International Journal of Astronomy, Astrophysics and Space Science
2017; 4(4): 17-22
http://www.openscienceonline.com/journal/aass

Existence of Dark Matter in the Space Determines All Fundamental Physical Properties of the Nature

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To cite this article

Igor Abuzedovich Boriev. Existence of Dark Matter in the Space determines all fundamental physical Properties of the Nature. *International Journal of Astronomy, Astrophysics and Space Science*. Vol. 4, No. 4, 2017, pp. 17-22.

Received: April 14, 2017; **Accepted**: April 27, 2017; **Published**: August 14, 2017

Abstract

Existence of dark matter (DM) in all space is now the real fact, and reliable study of DM nature and DM properties is an actual task of astrophysics and cosmology. Recently, it was shown by me that observed properties of cosmic microwave background radiation (CMBR) at reasonable assumption, that they are produced by thermal (at 2.7K) DM motion, give materialistic substantiation to conservation laws of classical physics and to all principles of quantum mechanics (as it gives Planck's constant value). This result confirms the DM existence and shows that CMBR is observed display of DM motion. Also recently, taking into account that creation of electron-positron pairs occurs from DM, the substantiation of positron nature of ball lightning was given by me, what let first explain all its specific properties. At this substantiation it was revealed that "electric field" of positron is a result of nearest DM "polarization" by positron rotation (according to its spin). Revealed physical essence of "electric field" (and "electric charge") of created from DM "charged" elemental particles (electron, proton and their antiparticles) allowed explain the problem of inexplicably many (more than 350) registered short-living "particles" and their commonly calculated large masses, which are much larger than the masses of stable particles (electron, proton). In addition, such essence of "electric field" let solve old puzzle of the absence of repulsion between protons in atomic nucleus (since in small size of atomic nucleus is not enough DM to produce the "electric fields" of protons) and thus let reveal physical reason of known concept of "strong interaction" (based on unobservable quarks) and also of recent concept of "asymptotic freedom" (based on theoretical treatment only). In this short paper it is shown that understanding of DM existence let also give reasonable materialistic explanation to some other observed fundamental physical properties of the Nature such as: 1) Hubble's red shift without using concept of Universe expansion, which lead to unaccountable concept of "dark energy", 2) neutrino physical essence as DM waves, which have different energy and zero rest mass, 3) validity of Boltzmann's approach for statistical physics since mathematical theorem on non-self-intersection of material body trajectory is not applied for the space filled by DM exhibiting thermal motion, 4) the reason of known failure of Michelson-like experiments at the Earth surface.

Keywords

Dark Matter, Cosmic Background Radiation, Physical Properties of the Nature, Hubble's Red Shift, Neutrino Essence, Elemental Particles

1. Introduction

Understanding of dark matter (DM) existence in ambient space allows, as may be shown, give materialistic explanation to observed fundamental physical properties of the Nature as for the large scale of the Universe and also for the small scale of elemental particles. Thus, as long enough known, obtained astronomical and astrophysical data indicate the presence in cosmic space of DM, which fills all space and explains observed dynamics of Galaxies in the framework of Newtonian mechanics ([1]-[3]). This DM with its very low density (~10^{-29}g/cm^3), which corresponds to known condition of Universe stationary state, is the main part of the matter in the Universe, because DM mass is ~10 times greater than the mass of all visible cosmic baryonic matter. No doubt, namely the properties of DM, which fills the real space, must determine the physical properties of the space and, therefore,

the fundamental physical laws and processes, which take place in the Nature. It is clear, that namely the existence of DM, which is called "dark" (invisible) since, as yet supposed, DM does not emit or absorb any radiation, let solve the problems of space gravity and also the stationary state of the Universe, what was recently confirmed by Plank satellite mission.

Therefore, it is not surprising, that during last years many published experimental and theoretical works are devoted to searching study of DM properties and DM nature ([4]-[7]), indicating that it is really an actual problem of modern astrophysics and cosmology.

First result of revealing DM properties was given recently by me [8]. It was shown that observed properties of cosmic microwave background radiation (CMBR) at reasonable assumption, that CMBR is produced by thermal (at 2.7K) DM motion, let give materialistic substantiation to three conservation laws of classical physics and to all principles of quantum mechanics (as it gives the value of Planck's constant). No doubt, this result directly confirms the reality of DM existence and shows that CMBR is observed display of DM thermal motion. Besides, understanding of DM existence in all ambient space let reveal simple materialistic essence of main accepted physical concepts such as space and time ([9]).

