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**New Insights into Microworld Organisation**

**The Model of Unity of Interaction in Nature**

**Abstract**

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## The Truth about Microworld

- Electrons and atoms are not to be taken for granted; they are formed at the birth of a New Star which rises in the sky due to electrons and atoms.

- Each atom has a nucleus, but “there is no something” in it, i.e. “there is nothing”. Electrons have a nucleus.

- Energy is transferred in portions, i.e. it is quantized, but the essence of quantum mechanics is a mathematical illusion.

- Atomic weight, valence, molecules and molecular weight are empirical facts, but they do not reveal the essence of a chemical reaction. Avogadro’s Law states the following “At a given temperature and pressure, the number of molecules is a Constant in a certain quantity of gas irrespective of its type”. In other words, “the number of molecules” is the number of basic volumes ( $\lambda_{01}^{\#} = \text{const}$ ) from which the atoms of all chemical elements are formed. They all have an equal quantity of matter but of different density. Each chemical element has its own atom and its position in the Table of Chemical Elements.

- Phase transitions and physical condition of substances are a structural leap at the atom  $\rightarrow$  electron  $\rightarrow$  atoms interaction in the surroundings.

- The atom is a product of deformed, compact and differentiated space in which the graded centrifugal forces of deformation are transformed into centripetal ones. The atom is the bearer and the transformer of electron vacuum into electron pressure and vice versa, and the electrons in the atom are the means of accomplishing this process.

- The energy accumulated in the atom is the energy of the electron vacuum and the energy of the electron pressure and their total is a Constant, only being transformed from one type into the other.

- “Photons” are electrons which have left the atoms of an atomic plane of higher electron pressure at graded speed equal to a Constant and have moved

towards the atoms of the adjacent atomic plane of lower electron pressure. As a result of the bumps, a certain portion of electron vacuum (sub-pressure -  $\Delta P$ ) is transformed into electron pressure, and in the atom-mothers an equal portion of electron pressure is transformed into electron vacuum. The electrons are reflected and returned back to the atom-mother. In the same way the transferred electron pressure in the adjacent atomic plane is transferred into the adjacent planes intermittently and in portions.

- The change in atom density (electron-vacuum density) in the process of structuring (cooling) and decomposition (heating) is the basis of the Law of chemical element property regularity.

- Temperature is the degree of transformation of electron vacuum into electron pressure, i.e. it indicates the “value” of electron pressure inside and around the atom.

- When an atom is being structured (cooled) it shrinks, and so do its surroundings. It attracts the atoms around itself, and when it is being decomposed (heated) its volume increases, the electron pressure inside and around it also increasing.

- The heat effect (electron pressure) of a chemical reaction is a result of the striking diffusion of atoms.

- Light, heat and sound are transfer (dissipation) of electron pressure in “shrunk and stretched” space. Electricity, electric current and electromagnetic waves are transfer (dissipation) of electron vacuum.

By using the terms “electron vacuum” and “electron pressure” I mean the electrons themselves as they generate the vacuum and the pressure.

- Gravity is the summation of microgravity. The transformed centrifugal forces of deformation into centripetal ones at atom formation appear to be an example of Coulomb’s Law, and its summation is a representation of Newton’s Law.

- Electron “charge” (load) is the radial power pulse (“radial velocity”) of the hydrogen atom formation ( $\dot{e} = \frac{\pi^2}{6} = 1,6 \dots [ \dots ]$ ). The power pulse of the formation of any of the chemical elements’ atoms is  $(n_{ox} \cdot \dot{e})$ , where  $n_{ox}$  is a chemical element number in the Table of chemical elements (atom plane density).

- The mass of an atom ( $m_{ox}$ ) when being formed is expressed by its linear density, i.e. its electron-vacuum linear density ( $\sqrt{n_{ox}}$ ).

- Plank’s constant is the integral velocity of the formation of chemical elements’ atoms squared ( $c^2 = \left(\frac{\pi^2}{6} \cdot \dot{e}\right)^2 = \left(\frac{\pi^2}{6}\right)^4 = 6,6 \dots [ \dots ]$ ).

Plank’s constant ( $\hbar$ ) is equal to the energy of the hydrogen atom formation (№1 in the Table of Chemical Elements); ( $c$ =const-max).

- The energy of atom formation is as follows:  
 $E_{o,x} = \hbar v_{o,x} = c^2 m_{o,x} = \hbar \sqrt{n_{o,x}}$  where:

$\hbar v_{o,x}$  - is the formation frequency (radiation at the time of formation);

$\tau_{o,x} = \frac{1}{v_{o,x}}$  – is the formation time of any of the chemical elements’ atoms.

- There is no “positive” or “negative” charge as an inherent property of the structural units of matter and as an absolute fact. There is a weaker, a stronger or an equilibrium representation of centrifugal or centripetal forces (electron vacuum or electron pressure).

- Radioactivity, superconductivity, superfluidity, the laser beam, etc. are notions that have found their explanation in “The Model of Unity of Interaction”.

- Spectrum analysis, Moseley’s Law, Frank and Hertz’s experiment are in compliance with The Model of Unity of Interaction.

- The Model of Unity of Interaction is a copy of our reality and a key to its understanding.

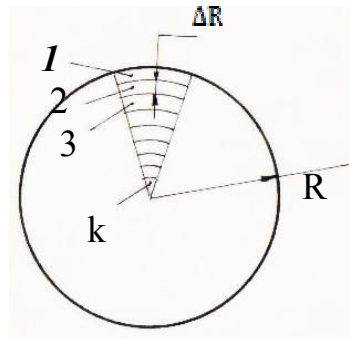
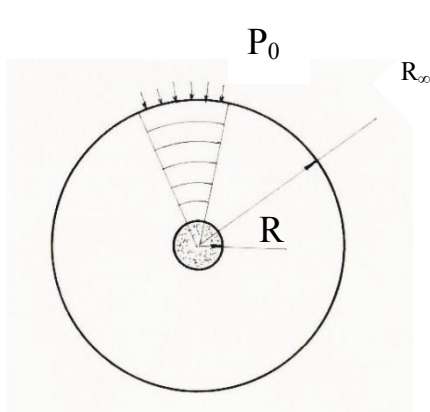
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1. Electrons, atoms and a New Star formation

Unlimited volume ( $R_{\infty}$ ) of space (Fig. 1) is subjected to multilateral pressure – deformation and compaction. In the volume ( $R_{\infty} - R$ ) acts Hooke's Law, that is deformation  $\Rightarrow$  force  $\Rightarrow$  velocity, and in the volume (R) acts the law deformation  $\Rightarrow$  force in which the radial velocity (at initial expansion), resulting from the radial deformation is ( $\dot{e}=\text{const-max}$ ) within the entire volume of the sphere (R). As a result of the radial pressure ( $P_0$ ) along the forming spherical plane ( $R_{\infty}$ ) acts the Law of flow continuity in the direction of the center of the sphere. Considering forces it could be presented in the following way: pressure x area = Constant referring to any spherical area, and in terms of its kinetic expression it is: area x velocity = Constant. In the volume of the sphere ( $R_{\infty}$ ) high pressures are generated, appearing to be the reason for certain space deformation and compaction of the “original matter” contained in it.

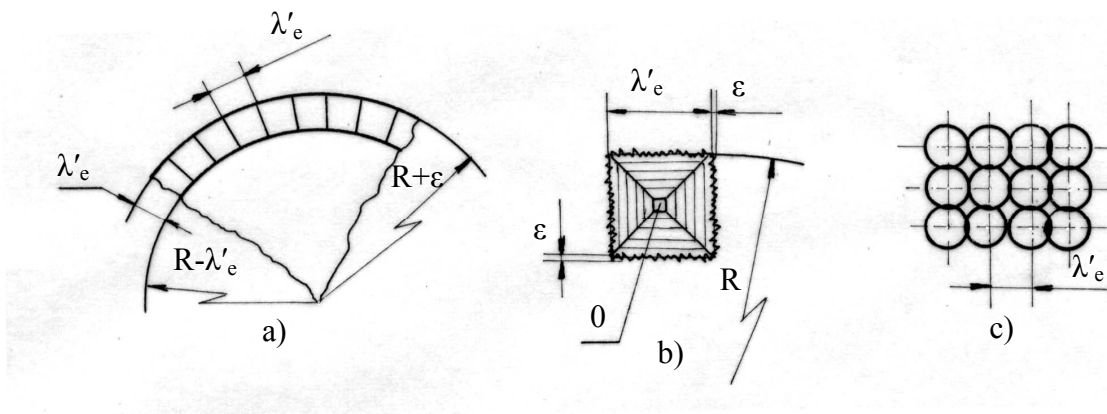


**Fig.1. Multilateral centripetal deformation of part of the space.**

**Fig.2. Spherical segments ( $\Delta R$ ) in nucleus (R) where the chemical elements' atoms are formed.**

In the central part of the sphere, ( $R_{\text{core}}$ ), (Fig.1), in the so called nucleus ( $R$ ), a New Star is formed as a result of some extreme conditions. Along the radius of the sphere ( $R$ ), (Fig.2) towards its centre spherical segments ( $\Delta R$ ) of approximately identical deformation and compaction are formed. Consecutively, from the periphery towards the centre in these segments ( $\Delta R$ ), the chemical elements' electrons and atoms are formed starting with hydrogen to uranium (number 1, 2, 3, etc.) as they are arranged in the Table of chemical elements.

After the multilateral pressure ( $P_0$ ) has faded, a process of expansion commences in the sphere ( $R$ ) at initial radial speed ( $\dot{e}=\text{const-max}$ ) (see fig. 2), consecutively from the periphery towards the centre accompanied by the separation of layer ( $\lambda'e$ ) (see fig. 3a).



**Fig. 3 Electron formation**

Along the spherical area ( $R - \lambda'e$ ) the maximum elastic deformation ( $\epsilon \rightarrow 0$ ) relaxes. As a result, the radius ( $R$ ) increases to ( $R + \epsilon$ ), and the peripheral layer ( $\lambda'e$ ) “crushes” into micro-volumes  $(\lambda'e)^3$  in the form of cubes to compensate for the bigger radius ( $R + \epsilon$ ). The deformation ( $\epsilon \rightarrow 0$ ) also relaxes on the walls of the cubes  $(\lambda'e)^3$  with speed ( $\dot{e}=\text{const-max}$ ) and total



volume  $[6(\lambda'e)^2 \cdot \epsilon]$ . The relaxed deformation ( $\epsilon$ ) is a volume with generated sub-pressure with speed equal to const-max.

The shifts ( $\epsilon \rightarrow 0$ ) along and perpendicularly to the cube walls  $(\lambda'e)^3$  are the beginning of the relaxation of the maximum radial “ $\dot{\epsilon}$ -deformation” towards their center. The simultaneity of shifting in all six directions towards the center “O” (Fig. 3b) of the “plane volumes”  $(\lambda'e)^2 \cdot \epsilon$  determines the “degeneration” of the latter into a summational “point” volume in the centre of  $(\lambda'e)^3$ . As a matter of fact, in the centre of this volume some sub-pressure has been generated as a result of the intermittent transfer of initial “plane” sub-pressure at increasing velocity towards the centre. This plane sub-pressure moves to the centre of the volume  $(\lambda'e)^3$  following the Law of continuity (area x velocity = Constant) and subsequently the intermittent movement determines the equation area x pressure = Constant. The created “point” volume with sub-pressure “without exit” necessitates the centripetal shift of matter in the volumes  $(\lambda'e)^3$  and creates a spherical monolithic volume of diameter  $(\lambda'e)$  surrounded by vacuum (Fig. 3c). The centrifugal forces corresponding to the maximum elastic “ $\dot{\epsilon}$ -deformation” are balanced in the volume  $(\lambda'e)^3$  by the centripetal forces which are derivative from and equal to them.

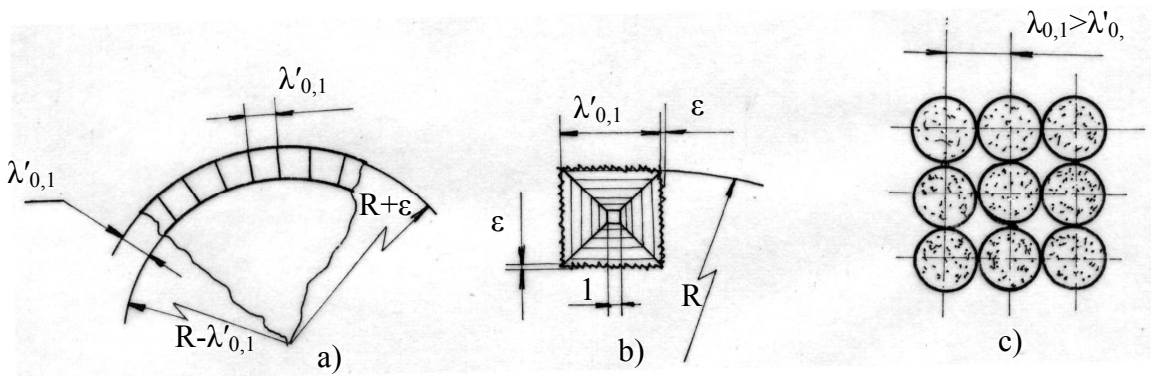
The separation of a second layer below the peripheral one at a velocity of ( $\dot{\epsilon}=\text{const-max}$ ) follows resulting in the generation of new spherical monolithic micro-volumes, etc., thus electrons and electron macro-sphere (R) are being formed.

