

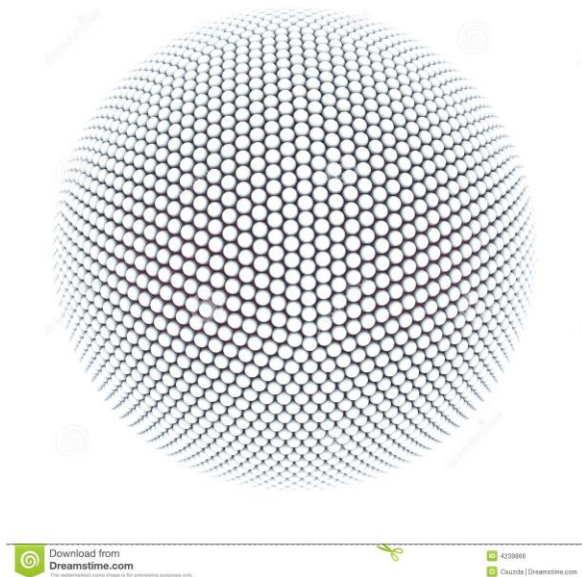
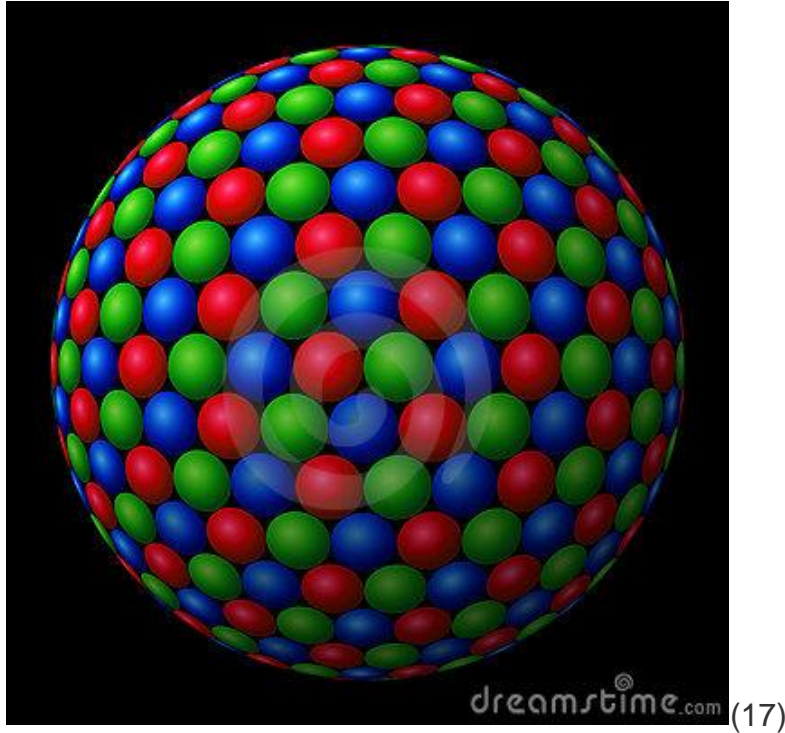
Evidence for Granular Spacetime

I Abstract

Originally, I had worked on an equation for charge and gravity. I had found that charge was mostly related to the electron mass, I since found out that gravity is most related to the proton mass. The realization came when I was working on “The Answer to the Universe, the Life and Everything is Still 42” I had an extra term for the mass ratio of the proton to the neutron. To get rid of that term, I came to the realization that Gravity was related to the mass ratio of the proton to the neutron. This paper is then an updated version of “The Aether Found, Discrete Calculations of Charge and Gravity with Planck Spinning Spheres and Kaluza Spinning Spheres”, which are the previous versions of this update.

This paper shows that the force of charge and gravity can be modeled from a sphere, indicating granulated granular spacetime. **Planck Spinning Spheres, (Planck)** packed in a cuboctahedron structure, where many spheres are combined to produce the fabric of space. The Planck would be made of smaller Spheres called **Kaluza Spinning Spheres (Kaluza)**. See images below for an example of a sphere made of spheres.

