AB Preon Interaction Theory and Model of Universe

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When God created the World, he did not know
of string theory or quantum mechanics.
He used the Principle of Simplicity.

Abstract

Author offers some initial ideas about a cognitive construct of the Micro-World with allows to design a preon based Universe matching many qualities of the observable universe.. The main idea is that - the initial base must be very simple: two energy massless virtual particles (eners) and two reciprocity relations (interactions) between them. Author postulates: Two energy massless virtual particles can explain the main features of much of what we see including: mass, electrical charges and the main interactions between particles such as: gravitation, centrifugal and inertial masses, repulsion and attraction of electric charges, weak and strong nuclear forces, design of quarks and baryonic matter.

Author gives only ideas of how these problems may be solved. Scientists who will be interested in the offered approach can make detailed mathematical descriptions and solutions.

Key words: microworld, preon, preon theory, virtual particles, fundamental interactions, Ener Model of Universe, Bolonkin.

Introduction

Short information, discription and history of problems.

Univese.

The Universe is all of time and space and its contents. The Universe includes planets, stars, galaxies, the contents of intergalactic space, the smallest subatomic particles, and all matter and energy. The *observable universe* is about 28 billion parsecs (91 billion light-years) in diameter at the present time. The size of the whole Universe is not known. Observations and the development of physical theories have led to inferences about the composition and evolution of the Universe. At present time the scientist suggest the University contants the Ordinary (baryonic) matter (4.9%), dark matter (26.8%), dark energy (68.3%).

Ordinary matter is at least 10^{53} kg, avarage density is 4.5×10^{-31} g/cm^3, avarage temperture is 2.72548 K.

Observations in the late 1990s indicated the rate of the expansion of the Universe is increasing indicating that the majority of energy is most likely in an unknown form called dark energy. The majority of mass in the universe also appears to exist in an unknown form, called dark matter.

The Big Bang theory is the prevailing cosmological model describing the development of the Universe. Space and time were created in the Big Bang, and these were imbued with a fixed amount of energy and matter; as space expands, the density of that matter and energy decreases. After the initial expansion, the Universe cooled sufficiently to allow the formation first of subatomic particles and later of simple atoms. Giant clouds of these primordial elements later coalesced through gravity to form stars. Assuming that the prevailing model is correct, the age of the Universe is measured to be 13.799±0.021 billion years. There is a lot of speculative model of Universes.

The remaining 4.9% of the mass–energy of our Universe is ordinary matter, that is, atoms, ions, electrons and the objects they form. This matter includes stars, which produce nearly all of the light we see from galaxies, as well as interstellar gas in the interstellar and intergalactic media, planets, and all the objects from everyday life that we can bump into, touch or squeeze.

Of the four fundamental interactions, gravitation is dominant at cosmological length scales, including galaxies and larger-scale structures. Gravity's effects are cumulative; by contrast, the effects of positive and negative charges tend to cancel one another, making electromagnetism relatively insignificant on cosmological length scales. The remaining two interactions, the weak and strong nuclear forces, decline very rapidly with distance; their effects are confined mainly to sub-atomic length scales.

Ordinary matter of our University is composed of two types of particles: quarks and leptons. For example, the proton is formed of two up quarks and one down quark; the neutron is formed of two down quarks and one up quark; and the electron is a kind of lepton.

Ordinary matter and the forces that act on matter can be described in terms of elementary particles. These particles are sometimes described as being fundamental, since they have an unknown substructure, and it is unknown whether or not they are composed of smaller and even more fundamental particles. Of central importance is the Standard Model, a theory that is concerned with electromagnetic interactions and the weak and strong nuclear interactions.[93] The Standard Model is supported by the experimental confirmation of the existence of particles that compose matter: quarks and leptons, and their corresponding "antimatter" duals, as well as the force particles that mediate interactions: the photon, the W and Z bosons, Higgs boson, and the gluon. The Standard Model does not, however, accommodate gravity.

Virtual particles.

In physics, a **virtual particle** is an explanatory conceptual entity that is found in mathematical calculations about quantum field theory. It refers to mathematical terms that have some appearance of representing particles inside a subatomic process such as a collision.

Often the virtual-particle virtual "events" appear to occur close to one another in time, for example within the time scale of a collision, so that they are virtually and apparently "short-lived". It restricts itself to what is actually observable and detectable. Virtual particles are conceptual devices that in a sense try to by-pass Heisenberg's insight, by offering putative or virtual explanatory visualizations for the inner workings of subatomic processes.

The range of forces carried by virtual particles is limited by the uncertainty principle, which regards energy and time as conjugate variables; thus, virtual particles of larger mass have more limited range.

They are "temporary" in the sense that they appear in calculations, but are not detected as single particles. Thus, in mathematical terms, they never appear as indices to the scattering matrix, which is to say, they never appear as the observable inputs and outputs of the physical process being modelled.

There are many observable physical phenomena that arise in interactions involving virtual particles. For bosonic particles that exhibit rest mass when they are free and actual, virtual interactions are characterized by the relatively short range of the force interaction produced by particle exchange. Examples of such short-range interactions are the strong and weak forces, and their associated field bosons. For the gravitational and electromagnetic forces, the zero rest-mass of the associated boson particle permits long-range forces to be mediated by virtual particles.

