The Six Photon Electron and Proton

The Turbx papers entitled **"Matter is Light"** develop quantum physics models based on the concept that all matter is photons moving in closed paths in energy wells created by their own properties. Evidence supporting the concepts and preliminary mathematics are outlined the "Proton Radius Problem" reported by Jan C. Bernauer and Randolph Pohl in the Scientific American of February 2014. In the electron model, the preliminary mathematics, are both very sketchy and startling in their content.

This paper develops a theoretical mathematical model that supports the preliminary mathematics presented in the previous paper. The conclusion is that matter is made from light in a manner closely approximated by the conceptual models of the first paper and accurately described by the mathematics presented in this paper

Outline

1 Summary

The startling result in the preliminary mathematics of the photon based model of the electron was that the kinetic energy of the electron photon in free space is proportional to the fourth power of the velocity.

$$E_e = m_{ekg}\, v_e{}^4 = \ 1.291307\, x\, 10^{-16} \text{ Joules}$$

Where: Ee is the particle kinetic energy**,**

m_{ekg} is the particle mass in kilograms

v_e is the light velocity in meters per second

Reference Equation (Wilson 5) in Light, M.A. Wilson, Turbx.Com, April 28, 2014

Revisiting the conceptual model of the electron provides a basis for developing a theoretical development of that same result, and adds a second startling result. The velocity of the photon comprising the electron is calculated by the cube root of the standard equation.

$$\boldsymbol{v_e} = \left(\frac{\hbar}{m_{ekgNIST}\ r_{eNIST}}\right)^{1/3} \qquad \text{(Wilson 8)}$$

The justification for these two equations are:

1. They are simple straight forward calculations from fundamental properties
2. Recalculation of the NIST standard radii is accurate to at six decimal places for the electron and four decimal places for the proton.

The facts strongly support the conclusion is that matter is made from light in a manner closely approximated by the conceptual models and accurately described by the mathematics presented.

2 Review of the Six Photon Model of the Electron

The objective in this review of the six photon model of the electron is to firmly establish

1. Electric Field: Each planar photon pair produces a radial electric field in that plane and the electric field in each of the three orthogonal fields are essentially totally independent of each other.
2. Magnetic Field: The central magnetic field is spherical in shape and all six photons contribute energy to it.

For simplicity view the electrostatic fields as simple planar plates of electrostatic field as shown in Figure 1, not even displaying the radial variation of field strength

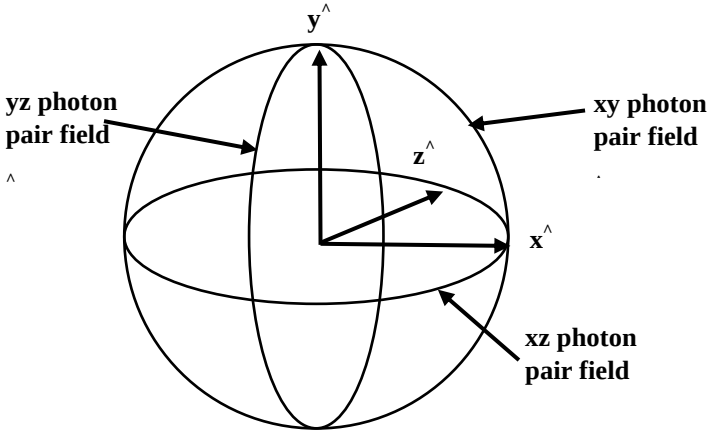

Figure 1 Electrostatic Fields of the Electron

Notice, the electric field of one photon pair is orthogonal to every other pair, i.e. it makes very little contribution to the forces on the other two photon pairs,

The central portion of the magnetic field for each photon pair is a sphere covering the same volume three times

