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

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Abstract

In this article we want to say about the Compton Effect and the Zeeman Effect. (Both of them are almost one effect (in the fundament and with considering just the refraction proposition of them). We know both of them are about the electromagnetism waves (the waves) and some special properties of them. For example the Zeeman effect is about the refraction of the magnetic fields (or the other made fields by that) of the electromagnetism waves since we put the source of that near the source of the magnetic or electrical field (we'll see the breaking or refraction of the wave) and this proposition is possible that the wave refracts to some part for example two or three part but we should remember that these effects (Zeeman, Compton) aren't just for the light(the electromagnetism type) and of course these proposition are less about the light (and some part of the light like the x-ray or β-ray or γ-ray or….) But it can't be impossible that these effects be correct also about the light. Of course the Compton Effect is depending on the angle θ with coefficient $(1-\cos\theta)$.

Now we want to justify that. We can say; if we want to consider the thing's (or waves or the atoms or….) properties we can consider the moving of them and we say that when an electron or another thing is turning around the nucleus quickly we'll take a special force that 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 justify simply with this method. For the first time this proposition is so easy but we can take this easy proposition as a principle of our discussion. [$Refer\ to\ appendix$ 2]

1. Electromagnetism equations and $\Delta\lambda$

First of all we write the Maxwell's equations and then we'll try to use them for calculating the Compton Effect electromagnetically. At the bottom there are the Maxwell's foundation equations:

$$\nabla \times \mathbf{H} = \mathbf{J} + \frac{\partial \mathbf{D}}{\partial t} \tag{1}$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \tag{2}$$

$$\nabla \times \mathbf{D} = \rho \tag{3}$$

$$\nabla . \mathbf{B} = 0 \tag{4}$$

We are trying to change them to the simple wavy equations with considering the motion. So we can get from eq. (3):

$$\nabla . \mathbf{D} = \frac{\sigma e}{4\pi R^2} \tag{5}$$

Which the (σ) is a monotonic distribution coefficient for the electric charge that is possible the density of the charge on some places on the surface be less or more. So we should consider this coefficient. Of course this coefficient is variable on each place at the surface. This proposition isn't completely correct for the all times because after a specific period of time the density will be monotone at the all of the surface and we'll have a monotonic distribution. Since we want to calculate the works that are doing on the electric charge (for example an electron or a heap of them) so we should write:

$$d\mathbf{W} = \mathbf{F}. d\mathbf{r} = \mathbf{F}_x dx + \mathbf{F}_y dy + \mathbf{F}_z dz = \mathbf{F}. \mathbf{D} \tag{6}$$

Since the **D** just for the radius or distance or… (Of course with considering (ρ)) so it wasn't necessary to write $d\mathbf{D}$ because the distance of the density is important

We can extent this equation to a heap of the particles (or the things like electron or…) with considering the ($\sum$). So:

$$\sum_{\mathbf{W}_0}^{\mathbf{W}_n} \mathbf{W} = \sum_{\mathbf{W}_0}^{\mathbf{W}_n} \mathbf{F}.\mathbf{r} = \sum_{\mathbf{W}_0}^{\mathbf{W}_n} \mathbf{F}_x dx + \mathbf{F}_y dy + \mathbf{F}_z dz = \sum_{\mathbf{W}_0}^{\mathbf{W}_n} \mathbf{F}.d\mathbf{D}$$

The $(\mathbf{W}_n)$ and $(\mathbf{W}_0)$ are depending to (m). Mathematically:

$$\mathbf{W}_n \propto m_n \quad \& \quad \mathbf{W}_0 \propto m_0$$

And we know that this equation represent the work doing on the electric charge or an electron. If we want to concern them to the electromagnetism propositions and the Compton Effect we should write the static equations for the matter and then also we can assume the matter moving:

$$d\mathbf{W} = -d\mathbf{U} = \mathbf{F}_x dx + \mathbf{F}_y dy + \mathbf{F}_z dz \tag{7}$$

Also we know an electron will move when a force exerted that and consequently we'll take a torque for electron's turning and we should right it simply:

$$r d\theta = \mathbf{r} \quad \& \quad d\mathbf{W} = \tau . d\theta \quad \Longrightarrow \quad \tau = -\frac{d\mathbf{U}}{d\theta} \tag{8}$$

And for this we infer that, since the potential; works on the charge is depending to the torque so it is depending to the angle making with the basic initial basis point. So we rewrite the Gauss's law:

$$\varepsilon_0 \oint \mathbf{E}.dA = \varepsilon_0 \oiint d\mathbf{W}.dx\,.dA = \varepsilon_0 \mathbf{\Phi}_{\mathbf{E}} = q \tag{9}$$

Here we took the $d\mathbf{W}$ as a constant and it is variable for the other integrals. And on the other hand we write for the force:

$$\mathbf{F} = \frac{1}{2} \oint \mathbf{E}\sigma\, da \tag{10}$$

This equation has proofed in many text books but here for remembering we rewrite the abstract of them:

$$\varepsilon_0 \oint \mathbf{E_s}.dA = q$$

$$\acute{\mathbf{E}} = \mathbf{E} - \mathbf{E_s}$$

$$\varepsilon_0(\mathbf{E}_s A + \mathbf{E}_s A) = \sigma A \qquad \Longrightarrow \qquad \mathbf{E}_s = \frac{\sigma}{2\varepsilon_0}\mathbf{n}$$

$$\boldsymbol{\mathcal{F}}_s = \sigma \mathbf{E}_s = \oint \acute{\mathbf{E}}\, \sigma\, da$$

(The **n** in the secondary past equation is the vertical vector)

From the initial concepts:

$$\mathbf{E} = \frac{\sigma}{\varepsilon_0}\mathbf{n} \quad \Longrightarrow \quad \acute{\mathbf{E}} = \frac{1}{2}\mathbf{E}$$

$$\mathbf{F} = \frac{1}{2}\oint \mathbf{E}\sigma da$$

And:

$$\frac{4}{3}\pi(da)^2 d\mathbf{F} = \frac{1}{2}\mathbf{E}\sigma. dA = \frac{1}{2}d\mathbf{W}dx. dA \tag{11}$$

(Here the (da) is the very little radius and the (dA) is the very little surface)

With substituting in the eq. (9):

$$q = \varepsilon_0 \oiint \frac{8}{3}\pi\, d\mathbf{F}da^2 = \varepsilon_0 \oiint \frac{8}{3}\pi\, d\mathbf{F}\left(da_x^2 + da_y^2 + da_z^2\right) \tag{12}$$

By writing the $\left(da_x, da_y, da_z\right)$ factors according to the (a) we'll have: (see fig.1)

$$q = \varepsilon_0 \oiint \frac{8}{3}\pi\, d\mathbf{F}\left(da^2(\cos^2\theta + \sin^2\theta + \sin^2\phi)\right)$$

$$= \varepsilon_0 \oiint \frac{8}{3}\pi\, d\mathbf{F}\left(da^2(1 + \sin^2\phi)\right) \tag{13}$$

