#### FROM LAW OF UNIVERSAL GRAVITATION

#### TO

# LAW OF UNIVERSAL CONNECTION

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### Introduction

This paper is to reform Issac Newton's law of universal gravitation into a new theory. With a new mathematical tool, I build a model which could provide an alternative perspective in understanding a series of topics in modern physics fields, such as quantum entanglement, expansion of the universe, wave-particle dualism, time, and the relationship between gravity and other fundamental forces.

# The Theory of "Relation"

Newton's law found there is a certain "relation" between two objectives. He uses the masses of two objectives and the square of the distance between two objectives, to form a formula with the gravitation constant, to describe the relation. He named this "relation" as gravity. Later, with the development of science and technology, people managed to measure the gravitation constant. Then, we got the calculable formula of gravity. Now, please forget everything above but one thing: the "relation".

Could we conduct a formula, to only discuss the relation between two of ANY objects? (*Remember, this is the only thing we want to achieve, nothing else.*)

# The Formula

Yes, we could. The formula is:

$$C = \frac{2}{3} * \frac{A_1 A_2}{n^2} * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \cdots$$

I will explain this formula later. First of all, I need to introduce the mathematics I used.

## The "Natural Calculus"

By understanding calculus, which also invented by Newton, from the geometric perspective, the volume of a sphere can be seen as the accumulation of infinite two-dimensional curved surface, the spherical surfaces, starts from the center of sphere. In the other words, three-dimensional sphere is the integration of infinite and constant two-dimension spherical surfaces.

$$\frac{\mathrm{d}}{\mathrm{d}r}(\frac{4}{3}\pi r^3) = 4\pi r^2$$

Similarly, the three-dimensional world (noting that no matter how many dimensions the real world has, three, four, 3.5, or infinite dimensions, the

principle remains the same) could be seen as the integration of infinite and constant two-dimensional spherical surfaces. Is it?

<u>It is not.</u> To reform Newton's law, one needs to invent a new calculus. In real world, it is usually difficult to directly deal with a particle. When

one want to understand or calculate some effect of a small thing on a large scale, he or she can observe the effect of it, through a larger scale, by considering the particle as a mass point. Then one can use calculus and geometric methods to do the analysis and calculation.

The classic calculus is true in a classic mathematical world. However, in the physical world, normally there is no such thing like a perfect point with a 0 radius occupying no space. Essentially, no matter how small the "point" is, it always occupies some space. (Most of time, we consider these mass points, or particles, as an approximate sphere in order to make it easier to be discussed.) Thus, when we do a differential to any object in the real world, we cannot just consider it as a mass point. We need to consider the original form of existence, such as its occupation of space, of the object as well. Also, when we consider the physical "effects" of an object, we cannot only consider the range of its effect, but also have to consider the existence of the object itself.

Therefore, geometrically, every differential of an object's effects in real world should consist of two parts: a minimum cut of the range of its effect, and a cut of the object itself. Since most of things in our universe is pretty "empty" inside, the calculus of an object's effects, whether it is a micro or macro objective, in real physical world, would always contains an "almost empty groove" in its every differential. This groove could be seen as an information carrier of the object's existing state. It is caused by the "center-weighted" nature of atom, the incompatibility inside a particle and the discreteness of a macro-system. Even though the "groove" is normally extremely thin (could also be very thick depending on the objective you are looking into, for example, doing a differential for the inside structure of an atom in a four-dimensional space), it is there. The calculus with consideration of these grooves is called the Natural Calculus(NC).





As demonstrated above, when we do natural calculus to analyze a object's effect, the object will be considered as its actual existence rather than a "mass point". A <u>Natural Differential(ND)</u> will consist of both the "effect we are looking for"(the blue part) and the groove (black circles,). Geometrically, one can normally consider the original existence of the object as the first "groove", a hollow sphere with a very small solid center. Then the "width" of groove would almost equal to the radius of the object in the very beginning, while "narrowing down" gradually as expanding.

(This could be an alternative approach in understanding the red-shift and blue-shift phenomena.) When we do <u>Natural Integration(NI)</u>, the algebraic result could basically remains the same because not only the difference is small enough to ignore, but also people can deduct the impact caused by the object's existence after the integral with a classic calculus. However, the calculus' process and geometric result is totally different, which will cause dramatic difference in physical significance.

For example, if one want to draw a "4D" graph of his or her 100 years of lifetime. This graph will consist of infinite 3D sections of all different scenes that this person has ever been. In every scene, there is an actual existence of him or her, rather than a mass point.

The wave-particle dualism could be partially explained via natural calculus. Geometrically, when one differentiate a light into a ND, rather than a photon, he or she will get a "particle with a groove". As introduced, the groove is from the status of existence of light source. People may not be able to physically detect the groove, because it is a deficiency, or "in-existence", rather than an existence. However, as a natural differential of the light, every photon we detected will contain the information of groove. In the other words, every "package" we received form the light would consists of two parts: an existence which we can directly detect, and an in-existence which we can only "feel" its consequence. Thus, when the researcher do the natural integration, he or she will get a wave

as a result of the superposition of the photon and the groove.

