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The Truth of String Theory

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[Abstract]

Standard Model is a mathematical model of subatomic particles complying with Quantum Field Theory and Yang Mills Non-Abelian Symmetry. Standard Model contains interactions with three Basic Forces including Quantum Electrodynamics for electromagnetic interaction, Quantum Electroweak Theory for both electromagnetic and weak interactions, and Quantum Chromodynamics for strong interaction, except Quantum Gravity Theory for gravitational interaction. Quantum Gravity Theory is based on point particles and Newton's Universal Gravitation (a directional long-range force with energy inversely proportional to distance) which results in two major mathematical problems, infinitive numbers of solutions and non-renormalization. Therefore, String Theory based on string particles is proposed to solve these problems by reducing the infinite numbers of solutions with resonance and constraining them into various dimensions.

Recently a mathematical model based on S-matrix bootstrap with ultrasoftness and minimal zeros has proved the inevitability of String Theory. In addition, a physical model of subatomic particles with string structures composed of Wu's Pairs based on Yangton and Yington Theory has also established successfully in simulation of String Theory. According to Yangton and Yington Theory, Wu's Pairs, a pair of superfine Yangton and Yington antimatter particles, with built-in inter-attractive Force of Creation circulating against each other on an orbit, are considered as the building blocks of all matters in the universe. Basic String Structures are composed of Wu's Pairs bonded together by String Forces, which are equivalent to Elementary Subatomic Particles in Standard Model. Also, Compound String Structures are composed of Basic String Structures bonded together by Alternating String Forces, which are equivalent to Composite Subatomic Particles bonded together by Four Basic Forces in Standard Model.

Even the string particles in String Theory comply nicely with the Basic String Structures and Compound String Structures composed of Wu's Pairs in Yangton and Yington Theory. Also, as shown in this paper, 11 dimensions in M-Theory can be interpreted as high graviton packing density planes. String Theory is incompatible with Unified Field Theory, simply because String Theory has a directional remote long-range force (Newton Universal Gravitation) carrying energy inversely proportional to distance. It is fundamentally different from Quantum Field Theory which has a short-range force carrying energy in normal distribution. Therefore, String Theory cannot completely fulfill Unified Field Theory.

However, a modified Quantum Gravity Theory having linear shaped string structures with mirror symmetry and short-range force with energy in normal distribution, could be more compatible with Quantum Field Theory, and such that Unified Field Theory can be fulfilled. Furthermore, according to Yangton and Yington Theory, a true Unified Field Theory based on Force of Creation can be realized.

[Keywords]

String Theory, M-Theory, Subatomic Particles, Four Basic Forces, Standard Model, Quantum Field Theory, Yang Mills Non-Abelian Symmetry, Quantum Gravity Theory, Gravitational Force, Electrodynamics, Electroweak, Chromodynamics, Unified Field Theory, Yangton and Yington, Wu's Pairs, String Force, String Structure.

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I. Subatomic Particles and Quantum Field Theory

Subatomic particles [1] are the components of atoms. Due to their extremely small size, they cannot be observed directly by any state-of-the-art equipment. Thus, Quantum Field Theory [2] that "The universe is made of a

variety of fields, with particles considered as a surge of fields" is proposed to solve this problem. Standard Model is a mathematical model of subatomic particles complying with Quantum Field Theory and Yang Mills Non-Abelian Symmetry [3], which has successfully attained some important properties of subatomic particles such as charges, spins and masses. Standard Model contains interactions with three Basic Forces including Quantum Electrodynamics [4] for electromagnetic interaction, Quantum Electroweak Theory [5] for both electromagnetic and weak interactions, and Quantum Chromodynamics [6] for strong interaction, except Quantum Gravity Theory for gravitational interaction. Quantum Gravity Theory is based on point particles and Newton's Universal Gravitation (a directional long-range force with energy inversely proportional to distance) which results in two major mathematical problems, infinitive numbers of solutions and non-renormalization. Therefore, String Theory based on string particles is proposed to solve these problems by reducing the infinite numbers of solutions with resonance and constraining them into various dimensions. It has indicated so far, some success in reducing the numbers of solutions, but the multiple dimensions issue has raised a big challenge to the reality of String Theory.

