Chapter 18

Applying CFLE Theory to Quantum Theory

18.1 Euclidian Geometry and the Uncertainty Principle: Focus on the Relation Between Geometry and Physics

From the time of Thales (B.C623–B.C546) to the present day, scientists have been working to create consistent and systematic mathematical knowledge. In Euclid's (B.C365–B.C275) era, the Greeks had already reached a study level high enough to establish perfect deductive reasoning. Specifically, mathematics that had deductive property, especially geometry, was stimulating the historic atmosphere. Therefore, there were many attempts to form a consistent and deductive mathematical knowledge system out of the fragmentary independent mathematical knowledge of the day. Hippocrates, who had written the first book named *Elements*, is good proof of this. But it was Euclid who historically was the first to accomplish a consistent and deductive knowledge system model that has had strong influence to the present day. Euclid's version of the same-titled *Elements* consisted of 13 books. It is a collection of definitions, postulates (axioms), propositions (theorems), and mathematical proofs. Upon opening the first book, one is immediately faced with 23 definitions, the first few of which are

> *Definition 1*: A point is that which has no parts.
>
> *Definition 2*: A line is breadth less length.
>
> *Definition 3*: The ends of a line are points.
>
> …
>
> …
>
> *Definition 6*: The edges of a surface are lines.

Therefore, we soon come to know that a Euclidian point has no size and no volume, but it can have position. According to the uncertainty principle given by $\Delta mv\Delta x \geq \hbar$, such definition is impossible because every particle has a field that is formed by force lines and their force line elements with size. A physical point cannot have such a position

according to $\Delta mv\Delta x \geq \hbar$. Every previous inconsistency of this current book originates as

$$x = x' = 0 \qquad 18\text{-}1\text{-}1$$

a result that was historically first produced by Euclid and his first definition in his first book. But every previous correction of every chapter of this book is solved by using $x = x' = \Delta x$. Newton's calculus was established on Euclid's idea because it is

$$\frac{\Delta y}{\Delta x} = 2x + \frac{(\Delta x)^2}{\Delta x} = 2x + \Delta x \qquad 18\text{-}1\text{-}2$$

where $\Delta x \to 0$ according to the definition of Euclid. Therefore, it can be written that

$$\frac{\Delta y}{\Delta x} = 2x$$

or

$$\lim_{x\to 0} \frac{\Delta y}{\Delta x} = 2x \qquad 18\text{-}1\text{-}3$$

However, we now know that physics with infinitive deductive definition cannot apply over Mercury, and thus should meet a dead end with this mathematics. Moreover, although relativity with such infinitive deductive definition can occur over Mercury, it cannot occur over the sun, because everything and everywhere of the universe is quantum theoretical. Surprisingly, such a dead end to Euclid's point definition and Newton's calculus become the starting point of quantum theory. In the 1900s, Rayleigh and Jeans were faced with the serious inconsistency between theory and experiment of blackbody radiation; namely,

$$N(\nu)\, d\nu = \left(\frac{8\pi V}{c^3}\right) \nu^2 d\nu$$

$$\rho T(\nu)\, d\nu = \left(\frac{8\pi \nu^2 kT}{c^3}\right) d\nu$$

This formula is simply called the Rayleigh–Jeans formula of blackbody radiation.

Figure 18-1-1 compares these theoretical and experimental values.

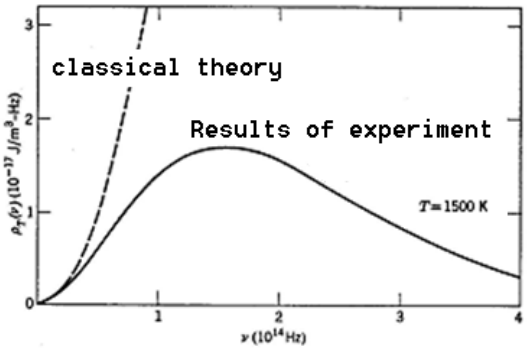


Figure 18-1-1

At that time, this result was named by scientist as the "ultraviolet catastrophe," despite it should really be called the "Euclid–Newton catastrophe."

The classical theory included the factor of $\Delta\varepsilon \to 0$ or $d\varepsilon \to 0$ as Euclid's infinitive definition of a point. In quantum theory, however, this factor of $\Delta\varepsilon \to 0$ or $d\varepsilon \to 0$ is rejected and replaced by the factor of $\Delta\varepsilon = h\nu$ as the minimum unit. If an oscillator can have $\Delta\varepsilon = nh\nu$, n = 1, 2, 3, …, then the probability of the oscillator energy along the Boltzmann distribution is

$$P = \frac{e^{-\frac{nh\nu}{kt}}}{\sum_{n=0}^{\infty} e^{-\frac{nh\nu}{kt}}} \qquad 18\text{-}1\text{-}4$$

The average energy of this oscillator is

$$< E(\nu, T) > = \left(\frac{\sum_{n=0}^{\infty} nh\nu e^{-\frac{nh\nu}{kt}}}{\sum_{n=0}^{\infty} e^{-\frac{n\hbar\nu}{kt}}}\right) \qquad 18\text{-}1\text{-}5$$

Planck's great contribution came when he realized that he could obtain the required cut-off in $\varepsilon_{\nu\to\infty}^{-} \to 0$ if he modified the calculation, leading from

$$P(\varepsilon) = \frac{e^{-\frac{\varepsilon}{kt}}}{kt} \quad \text{to} \quad \varepsilon^{-} = \frac{\int_0^{\infty} \varepsilon P d\varepsilon}{\int_0^{\infty} P d\varepsilon} \qquad 18\text{-}1\text{-}6$$

By treating the energy ε as if it were a discrete variable instead of the continuing variable, which is definitely the point of view of classical physics, this can quantitatively, be rewritten in terms of a sum instead of an integral:

$$< \varepsilon^{-} = \frac{\int_0^{\infty} \varepsilon P d\varepsilon}{\int_0^{\infty} P d\varepsilon} > \qquad 18\text{-}1\text{-}7$$

Thus, the formula (which Planck then immediately obtained for the energy density in the blackbody spectrum, using his results for $\varepsilon^{-}(\nu)$ rather than the classical $\varepsilon^{-} = kt$), becomes

$$\rho_T(\nu)d\nu = (\frac{8\pi\nu^2}{c^3})(\frac{h\nu}{e^{\frac{h\nu}{kt}}-1})\, d\nu \qquad 18\text{-}1\text{-}8$$

This formula was the start of quantum theory. However, from that time to the present day, only the essentiality of the discrete energy quantum was emphasized and there was not even any interest about the collapse of the Euclid–Newton mathematical system. Present quantum theory has found the proper physical characteristic of the wave nature of a particle and that it does not permit unfinished measurements of an exact position and size at the same time. Therefore, despite the 2300-year-long use of Euclid geometry, it should be used limitedly and carefully.

According to CFLE theory, the quantum theoretical definition of the point used should be "without size there is no position of a point," instead of the purely speculative definition "a point is that which has no part." Surprisingly, however, purely speculative definitions, axioms, and theorems can be used as deductive knowledge without logical inconsistency, but they cannot be used as inductive knowledge without logical inconsistency. Although Euclid's (which means good glory) geometry has strongly and limitlessly influenced the development of science to the present, nowadays Euclidian geometry is used with limit and carefully and approximately. However, for a general application to the quantum theoretical world, we need a new definition of a point that according to the uncertainty principle ($\Delta mv\Delta x \geq \hbar$) can measure the Δmv and Δx of particle at the same time. When Δmv is measured as a maximum, Δx is measured as a minimum. This minimum state of Δx defines a point called the quantum point. Only when the definition of Euclid geometry is changed according to the new definition of CFLE theory can Euclid geometry be changed to quantum geometry. Then the deductive, perfect logical system of Euclid geometry can be kept in quantum geometry without any major corrections. In quantum geometry, there are no irrational numbers. For example, $1^2 + 1^2 = 2$

$\sqrt{2}$ = 1.414… is not true.

Because of the uncertainty principle, quantum geometry does not permit unlimited precision for position and size at the same time when measuring for momentum. This is called the theory of quantum numbers. For example, $1^2 + 1^2 = 2$, $\sqrt{2} = 1.414\ldots\ n_{\text{finite}}$ is true according to the uncertainty principle, because an irrational number means unconditional infinite accuracy. Such accuracy is only speculative mathematics.

With this theory of quantum numbers as one field of quantum mathematics, we can better understand why ancient Greek philosophers as well as current physicists thought as they did.

According to Bertrand Russell, western philosophy began with Thales of Miletus (ca. 623–546 BC). Thales was not a fan of mythology; he chose to explain natural phenomena based on logic and deductive reasoning, whereupon he would develop hypotheses and set out definitions and principles as tools for his explanations. He was therefore the creator of the "scientific process," even though he often has to vie with Democritus (ca. 460–370 BC) for the title of the "Father of Modern Science," but he is undoubtedly the "Father of Geometry." Thales is credited with the first use of deductive reasoning as applied to geometry, by deriving four corollaries to his self-named theorem, making him the first true mathematician. He was also the first person known to have studied electricity. But, most importantly, he was the first person in history to stipulate a number as being a "collection of units" or a "set of one." This "one" is expressed as "one unit," which nowadays is not an "abstract one" but has some size and figure in space. With this definition, Thales had a profound influence on other Greeks thinkers and the whole of western history.

Pythagoras of Samos (570–495 BC) is best known for the Pythagorean Theorem. He taught that everything was related to mathematics and that his definition of a number was the ultimate reality. The Pythagorean number is a discrete number, much like Thales' number, and resembles discrete fixed numbers. His number acted like the current Atom. However, his theorem contained an irrational number, $\sqrt{2}$. Because of this existence of an unlimitedly continuous number, Pythagoras could no longer make the assertion that his number is the ultimate reality and that everything was related to mathematics. That was a most fatal catastrophe of the ancient age, as serious as the ultraviolet catastrophe of modern times. Pythagoras's disciples hid the

existence of this irrational number and disclosers of this secret were even put to death. But knowledge of this secret spread nonetheless.

Unavoidably, Democritus of Abdera (460–370 BC) separated the mathematical number of Pythagoras and the atom as the ultimate reality. The theory of Democritus held that everything is composed of atoms, which are physically, but not geometrically, indivisible, and that between atoms lies empty space. He further asserted that atoms are not destructive, but have always been, and always will be, in motion. There are an infinite number and kinds of atoms, differing in shape and size. With regard to the mass of atoms, Democritus is known to have said, "The more any indivisible exceeds, the heavier it is." But his exact position on the weight of the atom is disputed.

The most important point is that Democritus separated the physical atom from the mathematical number. From this point onward to the time of Sir Isaac Newton, mathematics and physics ran their own different courses. Still, the more serious problem remained of establishing mathematical logic as being unlimited and unconditional deductive knowledge. In attempt to achieve this, Plato of Athens (424–348 BC) developed the so-called platonic theory of form. This theory typically refers to Socrates' belief that the material world—as it seems to us—is only an image or copy of the real world. (This means that a geometrical form, made by a line with an irrational number based on Pythagorean discipline, is the real world.) In other words, Plato seemed to recognize two worlds: the apparent world that was constantly changing, and an unchanging and unseen world of forms, which may be a cause of what is apparent.

Euclid of Alexandria (365–275 BC), another contender for the "Father of Geometry" title and the author of *Elements*, used the so-called Euclid's point that has only position but no size (width, length, or breadth) to apply to the platonic theory of form. In Euclidian geometry, mathematical deductive logic was complete. Simply put, Euclid made a size-less point for geometrical logic. His *Elements of Geometry* is one of the most influential works in the history of mathematics. According to A.N. Whitehead, "…the safest general characterization of European philosophical tradition is that it consists of a series of footnotes to Plato." Such strong and wrong influences of Plato and Euclid about the problem of the size of a point or the problem between irrational numbers being the ultimate reality of mathematics and the atom as the

ultimate reality of physics have continued to this day in each field of physics.

