CORPUSCULATORY-SIMPLE THEORY (CST). THE DARK SIDE OF MATTER (DM and DE)

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Abstract
According to data from the Planck space observatory, the total mass-energy of the observable universe consists of 4.9% ordinary (baryonic) matter, 26.8% dark matter, and 68.3% dark energy. Thus, the universe is 95.1% dark matter and dark energy. For several decades, science has been struggling to understand these dark entities and to experimentally detect their carriers. This article attempts to answer these questions.

Keywords: Baryonic matter, Dark matter, Dark energy, physical vacuum, preon model of matter, three types of neutrinos.

INTRODUCTION

Dark matter was discovered by calculation based on experimental data measuring the velocities of peripheral stars in spiral galaxies and the gravitational lensing of light by galaxy clusters. These data indicate the presence of additional gravitational mass in these objects, significantly exceeding the observed baryonic mass of stars, clouds, and other objects. Dark matter, however, exhibits no electromagnetic properties—it neither glows nor absorbs light, and therefore is not detectable by photometry or spectrography.

These properties of dark matter particles are very similar to those of neutrinos. Therefore, neutrinos naturally became the first historical candidates for dark matter particles. However, modern physics quickly abandoned this idea, since according to cosmological models of the formation of the Universe, Dark Matter should have been cold in the early stages of the Universe's existence, with a temperature lower than that of baryons, electrons, and photons, and should have played a decisive role in the aggregation of all matter into the large-scale structure of the Universe. However, modern physics only knows of three types of hot neutrinos, produced during various nuclear reactions in stars or cosmic cataclysms (collisions of objects, collapses, etc.). Therefore, neutrinos were rejected as candidates for cold Dark Matter, and scientists began searching for other, as yet unknown, particles that could be cold Dark Matter particles.

Most Dark Matter detectors are based on large-volume underground installations filled with liquid xenon or argon. When dark matter particles in the galactic halo scatter off a particle of ordinary matter (an electron or nucleon), the latter gains a certain kinetic energy, which can be detected using conventional methods. An additional experimental prediction is based on the expected periodic change in the velocity of the Earth (and the detector along with it) relative to the dark matter halo due to its orbital motion around the Sun, which should lead to annual variations in the signal. While dark matter particles have not yet been detected in this way, the method is constantly being refined.

The LHC's program also includes the detection of dark matter particles. We will discuss this issue separately below.

PHYSICAL VACUUM AND PREONS

Modern physics has accumulated a number of unsolved problems. We will highlight just two of them:

• the interconversion of quarks and leptons in beta-decay reactions;

• Dark matter and dark energy have now been discovered through calculations, but dark matter particles and the mechanism for the formation and action of dark energy have not yet been identified or described.

Many physicists have already recognized the need and understand the necessity of developing a THEORY OF EVERYTHING that would unify all four types of fundamental interactions and explain the formation mechanism of all fundamental particles, including dark matter particles. A certain consensus has already emerged that to construct such a theory, we must return to the concept of the physical medium from which all matter was formed and through which all types of fundamental interactions are realized. The accepted model of the physical environment in modern physics is the PHYSICAL VACUUM (PVT) model (theory) [1], in which the fundamental quantum numbers—momentum, angular momentum, electric charge, etc.—are zero. At the same time, the physical vacuum is believed to be able to reproduce various quantum fields, including electric and magnetic fields, as evidenced by the presence of the parameters εo and μo. Gravity in PVT is explained by the presence of a quantum gravitational field, the theory of which has not yet been fully developed.

It should be noted that 130 years ago, the LORENZ ETHER THEORY (LET) [2] already existed, with similar properties—a stationary ether and the presence of E- and H-components. A significant difference between LET and PVT is the explanation of gravity in LET by the negligible excess of the elementary attractive forces of opposite charges over the repulsive forces of like charges (Zöllner's electrogravitics [3]).

Another significant difference between PVT and LET is the quantum nature of PVT, which was simply unknown at the time LET was developed. Considering the ability of the physical vacuum (ether) to reproduce electric and magnetic fields, the conclusion suggests itself that the quanta of the physical vacuum (ether) must have a dipole electric moment and a dipole magnetic moment, or more accurately, be quadrupole.

Regarding the interconversion of quarks and leptons, the Preon theory emerged back in the 1970s, according to which all quarks and leptons consist of single proto-particles—preons. The emergence of string theory in the late 1980s pushed preon theories into the background. However, in the late 1990s, the first crisis in string theory began to emerge, and preon theories experienced a resurgence. In 1997, the Preon Trinity [4] was developed. Currently, there are more than a dozen different preon theories (hypotheses). To avoid confusion, preons are given different names in different theories, such as subquarks, rishons, helons, ribbons, and so on.

CORPUSCULAR-SYMPLATE THEORY OF EVERYTHING

Corpuscular-Simple Theory (CST) [5-7] combines the theory of the physical vacuum and the Preon theory of the structure of matter into a unified theory of the formation and evolution of the Universe, and can be considered a variant of the THEORY OF EVERYTHING.

According to CST, the physical vacuum is stationary, and the quanta of the physical vacuum (ether) are strings, the simplest model of which is represented by quadrupole corpuscles consisting of two coupled elementary vortices of Planck size, mutually generating each other in an infinite cyclic process, one cycle of which is an elementary tick of time.

Such corpuscles can also be considered quanta of spacetime, possessing their own internal energy. The main and only property of such a physical vacuum (ether) is its ability to form E- and H-dipole-dipole chains of corpuscles, which is a physical model of the electric and magnetic polarization (curvature) of the physical vacuum (ether). In this process, the internal energy of the corpuscles is emergently transformed into the energy of polarization chains corpuscles (electric and magnetic fields).

