Abstract:

It was Zi-Jian Cai and the satellite operators from China, India and USA who led the world people in television to make the electromagnetic unification of four forces, and altogether achieved many important progressions, such as the spatially localized electromagnetic mass structure, the electromagnetic orienting force, the electromagnetic multi-hairy structure, the non-relativity of ideal time and space, the electromagnetic curve and red-shift for gravity, the stable strong force from electromagnetic multi-hairy hybrid, the weak processes from hybrid split and oscillatory pair of bound electrical fields of neutrino, and so on. Especially, it was an important supplement to general relativity of Einstein by the spatially localized electromagnetic mass structure and electromagnetic orienting force, unifying the gravitational force with electromagnetic force, while explaining the neutrino of small mass moving at light speed. Due to the mistake of Einstein in explaining the essence of mass, it would in turn mislead the mathematical field unification later in physics related to mass. Besides, it was unfortunately also a mistake of Einstein on concept of relativity for ideal time and space, which was proven to manifest as non-relativity. On the other hand, it was explained the Planck quantum as the dependence of photo energy only on frequency due to the identical strength of electrical hair of electron and emitted photo, supporting the classical quantum theory. It was herein accomplished the electromagnetic unification of four forces, supporting Planck and rectifying Einstein.

Keywords: Localized Electromagnetic Mass Structure, Electromagnetic Orienting Force, Electromagnetic Multi-Hairy Structure, Speed of Neutrino; Planck Photo.

Introduction

From 2005 to 2009, Cai together with the Chinese Members, India Members, and US Members in the world satellite networks organized the great movement for electromagnetic unification of four forces in physics, and accomplished altogether with the anonymous people in worldwide television (Cai, 2015; 2016; 2018). Recently, Zi-Jian Cai published the book “Electromagnetic Unification of Four Forces” (2015) and several papers (Cai, 2016; 2018), introducing the progressions of the great movement.

As the premise, the energy was present as the frequency of electromagnetic wave or frequency of light in atomic physics, while the energy of all forces in physics could be unified with the electromagnetic force due to energy conservation. Because of the frequency of electromagnetic wave or light was the detectable form of energy, it was convenient to unify the
other forces of energy in physics with the electromagnetic force.

In this article, it is attempted to review the electromagnetic unification of four forces, and compare it to the works of Einstein and Planck, interesting to readers.

**The New Electromagnetic Structures and Force**

**The Spatially Localized Electromagnetic Mass Structure**

Because of the detectability of the electromagnetic force and gravitational force around, Zi-Jian Cai started to unify the electromagnetic force and gravitational force first, by inquiring about what was the electromagnetic reality of mass and why the speed of light was constant (Cai, 2016, 2018). In early October 2005, Cai and European people in television proposed that the mass of particle should possess the spatially localized electromagnetic structure according to the fact that the \( \gamma \) photon of high energy could transform in reciprocation with the gravitational mass adequately and completely (Cai, 2016, 2018, Cai, et al., 2015a). The mass electrical field and magnetic field of particle moved continuously and transformed reciprocally, but spatially this electromagnetic mass structure did not resemble that of photon which dissipated away. Instead it returned to the vicinity around its original point of departure through its electromagnetic movement and transformation (Cai, 2016, 2018, Cai, et al., 2015a).

After Zi-Jian Cai led the sate-commune group to make this proposition in early October 2005, the activities in discussion and exchange of physics elicited the attention, participation and comment of people in the whole world with television as the common media (Cai, 2016). It was this moment of time that it started the processes of electromagnetic unification of four forces.

The adequate and complete reciprocal transformation of \( \gamma \) photon with the gravitational mass, and the increase in mass during quark condensation (Crewther, 1986, Dai, et al., 1992) both strongly supported the mass as spatially localized electromagnetic structure, with the change in mass to be easily explained with electromagnetic conformational change (Cai, et al., 2015a).

The electromagnetic mass structure was not considered in Einstein’s general relativity. Thus, it was an important supplement to Einstein’s general relativity on explaining the gravitational force.

**The Electromagnetic Orienting Force**

The Sate-Commune Group Zhejiang Member with heavy Suzhou tone proposed the asymmetrical electromagnetic orienting force (Cai, 2016, 2018, 2020, Zhejiang Members, & Shanghai Member, 2015). When several electromagnetic particles or waves were close together, among their electrical fields there would occur the electromagnetic interactions with the same charge repelling and opposite charge attracting, or the electromagnetic fields of same direction attracting and opposite direction repelling. The attraction made the electromagnetic fields decrease in distance, increase in interactive strength and increase in interactive time. The repulsion made the electromagnetic fields increase in distance, decrease in interactive strength and decrease in interactive time. Such asymmetrical interactions made them generate a kind of net attractive force among the electromagnetic particles or waves, called as the electromagnetic orienting force (Cai, 2016, 2018, 2020, Zhejiang Members, & Shanghai Member, 2015).