Elementary particles.

In particle physics, an **elementary particle** or **fundamental particle** is a particle whose substructure is unknown, thus it is unknown whether it is composed of other particles.[1] Known elementary particles include the fundamental fermions (quarks, leptons, antiquarks, and antileptons), which generally are "matter particles" and "antimatter particles", as well as the fundamental bosons (gauge bosons and Higgs boson), which generally are "force particles" that mediate interactions among fermions.[1] A particle containing two or more elementary particles is a *composite particle*.

Via quantum theory, protons and neutrons were found to contain quarks—up quarks and down

quarks—now considered elementary particles

Other estimates imply that roughly 10^{97} elementary particles exist in the visible universe (not including dark matter), mostly photons, gravitons, and other massless force carriers.

Fundamental Interactions.

Fundamental interactions, also known as fundamental forces, are the interactions in physical systems that do not appear to be reducible to more basic interactions. There are four conventionally accepted fundamental interactions—gravitational, electromagnetic, strong nuclear, and weak nuclear. Each one is understood as the dynamics of a *field*. The gravitational force is modelled as a continuous classical field. The other three are each modelled as discrete quantum fields, and exhibit a measurable unit or *elementary particle*.

The two nuclear interactions produce strong forces at minuscule, subatomic distances. The strong nuclear interaction is responsible for the binding of atomic nuclei. The weak nuclear interaction also acts on the nucleus, mediating radioactive decay. Electromagnetism and gravity produce significant forces at macroscopic scales where the effects can be seen directly in every day life. Electrical and magnetic fields tend to cancel each other out when large collections of objects are considered, so over the largest distances (on the scale of planets and galaxies), gravity tends to be the dominant force.

Currently the electromagnetic, strong, and weak interactions associate with elementary particles, The electromagnetic force are transferring the photons. The electromagnetic interaction carries are was modelled with the weak interaction, whose force carriers are W and Z bosons, traversing the minuscule distance, in electroweak theory (EWT). Strong nuclear force carriers are gluons, gravitation force carriers are gravitons, electro-magnetic force carriers are photons.

Bosons always carries energy and momentum between the fermions. Currently the theory implies the following power transmission mechanism between the particles: the particle know about other similar particle, produces a carrier that repels (the law of conservation of momentum) of the precursor particles, moving to another particle, and pushes her (transmits its pulses). Other particle acts is similarly [Hawking S., A Brief History of Time. Russin translation, Moscow 2015, p. 91].

Preons.

In particle physics, preons are "point-like" particles, conceived to be subcomponents of quarks and leptons.[1] The word was coined by Jogesh Pati and Abdus Salam in 1974. Interest in preon models peaked in the 1980s but has slowed as the Standard Model of particle physics continues to describe the physics mostly successfully.

Preon theory is motivated by a desire to replicate the achievements of the periodic table, and the later Standard Model which named the "particle zoo", by finding more fundamental answers to the huge number of arbitrary constants present in the Standard Model. It is one of several models to have been put forward in an attempt to provide a more fundamental explanation of the results in experimental and theoretical particle physics. The preon model has attracted comparatively little interest to date among the particle physics community.

The existed preon researches are motivated by the desire to explain already known facts (retrodiction), which include:

1) To reduce the large number of particles, many that differ only in charge, to a smaller number of more fundamental particles.
2) To reduce the number of experimental input parameters required by the Standard Model.
3) To provide reasons for the very large differences in energy-masses observed in supposedly fundamental particles, from the electron neutrino to the top quark.
4) To account for neutrino oscillation and mass.
5) The desire to make new nontrivial predictions, for example, to provide possible cold dark matter candidates.

6) To explain why there exists only the observed variety of particle species and not something else and to reproduce only these observed particles (since the prediction of non-observed particles is one of the major theoretical problems, as, for example, with supersymmetry).

There are a lot of preons models. The **Rishon model** (RM)[2 – 4] is the most popular and illustrates some of the typical efforts in the field.

The model has two kinds of fundamental particles called **rishons** (which means "primary" in Hebrew). They are **T** ("Third" since it has an electric charge of ⅓ *e*, or Tohu which means "unformed" in Hebrew Genesis) and **V** ("Vanishes", since it is electrically neutral, or Vohu which means "void" in Hebrew Genesis). All leptons and all flavours of quarks are three-rishon ordered triplets. These groups of three rishons have spin -½.They are as follows:

TTT = antielectron;
VVV = electron neutrino;
TTV, TVT and VTT = three colours of up quarks;
TVV, VTV and VVT = three colours of down antiquarks.

Each *rishon* has a corresponding antiparticle.

Matter and antimatter are equally abundant in nature in the RM.

Higher generation leptons and quarks are presumed to be excited states of first generation leptons and quarks.

Mass is not explained.

