Dear Mr. Professor!

1. **The global scientific sensation** – Andrea Rossi's energy catalyzer (E-Cat) is a home nuclear reactor operating on fast neutrons (as speaking the language of Modern Science (MN)). Electric power from urban grid serves as its fuel.

It consumes electric power → generates heat.

Consuming **1** kilowatt-hour →we get 3600000×**100** Joule.

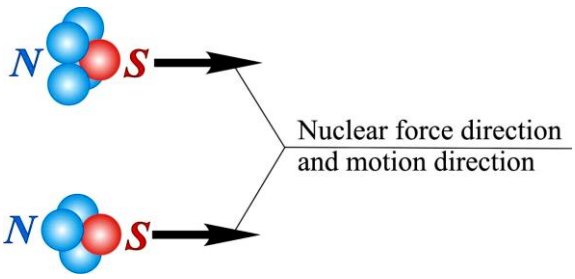
2. **The global scientific news** is a household fuel-free power generating plant having capacity of 10kW, invented by Valery Andrus, the author of Neutron Sciences (NS): physics, chemistry, astrophysics. In this embodiment, nothing but gravitons (β^+-particles) is consumed, and clean electric power (e^--particles) is generated, same as in the urban grid.

In it transformers-gravitons are reconstructed into electrons – this is electric generation, same as in the machine power generators of thermal power plants (see http://neutronscience.com.ua/books/, **About trying to preserve the environment and the Earth climate**).

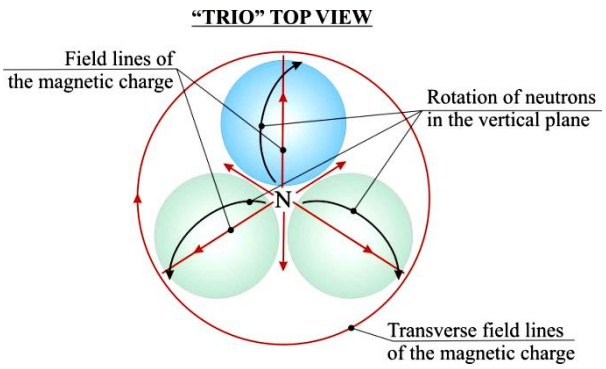
3. **The global scientific sensation** – electricity in the conductors (e^--particles = = α^--particles + γ^--particles) and magnetic field lines (MFL) around them consisting of gravitons (β^+-particles = α^--particles + γ^--particles) are the most dense packings of all three types (α^--, β^+-, γ^--) of radioactive radiation, **even in a normal incandescent lamp (**see ***Card No1*****)**.

CARD №1

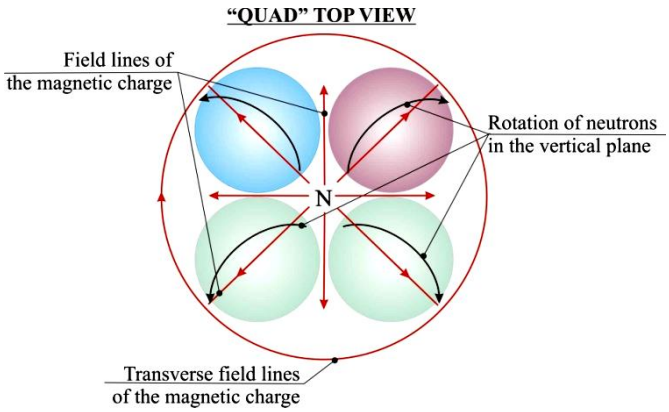
BASIC ENERGY CARRIERS of the i and ii parallel worlds on the basis of neutron or neutrino

PRIMARY – structural unit (SU)		
SU-4 and SU-5 have a stable structure due to the rotation of neutrons, ensured by the rotating MFL of molecular magnets ('drive belts'), having neutrino engines, and available magnetic charges, and speeds nearing the speed of light "*c*".	'pentad'	
	'quad'	

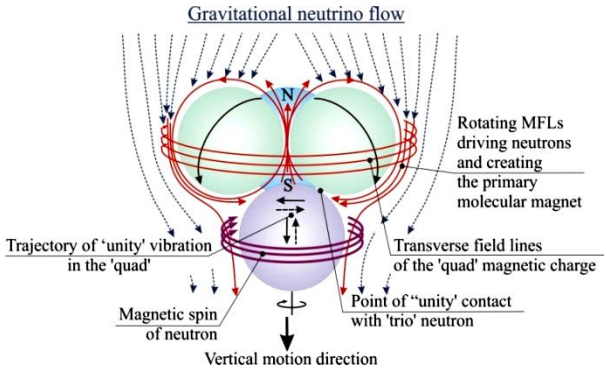
Neutrons consist of neutrinos and contact with each other in SU-4 and SU-5 through covalent neutrino chemical bond like sticky lubricants



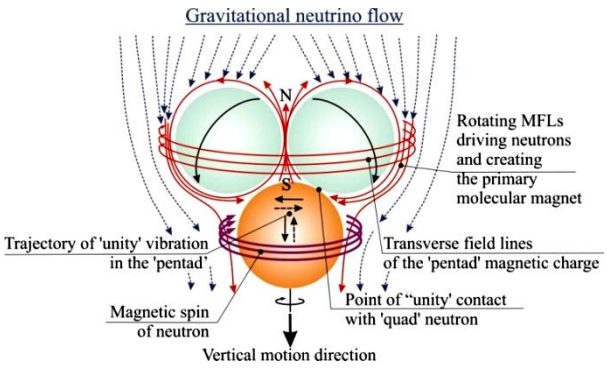
Magnetic charge of 'trio'



Magnetic charge of 'quad'



Magnetic field lines of 'quad'



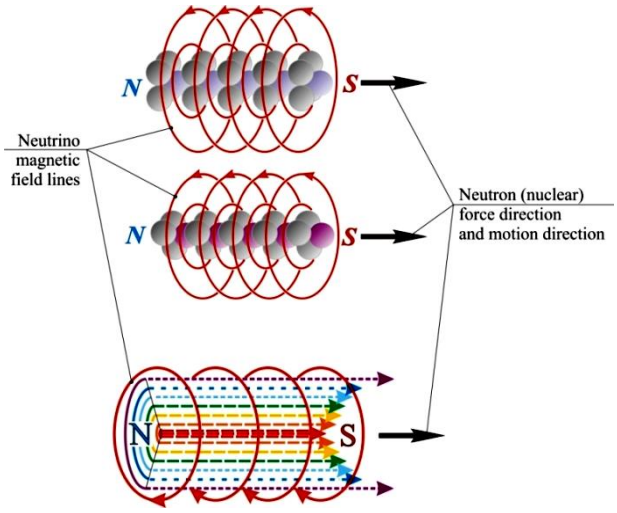
Magnetic field lines of 'pentad'

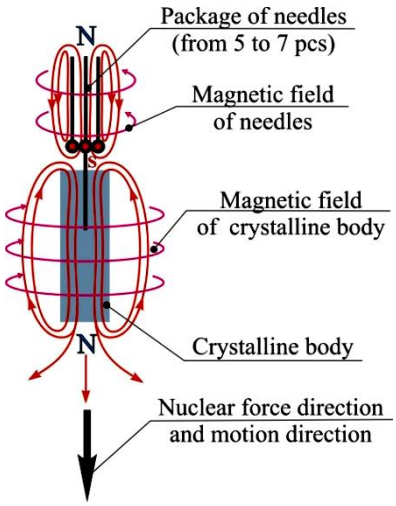
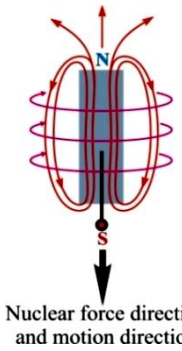
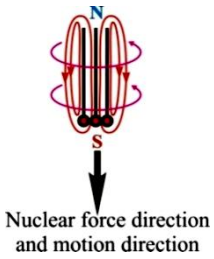
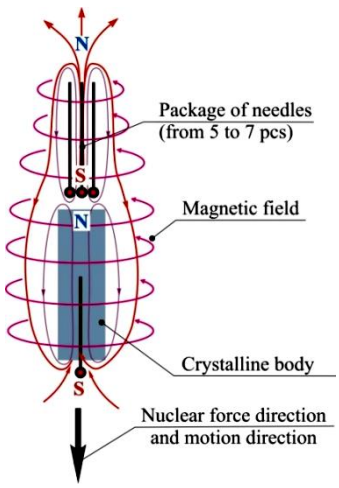
LIGHT

