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The New Particle from CERN and Leo Sapogin's Unitary Quantum Theory

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Abstract: *The discovery at the Large Hadron Collider of a new particle, which of colliding protons decays into muon pairs at an energy of 28 GeV, may indicate the failure of the Standard Model. A particle with a mass of 28.9354 GeV was predicted in 2007 by Professors Leo G. Sapogin and Yu. A. Ryabov theoretically, at on the calculation of the mass spectrum of elementary particles based on the Unitary Quantum Theory. By the way computed in 2007 Sapogin's spectrum has particle with the mass Higgs boson. In the Standard Model all the elementary particles interacting with the Higgs field acquire mass, but the Higgs boson from this universal mechanism falls out! Professor Leo Sapogin proposed a different universal mechanism allowing the Higgs boson acquiring a mass similarly to all other elementary particles. This ambiguity is fundamental and fraught with extremely serious consequences for SM.*

Keywords: *vacuum, dark matter, proton, electron, positron, resonance, mass, energy.*

1. Introduction

Now scientists at the Large Hadron Collider at CERN think that they may have discovered a new particle, the decay of which gives rise to muon pairs in a narrow peak of the energy of colliding protons strictly defined at 28 GeV, but it is too early to draw final conclusions. Among physicists, this particle causes not only excitement, but also alarm. Unlike the Higgs boson, predicted by the theory of elementary particles in the framework of the simplest version of the Standard Model (SM), the new particle can threaten the CM. The new result - consisting of a mysterious bump in the data at 28 GeV - has been published as a preprint on ArXiv and Roger Barlow's article was published as a on November 13, 2018 [1]. The LHC collaborations have very strict internal review procedures, and we can be sure that the authors have done the amounts correctly when they report "4.2 standard deviation value". This means that the probability of obtaining the peak of this large randomly generated noise in the data, rather than a real particle, is only 0.0013%. In a way, it seems that this should be a real event, not a random noise. If this particle really exists, then it should be outside the standard model, where no one expected it. Just as Newtonian gravity has given way to Einstein's general theory of relativity, the standard model will be replaced. But the replacement will not match the candidates that have already been proposed for the expansion of the standard model: including supersymmetry, extra dimensions, and the theory of the Great Unification. All of them offer new particles, but none of them possesses such properties as the one that may have just been discovered. It must be something so strange that no one has ever proposed it. Fortunately, another large LHC experiment, ATLAS, has similar data from its experiments, which the team is still analyzing and reporting in due time. New physics represents quantum vacuum (dark matter) as the third full participant of proton collisions in the LHC and whose presence the apologists of the dominant 100 years in the physics of the Einstein's Special Relativity Theory (SRT) deny [2]. Moreover, possessing an all-pervasive character, this medium influences all processes occurring in accelerators and colliders. It may turn out that the number of resonances identified as the newly generated unstable particles at the polarization of a quantum vacuum, under the action of peak electric and magnetic fields or relativistic protons in the LHC is so great that it will be necessary to create special tables analogous to the tables published by the collaboration Particle Data Group (PDG), which describes all the properties of resonances associated with the presence of quantum levels in the particles themselves. The addition new particles in SM to the Higgs boson review may include the X boson. Jonathan Feng, the professor of physics & astronomy at the University of California, Irvine, in a press release in 2017 said: "For decades, we've known of four fundamental forces: gravitation, electromagnetism, and the strong and weak nuclear forces. Discovery of a possible fifth force would completely change our understanding of the universe, with consequences for the unification of forces and dark matter. Dispensing with the dark photon, the physicists posit a "photophobic X boson." Other known forces before it only acted on electrons and protons. This new force interacts with electrons and neutrons at a very limited range. Scientists say there is no other boson possessing the same characteristics – hence the name X boson". The X boson of dark matter makes it possible to explain a number of experiments in which the anomalous magnetic moment of the muon is observed. Analysis of experimental data associated with the investigation of the anisotropy of physical space allows us to assume the existence of a fifth interaction (of fifth force). While American scientists open the fifth force, the Russian physicist Yu.A. Baurov has already created on the basis of this force an engine that allows him to fly to in the cosmos [3]. Quantum vacuum participates in all fundamental interactions, but if polarization of vacuum in electromagnetic interactions is accompanied by the production of electron-positron pairs with the participation of exchange virtual photons, then in a strong nuclear interaction the polarization of the quantum vacuum is accompanied by the production of three unstable π-mesons (π^0,π+,π-) with the participation of involving exchange virtual pions. At the same time, the energy spectrum of the production of new particles and antiparticles changes, which indicates a change in the structure of the quantum vacuum when it enters the atomic nuclei. It should be noted that the discovery of phenomenon the polarization of quantum vacuum (dark matter) in theories of quantum electrodynamics (QED) and quantum chromodynamics (QCD) leads to violating the symmetries, conservation laws and prohibitions in the Standard Model. The each symmetry in SM has its own conservation law. For example, the symmetry with respect to time shifts corresponds to the law of conservation of energy, symmetry with respect to shifts in the space-the law of conservation of momentum, and symmetries with respect to rotations in space (all directions in space are equivalent) corresponds the conservation of angular momentum. Conservation laws can be interpreted as prohibitions: symmetries prohibit the change of energy, momentum and angular momentum to the closed system during its evolution. The participation of the quantum vacuum (dark matter) in all interactions causes the rejection of the paradigm of a closed system of evolution and requires revision of all conservation laws and of symmetries. Today, experts working at the Large Hadron Collider, they are asking themselves about the epochal paradigm substitution in physics. An example is the article by Joseph Likken and Maria Spiropul: "Supersymmetry and Crisis in Physics" [4]. There is a question: "What should be the new physics?" There is no unity on this issue among the physicists. This the article is a the forerunner of the emergence of a new physics in which violation of conservation laws in the open systems is allowed, the prohibition on the creation of devices with an efficiency of more than 100% is lifted and in which for the mankind opens up an the inexhaustible source of conceptual innovations in the all fields of activity.

