ISSN 2250-3153

New approach to explain Gravity or Theory of Everything

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Abstract- A new explanation of the nature of gravity is presented in this article. It interprets gravity as a property of mass to deform and absorb space cells around it, creating space flows towards any massive body. The notion of space flows can change perception not only of gravity but also of the many other phenomena of physics such as repulsion of particles or movement of peripheral parts of galaxies, strong or weak forcers, and so on. In the first part of this paper, proposed model of gravity is confirmed by a derivation of inverse square Newton's law for gravitational force using the basic principles of this theory. In the second part, this model of gravitation is developed further and complemented with the main equation of space cells movement, which links a speed of space cells with their linear size. This equation allows us to obtain a formula for time relativity and to define an influence of mass on a value of the speed of light. In the third part, the space flows are used to explain an effect of gravitational repulsion on a micro level. The notion of space flows also is used to describe forces of strong and weak interactions. The fourth part is about particles. An important role of antimatter in a particles' internal structure and a few schemes of elementary particles' transformations are proposed there. This theory of gravity suggests that antimatter emits the space cells.

Index Terms- antimatter, gravity, red shift, space cells, space flows

I. Introduction

The purpose of this article is to present the proposed theory of gravity without diversions for discussion of existing models or theories. This theory can be considered as a thought experiment based on a sequence of assumptions, which leads to some interesting conclusions and unexpected explanations of otherwise usual phenomena.

II. Part I. Gravitation

Main hypothesis

Matter does not only deform space but also absorbs it. Antimatter emits space. The deformations of space by matter and antimatter are the same.

There are a few more assumptions in the development of the main hypothesis

Space consists of separate cells. These cells can be strained by the force of gravity; can move regarding each other or regarding massive objects; and their movements form flows of space.

It is necessary to say that the deformation of space and its absorption by mass are quite similar notions. This proposed model of gravity suggests that space cells are gradually squeezed by gravity while they are approaching a particle of matter, and this process is similar to a deformation of space described by the General Theory of Relativity. Because, if we accept that it's possible to squeeze a cell to its complete disappearance and that this process is developing in time, then deformation of space can be considered as a part of a space absorption process. The absorbed cells will be replaced with the new cells of space that are physically moving towards a massive object, creating space flows.

If we accept the idea that matter continuously absorbs space, then it's logical to suggest that movement in a certain direction requires extensive absorption of space in that direction. It leads to a conclusion that the maximum speed of motion will be limited by the speed of space absorption. But we also know that the speed of any object can't be higher than the speed of light, which means that the speed of space absorption and the speed of light must be the same or very similar by value.

The best candidate for the role of object that can absorb space with the speed of light is a Black Hole. If we assume matter is composed of particles with elementary mass, which consume space, then these elementary particles could be called Small Black Holes (SBH). Using the same logic for antimatter, we can assume the existence of Small White Holes (SWH), which emit space. The name "Small Black Hole" is already assigned to an object with different properties, but, in this paper, Small Black Holes consume space, not matter.

Space absorption by matter

Newton Equation

One way to check the validity of this theory is to obtain Newton's equation using the terms of the proposed model of gravity.

The described theory of gravitation assumes existence of space flows, which are created as a result of space being consumed by matter. It is also possible to suggest that a stationary object placed in the flow of accelerating space will be exposed to the same force as it would be moving with acceleration in a static space. The equation for the movement of space obtained from the conditions of this proposed theory must exactly coincide with Newton's Equation for Gravity acceleration.

The relation of space acceleration to the distance from a massive object is mainly defined by the rate of volume of space

cells' change while they are moving towards the center of the mass. For example, if the size of cells remains unchanged, then acceleration will be proportional to the mass in second degree and to distance in a minus fifth degree. Let's consider the following equation for the cell's volume, assuming the volume of the cell is decreasing on its way to the mass:

$$v = v_0\sqrt{\frac{ƥ_h}{ƥ}} \qquad (1.1)$$

Where:

$ƥ$ – The mass density at the distance R from the center of mass

$ƥ_h$- density of the SBH which is considered a constant

v - volume of the space cell at the distance R from the center of mass, and

v_0- minimal volume of space cell, which is equal to the volume of SBH. When the value of $ƥ$ will be equal $ƥ_h$, then v is going to be as small as v_0.

The volume of space consumed by the particle with the mass M in one act of absorption:

$$v_m = 2 * \frac{M}{m_0} * v \qquad (1.2)$$

Where:

m_0 – elementary mass

M – mass of the particle

As it will be shown in the third part of this article, the elementary mass has two lines of space absorption and therefore the number of consumed space cells will be proportional to the doubled specific mass of the particle.

The flow of space absorbed by the particle of matter is defined by the amount of space consumed in one unit of time. If we assume the act of absorption occurs in a certain quantum of time (q_{t0}) then the equation for space flow can be written as following:

$$W = \frac{2v_0M}{q_{t0}*m_0} * \sqrt{\frac{ƥ_h}{ƥ}} \qquad (1.3)$$

$\frac{m_0}{v_0}$ can be replaced with $ƥ_h$ - the density of SBH, and the density of mass $ƥ$ at the distance R can be presented as $\frac{3M}{4\pi R^3}$, then the equation (I.3) can be rewritten:

$$W = \frac{2M}{q_{t0} * \sqrt{ƥ_h}} * \frac{\sqrt{4\pi R^3}}{\sqrt{3M}}$$

We can use the expression above to create the equation for the space flow through the sphere with radius R:

$$4\pi R^2 * v = \frac{2M}{q_{t0} * \sqrt{ƥ_h}} * \frac{\sqrt{4\pi R^3}}{\sqrt{3M}}$$

Where v is speed of the space cells at distance R from the center of mass M

From the equation for space flow, we can get the relation of the space cell speed on the distance R from the center of the mass:

$$v = \frac{1}{q_{t0}\sqrt{3\pi ƥ_h}} * \left(\sqrt{\frac{M}{R}}\right) \qquad (1.4)$$

Using the expression for speed we can get the equation for acceleration:

$$a = \frac{dv}{dt} = -\frac{1}{2}\sqrt{\frac{M}{R^3}} * \frac{1}{q_{t0}\sqrt{3\pi ƥ_h}} * \frac{dR}{dt}$$

Replacing $\frac{dR}{dt}$ with the expression for v:

$$a = -\frac{1}{2}\sqrt{\frac{M}{R^3}} * \frac{1}{q_{t0}\sqrt{3\pi ƥ_h}} * \sqrt{\frac{M}{R}} * \frac{1}{q_{t0}\sqrt{3\pi ƥ_h}}$$

At the end we have the equation for acceleration:

$$a = -\frac{1}{6\pi ƥ_h * q_{t0}^2} * \frac{M}{R^2} \qquad (1.5)$$

We can see the derived equation for acceleration is very similar to the Newton law of universal gravitation:

Gravitational constant G:

$$G = \frac{1}{6\pi ƥ_h * q_{t0}^2} = 6.67 * 10^{-11} \text{ m}^3/(\text{kg}*\text{s}^2)$$

$$a = -G * \frac{M}{R^2} \qquad v = \sqrt{\frac{2G * M}{R}} \qquad (1.6)$$

III. The Main Equation of Space Cells Movement

We have to return to the statement that the volume of space cells at a certain distance is inverse dependent on the square root of mass density (1.1).

$$v = v_0\sqrt{\frac{ƥ_h}{ƥ}}$$

Below we'll try to obtain a relation of the linear size of a space cells from their speed of motion when they move towards a massive particle driven by the force of gravity.

$$v = v_0\sqrt{\frac{ƥ_h}{ƥ}} \Rightarrow l = 2r_0\sqrt[6]{\frac{m_0}{M}} * \sqrt{\frac{R}{r_0}}$$

$$l = 2\sqrt[6]{\frac{m_0}{M}} * \sqrt{Rr_0} \quad (2.1)$$

Where:

l – linear size of the space cell

r_0 – SBH radius

The coefficient 2 in the right part of the equation appears because the linear size of the cell is equivalent to the diameter of SBH, not radius.