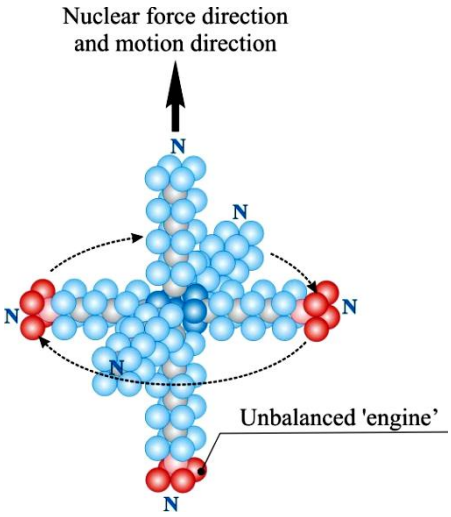
A needle from 'pentads'

A needle from 'quads'

Cord



MAGNETIC – **graviton** or **β^+ - particle**	Anode carrier – transformer mainly on the basis of the chemical element Ferrum with the needle 43 SU-4 long	
DURING GRAVITON FRACTURE	**α^- – particle** (a needle with crystalline body)	
	γ - particle (a package of 5-7 needles or package of light)	
ELECTRIC – "electron", e^--particle (when fractured – **α^--particle** and **γ-particle**)	Cathode carrier – transformer	

CHEMICAL ELEMENT – "GAS"	There is one unbalanced 'engine' (SU)	
Under certain conditions, all of the above energy carriers and their temporal combinations are broken into smaller structures (needles and cords of light, the SU), as well as into neutrons and neutrinos (for the II parallel world – the 'dark matter'), which become heat carriers. Let us pay attention to the fact that from the point of view of NS the Universe has a **plurality of parallel worlds** built on the same principle, but using different initial carriers: the I world uses the neutron, the II the world – the neutrino (dark matter), the III world - the superneutrino, etc.		

Let us refer to the abstract from the article of Russian Professor V. Etkin ***"Rossi's Generator – the truth and fiction"*** (http://etkin.iri-as.org/napravlen/07edinstvo/gener_rossy.pdf , ***in russian***): "It is shown that Rossi's generator is one of the operable over-unity devices, the actual source of energy in which is ether, rather than cold fusion and transmutation of chemical elements."

Immediately there are a number of questions arisen:

1. What is energy? This general definition is absent even in the ordinary physical directory, there are only specific definitions, for example, electrical energy.

2. What is ether? This definition is also nowhere to be found. Even it is not clear, how something unknown suddenly becomes understandable for us, and it can be measured. It turns out that the ether cannot be fixed, whereas the result of its activity can be recorded?

3. Is ether a source of energy?! Let us assume that this is a "dark matter" in the Universe. According to the Neutron sciences (NS), this is the II parallel world where up to 95% of the mass of the Universe is concentrated. However, the "dark matter" can never be measured by direct laboratory method due to the large difference in size between the chemical elements and electrons between the I and II parallel worlds.

Summary: Ether is a fiction due to lack of element basis, on which it could build at least mentally.

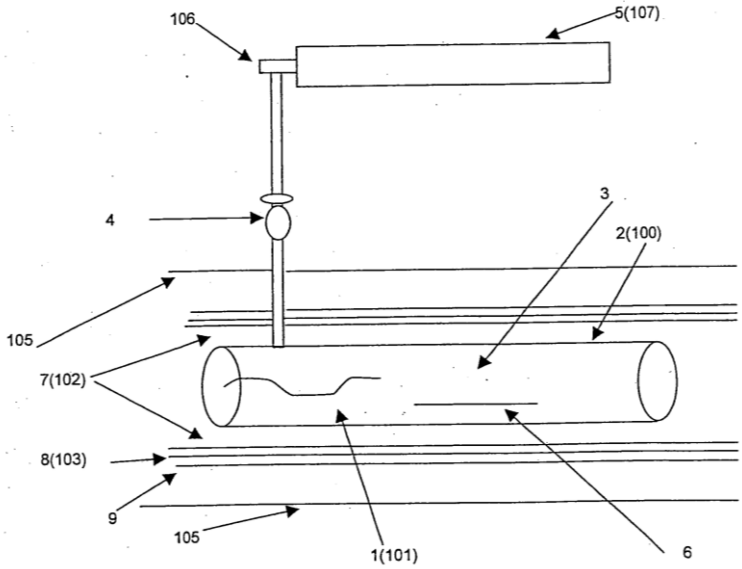


Fig. 1. Scheme of Rossi's generator

Let me cite Professor V. Etkin's information about the generator of Rossi: *"In 2011, physicist and inventor of the University of Bologna, Andrea Rossi with Professor Sergio Focardi demonstrated to the world a unique device 'E–Cat' (energy catalyzer) – an affordable and efficient the power generator (**Fig. 1**). Judging by the national patent, the main element in the plant is a metal tube 2 with multilayer insulation 7...9 comprising layers of water, boron, lead and steel. There is electric heater 1 inside the tube. The tube is filled with nickel powder 3, doped with other chemical elements playing the role of a conductor. The composition of these additives is the main know-how of this device. Hydrogen is fed from cylinder 5 into the tube under pressure of about 80 atmospheres through control valve 4. The plant dimensions are 0.5×0.5×1.0 m, its weight does not exceed 30 kg. When the temperature is risen to several hundred degrees by one 400W electric heater, hydrogen molecules enter into a self-sustaining reaction generating 12 kW of heat. Since after the operation lines of copper and iron appeared in the reactor, the authors explain its operation by transmutation of nickel into copper and refer the device to the category of low-energy nuclear reactions (LENR)."*

I would like to warn you that from the standpoint of modern science (MS), this phenomenon will never be explained ever since the atom in the form of a nucleus with electrons does not exist in nature, and hence it follows that all the representations of the chemical elements based on this model of the atom are also incorrect.

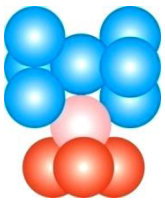
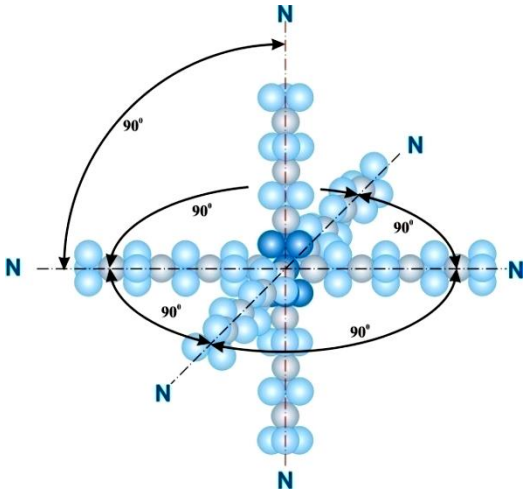


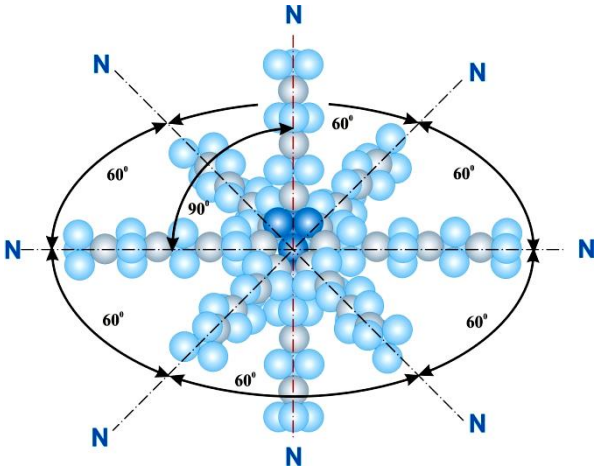
Fig.2. Hydrogen gas SU-4

All processes occurring in Rossi's reactor completely confirm the views of Neutron Sciences. According to NS, all chemical elements (see ***Card No.2***) successively transform into each other by magnetic bonding of structural units SU-4 or SU-5 as a result of hydrogen destruction (it is not fully formed, the most structurally unstable chemical element, consisting of only three needles instead of six (see ***Fig.2***)) – it is theoretically for drawing up a table of chemical elements. Moreover, the transformation of chemical elements occurs only in gaseous state. In other cases, we will get all sorts of isotopes. In fact the above scheme can be jumped over due to the addition is non-hydrogen SU, but the entire needles of chemical elements.

