

The Matter-Antimatter Asymmetry: Is Our Universe the One and Only in Our Cosmos?

Sylwester Kornowski

Abstract: Some extension of the General Relativity leads to the superluminal nontransparent infinitesimal pieces of space (plenums/tachyons). Due to their dynamic viscosity, in the infinite cosmos can appear big pieces of space composed of smaller ones. Due to collisions of very big pieces of space, there can appear cosmoses with stable boundary. Inside some of them can appear universes. Here, we discuss the possibility that in our Cosmos, our Universe is the one and only. Knowing the radius of the boundary, we can calculate the period of the oscillations of our Universe. We show also that the matter-antimatter asymmetry in our Universe follows from the transitions of the electron-positron pairs into the electron-proton pairs in a vortex with left-handed internal helicity produced in the Einstein spacetime.

1. Introduction and motivation

The General Relativity leads to the non-gravitating Higgs field composed of plenums/tachyons [1A], [2]. On the other hand, the Scale-Symmetric Theory (SST) shows that the succeeding phase transitions of such Higgs field lead to the different scales of sizes/energies [1A]. 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 and matter from antimatter [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].

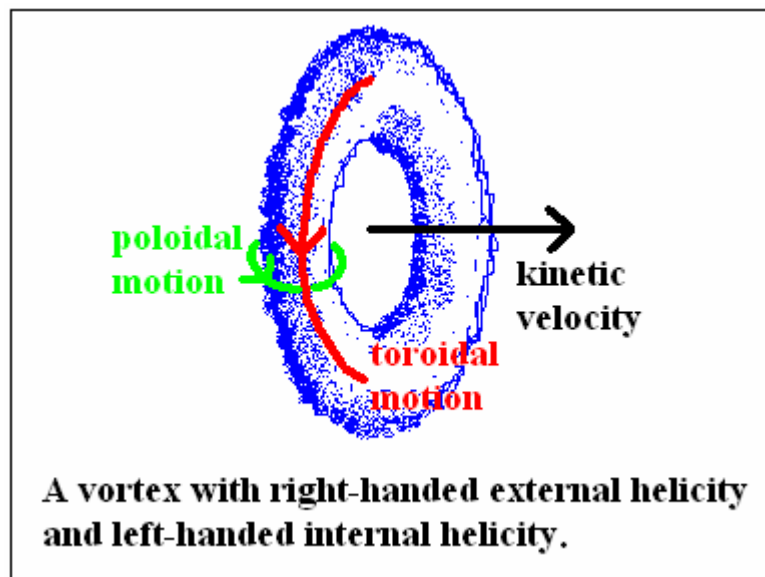
Due to the symmetrical decays of bosons on the equator of the core of baryons, there appears the atom-like structure of baryons described by the Titius-Bode orbits for the nuclear strong interactions [1A].

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.

The inner radius of our Cosmos is about $2.3 \cdot 10^{30}$ m [1B], [3]. Its stable boundary appeared due to the collapse of the outer shell of the Einstein spacetime – it was the end of the inflation [1B].

If the two-component spacetime inside our Cosmos has not internal helicity then, to conserve such property, there must appear vortices in the Einstein spacetime with both the left-handed and right-handed internal helicity.

To create a cosmos with an internal helicity of spacetime (similar to a tropical cyclone), at least one of the colliding very big pieces of space must have the external helicity not equal to zero (see Fig.). Left-handed external helicity means that angular velocity is antiparallel to kinetic velocity whereas right-handed means that the two vectors are parallel. Assume that there was collision of two big pieces of space composed of tachyons (initially there were not chaotic motions inside the big pieces) and that the smaller one expanded inside the bigger one (the big bang). If the expanding big piece of space had before the collision the left-handed external helicity not equal to zero then the two-component spacetime must have left-handed internal helicity i.e. such spacetime must prefer creation of vortices in the Einstein spacetime with left-handed internal helicity.



Moreover, the collapse of the outer shell of the expanding Einstein spacetime at the end of the inflation [1B], [3], there should be preferred creation of a vortex with left-handed internal helicity in the centre of our Cosmos i.e. there can be in existence one universe only.

SST shows that internal helicity of neutrons and protons is left-handed whereas of electrons is right-handed (we should not mistake the right-handed internal helicity of the electrons with

their left-handed external helicity) [1A]. But notice that mass of proton is about 1836 times greater than electrons so resultant internal helicity of an electron-proton pair is left-handed. For antiparticles is the vice versa. It leads to conclusion that in vortices with left-handed internal helicity there will dominate the transitions of the electron-positron pairs into the electron-proton pairs whereas in vortices with right-handed internal helicity there will dominate the transitions of the electron-positron pairs into the antiproton-positron pairs. Such is the origin of the matter-antimatter asymmetry in our Universe. Just our Universe appeared due to the evolution of a vortex in the Einstein spacetime with left-handed internal helicity [1B].

Assume that due to the collapse of the outer shell of the Einstein spacetime, there appeared the coming back shock wave that created the left-handed vortex in the centre of our Cosmos. This means that after the big bang there appeared only one Protoworld with left-handed internal helicity in centre of the Cosmos. This Protoworld, due to its evolution described within SST, transformed into the expanding Universe. Since radial speed of expansion of the front of our Universe is equal to the speed of light c so knowing radius of the spherical boundary of our Cosmos, we can calculate the period of oscillations of our Universe – it is about $5 \cdot 10^5$ Gyr. Such oscillation is defined by time the particles moving with radial speeds close to the c cover the distance from the centre of the Cosmos to its boundary and the way back (there and back).

There is very high probability that such scenario is correct i.e. that in our Cosmos, our Universe is the one and only. Could it be that the Milky-Way Galaxy is very near to the centre of our Cosmos? Notice that the linear speed of our Universe in relation to the Einstein spacetime (~ 355 m/s [3]) is very low in comparison with the speed c (about million times lower).

References

- [1] Sylwester Kornowski (2015). *Scale-Symmetric Theory*
 [1A]: <http://vixra.org/abs/1511.0188> (Particle Physics)
 [1B]: <http://vixra.org/abs/1511.0223> (Cosmology)
 [1C]: <http://vixra.org/abs/1511.0284> (Chaos Theory)
 [1D]: <http://vixra.org/abs/1512.0020> (Reformulated QCD)
- [2] Sylwester Kornowski (2016). “Is the Physical World the Math/Platonic-World Only?”
<http://vixra.org/abs/1411.0160>
- [3] Sylwester Kornowski (2015). “The Origin and Fate of the Cosmos and Universes and the Classical-Quantum Asymmetry”
<http://vixra.org/abs/1308.0138>