In the name of God

$Author$: $Arman.V.Zadeh$ $Esfahan, Iran$

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((Transformation of the Compton Effect and fundamentals about electromagnetism))

Abstract

In this article we want to say about the Compton effect and the Zeeman effect . (Both of them are almost one effect). We know that both of them are about the light (electromagnetism waves) and some special particularity of that. For example the Zeeman effect is about the refraction of the light that when we put the source of the electromagnetism wave near the source of the magnetism or electrical field we'll see the breaking or refraction of the light and we can also that is possible that the light refract to some part for example three or four part but we should remember that these effect (Zeeman, Compton) aren't just for the light(the electromagnetism type) and of course they are a little about the light and some part of the light like the X-ray or β-ray or γ-ray or…. But it cant be impossible that these effects be correct also about the light.

Now we want to say a reason for that. We say that if we want to consider the particularity of the things or waves or the atoms or…. We can do it with talking about the moving of them and we say that when for example an electron is turning around the nucleus quickly we infer that a special force caused it and now during the moving or after the moving we can get a special force and we can with this subject say the reason of many effects and now we try to say a simple reason with this method. For the first time this subject is so easy but we can put this easy subject the fundament of our saying.

1. The extra force for fraction

If we want to talk about the wave (electromagnetism) in the electromagnetic system we can say when the electromagnetism ray is passing from a place, that place, that place get effect from the wave because we know the electromagnetism wave makes the electrical and magnetic fields and they are the effectual wave for around. We know that it is possible that many other particles or other small matters be on that place which we're sending the rays of a wave. So we know that the particles are moving and they enter the little or small force to each other and we consider that this force was about the electron moving or in the usual because the electrons are moving they got an energy and force. Now we can say that when we take for example some narrow way of the electromagnetism waves and they can be near each other so each of them make an electromagnetism field and we can see that these fields go to each other and we can say it the particles interference of the waves. A special electromagnetism wave by its moving can make a force that it caused from making the field. So we can talk about the forces instead of the fields or the energy and we can accept it as a principle. In some where it is possible that the forces interference each other and it be a positive interference or for example the negative interference. As you see we can calculate this subject as the easily wave fields about interference but to this difference that we should talk about the force. We know that these forces have come from the moving of the wave for example we consider that the wave equations are:

$$x = A\cos(\omega t + \varphi) \qquad or \qquad x = A\sin(\omega t + \varphi) \tag{1}$$

Now we want to consider when a wave for example beats to another thing like materials or something else or even the other waves. We know that we should take the momentum of the wave and matter after and before or some times during the beating that they're constant. So we have:

$$p_w + p_m = p'_w + p'_m \tag{2}$$

We know that:

$$F = \frac{dp}{dt} \implies \int_{p_0}^{p} dp = F\int_0^t dt \implies p - p_0 = Ft \tag{3}$$

$$p = Ft + p_0 \implies (here\ we\ have)\ p = p'_w + p'_m\ \&\ p_0 = p_w + p_m$$
$$\implies p_w + p_m + Ft = p'_w + p'_m \tag{4}$$

You can see that here we could get a good correctly sentence that depended to (F & t). Here we're talking about the waves (electromagnetism) and it's important for us that there is a force depended to the time. In the easily classical effects we cant consider the (Ft) because it isn't important for us and also it's very little and when we want to talk about the particles we can consider the (Ft) and about (x) we'll have:

$$m_w\ddot{x}_w + m_m\ddot{x}_m + Ft = m_w'\ddot{x}_w' + m_m'\ddot{x}_m' \tag{5}$$

If we want to calculate it to the classically way and in the electromagnetism system we should consider another or correctly sentence for the (m_w) and we can take it from the *Poynting* vector because we're talking about the particularity of the waves and if we want to calculate it in the electromagnetism system we should consider the (m_w) like the pointing vector. So we have:

$$\vec{S} = \frac{1}{\mu_0}\left(\vec{E} \times \vec{B}\right) \tag{6}$$

And we will have: (for taking the electromagnetism mass we should consider the density)

$$\rho\vec{S} = \frac{\rho}{\mu_0}\left(\vec{E} \times \vec{B}\right) \tag{7}$$

And we put it in eq.(5):

$$\frac{\rho\ddot{x}_w}{\mu_0}\left(\vec{E} \times \vec{B}\right) + m_m\ddot{x}_m + Ft = \frac{\rho\ddot{x}_w'}{\mu_0}(\vec{E}' \times \vec{B}') + m_m'\ddot{x}_m' \tag{8}$$

And we know: (from some electromagnetism fundaments)

$$\vec{E} = c\vec{B}$$

So if we want to write it in the vector way, we'll have:

$$\vec{E} \times \vec{B} = c\vec{B} \times \vec{B} = c\left(\vec{B} \times \vec{B}\right) = 0 = const \tag{9}$$

And:

$$\frac{\rho \ddot{x_w}}{\mu_0} \, const + m_m \ddot{x_m} + Ft = \frac{\rho \ddot{x_w'}}{\mu_0} \, const + m_m' \ddot{x_m'}$$

Here we didn't delete the $\frac{\rho \ddot{x_w}}{\mu_0} \left(\vec{E} \times \vec{B}\right)$because we can write a diagonal matrix for that and consider for example the (x or y or z) components and write a zero diagonal matrix for the other components for example when we're calculating the (x) component we can take the (y & z) components equal to zero or even we can sometimes don't complete the diameter of the matrix and of course we should take the condition effects for doing this work. The mean is:

$$\begin{vmatrix} i & j & k \\ 0 & B_y & 0 \\ 0 & 0 & B_z \end{vmatrix} \Longrightarrow \begin{vmatrix} i & j & k \\ 0 & B_y & 0 \\ 0 & 0 & 0 \end{vmatrix} = 0 \tag{10}$$

But here we wrote the matrixes that infer that we can write the matrix that doesn't change to zero.