2. THE POLARIZATION OF VACUUM AND LEO SAPOGIN'S UNITARY QUANTUM THEORY

In quantum electrodynamics (QED), the instability of a physical vacuum under the influence of high-energy photons of cosmic radiation, relativistic protons, peak electric and magnetic fields or high-intensity laser radiation is called the vacuum polarization and is characterized by the formation of electron-positron and muon pairs, which makes the vacuum itself unstable [5]. In the LHC, the electric current arises from the motion of charged beams of relativistic protons and in accordance with Maxwell's equations, generates force and non-strong, toroidal and poloidal electromagnetic fields [6]. It has been experimentally established that in the presence of a strong magnetic field $H \approx 10^{16}$ T or peak of the electric fields strength $E \approx 10^{16}$ $V \cdot cm^{-1}$ in the quantum vacuum from virtual particles relatively stable particles are formed (lifetime $16 \cdot 10^{-23}$ sec.). With the polarization of the quantum vacuum and its transformation into the matter, the change in the energy of the vacuum w can be represented as a sum:

$$w = w^p + w^e \tag{1}$$

where w^p is the vacuum polarization, $w^p << E^2 / 8\pi$;

w^e is the change in the energy of the substance at the production of particles

$$w^e = eET\varkappa, \quad \varkappa = \frac{e^2E^2T}{4\pi^3}\exp(-\pi\frac{m^2}{\hbar E})$$

The creation of particles is the main reason for the change in the energy of the vacuum. The small value of the reverse reaction w^p implies the limitation on the electric field E strength for a the given time T (Es ≈ 10^{16} V · cm^{-1} is the critical Schwinger's field) [7].

The direction of motion of secondary electron-positron pairs produced in the vacuum (dark matter) can be determined by the nature of effect that caused the polarization of the vacuum. Under the influence of rigid photons, the deformation of vacuum occurs in the transverse direction to the propagation of perturbation, which determines the direction of motion of electron-positron pairs (Fig.1a).

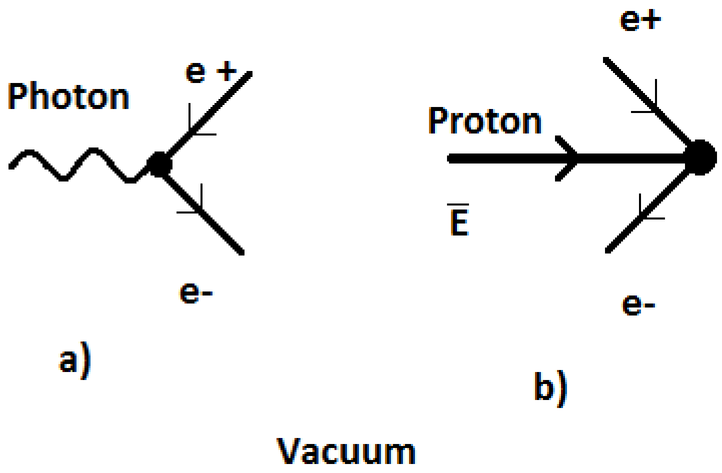

Figure1. *Polarization of quantum vacuum*

a) if the vacuum polarization is caused by the motion of photon;

b) if the vacuum polarization is caused by the motion of relativistic proton or by a the peak electric field strictly oriented in one the direction E.

This can be seen by analyzing the observation data on the fluxes of secondary electron-positron pairs with the soft energy spectrum in the quantum-dynamic cascades in an intense the laser field or in the near-Earth environment under the action of cosmic-ray photons in the PAMELA and AMS-02 experiments [8]. If the vacuum polarization is caused by the motion of relativistic charges or by the peak electric field strictly oriented in one direction, then the secondary electron-positron pairs produced in the vacuum will move in the direction opposite to the momentum of the primary charged particles, with zero the transverse momentum $p^{\perp}=0$ [5], since deformation the vacuum will occur in the longitudinal direction (Fig.1b). An experimental confirmation of this could be the appearance of a flow of backward electrons with a "soft" energy the spectrum in the multiwave Cherenkov generators (MWCG). One of the peculiarities of the work of MWCG using an the electron beam of microsecond duration with an the initial charged-particle energy W_e ~ 2 MeV and a the common current I ~ 20 kA is a the relatively short radiation pulse in the three-centimeter wavelength range with a of record high power level of up to 15 GW [9].

The quantum vacuum is a global field of oscillators' super-positions with the continuum of frequencies. In contrast to the field, a particle oscillates with the same fixed frequency. In front of us, there is an example of the non-integrable Poincare system. Resonances will occur whenever the frequency of the field and the particle are will coincide. The evolution of dynamical systems (the particles) up to the self-organized matter depends on available resonances between degrees of freedom. This was a conclusion by I. Prigogine and I. Stenger in their monograph the "Time, Chaos, Quantum" [10]. They revived an idea by N. Tesla on a theory of global resonance. Nevertheless, if the Tesla's resonance theory of the matter birth in the ether had been based on an intuition of the ingenious experimenter, then in case of I. Prigogine, this theory acquired rigorous mathematical view. Proved by Poincare the non-integrable dynamical systems and the theory of resonant trajectories by Kolmogorov-Arnold-Moser allowed Prigogine to conclude that the mechanism of resonance interaction of particles in large-scale Poincare systems (LPS) was "essentially" mandatory and not probabilistic. With increasing communication parameters, there is an increase in the likelihood of resonance outcomes. It is such LPS dynamic systems, to which systems of particle interaction with the space environment and with each other belong. Prigogine, winner of the Nobel Prize wondered: "Is the Universe a closed system in terms of thermodynamics?" Answering to this question, I. Prigogine came to the conclusion that the postulate of the absence of heat exchange between the environment and the volume element (adiabatic process of cosmological evolution dQ = 0) is erroneous [10]. Einstein's universe is a closed universe with constant entropy, since in such a universe there are no irreversible processes. For a description of the birth of matter in the Einstein's general relativity is necessary be considered variations in the density of matter due to the production of particles. This leads to disruption in time symmetry. Prigogine proposed to add the number of variables included in the standard model (the pressure P, the mass-energy density σ and the radius of the universe R (t)) an additional variable n - the density of the particles and an additional equation, which would tie the Hubble function of radius of the universe R (t) and the birth of particles n.

