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## ATOMS STRUCTURE

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### The Summary

Under the action of ethereal pressure protons that have to be of spherical form can press themselves one to other creating formations of 2 or more units, the forces of this mutual pressing being scientifically named as forces of strong interaction. The said formations under the action of contacting them ethereal particles rotate around their centers of mass, and this rotation has been scientifically named as spin. Formations of two mutually pressed protons depending on in what plane there occur their rotation can form either a) a hydrogen molecule, if the rotation occurs in a plane going through the contact point of the protons and is perpendicular to the straight-line segment connecting their centers, or b) a deuterium nucleus, if it rotates in a plane that contains the said straight-line segment. Formations of 3 and more protons rotate in planes that contain all the centers of these protons. The centers of protons belonging to formations of 3 and more units place themselves in centers of regular polygons. The said protons formations represent nuclei of atoms and ions of respective chemical elements and their isotopes. Electric charges of chemical elements are determined by the atomic nuclei side projections areas that are approximately equal to their respective Periodic Table ordinal numbers. Under the action of ethereal pressure (strong interaction) electrons that have to be of spherical form can press themselves one to other creating formations of 2 or more units. Electrons and their said formations can create atoms or their ions electronic shells. Each of the electronic shells contains either 2 electrons or 2 above described electronic formations, one of these electrons or electronic formations rotating around the nucleus in one direction, while the other rotating in the opposite direction. Resulting of the oncoming rotation of electrons or their formations of an electronic shell: a) there form photons, b) there is provided the atoms' and their ions' position stabilization in space. The elements' ordinal numbers are determined by the number of electron or planeton shells. Atoms that are electrically neutral structures while losing one by one their electron or planeton shells gradually transform themselves in positive ions of sequentially arousing orders. Electronic shells differ themselves by the numbers of electrons composing their planetons. In each planetary system the ether-born resistances to the rotation of its satellites, which may be star system planets, planets' satellites, and electrons or planetons of atoms, molecules, and their ions have to be equal. The said resistances equal the product of the perimeter of the satellite projection to a plane perpendicular to the direction of its movement and the linear speed of this movement. Helium atom has two electronic shells, one of which contains a pair of dyads that are formations of two electrons, and the other – a pair of triads that are formations of three electrons.

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### Atomic nuclei structures

According to modern scientific views atomic nuclei, on one hand, have their masses and, on the other hand, - the electric charges that determine the ordinal number of the respective element. The values of

masses and charges are not interconnected, but the statistics suggests that their mean relation is 2:1, whereas hydrogen, for which these values are meant to be equal, makes an exception. In order to explain such relation the modern science proposes an atomic nucleus buildup scheme, according to which it is composed of positively charged protons and nearly equal number of neutrally charged neutrons of a virtually equal mass. Due to such buildup the mass of a nucleus is determined by the combined number of protons and neutrons, while its charge as well as its ordinal number – just by the number of protons. Surely those neutrons that are presumably hidden inside the atomic nuclei have never been neither examined nor measured, whereas those which had been discovered by Sir Chadwick, and those (fast and slow), with which deal the explorers of nuclear reactions, may not be necessarily associated with the hypothetical neutrons of atomic nuclei.

In my article [1] there was shown that mass and charge are the notions absolutely identical as to their physical sense, because they are nothing else than screening areas, and this assertion if only to associate the mass and charge of an atom with the same screening area would totally contradict the above disclosed official conception.

However my assertion does not mean that the mass and charge of an atomic nucleus have to associate themselves with the same screening area. On the contrary, if the nucleus is not spherical one then, dependent on viewpoint, its screening areas have to be of different values, and in this case there only remain to find such form of nuclei, whose screening areas would correlate as the masses and charges of real atomic nuclei.

Certainly the nucleus of protium that is composed with only one proton of presumably spherical form must be of equal mass and charge independently of the viewpoint. The hydrogen molecule described in my article [2] has a charge 2 and as composed with two protons has also the mass of 2.

Making the idea about the buildup of more complicated nuclei, one needs to take into account that simultaneously they remain under the action of pressing forces of the so called strong interaction, as well as under the action of breaking strengths created by their rotation (the so called spin).

