

The CMB Axis of Evil

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Abstract: The cosmic microwave background (CMB) is the thermal radiation due to the time of recombination. The temperature variations on very large angular scales observed by WMAP and Planck are both larger than expected (there appears the CMB axis of evil) and, contrary to smaller-scale fluctuations, aligned with each other. The initial inflation in the big-bang model suggests that both deviations cannot be realized by Nature. The CMB axis of evil, if it exists, leads to the distinguished frame of reference in the Universe and is a sign of new cosmological phenomena. There are many ideas to explain the deviations in CMB. If we neglect the trivial explanation that the applied statistics is incomplete then there are two important ideas: that CMB is a local variation of an infinite universe or some characteristic features of finite/"small" universe. It was shown in 2003 (A. de Oliveira-Costa, M. Tegmark, M. Zaldarriaga, A. Hamilton) that "the simplest small universe model where the universe has toroidal topology with one small dimension of order half the horizon scale, in the direction towards Virgo, could explain three independent anomalies involving the quadrupole and octopole but the applied S-statistic and the circle test on the WMAP data show that we should rule out this model". Here we present a solution that follows from the Scale-Symmetric Theory. Due to the phase transitions of inflation field (i.e. of the Higgs field), the expansion of the Universe (the "soft" big bang) was separated in time from the inflation (the big bang). The dark matter had initially toroidal topology with internal helicity and inside such 3-dimensional torus with central condensate there were two very thin (in cosmic scale) baryonic loops (the loops had left-handed internal helicity and antiparallel unitary spins). It leads to the CMB axis of evil. We solved a few other cosmological problems as well.

1. Introduction

The cosmic microwave background (CMB) is the thermal radiation from the time of recombination after the inflation so anisotropies should be randomly oriented, not aligned. But we know that at least the cosmic octopole is aligned. It suggests that there are unknown cosmological phenomena.

Here, applying the Scale-Symmetric Theory (SST) [1], we show that the CMB axis of evil is not an illusion. We answered following questions. Why average temperatures in the southern ecliptic hemisphere of the sky are slightly higher? What is the origin of the CMB axis of evil? Why there appeared the cosmic SST octopole and why it is very planar (why the largest angular-scale CMB fluctuations are aligned)? Why ecliptic is aligned parallel to the plane of the CMB axis of evil? To answer these questions we need to present briefly the foundations of the SST.

Within the Standard Model we still cannot calculate exact masses and spin of nucleons from the initial conditions (since 1964). On the other hand, within the Cosmological Standard Model we cannot define properties of the dark matter and dark energy and calculate their abundances from some initial conditions. We as well do not understand the origin of physical constants and applied in physics mathematical constants. It suggests that the two leading mainstream theories, i.e. the Quantum Physics and General Theory of Relativity, are the incomplete theories and that there should be a theory superior to these two theories. Such theory should lead to initial conditions applied in these two theories and should describe the lacking part of the Theory of Everything. We showed that the Scale-Symmetric Theory described in tens of papers (http://vixra.org/author/sylwester_kornowski) is the lacking part.

The General Relativity leads to the non-gravitating Higgs field composed of tachyons [1A]. 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]. 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/condensates/loops/quantum-physics 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 fermions (the protoworlds as well) have internal helicity (helicities) which distinguishes particles from their antiparticles [1A]. SST shows that a fundamental theory should start from infinite true 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 practically invariant [1A], [1B].

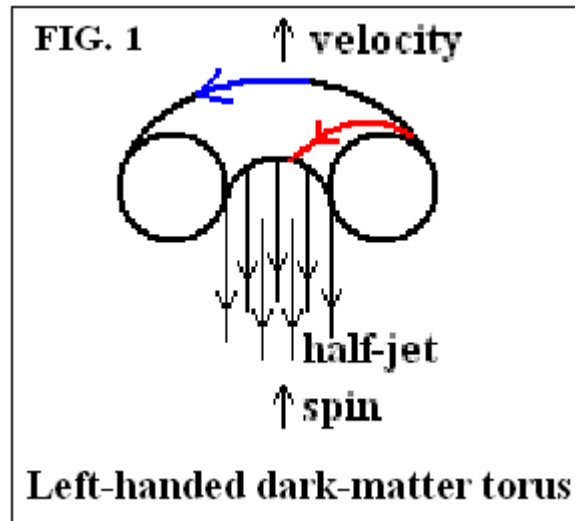
SST shows that to obtain results consistent with experimental data, the big piece of space that transformed into the inflation field had before the collision a rotational energy very low in comparison with kinetic energy [1A]. It leads to conclusion that there was low anisotropy of the inflation field i.e. of the expanding superluminal non-gravitating Higgs field. It means that to such field we can apply the Kasner metric, [2], that is a solution to the vacuum Einstein equations so the Ricci tensor always vanishes. The Kasner metric is for an anisotropic cosmos without matter so it is a vacuum solution for the Higgs field. The one of the two partially symmetrical Kasner solutions, i.e. $(2/3, 2/3 - 1/3)$, we interpret as virtual Higgs cyclones with toroidal and poloidal motions. Such tori appear in the succeeding phase transitions of the Higgs field [1A].