Know we write another equation using from eq. (2): (in this equation we can write (q) instead of (e)). And also here we'll use from these equations:

$$\mathbf{F_x}\cos\theta = \frac{\partial \mathbf{E_p}}{\partial x} = \frac{\partial \mathbf{U}}{\partial x} \tag{14 - a}$$

$$\mathbf{F_y} \sin\theta = \frac{\partial \mathbf{E_p}}{\partial y} = \frac{\partial \mathbf{U}}{\partial y} \qquad (14-b)$$

$$\mathbf{F_z} \sin\phi = \frac{\partial \mathbf{E_p}}{\partial z} = \frac{\partial \mathbf{U}}{\partial z} \qquad (14-c)$$

$\Longrightarrow$ $(\textit{since we cosidered the forces component so we can write the derivative instead of the partial derivative.})\ so$:

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad \Longrightarrow \nabla \times \left(\mathbf{E}_x + \mathbf{E}_y + \mathbf{E}_z\right) = \nabla \times \left(\frac{\mathbf{F_x}}{e} + \frac{\mathbf{F}_y}{e} + \frac{\mathbf{F}_z}{e}\right) =$$

$$\nabla \times \left(\frac{\frac{d\mathbf{U}}{\cos\theta\, dx}}{e}\hat{\imath} + \frac{\frac{d\mathbf{U}}{\sin\theta\, dy}}{e}\hat{\jmath} + \frac{\frac{d\mathbf{U}}{\sin\phi\, dz}}{e}\hat{k} \right) =$$

$$\left[\left(\frac{\partial}{\partial x}\right)\hat{\imath} + \left(\frac{\partial}{\partial y}\right)\hat{\jmath} + \left(\frac{\partial}{\partial z}\right)\hat{k}\right] \times \left(\frac{\frac{d\mathbf{U}}{\cos\theta\, dx}}{e}\hat{\imath} + \frac{\frac{d\mathbf{U}}{\sin\theta\, dy}}{e}\hat{\jmath} + \frac{\frac{d\mathbf{U}}{\sin\phi\, dz}}{e}\hat{k} \right)$$

$$= \frac{1}{e}\left[\left(\frac{\partial \frac{d\mathbf{U}}{\sin\theta\, dy}}{\partial x}\hat{k}\right) - \left(\frac{\partial \frac{d\mathbf{U}}{\sin\phi\, dz}}{\partial x}\hat{\jmath}\right) - \left(\frac{\partial \frac{d\mathbf{U}}{\cos\theta\, dx}}{\partial y}\hat{k}\right) + \left(\frac{\partial \frac{d\mathbf{U}}{\sin\phi\, dz}}{\partial y}\hat{\imath}\right) + \left(\frac{\partial \frac{d\mathbf{U}}{\cos\theta\, dx}}{\partial z}\hat{\jmath}\right) - \left(\frac{\partial \frac{d\mathbf{U}}{\sin\theta\, dy}}{\partial z}\hat{\imath}\right)\right]$$

$$= \frac{1}{e}\left[\hat{\imath}\left(\frac{\partial \frac{d\mathbf{U}}{\sin\phi\, dz}}{\partial y} - \frac{\partial \frac{d\mathbf{U}}{\sin\theta\, dy}}{\partial z}\right) + \hat{\jmath}\left(\frac{\partial \frac{d\mathbf{U}}{\cos\theta\, dx}}{\partial z} - \frac{\partial \frac{d\mathbf{U}}{\sin\phi\, dz}}{\partial x}\right) + \hat{k}\left(\frac{\partial \frac{d\mathbf{U}}{\sin\theta\, dy}}{\partial x} - \frac{\partial \frac{d\mathbf{U}}{\cos\theta\, dx}}{\partial y}\right)\right] = -\frac{\partial \mathbf{B}}{\partial t} \qquad (14-d)$$

From eq. (6):

$$\mathbf{F} = \frac{d\mathbf{W}}{\mathbf{D}} = \frac{d\mathbf{W}}{\frac{\sigma e}{\nabla 4\pi R^2}} = \frac{4\pi R^2(\nabla \times d\mathbf{W})}{\sigma e \sin(\theta, \phi)}$$
$$= \frac{4\pi R^2}{\sigma e \sin(\theta, \phi)} \left(\frac{\partial d\mathbf{W}_x}{\partial x} \hat{\imath} + \frac{\partial d\mathbf{W}_y}{\partial y} \hat{\jmath} + \frac{\partial d\mathbf{W}_z}{\partial z} \hat{k} \right)$$
$$= -\frac{4\pi R^2}{\sigma e \sin(\theta, \phi)} \left(\frac{\partial d\mathbf{U}_x}{\partial x} \hat{\imath} + \frac{\partial d\mathbf{U}_y}{\partial y} \hat{\jmath} + \frac{\partial d\mathbf{U}_z}{\partial z} \hat{k} \right) \tag{15}$$

Now we can extent it to eq. $(14-d)$:

$$\mathbf{F} = \frac{4\pi R^2}{\sigma \sin(\theta, \phi)} \left[(\nabla \times \mathbf{E})_x \left(\frac{\sin\theta \sin\phi\, dzdy}{\sin\phi dz - \sin\theta dy} \right) + (\nabla \times \mathbf{E})_y \left(\frac{\sin\phi \cos\theta\, dzdx}{\cos\theta dx - \sin\phi dz} \right) + (\nabla \times \mathbf{E})_z \left(\frac{\sin\theta \cos\theta\, dxdy}{\sin\theta dy - \cos\theta dx} \right) \right] \tag{16}$$

Here since we have the derivatives so we ignored the partial derivatives. As we can see, if we can analyze the electrons motion (by the polar coordinates), we'll can access to a force which we can justify the other electron or matter's motion and this proposition is correct for the electromagnetism waves. (This proposition is correct as this equation)

$$\mathbf{F} = \frac{1}{2} \oint \mathbf{E} \sigma da$$

And according to the Gauss's law we have:

$$\Phi_E = \oiint \mathbf{E} . ds = \oiint \frac{\mathbf{F}}{q} . ds \tag{17}$$

And we can get the ($\mathbf{F}$) from eq. (10) and concern it to motion. Now in the Compton Effect, we write the ($\Delta\lambda$) from this proposition; which connect it to the moving with the exerted energy and force (to the matter). Since we want to consider the motion on the x-axis so have: [Here we take: $\mathbf{D} = \Delta\lambda$ because we will see a difference for the wave length and with concerning to the coordinates moving and the density ($\mathbf{D}$) we'll have:]

$$\Delta\lambda = \frac{d\mathbf{W}}{\mathbf{F}} = \frac{d\mathbf{U_x}}{\frac{4\pi R^2}{\sigma\sin\theta}(\nabla\times\mathbf{E})_x\left(\frac{\sin\theta\sin\phi dzdy}{\sin\phi dz-\sin\theta dy}\right)} = \frac{d\mathbf{U_x}(\sin\phi dz-\sin\theta dy)}{\frac{4\pi R^2}{\sigma}(\nabla\times\mathbf{E})_x\sin\phi dzdy} =$$

$$-\frac{d\mathbf{U_x}(\sin\phi dz-\sin\theta dy)}{\frac{4\pi R^2}{\sigma}\frac{d\mathbf{B}}{dt}\sin\phi dzdy} = -\frac{d\mathbf{U_x}(\sin\phi dz-\sin\theta dy)}{\frac{4\pi R^2}{\sigma}d\mathbf{B}\sin\phi v_z dy} = -\frac{\frac{kq}{r^3}(\sin\phi dz-\sin\theta dy)}{\frac{4\pi R^2}{\sigma}d\mathbf{B}\sin\phi v_z dy} \quad (18)$$