Because the electromagnetic orienting force results from the asymmetrical electromagnetic interactions as attraction longer than repulsion, it is a force from the accumulative effects of both attraction and repulsion. In this regard, accumulatively the electromagnetic orienting force is irrelevant to the charges of particles, so that is a good candidate of gravitational force (Zhejiang Members, & Shanghai Member, 2015).

**The Electromagnetic Multi-Hairy Structure**

The Sate-Commune Group India Member and athletes in video record of 2000 Olympic
Opening Ceremony both proposed that the multi-pointy electromagnetic hybrid could make many electromagnetic interactions superimpose together, just like the DNA of genetic biology, similarly possessing the multi-hairy hybrid structure of complementary pairing and directional binding (India Member, et al., 2015a). In a photon when a changing electrical vector \( E \) generated a changing magnetic vector \( B \), immediately from such new and changing magnetic vector \( B \) there generated the next changing electrical vector \( E \). At this time, the original electrical vector \( E \) had changed a little. Such process repeated continuously until the earliest changing electrical vector \( E \) vanished. In this way, there would generate the electromagnetic multi-hairy structure for the photon (Figure 1) (India Member, et al., 2015a).

Likewise, there would also generate the multi-hairy electrical fields for both positron and electron (Figure 2) (India Member, et al., 2015b). It was easy to see that the positron and electron could hybrid like two gears. The difference in nuclear reactivity of \( \pi \) meson and \( \mu \) particle (Chiang, 1982, Wang, et al., 2011) strongly supported the multi-hairy hybrid structure sensitive to particle frequency.

### The Non-Relativity and Relativity of Time and Space

#### The Non-Relativity of Ideal Time and Space

In the process of unification, it was demonstrated the non-relativity of ideal time and space (Cai, 2016, 2020, Cai, et al., 2015b). As proposal, the ideal reference system \( O \) was stationary, the ideal reference system \( A \) moved at constant velocity \( v \), and the ideal reference system \( B \) moved at constant velocity \( -v \) (Figure 3). The reference system \( A \) and \( B \) were symmetrical in mirror.

From the reference system \( O \) to see \( A \), the relative velocity was \( v \). If the axial unit of time itself possessed relativity, its relative time changed \( t \). From the reference system \( O \) to see \( B \), the relative velocity was \( -v \). If the axial unit of time itself possessed relativity, its relative time also changed \( t \). In this regard, to observe from the reference system \( O \), the two axial units of time of reference system \( A \) and \( B \) were equal and the same. Again from the reference system \( B \) to
see A, the relative velocity of reference system A was 2v. If the axial unit of time itself possessed relativity, the change in relative time was close to 2t. This was different from the situation observed from the reference system O in which these two axial units of time were equal with each other. These two states were concurrent but contradictory. The only explanation was that the difference in value for these axial units of time t=0. With the same method, it could further be deduced that, among the ideal reference systems moving at constant velocity, the value of difference for the axial units of space x=0. These situations might occur in reality as holding the meeting together with hand phones or adding a mirror into the reference system. It was necessary to solve these contradictions and paradoxes with the conclusion that there was no relativity in time and space (Cai, 2016, 2020, Cai, et al., 2015b).

In consistency, it was demonstrated in experiment that the speed of neutrino was at least equal to that of light (Antonello, et al., 2012). In consideration of that the neutrino possessed the mass, the result was unfavorable to the rationality of special relativity, while in further supported the non-relativity of ideal time and space.

The Relativity of Electromagnetic Time and Space

It was also demonstrated that, in the ideal reference system without relativity in time and space but plus electromagnetic interactions, it would be no longer present the contradiction and paradox (Cai, 2020, US Members, et al., 2015).

The electromagnetic fields of atoms, earth and sun can approximately be simplified as the centric electrical field. To demonstrate this problem, the US operators of satellites likewise also adopted the above three ideal reference systems without electromagnetic interactions (Figure 3), among which O was stationary, A moved at constant velocity v and B at constant velocity –v (Cai, 2020, US Members, et al., 2015). Particle X moved at constant velocity v and particle Y at constant velocity –v (Cai, 2020, US Members, et al., 2015). However, at the center of ideal reference system O, it was added a centric electrical field E (Cai, 2020, US Members, et al., 2015).