II. Standard Model

Standard Model [1] is a group of elementary subatomic particles which is derived from a mathematical model complying with Quantum Field Theory [2] and Yang Mills Non-Abelian Symmetry [3]. There are two types of subatomic particles: (1) elementary particles, which according to current theories are not made of other particles, and (2) composite particles which are composed of elementary particles. Particle physics and nuclear physics study these particles and how they interact.

The elementary particles of the Standard Model (Fig.1) include:

1. Six flavors of quarks: up, down, bottom, top, strange, and charm.
2. Six types of leptons: electron, electron neutrino, muon, muon neutrino, tau, tau neutrino.
3. Twelve Gauge Bosons (force carriers): the photon of electromagnetism, the three W and Z Bosons of the weak force, and the eight gluons of the strong force.
4. The Higgs Boson.

Various extensions of the Standard Model predict the existence of an elementary Graviton particle and many other elementary particles.

Composite subatomic particles such as protons or atomic nuclei are bound states of two or more elementary particles. For example, a proton is made of two up quarks and one down quark, a neutron is made of two down quarks and one up quark, while the atomic nucleus of Helium-4 is composed of two protons and two neutrons.

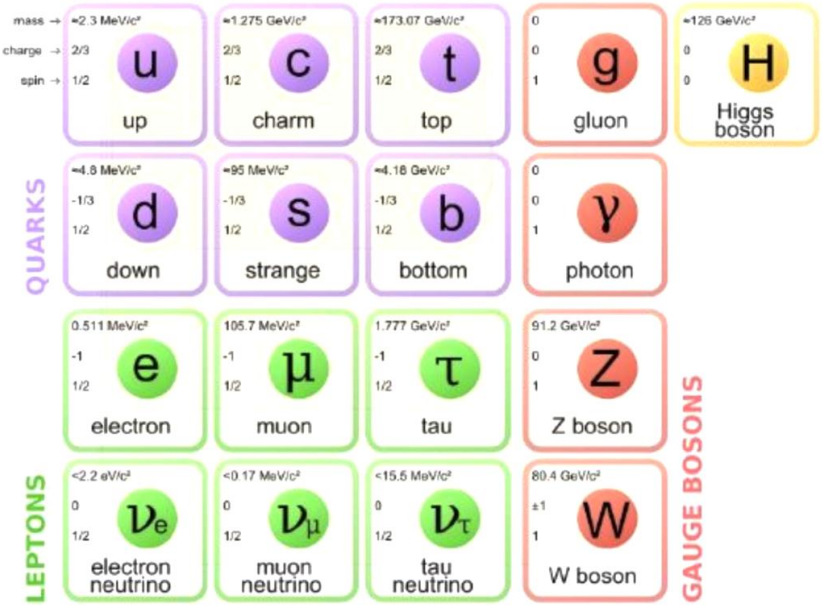


Fig. 1 The elementary particles of the Standard Model.

III. Quantum Gravity Theory

To be compatible with Quantum Electrodynamics (QED) for electromagnetic interaction, Quantum Electroweak Theory (QEW) for both electromagnetic and weak interactions, and Quantum Chromodynamics (QCD) for strong interaction, as well as to fulfill Unified Field Theory (UFT), theoretical physicists have tried in the past few decades to develop a "Quantum Gravity Theory" (QGT) for gravitational interaction (graviton and gravitational force) in accordance with Quantum Field Theory based on point particles with energy in normal distribution, and Newton's Universal Gravitation complying with General Relativity.

According to Yangton and Yington Theory, gravitons are string particles having linear shaped string structures. It is different from other elementary subatomic particles in Quantum Field Theory which are point particles having point shaped string structures. In addition, according to Yangton and Yington Theory, gravitational force is composed of a group of Alternating String Forces (revised from [7][8]) in adjustable circulations between two adjacent gravitons in the same object, which is a short-range force carrying energy in normal distribution. It is also different from Newton's Universal Gravitation which is the total amount of the short-range gravitational forces generated between the resident gravitons on target object and the incident gravitons from parent object at a distance based on Graviton Radiation and Contact Interaction Theory. Newton's Universal Gravitation is a directional long-range remote gravitational force carrying energy inversely proportional to distance between the two objects.

Electromagnetic force, weak force and strong force are all short-range forces carrying energies in normal distributions. They are perturbatively renormalizable, meaning that infinite numbers of independent parameters produced by perturbation can be reduced to finite numbers of parameters through normalization, such that reasonable solutions can be achieved, and elementary subatomic particles can be predicted by the corresponding quantum field theories. However, Newton's Universal Gravitation is a directional long-range remote gravitational force carrying energy inversely proportional to distance from the graviton. It is perturbatively nonrenormalizable [9][10] which results in irreducible infinitive numbers of independent parameters. Thus, no sensible solution can be obtained, and no graviton can be predicted by Quantum Gravity Theory [11].