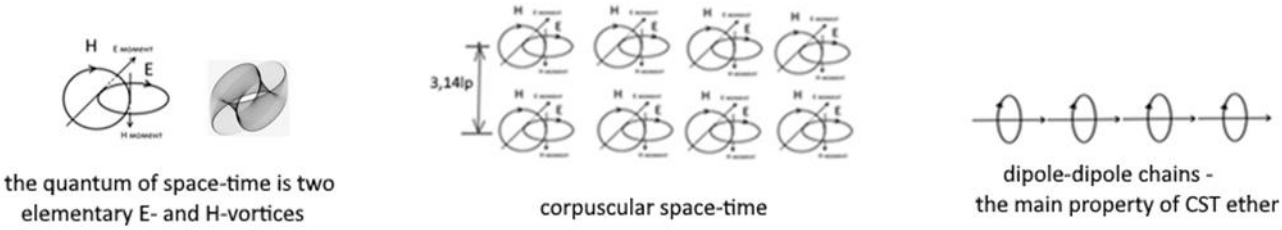

Fig. 1. Model of corpuscular space.

In such a physical vacuum (ether), four types of objects can form:

1. FLUCTUATIONS - the random alignment of the electric or magnetic moments of corpuscles into closed E- and H-dipole-dipole chains of vortices of VIRTUAL PHOTONS (without momentum).

Fig. 2. The model of E- and H-virtual photons.

2. ELECTROMAGNETIC RADIATION (EMR) VORTICES, consisting of closed E- and H-dipole-dipole chains (vortices), but possessing an electrodynamic impulse that leads to the generation of each subsequent vortex at the center of the previous vortex, with offset by half the diameter, which ensures the propagation of vortices at the speed of light. Moreover, all vortices and their corpuscles remain stationary relative to the ether. The speed of formation of dipole-dipole chains of EMR vortices in this case should be 1.57 times the speed of light.

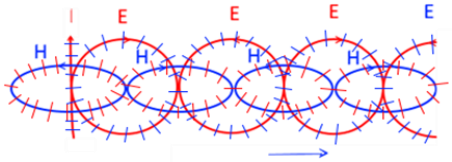

Fig. 3. The model of coupled vortices EMR.

3. In a free physical vacuum (ether), the E- and H-moments of corpuscles have an arbitrary direction. When charges or magnetic moments are introduced into the physical vacuum (ether), the process of polarization of the physical vacuum (ether) begins—a change in the orientation of the corpuscle moments and the formation of lines of force (LF) from E- or H- dipole-dipole chains. And if we recognize EMR as a type of matter that carries energy, then LF must also be recognized as material. In this case, the model of interaction between electric and magnetic charges through the exchange of virtual photons is replaced by a model of interaction between lines of force, their reconnection and attraction, or repulsion.

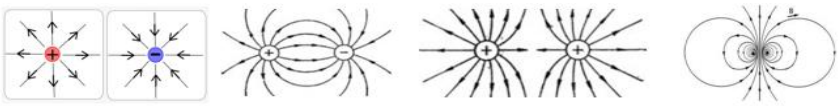

Fig. 4. Lines of force of electric charges and magnetic dipole.

4. Schematic diagram of the formation of PREONS-SIMPLES – the matter of the Universe possessing mass.

According to the CST, ***the model for the formation of preons-simples is the stretching of a virtual photon's electric vortex into a spiral-vortex by a short-term powerful magnetic field (SPMF), followed by its folding into a bagel-vortices, similar to the Zeldovich anapole*** [8].

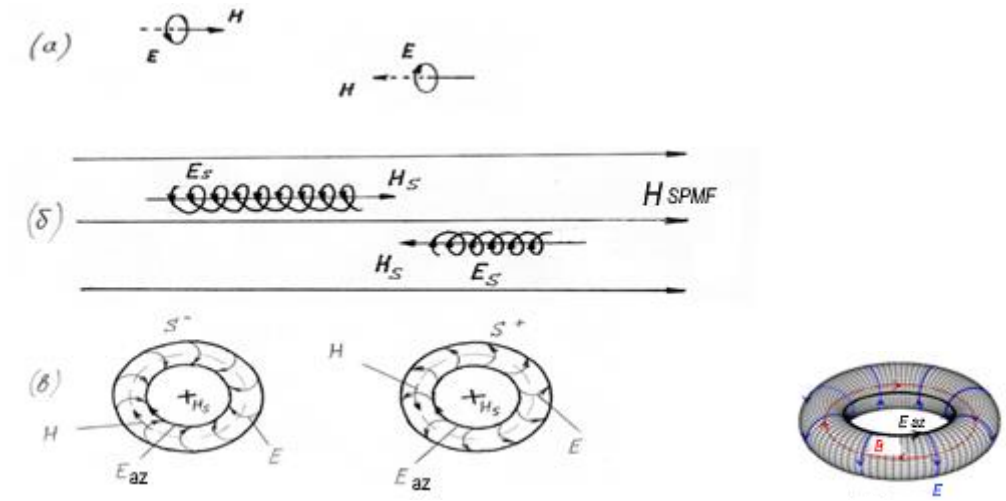

Fig. 5. The model of preon-simple formation.

A distinctive feature of the resulting bagel-vortices vortices, unlike Zeldovich's anapoles, is the presence of an additional azimuthal electric vortex (AEV), which imparts a magnetic moment and electric charge. This is why these particles were given a different name—simples (simplest).

