

# Time Frame Theory - A Possible Science Theory or Just A Beautiful Science Fiction

1Dr Soumendra Nath Bandyopadhyay, 2Satakshi Chatterjee

1Director, 2Head of The Department

1Haldia Institute of Management,

2Haldia Institute of Management

**Abstract** - Time is a concept that has puzzled researchers since the dawn of time. Time is regarded uni- versally for measuring the passage of time, however, the properties of time is debatable as it is abstract. It is not seen, felt or touched. Since it's a paper and not a book so it has been made sure maximum input is given without too much elongating the pages. This paper aims at dis- cussing the concept of time from the beginning of the universe till date. This paper looks into space time as the main understanding of time rather than the perceptual time understood by common person. Various important theories in this genre have been discussed in details. The measurement of time through the use of various devices such as the clock and the calendar has been discussed in details. Special importance was given to space time and it's relevance with Einstein's theory of special relativity and Einstein's theory of general relativity. The understanding of time through the human perception and human physiology is also discussed in this paper. The paper wants to give to it's readers a new concept of Time Frame Theory that states past, present and future has all occurred and it is encapsulated in time frame we are just merely passing by one of the frames so we cannot see all the frames together. The paper has argues how Astronauts are time travelers and how we can see past through telescope. At the end of the paper a new concept called Time Frame is given, since its just a concept as of now so in the beginning only the Title is given asking the readers their opinion on the subject they can classify this as a possible Scientific theory that can be worked on or just put it as one of the many Science Fictions that never becomes a part of the theory.

**keywords** - Time, Einsteins Theory of Relativity

## Introduction

Time is a very common term that most people are familiar with. In simple words, time determines the duration in which the various events take place. This duration is most commonly measured by clocks and watches. However, this is a very superficial definition of time which is incorporated in our day to day lives because of its simplicity. The concept of time is very complicated and as of yet, not fully understood by mankind.

Several faculties have tried to define time such as science, philosophy, religion and arts. Focus has been put in the measurement of time. As a result, the definition of time differs from one faculty to the other; however, the measurement of time remains the same for all the faculties. Today, time can be measured by two forms, clock and calendar. The clock is a device that measures the time for a singular day whereas the calendar provides a more detailed view about the time for more than a day.

## History of Time

From the start of this Universe till the end there will be time but understanding it is the main problem. The way we see time now was quite different from our ancestors. During the Egyptian Civilization time was measured by heliacal rising (when a star is visible above the eastern horizon just before sunrise) which occurs once each year. This was used to calculate flood in Nile and accordingly agricultural events were organized. This kind of time measurement was also done by the Babylonians and Greeks for their agricultural events. Slowly people tried to make time by the position of sun in the sky. As generations passed, people tried to calculate time by the shadow cast by a gnomon.

Our ancestors used to measure time by the position of moon as early as 6000 years ago known as the Lunar Calendar. Later it was reformed to the position of sun in 45 BC . This was known as the Julian calendar. Again in 1582 the Gregorian calendar came into existence. Till date it is now the most commonly accepted calendar.

The Egyptians around 1500 BC discovered the sundial. The sundial used a gnomon to cast a shadow which was then interpreted to calculate the hour. The problem was here it was difficult to calculate minutes forget about seconds. Also sundial needed a component called the sun, so in a rainy day or cloudy day it would not have been an affective device. Also sundial could measure time in a day not night.

Then Clepsydra or the water clock was invented. Again the credit goes to the Egyptian Civilization for this extra ordinary device. The benefit of this device was that it could calculate time even at night and in any season. The problem was it needed manual help constantly to replenish the flow of water.

Over the next few millennia, scientists have tried their best to measure time. Time intervals were measured based on certain pre-conceived standards such as a day, a lunar month or even a year. This invention was named as a clock. It is regarded as one of the oldest invention of mankind which is still in existence. Modern day clocks were different from their predecessors. These predecessors were based on their movement by nature. For example, a sundial depicts the time by analyzing as well as displaying the shadow's particular position on a flat surface. In these devices, there was a wide range of duration timers which were adjusted

according to the requirements. These were also referred to as the hourglass. Along with the sundials, the water clocks were also regarded as one of the oldest inventions.

