Connecting Energy Space To Momentum Space

This paper will demonstrate that there is a fundamental quantum momentum connected to a so-called *static* energy field. At the same time, a mechanism for the nearly infinite energy available for the bare electron field will be presented as well as what the field structure is. (The field will be shown to be a time limited version of the electron so that it exists everywhere for a period of time that is always less than the electron Compton time.) This is a case study involving non-accelerated charges.

Fundamental MKS Constants:

$$m_e := 9.109389700\cdot 10^{-31}\cdot kg \qquad \varepsilon_o := 8.854187817\cdot 10^{-12}\cdot farad\cdot m^{-1}$$

$$c := 2.997924580\cdot 10^{08}\cdot m\cdot sec^{-1} \qquad l_q := 2.817940920\cdot 10^{-15}\cdot m$$

$$\mu_o := 1.256637061\cdot 10^{-06}\cdot henry\cdot m^{-1} \qquad q_o := 1.602177330\cdot 10^{-19}\cdot coul$$

The famous Einstein equation that illustrates the equivalence of mass and energy is given below for the electron rest mass:

1) $$E := m_e\cdot c^2 \quad \text{or,} \quad E = 8.187111168006826\cdot 10^{-14}\cdot joule$$

It can be shown that mass of the electron is equivalent to the following expression:

2) $$m'_e := \frac{\mu_o\cdot q_o^{\,2}}{4\cdot\pi\cdot l_q} \quad \text{or,} \quad m'_e = 9.109389688253174\cdot 10^{-31}\cdot kg$$

Compare this with the stated constant above of: $m_e = 9.109389700000001\cdot 10^{-31}\cdot kg$

It may also be shown that the inverse of the product of μ_o and ε_o is equal to the square of the speed of light. This is shown below.

3) $$c' := \left(\frac{1}{\mu_o\cdot\varepsilon_o}\right)^{0.5} \quad \text{or,} \quad c' = 2.997924580625007\cdot 10^{8}\cdot m\cdot sec^{-1}$$

Compare this with the stated constant above for the velocity of light in free space:

$$c = 2.99792458\cdot 10^{8}\cdot m\cdot sec^{-1}$$

The c^2 expression related to the inverse of the product of μ_o and ε_o is the result of Maxwell's equations of electrodynamic theory and may be applied to the photon as well as to a wave. When the phase between ε_o and μ_o is not equal to 0 degrees, standing waves <u>normal</u> to the direction of propagation appear proportional to the tangent of the phase difference between ε_o and μ_o. For a phase angle approaching near to 90 degrees, the standing wave potentials ratio is nearly equal to infinity. Therefore, the potentials vary from nearly zero to nearly infinite as the range of phase between ε_o and μ_o changes from 0 to 90 degrees. To an outside observer, only the forward motion of the photon would be apparent, that part equal to a phase of 0 degrees. This would apply as a general case for any particle.

By combining the new field equations for mass and the velocity of light related to the derived value according to Maxwell, we arrive at the equation in (4) below.

$$\qquad\qquad m_e \qquad\qquad c^2$$

4) $$E' := \left(\frac{\mu_o \cdot q_o^2}{4\cdot\pi\cdot l_q}\right)\cdot\frac{1}{\mu_o\cdot\varepsilon_o} \quad \text{or,} \quad E' = 8.187111160862999\cdot10^{-14}\cdot\text{joule}$$

Compare this with the Einstein expression (1) for rest-mass energy on page 1:

$E = 8.187111168006826\cdot10^{-14}\cdot\text{joule}$ (Difference is negligible.)

Simplifying the above:

5) $$E'' := \frac{q_o^2}{4\cdot\pi\cdot\varepsilon_o\cdot l_q} \quad \text{or,} \quad E' = 8.187111160862999\cdot10^{-14}\cdot\text{joule}$$

Equation (5) above is the equivalent of the rest-mass energy in equation 1, page 1. Letting the phase angle between ε_o and μ_o be very nearly equal to 90 degrees, then either ε_o or μ_o can be considered to be equivalent to zero. If ε_o is considered as being equivalent to nearly zero in equation (5) then the potential field energy in the standing wave tends towards infinity. Then the particle supports its field normal to its direction of travel with copies of itself, each copy existing in time less than 1/r of its classic Compton time. (Equations (14) and (15) in chapter 1 of my book, "Electrogravitation As A Unified Field Theory" present the magnitude and transfer mechanics of this huge energy to normal field energy and geometry.)

If we now consider only the μ_o contribution as the phase between μ_o and ε_o approaches 90 degrees, we arrive at equation (6) below.