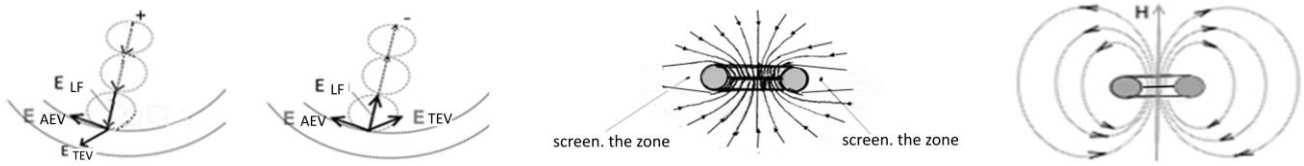

Fig. 6. Formation of field lines of charges and magnetic fields of preons-simples.

In the above diagram of preon-simple formation, the source of internal energy is the SPMF. Where does the CPMF come from? We will return to this question later.

All of the objects mentioned (VF, EMR, LF, and PREONS-SIMPLES) are formed in the physical vacuum (ether) electrodynamically, by changing the orientation of the dipole moments of stationary corpuscles—quanta of the physical vacuum (ether)—without moving them or imparting kinetic energy to them, as in gas- or hydrodynamic models. This means that all of these objects are formed COLD.

SPECTRUM OF RESONANCE LENGTHS OF SIMPLES, FORMATION OF RELIC NEUTRINOS

According to the presented scheme, preons-simples initially formed as spiral-vortices with a continuous spectrum of lengths from 0 to Lmax, depending on the angle of rotation of the virtual photon's vortex plane relative to the external magnetic field vector (the spiral-vortex length is zero if the WF plane is aligned with the external field vector, and the spiral vortex length is Lmax if the WF plane is orthogonal to the external field vector). After the external magnetic field is "switched off," the spiral-vortices, having open ends, lose energy by radiating their own internal magnetic field into the surrounding space, which leads to a shortening of the spiral-vortices to six resonant lengths. The number of six resonant lengths is determined based on the presence of six stable elementary particles of the Standard Model that possess mass. In descending order of length, they are: tau neutrinos (Sт), mu neutrinos (Sμ), electrons (Se), d quarks (Sd), u quarks (Su), electron neutrinos (Sv), and the same number of corresponding antiparticles with opposite charges.

After the spiral-vortices are shortened to resonant lengths, they curl into a toroidal bagel-vortices. At this stage, there is a limitation to this process: the critical length of the spiral-vortices, below which the spiral-vortices cannot curl into a toroidal bagel-vortex. This critical length is slightly less than the length of the Sμ spiral-vortices. Accordingly, only Sμ and Sτ spiral-vortices can curl into bagel-vortices. Pairs of these bagel-vortices of each type, with opposite charges, are attracted by their magnetic moments and Coulomb attractive forces and combine into a double wheel, forming mu-neutrino and tau-neutrino particles with zero net charge and double magnetic moment.

The minimum length in the spectrum of resonant lengths of spiral-vortices corresponds to electron-neutrinos (Sv). It is obtained by shortening the spiral-vortices formed in the interval slightly greater than zero to lengths slightly shorter than the lengths of Su simples. All of them shorten to a near-zero length, formed from several electric toroidal turns of the spiral-vortices, covered at the last moment by the shortening azimuthal electric vortex, which prevents these spiral-vortices from disappearing completely and halts the shortening process. Two such tiny remnants of spiral-vortices with opposite electric charges are attracted and combine into a double wheel, forming a neutral electron-neutrino particle.

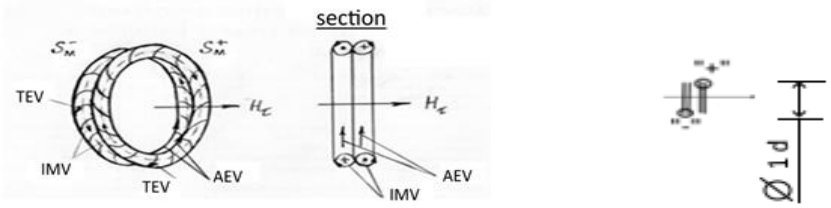

Fig. 7. Simple models of mu-, tau-, and electron-neutrinos.

Let us note once again that the aforementioned processes of shortening the spiral-vortices, folding them into bagel-vortices, and “sticking” bagels with opposite charges into double wheels occurred without the expenditure of external energy and the imparting of kinetic energy to the resulting neutrinos, i.e. all these relic neutrinos of three types were formed COLD.

THE HADRONIZATION PROCESS - THE FORMATION OF QUARKS AND RELIC NEUTRONS

It should be noted that u-quarks and d-quarks do not exist in a free state individually. At the level of spiral-vortices, this corresponds to the fact that their resonant sections cannot curl into a toroidal bagel-vortex. However, due to their relatively strong magnetic moments, these spiral-vortices can attract each other at their ends. The result of this attraction can be twofold. Let's first consider the optimistic scenario: two spiral-vortices with identical electric charges (directions of the azimuthal electric vortices) are attracted. In this scenario, the joining spiral-vortices form a single block of spiral-vortices.

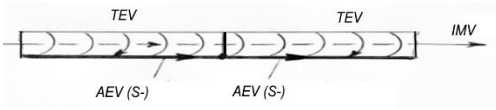

Fig. 8. Combining into a block of spiral-vortices with identical charges.

When spiral-vortices with opposite charges connect with oppositely directed azimuthal electric vortices (AEV), they “short-circuit”, as a result of which they annihilate with the formation of a photon at the point of their meeting.