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The calculations, herein, imply spacetime to be discrete. **Virtual Angular Momentum** is transferred to the **Continuous Discrete Spacetime** that is activated by the appropriate environment. This discrete Virtual Angular Momentum is modeled by equations developed herein. The modeling equations between charge and gravity use the same spherical model. This model: proposes a new definition of the fine structure constant in section IV; proposes a proton charge radius in section V; gives meaning to some Planck dimensions in section VI; predictions can be made about approximate

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values for the age of the universe and or the size of the **Hubble Sphere Universe (Hubble)** in section VII; Proposes ideas that may be used to help prove the idea of “Discrete Calculations of Charge and Gravity with Planck and Kaluza and a cuboctahedron, vector equilibrium, sub-structure of the universe and relate to wrapped up dimensions in section VIII; The equations will explore the mystery of the constants of nature as did John D. Barrow.(5) Due to these predictions, that may be validated and/or refined in the future, this model may deserve further investigation. These calculations bring back the Dirac’s large number hypothesis (15) and relationships similar to the Koide formula. (16) Below are summarized the simplified equations modeling the Planck for charge and gravity constructed in section II and III.

Charge appears to come from electron sized charge.

$$q^2 = T\pi^3hc\varepsilon(Me) / 2Mn \quad [2]$$

Gravity appears to come from Proton sized mass

$$N = 2Mp\pi^3hc / G(Mn)^3 \quad [3]$$

II Discrete calculation of elementary charge

In this section we develop a potential discrete method for calculating elementary charge from Planck’s constant and the masses of the proton, neutron, and electron. The equation developed is the following.

$$q^2 = T\pi^3hc\varepsilon(Me) / 2Mn \quad [2]$$

where

Sum Angular Momentum Scalar

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$$T^2 = \frac{1}{\sqrt{1 - \left(2^{0.5} \frac{\pi M_e}{3 * 3 M_n}\right)^2}} \left[\left(\frac{M_p - M_e}{M_n}\right)^2 + \left(\frac{M_n}{M_n}\right)^2 + \left(\frac{M_n}{M_n}\right)^2 \right] \quad [2.1]$$

Compton Radius of Neutron

$$r = \frac{h}{c M_n} \quad [2.2]$$

Compton Frequency of Neutron

$$f = \frac{M_n c^2}{h} \quad [2.3]$$

where q is elementary charge
 where pi or π is pi or π
 where h is plancks constant
 where c is speed of light

where Me is the mass of the electron
 where Mn is the mass of the neutron
 where Mp is the mass of the proton
 and T is defined as above

where ε is dielectric permittivity

To start we use the traditional equation of force between two charges.

$$F_e = \frac{q^2}{4\pi\epsilon r^2} \quad [2.4]$$

Let us propose that charge can be calculated by summing the combined vector of the sum of forces Fx, Fy, and Fz, for a hollow spinning sphere rotating on 3 perpendicular axes. This leads to the following equation.

$$\sum F_x + F_y + F_z = \frac{q^2}{4\pi\epsilon r^2} \quad [2.5]$$

We currently do not know what the forces are in each direction, but this section builds a case for the approximate forces, or rather it is broken down into a sum angular momentum multiplied by a frequency, in each x, y, and z direction. To reduce complexity, the force will be simplified by using the following equation which will be calculated at a later point. This equation is basically a proposal that most of the force from elementary charge is a result of 3 perpendicular forces that are related to the masses of the proton, electron, and neutron. Since the electron, proton, and neutron all contain elementary charge within the quarks or electron, and these charges are all 1/3 or 2/3 or 3/3 of elementary charge within the quarks or electron, it is not unlikely that some relationship of this sort is possible. It should be noted that, in this situation, force can be modeled as a rate of angular momentum since there are two frequencies in the equation for force. One could be the rate of spinning, the other the rate of emission of

angular momentum carriers.