So we prefer to put the (const) instead of the zero. From eq.(9) we have:

$$\vec{E} \times \vec{B} = const \;\; \Rightarrow \;\; \overrightarrow{E_m} \sin(kx - \omega t) \times \overrightarrow{B_m} \sin(kx - \omega t) \\ = \sin^2(kx - \omega t)(\overrightarrow{E_m} \times \overrightarrow{B_m}) = const \tag{11}$$

Of course we wrote at the before that $\vec{E} = c\vec{B}$ and this equation is correct about the (E_m & B_m)but if we want to have the other (E & B) we can take them equal with (E_m & B_m) but we know we should talk about the E_{total}. Know because the (E_m) at the first has made with flawing electrical source here we can't use from this formula:

$$E = \frac{kq}{r^2} \quad \& \quad \vec{E} = \frac{kq}{r^2} \, u_r \tag{12}$$

Because in fact we don't have really two ions for absorption and here the first force and field is important. So we write:

$$\overrightarrow{E_m} = \mathcal{E}_m = \frac{d\Phi}{dt} \quad (Faraday's\ law) \tag{13}$$

And we know that:

$$B_m = \frac{F_m}{1I} \quad (here\ the\ (1) refers\ to\ the\ lenght\ as\ an\ unit\ lenght) \tag{14}$$

But this formula is correct when the (E_m & B_m & I) be perpendicular that fortunately in the electromagnetism waves is true. By putting these in eq.(11) we'll have:

$$\sin^2(kx - \omega t)\left(\frac{d\vec{\Phi}}{dt} \times \frac{\vec{F_m}}{1I}\right) = const \tag{15}$$

If here we don't say that $\left(\frac{d\vec{\Phi}}{dt} \times \frac{\vec{F_m}}{1I}\right)$ is zero we can infer the good products. Now we write the top equation as a matrix.

$$\frac{\sin^2(kx-\omega t)}{1I}\begin{vmatrix} i & j & k \\ \frac{d\Phi_x}{dt} & \frac{d\Phi_y}{dt} & \frac{d\Phi_z}{dt} \\ \frac{dp_x}{dt} & \frac{dp_y}{dt} & \frac{dp_z}{dt} \end{vmatrix} = \frac{\sin^2(kx-\omega t)}{1I}[\hat{\imath}(\dot{\Phi}_y\dot{p}_z - \dot{\Phi}_z\dot{p}_y) + \hat{\jmath}(\dot{\Phi}_z\dot{p}_x - \dot{\Phi}_x\dot{p}_z) + \hat{k}(\dot{\Phi}_x\dot{p}_y - \dot{\Phi}_y\dot{p}_x \tag{16}$$

Know we can see that in the Compton & Zeeman effects when the wave beats with a matter or even another wave (electromagnetism) we infer a difference between Φ & p that we can write the (p) to this way:

$$p = mv = mr\acute{\omega} \quad \Longrightarrow \quad \acute{\omega} = \frac{p}{mr} \quad (we\ here\ wrote\ the\ \acute{\omega}\ because\ we\ don't\ wrong\ it\ with\ \omega\ for\ example\ in\ the\ \sin(kx - \omega t)).$$

We can take the (Φ) from this equation. For this we should solve the matrix for p (with take the integral from that.)

But the easily way is: (in the perpendicularity direction)

$$\frac{d\Phi}{dt} \times \frac{F_m}{1I} = \frac{d\Phi}{dt}\frac{F_m}{1I} = \frac{1}{1I}\frac{d\Phi}{dt}\frac{dp}{dt} = const \tag{17}$$

That gets us: (here we don't consider the(1) and until now we considered that because that was about the length and we want to take it a unit length):

$$d\Phi = \eta I\ dt \frac{dt}{dp} = \eta \frac{Idt}{F} \quad (\eta = const) \tag{18}$$

Of course here we could take an integration by part (but if we consider the (dt)s separate from each other). If we take $I = const$ we'll have: (that almost always the I is const)

$$d\Phi = \eta \frac{dq}{F} \implies \vec{\Phi} = \eta \frac{q}{\vec{F}} \tag{19}$$

But here these are good when $I = const$ and we consider when the force cause the moving and the moving cause the making (of course it was from before) the force. From this we can write ω:

$$\vec{\omega} = \eta \frac{q}{mr\vec{\Phi}} \tag{20}$$

Here we could get the general (ω) in the Compton effect and in the past articles we could take the (ω) in the particulars of the particles in the atom and electromagnetism and both of them depend to each other.

Because the moving of the electromagnetism wave isn't just in special direction, it is possible that the direction of the waves turn around the main axis. The transformation (16) is better than the recently equations. In equation (20) we can see that the (ω &η) depend to each other and possibly the η and its coefficients depend to ω for the Compton Effect and ω for the atom and simply electromagnetism.