The modern science believes that the protons and neutrons of atomic nuclei are kept together due to the mentioned strong interaction, whose nature does not remain completely understood. Nevertheless if to accept the existence of the gaseous ether that fills up all the existing space, including that surrounding the nuclear protons, and to agree that the pressure of this ethereal environment is of such fantastic value as  $1.07 \cdot 10^{51} \text{ Nm}^{-2}$  [1], there is no surprise that the inter-contacting protons are pressed one to another by the ethereal particles similarly to the famous Magdeburg hemispheres that were pressed one to another by the atmospheric particles.

Accounting for the mentioned pressing and breaking forces, the most probable nuclear structure seems to have form of a closed circular chain (necklace) of pressed together protons. Such a structure would be symmetric to the axe of rotation and successfully resistant either to the rupture under the action of eccentric forces, or to its squeezing by the strong interaction.

Fig. 1a, 2a, and 3a show top views of helium-4, lithium-7 and beryllium nuclei appropriate to the proposed conception. The areas of these figures are equal to the atomic masses A. Fig. 1b, 2b and 3b show the greatest and the fig. 1c, 2c, and 3c – the smallest as to their areas profile projections of the fig. 1a, 2a, and 3a. Although depending on the viewpoint the nuclei can create not only the shown but other projections of different forms and dimensions, those that are represented on the drawing have just those areas which screen the orbital electrons and are equivalent to the charges of the nuclei.

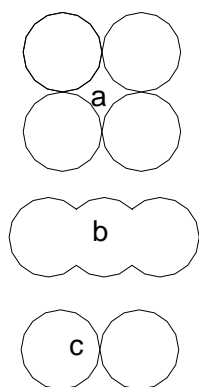


Fig.1

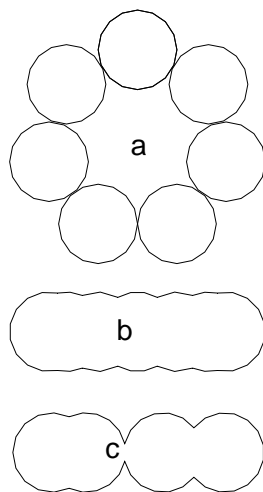


Fig.2

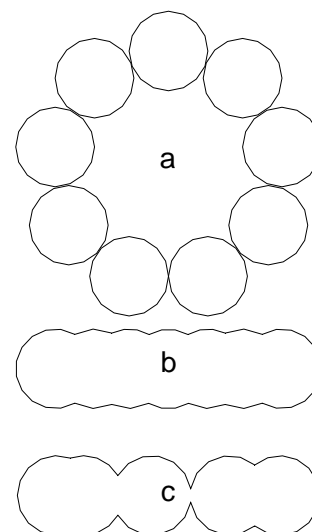


Fig.3

If to take the screening area of proton equal to 1, then relatively to this unit area the areas of the projections b and c for the depicted helium-4, lithium-7 and beryllium when calculated with the program Autocad-2009 will make 2.6366 and 2, with average of **2.3183**, 4.3086 and 4.2446, with average of **4.2766**, and 5.0656 and 4.5185, with average of **4.7920**. The obtained values differ from the accepted by the modern science values of charges that according to the modern scientific conception have to coincide with the ordinal numbers of elements in the Periodic Table. For helium such number has to be 2, for lithium – 3, and for beryllium – 4.

In order to find out the profile projections areas for elements heavier than beryllium I propose an approximate formula  $F = \frac{4n}{\pi^2} + 1$ , which even for beryllium gives  $F = 4.647$  that diverges from the value obtained with Autocad by about 1%. The side projections areas calculated with the proposed formula that is the charges of heavier elements are shown in the Table 1.

