SUBATOMIC PARTICLES AND ANTIPARTICLES AS DIFFERENT STATES OF THE SAME MICROCOSM OBJECT

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The distribution law for the values of pairs of the conserved additive quantum numbers of subatomic particles and antiparticles of all generations has been described that has made it possible to advance the hypothesis on the existence of the microcosm object, different states of which can be the mentioned particles. This object, named as bastron, has two very different groups of states. The smaller group in number is easy to be put in correspondence with the weakly interacting particles and antiparticles, and the larger one in number – to the hadrons and their antiparticles. Quarks don't correspond the bastron states and perhaps due to this fact they don't exist as free particles outside hadrons.

1 Introduction

At present we know more than two hundred strongly interacting particles and about twenty weakly interacting particles. Previously a discovery of every new particle was interpreted as an important event. Now the situation is different – there appeared to exist a great number of particles. The reasons for existence of a large quantity of particles and a variety of their properties have no explanations in many cases as the modern theory (the Standard model) considers mainly interaction of particles. The fundamental particles are especially singled out as it is considered that they do not consist of other particles and can be regarded as primary elements. Despite quite a large range of the fundamental particles nevertheless many theorists suppose that the list of these particles is not complete and they predict new hypothetical particles. At first sight, the pattern with particles has the following view: there are a lot of primary elements in nature. But this pattern is most likely an outward appearance.

According to the concept which is presented below instead of a great number of independent subatomic particles in fact we deal with only one object of the microcosm, the mentioned particles being different states of it. The hypothesis of existing the object that previously didn't occur in the physics of particles appeared while interpreting the type of value distribution for the pairs of the conserved additive quantum numbers of subatomic particles described in [1]. Now we proceed to the description of this distribution.

2 Distribution regularities for the conserved additive quantum numbers of strongly interacting particles

We consider the transformation

$$\mathrm{D}(m,n)\mathbf{A} = \mathbf{V}_{m,n} = \begin{pmatrix} G_1 \\ G_2 \end{pmatrix}, \tag{1}$$

with the matrix-function

$$\mathrm{D}(m,n) = \begin{pmatrix} \sin\frac{\pi}{3}m & \sin\frac{\pi}{3}n \\ \cos\frac{\pi}{3}m & \cos\frac{\pi}{3}n \end{pmatrix}, \tag{2}$$

where the vector $\mathbf{A} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$. Then we will be interested in the transformation properties (1), when the arguments m and n in the matrix-function (2) assume only the following values: 0, ±1, ±2, ±3,… and so on. In general case, the vectors $\mathrm{V}_{m,n}$ obtained from the transformation (1) have the following view

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$$\mathbf{V}_{m,n} = \begin{pmatrix} \sin\frac{\pi}{3}m + \sin\frac{\pi}{3}n \\ \cos\frac{\pi}{3}m + \cos\frac{\pi}{3}n \end{pmatrix} \tag{3}$$

Substituting in (3) different values for the pairs of integer numbers m and n for which $n \neq m \pm 6r$, where r is an integer number or zero, we obtain twelve different vectors $\mathbf{V}_{m,n}$

