Hidden Variable links the Relativity and the Quantum theory

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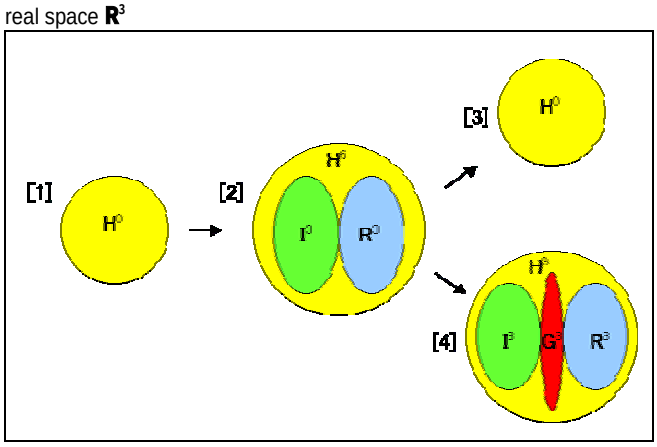
Albert Einstein. He discovered great achievements such as the photoelectric effect that leads to the quantum theory. Even if he did not approved the quantum theory. His idea is summarized in the word that "God does not play dice". He thought that the quantum theory should have hidden variable. Generally, this idea has been denied. However, I discovered this variable that links relativity and quantum theory. I could find the light velocity, the Planck's constant also the function that can calculate the gravitational constant by use this variable. In addition to it, I got the function that expresses electron. In here, we will get new way of forward to the Grand Unified Theory.

Generally, most of people have been believe in the space was born with the Big Bang. However still now, that is the important issue how was the space born and is growing up. For example, there has the idea of multiple universes that our world is only one of many of the spaces. This idea came from the suggestion that the space-time has 11 dimensions. It ascends to the Kaluza-Klein theory. The string theory was created in this theory. As for this theory, using a string for solve the problem that impossible to express the matter from the material particle. After that, the superstring theory was created for solve the problems of the string theory. The space-time began to be discussed that has 10, 11 dimensions or so, at the point. Also, a superstring got to have a lot of faculties. It connects the other end, snaps, vibrates and winds. Then, D-brane was created for a superstring solves many problems, be fluttering and connecting with the membrane. Now, the membrane became superior to a superstring by the M-theory exploited that the membrane has the inner structure. I do not find that will this story continue forever. The new hero is born every time the new problem happens. However, always you must pay attention to the new hero. They have the key that connects with the Grand Unified Theory also solve the space theory. Above-mentioned new hero "the membrane that has structure" appears in my suggestion. He plays the lead character in here. I call him "gap space". I suggest that our space – the whole space – has been dividing the real space, imaginary space also the gap space, exists between both, kinds of multiple universes. This whole space has some curvature. I got the light velocity with the Planck's constant in this whole space. In addition, got the electric charge and the electronic mass. Finally, The gravitational constant that has important issue was gotten. Actually, the solution of the electric charge has width. It seems to be the Heisenberg uncertainty relation in the quantum theory. This relation is that impossible to fix the other quantity in case of fix some quantity. I consider all of above, hidden variable seems to be the curvature of the whole space, as Einstein needed it in the quantum theory. Ensuring all of them by the gap space. Will he win the Oscar? – Refer to **1)** up to the superstring theory –

The space phase transition

In the latest observation result is that our space is 13.7-milliard years old[2]. However, I seem that she is active and not the elderly. She has the born moment as I can count here age. You call the moment the Big Bang. The substance of the Big Bang is the space phase transition. I suggest this process below.

