The Precise Positron and Electron

Thomas N. Lockyer
1611 Fallen Leaf Lane, Los Altos, CA
e-mail: tnlockyer@aol.com

Vector particle physics [1] shows that all precision in nature scales from the precise size of the electron and positron. The fundamental physical constants are known to within a few parts per billion uncertainty. These vector positron and electron identically return all known electron constants and several previously unknown electron fundamental constants as proof of concepts. Electron mass, spin angular momentum, charge and magnetic moment are derived. The cause of particle spin angular momentum is shown to be the conservation of the structure photon's linear momentum in the unique structure geometry. New previously unknown electron characteristics of loop current, loop voltage, loop impedance $Z_0/2$ and electron flux quantum are derived. The fine structure constant α is derived from the vector geometry. The fundamental charge *e* is shown to be size independent from the constant ratio between particle volume and current loop areas. Size independence sets the value of the smallest charge possible as $e = 1.602176487\text{x}10^{-19}$ A-s, solving a long standing mystery of why the electron, muon and proton all have the same charge of *e*.

1. Introduction

The answers to the previously intractable mysteries of charge and spin can now be given by a mathematical analysis of newly discovered particle geometric structures.

The whole process begins in Fig. 1 by deducing a structure for the photon energy, and then simply combining the photon vectors in all possible ways. Joining the vectors only occurs at the one exact energy where the photon (a boson) changes into a fermion, thus allowing for the well known photo-production of the electron positron pair.

Vector particle formation shows us that only electrons and neutrinos can exist as basic particles. All possible basic particles are formed by exhausting every way to combine the photon's Poynting vectors into particle structures.

This result is the best possible outcome because one does not have to invent different lepton structures. (Theorists have tried for 100 years to invent electron structure, without success.) Of course these basic particles (Fig. 1) had to later be found to mimic the labeled types shown, after much study.

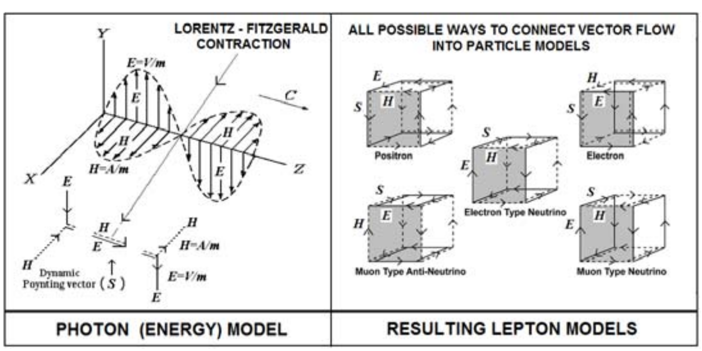

Fig. 1. Structure of the positron, electron and neutrinos **are** the only basic particles nature has, from which all composite particles can be formed.

2. Structure of Electron-Positron

In Fig. 2 the positron differs from the electron only by being a conjugate structure, that is, where one has an ***E*** vector (volt per meter), the other has an ***H*** vector (Ampere per meter). Thus, when positron and electron vectors meet, the ***E*** and ***H*** vectors can overlay and annihilate back into the photons that formed them.

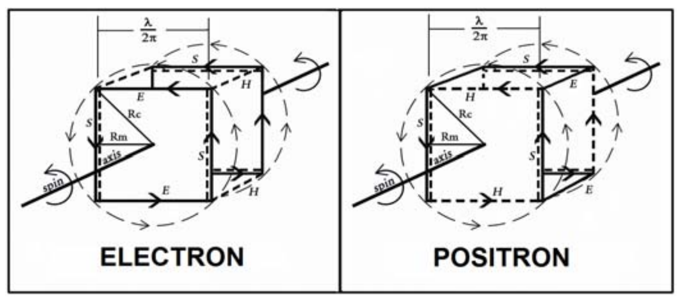

Fig. 2. The electron and the positron structures both have a cube edge length of exactly the electron rationalized Compton $\lambda/2\pi$ from the calculus of related rates.