In the case of the universe, consisting of particles of the same type of mass M, when the mass-energy density is simply equal to σ, and the pressure P - vanishes, Prigogine offers a simple equation that takes into account the creation of particles:

$$\alpha H^2 = \frac{1}{R^2}\frac{\partial nR^3}{\partial t} \qquad (2)$$

where α - kinetic constant equal to zero or positive.

In this equation (2), the value of α and H are positive since we are talking only about the birth (and not destruction) of the particles. In Minkowski's space, where H = 0, the production of particles can not be (equation Hψ = 0 equation is often called the Wheeler – DeWitt Equation). Furthermore, in the Einstein's Universe the total number nR^3 constant irrespective H values, α = 0 [10]. Further, considering how the birth of the particles leads to a modification of Einstein's equations of general relativity in terms of the first and second laws of thermodynamics Prigogine writes: "This approach leads to a modification of Einstein's equations" [10]. The internal energy can be created at the expense of gravitational energy dark matter.

Whereas the behavior the particle in an oscillator is generally interpreted as fully deterministic, with its past and future explicitly determined by equations of motion and initial conditions, stochasticity is associated with randomness and ambiguity [11, 12]. Could a strictly deterministic process also appear as random? L.Sapogin in his the Unitary Quantum Theory (UQT) answers in the affirmative. His physical and mathematical investigations demonstrate that it is possible and, in some cases, inevitable. In solving the problem of the harmonic oscillator, in addition to conventional stationary oscillations of a charge with a discrete value of energy professor Lev Sapogin offers are two new the solutions (Fig. 2), which were named by him "Crematorium" and "Maternity Home". In the first decision the particle oscillates in a potential well with an exponential decrease of energy, and second decision, its energy increases without limit. For the mechanics of a particle with an oscillating charge, there are three possible modes of behavior, which, as it was found out, do not depend on the type of the potential well; it must only be finite and have equal sides [12].

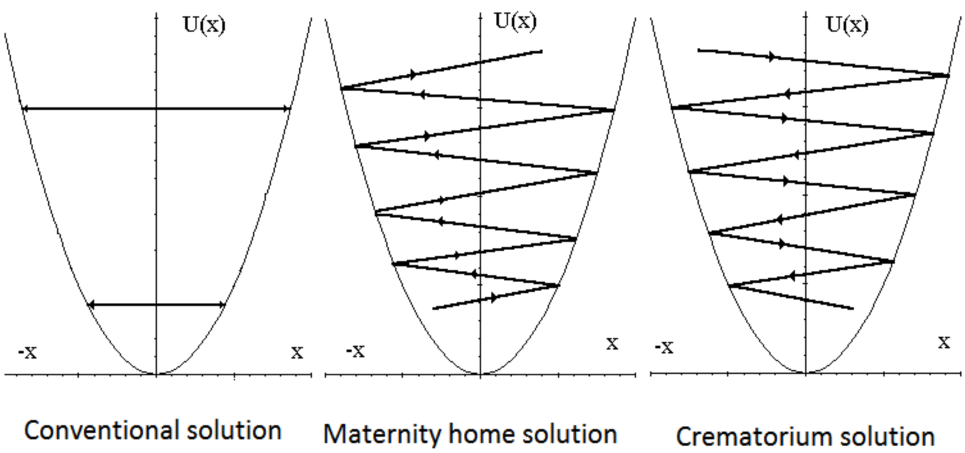

Figure2. *The solution of the harmonic oscillator problem*

The autonomous movement equation the particle in the case of a potential well in the shape of the hyperbolic secant

$U(x) = -U_o \operatorname{sech}(x^2)$ (3)

will look as follows:

$$m\frac{d^2x}{dt^2} + 4U_oQx\frac{\cos^2\left(mx\frac{dx}{dt}+\varphi o\right)\sinh\left(x^2\right)}{\cosh^2(x^2)} = 0$$

where m, Q, φ_o is are mass, charge an initial phase of a particle respectively,

x is the coordinate of the particle as a function of time;

The resulting modes of the particle's the behavior under equal conditions greatly depend on the initial phase, and its variations result in a very rich variety of trajectories [12].

Since the middle of the last century in QED, the study of the interaction of high-energy particles has made it possible to detect resonances that manifest themselves in the form of peaks on the general monotonic behavior of the cross sections of their interactions. Resonances were interpreted as a consequence of the presence of quantum levels in the particles themselves and identified in SM as newly generated unstable particles. Today, all resonances are classified and described within the framework of the Standard Model up to the Higgs Bosons. But the question arises whether it will be correct to interpret all the resonances only to the particles themselves. Direct experimental determination of the resonance dependence of elementary particle-antiparticle birth, under the influence of frequency ν of external radiation and of relativistic protons in the quantum vacuum (dark matter), is almost completely rejected by modern physics. Following the deceptive logic of the modern theory, this dependence is drawn as a monotonically the increasing curve, which contradicts the experimental discoveries made recently in the LHC and in the near-Earth space. In this case, the polarization of a quantum vacuum in space and vacuum installations under electromagnetic action is accompanied by the production of electron-positron or muon pairs of particles and antiparticles. In the role of exchange particles in the electromagnetic interaction with quantum vacuum in QED are playing the photons. We recall the most popular Feynman's diagram for the interaction of two electrons [13]. Their trajectory of mutual at rapprochement and repulsion (the latter occurs according to Coulomb's law) is determined in QED by the interaction of charges, which are exchanged in this case by virtual photons. In our concept, where there is a quantum vacuum structure, the use of the concept of an exchange photon is not necessary, since the process of polarization (deformation) of a vacuum can be represented energetically the formula (1). The physical meaning of this extremely fast oscillatory process is this after external impact on the quantum vacuum which represents a global field of oscillators' super-positions with the continuum of frequencies , a wave packet arises in it, oscillating like a membrane or string with a frequency $\omega_S = \frac{mc^2}{\hbar\gamma}$, $\gamma=\sqrt{1- v^2 / c^2}$. The frequency ω_S of these free oscillations is very high: it is proportional to the rest energy of the particle and it is equal to the frequency of the so called Schrödinger`s trembling ("zitter-bewegung") [14]. The computing shows the wavelength of the envelope is exactly equal to de Broglie wavelength, and the dependence of this wavelength on packet velocity is the same! Within the motion there arise de Broglie vibrations with frequency $\omega_B = \frac{mv^2}{\hbar\gamma}$ due to dispersion. At small energies $\omega_S >> \omega_B$ and the presence of quick own oscillations has no influence all quantum phenomena result from de Broglie oscillations. In the case when v→c , frequency $\omega_B \rightarrow \omega_S$ (frequency resonance ω_r), growth of energy and resonance phenomenon appears that results in oscillating amplitude increase and in mass growth- m_r :