Table 1

Nr. of element and its symbol		Mass of prevailing isotope	Mean side projection area	Nr. of element and its symbol		Mass of prevailing isotope	Mean side projection area	Nr. of element and its symbol		Mass of prevailing isotope	Mean side projection area
1	2	3	4	1	2	3	4	1	2	3	4
5	B	11	5.458	35	Br	80	33.423	65	Tb	159	65.440
6	C	12	5.863	36	Kr	84	35.044	66	Dy	162	66.656
7	N	14	6.674	37	Rb	85	35.449	67	Ho	165	67.872
8	O	16	7.485	38	Sr	88	36.665	68	Er	167	68.683
9	F	19	8.700	39	Y	89	37.070	69	Tm	169	69.493

10	Ne	20	9.106	40	Zr	91	37.881	70	Yb	173	71.114
11	Na	23	10.322	41	Nb	93	38.691	71	Lu	175	71.925
12	Mg	24	10.727	42	Mo	96	39.907	72	Hf	178	73.141
13	Al	27	11.943	43	Tc	99	41.123	73	Ta	181	74.357
14	Si	28	12.348	44	Ru	101	41.934	74	W	184	75.572
15	P	31	13.564	45	Rh	103	42.744	75	Re	186	76.383
16	S	32	13.969	46	Pd	106	43.960	76	Os	190	78.004
17	Cl	35	15.185	47	Ag	108	44.771	77	Ir	192	78.815
18	Ar	40	17.211	48	Cd	112	46.392	78	Pt	195	80.031
19	K	39	16.806	49	In	115	47.608	79	Au	197	80.841
20	Ca	40	17.211	50	Sn	119	49.229	80	Hg	201	82.462
21	Sc	45	19.238	51	Sb	122	50.445	81	Tl	204	83.678
22	Ti	48	20.454	52	Te	128	52.876	82	Pb	207	84.594
23	V	51	21.670	53	I	127	52.471	83	Bi	209	85.705
24	Cr	52	22.075	54	Xe	131	54.092	84	Po	209	85.705
25	Mn	55	23.291	55	Cs	133	54.903	85	At	210	86.110
26	Fe	56	23.696	56	Ba	137	56.524	86	Rn	222	90.973
27	Co	59	24.912	57	La	139	57.335	87	Fr	223	91.378
28	Ni	59	24.912	58	Ce	140	57.740	88	Ra	226	92.594
29	Cu	64	26.938	59	Pr	141	58.145	89	Ac	227	93.000
30	Zn	65	27.344	60	Ne	144	59.361	90	Th	232	95.026
31	Ga	70	29.370	61	Pm	145	59.766	91	Pa	231	94.621
32	Ge	73	30.586	62	Sm	150	61.793	92	U	238	97.458
33	As	75	31.396	63	Eu	152	62.603				
34	Se	79	33.017	64	Gd	157	64.630				

As one can see from the Table 1, the values of the side projection areas for the atomic nuclei of the proposed model generally coincide with the charges accepted for the plurality of elements; the visible differences are of non-essential character, which evidence the correctness of the found nucleus model and the needless to use the nuclear neutrons concept for the explanation of nuclear structure.

Besides, the analysis of the Table 1 suggests that the ordinal numbers of elements do not determine themselves by the charges of their nuclei, especially as for different isotopes of the same element such charges are different. Nevertheless although the elements' ordinal numbers are not identical to the atomic nuclei' charges, their relation to the nuclei' charges indubitable exists.

#### Atoms and ions electronic shells buildups

According to modern scientific views atom is an electrically neutral structure, the number of its nuclear protons being exactly the same as the number of its electronic shells electrons. If for some reason an atom lose one of its electrons it transforms itself to a positively charged ion or cation, and if it is for instance an atom of potassium K the respective ion deprived of one of its electrons would be designated as  $K^+$ , or also as K II, while the neutral potassium would be designated as K or K I. If the cation K II loses the next electron it would become double ionized and would be designated as KIII, or  $K^{++}$ . In spite of every next ionization needs even greater efforts the American National Institute of Standards and Technology (NIST) has collected and posted in Internet a richest information about the radiation spectra of not only the principal elements of the Periodic Table but in some measure of all their positive ions. As it needs to expect the number of these positive ions for each of elements is equal to its ordinal number minus one, and this one is the so called neutral ion supplied with full set of electrons, while the last of

the cations has only one electron. As to just where in atoms and ions are placed electrons the modern science gives no answer.

