

# The Views of Space-time and Mass-energy of Materialism

Li Zifeng Wang Zhaoyun

( Yanshan University, Hebei, Qinhuangdao 066004, China )

**Abstract:** *This paper analyzes the unidirectional and symmetrical lapse characters of time and every direction being uniform character of three-dimensional space. It brings forth the views of space-time of materialism and criticizes the views of space-time of mentalism. On the basis of full analysis to mass and energy, this paper reveals that mass is the essence of matter, energy is the nature of matter world. Mass and energy can't transform from one to the other.*

**Key words:** *materialism; time; space; mass; energy*

Long ago, time, space, quality and energy have always been one of the philosophical and scientific study issues. As the development of society, people have been deepening their understanding in this aspect. The abstracted view on space-time and mass-energy by philosophy is affecting people's thinking mode, as well as the view on nature<sup>[1]</sup>. Developing the space-time and mass-energy view of materialism, abandoning the space-time and mass-energy view of mentalism and liberating the people from the idealism, can definitely accelerate science development and promote people's ability on realizing and changing the world, which are of unprecedented practical significance.

## 1. Time is unidirectional and evenly passing

Day comes after night; autumn comes after summer; the moon changes from full to narrow; tide comes up and down. Nature moves without ceases. A case comes after another, a process comes after another process. From the primitive man "Begin work at sunrise and rest at sunset" to the modern people working around the clock, from the most primary mechanical movement, namely mutual position changing between objects, to the human cerebrum's most senior thinking activity, all of these reflect the matter's changing sequence and lasting nature, also is the time.

The Master standing by a stream, said, "It passes on just like this, not ceasing day or night!" Authur Eddington said that, "Time is very important for it is passing unceasingly." People are always sighing with emotion: How time flies! The down current may not flow or be blocked, may afloat or go reversibly, but time cannot stop running. It runs uninterruptedly and unidirectionally. People cannot slow its pace nor make it speed up. Time could be used or wasted, but people may not create nor eliminate, prevent or urge the time<sup>[2]</sup>. A millionaire's great wealth could not make him rejuvenated; money cannot prevent one from dying. Everything moves forward, some in a hurry, some leisurely. Even an atom, a nucleon, or an electron, they

also keep moving, participating, varying and balancing. Ancient Greek Heraclitus also had the similar words: "Everything changes and nothing is constant. No one can step into the identical river twice." There are not two totally same pieces of leaves, even the identical piece leaf is not same at different time. This is creator's iron principle and Time Farther's highest manifesto. Modern clone technology can merely clone the shape or the manifestation, but it is impossible to make duplication verily. Because time is irreversible, an organism's historical process cannot be duplicated. Galileo had such opinion: Time does not shift according to people's subjective desire; time is passing anywhere in this universe in the similar way. People once had such feeling that, when one is happy, the time passes quickly; when one is bored to death, then he felt experiencing one day like a year. However, the clock is still walking as before and time is passing equably. That feeling is just psycho-generated, is the subjective illusion. No matter how regardless people expect that time could be slower or quicker, that can only turn into part of their forever recollections.

Time is so charming that it becomes one of most important modern physics research topics, such as "the black hole time", "the imaginary number time", "the space and time travel" and so on. These discussions are aiming at explaining the time that are fantasy and too numerous to be cited individually. In 1895, an English renowned fiction writer Wells in his novel "Time Machine" initially turned human's dream into vivid writings, while in 1905 Einstein proposed "Theory of Special Relativity" theoretically "confirmed" the possibility of this kind of ultraspace-time travel. Afterwards the opinions on the "space and time tunnel", the fiction movie as well as the fiction novel emerged one after another. Perhaps this kind of time travel meant that people may revise or change destiny development, return to the past world accompanying the appreciation to the glory cause together, or go to the future stock market getting some useful information and experiencing the life that he never

feels. But, people might as well think carefully if someone does realize his return in the space and time travel, he has to deny the parents. But how could he come in the world? The most renowned Grandmother Theory has that: if a person goes back to the past and killed his grandmother, putting aside the unforgivingness in morality and justice, but this hypothesis can vividly showed time travel is impossible. People review the history, bring the present advanced weapon to support the antifascist wars in the 20th century, and eliminate the Fascism in the embryonic stage, then the world war will not occur, history will be revised, and the historical today will not be today's appearance. So actually which today should belong to us now? What the people must face at present is getting rid of the concept of time of idealism, prevent from getting deeper and deeper in its abyss. We should emancipate the mind and clearly recognized the object the time describes is the irreversible and advanced characteristic in its developing and changing process. It is a vector with "the irreversible advance arrow". It has the nature that is even, continuous and the advance order that may not inverted<sup>[3]</sup>.