With the invention of the verge escapement, a vast advancement occurred in the field of time measurement. This ensured the assimilation of the world's first mechanical clock which is the proto type of all modern day clocks today. This invention was made in Europe around 1300. In these devices, the oscillating to and fro motion of the handles of the clock was responsible for measuring the time.

The term 'Clock' refers to those devices which would indicate the passage of a hour with an indicative audible sound. However, a timepiece is a device which performs the same functions as that of a clock; however, it does not make any audible sounds. Gradually, over the years, the structure of the clocks was modified invariantly. In the 15th century, clocks that were driven by the springs were very common. This was a point in time when clock making flourished. This was because measurement of time was made relatively easy. In the year 1656, another significant development in clock making took place. The pendulum clock was invented and with this invention, the accuracy of the measurement of time improved drastically.

The 20th and the 21st century brought on the advent of the digital era. Clocks were developed without the mechanical parts used long before. The accuracy was also heightened. In the year 1840, the electric clock was patented. The modern day clock uses a timekeeping element which is common in almost all watches. This element is known as a harmonic oscillator which keeps vibrating at a fixed frequency. Various objects could be used as a harmonic oscillator. They might be a tuning fork, a pendulum, a crystal of quartz, any vibration which emits microwaves, etc.

Today, time is regarded as a very critical factor which influences a vast number of phenomenons. Thus, the international unit of time is second which is defined as 9,192,631,770 cycle of radiation that corresponds to the transition between two electron spin energy levels of the ground state of cesium atom. These units are used for conducting various experiments where time is a major factor that has to be included in the calculations. However, time is differently described in the world of physics.

### Review of Literature

Time is regarded as a property which is helpful in measuring the events which happens over a course of time. Clocks are generally used for this measurement. It is helpful in determining the sequence in which the events occur as well. There are three key features in time. Firstly, the sequential arrangement of the events could be determined with the help of time. Secondly, it determines the longevity of an event and how long it will last. Lastly, it can be also be used to predict an event. This can be done through the use of a calendar (Dowden, 2005).

Aristotle, Libniz and many others have already suggested through the help of their theories that time cannot exist independently. However, other scientists such as Newton, Plato and many others have argued this point. They have stated that time is an independent entity. They have compared time with that of an empty container which can be filled with other entities such as space, however, it in itself remains independent (Markosian, 2008).

There are various notions of time that exists today. One of the first theories of time has been suggested by a philosopher named Heraclitus. He suggested that the present is a real entity; however, the past and the future are not real entities. However, this idea was drastically changed with the help of Einstein's theory of relativity. Furthermore, in the year 1908, Hermann Minkowski suggested that time as well as space can be clubbed together into the fourth dimension along with length, breadth and height. From here the concept of block universe (4D) arose. This theory suggests that the past, present and future are equally important (Peterson & Silberstein, 2009).

However, the challenge with the experimentation of time is time itself. The concept of time cannot be fully explained without taking the assumption of time in itself. Also, if the past, present and future do exist, then it must be possible to travel to the future or the present as well (McTaggart, 1908).

Thus, there are a number of questions that are yet to be answered by the scientific community regarding the existence of space and time. It has been 2500 years since we have started investigating time but concrete answers are yet to be proven. Some of the most important questions today are the following:

- What is time in actuality?
- When nothing is made to change and everything is constant, does time exist in that situation?
- Is time travel possible?
- What would be the nature of this time travel?
- Why is time uni directional?
- Why the existence of the past, present and future cannot be questioned?
- What is meant by the flow of time?
- Will the future time will be infinite?
- Was there time before the big bang?
- What is space motion with respect to time?

There are many other questions like the ones stated above and science is trying to answer them even today (Shevchenko & Tokarevsky, 2011). This paper tries to analyse the research which have been done on space and time throughout the centuries and what are the theories which are commonly accepted of space and time today.

### Analyzing the Concepts of Space-Time in Physics - A Theoretical & Philosophical Analysis

Albert Einstein has worked extensively to understand the meaning of time. He came up with his special theory of relativity in the year 1905. In general, it is off our understanding that time defines the progression of different events from the past to the present and also from the present to the future. The flow of time is always unidirectional. Einstein's theory of relativity states that time is not constant for all. For example, let us assume that two individuals, Mr. X and Mr. Y are doing research on space travel. Mr. X is sitting in the control room of his laboratory on Earth, whereas, Mr. Y is travelling to a distant planet in a spacecraft. It has been seen that the time for Mr. Y runs slower than that of Mr. X. This phenomenon is known as time dilation.

