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AN EXTENDED DISCUSSION ON THE RELATIVITY OF SIMULTANEITY

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Abstract:

This article studies the relativity of simultaneity and finds that the relativity of simultaneity will cause "the relativity of existence". It also leads to multiple universes in the real world. Or it will result in "the absence of practical choices" and "the loss of practical possibilities". Also, the relativity of simultaneity will lead to a predestined world and denies the existence of human being free-will choice, the existence of accidental random events, and the existence of probability factors and uncertainty in quantum mechanics..

Key Words: Simultaneity; The Relativity of Simultaneity; Special Relativity; Theory of Relativity; Multiple Universe; Existence; Randomness; Probability

Main Text:

Based on the previous article 《A Discussion on the Relativity of Simultaneity》, this article extends the discussion as follows.

For the self-contradictory results demonstrated by scenario 2(Rod being accelerated) and scenario 3(Rod moving at constant speed) described in the previous article 《A DISCUSSION ON THE RELATIVITY OF SIMULTANEITY》, the explanation given by theory of relativity is that, for observers located on point D(static), laser emitters on point A and point C don't emit laser beams simultaneously, although, for observers located on point C(moving), laser emitters on point A and point C emit laser beams simultaneously. Laser beam from point A will be emitted earlier than laser beam from point C for observers located on point D(static). Then the 2 beams of laser arrive at point B at the same time and triggers the reaction.

This explanation, will result in "multiple universe" or "absence of practical choice" (or "loss of practical possibilities"), as can be shown by the following scenario:

As shown by Figure 1, point A, Point B, and Point C are located on the rod which moves in constant velocity to the right, and point D and Point E stay static. In the reference frame where the rod is located, a beam of laser is always emitted from point A when a beam of laser is emitted from point C, i.e., a beam of laser from point A and a beam of laser from point C are emitted at the same time. Then, according to theory of relativity, in the reference frame where point E is located, a beam of laser from point C is emitted after a beam of laser is emitted from point A, i.e., a laser beam is emitted from point A first, and then a laser beam is emitted from point C.

And when point C moves to the right, point C and point E pass by each other with very near distance.

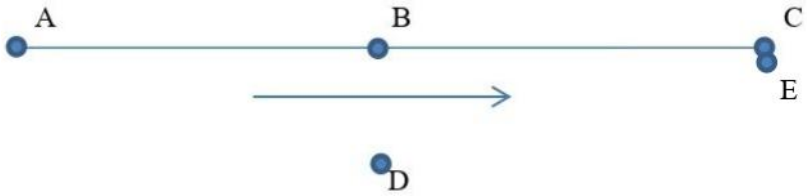

Figure 1: Rod in constant velocity

Because when point C passes by point E, they are at very near distance (they are at almost the same location), thus people located on point C can interact with people located on point E. For example, they can shake hands, or wave to each other, or take pictures of each other, or send messages to each other. All of these actions are physical interactions. If the speed of the rod is so high that people located on point C and people located on point E don't have enough time to do other things, they can at least send a beam of light to each other. Actually, sending a beam of light equals sending a message because a beam of light may contain much information. And if people located on point C and people located on point E react very quickly, they may be able to reply the information they receive. Thus, it is at least possible that they may repeatedly question and answer each other.

In a word, when people located on point C and people located on point E pass by each other, they can interact. Their interacting with each other is a physical event. No matter in what form this interactive communication event takes place, it is very much like shaking hands when two people meet, so we can call it "shaking hands" event(or handshake event).

And we can, through adjustment or planning, make sure that, immediately after the "shaking hands" event, a beam of laser is emitted from point C. Now here we can know: because, according to people on point D or point E, laser beam from point A is emitted earlier than laser beam from point C, the laser beam from point A must have already been emitted before the "shaking hands" event. (Actually, the according to people on point D or point E, laser beam from point A could also be emitted DURING "shaking hands" event if "shaking hands" event lasts relatively a long time. But we just design it that the "shaking hands" event lasts a very short period of time and the laser beam from point A was emitted BEFORE the "shaking hands" event so that the discussion is more simple). But, according to people on point C, laser beam from point A has not been emitted when "shaking hands" event happens because the laser beam from point C has not been emitted at this time and because the laser beams from point A and from point C must be emitted simultaneously.

Then the question arises. When the "handshake" event occurs (the "handshake" event exists in two coordinate systems at the same time, and the "handshake" event is not a concept, but a definite physical event and physical reality), whether point A have emitted the laser is a physical event. And if we admit the correctness of "the relativity of simultaneity", whether the physical event exists or not will depend on "who is the observer", "where the observer is", and "whether the observer is moving". However, this is not to say whether the physical event is "observed", but whether the physical event "exists". That is, when the "handshake" event occurs, whether this beam of laser emitted from point A exists in the universe.