As a result, the mathematical model of Quantum Gravity Theory is based on point particles (point shaped string structure) and Newton's Universal Gravitation as a directional long-range force carrying energies inversely proportional to distance. There are two major problems in this mathematical model, infinitive numbers of solutions and non-renormalization. Because of this reason, String Theory [12] based on string particles is proposed to solve these problems.

IV. String Theory

To solve the problems of Quantum Gravity Theory, String Theory [12] based on string particles instead of point particles is proposed. Gravitons with string structures having resonance nature can help to reduce the infinitive numbers of solutions. As to non-renormalization, extra dimensions such as Calabi-Yau Manifold (Fig. 2) [13] are implemented to increase the symmetry and to compact the numbers of solutions. However, these unimaginable multi-dimensional approaches such as M-Theory with 11 dimensions have raised a big challenge to the reality of String Theory.

Recently a breakthrough mathematical model [14] based on S-matrix bootstrap with ultrasoftness and minimal zeros, has proved the inevitability of String Theory. In addition, a physical model of subatomic particles with string structures composed of Wu's Pairs based on Yangton and Yington Theory [14] has also established successfully in simulation and interpretation of String Theory [15].

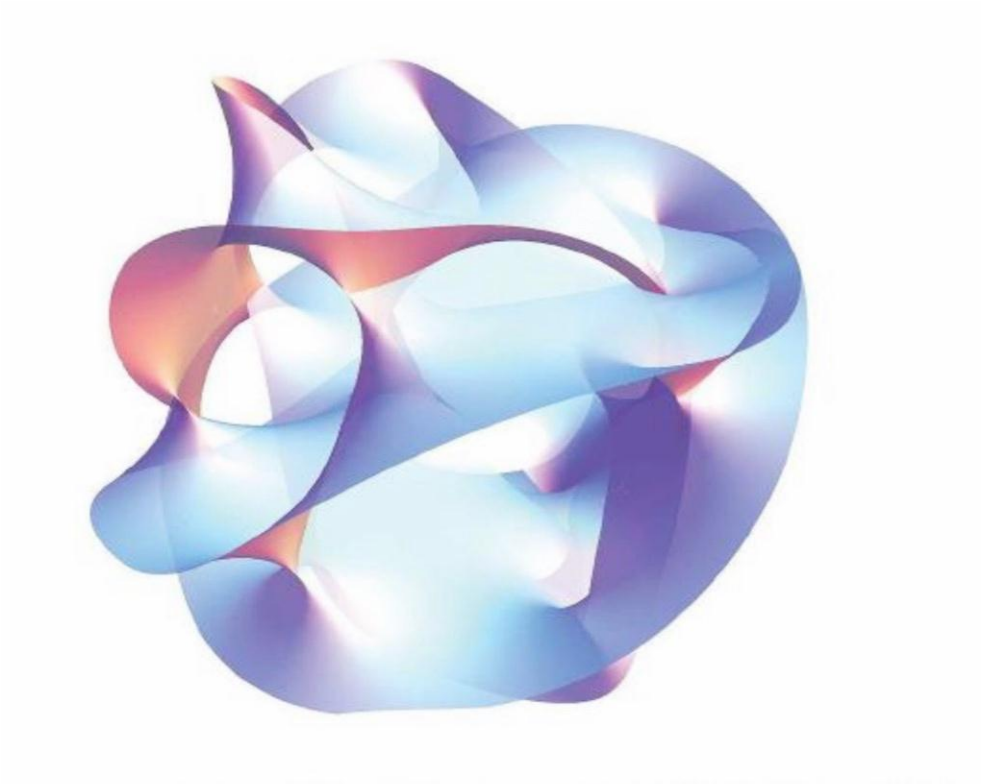


Fig. 2 A cross section of a quintic Calabi-Yau manifold.

V. Yangton and Yington Theory

Yangton and Yington Theory [14] is a hypothetical theory based on a pair of superfine Yangton and Yington antimatter particles with built-in inter-attractive Force of Creation circulating against each other on an orbit. These pairs of Yangton and Yington circulating particles are named "Wu's Pairs" which is considered as the building blocks of all matters in the universe (Fig. 3).

