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The Third Discussion on Cosmic Space in Zero Dimension

—A Discussion on Spatial Questions According to the Correspondence between Clarke and Leibniz

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Abstract

The relationship between space (absolute space) and matters (relative space) is similar to that between a stage and performers, where they both exist independently and are interconnected. This work first explores the hypothesis that the Essential space of the Universe is absolute and is zero-dimensional. The second part of the hypothesis discusses that the three-dimensional Universe is a relative space occupied by matters and a representation of its relative positions. The hypothesis in this work will be explored and discussed using reference from the correspondence between Clarke and Leibniz. This work tentatively concludes that the space is absolute and zero-dimensional.

Keywords

Newton, Absolute Space, Relative Space, Leibniz, Monadism, Space, Existence, Impetus

1. Introduction

In previous works, the author explored the relationship between natural and artificial existences such as matters. A parallel could be drawn to an arbitrary relationship such as a stage and performers, which is an interdependent relationship, with two independent concepts (Liu, 2020d). The relationship between these two existences is fairly simple to understand, where the stage offers a space for the performers to perform the act, and all space where performers perform can be called a stage. The significance of a stage all lies within the performance of the performers. However, a stage remains itself regardless of the existence of a

performance. Even without a show, a stage would still have other existence from the changes and motions of matter, such as air. From this above reflection on the relationship between coordinates, the relationship between a stage and performers can easily be extrapolated to the relationship between the absolute and relative space or that between space and matters, including humans.

In previous works, the author proposed the hypothesis that the Origin of the Universe is zero-dimensional. It does not contain any type of physical matters, and thus it remains an absolute vacuum that is represented by the concept of the void. It is also the stage for the existence of both physical and non-physical matters. Liu also explored the hypothesis that the existence of three-dimensional matters is defined by two concepts of energies, where the condensed Fundamental Energy formed the physical entity and the *cause* of Intelligent Energy that formed the zero-dimensional soul to all matters (Liu, 2020d). The previous works of Liu on the zero-dimensional space included the perspective of the philosophical ideologies from the Axial Age, both Eastern and Western, and the perspective of classical physics (Liu, 2021b; Liu, 2021c). This work will further explore the hypothesis that the space is an absolute space, an energy concept of *yin* and *yang*, a conflicting yet unifying impetus in the Universe. It will explore the topic by focusing on absolute space from the perspective of Leibniz and Clarke (Liu, 2020c).

2. Literature Review

From his works in physics, Einstein proposed that matters were another form of energy that relate to its mass and that it was possible to quantify it. Einstein then postulated his most renowned formula $E = mc^2$, where m is the mass of the matter. From a perspective of kinetics, if the velocity of a matter reaches the speed of light, the total energy of the matter is then the product of the square of the speed of light and its mass. This equation also pointed out that for any matter with a mass, its energy can be quantified (Einstein, 2018).

Based on the same principle, matters are energy under changes in the Universe. Its entropy could be positive at times and negative at others. However, the total entropy should be zero (Krauss, 2012). The theory of relativity shows that matters are under constant changes in the pool of energy. It was Einstein's theory that enabled scientists to accurately calculate the energy of any object.

Perhaps, there exist other coordinate systems similar to that of the light in fields such as thermodynamics or electromagnetics. If the mass-energy limit in these fields can be accurately computed, there would be numerous other theories of relativities. However, it is physicists who, with their relentless efforts, cracked the mystery of mass-energy relationships for matters.

Einstein was one of the greatest physicists to date because he discovered one of the most significant truths in the Universe, which is the constant speed of light and the limit of the kinetic energy of any matter. For matter can be described by its energy and its change in energy, and that change can be external to matter, but it can also be changes of place and relative space as described by

Newton in his works (Newton, 2018). These changes are the results and interexchange and perception between the matter and its external information and energy.

However, Einstein regarded the space occupied by matter itself, or place as described by Newton, and the space between the locations of matter, or the Newtonian relative space, as the space occupied by the Essence the Universe (or the Newtonian absolute space) (Einstein, 2018). In another sense, the description given by Einstein regarded the performers as the stage, therefore creating questions toward the results and theories in quantum mechanics for the rest of his life.