$m_r = \hbar\, \omega_r / c^2$ (4)

where m_r is mass of a quantum object,

ω_r is frequency of the wave function of a quantum object,

c is the speed of light c = 299792458 m / s

$\hbar = h / (2\pi)$, $\hbar = 1{,}0546 \cdot 10^{-34}$ J / Hz, h is the Planck's constant, $h = 6.6260 \cdot 10^{-34}$ J / Hz

Particle will obtain absolutely new low-frequency envelop with wave length $\lambda_r = \frac{h}{mc\gamma}$ [14].

A macroscopic approach, the hydrodynamic behavior of the added weight of spherical bodies of any nature (including those of charged clusters) in superfluid ^3He-B (analogue of dark matter) is the primary source of job Stokes. It is a complex force F (ω), exerted by the fluid on the sphere of radius R, perform the periodic oscillations with a frequency ω. Within the low Reynolds numbers we have [15]:

$$F(\omega)= 6\pi\eta R\,[1+R/\delta(\omega)]V(\omega) +3\pi R^2\sqrt{2\eta\rho/\omega}\,[1+2R/9\delta(\omega)]\, i\omega V(\omega), \quad (5)$$

$$\delta(\omega) = (2\eta/\rho\omega)^{1/2}$$

where ρ - fluid density, η - the viscosity, V - velocity amplitude sphere, δ (ω) - the so-called viscous penetration depth, which increases with an increase in viscosity and a decrease of the oscillation frequency.

The real part of the expression (5) is a known Stokes force derived from the movement of fluid in the sphere. Imaginary component (coefficient of iωV) is naturally identified with the effective mass of the cluster added:

$$M_{eff}(\omega R)=2\pi\rho R^3/3\,[1+9/2\;\delta(\omega)/R] \quad (6)$$

Origin added (attached) mass Meff (ωR), depending on the frequency ω and the radius R of the sphere of the cluster associated with the excitation of the field around a moving cluster of hydrodynamic velocity υ_i (r) and the appearance in connection with this additional kinetic energy. In superfluid additional mass has two components: superfluid and normal [15].

Leo Sapogin's Unitary Quantum Theory (UQT) describes elementary particles as wave packets of partial waves with linear dispersion [12, 14]. The most important results of new Unitary Quantum Theory approach is the emergence of a general field basis for the whole of physical science, since the operational description of physical phenomena inherent in standard relativistic quantum theory is so wholly unsatisfying. The particle was formally considered as a point in order to explain the wave function/probability amplitude. However, neither the point hypothesis, nor the Bohr's antiquated complementarity principle proved useful in understanding the structure of elementary particles and elaborating the quantum field theory within the accepted paradigm. Conventional quantum theory has concepts of the field dualism and the matter, where particle is considered as s point – a source of a field, but UQT was the first to present it as a field. There is a concept of a standard model (SM) of particle physics, it is often called by mass media as "theory of nearly everything". This modern theory of structure and interaction of elementary particles, repeatedly confirmed by experiments, allows predicting the properties of different processes of scattering and transformation in the world of elementary particles. Physicists working in the frame of this model stipulate that all their predictions are experimentally confirmed. But this perfect (for lack of something better) model cannot predict even the masses of elementary particles, that is why the SM cannot be considered as a final theory of elementary particles. The standard model (SM) even lacks a mass spectrum calculation algorithm for elementary particles. SM does not have theoretically proved algorithm for spectrum mass computation and no ideas how to do it! SM contains from 20 to 60 arbitrary adjustable parameters (there are different versions of SM) for calculating the mass of particles. All these bear strong resemblance to the situation with Ptolemaic models of Solar system before appearance of Kepler`s laws and Newton s mechanics. These earth-centered models of the planets movement in Solar system had required at first introduction of so called epicycles specially selected for the coordination of theoretical forecasts and observations. According to Einstein words next theory should decrease the number of matters, but SM builds the matter from 12 fundamental "bricks" – six grades of leptons and six grades of quarks. The number of possible combinations made from these bricks is limited, therefore SM leaves no space for the great number of weakly interacting particles that make up 95 % of the Universe general mass. In addition SM left in deep rear some fundamental quantum questions like corpuscular-wave dualism and uniform explanations of numerous phenomena of chemical catalysis [12]. Some late in 2007 the Unitary Quantum Theory allows the Professor Leo Sapogin to calculate computing the mass spectrum of all elementary particles without any adjusting parameters. Dispersion is chosen in such a way that the wave packet would periodically disappear and appear in movement, and the envelope of the process would coincide with the wave function [12, 14].

