The Constructive Criticism of the Mainstream Theories

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Abstract: We know that within the Standard Model (SM) we still (since 1964) cannot calculate exact masses and spin of proton and neutron from initial conditions, whereas the Cosmological Standard Model (CSM) that involves the General Theory of Relativity (GR) and Quantum Physics (QP) does not lead to origin of the dark matter and dark energy. Moreover, within the leading mainstream theories we cannot derive physical constants and mathematical constants applied in physics from initial conditions the GR and QP start from. There as well are tens of unsolved basic problems, for example, what mechanism causes that neutrinos acquire their masses or why the energy distance/gap between the Planck scale and the electric-charges scale is tremendous. It suggests that the leading mainstream theories are incomplete. Just there must be in existence some lacking part of the Theory of Everything (ToE) more fundamental than GR and QP. We suggest that the Scale-Symmetric Theory (SST) is the lacking part of ToE. What is the SST? The GR leads to the superluminal non-gravitating Higgs field composed of tachyons. On the other hand, the SST shows that the succeeding phase transitions of such Higgs field lead to the theories of different scales of sizes/energies that solve all unsolved basic problems in particle physics and cosmology. Here is a very short recapitulation concerning the basic problems solved within SST that are not solved or are described incorrectly within the mainstream theories: The equivalence of pure energy and gravitational mass; Wrong interpretation of the Michelson-Morley experiment that follows from the quantum entanglement; The illusion of acceleration of expansion of the Universe; Non-existence of luminal gravitational waves; Why the Cosmos did not collapse at the beginning of the big bang?; Where is the antimatter ?; Why the Universe is flat ?; The hierarchy problem; The origin of dark matter; The many-worlds interpretation within QP; The 3-valence-quarks model of baryons; Why QED gives good results in spite of neglecting the weak interactions of electrons ?; Can the flexible closed strings applied in the M/string theory lead to invariance of gravitational constant ?; What is the origin of DNA?

1. Introduction

We know that within the Standard Model (SM) we still (since 1964) cannot calculate exact masses and spin of proton and neutron from initial conditions, whereas the Cosmological Standard Model (CSM) that involves the General Theory of Relativity (GR) and Quantum

Physics (QP) does not lead to origin of the dark matter and dark energy. Moreover, within the leading mainstream theories we cannot derive physical constants and mathematical constants applied in physics from initial conditions the GR and QP start from. There as well are tens of unsolved basic problems, for example, what mechanism causes that neutrinos acquire their masses or why the energy distance/gap between the Planck scale and the electric-charges scale is tremendous. It suggests that the leading mainstream theories are incomplete. Just there must be in existence some lacking part of the Theory of Everything (ToE) more fundamental than GR and QP. We suggest that the Scale-Symmetric Theory (SST), [1], is the lacking part of ToE.

What is the SST? The GR leads to the non-gravitating Higgs field composed of tachyons. On the other hand, the SST shows that the succeeding phase transitions of such Higgs field lead to the theories of different scales of sizes/energies that solve all unsolved basic problems in particle physics and cosmology [1]. Due to the saturation of interactions via the Higgs field and due to the law of conservation of the half-integral spin that is obligatory for all scales, there consequently appear the superluminal binary systems of closed strings (entanglons) responsible for the quantum entanglement (it is the quantum-entanglement scale), stable neutrinos and luminal neutrino-antineutrino pairs which are the components of the luminal Einstein spacetime (it is the Planck scale), cores of baryons (it is the electric-charges scale), and the cosmic structures (protoworlds; it is the cosmological scale) that evolution leads to the dark matter, dark energy and expanding universes (the "soft" big bangs) [1A], [1B]. The non-gravitating tachyons have infinitesimal spin so all listed structures have internal helicity (helicities) which distinguishes particles from their antiparticles [1A]. SST shows that a fundamental theory should start from infinite nothingness and pieces of space [1A]. Sizes of pieces of space depend on their velocities [1A]. The inflation field started as the liquid-like field composed of non-gravitating pieces of space [1A]. Cosmoses composed of universes are created because of collisions of big pieces of space [1A], [1B]. During the inflation, the liquid-like inflation field (the non-gravitating superluminal Higgs field) transformed partially into the luminal Einstein spacetime (the big bang) [1A], [1B]. In our Cosmos, the two-component spacetime is surrounded by timeless wall – it causes that the fundamental constants are invariant [1A], [1B].