Speed of the cell depends on the distance to mass (1.4):

$$v = \frac{1}{q_{t0}\sqrt{3\pi\beta_h}} * \sqrt{\frac{M}{R}} = \frac{\sqrt{4\pi/3}}{q_{t0}\sqrt{3\pi}}\sqrt{\frac{r_0^3}{R}}\sqrt{\frac{M}{m_0}}$$

We can get the third equation out of two above:

$$v * l = \frac{2\sqrt{4\pi/3} * r_0^2}{q_{t0}\sqrt{3\pi}} \sqrt[3]{\frac{M}{m_0}} = \frac{4r_0^2}{3q_{t0}} \sqrt[3]{\frac{M}{m_0}}$$

We can replace the radius of SBH in the formula above to the linear size of the last space cell which is absorbed on the surface of the SBH. We can calculate an adjustment coefficient:

$$\frac{4r_0^2}{3} = l_0^2 \Rightarrow l_0 = r_0 * \sqrt{4/3}$$

Let us define the notion of the speed of space absorption - c_a as:

$$\frac{l_0}{q_{t0}} = c_a \quad (2.2)$$

Then the main equation of space cell movement is going to look like the following:

$$l * v = l_0 * c_a \sqrt[3]{\frac{M}{m_0}} \quad (2.3)$$

Therefore, when the $M = m_0$ the following equation will take place:

$$l * v = l_0 * c_a$$

The full equation of space cells motion, by the force of gravity of the object with mass M, is going to look like the following:

$$\frac{l * v}{\sqrt[3]{M}} = \frac{l_0 * c_a}{\sqrt[3]{m_0}} = K \quad (2.4)$$

$$l * v = K\sqrt[3]{M} \quad (2.5)$$

Where K is a global constant, which has yet to be defined.

The size of the last cell on the surface of SBH will be bigger for the bigger mass.

The same equation can be presented in a different form:

$$l * v = l_0 * c_a \sqrt[3]{M_s} \quad (2.5.1)$$

Where M_s – is the specific mass.

The equation above shows that the speed of a cell multiplied by its linear size is a constant for a certain mass. This equation can be called a main equation of space cells.

Performing a simple analysis of the main equation of space cells, we can get some interesting conclusions about the relation between time and the speed of the moving object.

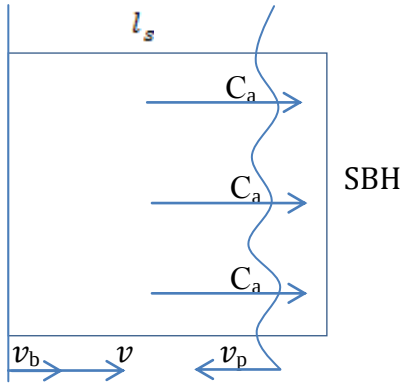

Figure 2.1: Scheme of the space absorption by SBH

We can consider the space cell with the linear size l_s on the surface of SBH as shown in Figure 2.1 above. The vertical wave line represents the border of the space consumption. The speed of space through this border is constant and equal c_a. The border itself can move in space with the speed v_p – equal to the speed of the particle to which this border belongs.

Assumption:

The speed of space absorption c_a is the ultimate speed for a space cell and cannot be exceeded by it. When the space cell accelerated by the force of gravity reaches the speed c_a, it collapses on the surface of SBH.

Taking into account that the absolute speed of cells through the SBH border is a constant equal c_a, and that a particle's speed isn't zero but equal v_p, then the maximum speed of space cell towards the particle on the SBH surface is going to be less than c_a and equal to $c_a - v_p$.

This means that the size of the last cell l_s will be bigger for the moving particle.

$$l_s = \frac{c_a}{c_a - v_p} l_0 * \sqrt[3]{\frac{M}{m_0}} \quad (2.6a)$$

$$l_s = \frac{\sqrt[3]{M}}{c_a - v_p} * K \quad (2.6)$$

From the equation (2.6), we can see that the linear size of a space cell at the surface of the SBH l_s is growing with the bigger mass and the higher speed of particle.

Size of background space cells

Considering the initial equation of the volume of space cells and its dependence on mass density, we can conclude that size of the space cells will grow with the growing distance from a massive particle.

$$\frac{l_1}{l_2} = \sqrt{\frac{R_1}{R_2}}$$

This growth of the size of cells with distance doesn't mean that cells will grow limitlessly. The influence from the next level of space and mass exists everywhere in space besides the gravitational influence from the nearest particle. Collective influence of the big mass behind the scene will limit the size of the space cells and force them to move with certain speed in the direction of the center of mass of the external system. Let's call this effect on space from external mass a ***background influence***. For the particles in any material object, the next level of gravitational influence will be the material object itself. For example, for molecules of water in the ocean, the background size of space will be defined by the density of mass in the surrounding water. On the surface of the Earth, the mass of the planet will define the size of the space cells. Out of the zone of influence of our planet, the sun will be responsible for background size of space, then the galaxy and groups of galaxies and at the end the Universe itself will restrict the space cells' size. It is possible that there are some other limits to the size of space cells, and it may happen that after reaching a certain size the cell will split or stop growing.

Considering the existence of the background mass influence, which limits the maximum size of background space cells, we can define the minimal but nonzero speed of space cells v_b with which the cell will move towards the absorbing particle. It means that speed of light c, which can be also called the *maximum speed of movement* (MSM), will be equal to the difference between the speed of space absorption and background speed.

$$c = c_a - v_b \qquad (2.7)$$

It means that the speed of light is not the ultimate speed. It is always going to be less than the speed of space absorption, and only in an extreme case, when a particle is moving at infinite distance from all other masses, can these two speeds became the same. As we will see further, the speed of light is not a constant even in a vacuum. It depends on the mass of the moving object and on the background influence of gravitation.

The speed of the background space cell towards the consuming particle can be obtained from the equation (2.5):

$$v_b = K * \frac{\sqrt[3]{M}}{l_b} \qquad (2.8)$$

Considering the last equation, the background speed will depend on the mass of the particle to which this cell is moving towards. The same-size cells will correspond to the higher speed for the bigger mass. Starting from a certain distance the speed of a space cell will be defined by only one particle, which is going to absorb this cell.

Particle's zone of gravitational influence

For every massive particle, it is possible to distinguish a sphere or a zone of gravitational influence where the main equation of space movement (2.5) is applicable. The boundary of this zone will be defined by the size l_b of background space cells or by background speed v_b. The size of gravitational zone for the particles with the same mass will be smaller in a case of the smaller size of background cells. This zone will have the shape of sphere when the particle is motionless.

Out of the zone of gravitational influence, the speed of cells' movement will not comply with the main equation of space movement $v * l = K\sqrt[3]{M}$ where M is the mass of the closest particle. Their size, and therefore their speed, will be defined by the distance from the remote or background mass.