The reason for the formation of the micro-volumes  $(\lambda'e)^3$  is the correspondence of the velocity ( $\dot{\epsilon}$ ) to the maximum volume and its contents which may obtain such a velocity. The electron volumes and the vacuum-volumes between them are equal (their total is the micro-volume  $(\lambda'e)^3$ ). The forming spherical plane of the electron “is shifted” from the cube walls  $(\lambda'e)^3$ ,

the centripetal forces created on the plane being counterbalanced by the centripetal forces generated by the vacuum formed between the electrons (Fig. 3c). The volumes, or the dimensions of electrons decrease towards the centre of the macro-sphere (R) in inversely proportional way to the increasing pressure.

The monolithic electron macro-sphere (R) resulting from the summation of the electron-vacuum interaction receives a centripetal elastic shift leading to the creation of recoil centrifugal expansion occurring in layers and in succession from the periphery to the centre (R) at velocity of ( $\dot{\epsilon} = \text{const-max}$ ).

The initial expansion effect occurs in the spherical surface ( $R - \lambda'_{01}$ ), (Fig. 4a).



**Fig. 4 Atom formation**

A layer of electrons is formed ( $\lambda'_{01}$ ) with a radial shift ( $\epsilon \rightarrow 0$ ). The layer is broken into micro-volume cubes ( $\lambda'_{01}$ )<sup>3</sup> due to its shift to a greater radius ( $R + \epsilon$ ), with the centrifugal forces realizing the shift ( $\epsilon \rightarrow 0$ ) perpendicularly to all six walls of the cubes. The total volume of the clearance ( $\epsilon$ ) which “lacks matter” is ( $6 \cdot \lambda'_{01}{}^2 \epsilon$ ) (Fig. 4b).

Intermittently and simultaneously in a perpendicular direction to all six walls of the cubes this “plane” vacuum-volume moves to the centre of the

micro-volume ( $\lambda'_{01}$ )<sup>3</sup> by the Law of continuity (area x velocity = Constant). Approaching the centre, the flow cross-section area decreases and flow velocity increases (so does its pressure, respectively). The hexahedron flow of material vacuum (electrons move in opposite direction) forms a “point without exit” in the centre of the volume ( $\lambda'_{01}$ )<sup>3</sup>, i.e. a cube of electron vacuum equal to the volume of one electron. Moving away from the walls ( $\lambda'_{01}$ )<sup>2</sup> the vacuum-volume (an electron) dampers the “differential recoil” of the electron macro-sphere (R) in volumes ( $\lambda'_{01}$ )<sup>3</sup>. This is followed by an adequate centripetal shift of the electrons in the same volume and a formation of a spherical monolithic micro-volume of electrons, called an atom of dimensions ( $\lambda_{01}$ )<sup>3</sup> in diameter (Fig. 4c). As a result of the striking centripetal shift of the electrons their boundary deformation, having velocities of ( $u < \dot{e} = \text{const-max}$ ), relaxes.

This process recurs in the following layers until the transformation of the electron macro-sphere into an atomic one (Fig. 4c) with a radius of ( $R_a > R$ ) resulting from the relaxation of the boundary deformation ( $u < \dot{e} = \text{const-max}$ ) of the atoms.

The vacuum-space formed among the atoms (and therefore the summation of the vacuum-spaces among the electrons) are equal to the atom volumes.

(In theory, it is possible that the vacuum spaces among the atoms are brought together and that a macro-sphere packed with atoms with volume equal to the compact macro-sphere is formed.)

In other words, there is a geometrical and a power similarity between the “macro-sphere” and the “atom”. Atoms are formed “in situ” in the deformed compact sphere (R) arranged next to each other in rows forming atomic planes (Fig. 4c).

## 2. Electron and atom peculiarities

### 2.1. What is an electron?

An electron is a monolithic microsphere full of primary unstructured (“black”) matter. An electron is the product of extreme centrifugal deformation forces transformed into centripetal ones and acting throughout the entire volume by the Law of flow continuity (area x sub-pressure = const.) As a result of the intermittent centripetal transfer from the periphery towards the centre in the micro-volume cubes ( $\lambda'_{01}$ )<sup>3</sup> of “plane volumes” with sub-pressure, a nucleus with sub-pressure “without exit” is formed in the central part which, in turn, causes the centripetal concentration of matter and the formation of an electron. The intermittent (striking) shift of electrons at velocity of ( $\dot{e} = \text{const-max}$ ) when atoms are formed causes relaxation of their boundary deformation with velocities of ( $u < \dot{e}$ ). This results in increase in their volume and only the maximum centripetal forces forming the electron are still active.

Centrifugal forces defined as “electron pressure” equal to or less than the forming centripetal ones correspond to the relaxed deformation in the electron. When electrons are formed the primary matter inside them lacks the strength of the strike during the centripetal shift which electrons have when forming the atoms. For this reason, in their formation the former remain with non-relaxed boundary deformation ( $u < \dot{e}$ ).

### 2.2. What is an atom?

An atom is a monolithic microsphere full of electrons resulting from the transformation of extreme centrifugal recoil forces into centripetal ones. Like the formation of the electron, in the centre of the atom a nest-nucleus forms with sub-pressure “without exit”, and the electrons in the cube ( $\lambda'_{01}$ )<sup>3</sup> receive a centripetal shift, and a microsphere called an atom is formed.

The striking centripetal shift of the electrons causes the graded deformation with velocities ( $u \ll \text{const.max}$ ) to relax. The volume of the electrons, the atoms and the star increase but the striking centripetal action is equal and less than the forming centripetal one. Thus the atoms and their electrons are preserved and the star shines in the sky.

A cooling process called “restoration of the relaxed deformation” commences. By “relaxation” I mean the transformation of centripetal forces into centrifugal ones due to which the electron pressure and the volume inside the electrons and the atoms increase.

The equiaxial maximum centripetal and centrifugal forces in the atom determine two stressed conditions: the first one can be defined as electron vacuum caused by centripetal forces. Processes of transformation of electron pressure into electron vacuum and vice versa take place in the atoms. The total energy of the electron pressure and the electron vacuum in the atom is always a Constant. I have used the terms “electron vacuum” and “electron pressure” because the kinetics of electrons controls their values and because different values have various (graded) deformations, i.e. shrinkage or expansion of the atoms. The latter are the energy carrier and their condition directly determines the condition and the properties of the volume in which they are.

### **2.3. Radial power pulse of hydrogen atom formation. “Electron charge”**

With the formation of the vacuum-volume, i.e. one electron, in the centre of the micro-volume  $(\lambda'_{01})^3$  the maximum centripetal recoil forces in it are counterbalanced. This is similar to taking an electron out of the volume  $(\lambda'_{01})^3$  at velocity equal to const. max. to form an atom. The vacuum-volume is the atom nucleus, or the pillar of the electrons in it.

According to the Law of flow continuity, atom compactness may be expressed by adding a linear radial maximum deformation having a maximum radial force and a maximum radial velocity according to Hooke's Law. This may be expressed by the convergent series below:

$$(1) \dot{\epsilon} = 1 \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} \dots + \frac{1}{\kappa^2} \right) \rightarrow \frac{\pi}{6} = 1,6 \dots$$

for  $\frac{1}{\kappa^2} \rightarrow \epsilon \rightarrow 0$  (number of electrons) maximum radial deformation.

The value 1 at the beginning of the series is the volume deformation (one electron) in the centre of an atom, and the vulgar fractions which are being added are the values of the layer ("plane volume") linear deformation along the radius of the atom expressed as part of the central deformation with a volume of one electron which is shown and proven in detail.

According to Hooke's Law, the maximum deformation  $\left(\frac{\pi^2}{6}\right)$  has a corresponding force  $(\dot{\epsilon})$  with a velocity of occurrence  $(\dot{\epsilon})$ . All these – deformation, force and velocity – are designated by the same unit  $(\dot{\epsilon})$  because the former refers to the hydrogen atom formed in the outermost  $(\Delta R)$  segment of the sphere for the period of time  $(\tau_{01} = 1)$ .  $(\dot{\epsilon}) = \frac{\pi}{6} = 1,6\dots$ , which is the number of electrons (linear radial deformation realized within  $\tau_{01} = 1$ ), is the so called "electron charge" – the radial power pulse of the hydrogen atom formation.

#### **2.4. Radial power pulse of chemical elements' atom formation**

The atoms formed in succession in the spherical segments  $(\Delta Ri)$  of the sphere (R) from the periphery towards the centre and have increasing density (electron-vacuum density). Their formation may be explained as a successive extraction of one electron from the volume of the hydrogen atom and its returning back at a speed equal to const. max (c), all chemical elements' atoms

being formed according to their number in the Table of chemical elements. The hydrogen atom formation (№ 1) results from the extraction of one electron at a speed (c); its maximum deformation and compaction are measured in a volume of one electron. Actually, the chemical elements' formation takes place when one by one electrons "leave" the volume  $(\lambda'_{01})^3$  which is already deformed and compact and belongs to a certain spherical segment ( $\Delta Ri$ ) of the sphere (R) at a speed (c). The volume  $(\lambda'_{01})^3$  is obtained after the deformation and compaction of volume  $(\lambda_{01})^3$ , so both volumes contain an equal number of electrons. At leaving of a single electron at speed (c) the centrifugal forces in the micro-volume transform into centripetal ones, and the successive leaving of one electron at a time from the hydrogen atom volume is analogous to the deformation and compaction of the volume  $(\lambda'_{01})^3$ . Therefore, the radial power pulse ( $F_{ox}(r)$ ) of chemical element atom formation is the product of the number ( $n_{ox}$ ) of the element in the Table of chemical elements and the power pulse ("electron charge") of hydrogen atom formation.

$$\dot{e} = \frac{\pi^2}{6} = 1,6 \dots$$

$$F_{ox}(r) = n_{ox} \cdot \dot{e}$$

## 2.5. Energy volume of an atom (Ve)

The interaction of space – time – matter can be expressed by the energy volume of atoms ( $1 \div 92$ ):

$$(2) V_e = \frac{4}{3} \pi \left( \frac{r_{ox}}{\tau_{ox}} \right)^3 = \left( \frac{\pi^2}{6} \cdot \frac{r_{ox}}{\tau_{ox}} \right)^3 = \left( \frac{\dot{e}}{\tau_{ox}} \right)^3 = const$$

The formula above expresses the compactness of an atom and the compactness of the energy accumulated inside it.

$r_{ox}$  - is the mean (inertia) radius of any chemical element atom;

$\tau_{ox}$  – is the time for atom formation;

$a_{ox}$  – is the mean (inertia) edge of an atom-cube – “ox”.

$$(3) \frac{V_e}{a_{ox}} = \left(\frac{a_{ox}}{\tau_{ox}}\right)^2 \cdot \frac{1}{\tau_{ox}} = c^2 v_{ox} = \hbar v_{ox}$$

$e$  – is the energy of the “ox” atom formation

$c$  = const.max – integral speed of an atom formation

$\frac{1}{\tau_{ox}} = v_{ox}$  – frequency of atom emission (formation) under extreme

conditions

$$(4) \hbar = c^2 = \frac{V_e}{a_{ox}} \cdot \tau_{ox} \text{ – Plank's constant}$$

We prove the following:  $\frac{1}{\tau_{ox}} = v_{ox} = \sqrt{n_{ox}}$ ,

i.e. the time for a certain chemical element atom formation is inversely proportional to its linear density (electron-vacuum density)  $\sqrt{n_{ox}}$ .

$(n_{ox})$  is the number of an element in the Table of chemical elements, i.e. the number of the electron successively taken out of the hydrogen atom volume at speed ( $c$ ) and having realized a certain atom density.  $(n_{ox})$  is the atom plane electron-vacuum density.

Therefore,

$$(5) V_e = \left(\frac{a_{ox}}{\tau_{ox}}\right)^3 = \left(a_{ox}\sqrt{n_{ox}}\right)^3 = \text{const}$$

The hydrogen atom formation takes place at

$\tau_{o1} = 1$  or:

$$(6) E_{o1} = \frac{V_e}{a_{o1}} = \left(\frac{a_{o1}}{\tau_{o1}}\right)^2 \sqrt{n_{o1}} = \left(\frac{a_{o1}}{1}\right)^2 \sqrt{1} = (a_{o1})^2 = c^2 = \hbar$$

i.e. the energy necessary for the hydrogen atom formation is  $c^2 = \hbar$ , which is equal to Plank's constant.

$$(7) E_{ox} = \frac{V_e}{a_{ox}} = \hbar \sqrt{n_{ox}} = c^2 m_{ox}, \text{ corresponds to Einstein's formula but}$$

one should bear in mind that it concerns the extreme conditions under which atoms are formed (destroyed).



$\sqrt{n_{ox}} = m_{ox}$ , means that the mass of an atom is actually its linear electron-vacuum density at ( $t^0 = T_{o\ max}, \ 0K$ ).