If to adhere to the planetary model of atom proposed by Rutherford and which I used while studying hydrogen molecule [2] and helium atom [3], and if to abandon the postulate stipulating that the number of nuclear protons must equal the number of atomic electrons, atom may be imagined as a planetary system with a nucleus as the central body and pairs of oppositely rotating around the central body planetons (structures composed with one or several electrons). As it was explained in the last of the cited sources, just due to the planetons create the oppositely rotating pairs, there generate in atom primary electromagnetic waves that afterwards generate photons. Each of the pairs of planetons have to place itself on its proper orbit or shell, and each planeton has to be composed with a certain number of electrons connected one to another by the “strong interaction”. The fact that atomic planetons are placed on orbits of different radii and have different angular velocities could be explained by that they have different amounts of electrons if only there were clear in what way the amount of electrons in a planeton could influence the radius of its orbit. The clarification of the problem makes one of the aims of this study.

As it was shown in my previous article [2] the electron shell of hydrogen molecule is composed with two electrons orbiting the molecule nucleus in opposite directions on a principally the same orbit, and the rotation frequency of these electrons may be determined as

$$\nu = cR = 3.2887 \cdot 10^{15} \text{ s}^{-1},$$

where  $R$  is the Rydberg constant, and  $c$  designates the speed of light.

The described buildup of the electronic shell assures the molecule’s stability as well as forming photons with frequencies subordinated to the famous Balmer-Rydberg formula [4]. As to the atom of hydrogen (protium), those affirmations concerning this atom that fill the quantum mechanics manuals beginning with the hydrogen atom model proposed by Niels Bohr that supposedly had explained this formula do not support critics; and to affirm that such atom exists at all would be very and very difficult.

In my article [3] on the basis of an analysis of helium atom radiation spectrum there was proposed a model, in which the electronic shell of helium atom had to be built with at least two different photon generating factors, one of which was proposed to be a pair of electrons, and the other – a pair of dyads. There was proposed that the last had to be formed each with two electrons pressed one to another by the forces of “strong interaction”. The electrons and dyads had to rotate in a common plane (plane of orbits) at different distances to the atom’s nucleus and respectively with different angular velocities. In addition to the rotation about the atom’s nucleus, each dyad had to rotate about its own center of masses in a plane that had to coincide with the plane of orbits.

The performed in the article analysis of the existing data about the helium atom electromagnetic radiation wave lengths has made it possible to find out that the angular velocities of the photon-generating factors (pair of dyad and pair of electrons) placed on two different orbits relate one to another as 1:1.35, although at that time I failed to explain the existence of such relation.

One of the aims of the study is besides all other to explain the nature of this relation.

To the base of the proposed explanation is laid a hypothesis on the nature of the ether’s resistance to movement through it of physical bodies. When a body moves through space with certain acceleration, then according to the II law of Newton it incurs a resistance that equals the product of its mass and the

acceleration. If though the body moves uniformly and rectilinearly it is thought that according to the 1-st law of Newton (the law of inertia) it does not encounter any resistance. Spreading the idea onto an orbital movement of a body on a circular orbit one may suggest that the component of this movement directed to the center of rotation encounters resistance of the inertial forces in form of an eccentric force, while its tangential component has not to encounter any resistance. The last contradicts the conclusions made in my book [5] stating that even on account of the gravitational signals spreading speed finiteness, rotation of astronomic bodies incurs the resistance of ethereal environment that may by analogy be extended to rotation of atomic and molecular planetons.

The above formulated hypothesis is based on two postulates:

- 1) In each planetary system the resistances exerted by ether to the rotation therein of its satellites, which satellites may be star systems planets, or electrons and planetons of atoms and molecules have to be equal;
- 2) The said resistances are equal to the product of the perimeter of the satellite projection to a plane perpendicular to its movement direction, and of its movement linear speed.

It is necessary to note that the correctness of the proclaimed postulates has found its confirmation by the examples of the solar system planets and their main satellites, in my last article [4].

