

Re: Photon, Momentum, Mass

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- *From:* John Kennaugh <JKNG@xx>
 - *Date:* Mon, 23 Apr 2007 21:02:26 +0100
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Jeckyl wrote:

"John Kennaugh" <JKNG@xx> wrote in message news:Q59C0ZLPYkKGFwyZ@xx

Jeckyl wrote:

On Apr 20, 4:21 am, John Kennaugh
<J...@xx>
wrote:

Y wrote:
You are studying the wrong
subject and are posting to
the wrong
newsgroup if you want
anything to appear sane.
Relativity is based upon
the assumption that the
speed of light is constant
w.r.t the observer
observing it no matter how
far away the source is nor
how long ago the
light set out.

That is one of the results you get from the principle of
relativity, that
say the same laws of physics apply in all inertial frames of
referenec (ie
physics don't change just because you are moving relative to
someone else).
That is a VERY sensible principle. Do you instead claim we
should NOT
have
that premise, and that the laws of physics should change
when you are
moving

Re: Photon, Momentum, Mass

relative to something else (or vice versa) ?

The principle of relativity does not result in the above.

What the PoR says is that you will always get the same law in any inertial FoR.

That's what I said

Whether that law is that the speed measured for light is c

I find your selective snipping unacceptable. What I said (or rather what I should have said) was

"Whether that law is that the speed measured for light is c even if the source is moving or whether it is that the speed is always $c+v$ from a source approaching at v ."

Fair enough .. It does assume

What assumes? The PoR makes no such assumption. It is totally neutral on the subjects as to what the laws of physics are, merely that they are not dependent on which inertial FoR they are tested in.

(or at least derive) that one of the laws of physics is that the speed of light is a constant c

That has been observed experimentally

Exactly what do you claim has been observed and when?

All that had been shown in 1905 was that the speed of light is constant if both source and detector are both stationary in the same inertial FoR. That was interpreted by Einstein as meaning that the speed was constant w.r.t the observer *because* of the widely accepted – but totally untested view that the source could not possibly control the speed because light is a wave travelling in aether and it is the aether which controls the speed not the source. As no one now believes in the aether and as light is made up of particles then with hindsight that assumption looks absurd. If it turns out that light is after all source dependent then a century of physics collapses like a pack of cards.

I have been asking for several years now for someone to point me towards an experiment which shows source independence convincingly and so far I haven't found one. I am told there is nothing worth considering before 1964. It is an incredibly difficult thing to test. What I have found on this NG is a surprising lack of objectivity – people who believe it is tested every day – who simply accept it as an article of faith.

Re: Photon, Momentum, Mass

The other myth which goes with it is the myth that every time SR makes an accurate prediction it disproves the alternative Ballistic theory. Even I who am neither a physicist nor a mathematician have shown that a couple of things, said to rule out BaTh, do no such thing. The fact is BaTh has a very strong tendency to give an identical answer to SR.

My real point is this. There is a strong case to be made to say that physics took a wrong turn. That when light was found to be particulate it should have been 'major rethink time' and the downgrading of the wave model/Maxwell to an approximation. Logically if light is made of particles it works better without an aether. Without an aether there is no reason to assume source independence. What you had was a classic battle between traditionalists headed by Einstein and the radical approach put forward by Ritz. One reason Einstein won was because Ritz produced his theory in 1908 and died in 1909. Not a good scientific reason for choosing one theory over another. Ritz theory seems to have been suppressed:

Reviewer: Walter G. Hecker

Book "Richard Arthur Waldron The Wave and Ballistic Theories of Light – A Critical Review", Frederick Muller Ltd., London 1977

"Waldron developed a ballistic theory of light on his own before learning that Walter Ritz had already done it at about the time that Einstein developed his 'Special Relativity'. Waldron shows with mathematical accuracy and in excruciating detail, one by one, that all the so called proofs of Einsteinian relativity (approx. 20) aren't proof at all but that the experimental and observational results can be just as well explained with the more pedestrian Ritzian relativity. Unfortunately the books writing style is extremely dry and the back referencing to figures and what was said earlier is hard to follow (References are to sections, but the pages have no section headers). But he is so detailed and conscientious in his proofs, that its a book worth having for any 'dissenter' regarding Einsteinian Relativity, special or general."