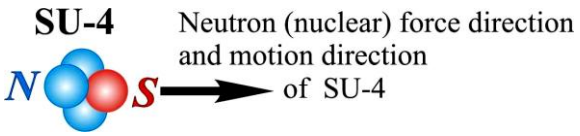
CARD №2



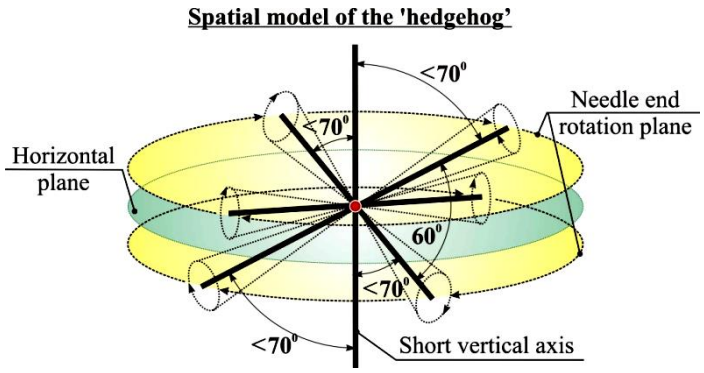
a). Quad-based six-pointed 'hedgehog' – simple sodium (Na)



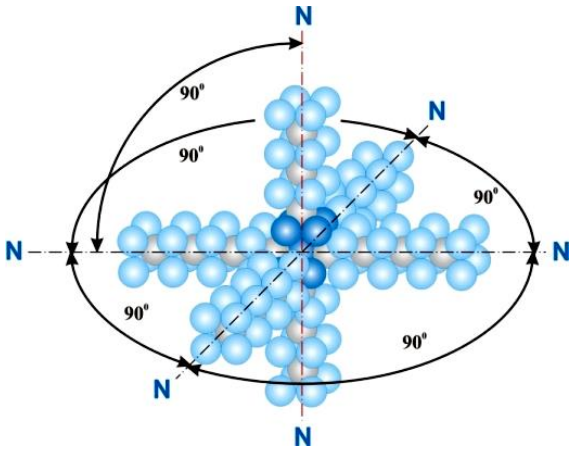
b). Quad-based eight-pointed 'hedgehog' – radioactive sodium (Na)



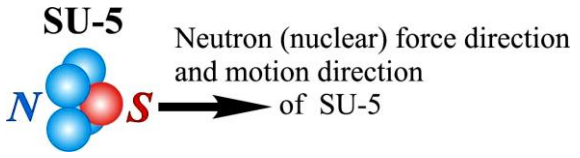
c) Quad structural unit (SU-4)



d) pentad-based eight-pointed 'hedgehog'



e) pentad-based six-pointed 'hedgehog'



f) Pentad structural unit (SU-5) (noble chemical elements – aurum, platinum, etc. are built on the basis of 'pentads')

Fig.3. Chemical elements – 'hedgehogs' and structural units SU-4 and SU-5

Both six-pointed (***fig.3.a and 3e***), and eight-pointed (***fig.3b*** and ***3d***) 'hedgehogs' are formed with needles on the basis of SU, they are summarized in the tables of conversions 1, 2 and 3, 4 (see http://neutronscience.com.ua/books/ "Tables №1, №2, №3, №4 of successive conversion of chemical elements into each other"). Let us consider a cell from ***Table 2*** of chemical elements conversions with chemical element ***Lithium*** as an example ***(***see ***fig.4*** and ***Fragment of Table of Conversions 2)***.

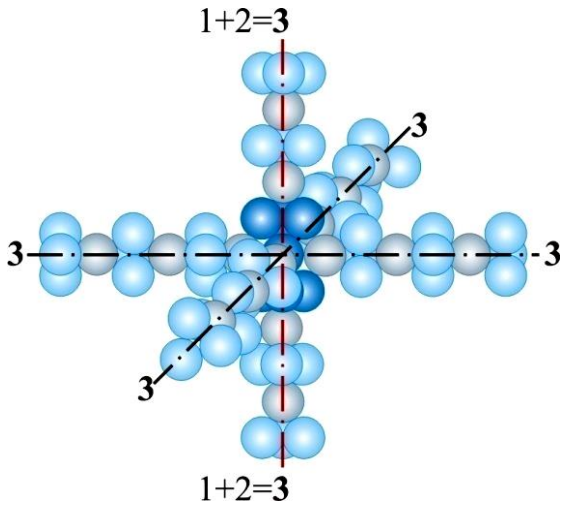


Fig.4. Six-pointed 'hedgehog' with quad-based needles. Lithium – 'solid state'

Solid state (physical state of the element)	
3 (atomic number)	
Li^2_{ss} (symbol) ***Lithium*** (name)	**71** (actual quantity of neutrons in the element)
	-1 (neutron deficit in protogas)
534 (roentgen density in solid state, kg/m^3)	**72** (theoretical number of neutrons)
542 (gravitational density in solid state, kg/m^3)	**3** (number of layers of structural units (SU) in the hedgehog's needles)
7.1 (relative neutron mass M)	**18** (number of SU-quads without neutron deficit)

Fragment of Table of Conversions 2 (6x4). LITHIUM.

gas-1		liquid-1		gas-2		liquid-2		gas-3		solid state	
3											
Li^2_{gas1}	51	Li^2_{liq1}	55	Li^2_{gas2}	59	Li^2_{liq2}	63	Li^2_{gas3}	67	Li^2_{ss} ***Lithium***	71
	-1		-1		-1		-1		-1		-1
	52		56		60		64		68	**534**	72
389	2 1/6	**420**	2 2/6	**450**	2 3/6	**481**	2 4/6	**511**	2 5/6	**542**	3
5.1	13	5.5	14	5.9	15	6.3	16	6.7	17	7.1	18

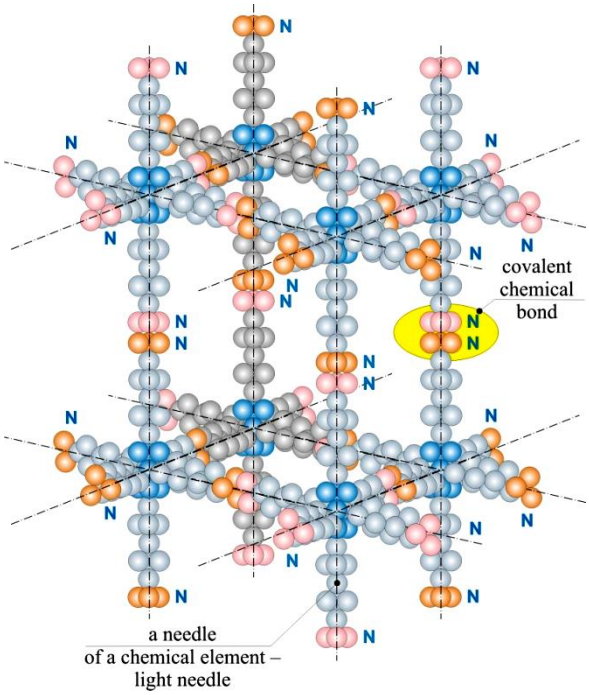


Fig.5. An example of the crystalline lattice made of chemical elements – 6x4 'hedgehogs'

Needles of a 'hedgehog' connect with the needles of neighboring 'hedgehogs' with the help of ***crystalline lattice*** (see ***fig.5***). Neutron Sciences distinguish such kinds of interactions (chemical bonds) of hedgehogs' needles – metallic, covalent (polar and non-polar), ionic and sedimental (metallic, covalent, ionic) chemical bonds.

For example, Rossi's reactor, according to the scheme given by Prof. V. Etkin, has boron (*B*) except nickel – a radioactive chemical element with the length of needles making 10 SU-4; Nickel (*Ni*) is noble metal, it has needles 39 SU-5 long. The length of the copper (***Cu***) needle is equal to 49 SU-4. As you can see, 39 SU-5 (Ni) + 10 SU-4 (B) = = 49 mixed SU (Cu). The needle length will correspond to ***Cu***, but with different SU. The chemical bond will be covalent based on magnetic closures – 'touch fasteners', but somewhat weakened since the ends of the needles have different numbers of neutrons: SU-5 has four neutrons, while SU-4 has three neutrons.

Images obtained with the electronic scanning microscope show that nickel in the initial fuel mixture has the form of porous spherical aggregates sized about 10 microns (see ***Fig. 6***). Lithium aluminum hydride has the form of flakes ranging in size from several to hundreds of microns (see ***Fig. 6***).

Two components can be seen in the spent fuel: the fused mass consisting mainly of nickel and flakes consisting mainly of aluminum and oxygen (see ***Fig. 7***).

The carried out analyzes revealed no significant changes in the *isotopic* composition of the fuel. We can assume that this is connected with insufficiently long duration of the experiment. An experiment in Lugano (see **Levi G., Foschi E, Höistad B. 'Observation of abundant heat production from a reactor device and of isotopic changes in the fuel'** http://www.sifferkoll.se/sifferkoll/wp-content/uploads/2014/10/LuganoReportSubmit.pdf) that found strong isotopic changes was 10 times longer with significantly higher capacity.