But it was not an error from Einstein, but rather the result due to the lack of a clear conclusion in the discussion of the absolute space between Clarke, representing classical physics, and Leibniz. Ever since, during the progress of modern physics, the relative three-dimensional Universe of matters has been regarded as the absolute space.

In past works, by referencing Ancient Greek and Eastern philosophy, Liu proposed the concept of Fundamental Energy and Intelligent energy, similar to the concept of *yin* and *yang*. Fundamental and Intelligent Energy, like the *qi* of *yin* and *yang*, are both conflicting and unifying (Liu, 2017; Liu, 2020a). Liu defined these two Energies as the eternal dynamic to the existence of the zero-dimensional Universe (absolute space and the three-dimensional Universe (relative space) (Liu, 2020c).

3. The Newtonian Concept of Space and Time

The relationship between space and time is shown in **Figure 1**. The basis of this discussion is based on Newton's work in *Mathematical Principles in Natural Philosophy* and on the correspondence between Clarke and Leibniz (Leibniz, 2000; Newton, 2018). The period of Newton and Leibniz was the period where the physicist had the most rational discussions and explorations on space

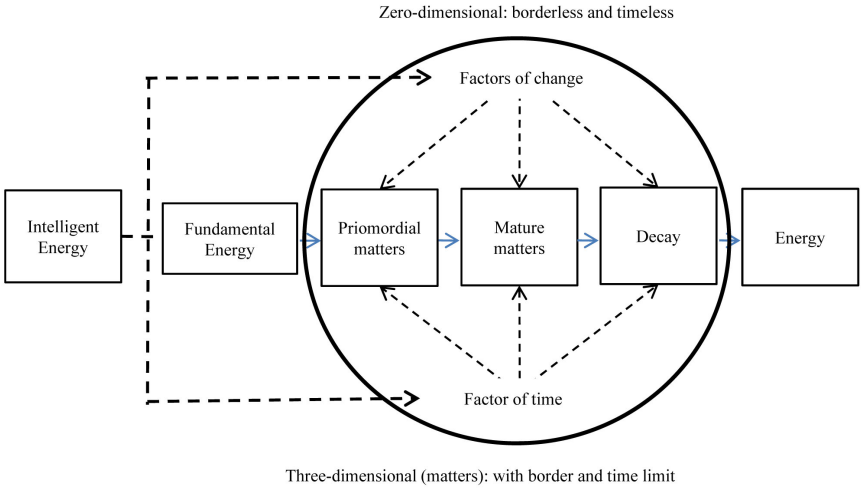

Figure 1. Relationship between the universe, matters and time.

and time. However, this fascinating discussion on space was abruptly interrupted by the passing of Leibniz, which resulted in today's progress in a fuzzy space concept (Leibniz, 2000).

Newton proposed three concepts of space in his work *Mathematical Principles*. First, Newton defined absolute space as a space that has properties independent of any external matters and is relatively static (Newton, 2018). Newton then defined relative space as the space between matters that express the motion velocity. Newton also stated that within this relative space, there would be air particles invisible to human eyes (Newton, 2018), and finally, Newton defined the space occupied by matters as the place, a space that could be absolute or relative depending on the property and space of the matter (Newton, 2018).

Newton also divided time into absolute and relative. Newton defined absolute time as the real mathematical time that is independent of any external existence, and it has a steady rate of change (Newton, 2018). For a relative time, Newton defined it as the superficial and universal time. It is a measure of the perceived and external duration of motion, often used in lieu of real-time, such as hours, days, months, and years (Newton, 2018).

The Newtonian definition of time defined absolute space, but it did not clearly define the existence and the dynamic of absolute time. The Newtonian definition of time clearly defined the existence of matter but lacked in the description of it as a factor to the existence of matters, in which Liu described it as Intelligent Energy in his past works (Liu, 2020b; Newton, 2018). The last debate on absolute and relative space and time happened during the exchange between Clarke, a supporter of Newton, and Leibniz. This debate lasted five letters between them and was abruptly cut short with the passing of Leibniz (Leibniz, 2000).