[Fig.1] I suppose that the base of our space is empty world $\mathbf{H^0}$ **[1]**. $\mathbf{H^0}$ has the special inner degree of freedom that "the fluctuation" and has zero dimension. This fluctuation originates in "mathematical zero has the solution". $\mathbf{H^0}$ separates real space $\mathbf{R^3}$ and imaginary space $\mathbf{I^3}$ by the fluctuation **[2]**. Each $\mathbf{R^3}$ and $\mathbf{I^3}$ has 3 dimensions. In this case, whole space $\mathbf{H^6}$ has 6 dimensions. Ordinary, $\mathbf{R^3}$ recombines with $\mathbf{I^3}$ immediately and revert to empty world $\mathbf{H^0}$ **[3]**. However, supposing that complex space $\mathbf{G^3}$ is composed by $\mathbf{R^3}$ and $\mathbf{I^3}$ [2]. As a result, $\mathbf{R^3}$, $\mathbf{G^3}$ and $\mathbf{I^3}$ compose whole space $\mathbf{H^9}$ that has 9 dimensions and it is not possible to revert to $\mathbf{H^0}$ **[4]**. This $\mathbf{H^9}$ is our present space. However, we live in is real space $\mathbf{R^3}$



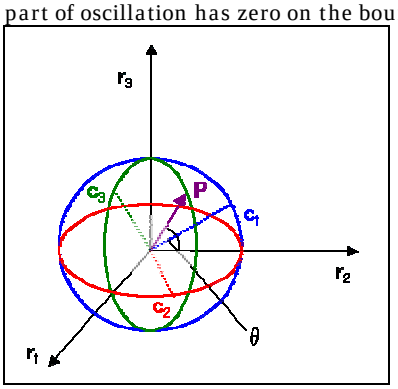
First, I take the empty world that impossible to call it space. Somewhere possible to twitches caprice even if it is the empty space. For example, I give you a vector that has size and the direction with arrow. Some product of the same two vectors becomes zero. My reverse explanation, it must have the vector as solution even if zero. There is possibility that the event happens in the empty world in this way. Generally, you call it "fluctuation"[3]. Notice, this phenomenon is a little different from pair creation of particle and antiparticle.

The solutions of the empty world always appear and disappear in caprice. I replace it in the phenomenon of the space that they disappear as soon as encounter even if the real space and the imaginary space appear in the whole space. As for this process, you could take the relation between the real number and the imaginary number with the same size. For example, you give the real number **a** and give the imaginary number **ia**. **i** is the symbol of the imaginary number. The

summation of their that a^2 is the square of a and $-a^2$ is the square of ia become zero. Pair creation and annihilation of virtual particle with anti-particle by the fluctuation that is simulated this calculation. However, I do not have the restrictions that the same solutions always appear in the whole space. Also, do not ensure that they disappear without doing anything. Sometime, I suppose that they start the irrecoverable action as impossible to recover empty space. Actually, this action is that the real-imaginary space appears between both spaces before both spaces meets after the real space and the imaginary space appeared in the whole space. This real-imaginary space is the complex space, named gap space. As a result, the whole space has 9 dimensions by each 3 spaces has 3 dimensions [Fig.1]. Incidentally, I do not take the time dimension in here. I^3 represents imaginary space, G^3 represents gap space and R^3 represents real space on the figure. Also, H^9 represents whole space. I consider of compactification of the extra dimensions now. This issue appears from that our world has 3 dimensions. In other words, compactification is the operation that the concealment of the extra dimensions in case of our world was created in over 3 dimensions space. By the way, you live in the world that is real space R^3. Therefore, do not necessary to consider of the compactification even if the whole space has 9 dimensions. Changing a viewpoint, I am possible to express that already made compactification of the extra dimensions when the space was born.

Unfortunately, unsaved the serious matter. The whole space had the general solution – call it elementary function – by the gap space appeared in there. I understand that he has the radius of the special space, call it Sub Bromwich=Wagner sphere[4] [Fig.2], when investigate these elementary functions in detail. It is a unique radius that has a unit of angle. It has more important thing, this radius is also the radius of the whole space. The curvature of the whole space is restricted by it. This curvature has the reciprocal of the unit of angle that are advantages for me. It depends on this, I can calculate of the elementary functions.

By the way, how should I take gap space in modern science? It will be the membrane that has structure also partitions space tiny, named holographic membrane[5] on the M-theory[6]. For example, you can imagine a soap bubble [Fig.3]. The membrane that the gap space also has the solution of oscillation. The real part of oscillation has not zero on the boundary between the gap space and the real space, also appears in the real space. On the other side, the imaginary part of oscillation has zero on the boundary, never have an influence in the real space. I need this result.



