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Law of Creation and Grand Unification Theory

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The understanding about the creation of our universe is explored in many philosophies, natural sciences, religions, ideologies, traditions and many other disciplines. Currently, natural science cannot answer this question at the most fundamental level. In this work, based on the ancient Chinese Tao wisdom about creation, we propose the Law of Tao Yin–Yang Creation. This law states that everything is created from emptiness through yin–yang interaction. Yin and yang are the two basic elements that make up everything. Yin and yang are opposite, relative, co-created, inseparable and co-dependent. The Law of Tao Yin–Yang Creation gives us a deeper insight about space and time. We propose that space and time are two basic measurements we conduct. Time relates to the measurement of movement and change. Space relates to the measurement of stillness and solidity. Space and time are a yin–yang pair. Interaction of two fundamental yin–yang pairs, the space and time yin–yang pair and the inclusion and exclusion duality pair, create our universe. We demonstrate that from this insight, one can derive string theory, superstring or M-theory and the universal wave function interpretation of string theory. We suggest that the Law of Tao Yin–Yang Creation presents the exact process how "it from bit" and it could be the fundamental principle leading to the grand unification theory and the theory of everything.

Keywords: Space; time; law of creation; Law of Tao Yin–Yang Creation; creation of universe; string theory; Tao wisdom; quantum physics; measurement theory; yin–yang; manifestation; grand unification theory; theory of everything.

1. Introduction

A law of creation is sought in many disciplines including sciences, philosophies, ideologies and religions. Current cosmology suggests that the creation of our universe

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is through a "big bang". However, the natural law that has led to the big bang remains unknown until now.

Wheeler proposed[1–3] the idea "It from Bit". He suggested that information sits at the core of physics, and every "it", whether a particle or field, derives its existence from observations. To show how everything comes to existence through observation, Wheeler acknowledged[3] that time played an essential role, but this is not understood well enough.

The Grand Unification Theory is an attempt to use one mathematical formula to explain everything, including all elementary particles, fundamental forces, dark matter, dark energy, the large structure of the universe and to unify quantum physics with Einstein's general relativity theory about gravity. So far, string theory is the only mathematically consistent theory that can unify everything.[4,5] However, string theory is limited in its ability to make predictions. Something is still missing in current string theory.

Tao Wisdom is ancient Chinese wisdom with more than 5000 years of written history. In the authority book of Tao wisdom, Tao De Jing, Lao Tze revealed the natural law of creation: Tao Sheng Yi, Yi Sheng Er, Er Sheng San, San Sheng Wan Wu. As used here, Tao means the source of everything. Sheng means create. Yi, Er and San mean one, two and three, respectively. Wan Wu means everything. This statement literally means that Tao creates one, one creates two, two creates three and three creates everything. This is the ancient Tao wisdom about the process of creation.

In our previous work,[6] we derived the space–time uncertainty relation. From this relation, we proposed a universal wave function interpretation of string theory (UWFIST), which indicates that string theory can be interpreted as calculating the evolution of the universal wave function driven by string action. With this insight, we are able to calculate dark energy and the cosmological constant using the age of the universe and the fundamental constants $\hbar$, G and c. Our result agrees with observations obtained in cosmology and astrophysics. We further showed[7] that from this new interpretation of string theory, UWFIST, one can derive the energy source that can explain the inflation and the current accelerated expansion of our universe. In another work,[8] we showed that UWFIST can explain the observed large-scale anisotropies, non-Gaussian distributions and anomalous alignments of the quadrupole and octupole modes in the microwave background. We also showed[9] that UWFIST provides a way to derive a mathematical expression of the multiverse. It can explain why our observed universe is a projection from a hologram and how the observed laws of physics are the result of the fact that our universe is a hologram. In a recent paper,[10] we demonstrated that it is possible to derive the rotation curve, and therefore dark matter, from UWFIST.

In this paper, we propose a law of creation, the Law of Tao Yin–Yang Creation, based on ancient Tao wisdom. This law of creation tells us that emptiness is the source of everything. Everything is created from emptiness through the interaction of two fundamental elements, yin and yang. Yin and yang are two core elements within everything. They are opposite, relative, co-created, inseparable and co-dependent.

We show that space and time are a yin–yang pair. Their interaction creates our universe. We will show that with this understanding, we can use the Law of Tao Yin–Yang Creation to derive string theory, M-theory, and the UWFIST.

