# Energy Loss Derivation of Mass Ratios of Pions



## 1.0 Abstract

Pions apparently give strength to the strong force. Where does this meson get its mass. It is made of up and down quarks with a plus or minus one charge. Imagine the insides of a so called elementary particle with jazillions of Kaluza spheres with size and frequency on the order of Planck length and time. Each one is paired with another of exactly opposite rotation. Going from an incremental/discrete scale of rotation fraction to minus one to plus one on the x, y, and z axes. Instead of going down to the 16th dimension, Pion's, quarks, and other mesons may only go to the 9th dimension. At least that is what these equations hint at.
Matching the energy effects these matched pairs may be result in the mass ratios of elementary particles. The mass ratio calculations for the Pion's are shown in this paper. Instead of these particles being connected to the neutron, the Pions, quarks, and other Mesons, may be connected to a mass ratio to the Proton. At least, that is what these equations hint at.
This paper is a comparison to "Energy Derivation of Mass Ratio's of Pions. This theory seems more likely as the sum of Energy Loss of particles in direct collisions of particles. This energy loss will be shown in a separate paper.

## 2.0 Calculations Pion

### Section 2.1 Mass Ratio of Neutral Pion pi$^0$ to the Proton

The following equations are proposed for modeling the mass of the Pions. These equations are part derivation and part models at this time. It is hoped that a some point they will be more derivation. What happens when one rotating sphere bumps into another rotating sphere? This model and empirical numbers are trying to get a grasp of what is happening. The model does have an uncanny ability to develop similar repeating patterns for calculations of the masses of particles. This is also seen in the following paper "Energy Derivation of Mass Ratios of Elementary Particles"(6)

Equation 2.1.1 $P(1-P) = 27/32 \int_0^1 x^2 (1-x)^2 dx$

This yields the following two solutions.

Where Px~~0.971036092035419 and Py~~0.0289639079645807

We see, with Equation 2.1.2 below, that we can obtain the Mass of the Neutral Pion pi$^0$

Equation 2.1.2

$$\pi^0 = ProtonMassMeV * Px * \frac{4}{27} = (938.272046 MeV)(0.971036092)\frac{4}{27} = 134.977188 MeV$$

Please note $\pi^0$: 134.9766(6) MeV/$c^2$ (7)

Please note that Equation 2.1.2 is within 2 sigma of the Neutral Pion mass from Wikipedia, shown above. Original reference is shown in bibliography.

Section 2.2 Mass Ratio of Charged Pion's pi$^{\pm}$ to the Proton

In Equation 2.1.1, above, we develop the following two values.

Where Px~~0.971036092035419 and Py~~0.0289639079645807

As we saw in "Energy Derivation of Mass Ratios of Elementary Particles"(6), the Py value was used for a Lorentz transformation for movement/rotation against the background of the Aether. It will be the same for the pi$^{\pm}$.

Equation 2.2.1 $$\alpha = \frac{1}{\sqrt{1-(\frac{Py}{6})^2}} = \frac{1}{\sqrt{1-(\frac{0.02896390}{6})^2}} = 1.00001165170$$

Equation 2.2.2 $$R(1-R) = 3*Px/(4)\int_0^1 x^2(1-x)^2\,dx = 3*0.97103600001/(16)\int_0^1 x^2(1-x)^2\,dx$$

Yields

Rx= 0.9751043043, Ry= 0.02489569566

Equation 2.2.3

$$\pi\pm = Mp(Rx+Py)*\alpha*\frac{4}{27} = 938.272046MeV(0.9751043043+0.02896390796)*1.00001165170*\frac{4}{27}$$

$$\pi\pm = 139.570387MeV$$

Note the accepted mass value for the charged pions is as follows. The calculated value is within one sigma of the accepted value.

π±: 139.57018(35) MeV/$c^2$ (8)

3.0 Discussion

It is clear that the Equation 2.1.2 and Equation 2.2.3 yields a value that is within two sigma and one sigma, respectively, for the accepted pion masses. It is clear, with careful examination, that the same pattern of calculation is used for the calculation of the pions

and leptons. The pions, calculation, however, is a smaller polynomial. At this point it is not clear why this is. It will be important to develop the derivation of the equation 2.1.

## 4.0 References

1) http://vixra.org/pdf/1502.0193v2.pdf
2) http://physics.nist.gov/cgi-bin/cuu/Value?mpsmn
3) http://physics.nist.gov/cgi-bin/cuu/Value?mesmn|search_for=electron+neutron+mass+ratio
4) http://vixra.org/abs/1508.0027
5) http://vixra.org/pdf/1508.0114v2.pdf
6) http://vixra.org/pdf/1508.0193v1.pdf
7) http://pdg.lbl.gov/2008/listings/s009.pdf
8) http://pdg.lbl.gov/2008/listings/s008.pdf