[Fig.2] I suppose that c_1 on $[r_2, ir_3]$, c_2 on $[r_1, ir_2]$ and c_3 is Bromwich=Wagner circle on complex plane $[r_3, ir_1]$. Bromwich=Wagner circle is a virtual circle on the complex plane and agrees the Laplace transform. Incidentally, i is the symbol of an imaginary number that in front of r. The virtual sphere can be composed in the real space by the combination of these three circles. I call it Sub Bromwich=Wagner sphere. Vector P can be placed in this sphere. P is a function with angle $\omega\tau$, and $\omega\tau$ is limited by another angle θ. It is written as $P(\omega\tau = w\tau \sin\theta)$. It is interesting, w that appeared here is the radius of Sub Bromwich=Wagner sphere and whole space H^9, and has a unit of angle. The reciprocal of w is the curvature of the space.

We can scarcely catch antiparticle in the reality world. The experimenter only has the privilege that catch antiparticles. Actually, antiparticles should still be exists stably in the imaginary space. However, antiparticles cannot come out from the imaginary space. I appreciate that the gap space exists for the stability of the world.

The light velocity also the Planck's constant

I cannot win your confidence even if the explanations that are so many words. The reality should prove philosophy. The most excellent proof in here is to get gap space. However, I have never met a trusted experiment result, for now. The next way, I should take the experiment value on the physical phenomenon by the computation. No one trusts me if I cannot get the light velocity about 300 million meter per second at least. However, I have a limitation to get the equipments. Do not take huge experimental facilities. Do not have the big researcher group. No budget and funds. I only have myself – none secretary – and a cheap personal computer with the computation software. However, you do not despise it. I needed 100 thousand £ to buy it that has the same ability, to got the elementary function before 20 years ago. Unfortunately, I was not able to buy it. In the meantime, I solved a lot of issues even if in such situation. Examined each variable in detail and cleared their relations. It was the preparation to do correct computation. Then, I got the materials of civilization, now. Be able to compute up to 15th decimal place use this software. Actually, I need 20th decimal place but tolerate it. Also use some special functions. However, I must compute the elementary function in the logical limitation and have not intention even if want the light velocity. Do not give the elementary function value in my

[Fig.3] The membrane of a soap bubble not only divides the space but also has structure. That fantastic ray is generated by this structure. In other words, the ray is created by the phase difference that is generated by the reflection of the light from the obverse and the reverse of the membrane.

The gap space is equivalent to this membrane. At first sight, the information that cannot be seen but clarifies by this space participates in it. The gap space vibrates same as the membrane of the soap bubble is wavered by the wind. Sighting from the real space, the gap space is the barrier that confines the imaginary space. Sighting converse from the imaginary space, the real space is confined by the gap space. By the way, I do not know whether the gap space burst same as a soap bubble, at last.

discretion. The computer does value calculation. I only give the computation table and the numerical formula. Then, made some computation tables; computed them in vertically and horizontally every time. I found interesting value in the **48.9-radian** vicinity of the elementary function that has the angle at some day, which took about one year and a half for the computation **[Column-1]**. It was **[3.51767E-43]** that divided the Planck's constant by the light velocity. **E-43** has a meaning that divide **3.51767** by **43** zeros line with 1 as the symbol of Microsoft Excel[7]. Generally, it is expressed as 10^{-43}. Is this result may just an accident? It is a result that I computed the elementary function in vertically. Therefore, computed it in horizontally. Then, certainly got value **[299792458]** with light velocity. Yes! Got not only it but also value **[1.05457E-34]** with Planck's constant that appears at the side of the light velocity **[Column-2, 3]**. Their wonderful results were gotten in the real space.