Also, the speed of the two persons has an effect on the length. This is known as length contraction. So, for Mr. Y, the length he is travelling to a distant planet is less than that of Mr. X.

So, with this theory, it can be understood that the past, present and future is already paved out in the universe. The future already exists in the space; however, we cannot jump right into it today as we do not have the advanced machines which would aid in this today.

Einstein modified his theory of relativity in the year 1915. He named this theory as the general theory of relativity. It states that the existence of all events happen with a reference point of view. For example, a person is travelling in a plane. This person have been sitting in his place for the entire duration of the flight, as a result, we can say that this person does not have any kind of displacement. However, this is a statement which can be made from one point of view. It is not necessary to hold true always. If this plane is observed by a person on the surface of the earth, the plane is travelling from one point to the other, thus, registering displacement. By virtue of this, the person sitting inside the plane will also register displacement which is contradictory to the statement which was made earlier. Thus, these events in time occur with a specific reference in mind.

Time was considered as an illusion by Einstein. He stated that time and space could be bended, thus, causing an illusion. Time is not constant for all in space. It changes from person to person. For example, time speeds up for a person who is in motion as compared to a person who is relatively at rest.

The scientists had a perception that the space was flat. However, according to Einstein, space is curved. Also, he believed that time is not a constant but a fourth dimensions. However, unlike the other dimensions of length, breadth and height, time cannot be seen or touched. It can only be perceived as it is an intangible property. With this, the entire plethora of the understanding of space and time was changed drastically. Many questions were finally answered through this theory. There were many new questions that were made which have not been answered as of yet.

Moving on to the next aspect, first let us have a look at the units of time used today. The speed of light is 299792.458 m/s. Till now, the maximum speed that can be reached is the speed of light. Light year is used to depict the astronomical distance in space. The light which travels in one Julian year, that is, 365.25 days, in vacuum is known as a light year. This unit is extremely helpful as because it can be used to measure large distances in space. So, it is off our understanding that the speed by which light travels is fixed. However, according to Einstein, it is believed that time varies with that of motion.

#### **Time Travel -A Possibility or a Fantasy**

In order to delve deeper in to this concept, let us take an example. In the earlier example where Mr. X is sitting in the control room of his laboratory on Earth and Mr. Y is travelling to a distant planet in a spacecraft, it is assumed that if Mr. Y is able to travel through space with the speed of light or more than the speed of light, Mr. Y would age considerably slower as compared to that of Mr. X who is sitting in the control room. Theoretically, it is possible to reduce the ageing of human beings through this concept, however, practically, it is not possible. This is because as of date, we do not have the equipments which would help us travel at the speed of light or more than the speed of light.

It has been seen that the astronauts who travel in space are younger than that of the persons who are living on Earth by 38 micro seconds per day. This proves that indeed the speed of motion of a human being has a significant effect on time. The astronauts could be considered as time travellers who can travel through space at a speed higher than that of the people who are living on the surface of the Earth. This also sheds light on the fact that time travel is indeed possible and with the right theories and equipments, it can be done practically.

Earlier, we have stated that Einstein considered space-time as the fourth dimension. This point can be further validated with the help of an experiment. A bed sheet is taken and it is stretched out in the four corners. If a tennis ball is placed on this bed sheet, it forms a dimple in the fabric of the cloth. This same thing happens in the space as well. The stars and other celestial bodies are objects in space and they form a curvature in the fabric of space. This bending causes the object to move in a curved path in the curvature of space which results in a force. This force is known as gravity.

Time is considered to be irreversible. In theory, it is possible to travel to the future as well as the past. However, in practical scenario, it is not yet possible. Hence, time can only travel in a singular direction and that is forward. This is also referred to as the arrow of time. This concept of time is further supported by the second law of thermodynamics.