Here since we're working with a component and it's (x) so we could write the derivative of $(\mathbf{B})$ and it wasn't necessary to write the partial derivative

On the other hand:

$$d\mathbf{B} = \frac{d\mathbf{E}}{c} = \frac{\frac{kq}{r^3}}{c} \quad (19)$$

So:

$$\Delta\lambda = \frac{c(\sin\theta dy - \sin\phi dz)}{\frac{4\pi R^2}{\sigma}\sin\phi v_z dy} \quad (20)$$

In this article we try to take the $(\Delta\lambda)$ from the simply electromagnetic equations.

As you saw, we arrived to the velocity that we can write (v_z)according to the (v_x) and this proposition represent that the $(\Delta\lambda)$ is depending to the velocity of the matter. In the new coordinate of the new wave with the new wavelength we'll have:

$$\Delta\lambda = \Delta x = \Delta v\Delta t = v(1-\cos\theta)\Delta t \quad (21)$$

Here we wrote the x-component velocity.

And the (Δt) is an optional period of time. Here we should take the $(\Delta\lambda)$ to (λ_0) because it is a little period of time and we want to compare it with the next wavelengths.

So, from eq. (20): [Of course we could write the (v_y) instead of (v_z) in eq. (18), But since we have $(\sin\phi)$ we preferred to write (v_z)]

$$\lambda_0 = \frac{c(\sin\theta dy - \sin\phi dz)}{\frac{4\pi R^2}{\sigma}\sin\phi\, v_z dy} = \frac{c.dt(\sin\theta dy - \sin\phi dz)}{\frac{4\pi R^2}{\sigma}\sin\phi\, dzdy} \Longrightarrow$$

$$\lim_{t \to 0} \Delta t = \frac{\lambda_0 \frac{4\pi R^2}{\sigma} \sin\phi \, dzdy}{c(\sin\theta dy - \sin\phi dz)} \tag{22}$$

With substituting in eq. (21):

$$\Delta\lambda = \frac{v}{c} \frac{\lambda_0 \frac{4\pi R^2}{\sigma} \sin\phi \, dzdy}{(\sin\theta dy - \sin\phi dz)} (1 - \cos\theta) \tag{23}$$

We could write:

$$\mathbf{B} = \mu_0 \mathbf{H} \tag{24}$$

And arrive to the different equations according to $\Delta\lambda$ but we chose this way. In this article we consider the initial and fundamental things about Zeeman Effect and didn’t consider the magnetic equations.

2. The extra force for scattering

Here in this part we’ll try to take the electromagnetically equations of encountering by considering the momentums and angular velocities and… of beating.

If we want to talk about the wave (electromagnetism) electromagnetically, we can say when the electromagnetism ray is passing a place, that place, will get an effect from the wave because we know the electromagnetism wave makes the electrical and magnetic fields and they are the effectual fields for around. We know that it’s possible there will be many other particles or other small matters there when we’re sending the waves. So we know that the particles are moving and they exert the little or small force to each other and we consider that this force was about the electron’s motion, or in the usual; since the electrons are moving, they got and will get an energy and force from around. Now we can say when we take for example some strips of the electromagnetism waves and they can be near each other so all of them make the electromagnetism fields and we can see that these waves will meddle each other and we can say it; the particles interference of the waves. An electromagnetism wave can make a force by its moving (Refer to appendix 2) and it is a clear proposition which it caused from making the fields. So we can talk about the forces instead of the fields or the energy and we can accept it as a principle (If we prefer). It is possible which in some where of the strips the forces interference to each other and it will make a positive interference or for example the negative interference. As you see we can calculate this theorem by the easily wave's fields about interference but with 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:

$$x = A\cos(\omega t + \varphi) \qquad \& \qquad y = A\sin(\omega t + \varphi) \tag{25}$$

Now we want to consider when a wave for example encounters 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 encountering that they're constant (But for the waves we should calculate the momentum electromagnetically).So we have: (but here we should consider that the wave's velocity is constant but we write them for accessing to the force)

$$p_w + p_m = \acute{p}_w + \acute{p}_m \tag{26}$$

We know:

$$F = \frac{dp}{dt} \Rightarrow \int_{p_0}^{p} dp = F\int_{0}^{t} dt \Rightarrow p - p_0 = Ft \tag{27}$$

$$p = Ft + p_0 \Rightarrow (here\ we\ have)\ p = \acute{p}_w + \acute{p}_m \ \&\ p_0 = p_w + p_m$$
$$\Rightarrow p_w + p_m + Ft = \acute{p}_w + \acute{p}_m \tag{28}$$

You saw that here we could get a good correctly sentence that is depending to (F & t). Here we're talking about the waves (electromagnetism) and it's important for us that there is a force depending to the time (Of course during the encountering and from matter to the wave and from the wave's motion). In the easily classical effects we can't consider the (Ft) because it isn't important for us and also it's very little but when we want to talk about the particles (making the things or alone) we can consider the (Ft). For the (x) we'll have:

$$m_w\dot{x}_w + m_m\dot{x}_w + Ft = \acute{m}_w\acute{\dot{x}}_w + \acute{m}_m\acute{\dot{x}}_m \tag{29}$$

If we want to calculate it classically and in the electromagnetically by the waves 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 specifics of the waves and if we want to calculate electromagnetically we should consider the (m_w) like the pointing vector (because exactly it is for the waves). So we have:

$$\vec{S} = \frac{1}{\mu_0}(\vec{E} \times \vec{B}) \tag{30}$$

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

$$\rho\vec{S} = \frac{\rho}{\mu_0}(\vec{E} \times \vec{B}) \tag{31}$$

And with substituting in eq. (5):

$$m_w = \acute{m}_w$$

$$\frac{\rho\dot{x}_w}{\mu_0}(\vec{E} \times \vec{B}) + m_m\dot{x}_w + Ft = \frac{\rho\dot{\acute{x}}_w}{\mu_0}(\vec{\acute{E}} \times \vec{\acute{B}}) + \acute{m}_m\dot{\acute{x}}_m \tag{32}$$

And we know: (From an electromagnetism equation)

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

We have used this formula, in eq. (19) by the differential because it was necessary there but here we want to use it without differential because we're working on the large and special system and it isn't necessary for us to do this. In the eq. (19) we could write this formula with differential because the light or electromagnetism's velocity is constant and it doesn't mean taking the differential of that.