4. The Author's Past Works

Liu proposed the theory of zero-dimensional Universe, based on a combination of ideologies from the Axial Age, Oriental knowledge, and modern physics, in order to evoke the attention of the science and philosophy communities to re-open the discussion on the Essence of the Universe. Although the Axial Age was during the early stage of human civilizations, it showed some of the most prominent ideologies in human history. At that time, there was no clear division between philosophy, science, and religion, where the first sign of division occurred after the first years of A.D. (Liu, 2020c).

The structure of myriad things of the three-dimensional Universe, according to Liu, was based on zero-dimensional Fundamental Energy, while the equally zero-dimensional Intelligent Energy adhered to matters under numerous forms and governed the motions and changes of those matters. Hence, all matters have had souls, were able to receive and transmit information, and could perceive their surroundings (Liu, 2020d). Fundamental and Intelligent Energy has since become the *cause* of the changes and existence of matter, and this cycle will continue eternally (Liu, 2020d).

In past work, Liu proposed the question on the existence of an absolute Truth and a relative truth (Liu, 2020c). He believed that the Truth and the existence of the Universe are absolute existence (Liu, 2020c). On the other hand, anything artificial, such as human languages and information, is relative Truth and existence that necessitate pre-requisites and a coordinate system to be properly understood. Many disciplines, including science, philosophy, or religions, have proven this point (Liu, 2020c).

For example, leading scientific theorems, such as Newtonian mechanics, Einstein's theory of relativity, or quantum mechanics, are all Truth only under specific circumstances. They are not an absolute existence. For the survival of humankind, humans and their discovered relative Truth is approaching the discovery of the absolute Truth, under the guidance of science, philosophy, and religions, a vital tool for human survival and continuation (Liu, 2020c).

Time is another principal factor of Intelligent Energy in matters (Liu, 2020d). Time is the quantification of the process of existence to matters. The dynamic to the existence of all beings came from the conflict of *yin* and *yang*. This conflicting yet unifying dynamic has existed throughout the three-dimensional Universe since the beginning of the zero-dimensional Universe. The transitional dynamic from the zero-dimensional Universe to the three-dimensional Universe was dominated by Fundamental Energy, while Intelligent Energy was the dominant dynamic for the reverse direction (Liu, 2020a; Liu, 2020c).

On the other hand, the 13th International Congress of Weights and Measures redefined second. This feat hinted that humans might finally uncover the factor of time bestowed to matters by the Universe. This factor of Intelligent Energy is related to the mass of matter and possibly be related to Weak force (Liu, 2021a).

5. Discussion

Even today, scientists have yet to fully understand the Essential question on space and are still disagreeing and debating within the relative space of matters. Unless the question of the absolute and relative space is solved, humans cannot truly uncover the Essence of humanity, soul, spirit, or consciousness. Furthermore, with the progress of modern physics, the question of absolute and relative space and the question of the relationship and existence between space and matters now involve the unification of the theory of relativity to quantum mechanics. The Theory of Everything is now the biggest enigma in modern physics, and its solution will lead to a further understanding of the forces in the three-dimensional Universe.

At the moment where $E = mc^2$, Strong Force, Weak Force, electromagnetic force, and gravitational force all ceased to exist. When gravity ceased to exist, all other structures would cease to exist and return to the zero-dimensional energy state. Therefore, it is now possible to draw a parallel from matters to energy.

Forces are the soul to all matters in the Universe for they are the first property of matter. From the first primordial particles, matters were the emitters, as well as receivers, to the information transmitted by forces to form the diverse sub-

stances in the Universe as known today. Liu previously proposed that under the influence of various *causes* of Intelligent Energy, particles formed matters (negative entropy). Matters, on the other hand, matures after a determined period of time, and under the *causes* of Intelligent Energy, dissipate in the Universe in the form of energy (positive entropy) (Liu, 2020d). A prominent representative of three-dimensional matter is the human body.

