Some of the biggest problems for the theory of relativity

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Abstract

According to experts in *special relativity*, it is '*mathematically self-consistent'*, and therefore it should be impossible to demonstrate any inconsistency in the theory. Supposedly, only *physical experiments* have the possibility of disproving it! – However, I and other researchers have demonstrated several inconsistencies in both the special and general theory of relativity, and in this paper I will show examples that are so simple and clear that experts will easily be able to understand the arguments. So – *unless* they can demonstrate crucial errors in my argumentation – they will be able to realize that there are serious inconsistencies in the theory of relativity!

One of these problems for the theory of relativity can be shown in the following way:

A clock, $\mathbf{C_2}$, moves in a circular orbit around another, $\mathbf{C_1}$, which is located in the center of the orbit, as shown in Fig. 1. – In addition, there is a clock, $\mathbf{C_3}$, which, at the moment shown, is located right next to, and 'at rest' with respect to $\mathbf{C_2}$, but *without accelerating at all*.

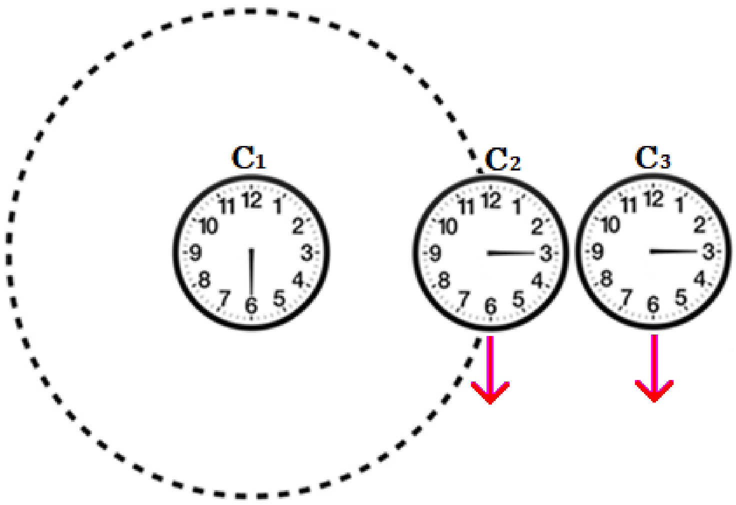

Fig. 1

Shows the rate of the clocks, relative to each other – physically speaking.

(The arrows are velocity vectors)

Each clock is associated with an *'observer'* who is very close to, and constantly at rest, with respect to the clock in question. We call these observers: $\mathbf{O_1}$, $\mathbf{O_2}$, and $\mathbf{O_3}$.

The really problematic issue for the theory of relativity is that $\mathbf{O_2}$ and $\mathbf{O_3}$ will *agree* that their clocks run equally fast, while they will *disagree* on how fast $\mathbf{C_1}$ runs, relative to their own clocks! The inertial $\mathbf{O_3}$ will, according to special relativity (SR), conclude that the clock at the center will run slower than his own clock. Let us set the orbital speed to be 260000 km/s.
As estimated by $\mathbf{O_3}$, $\mathbf{C_1}$ will then run about *half* as fast as $\mathbf{C_2}$ and $\mathbf{C_3}$.
As estimated by $\mathbf{O_2}$, $\mathbf{C_1}$ will run about *twice* as fast as $\mathbf{C_2}$ and $\mathbf{C_3}$.

(Here $\mathbf{O_2}$ has used *general relativity*, which imply that physical acceleration is a kind of gravitation, and that $\mathbf{C_1}$ is located higher than the two other clocks, in the gravitational field experienced by $\mathbf{O_2}$.)

– ***so, a clear inconsistency in the theory of relativity!!***

The problem for the theory of relativity is even clearer if one imagines that the radius of the orbit is extremely large – let's say: billions of light-years. Then $\mathbf{C_2}$ and $\mathbf{C_3}$ will move almost parallel for a long time, even though the orbital speed is still 260000 km/s, and thus $\mathbf{O_2}$ and $\mathbf{O_3}$ have plenty of time to observe / measure that their clocks run at almost exactly the same rate, which cannot be correct if they are both to be right in their assessments of how fast $\mathbf{C_1}$ is running!

If we now imagine that $\mathbf{O_2}$ with his clock, $\mathbf{C_2}$, suddenly stopped being in orbit and instead moved completely straight on (uniform linear motion), just like $\mathbf{O_3}$ and $\mathbf{C_3}$; this change in motion would be *immeasurably small*, since $\mathbf{C_2}$ and $\mathbf{O_2}$ were already moving almost 100% inertially. – Yet the theory of relativity predicts a *very large* change in the time-rate that $\mathbf{O_2}$ will assess $\mathbf{C_1}$ to be affected by!?