Due to the symmetrical decays of bosons on the equator of the core of baryons, there appears the atom-like structure of baryons described by the Titius-Bode orbits for the nuclear strong interactions [1A].

Applying 7 parameters only and a few new symmetries we calculated a thousand of basic physical (and mathematical) quantities (there are derived the physical and mathematical constants as well) consistent or very close to experimental data and observational facts (http://vixra.org/author/sylwester_kornowski). In SST there do not appear approximations, mathematical tricks, and free parameters which are characteristic for the mainstream particle physics and mainstream cosmology.

To the superluminal non-gravitating Higgs field we can apply the Kasner metric [2] that is a solution to the vacuum Einstein equations. The Kasner solutions we interpret as the virtual tori/cyclones and one-dimensional virtual oscillations which lead to virtual loops in the Higgs field [3]. To quantize the sizes of the virtual Higgs cyclones, we need a few new symmetries that follow from the initial conditions applied in SST [1A]. The quantization leads to the succeeding phase transitions so there appear the scales of sizes/energies.

The core of baryons is composed of entangled and/or confined Einstein-spacetime components which are the carriers of gluons and photons – they are the neutrino-antineutrino pairs [1A]. The total weak charge of the Einstein-spacetime components is equal to zero so it is much more difficult to detect the Einstein-spacetime components than the neutrinos.

SST shows that the General Relativity concerns the gravitational fields/gradients produced by the Einstein-spacetime components and neutrinos (they can be entangled and/or confined) in the superluminal non-gravitating Higgs field [1A]. On the other hand, the Standard Model concerns the quantum phenomena in the luminal gravitating Einstein spacetime (for example, entanglement, confinement, production of virtual and real particle-antiparticle pairs, their polarization, production of condensates and loops, propagation and rotation of entangled Einstein-spacetime components, electromagnetic, weak and strong interactions, and so on) [1A]. SST shows that the irreversible separation of the gravity and the Standard-Model interactions took place already during the inflation so unification of GR and QP within the same methods is impossible.

Here is a very short recapitulation concerning the basic problems solved within SST that are unsolved or are described incorrectly within the mainstream theories. Incompleteness and partial incorrectness of the internal structure of the Higgs field and Einstein spacetime applied in the predominant mainstream theories cause that there appear many wrong interpretations. The problems are as follows. In the Einstein spacetime, energy is equivalent to mass but direct transformation of mass into pure energy and vice versa is impossible. Due to the quantum entanglement, there is the wrong interpretation of the Michelson-Morley experiment which leads to the illusion of acceleration of expansion of the Universe. Why we cannot detect the gravitational waves moving with the luminal speed? Why the Cosmos did not collapse at the beginning of the big bang and where is the antimatter? Why the Universe is flat? The rest mass of the fundamental Higgs boson is wrongly interpreted so there appears the hierarchy problem. The assumed origin of dark matter is incorrect. The many-worlds interpretation within the Quantum Physics (QP) is incorrect. The 3-valence-quarks model of baryons is incorrect. QED neglects the weak interactions of electrons but due to the free parameters gives the correct results. The flexibility of the closed strings in M/string theory cannot lead to constancy of the gravitational constant. The origin of DNA must follow from ultimate theory (in the very early Universe there appeared the precursors of the DNA composed of entangled neutrinos).

2. The wrong assumptions and wrong interpretations in the mainstream theories

2.1
In the Einstein spacetime, energy is equivalent to mass but direct transformation of mass into pure energy and vice versa is impossible.