For correcting the (q) to the electromagnetic and vector way we should write:

$$\vec{E} = \frac{kq}{{r_{ij}}^2}$$
$$\implies (for\ easily\ way\ we\ change\ (r_{ij}) to\ (r) becauseit\ isnt\ changing\ the\ value$$

$$of\ that) \implies \vec{E} = \frac{q}{4\pi\varepsilon_o r^2} = \frac{\vec{S}\mu_0}{\vec{B}} \implies q = 4\pi\varepsilon_o \vec{E} r^2 = \frac{4\pi\varepsilon_o \mu_0 r^2 \vec{S}}{\vec{B}} \tag{21}$$

We know that: (from Maxwell's transformation)

$$c^{-2} = \varepsilon_o \mu_0 \quad \Longrightarrow \quad q = \frac{4\pi r^2 \vec{S}}{c^2 \vec{B}} = \frac{4\pi r^2 \vec{S}}{c\vec{E}} = \frac{\vec{S}A}{c\vec{E}} \qquad (22)$$

That gives us:

$$\omega = \eta \frac{\vec{S}A}{mrc\Phi\vec{E}} = \eta \frac{\vec{S}A}{mrc\left(A\vec{B}\cos\alpha\right)\vec{E}} = \eta \frac{\vec{S}}{mrc\left(\vec{E}.\vec{B}\right)}$$

$$\Longrightarrow \left(for\ the\ coordinate\ component(x)\right) \Longrightarrow \omega = \eta \frac{\vec{S}}{mxc\left(\vec{E}.\vec{B}\right)} \qquad (23)$$

At the before we calculated the (ω) for the Φ and now we calculated the (ω) for the poyinting vector for (E & B & S). If the second thing be a matter we put the (m) in this equation but if that was another wave we can write: (as we did in this article): $\rho\vec{S} = m_w$ so we'll have (for beating two waves)

$$\omega_x = \frac{\overrightarrow{S_x}\eta}{\left(\rho\overrightarrow{S_x}\right)xc\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)} = \eta \frac{1}{\rho xc\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)} \qquad (24)$$

As you see we can get the (ω) in many ways and systems but we try to get it as the whole:

$$\omega_{total} = \sqrt{\omega_x^2 + \omega_y^2 + \omega_z^2} = \frac{\eta}{mc}\sqrt{\frac{\vec{S}_x^2}{x^2\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)^2} + \frac{\vec{S}_y^2}{y^2\left(\overrightarrow{E_y}.\overrightarrow{B_y}\right)^2} + \frac{\vec{S}_z^2}{z^2\left(\overrightarrow{E_z}.\overrightarrow{B_z}\right)^2}}$$

$$= \frac{\eta}{mc}\sqrt{\left(\int \left(tensor\ of\ (with\ power\ 2)\right)\left(\frac{1}{x^3y^3z^3}\frac{\sum_i S_i^2}{\sum_0^3\left(\overrightarrow{E_\iota}.\overrightarrow{B_\iota}\right)^2}\right)\right)} \quad (25)$$

Because for the tensor we have:(also we could get the tensor of (S & E & B)

$$\acute{x}^{b} = \sum \frac{\partial {x^{b}}_{new}}{\partial {x^{a}}_{old}} x^{a} \ \Longrightarrow (at\ the\ all) \Longrightarrow\ \acute{x}$$

$$= \sum \frac{\partial x_{new}}{\partial {x^{a}}_{old}} x^{a} = \frac{\partial \acute{x}}{\partial x} X + \frac{\partial \acute{x}}{\partial y} Y \tag{26}$$

And we didn't calculate the $\frac{\partial \acute{x}}{\partial y}$ because they are different and just calculated the main axis and because they have the part derivative we should take an integral at the all and because after the part derivative there is a main component (x & y& z)we should at the all divide the all integral to (xyz) and because that from the before we had $\frac{1}{x^2y^2z^2}$ so we infer $\frac{1}{x^3y^3z^3}$ and at the all we'll have:

$$\omega_{total} = \frac{\eta}{c\sum_i m_i} \sum\nolimits_i \left[\sqrt{\int \big(tensor\ of\ (with\ power\ 2)\big) \left(\frac{1}{x^3y^3z^3} \frac{\sum_i S_i^2}{\sum_0^3 \left(\overrightarrow{E_\iota}.\overrightarrow{B_\iota}\right)^2} \right)} \right] \tag{27}$$

And this equation is for all of the materials that we want to calculate the sum of the *Poynting* vector is so good.

And for the waves we'll have:

$$\omega_{total} = \sqrt{\omega_x^2 + \omega_y^2 + \omega_z^2}$$

$$= \frac{\eta}{\rho c} \sqrt{\left(\frac{1}{x^2\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)^2} + \frac{1}{y^2\left(\overrightarrow{E_y}.\overrightarrow{B_y}\right)^2} + \frac{1}{z^2\left(\overrightarrow{E_z}.\overrightarrow{B_z}\right)^2} \right)} \tag{28}$$

When we want to talk about the many electromagnetism waves that are beating each other we should just get the some of the ρ (of course when the waves are stable).But when the waves aren't stable we should calculate the correctly sentence(s) which one them is curl of the expressions in the parentheses in eq.(28) and we should put the curl of that equal with zero and calculate the correctly sentences by solving the curl as a matrix which depend to the (x & y & z & c) and then multiple the correctly classical sentence to the parentheses.