The first thing noticed in Fig. 2 is the photon vectors are thrusting in the same direction in the front and back cube faces as a cause for particle spin. This reveals the only mechanism nature has for any particle's spin. The linear momentum of the photon is conserved in the particle spin. The calculus of related rates gives cube edge lengths of $\lambda/2\pi$ and a mass radius R_m as $\lambda/4\pi$. The charge radius is R_c and is the square root of two times R_m. The linear momentum of the photon is conserved in the spin angular momentum.

3. Electron Spin Momentum

As for universal spin, one can now demonstrate that any basic particle's spinning geometry will always result in the spin angular momentum of exactly $\hbar/2 = h/4\pi$, where h is Planck's constant, in Joule-seconds. In Fig. 3 the photon energy J_p is Planck's constant h times the velocity of light c divided by the electron's Compton wavelength. The photon momentum p is J_p divided by c and the spin angular momentum becomes p times the mass radius R_m. We see that the spin prediction of the vector electron is exactly the known spin $h/4\pi$.

Photon Energy

$$J_p := \frac{h \cdot c}{\lambda} \qquad J_p = 8.18710437794999 \times 10^{-14}\,\mathrm{kg\,m^2\,s^{-2}}$$

Vector Electron mass Radius

$$R_m := \frac{\lambda}{4 \cdot \pi} \qquad R_m = 1.93079632294748 \times 10^{-13}\,\mathrm{m}$$

Photon Momentum

$$P := \frac{J_p}{c} \qquad P = 2.73092406412372 \times 10^{-22}\,\mathrm{kg\,m\,s^{-1}}$$

Spin Angular Momentum

$$P \cdot R_m = 5.27285814125887 \times 10^{-35}\,\mathrm{kg\,m^2\,s^{-1}}$$

$$\frac{h}{4 \cdot \pi} = 5.27285814125887 \times 10^{-35}\,\mathrm{kg\,m^2\,s^{-1}} \quad \text{CHECK}$$

Fig. 3. The photon's linear momentum is shown to be conserved in the particle's spin angular momentum $h/4\pi$

4. Electron mass Derivation

The electron mass can be derived from the electron mass radius $\lambda/4\pi$. Knowing $h/4\pi$ spin angular momentum is mass radius times the electron mass energy, see Fig. 4.

$$\frac{h}{4 \cdot \pi} = 5.27285814125887 \times 10^{-35}\,\mathrm{kg\,m^2\,s^{-1}}$$

$$\frac{h}{4 \cdot \pi} = m_e \cdot c \cdot \frac{\lambda}{4\pi}$$

$$Me := \frac{h}{c \cdot \lambda}$$

$$Me = 9.10938214504288 \times 10^{-31}\,\mathrm{kg}$$

$$m_e = 9.10938215 \times 10^{-31}\,\mathrm{kg} \quad \text{Check}$$

Fig. 4. The electron mass in kilograms can be derived from the spin angular momentum obtained in Fig. 3.

By transposing and solving for M_e derives the electron rest mass in kilograms. Electron mass (energy) is not given by the Higgs theory, mass is given by the urgent photon produced momentum of the electron type structure!

5. The Fundamental Charge *e*

In Fig. 5 the fundamental charge is derived from the electron's geometry. Lambda λ is the published Compton wavelength for the electron to set the metric. J_s is the electrical potential energy as equal to the electron rest mass energy times the fine structure constant α. *Vol* is the cylindrical volume taken from the spinning vector electron geometry. Potential energy P_e is obtained from J_s and *Vol* just determined. We then take advantage of the fact that the impedance of the vacuum Z_0 is equal to *E* divided by *H*, and power density P_e is equal to *E* times *H*, so we can then obtain the electric field strength *E* as the square root of P_e times Z_0.