$$\begin{aligned}
&\overset{\{\Delta^{++}\}}{\mathbf{V}}_{0,1} = \begin{pmatrix} \frac{\sqrt{3}}{2} \\ \frac{3}{2} \end{pmatrix}, \overset{\{\Delta^{+},\mathrm{P}^{+}\}}{\mathbf{V}}_{0,2} = \begin{pmatrix} \frac{\sqrt{3}}{2} \\ \frac{1}{2} \end{pmatrix}, \overset{\{\mathrm{D}^{+}\}}{\mathbf{V}}_{1,2} = \begin{pmatrix} \sqrt{3} \\ 0 \end{pmatrix}, \overset{\{\Delta^{0},\mathrm{N}\}}{\mathbf{V}}_{1,3} = \begin{pmatrix} \frac{\sqrt{3}}{2} \\ -\frac{1}{2} \end{pmatrix}, \\
&\overset{\{\Delta^{-}\}}{\mathbf{V}}_{2,3} = \begin{pmatrix} \frac{\sqrt{3}}{2} \\ -\frac{3}{2} \end{pmatrix}, \overset{\{\pi^{-}\}}{\mathbf{V}}_{2,4} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}, \overset{\{\bar{\Delta}^{--}\}}{\mathbf{V}}_{3,4} = \begin{pmatrix} -\frac{\sqrt{3}}{2} \\ -\frac{3}{2} \end{pmatrix}, \overset{\{\bar{\Delta}^{-},\bar{\mathrm{P}}^{-}\}}{\mathbf{V}}_{3,5} = \begin{pmatrix} -\frac{\sqrt{3}}{2} \\ -\frac{1}{2} \end{pmatrix}, \\
&\overset{\{\bar{\mathrm{D}}^{-}\}}{\mathbf{V}}_{4,5} = \begin{pmatrix} -\sqrt{3} \\ 0 \end{pmatrix}, \overset{\{\bar{\Delta}^{0},\bar{\mathrm{N}}\}}{\mathbf{V}}_{4,6} = \begin{pmatrix} -\frac{\sqrt{3}}{2} \\ \frac{1}{2} \end{pmatrix}, \overset{\{\bar{\Delta}^{+}\}}{\mathbf{V}}_{5,6} = \begin{pmatrix} -\frac{\sqrt{3}}{2} \\ \frac{3}{2} \end{pmatrix}, \overset{\{\pi^{+}\}}{\mathbf{V}}_{5,7} = \begin{pmatrix} 0 \\ 1 \end{pmatrix},
\end{aligned} \tag{4}$$

and also a zero vector $\overset{\{\pi^{0}\}}{\mathbf{V}}_{m+3,m} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$. In (4) we have selected the vectors $\mathbf{V}_{m,n}$, the indices of which satisfy the inequalities $0 \le m \le 5$ and $1 \le n \le 7$. There are no other vectors $\mathbf{V}_{m,n}$ with the components that are different from (4). The vectors (4) can be juxtaposed to strongly interacting particles, indicated in braces as for the components G_1 and G_2 of these vectors the following equalities occur

$$\begin{aligned} G_1 &= \tfrac{\sqrt{3}}{2}B, \\ G_2 &= Q - \tfrac{1}{2}B, \end{aligned} \tag{5}$$

where B is a baryon number and Q is an electric charge of the strongly interacting particle designated in braces in (4) in the system of units where the module of an electron charge is assumed equal to one. Substituting into (5) the values of the components G_1 and G_2 from (3) we will get the following equalities which determine the values of pairs of the conserved additive quantum numbers B and Q for the strongly interacting particles in the function of the integers m and n

$$\begin{aligned} B(m,n) &= \tfrac{2}{\sqrt{3}}\left(\sin\tfrac{\pi}{3}m + \sin\tfrac{\pi}{3}n\right), \\ Q(m,n) &= \tfrac{1}{\sqrt{3}}\left(\sin\tfrac{\pi}{3}m + \sin\tfrac{\pi}{3}n\right) + \cos\tfrac{\pi}{3}m + \cos\tfrac{\pi}{3}n. \end{aligned} \tag{6}$$

From (6) after the calculations we obtain the following possible values of pair quantum numbers B and Q:

$$\begin{aligned}
&\boxed{\begin{matrix} B(0,1)=1 \\ Q(0,1)=2 \end{matrix}} \leftrightarrow \overline{\Delta^{++},\ldots}\,\Big|, \quad
\boxed{\begin{matrix} B(0,2)=1 \\ Q(0,2)=1 \end{matrix}} \leftrightarrow \overline{\begin{matrix} \mathrm{P},\Delta^{+}, \\ \Sigma^{+},\ldots \end{matrix}}\,\Big|, \quad
\boxed{\begin{matrix} B(1,2)=2 \\ Q(1,2)=1 \end{matrix}} \leftrightarrow \overline{\mathrm{D}^{+}}\,\Big|, \\
&\boxed{\begin{matrix} B(1,3)=1 \\ Q(1,3)=0 \end{matrix}} \leftrightarrow \overline{\begin{matrix} \mathrm{N},\,\Delta^{0}, \\ \Lambda^{0},\Sigma^{0}, \\ \Xi^{0},\ldots \end{matrix}}\,\Big|, \quad
\boxed{\begin{matrix} B(2,3)=1 \\ Q(2,3)=-1 \end{matrix}} \leftrightarrow \overline{\begin{matrix} \Delta^{-}, \\ \Sigma^{-},\Xi^{-}, \\ \Omega^{-},\ldots \end{matrix}}\,\Big|, \quad
\boxed{\begin{matrix} B(2,4)=0 \\ Q(2,4)=-1 \end{matrix}} \leftrightarrow \overline{\begin{matrix} \pi^{-}, \\ \mathrm{K}^{-}, \\ \ldots \end{matrix}}\,\Big|, \\
&\boxed{\begin{matrix} B(3,4)=-1 \\ Q(3,4)=-2 \end{matrix}} \leftrightarrow \overline{\bar{\Delta}^{--}}\,\Big|, \quad
\boxed{\begin{matrix} B(3,5)=-1 \\ Q(3,5)=-1 \end{matrix}} \leftrightarrow \overline{\begin{matrix} \bar{\mathrm{P}},\bar{\Delta}^{-}, \\ \bar{\Sigma}^{-},\ldots \end{matrix}}\,\Big|, \quad
\boxed{\begin{matrix} B(4,5)=-2 \\ Q(4,5)=-1 \end{matrix}} \leftrightarrow \overline{\bar{\mathrm{D}}^{-}}\,\Big|,
\end{aligned} \tag{7}$$