The discovery at the Large Hadron Collider of a new particle, which decays into muon pairs at an energy of 28 GeV (of 28.9354 GeV according to Sapogin's calculations 11 years ago) can be approximately detected in exposure graphics Figure3 with great accuracy. By the way computed Sapogin's spectrum has particle with mass=131.51711 GeV (L=2, m=2). Once desired it can be called "Higgs boson", it lies within declared by the CERN+Tevatron mass interval 125-140 GeV expected to contain "Higgs boson" Some late were find 3 pentaquarks. The significance of each of these masses is more than 9 standard deviations. One has a mass of 4380±8±29 MeV and a width of 205±18±86 MeV (Sapogin's theory mass=4315, 87 MeV (L=9, m=0)) while the second is narrower, with a mass of 4449.8±1.7±2.5 MeV and a width of 39±5±19MeV (Sapogin's theory mass=4496.65 MeV (L=7, m=2)), third θ+ barion has mass=1522±3 MeV (Sapogin's theory mass=1524.62 MeV (L=12, m=0)). Report number: CERN-PH-EP-2015-153, LHCb-PAPER-2015-029. All this masses were calculated in 2007 and the table with all theoretical masses for the elementary particles is given in [14]. The situation when theoretical predictions appear before their experimental confirmation and wait for of their recognition is really unique. It recalls the situation with the recognition of the work of the P. Higgs and F. Engler when theoretical predictions appear before their experimental confirmation and wait for almost half a century of their recognition. P. Higgs and F. Engler were awarded the Nobel Prize in 2013 for "the theoretical discovery of a mechanism that helps us understand the origin of the masses of subatomic particles and which was recently confirmed by the discovery of a new predicted particle at the Large Hadron Collider." But the question arises: "interacting with the Higgs field, all the particles acquire mass, but the Higgs boson from this universal mechanism falls out!" Professor Leo Sapogin proposed a different universal mechanism allowing the Higgs boson acquiring a mass similarly to all other elementary particles [14]. This ambiguity is fundamental and fraught with extremely serious consequences for SM.

3. Experiments

3.1. Discovery of a New Particle in the Large Hadron Collider, Pointing to a Critical Deviation from the Standard Model

The main goal of research at the collider is to study the forces that control the interaction of particles and clarify their internal structure. Although there are currently no indications of critical deviations from the predictions of the Standard Model (SM), which combines strong and electroweak interactions, a number of experimental facts that need to be explained are observed.

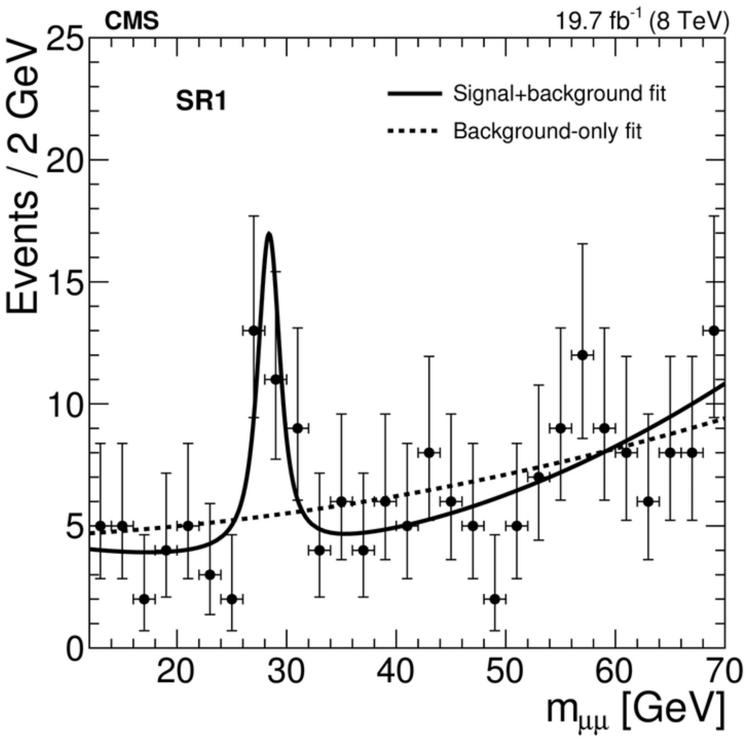

Figure3. *Peak of energy at 28GeV*

The experimental discoveries made recently at the Large Hadron Collider (LHC) include the discovery of the Higgs boson, the increase in the proton interaction cross-section with increasing energy, and the increase in the fraction of the elastic scattering processes in the interval the energy

Wp ~ 100 GeV - 13 TeV that is, the effect an increase in stability the protons as well as the emission of jets in inelastic processes with a large multiplicity [16]. The most striking is that the interval of resonant proton energy in the LHC, at which is observed the greatest probability of inelastic collisions of protons and the creation of new particles, corresponds to the energy interval Wp ≈ 10-100 GeV [16, Fig. 2], however, with increasing energy of relativistic protons, the effect of their stability after collision increases [16]. It can be assumed that the creation of new particles in this energy range is associated with the polarization of the quantum vacuum (dark matter) [2]. Such a picture contradicts the notions of classical physics and goes beyond the framework of the SM. As a result, predictions of models become less certain and not reliable enough. Now scientists at the Large Hadron Collider at CERN think that they may have discovered a new particle, the decay of which gives rise to muon pairs in a narrow peak of the energy of colliding protons strictly defined at 28 GeV, but it is too early to draw final conclusions [1]. New, exotic particles in the collision of protons in the LHC give birth for an extreme increase in known particles, such as a photon, electron, or muon, because heavy "invisible" particles, such as the Higgs boson, are often unstable and decay into lighter particles that are easy to detect. All of these particles fit into the Standard Model (SM). In most cases, pairs of muons come from different sources from two different events, and not from the decay of a single particle. If you try to calculate the parent mass in such cases, it will spread over a wide range of energies, rather than creating a narrow peak. In the new experiment, the CMS detector detected a large number of pairs of muons and, after analyzing their energies and directions, found that these pairs originate from the decay of one parent particle. You can look at Figure 3 and judge for yourself.

Is this a real peak or is it just a statistical wobble due to random scatter of points in the background (dashed curve)? If it is real, it means that some of these pairs of muons are really descended from a large maternal particle, which decayed, emitting muons - and none of these particles have ever been seen before.