In the expanded Harari–Seiberg version [2] the rishons possess color and hypercolor, explaining why the only composites are the observed quarks and leptons. Under certain assumptions, it is possible to show that the model allows exactly for three generations of quarks and leptons.

The basic ideas of the offered preon model

Virtual elementary fundamental particles and their features

In our model, we put first the principle of parsimony. We take only two elementary fundamental virtual particles named “A” and “B” (or +, -). They are *massless* (or they have a very small mass not measured by current devices. That mass may be equivalent to binding energy $m = E/c^2$, where E is fluctuation of energy. But they have equal the module of energy. Particle A has *positive energy*; particle B has *negative energy)*. We name them the *positive and negative* “***eners”***. The different particles **attract** one to other (A to B, B to A), the same particles **repel** one to other (A from A, B from B). Vacuum produces pairs of A - B in equal amounts, create mixture and not require energy for producing because **sum of their energy and momentum equal zero.**

Their energy may be in form of kinetic or/and rotation. No violations of laws of the conservation of energy, momentum and angular momentum occur.

Positive and negative eners are *not* conventional particles and antiparticles used in current science. In current science the particles and antiparticles produce a huge energy (conventional in radiation form) when they annihilate. The eners destroy energy, convert it to zero, when they annihilate.

The eners have a size and produce field and the space where they are located because the any particles have size (space). They can transmit the information because they can have collisions, vibrations and waves, but maximal speed of transmission is limited about c = 300 thousands km/s ($c = 3 \cdot 10^8$ m/s - light speed in vacuum).

Our word “ener field” has difference significance from the common sense of science. That is a space filled by eners, which can be used as construction material for real particles and fundamental interaction between the produced particles and transfer of interaction (forces).

The virtual particles (eners) and their initial interaction are shown in fig.1. The summary energy of vacuum is zero, but energy fluctuations of vacuum produce the negative and positive eners. The eners

got the impulse from other eners and change directions and speeds. Ener diameter is very small in comparison of space volume, the probability of perfect hit one to another is small (small cross section area). The eners become enough stable and the existing as real particles. If outer impulse *p* was small, the pair A, B produces the neutral pairs of real particles (fig. 2d). If outer impulse *p* is small, the pair A, B produces the neutral pairs of real eners like binary stars (fig. 2d). If outer impulse *p* is big, the particles A, B become the free the charged real eners (fig. 2e).

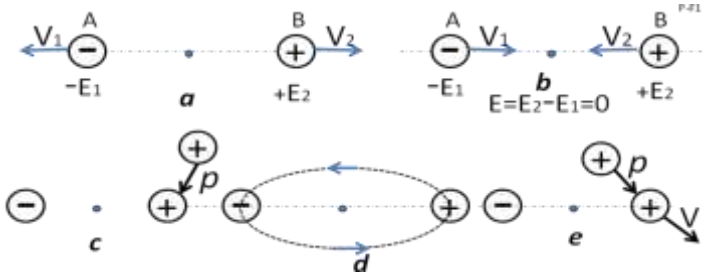

Fig.1. Virtual pairs of particles (eners A, B or "+" and "-") and their initial interaction: eners AA or BB - repulsion, AB or BA – attractive. *Notations:* a) Variations energy into vacuum (osculation the positive and negative energy); b) Annihilation (elimination) of pairs of opposed eners; c) One ener in pair gets the small side impact (impulse). d) Pairs of stable rotate relative to each other (like binary stars). e) One ener in pair gets a strong impact (impulse). The ener leaves the couple.

There is balance between relative stable and annihilate eners in vacuum. That balance can depend upon fields in vacuum.

Eners and Universe.

The offered eners model explains the emergence and expansion of the Universe. Before beginning of our Universe we did not have **nothing**: no space, no time, no any particles, no Universe. The appearance the couple (A – B) **eners** was beginning the produsion the space and time that is Universe. We don't know how this initial pair **eners** is appeared.

Our model the appearance of our Universe is principal difference from appearance of the current used model of Universe. In current model the University was created by Big Bang.The **Big Bang** theory is the prevailing cosmological model for the universe from the earliest known periods through its subsequent large-scale evolution. The model accounts for the fact that the universe expanded from a very high density and high temperature state, If the known laws of physics are extrapolated beyond where they are valid, there is a singularity. Extrapolation of the expansion of the universe backwards in time using general relativity yields an infinite density and temperature at a finite time in the past. The universe today is dominated by a mysterious form of energy known as dark energy, which apparently permeates all of space. The observations suggest 73% of the total energy density of today's universe is in this form.

The Big Bang theory depends on two major assumptions: the universality of physical laws and the cosmological principle. The cosmological principle states that on large scales the universe is homogeneous and isotropic. These ideas were initially taken as postulates.

As with any theory, a number of mysteries and problems have arisen as a result of the development of the Big Bang theory. Some of these mysteries and problems have been resolved while others are still outstanding.

Main problem of Big Bang is initial singularity: the entire universe at one point (??!!), super-gigantic energy, density, temperature? Where could it appear?

