ORIGINAL RESEARCH PAPER

Physics

KEY WORDS: Time travel, speed of light, paradoxes in physics

DIFFERENT WAYS TO TIME TRAVEL

Jeet Dutta Lecturer, Science & Humanities Department, Technique Polytechnic Institute, panchrokhi, Sugandhya, Hooghly

ABSTRACT

Time travel is a recognized concept in philosophy and fiction, defines as movement between different points of time as space. However this theory is mathematically proved but technically it is impossible to travel in time. However only one way time travel is only possible. One way to achieve time travel into the future would be travelling at the speed of light in space, as first theorised by Albert Einstein. There are many paradoxes in physics which explain why backward time travel is not possible. We discuss them in later.

INTRODUCTION-

Time is one of the great mysteries of the universe. We are all swept up in the river of time against our will. All of us have at some time wondered about the strange nature of time and how it differs from space. If we can move forward and backward in space, why not in time? From the perspective of science, time travel was impossible in Newton's universe, where time was seen as an arrow. Once fired, it could never deviate from its past One second on the Earth was one second throughout the universe. This conception was overthrown by Einstein, who showed that time was more like a river that meandered across the universe, speeding up and slowing down as it snaked across stars and galaxies. So one second on the Earth is not absolute; time varies when we move around the universe. According to Einstein's special theory of relativity, time slows down inside a rocket the faster it moves. But the speed of light is the ultimate barrier for any rocket.

History of the time travel concept-

Some ancient myths depict a character skipping forward in time.

1. In Hindu mythology, the ***Mahabharata*** mentions the story of King Raivata Kakudmi, who travels to heaven to meet the creator Brahma and is surprised to learn when he returns to Earth that many ages have passed.
2. The Buddhist P li Canon mentions the relativity of time. The Payasi Sutta tells of one of the Buddha's chief disciples, Kumara Kassapa, who explains to the skeptic Payasi that, "In the Heaven of the Thirty Three Devas, time passes at a different pace, and people live much longer. "In the period of our century; one hundred years, only a single day; twenty four hours would have passed for them.
3. The Japanese tale of "Urashima Tar ", first described in the *Nihongi* (720) tells of a young fisherman named Urashima Taro who visits an undersea palace. After three days, he returns home to his village and finds himself 300 years in the future, where he has been forgotten, his house is in ruins, and his family has died.
4. In 1836 Alexander Veltman published *Predki Kalimerosa: Aleksandr Filippovich Makedonskii* (The Forebears of Kalimeros: Alexander, son of Philip of Macedon), which has been called the first original Russian science fiction novel and the first novel to use time travel. The narrator rides to ancient Greece on a hippogriff, meets Aristotle, and goes on a voyage with Alexander the Great before returning to the 19th century.
5. Charles Dickens's *A Christmas Carol* (1843) has early depictions of time travel in both directions, as the protagonist, Ebenezer Scrooge, is transported to Christmases past and future. Other stories employ the same template, where a character naturally goes to sleep, and upon waking up finds itself in a different time.
6. Edward Everett Hale's "Hands Off" (1881) tells the story of an unnamed being, possibly the soul of a person who has recently died, who interferes with ancient Egyptian history by preventing Joseph's enslavement. This may have been the first story to feature an alternate history created as a result of time travel.

Ways to travel through time-

Now it's generally accepted that time travel is a one way trip, only going forward, and there may be some truth to that, but that's not guaranteed and it would be fun to imagine travelling at a faster rate to investigate the future, or even going against the flow of time to investigate the past, which leads onto our next method of time travel. As with a river, the current flows at different speeds in different places. Science as we know it allows for several methods to take the fast-track into the future or past.

1. Speed –

Einstein showed time was flexible and could be affected by speed, with his Theory of Relativity showing that as you approach the speed of light (186,282 miles per second) time slows down. Astronauts on board the International Space Station travelling at 17,000 miles per hour, for instance, age 0.014 seconds less than earthbound humans every year. Relativistic time travel even rears its head for the constellation of GPS satellites. If it wasn't for automatic corrections built into the system, geo location would be inaccurate by as much as 6 miles (10 km) a day.