Also recently, realizing that creation of electron-positron pair occurs from DM (as two contrarily rotating material vortex according to their spins), the substantiation of ball lightning positron nature (as a bunch of big amount of positrons) was given by me [10], what let first explain all its observed specific properties. At this substantiation, which also confirms the reality of DM existence, was revealed very important fact that "electric field" of positron is a result of nearest DM "polarization" by rotation of positron (according to its spin).

Such understanding of physical essence of "electric field" (and "electric charge") for "charged" elemental particles (due to these particles rotation) means that, if there will be not DM near these particles, they will be not able to have their "electric field" and to reveal their usual mutual repulsion. Namely this take place at powerful streak lightning in the air for the case of many concurrently and next to created positrons from all nearest DM. In this case, such created positrons, as identical material vortex, may confluence with each other in one material vortex (a bunch of many positrons), which should reveal in the air all known properties of ball lightning [10].

As also was recently shown by me [11], revealed physical essence of "electric field" (and "electric charge") let reasonably explain known problem of inexplicably many (more than 350) short-living particles, which are registered by various chambers and detectors and which till now do not obtain its full and clear classification [12]. Only about 60 of this so-called "particles", which are already considered as non elemental (complex), have been as now classified in the frame of Standard Model, at that with free (unreasoned) use of many strange concepts and parameters (such as quarks, glue, color, flavor, and so on) [13, 14]. As was underlined [11], these short-living "particles" are always identified simply as their tracks, which appear in the matter of used chambers, and they are never registered in free space filled by DM, where only stable particles (protons, electrons), hydrogen atoms and cosmic rays with different energy are observed.

As to commonly calculated for these short-living "particles" their peculiarly large masses, which are much larger than the masses of stable particles (electron, proton), the reason of it was explained in [11] on the base of revealed physical essences of "electric field" (and "electric charge") of "charged" elemental particles as the result of nearest DM "polarization" by rotation of "charged" (rotating) particle. These short-living "particles are unstable since they are created from DM as material vortex, which rotate significantly slower than the stable particles, and, consequently, exhibit their significantly smaller "electric field" (and "electric charge"). Therefore, at common calculation of masses of short-living "particles" from the curvature of their trajectories in magnetic field, the value obtained (at usual assumption that these short-living "particles" obey the known value of elemental "electric charge" for stable elemental particles) will be significantly larger than their real masses.

Besides, revealed physical essences of "electric field" (and "electric charge") of "charged" elemental particles, based on the existence of DM, let give reasonable physical explanation to old puzzle of the absence of repulsion between protons in atomic nucleus [11]. As known, this puzzle has obtained two hypothetic explanations: first explanation with the use of particle exchange theory approach (H. Yukawa, 1934) and then another explanation (called "asymptotic freedom" [15, 16]) on the base of theoretical description of disappearance of repulsion between protons at their close approach. However both these explanations give no substantiation of the physical reason of this puzzle, whereas, as shown [11], simple physical reason of this puzzle is that in the small size of atomic nucleus there is not enough DM (or not DM at all) to produce the "electric field" of protons by DM "polarization".

In this paper it is stated that understanding of DM existence let also give reasonable materialistic explanation to some other, besides mentioned above, observed fundamental physical properties of the Nature. As examples of such properties, now are considered next 4: 1) Hubble's red shift, which may be reasonably explained without using erroneous concept of Universe expansion, which lead to unaccountable concept of "dark energy", 2) neutrino physical essence as the waves of DM substance, which have different energy and, consequently, own zero rest mass since they are simply material waves, 3) profound validity of Boltzmann's approach for statistical physics since known mathematical theorem on non-self-intersection of material body trajectory is not applied for the space filled by DM exhibiting thermal motion, 4) the reason of known failure of Michelson-like experiments performed at the Earth surface.

Taking into account the significance of considered physical properties and the novelty of proposed materialistic concepts, based on the existence of DM, for "electric field" (and "electric charge") of "charged" elemental particles it is necessary establish at first what should be considered as true

for obtained results of physics.

2. Once More About the Physics as a Science and How Its Results Should Be Considered as Correct

As was previously underlined [11], at analysis of problem questions of the physics it is necessary establish true criteria of correctness of results of the physics, what should be based on the purpose and the essence of the physics. All results of the physics, the science developed by man for objective research of the nature properties, are obtained either experimentally or theoretically, and for these two kinds of results there are own objective criteria of their correctness.

The physics is first of all the experimental science, in principle, since the main purpose of physics is the experimental study of the properties of various processes, which take place in the nature. Experimentally obtained properties may be considered as correct only if these properties are revealed for certain by several researches and, as desirable, by different methods. So, once obtained throwaway complex experimental result should be well confirmed before it will be believed that this result reveals real property of the nature.