Due to the Higgs mechanism [4], [5], the Einstein-spacetime components (the neutrino-antineutrino pairs) have gravitational mass. To produce the Principle-of-Equivalence particles there are needed the pieces of space i.e. physical volumes/tachyons/plenums [6]. On the other hand, the photons and gluons are the rotational energies of the Einstein-spacetime components [1A]. Transformation of the rotational energies into volumes/tachyons/plenums and vice versa is impossible. Nature cannot transform motions into physical volumes and vice versa.

But in the Einstein spacetime can appear vortices of photons (in electromagnetic field) or vortices of gluons (in nuclear strong field) i.e. vortices of pure rotational energy carried by loops composed of entangled Einstein-spacetime components. Such vortices decrease local pressure in the Einstein spacetime so there are inflows into the vortices of additional Einstein-spacetime components – it increases local mass density i.e. there appears gravitational mass which, due to the interactions, can be seen by detectors and other masses. This mass, M, is equivalent to the well-ordered pure rotational energy of the vortex, $E_{well-ordered}$: for the grainy Einstein spacetime is: $lowered\text{-}pressure = E_{well\text{-}ordered} / volume = density \cdot c^2$ and $density = M / volume$ – it leads to $M = E_{well\text{-}ordered} / c^2$.

2.2

Due to the quantum entanglement, the interpretation of the Michelson-Morley experiment is wrong.

Photons can be entangled i.e. there are entangled the carriers of photons (i.e. the carriers of the rotational energies) i.e. the Einstein-spacetime components. Emitted photons, due to the superluminal quantum entanglement, are entangled with their source or with the last-interaction object. The speed c of photons is the speed in relation to the source or to the last-interaction object.

Michelson and Morley tried to detect the relative motion of the Earth and the stationary luminiferous aether. But we can see that the last-interaction object is the beam splitter and, next, the mirrors i.e. the speed of light all the time is the c in relation to the Michelson-Morley interferometer. We can see that due to the quantum entanglement, the real relative motion cannot be detected in the Michelson-Morley experiment.

But in reality, if a cosmic source of light (for example, a galaxy) has the going-away radial speed v in relation to the Earth (the emitted light is entangled with the source) then the relative speed of light is $\Delta v = c - v$. But due to the last-interaction object, the speed of this light measured on Earth always will be c. We can only measure the change in frequency i.e. the redshift.

The wrong interpretation of the Michelson-Morley experiment causes that in cosmology there appears an illusion of acceleration of expansion of the Universe [7]. Of course, the Special Relativity is correct for masses moving in relation to dominant gravitational field. Just there is the duality of relativity.

The duality of relativity causes that time distance (not spatial distance) to the most distant galaxies is indeed 13.866 ± 0.096 Gyr but they are already 7.75 Gyr old – just we cannot see the initial period of evolution of galaxies [8].

2.3

Why we cannot detect the gravitational waves moving with the speed c?

Gravitational waves never will be detected because their existence follows from the wrong assumption inserted into the Einstein field equations. In reality, the luminal speed c appears only in front of the stress-energy tensor. On the other hand, we know that in the Ricci tensor for weak gravitational waves there appears also the d'Alembertian in which appears the c. And it is the mistake. The Scale-Symmetric Theory shows that the gravitational fields are not associated with the luminal gravitating Einstein spacetime. In reality, the gravitational fields are the gradients produced by gravitating masses in the superluminal non-gravitating Higgs field.

The Ricci tensor concerns the non-gravitating Higgs field composed of the tachyons/plenums whereas the stress-energy tensor concerns the luminal, confined or/and entangled gravitating Einstein-spacetime components. In the Higgs field can be produced gradients, not gravitational waves or gravitons.

Due to the weak interactions, which follow from the confinement (confinement follows from the Mexican-hat mechanism [4]), in the Einstein spacetime can appear local fluctuations, not gravitational waves.

