The Origin and Fate of the Cosmos and Universes and the Classical-Quantum Asymmetry

Sylwester Kornowski

Abstract: On base of the lacking part of ultimate theory, i.e. the Everlasting Theory, the most fundamental laws of physics are formulated. The physical properties of the fundamental spacetime lead to conclusion that only selected mathematical formulae and equations can be realized by Nature and it concerns all possible cosmoses. Here, I described the exit from the inflation. The Einstein spacetime is the quantum-time liquid-crystal in the energetically-nonstationary but mass-ground-state. I calculated the mass and the today and initial radii of our Cosmos and pointed the phenomena in the era of inflation responsible for the classical-quantum asymmetry. All the broken symmetries and the 6(7) types of interactions appeared due to the succeeding phase transitions of the inflating field so there is not in existence an unification energy. A simulation of our Cosmos by a quantum computer is impossible. Presented here cosmology is not a speculative. It follows from the lacking part of ultimate theory that leads to the physical constants and hundreds theoretical results consistent or very close to experimental data.

1. Introduction

The lacking part of ultimate theory is based on two fundamental axioms [1]. There are the phase transitions of the fundamental spacetime composed of the superluminal and gravitationally massless pieces of space (the tachyons). The phase transitions follow from the saturated interactions of the tachyons and lead to the superluminal binary systems of closed strings responsible for the entanglement [1], [4] and [5], lead to the binary systems of neutrinos i.e. to the Einstein-spacetime components, to the cores of baryons and to the cosmic objects (protoworlds) that appeared after the era of inflation but before the observed expansion of our Universe. The second axiom follows from the symmetrical decays of bosons that appear on the surface of the core of baryons. It leads to the Titius-Bode law for the strong interactions i.e. to the atom-like structure of baryons.

On base of the phase transitions described within the lacking part of ultimate theory, we can extrapolate our theories to sizes approximately 10^{29} times below the Planck length [1]. Such sizes have the tachyons in our Cosmos [1]. Since the tachyons are the classical objects so we can extrapolate our theories to sizes small at will. Inertial mass (the tachyons have not the gravitational mass [1]), i.e. the total volume of the pieces of space, which are the classical objects (the quantum theories appear on higher levels of Nature [1]), without the truly empty volumes inside the porous pieces of space, and total energy, i.e. the total kinetic and rotational energies of the pieces of space, must be conserved [1]. It leads to conclusion that the ultimate theory must start from two states i.e. the nothingness and moving in the nothingness the internally timeless or porous pieces of space. Such pieces of space collide so we can define local mean unit of time for a gas composed of the pieces of space. The collisions can be

elastic or/and inelastic. There can be gigantic in cosmic scale timeless or porous pieces of space as well. The inertial mass cannot be created from nothing and vice versa i.e. the inertial mass cannot disappear because then information disappears. The inertial mass (i.e. the internally timeless pieces of space) is the most fundamental term in the ultimate theory, next, the kinetic and rotational energies of inertial masses. Energy cannot be separated from inertial masses. Below the Planck length the gravitational mass disappears so the theory for sizes smaller than the Planck length is beyond the General Theory of Relativity [1]. In our Cosmos, below the Planck length there are the classical objects only so it is beyond the Quantum Physics as well [1]. In our Cosmos, at and above the Planck length there are in existence the non-relativistic particles moving with relativistic speed c, the relativistic particles i.e. particles that inertial and gravitational masses depend on their speed, and the quantum particles i.e. particles that disappear in one place of spacetime or field and appear in another one, and so on [1]. Due to the superluminal entanglement characteristic for the Einstein-spacetime components, localization of the quantum particles by detectors built up of particles that maximum speed is the speed of light is impossible [1], [5]. Just our Cosmos is nonlocal but real.

Described here problems concern the abstract but real part of physics. This means that we can select the most probable phenomena that indirectly via the Platonic/mathematical “world” lead to the experimental data for the higher levels of Nature or are some analogies to phenomena observed for the higher/more-complex levels of Nature. The Everlasting Theory shows that mathematical objects have not real existence so everything cannot exist. But the phase transitions of the modified Higgs field [1] lead to the physical circles, tori and balls that causes that a Platonic realm very good describes the physical world.

Define the basic terms.