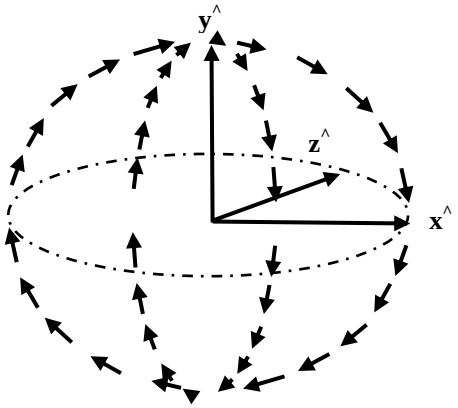

Figure 2 Internal Magnetic Fields of the Photon Pairs

While the flux lines of the magnetic fields will spread apart as far as possible, resulting in a uniform field, each line is in tension like a stretched rubber band and provides a tensile force toward the middle of the electron.

3 Mathematical Concepts of the Six Photon Model of the Electron

With this visualization of the three dimensional characteristics of the six photon model of the electron the development of the mathematics becomes straight forward.

Again borrowing from "Quantum Mechanics Concepts and Application", Second Edition by Nouredine Zettili, Wiley & Sons, 2009 paragraph 1.2.6.1 (p 50) discusses "Energy levels of the Hydrogen Atom." Equat 1.65, balances the the electrostatic force with the centripetal force.

$$\frac{q^2}{4\pi\varepsilon_0 r^2} = \frac{m_{ekg} v^2}{r}$$ **(**Zettili **1.65)**

Where: $\boldsymbol{q}$ is the charge of an electron $1.60217657\ x\ 10^{-19}$ Coulombs

$\boldsymbol{m_{ekg}}$ is the rest mass of the electron $9.10938291 \times 10^{-31}$ kg

$\boldsymbol{\varepsilon_0}$ is the permitivity of free space $8.85418782 \times 10^{-12}$ F/m

$\boldsymbol{v}$ is velocity of the electron in meters per second

For our six photon model in a single plane containing q1 and q2 forces to be considered are

Magnetic attraction

$$\frac{q_1 q_2 q_3 q_4 q_5 q_6}{4\pi\varepsilon_0 r^2}$$ Where q_1 to q_6 sum to make the charge of an electron (Wilson 9)

Electrostatic repulsion only applies each plane of the electron (two photons) separately.

$$-\frac{q_1 q_2}{4\pi\varepsilon_0 r^2}$$ Where the negative sign indicates electrostatic repulsion (Wilson 10)

And Centripetal force

$\frac{m_{ekg}v^n}{r}$ Where n is not yet known (Wilson 11)

Considering only the in plane forces from q1 and q2 the sum of the magnetic forces plus the electrostatic repulsion equals zero.

$$\boldsymbol{F = \frac{q_1 q_2}{4\pi\varepsilon_0 r^2} - \frac{q_1 q_2}{4\pi\varepsilon_0 r^2} = 0} \quad \text{(Wilson 12)}$$

Balancing the remaining forces:

$$\frac{q_3 q_4 q_5 q_6}{4\pi\varepsilon_0 r^2} = \frac{m_{ekg}v^n}{r} \quad \text{(Wilson 13)}$$

Since in Zettili equation 1.65 q^2 balances with v^2 then in Wilson 10 above q^4 must balance with v^4.resulting the equation below.

$$\frac{q_3 q_4 q_5 q_6}{4\pi\varepsilon_0 r^2} = \frac{m_{ekg}v^4}{r} \quad \text{(Wilson 14)}$$

As in Matter is Light for the Scientist, multiplying both sides by r gives the energy balance

$$\frac{q_3 q_4 q_5 q_6}{4\pi\varepsilon_0 r} = \boldsymbol{m_{ekg}v^4} \quad \text{(Wilson 14a)}$$

Where the left side is potential energy converted

And the right side is the conversion of that energy to relativistic kinetic energy

Which fully justifies the calculations of equations Wilson 4 5, 6, and 7 of the previous paper, Light, M.A. Wilson, Turbx.com, April 28, 2014 and defines the binding force of the electron as the six photon spherical magnetic field at its center.