3.2. Precision Measurements of Electron and Positron Spectra using an Alpha-Magnetic Spectrometer (AMS) (2011-2016)

The alpha-magnetic spectrometer AMS-02 was placed on the International Space Station (ISS). And during 2011-2016, it carried he carried out precision measurements of the spectra of electrons and positrons in the energy range 0.5-700 GeV for electrons and 0.5-500 GeV for positrons [17]. Alpha-magnetic spectrometer AMS-02 is designed to measure high-energy charged particles with a set of large statistics (an average of 2-3 orders of magnitude more than the "standard" measurements in of cosmic rays). The magnitude of the electric charge in the AMS-02 detector is measured independently by a coordinate detector (Tracker), a Cerenkov detector (RICH), a flight time counter (TOF) with a time resolution of 160 ps. A charge sign and a particle pulse are measured along a trajectory in a magnet using nine planes of a two-way coordinate silicon detector. The particle velocity is measured by a time-of-flight system (TOF), a transition radiation detector (TRD) and a Cerenkov detector (RICH).

Primary high-energy electrons and protons in cosmic rays are formed during acceleration in supernova remnants. Secondary electrons and positrons are generated in the cosmic medium by relativistic protons and cosmic radiation and are within the boundaries of the Earth's magnetosphere, which is assumed to be 25,000 km. [8]. Noteworthy is the fact that that in the alpha-magnetic spectrometer AMS-02, the resonance maximal of the total energy spectrum of the secondary electrons and positrons [17, Fig. 16], as well as the maxima of the energy spectra obtained separately for positrons [17, Fig.21] and for electrons [17, Fig.22] also corresponds to the energy interval Wp ≈ 10-100 GeV. It can be assumed that the creation of new particles in this energy range is associated with the polarization of a quantum vacuum (dark matter). Such a picture contradicts the notions of classical physics and goes beyond the framework of the Standard Model (SM). Direct experimental determination of the resonant dependence of the production of N pairs of elementary particles on the frequency ν is almost completely suppressed by modern physics. Following the deceptive logic of modern theory, this dependence is drawn in the form of a monotonically increasing curve. However, an analysis of the results of the AMS -02 experiment made it possible to establish that neither electronic nor positron spectra can be described by a power law with a single exponent in the entire energy range under study [17]. A staff member of the Massachusetts Institute of Technology Y. Galaktionov was able to detect the presence of Peak of energy (resonant maximum) in the total spectrum of electrons and positrons with external radiation energy of Wp ≈ 25-30 GeV [17]. This may indicate the generation of secondary electron-positron pairs in the near-Earth space environment, due to the decay of unstable dark matter particles. According to Yu.V. Galaktionov, one of the most important goals of the AMS-02 physics research program was the detection of dark matter in the near-earth medium in its non-gravitational manifestations [17].

3.3.Photoelectric Effect in the Quantum Vacuum (Dark Matter)

New physics represents quantum vacuum (dark matter) as the third full participant of proton collisions in the LHC and whose presence the apologists of the dominant 100 years in the physics of the Einstein's Special Relativity Theory (SRT) deny [2]. Due to the fact that within the framework of the ELI and XCELS projects the laser radiation intensity available for experiments has increased to 10^{23} W · cm^{-2} and higher, it has become possible to study the nonlinear vacuum effects that have so far not been experimentally studied. Thus, at the level of ultrahigh intensities 10^{26} W · cm^{-2}, the effect of scattering of a laser pulse on an electron beam with an energy of 46.6 GeV (nonlinear Compton effect) on the SLAC linear accelerator causes such cascades of successive hard-photon emissions (Wphot=hv) that the creation of secondary electron-positron pairs in vacuum is a chain reaction that continues up to up to the moment of complete loss of energy by charged particles. This is very reminiscent of the extensive atmospheric showers generated by cosmic particles [18, 19]. In this comparison of space observations with the results of laboratory studies demonstrates the deep analogies, evidencing, at a minimum, the unity of the physical principles of the behavior of matter in a wide range of densities (approximately 42 orders of magnitude) and temperatures (10^{13}K).

Perhaps the creation of electron-positron pairs in a vacuum is a manifestation of the instability of dark matter. Today, according to the results of experiments on the SLAC linear accelerator, many physicists believe that in the LHC the emission of jets in inelastic processes with a large multiplicity, including protons and antiprotons, is associated with dark matter [2, 20]. In the quantum electrodynamics (QED) there is still no complete clarity on how to solve the problem of the production of pairs of elementary particles and antiparticles in a vacuum under the action of external fields, relying on the corresponding equations the Klein-Gordon-Fock and the Dirac's equations. For some of these fields, it is possible to construct the corresponding quantum theory of the Dirac's field, but on the whole, there are insurmountable difficulties connected with the creation of electron-positron pairs from the vacuum leading to nonlinear many-particle problems.

