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Time Travel

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From ancient times to nowadays people have always been fascinated by time travel. The concept of it had been widely used in great amount of different mass culture products.

The time machine as a device which could transfer a person to any point of time is not possible anywhere except fiction. It is so because the physics of the backward and the forward time travel is pretty different.

There are two main methods of the forward time travel – biological and physical.

According to the biological method there is no big difference between time travel and the ordinary way of traveling through time simply by living per se.

The basic concept of this method is mainly based on stopping human metabolism with the further resurrection somewhen in future [1]. One of the most popular way to make it happen is cryopreservation. It is a process where cells, whole tissues, or any other substances susceptible to damage caused by chemical reactivity or time are preserved by cooling to sub-zero temperatures.

Right now there still is no method to save tissues and organs completely without damaging them while using the technique of cryopreservation. The success in such a process is also decelerating because the experiments on people who are still alive are banned. Nowadays cryopreservation is used not so widely in medicine, agriculture and scientific experiment.

The physical method of forward time travel is based on theory of relativity created by Albert Einstein.

According to the theory of relativity there are two ways of the forward time travel.

The first one has a great deal in common with cryopreservation. It is not about "jumping" between different points of time. Here the traveler does not notice the passage of time. If the traveler appears to be in the ultra-high gravity field, – near the event horizon of a black hole, for example, – the time for him begins to slow down and appears to be slower than for anyone outside of the event horizon.

The second method is based on travelling with the speed close to the light's one. According to relativistic physics the space and the time are interconnected and inversely proportional. So when the speed of a body is comparable to the speed of light, the time slows down in a moving reference system [2].

The theory of relativity and the fact of slowing down of time were confirmed by numerous experiments on the prolonging life of elementary particles and the deceleration of the macroscopic clock's progress during the movement of those particles [3].

The backward time travel is much more difficult. There are few ways, but there are more assumptions than any kind of reality.

If we take for a basis the Alexander Friedman's theory of the expanding Universe [2], the fact that the space and the time are interconnected would be considered helpful.

In theory if we find the point where the expansion of the Universe is happening (that means the space is increasing and the time is slowing down), then if we walk down along this "corridor" to the point where the expansion has begun, we are to have an opportunity to see how that expansion had begun in the first place.

Although such theory is pretty absurd, if the traveler decides to travel back this way, he will be held a great distance and possibly will age for decades just to travel back for a couple of seconds.

General theory of relativity admits the hypothesis of the existence of the wormholes [3]. Wormholes are a hypothetical topological feature of space that could be a shortcut between two separate points in space-time. In theory a wormhole might be able to connect extremely far distances, for example billions of the light years or even more, or short distances such as a couple of meters, different points of time and even different Universes.

Albert Einstein thought that the wormhole would shut down faster than the traveler could get out of it. But if some exotic matter which is a matter with negative energy density would hold the wormhole open, everything could become possible [4].

These were only theories but if we imagine that our traveler succeeded and somehow got in a different point of time we are going to face brand new pack of problems.

On the one hand there is the violation of causality. On the other hand we get all kinds of paradoxes.

But the main argument against the time travel is based on a well-known fact – the all of us are made of atoms. Those simple words contain pretty much everything, living and non-living, from human beings, animals, rocks, lakes to stars and black holes.

It is not only that we are made of atoms, it is also a fact that they are in constant so called “recirculation” [1]. The point is the Universe itself was created with the certain amount of atoms which are not reproducing anymore. What we see now is not the same from what somebody used to see in the past or going to see in future. Every single atom has already been in usage.

That statement leads us to a certain problem. Either forward or backward time travel creates two versions of the time traveler which means an extra set of his body atoms. That could under no circumstances be a good scenario. The best outcome is the atoms start the quick movement to their future or past versions and the time traveler is simply going to cease existing.

The second question comes from the astronomy basics [2]. Our Earth is moving around the Sun with the speed close to thirty kilometers per second. Our Sun is moving around the center of the Milky Way with the speed close to two hundred twenty kilometers per second. Our galaxy is moving away from the point of the Big Bang with the speed around five hundred fifty kilometers per second. The majority of the Universe is not even suitable for living.

According to that the problem of time travel turns into the problem of space and time travel, the traveler is unlikely to survive if one isn't capable of properly calculating the whereabouts of the Earth in any needed second of his destination. So it seems there is no time machine for us.

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