2. The Law of Tao Yin and Yang Creation

Based on ancient Tao wisdom, we propose the Law of Tao Yin–Yang Creation as follows.

Tao, the emptiness, is source of everything. Yin–Yang are the two basic elements of everything. Yin and yang elements are opposite, relative, co-created, inseparable and co-dependent. The interaction of yin and yang creates everything. It is the cause of all change.

The Law of Tao Yin–Yang Creation includes the following three important points:

(1) Tao, the source of everything, is emptiness

This is a profound spiritual wisdom known in many spiritual traditions. It is interesting that quantum physics can help us understand it scientifically. In quantum physics, everything is described by a wave function. If we try to calculate the wave function of emptiness, we find that wave function of emptiness is infinite. This basically means that Tao, the emptiness, contains infinite possibilities (information), energy and matter. Tao consists of everything.

(2) Everything, including every measurement, consists of two basic elements: Yin and yang

The relation between yin and yang consists of four aspects:

- Yin and yang are opposite;
- Yin and yang are relative;
- Yin and yang are co-created;
- Yin and yang are inseparable and co-dependent.

The wisdom about yin and yang is based on the observation of a basic natural law that everything has two sides, or two aspects, or two elements. For example, the up and the down parts are two aspects or elements within everything. They are opposite. They are relative because the up part for someone could be the down part for others. They are co-created because when we say some part is up, we are comparing it with the part we think is down. They are inseparable and co-dependent because there cannot be the up part without the down part and there cannot be the down part without the up part.

(3) The interaction of yin and yang creates everything and is the cause of all change

This is the core of the Law of Tao Yin–Yang Creation. We give one example in physics that illustrates this. For instance, in quantum mechanics, everything is described by a wave function, Ψ. The Hamiltonian H and time t are a pair of yin

and yang. The interaction of Hamiltonian H and time t brings change to a system, which can be calculated through the formula:

$$\Psi(t) = e^{i\mathrm{H}t/h}\Psi(0).$$

It is interesting to note that one bit of information consists of two elements. They are a pair of yin–yang. Law of Tao Yin–Yang Creation basically tells us how the "bit" creates "it". In the following, we will explore how our universe is created according to this law.

3. The Creation of the Universe

We propose that space and time are one of the fundamental yin–yang elements and that their interaction creates our universe.

From the quantum physics point of view, the universe we observe is determined by our measurement. We propose that space and time are two basic measurements we conduct. Time relates to the measurement of movement and change. Space relates to the measurement of stillness and solidity. For instance, the measurement of the movement of sand in an hourglass and the movements of the sun and the moon have all been used as a measurement of time. The duration of a day is based on the measurement of the rotation of the earth around its axis. The measurements of space, such as the length, height and width of an object, are the measurement of its unchangedness and stillness.

Space and time are a yin–yang pair. Space and time are opposite and relative. Change and stillness are opposites. They are relative because something may appear to be a change to you but to be still to others. Albert Einstein's relativity theory proves to us that space and time are relative. Space and time are co-created because whenever we measure change, we are referring to something unchanged. Whenever we measure something as unchanged, we are comparing with something you consider changing. Therefore, space and time are inseparable and co-dependent.

We propose that inclusion and exclusion are another yin–yang pair that is our basic measurement. All measurements are based on these two basic yin–yang pairs: Space–time measurement and inclusive–exclusive measurement. For instance, the measurement of velocity, acceleration, energy, momentum, temperature, spin, electricity, magnetic, mass, charge, force, mass and more are all variations of space and time measurement and of inclusive and exclusive measurement. Since quantum physics tells us that our measurement determines our observation, which in this case is the observed universe, we can therefore conclude and propose that these two yin–yang pairs are the two fundamental yin–yang pairs whose interaction creates all of the phenomena in our universe.

4. The Derivation of the Wave Function of the Universe

According to the Law of Tao Yin Yang Creation, the interaction of yin–yang elements creates everything. To see how the interaction of these two yin–yang pairs

creates our universe, we need to write down the action created by the interaction of these two yin–yang pairs. In physics, action is an attribute of the dynamics of a physical system from which the equations of motion and wave function of a system can be derived.

