Evolution of the Milky Way and Similar Massive Galaxies
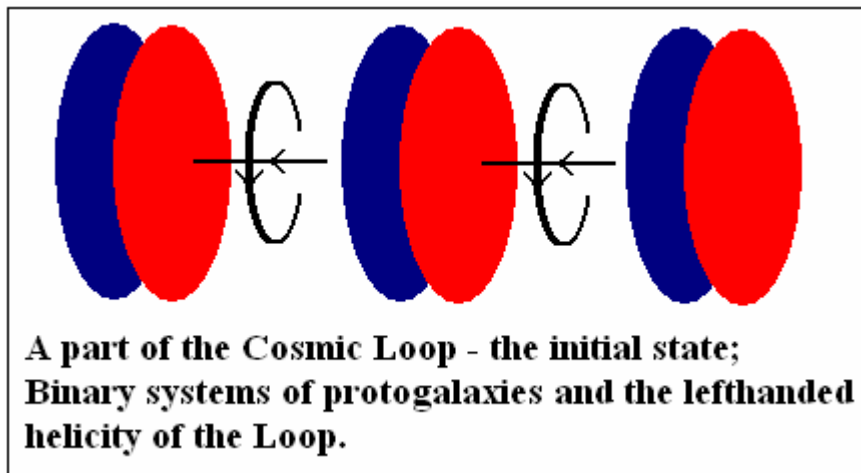
Sylwester Kornowski

Abstract: Here, applying the lacking part of ultimate theory i.e. the Scale-Symmetric Theory, evolution of the Milky Way, and similar massive galaxies, has to be explained descriptively and partially quantitatively. There is described production of the protoarms of the massive spiral galaxies, production of the Fermi Bubbles and dwarf galaxies. Due to the two succeeding transformations of groups of the binary systems of electron-positron pairs via the electromagnetic-type weak condensates inside bare electrons, there are emitted the gamma-rays with central values of energy in approximation equal to: 1.3 GeV, 2.6 GeV, 5.3 GeV, 10.6 GeV, 21 GeV, 42 GeV and 85 GeV. For muon-antimuon pair we obtain about 137 GeV, whereas for kaon-antikaon pair is 639 GeV.

1. Introduction

The Scale-Symmetric Theory [1], [2] starts from the expansion of the cracked space (it is the inflation of the Higgs field; the big bang) which leads to the Einstein spacetime. There appear the four succeeding phase transitions of the Higgs field and the atom-like structure of baryons.

The dark matter consists of the additional Einstein-spacetime components entangled with baryonic matter. It appeared due to the evolution of the cosmic structure (it was the Protoworld that appeared due to the fourth phase transition of the Higgs field) which appeared after the inflation described within the Scale-Symmetric Theory but before the observed expansion of our Universe (the 'soft' big bang).

A part of the Cosmic Loop - the initial state;
Binary systems of protogalaxies and the lefthanded helicity of the Loop.

Inside the Protoworld was created the Double Cosmic Loop (the very early Universe) composed of protogalaxies. Due to the quantum entanglement, the protogalaxies were grouped in bigger structures. The quantum entanglement leads to following formula which describes the number of binary systems of protogalaxies found in the structures of the Universe

$$D = 4^d, \tag{1}$$

where d = 0, 1, 2, 4, 8, 16 for a flattened spheroid-like structures, and d = 3, 6, 12 for a chain-like structures.

The protogalaxies consisted of the neutron black holes. The inflows of the dark matter (it appeared due to the evolution of the core of the Protoworld) caused the exit of numerical neutron black holes from their black-hole state – they transformed into the big stars.

Because in the double cosmic loop there were $2 \cdot 4^{16}$ binary systems of protogalaxies then mean distance between the planes of rotation of the binary systems of protogalaxies was 0.28 light years. Each protogalaxy consisted of 4^{16} neutron black holes so initial mass of binary system of protogalaxies was about $4.2 \cdot 10^{41}$ kg. On the assumption that in each protogalaxy the neutron black holes were maximally packed in a disc, the initial radius of protogalaxy was about 55 times smaller than the distance from the Sun to Earth.

