

Re: Hobba's misconceptions

Source: <http://sci.tech-archive.net/Archive/sci.physics.relativity/2005-12/msg00981.html>

- *From:* surrealistic-dream@xxxxxxxxxxx
 - *Date:* 10 Dec 2005 09:30:00 -0800
-

Mike wrote:

> surrealistic-dream@xxxxxxxxxxx wrote:

>> Bill Hobba wrote:

>>> "Mike" <eleatis@xxxxxxxx> wrote in message

>>> news:1134214183.192472.326840@xx

>>>>

>>>> Bill Hobba wrote:

>>>>

>>>> [snip apologetic crap]

>>>>

>>>>>

>>>>> That experiment shows no such thing. See Tom Roberts excellent analysis:

>>>>> <http://groups.google.com/group/sci.physics.relativity/msg/d157eb4b0462c947?dmode=source>

>>>>>

>>>>>

>>>>> Next thing we know, you are out in the street screaming "Roberts for

>>>>> President". For how long are you going to hide your misconceptions

>>>>> behind someone else's back?

>>>>

>>>> How about addressing the content of the post rather than your usual silly

>>>> verbal diarrhea?

>>>>

>>>>>

>>>>>

>>>>>>

>>>>>> Hobba does

>>>>>> not understand that when curvilinear motion comes into play, his silly

>>>>>> argument breaks down. Consider the following REAL experiment, not the

>>>>>> type of though experiments he has been brainwashed with:

>>>>>>>

>>>>>>> On a rotating disk there is a spring attached to its center and a steel

>>>>>>> ball attached to its other end, resting on the disk. When we start

>>>>>>> rotate the disk uniformly, the spring extends by a small distance

>>>>>>> $\Delta l(x)$. The ball now is at rest in its own frame of reference.

>>>>>>>

>>>>>>> Any object is at rest in some frame. In this case it is non inertial,

>>>>>>> and

>>>>>>> is subject to forces of acceleration.

>>>>>>>

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>>>> Your statement went further than the first law.
>>>>
>>>
>>> It is a simple application of $F=MA$.
>>>
>>>> You said in Newtonian
>>>> Mechanics there is no such thing as a preferred reference frame.
>>>>
>>>
>>> That is not what I said – I said there was no such thing as an absolute
>>> frame – meaning a (as in one) frame where the laws of physics are different.
>>> Frames can be preferred because they simplify the problem.
>>>
>>> But actually even though I replied one of my favourite movies the Johnson
>>> Story is about to start. It is much more important than responding to your
>>> rubbish.
>>
>> Bill, Mike is partly correct, at least insofar as his comments about
>> Newton's invention of an absolute space in which accelerations live. It
>> was this space (or better conceived of as, not a single space, but as
>> any inertial state of motion) which so bothered Mach and then Einstein.
>> I don't recall ever reading that Newton's so-called absolute
>> acceleration space was ever taken as Lorentz's rest space of the
>> luminiferous ether, but some people may have done that. Though,
>> logically we have no imperative to equate them.
>>
>> Rare is the mechanics book of the last century that even mentions
>> Newton's absolute acceleration space.
>
> This is true about the books but also very disturbing. In some cases it
> shows that even the authors do not realize the fragile foundations
> upon which science and in particular physics is built.

Physics education, and science education, could do with a revamping for historical accuracy and completeness, which gives the student a better appreciation of how we got to the physics we use today. It has a pedigree, though formal education tries to cover it up under the mistaken belief that it is superfluous for a good liberal arts education in physics. The philosophical and historical aspects of science gets the short shrift in science education.

> Note that I am
> not defending Newton's concept. However, the fact that mechanics
> problems can be solved by assuming the existence of a local inertial
> reference frame to apply the laws of motion does not justify omitting
> any reference to absolute space.

Even as a relativist myself, I agree with you completely for Newtonian mechanics. In fact, SR maintained this absolute inertial concept, and it became the point of departure for Einstein for generalizing SR to GR (as is clear from the quotes below). In fact, lacking knowledge of this

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legacy absolute acceleration in SR, makes the generalization from SR to GR to the unsuspecting physics student less obvious, and thus, more "out of the blue."

There is a responsibility on the part of science education to tell the student who encounters a shift in paradigm why this shift really occurred, including the philosophical and psychological factors that were apparent to the physicists who ushered in the changes.

- > Furthermore, SR and GR formulations
- > did not succeed to completely eliminate the absoluteness of acceleration
- > and this is also a very disturbing fact. You have theories called
- > "relativity" which include a commonly referred to as "kind of absolute"
- > acceleration. All these things are not mentioned for a single reason.
- > The student must not get the feelings the foundations are questionable.
- > However, you end up with people like Hobba.
- >
- > Mike

Well, I completely disagree with the motive you ascribe to this purposeful refusal to tell the whole story. To the modern physicist, the historical and philosophical aspects of the evolution of physics are revealed in lay books, and thus not to be a waste of time in real classroom education. This is an educational philosophy which dictates that Newton's absolute acceleration is superfluous and thus should be left out. Besides that, the increase in the quantity of basic physics has increased, making decisions by physics authors even more difficult about what to cut out of their physics textbooks.

Okay, so be it. Let the physics educators require the students to purchase a relevant paperback book on the history and philosophy of physics that complements the physics textbook the instructor uses. That sounds simple enough. But it's a prescription for disaster because the instructor is more like than not to be incompetent to teach that subject!