So if we want to write it from vectors, we'll have:

$$d(\vec{E} \times \vec{B}) = c.d(\vec{B} \times \overrightarrow{B}) = 0 \quad \Rightarrow \quad \vec{E} \times \vec{B} = const\ (in\ a\ special\ field) \tag{33}$$

And:

$$\frac{\rho\dot{x}_w}{\mu_0}.(const) + m_m\dot{x}_w + Ft = \frac{\rho\dot{\acute{x}}_w}{\mu_0}.(const) + \acute{m}_m\dot{\acute{x}}_m$$

Here we didn't ignore the $\frac{\rho\dot{x}_w}{\mu_0}(\vec{E} \times \vec{B})$ because the differential of that is zero and also 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 know the condition effects for doing this work. The meaning:

$$\begin{vmatrix} i & j & k \\ 0 & B_y & 0 \\ 0 & 0 & B_z \end{vmatrix} \Rightarrow \begin{vmatrix} i & j & k \\ 0 & B_y & 0 \\ 0 & 0 & 0 \end{vmatrix} = 0 \qquad (34)$$

But here we wrote the matrixes which inferred; we can write the matrix that doesn't change to zero or unchangeable (like the first matrix (34)).

So we prefer to substitute the ($const$) instead of zero (but of course the differential is zero). From eq. (9) we have:

$$\vec{E} \times \vec{B} = const \ \Rightarrow \ \vec{E}_m \sin(kx - \omega t) \times \vec{B}_m \sin(kx - \omega t)$$
$$= \sin^2(kx - \omega t)(\vec{E}_m \times \vec{B}_m) = const \qquad (35)$$

Here we take the (k) as a coefficient of changing the (x) .Of course we wrote $\vec{E} = c\vec{B}$ at the before and this equation is correct for 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}). Now because the (E_m) at the first has made with flawing electrical source here we can't use from this formula:

$$E = \frac{kq}{r^2} \quad \& \quad \vec{E} = \frac{kq}{r^2} u_r \qquad (36)$$

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

$$\vec{E}_m = \mathcal{E}_m = \frac{d\Phi}{dt} \quad (Faraday's\ law) \qquad (37)$$

And we know:

$$B_m = \frac{F_m}{1I} \quad (here\ the\ (1) refers\ to\ the\ lenght\ as\ an\ unit\ lenght) \qquad (38)$$

But this formula is correct when the (E_m & B_m & I) be perpendicular that fortunately in the electromagnetism waves is true. By substituting these in eq. (35) we'll have:

$$\sin^2(kx-\omega t)\left(\frac{d\vec{\Phi}}{dt}\times\frac{\vec{F}_m}{1I}\right)=const \qquad (39)$$

If here we don't say that $\left(\frac{d\vec{\Phi}}{dt}\times\frac{\vec{F}_m}{1I}\right)$ is zero we can arrive to the good products. Now we write the eq. (34) as a matrix.

$$\frac{\sin^2(kx-\omega t)}{1I}\begin{vmatrix} i & j & k \\ \frac{d\Phi_x}{dt} & \frac{d\Phi_y}{dt} & \frac{d\Phi_z}{dt} \\ \frac{dp_x}{dt} & \frac{dp_y}{dt} & \frac{dp_z}{dt} \end{vmatrix}=\frac{\sin^2(kx-\omega t)}{1I}[\hat{\imath}(\dot{\Phi}_y\dot{p}_z-\dot{\Phi}_z\dot{p}_y)+\hat{\jmath}(\dot{\Phi}_z\dot{p}_x-\dot{\Phi}_x\dot{p}_z)+\hat{k}(\dot{\Phi}_x\dot{p}_y-\dot{\Phi}_y\dot{p}_x) \qquad (40-a)$$

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

$$p=mv=mr\acute{\omega} \quad\Longrightarrow\quad \acute{\omega}=\frac{p}{mr}(we\ here\ wrote\ the\ \acute{\omega}\ for\ don't\ taking\ mistake\ it\ with\ \omega\ for\ example\ in\ the\ \sin(kx-\omega t)). \qquad (40-b)$$

We can take the (Φ) from this equation. For this, we should solve the matrix for p (by taking the integral of some part of that.)

But we choose the easily way: (in the vertical direction)

$$\frac{d\Phi}{dt}\times\frac{F_m}{1I}=\frac{d\Phi}{dt}\frac{F_m}{1I}\sin 90=\frac{1}{1I}\frac{d\Phi}{dt}\frac{dp}{dt}=const \qquad (41)$$

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

$$d\Phi=\eta I\,dt\frac{dt}{dp}=\eta\frac{Idt}{F} \quad (\eta=const) \qquad (42)$$

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)

$$d\Phi = \eta \frac{dq}{\vec{F}} \Rightarrow \vec{\Phi} = \eta \frac{q}{\vec{F}} \; (for\ the\ equal\ coditions\ of\ encountring\ or\ interferencing\ we\ should\ take\ \vec{F} = const) \quad (43)$$

Here we should consider the devices of eq. (43) electromagnetically (for example q as a density of the electrical fields be exerting force.)

But here these are good when $I = const$ and we consider when the force cause to motion and the motion cause the making (of course it was from before forces) the force (for protecting the momentums as a constant). From this, we can write (ω): (By using from eq. $(40 - b)$

$$\vec{\omega} = \eta \frac{qt}{mr\vec{\Phi}} \quad (44)$$

Here we could get the general (ω) in the Compton Effect and in the past articles we could take the (ω) for the specifics of the particles in the atom and electromagnetically specifics and both of them depend to each other.

Since 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 $(40 - a)$ is better than the recently equations. In equation (44) we can see that the $(\omega\ \&\eta)$ are depending 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 specifics.

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

$$\vec{E} = \frac{kq}{{r_{ij}}^2}$$

$$\Rightarrow (for\ choosing\ the\ easily\ way\ we\ change\ (r_{ij})to\ (r)because\ it\ doesn't$$

$change\ the\ value\ of\ that) \Longrightarrow\ \ \vec{E} = \frac{q}{4\pi\varepsilon_o r^2} = \frac{\vec{S}\mu_0}{\vec{B}} \Longrightarrow q = 4\pi\varepsilon_o \vec{E} r^2 = \frac{4\pi\varepsilon_o\mu_0 r^2\vec{S}}{\vec{B}}$ (45)

We know that: (from Maxwell's transformation) (for the spherical matter and as the usual)

$$c^{-2} = \varepsilon_o\mu_0 \quad \Longrightarrow \quad q = \frac{4\pi r^2\vec{S}}{c^2\vec{B}} = \frac{4\pi r^2\vec{S}}{c\vec{E}} = \frac{\vec{S}A}{c\vec{E}} \tag{46}$$

That gives us:

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

$$\Longrightarrow (for\ the\ \ component(x)\ of coordinate\ ) \Longrightarrow \omega = \ \eta\frac{\vec{S}t}{mxc\left(\vec{E}.\vec{B}\right)} \tag{47}$$

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

$$\omega_x = \frac{\vec{S}_x\eta t}{(\rho\vec{S}_x)xc\left(\vec{E}_x.\vec{B}_x\right)} = \eta\frac{t}{\rho xc\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)} \tag{48}$$

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

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

$$= \frac{\eta t}{mc}\sqrt{\left(\int\left(tensor\ of\ (with\ power\ 2)\right)\left(\frac{1}{x^3y^3z^3}\frac{\sum_i S_i^2}{\sum_0^3\left(\vec{E}_i.\vec{B}_i\right)^2}\right)\right)}$$

$$([i] refers\ to\ components) \tag{49}$$

Here since the (m) gives us a special consequent so we took it out of the radical. (Because the (ρ) is a constant.)