$$\lambda = 2.4263102175 \times 10^{-12}\,\mathrm{m} \quad \text{Compton wavelength}$$

$$Js := \frac{(h \cdot c \cdot \alpha)}{\lambda} \qquad Js = 5.97441869080294 \times 10^{-16}\,\mathrm{kg\,m^2\,s^{-2}}$$

$$Vol := \frac{\lambda^3}{16 \cdot \pi^2} \qquad Vol = 9.04522247606751 \times 10^{-38}\,\mathrm{m^3}$$

$$Pe := \frac{(2 \cdot Js \cdot c)}{Vol} \qquad Pe = 3.9602910136836 \times 10^{30}\,\mathrm{kg\,s^{-3}}$$

$$Z_0 = 376.730313474969\,\mathrm{kg\,m^2\,s^{-3}\,A^{-2}} \quad \text{Ohm impedance of space}$$

$$E := \sqrt{Pe \cdot Z_0} \qquad E = 3.86259197306307 \times 10^{16}\,\mathrm{kg\,m\,s^{-3}\,A^{-1}}$$

$$\varepsilon_0 = 8.854187817 \times 10^{-12}\,\mathrm{s^4\,A^2\,kg^{-1}\,m^{-3}} \quad \text{Farad per meter of space}$$

$$D := \varepsilon_0 \cdot E \qquad D = 3.4200114789937 \times 10^{5}\,\mathrm{s\,A\,m^{-2}}$$

L2 = Two loop areas, front and back

$$L2 := \frac{\lambda^2}{4 \cdot \pi} \qquad L2 = 4.68471084627891 \times 10^{-25}\,\mathrm{m^2}$$

$$e_m := D \cdot L2 \qquad e_m = 1.60217648700402 \times 10^{-19}\,\mathrm{s\,A}$$

$$\text{CODATA} \qquad e = 1.602176487 \times 10^{-19}\,\mathrm{s\,A} \quad \text{fundamental charge}$$

ELECTRON STRUCTURE

Fig. 5. Vector electron derived fundamental charge **agrees** perfectly with the published NIST recommendation.

$$\lambda 1 := 1 \cdot \mathrm{m} \quad \text{Fictional particle wavelength}$$

$$Js := \frac{(h \cdot c \cdot \alpha)}{\lambda 1} \qquad Js = 1.44957931131181 \times 10^{-27}\,\mathrm{kg\,m^2\,s^{-2}}$$

$$Vol := \frac{\lambda 1^3}{16 \cdot \pi^2} \qquad Vol = 6.33257397764611 \times 10^{-3}\,\mathrm{m^3}$$

$$Pe := \frac{(2 \cdot Js \cdot c)}{Vol} \qquad Pe = 1.37250017556258 \times 10^{-16}\,\mathrm{kg\,s^{-3}}$$

E := V/m electric field intensity

$$E := \sqrt{Pe \cdot Z_0} \qquad E = 2.27390066050419 \times 10^{-7}\,\mathrm{kg\,m\,s^{-3}\,A^{-1}}$$

D := Charge density

$$D := \varepsilon_0 \cdot E \qquad D = 2.01335435253045 \times 10^{-18}\,\mathrm{s\,A\,m^{-2}}$$

L2 = Two loop areas, front and back

$$L2 := \frac{\lambda 1^2}{4 \cdot \pi} \qquad L2 = 0.079577471545948\,\mathrm{m^2}$$

$$e_m := D \cdot L2 \qquad e_m = 1.60217648700402 \times 10^{-19}\,\mathrm{s\,A}$$

NOTE: Lambda (λ) can be any length (what-so-ever) and particle cube structures always have exactly a fundamental charge of (e)

Fig. 6. Demonstrating any size particle returns the fundamental **charge**, exactly. Proving the fundamental charge is the smallest charge possible. No fractional charges for the quarks exist, so the quark model is false.

Charge density *D* equals permittivity ε_0 times electrical potential *E*. Notice the charge density *D* dimensions are equal to a charge (A-s) divided by an area in meters squared. We can derive the areas of the two current loops L^2 from the geometry and thus obtain the fundamental charge *e* as L^2 times the charge density *D*. The fundamental charge is thus EXACTLY obtained from the vector electron's structure size. But I later discovered that wavelength λ can be any size whatsoever, for the spinning cube of electromagnetic energy. See Fig. 6.

This discovery solves the mystery of why the electron, muon and proton all have exactly the fundamental charge. We see that charge is quantized $e = 1.602176487\text{x}10^{-19}$ A-s .

Charge proves to be size independent in the spinning vector particle size, as in nature. In Fig. 6, the edge length was set as a fictional one meter λ_1 and the calculations done by substituting λ_1 for λ in the Fig. 5 equations. We see that the fundamental charge only depends on the size independent fixed ratio between the spinning particle volume *Vol* and current loop areas L^2 .