Studies of the *elemental composition* with an electronic microscope, as well as with a laser analyzer, showed a strong difference for different sampling locations. However, the two fractions differ distinctly: aluminum and oxygen prevail in one of them, and nickel prevails in the other. In the fraction with nickel after the reactor operation **the content of chromium, potassium, silicon, sodium, iron, titanium and other elements increased significantly.**

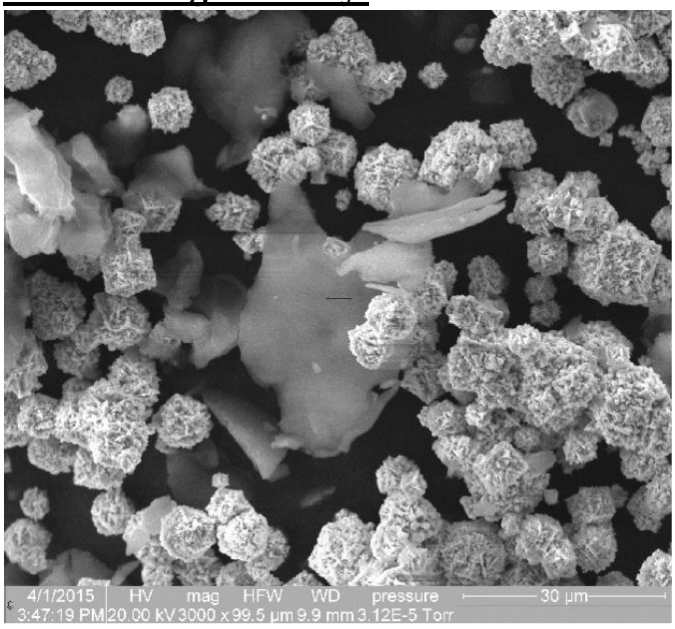


Fig.6. Image of fuel mixture in the electronic scanning microscope prior to the experiment.

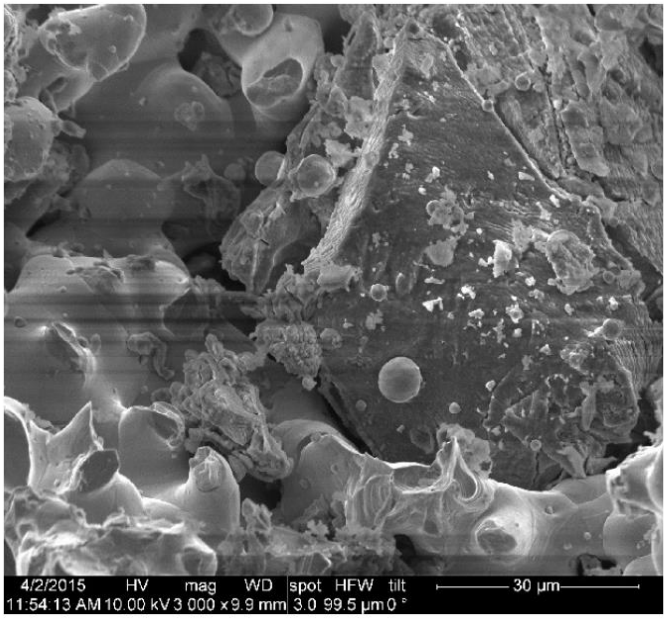


Fig.7. Image of fuel mixture in the electronic scanning microscope after the experiment.

It should be noted that fused nickel beads have a goldish shade. Where did this shade appear from?

It is known that there is nothing without something in the nature. Let us have a look at ***Fig. 8***. We can see that the white light reflected from the surface of copper, we perceive as red with a frequency of f = 400-480 THz. The change in frequency takes place due to inhibition of the needles of white light by molecular magnets of superficial needles of the copper piece. Hence, the change of white light into some other depends on the length of the needles of the object material and, accordingly, the magnetic power of molecular magnets, and the location of these needles over the object surface. If the copper needles on the surface are located on a piece of copper, then we will observe red color. If it is a fused piece of nickel Ni with individual randomly arranged on its surface artificially created copper needles, the frequency of light will increase by reducing the magnetic braking, and we will see a goldish reflected color (see ***Fig. 9***).

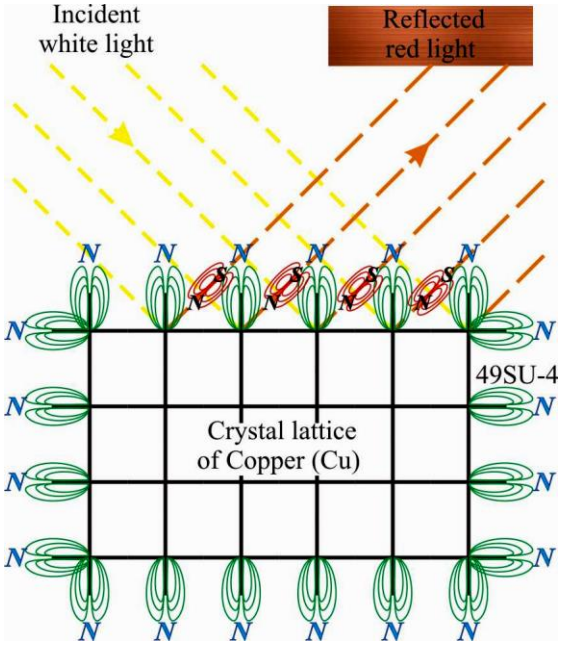


Fig. 8. The reflection of white light from the surface of the pure copper

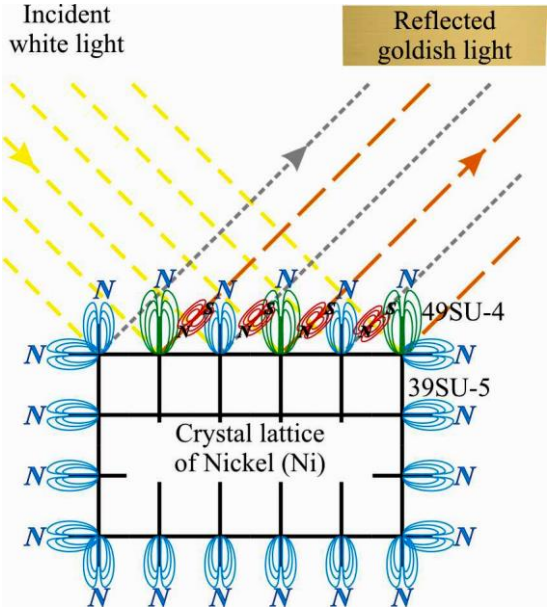


Fig. 9. The reflection of the white light from the surface of the isotope of Nickel with copper needles

Why is it goldish, not yellow? Because nickel is a metal of silver-white color. Merging of silvery-white and yellow will give a goldish color, i.e. instantaneously reflected light flows with two different frequencies will reach human eyes.

Now let us answer the question about the mechanism of formation of a plurality of different isotopes in the spent fuel. **The appearance of a plurality of isotopes and a small amount of new chemical elements is associated with a unique and universal chemical bond in the form of magnetic closure – 'touch fastener'.**

The magnetic mechanism of the chemical bond of any kind – it is one of the major discoveries of Neutron Sciences!

CARD № 3

THE MECHANISM OF ALL TYPES OF CHEMICAL BONDS

Now let us consider the mechanism of all types of chemical bonds –it is common, a magnetic one.

MFL from gravitons on the basis of neutrino and super-neutrino (II world)

Magnetic closure – a 'touch fastener' (is obtained when compressing parallel MFL)