In here one should notice that theoretically the differential of groove should be a variable shifting with time. This is determined by the existence of light source, which I will discuss the principle and give the full explanation of this matter later in this paper.

In addition, one can also find many interesting things by applying NC, such as cross-dimensional transition of objects. For example, with NC, he or she could mathematically "prove" that our macro world currently is a four-dimensional world operating in a three-dimensional space, with connections to other dimensions. A n-dimensional world would always existing in a n-1 dimensional space, with 1 "absolute dimension" which cannot be adjusted. Time, in the usual sense, is just a dimensional-coordinate rather than a mathematically absolute dimension. It looks very absolute because it is actually an geometric ND-appearance of the inherent absoluteness of our dimension. He or she could also learn that zero dimension could be discrete, or continuous, depending on the observer's location and perspective. They will also figure out how the dimensions interacting with each other and further find the theoretical solution of break dimensions.

I will not give further explanation here since these are not our topic. Readers should be able to explore these by themselves after reading the paper.

# From the Relation to "Connections"

First, let us suppose that we are in a universe composed by infinite number of extremely small "dots". Everything in this universe, including the vacuum, is full of dots. Then the only difference between two objectives is the number and distribution of their dots. One can consider those dots as the points in mathematics, while keeping in mind that no mater how small they are, they will always occupy some space. Every dot can connect to all other dots in the universe by simply drawing a line between them. Then we can calculate the relation between any two objects in the universe by counting the number of connections, with some geometrical consideration, between their dots. For example, assuming that object A is composed of a certain number of dots, with a total amount of  $A_1$ , while object B is also made up of dots with a total amount  $A_2$ . (one can just let  $A_1=A_2=1$  for a better understanding)

By putting two objects next to each other, one should get a graph like this:



This looks correct in mathematics. However, in physics, things are little different.

As we discussed earlier, things in real world is pretty empty inside, such as atoms. The density of dots is extremely high in the core, while the outer sphere is almost empty with only a few dots. Taking the object A as example, the core of object A could contain 10<sup>10</sup> dots, while the outer sphere only has 1 or 2 dots.

Thus, when we put two objects together to calculate the number of their connections, we actually did not put the "dots" together. There is a huge

gap between them caused by the distribution of dots. The real graph will look like this.



As it shows above, the dots of objects are still far away even though we put two objects next to each other. This will cause a dramatic geometrical difference when we do the calculation. The gap must be considered, just like the groove earlier.

Therefore, when we want to calculate the connections between A and B, we need to first figure out that what proportion of their total connections could be "projected" to each other.

In this example, the distance between A and B is r, which equals to the diameter of them, while the radius of one dot is p. Then r has to equals to n\*p, and n is a real number. Because the universe is made of dots, p would be the smallest unite of length.

No matter how far between the two objects, one can always adjust the outer sphere of two objects to make them in same size with the distance equals to the diameters for a easier calculation. In this way, when we consider these two objects as a whole system, the system will be a circle area with a radius of n\*p. One can safely do this as long as the number of dots and the distance between two objects are definite, since the only thing we care about is the connection of dots in a certain distance. Moreover, with the consideration of geometric effect, we can also think the connection happens in the middle interface between two spheres. The additive effect of geometric projection of two dots' proportion of connection to the middle interface would be a circle area with the radius of n\*p. (by imagining the cross-section of the middle interface between two dots and a sphere with a radius of n\*p). Its area is  $\pi(np)^2$ . Also, the "line" to connect two dots will leave a projection in the circle with an area of  $\pi p^2$ .

The equation of the number of connections between two dots would be:

$$C=2 * \frac{\frac{4}{3}\pi(np)^2 - \frac{4}{3}\pi p^2}{4\pi(np)^2 - 4\pi p^2} * \frac{(A_1A_2)\pi p^2}{\pi(np)^2}, \text{ if one uses Natural Differential.}$$

$$C=2 * \frac{\frac{4}{9}\pi(np)^3 - \frac{4}{9}\pi p^3}{\frac{4}{3}\pi(np)^3 - \frac{4}{3}\pi p^3} * \frac{(A_1A_2)\pi p^2}{\pi(np)^2}, \text{ if one uses Natural Integration.}$$

$$C=2 * \frac{1}{2} * \frac{4\pi(\frac{np}{2})^2}{\frac{3}{2}\pi(np)^2} * \frac{(A_1A_2)\pi p^2}{\pi(np)^2}, \text{ if one uses cross-dimensional projection of}$$

a hemisphere with a radius of np/2 to a equivalent two-dimensional world with a radius of np.

They all equals to  $\frac{2}{3} * \frac{A_1 A_2}{n^2}$ 

Instead of giving mathematical process of projection, which one can do with a ruler and compasses. I will give a logical approach to this, which would be more helpful for the rest of the paper.