The vector electron, muon and proton all have exactly the same ratio between their volume and current loop areas. As a consequence, the smallest charge possible in nature is the fundamental charge of exactly the $e = 1.602176487\text{x}10^{-19}$ A-s . No fractional charge is possible.

6. Electron Magnetic Moment

$$\mathbf{Cir} := 2\cdot\sqrt{2}\cdot\left(\frac{\lambda}{4\cdot\pi}\right)\cdot\pi \quad \text{CURRENT LOOP CIRCUMFERENCE}$$

$$\mathbf{Cir} = 1.71566040805646\times10^{-12}\,\mathbf{m}$$

$$\mathbf{T} := \frac{\mathbf{Cir}}{\sqrt{2}\cdot\mathbf{c}} \qquad \mathbf{T} = 4.0466498618521\times10^{-21}\,\mathbf{s}$$

$$\mathbf{A} := \frac{\mathbf{e}}{\mathbf{T}\cdot 2} \quad \text{AMPERE AROUND EACH CURRENT LOOP}$$

$$\mathbf{A} = 19.7963320486876\,\mathbf{A}$$

$$\mathbf{Area} := \left(\sqrt{2}\cdot\frac{\lambda}{4\cdot\pi}\right)^2\cdot\pi \quad \text{AREA OF ONE CURRENT LOOP}$$

$$\mathbf{Area} = 2.34235542313945\times10^{-25}\,\mathbf{m}^2$$

$$\mu\mathbf{B} := \mathbf{A}\cdot(2\mathbf{Area}) \quad \text{BOHR MAGNETON}$$

$$\mu\mathbf{B} = 9.27400914650257\times10^{-24}\,\mathbf{m}^2\mathbf{A}$$

$$\mu\mathbf{B} := 9.27400915\cdot10^{-24}\,\mathbf{m}^2\cdot\mathbf{A} \quad \text{CHECK}$$

$$\mathbf{a1} := \frac{\left[\mu_0\cdot(\mu_B\cdot\mu_B)\right]}{\lambda_e{}^3\cdot\pi\cdot\mathbf{m_e}\cdot\mathbf{c}^2} \quad \text{FINE STRUCTURE CONSTANT PREDICTION from BOHR}$$

$$\mathbf{a1} = 7.29735253830083\times10^{-3}$$

$$\alpha = 7.2973525376\times10^{-3} \quad \text{CHECK}$$

Fig. 7. Deriving the Bohr mgneton from vector electron **dimensions** of the spinning electron structure. We obtain the fine structure as the dimensionless ratio between the magnetic energy and rest mass energy $a1$.

The Bohr magneton magnetic moment (in A-m²) is derived from geometry. In Fig. 7 one obtains the circulating loop current, from one loop half the charge divided by the time around the loop. From this *A* times the vector electron's current loop areas, the Bohr magneton μ_B is obtained, exactly, as the loop current *A* times the vector electron's area of the two current loops.

The Bohr magneton can be used to derive the fine structure from the magnetic potential energy. The fine structure constant is, by definition, the dimensionless ratio between the electric or magnetic potential energy and the electron's rest mass energy. This is embodied in the equation $a1$, and the result agrees with the published value for the fine structure constant α .

7. Anomalous Magnetic Moment

After WII advances in microwave measurements showed that the electron's magnetic moment was slightly larger than the Bohr. This immediately prompted Schwinger [2] to a Quantum Electrodynamics (QED) theory that the electron's magnetic moment was increased by $\alpha/2\pi$. This was later taken as the first term in an alternating power series of α/π with a coefficient of 1/2. The accepted value for the series is published as α_e based on QED predicted power series coefficients obtained by summing over Feynman diagrams. But QED does not get the correct coefficient results. See Fig. 8.

Notice QED gets +1/2, -0.328478444, +1.1763, and -0.8, when the correct power series coefficients are +1/2, -1/3, +1/4, and -1/5. QED claimed precise prediction of the resulting electron's anomalous magnetic moment, and NIST accepted this based on the reputations of the theorists.

