M THEORY

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Abstract

Determining the initial indivisible component for all objects existing in the universe can resolve the contradictions among the branches of modern physics. To resolve these contradictions,it is necessary either to study certain particles formed from symbols in multi-dimensional space or to consider them as new manifestations of matter. The completion of theory M can eliminate all contradictions.

Keywords: elementary particles, String theory, Super String theory, multidimensional space, M theory.

It is known that one of the most intriguing questions that captivates people's interest is the issue of how the Universe came into existence and how it took shape. Today, one of the significant problems that scientists are working on is discovering a universal law that can explain the creation of the Universe and every event in it. Scientists' speculations on this matter suggest that various interacting forces played a crucial role during the creation of the Universe. According to these speculations, we can say that to complete the concepts related to the Universe, there must be a general theory. This theory is the String theory. This theory is the first major achievement obtained after Einstein's theory. The String theory is a theoretical framework that combines particle physics with quantum mechanics and Einstein's general relativity. This theory is the first major achievement obtained after Einstein's theory. The String theory is a theoretical framework in particle physics that combines quantum mechanics and Einstein's general theory of relativity. The term "String" is based on the concept that subatomic particles, which are classically described as "point-like particles," can actually exist as "one-dimensional and string-like particles."

To explain the essence of the String theory, let's take a look at some facts. As we know, all objects in the Universe are composed of atoms and molecules. Until recent years, people viewed atoms as the smallest indivisible particles. However, with modern advancements in knowledge, we can say that there are even smaller particles than atoms, known as elementary particles. We perceive the elementary particle at the level of modern knowledge as a particle whose structure or composition cannot be discussed, and it cannot be composed of any other particles. Scientists have discovered these elementary particles by colliding different atomic elements. Currently, there are more than 350 elementary particles known to science, including antiparticles, and all elementary particles are subject to mutual transformations. Elementary particles can be annihilated and recreated. Elementary particles are usually divided into three groups: photons, leptons, and hadrons. The term "hadrons" as mentioned here includes heavy particles relative to the group of elementary particles. The majority of the elementary particles discovered, exceeding 350, belong to the hadron group. As a result of the discovery of numerous hadrons, scientists came to the conclusion that hadrons are composed of other fundamental particles. Thus, in 1964, American physicist M. Gell-Mann proposed the hypothesis that all hadrons are composed of fundamental particles called quarks. According to the M. Gell-Mann theory, there are six quarks and antiquarks, and they are related to each other in various combinations. Quark hypothesis not only helped to understand the composition of known hadrons but also predicted the existence of new hadrons. Accepting the quark hypothesis led to the establishment of a new system for elementary particles [1]. However, numerous experiments did not provide the opportunity to observe quarks in a free state. Scientists attributed this to the relatively large mass of quarks. Thus, the large mass hindered the creation of free quarks in high-energy accelerators. Today, scientists are confident that quarks exist within relatively massive particles, such as hadrons. Einstein's theory of general relativity proposes that the cosmos is not an empty space. The cosmos and time form a continuum and resemble a material. All objects with mass bend this material, creating a dent around the bent material. As a result, smaller mass objects orbit around larger objects. This phenomenon is precisely what we refer to as gravity. Albert Einstein conceived of this material as a multi-dimensional phase. To conceptualize the macrorealm, we often use multi-dimensional phases, as seen in events on a larger scale. The formulation of specific laws to explain such events led Einstein to the conclusion that every event in the universe is subject to specific laws. He deeply believed that God does not play dice, and he thought that it is possible to fully describe the micro-realm with concrete laws.

However, accumulated experiences have greatly perplexed the scholars. When attempting to study microrealms through classical physics laws, a series of problems arise. Let's imagine that on one side, quantum physics exists, and on the other side, classical physics is present. When studied separately, classical and quantum physics give results seamlessly. However, if we try to merge them, significant challenges emerge. It is as if these two perspectives contradict each other." In such a situation, scientists work on creating a bridge between classical and quantum physics. Let's note the possibility of achieving this result. For example, consider irregularity in quantum physics and regularity in classical physics. Let's call it disorder for quantum physics and order for classical physics. In this case, our goal is to find the common ground between these perspectives. It is important to remember that small particles coming together create macroscopic phenomena. Therefore, here, a transition from disorder to order occurs. In other words, disorder turns into order at a certain point.

