In The Theory of Relativity
Time as a Coordinate of Motion

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Abstract

Theory of Relativity describes motion of elementary particles and massive bodies. With clocks one measures duration and numerical order of this motion. Time is what is measured with clocks: the duration and the numerical order of motion of elementary particles and massive bodies in space. In the Theory of Relativity time as a "fourth coordinate" describes motion of massive objects and elementary particles in space. In that sense fourth time coordinate is the "coordinate of motion". Time is not a part of space. Space-time is not a physical reality into which material change run. Space-time is a math model only used for description of motion of objects in space where time is a coordinate of motion. Space itself is atemporal.

Key words: time, space, space-time, atemporal space, duration, numerical order

Introduction

For describing position of an object regarding another object in space one needs three coordinates. For describing motion of a third object between this two objects one needs fourth coordinate that is time.

In the Theory of Relativity the forth coordinate **X4 = c x i x t** is called the "time coordinate", whereas **c** is light speed, **i** is an imaginary number and **t** is the number representing duration of material change. With "time coordinate" one describes motion of objects in space. With clocks one measures interval between material change X and material change X + n, where n represents number of units of time. The smallest unit of time is Planck time, the largest is light year. Time is a measure of intervals of motion space.

Lynds defines time as: »Time enters mechanics as a measure of interval, relative to the clock completing the measurement" (1).

Time enters into existence when one measures duration and numerical order of motion into space. Time does not run on its own in space or exist a as a part of space as a so called "space-time". Time is a physical quantity entering into existence with clocks measurement of motion that runs into space. Space itself is atemporal.

Relativity of Motion Speed and Material Change Speed

According to this understanding of time in the Theory of Relativity it is not time that is relative but the speed of material change; in a faster inertial system the speed of clocks and material change in generally is lower than in a slower inertial system. In physical space with stronger gravity the speed of clocks and material change in generally is lower than in physical space with a weaker gravity field.

This understanding of time resolves the problem of twins. We do not live in time; we live in atemporal space only. A brother in a high-speed spaceship is getting older slower than his brother on Earth, but both are getting older in an atemporal physical space.

Contradictory, hypothetical travel into past is possible according to the Theory of Relativity but out of question according to the atemporal space. No one can travel through space-time, as space-time is merely a mathematical model. One can travel into atemporal physical space only. Duration of travel we measure with clocks.

Atemporal Space and the Einstein-Podolski-Rosen experiment

The Einstein-Podolski-Rosen experiment confirms the idea of atemporal space according to which material change runs into atemporal space only and not into time. Into the EPR experiment atemporal space is the direct information medium between elementary particles. There is no information signal traveling into time between particles. Atemporal space is the “immediate information medium” between elementary particles (2).

In Special Theory of Relativity forth (time) coordinate should be understood as a “motion coordinate” that describes motion in atemporal space.

Atemporal space and the General Theory of Relativity

The brother living on the Moon is getting older faster than his brother on Earth because gravity is stronger on Earth, but both are getting older in an atemporal physical space.

Speed of rotation of planet Mercury is slower as should be regarding its mass, because in atemporal space with stronger gravity motion of massive objects is slower than in the space where gravity is weaker.

In General Theory of Relativity 3-dimensional objects exist into a 4-dimensional space. Gravity force is the result of a curvature of 4-dimensional space. As 4-dimansional physical space is atemporal, one can see the gravity

force as a non-propagating force working directly into space and indirectly between material objects.

According to the Loop Quantum Gravity, space has a granular structure; it is made out of quanta of space. A curvature of 4-dimensional atemporal space is the result of its quantum structure. Gravity force as the result of the curvature of space is a non-propagating force; it works directly between quanta of space in a 4-dimensional atemporal space and indirectly between 3-dimensional material objects. 3-dimensional material objects are somehow captured inside a 4-dimensional atemporal space.

Conclusions

In the Theory of Relativity with clocks is measured time as a duration and numerical order of motion in space. Time as a fourth coordinate is a "motion coordinate" and describes motion of massive objects and elementary particles into atemporal space.

References:

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