According to the known limitations of the applicability of modern physical theories, the earliest moment, enables the description, is the moment of the Planck epoch a temperature of about 10^{32} K (Planck temperature) and a density of about 10^{93} g / cm^3 (Planck density). The early universe was a highly homogeneous and isotropic medium with an extremely high energy

density, temperature and pressure. We can not modelling what was before early Plank time 10^{-43} sec.

The offered model of the origin of Universe does not have this problem. One not requires energy (matter), not require anything for creating of Universe, except one pairs of very small eners. They produce initial space and time. The initial space and time produced (and continue to produce) our current Universe and the cycle of birth and destruction of eners within it it. The eners generated and is generating now matter and interactions.

Mass, charge and fundamental interactions.

The most known particles and their field, interaction may be created from ener compositions A, B of different forms, structures, mixture and density. Some possible construction from eners are sown in fig.2. Constructions (structures) from eners are: a) Neutral couple; b) Charged triple; c) Thread (rod) from eners; d) Magnetic construction; e) Complex charged construction; f) Plate charged construction; g) Volume construction; h) Circle construction; i) Spheric construction and shell (cover) construction.

Structures can be stable and unstable. We are interested in only stable structures having the lifetime of hundreds of seconds and more.

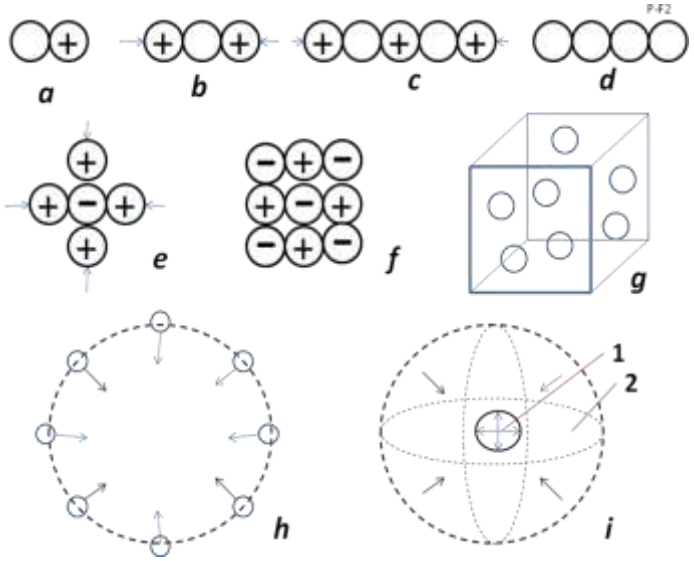

Fig.2. Constriction (structures) from eners. *Notations:* a) Neutral pairs of; b) Charged triple; c) Tread (rod) from eners ; d) Magnetic construction; e) Complex charged constriction ; f) Plate charged construction; g) Volume construction; h) Circle construction; i) Spherical construction (1 – core, 2 – pressure cloud from eners).

Let us show it for two important particles: mass particle and charge particle.

Mass.

The vacuum is produces very small eners (A and B) different signs "+" and "-" , which attract one to other. Most of them have different directions and speeds, stable and cannot eliminate each other because neighboring eners decrease attraction and the Heisenberg uncertainty and Paulie exclusion principles prevent annihilation at close distance.

Let us take the structure (eners core or cloud in spherical form). Any structures have a small excess of positive or negative eners. That means they will be attractive one to other, condense, collect in bigger structures. The ener cloud will collapse and press to inner core. We get mass particles with high binding energy and negative gravitation field. This process is same on a larger scale getting the stars and planets from cosmic gas and dust into the Universe. The excess or shortage is very small random values. That way the gravitation force is small in comparison with charge force.

Mass and its properties appear when in small volume the eners concentration (energy density) reaches

the density about $\rho_e = E/m = c^2$ (where ρ_e is density of the **binding** energy, E is **binding** energy, m is mass, c is light speed).

This density of energy creates the potential mass (ener) field from eners which scientists named gravitation field. That is scalar field connected to a mass particle which moves **together** with the mass particle (or collection of mass particles). The light sent from moving mass moves **into** gravitation field of this mass and has speed c of light. The well-known experiment of Michelson-Morlry confirms it (constant the light speed in moving inertial system). Moreover the Special Theory of Relative is built on it. Creation of mass particles from A, B eners is a stochastic process. That means that mass particles from them have the small difference in amounts of the eners A, B and attracting one to the other. This is gravity interaction. The gravity interaction of mass particles is small in comparison with other interaction. But a large mass produces a large gravitation force.

The offered model of mass interaction easily explains the old scientific discussion: What is the distinction between gravitation, inertial, centrifugal masses? If the mass moves uniformly in a straight line (inertial system) the gravity field is moving together with mass and no braking of mass (fig. 3a). If mass is accelerated, the observer in former system shows the thickening of living (scalar) lines (density of gravity field increases in ahead body and decreases in back of body) and brake force appears (fig. 3b). The same situation if mass moves in circle line (fig. 3c). In this case, the density of the mass field inside circle increase, out of circle - decrease and the centrifugal force appears (fig. 3c).