Professor A.V. Rykov, relying on his of the theory of quantum vacuum [21], as early as 2000 obtained the value of the frequency of natural oscillations of the structural element of the cosmic quantum vacuum $\nu_r = 4.6911 \cdot 10^{24}$ Hz ($W_r \approx 20$ GeV), assuming that in the electromagnetic interaction the dipole structure of the cosmic quantum vacuum will be formed by the virtual electron-positron pairs. According to Rykov, with the size of the structural element of the cosmic medium dipole $r_e = 1.3988 \cdot 10^{-15}$ m, the ultimate deformation (destruction boundary) $dr_e = 1.0207 \cdot 10^{-17}$ m is related by the relation $dr_e = \alpha_e r_e$, where $\alpha_e = 0.0072975$ is the fine structure constant. Destruction boundary corresponds to the external photon energy $W_e \geq 1$ MeV (the initial boundary of the photoelectric effect in the quantum vacuum $Wphot = h\ \nu$). The deformation in physical vacuum is less than dr should be of an electroelastic character, and at higher values, deformation leads to the destruction of the dark matter dipole and to the creation of an electron-positron pair [21]. Assuming that in the nuclear interaction (strong interaction between nucleons) the dipole structure of the nuclear quantum vacuum will be formed by the different virtual pions (π +, π-), Professor A. Rykov calculated the natural frequency the dipole structure of the nuclear quantum vacuum $\nu'_r = 1.6285 \cdot 10^{26}$ Hz and the value the energy, necessary for the destruction of the dipole structure and the resonance production of three π-mesons (π^0, π +, π-) $W'_r \approx 600$ GeV. According to Rykov, with the size of the structural element of the dipole of a nuclear quantum vacuum, $r_x = 5.1408 \cdot 10^{-18}$ m, the final deformation (fracture boundary) $dr_x = 1.6356 \cdot 10^{-20}$ m is related by the relation $dr_x = \alpha_x r_x$, where $\alpha_x = 0.00318157$ the fine structure of a nuclear quantum vacuum. The fracture boundary corresponds to the energy of an external photon $W_x \geq 30$ GeV (the initial boundary of the photoelectric effect of the production of π-mesons in a nuclear quantum vacuum). The analysis of the experimental data at the LHC (2012-2018) does indeed show the presence of resonant peaks in the energy spectra of particle production for pp-collisions energies $W_r \approx 1$MeV, $W_r \approx 20$ GeV for electron-positron pairs in the cosmic quantum vacuum and $W_r \approx 30$ GeV and $W_r \approx 0.6$ TeV for π-mesons (π^0, π +, π-) in the nuclear quantum vacuum. Thus, Professor AV Rykov relying on the analysis of the photoelectric effect, proposed the dipole structure of the quantum vacuum (particle and antiparticle) and was able to predict the resonant frequency (energy) of production of electron-positron pairs and π-mesons under the action of cosmic radiation and the relativistic protons (2000), 15 years earlier than similar results were received in experiments conducted at the LHC and the space detector AMS-2 (2011-2016).

4. CONCLUSION

Theory will be entirely useless if not supported by appropriate experimentation. As regards the quantum science, theory and experiment in it show coincidence with an accuracy of 6 to 9 significant figures. L.G. Sapogin's Unitary Quantum Theory (UQT) [14] breaks fresh ground in the theory of microcosmos, restoring the figurativeness and common sense excluded from physics by the Bohr's antiquated complementarity principle. Significant advances in quantum mechanics (especially in stationary conditions) started from a prime relation between De Broglie wavelength and geometric properties of potentials. The particle was formally considered as a point in order to explain the wave function/probability amplitude. However, neither the point hypothesis, nor the complementarity principle proved useful in understanding the structure of elementary particles and elaborating the quantum field theory within the accepted paradigm. The standard model even lacks a mass spectrum calculation algorithm for elementary particles. Today, among the experts working at the Large Hadron Collider, the question of replacing the paradigm that has reigned for a hundred years in physics has become more and more definite [1,4]. At the same time, the requirement of relativistic invariance is an entry ticket for any future theory. Irreversible processes, such as the birth of elementary particles in a vacuum, try to squeeze into the Procrustean bed of symmetric invariant solutions of Einstein's theory. New theoretical models include new types of interaction, which can lead to violation of the equivalence principle, variations of fundamental constants, and Lorentz symmetry breaking. This defines the limits of applicability of the invariant equations of Einstein's general relativity within the framework of reversible processes in stationary systems. To describe irreversible processes in time-varying non-integrable systems, new theories are needed. There is no need to go far for examples. New discoveries in cosmology (dark energy and dark matter)[22], recent experiments at the Large Hadron Collider [2] and in near-Earth space using space detectors Pamela, Fermi, AMS [8], as well as the discovery of cold nuclear fusion [23] can not be explained from the standpoint of the Einstein's relativistic theory and of Bohr's quantum mechanics. Modern quantum theories such the Leo Sapogin's Unitary Quantum Theory (UQT) [12] or the Yuri Baurov's Theory of the Byuon (TB) [3] competing with it reject the Bohr's antiquated complementarity principle and give an idea of the internal structure of an elementary particle. Such an approach allowed these theories to propose new algorithms for calculating the mass spectrum of elementary particles and theoretically calculate the value of the masses of all elementary particles, both discovered experimentally and so predicted in the future. It should be noted that the discovery of phenomenon the polarization of quantum vacuum (dark matter) in theories of quantum electrodynamics (QED) and quantum chromodynamics (QCD) leads to violating the symmetries, conservation laws and prohibitions in the Standard Model. The participation of the quantum vacuum (dark matter) in all interactions causes the rejection of the paradigm of a closed system of evolution and requires revision of all conservation laws and of symmetries. Only from the standpoint of new physics can one explain the principle of operation and technology of the microwave Roger Shawyer's engine EmDrive, Baurov's engine and Leonov's anti-gravity quantum engine, the Andrea Rossi's reactor E-cat, the Paul Bauman's generator "Testatik machine M/L Converter", Leo Sapogin's New Source of Energy, G.Shipov's torsion transmitting, the Nicola Tesla's Systems to wirelessly transmit Energy and the like. The laws of conservation of energy and momentum for these devices are only valid in the case of recognition of the existence of the quantum environment with positive density (dark matter), which participates in the all interactions in the nature. Non-baryonic matter, which forms the basis of the intergalactic medium, is in constant force interaction with the baryonic substance of planets and stars that are born from it. This non-baryonic matter is the main source of energy for the formation in them not only of electron-positron pairs but also of any other structural elements of matter. Moreover, possessing an all-pervasive character, this medium influences all processes occurring in accelerators and colliders.

