

Re: an electron question

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- *From:* srp <srp2@xxxxxxxxxxxxxxxxxxxx>
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FrediFizzx a écrit :

"srp" <srp2@xxxxxxxxxxxxxxxxxxxx> wrote in message
news:43CAC452.4060701@xxxxxxxxxxxxxxxxxxxx

|
|
| FrediFizzx a écrit :

[snip]

| >
| > Why 1 m³? The normalization "box" for the heuristic example
| > above for a .1 meter photon would be 0.001 m³.
|
| Simply because the unit volume of U is J/m³ (joules per cubic meter).
|
| This the arbitrarily set unit volume in MKS, I suppose in cgs it
| would be the cm³, but even that small a volume seems orders of
| magnitude larger than the size any individual photon may have
| at the fundamental level (in normal space of my model anyway).

Sure but the normalization box follows the size of the photon wavelength. IOW, for a 1 millimeter wavelength photon, the "box" becomes 1mm³. The quantum wave pattern and the classical wave pattern are basically the same with the quantum one being a probability for finding the photon.

Yes, but this for models with wave patterns being fundamental and from which photons are secondary effects. I understand that it may not be possible not to associate a volume in these models, but no such parameter is needed in the 3 spaces model in relation with motion of particles in normal space. The underlying model is not wave based.

| > | IF you analyze Marmet's paper, you will see that he integrates
| > | the magnetic energy of the electron from infinity to r_c
| > | precisely to localize it (concentrate it in a local lump of
| > | energy that more closely corresponds to the electron being

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> | a localized particle.
> |
> | Upon close analysis, that r_c (the electron classical radius)
> | simply is the absolute amplitude of the wavelength of the
> | electron divided by alpha.
> |
> | alpha has this value simply because integrating any nearer
> | to $r=0$ would accumulate too much energy and any further from
> | $r=0$ would not accumulate enough energy to account for the
> | verified complement of energy making up the mass of the
> | electron.
> |
> | I found that this inferior limit of integration
> | $(\lambda/2\pi)/\alpha$ turns out to corresponds a universal lower limit
> | of integration for any such spherical integration from infinity.
> |
> | The 3 alpha you find in my equation (α^3) corresponds to
> | the spherical integration of the three aspects of EM energy in
> | the 3 spaces model electric, magnetic, and "energy sustaining the
> | velocity of the particle"
> |
> | The result is to give the mean "local" energy density within
> | the mean volumes that the cycling energy of the particle will
> | occupy, which, being way smaller than the reference 1 cubic
> | meter volume, you will certainly relate to the fact that that
> | local density will be higher, and most probably by many orders
> | of magnitude than if the photons energy was spread out over
> | the total reference volume.
> |
> | These local densities are what my E and B give.
> |
> | As for the associated volumes, I simply don't know how to assess
> | them precisely since the energy probably is constantly pulsating
> | (cycling between E and B states) as it moves. They may even have
> | little to do with the actual wavelength, which, if you think about
> | it, is simply the physical distance covered by a photon during
> | one cycle of its frequency. The varying volume aspect remains
> | to be addressed.
> |
> | There probably is a yet to be found way to bridge the gap between
> | your E and B equations for "uniformly spread energy into the
> | reference volume" and my E and B equations for "localized lump
> | of energy within the reference volume"
> |
> | OK. I guess the real question here is my supposition that there
> | is a minimum volume that a whole photon could fit into based on its
> | wavelength.
> |
> | Possibly. I personally do not assume any volume in normal space
> | for a travelling photon. If you recall the geometry of my model,
> | the presence of energy in "normal space" always boils down to
> | point event, physical transverse amplitude belongs to both
> | electrostatic space and magnetostatic space, which are the
> | spaces where the particles electro-magnetically interact.

Yes, but do you assume that maybe part of the energy density
volume is in the non-normal spaces?

Certainly. As I said in a prior post, the volume issue remains to

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be addressed in my model, because the energy is shared between the 3 spaces and is in constant cyclic motion between them. Besides, it is not needed to calculate velocities.

EMR does have a volume associated with its energy density. Does this volume disappear when we get down to the quanta of EMR? I am assuming that it doesn't. Even though it may be partially hidden from us in the "non-normal" space.

It certainly can't disappear from my viewpoint also. In my paper, it simply is not needed anyway for the paper's purpose, which is to explain the mathematical elaboration leading to equations allowing calculating relativistic velocities of an electron strictly from electromagnetic considerations, from my strictly EM-based model.