The Infinity: It is the infinite truly empty volume filled with the internally structureless or porous pieces of space. Sizes of the pieces of space can be from infinitesimal to at will big but they cannot be equal to zero or infinite because in such transitions the Infinity loses information. The Infinity is eternal and due to the elastic or/and inelastic collisions of the porous, or not, pieces of space we can define local units of time.

Our/the Cosmos: The spacetime surrounded by internally structureless or porous, but impermeable for the spacetime, space together with radiation and matter so it contains our Universe as well.

Our/the Universe: The expanding dark energy (i.e. the thickened Einstein spacetime [1]) together with radiation and matter so it contains our Galaxy as well.

Local unit of time: The mean time between the local collisions of the pieces of space. Our Cosmos started from the timeless state whereas such state for the Infinity is impossible.

Fundamental spacetime: It is the perfect gas composed of tachyons [1]. It is the modified Higgs field. The tachyons are the internally structureless pieces of space. In our Cosmos the dynamic pressure of the fundamental spacetime is tremendous – it is approximately the 180 powers of ten of Pa [1].

The ground state of the Einstein spacetime: It is the gas composed of the neutrino-antineutrino pairs [1]. In our Cosmos the dynamic pressure of the Einstein spacetime is approximately the 45 powers of ten of Pa [1].

Here I listed the fundamental laws of physics that follow from the Everlasting Theory. I calculated mass and the today and initial sizes of our Cosmos and pointed the phenomena in the era of inflation responsible for the classical-quantum asymmetry.

The Everlasting Theory proves that the inflation was the expansion of gas composed of the pieces of space. At the beginning of the inflation there was the liquid composed of the pieces of space and distances between the pieces of space had increased with the superluminal speeds. Such state appeared due to a collision of very big pieces of space. The inflation

happened everywhere in the expanding gas. The Universe is composed of the free and bound pieces of space.

2. The exit from the inflation

A collision of very big pieces of space caused that there appeared smaller pieces of space. It is logic to assume that released energy density decreased when distance from a centre increased. This leads to conclusion that sizes of the created pieces of space should depend on distance from the centre i.e. should be greater for bigger radial distances. Moreover, the radial speeds of the bigger and bigger tachyons should be lower and lower. It means that the smaller pieces of space had been overtaken the bigger pieces. When the colliding initial very big pieces of space have sufficiently big sizes in relation to released energy then the produced shock wave creates the timeless boundary around the most speedy, so smallest, tachyons. It was the exit from the inflation. During the era of inflation, due to the phase transitions of the liquid→gas composed of the tachyons, there were produced the Einstein-spacetime components at once in the whole inflating region. In such a way arose our Cosmos.

The Einstein-spacetime components are the neutrino-antineutrino pairs [1]. They are the unitary-spin particles moving with speed of light c but they are the non-relativistic particles i.e. their mass does not depend on their speed [1]. This means that the Einstein-spacetime components are still in their mass-ground-state. In their energy-ground-state their spin does not rotate but there can be the rotational-energy-excited-states (they are the photons) [1]. We can say that the Einstein-spacetime components can be in the energetically nonstationary but mass-ground-state. Moreover, the tremendous pressure of the Einstein spacetime (approximately 10^{45} Pa [1]) causes that it behaves as a liquid crystal. Due to the entanglement, in the Einstein spacetime can appear the virtual/ghost quantum loops that can transform into the virtual electron-positron pairs [1]. It leads to conclusion that the Einstein spacetime as a whole behaves as the quantum-time liquid crystal (the quantum-time is associated with the quantum loops [7]). Due to the internal structure of the Einstein-spacetime components (they consist of the superluminal binary systems of neutrinos [1]) the rotational energies of the components, i.e. the electromagnetic energy, is shifted from region to region so it does not conflict with the principle of energy conservation. Rotational energy of the Einstein-spacetime components can change but gravitational mass cannot. Mass increases when local mass density of the Einstein spacetime increases (due to the entanglement and/or weak interactions [1]). Due to the entanglement and weak interactions of the Einstein-spacetime components its local mass density can change i.e. local unit of time can change.