Assuming the size of background cells as a constant in a scale of one particle, we can obtain the relation of the size of influence zone with the particle's mass. Using the equation (1.6) for speed of space cell:

$$v = \sqrt{\frac{2G * M}{R}}$$

For two particles with the masses M_1 and M_2, we can write:

$$l_b * v_1 = l_b \sqrt{\frac{2G * M_1}{R_1}} = K * \sqrt[3]{M_1}$$

$$l_b * v_2 = l_b \sqrt{\frac{2G * M_2}{R_2}} = K * \sqrt[3]{M_2}$$

Dividing one equation to another we will get the following formula:

$$\frac{R_2}{R_1} = \sqrt[6]{\frac{M_2}{M_1}} \qquad (2.9)$$

This last equation means that the spot of the influential zone will be bigger for more massive particle, but the cell's size at the same distance from more massive particle is going to have an inverse relation, as shown from equation (2.1).

$$\frac{l_1}{l_2} = \sqrt[6]{\frac{M_2}{M_1}}$$

If we draw the proton and electron in the same background space, then the proton's influence zone is going to be bigger than the electron's, but the size of space cells at the same distance from the center of the particles is bigger for the electron.

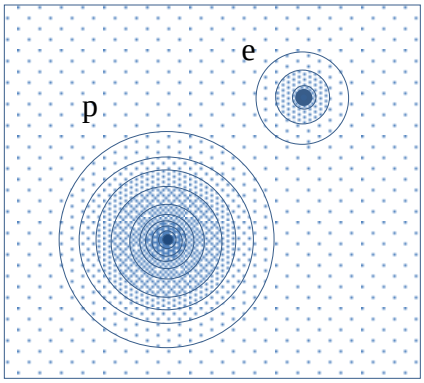

Figure 2.2: Zones of gravitational influence for proton and electron

Maximum Speed of Movement

We know that the maximum speed of any particle is less than the speed of space absorption (2.7):

$$c = c_a - v_b$$

We can replace v_b with (2.8):

$$c = c_a - K * \frac{\sqrt[3]{M}}{l_b}$$

Or using (2.4) to replace K:

$$c = c_a\left(1 - \frac{l_0}{l_b} * \sqrt[3]{M_s}\right) \quad (2.10)$$

The equation (2.10) shows that the maximum speed of movement (the speed of light) depends on the size of background space. When a particle is moving in space with smaller cells, then its maximum speed is decreasing, and, vice versa, when a particle goes to the space with bigger l_b, the maximum speed of movement increases. The smaller space size in a liquid or solid material corresponds to the higher density of mass and the higher refractive index, assuming inertial mass of photon as nonzero.

Time relativity

Assumption:

Everything exists in the present, but time is passing with different speed for every particle. Each particle is measuring time by the number of cycles of space cells absorption which depends on the particle's speed and mass.

One cycle of absorption is a quantum of time. We know that the size of space cells on the surface of SBH - l_s depends on the particle's speed and therefore the quantum of time relate to the particle's speed:

$$q_t = \frac{l_s}{c_a}$$

Relation of l_s with the particle's speed is defined by the equation (2.6a):

$$l_s = \frac{c_a}{c_a - v_p} l_0 * \sqrt[3]{M_s}$$

Then the quantum of time will look like:

$$q_t = \frac{l_s}{c_a} = \frac{c_a l_0 * \sqrt[3]{M_s}}{c_a(c_a - v_p)}$$

Or:

$$q_t = \frac{l_0 * \sqrt[3]{M_s}}{c_a - v_p} \quad or \quad q_t = \frac{K\sqrt[3]{M}}{c_a(c_a - v_p)} \qquad (2.11)$$

The equation (2.11) shows that higher speed corresponds to the longer quantum of time. Therefore, time measured as the number of quantum passed between two events is going to be shorter for the faster moving and more massive particle.

IV. Interactions between particles

Movement of particles in space and interactions with other particles

Movement and interactions of particles are interrelated notions because particles always move in a close or remote neighborhood with other particles. Depending on its mass, every particle absorbs a certain amount of space in a certain period of time. To move freely in space, particles must have enough space cells to absorb.

When do the particles start to compete for space? What does the collision of particles mean?

We can visualize the structure of the zone of gravitational influence of the particle as a set of contiguous levels or layers filled with space cells of a certain size. The first layer is the closest to the particle and has the smallest space cells. Each of the subsequent layers is filled with bigger-size cells and so on until cells reach the size of background space. Zone of gravitational influence is some sort of a place where space cells accelerate from the background speed v_b to the speed $c_a - v_p$. Photon doesn't have the accelerating zone because it moves with the speed of light $c = c_a - v_b$. Linear size of cells depends on the distance from the center of mass by the following equation (2.1):

$$l = 2\sqrt[6]{\frac{m_0}{M}} * \sqrt{Rr_0}$$

The concept that every level of influence zone is filled with the same size of space cells doesn't mean that all cells are moving simultaneously from upper to lower levels. The process of gravitational absorption can be described as consumption of space cells from the level contiguous to SBH and their replacement by the cells from the upper levels.

The area of a space cell cross-section s_c is equal:

$$s_c = l^2 = \sqrt[3]{\frac{m_0}{M}} * 4Rr_0 = \frac{4Rr_0}{\sqrt[3]{M_s}}$$

From the expression above we can see linear relation of the growth of space cell cross-section with the increase of the distance R from the particle. We know that the area of the surrounding sphere is growing proportionally to the R square. It is becoming obvious that the amount of cells not involved in the immediate consumption process will increase on every next level.

This means that the ratio of free cells considerably increases, especially outside the zone of gravitational influence. It is quite possible that particles moving in the background space won't actively interact with each other through the gravity forces.

Active gravity interactions or Collisions of particles

Active gravity interaction between particles occurs when zones of influence of two particles cross each other or/and when there are not enough space cells for consumption around the particles. Active interaction will appear in competitive action of the couple of particles which are trying to absorb the same cells located in a zone of their common influence. The interacting particles can move with the different speeds and have different masses.

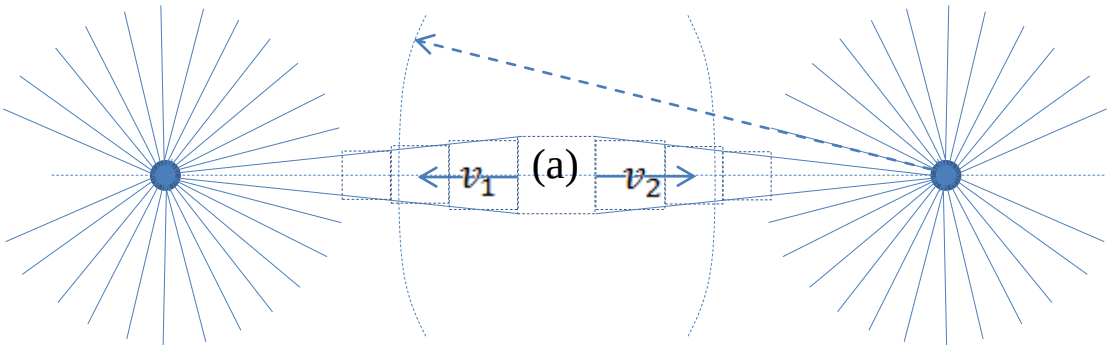

Figure 3.1: Competitive actions from two particles on one space cell (a)

Two particles with intersecting zones of influence which are moving towards each other are shown in Figure 3.1 above. At some point, both particles can start absorbing the same space cell (a) by trying to pull it to the opposite directions. Obviously the attempt to move one cell in two opposite directions can result either in accelerated convergence of the particles or in expansion of the space cells between them. Any acceleration of the particles is associated with physical changes of the space consumption profile and requires an outlay of energy.