Looking back from the ancient ages to modern times, we clearly see two separate chronological streams of thought regarding the non-correspondence between Number and Particle:

Stream 1 has the Particle as a physical reality: Thales (624–546 BC) → Pythagoras (570–495 BC) → Democritus (460–370 BC) → John Dalton (1766–1844) → Niels Bohr (1855–1962) → J. J. Thomson (1856–1940) → Max Planck (1858–1962) → Ernest Rutherford (1871–1937) → Erwin Schrödinger (1887–1961) → Enrico Fermi (1901–1954) → Werner Heisenberg (1901–1978) → George Gamow (1904–1968) → Hans Albrecht Bethe (1906–2005) → Yukawa Hideki (1907–1981) → Richard Feynman (1918–1988) → Murray Gell-Mann (1929–present) → Sheldon. L. Glashow (1932–present)

Stream 2 has the Number as a mathematical reality: Thales (624–546 BC) → Pythagoras (570–495 BC) → Plato (424–348 BC) → Euclid (365–275 BC) → Isaac Newton (1642–1727) → Nikolai I. Lobachevsky (1793–1856) → Janos Bolyai (1802–1860) → George F. Riemann (1826–1866) → Theodor Kaluza (1855–1954) → Hermann Minkowski (1864–1909) → Albert Einstein (1879–1955) → Oskar. B. Klein (1894–1977) →Roser Penrose(1931-present) → Leonard Susskind (1940–present) → John H. Schwarz (1941–present) → Michael Green (1946–present) → Edward Witten (1951– present).

That is, after separating from Pythagoras, Democritus started the stream that paid attention to the quantum character of the world, while Plato and Euclid started the stream that paid attention to the logical character of the world, clearly delineating the non-correspondence between the Number and Particle worlds.

Two thousand years after the Greek philosophical age came Sir Isaac Newton and John Dalton, one a quantum theoretician of matter, the other a continuum theoretician of mathematics. Newton used Euclid's infinity to invent differentials and integrals. Surprisingly, despite introducing the concept of infinity in his calculus, he connected physics and mathematics. His ingenious work *Philosophiae Naturalis Principia Mathematica* changed the history of physics and mathematics, and so it was that 2000 years after Democritus had separated physics and

mathematics, Newton mixed the two up again. Therefore, humankind could start anew and bear the full fruit of this development.

Because the applications of Euclidian geometry were too narrow, Bolyai and Lobachevsky changed Euclid's fifth postulate, thereby ushering in the era of non-Euclidian geometry. However, they changed only curved-surfaces geometry and continued to use Euclid's Point; therefore, the exact name of their geometry is non-fifth geometry. Minkowski then started manifold geometry, and united Time with Space into a continuum. This was the pre-arrangement for Einstein's general theory of relativity. Therefore, Riemann geometry was chosen on the advice of Grossmann. For the unified theory of gravity and electricity, the concept of the extra-dimension was introduced by Klein and Kaluza. String theory was then started by Veneziano and Susskind. After the weak force and strong force had been discovered, John. H. Schwarz, Michael Green, and Edward Witten introduced and developed more extra-dimensions, whereby they used 10 dimensions to describe Four Forces. Following John Dalton's generation, the era of quantum mechanics was started by Max Planck, Erwin Schrödinger, and Werner Heisenberg, who discovered the quantum character of nature. Because the micro-world is not infinitely continuous, such character is very different from irrational numbers. And so it was that the basis of Newton's physics and mathematics decayed in the micro-world of quantum mechanics and even in the high-speed world of relativity theory.

All of the scientists at this time were surprised at this new discovery, but the physicists and mathematicians did come around to accepting the quantum character and relativistic character of nature. However, they did not pay attention to the relation between the physics and mathematics behind the two new physics characters. Between Niels Bohr, who led the stream of physical reality, and Albert Einstein, who led the stream of mathematical reality, this controversy lasted 27 long years, until Einstein's death in 1955. The clear winner all along was Niels Bohr, but Einstein and his followers did not want to accept quantum mechanics.

It is my belief the reason for this non-acceptance is that Einstein and his followers were(are) entrenched in the European mindset of platonic philosophy (theory of form) and of Euclid's point from his *Elements* (theory of irrational number). This has limited their abilities to even imagine the existence of another viewpoint, so they could not solve

inharmonic problems between physics and mathematics. Therefore, to this day, with both streams of teaching still very much in existence, the controversy remains between the quantum theoreticians of physical matter (QTPM) and the continuum theoreticians of mathematical logical number (CTMN).

Because infinity always appears in Euclid's point-like particle model, CTMN choose the line instead of the particle, the so-called string. Yet, because this string is still formed from Euclid's point, the string theory of CTMN cannot avoid infinity or the unphysical essence. Therefore, the results of string theory based on CTMN would always be mathematically or physically trivial. On the other hand, QTMN cannot find the ultimate particle as being a physical reality at all, because QTMN wrongly applies Einstein's relativity theory, which basically is formed from Euclid's Point and irrational numbers. All of these problems are none other than the Essence of Pythagoras's catastrophe.

In another world, such side effects (i.e., unfinished arguments like the current situation between particle theoreticians and string theoreticians) would have been anticipated. Consequently, we could say that Pythagoras and his disciples and even the other Greek philosophers were more sensible about unpredictable fears and dangers, showing more sagacity than current scientists do.

To explain the inconsistency, according to Euclid's definitions of a Point ("A point is that which has no parts") and a Line ("A line is breadth-less length"), there cannot exist extra-dimensions, as shown in Figure 18-1-2.

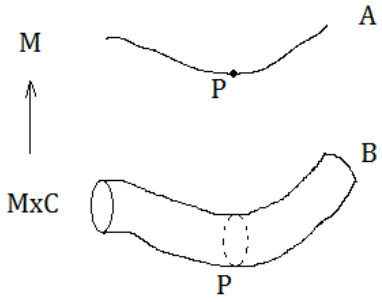


Figure 18-1-2

The popular analogy of mathematicians is that the hosepipe B in Figure 18-1-2, viewed from a distance, looks like a wiggly line A, but on closer inspection, a point P on the line A turns out to be a circle around the

circumference of the hosepipe B. So, it is rationalized likewise that a point in three-dimensional space is in fact a tiny circle wrapped around another dimension of space. This idea forms the basis of the Kaluza–Klein unification theory of electromagnetic and gravitational forces. This idea expresses that space $M \times C$ is compactified over the compact set M (space–time continuum cannot exist in the universe; cf. §14, §24).

However, we can find here the sophistry of the existence of extra-dimensions. According to the Euclid definitions of a Line and a Point, line A cannot be equated to hosepipe B, since a Line (by definition) is breadth-less. It follows that point P of line A cannot be equated to the point P of hosepipe B, because (again by definition) the point P of line A cannot have any parts like the point P of hosepipe B. Unavoidable catastrophic result of such sophistry is 10^{500} universes that is called blessed cosmic landscape by Leonard Susskind despite we need knowledge of only this our universe.

The only logical way to avoid this dead-end is to change Euclid's definition of a point to that which *has* parts, which in essence becomes CFLE theory in terms of quantum mechanics and charge screening theory.

With such theory of quantum number in CFLE theory, the mathematical number as the ultimate logical reality can finally correspond to the physical particle as the ultimate material reality, because the unconditional infinite accuracy of the irrational number cannot exist according to the uncertainty principle. Such accuracy is only in speculative mathematics. Thus, the 2500-year-old Pythagoras catastrophe between the quantized wholeness of the mathematical number and the quantized physical individuality of matter can finally be resolved by the quantum geometry and related theory of quantum number in CFLE theory.

18.2 Possibility of Generalizing Schrödinger's Equation by CFLE Theory

So far, this book has perused on the macro energy quantum $\hbar_{\mathrm{macro}}$, and its physical reality has been considered quantitatively with very satisfactory results. Therefore, we can use the Schrödinger equation generally as a gravitational huge wave equation. This formula is simply

$$-\frac{\hbar_i^2}{-2m}\frac{d^2\psi(x,t)}{dx^2}+V(x,t)\psi=i\hbar_j\frac{d\psi(x,t)}{dt} \qquad 18\text{-}2\text{-}1$$

This differential equation can be used generally when introducing a suitable macro energy quantum under the condition

$$\hbar_{\text{macro}} \geq \Delta mv\Delta x \geq 1 \geq \Delta mv\,\Delta x \geq \hbar_{\text{micro}} \qquad 18\text{-}2\text{-}2$$

18.3 The Quantization of the Electric Charge and Related Mass by CFLE Theory

Because an atom is extremely small, its mass could not be measured directly. Thus, the mass of an atom and a molecule has to be expressed with an artificially relative scale. To fix this relative scale of an atom's mass, chemists used the oxygen atom as the standard and fixed its mass at 16.0000 AU for a long time. After 1961, by international convention, the atomic mass unit was fixed using carbon atom C^{12} as the new standard, and the atomic mass unit was established as $\frac{C^{12}}{12}$. When such relative atomic mass is changed to the real unit mass, it is known experimentally that there are $N = 6.02214129 \times 10^{23}$ particles in a unit mass of 12g. This number is of course the Avogadro number. The experiments used to decide this number vary. Currently, x-ray crystallography and coulometry are used.

The experimental value is

$N_A = 6.02214129 \times 10^{23}$

CFLE theory can use this number for natural definition of 1 kg as definition of natural length unit.

$$Kilogram = N_A \cdot \frac{m_{c_{12}}}{12} \cdot 10^3$$

$$N_{Amass} = N_A \cdot 10^3$$

$$= 6.02214129\times 10^{26} \qquad 18\text{-}3\text{-}1$$

This number is called mass definition number.

However, from the view point of CFLE theory, we can find that when the force lines and their elements screen the bar seed mass, the results of charge screening give a mass of 1.673×10^{-27} kg. Therefore, if

particles were to move with light speed and charge screening becomes disorganized, to what degree would this bar mass of the seed become the mass of a perfect charge screening state? As discussed in §4, the charge screening ability of the electromagnetic force line is

$N = 1.686044 \times 10^{21}$ times

But, the strong force is one step stronger ($N_f = 1.190208 \times 10^7$) than the electromagnetic force. Thus, the total charge screening ability of a strong force line is

$$N_s = (1.686044 \times 10^{21})\,(1.190208 \times 10^7)$$

$$= 2.006743 \times 10^{28}$$

This number must become mass definition number.

However, this number is bigger than Avogadro's number by as much as

$$dn = \frac{2.006743 \times 10^{28}}{6.022141 \times 10^{26}} = 33.322750 \qquad 18\text{-}3\text{-}2$$

And Avogadro number used for unified atomic mass unit is as

$$1\text{u} = \frac{M_u}{N_A} = 1.660538921 \times 10^{-27} kg \qquad 18\text{-}3\text{-}3$$

For mass definition to use difference between unified atomic unit mass and proton mass is

$$d_{tw} = \frac{1.6726485 \times 10^{-27}\text{kg}}{1.6605389 \times 10^{-27}\text{kg}}$$

$$= 1.0072925 \qquad 18\text{-}3\text{-}4$$

Therefore, this difference for proton is

$$dn = (33.322750)(1.0072925)$$

$$= 33.565756$$

This result is due only to the difference created by the force line curve of

$$g^2 = (5.793596)^2 = 33.565756 \qquad 18\text{-}3\text{-}5$$

as §7.4 showed. The proton mass is $m = 1.6726485 \times 10^{-27}$ kg, but because the charge screening ability of a strong force line is $n = 2.006743 \times 10^{28}$, the maximum bar mass of the seed becomes

$M = 33.565756$ kg

The difference is

$$d^2 = \frac{M}{1 \text{ kg}} = 33.565756 \qquad 18\text{-}3\text{-}6$$

This difference too is the difference of the force line curve of g^2.

Consequently, the bar mass of the proton seed is

$$M = \frac{(33.565756 \text{ kg})\ (1)}{33.565756} = 1 \text{ kg} \qquad 18\text{-}3\text{-}7$$

Therefore, the theoretical quantized proton mass by strength of a strong force by CFLE theory is

$$M_\text{p} = \frac{(1 \text{ kg})\ (33.56575)}{2.006743 \times 10^{28}}$$

$$= 1.672648 \times 10^{-27} \text{ kg} \qquad 18\text{-}3\text{-}8$$

The observed mass is

$$M_\text{p} = 1.6726485 \times 10^{-27} \text{ kg} \qquad 18\text{-}3\text{-}9$$

The related theoretical mass of an electron is

$$Q_1 = \frac{0.000579}{(6.545979)(1.5)(6.545979)(1.5)} = \frac{0.000579}{96.412142} = 0.000006$$

$$x_1 = 1.000006 \qquad 18\text{-}3\text{-}10$$

$$Q_2 = \frac{0.000579}{(1836.109)(1.5)} = \frac{0.000579}{2{,}754.164} = 0.0000002$$

$$x_2 = 1.0000002 \qquad 18\text{-}3\text{-}11$$

$$g = (6.545979)\ (\frac{1.000006}{1.0000002})$$

$$= (6.545979)\ (1.0000058)$$

$= 6.546017$

$$g^4 = (6.546017)^4 = 1{,}836.151 \qquad 18\text{-}3\text{-}12$$

$$M_e = \frac{1.672648 \times 10^{-27}\ \text{kg}}{1{,}836.152} /$$

$$= 9.109534 \times 10^{-31}\ \text{kg} \qquad 18\text{-}3\text{-}13$$

The observed mass is

$$M_e = 9.109534 \times 10^{-31}\ \text{kg} \qquad 18\text{-}3\text{-}14$$

Finally, this process means that a 1 kg bar mass of the seed is screened by four kinds of force lines, the last force line of which is the gravitational force line.

