

Re: Does propagation delay give rise to time dialation?

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Source: <http://sci.tech-archive.net/Archive/sci.physics.relativity/2007-11/msg01100.html>

- *From:* blackhead <larryharson@xxxxxxxxxxxx>
 - *Date:* Fri, 16 Nov 2007 12:17:01 -0800 (PST)
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On 16 Nov, 18:22, "Sue..." <suzysewns...@xxxxxxxxxxxx> wrote:

On Nov 16, 1:03 pm, blackhead <larryhar...@xxxxxxxxxxxx> wrote:

On 16 Nov, 06:11, "Sue..." <suzysewns...@xxxxxxxxxxxx> wrote:

On Nov 15, 11:12 pm, blackhead
<larryhar...@xxxxxxxxxxxx> wrote:

This is from a paper:

Title: Retarded electric and magnetic fields
of a moving charge:
Feynman's derivation of Liénard–Wiechert
potentials revisited
Authors: J. H. Field

http://arxiv.org/PS_cache/arxiv/pdf/0704/0704.1574v1.pdf

In section 3 he goes through Feynman's
derivation of the Lienard–
Wiechert potentials for a moving charge,
which was published in The

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Feynman Lectures in Physics,
Electromagnetism I' Ch 21–5. Basically,
he considers a spherical light front
collapsing with velocity c
towards the field point, sampling the charge
along the way which will
contribute to the total potential there.

Hence he ends up with an equation for the
magnetic vector potential at
the field point:

$$A = uQ/cr' \quad 3.2$$

Where A – magnetic vector potential, u –
velocity, c – speed of light,
 r' distance to the charge when the light front
was sampling it.

Right after equation 3.2 he then says:
"Allowing for the propagation
time delay of the
light front with respect to the time of the
field point (3.2) agrees
with Eqn(2.16)"

Equations 3.2 and 2.16 differ by a factor of
 $\lambda = 1/\sqrt{1 - (u/c)^2}$.
So does this have something to do with time
dialation?

No... the term *time dilation* has several interpretations in
relativity theories but the ambiguity is eliminated in QED
by attaching a clock to a photon which explores all paths
in the Coulomb gauge. The statistics of
atomic absorbtion resolves the retarded components directly
at the level of fundamental particles.

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So what is it about the time delay of the light front with respect to the time of the field point that means 3.2 has to be multiplied by lambda?

<< The relativistic form is identical to the conventional expression of the Lorentz force if the momentum form of Newton's law, $F = dp/dt$, is used, and the momentum p is assumed to be $p = \gamma mv$. >>

http://en.wikipedia.org/wiki/Lorentz_force

Sue...

In the paper he says that lambda allows for the propagation time delay of the light front with respect to the time of the field point. What has the Lorentz force got to do with this?

Have you read section 3?

Thanks,

Larry

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