The connection of two 3-dimensional dots always occur in an approximately 2-dimensional plane, because the connection between two dots is a line. As shown in the figure above, when we find a cross-section of any dot from any angle, we will noticed that a dot is always in a situation where it is surrounded by 3 dots. This is because we assume the universe is made of dots. Even though they are not next to each other, the outer sphere of effect of those dots as shown could still construct a structure like this, if you expand the sphere for better observation. When one want to observe the connection between any two dots in the universe, he or she will find there are always three dots in a same distance, with a same size of outer sphere, connecting the one dot in the center.

To be precise, one should consider that every connection of a dot will expand outward in a circular pattern, rather than a straight line, when he or she calculating the proportion of one connection in different directions of a plane. Thus, logically speaking, the connection of any two dots, could only occupy 1/3 of each others' connection in a certain distance. The total connection between them would be 2/3. Then one can directly get the equation:  $C = \frac{2}{3} * \frac{A_1A_2}{n^2}$ 

When  $A_1 = A_2 = 1$ , the maximum number of connection between two dots would be 2/3 if they next to each other (np=p). The minimum number of "connection" between them would be a number that tends to 0 as "n" becoming infinitely large. (As the distance between two dots increasing) Moreover, as we discussed earlier, no matter how small it is, the dot always have to occupy some space. When one calculate the connections between two objects, he or she can only do the calculation with the real existing countable dots. We can temporarily assume the size of a dot is 10<sup>n</sup> dots to fulfill a volume of  $1m^3$ , in order to at least make it countable. However, although it is very small, it still seems quite large comparing to an infinite small point. In the other words, it is still divisible. Then, what is the absolutely indivisible size of dot in our universe? In the other words, what is the density of dots in the background and vacuum? This would be the real absolute dimension in our 4-dimensional world.

With this inherent absoluteness, when we calculate the connection between two "dots", we are actually doing an calculation of "extra connections", since there are already "fundamental connections" between the "background dots" underneath the "dots" we are counting.

After adding these in, the equation becomes:

$$C = \frac{2}{3} * \frac{A_1 A_2}{n^2} * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \cdots$$

\*\*C represents the number of connections between dots of two objects.

\*\* $A_1$ ,  $A_2$  refer to the amount of dots within two objects

\*\* $D_1$ ,  $D_2$  refer to the dots that already exist in the vacuum , in the other words, the number of "background dots" in the space occupied by objects.

\*\* $\frac{A_1A_2+D_1D_2}{D_1D_2}$  ... is a constant because "A" represents the smallest scale of

physical existence, and "D" represents the smallest scale of background in our dimension. They are both fixed. Based on the value of the universal gravitational constant, the value of  $\frac{A_1A_2+D_1D_2}{D_1D_2}$  should be around 1.0011. I call this constant as "Cross-Dimensional Constant (CDC)"

With this formula, one will think of an explanation for why the universe is expanding. As we can see from the formula, The number of connections between dots in vacuum is always smaller than the number of connections in a system with physical objects. This will cause the vacuum to become increasingly "loose" from our perspective.

#### An Alternative Approach to Unify Fundamental Forces

As we known, the formula of universal gravitation is only valid when calculating the gravitational force between macroscopic objects. If the assumption I made was true, my formula should be valid in all scale of objects.

Now, one needs to discuss this matter in different scenarios. This formula

is perfectly applicable to macro objects.  $G^* \frac{M_1M_2}{r^2}$  could be exactly equivalent in meaning to  $\frac{2}{3} * \frac{A_1A_2}{n^2} * \frac{A_1A_2+D_1D_2}{D_1D_2}$  if one convert the expression of  $M_1M_2$  into  $A_1A_2$  and  $r^2$  into  $n^2$ . Because in Newton's formula, he was basically recognizing the mass as the amount of dots. The only difference between our formulas is that my formula would be pure numbers without any unit. This is because I have already converted units of all variables in the formula into the count of dots.

Things will get a little complicated when it comes to the microscopic world.

From the previous content, one can see that force between two object can be regarded as an effect of the connections between their dots. There have to be dots in order to make any connection. Theoretically, one dot, no matter how small it is, must occupies a certain space of its own. In the other words, one dot should occupy a spot with a volume at least as much the space as itself. However, what if there is someway to "squeeze" more dots into one spot, just like an elevator, or a subway train, during peak hours? What will happen if we could "squeeze" 10^19 dots into the space of 1 dot's spot?

First, nothing will happen outside the spot. When we do the calculation of connection in a macro-scale, we still adhere to the principle of "one spot, one dot". It is just like no matter how many people you can squeeze into a subway, a subway is still a subway. On the other hand, if we take a look

at the inside of the spot, we will see that the "new spot" occupied by a "squeezed dot" at this scale is 10^-19 times that of the original spot. When we do the calculation of connection in a micro-scale, we will get a number of a huge magnitude.

For example, let us suppose that a macroscopic object A is composed of 1 dot. Another macroscopic object B is also composed of 1 dot. The distance between them is 1.