(8)  $E_{ox} = \frac{V_e}{a_{ox}} = c^2 m_{ox}$  is the total force exerted on the side of the “atom-cube”, i.e. it is the energy, or the potential, of the electron leaving at speed (c), and

$$(9) \quad F_{ox} = \frac{V_e}{a_{ox}^2} = \frac{a_{ox}}{r_{ox}^2} \sqrt{n_{ox}} = n_{ox} \cdot c,$$

is the force exerted on a single unit of area of the atom-cube side, i.e. the power pulse for atom formation.

$$(10) \quad c = \left(\frac{\pi^2}{6} \dot{e}\right) - \text{maximum integral speed of an electron, whereas}$$

$$(11) \quad \dot{e} = \frac{\pi^2}{6} = r_{01} - \text{maximum radial speed of atom formation}$$

$$(12) \quad \hbar = c^2 = (\dot{e}^2)^2 = \left(\frac{\pi^2}{6} \cdot \frac{\pi^2}{6}\right)^2 = 6,67 \text{ [...] } \Rightarrow [js].$$

## 2.6. Determination of plane, electron-vacuum density of the atoms formed in the macro-sphere (R). The numbers of elements in the Table of Chemical Elements. Radioactivity.

According to the Law of continuity and according to the similarity of the macro-volume, i.e. the atom sphere R

$$(13) \quad \left[ \frac{const}{\Delta R_k^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} \dots + \frac{1}{K^2} \right) \rightarrow \frac{const \pi^2}{\Delta R_k^2 6} \right] \text{ and the micro-volume-}$$

atom

$$\left[ \frac{const}{a_{ox}^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} \dots + \frac{1}{K^2} \right) \rightarrow \frac{const \pi^2}{a_{ox}^2 6} \right]$$

the “hardening” of the inertia edge ( $a_{01} \rightarrow a_{0\kappa}$ ) of the “atom-cubes” formed along the macro-sphere (R) radius towards its centre takes place according to the convergent power series below:

$$(14) \quad a_{01} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} \dots + \frac{1}{\kappa^2} \right) \rightarrow a_{01} \frac{\pi^2}{6}.$$

For  $\frac{1}{\kappa^2} \rightarrow \varepsilon \rightarrow 0$ ;  $(a_{01} \frac{\pi^2}{6})$  is the edge hardening of the “atom-cube” formed in the central part of the sphere (R), and then:

$$(15) \quad \left( a_{01} \frac{\pi^2}{6} \right)^3 = \left[ \left( \frac{\pi^2}{6} \right)^2 \frac{\pi^2}{6} \right]^3 \approx 92,$$

where 92 is the number of electrons taken out in succession at speed ( $c = \text{const. max}$ ) from a base volume ( $\lambda_{01}^3$ ) and then returned back, in this way the uranium atom being formed ( $n_{ox} = 92$ ).

The asymptotic hardening of the inertia edge ( $a_{01} \rightarrow a_{02} \rightarrow \dots \rightarrow a_{0x}$ ) results in the asymptotic decrease in atom dimensions ( $a_{0x} = \frac{a_{01}}{\sqrt{n_{ox}}}$ ), thus making the formation of the chemical elements’ atoms with numbers  $84 \div 92$  unstable. In this case, the so called radioactivity can be observed, which is the destruction resulting from deformation with almost zero shifts, and at “lack” of any shifts a stable transformation of centrifugal forces into centripetal cannot occur.

( $n_{ox} = 92$  number of electron deformation) we obtain

for  $\pi = 3,145$ , and  $n_{ox} = 83$  for  $\pi = 3,13$

## 2.7. Number of real electrons in atoms. ( $n_{ox} = 1 \div 92$ )

The mean maximum linear radial deformation of the hydrogen atom  $\dot{e} = \frac{\pi^2}{6} = 1,6 \dots$  (number electron deformation) is the vacuum-volume surrounding it, but it is not equal to it. Therefore, the mean (inertia) radius of the atom ( $r_{01}$ ) is equal to  $\frac{\pi^2}{6}$  which is the number of real electrons.

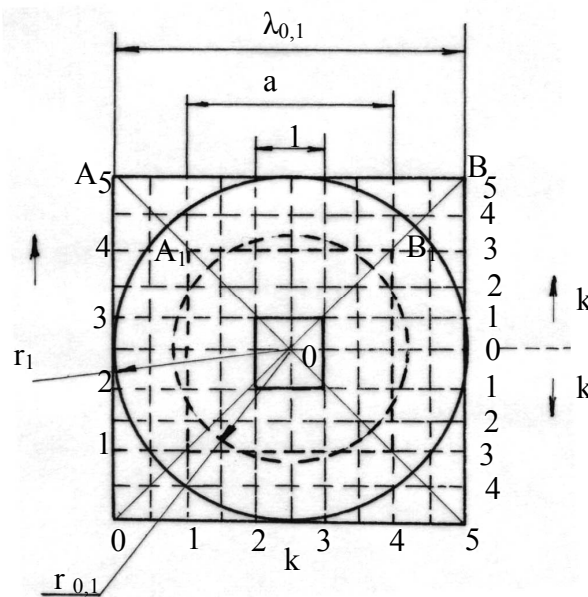
Fig. 5 shows the conventional volume ( $\lambda_{01}^3$ ) full of cubes with an edge (1) in which each electron of the hydrogen atom is formed.

(16)  $AB = (\lambda_{01} = 3r_{01} = 3\frac{\pi^2}{6} = 5 \text{ (number of real electrons)} = 5$   
(number of electron deformation).

(17)  $r_{01} = \frac{\pi^2}{6} = 1,6 \dots = \frac{AB}{A_1B_1} = \frac{r_1}{r_{01}} = \frac{k}{k-j} = \frac{5}{3}$  i.e. the atom geometrical and power parameters (deformation) coincide, and the atom geometry results from power shifts.

(18)  $(\lambda_{01}^3) = (3r_{01})^3 = \left(3\frac{\pi^2}{6}\right)^3 = 5^3 = 125$  - number of real electrons integrated in the hydrogen atom as well as in the atoms of all the other chemical elements.

This is possible because the deformation and the compaction along the macro-sphere (R) radius may be expressed by the deformation of a base volume ( $\lambda_{01}^3$ ) in which the hydrogen atom (N<sub>01</sub>) is formed and the number of the electrons in the deformed volume ( $\lambda_{01}^3 \Rightarrow \lambda_{0x}^3$ ) remains the same whereas the volume of electrons changes in proportion.



**Fig.5. Atom geometrical and force characteristics.**

## 2.8. Dimensions of atom energy volume (Ve).

The atom energy volume

$(V_e = (a_{ox}\sqrt{n_{ox}})^3 = \text{const})$  has two dimensions:

a) the dimension concerning one atom at maximum deformation occurring at atom formation (decomposition).

b) the dimension referring to a group of atoms with boundary relaxed deformation at speeds of  $u < \text{const.max}$  which have filled the base volume

$(\lambda_{01}^3 = \text{const})$ , so that

$$(19) \quad a_{ox}\sqrt{n_{ox}} = a_{01} = \text{const} = c,$$

where  $a_{ox}$  - is the inertia edge of the “atom-cube”

$\sqrt{n_{ox}}$  - is the number of the atoms forming the edge of the cube  $(\lambda_{01}^3)$  -

$$(\lambda_{01} = a_x\sqrt{n_{ox}})$$

$a_{01}$  - is the inertia edge of the hydrogen “atom-cube”

$a_x$  - is the diameter of atom „ $n_{ox}$ “.

Therefore, dimension “a” concerning one atom under extreme conditions is equal to dimension “b” under conservative extreme conditions, or in other words, the energy of one atom in dimension “a” will equal the energy of  $(\sqrt{n_{ox}})^3$  atoms in dimension “b”.

## 2.9. Transfer (dissipation) of electron pressure energy. “Photon”, “phonon”.

The deformation along the radius of the macro-sphere (R) is graded in the following way:

a) graded maximum deformation ( $n_{ox} = 1 \div 92$ ) at a velocity of  $c = \text{const.max}$ ;

b) deformation “equally” graded in all micro-volumes (atoms) forming the atom sphere (R) with values varying from 0 to max ( $0 \div \text{max}$ ) at velocities of ( $u_i < c$ ).

Each real electron (125 in number) in the atom appears to be the carrier of a certain stage of the graded deformation which has a graded electron pressure and a graded electron vacuum respectively. Similarly to electron №1 “leaving” volume  $(\lambda_{01})^3$  at speed  $c=\text{const.max}$  and transforming the maximum centrifugal forces of deformation into centripetal, at a certain graded value (stage) of the electron pressure each real electron leaves the atom at a given (graded) speed equal to a Constant, thus transforming a portion (stage) of electron pressure into electron vacuum. I use the term “stage” because the electron pressure in an atom changes and equals the volume of the electron.

This may occur when there is a difference in the electron pressures of two adjacent atomic planes. In this case, an electron from each atom of the higher-pressure plane leaves at a certain speed and moves towards the atoms of lower pressure, “strikes” and goes back. In the atom-mother a given stage of electron pressure is transformed into electron vacuum, and in the “hit” atom some electron vacuum is transformed into electron pressure equal to the first one. An electron from the “hit” atom, but of a higher electron pressure “strikes” an atom from a third adjacent plane, etc., thus a process of electron pressure transfer (dissipation) occurs. This is the so called “photon”/ “phonon” transfer of energy ( $h\nu$ ). The electron is the “particle” and the intermittent transfer of electron pressure, i.e. the electron pressure energy, is the “wave”.

## **2.10. Atom cooling-structuring and heating-decomposition. Temperature.**

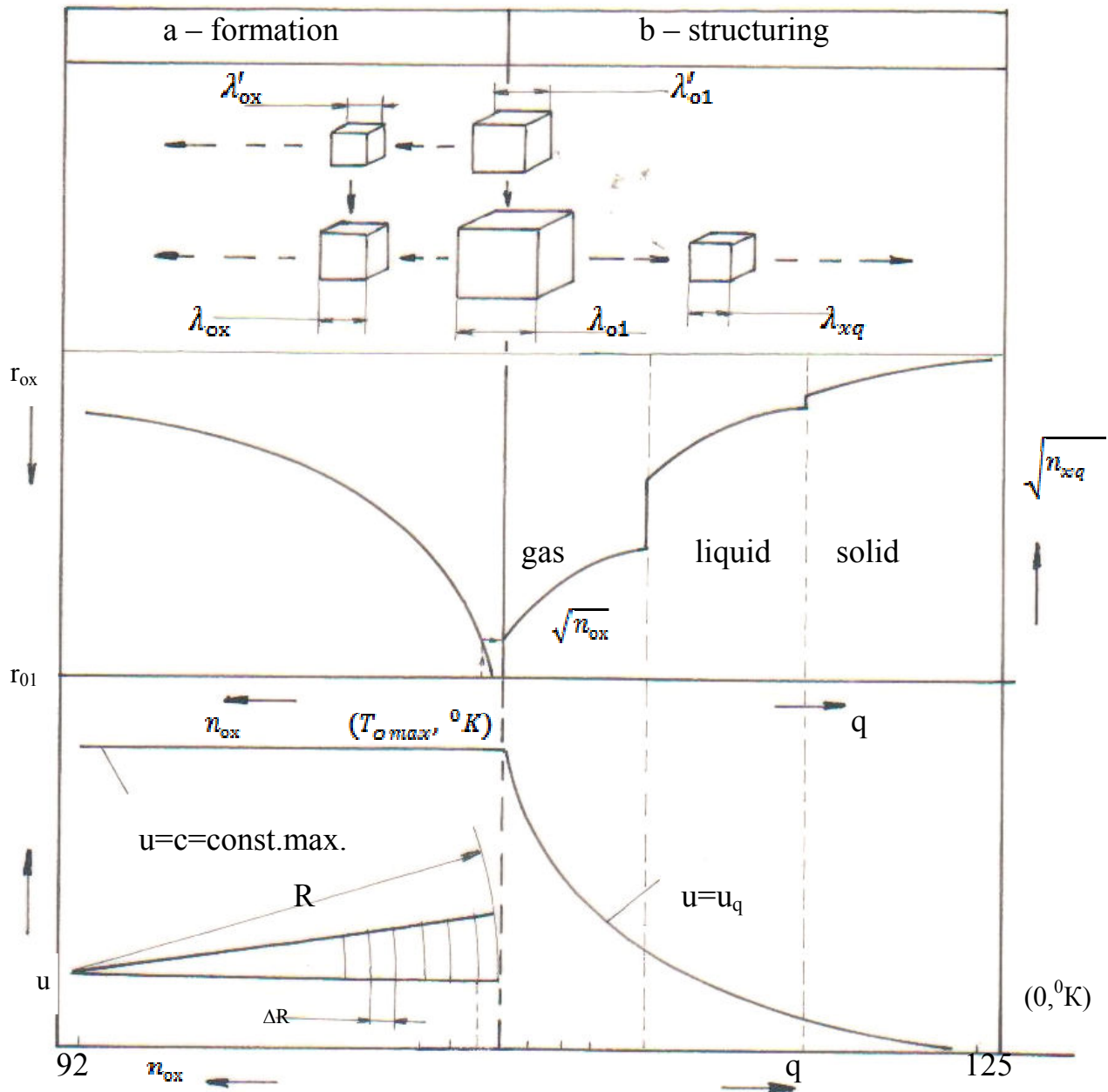
We can define the process of electron pressure transformation into electron vacuum as atom structuring, or cooling, and the process of electron vacuum transformation into electron pressure as atom decomposition, or heating. At structuring (cooling) the atoms’ volume decreases as a result of the electron vacuum, or the centrifugal forces, generated there because the electron leaves the atom at a very high speed. Centripetal forces are generated, in turn,

around the atom, i.e. some attraction, or interaction among the atoms occurs. Contrary to this, at heating, or decomposition, the atom volume increases. The connections between them are destroyed “in portions”. The electron pressure inside the atoms and that among them increases. This is a graded process, a succession of stepped manifestation of the Law of continuity: kinetic state - static state in alteration around each atom. The temperature we measure is nothing but values of graded electron pressure inside and around decomposed atoms ( $t^0 = 0^0 K \div T_{o\ max}, ^0K$ ) and corresponds to speeds of decomposition ( $u_i=0 \div c=const.max$ ).

