# A Calculation of the Binding Force For A Photon Within A Particle

by

Mark Anthony Tierno

(drstrange@gmx.us)

*Abstract:* Based on the theories presented in my first paper, "Relation of the Internal Structure of the Photon with Field and Charge" (https://vixra.org/abs/2301.0148), wherein particles are comprised of photons entangled at the same given frequency, in this paper I shall calculate the force with which such entangled photons are bound within their particle. Also referenced is my other paper, "Calculating the Size of any Stable Particle" (https://vixra.org/abs/2303.0167).

## Introduction

I have already established that all particles are comprised of photons entangled at a given frequency, with each given type of particle (proton, electron) having its own unique entanglement frequency. The next question, then, would be how much force such photons are bound to each other with at their given entanglement frequencies. The answer to this is simple enough given everything set up in my other paper.

## The Calculation

Assuming the particle in question has mass of $m_p$, and the photon bound to it has a mass of m, then we can treat this the same as for the gravitational force between two objects with just a couple of alterations. First, we start from:

$$F=Gm_1m_2/R^2$$

But since we're on the level of individual photons bound together via their Field Density frequencies, then (using my same nomenclature as in my first paper), our equation of force becomes:

$$F=G_{Dx}m_pm/R_p^2,$$

Where:

'$R_p$' is the radius of the particle, as computed via the formula given in my other referenced paper on Particle Sizes, $R_p = 3\lambda e/(2\pi)$.

$m = (h/2\pi)\nu/c^2$

$G_{Dx} = E_DF_{Dx} = c^2\, F_{Dx}$

Recall that there are 3 photons minimum in a particle, so this means that $m_p = 3m$.

Also recall that $c=\nu\lambda$, so $\lambda=c/\nu$, and also from my first paper $\nu = \sqrt{\{c^3\pi/(6F_{Dx}h)\}}$.

This means that $\lambda = c/\nu = c\sqrt{\{(6F_{Dx}h)/c^3\pi\}}$.

Thus proceeding…

$$F = G_{Dx} m_p m/R_p^2 = c^2 F_{Dx} m_p m/R_p^2$$
$$= c^2 F_{Dx} (3m^2)/ R_p^2$$
$$= c^2 F_{Dx} 3[(h/2\pi)\nu/c^2]^2/[3\lambda e/(2\pi)]^2$$
$$= [3c^2 F_{Dx} (h^2/4\pi^2) \nu^2/c^4]/[9\lambda^2 e^2/(4\pi^2)]$$
$$= 3 F_{Dx} (c^2/c^4)h^2 (4\pi^2/4\pi^2) \nu^2 /[9 \lambda^2 e^2]$$
$$= F_{Dx} h^2\nu^2 /(3c^2 \lambda^2 e^2)$$
$$= F_{Dx} h^2\nu^2 /[3 c^2 e^2 (c/\nu)^2]$$
$$= F_{Dx} h^2\nu^4/[3e^2 c^4]$$
$$= F_{Dx} h^2 \{c^3\pi/(6F_{Dx}h)\}^2/(3e^2c^4)$$
$$= (F_{Dx}/F_{Dx}^2)\pi^2 (h^2/h^2) (c^6/c^4)/(36e^2 3)$$

- $$\boldsymbol{= \pi^2 c^2/(108 F_{Dx} e^2).}$$

This is the final form of the equation for the photon's binding force at either of the two Field Densities inherent within the internal structure of a photon. Then, using

$F_{D+}$ = 9.560953724 X$10^{10}$ (J/Kg)/N for a proton, and

$F_{D-}$ = 3.22331369X$10^{17}$ (J/Kg)/N for an electron,

we can insert these to get both the binding force for a photon in a proton, and that for a photon in an electron, as follows:

- Binding Force for a proton = 11,625.91694 N
- Binding Force for an electron = 0.00344847 N.

As we can see, the force with which a photon is bound into a proton is quite stiff, while that binding photons into an electron shows why it is so much easier for electrons to shed photons in chemical reactions.

If you further break these values down into the amount of force compared to the diminutive surface area of either particle (so, Newtons per square meter), then these values become somewhat astronomical compared to most macroscopic objects. For instance, a 1Kg ball under 1 earth gravity of acceleration, assuming about a 3-inch ball, would have around 500 Newtons per square meter, while a proton or electron would have on the order of $10^{30}$ and $10^{20}$ Newtons per square meter respectively. This should shed some additional light (so to speak) on what keeps a proton or electron held so tightly together.