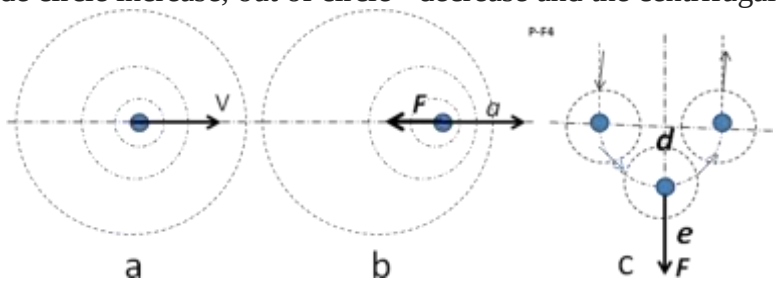

Fig.3. a) Moving mass with constant speed V. The ener field created by planet is moved together with planet, having equal density, force and light speed do not change; b) The body has acceleration a. The density of field ahead of body increases and appear a braking force F; c) When the body is moving in a circle the field density inside of circle increases, the outside decreases and appear as centrifugal force F.

The gravitation negative potential field of two planets between them is sum of two negative values. The sum is less than the initial value. That way the density of the summary gravitation field is less between planets and they attract one to other.

Charge.

The special construction from eners A-B creates the charge. If construction has much more A then B, we have one charge (for example, "+"), if conversely – we have other charge ("-"). The scalar field of opposed charges have an opposed signs. The charges produce the special charge fields from eners, which interact ONLY with charge fields of other charges. The two same charges fields increase the sum field density of between same charges and repel same charges. The opposed charge decrease the charge density between charges and attract the opposed charges. Summary: the same charges (++ or - -) repel each other. The different charges attract each other.

In charge constructions (structures) the same charged particles are kept together in core 1 the shell (cloud) from eners 2 (fig. 4a). But the requested pressure of shell is much more then pressure for keeping the mass structures. That way no the stable big charge structures having a big excess the same charges.

The charge field as mass field has long distance interaction and potential field.

The main binding energy of mass construction (mass + field) is concentrated in mass, the main energy of charge is concentrated in the charge field.

Creating the quarks from eners.

If we created the charge construction +1/3*e*, -1/3*e* from A and B ("-" and "+") eners as it is described over, it is no problem to create the quarks from them. For example, let us marked the charged construction having -1/3*e* ener charge as C_-, the charged construction having +1/3*e* as C_+. The quark $\mathbf{u_{up}}$ having the charge +2/3*e* may be created from two C_+ (C_+ C_+) plus the shell (cover) from the eners. The summary binding energy is about 2.3 MeV/c^2. The quark $\mathbf{d_{down}}$ having the charge -1/3*e* may be created from one C_- (C_-) plus the shell (cover) from the eners. The summary binding energy is about 4.8 MeV/c^2.

As known quarks may be created from proton (**uud)** and neutron (**udd**). Quarks are keeping together by the strong shell from eners collected from eners vacuum. That way the summary energy of proton (938 MeV) and neutron (939 MeV) is much more than energy of three quarks (9.4 MeV, 11.9 MeV). The very strong shell around the quark collections explain the confinement – inability to get quarks from nucleons.

Similarly, we can design main stable particles: charged electron (C_- C_- C_-) and neutral neutrino (A+B, fig.1c). The antiparticles can be got the changing the all eners A to B and B to A. They have a same property. In annihilation, the most blind energy of eners in construction will be converted at radiation (photon). The radiations (photons) are oscillation of the eners field in vacuum.

Most other unstable particles may be designed from the eners A, B. The eners are generated the gravitation and electric fields. They transfer the radiation.

Strong and weak nuclear interaction.

The strong and weak nuclear interaction can be explained by pressure ener shell around nucleons. As it is shown above the cover from attractive eners collapse and has pressure to center and surface tension. The one spherical shall has less surface than two shells having same (or less) sum volume. The nuclear shall of simple nuclear core when they close one to other can fuse together (fig.4b) because the volume and energy one sphere is less than two. As result we have a fuse nuclear reaction. If nuclear core has a complex construction, contains a lot of nucleus and positrons or small shell, the ener shell cannot to keep intact particles, so begins nuclear decay and instability (fig. 4c).

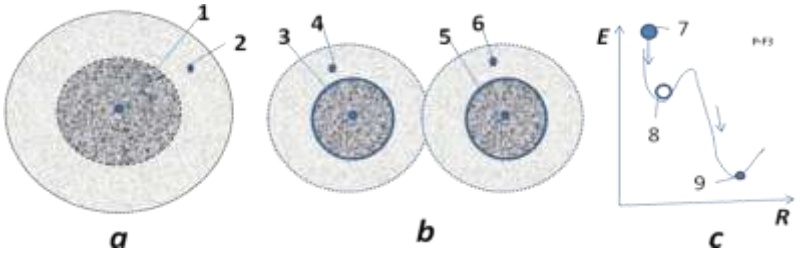

Fig.4. Strong and weak nuclear forces (interactions). *Notations*: a) Construction (structure) 1 is covered by shell (cloud) 2 from the emers (A, B). The cloud 2 are pressing the structure 1 and create its stability. b) If two shell get a contact they may merge two structures in one, because energy of one structure may be less than energy of two structures; c) Possible stable summary potential energy of construction from distance between them. 1, 3, 5 are internal structures; 2, 4, 6 are shells; 7 is structure; 8 is local minimum of energy; 9 is global minimum of energy. Stable (lifetime) of particles repents from hole depth in potential field and fluctuation energy of particles.

