

# A Deliberate Answer to Why Time Exists: How Higgs Field is Relevant to the Present Arrow of Physical Time

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**Abstract:** *What is a physical time? Why it exists the physical time. Why we should consider the present arrow of physical time the way it is now in the context of psychological recognition of time such as past, present and future. Why past is definite and future is uncertain psychologically. Can the physical time anticipate what is going to happen in the future? Why time has a single dimension and why it is unidirectional – the present arrow of physical time. Does time exists in the black holes where all of the physical theories break down to singularity. Why Hawking's radiation should exist. The paper will discuss with proper reasoning of all of the above said questions to find a deliberate answer about the characteristics of the physical time in the context of physical time arrow as it is now in the present state of the Universe. A deliberate answer in the sense that it is a new innovative answer to the long standing questions about the physical time.*

**Keywords:** Physical Time, Present Arrow of the Physical Time, Black Holes, Singularity, Hawking's Radiation

## 1. Introduction and the Theories

**Theory 1:** The physical time of an object is a function of speed of the object and the speed of light. On average, the physical time of an object is directly proportional to the difference in speed between speed of light and the speed of the object.

**Theory 2:** The evolution in an object reaches zero when it achieves the speed of light and the object at the speed of light sees time is zero. Then, no evolution is allowed by nature, the object become permanent in the Universe as long as it maintains the speed of light.

**Theory 3:** Information is a conserved quantity, does not matter we can access it or not. Information entered into the black hole is permanently stored on the surface of the black hole as a two-dimensional hologram.

**Theory 4:** Time is Unidirectional as long as the object has a speed on the left side of  $S$ -plane (Speed plane).

**Theory 5:** Because time is a function of speed and speed has single dimension, thus, time also has single dimension too.

**Theory 6:** Black Hole is a rotating disc at the speed of light, thus time has no meaning inside the black hole. If a three dimensional object falls into the black hole, it will become a two dimensional hologram at the surface of the black hole without any evolution because time has no meaning inside the black hole. For an observer outside the black hole, the object is permanently stored as information in the rotating disc of the Black hole.

**Theory 7:** The objects close by of an object has a significant effect on the speed of the object, thus, has a significant effect on the time of the object. The objects nearby form a system and the objects have significant effects on the motion of the particular object.

**Theory 8:** The significance of an object nearby is directly proportional to the mass of the object nearby and inversely proportional to the square of the distance between them. Unless there is no significant change in the speed or unless there is no significant change in the chemistry of the objects nearby of a system, the time of an object can anticipate the future, what is most likely to be happened in future. Thus, future is never probabilistic but a deterministic occurrence only.

**Theory 9:** While the speed of the object define the speed of the time in that object and the chemistry of the objects nearby in a system decides the positivity or negativity to be happened.

**Theory 10:** Generally energy travels at the speed of light but if energy for some reason goes on the right half of the  $S$ -plane, Hawking's radiation takes place from the black hole.

Suppose you are moving in a room with ease because air does not provide much resistance to you. You can be termed as almost resistance less mass. But if the room is half filled with water, you find it difficult to move and you find significant resistance [1, 2]. You can be termed as massive astronomical object while water can be termed as the Higgs field for which you feel resistance and the reason you are massive [3, 4]. But fish does not feel resistance in the same water. The fish can be termed as massless particle like photon. Thus, if Higgs field interact with you, you feel resistance while moving, you acquired significant mass because of the resistance and you travel much less speed compared to the speed of light [5, 6]. But if Higgs field does not interact with you, you feel massless and you travel at the speed of light [7, 8]. As all fields travel at the speed of light, Higgs field also revolve at the speed of light, the reason why Higgs Boson does not have any mass.

## 2. What is Time?

The Physical time of an object is a function of its speed and the speed of light.

$$T = f(S, C)$$

Where  $T$  is the physical time of an object.

$S$  is the speed of the object.

$C$  is the speed of light.

The physical time is directly proportional to the difference in speed between the speed of the object and the speed of light.

$$T \propto |C - S|$$

$$T = K|C - S|$$

Where  $K$  is a universal constant.

Generally,  $S \ll C$  [9, 10], the reason why time is generally plays a significant role in that object because  $|C - S|$  is significant in the equation.

## 3. When the Physical Time is Zero

When,  $S = C$ , the time of an object reaches zero. Thus, evolution stops and any change in the object is not allowed by nature. The object at the speed of light becomes permanent object without any evolution in the Universe as long as it maintains the speed of light.

$$T = K|C - S|$$

If  $S = C$ ,

$$T = K|C - C|$$

$$T = 0$$

Any object having non-zero mass has a speed limit in the Universe [11, 12], it cannot exceed the speed of light. Thus, for any given time, the object can travel a maximum distance possible that is allowed by the speed of light [13, 14].

## 4. Why Time is Unidirectional

In the present state of the universe, all masses have speed  $S \ll C$  [15, 16], thus, the sign of the equation is always the same.

$$T = K(C - S)$$

Because,  $S \ll C$ ,  $T$  is always positive. The physical time is always positive. That is why time is unidirectional in the present state of the Universe that flows from past to future through present [17, 18].

## 5. Why Time is One Dimensional

The Physical time is a function of difference in speed only. Because speed is a single dimensional parameter, the physical time is also single dimensional parameter too.

$$T \propto |C - S|$$

$$T = K|C - S|$$

Because  $(C - S)$  is single dimensional parameter, the physical time is also single dimensional parameter too.