As to theoretical physics, it was developed for adequate explanation of experimentally observed properties of the nature with the use of introduced base physical concepts (space, material body, time) and of revealed fundamental physical laws. It is clear that, if theoretical explanation of reliable experimental data on the base of used models, assumptions and conceptions do not give adequate description of such data, then something is not true with used models, assumptions or conceptions, and therefore they should be revised to achieve required full description. Besides, theoretical descriptions of experimental data may be considered as complete and correct only if they do not lead to any inexplicable problems (paradoxes, abnormalities) and, moreover, let give true forecast of yet unknown physical properties of the nature. Otherwise, proposed theoretical conceptions should be considered only as some hypotheses without their relation with real properties of the nature.

Thus, obtained reliable experimental data come first with respect to their theoretical explanation.

3. Existence of Dark Matter in Cosmic Space Gives Reasonable Explanation of Observed Hubble's Red Shift

The Hubble's red shift, observed for atomic spectral lines in electromagnetic waves coming from far cosmic objects, has reasonable materialistic explanation at taking into account the existence of DM. It is clear that electromagnetic waves, which really are the waves of DM, at their travelling in material substance (DM) must loss their energy. This energy loss must lead to red shift in spectral lines of electromagnetic waves, at that, as clear, this red shift will be larger for the waves coming from more far cosmic objects, as it is observed. This explanation of Hubble's red shift corresponds more reasonably to physical reality then known explanation with the use of Doppler's effect what lead to strange inexplicable concepts of the Big Bang and the Universe expansion, creating, in turn, physically unaccountable concept of "dark energy". It is worth mention that, as known, many famous physicists (among them M. Planck and yourself E. Hubble) were not agree with an explanation of Hubble's red shift by the Universe expansion, and they have supposed that there is another physical reason of this phenomenon. Proposed materialistic explanation of Hubble's red shift (on the base of DM existence) corresponds to known approach, which is called "tired light".

4. Understanding of Neutrino Essence as Material Waves of DM Substance with Their Very Different Energy

Understanding of DM existence in all space allows give simple materialistic explanation of physical essence of all known different kind of neutrino as DM waves, which have very different energy. Therefore, all neutrino, since they are material waves in DM substance (but not some kind of "particles" as it is yet supposed), have, obviously, zero rest mass. This is entirely like the known case of "photon", which (independently on its energy value) has, as it is believed, a zero rest mass and is, as clear, also a part (a quantum) of electromagnetic wave, that is DM wave. Such neutrino, as waves of DM, may freely propagate through any material bodies (e.g. through the Earth) since all bodies are entirely saturated with DM. It is important to note that, as was revealed at derivation of Planck's constant value from thermal motion of DM [8], the mass of yet unknown corpuscle of DM substance is very small (much smaller then 10^{-39}g). Therefore, now actively realized search of DM corpuscles (by the use of many different underground detectors) as expected very massive particles (so-called weakly interacting massive particles WIMP) is vain, in principle. This fact was confirmed in recent paper [8], where is reported about several years failure to detect WIMP by PICASSO equipment. In support of smallness of DM corpuscles it is worth note that inner volume of atoms is also filled by DM substance, what provides due to DM mechanical action (equal to the value of Planck's constant) the existence of energy levels of any atoms.

Observed practically free propagation of neutrino through material bodies is due to weak interaction of neutrino (DM waves) with matter particles because of very small cross sections of this interaction. However, when high-energy cosmic neutrino (wave of DM) nevertheless occasionally interact with some nuclear of the matter then the energy of neutrino creates many scattered secondary high-energy short-living "particles", which may produce observed very different tracks in the matter of some chamber [12]. These secondary high-energy "particles" may be some vortex of DM,

which must be created as a pair of oppositely rotating vortex (according to angular momentum conservation law) and should be considered as oppositely charged "particles" since they must produce curved tracks in magnetic field. Also some such short-living "particles" may be nearly plane wave of DM, which produce in magnetic field almost straight tracks, what shows that these short-living "particles" are likely "uncharged" (neutral).

It is important to note that neutrino, as the waves of DM, when they appear at beta decay, may take off different energy parts (without any quantization), what resolves the known problem of violation of the energy conservation law at beta decay.