With the formula  $C = \frac{2}{3} * \frac{A_1A_2}{n^2} * \frac{A_1A_2 + D_1D_2}{D_1D_2}$ , the connection between them in macro scale would be:

 $\frac{2}{3} * \frac{1*1}{1^2} * 1.0011 \approx 0.667$ 

Now, let us squeeze 10<sup>19</sup> dots into dot A, and 10<sup>19</sup> dots into dot B. The connection between A and B in macro scale would remain the same because they are still two dots at this scale.

However, when we calculate the connection between them in a micro scale, the number would be:

$$\frac{2}{3} * \frac{10^{19} \times 10^{19}}{1^2} * 1.0011 \approx 6.67^* 10^{37}$$

From here one can notice that this is equivalent to the scenario that two macro dots' connection at a scale of  $10^{-19}$  times the original scale:

$$\frac{2}{3} * \frac{1*1}{(10^{\circ} - 19)^2} * 1.0011 \approx 6.67 * 10^{37}$$

Please note that we only squeezed the dots into a small scale without changing anything of them including the size. This means when they connect to each other, the "cross sectional area" of two dots' connection will still remains  $\pi p^2$  in a area of 10<sup>-38</sup>  $\pi p^2$ . This is a geometric version of "mass-energy" conversion, which seems impossible in reality but feasible in mathematics.

Now let us take a look at what might have happened at the scale of  $10^{-19}$  times the original scale.

As we discussed before, things in our universe are pretty empty inside. The basic constituents of a macroscopic matter are atoms. The diameter of an atom is about  $10^{-10}$  meters. An atom is mostly empty inside, with a nucleus that is composed of protons and neutrons, in a  $10^{-15}$  meters scale. Also, the nucleus, protons and neutrons are pretty empty. There are quarks, inside proton and neutron, in a  $10^{-18}$  meters scale. There is a huge empty gap between its innermost structure and the surface of an atom. It is basically empty in the range from  $10^{-10}$  to  $10^{-18}$  meters other than a few particles, such as electrons, with a minuscule mass and a size of almost zero.



Even though there are protons and neutrons, which formed the nucleus, in the scale of  $10^{-15}$  meters, they are still not the most fundamental particles. Fundamental particles are in a scale around  $10^{-18}$  meters or less.

Now let us zoom in on the innermost structure of an atom.



These structures look very similar to the one we discussed earlier in this paper, which I also put here on the right side. The structure on the right side could be theoretically the most fundamental structure of the connection of a dot. This similarity implies that the innermost quark structure of an atom could be sort of "fundamental structure" in some degree. If so, there should be at least one dot, whether it is an actual or "background" dot, in the center of the structure, constraining by three quarks. The size of this dot should be at a scale much smaller than 10<sup>-18</sup> meters.



What would happen if we consider this "dot" in the center of quarks as the "entrance" of where 10^19 dots were squeezed into one spot? Or in the other words, it is where someone squeezes the connection between two dots into a scale which is 10^-19 times of their original scale. Then the innermost structure would be the mechanism to form the squeezing, while the existence of an atom, would be a result of this squeezing. One can consider the atom as a dimension created by this innermost structure. The "exchange rate" between this dimension and the macro world, in terms of the number of connections, is about 10<sup>38</sup> to 1.

The above demonstration shows how to interpret the strong nuclear force using my theory. One can see that rather than a force, the strong force is more like a structural effect of the "fundamental structure". This is a dimension where one dot could build about 10^38 times connections with another dot comparing to the macro dimension. With this approach, a "gluon" is merely an "appearance" of the connection between a dot and the inner structure. It could also be the "central dot".

I call the "central dot", whether it is an actual or background dot, as the first Natural Equilibrium Point of Dimension (1<sup>st</sup> NEP). Moreover, the the innermost structures, quarks in a scale of 10<sup>-18</sup> meters and protons and neutrons in a scale of 10<sup>-15</sup> meters, could be seen as the fundamental structures of the dimension. They are two layers of "customs" of this realm. I call the "exchange rate" of connections to pass through the "customs" of this realm, which is approximately 10<sup>-38</sup> to 1, as the first Dimensional Equilibrium Ratio of Connections (DRC 1).

For those dots which could not squeeze in, or were squeezed out by the inner structure, they would stay around in a sub-dimension surrounding the inner structures, with a "devalued exchange rate" of approximately  $10^{36}$ : 1. This is because when a dot were squeezed out of the inner structure, it will "fall" into a slightly larger scale. Even though the amount of dots did not change in its dimension, the number of connections will still drop dramatically because the square of the scale, as the denominator in the formula, has increased. This is the explanation of how the electromagnetic force is interpreted in my model. I call the "exchange rate" of connections in this sub-dimension, which is approximately  $10^{36}$  to 1, as the  $2^{nd}$  Dimensional Equilibrium Ratio of Connections (DRC 2)

With this approach, the electromagnetic force can be seen as the effect of dots in two directions. First direction is that dots try to get close to the inner structure. This is caused by the massive number of connections between a dot and the NEP with its structure. The other direction is that dots being rejected from approaching, or being kicking out of, the inner structure of the dimension. This is caused by the high "admission criteria" of 10^38 connections, and the high-density of the inner structure.