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| > I find that minimum volume to be  $\lambda^3/2\pi$ . Of course
| > this is a volume that travels with the photon at c and there should
be a
| > probability of 1 to always find the photon in that volume.
|
| In my model, there is a probability of 1 of always finding the
| photon as a point event (no volume involved in normal space)
| located in normal space at the junction point of both other
| orthogonal spaces, between which half the energy of the photon
| is cycling.
|
| > From a detection perspective, this reduced to an area that is
observer
| > dependent. But this volume situation goes to Casimir effect that
| > wavelengths longer than the distance between the plates are excluded
| > from being inbetween the plates.
|
| In my model, such interaction occurs in transverse electrostatic space
| and transverse magnetostatic space, and it is the transverse amplitude
| that is determinant ( $\lambda/\pi$ ), so volume in normal space is
irrelevant
| (in my model, of course)
|
| > However in the traveling volume
| > scenario, I guess there might be a non-zero probability of finding a
| > photon of a longer wavelength in a volume smaller than  $\lambda^3/2\pi$ .
| > Perhaps this is not a good example to show why your "generalized"
| > equations (34) and (40) for  $B_0$  and  $E_0$  of a photon would give the
wrong
| > answers if plugged into the wave equations.
|
| Well, I have not tried to fit my localized field equations into
| the wave equations, because I don't see how they could be compatible.
| Apples and oranges in my view, since they describe motion of particles
| moving without underlying fields. This is a totally different global
| approach, not meant to invalidate wave approach at all.
|
| > What happens with your values is that you will get a photon count
that
| > is about 6 orders of magnitude smaller if we could count photons in
a
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| > EMR field. IOW, since your E_0 and B_0 values are higher, it takes less

| > photons to make up a certain EMR field.

| Not really. Remember that they give the mean density of local energy within the moving photon (energy concentrated in one lump with zero energy in the rest of the reference volume), not the actual total energy of the photon.

| The actual energy of the photon is given by equation (11). If you look at equations (41) and (42), you will see how that energy equation relates to equations (40) for E_0 and (34) for B_0

I don't follow the relation there. Maybe you need to explain more fully?

In reading the paper, care must be taken not to confuse "E" for "energy" and "E" for "electric field". The former is represented by a regular capital "E", while the former is represented by a bold capital "E".

Equation (11) gives the "energy" (in joules), and is equivalent to $(h \nu)$ or $((h c)/\lambda)$.

In (41) and (41) you can see that energy equation (11) is a subset of these equations, so I substitute (11) in them so the "energy" value of the photon can be plugged directly into the field equations for convenience (if needed).

| > This is way off from what I have seen quoted in the literature.

| Of course, if you consider the concentrated density of energy within a localized photon to be uniform all over the reference volume. But this is not the intent of this equation.

I was assuming that the "intent" of eq. (34) and (40) were the "static" E_0 and B_0 field values for a photon. IOW, if you plug these into the wave equation, these are what would be the maximum measured values.

There is no way these values of E_0 and B_0 fields from my equations can be plugged into any wave equation. They belong to a different model, just like there is no way to plug Newtonian gravitational force into GR's inertial curved space model, or to plug a definite trajectory into the wave equation. Apples and oranges.

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| > For example, in Jackson's
| > "Classical Electrodynamics, 3rd Ed.", he quotes that one meter from
a
| > 100-watt light bulb the rms electric field is of order 50
volts/meter
| > and there are about 10^{15} visible photons per $\text{cm}^2 \cdot \text{second}$.
|
| This would be right in my model also, since standard treatment remains
| valid.
|
| > I suppose
| > this one might be tough to calculate. But another example he gives
is
| > 100 watt FM isotropic transmission of 10^8 Hz is rms .5 milliVolts/m
at
| > 100 kilometers and has a flux of about 10^{12} photons/ $(\text{cm}^2 \cdot \text{s})$. This
one
| > should be easier to calculate. Plug in your value from equation
(40)
| > and see if you agree.
|
| See above, there is no contradiction if you relate to the fact that
| the values given by equations (40) for E (and 34 for B) refer to the
| local density of energy within the localized moving photon, not to the
| density per MKS or CGS unit volumes, for which your equations seem
| absolutely fine.

OK, this is where I am having some trouble with what you are saying.
Your eq. (34) and (40) only have one variable, λ , the wavelength of
the photon. If you are specifying a certain volume for the energy
density volume of a photon, then there should be another variable for
that. Don't you think?

Possibly. Certainly in complete model description, but as I said, none
is required for the purpose of this particular paper.

Even the statement you are making before eq.
(34) doesn't make sense from what you are telling me now. I
think what
you are saying now, is that if you could measure the "static"
B field of
a photon upon detection, eq. (34) is what would be measured.
Is that
correct? Your statement is "Which gives us a generalized
equation
capable of calculating the magnetic field of any isolated
photon from
its absolute wavelength, all other parameters being
constants."

I guess I should have inserted the word "local" before "magnetic
field" in that sentence, but I thought this was obvious from the

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context. I mean local to the particle in motion (following it as it moves).

I guess

what is bothering me here is "relative to what?". At the point that a photon would be found or detected?

None of the above. This is for photons in motion (as they are travelling at the speed of light, not as they are emitted or absorbed. The same for (49) and (58) regarding electrons in motion.

There simply can't be anything arbitrary about the values of a photon's "static" E_0 and B_0 fields other than quantum uncertainty. In free space there is only a photon's wavelength or frequency as the only variable.

Yes. This is why the field can be determined either from the wavelength or the frequency, since both are dependant on one another for photons.

I have asked this question a few times and no one has ever been able to come up with another variable. So for sure the "static" E_0 and B_0 fields have to be directly proportional to wavelength.