$$\boxed{\begin{matrix} B(4,6)=-1 \\ Q(4,6)=0 \end{matrix}} \leftrightarrow \left.\overline{\begin{matrix} \bar{\mathrm{N}}, \bar{\Delta}^0, \\ \bar{\Lambda}^0, \bar{\Sigma}^0, \\ \bar{\Xi}^0, \ldots \end{matrix}}\right|, \quad \boxed{\begin{matrix} B(5,6)=-1 \\ Q(5,6)=1 \end{matrix}} \leftrightarrow \left.\overline{\begin{matrix} \bar{\Delta}^+, \\ \bar{\Sigma}^+, \bar{\Xi}^+, \\ \bar{\Omega}^+, \ldots \end{matrix}}\right|, \quad \boxed{\begin{matrix} B(5,7)=0 \\ Q(5,7)=1 \end{matrix}} \leftrightarrow \left.\overline{\begin{matrix} \pi^+, \\ \mathrm{K}^+, \\ \ldots \end{matrix}}\right|,$$

$$\boxed{\begin{matrix} B(3,0)=0 \\ Q(3,0)=0 \end{matrix}} \leftrightarrow \left.\overline{\begin{matrix} \pi^0, \mathrm{K}^0, \\ \bar{\mathrm{K}}^0, \ldots \end{matrix}}\right|,$$

where D^+ and $\bar{\mathrm{D}}^-$ are dibarions that are designated in a quark model as $uuuddd$ and $\overline{uuuddd}$ accordingly. The calculated values of the number pairs B and Q, as it can be easily seen, coincide with the well-known values of these numbers for all strongly interacting particles under examination [1], designated in (7). These results are unknown in the Standard model.

3 Distribution regularities for the conserved additive quantum numbers of weakly interacting particles

Now let us consider the range of values for the numbers m and n in which $n = m \pm 6r$, where r is an integer number or zero. Then from (3) we obtain the vectors

$$\mathbf{V}_{m,m} = \begin{pmatrix} G_1 \\ G_2 \end{pmatrix} = \begin{pmatrix} \sin\frac{\pi}{3}m + \sin\frac{\pi}{3}m \\ \cos\frac{\pi}{3}m + \cos\frac{\pi}{3}m \end{pmatrix} \tag{8}$$

Substituting the values of these numbers into (3) we obtain only six different vectors.

$$\begin{gathered} \overset{\{W^+\}}{\mathbf{V}}_{0,0} = \begin{pmatrix} 0 \\ 2 \end{pmatrix}, \overset{\{l^+\}}{\mathbf{V}}_{1,1} = \begin{pmatrix} \sqrt{3} \\ 1 \end{pmatrix}, \overset{\{\bar{\nu}_l\}}{\mathbf{V}}_{2,2} = \begin{pmatrix} \sqrt{3} \\ -1 \end{pmatrix}, \\ \overset{\{W^-\}}{\mathbf{V}}_{3,3} = \begin{pmatrix} 0 \\ -2 \end{pmatrix}, \overset{\{l^-\}}{\mathbf{V}}_{4,4} = \begin{pmatrix} -\sqrt{3} \\ -1 \end{pmatrix}, \overset{\{\nu_l\}}{\mathbf{V}}_{5,5} = \begin{pmatrix} -\sqrt{3} \\ 1 \end{pmatrix}. \end{gathered} \tag{9}$$