Sum Angular Momentum scalar

$$T^2 = \frac{1}{\sqrt{1 - \left(2^{0.5} \frac{\pi M_e}{3 * 3 M_n}\right)^2}} \left[\left(\frac{M_p - M_e}{M_n}\right)^2 + \left(\frac{M_n}{M_n}\right)^2 + \left(\frac{M_n}{M_n}\right)^2 \right] \quad [2.1]$$

This relationship is an unexplained natural relationship, similar to the Koide relationship. (16)

The equation then becomes;

$$TF = \frac{q^2}{4\pi\epsilon r^2} \quad [2.6]$$

It is known that $F=ma$, substituting yields;

$$Tma = \frac{q^2}{4\pi\epsilon r^2} \quad [2.7]$$

What is the acceleration of, A square, a circle, a sphere, a spherical shell? A spherical shell works for both force of charge and force of gravity. When attempts to pack spheres concentrically around other spheres a certain amount of defect space is made in relation to perfect packing. It can be shown that this amount of defect space is equal to the outer layer of spheres. So this is justification for using a hollow sphere when the actual geometry is not an actual hollow sphere. So the equation for acceleration of a spherical shell is as follows.

The distribution of these discontinuities can be summed to be a spherical shell. This is shown in the paper "The Holographic Principle and How can the Particles and Universe be Modeled as a Hollow Sphere"(18)

$$a = \frac{2}{3} R(2\pi)^2 f^2 \quad [2.8]$$

Substituting for "a" yields;

$$Tm \frac{2}{3} r(2\pi)^2 f^2 = \frac{q^2}{4\pi\epsilon r^2} \quad [2.9]$$

Propose that the mass on the left hand side of the equation "m" is the mass of the electron "Me"

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$$TMe \frac{2}{3} r (2\pi)^2 f^2 = \frac{q^2}{4\pi\epsilon r^2} \quad [2.10]$$

Propose that all masses and charges are divided by 3. Thus the equation becomes

$$TMe 2r (2\pi)^2 f^2 = \frac{q^2}{4\pi\epsilon r^2} \quad [2.11]$$

Propose that radii are different, depending which force they are experiencing. The rational for this is explained later in the discussion. It has to do with how the discontinuities are more concentrated at the center and the concentration of defects decreases inversely proportional to the radius. A radius of 10 would have approximately 20 percent defects, but a radius of 20 has only about 10 percent defects. To compensate for a large sphere the radii "r" are each divided by 4. Thus the equation becomes;

$$\frac{T}{2} Me r \pi^2 f^2 = \frac{q^2}{4\pi\epsilon r^2} \quad [2.12]$$

Substituting in Equation 2.2 and 2.3

$$\textbf{Compton Radius of Neutron} \quad r = \frac{h}{cMn} \quad [2.2]$$

$$\textbf{Compton Frequency of Neutron} \quad f = \frac{Mnc^2}{h} \quad [2.3]$$

where q is elementary charge
where pi or π is pi or π
where h is plancks constant
where c is speed of light
where Me is the mass of the electron
where Mn is the mass of the neutron
where Mp is the mass of the proton
and T is defined as above

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Which simplifies to

$$q^2 = T\pi^3hc\varepsilon(Me) / 2Mn \quad [2]$$

Substituting the values from the appendix

$$q = 1.602176622 * 10^{-19} \text{coulombs.}$$

This number for q is within .999999999 of the 2014 Codata value of **1.602 176 6208 (98) x 10⁻¹⁹ C.**

Section III Modeling Elementary Gravity

In this section we work on developing the following equation.

$$N = 2Mp\pi^3hc / G(Mn)^3 \quad [3]$$

Compton Radius of Neutron

$$r = \frac{h}{cMn} \quad [3.1]$$

Compton Frequency of Neutron

$$f = \frac{Mnc^2}{h} \quad [3.2]$$

where π or π is pi or π
where h is plancks constant
where c is speed of light
where Me is the mass of the electron

where Mn is the mass of the neutron
where Mp is the mass of the proton
and G is the gravitational constant