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, [1A], we calculated a thousand of basic physical quantities (there are derived the physical and mathematical constants as well) which are consistent or very close to experimental data and observational facts. In SST there do not appear approximations, mathematical tricks, and free parameters which are characteristic for the mainstream particle physics and mainstream cosmology.

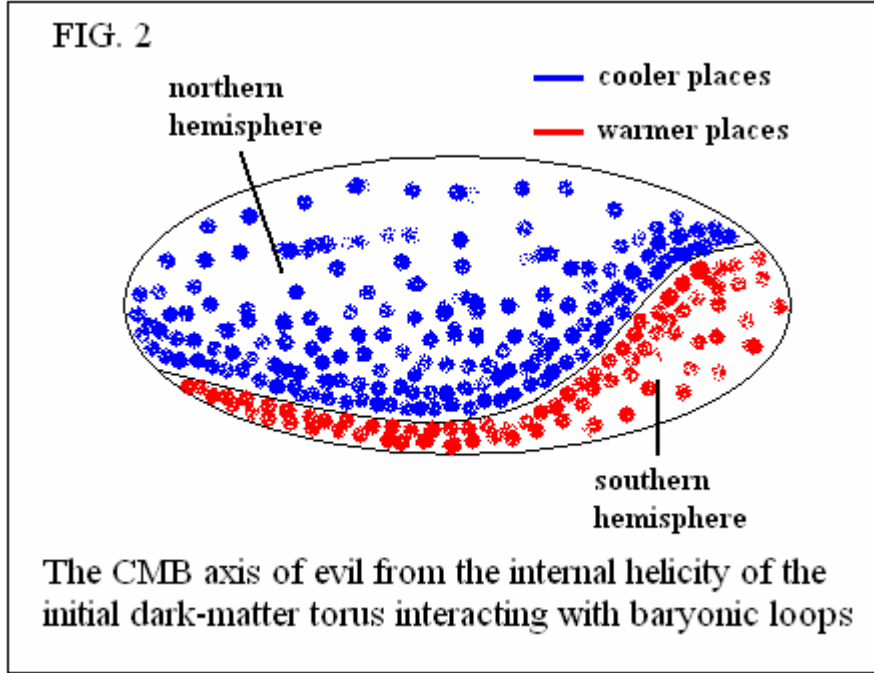
2. Why average temperatures in the southern ecliptic hemisphere of the sky are slightly higher? What is the origin of the CMB axis of evil? Why there appeared the cosmic SST octopole and why it is very planar (why the largest angular-scale CMB fluctuations are aligned?)? Why ecliptic is aligned parallel to the plane of the CMB axis of evil?

According to SST, the core of baryons and core of protoworlds are self-similar [1A], [1B]. In both, i.e. in the core of nucleons and Protoworld, is/was a torus with left internal helicity (i.e. there are the toroidal and poloidal motions) carrying half-integral spin and there is/was a central condensate/scalar. But the core of baryons is built of the gravitating luminal Einstein-spacetime components whereas the protoworlds were built of the nucleons. On the other hand, the early Universe was created inside the torus of the left-handed Protoworld similar to the creation of neutral pion inside the torus of the core of nucleons/baryons. According to SST, both created structures (i.e. early Universe and neutral pion) consisted/consist of two left-handed loops with antiparallel unitary spins. The loops in the binary systems of them were/are entangled (it is the superluminal quantum entanglement carried by the entanglons exchanged between the neutrino-antineutrino pairs and/or neutrinos [1A]). Emphasize that nucleons consist of entangled neutrino-antineutrino pairs (they are the carriers of the gluons and photons [1A]) and neutrinos whereas the core of Protoworld initially was composed of entangled nucleons (it transformed into the dark matter i.e. into entangled neutrino-antineutrino pairs but the entanglement is the long-distance entanglement [1B]). We can see that the structure of the Universe in its second stage looked as follows: the dark matter had initially toroidal topology with internal helicity and inside such 3-dimensional torus with central condensate there were two very thin (in cosmic scale) baryonic loops (the loops had left-handed internal helicity and antiparallel unitary spins). Moreover, the equatorial radius of the 3-dimensional dark-matter torus was 3 times greater than its “poloidal” radius i.e. we can assume that $R_y = R_z = 3$ and $R_x = 1$. Such values as well were assumed to estimate the significance of the largest scale CMB fluctuations in WMAP [3]. SST shows that the 3-dimensional dark-matter torus collapsed partially towards the two-baryonic-loops/early-Universe – it started the “soft” big bang [1B]. But the inflows of the dark energy and the nuclear explosions of the protogalaxies intensified evolution of the early Universe [1B].