We can assume that the result of the competitive action from two particles is going to be the growth of the space cell between them. The growth of the cell (a) is also coming out from the main equation of the space movement because the result of the competitive action to one cell will be decreasing its speed of movement. In a case of collision of two particles with the same masses, we can expect a complete halt of the cell relative to both particles. The cell will start growing with the speed equal to the total speed of absorption from each particle.

As it shown on the Figure 4 below, the expansion of space cell is going to be uniform in all directions assuming the isotropy of the space cells.

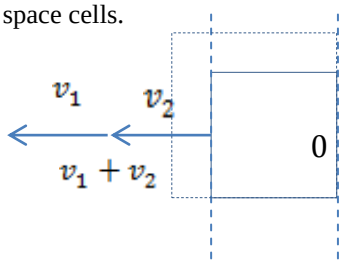

Figure 3.2: Isotropic expansion of a space cell

We can consider two possible consequences of the space cell expansion depending on the total speed of gravitational pull.

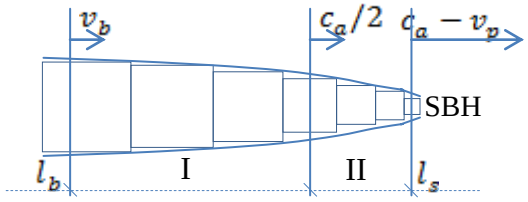

Figure 3.3: Two sectors of interaction in a zone of gravitational influence

The first sector of interaction is placed between background speed and a half of the speed of space absorption.

In the first sector, a speed of expansion of the space cell is equal to a total speed of attraction from two particles and will never exceed the speed of absorption c_a. The result of this type of interaction is going to be a repulsion of particles. In Figure 3.4, we can see a situation when the expansion of one cell can lead to distortion of space on a line between two particles. It was mentioned above that to move in a certain direction the particle must absorb more space in that direction. The result of the competitive actions on one cell from two moving towards each other particles is the creation of a space bubble that considerably increases the spatial angle of a single line of space absorption which connects centers of particles. This kind of blocking of space absorption ahead of each particle will lead to the displacement of other lines of space absorption to the opposite

direction from the space bubble. The deformation of the absorption profile will result in a change of speed of the particle's movement and a possible change in the direction of that movement. An example in Figure 3.4 shows the case when both particles will start moving in opposite directions after collision.

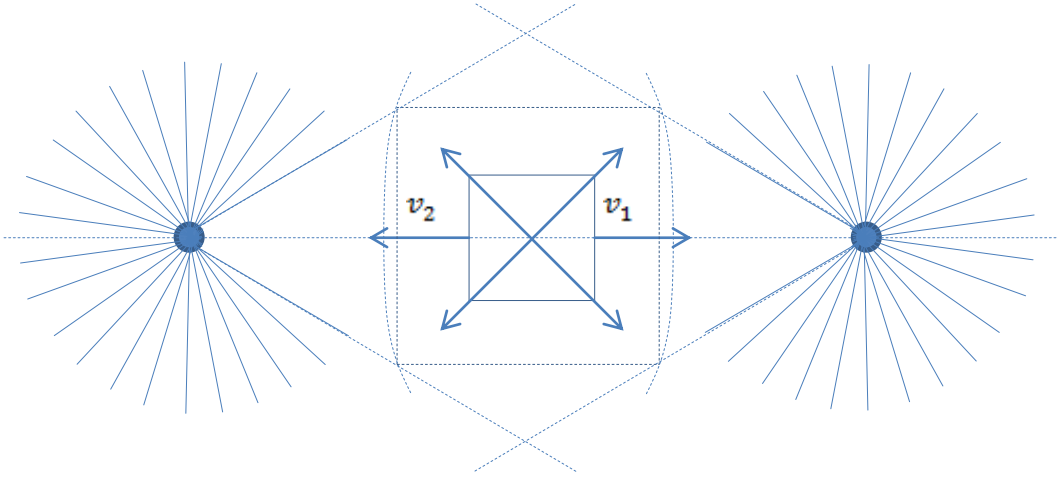

Figure 3.4: Repulsion of particles

The second sector on the space movement scheme covers cells with a speed exceeding half of the speed of space absorption.

The upper limit of this sector is defined by the space speed on the surface of a particle. The excess of the half of absorption speed is very important for initiation of qualitative changes in particles interactions. Beginning from the lower limit of this sector, the total speed of growth of space bubble produced by the common efforts of two particles will exceed the speed of space absorption.

Assumption:

The space cell splits into separate SBH and SWH when the speed of the space cell deformation exceeds the speed of space absorption (SSA). In a case of cell squeezing, the newly born SBH will start to compensate for the compressing flows of space and will be engaged into bond between particles that produce deformation. SWH becomes a part of a bond between particles when interacting particles create expansion of the space cell. In both cases, the second elementary mass, or anti mass, will be emitted from a zone of reaction with the kinetic energy equal to the total energy of a space cell minus energy of the newly created bond.

It is necessary to remember that to get into the second sector of interactions the particles must overcome the first sector of repulsion.

There are two examples of gravitational interaction with the speed of cell expansion exceeding SSA.

Example 1. Strong interaction

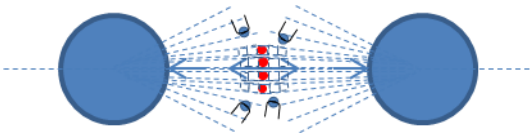

Figure 3.5: Strong interaction

Strong interaction is the force that binds the protons and neutrons together to form the nucleus of an atom. As a result of strong interaction the total mass of nucleons will decrease and the emitted energy is going to equal $E = \Delta mc^2$ where Δm is the mass loss. The proposed model of gravitational interaction can explain the loss of mass and the amount of emitted energy.

We can suggest that strong interaction takes place in the second sector of the space movement scheme where speed of cell's growth exceeds SSA. As the result of this interaction, a certain amount of antimatter is going to be created. Space cells emitted by antimatter will compensate the flows of space towards the matter. This compensation of space flows between interacting particles eliminates repulsion between them. The system matter – antimatter stabilizes. Antimatter in this scheme plays the role of glue, which keeps interacting particles of matter together.

Linked particles will absorb less space than they absorbed by themselves because some space is now emitted by the binding antimatter. This effect will be observed as a mass loss of the linked particles.

Important addition:

It is necessary to be sure that the speeds of interacting particles do not exceed a half of SSA to implement the gravitational interaction with the creation of antimatter. This conclusion is coming from the definition of the upper limit of second sector, which is equal to $c_a - v_p$. It means that in the case when the particle's speed exceeds half of SSA, the upper limit will become lower than the lower limit and the sector II will

cease to exist. In other words, to perform the reaction of fusion, the speed of nucleus must be lower than the half of SSA.

It is interesting to mention that if it will be possible to create conditions when background speed v_b is equal to half of SSA then every collision of particles will lead to the creation of nuclear bonds. These conditions may exist on a neutron star.

Example 2. Weak interaction; electron's capture.