“N” is a number of Kaluza discontinuities within a Planck. It is proposed that mass, forces, charge etc., comes from imperfect packing of spheres. If one has a basket of spheres normally if they were perfectly packed it could result in a cuboctahedron structure. However if there was a force that pulled all of these spheres toward a center

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then the spheres would also try to pack in concentric shells. It can be shown mathematically that the amount of defects that would occur would be equal to the amount of spheres on the final layer of packing and the effective radius for calculating momentum is $0.25r$. So a sphere with radius 100 spheres would have total defects of $4\pi \cdot 100^2$. Therefore, if the universe or a particle or deeper dimension yet, is actually a packing of spheres there would be two opposing packing techniques. One to pack everything perfectly in a cuboctahedron structure, the other to pack spheres concentrically in shells. These two different opposing packing techniques would give rise to forces, mass etc. This paper intends to show how an equation could be formed to model gravity and charge using the mass of the neutron, planck's constant, gravitational constant, and the speed of light. This section works on gravity.

We start with the traditional equation for the force of gravity and then modify it to obtain an elementary gravity.

$$F = \frac{GM_1M_2}{r^2} \quad [3.3]$$

A number of questions arise.

1. Is not $F=ma$? Is there some mass times acceleration that is equal to the gravitational force? If one breaks down gravity into one tiny object that carries force is there a point at which that mass times acceleration, or more accurately quantum gravitational momentum (graviton) times rate of graviton emission, that is equal to the traditional equation for gravitational force. Is the graviton a virtual momentum or virtual force?

2. Is there some elementary mass, just like there is an elementary charge where, at some discrete point, M_1 and M_2 would have a smallest value and are directly related to distance " r ". Therefore the equation became modified to the following. In this model, the mass of the neutron, is proposed to be the mass " M ".

$$ma = \frac{GMM}{r^2} \quad [3.4]$$

One wonders if the particles we experience are made of much smaller particles. One sees evidence of this possibility with Planck length. In this model this smaller mass is evaluated as the mass of the Proton " M_p " over some number " N ".

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$$\frac{M_p}{N} a = \frac{GMM}{r^2}$$

[3.5]

What is the acceleration of, A square, a circle, a sphere, a spherical shell? A spherical shell works for both force of charge and force of gravity. When attempts to pack spheres concentrically around other spheres a certain amount of defect space is made in relation to perfect packing. It can be shown that this amount of defect space is equal to the outer layer of spheres. So this is justification for using a hollow sphere when the actual geometry is not an actual hollow sphere. So the equation for acceleration of a spherical shell is as follows.

The distribution of these discontinuities can be summed to be a spherical shell. This is shown in the paper "The Holographic Principle and How can the Particles and Universe be Modeled as a Hollow Sphere"(18)

$$a = \frac{2}{3} r(2\pi)^2 f^2 .$$

[3.6]

Then the equation evolved more to

$$\frac{M_p}{N} \frac{2}{3} r(2\pi)^2 f^2 = \frac{GMM}{r^2}$$

[3.7]

where r is a radius and f is frequency.

Then the equation evolved more to

$$\frac{M_p}{N} \frac{2}{3} r(2\pi)^2 f^2 = \frac{GMM}{4\pi r^2}$$

[3.8]

Propose that all masses and charges are divided by 3. Thus the equation becomes;

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$$\frac{M_p}{N} 2r(2\pi)^2 f^2 = \frac{GMM}{4\pi r^2} \quad [3.9]$$

Propose that radii are different, depending which force they are experiencing. The rationale for this is explained later in the discussion. It has to do with how the discontinuities are more concentrated at the center and the concentration of defects decreases inversely proportional to the radius. A radius of 10 would have approximately 20 percent defects, but a radius of 20 has only about 5 percent defects. To compensate for a large sphere the radii “r” are each divided by 4. Thus the equation becomes;

$$\frac{M_p}{N} 2r(\pi)^2 f^2 = \frac{GMM}{\pi r^2} \quad [3.10]$$

Substituting Equation 3.1 and 3.2 into 3.10

Compton Radius of Neutron $r = \frac{h}{cMn}$ [3.1]