Because the charge screening strength is proportional to force strength, the maximum possible charge screening strength is

$$S = (1.190208 \times 10^7)^4$$

$$= 2.006742 \times 10^{28} \qquad 18\text{-}3\text{-}15$$

Therefore, the final quantized mass by charge screening of the strong force is

$$m_q = \frac{1\ \text{kg}}{2.006742 \times 10^{28}}$$

$$= 4.983202 \times 10^{-29}\ \text{kg} \qquad 18\text{-}3\text{-}16$$

Because the force line curve is $g = 6.545989$, the degree of charge screening is changed to

$$g^2 = (6.545979)^2$$

$$= 42.849841 \qquad 18\text{-}3\text{-}17$$

Therefore, the changed mass by the force line curve is

$$m_q = (4.983202 \times 10^{-29}\ \text{kg})\ (42.849841)$$

$$= 2.135294 \times 10^{-27}\ \text{kg} \qquad 18\text{-}3\text{-}18$$

Because the force line curve of earth $g = 1.202$ and gravitational permittivity of air at $g = \frac{(6.545979)}{(1.5\times1.202)}$ is

$Q_1 = (0.016774)\ (3.630604) = 0.060900,\ x = 1.060900$

The electrical permittivity of air at $g = (1.5\times\ 1.202)$ is

$Q_2 = (0.000589)\ (1.803) = 0.001062,\ x = 1.001062$

$Q_3 = \frac{0.000589}{8\times2\times1.202} = 0.000031\ ,x_{e3} = 1.000031$

The total different effect by permittivity is

$d = (1.202)(1.060900)(1.001062)(1.000031)$

$= 1.276595$ 18-3-19

The final quantized mass is

$m_{\mathrm{p}} = \frac{2.135294\times10^{-27}\ \mathrm{kg}}{1.276595}$

$= 1.672648 \times 10^{-27}\mathrm{kg}$ 18-3-20

Observed value is

$m_{\mathrm{p}} = 1.672648 \times 10^{-27}\mathrm{kg}$ 18-3-21

This mass is none other than the proton mass and the quantized mass of the proton as an individual particle. Therefore this process is called mass quantization. However, essence of this process is same as gravitational CP violation of protons and neutrons.

Thus, we can find here the maximum particle length, which is none other than the force line length:

$L = (1.190208 \times 10^{7})^{4}$

$= 2.006742 \times 10^{28}\ \mathrm{m}$

$\approx |\frac{1}{1.672648\times10^{-27}\ \mathrm{kg}}|\mathrm{m}$

$\approx 5.978544 \times 10^{26}\ \mathrm{m}$ 18-3-22

Now, we can understand why $\Delta x \Delta m = 1$; that is,

$(1.672648 \times 10^{-27}\ \text{kg})\ (5.978544 \times 10^{26}\text{m}) = 1$ 18-3-23

Therefore, from $\Delta x \Delta m = 1$ should be established

$\Delta x \Delta m = \frac{\hbar}{v}, \quad \frac{\hbar}{v} = 1, \quad |\hbar| = |v|$ 18-3-24

Here, we can find the lower limit of speed.

On the other hand, we can calculate purely theoretically the quantized electric charge in the same way using CFLE theory. To calculate the quantized mass of an electron, we use 4 kinds of force lines of g^4 and the strength of a strong force:

$N_s = (1.686044 \times 10^{21})\ (1.190208 \times 10^{7})$

$= 2.006743 \times 10^{28}$

The strength of an electric force is $N_e = 1.686044 \times 10^{21}$.

Therefore, the expected quantized electric charge is

$e = \frac{1}{1.686044 \times 10^{21}\ \text{C}}$

$= 5.931043 \times 10^{-22}\ \text{C}$ 18-3-25

Because the effective force line curve by Earth's EGM factor is

$g = 6.545979/1.5$

$= 4.363986$

$g_1^2 = (4.363986)^2$

$= 19.044374$ 18-3-26

To go from the 0 electric charge state of the neutron to the $+1e$ electric charge state of the proton, a change of force line curve of $g = 3.772002$ by the electric charge carrier particle of a muon is needed.

Therefore,

$g_2^2 = (3.772002)^2$

= 14.227999

The total force line curve change is

$g_1^2 \cdot g_2^2$ = (19.044374) (14.227999)

= 270.963334 18-3-27

The electrical permittivity of air at g = 2.587 = $\frac{238.03}{92}$ (cf. §6) is

Q_1 = (0.000589) (2.587) = 0.001529, x = 1.001524, x_1^2 = 1.003050

The electrical permittivity of air at g = 1/(6.545979×6.545979×1.5×1.5) is

$Q_2 = \frac{0.000589}{96.412142}$ = 0.000006, $x = 1.000006$, x_2^2 = 1.000012

The final difference is

$d = \frac{(270.963334)}{(1.003050)(1.000012)}$

= 270.136167

Therefore, the quantized electric charge is

e = (5.931043 × 10^{-22} C) (270.136167)

= 1.602189 × 10^{-19} C 18-3-28

The observed value is

e = 1.602189 × 10^{-19} C 18-3-29

This process is called the quantization of the electric charge.

However, because the proton and the neutron have a substructure, it is not immediately evident that the quantization process of the electric charge is from the quantized gravitational charge (mass) constant N = 2.006743 × 10^{28}.

The quantized electric charge constant is

$$N = \frac{2.006743 \times 10^{28}}{1.190208 \times 10^{7}}$$

$$= 1.686044 \times 10^{21} \qquad 18\text{-}3\text{-}30$$

Therefore, when we choose the electron, we can clearly see the quantization process from this constant. Because the electric charge constant is $N = 1.686044 \times 10^{21}$, we can theoretically expect the quantized electric charge of the electron to occur by a unit charge of 1 C. That is

$$e = \frac{1}{N}\,\mathrm{C}$$

$$= \frac{1}{1.686044 \times 10^{21}}\,\mathrm{C}$$

$$= 5.931043 \times 10^{-22}\,\mathrm{C} \qquad 18\text{-}3\text{-}31$$

However, this static charge state is a curved state at $g = 8$, by light speed. Figure 18-3-1 shows the state of force line curve at $g = 1$ and $g = 8$.

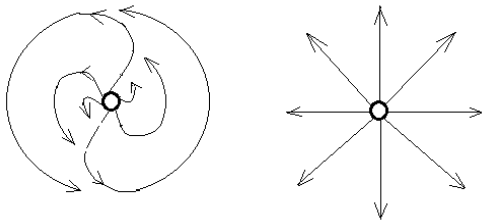


Figure 18-3-1

The static charge from force line elements is changed along by the curve of the force line elements from $g = 8$ to $g = 1$, as shown in Figure 18-3-2 (cf. §7, §19).

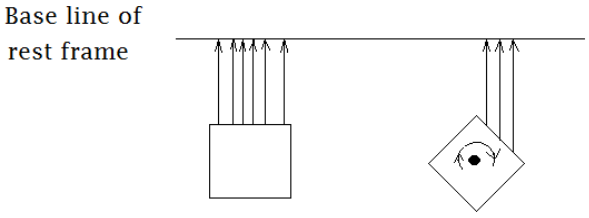


Figure 18-3-2

The total change of the electrostatic charge by change of the force line curve, the Earth EGM factor C_{EGM} = 1.5, and the correspondence factor C_{cor} = 1.5 is

d_c = (8 × 8)(1.5 × 1.5)(1.5 × 1.5)

= 324 18-3-32

Therefore, the total change of the electrical permittivity of air of Earth with $g = 1.202$ and at $g = 2 \times 1.5$ is

Q_e = (0.000589) (3× 1.202)

x_e = 1.002124 18-3-33

The electrical permittivity change of air at g = (8)(1.5)(1.025161) is

Q_e = (0.000589) /(12.301932) = 0.0000479

x_{e16} = 1.0000479

The total change of permittivity is

$$x_{eff} = \frac{(1.202)}{(1.002124)(1.0000478)}$$

= 1.199395 18-3-34

Therefore, the final difference is

$$d = \frac{324}{1.199395}$$

= 270.136194 18-3-35

The theoretical value of the electrostatic charge of an electron at g = 1 is

e = (5.931043 × 10^{-22} C) (270.136194)

= 1.602189 × 10^{-19} C 18-3-36

The experimentally observed value is

e = 1.602189 × 10^{-19} C 18-3-37

This is the quantization process of the electrostatic charge of an electron. In this quantization process, we can see how the coulomb potential is changed to a harmonic oscillator potential. Because the electric force line element is curved, its related electrostatic charge gets weaker and weaker. The Coulomb force also becomes weaker, as pictured on the left side of Figure 18-3-3. However, the neutrolateral force from the curved force line soon joins in as an additional force that is as strong as the usual Coulomb force. The result is the right side of Figure 18-3-3. After this phase, the strong neutrolateral force builds a more narrow potential shape, as strong as $E_0 = g(n + \frac{1}{2})\hbar\omega$ of the harmonic oscillator potential. This additional energy of $\frac{1}{2}\hbar\omega$ results from the neutrolateral force of the general relativity of CFLE theory. Therefore, historically speaking, Plank's postulated energy quantization of the simple harmonic oscillator (the minimum energy of his postulate is $\hbar\omega$, from $n\hbar\omega$, where n = 0, 1, 2, 3…) was actually in error by the additive energy quantity $\frac{1}{2}\hbar\omega$.

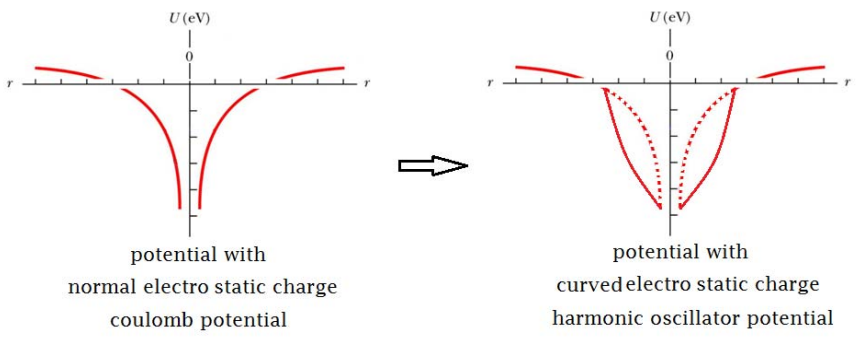


Figure 18-3-3

But the quantization process of the gravitostatic charge of the electron (mass) is the reverse of its electrostatic charge quantization. When electric force line elements curve from g = 8 to g = 1, the electrostatic charge changes from the permitted minimum value to unit 1. In contrast, when gravitational force line elements curve from g = 8 to g = 1, the gravitostatic charge changes from unit 1 to the permitted minimum value.