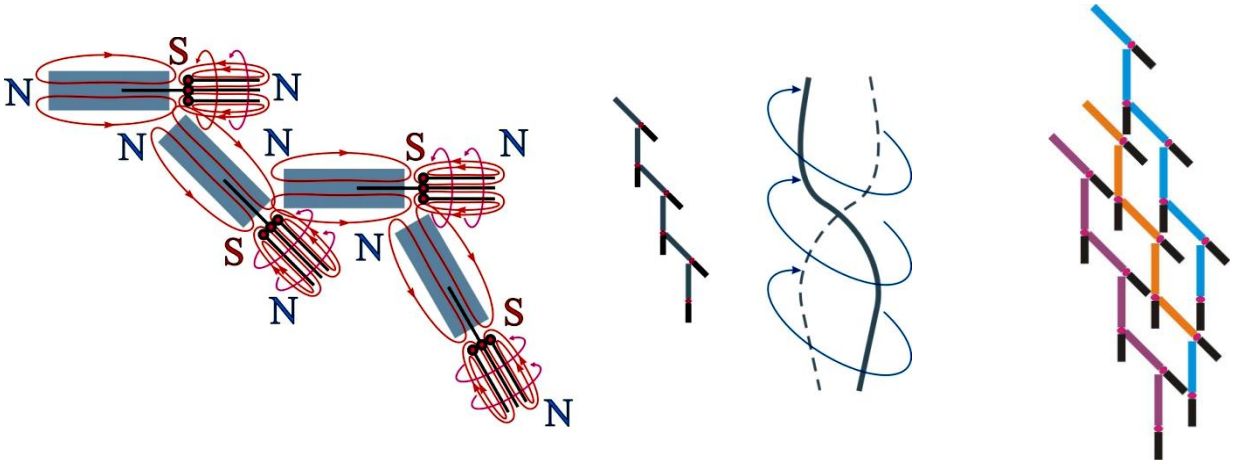
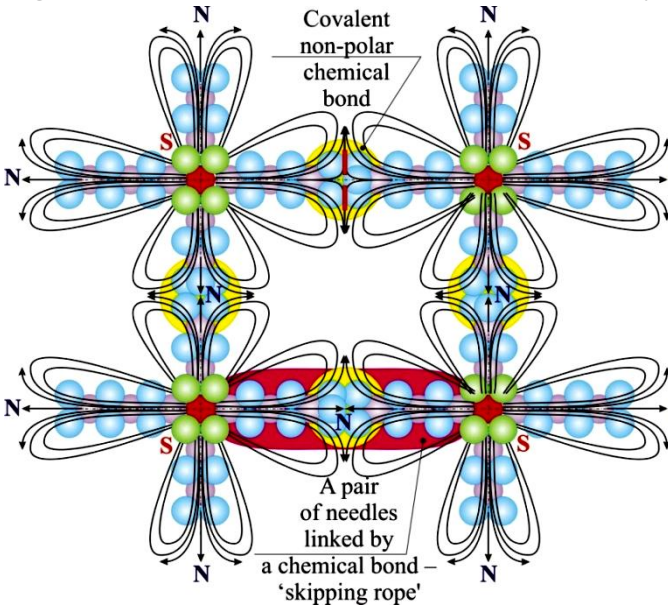
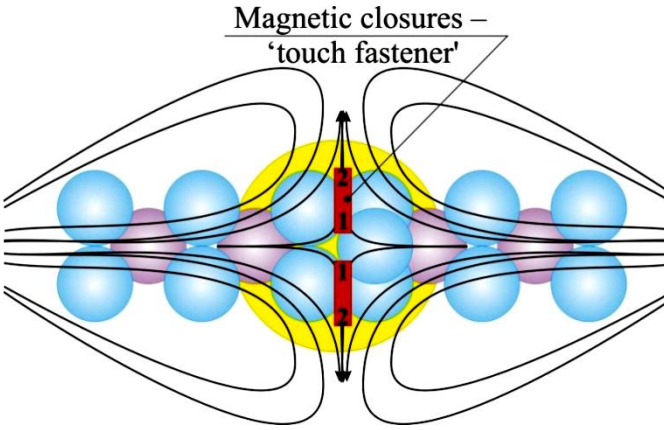


Fig.10

Let us have a look at a covalent chemical bond (***Fig.11***) with magnetic closures – 'touch fasteners'. In the needles with SU-4 covalent bond will be carried out by three magnetic closures – 'touch fasteners'; and by four of them with SU-5.



a)



1 – cross-linking points of parallel MFLs
2 – delinking points of parallel MFLs

b)

Fig.11. Covalent bond

The metallic chemical bond of a pair of needles will have one magnetic closures – 'touch fastener', the length of which can change.

The ionic chemical bond will have four short magnetic closures – 'touch fasteners'.

Thus, all the chemical bonds regardless of their type are magnetic closures – 'touch fasteners'.

CARD № 4

MECHANISM OF NEUTRON (NUCLEAR) POWER FORMATION

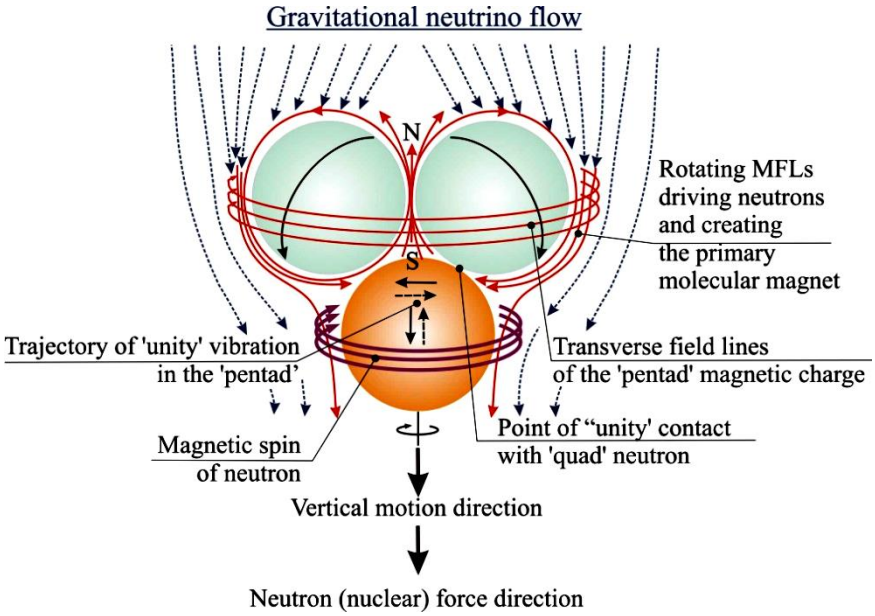
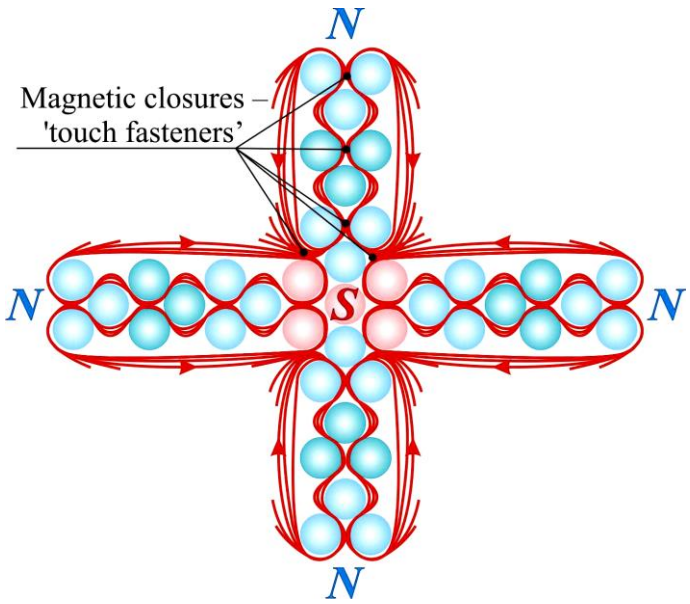


Fig.12

We are looking at ***Fig.12*** and see that inside the SU-4 and SU-5 neutrino MFLs will be compressed, i.e., magnetic closures – 'touch fastener' will appear, which does not let structural units decompose. During paired contacts of rotating neutrons, which tend to run along the surface of each other, there will be throws with a blow on the central neutron.

Thus, the neutron (nuclear) forces are impact forces!

Let us recall that magnetic closures – 'touch fasteners' are generated automatically as soon as external compression of parallel neutrino magnetic field lines (MFL) took place, regardless of their motion direction.



The top needle symbolically is not shown

Fig. 13. Magnetic closures – 'touch fasteners' in a chemical element

Looking at ***Fig. 13*** we see that there is a multitude of MFL compression zones in the chemical element, they keep the structure from damage and allow constructing the crystal lattice of any kind, even the most exotic.

In Rossi's energy reactor new chemical elements appear in small quantities, but generally various isotopes are formed depending on the elemental components involved in the process. **There is no transmutation because there areno atom and chemical elements on its basis in the vision of MS.**

In Rossi's energy catalyzer over-unity process formation chain is as follows:

1. The gravitons (β^+–particles) are generated mainly in the iron ore deposits. Graviton by means of magnetic bonding accumulates gaseous chemical elements in its α^--particle, which will provide additional heat later during their destruction (see ***Card No 5***).

CARD №5

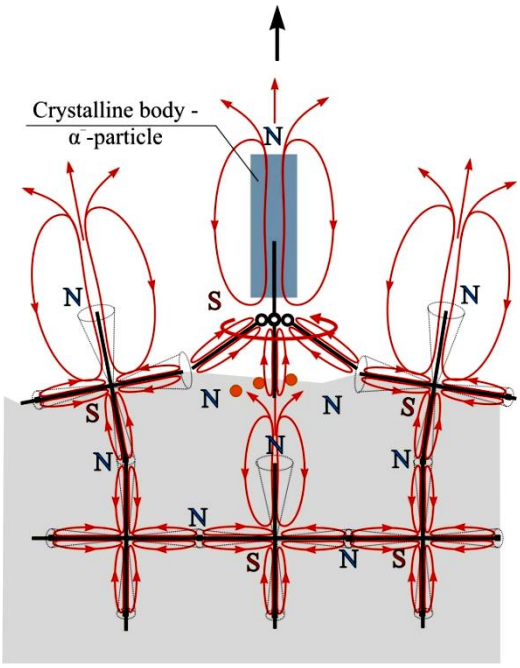


Fig.14. Graviton formation

Where do gravitons and electrons come from?

