1.0 Abstract

When is empirical evidence good enough to prove a hypothesis that cannot be observed directly? String Theory has the problem that strings will probably never ever be observed. The equations below, with the Fine structure constant, the mass ratio of the proton, electron, muon, and tau to the neutron all use the same patterns for developing an empirical equation for their values. The equations are remarkably similar.

2.0 Equations

Inverse Fine Structure Constant

Inverse Fine Structure Constant= $\sigma = T\pi^3 \frac{Me}{4Mn}$ [1]

Inverse Fine Structure Constant=137.035999146

Which is within less than one sigma of the Codata Inverse fine structure constant shown below.

Where Me is Mass of Electron, Mn is Mass of Neutron, Mp is mass of Proton and T is as follows.

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

inverse fine-structure constant α^{-1}	
Value	137.035 999 139
Standard uncertainty	0.000 000 031
Relative standard uncertainty	2.3×10^{-10}
Concise form	137.035 999 139(31)

(1)

Proton to Neutron Mass Ratio

$$P(1-P) = 3^{0.5}/(2)\int_0^{pi}((sin(t))/2)^9\,dt$$ [3]

Where two values for P are found

Px=0.998623461644, Py=0.001376538356

$$\alpha = \frac{1}{\sqrt{1-(\frac{Me}{3Mn})^2}} = 1.00000001645 \quad [4]$$

$$\frac{Mp}{Mn} = Px*\alpha = 0.998623461644084*1.00000001645 = 0.998623478023 \quad [5]$$

$$\frac{Mp}{Mn} = 0.998623478023 \quad [6]$$

Which is with less than one sigma of the proton-neutron mass ratio from Codata shown below.

Proton-neutron mass ratio m_p/m_n	
Value	0.998 623 478 44
Standard uncertainty	0.000 000 000 51
Relative standard uncertainty	5.1 x 10^{-10}
Concise form	0.998 623 478 44(51)

(2)

Electron to Neutron Mass Ratio

$$Px*N(1-N) = 8/3^{9/2}\int_0^{pi}((sin(t))/2)^9\,dt \quad [7]$$

N_x= 0.0000906445574284686867 and N_y= 0.999909355442571531

$$\frac{1}{(1-(\frac{\pi*Py}{12^{0.5}})^2)^{0.5}} = \alpha = 1.00000077922996619330 \quad [8]$$

Where Px and Py are the results of the calculation from Equation 3

$$\frac{Me}{Mn} = Nx*6*\alpha = 0.00054386734446 \quad [9]$$

$$\frac{Me}{Mn} = Nx*6*\alpha = 0.0000906445574284686867*6*1.000000779229 = 0.00054386734446$$

Which is within one sigma of the codata electron-neutron mass ratio

electron-neutron mass ratio m_e/m_n	
Value	5.438 673 4428 x 10^{-4}
Standard uncertainty	0.000 000 0027 x 10^{-4}
Relative standard uncertainty	4.9 x 10^{-10}
Concise form	5.438 673 4428(27) x 10^{-4}

(3)

Muon and Tau to Proton Mass Ratio

$$Px * m(1-m) = 3/16\int_0^{pi} ((sin(t))/2)^9\, dt \,. \qquad [10]$$

Where Px is the calculation result of Equation [3]

$$0.998623461664 * m(1-m) = 3/16\int_0^{pi} ((sin(t))/2)^9\, dt$$

Mx=0.99970188182917 and My=0.00029811817083363

$$Lm = \frac{1}{\sqrt{1-(\frac{\pi My}{9})^2}} = 1.0000000054 \qquad [11]$$

Muon

$$\frac{Mu}{Mn} = 1 - Lm * Px + \frac{Mx}{9} \qquad [12]$$

$$\frac{Mu}{Mn} = 1 - 1.0000000054 * 0.998623461644084 + \frac{0.99970188182917}{9} = .1124545198$$

$$\frac{Mu}{Mn} = 0.1124545198$$

Which is almost within one sigma of the Codata muon-neutron mass ratio shown below.

Muon-neutron mass ratio m_μ/m_n	
Value	0.112 454 5167
Standard uncertainty	0.000 000 0025
Relative standard uncertainty	2.2 x 10^{-8}
Concise form	0.112 454 5167(25)

(4)

Tau

$$\frac{Mt}{Mn} = (2*(1 - Lm*Px) + \frac{17*Tx}{9} \qquad [13]$$

$$\frac{Mt}{Mn} = 2*(1 - 1.0000000054*0.998623461644084) + \frac{17*0.99970188182917}{9}$$

$$\frac{Mt}{Mn} = 1.8910789$$

Which is within two sigma of the Codata tau-neutron mass ratio shown below.

Tau-neutron mass ratio m_τ / m_n	
Value	1.891 11
Standard uncertainty	0.000 17
Relative standard uncertainty	9.0 x 10^{-5}
Concise form	1.891 11(17)

(5)

Discussion

We see various similarities in the equations for these, well known, fundamental physics values.

1) All of these use a Lorentz like factor that indicates a relationship of mass to the speed of light. The proton uses one third of the electron mass. The electron uses pi*the mass of the proton divided by the square root of 12. The muon and tau both use a sine probability value that is pi divided by 9 times the probability value. The fine structure constant is similar to the muon and tau in that it uses pi divided by 9, but it uses the mass of the electron.
2) All of the masses use a sine probability value with the following base equation.

   $$P(1-P) = \int_0^{pi} ((sin(t))/2)^9 \, dt$$

   It is surmised that this is a probability value of a particle going in variations of x,y, and z direction, but through 3 dimensionally, mostly isolated areas. Thus the 9 dimensions of string theory. Brian Greene states in “The Elegant Universe”. Page 203 (8)“Why does string theory require the particular number of nine space dimensions to avoid nonsensical probability values?” If one looks at how the fine structure, alternative deriviation shown in “The Aether Found, Discrete Calculations of Charge and Gravity with Planck Spinning Spheres and Kaluza Spinning Spheres”(6) Equation 4, which is equation 1, above, the derivation shows that the aether is made of spheres made of spheres. The discontinuities inherent in a sphere made of spheres, being responsible for all properties we can measure, as evidenced by the calculations in “How can the Particles and Universe be Modeled as a Hollow Sphere” (7)

3) Please note, that the equations for the mass ratios of the muon and tau to the neutron are complimentary and almost identical.
4) The equations for the electron, muon, and tau all include a component that is the mass ratio of the proton to the neutron which is the Px value from Equation 3, above, and a separate component that is one minus the ratio of the proton to the neutron, which is the Py from Equation 3, above.

These observation alone, might be considered to be mere coincidence, together they show a compelling reason that the universe is packed with spheres in a cuboctahedron structure and thus the reason for pi, the square root of 2, the square root of 3, 2 and 3 being numbers that continually herald the cuboctahedron/spherical shell packing competition that give the universe observable properties and shows that defects are a necessary part of the construction of an observable universe.

References

1) http://physics.nist.gov/cgi-bin/cuu/Value?alphinv
2) http://physics.nist.gov/cgi-bin/cuu/Value?mpsmn
3) http://physics.nist.gov/cgi-bin/cuu/Value?mesmn|search_for=electron-neutron
4) http://physics.nist.gov/cgi-bin/cuu/Value?mmusmn
5) http://physics.nist.gov/cgi-bin/cuu/Value?mtausmn|search_for=tau+neutron
6) http://vixra.org/pdf/1403.0502v6.pdf
7) http://vixra.org/pdf/1407.0183v3.pdf
8) The Elegant Universe, Brian Greene, Vintage Books 2000.