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# The Further Thinking and Discussion on the Hamilton Tensor Equation

**Ge Guangzhou**

*Harbin Institute of Technology*
*92 West Dazhi St, Nangang District, Harbin, Heilongjiang Province, China.*

**Abstract**

Pursuing the understanding of Hamilton Tensor Equation, the author further depicts the relationship between energy and time, and explores the mechanism of Law of Inertia, and then interprets the phenomenon of quantum entanglement from a new perspective, and also comes up with the design ideas of a new spacecraft. This article could be regarded as the verification and application of Hamilton Tensor Equation.

**Keywords:** Hamilton Tensor Equation, Energy and Time, Inertia, Quantum Entanglement, New Spacecraft.

## 1. INTRODUCTION

Based on the relevant literature on the Hamilton Tensor Equation[1][2], the author would attempt to further depict the relationship between energy and time, and explore the mechanism of Law of Inertia, and then interpret the phenomenon of quantum entanglement from a new perspective, and also come up with the design ideas of a new spacecraft, and thus the author has written this article with details as follows.

## 2. ISSUES AND DISCUSSION

### (1) Further discussion on the relationship between energy and time

As far as the relationship between energy and time is concerned, the author has proposed the Energy-Time Equation as expressed in the form of Hamilton Principle[3]. However, pursuing the understanding of Hamilton Tensor Equation, the author thinks it necessary to further depict the relationship between energy and time.

At first according to the Energy-Time Equation as expressed in the form of Hamilton Principle[3], the relationship between energy and time could be depicted as follows

$$\delta S = \delta \int_{t_1}^{t_2} L(q, \dot{q}, t) dt = 0 \qquad (1)$$

where what Lagrangian function L represents is energy.

In order to express the energy in a general sense, the author might as well substitute the energy E for the Lagrangian function L, that is

$$\delta S = \delta \int_{t_1}^{t_2} E(q, \dot{q}, t) dt = 0 \qquad (2)$$

This new equation would thus more generally depict the relationship between energy and time, and could be referred to as the Energy-Time Equation of holonomic system, which represents the law that locates the real path out of the all possible paths in the physical system.

Furthermore, according to the Hamilton Tensor Equation [1][2], the relationship between energy and time could be further depicted as follows

$$H_{\mu\nu} = \delta \int_{t_1}^{t_2} L(q, \dot{q}, t) dt = kZ_{\mu\nu} \qquad (3)$$

where $H_{\mu\nu}$ is referred to as the Hamilton Tensor, $Z_{\mu\nu}$ is referred to as the energy-time tensor, and k is the proportionality coefficient, and what Lagrangian function L represents is energy.

Likewise, in order to express the energy in a general sense, the author might as well substitute the energy E for the Lagrangian function L, that is

$$H_{\mu\nu} = \delta \int_{t_1}^{t_2} E(q, \dot{q}, t) dt = kZ_{\mu\nu} \qquad (4)$$

Compared with the Energy-Time Equation of holonomic system as expressed by Hamilton Principle, the Hamilton Tensor Equation, which is a variational tensor equation, should more completely and deeply depict the relationship between energy and time. Just like the “positive hole” or “positive electron” which exists in other circumstances in physics the virtuality of space-time should not be really empty or “zero” but have some “content”, which is actually the energy-time tensor distribution or its corresponding physical space, or exactly, it’s the virtuality of space-time that determines its energy-time tensor distribution or its corresponding physical space so

produced, and thus the Hamilton Tensor Equation should so reveal the nature of "real path". Therefore, the author would herein refer to the Hamilton Tensor Equation as the Extended Hamilton Principle or the Energy-Time Equation of augmented system, which should apply to all the physical systems or processes.

**(2) The Interpretation of Mechanism of Law of Inertia**

According to Newton, the Law of Inertia could be depicted as follows:

An object at rest or traveling in uniform motion will remain at rest or traveling in uniform motion unless acted upon by a net force.

Among it there are two different conditions with an object not acted upon by a net force, the one condition is that an object is really not acted upon by the force, which is deemed as an ideal condition though, and the other one is that an object is acted upon by a balance force, which does exist in reality. And it should be noted that this Law of Inertia is no more than a descriptive definition of phenomenon of inertia and it doesn't explain the mechanism of the phenomenon.

Considering above the author feels concerned about the two points, the first one is that the condition with the object not acted upon by the force is deemed to be the ideal condition rather than the true condition, and the second one is what the mechanism of inertia should be like, and the author would thus suggest some new perspectives pursuing the understanding of Hamilton Tensor Equation.

At first, based on the research into the Hamilton Tensor Equation, the author believes that an object could really be not acted upon by the force and this condition could be true rather than ideal.

According to the relevant literature[1][2], the Hamilton Tensor Equation depicts the generation and distribution of matter and energy of physical system, or exactly, it's the virtuality of space-time that determines its momentum-coordinate tensor distribution or energy-time tensor distribution. **According to this equation, an object's forced motion would be replaced by its free motion in an appropriate physical space, which is ultimately the real path as defined by the Hamilton Principle and in nature to be determined by the corresponding momentum-coordinate tensor distribution or energy-time tensor distribution.** Thus the author believes that the condition as indicated by the Law of Inertia with the object not acted upon by the force shall not be ideal but can be true, that is, an object's forced motion could be replaced by its free motion following the "real path", or exactly, an object shall not be acted upon by the force but conduct a free motion on the "real path", and thus the so called condition of an object's "at rest or traveling in uniform motion" as indicated by the Law of Inertia is no more than the particular cases of its "real path".