Gravitons are generated after formation of α^--particles on the free needles of surface chemical elements of the bodies after they are torn out by oscillating heavy α^--particles from their lattices with the break-down of chemical bonds (see ***Fig.14***), thus, many bodies made of different chemical elements may produce gravitons;

Slow (α^-) and fast (e^-) electrons are obtained from gravitons, and electricity can be 'ferrous', 'golden', 'silver', 'uranium', etc., depending on which chemical elements the graviton was formed on;

In nuclear power reactors uranium-based fuel is used with the same principle of the accumulation of small gas components in α^--particles and β^+-particles. Hence, **the MFL of the Earth (β^+-particles = α^--particles + γ^--particles) is nuclear (neutron) fuel in the most concentrated form. Larger concentration can only be in the conductors of electrical current with e^--particles (e^--particles = α^--particles + γ^--particles).**

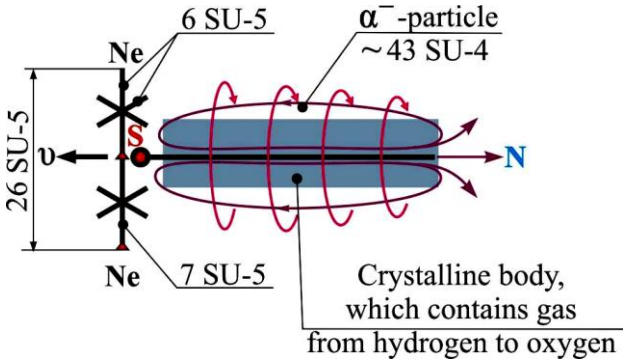
2. Transition of β^+-particles in the MFL of the Earth is carried out through connection with its conductive layer – the asthenosphere in a softened or liquid form as a wire with electric current and a magnetic field around it.
3. There is partial destruction of the Earth's MFL and the flow of gravitons towards its conventional center.
4. Gravitons and short chains of MFL are captured by windings of electric generators of power stations, and electrons – antipodes of gravitons are generated. Graviton and electron **are energy carriers-transformers, i.e. they can be converted into each other.**
5. Electrons capture gases in the crystalline lattice of the ceramic tube through the heating element of Rossi's generator and are converted to thermal e^--ions. At the same time the southern pole of the electron is closed by the northern poles of 'hedgehogs' of the captured gases, which does not give it the opportunity to destroy the structures of the crystal lattices, using their 'engines'. Due to the repulsion of the similarly charged northern poles of the surface needles of 'hedgehogs' of crystalline lattices of fuel and thermal e^--ions, the latter start randomly moving in a confined space, exciting finely dispersed fuel.

6. After the fuel excitation e^--ions break into α^--particles and γ^--particles, and the southern pole of γ^--particles reopens again.
7. α^--and γ^--particles are easily broken at high speed into individual light needles against obstructions in the form of tube walls and nickel pieces due to the loss of the hybrid magnet after the electron fracture. Destructions of chemical elements, α^--particles and captured gases into the individual light needles trigger a kind of slowed chain reaction, leading to an increase in the number of smaller energy carriers.
8. MS has no definitions what heat, temperature, negative and positive electrical charge, etc. are.
   a) There are no gas molecules in the pure form in the nature, i.e. without energy carriers magnetized to their chemical bond. Thus they automatically are thermal ions (see ***Card № 6, Fig.15.***).

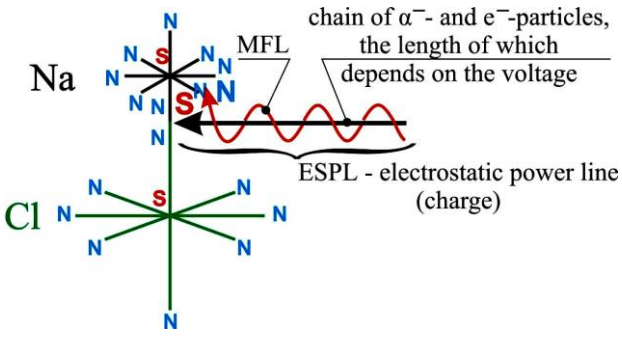
   According to NS, heat is vibration or chaotic motion of thermal ions in the crystalline lattices of bodies, liquids under the action of its own 'engines'.

CARD № 6.

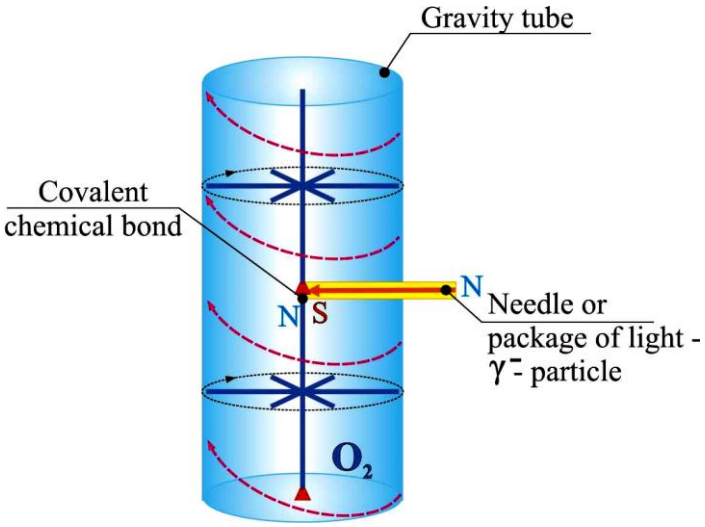
TYPES OF THERMAL IONS



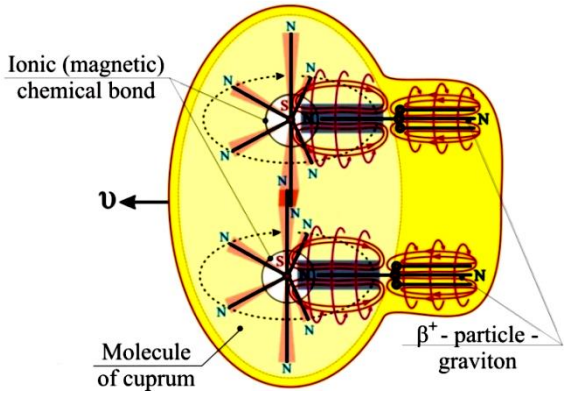
a) α⁻-ion



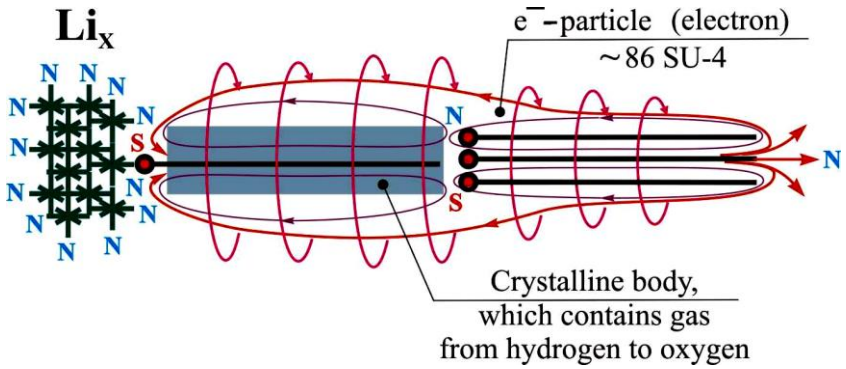
b) electroststic ion



c) γ⁻-ion



d) β⁺-ion



e) e⁻-ion

Fig.15.

b) **According to NS, temperature**is a bulk density of all types of energy carriers, including thermal ions, in solids, liquids and physical environments. The higher this density is, the higher the temperature.

c) A negative electrical charge is an α^--particle or e^--particle with the southern magnetic pole in the front while moving by means of its 'engine'.

d) A positive electric charge is a β^+-particle with the northern magnetic pole in the front in the direction of motion by means of its 'engine'.

e) All chemical elements have needles with molecular magnets which constitute one southern pole in the center of the element, and 6 or 8 northern poles at the outer ends. It can be said figuratively that the chemical element is a northern magnetic mono-pole.

9. Electron has a body of chemical elements, each needle of which is an energy carrier or simply light, that is, a body with its 'engines' – SU.

Chemical elements of the electron, except for its own 'engines', are mainly in the conventional balanced state (in gases one SU is always a turned on 'engine').