In (9) the vectors $\mathbf{V}_{m,m}$ for the values $0 \le m \le 5$ have been presented. The vectors (9) can be juxtaposed to the weakly interacting particles, for example, the particles of the first generation indicated in braces as it is easy to notice that between the components G_1 and G_2 of the vectors $\mathbf{V}_{m,m}$ and the additive numbers L_e and Q of the juxtaposed particles the equalities occur

$$\begin{aligned} G_1 &= -\sqrt{3}L_e, \\ G_2 &= L_e + 2Q, \end{aligned} \tag{10}$$

where L_e is a lepton number and Q is an electric charge of the weakly interacting particle in the system of units where the module of an electron charge is taken equal to one. Substituting into (10) the values of the components G_1 and G_2 from (8) we get the following equalities defining the values of pairs of the conserved additive quantum numbers $L = L_e(L_\mu, L_\tau)$ and Q for the weakly interacting particles in the function of number m

$$\begin{aligned} L(m,m) &= -\tfrac{2}{\sqrt{3}}\sin\tfrac{\pi}{3}m, \\ Q(m,m) &= \tfrac{1}{\sqrt{3}}\sin\tfrac{\pi}{3}m + \cos\tfrac{\pi}{3}m. \end{aligned} \tag{11}$$

From (11) after the calculations we obtain the following possible values of pair quantum numbers $L(L_e, L_\mu, L_\tau)$ and Q:

$$\boxed{\begin{array}{l}L(0,0)=0\\ Q(0,0)=1\end{array}} \leftrightarrow \overline{\mathrm{W}^{+}}\Big|, \quad \boxed{\begin{array}{l}L(1,1)=-1\\ Q(1,1)=1\end{array}} \leftrightarrow \overline{\begin{array}{l}e^{+},\mu^{+},\\ \tau^{+}\end{array}}\Big|, \quad \boxed{\begin{array}{l}L(2,2)=-1\\ Q(2,2)=0\end{array}} \leftrightarrow \overline{\begin{array}{l}\bar{\nu}_e,\bar{\nu}_\mu,\\ \bar{\nu}_\tau\end{array}}\Big|,$$

$$\boxed{\begin{array}{l}L(3,3)=0\\ Q(3,3)=-1\end{array}} \leftrightarrow \overline{\mathrm{W}^{-}}\Big|, \quad \boxed{\begin{array}{l}L(4,4)=1\\ Q(4,4)=-1\end{array}} \leftrightarrow \overline{\begin{array}{l}e^{-},\mu^{-},\\ \tau^{-}\end{array}}\Big|, \quad \boxed{\begin{array}{l}L(5,5)=1\\ Q(5,5)=0\end{array}} \leftrightarrow \overline{\begin{array}{l}\nu_e,\nu_\mu,\\ \nu_\tau\end{array}}\Big|, \qquad (12)$$

$$\boxed{\begin{array}{l}L=L(0,0)+L(3,3)=0\\ Q=Q(0,0)+Q(3,3)=0\end{array}} \leftrightarrow \overline{\mathrm{Z}^{0}}\Big|.$$

Whence it is clear, that the calculated values for the pair numbers $L(L_e, L_\mu, L_\tau)$ and Q exactly coincide with those that are known for the weakly interacting particles designated in (12). These results are unknown in the Standard model.

The vector with components $G_1 = 0$ and $G_2 = 0$ can be obtained by adding the vectors $\mathbf{V}_{m,m} + \mathbf{V}_{m+3,m+3}$. This vector can be put in correspondence with Z^0-bozon, as in this case $L = 0, Q = 0$. Therefore, all the known values of the pair numbers L_e and Q, L_μ and Q, L_τ and Q for the weakly interacting particles and antiparticles follow from the transformation (1) and appear to be the functions of the integer m.

4 On the distribution law of the conserved additive quantum numbers of subatomic particles

The transformation (1) with the matrix-function (2) in fact can be regarded as the distribution law of the pair additive quantum numbers B and Q for the strongly interacting particles and antiparticles and also L and Q for the weakly interacting particles and antiparticles. Specifying any integer values for the numbers m and n in the equalities (6) and (11) we can get the values for the pairs of the conserved additive numbers of real subatomic particles and antiparticles. The universality of this law is stipulated by the fact that it is not based on some specific model of particles. On the contrary, the whole spectrum of the observable values for the pairs of additive quantum numbers B and Q for the strongly interacting particles and antiparticles and also L and Q for the weakly interacting particles and antiparticles follows from it. The values B and Q for the quarks and antiquarks are only absent.

