

TRAVELLING THROUGH TIME

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Can we travel in time or is it just science fiction? Modern physicists have already found an answer to this question – yes, we can. In order to get into the future, we have to travel with great speed, close to the speed of light. For clarity, let's look at an example of the story of twin brothers. One of them goes into space flight, while the other stays on Earth. When the first brother returns home, he appears to be younger than his twin brother. Why? The thing is that at the time when the traveler starts speeding close to the speed of light, all his actions will slow down for the observer and at the same time everything outside the spaceship will start to slow down as well. Theoretically, if we make a spaceship being able to speed close to the speed of light and working on nuclear energy not to feel the lack of fuel, people being in it could have reached the other side of the universe in 80 years' time, while for people being on Earth this time will be equal to billions of years.

It is not the only way to travel in time. It is known that the time slows down with objects having a big mass. Not long ago an Earth quartz clock was on board a spaceship which flew a year in Earth orbit was checked and it turned out that it was 19 million seconds ahead. According to the theory of relativity put forward by Einstein, gravitational effects are caused not by the force interaction of objects and fields in space-time, but by the deformation of the space-time itself, which is particularly associated with the presence of mass energy. In brief, it is not the objects that cause gravitation, slowing the time. It is time itself that slows down causing gravitation. Far away from our solar system there is a super massive black hole the mass of which exceeds the mass of the sun at 200 billion times and it sucks everything that is not far from it: asteroids, planets and even stars. This black hole has a huge mass and if you were to launch a spaceship in its orbit which will be attracted to it, but not so much to be sucked, the time for the crew will be slowed by half. That is, if the ship flies in orbit the black hole for five years and then it comes back, all people on Earth will become 10 years older by this time, while the crew will age only for five years. According to this theory, all people of the planet Earth are travelers in time. Sometimes it proves that the time is not constant. It depends on many things affecting it. You never seemed that a couple of hours of flying for five minutes or a few minutes of stretching like an hour? Here we can talk about the perception of time. Time perception can be apparently sped up for living organisms through hibernation, where the body temperature and metabolic rate of the creature is reduced. A more extreme version of this is suspended animation, where the rates of chemical processes in the subject would be severely reduced. Time dilation and suspended animation only allow "travel" to the future, never the past, so they do not violate causality, and it's debatable whether they should be called time travel. However time dilation can be viewed as a better fit for our understanding of the term "time travel" than suspended animation, since with time dilation less time actually does pass for the traveler than for those who remain behind, so the traveler can be said to have reached the future faster than others, whereas with suspended animation this is not the case.

The general theory of relativity allows for the possibility of the existence of wormholes. They are like tunnels (probably very short) that connect remote areas in space. The wormholes can be the size of a few atoms and scientists think how to make them wider to use them as tunnels to travel in time. It is assumed that the time doesn't look like a straight line as it is commonly believed, but it is more like a continuously winding road. The wormholes are some kind of paths in places where loops are close.

In 1936 Williem Jakob van Stockum discovered that an object spinning around a massive and infinitely long cylinder could travel back in time. (Later, Frank Tipler suggested that it was possible with a finite cylinder.) A similar device might be built from a cosmic string. There is no reliable evidence that cosmic strings exist and it does not seem possible to create new ones. Cosmic strings are astronomical objects, representing huge curves of the space-time.

This conversation about travel in time is very controversial. There are a lot of opinions and half of them may sound absurd. For example, travelling in time back and forward we have a paradox, which is called a paradox of a crazy scientist. Suppose we have a wormhole with a time difference of one minute and we can send objects through it into the past. This crazy scientist stands up near the wormhole, takes his gun, goes around this wormhole and sees himself standing a minute ago. He shoots himself and logically, the scientist from the past must be killed. But if he dies, who kills him? He, who is one minute older? It can't be because the scientist from the future can't shoot himself, being dead a minute ago. The paradox is that a person can't kill himself in the past because he was dead at a certain time in the future and when he is being shot, he will be dead. On the basis of this paradox there can be different theories solving it, such as: creation of parallel reality or possibility to kill yourself in the past. This science is based on hypotheses and assumptions. As there are not enough facts to present a complete picture, the science is extremely abstract at present. One subject often brought up in philosophical discussion of time is the idea that, if one were to go back in time, paradoxes could ensue if the time traveler were to change things. The best examples of this are the grandfather paradox and the idea of auto infanticide. The grandfather paradox is a hypothetical situation in which a time traveler goes back in time and attempts to kill his grandfather at a time before his grandfather met his grandmother. If he did so, then his mother or father never would have been born, and neither would the time traveler himself, in which case the time traveler never would have gone back in time to kill his grandfather.

Auto infanticide works the same way, where a traveler goes back and attempts to kill himself as an infant. If he were to do so, he never would have grown up to go back in time to kill himself as an infant.

This discussion is important to the philosophy of time travel because philosophers question whether these paradoxes make time travel impossible. Some philosophers answer the paradoxes by arguing that it might be the case that backwards time travel could be possible but that it would be impossible to actually change the past in any way, an idea similar to the proposed Novikov self-consistency principle in physics.

Another argument about the time machine is its location. An objection that is sometimes raised against the concept of time machines in science fiction is that they ignore the motion of the Earth between the date the time machine departs and the date it returns. The idea that a traveler can go into a machine that sends him or her to 1865 and step out into the exact same spot on Earth might be said to ignore the issue that Earth is moving through space around the Sun, which is moving in the galaxy, and so on, so that advocates of this argument imagine that "realistically" the time machine should actually reappear in space far away from the Earth's position at that date.

In conclusion, I would like to note that it is possible to travel in time, but only for a short distance. Probably, when people are able to make spaceships which reach a huge black hole or fly at speeds approaching the speed of light or understand how to widen extremely small wormholes, we will travel in time wherever we want. There will be travel agencies that will send tourists not to islands and warm countries, but back into the 15th century or the age of the dinosaurs. The idea of creating a time machine or travelling in time was depicted in science fiction a long time ago. As a result, we have so many inventions which shook the world....