If you were in a spaceship travelling at 90% of the speed of light, you'd experience time passing about 2.6 times slower than it was back on Earth. And the closer you get to the speed of light, the more extreme the time-travel. The highest speeds achieved through any human technology are probably the protons whizzing around the Large Hadron Collider at 99.9999991% of the speed of light.

2. Gravity-

The next method is also inspired by Einstein. According to his theory of general relativity, the stronger the gravity you feel, the slower time moves. As you get closer to the centre of the Earth, for example, the strength of gravity increases. Time runs slower for your feet than your head.

Again, this effect has been measured. In 2010, physicists at the US National Institute of Standards and Technology (NIST) placed two atomic clocks on shelves, one 33 centimetres above the other, and measured the difference in their rate of ticking. The lower one ticked slower because it feels a slightly stronger gravity.

To travel to the far future, all we need is a region of extremely strong gravity, such as a black hole. The closer you get to the event horizon, the slower time moves – but it's risky business, cross the boundary and you can never escape. And anyway, the effect is not that strong so it's probably not worth the trip. Assuming you had the technology to travel the vast distances to reach a black hole (the nearest is about 3,000 light years away), the time dilation through travelling would be far

greater than any time dilation through orbiting the black hole itself.

Therefore, while black holes will simply crush anything that enters them, by staying outside of its event horizon you could travel years into the future relative to an observer beyond its gravitational field, while for you just a few days would have elapsed.

Wormholes - A wormhole is a hypothetical passage in space-time connecting two separate points, thus giving the traveler the chance to traverse potentially astronomical distances instantaneously. Furthermore, general relativity predicts that if traversable wormholes do spontaneously exist, they could permit time travel through relativistic time dilation. However, there is no way to predict where the other end of them would be. Worse yet, theories seem to indicate it would be a one-use sort of thing, collapsing behind you as you pass through it. If it went anywhere, that would be the end of the journey – there would be no hope of return, and no way for someone to follow. We don't currently possess or understand a method for generating a wormhole, but current estimates suggest that we would need the output of an entire sun to create one. With only one Sun in our solar system, which happens to be in use of the moment

3. Cosmic strings-

Described as one-dimensional "cracks in the universe" and some of the strangest structures observed by cosmologists, cosmic strings could help us navigate through time. "Cosmic strings are either infinite or they're in loops, with no ends", explains J Richard Gott, an astrophysicist at Princeton University. "So they are either like spaghetti or Spaghetti Os." They are thought to have formed billions of years ago, moments after the Big Bang, and because they contain such large amounts of mass, some scientists believe they could potentially "warp" space-time around them. "The approach of two such strings parallel to each other, will bend space-time so vigorously and in such a particular configuration that, it might make time travel possible.

CONCLUSION –

Apart from physical problems, several paradoxes stand in the way of time travel. These include the "grandparent paradox", which has long flumoxed physicists and philosophers. As Science Alert explains, a time traveller could in theory prevent his or her grandparents from meeting, "thus preventing the time traveller's birth". This would make it impossible for the time traveller to have set out in the first place and kept the grandparents apart. However, cosmologists believe they have figured a way around this by suggesting that there is more than one universe in existence – the 'multiverse' model. This allows for every possible version of an event to take place. This, and other paradoxes, are situations that "give cosmologists nightmares,"

Research is still going on. May be in the next century we are able to meet our ancestors or probably successors. But beside all this things I would like to say that we all have a time machine with us, which is in our brain and often lead us to our memories of past. Then what about the future? Well why we should think about the future which is uncertain. There will be no time machine ever be possible to make, which will allow you to change your future ,except your will power.

REFERENCES -

[1]. "Physics of the impossible" by Michio kaku.
[2]. "Parallel worlds" by Michio kaku.
[3]. Hawking, Stephen (April 27, 2010). "Stephen Hawking: How to build a time machine". Daily Mail. Retrieved August 7, 2015.
[4]. Page Mitchell, Edward. "The Clock That Went Backward". Archived from the original on October 15, 2011. Retrieved December 4, 2011.
[5]. Lewis, David (1976). "The paradoxes of time travel"
[6]. Https://cosmosmagazine.com/physics/five-ways-travel-through-time
[7]. Http://www.astronomytrek.com/is-traveling-back-through-time-possible/
[8]. Http://www.theweek.co.uk/health-science/59106/time-travel-four-ways-in-which-it-could-be-possible