Because the gravitational charge constant is $N = 2.006743 \times 10^{28}$, we can theoretically expect the quantized gravitational charge (mass) of the electron to change by a unit charge of 1 kg. That is

$$m = \frac{1}{N}\ \text{kg}$$

$$= \frac{1}{2.006743 \times 10^{28}}\ \text{kg}$$

$$= 4.983199 \times 10^{-29}\ \text{kg} \qquad 18\text{-}3\text{-}38$$

However, because of the curve of force line elements from g = 8 to g = 1 for maximum gravitational charge screening, the total change of the gravitostatic charge is

$$d = (8)(8)$$

$$= 64 \qquad 18\text{-}3\text{-}39$$

Because the gravitational permittivity of air by the Earth EGM factor C_{EGM} = 1.5 is

$$Q_{g1.5} = (0.016774)\ (1.5) = 0.025161$$

$$x_{g1.5} = 1.025161 \qquad 18\text{-}3\text{-}40$$

The electrical permittivity change of air from g = 8 to g = 1 and by the Earth curve factorg_E = 1.202 is

$$Q_{e3.6} = (0.000589)\ (\ 1.5\times 2 \times 1.202 \times 1.025161) = 0.002177$$

$$x_{e3.6} = 1.002177 \qquad 18\text{-}3\text{-}41$$

Total difference is

$$x_{tot} = (1.025161)(1.002177)$$

$$=1.027393 \qquad 18\text{-}3\text{-}42$$

Total effect is

$$x_{gf} = \frac{1.202}{1.027393}$$

$$= 1.169952 \qquad 18\text{-}3\text{-}43$$

The final difference is

$$d = \frac{64}{1.169952}$$

$$= 54.703117 \qquad 18\text{-}3\text{-}44$$

The theoretical value of the gravitostatic charge (mass) of an electron at $g = 1$ (rest mass) is

$$m = \frac{4.983199 \times 10^{-29}\text{kg}}{54.703117}$$

$$= 9.109534 \times 10^{-31}\ \text{kg} \qquad 18\text{-}3\text{-}45$$

The experimentally observed value is

$$m = 9.109534 \times 10^{-31}\ \text{kg} \qquad 18\text{-}3\text{-}46$$

Finally, because the solaratomic seed mass is 1 kg, the galactomic seed mass is

$$M_{\text{gs}} = (1\ \text{kg})\ (1.190208 \times 10^{7})^{2}$$

$$= 1.416595 \times 10^{14}\ \text{kg} \quad !!! \qquad 18\text{-}3\text{-}47$$

So, the cosmotomic seed mass is

$$M_{\text{cs}} = (1\ \text{kg})\ (1.190208 \times 10^{7})^{4}$$

$$= 2.006742 \times 10^{28}\ \text{kg}!!! \qquad 18\text{-}3\text{-}48$$

The meaning of Avogadro's number without the force line curve $N = 2.006742 \times 10^{28}$ is that the strong force is the real physical reason for mass quantization. Because mass is screened by force lines and the degree of mass screening is proportional to the force line length, outside of the limit of charge screening we cannot establish the uncertainty principle and relativity principle. Because the magnetic field is produced only by moving charges in classical electrodynamics and relativity theory, outside of the charge screening limit we again cannot establish classical electrodynamics and relativity theory. Consequently, a rest magnet field can exist. Therefore, x (cf. §1) can exist instead ofΔx. In other words, in order to establish$\nabla \cdot B \neq 0$, a particle has to be in the rest state under the limit of speed. According to the uncertainty principle, the lowest possible speed of a particle in the $\Delta x \Delta m = 1$ state is only $\frac{\hbar}{v} = 1$. therefore, the starting speed of the rest state is just under

$$\left|\frac{\left(\frac{6.626176\times10^{-34}\ \text{Js}}{2\pi}\right)}{\left(\frac{6.626176\times10^{-34}\ \text{m/s}}{2\pi}\right)}\right| = 1, \quad v_{\text{rest state}} = \frac{6.626176\times10^{-34}}{2\pi}\ \text{m/s} \qquad 18\text{-}3\text{-}49$$

Therefore, the established limit of the uncertainty principle and relativity principle is

$$v|_i^f = (\frac{6.626176\times10^{-34}}{2\pi}\ \text{m/s} \sim 2.99792458 \times 10^8\ \text{m/s}) = \left|\frac{c}{\hbar}\right| \qquad 18\text{-}3\text{-}50$$

$$\Delta m|_i^f = (9.109534 \times 10^{-31}\text{kg} \sim 1.535908 \times 10^{-9}\text{kg}) = \left|\sqrt{\frac{c}{\hbar}}\ \right| \qquad 18\text{-}3\text{-}51$$

$$\Delta x|_i^f = (1.145105\times 10^{-34}\ \text{m} \sim 5.48847910^{29}\ \text{m}\ ) = \{\left|\sqrt{\frac{c}{\hbar}}\ \right|\}^3 \qquad 18\text{-}3\text{-}52$$

18.4 The Quantization of the Gravitational Field in CFLE Theory

In the previous section, we obtained the seed mass of a proton. Therefore, we can now calculate the possible number of particle generations in a proton.

The rest mass of a proton is

$$m_{\text{proton}} = 1.672649 \times 10^{-27}\ \text{kg} \qquad 18\text{-}4\text{-}1$$

Therefore, the maximum mass of the first generation is

$$m_1 = (1.672649 \times 10^{-27}\ \text{kg})\ (1.190208 \times 10^7)$$

$$= 1.990800 \times 10^{-20}\ \text{kg} \qquad 18\text{-}4\text{-}2$$

The maximum mass of the second generation is

$$m_2 = (1.990800 \times 10^{-20}\ \text{kg})\ (1.190208 \times 10^7)$$

$$= 2.369466 \times 10^{-13}\ \text{kg} \qquad 18\text{-}4\text{-}3$$

The maximum mass of the third generation is

$$m_3 = (2.369466\times 10^{-13}\ \text{kg})\ (1.190208\times 10^7)$$

$$= 2.820157 \times 10^{-6}\ \text{kg} \qquad 18\text{-}4\text{-}4$$

The maximum mass of the last generation is

m_4= 1 kg

This mass is the bar mass of a proton seed.

Therefore, the possible particle generation number in a proton is four generations.

In 1927, the electromagnetic field was quantized by P. A. M. Dirac. Because gravitational force lines and the electromagnetic force lines have qualitatively the same property, Dirac's quantization process can be used for quantization of the gravitational force line and its field. Much like the electric field$\vec{E}$ and the magnetic field$\vec{B}$, for which only the vector potential$\vec{A}$ ($\vec{x}$,t) can be expressed, so too can we express the gravitational field $\vec{\mathbb{E}}$ and its mass magnetic field $\vec{\mathbb{B}}$ with the gravitational vector potential$\vec{\mathbb{A}}$ ($\vec{x}$,t) according to the correspondence property of force lines in CFLE theory:

$$\mathbb{E}^{\rightarrow} = -\frac{1}{C}\frac{\mathbb{A}}{dt}, \quad \mathbb{B}^{\rightarrow} = \nabla^{\rightarrow} \times \mathbb{A}, \quad \nabla^{\rightarrow} \times \mathbb{B}^{\rightarrow} = \frac{1}{C}\frac{d\mathbb{E}^{\rightarrow}}{dt} \qquad 18\text{-}4\text{-}5$$

Hence, the vector potential $\mathbb{A}$ is satisfied

$$\nabla^2\mathbb{A}^{\rightarrow} - \frac{1}{C^2}\frac{d^2\mathbb{A}^{\rightarrow}}{dt^2} = 0 \qquad 18\text{-}4\text{-}6$$

For solving by separation of variables, we change $\mathbb{A}^{\rightarrow}(x^{\rightarrow}, t)$:

$$\mathbb{A}^{\rightarrow}(x^{\rightarrow}, t) = \sum_l q_l(t) u_l^{\rightarrow}(x^{\rightarrow}) \qquad 18\text{-}4\text{-}7$$

About each l

$$\nabla^2 u_l^{\rightarrow}(x^{\rightarrow}) + \frac{\omega_l^2}{C^2} u_l^{\rightarrow}(x^{\rightarrow}) = 0$$

$$\left(\frac{d^2 q_l(t)}{dt^2}\right) + \omega_l^2 q_l(t) = 0 \qquad 18\text{-}4\text{-}8$$

where ω is a separation constant.

About the wall of a regular hexahedron

$u_l^{\rightarrow} 1_{\tan} = 0$

$$\nabla^{\rightarrow} \times u_l^{\rightarrow} 1_{\text{norm}} = 0 \qquad 18\text{-}4\text{-}9$$

Inside of a regular hexahedron

$$\nabla^{\rightarrow} \cdot u_l^{\rightarrow} = 0 \qquad 18\text{-}4\text{-}10$$

For the energy of a gravitational wave in a regular hexahedron, we can give the Hamiltonian $\mathbb{H}$:

$$\mathbb{H} = \frac{1}{8\pi} \int d^3x \, (\mathbb{E}^2 + \mathbb{B}^2)$$

$$= \frac{1}{8\pi} \int d^3x \, \{\frac{1}{c^2} \frac{d\mathbb{A}^{\rightarrow}}{dt} \frac{d\mathbb{A}^{\rightarrow}}{dt} + (\nabla^{\rightarrow} \times \mathbb{A}^{\rightarrow}) \cdot (\nabla^{\rightarrow} \times \mathbb{A}^{\rightarrow})\}$$

$$= \frac{1}{8\pi} \sum_l \sum_m \{q_l^{\cdot} q_m^{\cdot} \frac{1}{c^2} \int d^3 x u_l^{\rightarrow} \cdot u_m^{\rightarrow} + q_l q_m \int d^3x \, (\nabla^{\rightarrow} \times u_l^{\rightarrow}) . (\nabla^{\rightarrow} \times u_m^{\rightarrow})\}$$

$$= \frac{1}{8\pi} \frac{1}{c^2} \sum_l (q_l^{\cdot} q_l^{\cdot} + \omega_l^2 q_l q_l)$$

$$= \sum_l \mathbb{H}_l \qquad 18\text{-}4\text{-}11$$

$$\frac{d\mathbb{H}_l}{dq_l} = -p_l^{\cdot} = \frac{\omega_l^2}{4\pi} \frac{1}{c^2} q_l, \quad \frac{d\mathbb{H}_l}{dp_l} = q_l^{\cdot} \qquad 18\text{-}4\text{-}12$$

$$P_l = \frac{1}{4\pi} \frac{1}{c^2} q_l^{\cdot}$$

$$\mathbb{H}_l = 2\pi c^2 p_l p_l + \frac{1}{8\pi} \frac{1}{c^2} \omega_l^2 q_l q_l$$

$$P_l = \sqrt{4\pi c^2} \, P_l$$

$$Q_l = \frac{1}{\sqrt{4\mu c^2}} q_l \qquad 18\text{-}4\text{-}13$$

$$\mathbb{H}_l = \frac{1}{2} (P_l P_l + \omega_l^2 Q_l Q_l) \qquad 18\text{-}4\text{-}14$$

To quantize this formula, we use

$$[q_l P_l] = i\hbar_g = [Q_l P_l] \qquad 18\text{-}4\text{-}15$$

where $\hbar_{\mathrm{g}}$ is the energy quantum for the gravitational field. Now using the creation operator $a^{\dagger}$, and the annihilation operator a_l,

$$a_l = \frac{1}{\sqrt{2\hbar_{\mathrm{g}}\omega_l}} \left(\omega_l Q_l + iP_l \right) \qquad 18\text{-}4\text{-}16$$

$$a^{\dagger} = \frac{1}{\sqrt{2\hbar_{\mathrm{g}}\omega_l}} \left(\omega_l Q_l - iP_l \right) \qquad 18\text{-}4\text{-}17$$

$$\left[a_l, a_l^{\dagger} \right] = 1$$

or

$$Q_l = \sqrt{\frac{\hbar_g}{2\omega_l}} \left(a_l^{\dagger} + a_l \right)$$

$$P_l = i\sqrt{\frac{\hbar_g \omega_l}{2}} \left(a_l^{\dagger} - a_l \right) \qquad 18\text{-}4\text{-}18$$

The differentiated $a_l, a_l^{\dagger}$ is

$$\frac{d}{dt}[a_l(t)] = -i\,\omega_l a_l(t)$$

$$\frac{d}{dt}[a_l^{\dagger}(t)] = i\omega_l a_l^{\dagger}(t) \qquad 18\text{-}4\text{-}19$$

$$a_l(t) \equiv a_l e^{-i\omega_l t}$$

$$a_l^{\dagger}(t) \equiv a_l e^{i\omega_l t} \qquad 18\text{-}4\text{-}20$$

$$\mathbb{H}_{\mathrm{l}} = \frac{1}{2}\hbar_{\mathrm{g}}\omega_{\mathrm{l}}(a_l^{\dagger}a_l + a_l a_l^{\dagger})$$

$$\mathbb{H} = \frac{1}{2}\sum_{\mathrm{j}} \hbar_{\mathrm{g}}\omega_{\mathrm{l}} \left(a_l^{\dagger}a_l + a_l a_l^{\dagger} \right)$$

$$= \sum_j \hbar_{\mathrm{g}}\omega(a_l^{\dagger}a_l + \frac{1}{2}) \qquad 18\text{-}4\text{-}21$$

$$q_l(t) = \sqrt{4\pi c^2}\sqrt{\frac{\hbar_{\mathrm{g}}}{2\omega_l}} \left(a_l e^{-i\omega t} + a_l^{\dagger} e^{i\omega t} \right) \qquad 18\text{-}4\text{-}22$$

which normalized in a regular hexahedron is

$$u_l^{\rightarrow}(x^{\rightarrow}) = \frac{1}{\sqrt{V}}\,\varepsilon_l\,\mathrm{e}^{\pm ik_l^{\rightarrow}\cdot x^{\rightarrow}} \qquad 18\text{-}4\text{-}23$$

where $k_l^{\rightarrow}$ is

$$\frac{k_l^2}{c^2} = \omega_l^2$$

$$\varepsilon_l^{\rightarrow}\cdot k_l^{\rightarrow} = 0 \qquad 18\text{-}4\text{-}24$$

Therefore, $\mathbb{A}^{\rightarrow}(x^{\rightarrow},t) = \sum_l q_l(t)(x^{\rightarrow})$ is generalized to

$$\mathbb{A}^{\rightarrow}(x^{\rightarrow}) = \sqrt{\frac{4\pi C^2}{V}}\sum_l\sum_{\sigma=1}^{2}\sqrt{\frac{\hbar_g}{2\omega_l}}\varepsilon_{l\sigma}^{\rightarrow}\{a_{l\sigma}\mathrm{e}^{i(k_l^{\rightarrow}.x^{\rightarrow}-\omega_l t)} + a_{l\sigma}^{\dagger}\mathrm{e}^{-i(k_l^{\rightarrow}.x^{\rightarrow}-\omega_l t)}\}$$

This formula now expresses the quantized gravitomagnetic wave.