Features of the proposed preon model.

The offered preon model has next features:

1. Only two particles (eners: A, B) having opposed energy.
2. Only two interactions (attraction between different eners and repulsion from same eners).
3. All short distance interactions may be designed from eners (as pressure shell, cover of eners construction).

4. The mass and positive-negative charges (and their long distance field) may be design from eners.
5. All known quarks, leptons and neutrino may be designed from eners. As known, the nucleons are designed from quarks.
6. All main stable particles and most unstable particles may be design from eners.
7. In long distance interaction ($1/r^2$) of electric and gravity forces interact (add and subtract intensities) the scalar electric and gravity fields, not use photons and gravitons.

Some Results:

From suggested preon model follows:

1. All three types of mass (gravity, acceleration-centrifugal, passive) are same.
2. All matters are designed from two eners.
3. All four main interactions (gravity, electric, weak and strong nuclear) are designed from two eners.
4. It is impossible to design the negative mass.
5. It is impossible to create the anti-gravitation.
6. Simultaneous replacement of the particles A to B and B to A does not change the Universe.
7. Antiparticles connect with Law of Symmetry (change A by B).
8. From point 7 follows:
   a) The B ener is antiparticle of A ener;
   b) The mass particle is same as its anti-mass particle;
   c) The negative electric charge particle is antiparticle of the positive electric charge particle (example: electron and positron).

Difference between eners and rishon

Our preon model is different from the rishon model. There are substantial difference between rishons and eners. Eners two (not three) and eners have interaction one to another. They have energy. Rishon can be designed from eners, not the reverse. Eners theory explain an appearance mass, charges and all interactions between particles (gravitation, electromagnetic, strong and week nuclear and possible future interaction), the reshon theory cannot do it. Eners theory explain many scientific facts and phenomena. And so on.

Rishon theory simply divides quarks into its component parts and states that they are made up of these parts.

AB Preon Interaction Theory and current theory of interaction.

Current theory of interaction assumes the curriers of interaction (gravitation, strong and weak interaction, electro-magnetic). They are bosons-particles (gravitons, gluons, W, Z bosons, photons and Higge boson). They are running between bodies and pass forces from one body to other. That model has a lot of questions. Gluon and photon do not have mass and cannot transfer the momentum (force). Photon has constant speed *c* and also cannot to pass momentum. Moreover, this method can transfer only the repulsion force, not attraction.

AB theory assumes between bodies there are specific long distance scalar fields (gravity, charge) created these bodies. Those fields have a different density and interact with specific field and bodies. Increasing (summation) of density produces the repulsion, decreasing (subtraction) of density produces attraction.

Approximately long-range field looks like a field between two charged particles (fig. 5). The lines between same charged particles condense (fig. 5b). The lines between opposed charged

particles elongate (fig. 5a). Result: different charged particles (eners) attract, same charged particles - repel. The field is transferring this situation (forces) to bodies. The gravitons (not open yet) and photons are only the environment of the special bodies (mass, charge).

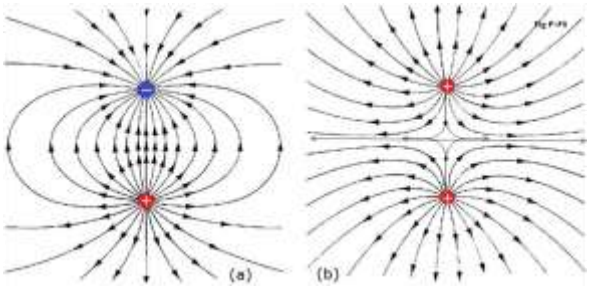

Fig.5. The interaction between two charged particles. a) same charged; b) different charged.

The mechanism of strong and weak interactions is another. In strong interaction, the power shells covering the assembly of quarks – nucleons . In special cases the shell can merge (connect, unit) and keep together the different nucleus. If nucleus are light and have a few particles, they excrete a binding energy. If there are a lot of particles in nucleus, the eners shell cannot keep them together and nucleus decays. If summary blind energy of new parts is less, the surplus is allocated.

The weak interaction works the same.

Theory and useful equations.

Below author gives the information which are useful for further developing the offered preon model.