If there is a dot which exceeds the limit of 10<sup>38</sup> connections, theoretically, it would pass through the "customs" and squeeze into the inner structure. This would cause a series of consequences. One of them could be that another dot were pushed out of the inner structure and fell down to the sub-dimension, so the inner structure could maintain its balance of the number of dots. In the other words, one comes in and one

leaves out. Otherwise, the inner structure will encounter a turbulence and even a restructuring depending on how many dots and connections would be involved.

In an atom, the number of connections between a dot in the sub-dimension and the inner structure at a certain distance is normally fixed. Thus the only difference between two sub-dimensional dots at a same distance is the direction. There are only two directions: in and out. Suppose there are two dots. If their directions are the same, they will repulse each other in order to "compete for the priority" to get in or out. If their directions are opposite to each other, they will find each other, and use each other as the path to switch positions. This is the explanation of why the electromagnetic force can manifest as both attractive and repulsive forces, with my theory. It is not about "positive" or "negative". It is because the NEP and its structure "attract" and "repulse" dots all the time with its high-density of dots and connections.

Now let us go back to the inner structures. As we discussed, the innermost quark structure, as long as the structure of protons and neutrons, indicate that these internal structures could be fundamental structures in some degree. If so, the realm ranging from a scale of 10^-15 to 10^-18, should be a "peaceful land" without obvious "force". Because if it is a fundamental structure, this indicates that the structure itself should be regarded as a basic unit. The calculation of connections is to find the

relation "between" two objects. It does not make much sense to find the connection "between" something fundamental. It becomes hard for one to distinguish what should be considered as "two objects". I mean we can still do the calculation. No matter how fundamental the structure is, the connections between dots is always there. They just tend to be "silent" in this scale. It is just like you have to fight to squeeze into a peak hour subway. Once you manage to squeeze in, you can "blend in" with the carriage and stay quite.

However, we all know that there is still weak force, dominating the 10<sup>-18</sup> meters of scale. There are two possible reasons for this phenomenon. The first reason is that the squeezing process could have squeezed too many dots into the innermost structure. Similar with the electromagnetic force, those dots were squeezing out by the innermost structure. Since the 10<sup>18</sup> meters of scale is already the innermost structure of the atom dimension, there is no room for those extra dots to stay unless they can squeeze into a even smaller scale. It is possible. However, even though a dot could squeeze itself into a smaller scale, its situation will be unstable because it does not have the support of a well-fitting structure. Thus it is very likely that the dot will eventually retreat back.

Another reason could be the inherent structural flaws of the "fundamental structure". As we discussed earlier, theoretically, the connections

between two dots should occupy 1/3 of the total number of connections between them, with a total of 2/3. However, when we do the calculation, we will find that the connection is always a little bit larger than 2/3, which seems to make the sum of the proportions exceeding 100%. This is because of the Cross-Dimensional Constant (CDC), which I explained earlier. Therefore, unless it is a pure vacuum, a fundamental structure will always be flawed. Only vacuum can build a structure where the connection between two dots are exactly 1/3 of each others' connection. Otherwise, no matter how "fundamental" it is, the structure could never have three identical objects surrounding the central dot. This further validates that the structure of quarks, could be the most fundamental structure of a micro dimension. They are arranged in either way of two larger quarks with a smaller quark, or two smaller quarks with one larger quark, to form the structure. This structure should make the sum of the proportions of the central dot's connection equals to 100%. Therefore, protons and neutrons within a nucleus should be relatively stable.

However, as we can see, these structures are inherently unbalanced. There are still differences in the number of connections of a dot in different directions within the fundamental structure. Thus, dots within quark scale will tend to move, shift, and exchange positions, due to the imperfection of the structure. This could be another source of the weak force. The above discussion is about how to explain the weak force with my theory. Please note that in this scale, a dot might need to acquire enough dots as its "partners" to accumulate enough number of connections to make the move, because their "intention" is to maintain or adjust the innermost structure. However, the number of connections those dots would need has reduced. This is because this "structural effect" only happens in the innermost structure. The number of dots within the innermost structure is much less than that within protons and neutrons. I call the "exchange rate" of connections in these structural adjustments at a 10^-18 scale, which is approximately 10^25 to 1, as the 3<sup>rd</sup> Dimensional Equilibrium Ratio of Connections (DRC 3).