Based on above discussion, the condition with an object not acted upon by the force as depicted by Newton should be replaced by the "Hamilton state" as defined by the author, and in the meanwhile, an object's remaining "at rest or traveling in uniform motion" should be replaced by the object's remaining "traveling on real path or in real motion", and the author would refer to this statement as the mechanism of inertia as being sought for. According to this mechanism, the Law of Inertia could then be depicted as follows:

**An object will remain traveling in real motion in the appropriate physical space as determined by the Hamilton Tensor Equation, as is true rather than ideal.**

It should be noted that an object traveling in real motion would not only not be acted upon by the force but also not be restricted by the speed of light. [4]

Based on the above interpretation of inertia mechanism, the author would thus explain the gravitational force from a new perspective. That is, as far as the phenomenon of an apple falling to the ground is concerned, Newton would interpret it to be the outcome of gravitational force, and Einstein would interpret it to be the apple's inertial motion in the appropriate curved space, and now according to Hamilton Tensor Equation the author would interpret it to be the apple's free motion along with the real path.

### (3) The Interpretation of the Quantum Entanglement

As a phenomenon of quantum mechanics, the quantum entanglement is a sort of wave as originally proposed by Einstein, Podolsky and Rosen in 1935. Specifically, the quantum entanglement is a phenomenon that one particle would interfere with another particle in the system comprised of two or more particles although they may be quite apart from each other in space. That is, the behavior of one particle would influence the states of another particle even though they are far from each other, or exactly, if one particle is somehow manipulated, such as by a quantum measurement, and then changes its states, another particle would at once change its states accordingly, and Einstein defined this spooky action at a distance as the quantum entanglement.[5]

Based on the above depiction of quantum entanglement and the pursuing understanding of Hamilton Tensor Equation, the author would assume that the quantum entanglement is actually the phenomenon that one particle would interfere with another particle in the system composed of two or more particles located on the one same real path as defined above. Specifically, according to Hamilton Tensor Equation[1][2], now that an object would not be acted upon by any forces and conduct the free motion in the appropriate physical space which is the real path as defined by the Hamilton Principle, the motion on the real path would not be restricted by the speed of light and would realize the instant connection in time, and thus the

two or more particles which located on the one same real path would so correlate with each other accordingly, that is, when one particle on one real path is somehow manipulated the whole real path or the physical space so produced where the particle is located is actually to be so manipulated accordingly, and thus all the particles which located on this same one real path would be so influenced. The author would then believe that the phenomenon of quantum entanglement is the further development of so called space-time manipulation, that is, **the so called space-time manipulation is to be extended from one point of a particle to one line of a real path, and thus all points of the particles located on this line of real path would be so influenced accordingly**, and the author refer to this statement as the mechanism of quantum mechanism, as can be accordingly verified. It should be noted that, now that the quantum entanglement may occur within the scope of kilometers on the earth, which can be known by some experiments as performed so far, the quantum entanglement would not be influenced or acted upon by the gravitational force, that is to say, this very real path correlation of quantum entanglement mechanism or the real path itself would not be restricted by the gravitational force.

**(4) The Design Idea of a New Spacecraft**

According to the Hamilton Tensor Equation, the author would come up with the design ideas of a new spacecraft.

At first, based on the Hamilton Tensor Equation[1][2], an object would not be acted upon by any forces and would conduct the free motion in the appropriate physical space which is the real path as defined by Hamilton Principle, that is, an object would not be restricted by any forces including speed of light. And thus the author believes the Hamilton Tensor Equation could be used as the dynamics principle for designing a new spacecraft.

If a man flies a spacecraft from the earth to a planet in space, at first he should map out a route for the spacecraft to follow, and thus based on the above dynamics principle the route should be determined as the real path setting forth from the earth to the planet, that is, the spacecraft would not be limited by any forces including speed of light and would travel in space freely if only it follows the route of real path, which should be able to be realized by the technology of automatic driving. And also as discussed above, now that the real path would not be restricted by the gravitational force, as indicated above the real path would not be limited by any forces, the spacecraft following the real path would not be restricted by gravitational force including limitations by the first and second and third cosmic velocities, which means the spacecraft may fly into space unlimitedly and may not need the powerful thrust as equipped and provided by the power units such as a rocket. Furthermore, now that the

real path would not be restricted by speed of light, the spacecraft following the real path would not be restricted by speed of light either, that is to say, theoretically the spacecraft could travel faster than light on the real path and arrive at any destination planets instantly considering the real path could realize the instant connection of time in space. Nevertheless, technically it'll call for some power and time so as to fly the spacecraft along with the real path all the time. Based on the above the author believes that the interplanetary travel could be completed in hours hopefully.

## 3. CONCLUSION

Based on the above discussion, the author would reiterate that an object would not be acted upon by any forces including speed of light and would conduct the free motion in the appropriate physical space and this can be achieved as discussed above.

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