The main fields are acceleration, gravity, electric, magnetic and photon/radiation. Density of energy in given point of these fields compute by equations [5]:

$$w_a = \frac{1}{G}\frac{a^2}{2}, \quad w_g = \frac{1}{G}\frac{g^2}{2}, \quad w_e = \varepsilon_0 \frac{E^2}{2}, \quad w_m = \mu_0 \frac{H^2}{2}, \quad w_r = \frac{\sigma}{c} t^4, \quad w_E = \frac{c^2}{GT^2}, \tag{1}$$

where w_a is density of acceleration energy, J/m^3; w_g is density of gravitation energy, J/m^3; w_e is density of electric energy, J/m^3; w_m is density of magnetic energy, J/m^3; w_r is density of radiation energy, J/m^3; w_E is time energy density, J/m^3.a is acceleration, m/s^2; g is gravitation, m/s^2; σ =5.67·10^{-5} , W/m^{2}K is Stefan – Boltzmann constant, W/m^{2}K ; E is electric intensity, V/m or N/C; H is magnetic intensity, T or Vs/m^2 or Wb/m^2; w_r is density of radiation energy, J/m^3; t is temperature , K; T is time, sec. The last two formulas show the energy density depends from temperature and time. μ_o = 1.257·10^{-6}, H/m; ε_o =8.854·10^{-12}, F/m.

Full energy, W, we find by integration of density to a full volume.

$$W = \int_v w dv \tag{2}$$

These computations in analytical form we can take as relating to simple geometric figures as, for example, the spherical forms of fields.

Binding energy of spherical mass equal density includes three components:
Field energy of internal part of sphere is

$$W_{g,1} = \frac{\pi G M^2}{5R}, \tag{3}$$

Here $W_{g,1}$ field energy of internal part of sphere, J; G = 6.672·10^{-11} Nm^2/kg^2 –gravity constant; M – mass, kg; R – radius sphere, m.

Field energy of excternal part of sphere is

$$W_{g,2} = \frac{2\pi GM^2}{R}, \qquad (4)$$

Mass energy is

$$E = Mc^2, \qquad (5)$$

where $c = 3 \cdot 10^8$ is light speed.

The field energy of nucleon is on 22 orders less then E. For Earth it is less on 9 orders, for Sun it is less on 3 orders less and for Black Hole it is in π times more then an energy mass of the Black Hole.

For electric charge the outer energy of electric field significantly depends from unknown radius R of charge. One can be computed by equation

$$W_{e,2} = k\frac{Q^2}{2R}, \qquad (6)$$

where $k = 9 \cdot 10^9$ is electric constant, Nm^2/C^2; Q is electric charge, C. The distance of gravity and electrostatic interaction is infinity. But force decreases as $1/r^2$. Classical radous of electron is $R = 2.8179 \cdot 10^{-15}$ m, charge $e = 1.6 \cdot 10^{-19}$ C.

The Energy of the strong interaction may be computed by Yukawa equation.

The Yukawa potential (also called a screened Coulomb potential) is a potential of the form

$$V_{\mathbf{Yukawa}}(r) = -g^2\frac{e^{-\mu r}}{r}, \qquad (7)$$

where g is a magnitude scaling constant, i.e., the amplitude of potential, μ is the Yukawa particle mass, r is the radial distance to the particle. The potential is monotone increasing, implying that the force is always attractive. The constants are determined empirically. The Yukawa potential depends only on the distance between particles, r, hence it models a central force.

The interaction distance is only 10^{-15} m. Fig.6 shows the potential energy (MeV) and force (10^4 N) between nucleons.

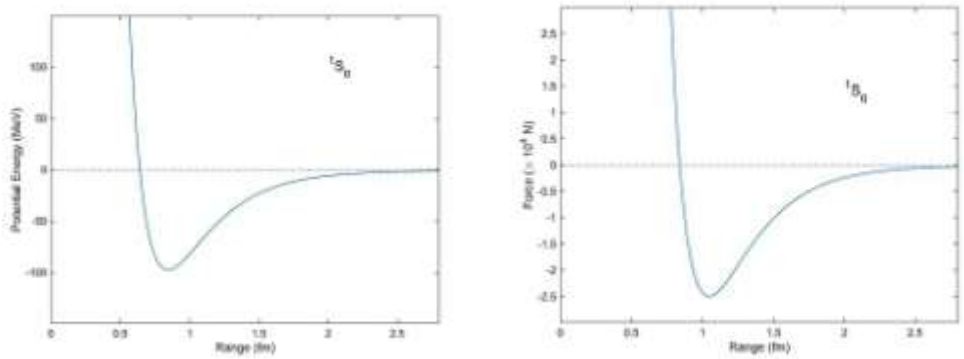

Fig.6. Potential energy and strong force of nucleon via distance from center of nucleon. The negative energy is attraction, the positive energy is repulsion.

For weak interaction potential is closed to strong interaction (7)

$$V = C\frac{e^{-m_{W,Z}\,r}}{r}, \qquad (8)$$

Where $m_{W,Z}$ is mass of gauge particle W, Z; C is constant. But interaction distance is very small 10^{-18} m.

The energy of photon is

$$E = \hbar\nu, \qquad (9)$$

where $\hbar = 6.626 \cdot 10^{-34}$, J·s is Plank constant, ν is frequency, 1/s. Radio frequency has $\nu = 3 \cdot 10^8$; X-ray has frequency up $3 \cdot 10^{27}$.