## **2. Space is three-dimensional and isotropic**

People got to know the space initially started from the certain volume that some concrete material objects hold. For instance, the static object has certain size volume, so people said it holds certain space. The space is just like a vessel that consists of length, height and width. It can not only hold all kinds of things, but also allows the objects to move in it. It is just the object's movement that further reveals the spatial idiosyncrasy. Therefore, space is the reflection of matter's motion extension and one of the material existence forms. Matter takes up space position. Space is a place where matter exists and changes. Natural space is the space which is filled up with moving and changing matter and star body. Space is not substantial and does not belong to matter. It is matter that takes up space.

Then why is the space three -dimensional? The archaism Chinese had that, "The east, west, north, south, up and down are called 'yu', through the ages is called 'zhou'." That is to say, "yu" represents space while "zhou" represents time. What's more, this speech had already indicated that in the whole world, "yu" has the front and behind, the left and right, and up and down, these three dimensions; while "zhou" (the same as "long", time) has only one dimension from past to the future.

It's common sense that, a partial rectangular space can be measured by its length, width and height. But ascertaining a point in space must use three independent coordinates (for example the Cartesian co - ordinates X, Y, Z). Biological analysis pointed out

that in any senior organism, the massive cells contact mutually must be through the nerve fibers. If space has only two dimensions, then one organism can only have a two-dimensional configuration, so its nerves usually interpenetrate as in the city streets. On the intersection, different nerves penetrate each other. Therefore, if the third dimension does not exist, one nerve fiber cannot be above or under the other. As a result, the nervous excitation will cause mutual interference. Therefore, there exist a lot of highly developed organisms with non- interpenetrated nerve channels, and only in the at least three dimensional space can then have the possibility. In the three-dimensional space, no matter how many points exist, people can still establish non-crossing correspondence contact between two-two-point. Then why people can't live in a higher dimensional space? In 1917, Ehrenfest conducted deeper research on this question and started to seek the reply from physical system dynamics. It is confirmed that, when the space dimension is higher than three, that is in four or higher dimension space, there could not be the stable solar system, the stable planetary orbit, nor the stable atomic condition. Only in the three-dimensional space, could people have solar system the atom, the molecule as well as the animal and plant, could people exist. In other words, the real space people live could only be three dimensional<sup>[4]</sup>.

In mathematics, the multi-dimensional variable can be called multi-dimensional space. In physics, there are one-dimensional space (line), the two-dimensional space (surface) and three-dimensional space (cube); but there are no physical space more than three dimensions. Multi-dimensional space in mathematics cannot be transplanted directly to physics. But only when the dimension is fewer or equal to 3 (time not included), may correspond.

The space is isotropic. It is only isotropic, can people recognize the object's concrete shape, size and position. If the directions are not connatural, that all the things in the world will not be able to have the stable existence form and there will not be the cube or the sphere. Seeing a person in one position is an appearance, while changing the position, the appearance turns to another. A person has innumerable faces, and he can play the trick to face off.

## **3. Time and space are elementary quantity that describe the physical world**

That human's existence and activities, the phenomenon and process they observe from far and near, all appear and develop in the time and space. Since human had consciousness, in the course of recognizing and changing the world, they began to describe their activities and the objective world which they lived in the form of the time and space. Engels once pointed out that, "All elemental existence forms are space and time. The existence beyond time and

space, is extremely absurd." When talking about space and time, "Natural Dialectics" says that, "If the two existence forms leave the matter, then there is nothing. All is the empty idea and abstract which exist in people's minds." This sentence indicates that time and space are closely related to the material world.

People use time and space to describe movement: from the heavenly body's rotation, the launch for spaceship lifting off, flux and reflux, train's running on two rails to the movement of molecular and so on. Matter is in motion. There is nothing absolutely stationary in the world. Movement is closely connected to time and space. It's nonsense to talk about movement regardless time and space. We could say that it is just because of the description on time and space can the abstract and blurred movement turn vivid and concrete, can the complex movement become simple. Thus, people's understanding level to the nature enhanced gradually. Therefore, time and space are the fundamental quantity describing the physical world which can not be changed by people's will<sup>[5-9]</sup>.

