

On a new concept of time

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Abstract

According to the predictions of Einstein's general relativity theory, time and space were created only at the big bang. Albert Einstein concluded in his later years that the past, present, and future all exist simultaneously. But according to Hindu philosophical cosmology, space and time are eternal. Modern physics is also exploring pre – big bang era. In this work, the author attempts to show that the present time contains both future and past time.

Key words: Space; Time; Spacetime, philosophical foundations

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On physical time

Time in physics is defined by its measurement: time is what a clock reads. It is a scalar quantity and, like length, mass, and charge, is usually described as a fundamental quantity. Time can be combined mathematically with other physical quantities to derive other concepts such as motion, kinetic energy and time-dependent fields. Timekeeping is a complex of technological and scientific issues, and part of the foundation of recordkeeping. In special relativity theory, Einstein unified energy and mass by the famous relation $E = mc^2$. In general relativity theory, Einstein unified space and time. The concept of a spacetime coordinate system was introduced in 1907, two years after Einstein originally proposed the theory of special relativity. Hermann Minkowski, a former professor of Einstein, presented the idea of this spacetime coordinate system. The ideas were inherent in Einstein's version of the theory, but he hadn't thought of it that way. In a 1908 talk called "Space and Time," Minkowski elaborated on these concepts and they began to gain popularity.

In modern cosmology, it's possible for spacetime to expand. Einstein noticed this in his original equations for general relativity, but thought that expanding space made no sense, so he put in a correction called the cosmological constant. Years later, Edwin Hubble discovered that space was actually expanding. The modern theory of inflation actually indicates that space was once accelerating faster than the speed of light ... nothing in space can move faster than the speed of light, but space itself can move faster. Then according to the law of general relativity, the expanding spacetime travel faster than light. This implies that time is in motion. In Einstein's

special relativity equation $t = t_0 / (1 - v^2 / c^2)^{1/2}$ if velocity v of an object approaches the velocity c of light, then we can overcome time. This more or less agrees with Osho's assertion that real time is being no time.

Einstein's general relativity theory is the unification of his special relativity theory with Newtonian law of universal gravitation.. This is done with the insight that gravitation is not due to a force but rather is a manifestation of curved spacetime. In general relativity, spacetime is non-Euclidean, or curved.

Many present-day cosmologists feel that, we live in a three dimensional universe that is curved into the 4th dimension. No one can point to the 4th dimension, yet it is all around us. The 4th dimension is a direction different from all the normal directions. It is neither up nor down, left nor right, in nor out. Some people say that Time is the 4th dimension. This is, in a sense, true. The curvature of spacetime, is due to massive objects in it, such as the sun, which warp space around their gravitational centre. In such a space, the motion of objects can be described in terms of geometry rather than in terms of external forces. For example, a planet orbiting the Sun can be thought of as moving along a "straight" trajectory in a curved space that is bent around the Sun. In another words we can say that Einstein's General Theory of Relativity can be understood as saying that:

Matter and energy distort space, and this distortions of space affect the motions of matter and energy. From this we can conclude that matter and energy can influence time.

General relativity shows that whenever you have gravitational phenomena to explain, the right way to do it is to appeal to the particular shape of space-time that does that job as a curved geometry. Whenever you've got gravitational phenomena, you can forget about the force of gravitation and just substitute for that the geometry. The geometry won't be Euclid's geometry, it will be geometry of curved space-time – that is to say, it will be a matter of the shape of that local area of space-time. So, time has a prime factor in the geometry of space.

Spacetime curvature

According to Einstein, a gravitational force does not exist. Rather, the presence of a mass causes a curvature of space-time in the vicinity of the mass, and this curvature dictates the space-time path that all freely moving objects must follow. Gravity according to general relativity is equivalent to the geometric properties of space-time; in fact they are equal and inseparable descriptions which you are free to move between. Geodesics are geometric objects which represent the straightest possible line that can be drawn between two points..Geodesics curve near matter because the geometry of space-time is curved. Experiments continue to show that there is no 'space' that stands apart from space-time itself...no arena in which matter, energy and gravity operate which is not affected by matter, energy and gravity. General relativity tells us that what we call space is just another feature of the gravitational field of the universe, so space and space-time can and do not exist apart from the matter and energy that creates the gravitational field. This is not speculation, but sound observation. A gravitational field contains energy just like electromagnetic fields do. This energy also produces its own gravity, and this means that unlike all other fields, gravity can interact with itself and is not 'neutral'. This is the single most important question in modern physics. Einstein himself said that so far as his general

relativity is concerned, space (actually space-time) and the gravitational field are the SAME THINGS. Many different tests that we are capable of performing IMPLY VERY STRONGLY that General Relativity in its most simple form, is the way that nature seems to work. This means that the underlying principles are also sound. "Spacetime does not claim existence on its own but only as a structural quality of the gravitational field". Time and space are modes by which we think and not conditions in which we live."Einstein stated that in his General relativity, there would be no mathematical difference between what we call the gravitational field, and what we identify as 'space-time'. Space-time is, therefore, not a consequence of gravity, it is the gravitational field itself. The cosmological gravitational field created at the Big Bang encompasses everything and is the dynamical embodiment of space-time itself.