Density of radiation energy is

$$w = \frac{\varepsilon_o E^2}{2} + \frac{\mu_o H^2}{2} \quad . \qquad (10)$$

Specific pressure of radiation is $p = w$. Active distance is infinity. Radiation energy, density and pressure decreases as $1/r^2$.

Note: The construction from eners (body) creates around self the energy field and radiation.

Discussion

Criticism of the current models of Universe and Micro-World. In current time the most scientists believe: the Universe appeared in Big Bang and Inflation. Initial World was a singular point (infinity small volume of dot, infinity density of energy and matter). This point was exploded about 14 billions years ago, rapidly expanded (speed significantly more *c*) and created stars, galactic, radiation, cosmic dust, etc. The proof is radiation 2.7K of Big Bang in space. This model has a lot of questions not having answers: How did infinity point appear amid gigantic energy and matter? Why did it explode? Where initial point was located? Why radiation having maximal known speed *c* not left our place during 14 billion years? Why the universe is expanding in present time? And so on.

Interaction in **Micro-World** the current theory explains the following way: world consists of particles. When one particle knows (how? Radio-location?) about other particle, one gives birth (how?) to a special carrier particle (who is designer?), give it momentum (how? Where does it take energy?) and sends it to other particles. The other particle accepts momentum; gives birth to same carrier particles and send it back [1] p.91. For example, in weak interaction the carrier particles are W^+, W^-, Z^0 gauge bosones. They have mass 80-90 GeV. It is in 100 times more then mass of nucleus (939 MeV)! Higgs boson has 125 GeV. From where does the nucleus take this high energy? Carrier of strong interaction glue (and photon) has a zero mass. How can it pass impulse (momentum)? Moreover, these carrier-particles can only transmit a repulsive force. And what about the force of attraction?

The offered pion AB model allows explaining from one position all current and future interactions.

Brief description of the suggested model. Author used the Principle of parsimony or Simplicity. This Principle is: *Simplicity is base of Universe*. The Local Principle Simplicity is: *Any physical phenomenon is simplicity in particular area.*

Author offers the preon model of microworld having one pair initial virtual particles - eners (A,B or "+","-") and one pair main interaction (attraction and repulsion) between them. The pairs of A-B ener has opposed the equal deviations of zero energy and momentum. They have short life - swiftly annihilate. But due to the impact of other eners and random factors the eners become stable.

The pairs of A-B has volume. They birth the same pair A-B and so on – produce space filled with the eners. The time is local speed of the interaction between eners (maximal transferring of information). The eners have possibility to create the stable constructions. Some of them under certain conditions get the special properties and create an own field which interacts with the same or related structures. For example, when the ener construction reaches the density of a blind energy c^2, they get a mass and the gravitation field. When density of negative or positive eners has certain density (charged blind energy), they get a charge and electric field.

As the author shown, the eners allow the design of the main stable quarks and interaction between them. It means we can design all hadrons and leptons – the main stable matters and main interactions.

The offered model has big possibilities to create the known and future particles and their interaction. I call the scientists to develop this model. The eners may be the revealed face of dark energy and dark matter.

Brief Results.

Author using the Principle of Parsimony (Occam's razor) offers ideas for creating a simple preon

model of the University and Micro-World. That is only pair of fundamental particles named ***eners*** (A-B, or "+". "-") and pair the fundamental interaction (attraction, repulsion).

He shortly shows how we can design from eners: mass, charge, quaks, matter, gravitation and charge (electric) fields, and strong-weak nuclear interactions. He shows how the Universe can be designed from eners without Big Bang. Why the universe is expanding. The eners may be good candidates for dark energy and dark matter. Some results are following from the suggest model to support current experiments or may be checked up by future experiments.

- All three types of mass (gravity, acceleration, centrifugal) are same.
- It is impossible to design the negative mass.
- It is impossible to create the anti-gravitation.
- Antiparticles connect with Law of Symmetry (change A by B).
- The mass particle is same its anti-mass particle;
- The negative electric charge particle is antiparticle of the positive electric charge particle (electron and positron).

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References

1. Хокинг С., Краткая история времени, Санк-Петербург, АМФОРА, 2015, стр. 91. Translation to Russia from Hawking S., A Brief History of Time.
2. Harari, H. (1979). "A Schematic Model of Quarks and Leptons" (PDF). Physics Letters B **86** (1): 83–86. Bibcode:1979PhLB...86...83H. doi: 10.1016/0370-2693(79)90626-9.
3. Shupe, M. A. (1979). "A Composite Model of Leptons and Quarks". Physics Letters B **86** (1): 87–92. Bibcode:1979PhLB...86...87S. doi: 10.1016/0370-2693(79)90627-0.
4. Zenczykowski, P. (2008). "The Harari–Shupe preon model and nonrelativistic quantum phase space". Physics Letters B **660** (5): 567–572. arXiv:0803.0223. Bibcode:2008PhLB..660..567Z. doi:10.1016/j.physletb.2008.01.045.
5. Bolonkin A.A., Universe (Part 3). Relations between Charge, Time, Matter, Volume, Distance, and Energy. 30/12/2013. The General Science Journal, #5245. , http://viXra.org/abs/1401.0075 .

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