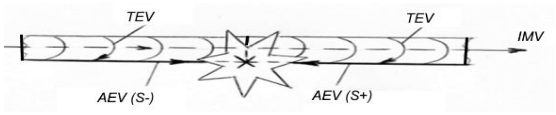

Fig. 9. Annihilation of spiral-vortices with opposite charges.

During annihilation, the energy of the spiral-vortices is converted into photon energy, and the spiral-vortices themselves very quickly shorten to a near-zero length, in the form the several toroidal electric turns of the spiral-vortices (TEV), engulfed at the last moment by the shortening azimuthal electric vortex. This prevents these spiral-vortices from completely disappearing and halts the shortening process. Two such tiny remnants of spiral-vortices with opposite electric charges are attracted and merge into a double wheel, forming an electron neutrino, but not a cold relic neutrino, but a hot annihilation neutrino with kinetic momentum.

The resulting photons begin to interact with particles in the simple plasma, heating it. This limits the length of the forming blocks of spiral-vortices with like charges to no more than 50d, where d is the diameter of the virtual photons or the "body" of the simples. Below we present a table of the resonant lengths of five types of simples (except for the electron-neutrino). This table shows that even two Se spiral-vortices, each 25.065d long, cannot form a block. In result all Se spiral-vortices annihilating.

However, Su and Sd spiral-vortices with like charges can form blocks of u-quarks and d-quarks approximately 42-44 d long, which, under the attraction of the magnetic poles at their ends, bend into arcs of approximately 120 degrees.

Fig. 10. Simple models of u- and d-quarks.

After the plasma cools to a certain temperature, arc-shaped blocks of u-quarks and d-quarks, under the influence of their dipole magnetic moments at the ends of the blocks, can mutually attract each other in groups of three quarks (two d-quarks and one u-quark), forming stable toroidal triads quarks (quark hoops). Therefore, the simples corresponding to these quarks can be considered quasi-stable. Moreover, as the quarks are drawn together into the quark hoop, the same magnetic forces of the quark magnetic moments collect and string dual wheels of mu- and tau-neutrinos onto the quarks, like wheels on the rod of a children's pyramid, resulting in toroidal aggregates of relic neutrons.

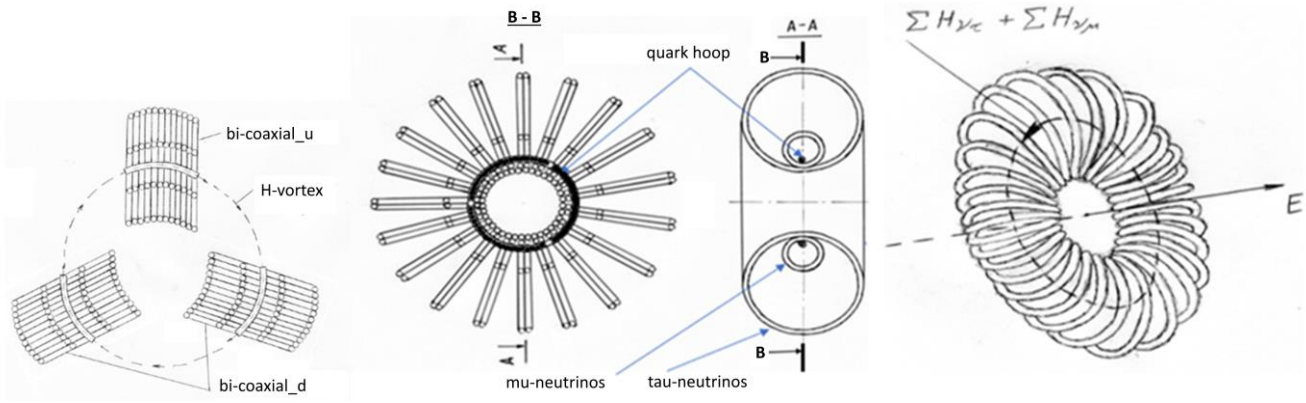

Fig. 11. Model of the formation of the relic neutron.

Based on the geometric conjugation conditions of the elements of such a toroidal aggregate and the known parameters of the specified elementary particles and nucleons, we can calculate the quantitative composition of the simples in the relic neutron and a table of the main simple parameters.

RELIC NEUTRON COMPOSITION
60 tau-neutrinos;
61 mu-neutrinos;
2 d-quarks;
1 u-quark;
gaps in the quark hoop = 1 d (the diameter of vortices of the virtual photon and the "body" of the simples).

TABLE 1. MAIN SIMPLE PARAMETERS

Designation of simple	Sτ-, Sτ+	Sμ-, Sμ+	Se-, Se+	Sd-, Sd+	Su+
Simple form	bagel	bagel	spiral	spiral	spiral
Simple mass (MeV/c^2)	7,733128152	0,092914675	0,085166485	0,072133125	0,037926625
Electric charge of the simple	-/+ 1/6	-/+ 1/6	-/+ 1/6	-/+ 1/6	+ 1/6
Simple length (fm)	1,340978222	0,016112051	0,014768461	0,012508386	0,006576741
The outer diameter of the simple torus (fm)	0,427435833	0,005717825	-	-	-
Simple density (g/cm3)	3,77*10^19	3,77*10^19	3,77*10^19	3,77*10^19	3,77*10^19
d - the diameter of the simple body (fm)	0,0005892	0,0005892	0,0005892	0,0005892	0,0005892

PS:

In [5], the aforementioned processes of relic neutron formation and calculations of the simple parameters are presented in more detail, including an examination of why other blocks of spiral-vortices of various types could not form in this process, as well as why protons could not form at this stage. As shown in this work, protons and electrons are formed in equal quantities in the next stage during the decay of free relic neutrons (75%), or in nuclei during the synthesis of heavier elements involving relic neutrons (25%).