18.5 Table of Whole Energy Quantum $\hbar_j$ Values

Each energy quantum $\hbar_i$ that should be used in microphysics and in macrophysics can be obtained from the unit energy quantum $\hbar_u = 1$, by the charge quantization constant $N = 1.190208 \times 10^7$ and the force quantization constant $N = 1.416595 \times 10^{14}$. Table 18-5-1 gives the required values.

The regular energy quantum interval between the first macro energy quantum $\hbar_{macro}$ and $\hbar_g$ ought to be $N = 1.416595 \times 10^{14}$, but despite the mass difference between the neutron and proton is only 1.001378 times different, the balance of the energy quantum appears broken. Such broken balance is

$$d = (2.116287 \times 10^{-6})\,(1.416595 \times 10^{14})$$

$$= 2.997922 \times 10^8 \ \text{Js} \qquad 18\text{-}5\text{-}1$$

Table 18-5-1. Micro and Macro Energy Quantum Values.

Micro Energy Quantum	Macro Energy Quantum
→ $\hbar_u = 1$	↓.
$\hbar_g = 2.116287 \times 10^{-6}$ Js	$\hbar_{ma1} = 1.894274 \times 10^{7}$ Js
↑	↓
$\hbar_w = 1.493926 \times 10^{-20}$ Js	$\hbar_{ma2} = 2.683420 \times 10^{21}$ Js
↑	↓
$\hbar_e = 1.054589 \times 10^{-34}$ Js	$\hbar_{ma3} = 3.801319 \times 10^{35}$ Js
↑	↓
$\hbar_s = 7.444534 \times 10^{-49}$ Js	$\hbar_{ma4} = 5.384930 \times 10^{63}$ Js
↑	$\hbar_{ma4'} = 9.679221 \times 10^{70}$ Js
$\hbar_s = 5.255231 \times 10^{-63}$ Js	$\hbar_{ma5} = 1.080616 \times 10^{77}$ Js
↑	↓
$\hbar_c = 3.079763 \times 10^{-77}$ Js	$\hbar_{ma6} = 1.286158 \times 10^{84}$ Js
←	←.

However,

$$\hbar_{ma1} = 1.894274 \times 10^{7} \text{ Js}$$

The balance difference is

$$d = \frac{2.997922 \times 10^{8} \text{Js}}{1.894274 \times 10^{7} \text{Js}}$$

$$= 15.826232 \qquad 18\text{-}5\text{-}2$$

Between the unit energy quantum and the first macro energy quantum for a macro-object, there are only three macro-object particles. That is, an electron, proton, and neutron. Because the macro energy quantum is

a hierarchical gravitational energy quantum along the weak force, electric force, and strong force, the electric charges of the electron and proton are offset as the same mass calculated in the unified state. The remaining macro-object is only a neutron. The ratio of the component macro-objects of Earth is 1:1:1 = electron:proton:neutron. The neutron has almost the same mass as a proton, but is electrically very different. We now know that the negative electric charge carrier in a neutron is the negative muon. The force line curve of a muon is

$g = 3.772002$

$g^2 = (3.772002)^2$

$= 14.227999$ 18-5-3

The remaining difference is

$d = \frac{15.826232}{14.227999}$

$= 1.112330$ 18-5-4

The gravitational permittivity of air at $g = 3.772002$ is

$Q = (0.016774)\ (3.772002) = 0.063272,$
$x = 1.063272,\ x^2 = 1.130547$ 18-5-5

The remaining difference is

$d = \frac{1.130547}{1.112330}$

$= 1.016377$ 18-5-6

That is only the gravitational permittivity of air at $g = 1$

$x = 1.016774$ 18-5-7

This difference means

$d = \frac{1.016774}{1.016377}$

$= 1.000391$ 18-5-8

That is the electrical permittivity of air from the quark state before the decay of a muon at $g = \frac{1}{3}$ from $e_{\text{quark}} = \frac{1}{3}e$.

$$Q = \frac{0.000589}{3} = 0.000196, \quad x = 1.000196, \; x^2 = 1.000392 \qquad 18\text{-}5\text{-}9$$

Therefore, the reason for the broken balance between $\hbar_g$ and $\hbar_{\text{ma1}}$ is the broken balance between a neutron's mass and its electric 0 charge. Such broken balances can also be found between electrons and protons. The electric charge of the two particles should be exactly the same, $1e_{\text{P}}: 1e_{\text{E}}$ = 1:1. Otherwise, even a regular star or galaxy should be exploded. However, the rest mass between the two particles is $m_{\text{P}}: m_{\text{E}}$ = 1836:1. We know that a proton has substructure. From these two factors, we can conclude that the proton mass comes from the neutrolateral force. In other words, the proton mass is a kind of dark matter. Of course, this dark mass appears by curved force lines, not by curved space. The original perpendicular mass of a proton (m_p = 9.109534×10^{-31} kg) is the same as the perpendicular mass of an electron (m_e = 9.109534×10^{-31} kg). This can be visualized in Figure 18-5-1.

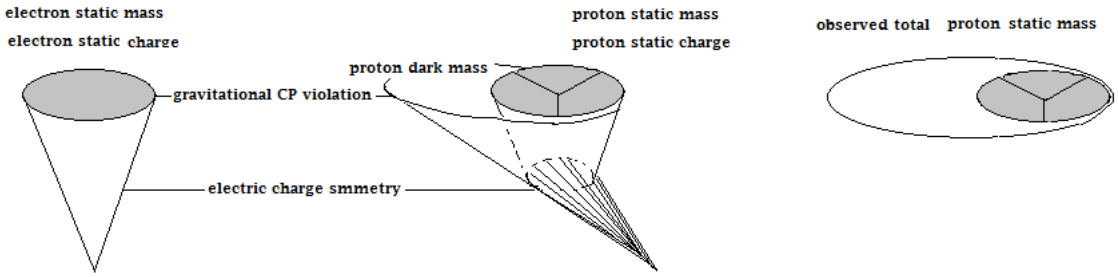


Figure 18-5-1

Figure 18-5-1 shows the curved force line of a proton and constituent quarks with fractional electric charge and gravitational CP violation by curve of force line. Because each electric charge component of proton is fractional as $+\frac{2}{3}e, +\frac{2}{3}e, -\frac{1}{3}e$, force line of each quark must be curved. Therefore, dark matter of proton can occur and gravitational CP violation. Otherwise, perfect neutralization of electric charge between proton and electron must be broken and all objects of universe must be exploded. Because the additional mass comes from the neutrolateral force line, the total mass of a proton is bigger than the perpendicular mass of an electron. Because we do not know the exact meaning of this

broken balance between the electric charge of a proton and its mass by the force line curve, we cannot calculate the correct relation between the mass and luminosity (related electric charge as source of electromagnetic wave) of stars and galaxies, let alone the cosmos. Dark matter is produced only by our misunderstanding. In the previous table of energy quantum values, Planck's energy quantum was shown to be only the electromagnetic energy quantum $\hbar_{\mathrm{e}}$ and his quantum theory is only for the electromagnetic force. Therefore, Planck's quantum theory cannot be used generally in the universe. The quantum theory that was started in the 1900s by M. Planck should be called the electromagnetic quantum theory. It is CFLE theory, which uses all energy quanta that should be called the universal quantum theory.

18.6 Solving the Inconsistency Between the Locality and Quantum Entanglement of Present Quantum Theory by CFLE Theory

The discussion so far has treated modern quantum theory as a perfect theory without discrepancy, but as discussed above, the modern quantum physics that was started by Max Planck in the 1900s contains fatal inconsistencies. This problem was raised by Einstein and his colleagues for too long a time for the Copenhagen interpretation to ignore. Because of quantum entanglement, quantum theory should treat two given particles as a whole, regardless that their location may be at the opposite ends of the universe. That is, any performed experiment about the whole particle will be influenced by the state of the individual particles located at opposite ends of the universe. In other words, "the world has no property of locality, or the world is always in a state of totality or globality."

Einstein had refused such notion of a non locality of quantum theory and bitterly criticized it as being "spooky action at a distance." But current experiments show that non locality does indeed exist. Therefore, the problem raised is that if the non locality of the universe were true, then it demands that with their only limited knowledge of everything (and limited theory of everything), humankind should not have been able to develop the sciences to what they have become today. It was only through the procession of small steps that humankind could reach its current state of scientific development without a full knowledge of everything.

In essence, the universe is in a state of non-locality, but modern quantum theory (Planck's quantum theory) cannot solve this discrepancy. The quantum theory of CFLE theory, however, can solve this discrepancy very easily, because in CFLE theory there are various energy quanta $\hbar_{\mathrm{i}}$ for every energy step, and every force strength step, associated with that can explain phenomena of every energy step satisfactorily. This means that the locality of the universe is established by various energy quanta $\hbar_{\mathrm{i}}$. These energy quanta $\hbar_{\mathrm{i}}$ and their various forces stipulate the phenomena of each range and each boundary. Therefore, humankind was able to start science without knowledge of everything, using the desired step, desired scale, and desired parts according to the needs of humankind.

The discrepancy between locality and quantum entanglement is historically the most serious and most difficult problem that broke quantum gravitation theory and quantum gravitational cosmology. Just for this reason, I pursued through CFLE theory the energy quantum of the various steps and finally found many energy quanta $\hbar_{\mathrm{i}}$. Ultimately, the Copenhagen interpretation is right. Namely, indeterminism is generally correct. But, determinism is partly right in the early phase of the universe, because the initial condition of the universe was $\hbar_{\blacksquare} \geq M_{\blacksquare} V_{\blacksquare} X_{\blacksquare}$. In this formula, we cannot find the uncertainty of any M, V, and X, so we do not express these as $\hbar_{\mathrm{macro}} \geq \Delta M V \Delta X$. In perfect quantum theory, there is no need to abandon localism. But, globally, a perfect quantum theory ultimately does not need realism, because the normal state of the universe is always that of a state of globality. This means that the universe always maintains its global symmetry of seven charges and time. The result is neutral nihility, as discussed in §15 and §16.

"No observation, no reality" is ultimately the truth by the Copenhagen interpretation and CFLE theory. However, realism is temporarily right, because when global symmetry is broken locally, physical existence appears. But the life-time of physical existence is relatively very short, compared with the life-time of the universe, and real observations are needed for proof that physical existence really exists. For example, the life-time of a star is regularly two billion years (10^{10}~10^{11} years), whereas the life-time of the universe is ~10^{30} years. To be able to believe in the reality of "any one individual star" in the universe, observers in the universe would needs constant observations of it. But, because the relative life-time of humankind ($\tau_{\mathrm{humankind}} < \sim 10^2$ years) is

like a flash of lightning compared with the life-time of the universe, we observers choose to simply believe in the physical reality rather than actually observing it. In other words, humankind has concluded that "to believe in this physical reality, we do not need constant observations of the phenomenon" so, realism is only temporarily right. The Copenhagen interpretation, however, is ultimately right.

18.7 Solving Theoretical deduction of Physical Constants by CFLE theory

The radiation emitted by a body as a result of its temperature is called thermal radiation. All bodies emit such radiation to their surroundings as well as absorb such radiation from the surroundings. Generally speaking, the detailed form of the spectrum of the thermal radiation emitted by a hot body depends somewhat upon the composition of the body. However, experiment shows that there is one class of hot bodies that emits thermal spectra of universal character. These are called blackbodies, that is, bodies that have a surface that absorbs the entire thermal radiation incident upon them. Independent of the details of their composition, it is found that all blackbodies at the same temperature emit thermal radiation with the same spectrum. This general fact can be understood on the basis of classical arguments involving thermodynamic equilibrium. The specific form of the spectrum, however, cannot be obtained from thermodynamic arguments alone.