QED FUNCKY SERIES COEFFICIENTS

$$\alpha_e = \left(\frac{1}{2}\right)\cdot\left(\frac{\alpha}{\pi}\right) - 0.328478444\cdot\left(\frac{\alpha}{\pi}\right)^2 + 1.1763\cdot\left(\frac{\alpha}{\pi}\right)^3 - 0.8\left(\frac{\alpha}{\pi}\right)^4$$

$$\alpha_e = 1.15965214941803\cdot10^{-3}$$

$$\mu_e = \left(\frac{1}{2}\right)\cdot\left(e\cdot c\cdot\frac{\lambda}{2\cdot\pi}\right)\cdot(1+\alpha_e) = 9.28476409877946\cdot10^{-24}\,m^2\cdot A$$

QVPP CORRECT SERIES COEFFICIENTS

$$\alpha_e 1 = \left(\frac{1}{2}\right)\cdot\left(\frac{\alpha}{\pi}\right) - \left(\frac{1}{3}\right)\cdot\left(\frac{\alpha}{\pi}\right)^2 + \left(\frac{1}{4}\right)\cdot\left(\frac{\alpha}{\pi}\right)^3 - \left(\frac{1}{5}\right)\cdot\left(\frac{\alpha}{\pi}\right)^4$$

$$\alpha_e 1 = 1.15961436329051\cdot10^{-3}$$

$$\mu_e 1 = \left(\frac{1}{2}\right)\cdot\left(e\cdot c\cdot\frac{\lambda}{2\cdot\pi}\right)\cdot(1+\alpha_e 1) = 9.28476374835056\cdot10^{-24}\,m^2\cdot A$$

$$\frac{\mu_e}{\mu_e 1} = 1.00000003774236$$

37.7ppb difference QED vs QVPP

Fig., 8. Note the QED first coefficient 1/2 by Schwinger is correct, but that all others by Feynman diagrams are not. There is not much difference in the predicted magnetic moment (37.7 parts per billion) so QED theory got away with claiming super precise agreement with nature.

This author has developed a geometric explanation for the anomaly as a small elbow at the junction between the *E*, *H* and *S* edges. Later, when scaling to the mass of the proton and neutron the vector junction (elbow) anomaly added a necessary 1500 parts per million to the structure, so for all intents and purposes the elbows can be considered real.

8. Electron Constants Derived

In Fig. 9 the vector electron geometrically derives the fundamental constants. In the left panel, the electron current ring circumference *Cir* time around the loop *T*, Ampere in the loop *Amp* and loop impedance R_L are calculated from the geometry. The $Volt_1$ in the current loop is then R_L times *Amp*. The *Flux* is then $Volt_1$ times *T* in the current loop.

In the right panel, elbow dimension are adjusted by the published α_e. The geometric elbow extension α_μ size is slightly smaller than the QED α_e, but nevertheless this exactly obtains the published anomalous magnetic value.

VERIFCATION OF ELECTRON CUBE STRUCTURE PREDICTIONS

$$\lambda = 2.4263102175 \times 10^{-12}\,\text{m} \quad \text{Electron wavelength}$$
$$e := 1.602176487 \cdot 10^{-19} \cdot \text{A} \cdot \text{s} \quad \text{Fundamental charge}$$
$$\text{Cir} := \left[\left(\frac{\lambda}{4 \cdot \pi}\right) \cdot \sqrt{2}\right] \cdot 2 \cdot \pi \quad \text{Flux ring circumference}$$
$$\text{Cir} = 1.71566040805646 \times 10^{-12}\,\text{m}$$
$$T := \frac{\text{Cir}}{\sqrt{2} \cdot c} \quad \text{Time in one ring}$$
$$T = 4.0466498618521 \times 10^{-21}\,\text{s}$$
$$\text{Amp} := \frac{e}{2 \cdot T} \quad \text{Current in one ring}$$
$$\text{Amp} = 19.7963320486876\,\text{A}$$
$$\text{RL} := \left(\frac{T}{\lambda \cdot \varepsilon_0}\right) = 188.365156744084\,\text{kg}\,\text{m}^2\,\text{s}^{-3}\,\text{A}^{-2}$$
$$\text{Zo} := 3.76730313461 \cdot 10^2\,\text{kg} \cdot \text{m}^2 \cdot \text{s}^{-3} \cdot \text{A}^{-2}$$
$$\frac{\text{Zo}}{2} = 188.3651567305\,\text{kg}\,\text{m}^2\,\text{s}^{-3}\,\text{A}^{-2} \quad \text{Ohm resistance}$$
$$\text{Volt1} := \text{RL} \cdot \text{Amp} \quad \text{Volt in one ring}$$
$$\text{Volt1} = 3.72893918930897 \times 10^3\,\text{kg}\,\text{m}^2\,\text{s}^{-3}\,\text{A}^{-1}$$
$$\text{Flux} := \text{Volt1} \cdot T \quad \text{Weber, volt seconds}$$
$$\text{Flux} = 1.5089711255272 \times 10^{-17}\,\text{kg}\,\text{m}^2\,\text{s}^{-2}\,\text{A}^{-1}$$