The collapsing part of dark-matter with toroidal topology and with toroidal and poloidal motions interacted, due to the weak interactions, with the two-baryonic-loops/early-Universe. SST shows that with decreasing radius of the dark-matter torus, its toroidal speeds decrease as well so poloidal speeds increase (dark matter consists of the entangled luminal neutrino-

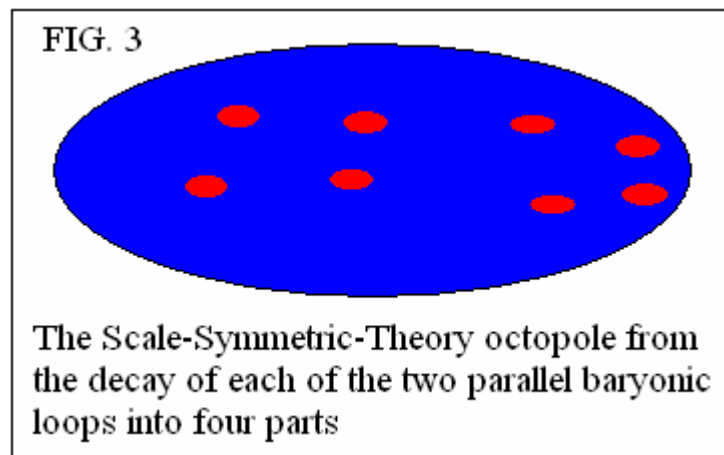
antineutrino pairs so their resultant speed is invariant). It means that much more neutrino-antineutrino pairs are separated from the torus on its internal equator. It causes that the torus produce a jet in the Einstein spacetime (FIG. 1). Such jet interacted with the two-baryonic-loops/early-Universe so more baryonic matter appeared in the hemisphere containing the jet. It is the reason that the average temperatures in the southern ecliptic hemisphere of the sky are slightly higher. Moreover, intensity of such phenomenon is highest near the ecliptic plane so close to it appears the CMB axis of evil (FIG. 2).



The half-jet caused that the early Universe was moving in the Einstein spacetime of the Cosmos – in such a way we can explain the space roar [4].

SST shows that there are only 4 different stable neutrinos (electron-neutrino, muon-neutrino and their antiparticles) [1A]. The tau-neutrino is unstable and consists of three different stable neutrinos. In reality, the neutrino oscillations are the exchanges of the free neutrinos for the neutrinos in the neutrino-antineutrino pairs the Einstein spacetime consists of. It means that there are only 4 different stable neutrino-antineutrino pairs. Neutrinos are the fermions whereas the neutrino-antineutrino pairs are the spin-1 bosons. It leads to conclusion that a totally neutral object consists of four entangled different stable neutrinos or four different pairs of neutrinos. It leads to the four-particle/four-object symmetry (the quadrupole: in SST cosmology it is a multipole configuration with four equal masses arranged in a circular pattern) or to the untypical octopole (in SST cosmology it is a multipole configuration with eight equal masses arranged in four mass dipoles with parallel axes arranged in a cylinder pattern – in an approximation we can assume that it is as well the SST quadrupole) [1A]. It means that decay of the two entangled baryonic-loops/early-Universe to the SST octopole was preferred i.e. there appeared the eight warmer lobes and cooler gaps between them (FIG. 3). In such a way should look the S -map, [3], of the all-sky cleaned CMB map when we neglect the succeeding decays of the SST octopole, when we neglect the inflows of dark matter and dark energy and the nuclear explosions of the protogalaxies. Such pattern was discovered by cosmologists [3] (see FIG. 1, top on the right in paper [3]). Moreover, the geometry of the early Universe shows that initially the plane of the two-baryonic-loops/early-Universe overlapped with the plane that separated the opposite hemispheres of the sky. It means that

the cosmic SST octopole should be very planar and it is consistent with the observational data [3]. The evolution of the main eight parts caused that on small angular scales the CMB anisotropies are randomly oriented, not aligned.



The CMB axis of evil and the alignment of the SST octopole suggest that the beginning of expansion of the Universe was separated in time from the end of the inflation. They suggest as well that the Universe started as finite/"small" Universe. The inflationary paradigm for the origin of the Universe is not valid. We showed that the existence of the CMB axis of evil observed by WMAP and Planck leads to the distinguished frame of reference in the Universe.

The solar system seems to line up with the CMB axis of evil. It follows from the fact that the two baryonic loops were the two closed magnetic lines (two parallel magnetic circles) and the spins of protogalaxies were tangent to the magnetic circles [1B]. But due to the phenomena characteristic for the expansion of the Universe, we should observe radial magnetic lines, [1B], i.e. the Universe should look in an approximation as a magnetic monopole. The radial magnetic lines should converge on the initial magnetic circles. The magnetic circles disappeared but there should be some residual cosmological vortices of charged particles. Magnetic axes of such vortices should be perpendicular to the plane of the CMB axis of evil. If the Sun lies inside the residual vortices of charged particles (i.e. close to the centre of the expanding Universe) then the axis of rotation of the Sun should be parallel to the initial jet i.e. the ecliptic should be aligned parallel to the plane of the CMB axis of evil. We are indeed very close to the centre of the Universe and probably very close to the centre of the Cosmos that radius is about 10,000 times greater than the present-day radius of the observed Universe [1B].

References

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