#### **4. Mass is the essence of material world and energy is matter's status attribute**

The concept of mass is from people's experience of life. For example, an iron hammer contains more iron compared with a nail; a wooden boat has more wood than a wooden chair, and so on. The concept of mass is the matter that is deduced from the object. Also the mass does not change when an object's shape, condition and position changes. In 1687, Newton in his book (*Philosophiae Naturalis Principia Mathematica*) defined mass equals to matter's density times its volume. The more an object holds atoms, the more its mass is. But in modern times, people are apt to call it as the inertia mass and the gravitational mass. The inertia mass is used to describe object's inertia. The heavier an object's mass, the bigger its inertia is; in verse, lighter mass, smaller inertia. The gravitational mass is used to measure the gravitational field an object produces and the effect that other gravitational field put on it. Inertia mass and gravitational mass present two different attributes respectively, however, they have close relations. The experiment indicated that: there is always the positive correlation between the material inertia mass and the gravitational mass, namely the bigger an object's inertia is, the stronger the gravitational field it produces. It has no relationship with the object's ingredient and structure. At present, many physicists hold that: the material base's two kinds of different attributes--inertia and gravity, are manifestations of identical essence in different aspects. In other words, the object's inertia and gravity originate from object's identical essential--mass. Therefore, mass is the essence of the whole material world.

Energy is used to represent the object's working

ability. It is the status attribute of material. Energy has many forms, like kinetic energy, potential energy, heat energy, chemical energy, electromagnetic energy, atomic energy and so on. In nature, energy keeps transforming from one object to another, or from one form to another form. In transformation, an object loses energy, another object consequentially obtains the energy. Potential energy reduces, and kinetic energy increases; chemical energy reduces, and heat energy increases; atomic energy reduces, and kinetic energy and potential energy increase. One loses energy, the other increases undoubtedly. The total energy is invariable. This is the conservation and transformation of energy theorem.

Mass is mass and energy is energy. Mass and energy cannot transform between each other. In the world, there is no energy that can be separated from mass, nor mass separated from energy. Any form's energy transfer  $\Delta E$ , must be accompanied by corresponding mass transport  $\Delta m$ . When a negative electron meets a positron, they disappear and transform into a pair of photon. With this kind of atomic energy release, the photon with its mass and energy shift together. The less the mass of atom which released the energy, the less its energy; the more energy matter receives, the more its mass. The process an atom emits the atomic energy is just like gun launches bullets. The bullets shifted together with its mass and energy. The entire process complies with the law of conservation of mass and the law of conservation of energy respectively. Mass and energy doesn't transform mutually.

#### **5. Conclusions**

In summary, people should set up the space-time and mass-energy view of materialism, clearly recognize that time is unidirectional and cannot flow backwards. We should also abandon the fantasy that time can flow backwards and value the time. The space is three dimensional, isotropic, and there are no four dimensional or multi-dimensional space existing. Both time and space are the objective. Time is not space function, nor space is time function, so they cannot be mixed. They are fundamental quantity describing the material world, which do not change after being defined. Mass is one of the material essential attributes. It is the quantity an object contains. There is nothing in the world whose mass is zero. As long as it is matter, its mass must be more than zero. Energy is the motion of matter's condition attribute. The material energy has many kinds of existence forms. Under some conditions, the energy may transform mutually between the different forms, but the total energy is invariable. Mass and energy cannot transform mutually.

#### **Reference**

[1] Zhang Junqing. Historical Attention and Expectations on the Time-Space View. *Theoretical Exploration*, 2005, (3):21-23

- [2] Xu Shaozhi. On Space and Time (II). Invention and innovation, 2005, (1):30-32
- [3] Ling Zhi. Discussion on Concept of New Time. World science, 2005, (5):44-45
- [4] Luo Weiyin (translating). Why is the space three dimensional?. Physical Knowledge, 1984, (3):8
- [5] Shi Zhengjin. Dialogue to Vacuum. *Matter Regularity* (Supplement), 2005.8
- [6] Wang Guohua. Persisting in the Scientific Truth and Telling the Truth. The Beijing Theory of Relativity Session the 3<sup>rd</sup> Annual Meeting, Beijing, 2005.
- [7] Paul Davies. On Time. Changchun: Jilin People's Publishing Agency, 2002
- [8] Guan Hong. Space. Beijing: Qinghua University Publishing House, 2005
- [9] B.K.Ridley, On Time, Space and Universe. Li Yongyi, Changsha: Hunan Science and Technology Publishing House, 2002

### Authors' Biographies



**Li Zifeng** is a professor of Yanshan University, China, SPE member and a member of Petroleum Society of Canada. Before joining Yanshan University, he was first a professor of Daqing Petroleum Institute and then a professor of China University of Geosciences. He has published 70 papers and 4 books on drill string, casing, rod pumping mechanics & well bore stability. He holds a BS degree in drilling engineering and an MS degree in machinery engineering from Daqing Petroleum Institute and a PhD degree in petroleum development engineering from Petroleum University, China.