Current Trends in Technology and Science
ISSN : 2279-0535. Volume : 04, Issue : 03 (Apr.- May. 2015)

Nothing Puzzles Me like The Physical Time: A Two Dimensional Approach of The Physical Time

Name : Prasenjit Debnath
Designation : PhD Student Organization : NIT Agartala, India Email ID : prasenjit1001@yahoo.com

Abstract — What is the physical time? Is it fully perceptible by human psychology or is it the effect of actual physical time on psychology and that effect we assume as the physical time all about? Based on psychological perception, is it an ever-rolling stream or is it a railroad track? Does the physical time have a beginning? If so, how it started its journey and where it is leading us to. What is the shape and direction of the physical time? Whatever the questions about the physical time, we are option less but to find the necessary solution with in the limitation of human perception and psychology. According to the Einstein's theory of relativity, one cannot curve space without being involved the physical time as well and thus, according to Einstein's theory, the physical time has a shape. However, it also appears to be unidirectional, just one way direction as is true for a locomotive in a railroad track. Sir Isaac Newton gave us the first formal and influential mathematical model for the physical time and space. In Newton's mathematical model, the physical time and space were a background where events rather psychologically recognizable events, to be precise, take place but which were not affected by them. The physical time was a separate identity from space and was considered to be a single line only just like a railroad track, which was infinite in both directions. The physical time itself was considered eternal, in a sense that it had existed for ever and will exist forever too. In the context of the Newtonian mathematical model, in which the physical time was an infinitely single lined, it was independent of what was happening in the physical Universe that we live in. However, in 1915, a completely new mathematical model was proposed by Einstein: the general theory of relativity. The general theory of relativity combines the physical time dimension with the three dimensions of space to form what is called the space-time. The general theory of relativity incorporates the effect of gravitational force by saying that the distribution of energy and matter in the physical Universe wraps and distorts the space-time itself. So, according to the theory of general relativity, the physical time is not flat at all and objects in this Einstein's space-time try to follow the path of a straight line, but because of the space-time is wraps to be curved, their paths appear bent. I propose a mathematical model of the physical time having two-dimensional approach in which there is an imaginary physical time direction at the right angles to ordinary real time line. The proposed model can completely determine the history in imaginary time from the real ordinary physical time and vice versa. The magnitude of the imaginary time will tell the change of rate at which the real physical time with respect to the rate of physical time in the absolute vacuum as reference.

Keyword — The physical time, Eternal, Space-time, the general theory of relativity, absolute vacuum, matter and energy, The physical Universe, the two-dimensional physical time, Parallel Universes.

1. INTRODUCTION

Imaginary numbers are just a different mathematical construction only [1], with respect to real numbers. Similarly, imaginary time is another way to express a real physical time line [2-5]. Then one might think of that, it means that the imaginary numbers are just mathematical game having nothing to do with the real world or the physical Universe [6, 7]. Well, from the viewpoint of the philosophy of positivist, one cannot determine what is real [8]. All one can do is to formulate a mathematical model that completely describes the physical Universe we live in [9, 10]. So, what is real and what is imaginary? Is that a distinction that is purely psychologically established concept? A real can be described as a set of rules or physical laws, we used to, in the physical world. If so, we definitely cannot have an imaginary credit card bill.

2. WHAT IS IMAGINARY TIME?

A real space-time can be resembled as a sphere like the surface of the Earth [11, 12]. The real physical time direction can be represented the distance from either the South Pole or the North Pole as reference frame. As one moves from South Pole to North Pole, the circles of latitude at constant distances from the either Pole become bigger resembles the Physical Universe expanding with the real physical time. The physical Universe would reach its maximum size at the equator and then contract again with the reverse of the real physical time to a single point in the South Pole again. Even though the Universe would have zero size at a single point at Poles, we can avoid the concept of singularities as being assumed in the theory of general relativity [13-15], where the theory of general relativity breaks down [16, 17], just as the North Pole and South Pole on the Earth surface are perfectly regular points. All these suggest that the origin of the

Current Trends in Technology and Science
ISSN : 2279-0535. Volume : 04, Issue : 03 (Apr.- May. 2015)