$$\alpha_e := 1.15965218111 \cdot 10^{-3} \quad \text{NIST value}$$
$$\alpha_\mu := 2 \cdot \left[\left(\sqrt{1 + \alpha_e}\right) - 1\right]$$
$$\alpha_\mu = 1.15931617760978 \times 10^{-3}$$
$$x := \alpha_\mu \cdot \frac{\left(\sqrt{2} \cdot \lambda\right)}{8 \cdot \pi} \quad \text{QVP radius extension centroid, meters}$$
$$x = 1.58279023226618 \times 10^{-16}\,\text{m}$$
$$\text{m2} := 2 \cdot \pi \cdot \left[\left[\frac{\left(\sqrt{2} \cdot \lambda\right)}{4 \cdot \pi}\right] + x\right]^2 \quad \text{Two current loop areas}$$
$$\text{m2} = 4.69014348142966 \times 10^{-25}\,\text{m}^2$$
$$\text{Tesla} := \frac{2\text{Flux}}{\text{m2}} \quad \text{Flux density two current loops}$$
$$\text{Tesla} = 6.43464802943398 \times 10^7\,\text{kg}\,\text{s}^{-2}\,\text{A}^{-1}$$
$$x\mu_e := \frac{(\text{Volt1} \cdot e)}{\text{Tesla}} \quad \text{Predicted electron anom. mag. moment}$$
$$x\mu_e = 9.28476377143694 \times 10^{-24}\,\text{m}^2\,\text{A}$$
$$\mu_e = 9.28476377 \times 10^{-24}\,\text{m}^2\,\text{A} \quad \text{NIST published}$$
$$\text{Alpha} := \frac{(\text{Flux} \cdot 2 \cdot e)}{h} \quad \text{Fine structure constant}$$
$$\text{Alpha} = 7.29735253730775 \times 10^{-3}$$
$$\alpha = 7.2973525376 \cdot 10^{-3} \quad \text{NIST published}$$

Fig. 9. Development of the vector electron's current loop impedance, electron flux quantum, anomalous magnetic moment geometric correction of electron's two current loops, new loop area, Tesla flux density from which is predicted the published measured QED value. The fine structure constant is derived from the electron' quantum flux constant.

In the right panel, α_e is the published QED anomalous magnetic moment correction. α_μ is the vector electron's geometric elbow extension. x is the radius extension centroid from where the loop current acts. m^2 is the total current loop areas. The (Tesla) is the flux density of the two loops. $x\alpha_e$ is the vector electron's predicted anomalous magnetic moment which is identical to α_e NIST published anomalous magnetic moment as proof of concepts.