The simplest action created by the interaction of the space–time yin–yang pair is

$$A_1 = \alpha \int \Delta\tau \Delta\sigma. \tag{1}$$

Here, the symbol σ represents space and the symbol τ represents time. $\Delta\sigma$ and $\Delta\tau$ represent the space and time duration to be measured. The symbol $\int$ represents the summation over space and time from the beginning $\tau = 0$ and $\sigma = 0$ till now $\tau = T$ and $\sigma = L$, with T being the age of our universe and L the length of horizon of the universe. And α is a constant. In,[6] we find that

$$\alpha = 1/(l_p t_p). \tag{2}$$

Here, t_p is the Planck time and l_p is the Planck length.

To introduce the second yin–yang pair into action, it is important to realize that corresponding to the inclusion and exclusion yin–yang pair, in nature, there exist two types of particles: Fermions and bosons. Fermions have half (1/2) spin. They repel each other. They refuse to be in the same state. Bosons have integer spin. They tend to clump. The normal time and space coordinates τ and σ are of bosonic nature. If we assume that each space or time coordinate has both the fermion (yang, repulsive) and boson (yin, clumping) parts, each time and space coordinate become two elements:

$$\tau \rightarrow (\tau, \theta_\tau), \tag{3}$$

$$\sigma \rightarrow (\sigma, \theta_\sigma). \tag{4}$$

Here, we use θ_σ and θ_τ to represent the fermion partner of space and time coordinates σ and τ. θ_σ and θ_τ can only take on the value of 0 or 1 because they are repulsive and refuse to stay at the same place with another element. The terms σ, τ, θ_σ and θ_τ represent the four elements of the two yin–yang pairs, the space–time yin–yang pair and the inclusion–exclusion yin–yang pair.

The simplest action created by these two yin–yang pairs is

$$A_2 = \alpha \int \Delta\tau \Delta\sigma \Delta\theta_\tau \Delta\theta_\sigma. \tag{5}$$

The symbol $\int$ represents the summation over space σ and time τ and θ_τ and θ_σ.

It is interesting to see that action A_1 is basically the action that creates string theory and action A_2 is the action that basically creates the superstring theory or M-theory. It is interesting to see that from the Law of Tao Yin–Yang Creation, we can derive string theory and M-theory.

There is one difference between the string action derived here and the usual string action. Actions A_1 and A_2 sum over the life span and horizon of our universe while

the current string theory and superstring theory set the length of the string at the Planck scale l_p and they set the time to the infinity.

In quantum physics, everything is mathematically represented by a wave function. One can calculate the wave function of our universe using Feynman's path integral formulation of quantum physics.[11] According to this method, the wave function created by action A_2 is of the form

$$\Psi = \sum_{\text{sum over all possible paths}} C \exp(i\alpha A_2). \tag{6}$$

Here, C is a constant. The symbol $\sum$ is to sum over all possible paths. We call Eq. (6) the universal wave function formulation of string theory.

In our previous work,[6–10] we have also shown that UWFIST has the potential to derive the dark matter, dark energy, inflation and the large structure of our universe consistent with observation. In another work,[9] we show that from UWFIST, one can derive the equations of motion regarding electromagnetic force, other gauge interactions, and gravity by requiring Weyl invariance. In this way, quantum physics and general relativity are integrated into one unified mathematical framework.

We therefore conclude that the Law of Tao Yin–Yang Creation can show us how our universe, basic laws of physics, and everything in the universe, are created. It has the potential to lead to the grand unification theory we seek.

5. Conclusion

In this work, we propose the Law of Tao Yin–Yang Creation, which states that everything is created through yin–yang interaction from emptiness. Yin and yang are two basic elements that make up everything. They are opposite, relative, co-created, inseparable and co-dependent. One bit of information is a pair of yin–yang. This law of creation basically tells us how information creates everything. It describes specifically how "it from bit". We propose that space and time are a yin–yang pair. Space and time are two basic measurements we conduct. Time relates to the measurement of movement and change. Space relates to the measurement of stillness and solidity. We suggest and demonstrate mathematically that our universe is manifested from the emptiness through the interaction of two yin–yang pairs: The space and time yin–yang pair and the inclusion and exclusion yin–yang pair.

The Law of Tao Yin–Yang Creation proposed here gives us a new and deeper insight about space and time. Space and time are the basic actions and codes that manifest our universe. We find that the Law of Tao Yin–Yang Creation is not only the fundamental law and principle from which other physics theories, laws, elementary particles, fundamental forces and phenomena are created, it can also address how every aspect of our lives is created. We will explore this further in our future work.

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