In eq. (23) at the first seeing we say that we can put L (in the perpendicular position) instead of (mrc) but in fact this saying is wrong because now we're talking about the beating between a material and a pulse of the electromagnetism wave. Here the (m) is for the material and the (c) is about the velocity of the electromagnetism waves and these are two different things and we can't make a communication between them. But if the material has a special moving with a special velocity we can add the (v) for example next to the (mrc) and we'll have:

$$\omega = \eta \frac{\vec{S}A}{mrc\Phi\vec{E} + mr\vec{v}\Phi\vec{E}} = \eta \frac{\vec{S}A}{mr(c+\vec{v})\left(A\vec{B}\cos\alpha\right)\vec{E}} = \eta \frac{\vec{S}}{mr(c+\vec{v})\left(\vec{E}.\vec{B}\right)} \quad (29)$$

Of course here we shouldn't get it wrong from relativity principle that says us the light velocity's is unit and constant from all of the systems. No, this equation doesn't say it to us. This equation says us that when the light is falling and beating to the matter we should take the sum of two velocities and it is correct while that principle says us that when we want to calculate the (v) and (c) separately we should get the (c) to constant and it isn't necessary that we consider and calculate (v) but now the (v) is important for us and we need it and also the matter is moving and we don't want to calculate the velocity of the light when it's passing the matter with velocity(v).We told that when we say (mrc) isn't the angular momentum know that we have (v) and this velocity depend to the matter we can take that equal with L or angular momentum but this is correct when the axis p and r be perpendicular to each other because (sin 90=1) and fortunately this is correct for the electromagnetisms fields and axis. So easily we can infer:

$$\omega = \eta \frac{\vec{S}A}{mrc\Phi\vec{E} + \vec{L}\Phi\vec{E}} = \eta \frac{\vec{S}A}{mrc\left(A\vec{B}\cos\alpha\right)\vec{E} + \vec{L}\cos\alpha\, A\vec{B}\vec{E}} \quad (30)$$

$$\Rightarrow (a\ transformation\ for\ all\ the\ angles) \Rightarrow$$

$$\omega = \eta \frac{\vec{S}}{mrc\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} \quad (31)$$

In the classically way we should accept this equation but in the relativity we can say it to another way but this method here isn't so good because we don't consider that the moving of that but if we want to write it's to this way:

$$\Delta E_k = \Delta mc^2 \Rightarrow (here\ means) \Rightarrow \Delta m = m_m - m_w = m - \rho\vec{S} \Longrightarrow m = \frac{\Delta E_k}{c^2} + \rho\vec{S} \quad (32)$$

So we'll infer:

$$\omega = \eta \frac{\vec{S}}{\left(\frac{r\ \Delta E_k}{c} + \rho r c\vec{S}\right)\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} \quad (33)$$

Here is when we want to know the kinematic energy that if we consider that the light enter a force and has an energy we can get it easily from the classical laws. With this we can take the (ω) with the (ΔE_k) and when we want to say this equation to the electromagnetism way it isn't necessary that use from this way and we can get the energies and vectors from the *Poynting* vector and the classical or the Compton Effect transformations in this article. Easily in the classically way we can write instead of (m) the ($\rho\vec{S}$) and write: (of course for beating between the two waves)

$$\omega = \eta \frac{\vec{S}}{\rho\vec{S}\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} = \eta \frac{1}{\rho\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} = \left(\vec{E}\vec{B}\right)^{-1} \frac{1}{\rho\cos\alpha + (\vec{p}.r)} = \frac{\left(\vec{E}\vec{B}\right)^{-1}}{\cos\alpha} \frac{1}{\rho + mr^2\dot{\theta}} \quad (34)$$

$$= \frac{\left(\vec{E}\vec{B}\right)^{-1}}{\cos\alpha} \frac{1}{\rho + \vec{L}}\ (but\ here\ again\ the\ p\ and\ r\ are\ in\ the\ perpemdicular\ possition\ and\ always\ this\ subject\ is\ correct\ about\ the\ electromagnetism\ waves.) \quad (35)$$

In eq. (33) we talked about the kinematical energy but it isn't completely correct that here we use from that, because the (m) is for matter and the (c) is light velocity and it's better that we don't use it but when in the beating all of the energy of the wave penetrate to the matter we can use it and also we can use from the classical laws because here the matter doesn't move with velocity (c) or in the other word the light velocity. Eq. (35) gives us the (ω) directly to depend on the (E & B). Again we can write eq. (35) to this way for three dimensions:

$$\omega_{total} = \sqrt{\omega_x^2 + \omega_y^2 + \omega_z^2}$$
$$= \sqrt{\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{\cos^2\alpha} \frac{1}{\left(\rho + \vec{L}_x\right)^2} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{\cos^2\alpha} \frac{1}{\left(\rho + \vec{L}_y\right)^2} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{\cos^2\alpha} \frac{1}{\left(\rho + \vec{L}_z\right)^2}} \qquad (36)$$

We put $(1 - \sin^2\alpha)$instead of the $(\cos^2\alpha)$ and write:

$$\omega_{total} = \left(\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{(1 - \sin^2\alpha)} \frac{1}{\left(\rho^2 + \overrightarrow{L_x}^2 + 2\rho\overrightarrow{L_x}\right)} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{(1 - \sin^2\alpha)} \frac{1}{\left(\rho^2 + \overrightarrow{L_y}^2 + 2\rho\overrightarrow{L_y}\right)} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{(1 - \sin^2\alpha)} \frac{1}{\left(\rho^2 + \overrightarrow{L_z}^2 + 2\rho\overrightarrow{L_z}\right)} \right)^{\frac{1}{2}} \qquad (37)$$

$$= \left(\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{\left(\rho + \vec{L}_x\right)^2 - ((\rho\sin\alpha)^2 + (\vec{p}_x \times r_x)^2 + 2\rho(\vec{p}_x \times r_x)\sin\alpha)} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{\left(\rho + \vec{L}_y\right)^2 - \left((\rho\sin\alpha)^2 + \left(\vec{p}_y \times r_y\right)^2 + 2\rho\left(\vec{p}_y \times r_y\right)\sin\alpha\right)} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{\left(\rho + \vec{L}_y\right)^2 - \left((\rho\sin\alpha)^2 + \left(\vec{p}_y \times r_y\right)^2 + 2\rho\left(\vec{p}_y \times r_y\right)\sin\alpha\right)} \right)^{\frac{1}{2}} \qquad (38)$$