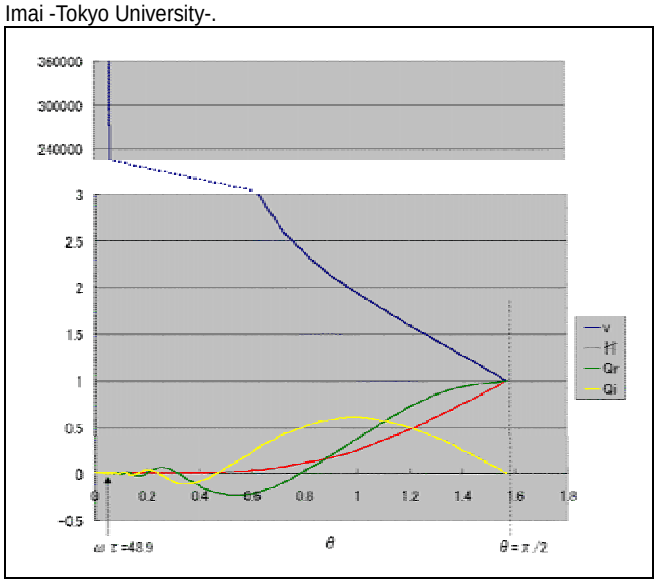
Electron

Primarily, the sufficiency to the light velocity and the Planck's constant were only gotten in the identical condition in the world for me. However, you know that it is not described how material is born. Therefore, this discussion is an insufficiency for you. At least, you need electron that I have searched it before 30 years ago. I needed more than 1 year for this great challenge.

First, I examined the elementary function in the gap space. The elementary function in here, it becomes the complex function that was combined the imaginary and the real number. In the gap space, the solution is different from the real space completely. The whole picture of this solution is vibrating beautifully [Fig.4]. Now, pay attention to the vicinity of the **48.9** radian. Two pieces of value that I have never seen them lined the side of the light velocity and the Planck's constant. The combination of two pieces of value is the solution of the complex function that has the real number and the imaginary number. However, you do not take nature of this function by appeared values. I described that a vector has size, just now. In addition to it, the complex function has size. At first, I did not understand this size that has the meaning. When examining well, I found that it was the square of the product between the light velocity and the Planck's constant. The value has about **[1.77807E-13]**. By the way, the light velocity can be replaced the combination of the dielectric constant in the vacuum and magnetic permeability by James C. Maxwell (**Edinburgh U. K.**). This mean is that the light velocity same as the combination of the electric field and the magnetic field. However, the relation between the electric field and the magnetic field does not have the unit of speed. Therefore, I accept that they have the same unit as they have the same meaning. In other words, regarding that the light velocity has the unit of the resistance. Then, the product between the light velocity and the Planck's constant has the unit that is the square of the magnetic flux. After all, this complex function has the unit that is the same as the magnetic flux **[Column-4]**. The unit of the electromagnetism is very complicate. Actually, this result was gotten by the idea of I. Imai[8] – Tokyo University –.

All the actors gathered in here. However, the story is not so easy. Actually, I deal with the angle here is the combination of time and the frequency. Unfortunately, I cannot operate isolated time in the logical limitation in case of computing all functions here. Planck time is not an exception. I cannot give the time any value and do not have to give it. To give time is intention for the value adjusting only. Therefore, I always cannot give only combination of time and the frequency the value. Also, cannot operate most of the

[Fig.4] There are velocity **v** -blue line-, angular momentum **ℏ** -red line-, real part of magnetic flux **Qr** -green line-, imaginary part of magnetic flux **Qi** -yellow line- in the figure. The x-axis sets angle **θ** from zero to **π/2**. The y-axis sets each physical quantity. Except for another frame of **v**, scale agrees of all physical quantities. Primarily, I should represent that divide the graph, **v** and **ℏ** are set in the real space, **Qr** and **Qi** are set in the gap space but get together them in one graph that visible. There are light velocity **[299792458(m^1s^{-1})]**, Planck's constant **[1.05457E-34($V^1A^1s^2$)]** and absolute value **[1.77807E-13(V^1s^1)]** of the magnetic flux at about **48.9** in **ωτ**. The dotted line of the position of **θ=π/2** is the boundary that divides real space and gap space. The imaginary articles do not appear on the real space same as **Qi** has zero on the boundary. I use exponent notation in **Microsoft Excel** as a **[E-34]** and so on, also the unit notation by Isao Imai -Tokyo University-.