Described above internal structure and properties of the Einstein spacetime are beyond the General Theory of Relativity and Quantum Mechanics [1]. We can describe it only within the Lacking Part of ultimate theory i.e. the Everlasting Theory. **Notice that the Einstein spacetime is the quantum-time liquid-crystal in the energetically-nonstationary but mass-ground-state**. Similar state was proposed by Frank Wilczek [2], [3]. Emphasize that the non-rotating-spin Einstein-spacetime components are moving but they cannot transfer any energy to a detector so it is very difficult to detect them. In such a state the components behave as the zero-energy objects. We can detect them directly measuring their mass but we are unable to measure such small masses [1]. Due to the observed entanglement of the photons, we know indirectly that the components of the Einstein spacetime are in existence. The dark energy is composed of the additional Einstein-spacetime components [1] so it is very difficult to detect it as well.

The gravitational constant G is directly associated with the internal structure of the Einstein-spacetime components and is constant due to the constancy of their gravitational mass i.e. due to their non-relativistic mass [1].

3. The fundamental laws of physics

Nature realizes the physical laws characteristic for liquids→gases in which pressure is tremendous [1].

A.

There can appear stable circles/vortices composed of the pieces of space. Such is origin of a spin. When components of a gas rotate then the circles have internal helicity. ***Since total spin and internal helicity of the gas must be equal to zero so the circles appear as the groups of four circles***. They are the binary systems of binary systems of circles. In a binary system of circles the spins are parallel and their directions overlap whereas the internal helicities are opposite [1]. In a group, the spin of the second binary system of circles is opposite and the directions of the spins of the binary systems of circles do not overlap. Number of pieces of space in a circle strictly depends on properties of the gas [1].

B.

The saturation of the interactions of the circles via the free pieces of space leads to phase transitions i.e. when the circles consist of X pieces of space then the next bigger object must contain X^2 bound pieces of space whereas the next bigger X^4 and so on [1].

C.

The bigger objects take over the properties of the smallest circles i.e. spin and internal helicity.

D.

Stability of the bigger and bigger objects is higher when Nature can quickly repair the damages to the objects. It is when mass surface-density of all the objects is the same [1]. This law and the law C lead to ***constancy of the half-integral spin of the objects created due to the phase transitions of the fundamental spacetime***.

E.

The C and D laws cause that the bigger and bigger objects are the tori [1]. They appear as the groups each containing four tori of the same size. If we neglect the size of the pieces of space in comparison to the sizes of the tori then distance of the tori in a binary system is $2\pi R/3$, where R is the maximum distance between the centre of a torus and its surface [1]. The distance of the binary systems in a group is $2\pi R$ [1]. In reality, due to the sizes of the pieces of space, both distances are a little bigger [1].

F.

In very high temperature, if it is possible, symmetrical decays of particles are realized [1]. It leads to the atom-like structure of baryons [1].

G.

All broken-symmetries follow from the internal helicities and spins of the fundamental circles and the tori produced in the phase transitions of the fundamental spacetime/gas.

H.

The tremendous dynamic pressures of the fundamental and Einstein spacetimes lead to the law of conservation of dynamic pressures of the spacetimes in our Cosmos.

I.

Due to the properties of pieces of space there is obligatory the law of conservation of the inertial mass of the objects created due to the succeeding phase transitions of the fundamental spacetime.

J.

The protoworlds produce tremendous number of the precursors of the DNA codes composed of the Einstein-spacetime components [1]. There are the four different components in the Einstein spacetime so such production is possible. Only not numerous precursors of the DNAs are useful because only not numerous precursors can lead to correctly functioning organisms. We can say that the statistics of tremendous number of the precursors

causes that the universes (produced by the protoworlds) are fitted for life. Just life is written into the fundamental laws concerning the protoworlds.

4. Mass and today and initial radii of our Cosmos and the next fundamental law of physics

In incompressible fluid dynamics dynamic pressure $p_{dynamic}$ of a fluid with density ρ and speed v is given by [6]

$$p_{dynamic} = \rho v^2/2. \quad (1)$$

where ρ is the fluid density whereas v denotes the fluid velocity.