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

$$\acute{x}^b = \sum \frac{\partial x^b{}_{new}}{\partial x^a{}_{old}} x^a \Longrightarrow (at\ the\ all) \Longrightarrow \acute{x}$$
$$= \sum \frac{\partial x_{new}}{\partial x^a{}_{old}} x^a = \frac{\partial \acute{x}}{\partial x} X + \frac{\partial \acute{x}}{\partial y} Y \tag{50}$$

We used the tensor in eq. (49).

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

$$\omega_{total} = \frac{\eta t}{c \sum_i m_i} \sum_i \left[\sqrt{\int \left(tensor\ of\ (with\ power\ 2)\right) \left(\frac{1}{x^3y^3z^3} \frac{\sum_i S_i^2}{\sum_0^3 \left(\overrightarrow{E_\iota}.\overrightarrow{B_\iota}\right)^2} \right)} \right] \tag{51}$$

And this equation is for all of the matters which we want to calculate the sum of the $Poynting$ vector.

And for the waves:

$$\omega_{total} = \sqrt{\omega_x^2 + \omega_y^2 + \omega_z^2}$$
$$= \frac{\eta t}{\rho c} \sqrt{\left(\frac{1}{x^2\left(\overrightarrow{E_x}.\overrightarrow{B_x}\right)^2} + \frac{1}{y^2\left(\overrightarrow{E_y}.\overrightarrow{B_y}\right)^2} + \frac{1}{z^2\left(\overrightarrow{E_z}.\overrightarrow{B_z}\right)^2} \right)} \tag{52}$$

When we want to talk about the many electromagnetism waves that are encountering each other we should just get the sum 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 of them is curl of the expressions in the parentheses and we should put the curl 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.

By the first observing in eq. (47) 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 encountering between a material and a pulse of the electromagnetism wave. Here the (m) is for the material and the (c) is 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 will have a special moving with a special velocity we can add the (v) (for example) next to the (mrc) and we'll have:(of course with considering the encountering we should add v because it will change the ω and it doesn't injure to any other theory because we're talking about the encountering and we should consider that a force is exerting for example on a matter and with this idea continue to the discussion and we know when we're considering the force of the electromagnetism wave we should add it(the velocity of that) to another parts)

$$\omega = \eta \frac{\vec{S}At}{mrc\Phi\vec{E} + mr\vec{v}\Phi\vec{E}} = \eta \frac{\vec{S}At}{mr(c+\vec{v})\left(A\vec{B}\cos\alpha\right)\vec{E}} = \eta \frac{\overrightarrow{St}}{mr(c+\vec{v})\left(\vec{E}.\vec{B}\right)} \quad (53)$$

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 us. This equation says us that when the light is falling and encountering to the matter we should take the sum of two velocities (if the matter be in a moving condition) 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) as a 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)(not as the before).We told that when we say (mrc) isn't the angular momentum know that we have (v) and this velocity is depending 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 axes. So we can infer simply:

$$\omega = \eta \frac{\vec{S}At}{mrc\Phi\vec{E} + \vec{L}\Phi\vec{E}} = \eta \frac{\vec{S}At}{mrc\left(A\vec{B}\cos\alpha\right)\vec{E} + \vec{L}\cos\alpha\, A\vec{B}\vec{E}} \quad (54)$$

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

$$\omega = \eta \frac{\vec{S}t}{mrc\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} \quad \left(since\ \theta = 90\ so\ we\ have\ \vec{L} = pr\sin 90 = pr\right) \quad (55)$$

Classically we should accept this equation but in the relativity we can say it by another way but this method, here, isn't so good because we don't consider the moving of that but if we want to write it's to this way will have: (for the high energy)

$$\Delta E_k = \Delta mc^2 \Rightarrow (here\ means\ for\ the\ changed\ waves(during\ the\ encountring)) \Rightarrow \Delta m = m_m - m_w = m - \rho\vec{S} \Rightarrow m = \frac{\Delta E_k}{c^2} + \rho\vec{S} \quad (56)$$

So we'll infer: (for the encountering between the matter and wave)

$$\omega = \eta \frac{\vec{S}t}{\left(\frac{r\,\Delta E_k}{c} + \rho rc\vec{S}\right)\left(\vec{E}.\vec{B}\right) + (\vec{p}.r)\vec{B}\vec{E}} \quad (57)$$

Here we want to know the kinetic energy. If we consider which the light exerts a force and has an energy we can get it easily from the classical laws. By this, we can take the (ω) depending to the(ΔE_k) and when we want to say this equation from the electromagnetically, 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 and classically way we can write ($\rho\vec{S}$) instead of the (m) and: (of course for encountering or even interference between the two waves)

$$\omega=\eta\frac{\vec{S}t}{\rho\vec{S}rc(\vec{E}.\vec{B})+(\vec{p}.r)\vec{B}\vec{E}}=\eta\frac{t}{\rho rc(\vec{E}.\vec{B})+(\vec{p}.r)\vec{B}\vec{E}}$$
$$=(\vec{E}\vec{B})^{-1}\frac{t}{\rho rc\cos\alpha+(\vec{p}.r)}$$
$$=\frac{(\vec{E}\vec{B})^{-1}}{\cos\alpha}\frac{t}{\rho rc+mr^2\dot{\theta}} \tag{58}$$
$$=\frac{(\vec{E}\vec{B})^{-1}}{\cos\alpha}\frac{t}{\rho rc+\vec{L}}\ (but\ here\ (again) the\ p\ and\ r\ are\ inthe\ perpendicular$$

$$possition\ and\ this\ subject\ is\ always\ correct\ about\ the\ electromagnetism$$

$$waves.) \tag{59}$$

In eq. (58) we talked about the kinetic energy but it isn't completely correct that here we used from that, because the (m) is for matter and the (c) is the light velocity and it's better which we don't use it, but when all of the energy of the wave, penetrate to the matter (in the involving) 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. (58) gives us the (ω) directly to depending on the (E & B). Again we can write eq. (35) to this way for three dimensions:

$$\omega_{total}=\sqrt{\omega_x^2+\omega_y^2+\omega_z^2}$$
$$=\sqrt{\frac{(\vec{E}_x\overrightarrow{B_x})^{-2}}{\cos^2\alpha}\frac{t^2}{(\rho rc+\vec{L}_x)^2}+\frac{(\vec{E}_y\overrightarrow{B_y})^{-2}}{\cos^2\alpha}\frac{t^2}{(\rho rc+\vec{L}_y)^2}+\frac{(\vec{E}_z\overrightarrow{B_z})^{-2}}{\cos^2\alpha}\frac{t^2}{(\rho rc+\vec{L}_z)^2}} \tag{60}$$