In [6], the formation of a mass defect in all nuclear reactions with the aforementioned preon-simple nucleon structure is also analyzed in great detail. It is shown that during all nuclear reactions, intranuclear nucleons participating in these reactions lose some muon-neutrinos without disrupting the nucleon structure, and, if necessary, with a rearrangement of the quark composition of the quark hoop. As a result, the mass of these nucleons decreases, which provides a physical explanation for the resulting mass defect. In the 56Fe isotope, all protons and neutrons have a minimum number of mu-neutrinos (9) and a minimum mass. However, the relic neutron we presented has the maximum number of mu-neutrinos (61), which is one mu-neutrino more than the reference neutron in the deuterium isotope (60). Accordingly, relic neutrons have an increased mass, ensuring that the primordial nucleosynthesis of all known isotopes occurs in a single cycle according to the Gamow model.

I would also like to note a certain correlation between the simple nucleon model we presented and the modern quark model of nucleons and its visualization in the HERA experiment.

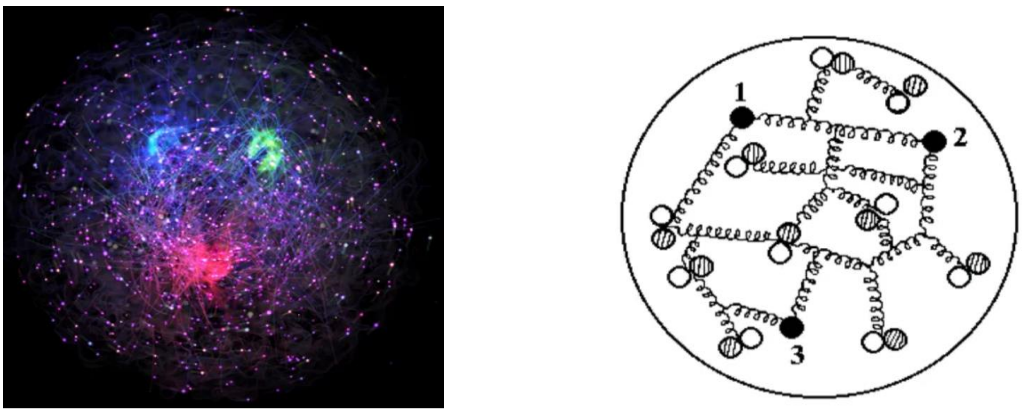

Fig. 12. Visualization of the HERA experiment and the quark model of nucleons.

DARK MATTER AND DARK ENERGY

The above set of CST models is presented in the most concise form possible. We needed to present this set of models to represent the simple composition of relic neutrons and the main parameters of the five main types of preon simples. Knowing this data, we can now analyze the above scheme of simple's formation with their numerical parameters and calculate the quantitative composition of the resulting simple's types, their consumption, and the remainder during the formation of relic neutrons.

The starting point for this calculation is our assumption that the orientation of all virtual photons (VP) in the physical vacuum is distributed isotropically with a high degree of probability in all directions (angles of the sphere). Accordingly, the length of the spiral-vortices (simples) formed by stretching the vortices of these VP will be proportional to the cosine of the angle α between the VP magnetic moment vector and the direction of the SPMF vector. Accordingly, knowing the resonant lengths of all simples, the number of simples of each type and sign of electric charge will be proportional to the area of the spherical belt enclosed between the adjacent lengths of the corresponding types of simples.

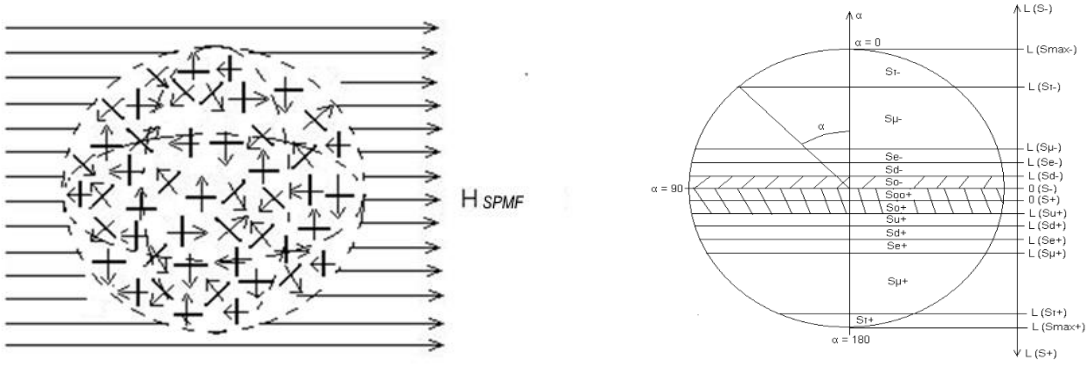

Fig. 13. Distribution of the orientation of the VF and the formation of simples by types and charges.

We also note that a significant factor influencing the spectrum of the simples is the already mentioned direction of the projection of the virtual photon's magnetic moment onto the direction of the SPMF vector, which determines, among other things, the electric charge of the sample. Addition and subtraction of these magnetic moments affect the different minimum and maximum stretch lengths of the positive and negative simples. They are offset relative to each other, as shown in the figure below.

Fig. 14. Spectrum of lengths and number of simples by type.