Universe can be perfectly regular point in space-time. At the same time, when the real physical time corresponds to the degrees of latitude, the imaginary time direction in a space-time which is a spear could also correspond to the degrees of longitude. Because all the lines of longitude meet at the North Pole and South Pole, the imaginary time is standing still at the Poles which mean that at Poles we have zero imaginary time. It also implies that the imaginary time started its journey during the Big Bang in an expanding Universe of recent shape. During Big Bang, when the Universe was just a perfectly regular point like North Pole or South Pole of Earth, the imaginary time was zero. The slightest variation of density made scattered distribution of the masses in the Universe of recent shape. In an expanding Universe, the uneven speed of real time line giving rise to the resultant imaginary time of the Universe. So, the net or resultant imaginary time is a function of the total area and the total mass of the Universe. The magnitude of the net imaginary time (say, it is positive for our Universe) is proportional to the rate of slowdown of real time line with respect to the rate of absolute vacuum as reference. If we know an object's mass, we can calculate its individual imaginary time to find the slowdown of real time line with respect to the rate of absolute vacuum space. The positive magnitude of imaginary time slows down the real time. And the negative imaginary time does the reverse. The advantage of two-dimensional approach is that we can represent the physical time with coordinates like X-Y axis or polar coordinates [18-20] and thus graphical representation of physical time itself is possible with the two-dimensional approach of physical time. Secondly, the physical time can be expressed mathematically with the volume and mass of the object like as the net resultant imaginary time can be mathematically related to the total volume and the total mass of the physical universe.

3. The Constant Imaginary Time Concept With Parallel Universes

The real physical time line can be resembled to latitude of Earth and similarly, the imaginary time can be with the longitude. During Big Bang, when our Universe was a perfectly regular point resembling like either poles of the Earth, the anti-Universe was in the maximum possible size resembling to the equator of the Earth. In that case, the magnitude of imaginary time was constant like the distance between either poles of Earth to the equator. Because the Universe and the anti-Universe is not of zero size simultaneously, if one is of minimum size, the other is of maximum size. So, imaginary time with parallel Universes is always non-zero quantity. It implies that when our Universe started the journey from zero size (a perfectly regular point) [21- 23], say from south pole, the anti-Universe cannot move from equator to south pole direction, because then at some point of time, the net imaginary time will become zero, then the expanding Universe and contracting anti-Universe would meet to annihilate each other. Therefore, when our Universe is moving (expanding) [24, 25] from, say south pole to the equator of the Earth, the anti-Universe must be contracting towards the opposite pole of Earth (must be North Pole) at the same rate, because, otherwise there will be violation of absolute rest of parallel universes both in the physical time and space, thus, the imaginary time magnitude is always maintained with constant magnitude which is the very cause of separation of self and anti self. The self and anti-self will never annihilate because the constant imaginary time is always maintained to separate the self and anti-self. Violation of this physical law is never allowed by the nature.