After the destruction of dozens of chemical elements of the electron we get on average a hundred needles of light, energy carriers.

Thus, we obtain a hundred small energy carriers instead of a single large source of energy – electron.

10. Let us return to the definition of temperature according to NS. If there is only one electron in a certain volume, the bulk density of the energy carriers will be conventionally equal to ~ 1, and after its destruction, it will become ~ 100. There will be a jump in temperature.

Initial bulk density (electrons)	**Bulk density after electron destruction to light needles**
1	100
100	10000
1000	100 000
10000	1 000 000
•••	•••

Conclusions:

1. As a result of breaking electrons in the urban electric grid in Rossi's generator we obtain significantly higher amounts of small energy carriers (light needles), which leads to an increase in bulk density of the latter and temperature growth, for example in water compared to the thermal 'fuel' consumption by the primary electric heater.

2. According to NS, new chemical elements are formed in the 'fuel' in small amounts, but primarily isotopes of the chemical elements are formed, i.e. the lengths of one or more needles of the chemical elements change. **There is no transmutation because there are no atoms and chemical elements on their basis according to MS.**

3. **The main thing is: Andrea Rossi's energy catalyzer (E-Cat) is home nuclear reactor operating on fast neutrons (according to MS).** It uses the same α^- and γ^--particles as a nuclear reactor operating on the radioactive fuel. In this case the radioactive components are obtained by chain **β^+-particle of the Earth's MFL → e^--particle in the generators of power plants → destruction of the e^--particle in Rossi's generator** (**nuclear reactor**).

4. What is now understood in MS as neutrons in a nuclear reactor, in fact are SU-4 and SU-5 with their 'engines' and light needles. Neutron cannot move in principle in MS.

Fundamentals of MS based on the atom in the form of a nucleus with electrons are historical misconception of scientists which long ago had led humanity into a scientific dead end.

The Neutron sciences has established the exact size of the neutron, the structural units SU-4 and SU-5, the chemical elements, their volumes and gravitational mass, and disproved the law of Avogadro.

CARD №7

Verification of the theoretical views of Neutron sciences on experimental data of modern physics in the area of the crystals (revision of the diameter of the neutron and the real sizes of the chemical elements).

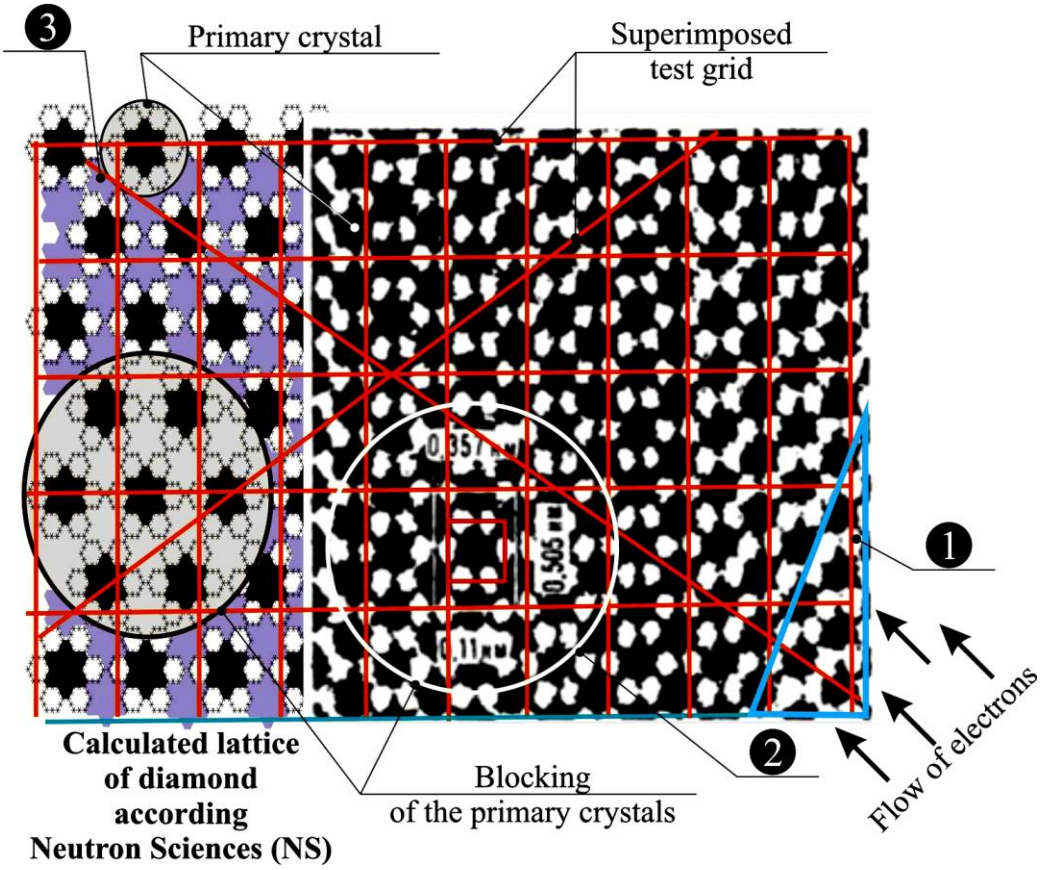
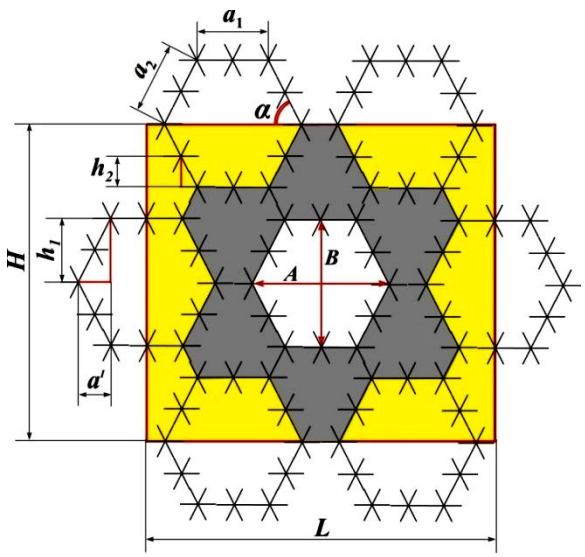
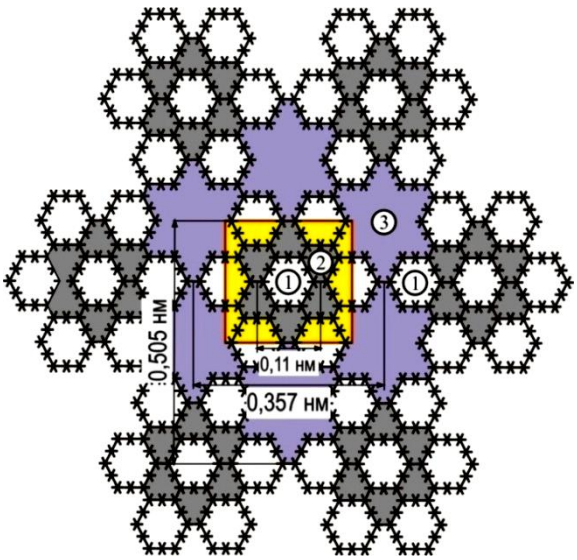


Fig.16. Electron micrograph of high-resolution of the diamond, the position of the carbon atoms projected on the plane (110).



a) a primary crystal with sizes to calculate

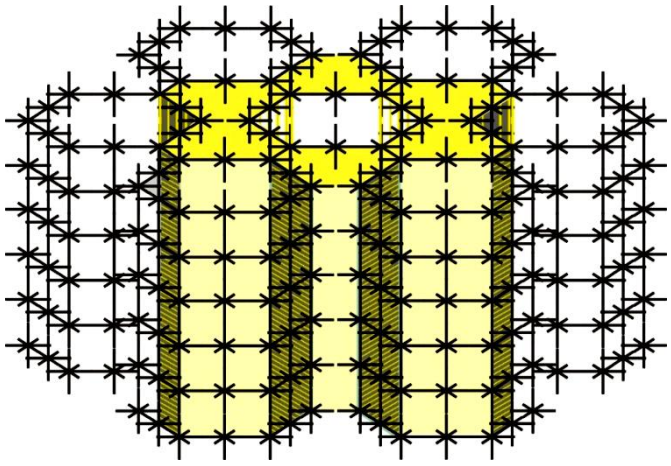


b) blocking of primary crystals:

1 – hexagonal cavity formed by the 12 chemical elements containing gases;

2 – rod of light;