According to scientists, the greatest discovery in the history of physics is to determine how disorder is converted into order, i.e., the identification of this converter. Briefly, we can say that this converter exists within the atom. That's why I spoke about atoms and discoveries within them in the introductory section. It is highly probable that this converter can manifest itself in photon-electron relationships. We think this way because the radius of an atom is 50-100 thousand times larger than the nucleus. This ratio is a very interesting fact. Also, it is worth noting that the characteristics of waves and particles are significantly different and often reflect each other in various ways. Therefore, contrary to many ideas, it is possible to argue that an electron is neither a particle nor a wave in the way we traditionally understand it [2]. This idea can also be applied to photons. In other words, due to this property, we can consider the electron as a new manifestation form of matter. Here, the electron will occupy an intermediate position between matter and the field. If we view electrons and similar particles as a new manifestation form of matter, some of the existing problems may be resolved.

In response to solving this problem, let's revisit the Theory of Strings. The String Theory suggests that particles can behave as entities with specific properties such as mass and charge, vibrating at certain frequencies. In 1980, physicists understood that the String Theory has the potential to unify all types of matter in the universe with the four fundamental forces through a quantum mechanical model. Exactly, the sought-after elementary particle must simultaneously unify the manifestations of matter as both particles and fields. Determining this particle has the potential to eliminate existing problems. Accordingly, it is noted that all objects are composed of energy wires (or strings) vibrating at the deepest level. These strings vibrate in different shapes, giving rise to different particles. The dimensions of these strings are so small that the ratio of a single string to an atom is equivalent to an atom's ratio to the entire solar system.

In essence, we can say that the Universe has emerged from vibrating energy strings in various forms. Different vibrations give rise to different particles, different particles form different atoms, and different atoms reveal the richness present in the Universe. Observing these tiny particles directly is not possible, but by understanding their influence fields, we can comprehend their existence. From a logical standpoint, strings can explain the manifestations of matter as both particle and field. When strings vibrate, they bring about the field, and when they interact, they give rise to particles. The different vibrations of these energy strings give rise to mutual interaction forces. Moving from strings to particles and beyond, various interaction transitions occur, such as weak nuclear force, strong nuclear force, electromagnetic force, and gravitational force. However, these transitions, especially in the case of the gravitational field, do not fully conform to the expected conditions. We can clarify the reason for this by considering the idea, as suggested by Albert Einstein, of explaining the gravitational field with a multi-dimensional space. On the other hand, we mentioned that strings combine to form quarks. However, stating that this theory is entirely correct would not be accurate since leptons, unlike quarks, are not composed of strings. In this case, determining the intermediate stage between strings and quarks becomes necessary. That is, if this stage exists, then hadrons emerge; if not, then leptons come into play. It is worth noting that since strings incorporate the concept of fields within themselves and, as mentioned earlier, the gravitational field is explained with a scalar field involving a large scale space, it may be conceivable that these strings cannot be accurately represented with a 3-dimensional space on their own. We can only describe the most probable region of existence for particles with a 3-dimensional space. As anticipated, attempts to study the microlife with a 3-dimensional space ended in failure. It became evident that a 10-dimensional space is required to describe particles of such small scale. Consequently, the String Theory later changed its name to the "Super String Theory." We know that the concept of trajectories does not apply to the microlife. However, this issue arises when trying to study the microlife with a 3-dimensional space. We believe that when particles are brought into a 10-dimensional space, they will move according to certain laws of regularity. Nevertheless, we do not know specifically which dimensional space to utilize.

According to the words of Michio Kaku, a Japanese-American physicist, when transitioning from multi-dimensional spaces to a 12-dimensional space, peculiar results are obtained. In the 12-dimensional space, two different concepts of time emerge. In the 13th space, the discussions become somewhat meaningless. Therefore, as a limit, the 11-dimensional space is considered. The transition from the "Super String Theory" to the "M Theory" occurred because of the use of the 11-dimensional space. Here, "M" is employed in magical and main meanings.

As we can see, to address the fundamental problems of modern physics, it is necessary to explain events in a sequential manner, starting from elementary particles. The main goal in the study of the M Theory is to answer the question: What is the simplest, elementary, indivisible particle present in the Universe? If, as we have mentioned, everything arises from a single particle, and if we can prove this, we can determine the most fundamental reasons for the occurrence of all events. As a result, the contradictions among the branches of physics are eliminated. Most importantly, it opens up the possibility of fully understanding how the Universe was created, how it formed, etc. In this regard, we can say that the M Theory is the theory of everything.

References:

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