Particle X and Y both formed electromagnetic interaction with the electrical field E. As movement of particle X and Y made their electromagnetic interaction with E shift blue, compared to their own stationary state, their wavelength both decreased as a change of x in equal (Cai, 2020, US Members, et al., 2015). There was no relative difference in wavelength for particle X as compared to Y. This was the situation observed in the reference system O. To see from the reference system B, the moving velocity of particle Y was 0, while that of X was 2v. At this time, the centric electrical field E in the ideal reference system O acquired moving velocity, which was v (Cai, 2020, US Members, et al., 2015). Thereby, the velocity of particle X relative to the centric electrical field E was v. The movement made its electromagnetic interaction with E shift blue, which decreased its wavelength by x (Cai, 2020, US Members, et al., 2015). The velocity of particle Y relative to the centric electrical field E was –v. The movement made its electromagnetic interaction with E shift blue, which also decreased its wavelength by x (Cai, 2020, US Members, et al., 2015). Both particles changed in wavelength by the same x, which was the same as that observed in reference system O, and was not in contradiction with each other (Cai, 2020, US Members, et al., 2015). Accordingly, with electromagnetic interactions, it was successful in solving the contradiction and paradox in special relativity that observation in different reference systems might lead to different results.

Just because the relativity of time and space resulted from electromagnetic interactions (Cai, 2020, US Members, et al., 2015), the special relativity would accordingly result from electromagnetic interactions, rather than the nature of ideal time and space.
The Electromagnetic Unification of Gravitational Force

The Electromagnetic Wave Curving and Shifting Red as Gravitational Force

With the electromagnetic orienting force, it was suggested that the electromagnetic mass waving entity of gravitational donor interacted in electromagnetic orientation with the electromagnetic waves mediating the gravity, making them turn in curve (Cai, 2016, 2020, Shanghai Members, et al., 2015). While such orienting interaction fading away with the electromagnetic waves partially returning to the original status, the electromagnetic waves consumed energy and shifted red (Cai, 2016, 2020, Shanghai Members, et al., 2015). Both of them manifested in sum as the phenomena of gravitational field (Cai, 2016, 2020, Shanghai Members, et al., 2015). The photon and electromagnetic wave curving and shifting red in gravitational field directly supported this explanation (Cai, 2016, 2020, Shanghai Members, et al., 2015). Besides, the increment of mass during condensation of quarks (Crewther, 1986, Dai, et al., 1992) could only be explained by the electromagnetic conformational change of gravitational entity, with higher mass frequency affected more in coordination in gravitational attraction, supporting this mechanism of gravitational force. Because this explanation of gravitational field with the electromagnetic interactions relies heavily on the curving and shifting red of electromagnetic wave by electromagnetic orientation, this mechanism is obviously the electromagnetic manifestations of Einstein’s general relativity, but with the gravitational changes in relative physical time and space (as the frequency and length of respective physical clock and wavelength for measurement) replaced directly by those in electromagnetic frequency and wavelength (Cai, 2020, Shanghai Members, et al., 2015).

The Identical Gravitational Constant G

To account for that different elements had the same gravitational constant G, Cai explained that the gravitational force mainly resulted from the gravitational attraction by heavy quarks in atomic nuclei rather than light electrons among various elements, which were identical in mass frequency for the same quark (Cai, 2020, Shanghai Members, et al., 2015).

The Electromagnetic Special Relativity

The special relativity of Einstein encountered many difficulties. On the one hand, the Yangzhou People in China on television pointed out that, even though the illuminant could move, the light speed determined by the constant electromagnetic media of vacuum was fixed and unchangeable (Yangzhou People, 2015), different from the view of Einstein that the light was constant in speed. On the other hand, some experiments have shown that the neutrino possessing mass might travel at speed at least equal to that of light (Antonello, et al., 2012), directly challenging the correctness of Einstein’s special relativity.

Because the electromagnetic special relativity of time and space resulted from electromagnetic interactions as mentioned above (Cai, 2020, US Members, et al., 2015), while the electromagnetic (physical) units of time and space in general relativity was identical to those in special relativity, it was interpreted the changes in time and space of Lorentz transformation in special relativity with the changes in electromagnetic frequency and wavelength as in electromagnetic general relativity, resulting from electromagnetic orienting force (Cai, 2020).