6) $$m_u := \left(\frac{\mu_o \cdot q_o^2}{4\cdot\pi\cdot l_q}\right)\cdot\frac{1}{\mu_o} \quad \text{or,} \quad m_u = 7.249021989693789\cdot10^{-25}\cdot\text{kg}\cdot\frac{\text{m}}{\text{sec}}\cdot\frac{1}{\text{ohm}}$$

Equation (6) above is momentum times conductance and if it is multiplied by the free- space impedance, we arrive at equation (7) below which is in momentum only.

$$\qquad\qquad [Zs]$$

7) $$P_Q := m_u\cdot(\mu_o\cdot c) \quad \text{or,} \quad P_Q = 2.730926325521272\cdot10^{-22}\cdot\text{kg}\cdot\text{m}\cdot\text{sec}^{-1}$$

where; $Z_s := (\mu_o\cdot c)$ or, $Z_s = 376.7303133310859\cdot\text{ohm}$

P_Q is a least-quantum momentum.

It is shown that the coupling impedance Z_s between the particle and free-space is determined by the particle parameters in equation (8) below.

8) $$V_{RS} := \frac{m_e \cdot c^2}{P_Q} \quad \text{or,} \quad V_{RS} = 2.997924583865913 \cdot 10^{8} \cdot m \cdot sec^{-1} \qquad (=c).$$

It can be shown by equation (9) below that the same quantum momentum may be attained for the ε_o case only.

9) $$P'_Q := \frac{{q_o}^2}{4 \cdot \pi \cdot l_q} \cdot \frac{1}{\varepsilon_o \cdot c} \quad \text{or,} \quad P'_Q = 2.730926326659959 \cdot 10^{-22} \cdot kg \cdot m \cdot sec^{-1}$$

Note that equation (6) previous may be simplified to:

10) $$m_u := \left(\frac{{q_o}^2}{4 \cdot \pi \cdot l_q} \right)$$

and then multiplying by the free-space expression for Z_s involving the ε_o term only, the equation for least quantum momentum in (9) above is arrived at.

The above analysis suggests that there exists a built-in field momentum (in a quantum sense) in the direction of the field for both the stand-alone magnetic or electric field. This effect may be greatly magnified if the field is a standing wave. This may also be very closely related to the Q potential as described by David Bohm. What is suggested here is fundamentally different from what is normally presented however. In the normal presentation, a changing momentum, ala dv/dt times mass, yields force. In the above analysis, a changing momentum is not necessary as what is arrived at is a quantum force constant that yeilds a quantum acceleration.

Equation 320 on page 181 derived the following quantum force constant, F_{QK}.

$$F_{QK} = \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q} \right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q} \right) \qquad \text{(From Chapter 11)}$$

where, $F_{QK} := 2.964371449283503 \cdot 10^{-17} \cdot newton$

Therefore a quantum constant frequency may be derived from the two quantum constants F_{QK} and P_Q by equation (11) below.

11) $$f_{RS} := \frac{F_{QK}}{P_Q} \quad \text{or,} \quad f_{RS} = 108.5482029149092 \cdot KHz$$

(Tesla may have had special knowledge of this frequency for transmitting power.)

The above frequency f_{RS} in equation (11) is based on an analysis for the open space free-field involving the free space impedance R_s. It may also be of interest to do an analysis for the case of the quantum Hall ohm, which is based on the quantum interaction between particles at the quantum level such as in a semiconductor. The quantum Hall ohm is derived in equation (12) below.

First, we define Planks Constant as: $h := 6.626075500 \cdot 10^{-34} \cdot \text{joule} \cdot \text{sec}$

12) Then; $R_Q := \frac{h}{{q_o}^2}$ or, $R_Q = 2.581280587436064 \cdot 10^4 \cdot \text{ohm}$

As in the equation (7) previous, we now multiply the resistance (in this case the quantum Hall ohm) by m_u to obtain the Hall equivalent least quantum momentum. This is shown below in equation (13).

13) $P_H := m_u \cdot R_Q$ or, $P_H = 1.871175973989373 \cdot 10^{-20} \cdot \text{kg} \cdot \text{m} \cdot \text{sec}^{-1}$

Now, as in equation (11) above, the least quantum frequency constant is derived related to the Hall quantum momentum P_H and the least quantum force constant F_{QK}. This is derived in equation (14) below.

14) $f_{RQ} := \frac{F_{QK}}{P_H}$ or, $f_{RQ} = 1.584229110725179 \cdot \text{KHz}$

Then the two quantum constant frequencies of interest are equations (11) and (14). These frequencies may be subject to investigation concerning how the respective fields, free space or inner quantum space field, may react harmonically at those frequencies.

Finally, the velocity related to the least quantum Hall ohm may be determined as it was in equation (8) previously. This is shown in equation (15) below.

15) $V_{RQ} := \frac{m_e \cdot c^2}{P_H}$ or, $V_{RQ} = 4.37538279767017 \cdot 10^6 \cdot \text{m} \cdot \text{sec}^{-1}$

Note that this velocity is twice the velocity of the electron in the n1 orbital of Hydrogen.

For the purpose of discussion, Let: $\alpha := 7.297353080 \cdot 10^{-03}$

which is the fine structure constant and also as the photon coupling constant.