Compton Frequency of Neutron $f = \frac{Mnc^2}{h}$ [3.2]

where pi or π is pi or π
 where h is plancks constant
 where c is speed of light
 where Me is the mass of the electron

where Mn is the mass of the neutron
 where Mp is the mass of the proton
 and G is the gravitational constant

This simplifies

$$N = 2M_p\pi^3 hc / G(Mn)^3 \quad [3.11]$$

Where substituting values from the appendix gives a value of N.

$$N = 6.57014(31)*10^{40} \quad [3.12]$$

It is proposed that the sphere described, the Planck, is composed of Kaluza. The

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number N would then be the number of Kaluza on the outside layer of the Planck. In section V and VI it is shown that the Planck and Kaluza give meaning to some of the Planck dimensions. Where N is the number of Kaluza within the Planck. This number “N” is clearly reminiscent of the Dirac’s large number hypothesis. (15)

VIII Discussion

This theory is describing three spheres. The three spheres are the Hubble, the Planck that is on the order of the size of protons and neutrons, and the Kaluza that is the size of Planck dimensions. From section II, we find that charge can be modeled from a structure of Planck. The value of “T”, that is proposed in section II, shown below;

Sum Angular Momentum

$$T^2 = \frac{1}{\sqrt{1 - \left(2^{0.5} \frac{\pi Me}{3 * 3Mn}\right)^2}} \left[\left(\frac{Mp - Me}{Mn}\right)^2 + \left(\frac{Mn}{Mn}\right)^2 + \left(\frac{Mn}{Mn}\right)^2 \right]$$

may have other factors affecting the forces in the x, y, and z dimension. The neutrinos mass appears to be so small, that if there is a neutrino were incorporated into the mass of the proton or neutron it might affect the mass in the 10th, or 11th digit. This in turn may have some affect on the calculated sum angular momentum. This may be useful, at some point, for estimating masses of neutrinos.

From section II and III we see that charge and gravity force are directly the mass of the proton and neutron and the neutrons compton wavelength and frequency. We see that charge is related to sum angular momentum on 3 axes where gravity is a momentum in only one direction. That the sum angular momentum is the sum of three perpendicular vectors indicates that an underlying structure should have perpendicular packing, of spheres. This is true of a cube packing and cuboctahedron packing. The most efficient packing is that of cuboctahedron which packs at $\frac{\pi}{\sqrt{18}}$. Indeed it is shown in Underlying Cuboctahedron Packing of Planck Spinning Spheres Structure of the Hubble Universe (14) that there may be a cuboctahedron packing.

It is clear, from Section II and III, when calculating charge and gravity, that the forces of charge and gravity, must be in the form of a hollow sphere. If it had some totally uniform dispersion of the dislocations/discontinuities of the Kaluza spheres the moments of inertia would have included some division of a multiple of 5 since a solid sphere has a moment of inertia of;

$$I = \frac{2mr^2}{5}$$

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Indeed for some particles the angular momentum does have factors of 5.(12) And therefor the particles must be acting with uniform dispersion.

It is clear however, from, "Sphere Theory May Describe Dark Energy" (19) other papers, depending on how the spheres are added up. By spheres, momentum, or energy, the sphere can appear to be hollow or solid.

IX Conclusions

The calculations of this hypothesis show, that the topology of the universe spacetime, could be discrete, granulated, granular, rather than continuous. When we talk about Planck area, and the Planck Spinning Sphere made of Kaluza Spinning Spheres made of Klein Spinning spheres, heading towards the smallest dimension of approximately 10^{-55} meters we realize that when the Creator said, make the universe smooth, the Creator meant Supreme smoothness. We also see that the Planck dimensions describe the current universe and perhaps, not instants around the Big Bang.