And we can vividly describe some details reasonably. For example, when the "handshake" event occurs, the person on point E can send a message to the person on point C, asking: "how do you comment on the laser beam that has been emitted from point A?" And the person on point C replies very quickly: "At this present moment, the laser beam from point A has not been emitted yet, why do you want me to comment on a laser beam that is not existing yet?" Then the person at point E also replies very quickly, "although I haven't seen the laser beam emitted from point A, now actually the laser beam from point A has really been emitted." And the person at point C replies again in an instant "In fact, the laser beam you mentioned doesn't exist now. Even if you are a god, you can only predict the future, but you can't live in the future! Why do you lie to me?". The person on point E then feels very sad: "I didn't lie to you, the laser beam from point A has really been emitted, and this beam of laser is now in the process of travelling to point B.".....

The above reasonably imagined dialog showed a situation that is unreal in reality.

To sum up about the above scenario:

For the reference frame where the person at point E is located, the "handshake" event occurs after the laser beam from point A has been emitted.

For the reference frame where the person at point C is located, the "handshake" event occurs before the laser beam from point A is emitted.

Here, the relativity of simultaneity leads to the reversal of the sequence of events. At the time of "handshake", as long as the person at point C has the ability to move instantaneously to point A, he can use the ability to immediately come to point A and turns off the laser emitting equipment at point A so that the equipment at point A will not emit laser beam. Then, for the reference frame where the person at point E is located, the reality will either be "fact erased"(the fact that a laser beam from point A has been emitted is erased）, or "finish before start"(the person at point C has arrived at point A and turned off the equipment BEFORE he start to move from point C to point A, which is apparently against the law of causation).

Well, it is normal to say that physical events can be observed by different people sooner or later. Or, physical events can be detected either earlier or later by people located in different reference frames. However, whether a physical event exists has nothing to do with where the observer is located or which reference frame the observer belongs to.

If the "the relativity of simultaneity " derived from the theory of relativity leads to the conclusion that physical events exist in one reference frame but not in another reference frame, that is, it is uncertain whether they exist or not, this will lead to "the relativity of existence".

Imagine that if the laser emitter at point A is suddenly destroyed when the "handshake" event is taking place, then, for the people at point E, the emitter is destroyed after emitting the beam of laser, but, for the people at point C, the emitter is destroyed before emitting this beam of laser.

So, in fact, does the emitter at point A have time to emit this beam of laser before it is destroyed? If the theory of relativity is correct, it is unsure whether the emitter at point A emits this beam of laser or not.

If we describe it this way:

- for the reference frame of the person at point E(static), when the "handshake" event is taking place, the emitter at point A is suddenly destroyed. This means, the emitter at point A is destroyed after emitting this beam of laser. In other words, this laser beam does exist in the universe and will always exist (or at least once existed) (regardless of whether it is observed or not and when it is observed);
- for the reference frame of the person at point C(moving to the right), when the "handshake" event is taking place, the emitter at point A is suddenly destroyed. This means, the emitter at point A is

destroyed before emitting this beam of laser. In other words, this laser beam does not exist in the universe, and it never exist in our universe (regardless of whether it is observed or not);

In sum：

(1) The universe includes this beam of laser.

(2) The universe doesn't include this beam of laser.

Thus the universe (1) and universe (2) are two different universes because they contain different contents.

In other words, for people located in different reference frames, a specific event which occurs at a specific time and place (the emitter is destroyed during handshake), which is a specific and real physical fact, brings self-contradictory physical results (there is this laser beam and there is not this laser beam) at the same time. In this way, it means that the existence of the universe is not unique. This means that because there are different reference frames in the real world, there are multiple universes in the real world, and the contents of each universe are different.

In short, "the relativity of simultaneity" derived from the theory of relativity leads to multiple universes in the real world.

Moreover, it should be pointed out that the scale in reality can be very large. For example, the length of the rod can be very long (for example, as long as several light years) and the moving speed can be very fast (for example, can be as fast as 1/2 or 1/10 the speed of light). Thus, for people at point E (for people in the static reference frame), a beam of laser may have be emitted from point A very long time before the "handshake" event occurs. For example, this laser may have been emitted many years ago. At this time, for the people on point C (for the reference frame where the rod is located), the laser beam has not been emitted from point A when the "handshake" event occurs (because the laser beam is not emitted from point C, and because laser beams are always emitted from point A and from point C at the same time). In this way, the multi-universes caused by "the relativity of simultaneity" can not only be slightly different, but can be hugely different.