There are strong indications of that $\mathbf{C_2}$ and $\mathbf{C_3}$ will run at the same *physical* rate in the shown case where $\mathbf{C_2}$ is in orbit. For example, experiments **[1]** have shown that acceleration has no effect on the physical time rate of muons. And it is also in accordance with the generally accepted ***clock postulate***, which predicts that acceleration has no effect on how fast a clock ('atomic clock') runs – only speed matters for this. Since $\mathbf{C_2}$, according to general relativity, and according to experiments (for example: **[2]**), runs *physically* slower than the center clock, $\mathbf{C_3}$ must also do so – **in direct contradiction to the *special principle of relativity!***

"The ***special principle of relativity*** states that physical laws should be the same in every inertial frame of reference, but that they may vary across non-inertial ones.**"**

https://en.wikipedia.org/wiki/Principle_of_relativity

"The ***clock postulate*** can be stated in the following way. First, we take the rate that our frame's clocks count out their time, and compare that to the rate that a moving clock counts out its time. Before the clock postulate was ever thought of, all that was known was that when the moving clock has a constant velocity and speed v (measured relative to the speed of light c), this ratio of rates is the "gamma factor" $\gamma = 1/\sqrt{(1-v^2)}$. The clock postulate generalises this to say that even when the moving clock accelerates, the ratio of the rate of our clocks compared to its rate is still the above quantity. That is, this ratio depends only on v, and does not depend on any derivatives of v, such as acceleration. So this says that an accelerating clock will count out its time in such a way that at any one moment, its timing has slowed by a factor (γ) that depends only on its current speed; its acceleration has no effect at all.**"**

https://math.ucr.edu/home/baez/physics/Relativity/SR/clock.html

"When measuring the time dilation of the mean lifetime of muons in the Muon Storage Ring, Bailey et. al.[1] reported that the muons experienced accelerations of $\mathbf{10^{18}}$ times the acceleration of gravity. [....] Consequently their experiments confirm that for accelerations of that magnitude, the rate of an ideal clock depends only upon its speed and is independent of its acceleration to within an experimental uncertainty of 0.1%. Therefore experiments confirm that we are justified in ignoring the effect of acceleration on time dilation in the circular twin problem."

From: "Two Examples of Circular Motion for Introductory Courses in Relativity" (p. 5)
https://arxiv.org/pdf/gr-qc/0703090

Another strong indication that acceleration has no influence on clocks ticking rates, can also be shown by a modification of the above thought experiment, so that the clock in orbit moves in an elongated path around the center clock, as shown in Fig. 2.

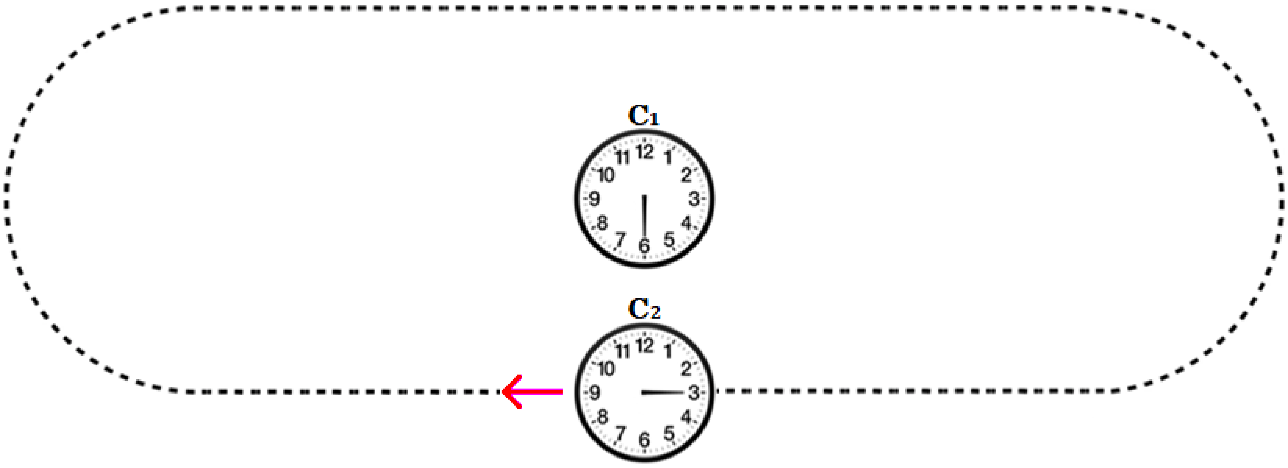

Fig. 2

Even in the periods when $\mathbf{C_2}$ is not accelerating at all, this clock *must* run physically slower than $\mathbf{C_1}$. If this were not the case, the time dilation result, after a complete orbit, could not be in accordance with the predictions of the theory of relativity, which we know can be calculated *solely* based on orbital speed. – The parts of the orbit that are curved could, in principle, be made arbitrarily short in relation to the straight sections, and therefore one cannot, based on relativity theory, explain the time dilation effects in a way that is consistent with the 'special principle of relativity,' which predicts that all inertial frames are completely equivalent!