In each protogalaxy dominated two magnetic fields. The magnetic axes of the neutron black holes (the spins of the neutrons) in a protogalaxy were polarized in such a way that they were tangent to the disc and their directions overlapped or were parallel. Just the disc was a magnetic domain. Such magnetic axes I will refer to as the tangent (to the discs) magnetic axes. Since the rotational axes of the protogalaxies were perpendicular to the discs and tangent to the Cosmic Loop (Fig.) so the tangent magnetic axes rotated around the Cosmic Loop.

Due to the inflows of the dark matter into the Double Cosmic Loop, numerous neutron black holes transformed into big stars so inside and around each protogalaxy appeared plasma which rotated together with protogalaxy. Such rotating plasma created magnetic axis overlapping with the rotational axis of the protogalaxy and perpendicular to the disc of the protogalaxy. Such magnetic axes I will refer to as the perpendicular (to the discs) magnetic axes.

The rotating tangent magnetic axes lead to the B-modes in the CMB whereas the perpendicular magnetic axes to the E-modes in the CMB.

The cosmic structures in the expanding Double Cosmic Loop were mostly moving in directions perpendicular to the Cosmic Loops. Due to the law of conservation of spin, the rotational axes of the protogalaxies should overlap with the directions of motion of the protogalaxies i.e. they should be perpendicular to the Cosmic Loops.
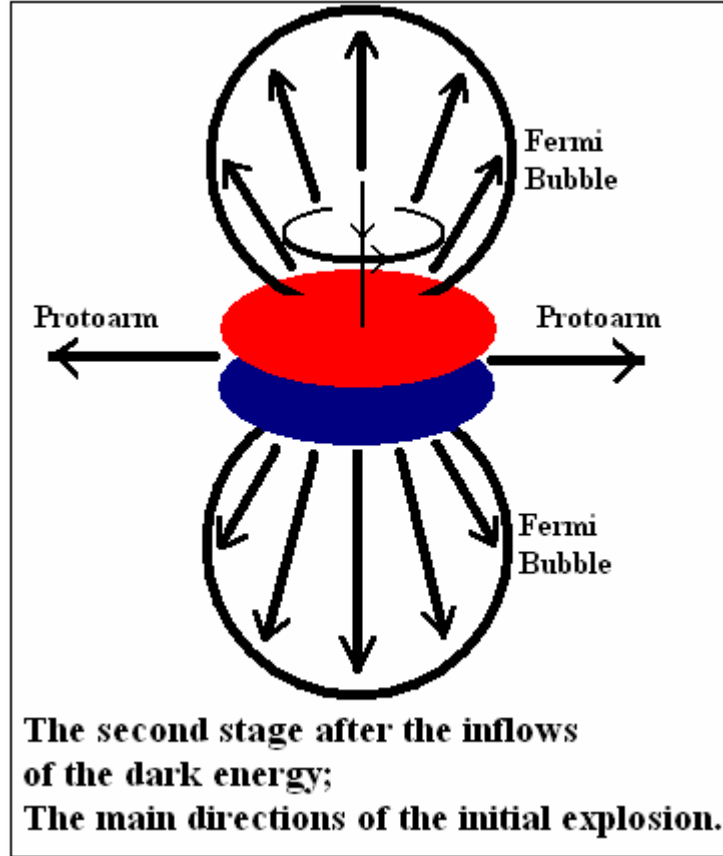
Here, applying the lacking part of ultimate theory i.e. the Scale-Symmetric Theory, evolution of the Milky Way, and similar massive galaxies, has to be explained descriptively and partially quantitatively.

2. Calculations

Due to the inflows of the dark matter into a binary system of protogalaxies numerous neutron black holes transformed into big stars. Their synchronized explosions caused that the very highly ionized plasma composed of ions and electrons was moving, first of all, along the two main magnetic axes. Due to the very dense and parallel discs of the two protogalaxies, the plasma, which created the protoarms of the big spiral galaxies, was highly collimated, whereas the plasma which created the Fermi Bubbles [3] was scattered (Fig.).

With time, the size of the two Fermi Bubbles, i.e. the regions of the halo which emit the gamma-rays, decreases. But it does not mean that there decreases size of the halo. Just temperature of the external layers of the halo decreases faster.

