The essence of fundamental particles of matter and of interactions

(Translated from Polish into English by Andrzej Lechowski)

Abstrakt: In the article there is presented, what is most important in the structure of the fundamental particles of matter and what is the cause of interactions between them, and there are also presented in it the fundamentals of material structures. In the article are presented two faces of two most important particles, which are the basis of the structure of matter - protons and neutrons. There is also presented a third fundamental particle of matter - protoelectron. From a very large number of such protoelectrons when they end up in areas of other centrally symmetric fields (ie, in the areas of protons and neutrons, near the centers of these fields) there are forming complex structural systems, which have a certain durability. These structural clusters of protoelectrons are precipitated from protons and neutrons in the process of collisions between them and they are known as electrons and other particles of matter that occur during collisions.

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1. Preface

To say that matter is composed of particles, there is no sorcery in it. During many daily life experiences we have examples that confirm this truth. But to say what forces particles that they combine with each other and how they combine, that they can create such a huge number of various stable structures of matter, then it is the biggest achievement. Physicists had not succeeded it by the end of the twentieth century. And they hadn't, because they could not observe the simplest dependency - the discovery of absolute truth is impossible.

At the present time, physicists say that scientists are discovering objective properties of matter and objective laws of physics, according to which run all processes and phenomena in matter. By the word "objective" physicists understand that these properties and laws result of many experiments, and anyone who doubts can check its authenticity, by repeating them. But they also understand that word so, that the objective truth and absolute truth are synonyms. In fact, that is not so. Properties of matter and the laws of nature, such as seen by man, depend on the mental faculties of the human species. About it, that is just so and not otherwise I present in the articles, in which the main physical ideas appear under a common name: a constructive field theory. Articles can be found on pages http://pinopa.narod.ru/Polska.html (in Russian on http://www.pinopa.narod.ru/ and http://konstr-teoriapola.narod.ru/).

Presented in the articles non-absolute truth we can summarize and say that all known today physical laws and interpretation of physical phenomena can be derived from the properties of the fundamental particles of matter. What are the particles, this can be argued. Author of the constructive field theory (CFT) derives all known physical phenomena from the property of three fundamental particles: neutrons, protons and protoelectrons.

We can say about discovery of protoelectron in relation to the discovery of physical gist of particles known since a long time - the proton and neutron. Protons and neutrons are known to physicists for many years - more than 90 years protons and neutrons over 80 years - but the physical nature of these particles was for all those years hidden before physicists. The physical nature of the three fundamental particles of matter: protons, neutrons and protoelectrons, found modest, a self-taught, theoretical physicist, Pinopa, at the beginning of the XXI century.

2. Three fundamental particles of matter

Important information about the concepts of "proton" and "neutron" - these terms are used here in two senses. One meaning of proton, is similar to what is used today in physics and chemistry - proton is a particle that remains after losing the electron by hydrogen atom – protium. You just have to add that this is also related to the specific definition of electron, which has been associated with CFT.
Electron is a particle, which consists of accumulated protoelectrons.
A second meaning of proton - proton is a particle - a centrally symmetric field in which there is not one protoelectron, or any other particle.

Similarly, the case of the two meanings of neutron. One meaning of neutron is similar to that of today operates in physics - a particle that has within its field other particles - according to modern physics they are, for example, mesons, which appear as a result of collisions. And another meaning of neutron - it's a centrally-symmetric field that doesn't have any other particles.

Other particles present in neutron field – are mainly protoelectrons that focus in this area. The focusing and condensation of protoelectrons runs by their acceleration in the neutron field in the direction of its centre. Experimental facts show that during collisions of neutrons (with nuclei of atoms) or decay of atoms of radioactive elements there fly out as fragments from the neutron - today they call them in physics mesons, quanta or otherwise. In fact, what comes out of the neutron, are fragments in the form of material structures consisting of closely spaced next to each other protoelectrons.

We can say that in the field of a single neutron, there are also other particles, not just protoelectrons - in this field are present other neutrons and protons. There are other neutrons in this field, with their own content in the form of accumulated protoelectrons, and there are protons, also comprising in their field the accumulated protoelectrons. These particles, strictly speaking, their central areas, are located at a certain distance from the centre of a given single neutron, and dimension of this distance is determined for them by the neutron field. These particles, together with the given neutron, form atomic nucleus. We can speak about such a combination for all the other atoms, except the hydrogen atom - protium, which consists only of proton and electron.

When these other particles - protons and neutrons - are in the field of neutron at much greater distance from the centre, than when they create atomic nucleus, then such a structure is already molecule. In this case (similarly as in all other complex combinations) all fields are associated with each other in a way that they accelerate one another. In the field of a given neutron there are all other particles, but the situation is such, that in fields of these other particles is also the given neutron.

We are talking about what exists in the field of neutron, proton and protoelectron at small distances of the order of a magnitude of atomic nucleus, molecule. Of course, in neutrons and protons there is a large number of protoelectrons, there are close and more distant neutrons and protons. But in fact, in the field of every single one of all particles there is everything that is contained in space, and thus there are planets, the sun, stars and everything else. And all them mutually accelerate.

3. Protoelectrons in protons and neutrons field

A few words describing what is a protoelectron. Protoelectron is one of three fundamental particles of matter - more has been mentioned about them above. Protoelectrons are the particles that make up the physical medium, which is today called physical vacuum, and more than a hundred years ago was called ether. As is clear from the name, protoelectrons are particles of which consist electrons and which are prior to the appearance of electrons. The electron, which separates from the hydrogen - protium is only a

very small part of the cloud of gathered protoelectrons, which are arranged around the central part of proton. Other protoelectrons of the cloud are very difficult to knock out of the proton, as in the place of their arrangement the acceleration they have, makes it impossible (or in other words, prevents it acceleration, which acts on them).