The calculations show the forces could come from equivalent of a hollow sphere, but the momentum should come from the angular momentum of the whole sphere changing from the interaction of the perfect with imperfection, cuboctahedron slash vector equilibrium, and the absence of stability.

We see charge comes from the electron and gravity from the proton, or rather electron like structure for charge and proton like structure for gravity.

Appendix A

Fundamental Physical Constants (18)

1. $c=2.99792458 \times 10^8$ m/s
2. $h=6.626\ 070\ 040\ (81) \times 10^{-34}$ J s $6.626\ 06957(33) \times 10^{-34}$ J s
3. Mass of Neutron = $M_n=1.674\ 927\ 471\ (21) \times 10^{-27}$ kg $1.674\ 927\ 351(74) \times 10^{-27}$ kg
4. Mass of Proton = $M_p=1.672\ 621\ 898\ (21) \times 10^{-27}$ kg $1.672\ 621\ 777(74) \times 10^{-27}$ kg

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5. Mass of Electron = $M_e = 9.109\ 383\ 56(11) \times 10^{-31} \text{ kg}$
 $9.109\ 382\ 91(40) \times 10^{-31} \text{ kg}.$
6. $q =$ unit charge = $1.602\ 176\ 6208(98) \times 10^{-19} \text{ C}$
 $1.602\ 176\ 565(35) \times 10^{-19} \text{ C}$
7. $\epsilon =$ Dielectric Permittivity = $8.854187817 \times 10^{-12}$
8. $G = 6.674\ 08(31) \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$ $6.67384(80) \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$

Appendix B

Definitions

Compton Frequency of Neutron $f = \frac{Mnc^2}{h}$

Compton Radius of Neutron $r = \frac{h}{cMn}$

Continuous discrete space- In this paper, the continuous discrete space is a space that is packed mostly in a continuous cuboctahedron-vector equilibrium packing with rare discontinuities occurring from spherical packing of layer upon layer of concentric layers of spheres. Gravity forces spherical packing, while vector equilibrium forces cuboctahedron packing.

Current rate of aging of the Universe – In this model the rate of aging of the Universe is not presumed to be constant, rather it is open to the concept that as the Universe was more dense, the aging rate of the Universe would have operated under the laws of General Relativity where a higher gravitational field would have generated a slower passing of time resulting in a possibly infinitely aged universe using the current rate of aging.

Hubble Sphere Universe (Hubble) - This is the size of the Universe when traveling at the Speed of Light for the age of the Universe at the **current rate of aging of the Universe**.

Kaluza Spinning Sphere (Kaluza)– Planck Spinning Sphere (Planck)- This model works with the idea that there are levels of spheres that make up the Universe, Multiverse, Planck Spinning Sphere. There may and probably are spheres besides these. The Kaluza Sphere would be made of the next smaller spheres called Kline Spinning Spheres (Kline). The spheres go in this order. Approximately 10^{30} Klein spheres make up a Kaluza sphere, approximately 10^{60} Kaluza spheres make up the Planck Sphere, approximately 10^{121} Planck Spheres make up the universe, and approximately 10^{242} universes make up the multiverse. All spheres are essentially

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equal within their domain.

$$\text{Sum Angular Momentum } T^2 = \frac{1}{\sqrt{1 - \left(2^{0.5} \frac{\pi Me}{3 * 3Mn}\right)^2}} \left[\left(\frac{Mp - Me}{Mn}\right)^2 + \left(\frac{Mn}{Mn}\right)^2 + \left(\frac{Mn}{Mn}\right)^2 \right]$$

The sum angular momentum is the sum of angular momenta on the Planck Spinning Sphere. In this case it is the sum scalar component of the momenta for charge.

Virtual Angular Momentum - Virtual Angular momentum is a real momentum, but it only is realized under certain circumstances that are not understood. This can be related to a neutrino that does not experience the strong force or charge. Whereas the graviton mediates the gravitational force, imparting a perpendicular momentum toward the source of the graviton.

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