The universal property of the radiation emitted by blackbodies make them of particular theoretical interest, and physicists sought to explain the specific features of this spectrum. The spectral distribution of blackbody radiation is specified by the quantity $R_{\mathrm{T}}(\nu)$, called the spectral radiancy, which is defined so that $R_{\mathrm{T}}(\nu)d\nu$ is equal to the energy emitted per unit time in radiation of frequency in the interval ν to $\nu + d\nu$ from a unit area of the surface at absolute temperature T. The earliest accurate measurements of this quantity were made by Lummer and Pringsheim in 1899. R_{T} increases rapidly with increasing temperature. In fact, this result is called Stefan's law, and it was first stated in 1897 in the form of an empirical equation

$$R_{\mathrm{T}} = \sigma T^4 \qquad 18\text{-}7\text{-}1$$

where

$\sigma = 5.670373 \times 10^{-8}\ \mathrm{W/m^2 \cdot K^4}$ by CODATA 18-7-2

This is called the Stefan–Boltzmann constant.

When temperature T increases, the spectrum shifts toward a higher frequency. This result is called Wien's displacement law:

$$\lambda_{max} T = C_W \qquad 18\text{-}7\text{-}3$$

where λ_{max} is the wavelength at which the spectral radiancy has its maximum value for a particular temperature T. The experimentally determined value of Wien's constant by CODATA is

$C_W = 2.897772 \times 10^{-3}$ mK $= 2.897772 \times 10^{-6}$ K. The value of these two important constants, σ and C_W, can be obtained only theoretically if CFLE theory were the ultimate unified theory. For that, we now rewrite Wien's constant as

$$C_W \approx 2.897772 \times 10^{-6}\ \mathrm{K} \implies C_W = \frac{1}{3.450927 \times 10^5}\ \mathrm{K}$$

But, because in CFLE theory the wavelength is (cf. §7.10)

$$\lambda = 4R \qquad 18\text{-}7\text{-}4$$

we can rewrite Wien's constant for radiation as

$$C_W = \frac{1}{[(4)(144)]^2}\ \mathrm{K} \qquad 18\text{-}7\text{-}5$$

The factor of 144 is essentially the full horizon factor of $g^2 c_c^2$ (cf. §13.6)

$$g^2 c_c^2 = (8)^2\,(1.5)^2 = (144)^2 = 20736 \qquad 18\text{-}7\text{-}6$$

But, because physical principle of Wien's displacement law and experiment were observed same condition of black body radiation as from18-7-11 to 18-7-13 is, related gravitational permittivity difference is

$Q_{g1} = (0.016774)$, $x_{g1} = 1.016774$

$Q_{e1} = (0.000589)(4 \times 1.202 \times 1.073202 \times 1.002356)$

$= 0.003046$, $x_{e1} = 1.003046$

x_{tot}=(1.016774)(1.003046)= 1.019871 18-7-7

The expected value of 4 from $\lambda = 4R$ is

$e_4 = (4)(1.019871)$

=4.079484 18-7-8

The theoretical expected observation value of Wien's constant is

$$C_{\mathrm{W}} = \frac{1}{[(4.079484)]^2\,[(144)]^2}$$

$$= \frac{1}{3.450924\times 10^5}$$

$$= 2.897775 \times 10^{-6}\ \mathrm{K}$$

$$= 2.897775\times 10^{-3}\mathrm{mK} \qquad 18\text{-}7\text{-}9$$

This is purely theoretical value.

The observed value by CODATA is

$C_W = 2.897772 \times 10^{-3}$ mK

This result means that the force line curve g is the same as temperature T, as discussed in §16.1. Namely,

$g \propto T \implies g = iT$,

where

$i = 1$ 18-7-10

In the empirical equation of Stefan's law, $R_{\mathrm{T}} = \sigma T^4$, the spectral radiancy is the emitted energy from a unit area of the surface. Because every component particle of a blackbody has a force line curve of $g = 6.545979$, this curve factor g affects the area factor squarely ($A_{\mathrm{unit}} = g^2$) according to the square law of every force.

$$F = \frac{GM^2}{r^2}, \quad F = \frac{e^2}{4\pi\varepsilon_{\mathrm{o}} r^2} \qquad 18\text{-}7\text{-}11$$

Because there are 4 kinds of force line elements, the total effect of the curve factor is

$E = A_{\text{unit}}^4 = (g^2)^4$ 18-7-12

The change of force line curve from the $g = 1$ state of a particle to the g = 8 state of a photon is

$d = \frac{g_8}{g_1} = 8$

The related electrical permittivity change of air by $g = 8$ is

1.327674/1.202=1.104554

$Q_1 = (0.000589)\ (8\times 1.202) = 0.005664,\quad x_1 = 1.005664$

$Q_2 = 0.000589, x_2 = 1.000589$

Thus, the total additional effect is

$x_{\text{eff}} = (x_1\ x_2)$

$= (1.005664)(1.000589)$

$= 1.006256$ 18-7-13

The total curve factor is

$d = (8)(1.006256)$

$= 8.050048$

d^2 as g^2 is

$d^2 = (8.050048)^2$

$= 64.803273$ 18-7-14

The final curve factor for the 4 kinds of force line curve is

$(g^2)^4 = (64.803273)^4$

$= 1.763550 \times 10^7$ 18-7-15

The expected theoretical value of the Stefan−Boltzmann constant is

$\sigma = \frac{1}{1.763550 \times 10^7}$ W/m^2·K^4

$= 5.670381\times 10^{-8}\ \mathrm{W/m^2\cdot K^4}$ 18-7-16

This purely theoretical value agrees quite well with the experimental value.

The observed value by CODATA is

$\sigma = 5.670373(21)\times 10^{-8}\ \mathrm{W/m^2\cdot K^4}$

The value of the Stefan−Boltzmann constant is derivable as well as experimentally determinable. That is

$$\sigma = \frac{2\pi^5 K_B^4}{15h^3c^2} = \frac{\pi^2 K_B^4}{60\hbar^3 c^2} \quad \text{or} \quad \sigma = \frac{2\pi^5 R^4}{15h^3c^2 N_A^4} = \frac{32\pi^5 hR^4 R_\infty^4}{15A_r(e)^4 M_u^4 c^6 \alpha^8} \qquad 18\text{-}7\text{-}17$$

where K_B is the Boltzmann constant, h is the Planck constant, c is the speed of light, R is the universal gas constant, N_A is the Avogadro constant, R_∞ is the Rydberg constant, $A_r(e)$ is the relative atomic mass of the electron, M_u is the molar mass constant, and α is the fine structure constant. Because of the successful theoretical calculation of the Stefan–Boltzmann constant by CFLE theory, we can expect to obtain pure theoretical results of the gravitational field constant and electrical field constant by the same curve factor from CFLE theory.

Because of the square law of every force, the curve factor gc_c of gravitationally interacting particles becomes

$g^2 c_c^2 = (6.545979)^2\ (1.5)^2 = 96.412142$

But, the gravitational permittivity of the component particle of every object for a neutrolateral force at $g = 8$ is

$Q_{6.5} = (0.000589)\ (6.545979) = 0.003856$

$x_{6.5} = 1.003856$

The electrical permittivity of a component particle at $g = \frac{1}{1.5}$ is

$Q_{0.66} = \frac{(0.000589)}{(1.5)} = 0.000393$

$x_{0.66} = 1.000393$

The electrical permittivity of a component particle at $g = \frac{1}{(96.412142)}$ is

$$Q_{0.01} = \frac{(0.000589)}{(96.412142)} = 0.000006$$

$$x_{0.01} = 1.000006$$

The total effect of this permittivity is

$$x_{\text{effect}} = \frac{(x_{6.5})(x_{0.66})}{(x_{0.01})}$$

$$= \frac{(1.003856)(1.000393)}{(1.000006)}$$

$$= 1.004244 \qquad \text{18-7-18}$$

Because this effect is only the factor gc_c, for the factor of $g^2 c_c^2$ we get

$$(x_{\text{eff}})^2 = (1.004244)^2 = 1.008507$$

Therefore, the final effective value of $g^2 c_c^2$ is

$$g_p^2 c_{cp}^2 = (96.412142)(1.008507)$$

$$=97.232305 \qquad \text{18-7-19}$$

In CFLE theory, the unit force line length for charge screening (cf. §7) is $R = 1.190208 \times 10^7$.

Therefore, the ratio of the uninfluenced unit force line length of gravitational interaction by the given resistant material (cf. §14 and §15) is

$$R = \frac{1}{\frac{1.190208 \times 10^7}{97.232305}} = \frac{1}{1.224087 \times 10^5} \qquad \text{18-7-20}$$

The square law of the gravitational force is $F = \frac{GM^2}{r^2}$.

The ratio of the uninfluenced unit force line area of gravitational interaction by the given resistant material is

$$A = \frac{1}{(1.224087 \times 10^5)^2}$$

$$= \frac{1}{1.498388 \times 10^{10}}$$

$$= 6.673838 \times 10^{-11} \qquad 18\text{-}7\text{-}21$$

The gravitational field constant G_o in a vacuum from ε_o in Eq. 10-5-10 is $G = 6.673838 \times 10^{-11}$ m^2·mkg/s^2·kg^2.

This theoretical value of Eq. 18-7-21 agrees well with the other theoretical value of Eq. 10-5-10. Therefore, we can find here that the physical basis of CFLE theory is principally correct in the given universe.

Because of the correspondence factor c_c = 1.5 (cf. §7.13), there is a difference between the gravitational force and electrical force. That is

$$\frac{g^2 c_c^2}{c_c^2} = g^2 \implies \frac{(6.545979)^2(1.5)^2}{(1.5)^2} = 42.849841$$

But, this value is observed in the air from the force line curve of g = 6.545979 for a proton (cf. §7.5). Thus, given the gravitational permittivity is

$Q_{g6.5} = (0.016774)\ (6.545979) = 0.109802$

$x_{g6.5} = 1.109802 \quad 1.009098$

the electrical permittivity of air at g =

$Q_{e14} = (0.000589)(6.545979 \times 1.5 \times 1.5 \times 1.050322) = 0.009112$

$x_{e14} = 1.009112$

$Q_{e0.02} = \frac{0.000589}{42.849841} = 0.000014$,$x_{e0.02} = 1.000014$

$$x_{tot} = \frac{(x_{g6.5})(x_{e0.02})}{(x_{e14})} = \frac{(1.109802)(1.000014)}{(1.009112)}$$

$$= 1.099796$$

Applying the square law of the force, this becomes

$$x_{eff}^2 = (1.099796)^2 = 1.209551 \qquad 18\text{-}7\text{-}22$$

Therefore, the net g^2 is

$$g_{\text{net}}^2 = \frac{42.849841}{1.209551} = 35.426252$$

In CFLE theory, the unit force line length for charge screening is $R = 1.190208 \times 10^7$.

Therefore, the ratio of uninfluenced unit force line length of an electrical interaction by a given resistant material is

$$R = \frac{1}{(1.190208 \times 10^7)/(35.426252)}$$

$$= \frac{1}{3.359678 \times 10^5} \qquad \text{18-7-23}$$

The square law of the electrical force is

$$F = \frac{e^2}{4\pi\varepsilon_o r^2}$$

and therefore, the theoretical expected ratio of uninfluenced unit force line area of the electrical interaction by a given resistant material is

$$A = \frac{1}{(3.359678 \times 10^5)^2}$$

$$= \frac{1}{1.128743 \times 10^{11}}$$

$$= 8.859409 \times 10^{-12} \qquad \text{18-7-24}$$

$$A_o = \frac{8.859409 \times 10^{-12}}{1.000589}$$

$$= 8.854188 \times 10^{-12}$$

The value of this electric field constant is a purely theoretical value.

The observed value of electric field constant in a vacuum ε_o (cf. §10.5) is

$$\varepsilon_o = 8.854188 \times 10^{-12}\ s^2 \cdot q^2/m^2 \cdot mkg$$

Because the theoretical value agrees well with the experimental value, we again find that the physical basis of CFLE theory is essentially correct in the given universe.

In §8.1, the quantized unit stellar mass $M_{\odot}$ with mass number $A = 1$ was shown to be

$M_{\odot} = 9.943053 \times 10^{29}$ kg

In CFLE theory, this mass corresponds to the proton mass. Therefore, from this mass we can obtain the theoretical mass of Earth with the required accuracy for obtaining the gravitational constant.