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

$$\omega_{total} = \left(\frac{\left(\vec{E}_x\overrightarrow{B_x}\right)^{-2}}{(1-\sin^2\alpha)}\frac{t^2}{\left((\rho rc)^2+\overrightarrow{L_x}^2+2\rho rc\overrightarrow{L_x}\right)}+\frac{\left(\vec{E}_y\overrightarrow{B_y}\right)^{-2}}{(1-\sin^2\alpha)}\frac{t^2}{\left((\rho rc)^2+\overrightarrow{L_y}^2+2\rho rc\overrightarrow{L_y}\right)} + \frac{\left(\vec{E}_z\overrightarrow{B_z}\right)^{-2}}{(1-\sin^2\alpha)}\frac{t^2}{\left((\rho rc)^2+\overrightarrow{L_z}^2+2\rho rc\overrightarrow{L_z}\right)}\right)^{\frac{1}{2}} \quad (61)$$

$$= t\left(\frac{\left(\vec{E}_x\overrightarrow{B_x}\right)^{-2}}{\left(\rho rc+\vec{L}_x\right)^2-((\rho rc\sin\alpha)^2+(\vec{p}_x\times r_x)^2+2\rho rc(\vec{p}_x\times r_x)\sin\alpha)} + \frac{\left(\vec{E}_y\overrightarrow{B_y}\right)^{-2}}{\left(\rho rc+\vec{L}_y\right)^2-\left((\rho rc\sin\alpha)^2+\left(\vec{p}_y\times r_y\right)^2+2\rho rc\left(\vec{p}_y\times r_y\right)\sin\alpha\right)} + \frac{\left(\vec{E}_z\overrightarrow{B_z}\right)^{-2}}{\left(\rho rc+\vec{L}_y\right)^2-\left((\rho rc\sin\alpha)^2+\left(\vec{p}_y\times r_y\right)^2+2\rho rc\left(\vec{p}_y\times r_y\right)\sin\alpha\right)}\right)^{\frac{1}{2}} \quad (62)$$

We could see that with this method we can arrive to the all the angular momentums 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 coordinate place; so we'll have:

$$\rho\sin\alpha = \rho_y \quad (63)$$

And we'll infer clearly:

$$\omega_{total} = t\left(\frac{\left(\vec{E}_x\overrightarrow{B_x}\right)^{-2}}{\left(\rho rc+\vec{L}_x\right)^2-\left({\rho_y}^2r^2c^2+\overrightarrow{\mathcal{L}_x}^2+2rc\rho_y\overrightarrow{\mathcal{L}_x}\right)} + \frac{\left(\vec{E}_y\overrightarrow{B_y}\right)^{-2}}{\left(\rho rc+\vec{L}_y\right)^2-\left({\rho_y}^2r^2c^2+\overrightarrow{\mathcal{L}_y}^2+2rc\rho_y\overrightarrow{\mathcal{L}_y}\right)} + \frac{\left(\vec{E}_z\overrightarrow{B_z}\right)^{-2}}{\left(\rho rc+\vec{L}_z\right)^2-\left({\rho_y}^2r^2c^2+\overrightarrow{\mathcal{L}_z}^2+2rc\rho_y\overrightarrow{\mathcal{L}_z}\right)}\right)^{\frac{1}{2}} \quad (64)$$

And we know that:

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

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

$$\vec{\tau}_r = I\dot{\omega} = I\alpha = \dot{\vec{\mathcal{L}}} \ \Longrightarrow \int I\alpha\, dt = \int d\,\vec{\mathcal{L}} \ \Longrightarrow \ \vec{\mathcal{L}} = I\alpha t \tag{65}$$

$$I\alpha t = \dot{\vec{\mathcal{L}}}t \Leftrightarrow (\ averagely\ and\ for\ the\ all)\vec{\tau}_r t = \vec{\mathcal{L}} \tag{66}$$

And it is an important subject because we can consider that when we take

$(I = const)$ and $(\alpha = constant)$ (that both of them are correct about the electromagnetism wave) we'll can find the all $\vec{\tau}_r$ depend on $\vec{\mathcal{L}}$. Now we put the results in eq. (64) and:

$$\omega_{total}$$
$$= t\left(\frac{\left(\vec{E}_x\overrightarrow{B_x}\right)^{-2}}{(\rho rc + mx^2\dot{\alpha})^2 - \left({\rho_y}^2r^2c^2 + (\vec{\tau}_x t)^2 + 2rc\rho_y(\vec{\tau}_x t)\right)}\right.$$
$$+ \frac{\left(\vec{E}_y\overrightarrow{B_y}\right)^{-2}}{(\rho rc + my^2\dot{\alpha})^2 - \left({\rho_y}^2r^2c^2 + (\vec{\tau}_y t)^2 + 2rc\rho_y(\vec{\tau}_y t)\right)}$$
$$\left. + \frac{\left(\vec{E}_z\overrightarrow{B_z}\right)^{-2}}{(\rho rc + mz^2\dot{\alpha})^2 - \left({\rho_y}^2r^2c^2 + (\vec{\tau}_z t)^2 + 2rc\rho_y(\vec{\tau}_z t)\right)}\right)^{\frac{1}{2}} \tag{67}$$

As you see we could get the(τ) depending to 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 for that we're talking about the waves we should write it as the poynting vector but we told that when the wave is encountering to material; the force and energy are making, and we can consider the mass of a thing and it wont cause to make difference between two times(of doing this work)) and if we want to write it as an electromagnetism equation we can write:

$$\omega_{total} = t\left(\frac{\left(\vec{E}_x\overrightarrow{B_x}\right)^{-2}}{\left(\rho(rc+\overrightarrow{S_x}x^2\dot{\alpha})\right)^2-\left({\rho_y}^2r^2c^2+(\vec{\tau}_xt)^2+2rc\rho_y(\vec{\tau}_xt)\right)} + \frac{\left(\vec{E}_y\overrightarrow{B_y}\right)^{-2}}{\left(\rho(rc+\overrightarrow{S_y}y^2\dot{\alpha})\right)^2-\left({\rho_y}^2r^2c^2+(\vec{\tau}_yt)^2+2rc\rho_y(\vec{\tau}_yt)\right)} + \frac{\left(\vec{E}_z\overrightarrow{B_z}\right)^{-2}}{\left(\rho(rc+\overrightarrow{S_z}z^2\dot{\alpha})\right)^2-\left({\rho_y}^2r^2c^2+(\vec{\tau}_zt)^2+2rc\rho_y(\vec{\tau}_zt)\right)}\right)^{\frac{1}{2}} \tag{68}$$

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

$$\Gamma = \left(\rho\left(rc+\vec{S}x^2\dot{\alpha}\right)\right)^2-\left({\rho_y}^2r^2c^2+(\vec{\tau}t)^2+2rc\rho_y(\vec{\tau}t)\right) \tag{69}$$

So we will have:

$$\omega_{total} = t\sqrt{\frac{1}{\left(\vec{E}_x\vec{B}_x\right)^2\Gamma_x}+\frac{1}{\left(\vec{E}_y\vec{B}_y\right)^2\Gamma_y}+\frac{1}{\left(\vec{E}_Z\vec{B}_Z\right)^2\Gamma_Z}} \tag{70}$$