physical quantity expressions in this strong limitation. Of course, they have the distance and acceleration. Actually, the actors gathered only three the light velocity, the Planck's constant and the magnetic flux. It will be the outside of the expectation of Carlo Collodi **(Author/1826-1890/Italy)**. However, I have an idea that inspires a life in Pinocchio. It is the cancellation of time at the time. For example, the time function is tied in the time, but it has the possibility that is released by the integral. The integral is the mathematical technique for the evaluation in the function by gathering objects of some area. Here, the electric current works a part of Pinocchio. The electric current can be made with the combination of the energy and the magnetic flux. The energy is a kind of Pinocchio. Pinocchio runs here by the operation of the cancellation of the time in the logical limitation. That is the expression of the electric charge.

Correctly, the electric charge is composed by the magnetic flux and the angular momentum that has the Planck's constant also another material **[Column-5]**. This material is the angle that is made by the radius of the Sub Bromwich=Wagner sphere and the time. Of course, it is released from the time. The light velocity and the Planck's constant have this angle. In the computation result, the electric charge has a width of **0.05%** around **[1.60217E-19]**. Also, the angle has a width of about **0.05%** in **48.9** vicinity. These cause that the space has the curvature, no less. In other words, the light velocity, the Planck's constant and the electric charge are appeared in our world by the space has the curvature. This width should cause of the uncertainty in the quantum theory. All expressions have the angle that has

width. Therefore, this angle should hidden variable that links relativity and quantum theory.

Electron is composed by electric charge and electronic mass. The mass is created by the Higgs mechanism in the standard theory – the G-W-S theory[9] –. The Higgs mechanism expects that Higgs boson as a seed of mass has greater mass and exists in our world. However, I do not use this idea in here; only use the information about the light velocity, the Planck's constant, the electric charge and the angle. Like the case of the electric charge, I must exclude of the concept with time and length. However, there are the necessary and sufficient even if a little information. First, I want to get information by the electric charge. Got the result that the electric charge has width a short while ago. Of course, this width is limited at the width of some angle. Mathematically, the width of the electric charge is gotten by integrate – the definite integral – the electric current. This width has **[8.2E-23]**. Next, I want to get information from the angle. There are two kinds of angle; one of angle decides the curvature of the space, be discussed here already. The width of this angle has **[0.025235]**. Another one exists in Sub Bromwich=Wagner sphere, it has **[0.032126471]**. Actually, this one is limited by the angle that decides the curvature of the space, also is used to integrate the electric current. We must discussed width by the mass is not a material particle. In fact, the string theory progressed on this understanding. Next, I need the value that is the base of the fine structure constant. The fine structure constant does not have the unit that is used to explain the fine structure of the atomic spectrum. It is gotten from the squared of electric charge and the ratio of Planck's constant to light velocity. Both of them have same unit. Therefore, the solution of the ratio does not have a unit. Actually, this value has width of **0.05%** around **[1.37036E-05]**. Now, I get the expression of electronic mass and value **[Column-6]**. The mass value has width, also that central value agrees with experimental value **[9.1093897E-31]**. It is obvious with above discussion; the mass is created by the space that has the curvature.

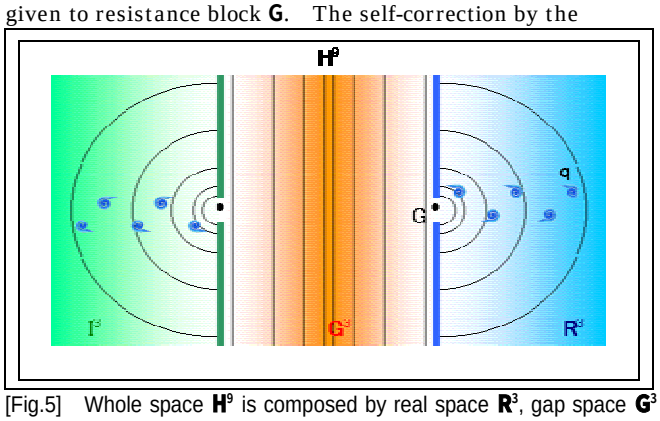
The gravitational constant

As you know, the gravitational constant is the most important value same as the light velocity and the Planck's constant. Out of the assumption that I could explain it at first. Therefore, postponed it than research of electron. I describe them here in my order of the research process.