We could see that with this method we can reach to the all angular momentum and it doesn't depend on the angle and is correct for all of the angles and here will show it with $(\vec{\mathcal{L}})$. Also if we pay attention a little we can accept that the (ρ) depend to its place so we'll have:

$$\rho \sin \alpha = \rho_y \quad (39)$$

And we'll infer clearly:

$$\omega_{total} = \left(\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{\left(\rho + \vec{L}_x\right)^2 - \left({\rho_y}^2 + \overrightarrow{\mathcal{L}_x}^2 + 2\rho_y \overrightarrow{\mathcal{L}_x}\right)} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{\left(\rho + \vec{L}_y\right)^2 - \left({\rho_y}^2 + \overrightarrow{\mathcal{L}_y}^2 + 2\rho_y \overrightarrow{\mathcal{L}_y}\right)} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{\left(\rho + \vec{L}_z\right)^2 - \left({\rho_y}^2 + \overrightarrow{\mathcal{L}_z}^2 + 2\rho_y \overrightarrow{\mathcal{L}_z}\right)} \right)^{\frac{1}{2}} \quad (40)$$

And we know that:

$$\vec{\tau}_r = \frac{d\vec{\mathcal{L}}}{dt}\, u_r = \frac{dI\omega}{dt} \;\; (here\ we\ delete\ the\ \ u_r\ because\ it\ is\ in\ \omega) = I\dot{\omega} + \omega\dot{I}$$

Because in the stable electromagnetism waves the $I = const$ so we'll have:

$$\vec{\tau}_r = I\dot{\omega} = I\alpha = \dot{\vec{\mathcal{L}}} \;\; \Longrightarrow \int I\alpha\, dt = \int d\,\vec{\mathcal{L}} \;\; \Longrightarrow \;\; \vec{\mathcal{L}} = I\alpha t \quad (41)$$

$$I\alpha t = \dot{\vec{\mathcal{L}}} t \Longrightarrow (at\ the\ average\ and\ the\ all) \vec{\tau}_r t = \vec{\mathcal{L}} \quad (42)$$

And it is an important produce because we can consider that when we take $I = const$ and α=constant that both of them are correct about the electromagnetism wave we'll can the all $\vec{\tau}_r$ depend on $\vec{\mathcal{L}}$. Now we put the produces in eq. (40) and infer:

$$\omega_{total} = \left(\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{(\rho + mx^2\dot{\alpha})^2 - \left({\rho_y}^2 + (\vec{\tau}_x t)^2 + 2\rho_y (\vec{\tau}_x t)\right)} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{(\rho + my^2\dot{\alpha})^2 - \left({\rho_y}^2 + (\vec{\tau}_y t)^2 + 2\rho_y (\vec{\tau}_y t)\right)} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{(\rho + mz^2\dot{\alpha})^2 - \left({\rho_y}^2 + (\vec{\tau}_z t)^2 + 2\rho_y (\vec{\tau}_z t)\right)} \right)^{\frac{1}{2}} \quad (43)$$

As you see we could get the(τ) depend on the (ω). But this equation is about two matters (of course we got the (ρ) beating between two waves but here again we inferred (m) and because we're talking about the waves we should write it as the poynting vector but we told that when the wave is beating to material the force and energy are freeing and we can consider the mass of a thing and it wont cause to make the difference between two times) and if we want to write it as a electromagnetism wave we can write:

$$\omega_{total} = \left(\frac{\left(\vec{E}_x \overrightarrow{B_x}\right)^{-2}}{\left(\rho(1+\overrightarrow{S_x}x^2\dot{\alpha})\right)^2 - \left(\rho_y{}^2 + (\vec{\tau}_x t)^2 + 2\rho_y(\vec{\tau}_x t)\right)} + \frac{\left(\vec{E}_y \overrightarrow{B_y}\right)^{-2}}{\left(\rho(1+\overrightarrow{S_y}y^2\dot{\alpha})\right)^2 - \left(\rho_y{}^2 + (\vec{\tau}_y t)^2 + 2\rho_y(\vec{\tau}_y t)\right)} + \frac{\left(\vec{E}_z \overrightarrow{B_z}\right)^{-2}}{\left(\rho(1+\overrightarrow{S_z}z^2\dot{\alpha})\right)^2 - \left(\rho_y{}^2 + (\vec{\tau}_z t)^2 + 2\rho_y(\vec{\tau}_z t)\right)} \right)^{\frac{1}{2}} \tag{44}$$

So you see that we can get the($\vec{S}$) depend on the (ω). We get the (Γ) to this way: (for taking easy eq. (44))

$$\Gamma = \left(\rho\left(1+\vec{S}x^2\dot{\alpha}\right)\right)^2 - \left(\rho_y{}^2 + (\vec{\tau}t)^2 + 2\rho_y(\vec{\tau}t)\right) \tag{45}$$

So we will have:

$$\omega_{total} = \sqrt{\frac{1}{\left(\vec{E}_x\vec{B}_x\right)^2 \Gamma_x} + \frac{1}{\left(\vec{E}_y\vec{B}_y\right)^2 \Gamma_y} + \frac{1}{\left(\vec{E}_Z\vec{B}_Z\right)^2 \Gamma_Z}} \tag{46}$$

We know that:

$$\left(\vec{E}\times\vec{B}\right) = \vec{E}\vec{B}\sin\alpha = \vec{S}\mu_0 \implies \left(\vec{E}\vec{B}\right)^2 = \frac{\left(\vec{S}\mu_0\right)^2}{\sin^2\alpha}$$