Above, in the last sentence, the term "proton" is already used in the latter sense. At this point, proton is a fundamental part, which in relation to protoelectrons fulfils a decisive role. Proton accelerates towards its centre all particles that are found throughout the universe. But the biggest acceleration gain particles, which are located closer to the centre of the proton. It is important what are the particles that proton accelerates. Because every proton accelerates outsider particles that are found in the entire universe, but these outsider particles accelerate in a similar manner, each proton. Only from the value of the proportionality factor in the acceleration functions of two mutually accelerating particles depends which of them stronger speeds the other and consequently gives it a higher speed.

Two individual particles: proton and protoelectron, differ from each other mainly by mass quantity. What in fact are conventional masses of proton and protoelectron, or what is the ratio value of these masses, it is not known today. The values of the proton and electron masses, which are known in physics, cannot help you in calculating the masses of the protoelectron and proton, in the field of which there is no longer a single protoelectron. They cannot help you for two reasons. Firstly, the mass of the electron known nowadays is of the approximate value. It was adopted as the exact value (of course, with some approximation), but this value is not accurate at all. Electrons, which are knocked out of a various atoms and in various physical and technical conditions are different, because they contain different amounts of protoelectrons. They are knocked out in various places in the volume of atoms, where are different densities of protoelectrons, and therefore they cannot be the same. By carrying out a very accurate experiments this could confirm this fact.

Secondly, today we do not know what is (at least approximate) number of protoelectrons, which enter into the composition of the electron, and it is not known how many protoelectrons remain in proton (in areas with condensed protoelectrons) when electron is being knocked out from it.

Condensation of protoelectrons in proton (or in the hydrogen atom - protium) depends on the spatial distribution of accelerations in the field of proton, which protoelectrons are getting there, in other words, it depends on the intensity of the proton field, especially near its central point. But this concentration also depends on the presence of a small or large amount of protoelectrons. If there wouldn't be enough protoelectrons accelerated by proton, then they moved in the vicinity of its centre and only in a small degree obstructed each other in these motions performing there some vibrations. And when there is a lot of protoelectrons, which are accelerated by proton, these particles mutually brake their motions and interfere with each other's free motion. For this reason, their velocity near the centre of the proton is not great. In such a situation protoelectrons don't move there for long distances, but vibrate due to interactions. For this reason, in areas near the centre of each proton, where protoelectrons in other conditions (if there would be not enough them and they would be accelerated starting their motion from long distances) would have the greatest speed, there in the field of proton they are in the state of the highest condensation.

In a similar way as in the proton field, takes place also focusing of protoelectrons in the neutron field. The process of collecting and condensing of protoelectrons in the protons field and neutrons field runs constantly, because there is a constant potential distribution of a definite kind around the central points of protons and neutrons, and thus, there is also the distribution of field intensity and of accelerations, which in these fields receive outsider particles. About distribution of potentials of proton and neutron fields, which determines the condensing of matter consisting of protoelectrons, it is known on the basis of observations and experimental facts. Because on the basis of scientific research of Copernicus, Galileo, Kepler, Issak Newton concluded that at large distances the acceleration changes inversely proportional with the square of the distance from the accelerating field centre - according to contemporary notation,

the formula is: $a_n \doteq \frac{G \cdot M}{R^2}$.

(For information on how research and discoveries of Copernicus, Galileo, Kepler, helped Newton in his theoretical studies, you can read in the Pinopa's monograph "Constructive field theory - briefly and step by step" on http://pinopa.narod.ru/KTP_pl.pdf . html to http://pinopa.narod.ru/KTP_ru.html russian, in English on http://pinopa.narod.ru/KTP_uk.pdf.)

Today we know that the gravitational interaction does not change exactly as described by Newton. Because if by change of a distance it would change exactly according to Newton's law, then the orbits of the planets in the Solar System were of the exact elliptical shape. But they don't have such a shape. The most expressive example is the phenomenon that is known as the perihelion motion of Mercury. Mercury's perihelion motion is slow - its value is equal to 42.98 arc seconds per century. But the existence of this motion attests to the fact that the actual orbit of the planet has the shape of a rosette. Variability of Mercury's orbit can be described more accurately, if you add exponential factor to the Newtonian function. Then the variability of the gravitational acceleration can be noted by the following function in the form $a_n = \frac{G \cdot M}{R^2} \cdot \exp\left(\frac{-B}{R}\right)$. When analysing motion, it is better to use this function, but noted as field intensity, which varies depending on the distance R. It can also be noted by adding "minus" sign, which is here recommended so that potential field function was positive. Then the function of field intensity along any radius, which comes from the central point of the field, has the form $E_p = \frac{-A \cdot B}{R^2} \cdot \exp\left(\frac{-B}{R}\right)$ and the potential of such a field is described by an exponential function, or the function E, in the form of $V_p = A \cdot \left(1 - \exp\left(\frac{-B}{R}\right)\right)$. In these formulas A is a proportionality factor, and B is an exponential factor.

At large distances R (in cosmic scale) noted in this way parameters of the gravitational field of a celestial body and parameters according to the notation presented by Newton, differ in a small way. Because with growth of the distance the exponential factor exp(-B/R) tends to one. But exponential factor plays an important role in the description of fields of the individual components of matter, such as the fundamental particles, atoms, molecules, and also by description of their mutual accelerations at small distances of the order of the distance between components in atomic nucleus and the distance between atoms.