Atoms are the carriers and the transformers of electron pressure into electron vacuum, and the electrons inside them are the tool for accomplishing this. The energy in the atoms, in the form of electron pressure and electron vacuum remains constant; it just transforms from one type into the other. These processes lead to materialized matter structuring and its property formation.

### **2.11. Graphical expression of portional formation and portional structuring of atoms.**

The processes of portional formation and portional structuring (cooling) of chemical elements' atoms are shown graphically in Fig. 6.



**Fig.6. Portional formation and portional structuring (cooling) of chemical elements' atoms.**

a) chemical element atom formation (Fig. 6a) at a speed of  $(u=c=\text{const.max})$  from the volumes  $(\lambda'_{o1})^3$ , where the hydrogen atom is formed,

along the sphere (R) radius, at the same time their boundary deformation of speeds ( $u < c$ ) relaxing.

The volume of the Star increases up to an explosion as a result of the increase in the volumes  $(\lambda'_{0x})^3$  to  $(\lambda_{0x})^3$  keeping their preserved maximum deformation similar to the volume  $(\lambda_{01})^3$  which we define as base volume (see Fig. 6a).

Chemical elements' atom formation also means that if from a base volume  $(\lambda_{01})^3$  we take out (and return back) one electron at a time in succession at speed ( $c = \text{const.max}$ ), we will obtain one by one the elements' atoms from Mendeleev's Table of Chemical Elements.

Under the conditions of boundary relaxation ( $u < c$ ), volume  $(\lambda_{01}^3 = \text{const})$  is the unit in which the maximum energy potential of atoms ( $E_{0x} = m_{0x}c^2$ ) is counterbalanced and is expressed quantitatively by the formula ( $E_{0x} = \hbar\sqrt{n_{0x}}$ ), where ( $\hbar$ ) is the potential of one atomic plane  $(\lambda_{01}^2)$  containing ( $n_{0x}$ ) number of atoms and where  $(\sqrt{n_{0x}})$  is the number of atomic planes which are integrated in the volume  $(\lambda_{01}^3)$ .

b) the chemical elements' atom structuring (cooling) (Fig. 6b) means that one electron at a time leaves those 125 electrons filling the atoms and that it returns at graded speeds ( $u_q$ ), with staged electron pressure ( $\Delta P_q$ ) being transformed into electron vacuum accompanied by temperature fall up to  $0^0\text{K}$  for the  $q=125^{\text{th}}$  electron. Atom volume decreases and their number filling the base volume  $(\lambda_{01}^3) = \text{const}$  increases, hence "restoring the pre-relaxing condition".



## 2.12. Units of measurement in the Model of Unity of Interaction

- The unit of time ( $\tau_{01} = 1$ ). This is the time for the hydrogen atom formation.

- The unit of linear radial deformation

$$\dot{e} = r_{01} = \frac{\pi^2}{6} \text{ (number electron deformation)}$$

- The unit of linear radial force

$$\dot{e} = \frac{r_{01}}{\tau_{01}^2} m_{01} = \left(\frac{\pi^2}{6}\right) \frac{1}{1} [\dots] - \text{the radial power pulse for the hydrogen}$$

atom formation;

- The unit of linear radial velocity

$$\dot{e} = \frac{r_{01}}{\tau_{01}} = \left(\frac{\pi^2}{6}\right) \frac{1}{1} [\dots] - \text{the radial velocity of hydrogen atom formation}$$

- The unit of linear integral deformation

$$c = \dot{e}^2 = \left(\frac{\pi^2}{6}\right)^2 [\dots] \text{ number electron deformation}$$

- The unit of linear integral force

$$c = \frac{\pi^2}{6} \frac{r_{01}}{\tau_{01}^2} \cdot m_{01} = \left(\frac{\pi^2}{6}\right)^2 \frac{1}{1} \cdot 1 [\dots] \text{ integral power pulse for the hydrogen}$$

atom formation

- The unit of integral velocity

$$c = \frac{\pi^2}{6} \frac{r_{01}}{\tau_{01}} = \left(\frac{\pi^2}{6}\right)^2 \frac{1}{1} [\dots] \text{ integral velocity of the hydrogen atom}$$

formation

- The unit of energy

$$h = c^2 [\dots] \Leftrightarrow [j.s] - \text{the energy required for the hydrogen atom formation}$$

- The unit of length

$(\lambda_{01}) [\dots]$  - the length of the edge of a base volume  $(\lambda_{01}^3)$  where the hydrogen atom (its diameter) is formed

- The unit of volume

$(\lambda_{01}^3)$  – base volume

### 3. Electron pressure and electron vacuum kinetics.

#### 3.1. Energy and power series of interaction

The deformation and the compaction of matter (atoms) is a graded condition obtained as a result of a graded force action with graded velocities of relaxation. The ability to preserve maximum deformations and their derivative forces and velocities after boundary elastic deformation ( $u < c$ ) relaxation in the differentiated micro-volumes presupposes and makes it possible for the deformation to restore itself and relax again. The process of restoration (structuring-cooling) and relaxation (decomposition-heating) can be described by the so called Energy series of interaction.

$$(20) \quad \sum_{i=1}^q E_i = \frac{V_e}{a_{ox}} \left( 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{q} \right) \text{ where}$$

$\frac{V_e}{a_{ox}} = \left( \frac{a_{ox}}{r_{ox}} \right)^2 \sqrt{n_{ox}} = \hbar v_{ox} = m_{ox} c^2$  is the energy, or the potential, of electron №1 symbolizing atom ( $n_{ox}$ ) formation at velocity ( $c = \text{const. max}$ ). The addends of the divergent series indicate what part of №1 electron potential constitutes the potential of electrons ( $q$ ), from №1 to №125.

Each “ $q$ ” electron contributes to the stepped and portional restoration (structuring of atom graded deformation). The electron potential is both in the form of “electron pressure” being the result of a “relaxed boundary deformation” ( $u < c$ ), and in the form of “electron vacuum” resulting from “restored deformation”.

When an electron ( $q_i$ ) leaves an atom at a given graded velocity, a stage of electron vacuum is generated in it and the atom shrinks, so do its surroundings, thus attracting adjacent atoms. Metaphorically speaking, each atom appears to be the common apex of six regular quadrangular pyramids whose bases are shifted from the walls of the atom-cube formed at ( $t^0 = T_{o \text{ max}}^0 K$ ); they move

from an atom plane to an atom plane at each successive leaving of an electron from the atom. Each new base becomes a wall of an equipotential cube in which the centripetal forces generate deformation whose centrifugal forces counterbalance the centripetal ones. The centrifugal forces of deformation on the walls of each equipotential cube (formed most recently) determine the electron pressure in the atoms and around them. This corresponds to the current temperature of structuring ( $t^0 = T_{qi}, {}^0K$ ). When an electron ( $q=125$ ) is being structured the temperature is ( $0, {}^0K$ ).

The centripetal forces equal to the centrifugal forces of the “restored” deformation and density integrate in the base volumes ( $\lambda_{01}^3$ )=const where they counterbalance one another and the maximum forces of atom formation act.

The dynamics of the transformation of electron pressure into electron vacuum and vice versa is described by the convergent power series below:

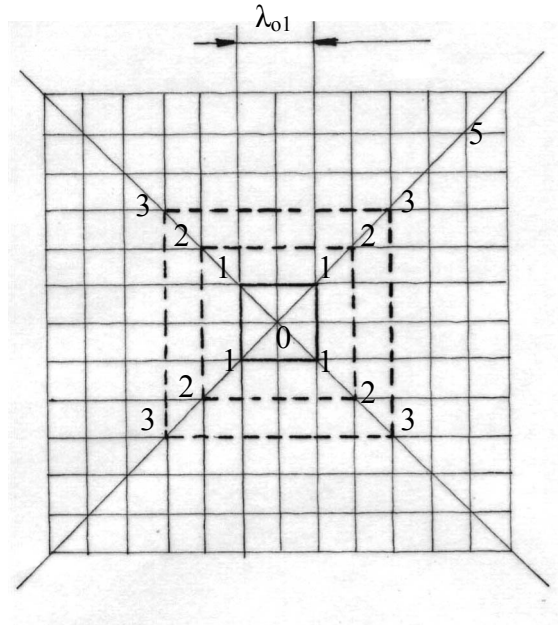
$$(21) \quad \sum_{i=1}^q F_i = \frac{V_\theta}{a_{0x}^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{q^2} \right) \text{ where}$$

$$\frac{V_\theta}{a_{0x}^2} = \frac{a_{0x}}{r_{0x}^2} \sqrt{n_{0x}} = \left( \sqrt{n_{0x}} \right)^2 \frac{a_{0x}}{r_{0x}} = n_{0x} \cdot c \text{ is } N_{\#1} \text{ electron force action which}$$

is the reason for atom formation

The addends of the convergent series show what part of the force action of  $N_{\#1}$  electron is the force action of the successive electrons ( $q$ ) structuring the atoms in the base volume ( $\lambda_{01}^3$ )=const. The power series is the manifestation of Coulomb’s Law of the Microworld.

The power and energy series concern the ( $\lambda_{01}^3$ )=const base volume full of  $\left( \sqrt{n_{xi}} \right)^3$  number of chemical elements’ atoms or their compounds at the moment of their current structuring with increasing density.



**Fig.7. Graphical expression of the energy and power series.**

Fig. 7 shows the graphical expression of the energy and power series. The centripetal forces generated on the walls of the equipotential cubes, e.g. 1,1,1,1; 2,2,2,2; etc. are the stages of a force action according to the Law of continuity ( $p_i F_i = \text{const}$ ).

Two adjacent atomic planes are in equilibrium if they have the same electron pressures.

When the electron pressure in one plane is higher, this provokes an electron to leave the plane atoms at a certain velocity and move towards the atoms of the adjacent plane having lower electron pressure but with prevailing electron vacuum. As a result of the electron striking, a certain stage of electron vacuum is decomposed and transformed into electron pressure, and in atom-mothers the same stage of electron pressure is transformed into electron vacuum, the atoms in the plane being cooled. Similarly, the electron pressure transferred to the adjacent atom plane moves to the next adjacent one, etc.

If the adjacent planes are of two limited macro-volumes, the first one having higher electron pressure and the second one being full of moving fluid in which the electron pressure intermittently decreases in portions, then in the first

volume there will be structuring-cooling up to the absolute zero ( $0^0\text{K}$ ) and the electron pressure will completely transform into electron vacuum.

The electron pressure and electron vacuum corresponding to each “ $q_i$ ” electron being structured are equal to the absolute value of “ $q_i$ ” members of the power series, and the electron pressure and electron vacuum potential are equal to the “ $q_i$ ” addends of the energy series.

The power and the energy series are examples of the interaction (connections) of each atom with those surrounding it. The graded centripetal forces gradually generated in the atoms in portions are counterbalanced by the tensile forces generated in “ $q_i$ ” equipotential atomic planes, e.g. 2-2-2-2, 3-3-3-3, ...  $q_i - q_i - q_i - q_i$  (Fig. 7).

### 3.2. Phase transitions, physical conditions of matter.

The process of matter (atom) structuring takes place according to the properties of the power series of interaction (Coulomb’s Law of the Microworld):

$$(22) \quad \sum_{i=1}^k F_i = n_{ox} c \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2} \right),$$

where

$n_{ox} c$  is the initial static monolithic state of atoms determined by the maximum deformation conditions under which atoms are formed at a speed of ( $c = \text{const. max}$ ). ( $F_i = n_{ox} c$ ) are the maximum centripetal forces forming atoms and being equal to the maximum centrifugal ones. When atoms have already been formed and feature relaxed boundary deformation ( $u < c$ ) and a temperature of ( $T_{e \text{ max}}, ^0\text{K}$ ), these forces are in equilibrium throughout the spherical surface forming them. Under these conditions, the interaction of atoms is direct by means of the spherical surfaces forming them and by the inter-atom vacuum-spaces. When being structured the atom shrinks, so does the space around it; fluidity of the macro-volume decreases, with its shrinkage lagging to some

extent behind that of the atoms. At continual structuring, the tensile forces between atoms increase in power and at a certain point connections are torn apart. The macro-volume fluidity increases and an unsteady shrinkage of both the atoms and the macro-volume occupied by them occurs. Their density increases and a new compactness featuring addition of the power series members is formed inside them:

$$n_{ox}c\left(1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2}\right) \rightarrow n_{ox}c\frac{\pi^2}{6}, \text{ for } \frac{1}{k^2} \rightarrow \varepsilon \rightarrow 0, \text{ but the torn}$$

connections, the increased fluidity of the macro-volume and the unsteady shrinkage create conditions adequate to “atom formation”, the compaction being expressed in “k” times and corresponding to the number of the structured “q” electrons.