#### Helium atom electronic shells structures found based on the proclaimed postulates

With reference to the proposed in the article [3] helium atom model, one may compose an equation stating the equality of the resistances applied to the movement of an electron of the one orbit and of a dyad of the other orbit:

$$p_1 v_1 = p_2 v_2 \quad (1).$$

Here  $p_1$  and  $p_2$  are perimeters of the projections of the first and second factors (electrons and dyads) on plains perpendicular to the directions of their movements, and  $v_1$  and  $v_2$  are their linear speeds.

The perimeter  $p_1$ , being taken as one, one can calculate the perimeter  $p_2$  by means of finding the arithmetic average of the perimeters of the dyad projections on the direction of its movement.

One of such projection 4 is shown as an example on fig.4b, while the dyad itself composed with electrons 1 and 2, whose centers rotate around the mass center O along the circular trajectory 3 is represented on fig.4a.

At a certain moment the dyad is inclined to the direction of movement designated by the arrow A under the angle  $45^\circ$ , which is represented on the drawing. The perimeter of the shown projection 4 was calculated with the aid of the graphical program "Autocad 2009", as well as the perimeters of other projections corresponding to other dyad's rotational angles around the center of its mass. The arithmetic average of the found perimeters equaled 1.5. Putting to the equation (1) the found values of the mean projection perimeters of the electron and dyad, one obtain:

$$\omega_1 R_1 = 1.5 \omega_2 R_2 \quad (2), \text{ where}$$

$\omega_1$  and  $\omega_2$  are the angular velocities of the electron and dyad respectively, and  $R_1$  and  $R_2$  are the radii of their orbits. From the III law of Kepler there follow

$$\omega_1^2 R_1^3 = \omega_2^2 R_2^3 \quad (3).$$

If to rise to cube the equation (2), there will be obtained

$$\omega_1^3 R_1^3 = 3.375 \omega_2^3 R_2^3 \quad (4),$$

Resolving the last equation together with equation (3) one obtains  $\omega_1 = 3.375 \omega_2$ , which does not coincide with the relation of angular velocities 1:1.35 found in [3].

Presuming that one of the atom's electronic shell is as earlier filled with dyads, while the other can be filled not with single electrons, but with planetons formed with other number of electrons, one may compose equation (2a)

$$X \omega_1 R_1 = 1.5 \omega_2 R_2 \quad (2a),$$

and the derived there from equation (4a)

$$X^3 \omega_1^3 R_1^3 = 3.375 \omega_2^3 R_2^3 \quad (4a).$$

Resolving the last one with equation (3), there will be obtained

$$X^3 \omega_1 = 3.375 \omega_2,$$

$$\text{or } \frac{\omega_1}{\omega_2} = \frac{3.375}{X^3},$$

which indicate that *the angular velocities of atom's electronic shell electronic formations have to correlate as cubes of perimeters of their projections on a plane perpendicular to their movement direction.*

$$\text{If } \frac{\omega_1}{\omega_2} = \frac{1}{1.35} = \frac{3.375}{X^3}, \quad X = 1.65781.$$

This means that the sought electronic formation ought to have the arithmetic average perimeter of the said projections equal to **1.65781**. Calculations effected by the same methodic as those used to find the arithmetic average of the projections of dyad, have allowed to find that the arithmetic average of the projection perimeters of a triad that is a formation of three electrons, equals **1.666666**, which differ from the just found value by about 0.5%. The last gives the foundation to believe that the helium atom total electronic shell is composed with a pair of dyads filling one orbit and a pair of triad filling the other one.

$$\text{From the equation (3) there follows } \left(\frac{R_2}{R_1}\right)^3 = \left(\frac{\omega_1}{\omega_2}\right)^2, \text{ or } \frac{R_2}{R_1} = \left(\frac{\omega_1}{\omega_2}\right)^{\frac{2}{3}} = \left(\frac{3.375}{1.65781^3}\right)^{\frac{2}{3}} = 0.818678.$$

The last means that the dyads' orbit with radius  $R_2 = 0.818678 R_1$  is internal, while the triads' orbit with  $R_1 = 1.221481 R_2$  is external. The scheme of an imaginary helium atom with a pair of dyads and a pair of triads is represented on fig.5.