$$\text{Cir} := 2 \cdot \sqrt{2} \cdot \left(\frac{\lambda}{4 \cdot \pi}\right) \cdot \pi \quad \boxed{\text{CURRENT LOOP CIRCUMFERENCE}}$$
$$\text{Cir} = 1.71566040805646 \times 10^{-12}\,\text{m}$$
$$T := \frac{\text{Cir}}{\sqrt{2} \cdot c} \quad T = 4.0466498618521 \times 10^{-21}\,\text{s}$$
$$\text{Amp} := \frac{e}{T \cdot 2} \quad \boxed{\text{AMPERE AROUND EACH CURRENT LOOP}}$$
$$\text{Amp} = 19.7963320486876\,\text{A}$$
$$\text{RL} := \frac{T}{\lambda \cdot \varepsilon_0} \quad \boxed{\text{Loop impedance is half that of the vacuum Zo=376.730313461 Ohm}}$$
$$\text{RL} = 188.365156744084\,\text{kg}\,\text{m}^2\,\text{s}^{-3}\,\text{A}^{-2}$$
$$\text{Volt} := \text{RL} \cdot \text{Amp}$$
$$\text{Volt} = 3.72893918930897 \times 10^3\,\text{kg}\,\text{m}^2\,\text{s}^{-3}\,\text{A}^{-1}$$
$$\text{Weber} := \text{Volt} \cdot T \quad \boxed{\text{Volt seconds (Weber)}}$$
$$\text{Weber} = 1.5089711255272 \times 10^{-17}\,\text{kg}\,\text{m}^2\,\text{s}^{-2}\,\text{A}^{-1}$$
$$\alpha \cdot \left(\frac{h}{2 \cdot e}\right) = 1.50897112558763 \times 10^{-17}\,\text{kg}\,\text{m}^2\,\text{s}^{-2}\,\text{A}^{-1}$$
$$x\alpha := \frac{\text{Weber} \cdot 2 \cdot e}{h} = 7.29735253730775 \times 10^{-3}$$
$$\boxed{\text{NIST}}\ \alpha = 7.2973525376 \times 10^{-3} \quad \boxed{\text{CHECK}}$$

Fig. 10. Derivation of space impedance and electron flux quantum from the vector electron geometric dimensions

9. New Constants Derived

The vector electron gives us an exact platform for derivation of known, measured fundamental constants. What is revealing is the suggestion of some previously unknown fundamental physical constants that can be derived from the geometry.

In Fig. 10, the circumference of the current loop *Cir* and time *T* around the loop are calculated. The current in the loops *Amp* is obtained from time *T* around the electron's two current loops. The single loop space impedance R_L is derived from the time *T* around one loop, divided by the Compton wavelength λ times the permittivity ε_0 of the space. The resulting R_L for one loop is half the impedance of space Z_o.

The *Volt* in the loop is R_L Ohms times the current in the loop *Amp*. With this voltage and time around the loop the vector electron predicted flux quantum in *Weber* is the Volt-seconds. We see that the electron loop flux quantum is the fine structure α times the published flux quantum h/2e. As proof, the fine structure constant α is obtained in by dividing the published flux quantum h/2e into the Weber Flux just determined. The value for the xα is the vector electron's prediction of the fine structure constant, as obtained from the derived Weber flux.

Conclusion

The positron and electron structures are now settled physics. The photon (energy) vectors combined in all possible ways are producing perfect representations of positron and electron characteristics. All precision in nature can be shown to scale from the exact size of the electron and positron. A particle's spin angular momentum $h/4\pi$ numerically equals the photons linear momentum that is conserved in the spin angular momentum. Positron and electron mass (energy) is the energy stored in the spin angular momentum. The impedance of the electron's two current loops is equal to the impedance of the vacuum $Z_0 =$ 376.730313461 Ohm. The anomalous magnetic moment is geometrically represented by small radius extension (elbows) where *E*, *H*, and *S* vectors join slightly enlarging the current loop areas m^2. The electron's flux quantum is exactly equal to the fine structure constant times the published magnetic flux quantum $h/2e$. The positron is not anti-matter, rather it is conjugate matter. That is, where one has an *E* vector, where the other has an *H* vector. Annihilation results when *E* and *H* align parallel. This explains why the different spin-states of ortho-positronium and para-positronium each decay in different times. The vectors require different times to align *E* parallel to *H* in the positron and electron vector structures.

Details can be found in several books available from amazon.com, or an overview of the vector particle physics may be heard in a narrated Power Point presentation available from [1].

References

[1] T. N. Lockyer, Narrated PowerPoint www.vectorparticlephysics.com/Photontomatter.ppt.

[2] Julian Schwinger, "Quantum Electrodynamics III", *Physical Review* **76**:790 (1949).