Below are shown the charts, in which is shown exemplary potential of centrally-symmetric field (exponential function E) and intensity of the field along any radius, which can be led from its central point.*)

$$A1 \leftarrow 0.1$$
$$A2 \leftarrow 2$$
$$B \leftarrow 2$$
$$C \leftarrow 1$$
$$D \leftarrow 2$$
$$V1 \leftarrow 0$$
$$V2 \leftarrow A2 \cdot \left(1 - \exp\left(\frac{-B}{x}\right)\right)$$
$$V \leftarrow V1 + V2$$

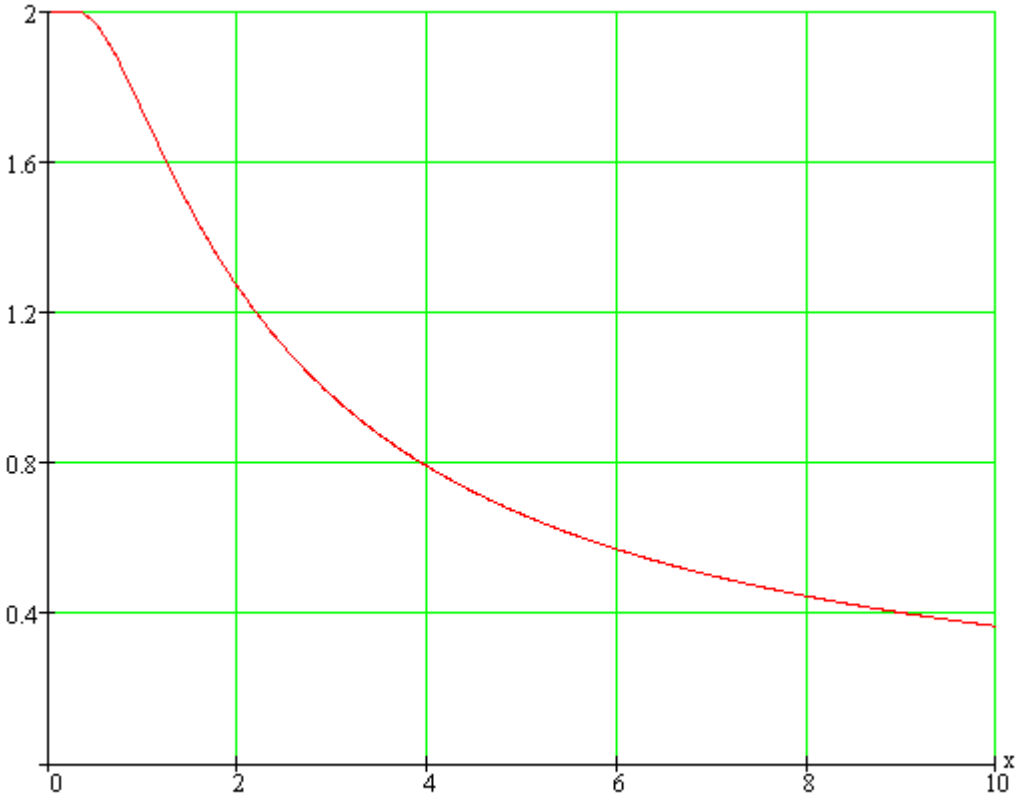

Figure OP1. Function E - Field potential - changes in gravitational field - Component of fundamental matter field

$A1 \leftarrow 0.1$

$A2 \leftarrow 2$

$B \leftarrow 2$

$C \leftarrow 1$

$D \leftarrow 2$

$E1 \leftarrow 0$

$E2 \leftarrow \frac{d}{dx} A2 \cdot \left(1 - \exp\left(\frac{-B}{x}\right)\right)$

$E \leftarrow E1 + E2$

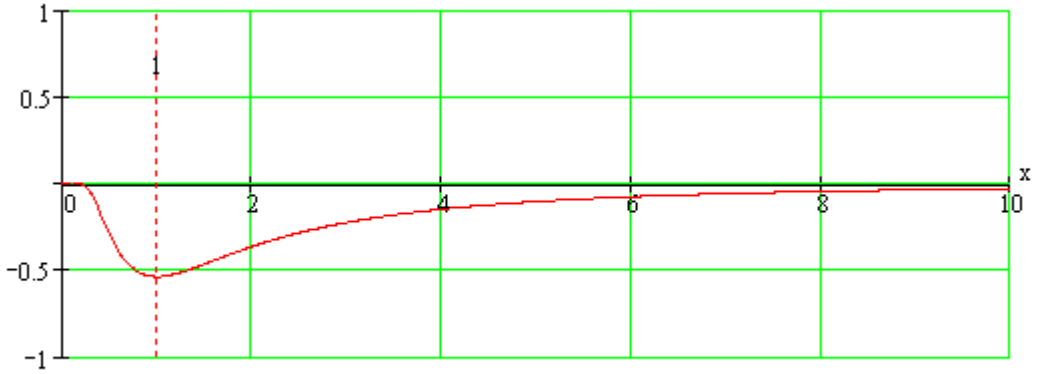

Figure OP2. Intensity of the gravitational field - derivative of function E

Here, presenting the physical nature of fundamental particles of matter - single protons, single neutrons and single protoelectrons - gravitational interaction is used primarily. It is used because from it starts understanding nature of all interactions in matter. Gravity is seen primarily as a long-distance interaction between celestial bodies, but yet these interactions begin with interactions between fundamental particles. After all the interaction between celestial bodies in cosmos is not anything other than the interaction between fundamental particles that make up the bodies.

4. Formation of stable structures of matter - the atomic nuclei and molecules

The fact that there is a gravitational interaction at large distances between celestial or other macroscopic bodies, helps to understand that matter and field is one and the same. Matter, as such, we know by the fact that we perceive the world around us through the sense organs, and on this basis we create in the mind its image. But in this way, we see matter, a structure of which consists of central parts of what is all around and at each distance from these central parts. The question arises: what is it, which enters into the composition of the structure of matter? Based on research that began illustrious Galileo, and experimental facts in the form of mutual accelerations of material objects, using mathematical associations coupled with the use of concepts of field potential and field intensity, we can say that into the composition of the

structure enter centrally-symmetric potential fields.

