Critics of the Theory of Relativity for Beginners

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Summary

The Theory of Relativity does not show to us a strange behaviour of nature. Strange may be, however, why it could be so widely accepted. It shows to us that every day's methods must not be used in an environment where they are due to fail. Albert Einstein's methods of defining simultaneity and determining it don't match. This paper is intended for non-professionals in this matter and does not use mathematical notation.

Basics

As fundamentals of physics one needs a series of things, but at least a system to measure distances and time. The simplest case would equip us with a ruler and a clock. We assume that we have only length instead of length, width and height. Such a system would be sufficient to describe the movement of trains on a railroad. We could measure distances by repeated application of our ruler. For knowing the time we look at the nearest clock. We will also ignore some difficulties like:
- will our ruler yield the same result if we repeat the measurement over and over ?
- will our clock always run the same way or will it change when it is moved ?

These questions may look somewhat extreme. But they show that we have to ask for the reliability of our equipment. Eventually we will arrive at a point where we have to admit that only our experience tells us that we will always measure the same distance. There will be no proof for this. We have to be very careful with silent assumptions. The fewer assumptions are involved the more reliable will be our system. In physics the term assumption is replaced by postulate. This doesn't denote an arbitrary assumption but one which is at least not contradictory to observation. As an example for a postulate there is the constancy of light speed in vacuum. It states that the speed of light is independent both from the movement of its source and receiver and also from the direction.

Now we can take advntage of this for measuring wider distances. If it would take too much pain to walk along the tracks with our ruler, we could proceed as follows:
We send a light to a remote point were it will be reflected. We measure the time until it arrives back with us. We are hopeful to have a reasonable system for measuring distances this way.

Simultaneity

The most important item in the Theory of Relativity is the definition and determination of simultaneity. Its major statement is that two observers being in relative motion will judge differently about the simultaneity of two events. These clocks should show the same time as our own one rather than just any time. What we mean by “same” time we will have to define first. There is a need for a procedure establishing some relation between distant clocks. Such a procedure is arbitrary in principle, but it will have to stand judgement from a practical point of view.

We do the following now:

The clocks are about to be synchronized. A first guess would be to bring a distant clock near our one and adjust it before bringing it back to its destination. This would not only be tedious but we would have to assume that moving back wouldn't disturb the clock. Since we have already an assumption (even something better: a postulate) we do not need the former assumption. We keep the distant clock resting at its destination and proceed like this:

We send a light to the distant clock. It will be reflected and shows us the state of the clock when it was reflected. Following our postulate (constancy of light speed) it will take the same time for both ways forth and back. We will have to adjust the distant clock such that the time we get from it is exactly the mid between the times when we sent the light and when we received it back.

This makes up a fine system for measuring length and times for us. Big question now is:
What does it mean if we denote two events being simultaneous ? What we need is a defnition for simultaneity. Which choice do we have at all ?

We have already equipped each point being of interest with a clock. For any event at a given point we can expect therefore a clock giving us a timestamp for this event. There is only left that we have to get this information finally. We will judge two events as simultaneous after having both timestamps if these stamps are the same. For this it is completely irrelevant how and when the information reached us. Starting from the point when we have both timestamps we can determine whether the events were simultaneous. For example there could be pony express riders bringing sheets with the departure times of two trains in two stations. The station clocks being synchronized before we can simply compare the departure times on the sheets and will see from this whether the trains started at the same time.

It seems pretty clear how we can recognize simultaneity. Most probably there isn't an alternative. The intention of placing clocks and synchronizing them was excatly to get timestamps for events from them. This is the procedure we apply daily:
Whether we are informed about events by TV, by newspaper or something quite different: We compare the timestamps which were recorded in the places of the events. If and only if two stamps are the same we will consider two events being simultaneous. We proceded this way because the way of transmitting the information is too slow that we could observe the events directly.

What seems clear to us so far is not for A.Einstein. In order to judge about the simultaneity of events he doesn't compare their timestamps. In order to understand his method we assume that we are resting in the mid of two events being about to be compared. We remember our postulate and end up with the idea that we will have to see the two events at the same time, if they were simultaneous. In this case we would see equal timestamps also.
The equality of timestamps is now rather a consequence or by chance and not the base of our decision. We would have to ask what gives us the right to use a different method than the one we used above (comparing timestamps). If both methods would give the same result always this wouldn't be so important.

Given the case where we rest in the mid between two events the latter seems to be true. But we must deal with the case where we are moving relatively against the events (or the events against us). Let's assume that we are in a moving train, which is exactly in the mid between two stations when two trains simultaneously (as judged from a resting observer on the tracks) leave the stations. As we move towards one of the stations the light has to go a bit shorter distance than the light from the other station and it will reach us somewhat earlier than the light from the other station. Knowing that we were in the mid between the stations when the trains left we conclude that one train left earlier than the other. We don't care about time stamps. Otherwise we would have to become alarmed because they are still the same. Nothing has changed for the trains and the timestamps compared to earlier times when we used the old method for determining simultaneity (i.e. comparing the stamps).

The nonsense of this new method would be completely clear, if we would use pony express riders instead of light. They shall have comparable properties to light, but much slower (especially they should have a constant speed). We don't wait patiently between the stations but walk towards the one of them while we go away from the other. Nobody would think about one train having started earlier because we met one rider earlier.

What drives Einstein to use this method ?
At this place I have to omit an answer. I don't accept the new method, I only described how it works. It is used, however, by A.Einstein in the deduction of his Special Theory of Relativity. An explanation why he did so is not recognizable for me.

This method is applied by us in every day's usage also. For daily measurements we usually don't have timestamps for the events observed so that we use this method for comfort. In those cases the light is fast enough so that we don't have to deal with minor imprecisions.

This method being in contradiction to our first method which is implied in a very forcing manner as being the sense of placing our clocks (in Einstein's speaking we talk about a 'necessity of thinking') tis surely not the foundation of a new theory. It is at most an explanation why we see strange observations and why the new method (which is in Einstein's speaking a 'habit of thinking') is not usable in environments where we can no longer neglect the limited speed of light.

Conclusion

Einstein's special theory of relativity is not a genious new theory. It shows to us only that we must no longer use an every day's method for high speed environments. The conclusion is on no account that nature behaves strangely. One conclusion must be that strange obervations have to make us examine or revise our doing.

References:

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