Enhancement of the Concept of Charge-Energy

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Abstract--- *The main purpose of the present work is to find a relationship between mass and charge by supposing a special case (system at rest). The relation gives us the following results:-*

Get a binding relation between the charge and energy, to give us a precise interpretation for pair-production (e+, e-), and proving on existence a neutral charge for electromagnetic waves which can be a calculation from the wavelength, also; prove, existence associated wave for the particle moving charge. Finally, proving the magnetic field can be produced from the mass movement.

Keywords--- *Concept, Charge, Energy, Pair Production.*

I. INTRODUCTION

The interpretation of pair production phenomenon by depending upon Einstein's relation is $E=mc^2$ which is obviously that couldn't take into consideration the charge of electron and positron (i.e., there is no explicit mathematical relation between energy and charge) to this phenomenon or generality. In this paper; we derive a relation that binds a charge with the energy to give us a mathematical competence form to get an exact description of this phenomenon.

Theory

Let us suppose that, there are two particles as shown in figure (1), each of them has a mass (m),and a charge (q), the distance (r) is the distance between the two particles. In such way that the magnitude of this charge makes the force between the two mass, gravitational forces (F_g) and electrical force (F_e) isequalizations.
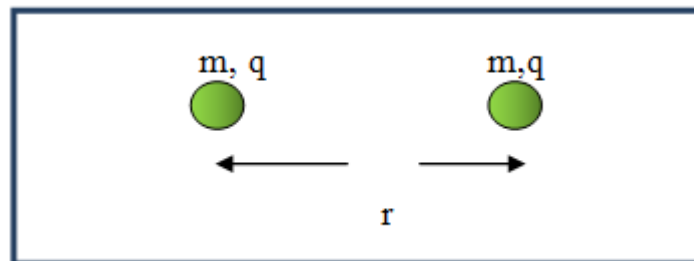

Figure 1

Gravitational force is:

$$F_e = \frac{G(m.m)}{r^2} \qquad (1)$$

The electrical force is:

$$F_e = \frac{K(q.q)}{r^2} \qquad (2)$$

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As we assumed before:

$$F_g = F_e$$

Then:

$$\frac{G(m.m)}{r^2} = \frac{K(q.q)}{r^2} \quad (3)$$

$$Gm^2 = Kq^2$$

$$\therefore m = \pm \left(\sqrt{K/G} \right).q$$

Or:

$$m = \pm A.q \;\dots (4), A = \left(\sqrt{K/G} \right) = 1.16 \times 10^{10} \text{kg/Coul.}$$

II. ENERGY AND CHARGE

Equation (4) shows an equivalenceof the charge (q) with the mass (m) to act the same force, when the force is found that means ability to make a work, by Einstein's equation ($E=mc^2$) which means equivalent between energy and mass and opposite, like what happened in pair production (e^+, e^-). Since the charge and mass has an equivalent relation ($m = \pm Aq$), then that means the charge can change to mass and vice versa, or that means the charge can change to energy and vice versa as shown in equation (6).

By replacing we obtain: -

$$E = \pm Bq \dots (6), \qquad B = Ac^2 = 1.04 \times 10^{27} \text{ J/Coul.}$$

Equation (6) can explain the pair production(e^+, e^-)phenomenon regarding the charge, which shows transform the energy to two charges of positron and electron (e^+, e^-).

The energy transformation produced two equivalent different charges, energy to produce positron charge ($E_+ = +Bq$) and energy for electron charge ($E_- = -Bq$), whichclear by: -

$$E_+ = +Bq \text{(for positron)}, \qquad E_- = -Bq \quad \text{(for electron)}$$

Hence: $\quad E_+ + E_- = +Bq - Bq = 0$

The Pair production phenomenon produced two masses of the two particles, positron,andelectron according to Einstein's relation ($E = 2m_o c^2$). But when we write: -

$$E = 2m_o c^2 + Bq - Bq \qquad (7)$$

$$E = (m_o c^2 - Bq)_e + (m_o c^2 + Bq)_p \qquad (8)$$

There is nothing will change for Einstein's relation ($E = 2m_o c^2$),but the relation (8) gives more accurately describe the pair production phenomenon.

Which leads us to the question: - "Why the energy didn't change to two particles without charges...? or to one particle ...?" Hence that not protest with the meaning of the relation ($E = mc^2$). Equation (8) is the real form for pair production phenomenon which it is shown that reason. Hence the photons have an equivalent charge not doesn't have a charge.