The transformation (1) with matrix (2) also allows describing mutual transformation of the subatomic particles. It is caused by the properties of the matrix-function (2). Indeed, from (1) we get the equalities

$$\mathrm{D}(m,n)\mathbf{A} = \mathrm{D}(m+1,n+1)\mathbf{A} + \mathrm{D}(m-1,n-1)\mathbf{A} \qquad (13)$$

that are true for any integer numbers m and n, or the equalities for the vectors (4)

$$\mathrm{D}(m,n)\mathbf{A} = \mathrm{D}(m,n+1)\mathbf{A} + \mathrm{D}(m-1,n)\mathbf{A} \qquad (14)$$

Whence for the vectors $\mathbf{V}_{m,n}$ we get the equalities

$$\mathbf{V}_{m,n} = \mathbf{V}_{m+1,n+1} + \mathbf{V}_{m-1,n-1}, \qquad (15)$$

$$\mathbf{V}_{m,n} = \mathbf{V}_{m,n+1} + \mathbf{V}_{m-1,n} \qquad (16)$$

The vector equalities (15, 16), as it can be easily seen, describe transformation of the subatomic particles at which the components G_1 and G_1 remain as well as the numbers B and Q or L and Q remain separately due to the equalities (5) and (10). For example, the equality (15) $\mathbf{V}_{3,3} = \mathbf{V}_{4,4} + \mathbf{V}_{2,2}$ according to (9) represents the transformation $\mathrm{W}^- \to l^- + \bar{\nu}_l$ under which the numbers L_e and Q remain separately. And, for example, such equalities (14) as $\mathbf{V}_{1,2} = \mathbf{V}_{1,3} + \mathbf{V}_{0,2}$ and $\mathbf{V}_{2,3} = \mathbf{V}_{2,4} + \mathbf{V}_{1,3}$ according to (4) represent the transformations $D^+ \to P^+ + N^0$ and $\Delta^- \to N^0 + \pi^-$ accordingly under which the numbers B and Q remain separately.

5 Subatomic particles as different states of the same microcosm object

The transformation (1) with the matrix-function (2) and following from it the corollaries that can be seen from the equalities (7), (12), (15) and (16) makes it possible to suggest the following concept of the nature of the subatomic particles. As far as all the vectors $\mathbf{V}_{m,m}$ are obtained from the same vector $\mathbf{A}$ after the transformation (1) and these vectors can be associated with hadrons, leptons, their antiparticles, $W^{\pm}$-and Z^0-bozons then the vector $\mathbf{A}$ also can be associated with one object of the microcosm, different states of which are the mentioned particles and their antiparticles.

The object with such properties is named in [1] as bastron. It is supposed that a bastron doesn't consist of any parts, each of which could exist independently outside a bastron. These assumptions are based on the fact that the weakly interacting particles regarded as bastron states are not composed of other particles, and the structure of hadrons, as the bastron states, is so that its component (quark) cannot exist independently outside a hadron.

We designate the bastron in some state as a function $B(\mathbf{V}_{m,n})$. The vector $\mathbf{V}_{m,n}$ will be named as a vector of the bastron state with the quantum numbers *m* and *n*. Distribution regularities of the state vectors $\mathbf{V}_{m,n}$ which differ in the values for the pairs of the conserved additive quantum numbers *L* and *Q* or *B* and *Q* can be seen if we represent the vectors $\mathbf{V}_{m,n}$ in the form of the radius-vectors, the coordinates of their ends being equal to the components G_1 and G_2 on the plane (G_1, G_2) (fig.1).