So we'll have:

$$\omega_{total} = \frac{\sin\alpha}{\mu_0}\sqrt{\frac{1}{\vec{S}_x{}^2\Gamma_x} + \frac{1}{\vec{S}_y{}^2\Gamma_y} + \frac{1}{\vec{S}_z{}^2\Gamma_Z}} = \frac{1}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{\vec{S}_x{}^2\Gamma_x} + \frac{1}{\vec{S}_y{}^2\Gamma_y} + \frac{1}{\vec{S}_z{}^2\Gamma_Z}}}\right]_{perpendicular} \tag{47}$$

That is a very good and useful equation. And also we can make a communication between the (ω) in the atom and (ω) here. Remember that at the before we tried to get a communication coefficient for two (ω)s but there were the other coefficient like the $(\Phi\ \&\ \rho\ \&\ S\ \&\ r)$ and know we try to get the constant between two (ω)s to directly way and get for example the (ξ) as the constant and rewrite again:

$$\omega_{wave} = \xi\ \omega_{atom}\ \Longrightarrow\ \frac{1}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{\vec{S}_x^{\,2}\Gamma_x}+\frac{1}{\vec{S}_y^{\,2}\Gamma_y}+\frac{1}{\vec{S}_z^{\,2}\Gamma_Z}}}\right]_{perpendicular}$$

$$= \xi(456603773.9) \tag{48}$$

That the recently number is for the general (ω) in the hydrogen atom that we took it in the past article with the special method .So because we told that in the Hydrogen atom and it has just one energy balance and we want to get this formula for all of the matters we should add the ψ parameter that depends to the uncertainly principle but here we know the wave direction and electron or other particles circuits and the ψ is in fact the correctly parameter and in the different circuits it's possible that changes with one or many coefficient(s). So we write:

$$\omega_{wave} = \xi\psi\ \omega_{atom}\ \Longrightarrow\ \frac{1}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{\vec{S}_x^{\,2}\Gamma_x}+\frac{1}{\vec{S}_y^{\,2}\Gamma_y}+\frac{1}{\vec{S}_z^{\,2}\Gamma_Z}}}\right]_{perpendicular}$$

$$= \xi\psi(456603773.9) \tag{49}$$

Until now we were talking about the electrical and magnetic particulars of the electromagnetism waves but we want to talk about gravitational particular of that and until now we calculated the equations without considering the gravity force at the beating time. Now we want to consider that. We told that when the wave is moving can create the energy and a force. It is possible that these forces do absorption to each other and give an interference effect and it cause that direction of wave want to change its axis. If we want to don't say it for force and say it for the energy also we can say that the interference energy and this interference energy can cause that the ray will change its axis. Of course it is possible that this interference energy, if energy of the two things will be equal and in the opposite direction doesn't work because they aren't equal with themselves and in fact these energies are the internal energies and usually they are to challenging with each other for their value. We know that when we want to consider a wave is beating to another thing we should consider a f(x) for that because it is moving and we need to get the function of the (x) because with this we can get the phase angle and (kx) and the domain and it is so good. Because for moving the particles in the atom and moving the waves we don't know certainly place of them (that's simple thing).We should write the correction equation for the (f(x)) and in the past article we did it and with the uncertainly principle we have:

$$\bar{\psi}^2 f(x) = \frac{1}{2}\bar{\psi}^2 \frac{d}{dx}\left(\frac{\sum_i m_{ei} + m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \qquad (50)$$

That this equation is about the particles in the atom that here we got average of the (m_e & m_p).But here we need it about the waves and we can write: (for the wave & matter) $m_e \Rightarrow \rho\vec{S}$ & $m_p \Rightarrow m$ (51)

That these are simple because we at the before calculated these and considered them. The expression ($\bar{\psi}^2 f(x)$) in the eq.(50) we writ to this way:$(f(x))_\psi$ for changing to the simple way of the calculation of the equations. We know that in fact the f(x) convert to (G) because when we are talking about the gravity between two forces we should consider and calculate the (G) in all of the circuits and things like materials or particles. If we write these equations we can take (G) and we can get it from the past article and we arrived to the Fourier theorem and we have: (of course it was a part about theψ)

$$G_{ave} = \frac{1}{\tau}\int \frac{1}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i.m_i}\right)$$
$$= \frac{1}{\tau}\int a_0 dx + a_1\cos\omega t\, dx + a_2\cos 2\omega t\, dx + a_3\cos 3\omega t\, dx + \cdots$$
$$+ a_n\cos n\omega t\, dx + \cdots + b_1\sin\omega t\, dx + b_2\sin 2\omega t\, dx + b_3\sin 3\omega t\, dx + \cdots$$
$$+ b_n\sin n\omega t\, dx \qquad (52)$$

And we have written it about the waves. We have:

$$F = -\frac{GMm}{r^2}$$

And it is between two matters and here for the waves we should consider the *poynting* vector and density. So we'll have:

$$\vec{F} = -\frac{G\rho\vec{S}m}{r^2}\left(r_{ij}\right) \tag{53}$$

And with putting the (G) we'll have:

$$\vec{F} = -\frac{\rho m}{\tau r^2}\left[\int \frac{\vec{S}}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]$$
$$= -\frac{\rho m}{\mu_0 \tau r^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right] \tag{54}$$

And we could infer that the (F) depend to $\left(\vec{E}\&\vec{B}\right)$ and also we have: (for energy)

$$\vec{F}\cos\theta = \frac{\partial\vec{E}_{Int}}{\partial r} \implies \vec{F} = \nabla\vec{V}$$