Generally, the gravitational constant has deep relation with mass. In this case, the electronic mass must be hint of it. Therefore, I must get electronic mass by all means. There is possibility that Planck mass exists in here. However, I found that it is not possible to reach the solution even if approach it contrary to my expectations. Therefore, take another way. All physical quantity is limited by the curvature of the space is a fact. Then, the gravitational constant must be limited by the curvature of the space, and precede electron same as the light velocity. In this way, I suppose that one of elementary function express the gravitational constant. However, I could not find such a expression at first sight. Therefore, I will restructure the process that approach for the gravitational constant.

First, I take Kármán Vortex Street[10] on the hydrodynamics as you know. Why Kármán whirlpool? I think that situation of electron is born in the gap space resembles situation of Kármán whirlpool is born. In this way, electron can be supposed to Kármán whirlpool itself [Fig.5]. **q** is Kármán whirlpool electron and resistance block **G** is equivalent to the isolate isle in the natural world. The vertical line in the gap space expresses the transverse wave. The arc in the real space, the imaginary space expresses the diffracted wave, I can suppose that they are the electromagnetic wave. The issue is that do I replace resistance block **G** to something of the gap space theory. I consider about this. Generally, seem to be that the mass does not born in resistance-less. The Light velocity was decision by that the vacuum has the dielectric constant and magnetic permeability. Therefore, seem to be that the vacuum has viscosity. I think that this viscosity becomes resistance and generates mass. Therefore, I accept that this resistance was generated by the whole space has the curvature. Resistance block **G** has this meaning in the figure. Also, I can explain that **G** relates to the gravitational constant by accept that the curvature generates gravitation. By the way, **G** is expressed the reverse of the resistance on the electromagnetism. As described a little while ago, the unit of the resistance is equal to the unit with velocity. Therefore, the key point is velocity or the product in the time to the acceleration. The reversal of them is resistance block **G**. The gravitational constant that is gotten lined the side of the light velocity and the Planck's constant after computed them. However, there are differences about **2%** between this value and experimental value. Why do not get the experimental value? Yes! This computation value must be exists in the ideal field. For example, the nonlinear equation like that Einstein equation or Schrödinger equation[11] gets the effect of gravitational field or particle itself. Actually, the nonlinear equation expresses the real world very well by takes the effect of itself. Therefore, the difference between computation value and experimental value can be described by put the correction as follows.

The approximate value of the one particle field potential that is gotten by Einstein equation has a unit that is the square of the speed[12]. This one particle field potential can be given to resistance block **G**. The self-correction by the



[Fig.5] Whole space $\mathbf{H}^9$ is composed by real space $\mathbf{R}^3$, gap space $\mathbf{G}^3$ and imaginary space $\mathbf{I}^3$. For example, I suppose that there is a small hole on the boundary of $\mathbf{G}^3$ and $\mathbf{R}^3$, also set resistance **G**. The vertical line in $\mathbf{G}^3$ is the vibration of magnetic flux **Q**. Real part **Qr** of **Q** leaks out $\mathbf{R}^3$ as I explained in [Fig.4]. Then, **Qr** collides with **G** and has an impact by the angular momentum that exists in $\mathbf{R}^3$. In this result, electron **q** same as Kármán whirlpool appears in their. This electron **q** takes the base as the minimum value of Planck's constant $\hbar$. By the way, the unit of resistance **G** $[\mathbf{V^1A^{-1}}]$ agrees with the unit of speed $[\mathbf{m^1s^{-1}}]$. **G**, i.e. v is the base of the gravitation, supposing that the gravitation is a kind of resistance. Certainly, gravitational constant $\mathbf{G_N}$ is gotten by the combination of **v**, **1/w** that is the curvature of the space and **o (omicron)** that is the self-correction by the gravitation field. **o** is gotten by the infinite product of the curvature of the space, but replace it to an approximate expression $[-\mathbf{sinw}\,\tau]$. Incidentally, I took an isolate isle as resistance **G** figuratively, not a reality. Correctly, the space has resistance. It is clear by the relation between the velocity and the resistance. Incidentally, the relation between $\mathbf{G}^3$ and $\mathbf{I}^3$ is same as the above.