The atoms appear to be in a new phase called “liquid phase” with distinctive compactness:

$$(23) F_T = \frac{a_{ox}}{v_{ox}^2} \sqrt{n_{ox}K_T} \frac{1}{K^2} = n_{ox}K_T \frac{c}{K^2}$$

$$\frac{c}{K^2} = \text{const}, \text{ velocity of electron “k” being structured in the phase transition}$$

which is achieved under the familiar conditions of constant temperature and pressure.

$K_T$  – coefficient of atom and macro-volume shrinkage at phase transition which is actually less than “k” because the real conditions are only similar, not identical to those of atom formation.

Under the conditions of atom reversible boundary deformation ( $u < c$ ) the power series given below refers to a group of atoms having occupied base volume  $(\lambda_{01}^3) = \text{const}$ . In this case the energy volume (Ve) also remains Constant but under gradually and proportionally changing deformation, force and velocity directed at obtaining finite, zero values. The nature of (Ve) is mainly geometrical featuring inverse proportion between the decreasing atom dimensions and their increasing deformation. In other words,

$$V_e = (a_{\text{XK}} \sqrt{n_{\text{XK}}})^3 = \text{const}$$

$a_{\text{XK}}$  – mean inertia edge of the atom-cube

at ( $t^0 = T_K, {}^0K$ )

$\sqrt{n_{\text{XK}}}$  – linear density of the electron vacuum which also designates the number of atoms along the edge of base volume ( $\lambda_{01}^3 = \text{const}$ ) and the number of planes ( $\lambda_{0K}^2$ ) in base volume ( $\lambda_{01}^3$ ).

This holds true because the generated change in the volume is in the atoms and it is the same for all atoms.

The liquid phase compactness expressed by the formula below:

(24)  $F_T = n_{\text{OX}} K_T \frac{c}{K^2}$ , appears to be the coefficient of a new power series:

(25)  $\sum_{i=1}^p F_{T,i} = n_{\text{OX}} K_T \frac{c}{K^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{p^2} \right)$  which reveals the

electron ( $k+1, k+2, \text{etc.}$ ) structuring corresponding to  $(1, 2, 3, \dots, p)$  under the new conditions.

(26)  $\left( \frac{\pi^2}{6} \right)^2 \leq K_T \leq K$  does not contradict the power series; it most likely

depends on the genesis of certain atoms ( $n_{\text{OX}}$ ) or on other conditions.

$\left( \frac{\pi^2}{6} \right)^2$  is the coefficient of plane density ( $n_{\text{OX}}$ ) increase which results from the addition of the members of the power series whose value makes the phase transition possible.

$k$  – number of the electron being structured, the phase transition occurring under its conditions.

$K_T$  – actual coefficient of atom shrinkage at gas – liquid phase transition.

At continual structuring (cooling) of “hot” electrons  $k+1, k+2, k+3, \text{etc.}$  like in ( $F_T$ ) a new phase transition is reached, i.e. compactness and a new interaction expressed by the following formula:

$$(27) F_S = n_{\text{OX}} K_T \frac{c}{K^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{p^2} \right) \rightarrow n_{\text{OX}} K_T K_S \frac{c}{K^2 p^2}$$

and the power series:

$$(28) \quad \sum_{i=1}^z F_{s,i} = n_{ox} K_T K_S \frac{c}{K^2 p^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{z^2} \right),$$

describing the so called “solid phase” and the value  $\left( n_{ox} K_T K_S \frac{c}{K^2 p^2 z^2} \right)$  corresponds to  $[0, {}^0K]$ , i.e. to the pressure in the so called “space” prior to the formation of the compact (deformed) macro-sphere (R).

The coefficient  $(K_S)$  indicates how many times the density  $(n_{ox} K_T)$  has increased after the liquid – solid phase transition. Due to the steeply decreased fluidity of the macro-volume,  $(K_S)$  has very low values.  $k+p+z=q=125$  is the number of electrons being structured and filling the atom volume.

### 3.3. Matter density, electron-vacuum density

“Electron vacuum” density obtained at chemical elements’ atom structuring (cooling) refers to a unit of the base volume  $(\lambda_{01}^3)=\text{const}$  from which №1 atom (Hydrogen) is formed at  $(T_{0\text{max}}, {}^0K)$ . Within this volume the action of the forces  $(n_{ox} \cdot c)$  of non-reversible maximum static deformation are counterbalanced and conversed under the conditions of the reversible boundary deformation ( $u < c$ ). The electron vacuum density, i.e. the degree of atom deformation and compaction, is expressed by the number of atoms of any chemical element contained in the volume  $(\lambda_{01}^3)=\text{const}$ . at any temperature  $(T_{0\text{max}}, {}^0K \div 0, {}^0K)$  because what actually happens is the deformation of volume  $(\lambda_{01}^3)$  along the radius of the macro-sphere (R), but its filling up to  $(\lambda_{01}^3)$  is with a volume equal to the deformation which it has undergone and which is measured by the number of atoms.

In the process of structuring (cooling) all atoms shrink to the same degree; therefore, in any volume  $(\lambda_{01}^3)=\text{const}$  the total deformation is the same, i.e. the graded deformation and compaction have proportional power and velocity.

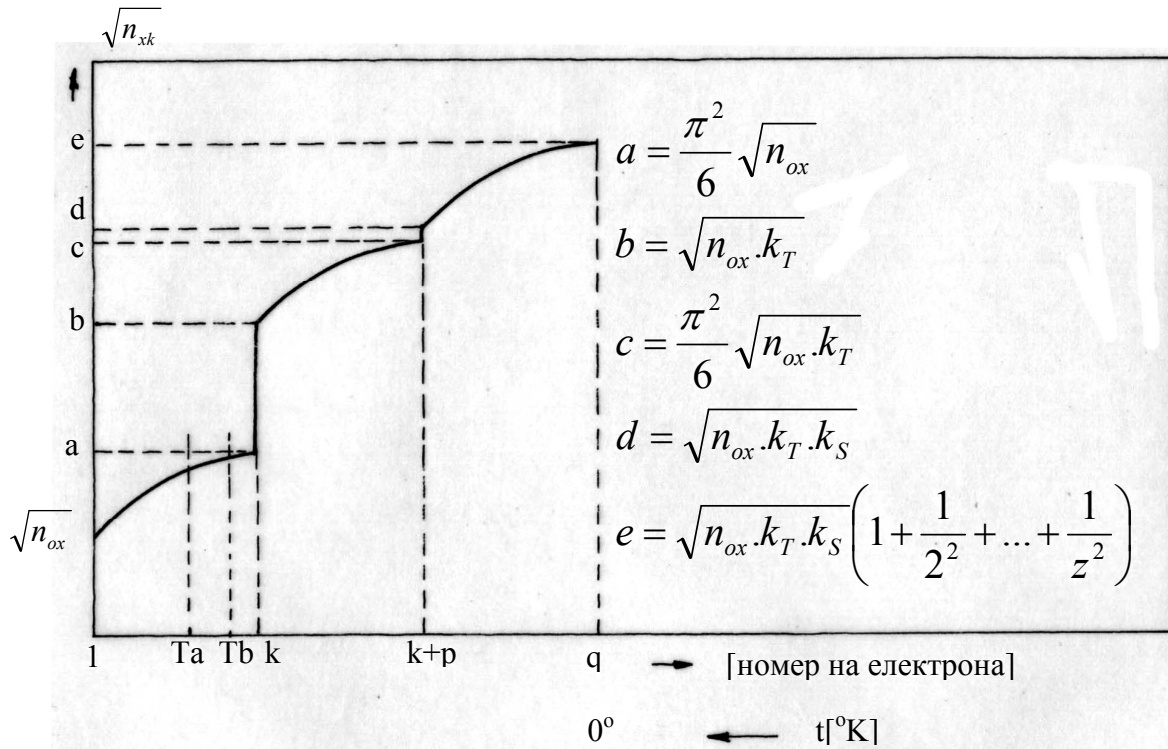


At atom structuring and decomposition, the energy volume (Ve) remains constant.

At atom structuring under the conditions of reversible deformation ( $u < c$ ) the linear density of the “electron vacuum” of the gaseous state is determined by the following series:

(29)  $\sqrt{n_{\text{xx}}} = \sqrt{n_{\text{ox}}} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{n^2} \right)$  which shows [the number of electrons] deformation, or the number of real electrons along the edge of the “atom-cube”, or the number of atoms along the edge of the base volume  $(\lambda_{01}^3) = \text{const.}$

By form and contents this series is analogous to the power series; the only element missing is the multiplier of the power series, ( $c = \text{const.max}$ ), but according to Hooke’s Law such deformation has corresponding forces and velocity. During and after phase transitions, density is determined in an analogous way like the dependencies in physical conditions of matter.



**Fig.8. “Electron vacuum” linear density at structuring “q” kinetic electrons of an atom**

Fig. 8 illustrates the changes in linear density of the electron vacuum of the  $i^{\text{th}}$  chemical element at structuring (cooling) of its hot “q” electrons.

### 3.4. Chemical reactions and chemical structures.

#### 3.4.1. Osmotic pressure and diffusion.

The centripetal forces generated in the atoms, also acting outside them, determine respective macro-interaction. An indicator for this is the so called osmotic pressure which is demonstrated by liquids rising above their level in an open vessel when a narrow open tube called “capilara” is immersed in it.

Taking into consideration that fluids (gases) feature high fluidity and consist of micro-distinguished volumes with forming boundary surfaces between which there are “empty” vacuum-spaces, a kind of capillaries, one can assume that under osmotic pressure the atoms of two gaseous elements (x and y) can

penetrate in both directions through their contact boundary surfaces in both macro-volumes, i.e. a process of transfer called diffusion occurs.

### 3.4.2. The essence of a chemical reaction.

In order to form a compound at a given temperature ( $T_0$ , °K), the atoms of chemical elements “x” and “y” with electron-vacuum density  $n_{xk}$  and  $n_{yk}$ , and sizes  $a_{xk}$  and  $a_{yk}$  similar to those at temperature ( $T_{0max}$ , °K), determined by the energy volume of the atom

$$(30) \quad V_0 = (a_{0x} \sqrt{n_{0x}})^3 = (a_{xk} \sqrt{n_{xk}})^3 = \text{const.}$$

and depending on the location ( $R_{0x}$  and  $R_{0y}$ ) of their formation along the radius of the macro-sphere (R), the following proportions must be valid:

$$(31) \quad \frac{n_{0x}}{n_{0y}} = \frac{a_{0y}^2}{a_{0x}^2} = \frac{n_{xk}}{n_{yk}} = \frac{a_{yk}^2}{a_{xk}^2} = \frac{4\pi R_{0y}^2}{4\pi R_{0x}^2}.$$

The atoms of “x” being of higher density and smaller size penetrate into the inter-atom vacuum-spaces of the atoms of “y” having a greater size and lower density where the centripetal forces of the electron vacuum ( $n_{0x} \cdot c \leftrightarrow n_{0y} \cdot c$ ) interact. This results in “x” atoms becoming greater in size and “y” atoms becoming smaller, i.e. they become equal and this is expressed both by the forces and geometrically. The newly-formed integral macro-volume is the “total” of “x” and “y” volumes 4 but having new derivative micro-volumes: atoms arranged in rows forming mutually perpendicular atomic planes. The inter-atom vacuum-spaces are equal to the atom volumes.

To obtain a “symbiosis” between “x” and “y” at a temperature of ( $T_{0max}$ , °K), they interact with minimum volumes equal to the base volume ( $\lambda_{01}^3$ )=const. It is proportional to the so called “mol volume” (22.4l gas at a temperature of 0°C and pressure of 1 kg/cm<sup>2</sup>). According to Avogadro’s Law:

$$(32) \quad \lambda_{01}^3 = \text{mol volume} / \text{Avogadro's number}$$

is designated by the so called “molecule” but this volume has nothing to do with its definition, only with the fact that “the number of molecules” in a certain quantity of any gas is the same at a given temperature and pressure. Atoms are the energy carriers but under the conditions of relaxed boundary deformation ( $u < c$ ) their maximum force ( $n_{ox} \cdot c$ ) is limited and counterbalanced in the base volume ( $\lambda_{01}^3$ ) = const which is a Constant for all chemical elements’ atoms and their compounds.

### 3.4.3. Correspondence of atoms to the location of their formation in the spherical segments of the atom macro-sphere (R).