So we can get the (V) or the (E_{Int}) from this and we have:

$$\vec{V} = \frac{\vec{F}}{\vec{\nabla}} = \left(\hat{\imath}\frac{\partial\vec{F}}{\partial x} + \hat{\jmath}\frac{\partial\vec{F}}{\partial y} + \hat{k}\frac{\partial\vec{F}}{\partial z}\right)$$

And we have for example (r=x & y & z) and we'll have: (here we calculated the vector way → ($r = \vec{x} + \vec{y} + \vec{z}$)

$$\vec{F} = -\left\{\frac{\rho m}{\mu_0 \tau x^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right] + \frac{\rho m}{\mu_0 \tau y^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi y}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right] + \frac{\rho m}{\mu_0 \tau z^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi z}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]\right\} \tag{55}$$

If we want to solve integral (54) we should take by the part integration from that and it is:

$$\int \frac{(\vec{E}\times\vec{B})}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) = \int \frac{(\vec{E}\times\vec{B})}{4}\psi_m^2 (\vec{E}\times\vec{B}) \sin^2\frac{n\pi x}{l}\, d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) + \int \left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\frac{\psi_m^2}{4}\, d\left((\vec{E}\times\vec{B})\sin^2\frac{n\pi x}{l}\right) \qquad (56)$$

That the second sentence that's an integral that's:

$$\int \left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\frac{\psi_m^2}{4}\, d\left(\sin^2\frac{n\pi x}{l}\right) = \frac{\psi_m^2}{4}(\vec{E}\times\vec{B})\sin^2\frac{n\pi x}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) \qquad (57)$$

And here the (ψ_m) is constant because it is the maximum and has just one value. So eq. (55) changes to:

$$\vec{F} = -\left(\frac{2\rho m}{\mu_0 \tau x^2}\frac{\psi_m^2}{4}(\vec{E}_x\times\vec{B}_x)\sin^2\frac{n\pi x}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) + \frac{2\rho m}{\mu_0 \tau y^2}\frac{\psi_m^2}{4}(\vec{E}_y\times\vec{B}_y)\sin^2\frac{n\pi y}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) + \frac{2\rho m}{\mu_0 \tau z^2}\frac{\psi_m^2}{4}(\vec{E}_z\times\vec{B}_z)\sin^2\frac{n\pi z}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right) \qquad (58)$$

Because $(\vec{E}\times\vec{B}) = const$ we'll have:

$$\vec{V} = \left(\hat{\imath}\frac{\partial\vec{F}}{\partial x} + \hat{\jmath}\frac{\partial\vec{F}}{\partial y} + \hat{k}\frac{\partial\vec{F}}{\partial z}\right) = \hat{\imath}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_x\times\vec{B}_x)\psi_m^2\frac{\rho m}{\mu_0\tau x^3}\frac{2\pi n}{l}\sin\frac{n\pi x}{l}\right] + \hat{\jmath}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_y\times\vec{B}_y)\psi_m^2\frac{\rho m}{\mu_0\tau y^3}\frac{2\pi n}{l}\sin\frac{n\pi y}{l}\right] + \hat{k}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_z\times\vec{B}_z)\psi_m^2\frac{\rho m}{\mu_0\tau z^3}\frac{2\pi n}{l}\sin\frac{n\pi z}{l}\right] \qquad (59)$$

$$\vec{V} = 2\pi\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\psi_m^2\frac{\rho m}{\mu_0\tau}\frac{n}{l} = \left(\frac{1}{x^3}\sin\frac{n\pi x}{l} + \frac{1}{y^3}\sin\frac{n\pi x}{l} + \frac{1}{z^3}\sin\frac{n\pi x}{l}\right) \qquad (60)$$

The expression (2π) shows us the ($2\pi\ rad$) and it says us that we should talk about them in the radians system. The equation (60) is important because gives us the $\vec{V}$ depend on the (l)and we can take our experimental length and calculate the $\vec{V}$.

References

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[Because we in this article used from some important equations from the other articles we wrote they again here for remembering]

Appendixes (some parts of article 1 & 4)

4

For the other unit vectors we can use from this method to the other ways and we get a vector answer. Now from eq.28 we have:

$$f(x) = \frac{1}{2}\frac{d}{dx}\left(\frac{\sum_i m_{ei}+m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \tag{32}$$

Know we want to enter the ψ in these equations: (because the f(x) depend to the ψ):

$$\bar{\psi}^2 f(x) = \frac{1}{2}\bar{\psi}^2\frac{d}{dx}\left(\frac{\sum_i m_{ei}+m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \tag{33}$$

We know that the ($\bar{\psi}^2$) is a correctly sentence. So because we want to take this equation from easily way, we take ($\bar{\psi}^2 f(x) = (f(x))_\psi$) and we have:

$$\left(f(x)\right)_{\psi}) = \frac{1}{2}\bar{\psi}^2 \frac{d}{dx}\left(\frac{\sum_i m_{ei} + m_{pi}}{\sum_i m_{ei}.m_{pi}}\right)$$

And we know that:

$$\left(f(x)\right)_{\psi}) = \frac{1}{4}\psi_m^2 \sin^2\frac{n\pi x}{l}\frac{d}{dx}\left(\frac{\sum_i m_{ei} + m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \quad (34)$$

From the Fourier theorem that(x=f(t)) now we take f(x) instead of the f(t) because we have:

$$\int_0^\tau f(x)dx \quad and\ we'll\ have\ \int f(\tau)dx - \int f(0)dx = \int f(\tau)dx \quad (35)$$

