetry also. But in this status, the particle wave group velocity U_g, and the particle wave phase velocity U_p, no longer be invariable. The speed value is not a constant. This is different with the light speed C. And this is different with the speed V_c also. So we get this result. The particle-wave symmetry not only have the form with invariable V_c speed. But the particle-wave symmetry also have the form with variable speed. In the two form, group velocity is equal with phase velocity. The particle-wave symmetry is a widely used concept. This can enlighten us to consider the Schrodinger equation from a new perspective. Is the Schrodinger equation really just a low speed approximation to Klein-Gordon equation? From above discuss, we can get this result. The Schrodinger equation is a independent theoretical model with Klein-Gordon equation. This model satisfies the particle-wave symmetry in 5-dimensional space-time. In fact, this is the most simple model about the particle-wave symmetry. To a possible particle wave equation, it must meet two conditions. First, it can derive out the Energy Momentum equation in Newton Mechanics, this is formula (5.1). Second, its group velocity is equal with its phase velocity. Schrodinger equation is the most simple model that meet the two conditions.

Formula (5.2) can be changed to (5.11).

$$E = E' + m_0 C^2 = \frac{1}{2} m_0 V^2 + m_0 C^2 \tag{5.11}$$

In (5.11), E' is the particle kinetic energy in 3 space dimensions. It is the kinetic energy in Newton Mechanics also. Remove the rest energy, it is the Schrodinger equation.

$$E' = \frac{1}{2} m_0 V^2 \tag{5.12}$$

Conclusion

From above description, we get a new particle-wave symmetry in Quantum Mechanics. This new symmetry is a extension to Lorentz symmetry. The particle-wave symmetry include Lorentz symmetry, and have more wide range than Lorentz symmetry. From the new particle-wave symmetry, we can derive out all results in Special Relativity Theory. Special Relativity Theory is only a special instance of particle-wave symmetry. Then human no longer be limited by light speed C. And the space time no longer is relative, but the space time is obsolute. Human will enter 5-dimensional space time. Then we take a new constant V_c into physics. V_c is similar to the light speed C. But, its value is variable. V_c is the flag of different kind particles. Different particles have different V_c . Then we get a result. Different kind particles, although have same energy, but have different rest mass, and have different gravity. This new kind particles, perhaps is the answer, to cosmic dark matter and radio burst. From the new particle-wave symmetry, we can take the speed quantization concept into physics. The new particle-wave symmetry can enlighten human to consider the Schrodinger equation from a new perspective. The Schrodinger equation is a independent theoretical model with Klein-Gordon equation. There exist many questions need to be study. How to discover the 4th space dimension in real world? How to discover the kind of particle that its V_c more than C or less than C? If the new particle-wave theory is true, it will take great change to physics.

REFERENCES

"The Feynman Lectures on Physics (Volume I,II,III)", R. P. Feynman, R. B. Leighton, M. Sands, ISBN 9787506272476, ISBN 9787506272483, ISBN 9787506272490.

Broglie, Louis de, T1929. he wave nature of the electron, Nobel Lecture, December 12.

D R Lorimer, M Bailes, M A Mclaughlin, D J Narkevic, F Crawford, 2007. A bright millisecond radio burst of extragalactic origin Science, Vol. 318, No. 5851.

Gianfranco Bertone, Dan Hooper, Joseph Silk Particle Dark Matter: Evidence, Candidates and Constraints Physics Reports, 2004, Vol. 405, No. 5.

XiaoLin Li, 2016. A new equivalent theory with Special Relativity Theory, particle wave in 5-dimensional Space-time, *International Journal of Physics*, August, Vol. 4, No. 5.

****