The philosophical ideologies from the Axial Age, especially those from the oriental knowledge in the East, could be used as the foundation to the philosophical approach in modern science (Liu, 2020b). Two of the most prominent theories in modern physics are the theory of relativity and quantum mechanics. When these two theories are combined, scientists discovered that they could not unify these two theories. Many methods, like M-theory, were developed to unify these two theories, and the most crucial task was to unify the four forces of nature, including gravity, strong force, weak force, and electromagnetic force. Liu, however, proposed to undertake the perspective of absolute space to finally unify the theory of relativity and quantum mechanics.

6. The Newtonian Space

The correspondence between Leibniz and Clarke happened from the end of the 17th century to the beginning of the 18th century. It took place between Leibniz and the Newtonian school on the subject of cosmic space and time (Leibniz, 2000). It was of great significance to both science and philosophy. At that time of classical physics, there was no systematic science or information. The theories in science were significantly lacking compared to modern science, and the only scarce information on the Essence of the Universe was from philosophical ideologies from the Classical Greek period (Liu, 2020b; Liu, 2020c). Newton, Leibniz, and Clarke were all believers of God. Their debate over space and time was heated but rational, with some individual words being not necessarily reasonable.

The Newtonian perception of the space, beside a short definition in *Mathematical Principles*, was accurately described in the fourth reply to Leibniz by Clarke as: extramundane, void of body, and void space (Leibniz, 2000).

The extramundane space described by Clarke in his letter to Leibniz is not imaginary but real. In this letter, Clarke made a critical comment on absolute space: "if the material world is finite in its dimensions". It was this comment that made one of the core ideals in Liu's past works (Liu, 2020c; Liu, 2020d). During the Axial Age, Eastern philosophy defined the Essence of the Universe as "large without a boundary and small without limit" (Hu, 2012). The Classical Greek described the Essence of the Universe as "limitless" (Russell, 2017), which was very similar to that of the Eastern ideology.

In a material world, the dimension and the relative position are both limited and are quantifiable. The Greek philosopher Pythagoras believed that all things could be explained by numbers, such that the distance between materials (relative space) and the size of materials (place), regardless of how big, or small, the

number was, could be expressed by numbers or mathematical means (Riedweg, 2005). This extramundane space described by Newton is limitless and cannot be described using numbers. If a number is to be used to define this space, it can only be zero. It is called the three-dimensional Universe because of the existence of three-dimensional matters. However, if no three-dimensional matters exist in the world, or in other words, only energy exists in this Universe, as in the beginning of the Big Bang, before any matters appeared in the Universe, then this Universe would not be three-dimensional and should be considered as zero-dimensional space. Hence, the Essential space in the Universe itself should be absolute.

Clarke clearly described the property of absolute space and its difference to the relative space and place, and he described a space void of body as *the property of an incorporeal substance* (Leibniz, 2000).

Clarke's perception of Newtonian space, in terms of the concept of space, is nearly impeccable. In this letter to Leibniz, Clarke offered a very rational explanation that included the concept of space by Eastern and Western philosophy of the Axial Age. Liu expressed that the definition of space during the Axial Age was under a state of rational perception or by sensuous perception as proposed by other authors (Liu, 2020a; Russell, 2017). Unfortunately, what was precisely within space and what was the dynamic of its existence were not recorded in any of Newton's work. Newton is often quoted with "*Gravity explains the motions of the planets, but it cannot explain who sets the planets in motion.*" Although no elaboration on this statement was found in any other of Newton's work, it is clear that Newton believed in the existence of an Almighty being. Without a precise definition of absolute space, Newton has left a mission for the present and future generation to solve.

Clarke's conclusion on the absolute space as a property that is immense, immutable and eternal, and that has a duration. He also attributed the space and duration a work of God (Leibniz, 2000). Similar conclusions were found in the works of Professor Krauss of University of Arizona and in the works of Professor Randall of Harvard University. In his work *A Universe from Nothing*, Professor Krauss discovered particles from nothing, but he could not define what was the void (Krauss, 2012). Similarly, Professor Randall described her findings on the fifth dimension as the extra dimension of the Universe and hid it in an infinitesimal corner of the Universe (Randall, 2005).