Electromagnetic Unification of Classical Quantum Theory

The electromagnetic multi-hairy mass structure was adopted to explain the quantum theory of Planck (Cai, 2016, 2018). It was obvious that any photon emitted by the electron would have the same electrical hairy strength as the electron (Cai, 2016, 2018). With the repeated occurrence of photon-electron absorption and emission during the evolution of cosmos, all photons would acquire the same electrical hairy strength as that of electron. In this way, with the identical
electrical hairy strength, the energy of all photons would be only relevant to their frequencies (Cai, 2016,2018), which was exactly the phenomenon of Planck, the basis of quantum theory (Cai, 2016,2018).

Electromagnetic Unification of Strong Force and Weak Force

Electromagnetic Unification of Strong Force

As mentioned above, the Sate-Commune Group India Member and athletes in video record of 2000 Olympic Opening Ceremony both proposed the electromagnetic multiple hairy structure (Cai, 2016,2018, India Member, et al., 2015a), applicable for both photon (India Member, et al., 2015a) and charged particles (India Member, et al., 2015b).

For the strong force, it was suggested that there formed the stable electromagnetic multi-hairy flat hybrid between the adjacent positive and negative quarks, while it was further divided the released energy brought about by the electromagnetic hybrid into two parts (Cai, 2016,2018, UN Staffs, et al., 2015). One was the released energy of the electromagnetic multi-hairy flat hybrid itself. Another was the thermodynamic moving, vibrating and rotating energy of quark particles and their internal electromagnetic structures, which was released by the orderliness and stability of electromagnetic multi-hairy hybrid (Cai, 2016,2018, UN Staffs, et al., 2015). Both of the two energies were parts of the energy of strong interaction.

The nuclear reactivity for π meson and μ lepton was different (Chiang, 1982, Wang, et al., 2011), which supported the strong interaction as generated from the electromagnetic multi-hairy hybrid requiring matching on frequency(Cai, 2016,2018, UN Staffs, et al., 2015). Besides, quark condensation as increase in mass by strong force could be explained by the electromagnetic conformational change at the region of hybrid (Cai, 2016,2018), which turned to flat from round(Beijing People, et al., 2015, Taiwan Member, et al., 2015).

Electromagnetic Unification of Weak Force

For the weak process, it was suggested that, as the electromagnetic multi-hairy hybrid of positive and negative quark was subject to the multiple destructions and effects within atomic nucleus such as tension and so on, the hybrid was simply torn apart and there accordingly occurred the recombination and modification in structure of atomic nucleus. The electromagnetic multi-hairy hybrid torn-apart to single side formed weak pairing and binding with the external inductive field of opposite charge, getting stabilized temporarily (Cai, 2016,2018, Taiwan Member, et al., 2015). In the subsequent process of weak interactive decay such as $\pi-\mu$ decay (Castagnoli, & Muchnik, 1958), the external inductive electrical field pairing and binding with the single side of hybrid turned to bind with another external electrical field of opposite charge in external environment, dropping away from its binding with the original single side of hybrid, and becoming the neutrino of electrical pairing structure of bound fields (Cai, 2016,2018, Taiwan Member, et al., 2015). This decay model was established mainly by the low energy threshold of nuclear weak fission (Taiwan Member, et al., 2015) and $\pi-\mu$ weak decay (Castagnoli, & Muchnik, 1958). It was also able to explain the reverse weak reaction (Taiwan Member, et al., 2015).

Concurrently, two other plausible electromagnetic mechanisms of weak interaction were excluded, as the followings:

First, by releasing the neutrino of alternatively proposed spatially localized electromagnetic rotating structure, there directly reduced the waving frequency of quark particle itself, no longer able to form the electromagnetic multi-hairy hybrid with other quarks, thereby bringing about the weak interaction and decay (Taiwan Member, et al., 2015). However, this mechanism might not be correct. It was demonstrated in experiments that the speed of neutrino was at least equal to that of light (Antonello, et al., 2012). In consideration of that the neutrino possessed the mass, such result was favorable to the electromagnetic pairing structure of bound...
fields of neutrino rather than spatially localized rotating structure.

Second, the electromagnetic multi-hairy hybrid between the positive and negative quark might directly drop from the two quarks when the weak interaction occurs, forming the neutrino in alternative way (Taiwan Member, et al., 2015). The mass of electronic neutrino and μ-type neutrino were both smaller than that of electron, while the mass of π meson and μ particle were both 200 times more than that of electron. The only explanation to get back the mass for neutrino was that the hybrid of neutrino reduced its electromagnetic hybrid frequency after dropping away from the quark, and transformed the mass into the moving energy of neutrino (Taiwan Member, et al., 2015). Thus the neutrino was very unstable, not compatible with the fact that the neutrino was the stable particle (Taiwan Member, et al., 2015). Besides, the recently discovered neutrino oscillations manifested transformation of neutrinos among all three types of them (Forero, et al., 2012, Maltoni, et al., 2005). The dropped electromagnetic hybrid could not fit neutrino oscillations.