In this way, multiple universes in the real world will result in uncertainty for everything. For example, that beam of laser may exist and may not exist. For example, you and I may exist or you and I may not exist. For example, the earth may exist or the earth may not exist.....

Now we discuss from a different angle. In the scenario described by Figure 1, if for the person in the reference frame of point E, the emitter at point A has emitted this laser beam before "handshake" event(no matter this person send messages to the person in point C or not during "handshake"). Then, "the laser emitter from point A emitted the beam of laser" is already a "physical reality". We recognize that "physical reality" should be real and solid, and nothing in the world should contradicts "physical reality".

Then, if the theory of "the relativity of simultaneity" is correct, the persons inside the reference frame of the moving rod will not be able to choose to immediately destroy the emitter at point A when "handshake" event is taking place(resulting in "the absence of practical choices"). In other words, there is no possibility for the occurrence that the emitter at point A is destroyed or breaks down at the time of "Handshake" (can be called "the loss of practical possibilities"). Because if the person inside the reference frame of the moving rod chooses to immediately destroy the emitter at point A when "handshake" event is taking place, the statement that "the laser emitter from point A emitted the beam of laser" will be false. But as we said previously, "the laser emitter from point A emitted the beam of laser" is already a "physical reality" and nothing in the world should contradicts "physical reality". Thus the persons inside the reference frame of the moving rod will not be able to choose to immediately destroy the emitter at point A when "handshake" event is taking place. Similarly, if there is a possibility for the occurrence that the emitter at point A is destroyed or breaks down at the time of "Handshake", it will also contradict the "physical reality" that "the laser emitter from point A emitted the beam of laser". Thus, there is no possibility for the occurrence that the emitter at point A is destroyed or breaks down at the time of "Handshake", according to the persons inside the reference frame of the moving rod. In sum, "the relativity of simultaneity" will result in "the absence of practical choices" and "the loss of practical possibilities".

However, in fact, self-evidently, there doesn't exist so-called "the absence of practical choices"(or "the loss of practical possibilities") in the reality for anyone in any reference frames. Instead, all practical choices are available for all people at all times, and all the practical possibilities can happen at all times. This includes that people from the reference frame of the moving rod can destroy the emitter at point A during the "handshake" and that the emitter at point A can be destroyed or can break down during "handshake", according to people from the reference frame of the moving rod).

Also, if "the relativity of simultaneity" is true, we can find that due to "the relativity of simultaneity", all events that have not happened yet in one reference frame can always have already happened in another reference frame. In this way, all things that haven't happened in reality can have already happened before they happen. For example, as shown by Figure 2, we can put our moving planet earth at point A and find another point faraway from our planet as point C which is inside the same moving reference frame as our planet.

Figure 2: Reference frame which point A and point C is inside is moving

And when point C passes by point E(a static point from a static reference frame) which can be considered a “handshake” event, for the people located on point E from the static reference frame, our plant’s future(next minute, or even next year) is already their past(for example, the laser beam from point A has already been emitted before “handshake” for people located on point E but this laser beam has not been emitted for people located on point C and point A). In this way, for any moving celestial body in the universe, we can always find a point C and a point E for it, and conclude that the future of this celestial body is already the past for the people on the point E. Thus for every celestial body in the universe, what have not happened would have already happened according to some people inside another reference frame. This will cause the previously-mentioned "the absence of practical choices"(or “the loss of practical possibilities”) to be extreme. The result will be: the future of everything inside universe is already pre-destined and cannot change in different directions. This result denies everything that makes the development of the world uncertain, including the existence of human being free-will choice, the existence of accidental random events, and the existence of probability factors and uncertainty in quantum mechanics.

Thus, the existence of human being free-will choice, the existence of accidental random events, and the existence of probability factors and uncertainty in quantum mechanics are in conflict with "the relativity of simultaneity". The fact that the development and evolution of the real world is uncertain is in conflict with "the relativity of simultaneity". And the fact that the future of the world are not strictly and precisely pre-decided is in conflict with "the relativity of simultaneity".

Conclusions:

- “The relativity of simultaneity” will cause the existence of physical reality to be uncertain.
- “The relativity of simultaneity” leads to multiple universes in the real world.
- “The relativity of simultaneity” denies the existence of human being free-will choice, the existence of accidental random events, and the existence of probability factors and uncertainty in quantum mechanics.
- “The relativity of simultaneity” cause the future of the world to be strictly and precisely pre-decided.

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