With the explanations above, we can modify our formula to include all the fundamental forces, by introducing DRCs into it. One can set the DRC of the macro world as DRC 0 with a exchange rate of 1:1. Then the formula would be:

$$C = \frac{2}{3} * \frac{A_1 A_2}{n^2} * (DRCx) * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2}$$

$$C_0 = \frac{2}{3} * \frac{A_1 A_2}{n^2} * DRC0 * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \quad (\text{gravitational force})$$

$$C_1 = \frac{2}{3} * \frac{A_1 A_2}{n^2} * DRC1 * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \quad (\text{strong nuclear force})$$

$$C_2 = \frac{2}{3} * \frac{A_1 A_2}{n^2} * DRC2 * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \quad (\text{electromagnetic force})$$

$$C_3 = \frac{2}{3} * \frac{A_1 A_2}{n^2} * DRC3 * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} \quad (\text{weak nuclear force})$$

Please note that DRCs are not necessarily fixed exchange rates. They could be floating rates determined by how many dots were squeezed into the dimension, and how many dots are involved in the activity we are looking at. In previous discussion, I only used the most basic model as the example for a better understanding. If there were 10^100 times the number of dots squeezed into a central spot and managed to create a dimension, the DRC1 of this dimension would be 10^100 to 1. There are also scenarios with multiple "central dots" in one dimension. Also, I only use estimated values in the discussion. The accurate values of DRCs in a normal condition would need to be further determined. Moreover, if someone is "injecting" new dots into an atom, the DRCs of this atom will change over time.

Moreover, DRCs are set for the convenience of calculation. One can use DRC1 solely to calculate the connections, as long as he or she can distinguish the "distance" and the number of dots involved. One can also do the calculation without using any DRC. He or she can simply modify either  $A_1A_2$  or "n" in the formula into a right scale. Then the formula will remain in its original form:  $C = \frac{2}{3} * \frac{A_1A_2}{n^2} * \frac{A_1A_2+D_1D_2}{D_1D_2} \cdots$  (please note that  $A_1A_2$  in  $\frac{A_1A_2+D_1D_2}{D_1D_2}$  should remain unchanged because they represent the number of connections between spots in macro scale, which should equal to  $A_1A_2$  in DRC 0). In the other words, the value of DRC depends on the scale of dimension. All fundamental forces are just appearances of the effects of the structure of dots and the number of connections among them.

People could also interpret this matter in a reverse way. The number of connections among the invisible background dots has increased in someplace of the vacuum for some reason. Those "extra connections" formed structures which created various "dimensions", in the form of particles, to "reserve" and "present" themselves, so the vacuum could keep its peace. This process created the physical world we are living in. I will discuss a little more about this later in this paper. For now, the four fundamental forces are unified into one model under my theory.

## Topics Could be Explained

With my model, many topics in modern physics could be explained from a new perspective. I have already explained why the universe is expanding earlier in this paper. Now, I will give a few other examples.

#### Superconductivity

The resistance is from connections. Similar to the reason why the universe is expanding, the principle of superconductivity is to create a scene which has minimum number of connections, to simulate the scenario where light propagates in a vacuum. To achieve this, one needs to taking dots away from the conductor. Objects with more dots tend to have a higher density, a greater mass, a higher temperature, and a greater pressure. Thus, theoretically, the easiest way to reduce the number of dots within an object is to reduce its temperature. This is why the temperatures of superconductors are extremely low.

### Wave-Particle Dualism

I already explained this phenomenon earlier in this paper with the approach of Natural Calculus. Now let us further explore its principle from the perspective of dots and connections.

When an object lose a significant amount of connections in one direction, it will tend to move toward the opposite direction. However, what if the object is constrained by the rest of connections and can not go too far, such as the electron in an atom? The answer is some dots of the object will be "launched out", so the object can maintain the new balance of connections. This is the principle of how the light is generated in my theory.

Therefore, light inherently has a particle-like properties because photon is essentially composed of dots. Now, let us take a look at the wave nature of light. The change in the number of connections of the object will not only cause the launch of dots, but also generate "grooves" in each "photon". If the object, the light source, originally has a large number of connections, the change of connections will be big. Then a relatively large amount of dots will need to be launched out in a photon. Thus the groove will be "thinner", which indicates that there are more dots within the photon. The structure of dots within the photon will be more "compact". If the light source has a small number of dots and connections, the change of connections will be mild. Then a relatively small amount of dots will need to be launched out. Thus the groove will be "wider", which indicates that there are only a few dots within a photon. The structure of dots within the photon will be "looser".

In the other words, the groove, as a component of the structure of dots within the photon, is also reflecting the change in connections of the light source (electrons). When the change of the number of connections of the object is big, it will launch "photons" with more dots and less grooves in order to get back to the new equilibrium. When the change of connections of the object is small, it will launch "photons" with less dots and more grooves.

Moreover, Losing and gaining connections of the light source is a continuous dynamic process as the distance between electron and the nucleus increasing and decreasing while the electrons moving back and forth. Thus the width of the groove and the number of dots within photons will fluctuate periodically. With the superposition of the grooves and dots in a switching proportion, the effect of light will look like a wave. In conclusion, the dynamic changing process in the number of connections of the light source determined the amount of dots and the density of grooves within the photon. This approach of understanding also explains why high-energy rays have short wavelengths while low-frequency waves have longer wavelengths.