Experimental facts suggest that the gravitational interaction between fields, which manifests itself in the form of mutual accelerations, it's only one of the two components, which are part of the general, fundamental interaction. If there was only this component, it is absolutely not suitable to ensure that from such fields might form a stable structures. But there is another component of the function of fundamental interaction (acceleration) - a structural component. It is this component of interaction function makes it possible to form the stable, permanent structures, as well as the existence of property known as resilience of individual particles and resilience of made up of them structural systems.

The following charts are presented that show an example of the potential of centrally-symmetric field and the intensity of the field along any radius (which comes out of the centre of the field), for example, when the field would not have other components - it's a structural component of the fundamental field of matter.

$$
\begin{aligned}
&A1 \leftarrow 0.1\\
&A2 \leftarrow 2\\
&B \leftarrow 2\\
&C \leftarrow 1\\
&D \leftarrow 2\\
&V1 \leftarrow A1 \cdot \left[-\left[\left[\frac{2.5 - \left(\frac{1.029}{C} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{C} \cdot x} \right] - \left(\frac{1.029}{C} \cdot x \right) \right] \frac{2.5 - \left(\frac{1.029}{D} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{D} \cdot x} \right]\\
&V2 \leftarrow 0\\
&V \leftarrow V1 + V2
\end{aligned}
$$

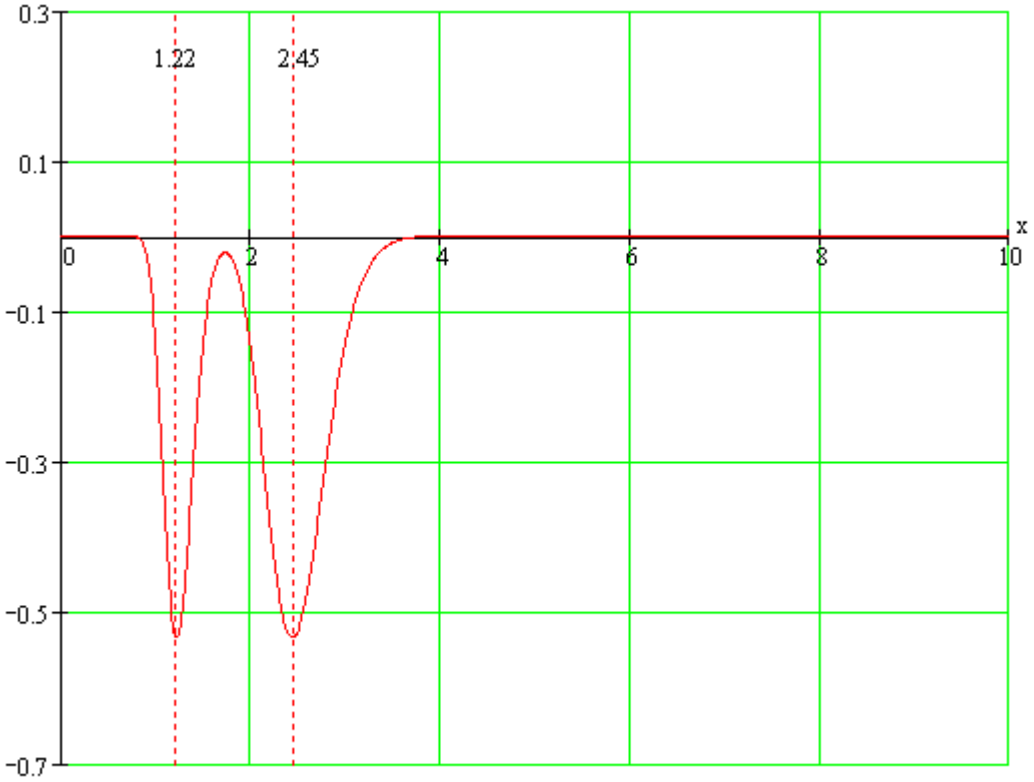

Figure OP3. Function PES - Field potential - changes of the structural component of fundamental matter field

$$
\begin{aligned}
&A1 \leftarrow 0.1\\
&A2 \leftarrow 2\\
&B \leftarrow 2\\
&C \leftarrow 1\\
&D \leftarrow 2\\
&E1 \leftarrow \frac{d}{dx} A1 \cdot \left[- \left[\left(\frac{1.029}{C} \cdot x \right) \frac{2.5 - \left(\frac{1.029}{C} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{C} \cdot x} \right] - \left(\frac{1.029}{D} \cdot x \right) \frac{2.5 - \left(\frac{1.029}{D} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{D} \cdot x} \right]\\
&E2 \leftarrow 0\\
&E \leftarrow E1 + E2
\end{aligned}
$$