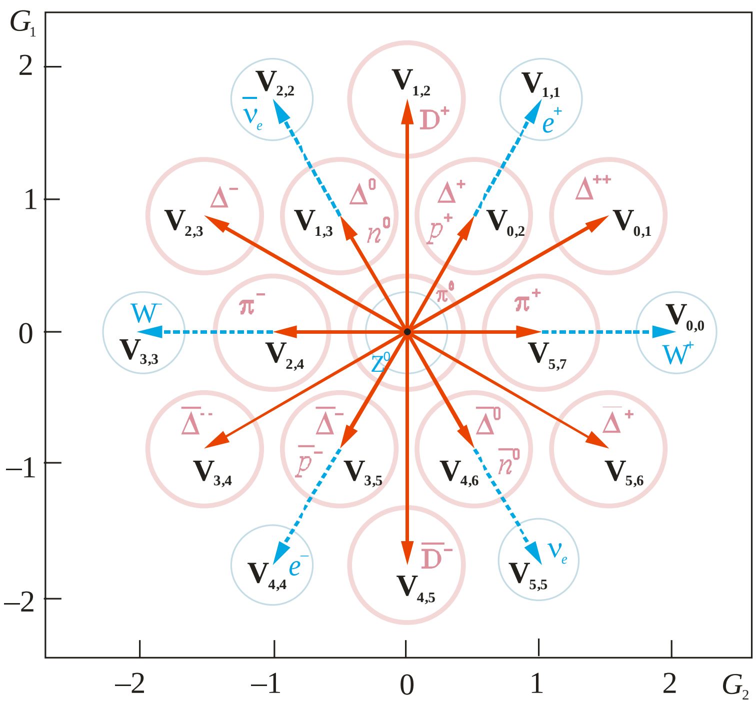

Figure 1: *The vector-diagrams of the bastron states*:
a) The radius-vectors $\mathbf{V}_{m,m}$ *for the bastron states juxtaposed to weakly interacting particles and antiparticles, b) The radius-vectors* $\mathbf{V}_{m,n}$ *for the bastron states juxtaposed to hadrons and their antiparticles.*

The modules of the radius-vectors $\mathbf{V}_{m,m}$ corresponding the weakly interacting particles are identical and the angles between them are multiple of $\pi/3$. The modules of groups of the radius-vectors $\mathbf{V}_{m,m+1}$ are identical as well as with the vectors $\mathbf{V}_{m,m+2}$, and the angles between the radius-vectors of the states $\mathbf{V}_{m,n}$ corresponding hadrons are multiple of $\pi/6$. For the radius-vectors $\mathbf{V}_{m,m}$ shown in Fig.1, *a* the equalities (15) occur, and for the radius-vectors $\mathbf{V}_{m,n}$ the equalities (15) and (16) occur. They describe different possible transformations of the bastron states.

It is obvious from the equalities (7) and (12) that antiparticles are the same bastron states as the particles. If the state vector $\mathbf{V}_{m,n}$ corresponds to a particle, then the state vector $\mathbf{V}_{m+3,n+3} = -\mathbf{V}_{m,n}$ corresponds to an antiparticle.

6 Transformation of the bastron states

Now we consider the transformation of subatomic particles as the states of a bastron. Transmutation of such particles occurs as a result of a bastron transition from one state into another. Let us consider this process at greater length. Let the bastron changes over from the state $B(\mathbf{V}_{m,n})$ to the state $B(\mathbf{V}_{m+1,n+1})$ or $B(\mathbf{V}_{m,n+1})$. Then it follows from the equalities (15) or (16) that this transition is accompanied by appearance of a new bastron in the state $B(\mathbf{V}_{m-1,n-1})$ or $B(\mathbf{V}_{m-1,n})$ accordingly. According to the stated concept the initial bastron, as it can be seen from the equalities (13) and (14), transforms into two bastrons in other states. However, it is incorrect to consider this process as a division of the initial bastron into two parts. A bastron doesn't contain any parts it could be divided into. Therefore the processes (13) and (14) are due to the mechanism that doesn't break the integrity of a bastron. The main point of this mechanism is in the following. When the bastron changes over from the state $B(\mathbf{V}_{m,n})$ to the state $B(\mathbf{V}_{m+1,n+1})$ the vector of a new state $\mathbf{V}_{m+1,n+1}$ can be presented according to (15) in the form of

$$\mathbf{V}_{m+1,n+1} = \mathbf{V}_{m,n} + (-\mathbf{V}_{m-1,n-1})\,. \tag{17}$$

The equalities (17) can be interpreted in the following way: in the transition $B(\mathbf{V}_{m,n}) \to B(\mathbf{V}_{m+1,n+1})$ the bastron in the state of $B(\mathbf{V}_{m,n})$ entirely absorbs a virtual bastron in the state of $B(-\mathbf{V}_{m-1,n-1})$ taken from a virtual pair of bastrons $\left[B(-\mathbf{V}_{m-1,n-1}) + B(\mathbf{V}_{m-1,n-1})\right]_{\text{virt}}$. Following which the second virtual bastron of this pair in the state of $B(\mathbf{V}_{m-1,n-1})$ becomes real (Fig.2, *a*). We should note here that if the vector $\mathbf{V}_{m,n}$ corresponds to the particle, then the vector $-\mathbf{V}_{m,n} = \mathbf{V}_{m+3,n+3}$ corresponds to the antiparticle.