The vertical axis shows the number of simples per unit length, i.e., the density of simples per unit height of the spherical belt. Accordingly, the total number of simples of each type in a given control volume of the physical vacuum will be proportional to the area, or ΔL of the base of the rectangle corresponding to the type of simples. Knowing the resonant lengths of all simples, we can calculate ΔL for each type of simples except for positive and negative tau-simples, since we don't know the maximum lengths of the spiral-vortices for these simples. If we knew the magnetic moment of the virtual photon vortices and the magnitude of the SPMF strength, we could calculate these maximum simples lengths and determine the ratio of the total number of all simples formed. We hope that future research will allow us to do this. For now, we will take a different approach.

Let us assume that 100 relic neutrons were formed in a certain control volume of the physical vacuum, the formation of which consumed 6000 tau-neutrinos (6000 Sτ+ and 6000 Sτ-), 6100 mu-neutrinos (6100 Sμ+ and 6100 Sμ-), 200 d-quarks (400 Sd-), and 100 u-quarks (400 Su+). All these simples are shaded yellow (the scale of the sizes along the horizontal axis is not maintained, the sizes of all regions are shown conditionally). Based on the minimum value of ΔL for Sd simples, it is obvious that the critical element in the process of relic neutron formation is the number of Sd- simples. In other words, the process of relic neutron formation ends with the end of Sd- simples in the control volume.

Knowing the mass of each simple, we can calculate the total mass of simples expended in the formation of 100 relic neutrons, i.e., the mass of future baryonic matter in a given control volume of the physical vacuum. As we see, a smaller number of the resulting simples were expended in the formation of baryonic matter. Most of them remained "unused," and this excess consists primarily of simples from which mu- and tau-neutrinos have already formed. These relic mu- and tau-neutrinos, according to our model, are cold, and we hypothesize that these relic mu- and tau-neutrinos constitute cosmological dark matter.

Without knowing the maximum extension lengths of the tau-simple spiral-vortices, we cannot calculate the ratio of baryonic to dark matter from our model. However, from other cosmological data, we know the accepted ratio of baryonic to dark matter in the Universe. We developed all the CST models and performed this calculation between 2012 and 2017. At that time, the ratio of baryonic to dark matter in the Universe by mass was assumed to be 14.8% to 85.2%. Using this ratio, we can calculate the maximum lengths of positive and negative tau-simples and determine the number and mass of all types of simples remaining in the control volume after the formation of relic neutrons (baryonic matter).

Table 2 shows that 100 relic neutrons were formed in the control volume: baryonic matter, accounting for 14.8% of the mass of all simples, and dark matter, accounting for 85.2% of the mass of all simples. In this case, 90% of the dark matter by mass are tau-simples, which have combined into tau-neutrinos, and 10% of the dark matter by mass are mu-simples, which have combined into mu neutrinos. All Se+ and Se- samples annihilated with each other. The remaining short positive Su+ and Sd+ samples annihilated with a small number of also remaining Sτ- samples.

Please note that after these processes, a small excess in number (0.6% of the total number of all simples) but a significant excess in mass (6.5% of the total mass of all simples) remained in the control volume. This excess consists of the remaining negative Sτ- simples (the area of the diagram with purple circles).

ТАБЛИЦА 2. РАСПРЕДЕЛЕНИЕ СИМПЛОВ

Number simples	EVERYTHING	RN	DM+DE
Numb (Su+)	1235	400	835
Numb (Sd+)	471	0	471
Numb (Sd-)	400	400	0
Numb (Se+)	280	0	280
Numb (Se-)	280	0	280
Numb (Sμ+)	275861	6100	269761
Numb (Sμ-)	275861	6100	269761
Numb (Sτ+)	35045	6000	29045
Numb (Sτ-)	40395	6000	34395
Numb (S+)	312891	12500	300391
Numb (S-)	316936	12500	304436
Numb (S-) - Numb (S+)	4044	0	4044
Excess (S-)% от Σ(S)	0,6%	0,0%	0,6%
Mass simples	MeV	MeV	MeV
Σm(Su+)	46,8	15,2	31,7
Σm(Sd+)	33,9	0,0	33,9
Σm(Sd-)	28,9	28,9	0,0
Σm(Se+)	26,0	0,0	26,0
Σm(Se-)	26,0	0,0	26,0
Σm(Sμ+)	25631,5	566,8	25064,7
Σm(Sμ-)	25631,5	566,8	25064,7
Σm(Sτ+)	271005,5	46398,8	224606,7
Σm(Sτ-)	312378,6	46398,8	265979,9
ΣΣm(S)	634808,8	93975,1	540833,7
%	100%	14,8%	85,2%
ΣΣm (S-) - ΣΣm (S+)	41373,1	0	41373,1
Excess (S-)% от Σ(S)	6,5%	0%	6,5%

This excess of negative Sᴛ-simples, uniformly distributed throughout the entire volume of the Universe, creates electrostatic pressure and a constant force of electrostatic repulsion between these simples. Through their gravitational interaction, these simples pull along all remaining neutral gravitating Baryonic and Dark Matter, initiating the process of accelerated expansion of the Universe, which is interpreted by modern physics as the action of Dark Energy. Below, we will explain the reason why, at a certain stage, the acceleration of the Universe's expansion can begin to decrease and even become negative (contraction of the Universe).

Thus, the source of Dark Energy in our Universe is 6.5% of its mass, which has an excess negative charge with a total value equal to 0.6% of the sum of all positive and negative charges in the Universe.