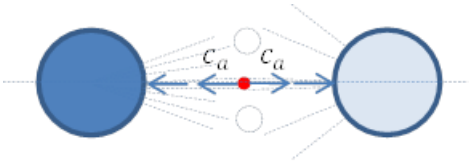

Figure 3.6: Weak interaction

One of the classic examples of weak interactions is the beta decay of the nucleus. During beta decay the neutron emits W^- boson and proton. W^- boson after a short delay decays to the electron and antineutrino.

$$n^0 \rightarrow p^+ + e^- + \bar{v_e}$$

The electron's capture is one of the types of beta decay. In electron's capture, one of the protons of a nucleus captures an electron from the nearest orbit and turns into a neutron. Electron neutrino is emitted as a result of electron's capture reaction.

$$p^+ + e^- \rightarrow n^0 + v_e$$

We can consider the electron's capture using the proposed model of particles interaction. It is an example of interaction between particles with very different masses. In many aspects, this type of interaction is similar to the strong interaction described above. We can suggest that this interaction is also located in the second sector of the scheme of space movement where the speed of space cells exceeds half of SSA.

As a result of the electron's capture we can expect formation of an antiparticle – antineutrino which will glue two particles of matter. It is very important that at the result of this reaction it is also possible to register a neutrino. This fact supports the notion that the formation of one type of an elementary particle that participates in the nuclear bond leads to emission of the other type of a particle.

The weak interaction can be distinguished from strong interaction because of significant difference in the density of absorption lines of the heavier proton compared to the density of the electron's lines. Because of this, we can't expect multiple coincidences of the absorption lines when the particles collide. The only direction where competitive absorption can take place is the line between centers of interacting particles. More than this, the lines of absorption in other directions can create the space bubbles which will cause repulsion. Continuous repulsion will result in an inevitable destruction of a single bond which keeps the couple of particles together.

The fact of antineutrino's registration as a result of beta decay is very important for further development of this theory of gravity. If it's possible for antimatter to bind the particles of matter, then it's possible to assume antimatter as a natural part of the internal structure of basic particles of matter such as electrons or protons.

We can consider annihilation as a process in which the balance of the bonds between matter and antimatter within particles are breaking. This leads to the destruction of the particles down to the elementary building blocks. We know that the main products of annihilation are neutrino, antineutrino, and photons. It may mean that all the particles are built out of these basic elements.

V. Particles

Neutrino model of particles' structure

Elementary particles

Considering the model of gravitation described in previous sections of this article we can suggest that simple neutrinos and antineutrinos may be the basic components of the matter and antimatter, but probably not the only ones.

We assumed elementary particles as the cells of space converted under external forces into the matter and antimatter of the minimal size and minimal mass but maximum density. If elementary particles can be defined as small black holes (SBH) and small white holes (SWH), then simple neutrino and simple antineutrino are the simplest SBH and SWH which have no other properties but mass.

Both simple neutrino and antineutrino have two lines of space movement but neutrino as the matter consumes space and antineutrino as antimatter emits it. Existence of two lines of space movement allows neutrinos to serve as the gluing components between particles of the opposite type.

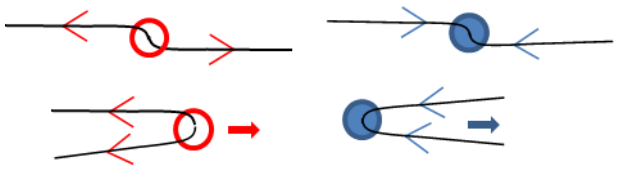

Figure 4.1: Simple neutrino and antineutrino

Lines of space movement of neutrino and antineutrino can consume or emit space in any possible direction, and this flexibility allows them to move with any speed to any direction or stay motionless. However, it's obvious that having only these two particles is not enough to build everything else in this world. It would be necessary to at least have elementary particles responsible for the electrical charges to complete the neutrino's model of matter.

Description of the positive and negative elementary charges

Considering the concept of mutual complementarity of matter and antimatter in the construction of complex particles, we can suggest that elementary charges will also belong to the different types of matter. But in contrast to the simple neutrino and antineutrino, which can only consume or emit space, the elementary charges must have some other properties that could help us to explain their special capabilities.

Assumptions:

- Negative elementary charge corresponds to the matter and positive charge to antimatter. It means that the negative charges absorb space cells and that positive charges emit them.
- SBH and SWH of charged particles are the space eddies with accretion discs. Lines of space consumption of SBH and space emission of SWH coincide with their rotation axes.
- The axes of rotation coincide with the lines of electric field created by the particle.
- Accretion disks of SBH and SWH are the looped space flows which do not participate in consumption or emission of the space cells. They are responsible for magnetic properties of the particles.
- Linear speed and linear size of the space cells in accretion disks are following the main equation of the space movement $v * l = K\sqrt[3]{M}$.

There are few options for the movement of space cells under the influence of the gravity. The space cell can move to the particle if the particle is matter. It can move out of the particle if the particle is antimatter. The space cell will rotate around the particle when it is moving in accretion disk of an elementary charge. The space cell will move to or out of particle rotating around its own axis when it's moving along the electric field line of an elementary charge.

Creation of elementary charges

The speed difference between contiguous magnetic flows can cause a rotation of space cells located between them. Rotation of the space cells creates pairs of charge germs inside each of these rotating cells, and axes of rotation coincide with electrical field lines. At some value of the speed difference, the distance between charge germs can exceed the cell's size, and two independent elementary charges will be formed.

The creation of elementary charges happens along the line of the electrical field. If the speed difference of magnetic flows will be not enough for creation of elementary charge particles then the pair of charge germs will recombine to the initial state and transfer the rotating energy to the neighbor cell. In that case, the electromagnetic wave will propagate in the direction perpendicular to the vectors of magnetic and electrical fields.

Creation of elementary charge particles leads to formation of their accretion disks, which means creation of their own magnetic space flows. Rotation of SBH or SWH of the elementary charges is responsible for a spin or angular momentum of the charged particles.

Figure 4.3: Positive and Negative elementary charges

Origin of Particles

At this point we have two sets of elementary particles which can be considered as universal building blocks for all other more-complex particles. Elementary charges besides a charge and magnetism also have an elementary mass. Actually, both types of particles are the same SBH or SWH but in the different states. Admitting this, we could start the chapter about origin of particles from Small Black and Small White Holes which represent elementary particles of matter and antimatter. But if we recall that all elementary particles are created from the space cells then we can conclude that the initial component of everything around us is the space cell. We can even suggest that the space cell has always contained two recombined elementary mass and anti-mass particles and that deformation of space just separates this pair. Releasing one particle always results in releasing another one. It means that at the very root of the genealogical tree of the particles must lay a space cell.

Stage I. Creation of elementary masses and charges

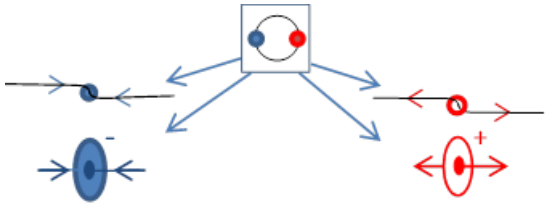

Figure 4.4: First step of space cell transformation

Gravitation and magnetic field do not create but only release the elementary particles of the matter and antimatter from the space cells conserving the quantitative symmetry of the particles of both types. The internal energy of each space cell is equal to the total energy of the neutrino – antineutrino pair ($2m_0c_a$). For example, in the case of strong interaction, the total energy of split space cells will be shared equally between energy of emitted particles and the energy of antiparticles participating in nuclear bonds.