gravitational field can be seen by reconstruct the expression in this way. The self-correction by the gravitational field is that the gravitational field gets the effect of the mass by the mass was created on the gravitational field, and the mass gets the effect of the gravitational field, and then _ _ _ the way of the correction that the effect continues just like infinitely of itself. Generally, it is expressed by the infinite series as the summation infinitely or the infinite product as the product infinitely. They often diverge infinity, the known gravitational theory are suffered from them. The operation of renormalization[13] was developed for solve the problem. However, it is not the universal. Therefore, I did not use it for the electric charge in this paper. Also, I do not need it for the gravitational constant. I can make the self-correction that does not diverge the infinite series or the infinite product by use the curvature of the space. Therefore, I take a term of the self-correction gotten by the infinite product, here. The value is about **0.9778**. This result has width, the average agrees with experiment value **[6.67259E-11] [Column-7]**.

I describe another idea. The maximum velocity may be faster than c about **2%** as the correction of the gravitational constant is unnecessary by the fact of the photon is dominated in the gravitation. In this case, the maximum velocity has the relation in the expending universe[14) 15)]. Actually, it is possible to say that the self-correction by the gravitational field is the correction with the velocity by the one particle field potential has a unit of the speed.

Discussion

I present the light velocity, the Planck's constant, the gravitational constant, the electric charge and electronic mass for you in this paper. Surely, we are close the Grand Unified Theory now. However, I have one of dissatisfactory point. I do not make that they will be able to answer a question "does the mass exist in the world" clear. Here, I will show the one direction.

The mass exists around us very much. However, it is very difficult to demonstrate it logically. In addition to it, Higgs boson is not confirmed. Therefore, I will take up Planck mass as the polestar. Of course, I do not take it with the gravitational constant. If the other method were here, I should use it. I got the interesting result that take off the ingredient of the electric charge from the expression of electronic mass after considering variously. This value has about half Planck mass. In other words, this value multiplied by twice of the self-correction is the approximation of Planck mass. It has more accuracy. They are not perfect but electronic mass and Planck mass are represented by the expressions that are very akin **[Column-8]**. In this result, I hope that all mass must be represented by unified form. Then, the substantiality with mass will be proved. The perfect Grand Unified Theory will be built with sooner or later.

I want to discuss one point supplementary. I hope that they are connected with the experiment and the application. I described that the electric charge is composed by the angular momentum, the magnetic flux and the curvature of the space in the ex-section. However, the composition way of the electric charge is not only it. For example, it is possible to compose by the moment of force and the electric potential or the electric moment and the moment of inertia. Also, the electric charge is gotten by the cancellation of time with the combination of the angular momentum and the electric moment. Of course, all cases need the curvature of the space. There are a variety of cases but every event does not happen on the high-energy physics. At least one of expression of the electric charge is a cheap and convenient instrument that creates electron, I hope. □

[Column]
A part of the expressions list.

1, Angle
$\omega\tau = w\tau \sin\theta$

2, Velocity include the light velocity
$v = \omega^2 \exp(+\sigma\tau)\cos\omega\tau/(\sigma^2+\omega^2)$

3, Angular momentum include the Planck's constant
$\hbar = \omega^2 \exp(-\sigma\tau)\cos\omega\tau/(\sigma^2+\omega^2)$

4, Magnetic flux
$Q = \omega^2 \exp(-i\sigma\tau)\cos\omega\tau/(\sigma^2+\omega^2)$

5, Electric charge
$q = w\tau\hbar/Q$
$= \hbar\tau\sin\theta/U$ [U : Electric moment]

6, Electronic mass
$m_q = \Delta q\beta\sin\Delta\omega\tau$ [β : Base of the fine structure constant]

7, Resistance of the space include the gravitational constant
$G_N = o/(w\tau v)$ [o (omicron): Self-correction of the gravitational field]

8, Approximation of Planck mass
m_{PL} -2sinw τ β sinΔω τ [o -sinw τ]

Refer to http://www.fit-hp.com /

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