Most important is the fact that the coupling constant of weak interactions for the weak condensate in the centre of bare electron, calculated within the Scale-Symmetric Theory, is $\alpha'_{W(electron)} = 1.11944 \cdot 10^{-5}$ [1]. Calculated fine-structure constant is $\alpha_{em} = 1/137.036$ [1]. Such values lead to hundreds theoretical results consistent or very close to experimental data [1], [2].

The second stage after the inflows of the dark energy; The main directions of the initial explosion.

Consider a transition of an electromagnetic energy E into an additional electromagnetic-type weak condensate overlapping with the weak-type weak condensate in bare electron [1], [4]. In an additional electromagnetic-type weak condensate the spins of the entangled and confined Einstein-spacetime components (they are the carriers of gluons and photons [1]) rotate – gluons and photons are the rotational energies. Creation of such additional weak condensate causes emission of energy equal to $E\alpha_{em}$. Outside bare electrons, the additional weak condensates transform again into electromagnetic energy so there appears the factor $f = \alpha_{em} / \alpha'_{W(electron)}$. Due to the electromagnetic→weak transition and the return weak→electromagnetic transition, the initial energy E is increasing to

$$E_{o,em} = E\,(1 - \alpha_{em})\,\alpha_{em} / \alpha'_{W(electron)} = 647.12\ E. \qquad (2)$$

There should appear objects containing 2^n entangled binary systems of electron-positron pairs (their spin is equal to zero), where n = 0, 1, 2, 3, 4,… The GASER ([1]; Gamma Amplification by Stimulated Emission of Radiation) and the four-neutrino symmetry [1] cause that abundances should be higher for objects containing 1, 4, 16, 64,… entangled binary systems of electron-positron pairs.

Calculate central values of energies of the emitted gamma-rays. Energy of binary system of electron-positron pairs is 2.044 MeV. Due to the two succeeding transitions, this energy increases to $E_C = 1.323$ GeV (formula (2)). Energies of the 2^n entangled energies E_C are as follows: 1.32 GeV, 2.65 GeV, 5.29 GeV, 10.58 GeV, 21.16 GeV, 42.33 GeV and 84.65 GeV. The next value is higher than for muon-antimuon pair.

Applying formula (2), for muon-antimuon pair we obtain 136.7 GeV, whereas for kaon-antikaon pair is 639 GeV.

Due to the explosion which created the Fermi Bubbles, the two parallel discs transformed into one disc. The explosions created the dwarf galaxies as well.

Due to the tangent magnetic axis associated with the neutron black holes in centre of the Milky Way which did not transform into plasma during the inflows of the dark matter, there could be created flat magnetic domains parallel to the disc of our Galaxy. Distances of the flat magnetic domains from the abstract plane-disc should be defined by the Titius-Bode law $R_D = A_D + dB_D$, where $A_D / B_D = 1.3898$ and $d = 0, 1, 2, 4, 8, 16, 32, 64, 128$ [1].

3. Summary

Here, applying the lacking part of ultimate theory i.e. the Scale-Symmetric Theory, evolution of the Milky Way, and similar massive galaxies, has to be explained descriptively and partially quantitatively.

There is described production of the protoarms of the massive spiral galaxies, production of the Fermi Bubbles and dwarf galaxies.

Due to the two succeeding transformations of groups of the binary systems of electron-positron pairs via the electromagnetic-type weak condensates inside bare electrons, there are emitted the gamma-rays with central values of energy in approximation equal to: 1.3 GeV, 2.6 GeV, 5.3 GeV, 10.6 GeV, 21 GeV, 42 GeV and 85 GeV. For muon-antimuon pair we obtain about 137 GeV, whereas for kaon-antikaon pair is 639 GeV.

References
[1] Sylwester Kornowski (3 March 2015). "The Scale-Symmetric Physics"
    http://vixra.org/abs/1203.0021 .
[2] Sylwester Kornowski (2012 – 2015).
    http://vixra.org/author/sylwester_kornowski .
[3] http://fermi.gsfc.nasa.gov .
[4] Sylwester Kornowski (3 March 2015). "The Origin of the Unidentified Emission Line Characteristic for the Dark Matter".
    http://vixra.org/abs/1407.0047 .