The second law of thermodynamics states that the entropy of a system remains constant or increases within a closed system. If the universe is regarded as a closed system, then the universe cannot revert back to the same state as it was in a earlier period of time. That is why time is branded as irreversible. But, the past events can be viewed across the space. Let us look at an example. If a telescope is taken and events are observed in the space, the events which are recorded have already happened in the past. However, we are viewing that past event in the present because of our unique position in the space. The light from that event takes time to reach us and that is called the time gap. So, we can observe the events that have happened in the past. Let us try to understand this concept with an example. Let's presume that Mr. X is getting married in a planet which is 400 light years from us. With a high resolution telescope Mr. Y sitting on earth is watching that marriage then in actuality Mr. Y is seeing Mr. X getting married which happened 400 years ago and by now Mr. X does not exist. Light took 400 years to travel from Mr. X's planet to earth for Mr. Y to observe it. This means Mr. Y in present saw an event of past. This means when an event occurs, it get transported in the space time fabric and it's only the position of the other person that will determine when the event is viewed. So theoretically speaking, Mr. Y just viewed history in this present time.

#### **Human Understanding of Time**

The human brain can also track time with the help of suprachiasmatic nuclei. Human brain can also increase or decrease the speed of time through its perception. It has been seen that at times of happiness, time passes very quickly whereas at time of depression, time passes very slowly. This is because the neurons are excited at times of happiness through the release of various chemicals in the body. This would make result in a perception by the human brain that the time is moving very fast. At times of depression, the neurons are not excited because the chemicals are not released in the body. As a result, the time moves very slowly according to our perception.

There is also a theory that the time travels faster for the older generation as compared to the younger generation. Scientists believe that memories are formed for the younger generation that is crucial for their adulthood. Hence, time travels faster for them. However, for the older generation, relatively less number of memories are formed and hence, time travels relatively faster for them. All of these are the result of the perception of the human beings and it binds out from what is actually happening.

### **The Beginning and End of Time**

There is one school of thought that suggests that time is eternal. Time was there even before the big bang of the universe and it will be there even when the universe comes to an end. However, another school of thought contradicts this belief. It states that time is not eternal. It had a particular starting point and it will be having an ending point as well.

This concept can be demonstrated with an example. At first, let us consider the theory that time is eternal. Let us take a wheel and mark A, B, C and D in four points of the wheel and swing it. We will find that the point A, B, C and D will keep on hitting the floor several times as long as the wheel is spinning. Now, if we consider the wheel to spin eternally this will mean that the point A, B, C and D will keep hitting the floor eternally. This means if we take the wheel as time and the A, B, C and D as events, then if time was eternal the events are going to happen again and again. In this case, time can be considered as a cycle wherein the same events will be repeated again and again. Einstein's theory of special relativity implies that time is elastic and it depends on the motion of the person. However, this scenario proves otherwise. If this scenario is considered, then it can be said that the events happening in time are fixed. In simple words, it is depicted that the life events of human beings are fixed and the same cycle is repeated again and again.

This is the case only if time is considered as infinite. However, some scientists have found evidence to the contrary. Cosmic radiations can be measured from the time of the big bang. No traces of cosmic radiation have been found before the occurrence of the big bang, leading the scientists to believe that the starting point of time is at the time of the big bang, that is, 13.799 billion years ago. Also, if time would have been there before the big bang then the sky will be filled with the light of some of the older stars. However, this is not the case.

If time is considered to be finite, then Einstein's theory of general relativity would hold true. Let us take the previous example for this case as well. The events A, B, C and D will not be the same in all the cases. The events would not be fixed. This might result in the parallel universe theory wherein all the matter remain the same but the outcome of the events differ across many planes of existence.

Scientists believe that if there is a big bang in the universe today, then it will nullify the previous big bang and time as we know today will cease to exist. It will be redefined with the new big bang that will occur. A person who will be studying the universe 100 billion years from now will perceive that time had started from today onwards.

It is of common knowledge that the universe is expanding today. It was discovered in 1929 by Edwin Hubble that the galaxies are moving away from us. According to Einstein's theory of general relativity, the universe either has to expand or contract. There is no other alternative. Recent research has proved the fact that the universe is still expanding. It is growing at a tremendous speed which is utterly expected. This was discovered by Adam Reiss. The reason for this is unknown; however, speculations suggest that the production of dark matter might have accelerated the speed of expansion of the galaxy.