# The Speed of Light

As we discussed above, one can see that photon is generated by the change of connections of electrons in the direction toward the nucleus. The initial speed of the light is because there is a dramatic change in the number of connections of the photon when it is "launched out" of the dimension. The photon lose a significant amount of connections in the direction of the light source, so it will tend to move toward the opposite direction. As the photon moving, the number of connections between the photon and the direction of the light source keeps decreasing at a constant exponential rate, while the numbers of connections from macro world are too small to influence it because of the DRC. This ensures that photon travels at a constant speed in one direction, unless there are significant amount of dots "capture" the photon with a huge number of connections from their directions. This explains why a massive celestial body could cause the bending of light propagation. (By combining this part with the previous explanation regarding the expansion of universe, one can further

explain the phenomena of redshift and blueshift).

As we discussed earlier, atom is a "dimension" created by the "central dot" in a certain scale. Thus, from the formula one can see that theoretically every dot, or groove, should lost a same fixed amount of connections once it left the dimension. This indicates that the light speed should be a constant.

I did not do the math. The value of the speed of light should be a number highly correlated with the square root of the number of connections that the photon has lost when it is launched out. For example, if the central dot is in a scale of 10^-19 meters, and the size of dimension is 10^-10 meters, the result of light speed should be a value around 0.33\*10^9 meters if the structure is perfectly balanced within the dimension and everything is uniform and flat in the universe.

## The Black Hole

Under my model, the black hole is where the amount and density of dots are extremely high. The connections it has with anything that is close enough to it will be extremely large numbers according to the formula. Thus, it will "capture" anything which do not have enough number of connections form other directions. A black hole system can be roughly regarded as a macro version of the "central dot" and its structures.

The black hole can either expand or contract depending on the change in

its density and amount of dots. It also could disappear if everything is back to the normal scale as it evolving. For example, if there is a huge ring with an infinite dot density, surrounding a black hole, the black hole could be "flattened" by this ring.

Moreover, suppose there are two dots with a great number of connections between them passing through the edge of the black hole, the following thing could happen: When the dot on the side close to the black hole is captured, the other dot will move in the opposite direction to the black hole instead of being captured. Just like what we discussed earlier, as long as the number of connections the dot has lost is greater than the number of connections it has gained form the direction of the black hole, it will tend to move toward the opposite direction.

## Quantum Entanglement

Another phenomena could be explained is quantum entanglement.

From the previous discussions one can see that two particles with a sufficient number of connections between them will easily generate entanglement. If you change the state of one of them, the other will react symmetrically. This is easy to understand since all the dots between them are in strong connections. This entanglement is also very easy to be interrupted as long as the number of connections between them can no longer dominate the connections they have with the rest of the world.

Moreover, if enough number of dots are "injected" into related particles, or any objectives, this will create enough connections for the two objects to entangle together. The "injection" could be in various forms such as energy, mass, light, or any form, because the existence of anything would create connections.

For example, if one managed to inject 10<sup>n</sup> dots, with sufficient order of magnitude, into two particles at both ends of the Milky Way Galaxy, the particles could not only establish "quantum" entanglement, but also be able to twist the whole galaxy into a symmetrical binary black hole system. One can also literally divide the universe, or even create a new one, if he or she could access the permission of infinite "dots injection".

#### <u>Time</u>

Time will play a new role in my theory. It is the "absolute" coordinate of the "location information" of all the dots in this universe, while space is a relative coordinate that mark positions from our perspective.

The "time" we can "feel" is just an effect of the speed of light. As we discussed earlier, light is an effect of the structures of "central dots". Theoretically, one can create a "faster" light if he or she could squeeze the connections into a much smaller scale to create a more "powerful" dimension with more dots. (It is worth noting that the dimension has to have a structural effect of generating "light", otherwise it will be a black

hole.)

Dots will not need time to build connections. As long as the dots are there, the connections are there. Our sense of time is based on the structure of dots. Once the structure is set, the consequence happens immediately form the perspective of connections. Time is only the necessary support for us to experience those connections. This could explain those experiments that seem to go beyond the law of causality.

Many other topics such as the three-body problem, gravitational wave, dark matter, and dark energy could also have alternative explanations with this theory. Readers can take a look into these topics if they are interested.

# The Full Version of the Formula

As I discussed earlier, the number of connections among the invisible background dots has increased in someplace of the vacuum for some reason. If this is the "first cause" of our universe, then where did those "extra connections" come from? One could argue that those connections were pre-installed. Our universe is just as it is. If this is true, then the Cross-Dimensional Constant in the formula should be a rational number. All we need to do is to find the accurate value of this number and then we will get the "truth" of our universe. However, what if things are more complicated than we have imagined? What if we are living in a universe with more than three dimensions? I will give an explanation based on my theory, by introducing the full version of the formula of connection.

We already have the first Natural Equilibrium Point of Dimension (1<sup>st</sup> NEP) in a extremely small scale. However, it is still far away from the mathematical limit. There might be more NEPs until we reach the infinitesimal scale of our universe in mathematics. Moreover, from the natural calculus one can see that our universe could be geometrically a four-dimensional world operating in a three-dimensional space. He or she can further calculate the conversion ratios among different dimensions. What if there are also infinite geometric dimensions in the ultimate universe?