“Frame dragging is a theory which says that space is elastic, and particles in it will exchange energy with it. In the scientific world, "elastic" means that when you apply a certain amount of force to an object (which will cause it to bend) and then remove the force, the object will return to its original shape and energy state. Also, space is referred to as spacetime, which is simply a way to bring together the concepts of space and time together. This basically means that whenever space is affected, time is affected. Frame dragging would provide answers for very old questions about gravity, strong force, and wave-particle duality (how things like electrons can act like waves and particles at the same time. Scientists such as Einstein and Schrödinger spent much of their lives trying to find an answer for how can something like an electron act like a wave and also act like a particle. Frame dragging states that since spacetime is elastic, it can also give the spin-energy back to the particle. Once the particle has all of its spin-energy given back to it, it acts most like a wave. At that point, it will once again begin using its energy bunching up spacetime. Once the particle is no longer spinning, it acts most like a particle. Then, spacetime begins giving the particle its energy back, and the cycle continues forever. This is how a particle can actually act like a particle and a wave at nearly the same time. No energy is lost during the cycle due to the conservation of energy. “
[\[http://simple.wikipedia.org/wiki/Frame-dragging\]](http://simple.wikipedia.org/wiki/Frame-dragging)

Time Travels

According to Einstein’s variance of mass with velocity equation, the velocity of an object can not approach light velocity. In 1962, Sudarshan proposed that particles whose rest mass is imaginary, can move by birth faster than light. Thousands of papers have been written superluminal phenomena; several seminars have been conducted; a number of PhD degrees have been awarded but till this date, there is no experimental evidence for faster than light velocity phenomena. In Hindu philosophy, Mundakopanishad written around 6000 BCE in ancient India, is associated with the Atharva Veda. It describes about Tachyons (particles that travel faster than light), Ultra-Violet band, Infra-Red band, Nuclear Energy and Black Holes in the space. Mundakopanishad might have derived its name from ‘munda’(shaven head of a monk). It has three chapters and each chapter is divided into sub chapters.. Tripura Rahasya is one of the most famous treatise in Hindu philosophy. This ancient scripture asserts that, there is a tachyon universe where twelve thousand years of earth’s time is only equal to one year. Belief/faith is the

basis in philosophy whereas science needs mathematical formulation and experimental verifications. Recently CERN announced that accelerated neutrinos were travelling faster than light. But later on CERN itself abandoned its claim. So, there is no theoretical or experimental evidence for time travel.

New concept of time

Yesterday - Past Time , Today - Present Time , Tomorrow - Future Time

According to eastern calendar system, a day starts only when the sun rises. But in western calendar, the day starts at 12 in the night. Yesterday, today and tomorrow are based on the sun rise. Let us assume this for our new description of time. Let now the time is 11 AM. I have had my breakfast at 10 O' clock. This is past time. This past time is within this present time. There is no doubt in it. I am going to eat my lunch at 2 O' clock. This is future time. This future time is also in present time. So, this simple example shows us clearly that the present contains both past, and future. This example is acceptable if and only if there are both day and night. What is the nature of time if there is only day or if there is only night? Needless to say day means light and night means darkness. Let us assume that in a planet in our universe, there is only light for ever and forever and there is darkness at all. And another planet has only darkness and no light at all. How to deal with time in these two cases? A brief analysis will lead us to conclude that there is NO time in complete day and complete night. So time arises if and only if there are both day and night. This yields that it is both light and darkness which give birth to time. But Stephen Hawking proved by assuming Einstein's general relativity theory that the big bang created time and space.

Modern physical cosmology is only 100 years old. Still it is an infant. Various philosophical cosmologies such as the Hindu cosmology and the Tao cosmology are more than 5000 years old. Whenever science faces drawbacks and crisis philosophical insights help science to advance. According to philosopher Osho, there are three types of time, namely chronological time, psychological time and real time. Osho told that Nagarjuna in the east and Juno in the west are experts in time. Osho said that the psychological and chronological times are well known to us. ***He theorised that real time is being no time.*** This is the spiritual interpretation of time.

Discussion

Newton worked with four quantities namely space, time, matter and energy. Einstein unified matter and energy by his famous formula $E = mc^2$. Also, he combined space and time as we have seen in the previous sections. So, Einstein's quantities are only two, i.e. mass-energy and space-time. He successfully demonstrated that spacetime and gravitational fields are the same things. NASA's Gravity Probe A and Gravity Probe B experimentally confirmed Einstein's geodetic effect and frame dragging. An analysis of Einstein's predictions and scientists' experimental verifications give us courage to postulate that matter-energy makes spacetime an OBJECT. This implies that space is a matter, and time is also a matter. If not so, how is it possible for matter-energy to curve spacetime?

The author theorises as follows:

Einstein's two quantities *matterenergy* and *spacetime* can be deduced in to one quantity namely energy. The big bang released the compressed energy of the tiny hot dot singularity whose volume was zero and density was infinity. That energy gave birth to all matter. Right from the big bang ,the universe is expanding perpetually. The ultimate reality will be the big crunch. Then big band and then big crunch. Logically speaking something should the singularity. That something is being called as Brahman in Hindu philosophy.

Conclusion

The ultimate fate of the universe is a subject of study in the field of cosmology. Current understanding of matter in the universe suggests that the universe must consist of dark energy and dark matter to explain the current rate of expansion. Mainstream models of the universe currently predict that the universe will go on expanding at an accelerating rate. In the previous section the author has hypnotized that in full light and dark, there is no time. But physicists have to rely on dark matter and dark energy to explain the expansion of spacetime. This is to be probed.

*“Time present and time past
Are both perhaps present in time future
And time future contained in time past.” - T.S. Eliot; Four Quartets*

The mentioned Eliot's poetic time ca not be ignored. The author's , Osho's and Eliot's concepts are to be studied. Further explorations may unlock hidden truths of physics and cosmology.

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