1.0 Abstract

Sphere Theory is a theory that the universe is made of spheres that are made of spheres perhaps indefinitely. It is the discontinuities in the spheres that give rise to imperfection and make the universe interesting. The equations, so far have shown the forces from elementary charge, weak charge, and gravity. This paper shows the building of the equation for the unit strong force. The unit strong force is the force of one strong force carrier at its closest interaction. The unit strong force has a very short distance of action as the attraction loops back on itself very quickly due to its extreme strength that basically pulls apart space and makes new quarks. The equation developed herein is only for the force at its closest interaction, which is strong enough to hold the protons and neutrons and other nucleons together within the nucleus of the atom. An article from Nature "The pressure distribution inside the proton"[1] states the peak pressure is on the order of 10^{35} Pascals. This peak pressure can be converted to a force, which the author proposes is mostly due to the strong force.

2.0 Calculations

An article in Nature, "The pressure distribution inside the proton" [1], states the peak pressure is on the order of 10^{35} Pascals. The author proposes that only the force can be known, unless one knows what area this force was distributed over. The author reverses this pressure using the Compton radius of the neutron and comes up with a value of the peak force.

The Compton Wavelength of the neutron is calculated as follows.

Neutron Compton Wavelength $r = \dfrac{h}{cMn}$ [1]

Where h is Planck's constant, c is the speed of light in a vacuum, and Mn is the mass of the neutron.

Pressure is defined as

$$P = F / A \quad [2]$$

Where F is Peak Force, P is Peak Pressure and A is the area defined within the Neutron.

The peak force would then be

$$F = PA \quad [3]$$

And using the Compton Radius of the neutron, the would be defined as follows.

$$A = \pi * r^2 \quad [4]$$

And therefore, the Peak Force would be

$$F = P * \pi * r^2 \quad [5]$$

There are a few adjustments to r which we will describe below, and have been used in Evidence for Granular Spacetime[2] by the author.

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 5 percent defects. To compensate for a large sphere the radii "r" are each divided by 4. Thus the equation becomes;

$$F = P * \pi * \frac{r^2}{4^2} \quad [6]$$

r calculates out to be $0.6 * 10^{-15}$ and therefore using a Peak Pressure of 10^{35} Pascals used by the authors in Nature

$$F = 7 * 10^3 \text{Newtons} \quad [7]$$

The author now uses his equations for calculating the Peak Strong Force using the Equation of F=ma

It is known that the equation for force is

$$F = ma \quad [8]$$

A number of questions arise.

1. Is not F=ma? Is there some mass times acceleration that is equal to the peak strong l force? If one breaks down the strong force into one tiny object that carries force is there a point at which that mass times acceleration, or more accurately quantum strong force

momentum (gluon) times rate of gluon emission, that is equal to the traditional equation for gravitational force. Is the gluon a virtual momentum or virtual force?

2. Is there some elementary mass for the peak strong force, just like there is an elementary charge. It is proposed that one or all of the Pion particles are part of the mediation of the peak strong force. Therefore the equation became modified to the following. In this model, the mass of the neutron, is proposed to be the mass "M".

$$F = M_{pion} a \qquad [9]$$

Where M_{pion} is the mass of the pion.

As used before, the author proposes that the Pion is divided into 3 equal parts and therefore, the mass of the Pion must be divided by 3. And the equation becomes

$$F = \frac{M_{pion}}{3} a \qquad [10]$$

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"(3)

$$a = \frac{2}{3} r (2\pi)^2 f^2 . \qquad [11]$$

Then the equation evolved more to

$$F = \frac{M_{pion}}{3}\frac{2}{3}r(2\pi)^2 f^2 \qquad [12]$$

where r is a Compton radius and f is Compton frequency of the neutron.

Assume that the strong force requires neutron pairs thus the Compton radius and Compton frequency are affected by a factor of two. This may or may not be the case as this is an exercise in trying to build a model to fit the data.

Compton Radius of Neutron Pair $$r = \frac{h}{c2Mn} \qquad [13]$$

Compton Frequency of Neutron Pair $$f = \frac{2Mnc^2}{h} \qquad [14]$$

Propose that when calculating the Compton radius and frequency of the neutron the mass should be divided by 3 and therefore the equation becomes.

$$F = \frac{1}{3}\frac{M_{pion}}{3}\frac{1}{3}r(2\pi)^2 f^2 \qquad [15]$$

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 5 percent defects. To compensate for a large sphere the radii “r” are each divided by 4. Thus the equation becomes;

$$F = \frac{1}{3}\frac{M_{pion}}{3}\frac{1}{3}\frac{r}{4}(2\pi)^2 f^2 \qquad [16]$$

Substituting Equation 13, 14, and 16 yields approximately

$F = 6150$ Newtons [17]

3.0 Discussion

We find that the peak force measured at Jefferson Laboratory could be about 7000 newtons inside the proton, and the peak strong force calculated in equation 16,17 to be about 6150 Newtons. Both are similar and the author proposes that what Jefferson Laboratory measured in their test was mostly the strong force.

It is not clear what surface area Jefferson Laboratory was using for their calculation of pressure. The author believes it was an area from a space that had a radius of 0.6 femtometers as discussed in the Nature article [1]. Also, in Nature article, it is clear that the 10^{35} Pascals, is a rough number, on which they intend to find improvement.

The author of this paper proposes that Jefferson Laboratory only state what the force was as the area may not be measurable and could in fact be the Planck Area, which would put the pressure up into the 10^{75} Pascals pressure.

3.0 References

1. https://www.nature.com/articles/s41586-018-0060-z
2. http://vixra.org/pdf/1601.0234v6.pdf
3. http://vixra.org/pdf/1601.0103v1.pdf