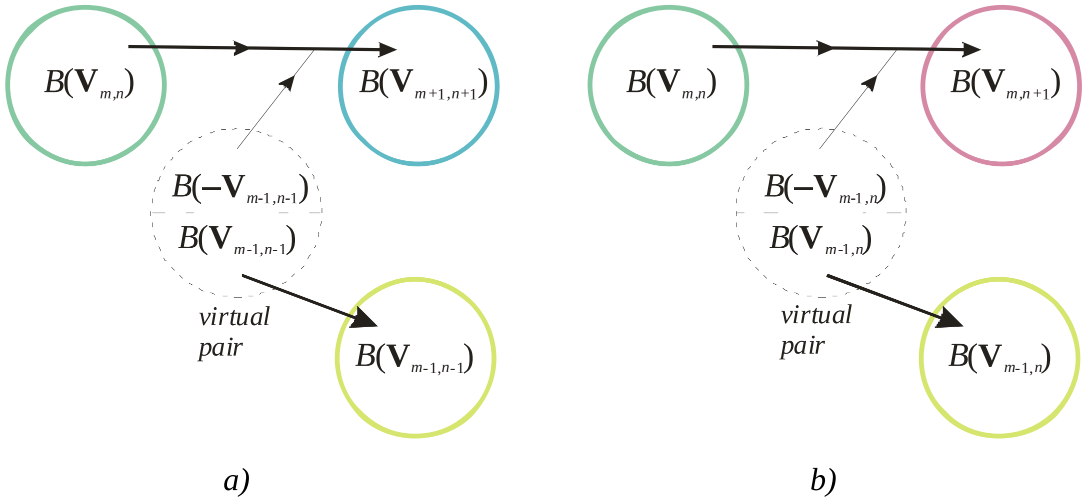

Figure 2: *a) The bastron transition from the state* $B(\mathbf{V}_{m,n})$ *to the state* $B(\mathbf{V}_{m+1,n+1})$ *and appearing of a new bastron in the state of* $B(\mathbf{V}_{m-1,n-1})$, *b) The bastron transition from the state* $B(\mathbf{V}_{m,n})$ *to the state* $B(\mathbf{V}_{m,n+1})$ *and appearing of a new bastron in the state of* $B(\mathbf{V}_{m-1,n})$.

In the examined process the initial bastron absorbs a virtual bastron completely rather than some its part, and after this the second bastron of the virtual pair becomes the real one. This bastron emerges entirely from the vacuum and is not built up of some parts. Therefore, the number of bastrons may not conserve when its state is changing, and for these processes it is not required at all the bastron to consist of some parts. The bastron always participate in any processes as a whole object, as a structural unit of matter [4].

7 Conclusions

In the presented concept based on the law of distribution of pair additive quantum numbers the independent subatomic particles and antiparticles observed in nature are considered to be different states of the same microcosm object called a bastron. From the law of distribution of pair additive quantum numbers it follows that there are two groups of the bastron states which differ in values of quantum numbers. The smaller group in number is easy to be put in correspondence with the weakly interacting particles and antiparticles, and the larger one in number – to the hadrons and their antiparticles.

In the presented concept only the bastron states can be independent states. The properties of quarks don’t correspond to the bastron states and perhaps due to this fact they don’t exist as free particles. The idea of a bastron is indirectly confirmed by the fact that the quarks have failed to be discovered outside hadrons yet. The concept briefly presented here can be called a bastron pattern of the microcosm. In this pattern there is no absolute elementary object the subatomic particles would consist of, but the subatomic particles as different states of the bastron appeared as a result of the primary matter decay and therefore the states of the bastron corresponding to the antiparticles could not appear.

The concept of a bastron can be briefly expressed as follows: any subatomic particle or its antiparticle is a bastron in some definite state. Therefore, a bastron is more general concept than a subatomic particle. It can be described only with a range of states in which it can be.

8 Reference

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