GFT

CHAPTER TWENTY

A Classical Derivation of the Electron and Base Quark Masses

Given postulate one where

$$mcr = \alpha\hbar = q^2 R$$

and postulate 3 where

$$\boldsymbol{V_{gravity} = \alpha V_{electromagnetic}}$$

masses peculiar to the electromagnetic and gravitational potentials. can be derived.

$$\boldsymbol{m_{electromagnetic} = \frac{q^2 R}{\alpha rc} = \frac{\hbar}{rc}} \quad \textbf{(20.1)}$$

$$\boldsymbol{m_{gravity} = \frac{q^2 R}{rc} = \frac{\alpha\hbar}{rc}} \quad \textbf{(20.2)}$$

If we allow

$$r = r_g$$

then for the electrostatic force

$$m_g = \frac{q^2 R}{r_g c} = \frac{\alpha\hbar}{r_g c} \quad \textbf{(20.3)}$$

Since m_f **was derived via the electrostatic force an equivalent expression for it is**

$$m_g = m_{gravity} = \alpha m_{electromagnetic} \quad \textbf{(20.4)}$$

The mass m_g **is actually**

$$m_g = \frac{q^2 R}{r_g c} = \frac{\left[(1.602x10^{-19}C)^2 x30NM/C^2\right]}{\left[(4.06x10^{-35}m)x(3x10^8 m/s)\right]} = 6.32x10^{-11} Kg \quad \textbf{(20.5)}$$

From both the Law of Moments and Postulate II we may state that

$$m_1 r_1 = m_2 r_2 \quad \textbf{(20.6)}$$

or

$$m_g r_g = m_1 r_1 \quad \textbf{(20.7)}$$

or

$$\boldsymbol{m_{max} r_{min} = m_{min} r_{max}} \quad \textbf{(20.8)}$$

Since equations (20.6) –(20.8) pertain to moments we may assume the case where the masses are orbiting about each other . In the course of deriving the GFT version of Coulomb's Law in Chapter Eighteen, we introduced the distance $r_P = 4.01x10^{-18}\,meters$ which must also be a moment. Since equation (20.5) was derived in terms of $r = r_g$ then $r_P = 4.01x10^{-18}\,meters$ must be factored by $\sqrt{2\pi}$ to reflect the relationship between $r = r_g$ and $r_P = 4.01x10^{-18}\,meters$. Also, if we assume that these masses are interacting gyroscopically then from the gyroscopic forces derived in Chapter Five the mass m_g must be factored by 2.

Therefore, since

$$\boldsymbol{m_{max} r_{min} = m_{min} r_{max}} \quad \textbf{(20.8)}$$

Then

$$\frac{q^2 R r_{\min}}{c r_{\max}} = 2m_{\min} \quad \textbf{(20.9)}$$

Therefore

$$\frac{q^2 R r_{min}}{\left(2\sqrt{2\pi}\, r_p\right) c r_{max}} = m_{min} \quad \textbf{(20.10)}$$

$$m_{\min} = \frac{(6.32x10^{-12}\,Kg)\,x\,(4x10^{-34}\,m)}{2.03x10^{-17}\,m} = 1.245x10^{-28}\,Kg \quad \textbf{(20.11}$$

Through equation (20.1) the electromagnetic mass is $\frac{1}{\alpha} = 137$ larger then the gravitational mass. Therefore to find the gravitational mass we simply factor the electromagnetic mass by α. Therefore

$$\alpha m_{elctromagnetic} = m_{gravity} = \alpha\left(1.25x10^{-28}\,Kg\right) = 9.12x10^{-31}\,Kg \text{ = Electron mass} \quad \textbf{(20.12)}$$

QED

Through equation (20.12) we derive the mass of the electron. What then is m_{min} in equation (20.11)? The answer is that m_{min} is the mass of a quark and hence will be named the Base quark. It will be demonstrated that this particular quark is instrumental in the formation of several of the elementary particles.

$$m_{\min} = 1.245x10^{-28}\,Kg = \frac{m_{electron}}{\alpha} = \frac{m_e}{\alpha} = \textbf{ Base quark mass} \qquad \textbf{(20.11)}$$