When we try to explain the relation (E=+Bq), we can say that the positive charge can transform into energy when it is free. But this energy may be a different nature from the energy which we know, because the gamma photon in pair production produced by meeting two different charges, positive and negative together, but in (E=+Bq) the charge is positive.

((The kinetic energy of electron and positron (T) didn't toke because it's not necessary for our subject, so the general relation is (E= $(m_oc^2+T-Bq)_e$+ $(m_oc_2+T+Bq)_p$) where the first part is to the electron,and theanother part is to the positron)).

When we can free or transform e the positive charge to energy by that way, then that may mean obtaining on positive photons or positive nature photons.

If we suppose the energy relations applicable to these positive photons, then: -

$$E=hf, \ E=Bq, hf=Bq$$

$$\frac{hc}{\lambda} = Bq$$

$$\lambda = \frac{hc}{Bq} \qquad (9)$$

$$\lambda = \frac{1.9\times10^{-52}}{q} \qquad (10)$$

Relation (10) can help us to find the positive charge part of electromagnetic waves, which is equal to the value of the negative charge part, which it means the total charge equal to zero.

III. WAVE AND CHARGE

As we know there is a wave caused by a moving mass of De-Broglie's equation: -

$$\lambda_m = \frac{h}{mv}$$

By replacing eq.1 in De-Broglie's equation: -

$$\lambda = \frac{h}{Aqv}$$

Or

$$\lambda_q = \frac{5.7 \times 10^{-44}}{qv}$$

That means any moving charged particle must have two waves, one of them with it is mass (λ_m =h/mv), and another with it is charge $\lambda_q = \frac{5.7\times10^{-44}}{qv}$.

For example, the relation between them for anelectron at any velocity is:($\frac{\lambda_m}{\lambda_q} = 2 \times 10^{21}$), since the velocity of the charge wave is equal to the velocity of De-Broglie (w=c^2/v). The charge wave has no relation with the quantity of angular momentum (mvr=h/2), since (q) means the equivalent charge to the mass (m), not means the electron charge, and when we suppose (Aqvr=h/2) then we will obtain the same results of Bohr.

IV. ELECTRIC CURRENT AND MASS

As we know that a movement charge means an electric current, then can a movement mass make an electric current according to the relation (m=Aq) ..?

Hence:

$$I = \frac{q}{t}$$

$$\text{Or:} \quad I = \frac{m}{At}, \frac{1}{A} = 8.6 \times 10^{-11}$$

$$I = m\frac{8.6 \times 10^{-11}}{t} \quad (6)$$

This relation may be clear making an electric current that can be caused by a moving mass.But its very small, for example for an electric current if we calculate it for a million Ampere, which means one coulomb per a second, so we can calculate the No. of electrons by(total charge) =(electron charge).(No. of electrons)

$\therefore$ No. of electrons$=6.25 \times 10^{24}$ electrons

The total mass for that electrons = (mass of electron). (No. of electrons)

$\therefore$ The total mass of electrons $=5.68 \times 10^{-6} \ kg$

By equation (6) we find the current of the total mass of electrons equal (4.88×10^{-16}) Amp. Which it's very smallwith respect to the electric current (10^6Amp.).

So that:

The total electrical current (I) =electric current (I_q)+mass current (I_m)

$$\text{Or:} I = I_q + I_m$$

Then:

$$I = \frac{q}{t} + m\frac{8.6 \times 10^{-11}}{t} \quad (7)$$

That means the magnetic field for a moved charge particle (B) equal: $(B = B_q + B_m)$, Where: $(B_q = \mu\frac{I_q}{2\pi r})$, then:

$$B = \mu\frac{I_q}{2\pi r} + \mu\frac{I_m}{2\pi r}$$

From equation (7): $I_m = m\frac{8.6 \times 10^{-11}}{t}$

$$B = \mu\frac{I_q}{2\pi r} + \mu.m\frac{8.6 \times 10^{-11}}{2\pi rt}$$

V. CONCLUSION

1. The positive charge can transform into energy when it is free.
2. Einstein's relation $(E=2m_o c^2)$ must be taken as an equation $((E= (m_oc^2+T-Bq)_e + (m_oc_2+T+Bq)_p))$.

3. Any moving charged particle must have two waves, one of them with it is mass (λ_m =h/mv), and another with it is charge $\lambda_q = \frac{5.7 \times 10^{-44}}{qv}$.

4. The total electrical current (I) =electric current (I_q) + mass current (I_m).

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