Yangton and Yington Theory can explain that elementary subatomic particles such as quarks, electrons, neutrinos, gluons, photons and gravitons are basic string structures composed of Wu's Pairs with String Forces. It complies very well with Quantum Field Theory and String Theory. In addition, Four Basic Forces including electromagnetic, weak, strong and gravitational forces are made of String Forces induced from Force of Creation. It agrees with Unified Field Theory [16].

Furthermore, Yangton and Yington Theory can bridge Quantum Theory with General Relativity [17], also interprets and correlates space, time, energy and matter in the universe. Therefore, it is believed that Yangton and Yington Theory is not only a Unified Field Theory but also a theory of everything.

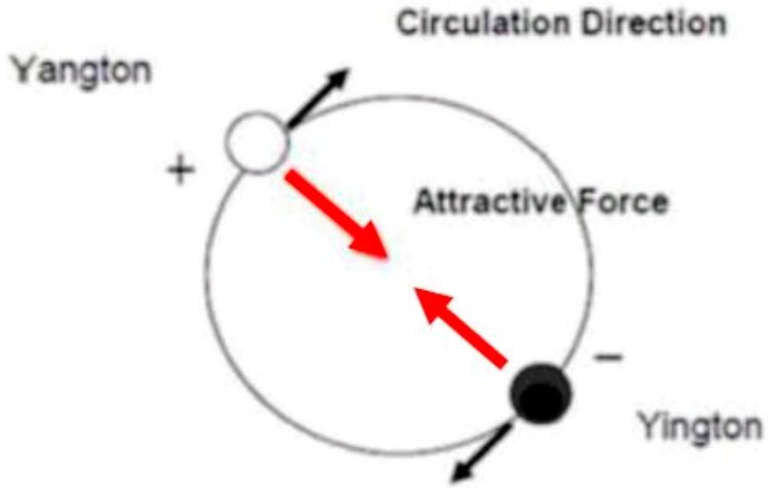


Fig. 3 Wu's Pair - a Yangton and Yington circulating pair.

VI. String Structures Composed of Wu's Pairs

Could String Theory be true? Are all particles made of strings? Physicists have absolutely no idea what kind of string structures quarks, electrons and photons are. However, based on Yangton and Yington Theory, all subatomic particles should have a string structure is not only possible, but also quite obvious.

According to Yangton and Yington Theory, Wu's Pairs [14] is a pair of superfine Yangton and Yington antimatter particles with built-in inter-attractive Force of Creation circulating against each other on an orbit. They are the Building Blocks (God's Particles) of all matters in the universe. When two Wu's Pairs come together in the same circulation direction (both spin-up or spin-down), they can stack up on each other at a locked-in position, where Yangton of the first Wu's Pair lines up to the Yington of the second one due to the attractive force between Yangton and Yington particles. This force induced from Force of Creation, is generated between the two stacking Wu's Pairs in the same circulation direction. It is called "String Force". However, there is no interaction between two Wu's Pairs that stack in opposite circulation directions due to the cancellations of the alternative attraction and repulsion forces between the two Wu's Pairs. By repeating these stacking processes, strings (such as gravitons), balls (such as electrons and positrons) and other shaped string structures can be made of Wu's Pairs with string forces. These are called "Basic String Structures" (equivalent to Elementary Subatomic Particles in Standard Model) (Fig. 4) [14].

Furthermore, "Compound String Structures" (equivalent to Composite Subatomic Particles in Standard Model) can be made of Basic String Structures (Elementary Subatomic Particles) with a group of Alternating String Forces (equivalent to Four Basic Forces) in adjustable circulations between two adjacent particles, such as neutrons and protons with ring structures (Compound String Structures) composed of Quarks and Gluons (Basic String Structures). As a result, all these string structures including basic string structures and compound string structures comply nicely with "String Theory".