Because the proton has a force line curve of $g = 6.545979$, and the electron has a force line curve of $g = 1$, the expected Earth mass $M_{\oplus}$ is

$$M_{\oplus} = \frac{9.943053 \times 10^{29} \text{ kg}}{1{,}836.151}$$

$$= 5.415161 \times 10^{26} \text{ kg} \qquad 18\text{-}7\text{-}25$$

But, this mass only means that the electrical force line is flat at the electron. To build a gravitationally huge particle like Earth, we need a weak force line and gravitational force line too.

For living things to survive, the electrical and gravitational soft environment has to be in perfectly harmonic relation to each other. To achieve this, we need a flat force line curve state ($g = 1$) for the weak force line and gravitational force line.

Because the correspondence number for electricity is $c_c = 1.5$, the square law of the gravitational force needed is

$g^2 \, c_c^2 = (6.545979)^2 \, (1.5)^2 = 96.412142$

But, the gravitational permittivity of Earth is

$x_{gE} = 1.073176$

Because the electrical permittivity of the unit corresponding particle (protons) at the maximum neutrolateral force at $g = 8$ is

$Q_{e16} = (0.000589) \, (8\times 2) = 0.009424$

$x_{e16} = 1.009424$

$Q_{e0.23} = \frac{0.000589}{4.363986} = 0.000135$

$x_{0.23} = 1.000135$

The final difference is

$$d_{\mathrm{f}} = \frac{(x_{\mathrm{gE}})(x_{0.23})}{(x_{e16})}$$

$$= \frac{(1.073176)(1.000135)}{(1.009424)}$$

$$= 1.063300$$

This result means

$$g^2\ c_{\mathrm{c}}{}^2 = \frac{96.412142}{1.063300} = 90.672568 \qquad \text{18-7-26}$$

Therefore, the expected theoretical mass of Earth is

$$M_{\oplus} = \frac{5.415161 \times 10^{26}\ \mathrm{kg}}{90.672568}$$

$$= 5.972215 \times 10^{24}\ \mathrm{kg}$$

The observed value is

$$M_{\oplus} = 5.97219 \times 10^{24}\ \mathrm{kg} \qquad \text{18-7-27}$$

From §8.3, the quantized unit stellar size was found to be

$$R_{\odot} = 3.477370 \times 10^{8}\ \mathrm{m}$$

Between Sun and Earth there are curve difference of force line as between weak charge and electric charge.

Maximum curve difference of force line between two forces is

$$g_{tot}^2 = (8)^2$$

$$=64$$

Because gravitational permittivity at $g = 4.363986$ is

$$x_{gE} = 1.073202$$

electrical permittivity at g =(6.545979× 1.5 × 1.073202) is

$Q_{e11} = (0.000589)(6.545979 \times 1.5 \times 1.073202) = 0.006207$

x_{e11} =1.006207

and because electrical permittivity of air at g = (8× 2) is

Q_{e16} = (0.000589)(8× 1.5 × 1.202 × 1.073202 × 1.006207)

= 0.0091742

x_{e16} = 1.009174

Total effect of permittivity is

$$(x_{tot})^2 = (x_{gE} \cdot x_{e16})^2$$

$$= [(1.073202)(1.0091742)]^2$$

$$= (1.083049)^2$$

=1.172993 18-7-28

Nett difference is

$$d_{nett} = \frac{64}{1.172993} = 54.561280$$

The expected theoretical regular radius of Earth is therefore

$$R_{\oplus} = \frac{3.479987 \times 10^8 \text{m}}{54.561280}$$

= 6.378126× 10^6 m 18-7-29

The present value as interglacial period value by the World Geodetic System 84 (WGS84) at the equator is

$R_{\oplus}$ = 6.378137 × 10^6 m 18-7-30

Two values agree well.

Here, we can ultimately conclude and assert that CFLE theory is the ultimate unified theory in the given universe, because CFLE theory can deduce all fundamental constants theoretically.

18.8 Physical Meaning and Process of Higgs Mechanism in CFLE Theory

Physical meaning of magnet field B is $\frac{v}{c^2} \times E$. This means that moving electric field along vector$\bar{v}$.

That is

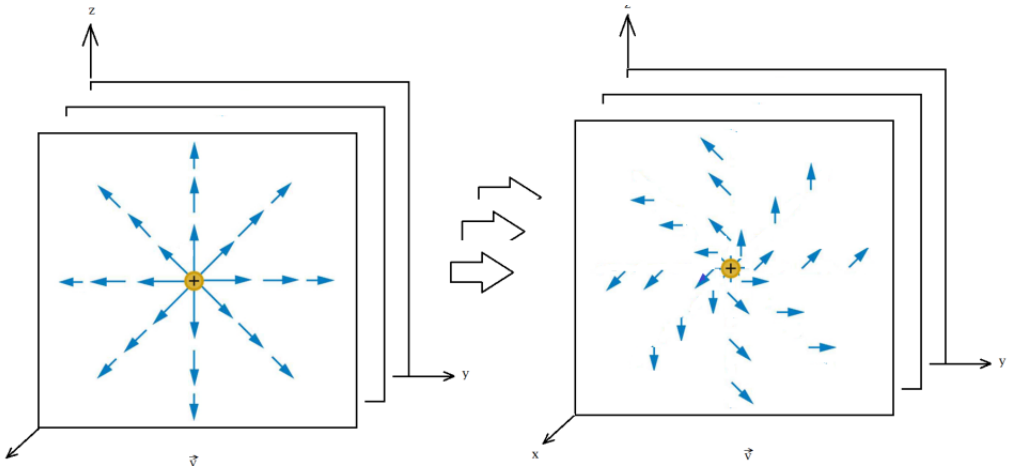


Figure 4-4-6

However, in classical electrodynamics only curl of magnetic field$\nabla \times B$ represent as figure 4-4-8.

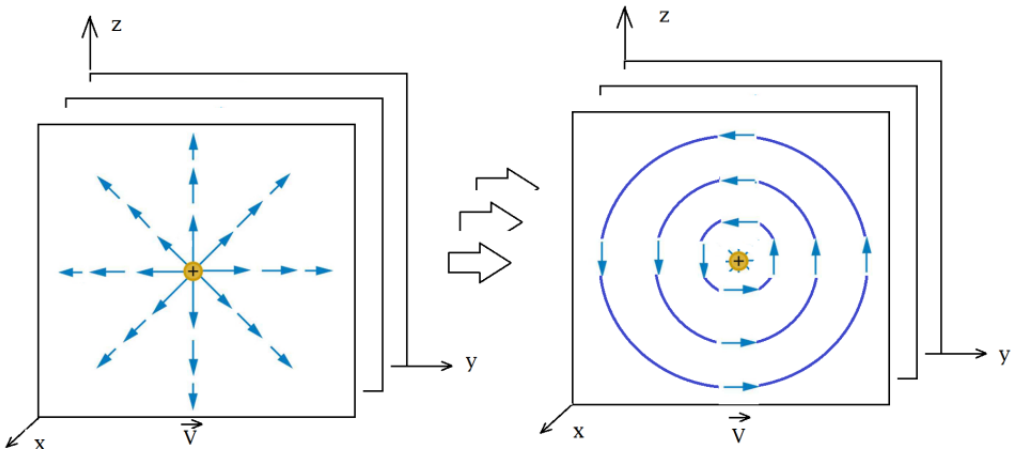


Figure 4-4-8

Figure 4-4-8 can be changed by hexahedron force line element for generation of rest mass of gauge boson to visualize. That is

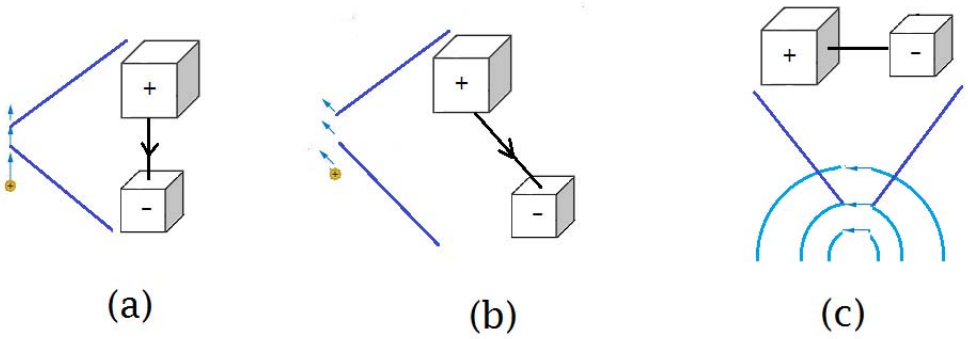


Figure 18-8-1

In photon system E and B must be not changed for $U(1)$ gauge symmetry to keep by Noether's theorem.

Force line running of real photon is

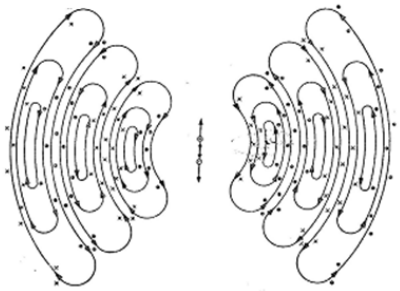
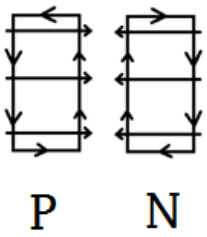


Figure 18-8-2

Photon's force line running of electric field and magnetic field is



where P is half photon from positive charge, N is half photon from negative charge

Figure 18-8-3

Photon builds two components. One of N component comes from negative charged particle with spin$\frac{1}{2}\hbar$. Other P component comes from positive charged particle with spin$\frac{1}{2}\hbar$ as figure 18-8-4.

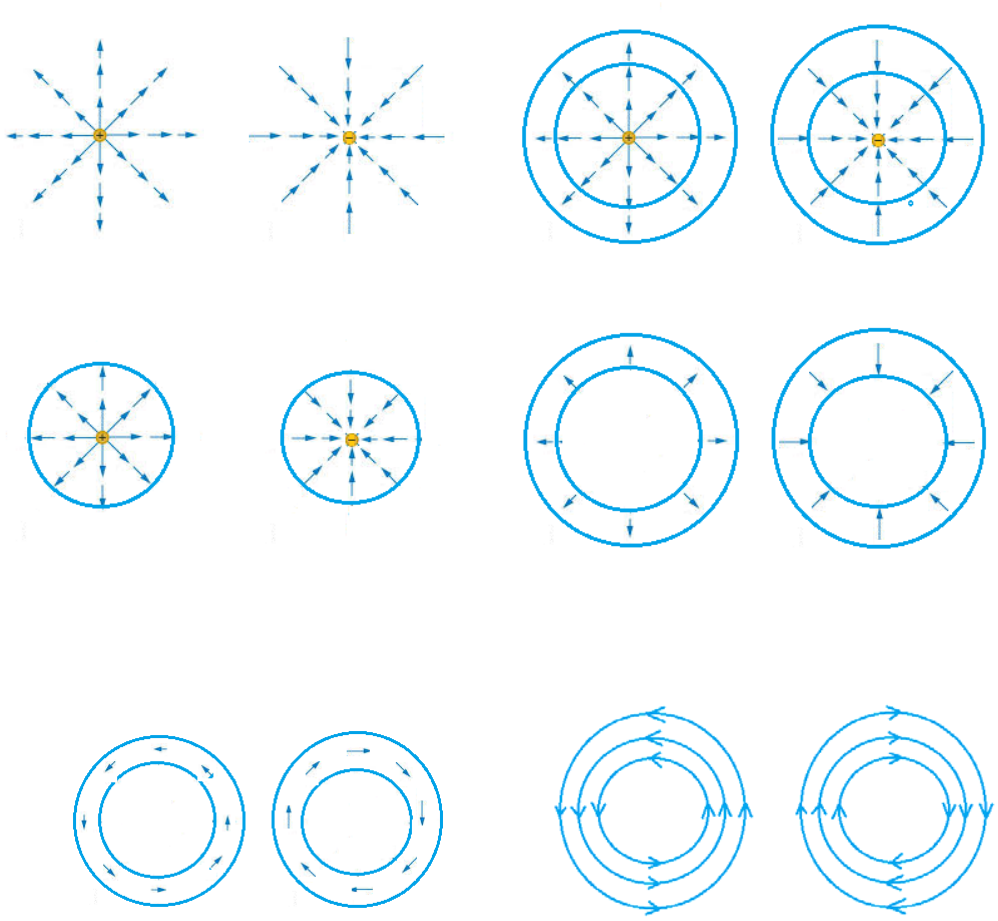


Figure 18-8-4

If a photon did have non-zero static rest mass, there would be other effects as well. Coulomb's law would be modified and the electromagnetic field would have an extra physical degree of freedom.