4 First Principal Calculations for Electron Properties

The objective here is to take well documented properties of the electron and Plank's constant and to calculate the velocity, energy, radian frequency then to check the theory by generating the original radius from those values.

According to NIST

Plank's Reduced Constant $\hbar = \mathbf{1.054571726x\ 10^{-34}}$

Electron Mass in kg $\boldsymbol{m_{ekgNIST} = 9.9109383\ x\ 10^{-31}\ kilograms}$

Electron Radius in meters $\boldsymbol{r_{eNIST} = 2.817940\ x\ 10^{-15}}$ **meters**

Electron Velocity and Energy from First Principals

$$\boldsymbol{v_e = \left(\frac{\hbar}{m_{ekgNIST}\ r_{eNIST}}\right)^{1/3} = \frac{1.054571726x\ 10^{-34}}{9.9109383\ x\ 10^{-31} * 2.817940\ x\ 10^{-15}} = 3450.525\ m/s}$$

(Wilson 15)

$$E_{ek} = m_{ekgNIST}\ v_e^4 = 9.9109383 \text{ x } 10^{-31} * 3450.525^4$$

$$= 1.291307 \text{ x } 10^{-16} \text{ Joules} \quad \text{(Wilson 16)}$$

$$\omega_e = \frac{E_{ek}}{\hbar} = \frac{1.291307 \text{ x } 10^{-16}}{1.054571726 \text{ x } 10^{-34}} = 1.224485\ x\ 10^{18}\ radians/second \quad \text{(Wilson 17)}$$

Verification Calculation – Recalculate radius from these derived values

$$r_{eCHECK} = \frac{v_e}{\omega_e} = \frac{3450.525 \text{ m/s}}{1.224485\ x\ 10^{18}\ radians/second} = 2.817940\ x\ 10^{-15}\ m$$

(Wilson 18)

Which is a calculation from first principals

to an accuracy of six decimal places.

Maybe we were lucky how about a proton?

5 First Principal Calculations for Proton Properties

The electron model applies equally to a proton. The charge is reversed by reversing the photon circular motion from the clockwise from the top to counter clockwise as shown and discussed in the paper "Light."

According to NIST

Plank's Reduced Constant $\hbar = 1.054571726 \text{x } 10^{-34}$ (Wilson 19)

Proton Mass in kg $m_{pkgNIST} = 1.672622 \text{ x } 10^{-27}\ kilograms$ (Wilson 20)

Proton Radius in meters $r_{pNIST} = 8.775 \text{ x } 10^{-16}$ meters (Wilson 21)

Proton Velocity and Energy from First Principals

$$v_p = \left(\frac{\hbar}{m_{pkgNIST}\ r_{pNIST}}\right)^{1/3} = \frac{1.054571726 \text{x } 10^{-34}}{1.672622 \text{ x } 10^{-27} * 8.775 \text{ x } 10^{-16}} = 415.729 \text{ m/s} \quad \text{(Wilson 22)}$$

$$E_{pk} = m_{pkgNIST}\ v_e^4 = 1.672622 \text{ x } 10^{-18} * (415.729)^4 \text{ Joules}$$

$$= 4.996195 \text{ x } 10^{-17} \text{ Joules} \quad \text{(Wilson 23)}$$

$$\omega_p = \frac{E_{pk}}{\hbar} = \frac{4.996195 \text{ x } 10^{-17}}{1.054571726 \text{x } 10^{-34}} = 4.737653 \text{ x } 10^{+17}\ radians/second \quad \text{(Wilson 24)}$$

Verification Calculation – Recalculate radius from these derived values

$$r_{pCHECK} = \frac{v_p}{\omega_p} = \frac{415.729 \text{ m/s}}{4.737653 \text{ x } 10^{+17}\ radians/second} = 8.775\ x\ 10^{-16}\ m$$

(Wilson 25)

Which is a calculation from first principals

to an accuracy of four decimal places.