Undoubtedly, Leibniz once studied the ancient Eastern philosophy from the Axial Age. He wrote the article of *Discourse on the Natural Theology of the Chinese* and he opposed the Newtonian theory of absolute space. Ironically, in his reply to Clarke, the way he objected the theory of absolute space, he actually made a scientific and systematic explanation to the existence of absolute space. If Leibniz's view of absolute space can be combined with that of Clarke, science might go into another direction that would lead to a unification between the theory of relativity and quantum mechanics.

From the correspondence between Leibniz and Clarke, it is clear that they

were both the defender of God. However, they were on the opposite end of a coordinate system and firmly opposed the other's ideology.

Leibniz believed in his second letter to Clarke that *God has foreseen everything* (Leibniz, 2000). He also believed that God has an extramundane intelligence, and he proposed the concept of the monad, a real and psychic existence with perception and appetite (Leibniz, 2000; Leibniz, 2018).

On the other hand, in his first reply to Leibniz, Clarke stated that God is omnipresent and that *he is actually present to the things themselves* (Leibniz, 2000), Clarke then used a metaphor to describe the infinite space as an omnipresent organ of sensation (Leibniz, 2000).

Based on the debate between Leibniz and Clarke and combining Zhang Zai's *qi* theory of *yin* and *yang* from the Eastern philosophy, Liu proposed that the Almighty existence in the Ancient Greek philosophy was Intelligent Energy (Liu, 2020c; Zhang, 1978). Liu defined Intelligent Energy as the *cause* and soul of all matters as they move and change within the space following the command of Fundamental Energy. Forces and time are factors to the existence of these matters and the factor to the dynamic of the Universe and God.

Leibniz's perception and judgment of space are founded on factors of coordinate systems based on matters. He stated in his third reply that *space denotes*, *in terms of possibility*, *an order of things that exist at the same time*, *considered as existing together*, *without entering into their particular manners of existing* (Leibniz, 2000). Simply put, Leibniz believed that space was the stage to matters, which were the performers. The stage itself is not of prime importance because without matters, there would be no space since it was void. However, Leibniz did not deny the existence of space, and some of his statement in the third reply to Clarke demonstrated his scientific perspective toward absolute space: *Space is something absolutely uniform*, *and without the things placed in it*, *one point of space absolutely does not differ in any respect whatsoever from another point of space* (Leibniz, 2000). From this statement, Leibnitz inadvertently gave the reason why space should be absolute: the three-dimensional Universe is three-dimensional only because of the three-dimensional matters perceived by humans. At the beginning of the Big Bang, or at the end of the Universe where no three-dimensional matters existed, the space was uniform, absolute, and zero-dimensional.

Leibniz, although a firm non-believer of absolute space, during his debate on absolute space with Clarke, has expressed the core idea of absolute space using scientific language, which represented a significant advance compared to the rational explanation on space from the Axial Age. Regrettably, the debate on absolute space was left unfinished with the passing of Leibniz. With the apparition of the theory of relativity of Einstein, both the relative space and place were now considered absolute space. With the later apparition of the four-dimensional Universe, the factor of time became part of a spatial dimension. However, what they truly described were matters, not space, and definitively not the zero-dimensional space. The same can be said for the M-theory and string-theory.

7. Conclusion

This paper briefly looked at Newtonian and Leibniz's perspective of space and discussed the true form of space, which should be absolute. This work concluded that absolute space should be the objective existence of the Universe. The zero-dimensional Universe is the beginning of all being and the mother to all existence. It has created the myriad things in the Universe and offered the stage for all matters for them to perform their motions and changes.

This paper also explored the conflict between the theory of relativity and quantum mechanics and proposed to unify it from the perspective of the coordinate system of absolute space. It also proposed that the apparent time was only a numerical unit in the calculation of a process. The hidden time was one factor to Intelligent Energy, an intrinsic dynamic to matters. This paper advocated that time should not and cannot be considered as a spatial dimension.

The author hopes that this work could bring another perspective in the search for the Truth of the Universe that differs from the mainstream scientific theory, which encountered some conflicts in unifying the theory of relativity and quantum mechanics. In future works, the author will explore the hypothesis of the zero-dimensional Universe from the perspective of Aristotle and his concept of spatial energy where it is located both inside and outside of matters.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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