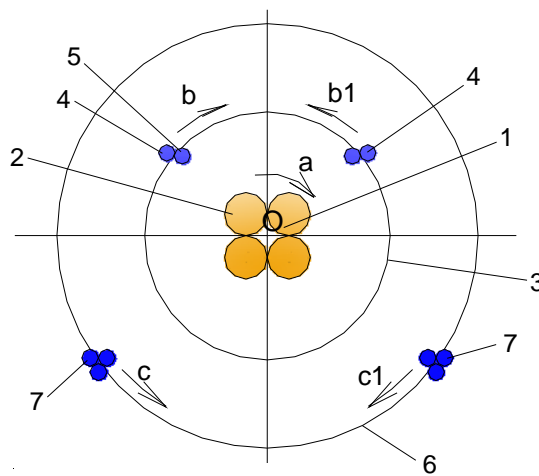


Fig.5

The atom is placed in the plane of orbits, where around the central point “O” there come about the rotation of the atom’s nucleus 1 in the direction of the arrow “a”, as well as the opposite rotation of its planetons i.e. dyads 4 in the direction of the arrows «b» and «b1» along an internal orbit 3, and triads 7 in the direction of the arrows «c» and «c1» along an external orbit 6. The atom’s nucleus 1 is composed with four protons 2 pressed one to other by the forces of “strong interaction” while the dyads and triads are respectively composed with two or three electrons 5 also pressed together by strong interaction i.e. by ethereal pressure.

The above shown data concerning the number of chemical elements positive ions together with the above represented helium atom’s model evoke that *the ordinal number of an element has to be determined by the number of orbits or shells of its total electronic shell. In their turn the orbits have to differ by the number of electrons composing the respective planetons.*

Each planeton’s structure could be determined by analyzing respective electromagnetic radiation spectra by analogy with the analysis made in [3] for helium atom.

Conclusions:

- 1) Under the action of ethereal pressure protons that have to be of spherical form can press themselves one to other creating formations of 2 or more units, the forces of this mutual pressing being scientifically named as forces of strong interaction;
- 2) The said formations under the action of contacting them ethereal particles rotate around their centers of mass, and this rotation has been scientifically named as spin;
- 3) Formations of two mutually pressed protons depending on in what plane there occur their rotation can form either a) a hydrogen molecule, if the rotation occurs in a plane going through the contact point of the protons and is perpendicular to the straight-line segment



- connecting their centers, or b) a deuterium nucleus, if it rotates in a plane that contains the said straight-line segment;
- 4) Formations of 3 and more protons rotate in planes that contain all the centers of these protons;
  - 5) The centers of protons belonging to formations of 3 and more units place themselves in centers of regular polygons;
  - 6) The said protons formations represent nuclei of atoms and ions of respective chemical elements and their isotopes;
  - 7) Electric charges of chemical elements are determined by the atomic nuclei side projections areas that are approximately equal to their respective Periodic Table ordinal numbers;
  - 8) Under the action of ethereal pressure (strong interaction) electrons that have to be of spherical form can press themselves one to other creating formations of 2 or more units;
  - 9) Electrons and their said formations can create atoms or their ions electronic shells;
  - 10) Each of the electronic shells contains either 2 electrons or 2 above described electronic formations, one of these electrons or electronic formations rotating around the nucleus in one direction, while the other rotating in the opposite direction;
  - 11) Resulting of the oncoming rotation of electrons or their formations of an electronic shell: a) there form photons, b) there is provided the atoms' and their ions' position stabilization in space;
  - 12) The elements' ordinal numbers are determined by the number of electronic shells;
  - 13) Atoms that are electrically neutral structures while losing one by one their electronic shells gradually transform themselves in positive ions of sequentially arising orders;
  - 14) Electronic shells differ themselves by the numbers of electrons composing their planetons;
  - 15) In each planetary system the ether-born resistances to the rotation of its satellites, which may be star system planets, planets' satellites, and electrons or planetons of atoms, molecules, and their ions have to be equal;
  - 16) The said resistances equal the product of the perimeter of the satellite projection to a plane perpendicular to the direction of its movement and the linear speed of this movement;
  - 17) Helium atom has two electronic shells, one of which contains a pair of dyads that are formations of two electrons, and the other – a pair of triads that are formations of three electrons.

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