If the concept of closed universe is true and time has a definite beginning at the time of big bang, then it will come to an end also at some future point of time. The universe will continue to expand until it reaches an ultimate point. The contraction will start from this point onwards as the gravitational force will pull all the matter together and then all the celestial bodies will assemble together in a point of solidarity. This will be known as the Big Crunch.

### **Our Time Frame Theory - A Possible Science Theory or Just A Beautiful Science Fiction**

We have understood from the above analysis that astronomers are time travelers in one hand in the other hand we are being the past through the telescope which means that in an given point of time the past ,present and future is present only it depends on the position of the observer to feel where he is. If that is the case this will mean that the being of time, the present and the end of the time would be present all together and similarly the start and end of the Universe would have had happened in different time frame.

We want to put a new theory to the world that every event happens in a frame of time and that frame is encapsulated which can never be changed and that frame of time can be viewed by the observer if his position is in the right spot. What this means is we want to tell the world that time and space is eternal it has been happening ,and will continue happening without any start or finish and all events that has happened can be viewed by anybody as long as he or she is in the right position. This we can also prove by the simple things that we see in space through a telescope this is due to the fact through a telescope we only see the past. So in the present day we can see the past this is due to the time taken by light to reach us from the event that occurred in the space.

So if somebody in another planet which is 2500 light years away takes a high resolution telescope and start viewing Earth he will be able to see the Era of Alexander the great. This means though Alexander the Great is no more for centuries but still for that person he will be alive and fighting many wars. This simple concept states that it is directly on the view to see the past or present according to the instrument in hand. Here the high resolution telescope is helping the person see events in the back. Why is the person seeing things in the past is due the distance the person is from earth that means light took 2500 years to reach him. We all stop here but why don't we look at the next statement that says if something that has happened is not captured in the so called notion of space-time then this person will not have been able to see the event.

So it can be deduced very easily that past can be viewed but what about future. We know the direction of time is always forward. So how can we see the future from the present. This was answered by the earlier part of our paper that stated that Astronauts are time travellers. Though the time frame may be very small 38 microsecond but still it proves the theory that future has also happened in a time frame it is only our position that will able to let us see the future.

So can if we develop a machine that can see the past and future, so at least if we can not travel to past or future we can see it. Theoretically it has been proven that time exists in past and present so we feel that in due course of time such machine will be build. There will of course be some constrains that we can nullify as we do further research on this.

Will that not be fascinating to lay in your living room and looking back at the past and the future well it will be but there can be certain paradoxes like if we see the future will we be able to change that by avoiding certain events or can we win lotteries by getting to know the winning numbers. This is the part our papers wants the researchers to do further research on.

To make this theory more full proof we need to get rid of this paradoxes but after the knowledge of astronauts time travel we are very upbeat that at least we can prove that time do exist in past ,present and future.

### Conclusion

This paper dealt with the concept that time frame and looked into Einstein special relativity theory and general relativity theory. The paper tried to give examples in dealing with time travelling my astronauts and how that knowledge can be used for developing machines that can be used to peep back to our future or to look to the future.

This paper tried to tell all events in space and time is captured in time frame and that time frame can be viewed by an observer provided that the observer is in the right place to see it. We also looked into the physiology and perception of time by human. We showed how we perceive time to speed up or slow down depending on the events happening in the life of the person. This can also be related to the time frame theory that is if more events happen in the same time frame the person will feel time is happening slowly that is because space and time is framing the events in the time frame. It is similar to uploading heavy files in a computer. More the data in the file more time taken to upload. Similarly more events in life more people will think that time are passing slowly.

The question that was not answered in this paper was can we travel in time. H. G. Wells had given us in our childhood something to dream about when we wrote a brilliant book by the name Time Machine. Generations have passed but still we are far from developing such machine. Many scientists do not believe time travel is possible but the Astronauts time travelling gives us some hope. On this hope we are trying to build a new theory called Time Frame Theory. Will this theory stand or fail that again time will tell. The theory is just in the starting phase lot of improvement in it is needed more imperial analysis has to be done but first we need to accept the Philosophy in it.

In our theory there are certain paradoxes like fewer events and more events in time makes us perceive time is passing slowly or fast but the time taken is same how is it possible. Another paradox is if we know the future can we change it. Well we hope ourselves or other scientists will be able to correct these paradoxes.

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