## 6. On The $S$ - Plane

At the present state of the universe, time is always positive and single dimensional parameter too. The physical time of an object can be termed as unidirectional vector where the arrow heads psychologically from past to future through present.

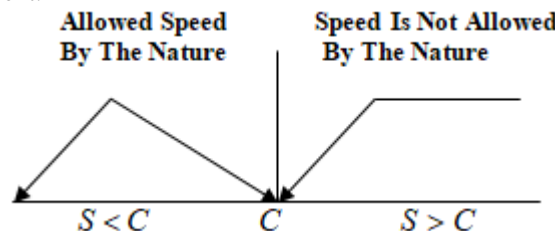


Figure:  $S$  - plane (speed plane)

Because all the astronomical bodies in the observable Universe have speed that are on the left half of the  $S$  - plane, the physical time is always positive and unidirectional vector with single dimension only.

## 7. On The Black Holes

Black Hole is basically a rotating disc which revolves at the speed of light in its own axis, thus, time is zero or time has no meaning inside the black hole. If a three dimensional object falls into the black hole, it will become a two dimensional hologram keeping all the information intact but without any evolution because time has no meaning inside the black hole. For an observer outside the black hole, the object is permanently stored as information in the rotating disc of the Black hole. Because black holes revolve at the speed of light, light cannot escape from black holes. From outside, black holes really look black.

## 8. On The Closed System

Although nothing is an absolute closed system, everything is related to everything. But in terms of significance, the solar system can be treated as closed system where the motion of Earth primarily controlled by Sun and indirectly controlled by the other astronomical bodies of the solar system. The objects close by of an object has a significant effect on the speed of the object, thus, has a significant effect on the time of the object. The objects nearby form a system and the objects nearby have significant effects on the motion of the particular object.

$$SS \propto \frac{M}{d^2}$$

Where  $SS$  is the degree of significance.

$M$  is the mass of the object nearby.

$d$  is the distance of the nearby object.

Unless there is no significant change in the speed or unless there is no significant change in the chemistry of the objects nearby of a system, the time of an object can anticipate the

future, what is most likely to be happened in future. While the speed of the object define the speed of the time in that object and the chemistry of the objects nearby in a system decides the positivity or negativity to be happened.

## 9. When Hawking's Radiation Takes Place

When anything goes in the right side of the  $S$  – plane, it does escape from the Black Holes in the form of radiation which we call it Hawking's radiation. The particle came out of black hole is actually came out from no time zone (singularity) to time zone where it loses its velocity to  $\leq C$  to be part of unidirectional time zone.

## 10. On The Psychological Division of Time

Time flows in the forward direction almost uniformly in the Earth because Earth has almost uniform velocity and thus, uniform difference in velocity  $|C - S|$ . Unless Earth goes on the right half of the S-plane, we can never go to past. Thus, travelling to the past is an illusion only at the present state of the Universe. Unless Higgs field changes its characteristics, astronomical bodies will have velocity  $S \ll C$ , going past is never feasible. The future of the Earth is totally predictable unless, it changes its velocity drastically or the chemistry among all planets in the solar system breaks down. Without any external disturbances, future can be easily tractable because of the linear relationship between speed and the physical time.

## 11. Conclusion

The physical time of an object is a function of speed of the object and the speed of light. On average, the physical time of an object is directly proportional to the difference in speed between speed of light and the speed of the object. Evolution is the proof of the existence of time that flows in the forward direction. The evolution in an object reaches zero when it achieves the speed of light and the object at the speed of light sees time flow is zero or time has no meaning. If time is zero, then, no evolution is allowed by nature, the object become permanent in the Universe as long as it maintains the speed of light. Any object having non-zero mass, has a limit of maximum distance travelled at a given time allowed by the speed of light. It implies nature indirectly put limits of the information access from the Universe. Time has a forward temporal arrow and it is unidirectional as long as the object has a speed on the left side of  $S$  – plane (Speed plane). Time will flow in the reverse direction if object enters on the right half of the  $S$  – plane. Because time is a function of speed and speed has single dimension, thus, time also has single dimension too. Black Holes are rotating disc at the speed of light, thus time has no meaning inside the black hole. If a three dimensional object falls into the black hole, it will become a two dimensional hologram without any evolution because time has no meaning inside the black hole. For an observer outside the black hole, the object is permanently stored as information in the rotating disc of the Black hole. Thus, information is a conserved quantity, it does not matter

whether it can be accessed by psychology or not. The significance of an object nearby is directly proportional to the mass of the object nearby and inversely proportional to the square of the distance between them. The objects nearby of an object has a significant effect on the speed of the object, thus, has a significant effect on the time of the object too. The objects nearby form a system and the objects nearby have significant effects on the motion of the particular object. Unless there is no significant change in the speed or unless there is no significant change in the chemistry of the objects nearby of a system, the time of an object can anticipate the future, what is most likely to be happened in future. While the speed of the object define the speed of the time in that object and the chemistry of the objects nearby in a system decides the positivity or negativity to be happened. Generally energy travels at the speed of light but if energy for some reason goes on the right half of the  $S$  - plane, Hawking's radiation takes place from the black hole.

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