If Physics had worked the way science is supposed to work (and rarely does) then it should have accepted the particulate – no aether – source dependent theory because without the ego's and prejudices of those wanting to cling to the wave–in–aether model that is what the evidence was saying. It is by far the simplest explanation of the MMX. Had that happened there is absolutely no doubt that physics today would be different to what it is. I cannot say it would be better. I cannot say it would be worse but it would be different. I would have thought that natural curiosity would make anyone who claims to be a scientist to be interested in where that would have led. All debate is better for having two opposing sides.

This is clearly absurd.

Some of the restulst are counter–intuititive to those who have seen the restulst only, and not understand how they are derived.

I did not say the maths was absurd. Once you accept the second postulate the maths follow and I do understand how they are derived. The absurdity comes in trying to produce a physical model to go with the maths. Both the provenance of the second postulate and the physical consequences are absurd.

Re: Photon, Momentum, Mass

Counter intuitive, and difficult to imagine when we have such a deeply ingrained model of 3D space in our minds .. but not necessarily absurd

SR of course requires that the light in an observer FoR separates from the source at $c+v$ so as to be c w.r.t that observer. If there is no aether then how can anything have an effect on what speed light separates from the source at, other than the source?

The light moves at c in the FoR of the source, and c at the FoR of the observer. It is never observed as travelling at any other speed

That other things are moving with different velocities (including the source) is not relevant. Light always travels at c from ANY inertial FoR

What makes it do so? A FoR is a mathematical abstraction it cannot make light travel at c w.r.t itself. Unfortunately the physical space it defines is equally devoid of any physical entity which could take part in a physical process to do the job either.

The idea of light separating from the source at different speeds in different FoR is what causes Doppler shift in SR. If in a given FoR light separates at greater than c i.e. at $c+v$ then the wavelengths are stretched and when observed travelling at c w.r.t the observer a lower frequency is measured. If in a given FoR light separates at $c-v$ the wavelengths are compressed and when observed travelling at c w.r.t the observer the frequency is higher. I do not see why you consider this as not relevant it is as much a part of the model as light always travelling at c in a FoR. It has to separate from the source at whatever speed makes it c w.r.t the FoR and Doppler shift is the result. Surely anyone trying to understand SR needs to understand all its implications. Do you find that implication somehow embarrassing? If so why.

Essentially the denial of an aether means that the source must control the speed of light as there is nothing to prevent it.

No .. it does not .. the speed is simply always c

Is that a statement of faith or are you prepared to justify it with some sort of logic. One would logically assume that if a process is ejecting photons that their speed would be the result of that process. If there is nothing physical surrounding the source there can be no physical process which prevents the processes emitting it being what controls it.

Quite simply if the speed of light is not dependent upon the physical processes which generate it then what is it physically dependent upon?

All I get for an answer comes down to 'it is what the maths says'. Well of course the maths says that. The maths are based upon the assumption that it is so. There are those who think that if they express 'its what the maths says' in more sophisticated terminology that it will be more convincing.

Re: Photon, Momentum, Mass

According to relativity
anything with mass
increases its mass as its
speed increases

No .. relativity says mass is invariant

I think that physicists have redefined mass several times since Einstein.
He writes "If a body takes up an amount of energy E then its inertial mass
increases by E/c^2 ."

What physicist call mass is the rest mass (invariant mass). That mass does
not change with velocity.

until it becomes infinite
when it reaches the speed of
light c . Therefore if you
accept relativity a photon
cannot have any
mass because if it had it
would have to be infinite.

No .. relativity doesn't say that, it says the energy of the
photon
would be
infinite. The mass would remain at whatever the mass is,
because mass
does
not change with velocity.

If you say so. I don't really care.