ADDITIONAL ARGUMENTS FOR IDENTIFYING RELIC NEUTRINOS WITH DARK MATTER PARTICLES

We have already noted that modern physics has rejected neutrinos as candidates for cold dark matter particles because it only knows of three types of hot neutrinos, produced in various nuclear reactions. According to CST models, however, in the very first stages of the formation of the Universe from preon-simple plasma, the very first "elementary" particles were cold relic mu- and tau-neutrinos, formed in cold electrodynamic processes and comprising 99.97% of the mass of the entire Universe.

Additionally, another interesting experimental fact should be noted. According to all the canons of particle physics, heavier particles are easier to detect than lighter ones, especially if these particles are stable and have mass (like the three types of neutrinos). However, the lightest electron neutrinos were first discovered in 1956. Then, in 1962, mu-neutrinos were discovered. It was only in 2000 that the heaviest tau neutrinos were discovered in the DONUT experiment. In this experiment, a beam of protons was directed at a tungsten target, effectively breaking up the protons. According to our S-model, each proton contains 60 tau-neutrinos. A powerful magnetic field then filtered out all the charged particles, and the remaining beam of neutral fragments was directed into a layered detector made of steel sheets and photographic plates (with a total length of 15 meters). This detector recorded six million particle signatures. Scientists selected only about a thousand candidate events, and only four of these were recognized as genuine evidence of the existence of tau-neutrinos. The question arises: why are tau neutrinos so difficult to detect? The answer is provided by the toroidal model of tau-neutrino simples, with a very large ratio of the outer diameter of the tau-neutrino torus to the diameter of the tau-neutrino torus body: this ratio is 725 units. As a result, tau-neutrino tori are extremely deformable, and like a child's toy slug, they seamlessly bend around all obstacles without revealing themselves. This circumstance correlates very well with the unsuccessful attempts to detect dark matter particles at numerous DM detectors based on liquid xenon pools. And, interestingly, two dark matter detectors, XENON and PandaX, which are independently operating in Italy and China, respectively, have detected clouds of neutrinos [9]. The question naturally arises: are these neutrinos dark matter particles?

In 2018, rumors began to circulate that research at the LHC had reached a dead end. As a result, CERN announced a call for proposals for further research at the LHC. I wrote a letter to CERN and proposed searching for tau-neutrinos at the LHC. The problem is that the LHC detectors only study 10% of the particles produced in the collider, while 90% of the fragments escape into the tube as the patches move, due to their lack of electric charge and their deflection in the detectors' magnetic fields. In 2021, CERN published a new program approving the construction of the FPF layered neutrino detector (due for launch in 2030) to replace the existing FASER trial layered detector, originally designed to search for dark photons and installed in a side tunnel located tangentially to the LHC ring at a distance of 480 meters from the ATLAS detector. At the same time, a program was immediately launched to search for neutrino signatures in the dataset collected by the FASER detector since 2019. In August 2023,

a paper [10] was published about the detection of six mu-neutrinos in the FASER data. The authors predict that the next FPF detector should detect tau neutrinos and dark-matter particles (New Physics). It can be predicted that by then, modern physics will understand that tau neutrinos and dark-matter particles are one and the same.

BIG BANG, MATTER-ANTIMATTER BALANCE

The attentive reader has probably noticed that, according to our models, preon-simple plasma of positively and negatively charged simples forms from the initially neutral physical vacuum. This plasma then forms neutral baryonic matter in the form of relic neutrons, and neutral dark matter from mu- and tau-neutrinos, leaving behind a certain unbalanced residue of negative tau-simples. This immediately raises the question of a violation of the law of charge conservation, which calls into question the entire set of CST models. How does CST solve this problem?

To answer this question, let's recall our promise to name the source of SPMF at the stage of simple's formation. "Where does the SPMF come from?" The answer is that the initial source of SPMF formation is the physical vacuum. This occurs according to the following scheme.

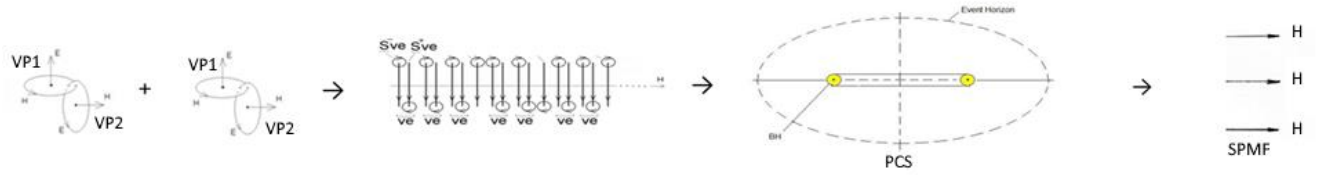

Fig. 15. Model of formation of the first PCS and SPMF.

We noted that in the physical vacuum, vortices of virtual photons are formed as fluctuations in the random alignment of the electric or magnetic moments of ether corpuscles into closed dipole-dipole chains-vortices of a certain minimum length. Moreover, again by chance, two such vortices of different types (electric and magnetic) can form entangled (similar to EMP vortices, but without momentum). Such entangled vortices acquire the emergent property of mutually generating each other, i.e., they become stable. They also possess electric and magnetic dipole moments, can interact with each other, and form dipole-dipole chains-blocks (similar to electron-neutrino oscillations). Over trillions of years, these chains of blocks then gather into clouds, collapse, and form a primordial cosmological singularity (PCS), shaped like a super-simple bagel with an internal magnetic vortex inside and toroidal electric vortices outside. The PCS grows and grows, absorbing ever new chains of blocks of linked VFs, and reaches a critical mass, at which the chains of field lines of electric and magnetic vortices of the PCS fill the entire internal space of the PCS at the Planck level. New chains of field lines can no longer form, and new VF blocks continue to fall onto the PCS. The balance of electric and magnetic vortices in the PCS is disrupted, and the bagel PCS bursts, releasing a powerful magnetic field (PMF) from the two magnetic poles of the burst singularity into the surrounding space. This model is a Big Bang model in the CST.

