The Protoworld as a Neutron-Like Object

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Abstract: Here we show the similarity between the neutron and the virtual neutral pion inside it on the one hand, and the Protoworld and the very early Universe inside it on the other hand. Such similarity leads to the correct abundances of different states (i.e. baryon matter, dark matter, photons and neutrinos, and dark energy) in the cosmic structure at the beginning of the expansion of the Universe and in the Universe today.

When a new particle physics and a new cosmology are formulated that are similar due to internal structure of created objects and which with a much smaller number of initial conditions give much better results, we must carefully describe the physical side of the postulated structures and phenomena.

Of course, the mathematical description is equally important because it allows the theoretical results to be compared with the experimental and observational data.

A physical and mathematical description of the new particle physics and new cosmology can be found in [1] and [2], but we are convinced that emphasizing the similarity of nature on very small and very large scales is extremely important.

Here we show again that the neutron is a miniature of the cosmic structure (the Protoworld) that was formed before the expansion of the Universe and that the virtual neutral pion is a miniature of the very early Universe that appeared inside the core of the Protoworld.

In paper [3], we already showed the similarity between the Active Galactic Nuclei (and quasars) and the core of proton. In AGN and quasars, there is an opaque torus with a central black hole composed of the neutron black holes (NBHs). On the other hand, in the core of proton, there is the torus/electric-charge with the central condensate which is the Scale-Symmetric-Theory (SST) black hole with respect to the nuclear weak interactions [1].

According to SST, in the neutron there is the core built of a torus with central condensate and outside the torus is relativistic pion, while a virtual neutral pion consists of two gluon loops with opposite spins with a total mass of ~135.0 MeV (outside the neutron, the neutral pion decays into two photons) [1]. The neutron that produces virtual neutral pion inside its core is a miniature of the Protoworld which created the virtual very early Universe inside its core. The difference between real and virtual objects we described in [4]. The Protoworld is an analog of the neutron, and the virtual very early Universe is an analog of the virtual neutral pion.

There are two states of the neutron: the neutral core plus relativistic neutral pion or the charged core (727.4 MeV) plus relativistic charged pion (215.8 MeV) [1]. These two states in a neutron transform into each other with tremendous frequency, but the latter state is more stable [1], so we assumed that the state of the Protoworld was similar to it. Such a similarity of the

second state of the neutron to the Protoworld lies in the similarity of the shapes of the largest parts (i.e. of the tori, central condensates and the loops in the d = 1 state [1], [2]), lies in the proportionality of their sizes, and the proportionality of their masses. The relativistic charged pion in the d = 1 state in neutron has the azimuthal quantum number equal to zero so it looks as a circle-like loop [1]. Contrary to the torus/electric-charge and relativistic charged pion in neutron, the dark-matter (DM) cosmic torus and the cosmic loop (it was built of the particle-antiparticle pairs which had decayed into photons and neutrinos) in the Protoworld were electrically neutral. The DM cosmic torus behaved as a big monopole.

The internal structure of neutral pion (electric charge and spin of it are equal to zero) preserves the electric charge and spin of the charged core of neutron and the pion is produced inside the neutron torus. It leads to conclusion that the very early Universe appeared inside the torus of the Protoworld. There were two loops composed of the NBHs [2]. From paper [5] follows that the gravitational potential binding energy per NBH increases with increasing number of NBHs in an association of them. But the binding energy cannot be higher than the total mass of the NBHs. It means that the very early Universe inside the Protoworld was a virtual object. The expansion of the Universe forced the transition from the virtual state to real one.

SST shows that to create the stable core of the Protoworld, we need a stable and electrically neutral particle with a mass of 727.4 MeV and equatorial radius equal to A = 069744 fm [1]. In paper [2] we showed that such particle is a torus composed of the dark-matter (DM) loops so it is the DM torus. The ratio of the charged core of neutron to the mass of real or virtual neutral pion created inside the core is $727.4/135.0 \approx 5.39$ [1]. On the other hand, in our Universe, the ratio of density of dark matter to density of baryon matter (BM) is also ~5.4. It suggests that the core of the Protoworld (i.e. the cosmic torus with central condensate) was built of the DM tori while the two loops inside the torus of the Protoworld were built of the NBHs, i.e. of baryon matter. An analog to the relativistic charged pion in the neutron (215.8 MeV), in the Protoworld should be built of the particle-antiparticle pairs so the decay of the Protoworld caused that such analog decayed into photons and neutrinos.

According to SST, to create a cosmic object with a mass of M, we need a vortex of pure energy (i.e. the non-gravitating quantum entanglement or rotational energy) equal to E = M, i.e., locally, the energy-mass is increased by E + M = 2M. To conserve the local mass-energy density, dark energy (DE) equal to 2E = 2M is pushed aside the cosmic object that causes that the local zero-point energy is decreased by 2E. Here, dark energy is the Einstein spacetime i.e. it is the field composed of the non-rotating-spin neutrino-antineutrino pairs [1]. We see that an expansion of the Protoworld caused an inflow of dark energy equal to 2E. For the Protoworld, the dark energy equal to 2E is directly proportional to two masses of the neutron described here, i.e. $2E \sim 2\,(727.4 + 215.8) = 1886.4$ MeV.

Neutrinos consist of the superluminal binary systems of closed strings (entanglons) which are responsible for the quantum entanglement [1]. The non-gravitating energy frozen inside each neutrino is about 119 powers of ten higher than its gravitational mass [1]. Creation of a new neutrino inside the Protoworld caused that most of the entanglons exchanged between and inside the DM tori have been frozen inside the new neutrino. This phenomenon caused the DM particles to disintegrate into the DM loops which began to move towards the very early Universe, causing violent collisions between dark matter and NBHs and between NBHs. Such phenomena started the expansion of the Universe composed of dark matter, baryon matter, photons and neutrinos [6]. It forced the inflow of dark energy equal to 2E so dynamic pressure of spacetime increased and the galaxies continued to move away from each other.

From the neutron-Protoworld similarity results that abundances of different states in the cosmic structure at the beginning of the expansion of the Universe were as follows.

Baryon matter:	proportional to	135.0 MeV	i.e. abundance was	~12.52%
Dark matter:	proportional to	727.4 MeV	i.e. abundance was	~67.47%
Photons and neutrinos:	proportional to	215.8 MeV	i.e. abundance was	~20.01%
Dark energy:	proportional to	0 MeV	i.e. abundance was	~0%

The present-day abundances should be as follows.

Baryon matter:	proportional to	135.0 MeV	i.e. abundance is	~4.91%
Dark matter:	proportional to	727.4 MeV	i.e. abundance is	~26.46%
Photons and neutrinos:	proportional to	0 MeV	i.e. abundance is	~0%
Dark energy:	proportional to	1886.4 MeV	i.e. abundance is	~68.63%

We obtained results consistent with observational data. The ratio of dark energy to dark matter $F = 68.63 / 26.46 \approx 2.6$ is characteristic for the present Universe but also for the inner Cosmos [7].

Summary

The direct transition of the inflation into the expansion of the universe and partially the quark model of hadrons are erroneous ideas that block the proper development of cosmology and particle physics. Let us remember that by applying a sufficiently large number of initial conditions, even by applying extremely absurd ideas, we always find theoretical results coinciding with the experimental data.

We showed here the similarity of the initial cosmic structure and neutron and we obtained correct results! From such similarity follows that we must reformulate cosmology and particle physics.

References

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