In spacetimes or fields with very high dynamic pressures pressure in each point of a vortex must be the same. The same concerns the resultant speed of components of the spacetimes or fields. In spinning stable torus, the spin speed v_{spin} decreases when radial distance from centre of the torus decreases. Since the resultant speed of components must be conserved so there appears the radial speed v_{radial} of the components. Since the spin and radial velocities are perpendicular so we obtain following formula

$$v_{spin}^2 + v_{radial}^2 = \text{const.} \quad (2)$$

In formulae (1) and (2) there is the square of a speed so we can separate the spin dynamic pressure from the radial dynamic pressure

$$p_{total,dynamic} = p_{spin,dynamic} + p_{radial,dynamic} = \rho v_{spin}^2/2 + \rho v_{radial}^2/2 = \text{const.} \quad (3)$$

The radial speed increases when the radial distance $r \rightarrow 0$. It causes that in centre of a spinning stable torus appears a ball in which mass density can be a little higher than the mean mass density of spacetimes or fields in which the torus is created. The weak interactions of the Einstein-spacetime components cause that, for example, in the centre of the core of baryons there is the stable ball responsible for the weak interactions of baryons [1].

K.

In centers of tori, produced due to the succeeding phase transitions of the fundamental spacetime, is a ball.

Formula (3) leads to conclusion that when there is a change in spin speed Δv_{spin} then there is a change in mass density Δρ

$$p_{spin,dynamic} = \Delta\rho(\Delta v_{spin})^2/2 = \text{const.} \quad (4)$$

For decreasing radial distance, the spin speed decreases as well whereas mass density increases. For the maximum radial distance in a vortex/torus, the spin speed is equal to the resultant speed of the components of the vortex/torus whereas for r = 0 is zero. This means that $\Delta v_{spin} = v_{components}$ so we can rewrite formula (4) as follows

$$\Delta\rho(v_{components})^2/2 = \text{const.} \quad (5)$$

The local changes in mass density in the Einstein spacetime follow from the weak interactions [1]. To create the Protoworld (its radius is approximately 286.7 million light-years [1] i.e. about $2.712 \cdot 10^{24}$ m) that had produced the expanding our Universe [1], the local changes in mass density of the Einstein spacetime must be approximately $1.545 \cdot 10^{16}$ kg/m^3. This value follows from the mass of a neutron and the range of the strong interactions about 2.958 fm [1]. The ratio of such local changes in mass density to mass density of the Einstein spacetime (it is approximately $\rho_{Einstein\text{-}spacetime} = 1.1022 \cdot 10^{28}$ kg/m^3 [1]) is about $1.402 \cdot 10^{-12}$ so from formula (5) and the law H we obtain that the changes in spin speed are about $1.184 \cdot 10^{-6}$c i.e. 355 m/s. We can see that the changes in spin speed of the Einstein spacetime components, which are moving with the speed of light c, are the acoustic speeds so we can say that to create the protoworlds there are needed the acoustic fluctuations in the Einstein spacetime.

For the objects created due to the succeeding phase transitions is obligatory the law D

$$m\, \Delta v_{spin}\, r_{maximum} = \text{const.} \quad (6)$$

Applying the law I and knowing that $\Delta v_{spin} = v_{components}$, we obtain

$$X = v_{components}\, r_{maximum} = \text{const.} \quad (7)$$

For the neutrinos composed of the binary systems of closed strings [1] we obtain $X = 0.813 \cdot 10^{33}$ m^2/s whereas for the dark energy inside a protoworld [1] (the maximum radius is 286.7 million light-years i.e. $2.712 \cdot 10^{24}$ m; the speed of light is $2.99792458 \cdot 10^8$ m/s [1]) $X = 0.813 \cdot 10^{33}$ m^2/s as well.

Knowing the X, we can calculate the radius of our Cosmos. The Cosmos consists of the protoworlds and to create them there are needed the acoustic changes in spin speed of the Einstein-spacetime components i.e. $v_{components} = 355$ m/s. Applying formula (7) we obtain the radius of our Cosmos $\mathbf{R_{the\text{-}Cosmos} = 2.29 \cdot 10^{30}\ m}$.

In our Cosmos dominates the mass density of the Einstein spacetime and it is approximately $1.1022 \cdot 10^{28}$ kg/m^3 [1]. The assumption that the inner surface of the timeless boundary of our Cosmos is a sphere leads to the mass of the Cosmos (without the inertial mass of the timeless boundary of our Cosmos) equal to $\mathbf{M_{the\text{-}Cosmos} = 5.55 \cdot 10^{119}\ kg}$. The inertial-mass density of the tachyons is $\rho_{tachyon} = 8.3219 \cdot 10^{85}$ kg/m^3 [1] so the initial radius of the Cosmos was $\mathbf{R_{initial\text{-}of\text{-}the\text{-}Cosmos} = 1.17 \cdot 10^{11}\ m \approx 1\ AU}$ ($1\ AU \approx 1.5 \cdot 10^{11}$ m) i.e. approximately the distance from the Sun to Earth.