Stage II. Formation of photons

As it was mentioned before, the alternating magnetic field can split a space cell creating a pair of elementary charges when the certain speed of magnetic field change is reached. What will happen with the space cell when the speed of the changing field will exceed the speed of cell splitting? In this case conditions to form elementary particles of charge will be created and recombination of magnetic eddies won't be possible. Another space cell can be split in an attempt to pull away two newly created elementary charges and elementary neutrino – antineutrino bonds can be formed.

Figure 4.5: Elementary photon

Elementary photon is shown on the picture above. Its energy is minimal, but it will move with the speed of light and will have the gravitational mass equal to zero which is typical to photons of any energy. Elementary photon is a particle with the smallest

inertial mass, and its charge is equal to zero and its antiparticle for itself. This photon has one of two possible directions of the rotation of the frontal negative eddy, and the positive charge will always rotate in inverse direction to the negative one.

Note:

Gravitational mass of the complex particle can be defined as the total sum of free lines of space movement, taking lines of emission with minus. In this work the gravitational and inertial masses are not the same and should be calculated differently. The inertial mass can be evaluated as the total number of free lines of space movement independent of their belonging to the matter or antimatter because as for matter as for antimatter it is necessary to apply a force to change direction of the space lines. The absolute mass of a particle, which is equal to the total mass of all included elementary particles, is always bigger than gravitational or inertial mass because in a complex particle some lines of space movement are always engaged in internal bonds.

It has to be mentioned that the alternating magnetic field is not the main source of photons. The main producers of photons are electrons as it will be shown below. But strong magnetic fields are common on the surface of any star, and we can suggest that plenty of elementary photons are also produced by the stars' magnetic fields.

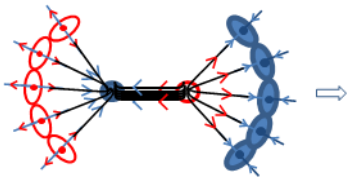

Figure 4.6: Photon's structure

Regular photon is shown on the picture above. This photon is the combination of many elementary photons gathered in a single cluster. The energy of this photon is equal to the total energy of all elementary photons in the cluster.

$$E_f = n * E_{f0}$$

Where

E_f- energy of photon; E_{f0}- energy of elementary photon; n – number of elementary photons

Stability of this particle is secured by two main reasons. First of all, it is the attraction of simple neutrinos and antineutrinos due to deformation of space. In the first part of this article, a lot of attention was paid to explain an effect of gravitational repulsion between particles as a result of competitive consumption of space. In our case, all internal lines of space consumption or emission are engaged in bonds between photons' components, but deformation of space around every elementary particle still exists. The second reason which keeps the particles together in a photon is the force of magnetic attraction between elementary eddies of the same charge. A regular photon collects only elementary photons with the same directions of eddies' rotation for each type of charge.

Besides the forces which keep a photon together, there is also a force directed to rip the bonds between two parts of a photon. This is the force of magnetic repulsion between bunches of positive and negative elementary charges, which magnetic space flows have opposite directions.

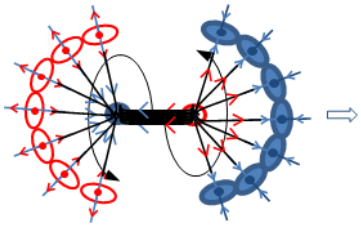

Figure 4.7: Magnetic repulsion between positive and negative parts of photon

It is important to note that the force of magnetic repulsion between groups of elementary charges will grow with the increasing number of elementary photons in a bunch.

Notes:

Red shift of photons. Existence of the force directed to a photon's destruction can become a reason of its spontaneous decay, and probability of this decay will directly relate to the photon's energy. When the energy of photon decreases, the force of repulsion becomes weaker and decay happens less often and with the smaller energy of the fragments. It will be possible to use the red shift value to calculate distance to remote objects when relation of decays' frequency with photons' energy and time are determined.

Cosmic microwave radiation. Decay of the high energy photons means losing small fragments consisting of a few elementary photons. The fragments of the decay are photons with the big "length of waves" which could be registered as a cosmic microwave background radiation. We can even suggest that the number of background photons will exceed the number of the parent photons because the photon can decay several times on its way to Earth. Direction of movement of the fragment and the parent photon must be the same as well as a total energy and impulse. The beginning of the CM spectrum can't be continuous because it starts from the single photon.

The format of this article doesn't allow discussing the properties of the particles thoroughly, but some conclusions about photons' properties are coming out of its structure. It is necessary to say that all notions about length of wave for photons have no real sense in the context of this article. The structure of photons implies discreet deviation from the trajectory of movement. The increase of photon energy or its inertial mass can be observed as a decrease of the distances between single-sleet diffraction maximums.

In a case of dispersion the violet light will deflect more than the red light as it follows from the equation for speed of light (for the same l_b the bigger mass will move slower):

$$c = c_a\left(1 - \frac{l_0}{l_b} * \sqrt[s]{M_r}\right)$$

The construction of photons can be described as a frame with two separate pull and push engines. The movement of the particle like this will depend on the direction of its pushing and pulling components. Rotation or sideways moves can be expected in certain conditions.
Behavior of photons can be discussed more in a separate article.

Stage III. Formation of Electrons and Positrons

In the previous chapter, we talked about photons and about forces which keep the components of photons together. It was also mentioned that there is a force of magnetic repulse between positive and negative parts of photons which tries to tear them apart. The magnitude of the repulsive force will increase with growth of photons' energy which directly corresponds to a number of elementary photons embedded into photon structure.

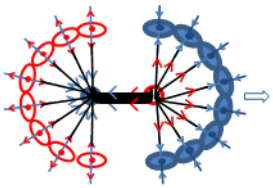

Figure 4.8: Photon of the maximum energy

It can be expected that energy of a particle cannot grow endlessly if it leads to the growth of force directed to destroy this particle. Maximum value of magnetic repulsion will be reached when the positive and negative parts of the photon become hemispheres. In this case, the accretion disks of the positive and negative parts of the photon will lie in the same plane, and the force of magnetic repulsion will be the highest. The increased magnetic repulse force will break the bonds between neutrino and antineutrino centers of the photon.

Neutrino and antineutrino nucleuses of the split photon obtain free lines of absorption and emission correspondently which can interact with the space cells between them, tearing those cells apart and creating eddies of elementary charges. Every free line of neutrino will link with the positive eddy of antimatter and antineutrino and will take the negative eddy of the matter. The hemispheres of the positive and negative parts of photon will be restored to the full spheres.

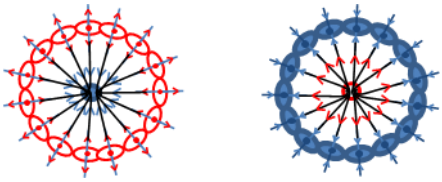

Figure 4.9: Positron and electron

The rupture of a maximum energy photon will result in a formation of two separate particles – positron and electron. Photons of such energy can be obtained by the strong magnetic fields or produced by a combination of two photons when gamma quant captures a weak photon of the cosmic microwave radiation.

Positrons and electrons are unique particles in a certain sense because they can't move in any direction without changing their internal structure. The density of elementary charges in both particles is the highest and cannot be increased any further. To increase consumption of space from any side of electron or positron, some bonds of these particles should be stretched in length. These deformations will result in increasing consumption of space at one side of a particle and decreasing absorption at the other side.