In the paper: ***"Fundamental inconsistencies in the theory of relativity"*** **[3]**, I described a special version of the *twin paradox*, where the traveling twin moved at a constant speed of 10 km./hour, both on the outward and return journeys. On the other hand, the distance was extremely long: $\mathbf{2*10^{22}}$ km. This would (according to my calculations) mean that the travel time would be approx. $\mathbf{2*10^{17}}$ years, and that the age difference between the two twins would be approx. 10 years at their reunion. At such a low speed, the acceleration during the 'turnaround' could be done in a few seconds, and a local observer who was completely at rest relative to the twin on Earth (here assumed to be an inertial frame) would be able to ascertain that the traveling clock ran at roughly the same rate as the observer's own clock during the acceleration. Therefore, the relative speed between the two twins during the journey is the only thing that can explain the 'age difference' between them at the reunion!

Conclusion: *the speed is crucial*, while acceleration has no effect on the result! The physical (non-symmetrical) time dilation must therefore begin at the moment one of the twins ***starts*** his journey!!

By means of thought experiments, I have shown that there is a corresponding problem for the theory of relativity in its predictions about relativistic length contraction. If a measuring rod is accelerated from one inertial frame to another, then its *physical* length ***must*** become shorter, if the rest length is preserved. This can be understood if one imagines a closed tube, which at the start of the experiment is *completely filled* with identical measuring rods, where both these and the tube are at rest in an inertial frame, which we can call: *the tube frame*. Then the measuring rods are set in motion until they have reached a speed corresponding to $\boldsymbol{\gamma = 2}$ (i.e., about 260000 km/s), see Fig. 3:

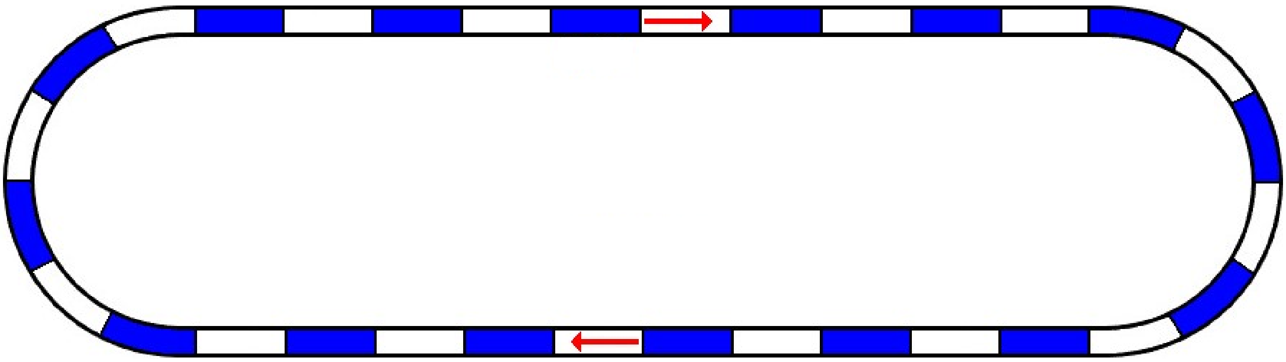

Fig. 3

Then we know that SR predicts that all the lengths of the measuring rods are halved, measured in the tube frame – under the condition that their rest lengths are preserved. This cannot be done without there being more space in the tube (since the tube has not been contracted, measured in the tube frame)! This means that the measuring rods have been *physically* contracted, and they physically take up less space in the universe. (*Coordinate-dependent* effects can never result in such phenomena! No matter how much, or how, an observer changes his state of motion, this will never, by itself, be able to contract the rods in the tube so that gaps appear, of course!)
And the effects are completely independent of whether the measuring rods are located in a straight part of the tube system, or a curved one (exactly like the time effect in the 'twin paradox')!

I have elaborated this problem, for the theory of relativity, thoroughly in the paper:
"Is relativistic length contraction consistent?" **[4]**.

References:

[1] ***"Measurements of relativistic time dilatation for positive and negative muons in a circular orbit"***
https://www.researchgate.net/publication/30398795_Measurements_of_relativistic_time_dilatation_for_positive_and_negative_muons_in_a_circular_orbit

[2] ***"Measurement of the Transverse Doppler Effect in an Accelerated System"*** (Walter Kündig – 1963)
https://journals.aps.org/pr/abstract/10.1103/PhysRev.129.2371

[3] https://vixra.org/pdf/2207.0088v1.pdf

[4] https://vixra.org/pdf/2501.0062v1.pdf