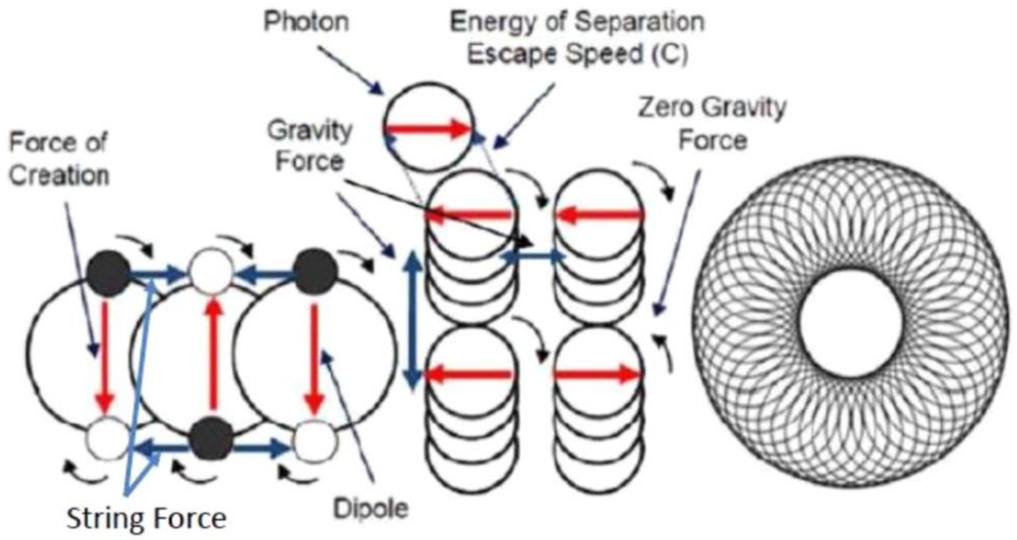


Fig. 4 Wu's Pairs stack up in a preferred direction by string force to form string and ring structures.

VII. Compatibility Between Quantum Field Theory and Yangton and Yington Theory

According to Quantum Field Theory, it is assumed that "The universe is made of a variety of fields, with particles considered as a surge of fields". This is equivalent to the proposal based on Yangton and Yington Theory that "The universe is composed of the fields made of Alternating String Forces (Four Basic Forces) induced from Force of Creation, with particles (basic string structures) considered as a stream of fields".

Despite the difference between point particles and string particles, which makes no difference to short-range forces with energy in normal distribution. All elementary subatomic particles predicted in Standard Model based on Quantum Field Theory and Yang Mills Theory, should have a counterpart in Basic String Structures composed of Wu's Pairs that can interact with the corresponding electromagnetic force, weak force, strong force and gravitational force composed of Alternating String Forces induced from Force of Creation based on Yangton and Yington Theory. For example, graviton with linear shaped string structure carrying gravitational force [15], electron and positron with ball shaped string structure carrying electromagnetic force [15], quarks with three threads string structure [17] and gluons with twist string structure carrying strong force [17] and W Bosons with plate shaped string structure carrying weak force [15]. In addition, the charges and colors of quarks [17], as well as the symmetries of gluons [17] derived from Standard Model can also be interpreted by the arrangements of string structures composed of Wu's Pairs based on Yangton and Yington Theory.

Furthermore, Quantum Gravity Theory complying with point particles and Newton's Universal Gravitation has long-range force with energy inversely proportional to distance. It is incompatible with Quantum Field Theory which has point shaped string structures and short-range force with energy in normal distribution, because of the infinitive numbers of solutions and non-renormalization. It is also incompatible with Yangton and Yington Theory which has linear shaped string structures and short-range force composed of Alternating String Forces with energy in normal distribution.

As a result, Standard Model complying with Quantum Field Theory can be considered as a blueprint of String Structures based on Yangton and Yington Theory. Or in other words, String Structures based on Yangton and Yington Theory can serve as a physical model to prove Standard Model complying with Quantum Field Theory.

VIII. Compatibility Between Subatomic Particles and String Structures

According to Yangton and Yington Theory, all elementary subatomic particles in Standard Model including quarks, leptons, Gauge Bosons, gluons, photon, Higgs Boson and Graviton, have Basic String Structures composed of Wu's Pairs, the building blocks of all matters in the universe (Fig. 5), bonded together by string forces induced from Force of Creation (Fig. 4). In addition, all composite subatomic particles in Standard Model including neutron and proton, have Compound String Structures made of elementary subatomic particles (Basic String Structures) bonded together by four basic forces (Fig. 5) including gravitational force, electromagnetic force, weak force and strong force composed of Alternating String Forces induced from Force of Creation.