5. Thorough Validity of Boltzmann's Approach for Statistical Physics in the Space of DM with Its Thermal Motion

Existence of DM directly states the validity of Boltzmann's approach developed by him for substantiation of applicability of statistical physics methods for description of many-particle physical processes. This is really so, since known classical mathematical theorem about non-self-intersection of material body trajectory (what was main theoretical argument against Boltzmann's approach with his famous H-theorem) is not applied for body motion in the space filled by DM. It is so since DM substance exhibits equilibrium thermal (at 2.7K) motion, which, as was recently shown [8], produces mechanical action equal to the value of Planck's constant. This fact means that motion of anyone body in DM substance must undergo to random walk, like the case of well known Brownian motion. Therefore, the motion of a body in DM substance is chaotic, in principle, and so it doesn't obey the equations of classical mechanics, but totally corresponds to the base of Boltzmann's approach. The fact of body chaotic motion is really observed for the case of motion of very light bodies such as electrons, for which this mechanical action from DM substance is strong, and therefore their dynamics should be described by wave functions, as it was developed by L. de Broglie. However, for motion of heavy body this action from DM is negligible, and so body motion may be well described by equations of classical mechanics.

6. The Reason of Known Failure of Michelson-Like Experiments to Check the DM (Ether) Existence

Understanding of DM existence let explain the reason of the failure of Michelson-like experiments, which were carried out at the Earth surface for searching the existence of the ether, which, as clear, is the same as considered DM. The reason is that some layer of DM, which is situated just near the Earth surface, must be almost motionless relative to the Earth surface due to some gravitational interaction of DM substance with the Earth. This situation is like to known behavior for the case of the body motion through gas or liquid substance, when some layer of this substance, which is near the surface of the body, moves together with this body. It is clear, that Michelson-like experiments, carried out far enough from the Earth surface, should reveal the motion of the Earth relative (or through) DM substance. The motion of the Earth through DM substance is confirmed by observed (from the Earth) weak (~0.1%) dipole anisotropy of CMBR, what shows that the Earth (together with Solar system) moves through DM substance in direction of the Leo constellation with the rate ~400 km/s.

This fact, as it was noted [8], straight confirms the DM (or the ether) existence in the Space and shows that the Space is filled by material (DM) substance, from which known stable elemental particles (electron, proton and their antiparticles) are created [9, 10]. No doubt, that DM is so-called "Higgs's boson field", from which all known material substance (beginning from stable elemental particles and then producing atoms, molecules, planets and so on) are created in the Nature.

7. Conclusion

The results of this article and articles published earlier [8-11] show, that understanding of DM existence in the space and reasonable understanding that observed CMBR is produced by equilibrium thermal (at 2.7K) seesaw motion of DM, let explain many of the most fundamental physical properties of the Nature.

1. Understanding, that observed properties of CMBR (spatial homogeneity, isotropy and blackbody spectrum at ~2.7K) are produced by equilibrium thermal (at 2.7K) seesaw motion of DM, let give materialistic substantiation to three conservation laws (for momentum, angular momentum and energy) of classical physics and to all principles of quantum mechanics (as seesaw motion of DM produces the value of mechanical action, which is equal to the value of Planck's constant) [8].

2. Understanding that known creation of pair of electron and positron, both of which are stable material elemental particles, occurs from DM as two contrarily rotating (according to conservation law of angular momentum) material vortex with their spins let substantiate positron nature of mysterious ball lightning [10]. Revealed physical nature of ball lightning (as a bunch of large amount of positrons) let explain for the first time all observed its specific properties.

Given in [10] explanation of confluence possibility of many positrons in one bunch has revealed that "electric field" (and consequently "electric charge") of positron results from some "polarization" of nearest DM by positron rotation. Thus, in the case of many simultaneously and next to created positrons from all nearest DM, what is realized at strong streak lightning in the air, such positrons may confluence with each other as they is identical material vortex. It is so since at this moment near created positrons is not DM to produce their "electric fields", which usually result to their mutual repulsion. Revealed conception of "electric field" shows that known

constant elemental "electric charge" of stable elemental particle is the consequence of acting of angular momentum conservation law in DM space [8] for rotating particle, which is created from DM as stable material vortex.

3. Taking into account the existence of DM let reasonably explain [11] the marked problem of inexplicably many (more than 350) short-leaving unstable so-called "particles" registered by various chambers and detectors as various tracks [12]. Observed different kinds of tracks are coursed by the energy of various material vortexes from DM, which behave as "charged" particles or by the energy of near plane DM waves, which behave as "uncharged" neutral particles. Such kinds of these secondary "particles" may arise in DM under the action of transiting (trough the substances of chambers or detectors) primary more high-energy particles or cosmic rays.