Then, $V_{n1} := c \cdot \alpha$ or, $V_{n1} = 2.187691416747071 \cdot 10^6 \cdot \text{m} \cdot \text{sec}^{-1}$

and the ratio of V_{RQ} to V_{n1} is: $\frac{V_{RQ}}{V_{n1}} = 1.99999998362476$

A least quantum velocity, V_{LM} was developed in my book as being equal to the square root of the fine structure constant in magnitude only. (The fine structure constant is a number without units while V_{LM} has the units of meters/second.)

The fine structure constant can be interpreted as a measure of entropy, or energy transformation to a lower state from a higher state as a loss. Or, put another way, as the allowed yield of action during a transformation of energy from a higher state to a lower state as a loss. The most simple condition for the purpose of analysis is to consider the electron as being unattached to any field while also having no velocity whatever. (This is a hypothetical situation for the purpose of discussion, since zero velocity is not attainable in the quantum state.)

Since zero momentum is not possible and we have a condition of universal entropy, we not only assign the least quantum velocity as being the square root of the allowed rate of action, (velocity), but we also assign a negative value to that velocity. This infers that since velocity has the units of meters/second, the seconds (time) is assigned as a negative value. It is logical that time be assigned the negative value rather than the distance since it is universally understood that negative time does exist while the concept of negative distance is not as fundamental. (Distance is based on time since distance = velocity x time, so time is the fundamental unit applicable to all dimensions involving distance, or basically to all dimensions of space-time.)

Therefore, a portion of the mass of the electron at absolute rest is temporarily sacrificed by uncertainty to impart a velocity equal to the square root of the least action, equivalent in absolute magnitude to the square root of the fine structure constant. Energy space then restores that mass from the electron that was converted to momentum. (Another form of sunlight that keeps it all going.)

The primary action transformed momentum is negative due to the negative velocity that occurs from the time being negative. The energy is positive however due to the fact that the negative V_{LM} squared is positive, algebraically. This infers that the electrogravitational action not only arises from the quantum negative momentum action as described above, but also that the electrogravitational action will transfer that entropic action to everything that gravitation has an effect on. That would be just about all matter everywhere. As a result of the above, let V_{LM} now be established as:

$$V_{LM} := -8.542454612 \cdot 10^{-02} \cdot m \cdot sec^{-1}$$

Now let: $\lambda_{LM} := \left| \frac{h}{m_e \cdot V_{LM}} \right|$ and, $t_{LM} := \frac{\lambda_{LM}}{V_{LM}}$

where: $\lambda_{LM} = 8.514995416262534 \cdot 10^{-3} \cdot m$ and: $t_{LM} = -0.099678556141242 \cdot sec$

Note that the electrogravitational frequency is: $t_{LM}^{-1} = -10.03224804523679 \cdot Hz$

The previous derivation of V_{LM}, λ_{LM}, and t_{LM} allows for a new set of frequencies in the quantum aspect related to Planks constant h as:

16) $$f_Q := \left| \frac{P_Q \cdot \lambda_{LM}}{t_{LM} \cdot h} \right| \quad \text{and,} \quad f_Q = 3.520758884271906 \cdot 10^{10} \cdot Hz$$

17) $$f_H := \left| \frac{P_H \cdot \lambda_{LM}}{t_{LM} \cdot h} \right| \quad \text{and,} \quad f_H = 2.412353410230401 \cdot 10^{12} \cdot Hz$$

Equation (16) result agrees exactly with the frequency f_{at} derived in equation (316) in chapter 11 on page 178 of my book using a different set of parameters. Also see equation (61) on page 25 of chapter 1. This most likely would be relevant to free-space particle interactions. The result for equation (17) would be a frequency related to the quantum Hall resistance and may be looked for in semiconductor actions, or in current conduction through metals.

As a result of the preceding analysis, several postulates may be made that directly contradict important accepted ideas in physics.

1. The idea that the universe is expanding (based on the Hubble constant) may be actually a result of the entropic action of gravity acting on a line normal to the direction of propagation of photons. This action downshifts the photon frequency. Therefore, the universe may not be expanding as theorists have assumed it to be.
2. Relativistic frame dragging around a large rotating mass may actually be the electrogravitational vector imparting a coriolis action to objects near (and far) from that mass.
3. Gravity need not be the result of a space-time enfoldment and the concept of a mass creating a special space-time fabric that in turn creates mass is no longer needed to explain gravitational action. This is circular logic that has served to lead people away from the actual gravitational action. The action is one-way. Hence, the so-called fabric of space need not be called upon to explain gravity. Therefore, not only is it not needed, it (the fabric) most likely does not exist. (This does not exclude special relativity effects nor the increase of interval time due to gravitational fields.)
4. The so-called dark matter is explained as the gradual increase over time of the vector magnetic potentials that get passed along to the next interaction and in contrast to the photon, is not diminished in energy over time. Rather, its participant numbers increase with time. Being of a low frequency (f_{LM}) it is not taken for what it actually is.

In conclusion, it seems to this author that there has been a concerted effort to ridicule and ignore all theories except for Einstein's General Theory. That is probably why very little progress has been made in utilizing the gravitational action mechanism.

-- Jerry E. Bayles --