

## A Brief Note on Origin of Time

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### Abstract

The aim of this paper is to find the origin of time to get answers of questions such as what was before big bang. Does time existed before big bang? From where did the time started? These questions don't have specific and simplified answers but this paper will give it. By considering the situation that can be before big bang and origin of universe it can be easily calculated the behavior of time at that stage. The nature of time is totally dependent on the surrounding activities. The motion is the thing from which time can be said as the thing that brings time into existence because its type only way to measure time and presence of motion is the thing that shows presence of time. The time and its value are 2 different things are described in this paper.

**Keywords:** *Cosmology; Astronomy; Big bang; Theory; Universe; Time; Space; Beginning of universe*

### Introduction

In this paper we will study the origin of time or from where does the time started? Many researches are being conducted on time' but the motive of today's researchers is to do time travel. In this paper we will study the concept of time [1]. Most of the people don't perceive real definition of and therefore they misunderstand the concept of time so we should know what time exactly mean [2]. Time is defined as a continued sequence of existence and events that occurs in an apparently irreversible succession from the past, through the present into the future. In simple terms it can be said as the change or the interval over which change occurs [3-5]. Now this was simple definition but Albert Einstein believed that time is a 4<sup>th</sup> dimension and as we are 3 dimensional beings we can't change time or control it but we can only sense it. This study will state the proper begging of time. This study will also help in research of origin of universe because time is the initial factor [6].

### Literature Review

The standard model of big bang says that space and time both had a beginning which started from a singularity. The big bang theory explains the formation of universe in every milliseconds but it fails to answer the absolute beginning of it. Cosmologist Stephen Hawking and James Hurtle proposed a theory named no boundary proposal. This theory says that universe is finite but does not have a boundary (in imaginary time), so in this theory the time at the beginning was taken as imaginary (root of -1). This theory states that there was no time before the beginning of universe. The graph of this model and big bang is different. The difference can be seen in the Figure 1 below.



FIG. 1. Figure is showing both the standard big bang model and Hartle-Hawking "no boundary model".

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It can be seen that this model has no specific boundary like big bang theory but still Stephen Hawking fail to prove the beginning of time by the statement “asking what was before big bang is like asking what is south of south pole”. Even the big bang says that there was no time before the big bang and it started along with big bang but it doesn't give any clear reasons. There are also other theories like Lee Smolin's “fecund universe” hypothesis, Roger Penrose's conformal cyclic cosmology, Steinhardt-Turok model etc. which states formation of universe but none of them clearly explain beginning of time.

## Methodology

The time that we described above deals only with change so if we go back to early universe when there was nothing or just singularity which is almost equal to nothing. This clearly means that there was nothing that can change its position or can be in motion so it's actually not possible to measure the interval of change. If you would be asked what will happen if we stop time then your answer would be like every moving objects will be stopped *i.e.* movement of everything will stop. To know whether time is stopped or not you would first observe the surrounding. Similarly if we want to know that whether time was present before big bang then we must know it's surrounding which was nothing so it would be unable to know whether something is moving or not because there nothing so it can be said that time was zero.

The basic formula of time is distance divided by speed so as there was nothing to travel and even the space was at singularity so both the distance and speed becomes zero therefore time also becomes zero before big bang. This was only for the regular definition of time which is just about the change in surrounding. It is the big bang when things started to move therefore it can be said that time started along with big bang. This is said because the time existed before big bang but its value would be equal to 0. Here it can be said this possibility that nothing (which can be also said as a thing!) is moving therefore we can't deny the existence of time but we can give it a value 0 because even if nothing is moving the value will be zero.

## Results and Discussion

The value of time before big bang becomes zero but this doesn't mean that time doesn't exist before big bang because the time was always present just the thing is that we didn't find anything that can show that the value of time greater than 0.

This solution is not only valid on big bang theory but also on other theories. The big bang theory is most relevant theory for origin of universe therefore it is taken in the context. If we take another theories like string theory which predict some events before big bang can give value of time before big bang but the value of that time would be constant as it would be impossible to predict exact value of time so according to our study the value of time would be raised above zero.

## Conclusion

Hawking summarizes the efforts made by humans through their history to understand the universe and their place in it: Starting from the belief in anthropomorphic spirits controlling nature, followed by the recognition of regular patterns in nature and finally with the scientific advancement in recent centuries, the inner workings of the universe have become far better understood. However, Hawking states that the uncertainty principle introduced by the quantum theory in the twentieth century has set limits to the predictive accuracy of future laws to be discovered.

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