Registered short-leaving "charged" particles, as some material vortexes from DM, are unstable since they rotate much slower then stable elemental particles, and therefore they reveal smaller "electric field" (and, consequently, smaller "electric charge") because of weaker DM "polarization" by their slower rotation. This logically explains calculated for these unstable particles (from the curvature of their tracks in magnetic field) considerably larger masses relative to the mass of stable particles [11,12], since at usual calculation the "electric charge" of these unstable particles is supposed to be equal to the "electric charge" of stable elemental particle (electron, positron).

Established physical essence of "electric field" (and "electric charge") as result of nearest DM "polarization" let reasonably explain old puzzle of the absence of repulsion between protons in atomic nucleus since in their small size there is not enough DM (or not DM at all) to produce the "electric fields" of protons [11]. Such materialistic explanation reveals physical reason of this old puzzle instead of two proposed strange concepts (of unobservable quarks with their fractional "charges" or so-called "asymptotic freedom"), both of which have only theoretical explanation of this puzzle without any indication of its physical reason.

4. Understanding of DM existence in cosmic space let give reasonable materialistic explanation of observed Hubble's red shift as a consequence of energy loss by electromagnetic waves (waves of DM) at their travelling in DM substance. This energy loss, which should lead to red shift in spectral lines of electromagnetic waves, must be larger for the waves coming from more far cosmic objects, as it is really observed. Such explanation, which corresponds to known concept of so-called "tiered light", reveals the reason of Hubble's red shift without using incorrect concept of Universe expansion, since it lead to unaccountable concept of "dark energy". Moreover, this incorrect concept, which is based on Doppler's effect for explanation of Hubble's red shift, led to problem conception of accelerated expansion of Universe with appearance of hardly unaccountable expansion speed, which is higher, then known speed of light. This incorrect concept also does not corresponds to observed stationary state of the Universe, what was recently confirmed by Plank satellite mission

5. Understanding of DM existence in all space let give simple materialistic explanation of physical essence of all known different kind of neutrino as DM waves with their very different energy and, obviously, zero rest mass, what is entirely like the known case of "photon". Such neutrino, as waves of DM, may freely propagate through any material bodies (e.g. through the Earth) since all bodies are entirely saturated with DM and since neutrino (DM waves) weekly interact with matter particles because of very small cross sections of this interaction. However, when high-energy cosmic neutrino (wave of DM) nevertheless occasionally interact with some nuclear of matter then the energy of neutrino creates many scattered secondary high-energy "particles", which may produce observed very different tracks in the matter of some chamber [12].

6. Existence of DM directly states the validity of Boltzmann's approach developed by him for substantiation of applicability of statistical physics methods for description of many-particle physical processes. This is so, since known classical mathematical theorem about non-self-intersection of material body trajectory, which was main theoretical argument of some mathematics against Boltzmann's approach, is not applied for body motion in the space filled by DM. It is so, since DM exhibits equilibrium thermal (at 2.7K) motion, which, as shown [8], produces mechanical action equal to the value of Planck's constant. From this fact follows that the motion of a body in DM substance undergo to random walk like the case of well known Brownian motion. So, a body motion in DM substance is chaotic, in principle, what is the base of the Boltzmann's approach.

7. Understanding of DM existence let explain the reason of known failure of Michelson-like experiments, which were carried out at the Earth surface for searching the existence of the ether, which is the same as considered DM. The reason of this failure is that some layer of DM, which is situated just near the Earth surface, must be almost motionless relative to the Earth surface due to weak gravitational interaction of DM substance with the Earth gravitational field. This is like to known behavior for the case of the body moving through gas or liquid substance, when some layer of this substance, which is near the surface of the body, moves together with the body. Consequently, Michelson-like experiments, carried out at the Earth surface, were can not reveal the motion of the ether relative the Earth surface.

It is clear, that Michelson-like experiments, which will be carried out far enough from the Earth surface, should reveal the motion of the Earth relative (or through) DM. The motion of the Earth through DM substance is confirmed by observed (from the Earth) weak (~0.1%) dipole anisotropy of CMBR, what shows that the Earth (together with Solar system) moves through DM in direction of the Leo constellation with the rate ~400 km/s.

As total conclusion from understanding of DM existence it should be underlined that revealed physical essence of "electric field" (and "electric charge") of stable (rotating) elemental particles (as a result of nearest DM "polarization" by their rotation) signify the appearance of real materialistic

conceptions about existent physical processes in the Nature. This circumstance let create in future New Physics, were "electrical" phenomenon (including "electric" and "magnetic" fields) will receive their materialistic (on the base of DM existence) description, what will allow create unified system of measuring of physical quantity.

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