The present-day densities of the Higgs field and Einstein spacetime are very different. The "Einstein-to-Higgs ratio" is about $4 \cdot 10^{42}$ [1A] and it is the reason that the gravity is so weak in comparison with the Standard-Model forces (the electromagnetic, weak and strong interactions).

2.4

Why the Cosmos did not collapse at the beginning of the big bang and where is the antimatter?

Within the Standard Model we still cannot explain why the Cosmos did not collapse at the beginning of the big bang. Within the SST such explanation is very simple. Due to the Higgs mechanism [4], [5], there appeared the Einstein spacetime and the whole gravitational field was produced by the luminal Einstein-spacetime components. On the other hand, there was the dynamic pressure in the Einstein spacetime. Value of the gravitational pressure squeezing our Cosmos had overcame the dynamic pressure (due to the dynamic pressure the Cosmos had expanded) for radius greater than about $2.3 \cdot 10^{30}$ m so there was the collapse only of the outer shell of the expanding Einstein spacetime [9].

The Universe appeared in the Cosmos due to a local fluctuation of the Einstein spacetime that transformed into the Protoworld and the very early Universe [1B]. Due to the evolution of the Protoworld, there appeared the dark matter (i.e. the additional Einstein-spacetime components entangled with baryonic matter) and the dark energy (i.e. the additional free Einstein-spacetime components that interact gravitationally only) that caused the exit of our very early Universe from the black-hole state [1B].

The cosmic fluctuations in our Cosmos appear as the left-handed or right-handed vortices [1B]. The neutrons and protons are left-handed whereas antineutrons and antiprotons are right-handed [1B]. We can see that our Universe arose from a left-handed vortex. Such is the origin of the matter-antimatter asymmetry in our Universe.

2.5

Why the Universe is flat?

The gravitational fields are composed of the tachyons/plenums which have inertial mass only. They are not the Principle-of-Equivalence particles. The gravitons are not in existence. Such fields cannot have infinite density. Due to the internal structure of the Einstein-spacetime components, the gravitational fields produced by them are curved [1A]. On the other hand, the Einstein spacetime is flat (there can appear only the local virtual fluctuations) and there dominate different types of polarization. Density of the flat Einstein spacetime is about 42 powers of ten higher than the inertial-mass density of the gravitational fields so the two-component spacetime as a whole is flat [1A]. The dark matter and dark energy only insignificantly increase density of the Einstein spacetime inside our Universe (one part in about 10^{55} parts [1B]).

2.6

The rest mass of the Higgs boson is wrongly interpreted.

In reality, the true Higgs boson is the binary system of two Einstein-spacetime components with antiparallel unitary spins. Such boson is the zero-spin boson and it can decay to four neutrinos or two photons. Its rest mass is about $1.3 \cdot 10^{-66}$ kg [5]. Its maximum rotational energy is very close to the Planck energy [6]. It solves the hierarchy problem. There can appear condensates composed of such true lowest-mass Higgs bosons [5]. Due to the internal structure of the core of baryons, there, for example, can be produced the composite Higgs boson with a mass of 125 GeV [1A], [5], [10].

The Higgs mechanism describes the interactions of the Higgs field with the neutrinos or neutrino-antineutrino pairs. The binary systems of closed strings (the entanglons) the Einstein-spacetime components consist of, due to their internal helicities and viscosity, transform the chaotic motions of the tachyons into the divergently moving ones – it produces the gradients/gravitational-fields [1A].

Emphasize that the Einstein-spacetime components consist of superluminal objects so energy, not mass, frozen inside neutrinos is tremendous. The geometrical mean of the superluminal energy frozen in a neutrino and its gravitational mass is close to the Planck mass [1A], [1B].

2.7

The assumed origin of dark matter is incorrect.

The cosmic left-handed vortex transformed into the Protoworld. Due to its evolution, the core of the Protoworld transformed into the additional Einstein-spacetime components entangled with baryonic matter – it is the dark matter [1B]. There can appear 'islands' and 'loops' composed of dark matter which lead, respectively, to gravitational lensing and to the Type dark-mater orbital motions of stars in rotating galaxies [11].