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:

$$\omega_{total} = t\frac{\sin\alpha}{\mu_0}\sqrt{\frac{1}{{\vec{S}_x}^2\Gamma_x}+\frac{1}{{\vec{S}_y}^2\Gamma_y}+\frac{1}{{\vec{S}_z}^2\Gamma_Z}} = \frac{t}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{{\vec{S}_x}^2\Gamma_x}+\frac{1}{{\vec{S}_y}^2\Gamma_y}+\frac{1}{{\vec{S}_z}^2\Gamma_Z}}}\right]_{perpendicular} \tag{71}$$

This equation 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 (Φ & ρ & S & r) and know we try to get the constant between two (ω)s by a directly way and get for example the (ξ) as the constant and rewrite again:

$$\omega_{wave} = \xi\ \omega_{atom} \Rightarrow \frac{t}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{\vec{S}_x{}^2\Gamma_\mathrm{x}} + \frac{1}{\vec{S}_y{}^2\Gamma_\mathrm{y}} + \frac{1}{\vec{S}_z{}^2\Gamma_\mathrm{Z}}}}\right]_{perpendicular}$$
$$= \xi(456603773.9) \quad (72)$$

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 since 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:

$$\omega_{wave} = \xi\psi\ \omega_{atom} \Rightarrow \frac{1}{\mu_0}\left[\overrightarrow{\sqrt{\frac{1}{\vec{S}_x{}^2\Gamma_\mathrm{x}} + \frac{1}{\vec{S}_y{}^2\Gamma_\mathrm{y}} + \frac{1}{\vec{S}_z{}^2\Gamma_\mathrm{Z}}}}\right]_{perpendicular}$$
$$= \xi\psi(456603773.9) \quad (73)$$

Until now we were talking about the electrical and magnetic specifics of the electromagnetism waves but now we want to talk about gravitational particulars of that and until now we calculated the equations without considering the gravity force at the encountering 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:

$$\bar{\psi}^2 f(x) = \frac{1}{2}\bar{\psi}^2 \frac{d}{dx}\left(\frac{\sum_i m_{ei} + m_{pi}}{\sum_i m_{ei}.m_{pi}}\right) \tag{74}$$

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) $m_e \Rightarrow \rho\vec{S}$ & $m_p \Rightarrow m$ (75)

That these are simple because we at the before calculated these and considered them. We write the expression ($\bar{\psi}^2 f(x)$) in the eq. (74) to this way:$(f(x))_\psi$ for changing to the simple way of the calculation of the equations. We know that in fact the $f(x)$ converts 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)

$$G_{ave} = \frac{1}{\tau}\int \frac{1}{4}\psi_m^2 \sin^2\frac{n\pi x}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i.m_i}\right)$$
$$= \frac{1}{\tau}\int a_0 dx + a_1\cos\omega t\,dx + a_2\cos 2\omega t\,dx + a_3\cos 3\omega t\,dx + \cdots$$
$$+ a_n\cos n\omega t\,dx + \cdots + b_1\sin\omega t\,dx + b_2\sin 2\omega t\,dx + b_3\sin 3\omega t\,dx + \cdots$$
$$+ b_n\sin n\omega t\,dx \tag{76}$$

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:

$$\vec{F} = -\frac{G\rho\vec{S}m}{r^2}\left(r_{ij}\right) \tag{77}$$

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

$$\vec{F} = -\frac{\rho m}{\tau r^2}\left[\int \frac{\vec{S}}{4}\psi_m^2 \sin^2\frac{n\pi x}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]$$
$$= -\frac{\rho m}{\mu_0 \tau r^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi x}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right] \tag{78}$$

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

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

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 ⟶ $(r = \vec{x} + \vec{y} + \vec{z})$

$$\vec{F}$$
$$= -\left\{\frac{\rho m}{\mu_0 \tau x^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi x}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]\right.$$
$$+ \frac{\rho m}{\mu_0 \tau y^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi y}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]$$
$$\left. + \frac{\rho m}{\mu_0 \tau z^2}\left[\int \frac{\left(\vec{E}\times\vec{B}\right)}{4}\psi_m^2 \sin^2\frac{n\pi z}{l} d\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right]\right\} \tag{79}$$

If we want to solve integral (79) we should take by the part integration from that and it is:

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

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

$$+ \int \left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\frac{\psi_m^2}{4}\, d\left((\vec{E}\times\vec{B})\sin^2\frac{n\pi x}{l}\right) \quad (80)$$

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

$$\int \left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\frac{\psi_m^2}{4}\, d\left(\sin^2\frac{n\pi x}{l}\right) = \frac{\psi_m^2}{4}(\vec{E}\times\vec{B})\sin^2\frac{n\pi x}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) \quad (81)$$

And here the (ψ_m) is constant because it is the maximum and has just one value. So eq. (79) changes to:

$$\vec{F} = -\left(\frac{2\rho m}{\mu_0 \tau x^2}\frac{\psi_m^2}{4}(\vec{E}_x\times\vec{B}_x)\sin^2\frac{n\pi x}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) + \frac{2\rho m}{\mu_0 \tau y^2}\frac{\psi_m^2}{4}(\vec{E}_y\times\vec{B}_y)\sin^2\frac{n\pi y}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right) + \frac{2\rho m}{\mu_0 \tau z^2}\frac{\psi_m^2}{4}(\vec{E}_z\times\vec{B}_z)\sin^2\frac{n\pi z}{l}\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\right) \quad (82)$$

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

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

$$= \hat{\imath}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_x\times\vec{B}_x)\psi_m^2\frac{\rho m}{\mu_0 \tau x^3}\frac{2\pi n}{l}\sin\frac{n\pi x}{l}\right]$$

$$+ \hat{\jmath}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_y\times\vec{B}_y)\psi_m^2\frac{\rho m}{\mu_0 \tau y^3}\frac{2\pi n}{l}\sin\frac{n\pi y}{l}\right]$$

$$+ \hat{k}\left[\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)(\vec{E}_z\times\vec{B}_z)\psi_m^2\frac{\rho m}{\mu_0 \tau z^3}\frac{2\pi n}{l}\sin\frac{n\pi z}{l}\right] \quad (83)$$

$$\vec{V} = 2\pi\left(\frac{\sum_i \rho\vec{S}_i + m_i}{\sum_i \rho\vec{S}_i . m_i}\right)\psi_m^2\frac{\rho m}{\mu_0 \tau}\frac{n}{l}\left(\frac{1}{x^3}\sin\frac{n\pi x}{l} + \frac{1}{y^3}\sin\frac{n\pi x}{l} + \frac{1}{z^3}\sin\frac{n\pi x}{l}\right) \quad (84)$$

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 (84) is important because gives us the $\vec{V}$ depend on the $(l)$and we can take our experimental length and calculate the $\vec{V}$.