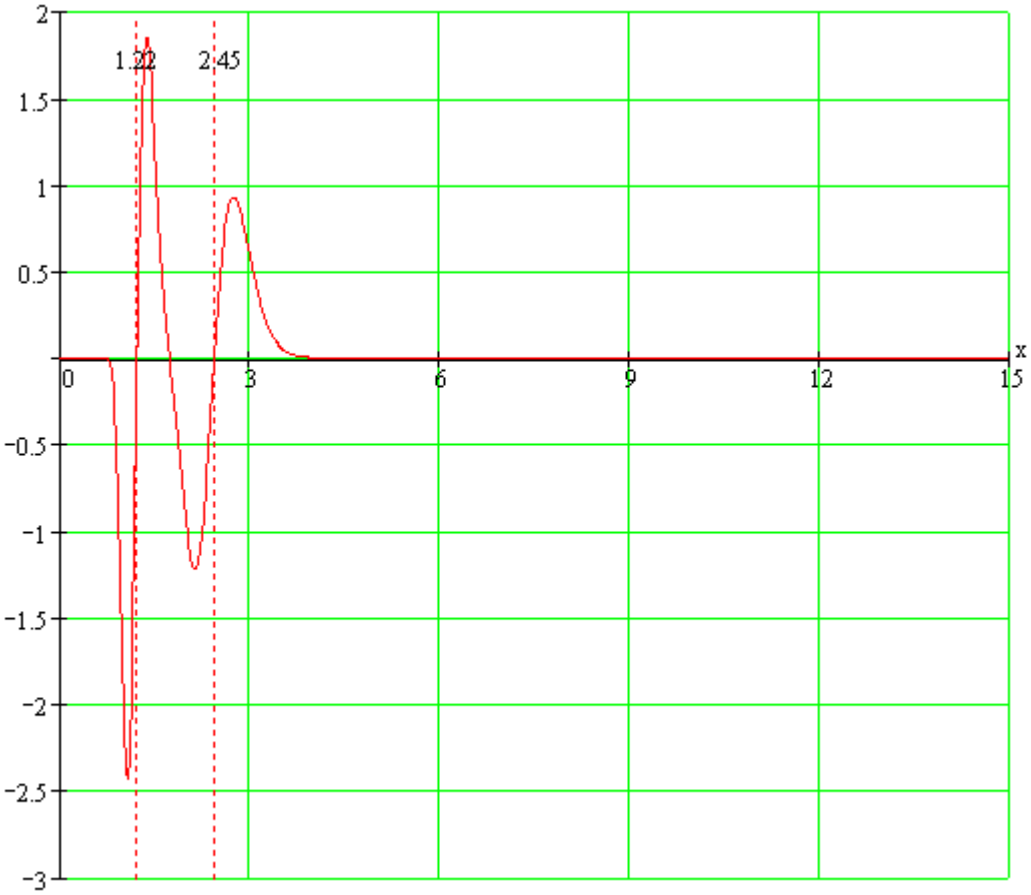

Figure OP4. Intensity of structural field - derivative of function PES

At this point, the reader should take advantage of their spatial imagination. Because on the schematic diagrams are shown changes of parameters of centrally-symmetric field along the radius, which can be run from the central point of the field. But from the central point of the field can be led an infinite number of such radii in various directions. In this exemplary potential field there are two spherical formations - they are potential antishells with the values of the radii, that are approximately equal to 1.22 and 2.45. Among them there is (concentrically disposed with antishells) a spherical potential shell. And it is potential shells are places in which in case of neutrons and protons are focused protoelectrons, and thanks to them (those places) neutrons and protons can bind together, couple with each other.

Thanks to potential shells, which are arranged close to centres, neutrons and protons can bind with each other and create atomic nuclei. Shells with large radii, which are located further away from the central points of c.s. fields in the form of protons and neutrons are also places of gathering of protoelectrons. However, their main role consist in this that with their aid originate molecular bonds, which are formed between atoms.

Centrally-symmetric field of fundamental particle can be described as the sum of two components of c.s. fields. On the below figure are shown graphs of potential of fundamental particle field and field intensity.

$$
\begin{aligned}
&A1 \leftarrow 0.1\\
&A2 \leftarrow 2\\
&B \leftarrow 2\\
&C \leftarrow 1\\
&D \leftarrow 2\\
&V1 \leftarrow A1 \cdot \left[- \left[\left[\frac{2.5 - \left(\frac{1.029}{C} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{C} \cdot x} \right] - \left(\frac{1.029}{C} \cdot x \right) \right] \right] - \left(\frac{1.029}{D} \cdot x \right) \left[\frac{2.5 - \left(\frac{1.029}{D} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{D} \cdot x} \right]\\
&V2 \leftarrow A2 \cdot \left(1 - \exp\left(\frac{-B}{x} \right) \right)\\
&V \leftarrow V1 + V2
\end{aligned}
$$