With all these considerations, the full version of the formula when it reaches the infinity in our dimension is

$$2 * \frac{1}{3} * \frac{(A_1 A_2) \pi p^2}{\pi (np)^2} * \frac{A_1 A_2 + D_1 D_2}{D_1 D_2} * \cdots * \frac{A_1 A_2 + D_1 D_2 + \dots + D_{i1} D_{i2}}{D_{i1} D_{i2}} * \cdots$$

\*\*  $D_1D_2$  refer to the background dots, while \*...\* in the middle refers to the possibility that the background dots are still divisible. Then there will be  $D_3D_4$  and so on.

\*\*  $D_{i1}D_{i2}$  refer to the mathematically infinite scale of background dots in our universe.

The full version of this formula while considering cross-cardinal infinities in all dimensions would be:

$$2 * \frac{1}{3} * \frac{(A_1A_2)\pi p^2}{\pi(np)^2} * \frac{A_1A_2 + D_1D_2}{D_1D_2} * \dots * \frac{A_1A_2 + D_1D_2 + \dots + D_{i1}D_{i2}}{D_{i1}D_{i2}} * \dots * \frac{A_1A_2 + D_1D_2 + \dots + D_{i1}D_{i2} + \dots + D_{di1}D_{di2} + \dots + D_{dd}D_{dd}}{D_{dd}} * \dots$$

 $**D_i$  refers to the infinite scale of our dimension, in all direction, where we reach

the first infinite of the constant. When the constant reach this point, one could explain why there are transcendental numbers exist in the real world( "naturally created" all real numbers in its decimal part).

\*\*  $D_{di}$  refers to the infinite scale & combination of all dimensions, d is for

dimension, i is for infinite scale.

When the CDC reach this point, infinite numbers of transcendental number with "cross-cardinal number features" are created. One could explain why there are infinite transcendental numbers exist in the real world.

The CDC will become a "cardinal number free" number. It consist of infinite "cross-cardinal number transcendental numbers" which further contain infinite transcendental number separated by infinite dimensions.

By the way, a possible conversion ratios of the number of dots among different dimensions could be:

Dimension in NI Form	2πr	$\frac{3}{2}\pi r^2$	$\frac{4}{3}\pi r^3$	$\frac{5}{4}\pi r^4$	$\frac{6}{5}\pi r^5$	$\frac{7}{6}\pi r^6$	$\frac{8}{7}\pi r^7$	$\frac{9}{8}\pi r^8$	$\frac{10}{9}\pi r^9$
Conversion Ratio by 3D	8πr	$4\pi r^2$	$\frac{4}{3}\pi r^3$	$\frac{1}{3}\pi r^4$	$\frac{1}{15}\pi r^5$	$\frac{1}{90}\pi r^6$	$\frac{1}{630}\pi r^7$	$\frac{1}{5040}\pi r^8$	$\frac{1}{45360}\pi r^{9}$

 $**D_{dd}$  refers to the infinite connection of dimensions and the end of dimensional

universe, this will lead to an infinite set of loop nesting of dimensions. Till this point, the constant will become a "number" that contains infinite numbers of itself in it, with infinite connections, which is also itself, while containing infinite number of itself in it.

Therefore, Godel incompleteness theorem is no longer applicable here. In the other words, the ultimate universe is just an effect of the "universal constant", CDC. The mathematical ontology of the whole universe is this one single number.

Thus, the  $D_{dd} * D_{dd}$  in formula means the whole ultimate universe engaging with

itself. The part 
$$\frac{A_1A_2+D_1D_2+...+D_{i1}D_{i2}+...D_{di1}D_{di2}+...+D_{dd}D_{dd}}{D_{dd}D_{dd}}$$
 's meaning will be the

demonstration of how the universal constant connecting to itself while generating the whole universe. One can not mathematically understand this.

Someone might think that it is equals to 1. Well we may use the number 1 to replace it for mathematical or philosophical purpose. Actually we can use 1 or 0, or

any number, for different purpose, but it is not 1, nor 0, nor anything. It is just as it is. This is how the "universal constant" to demonstrate that: 0=0, 1=1, and 0=1, in a perfect way. Because in this level of sense, the equal sign "=" will become an"Illegal" needless action. While the universal constant demonstrated "equal" without using any equal sign here.

\*\*The last "..." sign in this formula is something beyond what I could discuss with language right now.

Form this full equation one can see that even though someday we could finally reach the mathematical limit of the ultimate universe, It is always just a beginning of another bigger game. Our universe is merely a remnant caused by the repetitive calculation of the ontological world.

However, this formula shows at least one thing: no matter how infinite the ultimate universe is, we are in direct connection with it. And no matter how minor it is, we could get the "truth" in some degree for sure. Reference:

Gravitatio Universalis, *Philosophiae Naturalis Principia Mathematica*, Issac Newton (1643-1727)