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$Dr.N.Riazi$

[Since 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 and additional explain promised during the article)

1. Articles

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:

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

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

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

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:

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

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

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

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

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

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

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

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

And we have:

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

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

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

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

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

$$dL = \tau\left(m_p dv + m_e\, dv\right) \;\; \rightarrow \;\; \tau = \frac{dL}{(m_e dv + m_p dv)} \qquad (15)$$

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:

$$\partial\tau = \frac{\partial L}{m_p \partial v + + m_e \partial v} \qquad (16)$$

Now also we calculate the partial 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

$$2\partial\tau = \frac{[\, ln2\ v.e\,,t\ \ e2\ ln2\ v,p\,,t]}{m_p dv + m_e dv} \qquad (17)$$

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 $(m_p dv)$:

$$\partial\tau = \frac{[\ln^2(v,e,t) \;\; e^2 \ln^2(v,p,t)\,]}{\left[m_p\left(\frac{dv}{dt_v}\right) + m_e\left(\frac{dv}{dt_v}\right)\right]} =$$

$$\frac{invoice}{[m_p[v_t\,(\frac{dv}{dv})) + m_e\,(v_t\,(\frac{dv}{dv}))]]} = \frac{invoice}{[v_t(m_p + m_v)]} \quad (18)$$

$v_t \propto t$

$v_t \rightarrow (we\ take) \rightarrow v$

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:

$$\partial\tau = \frac{[\ln^2{}_{v,e,t}\;\; e^2\;\ln^2(v,p,t)\,]}{[v\,(m_p + m_v)]} \rightarrow \partial\tau = \frac{3.5500}{1.2 \times (0.511Mev + 938Mev)} =$$

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

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:

$The\ const\ (\omega) \quad \rightarrow \quad 456603773.9 \quad (cm2/t)$ (13)

$The\ const\ (\partial\tau) \rightarrow \quad 0.0031521562\ (1/Mev)$ (19)

2. Additional explain

Here we want to talk about the justification of the proposition says us “when a things is turning it can cause a force making and energy making”.

For this we can justify by many reasons:

1 .We can consider the simple unit system have made with just a matter or another thing. Consider, we exert a force on that and the matter begins to moving. As the Newton’s first law we will see that the thing continues to its direction and it is stable for the always (in fact, with perfect conditions for example with out the friction or any other external force like gravity or …).now we consider this subject with the critical observing and ask this question: why should do this event? Of course this proposition is a law or a principle but we can critic it for reaching to a system of matters. So we answer:

Because we should consider that when for example a matter finished a special distance, since at the first to at the end, the force was producing by the moving and that’s because we want to have the initial force (as the Newton’s law)by this way:

The thing by its moving charge and save the force and for this we can arrive to this subject:

The force and motion are depending on each other in a unit close system

Of course we will arrive to this proposition which the past sentence says us but for a system of the things. For justifying this we’re more comfortable because we can consider the external forces. So we have:

The forces in a system of matters are changing with and between each two matters. So the recharging the initial forces are more important here because this is possible that at every time the matters positions change and of course for don’t let it at the all it should get a force (for following the first Newton’s law)

So we write again (for a material system):

The force and motion are depending on each other in material system

2. This method is almost like the first method and is about the not changing the angular or the leaner momentum.

We know that the momentums of a close system should be constant and for this, we can infer that when a thing in a system moves, all of the material's system try automatically to save the momentum as a constant and we can infer that by changing the position a thing in a system we can change automatically the other subject's positions and for not changing the initial force the system should substitute the free space with exerting a force(for not changing).

3. Another reason is about not considering the produced force as another force and we should take them as a force. This justification is so clearly because by changing the force we'll infer the velocity or positions changing as the initial (entered) force value so also and again we can write:

The force and motion are depending on each other in a unit close system (and the force and motion can change to each other)

4. …

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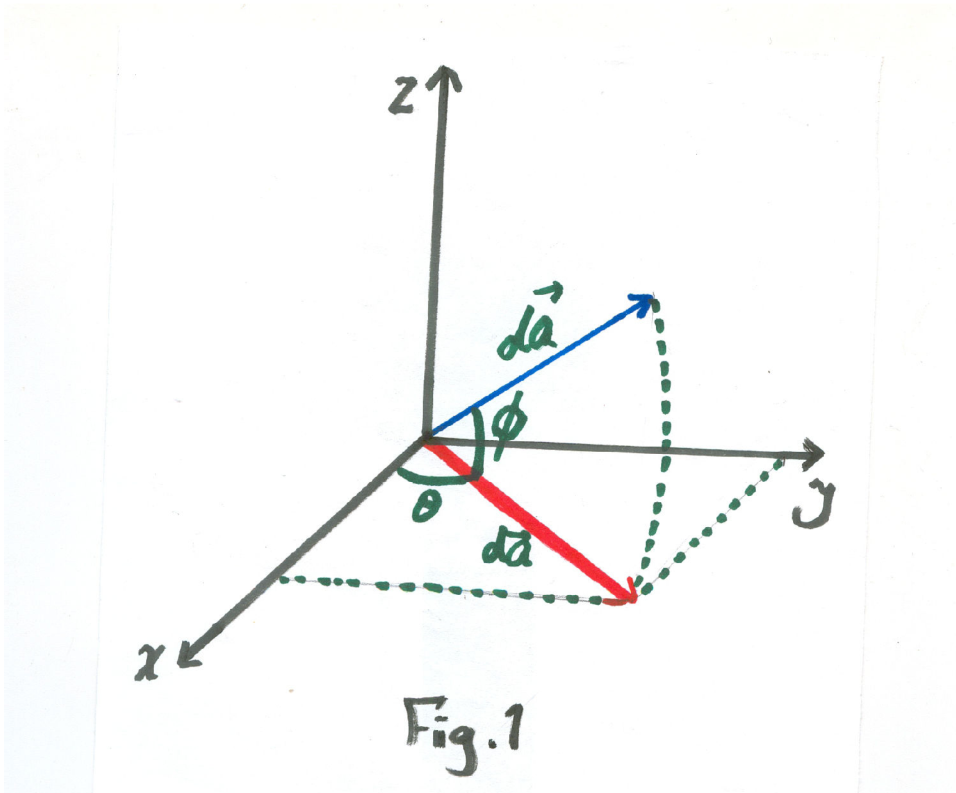
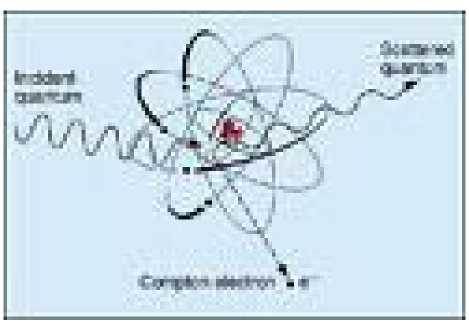
FIGURES table

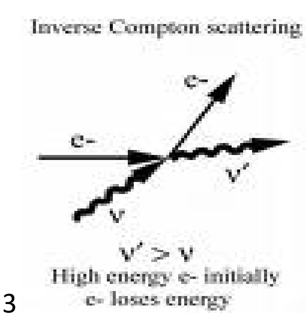




Here for fig.1 we assume the (da) as the radius of the circle for our discussion.

In Fig.2 we can get the geometrical communications between two (ω) s.

Fig.2



In this figure we can see the frequency of the wave. Fig.3