Re: ABSOLUTE TRUTH ABOUT ABSOLUTE SPACETIME

Source: http://sci.tech−archive.net/Archive/sci.physics.relativity/2004−06/5011.html

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From: Perfectly Innocent (*perfectlyInnocent_at_as−if.com*)
Date: 06/26/04

Date: 26 Jun 2004 02:31:42 −0700

"J.J." <nospam@nospam.com> wrote in message news:<bmECc.110733$0y.63662@attbi_s03>...
> "Perfectly Innocent" <perfectlyInnocent@as−if.com> wrote in message
> news:c45b45b3.0406232153.2e353f45@posting.google.com...
>
> The way we choose to synchronize clocks has no effect on physical phenomena.
> It does, however, affect the form of the equations that we use to describe
> phenomena. As I see it, your synchronization scheme would lead to
> frame−dependent, complicated equations for expressing the laws of physics.
> Take the one−dimensional wave equation
>
> (D_tt − D_xx) u(x,t) = 0.
>
> Let's assume that this expresses the propagation of a longitudinal pulse on
> a slinky in the preferred frame of the SxR spacetime. Now consider a slinky
> in another inertial frame. What would the wave equation look like in this
> frame if one adopted your synchronization scheme?

I'm trying to prove an existence and uniqueness theorem. Are you
trying to turn my theorem into a debate about arbitrary conventions,
like the metric system verses British pounds, inches and acres?

> > There is only one physically distinguished, globally applicable
> > definition of simultaneity for SxR.
>
> But, I don't see much use for this definition of simultaneity.

Do you see any logic that prohibits me from connecting simultaneity
with "cosmic time" and choosing the only physically distinguished,
globally applicable definition of simultaneity, to prove theorems
about simultaneity?

> > Ah, but the problem is that the occupants of any other frame can't
> > E−synchronize all their clocks so that all the clocks of that frame
> > are synchronized. They must resort to S−synchronization to achieve
> > total global synchronization.

>
> *That's true. But why should so much importance be given to global*
> *synchronization? What is the physical significance of whether or*
> *not two events are simultaneous according to global synchronization.*

Perhaps we need to backtrack a bit and take a careful look at your questions in the context of an ordinary Newtonian universe, governed by Galilean spacetime. How do you answer your own questions in that familiar context?

> *Why would any*
> *inertial frame choose global synchronization if it leads to unduly*
> *complicated mathematical equations for simple phenomena?*
> *Personally, I would much prefer locally E−synched clocks.*

Global questions require global definitions. Why do you believe that personal preferences and ease of computation is a determining factor that somehow obliterates cosmic time?

> > *Also, you still misunderstand the PofR.*
> >
> *Please elaborate.*

I interpret the PofR as a law of physics. That requires a minor adjustment in semantics from the way it's usually described. If you think about it, the statement that "the laws of nature require the same mathematical form in all local inertial frames" literally implies that "the laws of physics demand that clocks be synchronized." I have an amusing thread on that idea in the google archives for sci.physics.relativity titled, oddly enough, "Do the Laws of Physics Demand that Clocks be Synchronized?" :−)

See http://www.everythingimportant.org/viewtopic.php?t=221 for the highlights.

> > > *The poor student trying to learn SR is likely to find the SxR spacetime*
> > > *more confusing than enlightening. If introducing an absolute time in*
> > > *the SxR spacetime were really useful, then why don't people introduce*
> > > *an absolute time in the usually assumed topology R^3 x R?*
> >
> > *People do. They've done it.*
>
> *That's interesting. Can you give me a specific reference?*

http://arxiv.org/PS_cache/hep−th/pdf/0207/0207042.pdf

Please see the Ives−Tangherlini formulae on the bottom of page 2.

> *Is this done in*
> *any introductory text as a pedagogical aid to understanding SR?*

It's only a matter of time.

> > I believe it brings clarity. The way to think of it is that the PofR
> > would apply locally to one class of physical law but other laws could
> > be allowed that operate differently but consistently.
>
> I guess we will just have to disagree as to what brings clarity. I can't
> see the clarity that arises from splitting the physical laws into classes
> this way. Could you elaborate on what you mean by laws that operate
> differently but consistently? A specific example would be helpful.

"It is popularly believed that there is some strange disparity between quantum physics and physics generally, that whereas ordinary physical interaction takes time to travel, at speeds up to the finite limit c, quantum interaction (action−at−a−distance) is instantaneous, regardless of distance." The clarity that SxR brings to this backwater debate on quantum mechanics is that it's easily conceivable that light−speed EM forces and unknown instantaneous action−at−a−distance forces coexist simultaneously in the same universe. Physicists who reject David Bohm's theory on the basis of SR causality need to discard their invalid arguments and learn SxR.

There really isn't any instantaneous quantum interaction propagating anywhere, at least I don't believe there is, but google whips up 633 hits for +instantaneous +"action at a distance" +Bohm. Is there anything improper about me pointing out that physicists are using faulty arguments in their debates?

Identical experiments can be performed in different "inertial frames of reference," each yielding dissimilar outcomes. I can't imagine what's so difficult about the example I've already published: http://www.everythingimportant.org/viewtopic.php?p=1949#1949 We may call the structure and results of this kind of phenomena a category II law of physics. I've explained the structure of this law in great detail.

We may also take it as an axiom whether or not superluminal signaling exists in SxR. We can build any consistent FTL theory we prefer. It's like the Axiom of Choice. Assuming that the Axiom of Choice is true doesn't contradict ZF set theory, provided that ZF set theory is consistent without the Axiom of Choice. Likewise, assuming that the Axiom of Choice is false leads to no contradictions in ZF set theory. The Axiom of Choice, then, is independent of all the other axioms of ZF set theory. The only concern for a mathematician is mathematical consistency, and the logical implications of reasonable axioms.

> Some students might enjoy thinking about these things quite early on. But,
> my feelings are that the average beginning student is not going to profit
> from it and is likely to find it confusing. It would be interesting to see
> an outline of a set of lectures that incorporates SxR that you would present
> to students who are learning SR for the first time.

First I'd begin with my derivation of the Lorentz transformation from a Galilean synchronization:

x'=x−uT
T'=T

http://www.everythingimportant.org/relativity

Then I'd go through my second derivation of the Lorentz transformation, which completely bypasses the use of Einstein's bungled relativity principle and the notion of groups. It needs, primarily, the SxR topology and the Galilean transformation:
http://www.everythingimportant.org/relativity/simultaneity.htm

At this point I would assign an extraordinary exercise:

Without cheating by resetting clocks to make the computations trivial, use the transformation equations for SxR:

x'=Y(v)(x−vt)
t'=t/Y(v)

Y(v)=1/sqrt(1−v^2/c^2)

Compute the outcome to the following experiment in an arbitrary moving frame. (This to me is a delightful curiosity). Suppose you have two synchronized clocks side−by−side and slowly transport one of them to any convenient distance D and then measure the speed of light, i.e., D/(t2−t1). Prove that the measured value will be c. (t1 is the time on the stationary clock when the light pulse is sent. t2 is the time when the light arrives as measured by the slowly transported clock. Take the limit of ultraslow transport for a perfect answer of c).

Try this problem. It's amazingly enjoyable!

Also, let me know if you can do the exercises and construct a full proof of the claims made on this page:

http://www.everythingimportant.org/relativity/generalized.htm

I would greatly desire explaining the global issues in SxR ASAP but you're doing such a fine job of resisting instruction that I haven't as yet figured out what approach to take.

Eugene Shubert
http://www.everythingimportant.org