2.8

The many-worlds interpretation within the Quantum Physics (QP) is incorrect.

The many-worlds interpretation of quantum physics is incorrect. Generally, the photons are the groups of entangled elementary photons so they occupy volumes i.e. there is a distribution of elementary photons in a photon. Observation of one elementary photon causes that whole energy of the photon is accumulated in the point of observation. We cannot say that a photon is simultaneously in two or many different places. We can say only that entangled different parts of the photon occupy different places. The photon composed of entangled elementary photons can change distribution of the still entangled elementary photons. It concerns as well mass and energy of a quantum particle – the portions of mass and energy are still entangled. But we cannot say that charge or spin of a quantum particle as a whole can be simultaneously in two or more places. The entangled parts of a charge occupy different places but the charge as a whole has simultaneously only one distribution of its parts. There disappears the distribution of the entangled parts of the charge and appear a displaced distribution, and so on. Only observation which lasts longer than lifetime of charge and spin in defined state of distribution of entangled parts can lead to the wrong interpretation that charge and spin can be simultaneously in two or many different places displaced more than size of bare particle.

2.9

The 3-valence-quarks model of baryons is incorrect.

Since 1964 we cannot within the 3-valence-quarks model of baryons calculate exact masses and spin of proton and neutron i.e. we cannot calculate the fundamental most important physical quantities. It suggests that this model is incorrect. Is there some alternative solution? Of course, there is such solution within SST. In the Standard Model there are about 20 initial parameters and tens of free parameters (the physical constants and mathematical constants if not derived from initial conditions are the free parameters as well). On the other hand, SST starts from 7 initial parameters only and there do not appear free parameters. SST is much simpler and gives best theoretical results. Within SST we calculated spin and mass of proton, [1A], and the electron and muon radii [12].

Of course, within SST we calculated the masses of quarks and we showed the place of the quarks in the complete theory of Nature [1A], [1D].

2.10

QED neglects the weak interactions of electrons but leads to correct results – it is due to the free parameters.

The mainstream theories based on renormalization sometimes give good results but it is due to the free parameters.

It is obvious that electrons can interact also weakly so a complete theory of electrons should take into account these interactions. The QED neglects the weak interactions of electrons with virtual electron-positron pairs in the electromagnetic field but gives good results. It suggests that the QED, in which appears the mathematical indeterminate/incoherent form $(\infty - \infty = const.)$, gives good results only due to the free parameters. Such free parameters do not appear in SST and within this theory there appear the mentioned weak interactions. Such theory is very simple and the obtained results are perfect [1B], [13].

2.11
The flexibility of the closed strings in M/string theory cannot lead to constancy of the gravitational constant.

In SST, the stability of the closed-strings/circles and of the Einstein-spacetime components leads to value of the gravitational constant [1A]. It follows from the fact that their shapes cannot change [1A]. The SST is the useful version of the modified M/string theory [14].

2.12
The origin of DNA must follow from ultimate theory.

Within the mainstream theories unmistakably we cannot explain the origin of DNA. The origin of DNA is described within SST.

The neutrino precursors of the DNA appeared already before the observed expansion of the Universe. There are the four different Einstein-spacetime components and there are the four different bases i.e. A, C, G and T.

Neutrinos have two states of the weak charges so their alternate setting can force the alternate setting of the deoxyribose and the phosphoric acid along a line composed of the entangled neutrino-antineutrino pairs.

There are two phenomena that can lead to the codons in the DNA composed of three bases i.e. the decays of charged pions and the decays of tau-"neutrinos" (according to SST they consist of three different entangled electron-neutrinos, muon-neutrinos and their antiparticles) to three entangled neutrinos.

The internal helicity of the double helix is right-handed because such helicity have electrons responsible for the interactions of molecules.

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