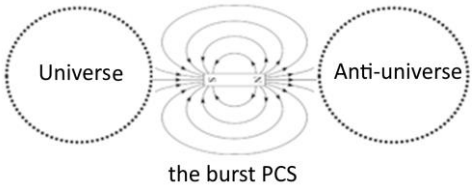

Fig. 16. The Big Bang model with the formation of the Universe and the Anti-Universe.

SPMF initiates the process of simple formation, and a pair of universes, our Universe and the Anti-Universe, are formed at the two magnetic poles of the burst PCS. Due to the different directions of the magnetic field vector at the poles, our Universe forms with an excess of negative tau-simples and the formation of relic neutrons, with a quark ring consisting of two d-quarks with negative charges of -1/3 and one u-quark with a positive charge of +2/3. At the other pole, with the magnetic field vector in the opposite direction, the Anti-Universe forms with an excess of positive tau-simples and the formation of relic anti-neutrons, whose quark ring consists of two d-antiquarks with charges of +1/3 and one u-antiquark with a charge of -2/3.

Thus, the CST further resolves the issue of matter-antimatter balance, and the law of charge conservation is observed.

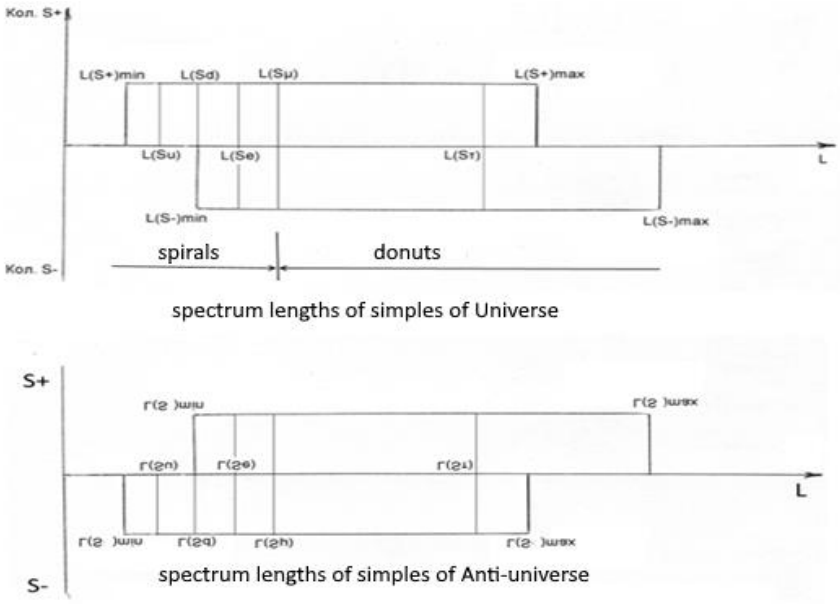

Fig. 17. Composition of simples of the Universe and Anti-Universe.

Let us reiterate that, according to the CST models, the Big Bang was not hot, but cold (or rather, electrodynamic), without the kinetic movement of matter through space. More precisely, the Big Bang occurred as a "splash" of a powerful relic magnetic field (RMF) into space and magnetic polarization of the physical vacuum (the formation of magnetic field lines—magnetization of the physical vacuum). The demagnetization of the physical vacuum (ether) occurs exponentially, but not instantaneously. Remnants of the RMF are still detected in voids, when observing the passage of gamma quanta from blazars located behind the voids [11]. Within and around galaxies, there are numerous powerful sources of magnetic fields, and under the influence of these MF sources, space is constantly remagnetized, as observed by modern instruments.

Of course, a certain interest arises from the question of how the two universes will behave relative to each other in the future. Given their opposite charges, it can be assumed that there is an attractive force between them, which spins them in an endless mutual rotation (waltz). However, it is also possible that they are gradually moving closer together (like a cyclical oscillation of universes) or are flying apart as a result of energy loss (photons escaping or losing energy). All of this requires further theoretical and experimental research.

CONCLUSION

This article is part of a series of articles already written and publication and planned for written under the general subtitle "CST." These articles examine, either comprehensively or in-depth, a number of interconnected models of the formation and evolution of the Universe.

In this article, we examined in detail the models for the formation and structure of Dark matter particles and the causes and mechanisms of Dark energy. We demonstrated that, according to the concept and models of CST, the structural elements of Baryonic matter and antimatter, Dark matter, and the carriers of Dark energy are the same proto-particles—preons (simples) formed from quanta of the physical vacuum (corpuscles). These corpuscles are modeled after two interconnected elementary vortices of Planck size, cyclically generating each other with an elementary tick of time.

RESEARCH PROSPECTS

The combination of the presented models allows us to move on to a detailed examination of fundamental questions of cosmology, including cosmic inflation (with the RMF propagating from the Big Bang of PCS at a rate of 1.57c), the difference in the ages of galaxies in the vicinity of the burst PCS and at the periphery of the Universe at 4.5 billion years, the role of the RMF in the formation of the large-scale structure of the Universe, and changes in the dynamics of the expansion of the Universe under the influence of electrodynamic and gravitational forces. These issues will be the subject of our research in subsequent articles.

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