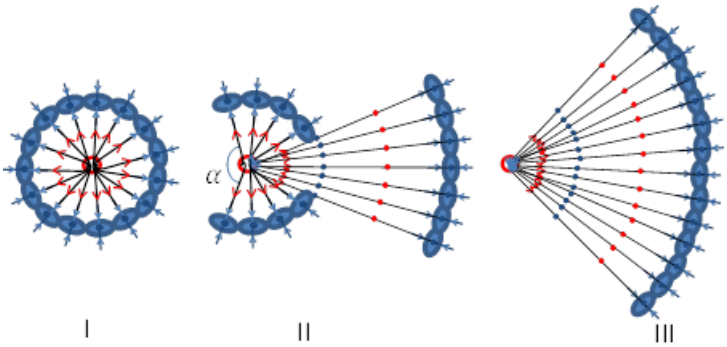

Figure 4.10: Structural changes in the moving electron

As we can see in the picture above, the bonds between central antineutrino nucleus and negative eddies are stretching to the length of a simple neutrino-antineutrino pair. Space released from the extended eddies is filled with elementary charges moved from the backside of the particle. We can assume that the speed of electron will be defined mainly by the size of the hole at its backside.

$$\mathrm{Cos}\,(\alpha/2) = 1 - v\,/\,c_a$$

The equation above shows that the maximum speed of movement c which is always lower than c_a can be reached when the angle α is even smaller than π (stage II on the Figure 4.10).

Electrons can be accelerated by a few ways: absorption of photon, electric field, or collision with another particle.

The mechanism of photon absorption by electron is based on recombination of the positive part of elementary charges of photon with negative elementary charges of electron.

Assumption:

Recombination of the matter and antimatter. Out of two pairs of elementary particles of matter and antimatter, only elementary charges of different type and different spin can recombine back into a space cell. The simple neutrino and antineutrino cannot recombine into a space cell, but instead of recombination they produce an elementary photon.

In the process of the photon – electron interaction, we can assume recombination of the positive part of the photon with the negative charges of the electron. Such integration of the particles can be possible only when spins of the negative elementary charges of the electron and photon coincide. Taking into account that the rotation of the positive and negative eddies in the photon are opposite in direction, we can see that when condition of recombination is fulfilled then automatically fulfilled the

condition of incorporation of the negative part of the photon to the common magnetic flow of the electron.

Recombination of eddies into a space cell is looking like the disappearance of two elementary charges and one bond between elementary particles. At the result of recombination, the photon will be sucked into the electron on the length of one bond, leaving two bonds and one elementary negative charge outside. Acceleration of electron by collision with another particle or by the electric field results in an increase of density of charge eddies on the side of movement. When compression of eddies reaches a critical value some elementary eddies will move out of the surface of the particle, extending their bonds to the central nucleus with the standard neutrino – antineutrino bonds.

Motion and braking of electron

Whatever way an electron is accelerated, the result of acceleration can be seen in a changed structure of the particle. In Figure 4.10 we can see that the electron stretches in the direction of movement with the growth of speed by embedding elementary photons in its structure. At the same time, it is possible to pump up the energy of the electron, increasing its absolute mass without increasing its speed when the maximum speed is reached already.

The movement of any particle implies deviations from the strait line trajectories, accelerations, and braking. The structure of the electron as the structure of its parental photon allows only discreet changes in the direction of its movement. The zone of higher absorption of the electron must physically move from one place to another to perform a deviation from the strait line, and all stretched bonds will have to be recreated again. It may be possible that very small deviations from the main direction can be performed by correction of angles of the stretched parts of elementary charges, but when direction is changing essentially then extended bonds are breaking.

The breaking of every long bond occurs simultaneously with the creation of the pair of eddies which are needed to complete bonds of electron and photon. When the electron brakes or sharply changes direction of movement, the number of created elementary photons can be quite high. The energy of the resulted photon will be defined by the number of truncated bonds, and in some cases the electron can just stop moving if the gamma quantum will take all embedded elementary photons.

The process of changing direction can be described in general as a consequent truncation of the long bonds from the side where absorption of space decreases and displacement of elementary charges to the side where absorption increases. Truncation of bonds on every stage of the turn will be manifested by emission of photons, loss of energy, and decrease of speed.

Everything about the electron behavior when it turns or brakes is applicable to the positron with the only difference being that the neutrino nuclear of the positron is going to move ahead of elementary charges.

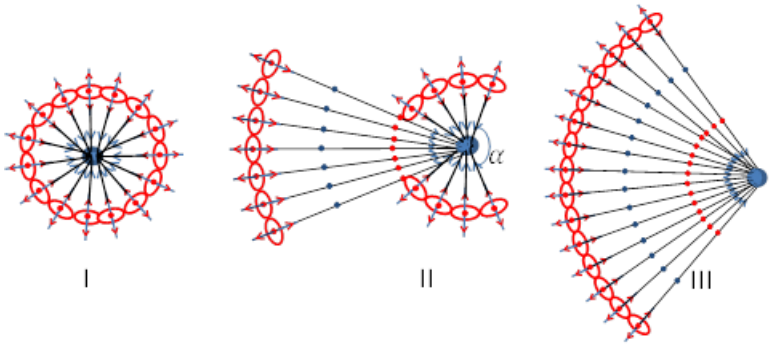

Figure 4.11: Movement of positron

It would be interesting to calculate the inertial mass of the electron or positron during acceleration under external forces and changing their structure while increasing kinetic energy. As we can see from the Figure 4.10, the gravitational mass of the non-moving electron equals only a third part of its absolute mass. If we assume that total mass of all elementary charges of the electron is equal to 1 then absolute mass of the stationary electron will be 1.5. On the third stage in Figure 4.10, the electron has total mass equal to 3.5, which is 2.33 bigger than total mass of a stationary electron. On the last stage of the figure above, every bond of electron extends on 4 standard bonds of neutrino – antineutrino which increases total mass to 5.5.

Stage IV. Formation of Protons

The model of electron and positron structure defines the value of their electrical charge as a certain number of elementary charges explicitly determined by the geometry of the photon. This restriction ensures a stable value of the total charge of the created particles independent on the way of obtaining of photons, but it also requires a strict sequence of transformations to create any charged particle. This sequence must always include transformation of photon into positron and electron.

Formation of proton as a positive particle should always go through the transformations which include positron. At the same time, we know that proton is an extremely widespread and stable particle which implies that its way of transformations must be the most probable and reproducible in the conditions of electron – positron pairs' formation.

Positron Pairs

To describe the formation of protons it is necessary to return to the description of positrons and electrons. Both particles are characterized by the changes of internal structure when their speed changes. If the main type of interaction between particles of the same charge at the low speed is electric repulsion, then at the speed of light, the nature of interaction changes dramatically because of a new structure of particles.

Let's consider the interaction between positrons at the speed equal to the maximum speed of movement. In the picture below, we can see two possible configurations of positron pairs which are moving in the same direction with the speed of light. We can assume the most stable configurations of moving positrons are those where all eddies are gathered in a single group.