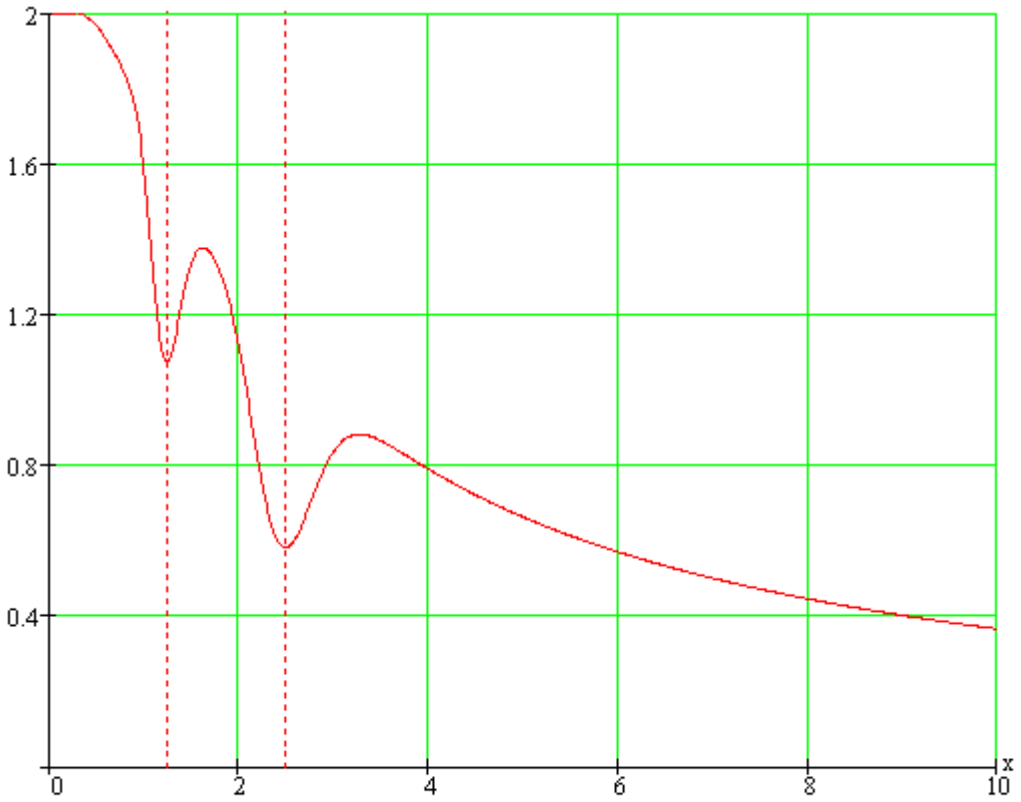

Figure OP5. Function EPES - the sum of functions E and PES - Field potential - changes in the fundamental matter field

$$
\begin{aligned}
&A1 \leftarrow 0.1 \\
&A2 \leftarrow 2 \\
&B \leftarrow 2 \\
&C \leftarrow 1 \\
&D \leftarrow 2 \\
&E1 \leftarrow \frac{d}{dx} A1 \cdot \left[- \left[\left(\frac{1.029}{C} \cdot x \right) \frac{2.5 - \left(\frac{1.029}{C} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{C} \cdot x} \right] - \left(\frac{1.029}{D} \cdot x \right) \frac{2.5 - \left(\frac{1.029}{D} \cdot x \right)^2}{0.1 \cdot \frac{1.029}{D} \cdot x} \right] \\
&E2 \leftarrow \frac{d}{dx} A2 \cdot \left(1 - \exp\left(\frac{-B}{x} \right) \right) \\
&E \leftarrow E1 + E2
\end{aligned}
$$

Figure OP6. Intensity of fundamental matter field - derivative of function EPES

On the charts, which are presented in Fig. OP5 and Fig. OP6, you will see changes in gravitational component of the fundamental field. The main role of this component is to accelerate all other particles in the direction of the central point of the field. If the accelerated particle that rushes toward the centre of the

field and, for example, at a distance x = 4 has too small speed, then at the outer edge of antishell with a radius equal to "2.45," it will be accelerated in the direction "from the centre". Therefore, it will be stopped and will start to move in the opposite direction, moving away from the centre of the fundamental field. In this way will manifest resilient action of this field. In this case, it can be said that the two particles collided and bounced off of each other.

Only particle, which has sufficiently high speed, will be able to overcome this potential barrier (in the field of other particle, with a radius equal to "2.45") and hit the area of the field, where is the inner edge of the antishell. At this point, the particle will again be accelerated towards the centre of the field, and if it gets a sufficiently high speed, it can also overcome other potential barrier that exists in the form of antishell of a radius equal to "1.22". But to overcome the second potential barrier, the particle has earlier to pass the region of a potential shell. If there is already there a cluster of other particles which hit there earlier, they can change the direction of motion of the new particle, which flew there, and to brake its motion. In this way, increases the chance that a new particle will then remain in the region of the potential shell.

At this point you can imagine various situations. In the manner described above there are formed bonds between protoelectrons in physical vacuum or during their accumulation and condensation in the area of shells of protons and neutrons. In this way are also created bonds between fields of protons and neutrons, at which time nuclei of atoms are formed from them and also bonds between the particles, once formed the nuclei and exist atoms, and from these atoms form molecules, then the bonds between protons and neutrons are made with the help of potential antishells and shells, which have much larger radii. About dimensions of these radii we can speculate on the basis of experimental facts, in the form of distances between atoms in molecules or crystals.

5. Formation of electrons and other particles

On the charts of potential and intensity of the gravitational field, which is presented by using function E and its derivative, it can be seen that in the gravitational field of a single particle - a proton or neutron - the biggest acceleration gain other particles - protoelectrons - in some distance from the central point. This distance is equal to x=0.5B, where B is the exponential factor in the exponential function E. In the very centre of the field acceleration is equal to zero. This makes it possible, that in the centre of the field and within its proximity can be formed the highest density of particles of matter. This could happen, when there are so many particles and they interfere with each other in motion.

As can be seen from the direction of accelerations, which protoelectrons gain in the field of protons and neutrons, in the places on antishells, where potentials are minimal, there will be a minimum amount of protoelectrons. Because in these areas they will be accelerated in such directions that the situation looks as if they were repelled from antishells of protons and neutrons. So for this reason, in places on potential shells with maximum potentials there will be the largest density in distribution of protoelectrons, because protoelectrons, which flew through the barrier of the potential which creates the antishell, are accelerated just in this area. In this way the distribution of density of matter consisting of protoelectrons, is similar to the distribution of potentials around the central point of a proton or neutron, which is shown in Fig. OP7.

