Re: Einstein's math and physical objects

Source: http://sci.tech−archive.net/Archive/sci.physics.relativity/2005−01/2651.html

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dseppala_at_austin.rr.com
Date: 01/13/05

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Date: Thu, 13 Jan 2005 16:20:28 GMT
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On Thu, 13 Jan 2005 09:18:27 −0500, jem <xxx@xxx.xxx> wrote:

>Harry wrote:
>> "jem" <xxx@xxx.xxx> wrote in message news:7U9Fd.2$do.0@fed1read06...
>>
>>>dseppala@austin.rr.com wrote:
>>>
>>>
>>>>On Mon, 10 Jan 2005 09:01:49 −0500, jem <xxx@xxx.xxx> wrote:
>>>>
>>>>
>>>>>dseppala@austin.rr.com wrote:
>>
>> SNIP
>>
>>>>>>>>>>When I don't accelerate the disks from one frame into the other, I
>>>>>>>>>>follow you are saying. However, if I were to go into a lab here on
>>>>>>>>>>earth where the disk has zero velocity along the x−axis (as in the
>>>>>>>>>>final reference frame of the problem I posted), it is physically
>>>>>>>>>>impossible for me to have the two disks more than 180 degrees out
>>
>> of
>>
>>>>>>>>>>phase without the wires crossing (touching). There is no way to
>>
>> make
>>
>>>>>>>>>>that happen. If I'm observing the wires from a reference frame
>>
>> that
>>
>>>>>>>>>>has zero relative velocity wrt to the x−axis in this problem, the
>>>>>>>>>>wires must cross (touch) if the disks have 180 or more degrees of
>>>>>>>>>>phase difference − that is what physically happens when we do the
>>>>>>>>>>experiment here on earth.
>>>>>>>>>
>>>>>>>>>This is a different experiment than the original. One difference is
>>>>>>>>>that in this formulation (where the wires touch), the wires also

>>>>>>>>>stretch, whereas no stretching occurred in the original formulation.
>>>>>>>>
>>>>>>>>During the acceleration, since the two disks are accelerated in an
>>>>>>>>identical fashion as measured in the original reference frame, the
>>>>>>>>wires do indeed stretch in the experiment of my original post. This
>>>>>>>>is per Einstein's equations.
>>>>>>>
>>>>>>>OK, I mis−recalled the specification, but the manner in which the
>>
>> disks
>>
>>>>>>>are accelerated isn't important, the description you gave here (where
>>>>>>>the wires touch) is still different than the original.
>>>>>>>
>>>>>>>At any rate, you should have paid more attention to the second
>>
>> paragraph
>>
>>>>>>>than the first. The nature of coordinate transformations makes it
>>>>>>>impossible for one observer to see the wires touch when another
>>
>> doesn't.
>>
>>>>>>Yes I agree that's what should occur, but the wires must cross in the
>>>>>>final reference frame when a steady−state condition is achieved. This
>>>>>>is a physical condition, so therefore we must get the math to agree.
>>>>>>Or can you show me how to attach non−accelerated wires to the same
>>>>>>points on the disks in the final reference frame in a manner that they
>>>>>>will not cross. I don't see how that is physically possible. Paul
>>>>>>seems to think that the wires that are accelerated lie on the surface
>>>>>>of a hypothetical cylinder even after the acceleration has stopped,
>>>>>>but he has not yet posted why these accelerated wires behave
>>>>>>differently then wires attached to the same points of the disks in the
>>>>>>final reference which haven't been accelerated.
>>>>>> Unless you can explain that, there seems to be two choices left.
>>>>>>Either the wires cross while the disks and wires are accelerating, or
>>>>>>the analysis is wrong.
>>>>>
>>>>>The only thing that's wrong is your insistence that if the disks are
>>>>>measured to be more than 180 degrees out of phase then the wires must
>>>>>touch. That's only true when the disks are "stationary" wrt the
>>
>> measurer.
>>
>>>>As they are as measured by observers in the final reference frame.
>>>>That is what I don't understand. Why do you think the two disks do
>>>>not have 180 degrees or more of relative rotation angle between them
>>>>as measured in the final reference frame, after the acceleration
>>>>stops?
>>>
>>>They very well might "have 180 degrees or more of relative rotation

>>>angle between them as measured in the final reference frame", but the
>>>disks weren't "stationary" in this frame while the rotation was
>>>occurring, so the fact that the wires don't touch shouldn't be surprising.
>>
>>
>> I find your assumption very surprising − it's a perfectly symmetrical
>> situation in the frame in which the rotational axes are resting. I don't see
>> how the wires can't touch, from symmetry they must do so according to the
>> laws of nature.
>
>It's pretty clear in the case of the "rest" frame that the wires don't
>touch as there's no differential rotation of the disks.
>
> >
>> The situation isn't symmetrical in the frame in which the whole set−up is in
>> translation − but I can't think of what would make the wires come together
>> in that frame, and misaligned on top of that...
>>
>>>You can specify what it is that actually happens − the disks rotate such
>>>that the wires don't touch or they rotate such that they do touch. In
>>>either case when the transformation equations for observers in motion
>>>wrt the apparatus are applied, you'll find that all observers reach the
>>>same conclusion re. touching.
>>
>>
>> I am afraid you didn't understand the problem, for we all know that the
>> transformation equations only change the mapping. If I understood it well,
>> the question was if in this case that mapping is conform the laws of nature,
>> as is always claimed.
>>
>If you really understood the character of coordinate transformations
>you'd realize that if a particular description of a process satisfies
>the "laws of Nature" (e.g. the description from the "rest" frame), then
>the description of that process from the viewpoint of any other frame
>(which is defined by a coordinate transformation) necessarily satisfies
>those laws as well.
>

In the final reference frame, the disks have a relative rotation angle
greater than 180 degrees as measured by observers who have zero
relative velocity wrt to the disks. Can you show how to connect the
wires so that they do not cross and intertwine in the steady−state
condition?

Thanks,
David