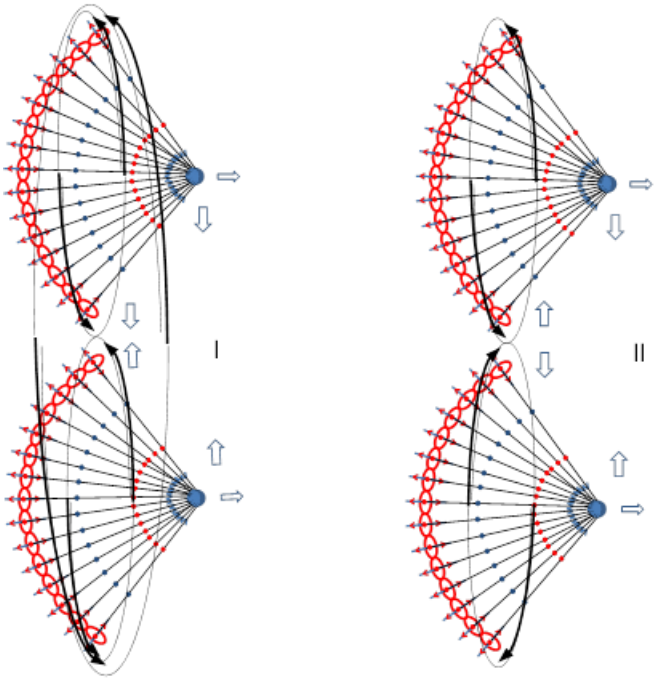

Figure 4.12: Interaction of positrons

In Figure 4.12, we can see two couples of positrons with the internal bonds extended 3 times. The interaction of positrons which are moving at the speed of light on parallel trajectories will be defined by the magnetic interaction of elementary charges and by attraction of neutrino nucleuses of moving positrons. The positron's groups of elementary charges can attract or repulse each other depending on concordance of their spins. Neutrinos nucleuses are always attracting. Two positrons with the same direction of magnetic flows will attract each other by both magnetic and gravitational forces. As the result of this attraction, we can expect integration of positrons in a new particle which will have a similar structure as any positron moving with the light speed, but it will have a double charge. This particle will continue moving at the same direction as the initial pair of positrons until it collides with some other particles and decays back into two positrons and some photons.

It is more interesting for us to consider the case of interaction between two parallel moving positrons with opposite direction of magnetic flows Figure 4.12 (II). Unlike the positrons in a previous example, the interaction between opposite magnetic flows will try to turn the particles towards each other where directions of their magnetic flows will coincide.

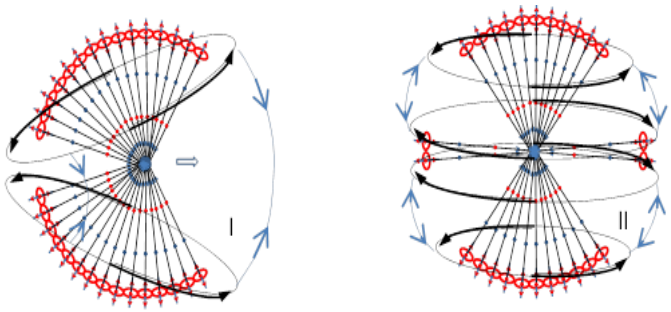

Figure 4.13: Second stage of interaction of positrons

When the centers of positrons stick together, the magnetic repulsion of elementary charges will change to the attraction of the tilted magnetic flows. The magnetic pull may be strong enough to remove the outer layer of elementary eddies and form a ring on the equator of the coupled positrons. Repulsion of the equator ring and the rest of the elementary charges can stop movement of the combined particle by shifting the bundles of eddies to the opposite positions as is shown on Figure 4.13 (II). The coupled nucleuses of a combined pair of positrons can serve as a pivot joint. The complete halt of two particles can lead to the transformation presented on Figure 4.14. Both positrons will be linked together while trying to move toward each other with the speed of light. The forces between neutrinos nucleuses of two particles can start splitting the space cells and creating neutrinos and antineutrinos. Newly created neutrinos will stick to the existing positron nucleus but antineutrinos will be removed from the neutrino's space pit, taking away the energy of the reaction.

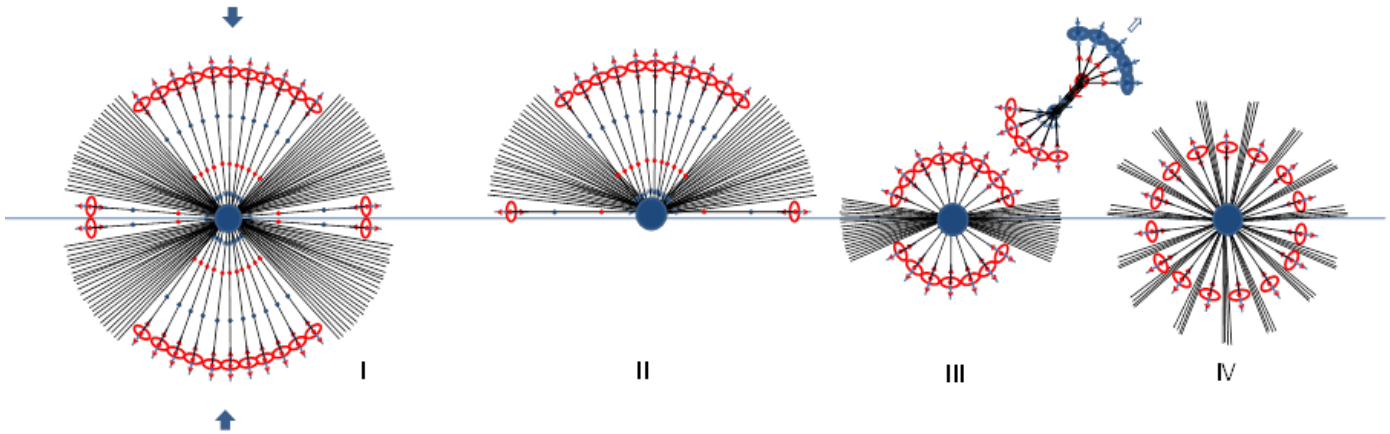

Figure 4.14: The stages of positron – proton transformation.

The generation of mass will continue until conditions allow this transformation. Newly created particles of matter will start absorbing space and this process can be restricted by the geometry of the coupled positrons. At the same time, the

increasing mass will lead to changes of the space cells' size and consequently to the length of bonds, the size of accretion discs, and even to the size of neutrino nucleuses. All geometrical changes will affect the upper limit of the mass growth. When the coupled positrons reach the limit of possible mass growth, they will split apart from each other sharing accumulated neutrinos between themselves. It will be the end of the positron – proton transformation. Protons will curl into spheres after emitting excessive photons.

Shortage of positrons

We can only guess which set of transformations of positrons will lead to the formation of protons, but the idea that protons are formed from positrons and that this transformation is taking place in practically the next moment after the generation of the positrons seems very possible. On one hand, we know that the strong magnetic fields that are abundant at the star's corona can create plenty of electron – positron pairs. On the other hand, we also know that the free positrons can easily find electrons for annihilation and collapse into photons and neutrinos. So if there is transformation from positron to proton then it must take place immediately after the creation of positrons.

Positron – electron formation or annihilation processes are applicable only to the positron – electron pairs but not to positrons alone. These paired transformations guarantee fulfillment of the law of charge conservation and at the same time they must ensure quantitative parity of electrons and positrons in the Universe. *The positron paradox* is that there is no parity between positrons and electrons. In the real world, we have plenty of electrons but almost no positrons and charges of electrons are compensated by protons. But could it happen that we've got exactly as many protons as we have electrons if protons were not converted from positrons?

VI. Conclusion

Stars produce both positrons and electrons in pairs, but if for electrons all transformations are over at this stage then for positrons it is only beginning – the first step in the further conversion to protons. Transformation of space to matter and antimatter is the main mechanism to produce all necessary ingredients to maintain stars burning. Stars do not consume but produce mass and anti-mass out of space. Space is an unlimited source of energy and matter.

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