- >>
- >> The following quotes are from Einstein's book of essays, Ideas and
- >> Opinions:
- >>
- >> <BEGIN QUOTE>
- >> There is yet another factor underlying the evolution of the general
- >> theory of relativity. As Ernst Mach insistently pointed out, the
- >> Newtonian theory is unsatisfactory in the following respect: if one
- >> considers motion from the purely descriptive, not from the causal,
- >> point of view, it only exists as relative motion of things with respect
- >> to one another. But the acceleration which figures in Newton's
- >> equations of motion is unintelligible if one starts with the concept of
- >> relative motion. It compelled Newton to invent a physical space in

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>> relation to which acceleration was supposed to exist. This introduction
>> ad hoc of the concept of absolute space, while logically
>> unexceptionable, nevertheless seems unsatisfactory. Hence Mach's
>> attempt to alter the mechanical equations in such way that the inertia
>> of bodies is traced back to relative motion on their part not as
>> against absolute space but as against the totality of other ponderable
>> bodies. In the state of knowledge then existing, his attempt was bound
>> to fail.

>> <END QUOTE>

>>

>> --- On the Theory of Relativity, p. 248

>>

>>

>> <BEGIN QUOTE>

>> In so far as geometry is conceived as the science of laws governing the
>> mutual spatial relations of practically rigid bodies, it is to be
>> regarded as the oldest branch of physics. This science was able, as I
>> have already observed, to get along without the concept of space as
>> such, the ideal corporeal forms---point, straight line, plane,
>> segment---being sufficient for its needs. On the other hand, space as a
>> whole, as conceived by Descartes, was absolutely necessary to Newtonian
>> physics. For dynamics cannot manage with the concepts of the mass point
>> and the (temporally variable) distance between mass points alone. In
>> Newton's equations of motion, the concept of acceleration plays a
>> fundamental part, which cannot be defined by the temporally variable
>> intervals between points alone. Newton's acceleration is only
>> conceivable or definable in relation to space as a whole. Thus to the
>> geometrical reality of the concept of space anew inertia-determining
>> function of space was added. When Newton described space as absolute,
>> he no doubt meant this real significance of space, which made it
>> necessary for him to attribute to it a quite definite state of motion,
>> which yet did not appear to be fully determined by the phenomena of
>> mechanics. This space was conceived as absolute in another sense also;
>> its inertia-determining effect was conceived as autonomous, i.e., not
>> to be influenced by any physical circumstance whatever; it affected
>> masses, but nothing affected it.

>> <END QUOTE>

>>

>> --- The Problem of Space, Ether,
>> and the Field in Physics, p. 279-280

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>> <BEGIN QUOTE>

>> When by the special theory of relativity I had arrived at the
>> equivalence of all so-called inertial systems for the formulation of
>> natural laws (1905), the question whether there was not a further
>> equivalence of coordinate systems followed naturally, to say the least
>> of it. To put it in another way, if only a relative meaning can be
>> attached to the concept of velocity, ought we nevertheless to persevere

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>> in treating acceleration as an absolute concept?
>>
>>>From the purely kinematic point of view there was no doubt about the
>> relativity of all motions whatever; but physically speaking, the
>> inertial system seemed to occupy a privileged position, which made the
>> use of coordinate systems moving in other ways appear artificial.
>>
>> I was of course acquainted with Mach's view, according to which it
>> appeared conceivable that what inertial resistance counteracts is not
>> acceleration as such but acceleration with respect to the masses of the
>> other bodies existing in the world. There was something fascinating
>> about this idea to me, but it provided no workable basis for a new
>> theory.
>> <END QUOTE>
>>
>> --- Notes on the Origin of the General
>> Theory of Relativity, p. 286
>>
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>>
>>
>> <BEGIN QUOTE>
>> I. Newton's endeavors to represent his system as necessarily
>> conditioned by experience and to introduce the smallest possible number
>> of concepts not directly referable to empirical objects is everywhere
>> evident; in spite of this he set up the concept of absolute space and
>> absolute time. For this he has often been criticized in recent years.
>> But in this point Newton is particularly consistent. He had realized
>> that observable geometrical quantities (distances of material points
>> from one another) and their course in time do not completely
>> characterize motion in its physical aspects. He proved this in the
>> famous experiment with the rotating vessel of water. Therefore, in
>> addition to masses and temporally variable distances, there must be
>> something else that determines motion. That "something" he takes to be
>> relation to "absolute space." He is aware that space must possess a
>> kind of physical reality if his laws of motion are to have any meaning,
>> a reality of the same sort as material points and their distances.
>>
>>
>> The clear realization of this reveals both Newton's wisdom and also a
>> weak side to his theory. For the logical structure of the latter would
>> undoubtedly be more satisfactory without this shadowy concept; in that
>> case only things whose relations to perception are perfectly clear
>> (mass-points, distances) would enter into the laws.
>> <END QUOTE>
>>
>> --- The Mechanics of Newton and their Influence
>> on the Development of Theoretical Physics, p. 258.
>>
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>> <BEGIN QUOTE>

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>> It is characteristic of Newtonian physics that it has to ascribe
>> independent and real existence to space and time as well as to matter,
>> for in Newton's law of motion the concept of acceleration appears. But
>> in this theory, acceleration can only denote "acceleration with respect
>> to space."
>>
>> Newton's space must thus be thought of as "at rest," or at least as
>> "unaccelerated," in order that one can consider the acceleration, which
>> appears in the law of motion, as being a magnitude with any meaning.
>> Much the same holds with time, which of course likewise enters into the
>> concept of acceleration. Newton himself and his most critical
>> contemporaries felt it to be disturbing that one had to ascribe
>> physical reality both to space itself as well as to its state of
>> motion; but there was at that time no other alternative, if one wished
>> to ascribe to mechanics a clear meaning.
>> <END QUOTE>
>>
>> --- Relativity and the Problem of Space, p. 360.

• Follow-Ups:

- ◆ [Re: Hobba's misconceptions](#)
◇ From: shuba

• References:

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