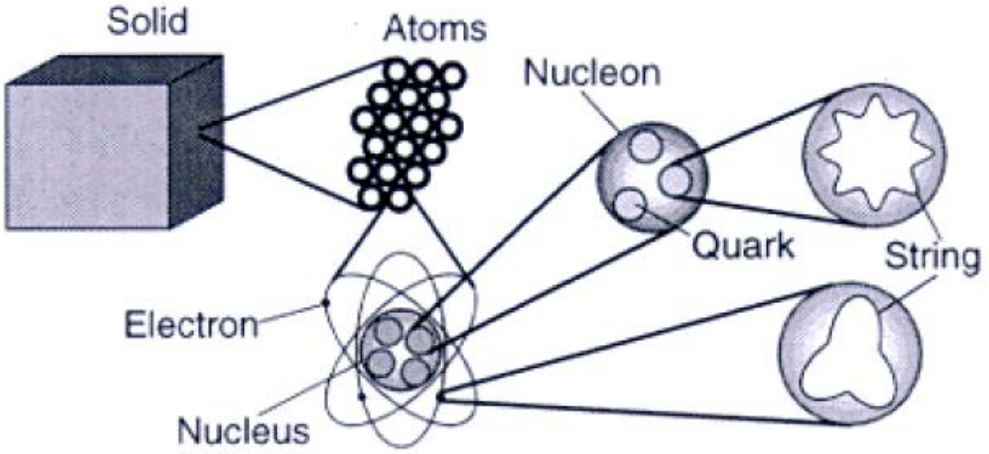


Fig. 5 Subatomic particles made of string structures.

More specifically, in compliance with Standard Model, Elementary Subatomic Particles could have Basic String Structures in a variety of shapes composed of Wu's Pairs bonded together by String Forces as follows:

1. Graviton – linear shaped string structure [15].
2. Quark – three threads shaped string structure [17].
3. Electron & Positron – ball shaped string structure [15].
4. Gluon – twist shaped string structure [17].
5. Neutrino – plate shaped string structure [15].
6. Photon (free Wu's Pair) – point particle, an exception of string structures [15].

Also, Composite Subatomic Particles (Compound String Structures) composed of Elementary Subatomic Particles (Basic String Structures) bonded together by four basic forces composed of Alternating String Forces could have structures as follows:

1. Neutron contains 3 quarks (udd) and 3 gluons bonded together by strong forces [15].
2. Proton contains 3 quarks (uud) and 3 gluons bonded together by strong forces [15].
3. Proton contains Neutron, Positron and Electron Neutrino bonded together by weak forces (Inverse Beta Decay) [15].
4. Neutron and Neutron pair bonded together by strong force [15].

5. Neutron and Proton pair bonded together by weak force and strong force [15].

6. Graviton and Graviton pair bonded together by gravitational force [15].

7. Electron and Electron, Positron and Positron, Electron and Positron pairs bonded together by electromagnetic force [15].

8. Gluon and close packed Quarks bonded together by strong forces [18].

According to Standard Model, W^+, W^- and Z bosons have large masses which can be converted to energy during particle transformation process. However, complying with Yangton and Yington Theory, they are considered as particle and force composites containing elementary subatomic particles with four basic forces. For example, W^+ boson contains positron and electron neutrino with weak force, W^- boson contains electron and electron antineutrino with weak force, and Z boson contains neutrinos with week force.

9. Discrepancies Between Standard Model and Basic String Structures

Despite the similarity, there are several discrepancies between Standard Model and basic string structures:

1. Graviton is unpredictable in Standard Model because of the incompatibilities between Quantum Field Theory and Newton's Universal Gravitation due to the infinite numbers of solutions and non-renormalization. However, according to Yangton and Yington Theory, gravitons have variable sizes and flexible linear shaped string structures which can be structured by Wu's Pairs and String Forces. Because gravitational force is insignificant compared to other three basic forces, graviton with short-range gravitational force cannot be easily detected by high energy LHC.

2. Photon and gluons have zero mass in Standard Model, which could mean that either they do not have string structures or there is no string force in their structures. In contrast, according to Yangton and Yington Theory, all elementary subatomic particles including photon and gluons should have its mass equal to the amount of Wu's Pairs in the particle times Wu Unit Mass (m_{yy}). For example, photons as a free Wu's Pair in space should have a mass equal to One Wu Unit Mass and Gluon should have a mass equal to the amount of Wu's Pairs in the Gluon times Wu Unit Mass.