These effects yield more sensitive experimental probes of the photon mass than the frequency dependence of the speed of light. If Coulomb's law is not exactly valid, then that would cause the presence of an electric field inside a hollow conductor when it is subjected to an external electric field. This thus allows one to test Coulomb's law to very high precision. A null result of such an experiment has set a limit of $m \lesssim 10^{-14}$ eV.

The Particle Data Group gives an upper bound on the photo mass $m < 2 \times 10^{-16} eV$ from a laboratory experiment (an astronomical bound $m < 3 \times 10^{-27} eV \rightarrow arXiv: hep - ph/0306245v2$).

This means that as long as nothing happens to E and B, extra condition of V (component of scalar potential) and A (component of vector potential) are freely imposed (gauge freedom).

Therefore force line elements must be aligned perfectly with line of force line running of photon for charge conservation's law and $U(1)$ gauge symmetry as figure 18-8-5.

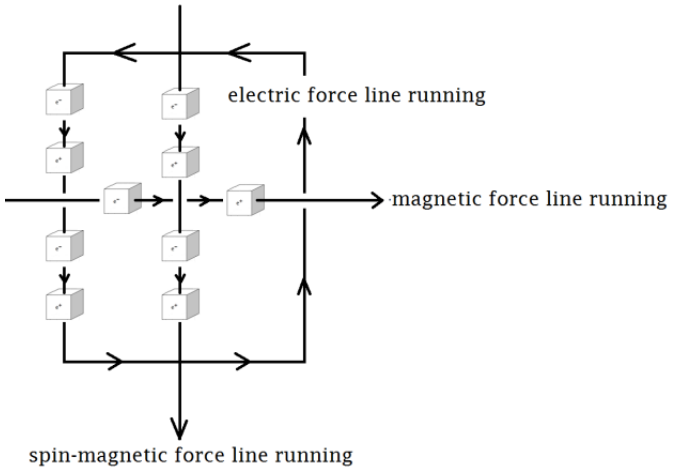


Figure 18-8-5

This means that photon perfectly cannot have any static rest charge (Coulomb charge) and related gravitational static rest charge (Newton mass).

However, such rest charge symmetry is broken with spin force line element of photon by inertia as figure 18-8-6 and 18-8-7

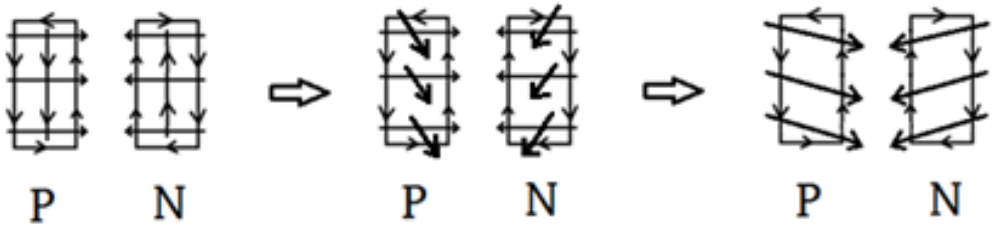


Figure 18-8-6

In the sun's gravito-spin magnet field react this photon react by goldstone boson from Higgs mechanism as figure 18-8-7

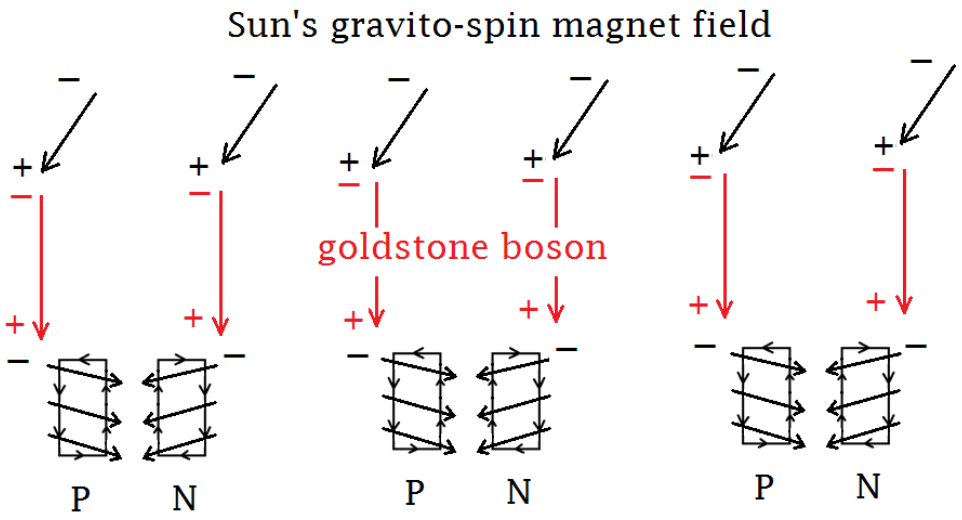


Figure 18-8-7

Static electric charge and related rest (static) mass must be zero. However, neutro-lateral rest mass is not zero, because potential of $\pm$ monopole force line elements is not same by Higgs potential as result of inertia. This means that the electromagnetic field has a physical extra degree of freedom by curved monopole force line elements as spin-magnetic force line. Because spin-magnetic force line running of photon is occurred lastly as result of inertia of charged particles, direction of spin-magnetic force line elements of photon is changed firstly too by resistance of goldstone boson from Higgs potential.

Between gravitational force line elements from photon's electric force line elements connect force line elements of goldstone boson with sun's gravito-spin magnet force line elements as figure 18-8-8 so called eaten up of goldstone boson.

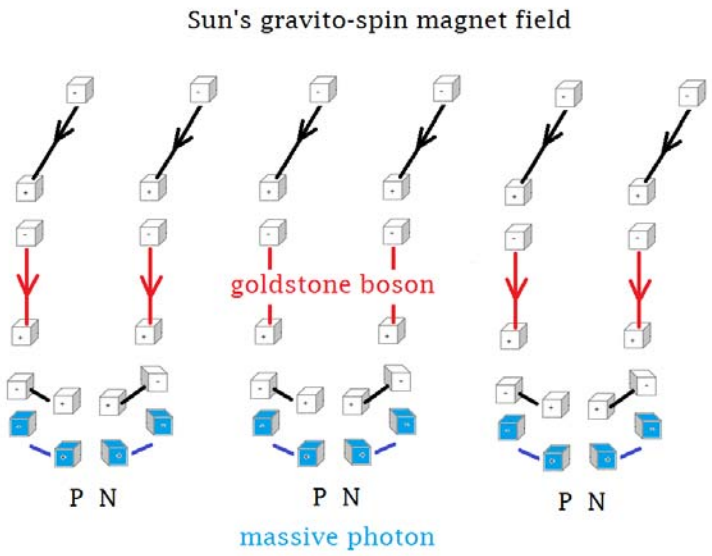


Figure 18-8-8

Results of eaten up of goldstone boson, the Sun is observed massive astronomical object for observer of photon's coordination system and photon is observed massive gauge particle for the Sun as figure 18-8-9.

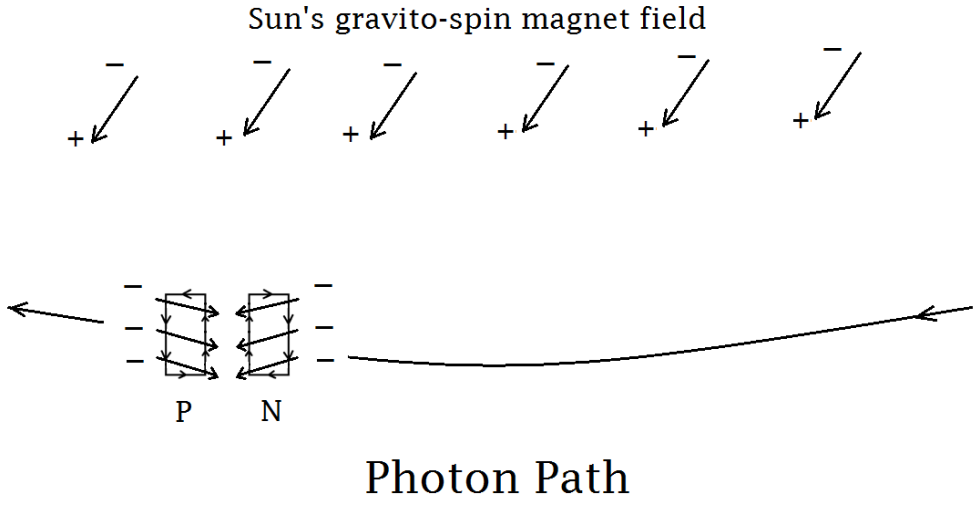


Figure 18-8-9

Therefore, this rest mass is called neutro-lateral rest mass or rest mass from extra freedom of electromagnetic field as figure 18-8-10. Because this neutro-lateral mass is not generated from static rest charge,

coulomb's law that is law between static charge, is valid unlimitedly perfect. This physical compensation process is that process mentioned §2.2.

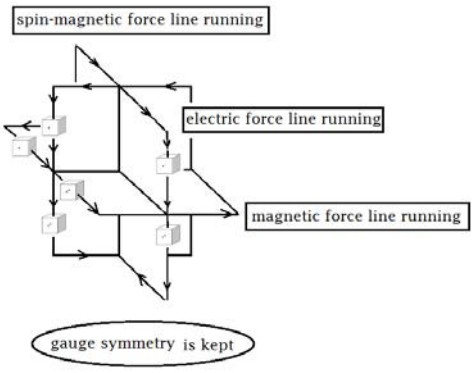


Figure 18-8-10

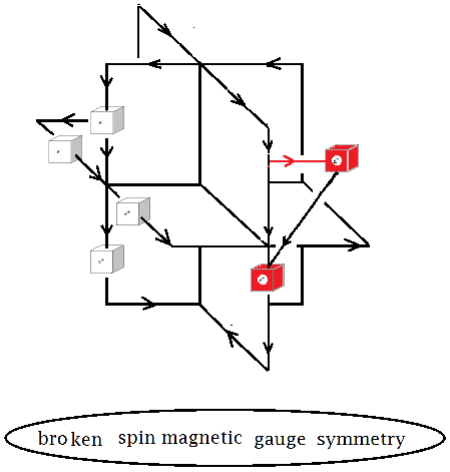


Figure 18-8-11

Inside of superconductor can photon obtain neutro-lateral rest mass same as above mentioned process (§6.2).

Because of superconducting in superconductor there can be plenty resistant material (goldstone boson) around atoms of superconductor same as near the sun's gravitational field

$$\mathcal{L} \supset -m_u(\overline{u_L}u_R + \overline{u_R}u_L) + m_W^2 W_\mu^+ W^{-\mu} + \frac{1}{2}\cdot 0^2 A_\mu^2 - \frac{1}{2}(2\lambda v^2)h^2$$

Because zero photon mass in Eq.18-8-1 is only by two gauge freedom, this result cannot perfect. However, with extra gauge freedom as spin-magnetic force line running of photon can have neutro-lateral rest mass by goldstone boson as figure 18-8-11. Figure 18-8-2 shows relation between Higgs potential and broken symmetry of spin-magnetic force line elements.

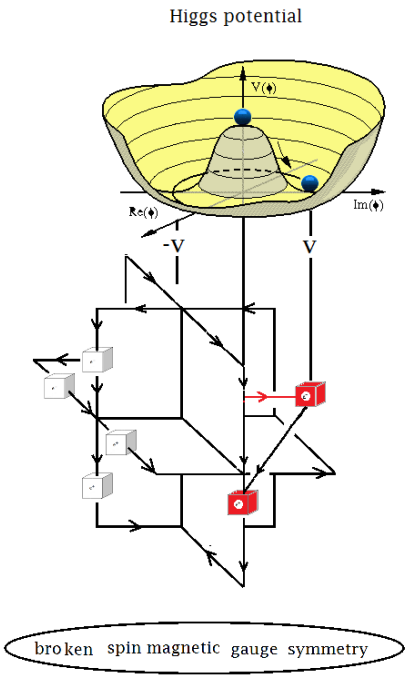


Figure 18-8-12

Conclusion:

•Space-time is not curved.

•Einstein's general relativity is wrong.

• String theory that use general relativistic gravitational field as background gravitational field is wrong.

• Super symmetry is wrong.