Certainly.

| Think that both approaches are simply attempts at mathematical
| "descriptions" of this or that aspect of what really occurs
| physically at the fundamental level. None of them, nor any other
| method could actually be the physical reality that we are trying
| to describe.

Sure, but a mathematical description should be supported by experimental evidence.

My experimental evidence is the fact that equations (49) and (58) can calculate verifiable relativistic velocities of a moving electron from only EM considerations. Unless currently accepted theories can explain them otherwise, they are proof that the underlying new theory has some degree of validity.

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| > | > | By "absolute wavelength", I mean the wavelength that the
energy
| > | > | making up the rest mass of a particle would have it if were
free
| > | > | energy,
| > | > |
| > | > |  $\Lambda_A = h / m c$ 
| > | > |
| > | > | For the carrying energy, it is the wavelength that this energy
| > | > | would have if it was free (not carrying a massive particle)
| > | > |
| > | > |  $\Lambda_A = hc / E$ 
| > | > |
| > | > | For example, the absolute wavelength of the energy making up
| > | > | the rest mass of the electron would be Compton wavelength,
| > | > | of course
| > | > |
| > | > | André Michaud
| > | > |
| > | > | OK, I guess you mean an invariant type of wavelength.
| > | > |
| > | > | Yes. The wavelength that any amount of energy would have it
| > | > | was moving at the speed of light.
| > | > |
| > | > | Unfortunately the wavelength of a photon is observer dependent so I
take
| > | > | this to mean the wavelength upon detection.
| > | > |
| > | > | Well, if you wish. You'll get results anyway, but in reality I am
| > | > | talking about the wavelength of the photon in its own reference
| > | > | frame, not from an observer's point of view. Of course, all aspects
| > | > | of relativity and observer related variations can be saddled on
| > | > | at will.
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If you could be in the frame of a photon, what do you suppose you would see? And how would you be able to measure any wavelength?

I guess that I could then measure its local frequency, from which its total complement of local energy could be calculated and then its local wavelength could be obtained.

A photon only has a wavelength wrt emission or detection as far as I know.

In a model where there are no underlying fields, such as mine, the localized moving photon is the only possible carrier of its own energy, so it obviously carries this information as it moves all along the trajectory that it follows between emission and absorption.

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What
might have been radio photons wrt the emission frame could be
gamma
photons wrt the detection frame if the detector and/or the
emitter are
moving rapidly towards each other.

Certainly. The relative velocities of emitter and detector could
be factored in.

I think for this discussion we need
to limit ourselves to photons that are emitted and detected in the same
frame. IOW, the emitter and detector are at rest relative to each
other.

That would be way simpler indeed, and it is actually the context
of the paper also, for simplicity's sake.

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| > | If you dig into the second part, regarding relativistic velocities
| > | of moving electron, you will see how my E and B equations
| > | combine to allow calculating relativistic velocities strictly
| > | from EM considerations. To me, this is the confirmation that
| > | my approach by localizing the photon's energy is a promising
| > | avenue.
| >
| > Well, you are simply carrying the same 6 order of magnitude error in
| > both E and B so you still get the right answer at the end in
equation
| > (61). ;- ) But I will try to take a closer look at what you are
doing in
| > the second part.
|
| Super. If you can explain why equations (49) and (58) can give the
| right relativistic velocities while being made up of equations (34)
| and (40) that you see as wrong, I am willing to listen and analyze
| further ;-), especially if you can point to a blunder (always a
| possibility) in deriving equations (34) and (40) from Marmet's
| equation, or in deriving (49) and (58) from Biot-Savart and (34)
| and (40).
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Hmm... I think you lost me here. How do you get relativistic
velocities from (49) and (58)?

This is precisely what the paper explains, with all required
mathematical sequences. For any deeper understanding, I guess that
mastering the 3 spaces model would be required.

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They are simply "static" B and E fields.

The E and B fields that I defined are for "moving particles", consequently, they follow the particles and can in no way be static.

| I think you assume that my E and B densities are 6 orders of magnitude
| off probably because you assume these densities not to be localized
| (which they are, and even reduce to point events in normal space in
| my model), but to pervade whichever reference volume you care to
| refer to, which is not the case. In whichever volume you associate,
| your equation (not mine) gives the right value.

Well, when you say "localized", what does that mean exactly?

By localized, I mean that in my model, at any given moment of its motion, a photon can be in only one place as it progresses along its trajectory from emission to absorption, and that its local fields are permanently centered on that location.

As far as
I can figure, a photon could only be "localized" to a volume no smaller than $\lambda^3/2\pi$ if we cheat and could be in the frame of a photon.

Possibly, but as I said, I still cannot assess the variable volume aspect in my model. Besides, as already mentioned, it is not needed for the purpose of the paper (showing that relativistic velocities of the electron can be calculated from strictly EM considerations and providing the equations to do it).

For detection, it could only be "localized" on the order of a circular area with a radius of $\lambda/2\pi$. This is actually an experiment that I would like to see done some day.

That certainly would be interesting.

André Michaud

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