

Timeless Quantum Universe in Dynamic Equilibrium

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Abstract

Original solution of gravity motion is curved 4 dimensional cosmic space. Massive objects move into direction of higher curvature of space. Quantum gravity introduces idea that cosmic space is made out of grains of Planck size. If space has granular structure one can consider space also has its density. More mass in given volume of quantum space less space is dense. Less space is dense more space is curved. Massive objects move always into direction of lower density in higher curvature of quantum space. Gravitational motion of massive objects is result of change of density of quantum space. Change of density of quantum space is a physical basis for change of its curvature. In black holes density of mass is extremely high and density of space is extremely low. In a centre of black holes mass is transforming into quanta of space. In outer space density of mass is extremely low, density of space is extremely high. In outer space quanta of space are transforming into elementary particles i.e. cosmic rays.

Key words: gravitational motion, quantum space, curvature of quantum space, density of quantum space, gravitational motion, space-time, time, run of clocks, black holes, cosmic rays, dynamic equilibrium

Timeless Quantum Space and Gravitational Motion

Quantum gravity describes cosmic space as granular. Space is made out of quanta of space QS volume of Planck (1). Prevalent idea in physics is that cosmic space has three spatial dimensions and one temporal dimension. It is difficult to imagine that quanta of space QS have three spatial dimensions and one temporal dimension.

According to Gödel time is not part of space. Fourth coordinate of space-time is spatial too (2). Experimental data confirms Gödel vision. With clocks we measure a frequency $\gamma(s^{-1})$, velocity $v(ms^{-1})$ and numerical order $n...n+1...n+2...n+3$ of material changes that occur in a quantum space. Physical time that is run of clocks ("tick" of clocks) is not a part of quantum space in which change occurs. With clocks we do not measure time as a fourth dimension of space. Quantum space itself is timeless. Space-time is mathematical model merely where fourth coordinate X_4 is a product of imaginary number i , light speed and number t that represents "tick" of clock: $X_4 = i \times c \times t$.

Physical time is run of clocks and is derived from motion. Motion is primary physical reality. Run of clocks is man made secondary physical reality for measuring motion in timeless space (3).

Original solution of gravity in General Theory of Relativity is curved 4 dimensional cosmic space. Massive objects move into direction of higher curvature of space. Quantum gravity introduces idea that cosmic space is made out of grains of Planck size. If space has granular structure one can consider space also has its density. More mass in given volume of quantum space less space is dense. Less space is dense more space is curved. Massive objects move always into direction of lower density in higher curvature of quantum space. One can imagine density/curvature of

quantum space as a density of material on which is an iron ball that represents stellar object. Under the ball material is curved, stretched and so less dense. Gravitational motion of massive objects is result of change of density/curvature of quantum space. In the area where there is no change of density/curvature material object will not move as for example in a centre of stellar object or in intergalactic quantum space.

presence of mass \rightarrow change of density/curvature of quantum space \rightarrow gravitational motion

Change of density of quantum space corresponds in General Theory of Relativity to change of curvature of quantum space. Einstein curvature tensor in General Relativity $G_{\mu\nu}$ is in relation with density tensor $D_{\mu\nu}$ of quantum space by equation:

$$D_{\mu\nu} = \frac{1}{G_{\mu\nu}} = \frac{c^4}{8\pi G * T_{\mu\nu}} \quad \text{wich becomes in geometrized units} \quad D_{\mu\nu} = \frac{1}{8\pi T_{\mu\nu}} \quad (4)$$

Dynamic Equilibrium of the Universe

Here idea is proposed that in black holes inside Schwarzschild radius $r_s = \frac{2GM}{c^2}$

where density of mass is extremely high and density of space is extremely low mass is disintegrated in quanta of space. Quanta of space are “fundamental elements” of energy that builds up elementary particles.

In outer space where quantum space is extremely dense quanta of space get formed into cosmic rays. “Enigmatic for many years, cosmic rays are now known to be not rays at all, but particles, the nuclei of atoms, raining down continually on the earth, where they can be detected throughout the atmosphere and sometimes even thousands of feet underground” (5).

Transformation “mass - quanta of space - mass” is permanent. Universe is a system in a permanent dynamic equilibrium without beginning and with no end.

According to the first law of thermodynamics energy of the universe cannot be created and not destroyed, it can only be transformed. The sum of energy in the universe is constant.

$$\sum E_u = K$$

Expanding of the universe is the result of high density of quantum space in outer space. High dense space is expanding similar as a high dense gas. With a continuous creation of elementary particles in outer space amount of mass in the universe is increasing and cosmic space is getting less dense. This process is more intensive as a transformation of mass in quanta of space in centre of black holes. Process of continuous creation of particles in outer space increases presence of mass in the universe, ends expansion and starts contraction. Universe shrinks in a huge back hole where mass will be transformed into quanta of space. Density of quantum space will extremely increase; this will lead to the new “big bang”. Expansions and contractions of the universe are cyclic.

Increasing of the entropy that we observe in the universe is only a part of universal dynamics. Entropy (S) of the universe as a whole is zero.

$$S_u = 0$$

Conclusion

In today's physics the conviction still prevails that gravity works directly between massive bodies via hypothetical gravitational waves. Research here shows that mass changes density/curvature of quantum space and this change generates gravitational motion. Gravity rules permanent cosmic dynamics of expansion and contraction with transformation of mass in quantum space and vice versa. Universe is a non created system in a permanent dynamic equilibrium.

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