We can see that during the inflation the size of our Cosmos increased approximately $f = 2 \cdot 10^{19}$ times whereas size of the volume filled with the dark energy increased about 70 times only [1]. This means that the observed expansion of our Universe was separated in time from the inflation of our Cosmos. The exact value of f we obtain from following formula

$$f = (\rho_{tachyon}/\rho_{Einstein\text{-}spacetime})^{1/3} = 1.962 \cdot 10^{19}. \quad (8)$$

Notice that this value is very close to $2/R_N = 1.985 \cdot 10^{19}$, where R_N is the Reynolds number for the maximum dense modified Higgs field (the Newtonian spacetime) [1].

The range of gravitational field is $2 \cdot 10^{36}$ m [1] > $R_{the\text{-}Cosmos} = 2.29 \cdot 10^{30}$ m so to eliminate destruction of the gravitational field the inner surface of the boundary of our Cosmos must be rough. Then, the trajectories of the tachyons after collision with the boundary are not convergent.

5. The fate of the Cosmos and universes

Our Cosmos can be destroyed only due to creation of a gap in the timeless boundary. It can happen due to a very energetic collision of the boundary with an external big piece of space. A gate in the boundary will change the conditions that led to the phase transitions and lead to life. The acoustic fluctuations, which lead to the production of the nucleons, depend on size of the Cosmos. Why the Einstein spacetime cannot collapse? Calculate the gravitational pressure influenced on single neutrino in an Einstein-spacetime component moving near the boundary of our Cosmos. The gravitational force acts on area that is the cross-section of the neutrino but due to the confinement the radius of neutrino is enlarged in approximation $x \approx 3{,}500$ times [1] i.e. the effective radius R is $R = xr_{neutrino}$. The gravitational pressure p_{gr} is

$$p_{gr} = F/S = (G\, M_{the\text{-}Cosmos}\, m_{neutrino}\, /R^2_{the\text{-}Cosmos})/(\pi R^2) \approx \mathbf{5 \cdot 10^{44}}\ Pa. \quad (9)$$

On the other hand, the dynamic pressure of the Einstein spacetime p_{dynE} is

$$p_{dynE} = \rho_{Einstein\text{-}spacetime}\, c^2/2 \approx \mathbf{5 \cdot 10^{44}}\ Pa. \quad (10)$$

We can see that near the boundary the gravitational pressure is equal to the dynamic. It is easy to notice that for all points closer to the centre of the Cosmos than the inner surface of the boundary the gravitational pressure is lower than the dynamic pressure. This leads to conclusion that collapse of the Einstein spacetime is impossible. The same concerns the gas composed of the tachyons. This means that the inflation was the irreversible process.

The protoworlds give birth to the universes fitted for life and decay to the dark energy [1]. Due to the dark energy produced in the decays of the protoworlds the universes expand. It is obvious that due to the expansions of the universes they sooner or later will overlap so their components will collide, for example, galaxies in universes with antigalaxies composed of antimatter in antiuniverses. In such collisions the matter decays into the Einstein-spacetime

components. But due to the acoustic fluctuations there arise new protoworlds. Assume that in our Cosmos there are about 100 billion protoworlds and universes (it is approximately the number of stars in a massive galaxy or number of galaxies in the Universe). It leads to conclusion that then the mean distance between them is about 100 billion light-years (10^{11} light-years).

Due to the very low mass density of the protoworlds and universes in comparison with the mass density of the Einstein spacetime, the collisions of such objects with the boundary of the Cosmos are not dangerous.

The mean gravitational-mass density of protoworlds is approximately 10^{49} times lower than the mass density of the Einstein spacetime. The very high dynamic pressure of the Einstein spacetime causes that the Cosmos is flat but the sources of gravitational fields curve trajectories of the carriers of photons i.e. trajectories of the Einstein-spacetime components.

