W and Z Boson Weak Force and Weak Charge in Granular Spacetime

I Abstract

This paper shows the magnitude of the weak force and weak charge with calculations and makes predictions of the weak charge. It also postulates that the weak force may be a result of w boson pairs and z boson pairs. Tommaso Dorigo discusses W boson pairs [2]. The equations to derive a value of weak charge to elementary charge in this paper seem to imply that weak charge, of .076447, may be the result of W boson pairs or perhaps .071776 of a Z boson pairs. This paper uses the cuboctahedron structure shown in "Proton Electron Universe and Their Directions of Force"[1]. We also show that the ratio of weak charge and elementary charge are simply the square root of the mass of the neutron to the mass of two times the w boson or perhaps two times the z boson or a combination of these two numbers.

Charge appears to come from electron sized mass.

$$q^2 = T\pi^3 hc\varepsilon(Me)/2Mn \text{ [1]} \qquad [2]$$

Gravity appears to come from Proton sized mass

$$N = 2Mp\pi^3 hc/G(Mn)^3 \text{ [1]} \qquad [3]$$

II Discrete calculation of weak charge

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

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

where

Sum Angular Momentum Scalar

$$T^2 = \frac{1}{\sqrt{1-(2^{0.5}\frac{\pi Me}{3*3Mn})^2}}[(\frac{Mp-Me}{Mn})^2+(\frac{Mn}{Mn})^2+(\frac{Mn}{Mn})^2] \text{ [1]} \qquad [2.1]$$

Compton Radius of W boson or Z boson pairs $R = \frac{h}{c2M}$ [2.2]

Compton Radius of Neutron $r = \frac{h}{cMn}$ [2.2.1]

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

where q is w boson charge
where pi or π is pi or π
where h is plancks constant
where c is speed of light
where ε is dielectric permittivity

where Me is the mass of the electron
where Mn is the mass of the neutron
where Mp is the mass of the proton
T is defined as above
M is the mass of the w or z boson.

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

$$Fe = \frac{q^2}{4\pi\varepsilon r^2}\,. \qquad [2.4]$$

In this case we are calculating the weak charge and weak force max and estimating the mass of the W boson or Z boson. The value q will be the weak charge.

$$Fw = \frac{q^2}{4\pi\varepsilon r^2} \qquad [2.5]$$

Let us propose that charge can be calculated by summing the combined vector of the proton and electron force signified by the value “T”.

$$T^2 = \frac{1}{\sqrt{1-(2^{0.5}\frac{\pi Me}{3*3Mn})^2}}[(\frac{Mp-Me}{Mn})^2+(\frac{Mn}{Mn})^2+(\frac{Mn}{Mn})^2] \quad [1] \qquad [2.1]$$

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

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.

It is known that F=ma, substituting yields;

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

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. Therefor, this is justification for using a hollow sphere when the actual geometry is not an actual hollow sphere. Therefore, the equation for acceleration of a spherical shell is as follows in equation [2.8]

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”(4)

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

Substituting for “a” yields;

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

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

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

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

$$TMe2R(2\pi)^2 f^2 = \frac{q^2}{4\pi\varepsilon r^2} \quad . \qquad [2.11]$$

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;

$$\frac{T}{2}MeR\pi^2 f^2 = \frac{q^2}{4\pi\varepsilon r^2} \qquad [2.12]$$

Substituting in Equation 2.2 and 2.3

Compton Radius of W boson or Z boson pairs $R = \frac{h}{c2M}$ [2.2]

Compton Radius of Neutron $r = \frac{h}{cMn}$ [2.2.1]

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

where q is weak charge
where pi or π is pi or π
where h is Planck's 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

where M is the mass of the W or Z bosons
and T is defined as above

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Which simplifies to

$$q^2 = T\pi^3 hc\varepsilon(Me)/4M \qquad [2.13]$$

Substituting the values from the appendix

$q = .076447 * 1.602176622 * 10^{-19}$ for the W boson or

$q = .071776 * 1.602176622 * 10^{-19}$ for the Z boson

Both the ratio of weak charge to elementary charge for the W boson of 0.076447 and the Z boson of 0.071776 compare well to the 0.0719 ± 0.0045 ratio of the weak charge of the proton discussed in nature[4] It is not know which of these values are correct or if weak charge is a combination of weak charge from both the w and z boson.

Please note that the ratio of weak charge and elementary charge are simply the square root of the mass of the neutron to the mass of two times the w boson.

$$qratioweakchargetoelementarycharge = \sqrt{\frac{Mn}{2Mw}} = 076447$$ for the w boson

or

$$qratioweakchargetoelementarycharge = \sqrt{\frac{Mn}{2Mz}} = 071776$$ for the z boson

VIII Discussion

The value of “T”, that is proposed in section II, shown below;

Sum Angular Momentum

$$T^2 = \frac{1}{\sqrt{1-(2^{0.5}\frac{\pi Me}{3*3Mn})^2}}[(\frac{Mp-Me}{Mn})^2 + (\frac{Mn}{Mn})^2 + (\frac{Mn}{Mn})^2] \quad [2.1]$$

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 10^{th}, or 11^{th} digit. Note that equation 2.1 was used in Proton Electron Universe and Their Directions of Force[1]. It is presumed here that this same value may be used for the weak charge. The actual weak charge is not known to much accuracy so it did not seem of value to speculate if it is different than the value for elementary charge.

IX Conclusions

We see that the same form of equations can be used for calculating the elementary charge, elementary graviton, and the weak charge. These equations are shown below.

$q^2 = T\pi^3 hc\varepsilon(Me)/2Mn$ [1] Elementary Charge Equation 2

$q^2 = T\pi^3 hc\varepsilon(Me)/4M$ Weak Charge Equation 2.13

$(Mn)^2 = 2\pi^3 hc(Mp)/(N*GMn)$ elementary graviton

Hopefully a more accurate measurement can be made of the weak charge and therefore it will be better know if the weak charge comes from the

$qratioweakchargetoelementarycharge = \sqrt{\frac{Mn}{2Mw}} = 076447$ for the w boson

or

$qratioweakchargetoelementarycharge = \sqrt{\frac{Mn}{2Mz}} = 071776$ for the z boson

Appendix A

Fundamental Physical Constants (18)

1. c=2.99792458 * 10 Exp 8 m/s
2. h=6.626 070 040(81) x 10^{-34} J s6.626 06957(33) x 10^{-34} J s
3. Mass of Neutron = Mn= 1.674 927 471(21) x 10^{-27} kg1.674 927 351(74) x 10^{-}

^{27} kg

4. Mass of Proton = Mp= 1.672 621 898(21) x 10^{-27} kg1.672 621 777(74) x 10^{-27} kg

5. Mass of Electron = Me = 9.109 383 56(11) x 10^{-31} kg 9.109 382 91(40) x 10^{-31} kg.

6. q = unit charge = 1.602 176 6208(98) x 10^{-19} C1.602 176 565(35) x 10^{-19} C
7. ε = Dielectric Permittivity = 8.854187817 * 10 Exp –12

8. G= 6.674 08(31) x 10^{-11} m^3 kg^{-1} s^{-2} 6.67384(80) x 10^{-11} m^3 kg^{-1} s^{-2}

9. W boson mass=8.5555*10^-26 kg or 80.385(15) GeV

References

1. http://vixra.org/pdf/1807.0519v1.pdf
2. https://www.science20.com/tommaso_dorigo/things_that_can_decay_to_boson_pairs-228083
3. http://vixra.org/pdf/1712.0672v3.pdf
4. https://www.nature.com/articles/d41586-018-05037-9