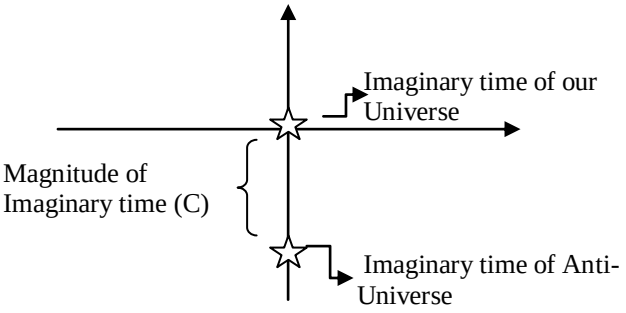

Fig 1: Imaginary time during Big Bang

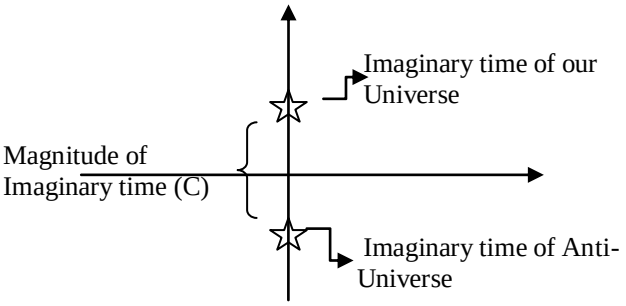

Fig 2: Imaginary time in recent shape of the Universe

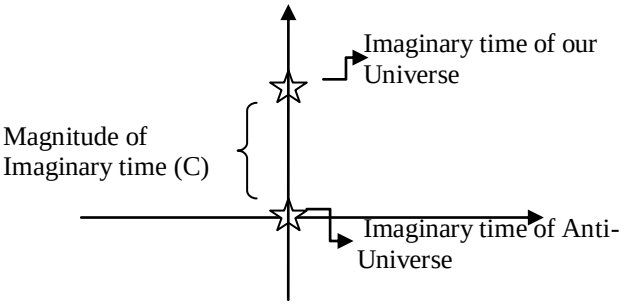

Fig 3: Imaginary time when the Universe will be at maximum size

4. CONCLUSION

A two dimensional approach is feasible to represent the real physical time graphically like X-Y axis or in Polar form. The positive magnitude of imaginary time indicates the rate of slowdown of real time line while the negative magnitude indicates the reverse of that. A constant magnitude of imaginary time is maintained by rules and physical laws of nature to avoid annihilation of Universe and anti-Universe. If annihilation would occur, the Universe would be left with radiation of energy all over. And this constant is independent of beginning and end of the physical Universe, actually there is no beginning or end and both are just successive time instants. As real physical time is discrete, the two successive samples of real physical time are called successive time instants. Because annihilation will never going to happen, is the reason that the Universe is so highly stable at least locally.

.

ACKNOWLEDGMENT

I sincerely admire the motivation, inspiration of **Dr. Aparna Nath**, Associate Professor and my PhD Guide, The department of Physics, National Institute of Technology, Agartala, India to write this paper with perfection. She not only helped me revise it in details, she also got me with some important references.

REFERENCE

[1] Stephen Hawking, "The Universe in a Nutshell", Bantam Press, London 2013, pp. 58-61, 63, 82-85, 90-94, 99, 196. ISBN 0-553-80202-X
[2] Stephen Hawking, "The Grand Design", Bantam Books, London 2011
[3] Stephen Hawking, "A Brief History of Time", Bantam Books, London 2011, pp. 156-157. ISBN-978-0-553-10953-5
[4] Stephen Hawking, "The Beginning of Time", A Lecture.
[5] Stephen Hawking, "Stephen Hawking's Universe: Strange Stuff Explained", PBS site on imaginary time.
[6] Gerald D. Mahan, "Many-Particle Physics", Third Edition, Springer, 2000
[7] A. Zee, "Quantum Field Theory in a Nutshell", Princeton University Press, 2003
[8] Uno Ingard, K "Fundamental of Waves & Oscillations", Cambridge University Press. P. 38, ISBN-0-521-33957-XOxford: The British Academy, 1999
[9] Storrs McCall, "A Model of the Universe", Oxford: Clarendon Press, 1994
[10] Craig Callender, "Time, Reality and Experience", Cambridge, UK: Cambridge University Press,
[11] Storrs McCall, "A Model of the Universe", Oxford: Clarendon Press, 1994
[12] Craig Callender, "Thermodynamic Asymmetry in Time", The Stanford Encyclopedia of Philosophy (Spring 2002 Edition)
[13] Robin Le Poidevin and Murray McBeath, "The Philosophy of Time" Oxford: Oxford University Press, 1993
[14] Barry Dainton,"Time and Space", Ithaca: McGill-Queen's University Press, 2001
[15] Robin Le Poidevin, "Questions of Time and Tense", Oxford: Oxford University Press, 1998
[16] "Time Travel", Available: http://plato.stanford.edu/entries/time-travel/
[17] Rietdijk, C. "A Rigorous Proof of Determinism Derived from the Special Theory of Relativity," Philosophy of Science, 33: 341-4, 1966.
[18] Savitt, Steven (ed.), "Time's Arrows Today: Recent Physical and Philosophical Work on the Direction of Time". Cambridge: Cambridge University Press, 1995.
[19] Newton-Smith, W.H., "The Structure of Time". London: Routledge & Kegan Paul, 1980.
[20] Nerhlich, Graham, "What Spacetime Explains". Cambridge: Cambridge University Press, 1994.
[21] William L.Craig, "Time and the Metaphysics of Relativity", Dordrecht: Kluwer Academic Publisher, 2001
[22] Whitrow, G., "The Natural Philosophy of Time". Oxford: Oxford University Press, 1961. (2nd edn., 1980.)
[23] Smart, J. J. C., "Problems of Space and Time". London: Macmillan, 1964
[24] Sklar, Lawrence, "Space, Time, and Space-time". CA: University of California Press, 1974
[25] Stephen Hawking, "A stubbornly persistent illusion- The essential scientific works of Albert Einstein", Running Press Book Publishers, Philadelphia, London 2011.

AUTHOR'S PROFILE

Prasenjit Debnath, born in Agartala, Tripura, India on 15th of March 1979. I am pursuing a PhD degree in the Department Of Physics in National Institute of Technology Agartala (NIT Agartala), India.