The mean base plane density ( $n_{ox}, n_{oy}$ , etc.) of the atoms in the spherical segments ( $\Delta R$ ) is in correspondence with the mean radius ( $R_{ox}$ ) of segments ( $\Delta R$ ):

$$(33) \quad \frac{4\pi R_{ox}^2}{4\pi R_{oy}^2} = \frac{n_{oy}}{n_{ox}}, \text{ or to be more precise, the area } R_{ox}^2 \text{ is part of the}$$

spherical surface ( $R_{ox}$ ) pertaining to chemical element “x” and ( $R_{oy}^2$ ) is an area of the spherical surface ( $R_{oy}$ ) of chemical element “y”. ( $R_{ox}^2$ ) and ( $R_{oy}^2$ ) are the bases of a regular quadrangular truncated pyramid.

The mean cross-section of the pyramid ( $\frac{R_{ox}^2 + R_{oy}^2}{2}$ ) has a mean density of ( $n_{oxy}$ ). In other words,

$$(34) \quad n_{oxy} = \frac{n_{ox} + n_{oy}}{2}, \text{ because}$$

$$(35) \quad \frac{n_{ox}}{n_{oy}} = \frac{a_{oy}^2}{a_{ox}^2} = \frac{R_{oy}^2}{R_{ox}^2},$$

$$a_{ox} = \frac{a_{o1}}{\sqrt{n_{ox}}}, \quad R_{ox} = \frac{R_{o1}}{\sqrt{n_{ox}}}, \quad a_{oy} = \frac{a_{o1}}{\sqrt{n_{oy}}}, \quad R_{oy} = \frac{R_{o1}}{\sqrt{n_{oy}}}.$$

The mean cross-section ( $R_{oxy}^2 = \frac{R_{ox}^2 + R_{oy}^2}{2}$ ) is the mean geometrical value of both bases of the truncated pyramid and is unique, i.e. there is a constant ratio of

the contents and density. The quantity of matter prior to reaction is the same after it.

The product, e.g. the gas in the case of a reaction between gases, is always measured with two ( $\lambda_{01}^3$ )=const volumes because x and y interact in the chemical reaction with one volume each at temperatures ( $T_{o\ max}^0, K$ ) and at structuring according to the power series below:

$$(36) n_{xx} = n_{ox} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2} \right)^2 .$$

In this case the chemical elements' atoms change their density proportionally and depending on the location of their formation ( $R_{ox}$ ) along the radius of the sphere (R). Under these conditions each chemical element can combine with any other to form only one compound, the ratios being constant.

When chemical elements' atoms undergo shrinkage of 2<sup>nd</sup> order, e.g. allotropy, their density sharply rises by (f) times:

$$(37) n_{xx} = n_{ox} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2} \right)^2 f$$

Here, the product is also measured with two ( $\lambda_{01}^3$ ) volumes because “x” and “y” interact in the chemical reaction with two volumes of “derivative density” obtained at the moment of diffusion and interaction but this occurs under certain conditions determined by the circumstances.

### **3.4.4. Examples of gaseous condition of reagents and product**

#### **3.4.4.1. The chemical reaction of hydrogen and oxygen.**

It occurs in such a way that two volumes of hydrogen react with one volume of oxygen, thus two volumes of water vapor being produced.



As a result there is a change in the weight condition in the oxygen to hydrogen proportion at structuring, or cooling:

$$(38) \quad \frac{0}{H} \rightarrow \frac{8}{1} \cdot \frac{2}{2} \cdot \frac{2}{1} \cdot \frac{1}{f} = \frac{8}{1} \text{ for } f=2$$

$$\frac{8}{1} = \frac{n_{oo}}{n_{oh}} \text{ base ratio at } (t^0 = T_{o \max}, \text{ } ^0K)$$

$\frac{2}{2}$  - a change in the weight condition resulting from the structuring according to the power series (21)

$\frac{2}{1}$  - compensatory shrinkage of oxygen atoms (phase transition of 2<sup>nd</sup> order at  $t^0 = T_j, \text{ } ^0K > T_k, \text{ } ^0K$ )

$f=2(\lambda_{01}^2)$  – compensatory volume of hydrogen which is to correspond to the current condition of the base condition and which is required for the hydrogen and the oxygen to interact.

Under normal conditions ( $t^0 = 25^0 \text{ C}$ ,  $p=1 \text{ kg/cm}^2$ )

$\rho_o = 1,43 \text{ g/l}$  - oxygen density

$\rho_H = 0,0899 \text{ g/l}$  - hydrogen density

$$(39) \quad f = \frac{\rho_o}{n_{oo}} \cdot \frac{n_{oh}}{\rho_H} = \frac{1,43}{8} \cdot \frac{1}{0,0899} = 2$$

The ratio indicates that the oxygen has really undergone phase transition of 2<sup>nd</sup> order and its density has increased twice, the ratios  $n_{xk}/n_{yk}$  and  $n_{ox}/n_{oy}$  corresponding to the weight ratios.

The coefficient (f) is relative. It is obtained as a product of two density (weight) conditions:

$$\text{Base current } x = \left( \frac{n_{oH}}{n_{oo}} \cdot \frac{\rho_o}{\rho_H} \right)$$

Included also are in the structural (weight) electron-vacuum ratio of densities  $\left( \frac{\rho_o}{\rho_H} \right)$  the base plane densities ( $n_{oH}$  and  $n_{oo}$ ) which are const. and are equal to the numbers of the chemical elements in the Table of chemical elements. With the multiplication of the current ratio  $\left( \frac{\rho_o}{\rho_H} \right)$  and their inversely proportional base ratio  $\left( \frac{n_{oH}}{n_{oo}} \right)$  base densities are eliminated and the coefficient (f)

is determined which concerns only the change in the current (structural) density of atoms.

- When ( $f=1$ ), then ( $x$  and  $y$ ) react in a chemical reaction equal to the base ratio ( $n_{ox}/n_{oy}$ ).

- If one of the chemical elements (the one with higher density) has undergone phase transition of 2<sup>nd</sup> order ( $f \neq 1$ ), then ( $f$ ) corrects their volume ratio and  $x$  and  $y$  react with the base (weight) ratio ( $n_{ox}/n_{oy}$ ).

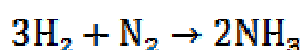
- When  $x$  and  $y$  have undergone phase transition of 2<sup>nd</sup> order, then the base density of the heavier atom decreases with the same coefficient the density of the lighter atom increases and after that ( $f$ ) is set determining the increased density of the heavier atom, or the volume with which the lighter atom is supposed to react.

- The atoms of one of the chemical elements always interact in a chemical reaction with one ( $\lambda_{01}^3$ )=const volume .

- The current atom structuring (cooling) or decomposition (heating) is accomplished according to the power series (Coulomb's Law of the Microworld) and if there is no phase transition of 2<sup>nd</sup> order (compensatory shrinkage/ expansion), then the atom volumes of all gases change uniformly. This has been discovered by Gay Lussak at the beginning of 19<sup>th</sup> c. by changing the temperature of equal quantities of gases under constant pressure.

#### 3.4.4.2. The chemical reaction of hydrogen and nitrogen

In this reaction three volumes of hydrogen react with one volume of nitrogen resulting in two volumes of ammonia.



• As a result, there is a change in the nitrogen to hydrogen weight ratio at structuring (cooling):

$$\frac{N}{H} \rightarrow \frac{7}{1} \cdot \frac{2}{2} \cdot \frac{1}{1.5} \cdot \frac{2}{1} \cdot \frac{1}{f} = \frac{4.66}{1} \text{ for } f=2$$

$\frac{7}{1} = \frac{n_{ON}}{n_{OH}}$  - a base ratio at temperature ( $t^0 = T_{max}, ^0K$ )

$\frac{2}{2}$  - a change in the weight ratio resulting from the structuring according to

the power series.

$\frac{1}{1.5}$  - at the moment of diffusion of the nitrogen atoms among the hydrogen

atoms, the latter undergo compensatory shrinkage ( $f_H=1.5$ ), and as a result the three ( $\lambda_{01}^3$ ) volumes of hydrogen remain only two.

$\frac{2}{1}$  - compensatory shrinkage of nitrogen atoms at temperature  $T_j, ^0K > T_k, ^0K$

$f=2 \rightarrow (2\lambda_{01}^3)$  - compensatory volume of hydrogen due to the nitrogen phase transition of 2<sup>nd</sup> order so that the current weight ratio corresponds to the base ratio.

- Under normal conditions ( $t^0 = 25^0 C, p=1 \text{ kg/cm}^2$ )

$\rho_N = 1,25 \text{ g/l}$  nitrogen density

$\rho_H = 0,0899 \text{ g/l}$  hydrogen density

$$f = \frac{\rho_0 \cdot n_{OH}}{n_{ON} \cdot \rho_H} = \frac{1,25}{7} \cdot \frac{1}{0,0899} = 2$$

The ratio shows that the nitrogen has undergone a phase transition of 2<sup>nd</sup> order and its density has increased twice. The hydrogen has also undergone a phase transition of 2<sup>nd</sup> order at the very moment preceding the reaction and its density has increased 1.5 times, so due to the density increase the three volumes of hydrogen remain two and they, in turn, compensate the doubled nitrogen density after the phase transition.

### 3.4.4.3. The chemical reaction of nitrogen and oxygen

In this reaction one volume of nitrogen reacts with one volume of oxygen forming two volumes of nitrogen oxide.





• A change in the oxygen to nitrogen weight ratio at structuring takes place.

$$\frac{O}{N} \rightarrow \frac{8}{7} \cdot \frac{2}{2} \cdot \frac{2}{2} = \frac{8}{7}$$

$\frac{8}{7} = \frac{n_{O0}}{n_{ON}}$  - base ratio at ( $t^0 = T_{\max}, ^0K$ )

$\frac{2}{2}$  - a change in the weight ratio resulting from the structuring according to

the power series below:

$2/2 \rightarrow$  oxygen compensatory shrinkage/ nitrogen compensatory shrinkage and the current ratio corresponds to the base ratio.

• Under normal conditions ( $t^0 = 25^0 C, p=1 \text{ kg/cm}^2$ )

$\rho_o = 1,43 \text{ g/l}$  oxygen density

$\rho_N = 1,25 \text{ g/l}$  nitrogen density

$$f = \frac{\rho_o}{n_{O0}} \frac{n_{ON}}{\rho_N} = \frac{1,43}{8} \cdot \frac{7}{1,25} = 1,$$

because the oxygen and the nitrogen have the coefficients of compensatory shrinkage – 2 – due to which their ratio in the reaction is equal to the base ratio  $\left(\frac{n_{O0}}{n_{ON}}\right)$ .

### 3.4.5. Atomic weight, valence, a molecule. Chemical equivalent.

Each compound has an atom of its own and a place in the Table of chemical elements as well as its place along the radius of the macro-sphere (R). The atoms are the energy carriers and a direct chemical reaction between them takes place.

The concepts of “atomic weight”, “valence” and “a molecule” are only empirical facts and do not concern the essence of a chemical reaction.

The determination of the plane density at atom structuring is accomplished according to the power series below:

$$(40) \quad n_{xx} = n_{ox} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2} \right)^2 f$$

$$n_{ox} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{k^2} \right)^2 = A - \text{"x" atomic weight}$$

f – compensatory shrinkage coefficient (phase transition of 2<sup>nd</sup> order, e.g. allotropy).

$$n_{xk} = Af - \text{"x" current density at temperature } (T_k, {}^0K)$$

The atomic weight of all chemical elements may be determined within the temperature interval (Ta÷Tb) (Fig. 8) which is a gaseous state at structuring according to the power series before any chemical element has undergone compensatory shrinkage (f).

$$(41) \quad A = n_{ox}(1,41^2 \div 1,59^2) = 2 \div 238$$

(1,41 ÷ 1,59) - is the summation of the change in a chemical element linear density ( $\sqrt{n_{ox}}$ ) determined according to the power series;

$$n_{ox}(1,41^2 \div 1,59^2) - \text{"x" plane (weight) density.}$$

At a certain temperature ( $T_k, {}^0K$ ), the compensatory shrinkage (f) of the chemical element "x" results in the difference between the current ratio  $\frac{n_{xk}}{n_{yk}}$  and the base ratio  $\left(\frac{n_{ox}}{n_{oy}}\right)$  of the elements "x" and "y", i.e.  $\frac{n_{xk}}{n_{yk}} \neq \frac{n_{ox}}{n_{oy}}$ , therefore

$$n_{xk} = \frac{n_{yk} \cdot n_{ox}}{n_{oy}} \cdot f.$$

Structuring (cooling) occurs according to the power series when  $\frac{n_{xk} \cdot n_{oy}}{n_{yk} \cdot n_{ox}} = 1$ , and if there is a compensatory shrinkage  $(f) = \frac{n_{xk} \cdot n_{oy}}{n_{yk} \cdot n_{ox}}$ , the chemical element "x" reacts with a density of ( $n_{xk}$ ) and a volume of  $\left(\frac{1}{f} \lambda_{01}^3\right)$ , the chemical element "y" will have a volume ( $\lambda_{01}^3$ ) and density ( $n_{yk}$ ), and the product of the reaction will be one volume ( $\lambda_{01}^3$ ).