3. In Standard Model, W^+, W^- and Z bosons have large masses which can be converted to energy during particle transformation process. But in Yangton and Yington Theory, they are considered as the composites of particles and forces containing elementary subatomic particles with four basic forces. For example, W^+ boson contains one positron and one electron neutrino with weak force, W^- boson contains one electron and one electron antineutrino with weak force, and Z boson contains neutrino and anti-neutrino pair with week force.

4. Higgs Boson is the force carrier of string force and Higgs Field is the distribution of Higgs Bosons (string forces) in space. They are fundamentally different from Wu's Pairs and the distribution of Wu's Pairs (mass) in space, simply because the amount of Wu's Pairs is always one piece more than that of the string forces (Higgs Bosons) in a single string structure. However, for a string structure composed of a large number of Wu's Pairs, the amount of Wu's Pairs becomes equal to that of the Higgs Bosons (string forces). Therefore, mass can be defined either by the amount of Wu's Pairs based on Yangton and Yington Theory or the amount of Higgs Bosons based Higgs Field Theory.

Furthermore, it is believed that 125 Gev as the energy of Higgs Boson found earlier in LHC [19] could be the energy of String Force between two adjacent Wu's Pairs in the same object. This means that Higgs Bosons are the carriers of String Forces, or even they are Wu's Pairs themself. Also, 4.8 Tev recently discovered in LHC by Google AI, which does not fit within the Standard Model, could be the energy produced by Force of Creation between Yangton and Yington particles inside Wu's Pairs [20].

As a result, all the above discrepancies between Elementary Subatomic Particles in Standard Model based on Quantum Field Theory, and Basic String Structures composed of Wu's Pairs based on Yangton and Yington Theory are mainly due to the insufficient mathematical models of Quantum Field Theory applied on Standard Model rather than the physical models of Basic String Structures composed of Wu's Pairs based on Yangton and Yington Theory.

IX. Unified Field Theory

Physicists believe that all matters are made of fields. Therefore, they intend to develop a "Unified Field Theory" [16] to explain that all subatomic particles and four basic forces are made of one unified quantum field. So far, there has been little success in Quantum Gravity Theory due to the incompatibility between Quantum Field Theory and Newton Universal Gravitation (or General Relativity). String Theory based on string particles instead of point particles is proposed to solve the discrepancies. Although recently a mathematical breakthrough [21] based on S-matrix bootstrap with ultrasoftness and minimal zeros has proved the inevitability of String Theory. A physical model of string structures is missing for better visualization and understanding.

According to Yangton and Yington Theory, Force of Creation, the inter-attractive force between Yangton and Yington Pairs is the fundamental force of the universe. Elementary Subatomic Particles (Basic String Structures) are composed of Wu's Pairs bonded together by string force induced from Force of Creation. On the other hand, Composite Subatomic Particles (Compound String Structures) are composed of Elementary Subatomic Particles (Basic String Structures) with four basic forces composed of Alternating String Forces which are also induced from Force of Creation. Therefore, Basic String Structures and Compound String Structures provide an ideal physical model for String Theory.

Even though String Theory based on Newton's Universal Gravitation has a long-range force with energy inversely proportional to distance. It is fundamentally different from Quantum Field Theory which has a short-range force with energy in normal distribution. Therefore, String Theory cannot completely fulfill Unified Field Theory.

However, a modified Quantum Gravity Theory having linear shaped string structures with mirror symmetry and short-range force with energy in normal distribution, could be more compatible with Quantum Field Theory, such that Unified Field Theory can be better fulfilled. Furthermore, according to Yangton and Yington Theory, a true Unified Field Theory based on Force of Creation can be realized.

X. M-Theory and Yangton and Yington Theory

M-Theory [13] is a String Theory with a mathematical model having 11 dimensions based on string particles and Newton's Universal Gravitation. It is one of the most promising solutions to solve the two major problems, infinitive numbers of solutions and non-renormalization in Quantum Gravity Theory.

According to Yangton and Yington Theory, Gravitons have linear shaped string structures. When a linear shaped graviton with random orientation emitted from parent object reaches a linear shaped graviton on target object. Based on Newton's Law of Universal Gravitation, a remote long-range gravitational force carrying energy inversely proportional to distance can be generated to the graviton on target object.

Because the projection of a plane is proportional to Cos Θ between the normal of the plane and the direction of the incident beam. Therefore, the target graviton with linear shaped string structure on the graviton plane (the plane target graviton lies on) has the minimum projection length L cos Θ along the direction of the intersection between the graviton plane and the normal plane containing the normal of the graviton plane and the direction of incident graviton (Fig. 6). This projection length indicates the corresponding minimum remote long-range gravitational force F Cos Θ and minimum energy E Cos Θ on the same graviton plane.