6. The origin of the classical-quantum asymmetry

I must emphasize that the all broken symmetries and the 6(7) types of interactions, i.e. fundamental, weak, entanglement, gravitational, strong and electromagnetic [1], appeared due to the succeeding phase transitions in the inflating field composed of the tachyons so there is not in existence an unification energy. When the inertial-mass density increases then number of different interactions decreases. The fundamental interactions appeared due to the transition from the timeless space to the liquid composed of the tachyons, the gravitational interactions, entanglement, weak-classical and electromagnetic interactions appeared when the Einstein spacetime appeared whereas the strong and weak-quantum interactions appeared when there appeared the cores of baryons [1]. Generally, to describe the different types of interactions we must apply very different methods. Unification can be partial only and concerns selected interactions. But there is the equation that ties masses of carriers of all types of interactions [1] (see formula (280)).

At the end of the inflation of our Cosmos, the mass density of the Einstein spacetime decreased sufficiently to cause that instead the domination of the weak interactions of the Einstein-spacetime components there domination of the gravitational interactions appeared. But there is needed change in distance between the Einstein-spacetime components equal to only about one part in 100,000 to restore the domination of the weak interactions [1]. The weak interactions of the Einstein-spacetime components are needed to create vortices whereas the vortices are the foundations of the quantum physics. We can rank the interactions as follows

$$\begin{aligned} &\text{fundamental} \rightarrow \text{weak (classical)} + \text{entanglement} \rightarrow \text{gravitational} \\ &\qquad \hookrightarrow \text{weak (quantum)} + \text{entanglement} \rightarrow \text{strong} \\ &\qquad\qquad \hookrightarrow \text{electromagnetic.} \end{aligned} \tag{11}$$

The fundamental interactions, the entanglement and the weak and gravitational interactions of the Einstein-spacetime components are classical [1]. Range of the weak-classical interactions is approximately from 10^{-35} m to 10^{-32} m. Due to the entanglement and the weak-classical interactions of the Einstein-spacetime components there can appear vortices with internal helicity composed of the carriers of gluons. In centres of such vortices can be produced balls responsible for the weak-quantum interactions. Radius of the ball, i.e. range of the weak-quantum interactions, for a resting baryon is approximately 10^{-17} m [1]. The vortices produce loops (composed of the carriers of gluons) that can transform into the sham-quark-antiquark pairs [1]. Such processes are typical for the quantum physics. A quantum particle disappears in one place of a field and appears in another one and so on [1]. When density of fields is sufficiently low then the produced vortices have very small or have not internal helicity. In such fields the gluons behave as photons [1]. Such low-energy vortices produce loops composed of photons that can transform into the electron-positron pairs [1].

The classical-quantum asymmetry follows from the very small changes in mean distance of the Einstein-spacetime components [1].

Time is going in different way for classical and quantum parts of nucleons [7] so there is not in existence coherent description of nucleons via equation containing only classical or only quantum time. The incoherent descriptions must contain approximations, mathematical tricks and additional/free parameters to fit theoretical results to experimental data.

The equations of motion are very important for classical objects. For quantum objects most important are the stationary states created in the phase transitions, or the atom-like structures, and so on.

The confinement of the Einstein-spacetime components and the superluminal entanglement are the foundations of the quantum effects.

7. Summary

Here, on base of the lacking part of ultimate theory, i.e. the Everlasting Theory, the most fundamental laws of physics are formulated. The presented set of fundamental laws is typical for all possible cosmoses but due to the different initial conditions there appear different parameters and factors in the fundamental laws. Due to the initial parameters, some laws cannot be realized in some cosmoses. The physical properties of the fundamental spacetime lead to conclusion that only selected mathematical formulae and equations can be realised by Nature and it concerns all possible cosmoses.

Here, I described the exit from the inflation. The Einstein spacetime is the quantum-time liquid-crystal in the energetically-nonstationary but mass-ground-state.

I calculated the size of our Cosmos on base of the acoustic fluctuations which follow from the weak interactions of the Einstein-spacetime components. The calculated today radius of our Cosmos is $R_{\text{the-Cosmos}} = 2.29 \cdot 10^{30}$ m, .the mass is $M_{\text{the-Cosmos}} = 5.55 \cdot 10^{119}$ kg whereas the initial radius of the Cosmos was $R_{\text{initial-of-the-Cosmos}} = 1.17 \cdot 10^{11}$ m $\approx$ 1 AU i.e. approximately the distance from the Sun to Earth.

I described the conditions responsible for the stability of the Cosmos as a whole.