( $n_{ox}$ ) and ( $n_{oy}$ ) are densities at a temperature of ( $t^0 = T_{max}, {}^0K$ ) in a unit of the base volume ( $\lambda_{01}^3 = const$ ). If ( $n_{ox}$ ) grams (weight quantity) of "x" and ( $n_{oy}$ ) grams of "y" react at room temperature, a compound will be formed

without any residuum of “x” or “y” unless both elements have undergone compensatory shrinkage (f). A similar result will be obtained under the same conditions when “x” and “y” react in quantities (grams) equal to their atomic weights. When one of the elements, let’s say “x” has compensatory shrinkage (f), then it will react with the weight of „x”  $\rightarrow \frac{A_x}{f}$ , and „y”  $\rightarrow \frac{A_y}{1}$ , or „x” will take part in the reaction with one volume  $(\lambda_{01}^3)$ , and „y” with  $(f \cdot \lambda_{01}^3)$  volumes determining the gaseous state.

The weight quantity of a chemical element that is required for a reaction  $\frac{A_x}{f} = \frac{A_x}{V} = \varepsilon$  is called a chemical equivalent, i.e. the weight quantity of a substance which is proportional to any other weight quantity taking part in the reaction.

The compensatory coefficient (f) appears to correspond to the chemical element valence (V).

The atomic weight (A) measured by the density, or the number of atoms on a base area  $(\lambda_{01}^2) = \text{const}$  at a temperature of  $(T_a \div T_b)$  (Fig. 8) taken in quantities (absolute number of grams) under normal conditions (temperature and pressure) refers to a unit of volume and contains the increased density “f” in grams.

$\frac{A}{f} = \frac{A}{V} = \varepsilon$ , makes the weight quantity of “x” correspond to the base weight quantity  $(n_{ox})$ .

The atomic weight (A), as an absolute value, expressed in grams is in line with “x” density expressed in number of atoms at a temperature  $(T_a \div T_b)$ , (Fig. 8).

- The concept of “a molecule” as it has been considered so far, does not exist. The “molecule”, according to Avogadro’s law, is identified with a base volume  $(\lambda_{01}^3) = \text{const}$ , but only with the equal number of molecules in a mol volume. By “base volume”  $(\lambda_{01}^3) = \text{const}$  I mean a unit of volume for all chemical

elements and their compounds. This results from the conditions of atom formation and structuring.

- If atom structuring took place in a normal, “smooth” way according to the power series, i.e. without phase transitions of 1<sup>st</sup> and 2<sup>nd</sup> order, then each chemical element would form only one compound with any other chemical element. Since phase transitions are limited, so is the number of the chemical compounds, e.g. the hydrogen and the oxygen form only two compounds.

- The chemical reaction between the chemical elements’ atoms is a function of their structural (current) weight (electron-vacuum) density in the process of structuring (cooling) and decomposition (heating).

The property recurrence in the Table of chemical elements is a function of this density.

### **3.5. Superstructural electron vacuum. Electricity and electric current, conductor, insulator, electric resistance and superconductivity. Magnetism. “Positive” and “negative” charge.**

The structural electron vacuum is differentiated and graded. It is the cause of the formation of matter structures and of their interaction at a velocity of ( $u < c$ ) corresponding to a graded space deformation and a graded matter compaction.

We can define the electron vacuum whose interaction with, or transfer to the matter structures under boundary reversible (elastic) deformation takes place at velocity of ( $c = \text{const. max}$ ) as superstructural electron vacuum.

Superstructural electron vacuum may be generated in many diverse ways. Any materialized surface is made up of atoms of a certain density. It consists of base areas ( $\lambda_{01}^2$ ) and deep inside it base volumes ( $\lambda_{01}^3$ ) are formed.

If an electron-vacuum interaction is applied to its surface expressed by a force,

$$(42) \quad F = \left( \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k^2} \right) \sqrt{n_{ox}} = \text{acceleration} \times \text{mass, then in the volume } (\lambda_{01}^3)$$

electron-vacuum potential (electricity) will be formed.

$$(43) \quad E = \frac{\hbar}{k} \sqrt{n_{ox}} = \left( \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k^2} \right) \sqrt{n_{ox}} \cdot k \cdot a_{ox} = \text{force} \times \text{distance}$$

which means that from the volume  $(\lambda_{01}^3)$  an electron  $(N_{0k})$  has been vacuumized.

The force action upon electron  $N_{0k}$  is formed in an equipotential atomic plane (“k”) and according to the Law of continuity it is multiplied in the base volume  $(\lambda_{01}^3)$  which appears to be the apex of a regular quadrangular pyramid whose base is the atomic plane “k”. The electron taking out of the volume  $(\lambda_{01}^3)$  takes place at a velocity of (c), and such velocity is typical of the maximum deformation, but under boundary deformation the energy volume of the atom (Ve) refers to the base volume  $(\lambda_{01}^3)$  which is full of atoms. The generated electron-vacuum potential is as follows:

$$(44) \quad \frac{V_e}{a_{ox} \cdot k} = \left( \frac{a_{ox}}{\tau_{ox}^2} \right)^2 \frac{1}{k} \sqrt{n_{ox}} = \left( \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k^2} \sqrt{n_{ox}} \right) (a_{ox} \cdot k) =$$

$$= \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k^2} \frac{a_{o1}}{\sqrt{n_{ox}}} \cdot k \sqrt{n_{ox}} = \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k} \cdot a_{o1} =$$

= force x distance at velocity  $c = a_{o1}$  for time  $\tau_{o1} = 1$ , or

$$(45) \quad \frac{V_e}{a_{ox} \cdot k} = \frac{a_{ox}}{\tau_{ox}^2} \cdot \frac{1}{k} \cdot c, \text{ i.e. the potential of the superstructural electron}$$

vacuum is measured by the potential of the structural electron vacuum of the electron “k” already missing in the volume  $(\lambda_{01}^3)$  and having obtained “uniform rectilinear motion” at velocity ( $c = \text{const. max}$ ). In other words, the place of the missing electron in the volume  $(\lambda_{01}^3)$  has been taken by an electron from the adjacent volume at velocity (c), and its place, in turn, is taken by the next one,

etc. This may only take place in a “closed electrical circuit”, or a metal conductor having the property for that.

The movement of the “connected electrons” is in one direction and the movement of the electron vacuum generated in the opposite direction is a form of an electron called “vacuum equilibrium”. This directed movement of “connected electrons” (electron vacuum) is referred to as an “electric current”.

The kinetic equilibrium may be expressed by the power series below:

$$(46) F_k = n_{ox} c \frac{1}{K^2} \left( 1 + \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{p^2} \right)$$

When ( $F_k$ ) is equal to the first member (1) of the series, then the materialized volume in which the transfer takes place is defined as a conductor of electric current, but when the generated electron vacuum is counterbalanced within the volume ( $\lambda_{01}^3$ ) and around it on the force series for which

$$\left( n_{ox} c \frac{1}{K^2} \cdot \frac{1}{p^2} \right) \rightarrow \varepsilon \rightarrow 0, \text{ then the materialized volume is called an } \underline{\text{insulator}}.$$

The electromagnetic field created around the conductor is nothing else but integrated electron vacuum generated along the conductor length and results from the movement of the connected electrons along the given “field lines” whose intensity (location along the conductor cross-section) depends on the area of the equipotential plane “k”.

The electromagnetic field (volume) intensity decreases perpendicularly to the conductor (in radial dimension) and occurs on the power series in accordance with Coulomb’s Law of the Microworld. The counterbalancing of the electron vacuum transferred along the conductor length, or the conductor resistance, depends on the conductor electron pressure (temperature) and its properties. The electron pressure “eats up” electron vacuum equal in quantity to it itself, and for this reason when a conductor has “ideal” conductivity and the temperature is, or is close to ( $0^0\text{K}$ ) the so called superconductivity can be observed.

$(\rho \rightarrow 0)$  - electron vacuum in the conductor  $\rightarrow 0$ .

- Bearing in mind all considerations above, we may explain the reasons for the magnetic properties of some other substances called magnets. A typical example is the iron which obtains its magnetic properties in solid state after  $(\gamma \rightarrow \alpha)$  transformation at temperature  $910^{\circ}\text{C}$ , a process of compensatory compaction of the micro-determined volumes with distinguished boundaries resulting in the increase in the volume of iron at the expense of its “grains” boundaries. These circumstances contribute to the vacuumizing of the electrons from the micro-determined volumes (atoms) and from the volume of the piece of iron placed in an electromagnetic field.

After the electromagnetic field has been removed, the piece of iron is capable to some extent of attracting miniature iron particles. This ability is due to the “electron hunger” generated in the volume of the piece of iron, i.e. an electron-vacuum disbalance is established in the volume. The electrons taken out are evenly distributed on both sides of the piece of iron in the direction of the electromagnetic field previously applied. The balance is restored ostensibly outside, with clear internal electron-vacuum disbalance being present. Two pieces of iron processed in this way and brought close to each other with their sides having vacuumized electrons or with the same poles, repel each other. If they are brought close to each other with their opposite poles, they attract each other. Repulsion is due to the presence of electron “cushions” on both poles of the two magnets and the fact that it is impossible for these to be removed when the magnets are placed close to each other with the same poles. When the magnets are close to each other with their opposite poles, an exchange of electrons between the outer sides of the two magnets takes place resulting in the attraction of the two pieces, i.e. there is a natural coincidence of the directions of electron vacuumizing in the magnets.

The residual magnetism in the iron is due to the fact that it is impossible for the electrons to go back to their original positions; this may happen under the

influence of an electromagnetic field with a direction opposite to the one having caused the residual magnetism.

- At this point, it is important to refute the belief about the existence of “positive” and “negative” charges as an absolute fact and an inherent property of the structural units of matter. The electrons and the atoms have “a vacuum nucleus” which is the cause for their independence and compactness. The electron nucleus attracts “primary matter” and the atomic nucleus attracts individual electrons.

I have defined the particles that are attracted as positively (+) charged but both the electrons and the atoms are determined by centripetal forces of attraction with the only difference that the electrons have a relaxed boundary deformation with corresponding velocities of ( $u < c$ ) and maximum forces of attraction acting only within the electron volume and along the surface forming it. Between the electrons there may be only coalescent interaction, and between the atoms there may be the following relationships:

a) the attractive (electron-vacuum) action of various chemical elements’ atoms and their compounds is different in terms of “formation”;

b) there is also an attractive action around the atoms which is adjustable:

- naturally – accomplished by the electrons in the atoms which tend to balance the electron pressure between the atom planes;

- forcefully – by taking out or by adding electrons from/ to an atom.

Therefore, we can speak about a weaker, stronger or balanced capability of attraction.

At forcefully addition of electrons there is some weakening and isolating of attractive forces on the one hand, and on the other, around the distinguished volume “an electron cushion” is formed which has elastic properties appearing to be the reason for the “ostensible” repulsion and not for the existence of a negative charge (-).



The electron is the structural unit of “exchange” between atoms during their interaction.

The power pulses of electron vacuum transfer, or the electricity, take place at velocity ( $c = \text{const. max}$ ) or:

(47)  $F_K = \frac{\pi^2 n_{ox}}{6 K^2} c = \frac{\pi^2 n_{ox}}{6 K^2} (\dot{e})$ , i.e. the power pulse has its own gradation in terms of its material (electron-vacuum) density ( $n_{ox} = \frac{n_{ox}}{2^2}, \dots, \frac{n_{ox}}{K^2}$ ) which also means a number of the power lines of the electric current along the cross-section of the conductor. The magnitude of the power pulse of electron pressure transfer is equal to the power pulse of electron vacuum transfer.

$(\dot{e})$  - is the radial velocity of any atom formation, or the radial velocity of taking an electron out of an atom for compensation of the electron vacuum generated previously, or of an electron taken out of an adjacent atom in a closed metal conductor

Moreover,  $(\dot{e})$  is the radial power pulse for hydrogen atom formation ( $n_{ox} = 1$ ) – the atom having electron-vacuum density 1. The power pulse of the electron vacuum is determined not only by the density of the cross-section of the conductor, i.e. the number of the power lines along which it is being carried out, but also by the length (L) of the “continuous” intermittent transfer of electron vacuum at velocity ( $c = \text{const. max}$ ).

This length of “continuity” of the power vector coincides with the product of the time of “continuity” of transfer multiplied by the velocity of transfer (c). In this case the power pulse

$(F_K = \frac{\pi^2 n_{ox}}{6 K^2} (\dot{e}))$  referring to the base volume ( $\lambda_{01}^3 = \text{const}$ ) multiplied by the distance of its formation ( $a_{ox} \cdot K$ ) and the length of continuity (L) determines the energy of the electron vacuum transferred:

$$(48) \quad E = \frac{\pi^2 n_{ox}}{6 K^2} (\dot{e}) a_{ox} \cdot K \cdot L =$$

$$= \left( \frac{\pi^2}{6} \frac{n_{OX}}{k^2} a_{OX} \cdot K \cdot L \right) (\dot{e}) = U \dot{e} \quad \text{where}$$

$U$  – is the so called voltage of the electric current.