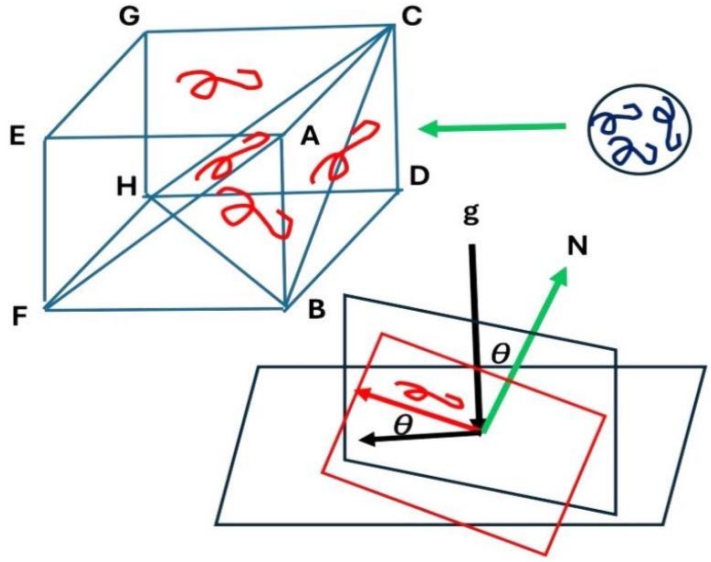


Fig. 6 The interactions between linear shaped random oriented incident graviton and linear shaped target gravitons on 11 high graviton density planes: ABCD, ACEG, ABEF, CAHF, AEHD, EGBD, CGFB, CBH, GFD, EBH and AFD. Each plane has a direction for minimum energy graviton (E cos Θ) except ABCD plane.

Fig.6 shows 11 high graviton packing density planes: ABCD, ACEG, ABEF, CAHF, AEHD, EGBD, CGFB, CBH, GFD, EBH and AFD between the linear shaped random oriented incident graviton and linear shaped target graviton. For each of these planes, there is one direction that target graviton has minimum remote gravitational force and minimum energy, except ABCD plane which has even remote gravitational force and energy in every direction. This means that target graviton should stay in one of these 11 lowest energy positions. Considering these high graviton packing density planes as dimensions, then M-Theory has 11 dimensions can be reasonably explained.

The whole idea about Sting Theory including M-Theory is misleading, simply because String Theory is based on Newton's Universal Gravitation which has a long-range force with energy inversely proportional to distance. It is fundamentally different from Quantum Field Theory which has a short-range force with energy in normal distribution. Therefore, String Theory cannot completely fulfill Unified Field Theory.

However, a modified Quantum Gravity Theory having linear shaped string structures with mirror symmetry and short-range force with energy in normal distribution, could be more compatible with Quantum Field Theory, and such that Unified Field Theory can be fulfilled.

XI. Conclusion

Standard Model is a mathematical model of subatomic particles complying with Quantum Field Theory and Yang Mills Non-Abelian Symmetry. Standard Model contains interactions with three Basic Forces including Quantum Electrodynamics for electromagnetic interaction, Quantum Electroweak Theory for both electromagnetic and weak interactions, and Quantum Chromodynamics for strong interaction, except Quantum Gravity Theory for gravitational interaction. Quantum Gravity Theory is based on point particles and Newton's Universal Gravitation (a directional long-range force with energy inversely proportional to distance) which results in two major mathematical problems, infinitive numbers of solutions and non-renormalization. Therefore, String Theory based on string particles is proposed to solve these problems by reducing the infinite numbers of solutions with resonance and constraining them into various dimensions.

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Even the string particles in String Theory comply nicely with the Basic String Structures and Compound String Structures composed of Wu's Pairs in Yangton and Yington Theory. Also, 11 dimensions in M-Theory can be interpreted as high graviton packing density planes. String Theory is incompatible with Unified Field Theory, simply because String Theory has a directional remote long-range force (Newton Universal Gravitation) carrying energy inversely proportional to distance. It is fundamentally different from Quantum Field Theory which has a short-range force carrying energy in normal distribution. Therefore, String Theory cannot completely fulfill Unified Field Theory.

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