Here are pointed the phenomena responsible for the classical-quantum asymmetry. They follow from the very small changes in mean distance between the Einstein-spacetime components. Today there dominates the gravitational interaction between the Einstein-spacetime components and the components are the classical objects. But very small changes in distance between the components cause that due to the weak interactions and entanglement there can appear vortices that are the foundations of the quantum physics. Time is going in different way for the classical and quantum parts of particles so unification of gravity and quantum physics via a single equation depending on only classical time or only quantum time is impossible.

We can assume that due to the energy released in collision of the big pieces of space that caused the big bang of our Cosmos, the tremendous initial pressure caused that the tachyons were compressed in such a way that their inertial-mass density is maximum i.e. the maximum inertial-mass density of pieces of space is $8.3219 \cdot 10^{85}$ kg/m^3. This density is approximately 11 orders of magnitude lower than the Planck density but it is not a mistake. Just the Planck density concerns the maximum energy density of the Einstein-spacetime components, not their inertial mass [1]. Since the components consist of the superluminal binary systems of closed strings so their speeds associated with rotational energies can be much higher than the speed of light. What is origin of the maximum inertial-mass density or what is origin of the pieces of space? What is origin of the positive energy of the Infinity? Can we answer these questions? If the Infinity is eternal then the questions have no sense. In my opinion, the inertial-masses and their energies are eternal because information must be conserved. The value of the maximum inertial-mass density follows from definitions applied in our theories.

When we change the definitions then we obtain different results. Very important are dimensionless ratios such as, for example, the number $2 \cdot 10^{19}$ (it is the ratio of the today radius of our Cosmos to its initial radius at the beginning of the inflation) characteristic for the big bang of our Cosmos. The lacking part of ultimate theory leads to conclusion that there are two initial states in the Infinity i.e. the nothingness and moving infinitesimal pieces of space that inertial-mass density is maximum (it is because they are structureless).

The all broken symmetries and the 6(7) types of interactions, i.e. fundamental, entanglement, weak, gravitational, strong and electromagnetic [1], appeared due to the succeeding phase transitions in the inflating field composed of the tachyons so there is not in existence an unification energy. Generally, to describe the different types of interactions we must apply very different methods. Unification can be partial only and concerns selected interactions. But there is the equation that ties masses of carriers of all types of interactions.

In singularities information is lost so theories that lead to singularities, i.e. to infinite inertial-mass density, are incomplete. The singularities are the mathematical objects which cannot appear in the Infinity. Physics needs an upper limit for inertial-mass density. Within the lacking part of ultimate theory we can calculate the upper limit so the phase transitions of the associations/sets of the moving pieces of space described within the Everlasting Theory, are the foundations of physics.

To simulate our Cosmos we need approximately 10^{226} tachyons carrying the inertial mass (only). The ratio of the today size of our Cosmos to the mean size of the tachyons is about 10^{94}. Is such computer simulation possible? Will be it possible to build such computer? Assume that we want to produce such computer from particles that can be detected in our Cosmos. Their maximum speed is the speed of light so there is the upper limit for speed of communication of the computer elements. The Lacking Part of ultimate theory proves that the tachyons communicate themselves with speed $2.4 \cdot 10^{97}$ m/s [1] i.e. $8 \cdot 10^{88}$ times higher than the speed of light. This means that the mean distance between the abstract tachyons in the computer must be $8 \cdot 10^{88}$ times shorter than in reality i.e. should be about $(10^{91}/10^{226})^{1/3}/(10^{97}/10^{8}) = 10^{-134}$ m. On the other hand, the shortest observed distance cannot be shorter than the Planck length i.e. approximately 10^{-35} m. This means that a computer simulation of the Cosmos by a computer built in our Cosmos is impossible. In a quantum computer we can increase the speed of communication to about 10^{68} m/s (it is approximately the speed of the components of the Einstein-spacetime components; they are responsible for the entanglement of, for example, entangled photons [1]). Then, the mean distance between the abstract tachyons should be about $(10^{91}/10^{226})^{1/3}/(10^{97}/10^{68}) = 10^{-74}$ m. This distance is much shorter than the Planck length as well so even a simulation by a quantum-computer is impossible. This distance is even much shorter than the mean size of the tachyons which are the smallest objects in our Cosmos.

Many scientists claim that the ultimate explanation of our Cosmos should be simple and the Everlasting Theory shows that it is true. Presented here cosmology is not a speculative. It follows from the lacking part of ultimate theory that leads to the physical constants and hundreds theoretical results consistent or very close to experimental data.

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