Example: There is a proportion between the voltages of the primary and the secondary coil of a transformer:

$$\frac{u_1}{u_2} = \frac{n_1}{n_2} \quad u_2 = \frac{u_1}{n_1} n_2 \quad n_2 > n_1 \quad u_2 > u_1, \text{ which means that the}$$

primary ( $n_1$ ) has a bigger cross-section of the wire and lesser number of windings in comparison to the secondary ( $n_2$ ), i.e. the power lines of the electric current in the primary will cross the secondary coil with a higher length and will generate power vectors of electron vacuum with lines of greater length, i.e. a greater voltage. The voltage of the generated electron vacuum is a manifestation of the so called mass, or the generated electron-vacuum density.

### **3.6. Transfer (dissipation) of electron pressure and electron vacuum.**

#### **Waves.**

The transfer of electron pressure determines such phenomena like light, heat, sound, etc. which we perceive with our senses. The structured space is shrunk and stretched. It is deformed and divided into micro-volumes in which the centrifugal forces of deformation are transformed into centripetal ones.

The atoms and the electrons that fill them up are the micro-volumes which preserve the deformation by being able to relax and restore part of it without losing their compactness. The staged relaxation and restoration is connected with the action of the graded forces and velocities of the electron pressure and the electron vacuum.

The change in the electron pressure in atoms which fill up a local volume destroys the balance in the surroundings which is a sign of a process of transfer, or dissipation of electron pressure in a given or all directions. Static equilibrium can be achieved at expanding the volume of transfer up to the moment when the electron pressure in the volume and the surroundings come into balance. The

process of transfer is a dynamic balance. The transfer takes place in a step-like manner, intermittently at a velocity equal to a Constant and accomplished by transforming electron pressure into electron vacuum from an atomic plane to another one and vice versa and thus repeating alternately in any adjacent plane.

The energy measured by the velocity and the frequency of the intermittent transfer of electron pressure can be defined as light, heat, etc. The portions of electron pressure transferred with an expanding volume in the unlimited space full of gas along a base atom series determined by the wall ( $\lambda_{01}^2$ ) of the base volume ( $\lambda_{01}^3$ ) takes place with the formation of “kinetic volume” according to the power series below:

$$(49) \quad \sum_{i=1}^m F_i = n_{ox} \frac{c}{k^2} \left( \frac{1}{2^2} + \frac{1}{3^2} + \dots + \frac{1}{m^2} \right).$$

The interval for electron pressure drop from ( $n_{ox} \frac{c}{k^2}$ ), which is the electron pressure in the source, to ( $n_{ox} \frac{c}{k^2} \frac{1}{2^2}$ ) is determined by ( $2\lambda_{01}$ ), and the interval for electron pressure drop to ( $n_{ox} \frac{c}{k^2} \frac{1}{m^2}$ )  $\rightarrow \varepsilon \rightarrow 0$ , or more precisely to achieving an equilibrium with the surroundings, will be ( $R_m = \lambda_{01} m$ ). Then, at the front of the source of electron pressure a “kinetic volume-wave” is formed with length ( $R_m$ ) and mean electron pressure ( $F = \frac{2}{3} n_{ox} \frac{c}{k^2}$ ). This wave has a direction of propagation determined by the power series below:

$$(50) \quad \sum_{i=1}^m F_i = \frac{2}{3} \cdot n_{ox} \frac{c}{k^2} \left( 1, \frac{1}{2^2}, \frac{1}{3^2}, \dots, \frac{1}{p_2^2} \right) \text{ and when } \frac{2}{3} \cdot n_{ox} \frac{c}{k^2} \frac{1}{p_2^2} \rightarrow \varepsilon \rightarrow 0,$$

the wave will dissipate at a distance from the source (p.  $R_m$ ). “The kinetic volume-wave” has its own compactness determined by the directed movement at a constant velocity and by a boundary surface on which there is a dynamic balance with the surroundings at any time.

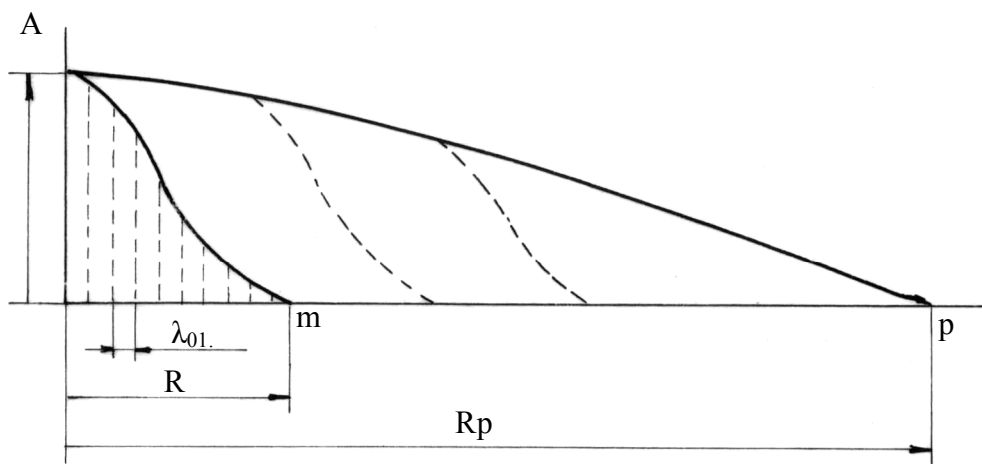
The increase of the wave volume along the axes “x” and “y” while moving along “z” is the reason for the electron pressure dissipation in it. With the wave volume increase, proportionally also decreases the amplitude (A) of

the electron pressure, of both the kinetic volume and the discrete atoms along the wave length but its graded degree is preserved, i.e. the relaxed deformation volume of the “stage” of electron pressure in the atoms decreases but its pulse characteristics remain. They appear to be the reason for the wave movement at a velocity equal to a Constant.

Graphically the characteristics of the “kinetic volume-wave” are illustrated in Fig. 9.

(51)  $(R_m = \lambda_{o1} m)$  – wave length;

(52)  $(R_p = R_m p)$  – distance of wave propagation (dissipation);



**Fig.9. Wave characteristics.**

A – wave amplitude corresponding to the decreasing volume of the relaxed deformation stage (K) along the distance of dissipation;

m - number of power pulses determined by the wave length  $\lambda_{o1}$  after which the electron pressure becomes  $n_{ox} \frac{\epsilon}{k^2 m^2} \rightarrow \epsilon \rightarrow 0$ ;

p – number of times the wave length recurs ( $R_m$ ) up to the electron pressure dissipation  $\frac{2}{3} \cdot n_{ox} \frac{\epsilon}{k^2 p^2} \rightarrow \epsilon \rightarrow 0$ ;

Similarly, the electron vacuum waves, or the electromagnetic waves, are formed and propagated (dissipated).

### 3.7. Transfer of materialized monolithic macro volumes. Inertia of mass.

The transfer of a monolithic macro-body having the properties of a fluid through “shrunk and stretched” space is accomplished at a given velocity as a result of a given force. This causes the accumulation of energy in the body ( $Mu^2$ ). Such a dynamic state is characterized by increased polarized electron pressure in the body atoms in the direction of the shift and adequate to its velocity:

$$(53) \quad Mu^2 = \left( \sqrt{n_{ox} K_T K_S K_Z} \frac{c^2}{k p z} \right) N Z, \text{ where}$$

$\sqrt{n_{ox} K_T K_S}$  - is the linear electron-vacuum density of the body obtained after phase transitions (atom formation  $n_{ox}$ , gas – liquid denoted by  $K_T$ , and liquid – solid, designated by  $K_S$ ) which is the so called mass referring to a unit of base volume  $(\lambda_{01}^3) = \text{constant}$ ;

$\sqrt{K_Z}$  – linear electron-vacuum density of the solid obtained after the solid phase structuring according to the “power series”;

$C$  – velocity of electron pressure transfer under the conditions of non-reversible (max) deformation, i.e. atom formation velocity;

$k, p, z$  – number of the structured atom electrons at phase transition:  $k$  – gas-liquid transition;  $p$  – liquid-solid transition;  $z$  – electrons structured in a solid;

$n_{ox}$  - number of electrons taken out of a hydrogen atom and returned back at velocity of  $(c)$  when a certain atom ( $N_0(n_{ox})$ ) from the Table of chemical elements has been formed;

$N_z$  – number of the base volumes ( $\lambda_{01}^3$ ) in a body having accumulated a potential of electron pressure:

$$(54) \quad \psi = \sqrt{n_{ox} K_T K_S K_Z} \frac{e^2}{kpz}$$

$K_T$  – coefficient of compaction, i.e. deformation, of an atom at the gas-liquid phase transition

$K_S$  - coefficient of compaction, i.e. deformation, of an atom at the liquid-solid phase transition

$K_Z$  - coefficient of “plane” compaction at the solid phase structuring according to the power series;

$u$  – velocity of body transfer;

$m$  – body mass which is the body volume multiplied by its linear electron-vacuum density ( $\sqrt{n_{xi}}$ ).

Expression (53) shows the equilibrium between the external and the internal manifestation of the body.

In this case the velocity of transfer is:

$$(55) \quad u = c \sqrt{\frac{N_z - 1}{N_m kpz}}$$

$N_m$  – number of the base volumes ( $\lambda_{01}^3 = \text{const}$ ) in the body.

In order to make a body move, the so called “striking” force action should be applied at the initial moment. That is at the point of application and around it, in ( $N_z$ ) base volumes ( $\lambda_{01}^3$ ) of the body volume a mean potential ( $\psi$ ) of directed electron pressure is excited. One electron in each of the atoms of this volume is decomposed, thus exciting kinetic energy ( $N_z \psi$ ) of polarized electron pressure which is distributed among all atoms (all base volumes) of the monolithic body with the same direction which takes some time ( $\tau_i$ ) and the body starts moving at velocity ( $u$ ). Internal equilibrium of the electron pressure among all ( $N_m$ ) base volumes of the body is achieved (see equation 55).

There is dynamic equilibrium between the body and its surroundings (velocity  $u=\text{const}$ ) which is provided by the interaction between the body and the surrounding space. Across the front atomic plane of the body there is adequate pressure resulting from the resistance of the surroundings (shrunk and stretched space) in which the movement takes place.

The maintenance of constant electron pressure in the front atomic plane of the body and its adjacent atomic plane of the surroundings (reduced body velocity) is the beginning of a counter power pulse of “hot” electrons emitted by the body in the direction of movement. These electrons are attracted by the surroundings which makes it possible to maintain the velocity  $u=\text{const}$ . They do not lose their connection with the atom-mother (they go back) and are a kind of “wires” between the body and the surroundings through which the former is “pulled” in the direction of movement. The power pulse, or the leaving, of the electron transforms in the atom-mother a portion of electron pressure into electron vacuum which in turn transforms again into electron pressure resulting from the striking action of the identical electrons from the adjacent plane in direction opposing the body movement. The front atomic plane of the body again interacts with the adjacent plane from its surroundings. This process recurs until power pulses attenuate during their intermittent interaction along the body length, i.e. the direction of movement.

All this time the velocity of the body remains Constant, or close to it. When the moving force is removed, the body velocity decreases, so does the pressure in front of the body front atomic surface which leads to a change in the body-surroundings equilibrium. To restore it, a power pulse is sent out in the direction of the movement of the atoms of the front body surface which in turn are attracted by the atoms of the adjacent surface from the surroundings. The power pulse is a substitute of the moving force that has been removed.

Such power pulses are excited in a chain, intermittently and successively in any atomic plane of the body going to the front plane where they interact with

the surroundings. This process continues for a period of time ( $\tau_i$ ) when the body maintains its velocity at the expense of the accumulated electron pressure at velocity ( $u$ ) and after that the body velocity decreases again under the influence of the resistance forces, with the pressure in front of its atomic plane also decreasing. As a result, due to the electron pressure at velocity ( $u_i < u$ ), accumulated in the body but lower in this case, an intermittent decrease in the velocity up to a halt takes place, i.e. an inertia movement occurs. The greater the mass (the electron-vacuum density) and the volume of the body, the longer the time and the distance for stopping.

#### **4. Insights into the Model of Unity of Interaction**

- The code of space – time – matter interaction has been established;
- Matter is made up of electrons and atoms;
- The intermittent transformation of the electron pressure energy into electron vacuum energy and vice versa taking place inside the atoms and around them is the reason for the structuring and decomposition of matter

- The atom is the accumulator of electron pressure and electron vacuum. Electrons are the tool for the transformation of the former into the latter;

- The sum of the energy of the electron pressure and the electron vacuum in an atom is a Constant;

- ... ;

- ... .

The significance of the Model of Unity of Interaction is universal:

- It shows the beginning and the way of the whole world formation;
- It identifies the basic structural units of matter;
- It explains the technique (the objects, the reasons and the manner) of interaction;

- It analyses the structural evolution of matter;



- It explains the essence of chemical elements and their compounds, as well as the nature of the Table of chemical elements;
- It describes the basis of organic and inorganic matter;
- It explains the nature of processes, phenomena and concepts, such as light, heat, sound, electricity and electric current, electromagnetic interaction, gravity, transfer of materialized macro-volumes and the notions connected with the latter, namely power, velocity, acceleration, mass, inertia, energy, etc.

The Model of Unity of Interaction is the basis and the insight into the nature of problems and their management.