Obviously .. you've made up your mind to think it absurd and anything that
makes it less absurd is rejected by you.

No physics can invent what it wants, re-define what is mass etc. until it comes up with something which can
be defended and then insist that it was always the case even if Einstein said mass increases with speed. As I
say I don't really care. What is mass anyway? I don't pretend I know do you? I can't argue is someone decides
to redefine it.

I thought that in theory there are two sorts of mass inertial mass and gravitational mass which happen to be

Re: Photon, Momentum, Mass

equal.

Q1/ Are photons affected by gravity?

A/ Apparently so in that light is bent by massive objects i.e. the sun and they gain energy if they fall from the top of a tower to the bottom.

Q2/ Do photons have momentum?

A/ Yes light does exert a small but detectable physical pressure when it falls on something.

Q3/ Is the mass calculated from Q1 equal to that of Q2?

A/ – I don't know. Maybe you have an answer.

I would be more interested to know how a photon stores its energy in other words what makes a low energy photon different to a higher energy photon.

How does an electron store its charge. How does a neutron store its mass.
I don't see why you're asking this or what difference it makes.

An electron is always the same, a neutron is always the same. A photon can have a very wide range of energies. Are there lots of different types of photon or are they all the same but somehow store different amounts of energy? To me the most interesting question in physics is what is a photon, how does it store energy, how does that energy manifest itself in the form of frequency and wavelength. i.e. to explain the wave properties of light in terms of photons.

OTOH a photon has energy and energy and mass are equivalent.

The energy of a photon comes from momentum,

And momentum is defined as mv is it not or has that also been redefined!

Yes .. momentum reduces to mv at lower velocities .. relativistic momentum is defined differently

Are you going to elucidate? My limited understanding is that $m = \gamma m_0$ where $\gamma = 1/\sqrt{1-v^2/c^2}$ where m is the relativistic mass and m_0 is the rest mass. The problem as I see it is if you say m_0 is finite for a photon the relativistic mass becomes infinite. OTOH if you make $m_0=0$ the relativistic mass becomes 0 so $mv = 0$ which used to be momentum – by definition – I am sure a workaround has been found. Momentum without mass or different sorts of mass.

Again.. it appears you have a lot of knowledge about the history of it, and are good at picking out all the things that seem absurd to you, and ignore

Re: Photon, Momentum, Mass

the important things.

It seems to me that a relativist is a bit like an estate agent who wants to sell me a house by guiding me via the scenic route showing me that the house is near to the park, and a good school. I am like a buyer who has done my own poking around and know that the estate agent is carefully avoiding the nearby pig farm, sewage works and landfill site.

If the estate agent gave a more balanced view then perhaps I would not feel obliged to try and redress the balance.

Having thought again it really isn't like that. It is not that the estate agent is trying to avoid the nearby pig farm, sewage works and landfill site. He doesn't know they are there because his firm has been using the scenic route for years. He is inclined not to believe they are there even when they are pointed out to him. If I put doubts in his mind he goes back to the office for reassurance from his colleagues who are also only familiar with the scenic route.

Next thing you know you might be saying things
actually get crushed by distance contraction, when their proper length is
unchanged.

Not me. Of course I may point out that while in SR length contraction is simply something which appears in the maths the only physical model compatible with SR is LET. Now in LET contraction is physical not merely mathematical and my understanding is that modern advocates of the theory say that if there is an aether as Per Maxwell/Lorentz electrodynamics then the maths says that the orbit of an electron orbiting a nucleus moving through the aether would become elliptical and this ties in with the amount of contraction predicted. Not my strong subject. If you are interested consult a modern advocate of the theory.

The timing was interesting in that the Bohr model of the atom was not until 1913 so Lorentz's 'guess' that movement through the aether could affect dimensions could not be shown to be mathematically sound until after SR had replaced LET.

There is no 'crushing' involved if by 'crushing' you imply mechanical damage. Merely that each atom is an electromagnetic sub-system which is affected by movement through the electromagnetic aether.

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John Kennaugh

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