In our electromagnetic structure of neutrino, both light speed of neutrino (Antonello, et al., 2012) and neutrino oscillations (Forero, et al., 2012, Maltoni, et al., 2005) can be explained. On speed, the mutually facilitated electrical pairing structure of bound fields of neutrino (Cai, 2016, 2018, Taiwan Member, et al., 2015) can certainly make neutrino move at speed of electromagnetic photon. On neutrino oscillations, the electromagnetic neutrino with pairing structure of bound fields (Cai, 2016, 2018, Taiwan Member, et al., 2015) changes the electromagnetic shape or wavelength from time to time by exchanging with external electrical fields. If all three types of neutrinos fit this model, then with the flexibility of changing electromagnetic fields, the three types of neutrinos can certainly transform mutually as neutrino oscillations.

Discussions

Supplements and Rectifications to Einstein

These updated progressions made significant supplements to Einstein’s general relativity. (a) The electromagnetic mass structure was not considered in Einstein’s general relativity for explaining the gravitational force (Cai, 2016, 2018, 2020, Cai, et al., 2015a), which was an important supplement to Einstein’s general relativity. (b) The electromagnetic orienting force was another supplement to Einstein’s general relativity (Cai, 2016, 2018, 2020, Zhejiang Members, & Shanghai Member, 2015), and successful in unifying gravitational force with electromagnetic wave curving and shifting red by such force (Cai, 2016, 2020, Shanghai Members, et al., 2015).

There were also some rectifications to the mistakes made by Einstein. (a) In contrast to the view of Einstein on change of time and space, the ideal time and space would manifest as non-relativity (Cai, 2016, 2020, Cai, et al., 2015b), while the electromagnetic time and space could manifest relativity from electromagnetic interactions (Cai, 2020, US Members, et al., 2015). (b) Different from the view of Einstein that the light was constant in speed, the light speed was determined by the constant electromagnetic media of vacuum, which was fixed and unchangeable (Yangzhou People, 2015). (c) Opposite to the prediction of Einstein that any matter with mass could not reach the light speed, the speed of neutrino with mass was shown at least equal to that of light (Antonello, et al., 2012).

The Biggest Negative Influences from Mistake of Einstein

The biggest negative influence from Einstein came from his explanation of gravitational force as the change in time and space, while neglected the electromagnetic mass structure and interaction. For mathematical field unification in present physics after Einstein, the misinterpretation of Einstein on mass would mislead all these later efforts using the mathematical field related to mass to unify the four forces.
The Support and Supplement to Planck Quantum

With the identical electrical hairy strength of electron and emitted photon, the energy of photons would be only relevant to their frequencies (Cai, 2016, 2018). This was the supplement and support to the classical quantum theory of Planck.

The Advantage for Electromagnetic Unification of Four Forces

The frequency of electromagnetic wave or light was the detectable form of energy, it was certainly convenient to use the detectable electromagnetic force to unify the energy of other forces in physics. The mathematical field unification in present physics does not consider this experimental simplicity and convenience, and is naturally full of subjective assumptions. The rectifications to the mistakes of Einstein on mass would warn the defects of mathematical field unification.

Conclusions

In this article, it is briefly reviewed the recent electromagnetic unification of four forces, including the spatially localized electromagnetic mass structure, the non-relativity of ideal time and space, the electromagnetic orienting force causing electromagnetic curve and red-shift in gravity, the electromagnetic multi-hairy structure forming hybrid for stable strong force, the weak processes from hybrid split and electromagnetic oscillatory pair of neutrino of bound electrical fields, and so on. Thereafter, it is discussed the supplements and rectifications to Einstein, including the spatially localized electromagnetic mass structure, the electromagnetic orienting force, the non-relativity of ideal time and space, the neutrino with mass able to move at speed at least equal to that of light, and so on. It is pointed out that the mistake of Einstein on interpreting the essence of mass would negatively influence all mathematical field unification later in physics related to mass. Whereas, the Planck quantum resulted from the dependence of photo energy only on frequency due to the identical strength of electrical hair of electron and emitted photo, was supplemented and supported quite well.

Funding

The author declares no financial support for this work.

Conflict of Interest Statement

The author declares no conflict of interest for this work.

References