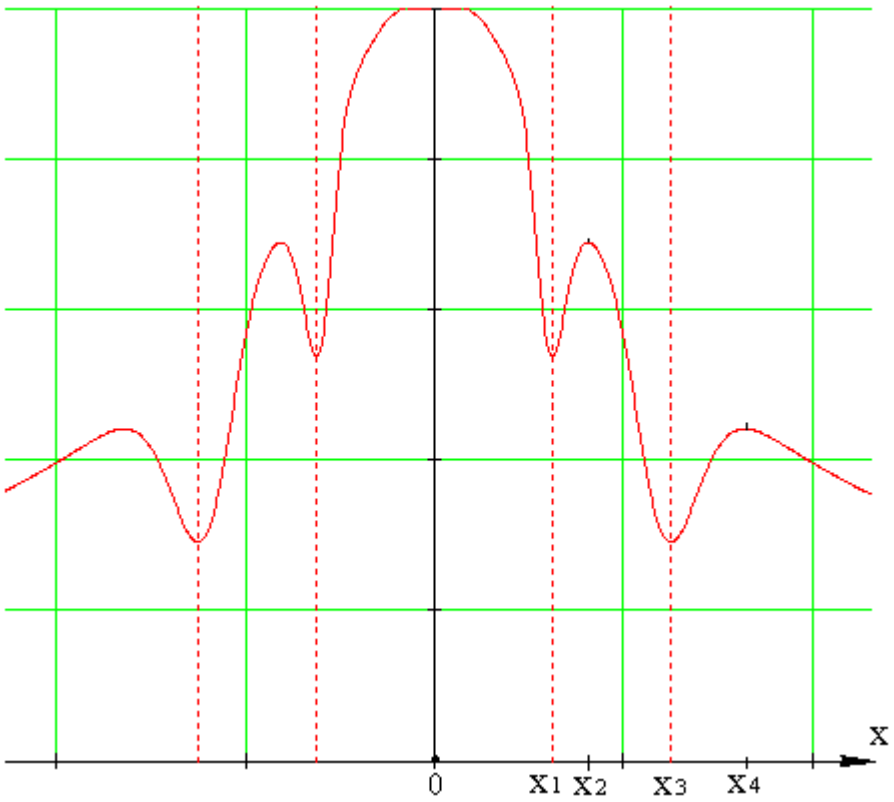

Figure OP7. Schematic distribution of potentials around the central point of the fundamental particle of matter - proton or neutron - an example of two antishells, X1,
X3 - radii of two spherical potential antishells (spherical areas with minimum density of protoelectrons), X2, X4 - radii of two spherical potential shells (spherical areas of maximum density of protoelectrons);

Antishells of two or more particles in the form of protons and neutrons, which are bound in the nuclei of atoms or which form molecular bonds between atoms, exert together influence on clusters of protoelelectrons, which are located on shells. This phenomenon is schematically shown in Fig. OP8.

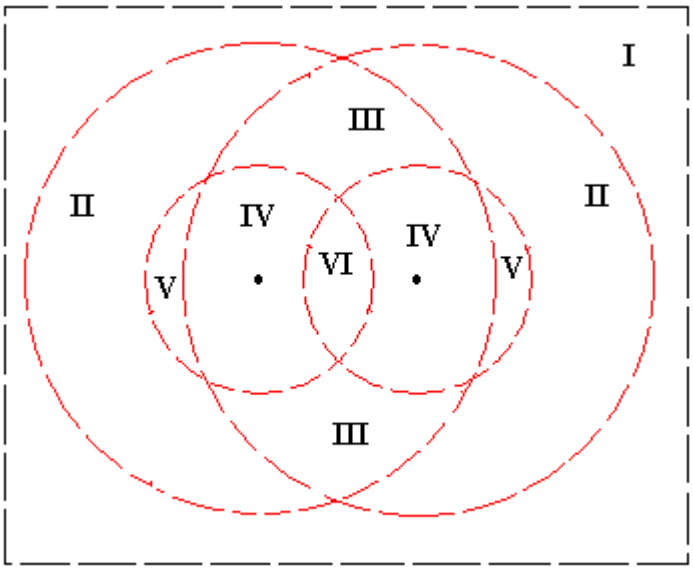

Figure OP8. Various shapes of zones - parts of potential shells with large densities of protoelectrons - each separated by potential antishells of stably bounded fundamental fields - particles of matter - two protons or two neutrons;
The figure shows a cross section passing through the centres of the two particles of matter;
Zone I - Common - resultant potential field of two particles of matter surrounded by successive potential shells and antishells, unseen in the figure;

Antishells of one particle intersect protoelectrons clusters, which are located on shells of the other particle. In this way, is affected consistency of protoelectrons clusters in the shell and from a compact spherical cluster of protoelectrons are formed compact segments. **) The segment at the time of the collision is relatively easily knocked out of the shell and moves away as a separate material particle. In this way out of the outer series of atomic shells, thanks to which molecular bonds are formed, electrons are knocked out - here you can see why electrons are various. However, out of the inner series of shells of the incomparably stronger impacts, more massive particles are knocked out, which are called mesons or otherwise.

Permanence of protoelectron segments and preservation of their shape when they move away from the place where they were formed, is for the same reason, from which there is permanence of atomic nuclei and permanence of molecules. These structures exist thanks to shells and antishells, which are in potential fields of protoelectrons, namely, due to their mutual accelerations. Protoelectrons bind together in a similar manner as protons or neutrons, but radii of their antishells and shells are much smaller than the radii of these formations in protons and neutrons.

Furthermore, the difference between protoelectrons and protons and neutrons consists in this, that in potential function their c.s. fields, which reflects their ability to accelerate other particles, the proportionality factor is much smaller than the proportionality factor of protons and neutrons. These factors are mathematical symbols of mass and inertia of particles. Therefore, even a large number of protoelectrons very little affect motion of protons and neutrons, while protons and neutrons easily

accumulate protoelectrons in shells of their c.s. fields and freely move together with clusters.

6. Electromagnetic vibration of particles and structures *)**
Motions of protons and neutrons, together with their protoelectron load, are most often performed by mutual accelerations of protons and neutrons, when they form nuclear and molecular bonds (and not, for example, as a result of collisions with the incoming particles). They accelerate each other and vibrate in places of their stable position with their accumulated protoelectrons. There is a centre all around them - the physical vacuum - where there are similar protoelectrons - thanks to the protoelectrons variety of vibrations move over long distances.