And we find f(τ) or f(t) so we write f(x) and write :(because the particles have a period for turning)

$$f(x) = a_0 + a_1\cos\omega t + a_2\cos 2\omega t + a_3\cos 3\omega t + \cdots + a_n\cos n\omega t + \cdots + b_1\sin\omega t + b_2\sin 2\omega t + b_3\sin 3\omega t + \cdots + b_n\sin n\omega t \quad (36)$$

That is for the particles. We get the a_n and b_n from this method:

$$a_n = \frac{2}{\tau}\int_0^\tau f(x)\cos n\omega t\, dx \quad (37)$$

$$b_n = \frac{2}{\tau}\int_0^\tau f(x)\sin n\omega t\, dx \quad (38)$$

And we have:

$$G_{ave} = \frac{1}{\tau}\int_0^\tau f(x)dx \Longrightarrow G = \frac{1}{\tau}\int \frac{1}{4}\psi_m^2 \sin^2\frac{n\pi x}{l} d\left(\frac{\sum_i m_{ei} + m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \quad (39)$$

$$G_{ave} = \frac{1}{\tau}\int a_0 dx + a_1\cos\omega t\, dx + a_2\cos 2\omega t\, dx + a_3\cos 3\omega t\, dx + \cdots + a_n\cos n\omega t\, dx + \cdots + b_1\sin\omega t\, dx + b_2\sin 2\omega t\, dx + b_3\sin 3\omega t\, dx + \cdots + b_n\sin n\omega t\, dx \quad (40)$$

And from this method we can get G or G_{ave} or correctly G in the atom between the particles and nucleus. But we should put numbers in the parameters of these equations. For example we want to calculate these equations for nth circuit or on the nth circuit.

1

We want to extent equation (14) to the torque of the electron. For this we remember equation 6 that also have inferred the angular momentum classically. It's important in our calculating here that consider a system that has the particulars of electron and proton (both of them) because as have spoken in this article a force enter to the proton (of gravity and electrical) and also a force enter to electron from proton in opposite direction than the electron to proton. So we write that: (we get that

$$L\tau = \vec{L} \ (because\ we\ can\ almost\ get\ for\ the\ particles\ that\ are\ small\ which\ the\ changing\ of\ the\ angular\ momentum\ is\ equal\ with\ the\ torque\ and\ it's\ like\ that\ we\ say: \tau = \frac{dL}{dt}\ \ and\ here\ the\ time\ is\ a\ little.$$

$$L = m_p v_p \tau + m_e v_e \tau \quad \rightarrow \frac{dL}{dt} = m_p (\frac{dv}{dt}) \tau + m_e (\frac{dv}{dt}) \tau \quad \rightarrow$$

$$dL = \tau \left(m_p dv + m_e dv \right) \quad \rightarrow \quad \tau = \frac{dL}{(m_e dv + m_p dv)} \tag{15}$$

Here we wrote the derivative of the momentums (angular and leaner) of the proton and electron in a system. Now we want to calculate the partially derivative of them because they are too small and this derivative is better than and is good for considering the differential of the proton and electron. So we'll have:

$$\partial\tau = \frac{\partial L}{m_p \partial v + + m_e \partial v} \tag{16}$$

Now also we calculated the partially derivative. The (dL) because is too small and it should be constant at all of the circuit about proton and electron (because we have: $F_{e,\ everyplace}$ =

$F_{p,everyplace}$) so we now that a number that its derivative is itself is (e) and we can write:

$\tau \propto$ e

$$2\partial\tau = \frac{[\, ln2\ v.e\ ,t\ \ e2\ ln2\ v,p\ ,t]}{mpdv\ +\ medv} \tag{17}$$

The power of τ here was 2 because the force of power (likely the$(r \times F)$) enter from to direct. Here for numbering calculating we add the (dt) to the issue of the $(m_p dv)$:

$$\partial\tau\ = \frac{[ln2\ v, e, t\ e2\ ln2\ v, p, t]}{\left[mp\ \left(\frac{dv}{dtv}\right) +\ me\ \left(\frac{dv}{dtv}\right)\right]} =$$

$$\frac{invoice}{[mp[v\ (dv/dv)) + me\ (v\ (dv/dv))]]}\ = \frac{invoice}{[v(mp + mv)]} \tag{18}$$

Here we could proof that when we want to take the differential of the moving of electron and moving of the proton we can consider (v) not (dv) and we have ($\frac{v}{dv} = \frac{1}{dt}$) because the (v) and (t) have some communications between them self and we for getting the (dt) should divide the dv on the v because we want to find the dt that is so little and the v is big and again the dv is so little and when we divide them we can arrive to the little parameter. So for the ∂τ we have:

$$\partial\tau\ = \frac{[ln2\ v, e, t\ e2\ ln2\ v, p, t]}{[v\ (mp +\ mv)]} \rightarrow\ \partial\tau\ = \frac{3.5500}{1.2 \times (0.511 Mev + 938 Mev)} =$$

$$\frac{3.5500}{[1.2 \times (938.511)]} = 0.0031521562 \tag{19}$$

As you saw in this article we could two important constants. one of them is equation 13 about (ω) and another one is this equation (19) that’s about (∂τ). In fact these equations are the roots of my theory and we could calculate them. Now write them again here:

$$The\ const\ (\omega)\ \ \rightarrow\ \ \ 456603773.9\ \ (cm2/t) \tag{13}$$

$$The\ const\ (\partial\tau)\ \rightarrow\ \ \ 0.0031521562\ (1/Mev) \tag{19}$$

Gmail:avasighza@gmail.com