Today, before the physicists there is of question: "Which project them choose for the new collider?" If the LHC had discovered the new particle outside the Standard Model or reliably pointed some fundamentally new effect, of physicists would know how to build a collider to study this phenomenon. This would be a reasonable of choice. Now of physicists are forced to make a choice almost blindly, trying to find an option that would be optimal in terms of time, financial investments, and the expected scientific impact. In September 2017, at the 186th session of the CERN Council, the secretariat of the European Strategic Group (ESG) was established, a new body to coordinate the preparation of the updated European Strategy. The key task of the European Strategic Group is to draw up a final program plan and submit it for consideration at CERN. I propose to the European Strategic Group consider this article, for research a fundamentally new the effect - the polarization of quantum vacuum (dark matter) in the new collider [24]. In the list of tasks for the new collider, it is necessary also to include an investigation of the fifth fundamental interaction on the basis the Yu.Baurov's Byuon theory and on the based the professor Jonathan Feng's theory "photophobic X boson" and the study of elementary particles based on the professor Leo Sapogin's Unitary Quantum Theory [25].

There is a question: "What should be the new physics?" There is no unity on this issue among the physicists. This the article is a the forerunner of the emergence of a new physics in which "violation" of conservation laws in the open systems is allowed, the prohibition on the creation of devices with an efficiency of more than 100% is lifted and in which for the mankind opens up an the inexhaustible source of conceptual innovations in the all fields of activity.

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REFERENCES

[1] Roger Barlow, *The Conversation- Has CERN discovered a particle that 'threatens our understanding of reality'?* -Science & Technology, November 13, (2018)

[2] Konstantinov S.I. *The Higgs boson and the resonances at the Large Hadron Collider* - Physics & Astronomy International Journal, Volume 2 Issue 5 (2018)

[3] Yu.A. Baurov, Yu.G. Sobolev, F. Meneguzzo, *Fundamental experiments on the detection of the anisotropy of physical space and their possible interpretation,* - M: Bulletin of the Russian Academy of Sciences: Physics ISSN, Vol.79, No.7, pp.1047-1052, (2015)

[4] Joseph Lykken, Maria Spiropula. Supersymmetry and the crisis in physics – *Scientific American* N 7-8, (2014).

[5] Adornov T.K., Gavrilov S.P., Gitman D.M., Ferreira R., *Peculiarities of the production of particle pairs in a peak electric field,* - M: Russian Physics Journal, Vol. 60, No. 3, (2017)

[6] Aksenov V.V. , *Non-force and force the magnetic field*, M: Russian Physics Journal, Vol. 59, No. 3, (2016)

[7] Gitman D.M., Gavrilov S.P. *Description of processes in strong external fields within the framework of quantum field theory.* - M: Russian Physics Journal, Vol. 59, No. 11, (2016).

[8] Konstantinov S.I., *Generation of secondary electrons and positrons in the near-Earth space environment from the data of experiments PAMELA, FERMI and AMS (2006-2016)*,- Global Journals Inc. (US) GJSFR-A, Volume 17, Issue 2, (2017).

[9] Kornienko V.N., Cherepenin VA, *Dynamics of the flow of backward electrons in many-wave Cherenkov generators,* - M.: Bulletin of the Russian Academy of Sciences: Physics, ISSN 1062-8738, Vol.81, No.1, pp. 38-40, (2017).

[10] Prigogine I.R., Stengers I. *Time, chaos, quantum*,- Moscow: Progress, (1994).

[11] Trubetskov D.I. *Introduction to singeretiku. Chaos and structure* - M: URSS, (2004).

[12] Leo G. Sapogin, Yu.A. Ryabov, V.A. Boichenko , *The Unitary Quantum Theory and a New Sources of Energy*. - Science Publishing Group, USA. (2015)

[13] Richard Phillips Feynman. *QED: The Strange Theory of Light and Matter* - Moscow: Nauka, (1988)

[14] Leo G. Sapogin, Ryabov Yu.A. *The Mass Spectrum of Elementary Particles in Unitary Quantum Theory and Standard Model*,- Global Journal of Science Frontier Research A ,vol.16,Issue 2,Version 1.0, (2016), earlier version Sapogin L.G., Ryabov Yu. A. *On the mass spectrum of elementary particles in Unitary Quantum Theory*,- Journal "The old and new Concepts of Physics",Vol. V, No.3, 2008.

[15] Shikin V. *Low – frequency anomalies of effective mass of charged clusters in liquid helium*,- Low Temperature Physics, Volume 39, No. 10, 2013

[16] Dremin I.M. *Some new discoveries at colliders* – Physics-Uspekhi, **61**, (4) (2018)

[17] Galaktionov Yu. V., *Search for antimatter and dark matter, precision studies of the cosmic rays fluxes on the international space station. AMS experiment. Results of four year exposure*. – Physics – Uspekhi, **60**, (1), (2017)

[18] *Quantum-electrodynamic cascades with ionization of atoms* - Physics - Uspekhi, **60**, (11), p.1271, (2017).

[19] Narozhniy N.B., Fedotov A.M. *Quantum-electrodynamic cascades in an intense laser field* - Physics - Uspekhi, **58**, (1), pp.103-108, (2015)

[20] Hunting the mysterious dark photon: the NA64 experiment (CERN)

[21] Rykov A.V. *Fundamentals of the theory of ether*, - Moscow: Russian Academy of Sciences, Institute of Physics of the Earth, (2000)

[22] Konstantinov S.I., The cosmological constant and dark energy: theory, experiments and computer simulations,- Global Journals Inc. (US) GJSFR-A, Volume 16, Issue 5, 2016.

[23] Stanislav Konstantinov *Nuclear fusion: the management prospects* -Physics & Astronomy International Journal, Volume 2, Issue 6 ,(2018)

[24] Stanislav Konstantinov *Project AWAKE and the Maxwell's Electrodynamics* - Open Access Journal of Physics Volume 2, Issue 3, 2018, PP 30-34

[25] Sapogin, L.G., Dzhanibekov, V.A., Mокulsky, M.A., Ryabov, Yu.A., Savin, Yu.P. and Utchastkin, V.I., *About the Conflicts between the Unitary Quantum Theory and the Special and General Relativity Theories.* - Journal of Modern Physics, 6, pp. 780-785, (2015).

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