A variety of vibrations are generated by the impact of various structural components and various systems. Thus, vibrate interacting protoelectrons. They vibrate both in the physical vacuum, and in every segment in clusters near the centres of neutrons and protons. But the frequency of their vibrations is various. The frequency of their vibrations is higher where they are more condensed. Vibrates every segment consisting of condensed protoelectrons, moving between antishells. Vibrate protons and neutrons within the limits of keeping them together bonds in atomic nuclei. Vibrate atoms within the bonds in molecules. All of these are electromagnetic oscillations, which propagate in all directions, providing energy between different places of the universe. In the case of hydrogen - protium atoms there is a special kind of vibrations.

7. Radial pulsation of the hydrogen atom
Structure of the hydrogen atom is "the smallest picture" of everything that happens in matter of any larger scale. Density distribution of matter in the hydrogen atom is repeated in atom of every other chemical element. For each atom density of matter is highest in the central zone, and that density increases approximately in proportion to the number of contained protons and neutrons in it. This happens because density of matter in atoms increases, but their external dimensions, if for dimensions we take into account their resultant potential shells with the biggest radii, with an increase in the number of nucleons they increase only slightly.
Similarly, increases density of matter in the central regions and also in larger clusters, for example, when matter is in the form of planets, stars, galaxies.

Similarities in distribution of density of matter at the nanoscale (in hydrogen atoms) and megascale (in stars) results in a specific type of similarity that manifests itself only in specific circumstances. Regardless of the fact that a single star in terms of its size, is very different from a single hydrogen atom, under specific conditions, both the star, and the atom can enter into a state of pulsation, in which both the star, and atom pulsate as a whole. Pulsating stars are called variable stars, Cepheids and their pulsation period is counted from 1 to 150 days. Hydrogen atoms can pulsate when they are in the form of very thin gas, in which atoms are not bound into molecules and collisions between them occur very rarely. In this state matter, which in the hydrogen atom surrounds its proton, does not vibrate in areas of its individual potential shells and atom does not emit light waves in space. For this reason, spectral lines are not formed in measuring instruments. State of calm of protoelectron matter in atoms of hydrogen favours that it can pulsate along radi as a whole. During this pulsation takes place a cyclical increase in volume of protoelectrons cloud, that surrounds the proton, and its diminution. There follows dilution of matter and its condensation. These vibrations of hydrogen atom measuring instruments register as radiation having a wavelength of 21 cm.

8. Forces, fields - various manifestations of the fundamental interactions (End)
You can create a variety of descriptions about interactions between protons and neutrons, as well as between these particles and protoelectrons. You can come up with a variety of forces that act on particles to accelerate them. But they are only inventions - empty words, and nothing more. Because in reality, these "forces" are only names for the reason that constrains particles to their acceleration, but the cause still remains hidden. Explicit fact that it is found in experiments, will always be the same - it will be accelerated motion of material objects.

There is no obstacle to use the concepts of forces - such as nuclear, molecular, etc. - and various fields - such as electrostatic, magnetic, electromagnetic, or other - just as until now. However, such practice

requires from physicists knowledge of the mechanisms of physical processes that take place with participation of fundamental particles and are at the root of various forces and fields.

These concepts facilitate descriptions of physical phenomena and in their proper interpretation they are not misleading. But in today's physics, there are concepts that inevitably lead to errors. These are the energy quanta, quarks, photons and other particles that are supposedly carriers of impacts in the form of attraction, repulsion, rotation. There is no reason for their applications in physics, because they defy experimental facts and logic.

Facts and logic - it's the basis for science. On this principle, are based properties of the shown fundamental particles of matter, because only the logic and facts make up what is called the essence of the fundamental particles of matter. But it is enough that basing on elaborated in this way properties of fundamental particles, to build interpretations of physical phenomena and laws of nature. It is sufficient, so that these interpretations considered together make up the Universal Physical Theory.

The present-day science of nature has enormous number of experimental facts, but in physical theories used so far there is not enough logic. The reason for this state of affairs in physics is that there is wrongly understood the very conception of logic. Today, few people remember that only experimental facts may serve as the basis for logical considerations. When the theoretical considerations are not based on empirical evidence, then the end result of the considerations is the fantastic. For this reason, in today's theoretical physics, which was forming in the twentieth century, there is so much fantastic. For this reason, theoretical physics hit a dead end and requires a major change.

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*) In order to determine how actually are distributed in space parameters of centrally symmetric fields - of protoelectrons, protons and neutrons, there should be developed appropriate units of length, of field potential and of field intensity, by means of which one could describe changes in the parameters of particles with increase of distance from the central point of c.s. field. It's all a matter of the future, because it requires revision of physical knowledge on elementary particles and carrying out a lot of research. For this reason, the presented in the figures length, potential and field intensity are dimensionless values. Note: The presented in this article mathematical functions that describe field components – gravitational and structural – and formed from them resultant, fundamental field of matter, are of parameters that are associated with each other only formally. For example, function of the fundamental field potential (in Figure OP5.) is noted as V=V1+V2, where V1 and V2 is function of structural field potential and function of gravitational field potential, as separate component functions. But also in these two cases, the notation V=V1+V2, the first or the second function is equal to zero.

**) Segment is a structure consisting of central areas of protoelectrons.

***) The concept of electromagnetic vibration was applied here on the basis of a custom. At the level of fragmentation of the matter, which is here presented, the described vibrations do not have much to do with the electromagnetic vibrations that are produced practically in electrical engineering and electronics. Because at this level there are not yet magnets and there are not magnetic fields yet, which arise and manifest themselves in much more complex structural arrangements of matter.

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