3 – domain

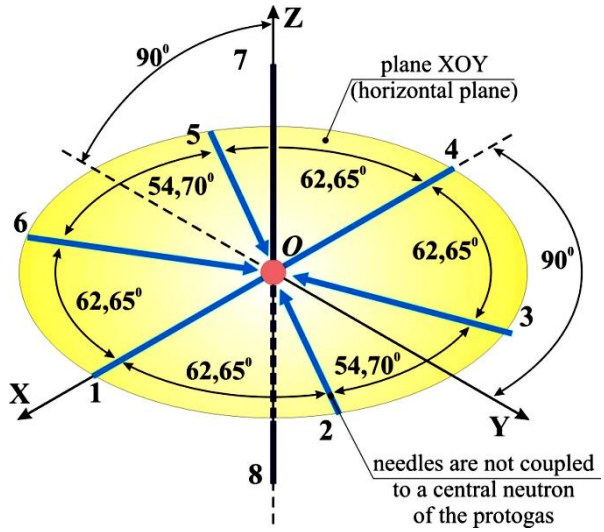


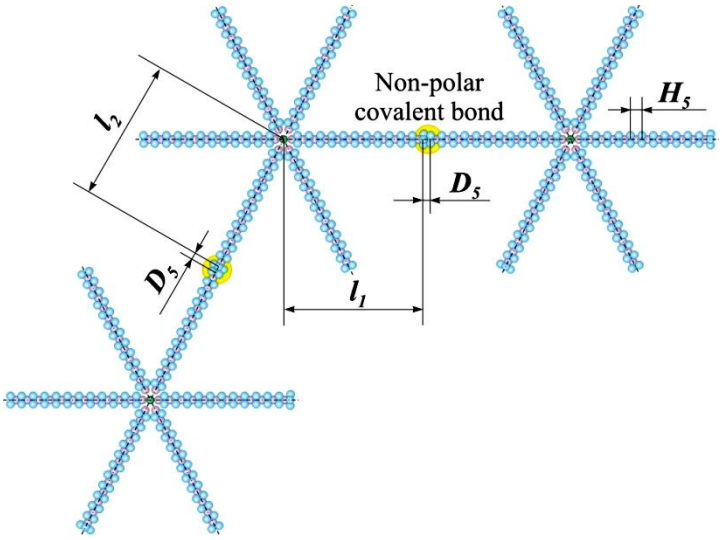
c) rod of light in the body of the primary crystal

Fig.17.

$C_{diamond}$ – "hedgehog" 8 × 5, 12 SU

Consider the fragment of the diamond crystal structure (***Fig.17, a***). Assume that it is built on "hedgehogs" $C_{diamond}$ – 8×5 with the length of the needles N = 12 SU. "Hedgehogs" are linked non-polar covalent bond (see ***Fig.18***). Let's do a calculation of the parameters of this structure.





a) «Hedgehog » 8×5, 12SU ***b)***

Fig.18

$$l_1 = \left((N-0{,}5)\sqrt{2}+1\right)d \approx 17{,}263d;\ l_2 = \left((N-0{,}5)\sqrt{2}+1{,}348\right)d \approx 17{,}611d;$$

$$a_1 = 4l_1 + 2D_5 = 70{,}736d;\ a_2 = 4l_2 + 2D_5 = 72{,}128d,$$

where d – diameter of the neutron, $H_5 = \sqrt{2}d$, $D_5 = d/\sqrt[4]{2}$.

$$a' = a_2 \cdot \cos 62{,}65° = 33{,}137d;$$

$$h_1 = a_2 \cdot \sin 62{,}65° = 64{,}065d;\ h_2 = \frac{a_2}{2} \cdot \sin 62{,}65° = \frac{h_1}{2} = 32{,}032d;$$

$$A = a_1 + 2a' = 137{,}010d;\ B = 2h_1 = 128{,}130d;$$

$$L = 2A + a_1 = 344{,}756d;\ H = 2B + h_1 = 320{,}325d;$$

$L/H = 1{,}076 \approx 1.$

The crystal structure, which is illustrated in ***Fig. 18, a***, – static, i.e. it does not account for the deflection of the horizontal and vertical "skipping ropes" by the action of gravitons.

In the dynamics the ratio

$$L/H = 1$$

since the curving of the horizontal "skipping ropes" leads to a decrease in L, and stretching a vertical "skipping ropes" leads to an increase in H.

Let's define what values 1 and 2 lead to the ratio:

$$L/H = 1$$

$$L = H$$

$$2A' + a_1' = 2B' + h_1';$$

$$2(a_1' + 2a'') + a_1' = 2 \cdot 2h_1' + h_1';$$

$$3a_1' + 4a'' = 5h_1';$$

$$\underbrace{3a_1' + 4a_2' \cos\alpha}_{L} = \underbrace{5a_2' \sin\alpha}_{H};$$

$$a_1 = \frac{a_2'(5\sin\alpha - 4\cos\alpha)}{3}.$$

Assume in first approximation that the horizontal and vertical 'skipping ropes' deformed in such a way that $\alpha = 62{,}65° = const$. Then

$$a_1' = \frac{a_2'(5\sin 62{,}65° - 4\cos 62{,}65°)}{3};$$

$$a_1' = 0{,}8678 \cdot a_2', \quad a_2' = 1{,}1523 a_1'.$$

Let's consider limiting cases:

1) only vertical 'skipping ropes' are stretched:

$a_1' = a_1 = 70{,}736d$, then $a_2' = 1{,}1523 \cdot 70{,}736d = 81{,}5091d$;

2) only horizontal 'skipping ropes' are flexed

$a_2' = a_2 = 72{,}128d$, then $a_1' = 0{,}8678 \cdot 72{,}128d = 62{,}5927d$.

At the same time horizontal "skipping ropes" will flexed, vertical "skipping ropes" will stretch, and the values a_1 and a_2 will take the average value:

$$a_{1average} = (a_1 + a_1')/2 = 66{,}6643d; \quad a_{2average} = (a_2 + a_2')/2 = 76{,}8186d.$$

With these values $a'_{average}$ and $a'_{average}$

$$L = 3a_{1average} + 4a_{2average} \cos 62{,}65° = 341{,}16d;$$

$$H = 5a_{2average} \sin 62{,}65 = 341{,}16d.$$

Thus, $\boxed{L = H = 341{,}16\ d}$.

We have the ability to accurately determine the diameter of a neutron on the largest size of 0,505nm at the pictures in zone 2. If we compare ***Fig. 16.*** and ***Fig.17, a-b***, we see that the 2H = 0,505 nm.

Thus, the diameter d of the neutron is equal to:

$$0{,}505\,(nm) = 2\cdot 341{,}16\,d \Rightarrow d = \frac{0{,}505\,(nm)}{2\cdot 341{,}16} \approx 0{,}00074\,(nm) = 0{,}74\,(pm) = 0{,}74\cdot 10^{-12}\,(m).$$

$$\boxed{d = 0{,}74\cdot 10^{-12}\,(m)}$$

Accordingly, we get:

$$\boxed{H_4 = \frac{2\sqrt{6}}{3}\,d \approx 1{,}210\cdot 10^{-12}\,(m) = 1{,}210\,(pm);\quad H_5 = \sqrt{2}d \approx 1{,}047\cdot 10^{-12}\,(m) = 1{,}047\,(pm)}.$$

Let's compare the obtained value of the diameter of a neutron d = 0,74 pm with a tabular value of the diameter of a proton, i.e. the nucleus of an atom of hydrogen (according to Modern Sciences (MS)).

The radius of the proton in MS is equal to $6.5\cdot 10^{-7}$ nm = $6.5\cdot 10^{-16}$ m (see the website ***"Chemist's Handbook of the 21st century"***, http://chem21.info/page/249122225148062107120160016075011146186130110135/ (in russian) or ***Chemistry: Reference. The Book for students.*** *Authors: Yu.D. Tretyakov, N.N.Oleynikov, Y.A.,Kessler, I. V. Kazimirchik. Under the editorship of Yu.D.Tretyakov. 2nd edition, revised. (Moscow: Publishing House "Education", 1989)* (in russian)

$$\frac{d_{neutron(NS)}}{d_{proton(MS)}} = \frac{d_{neutron(NS)}}{2\cdot r_{proton(MS)}} = \frac{0{,}74\cdot 10^{-12}}{2\cdot 6{,}5\cdot 10^{-16}} \approx 569.$$

Finally, it happened! The diameter of a neutron is equal to d = $0{,}74\cdot 10^{-12}$m, and from that moment we can know the actual size of all the chemical elements, and how many of them are in any volume.

Knowing the actual diameter of a neutron, we can determine the actual geometric dimensions of the "hedgehogs" of the chemical elements and their gravitational masses.

We take a simple substance of 1 kg, the crystal lattice of which is made up of the "hedgehogs" of one kind, connected by a covalent bond.

Knowing gravitational density of the substance, we can find the volume of the substance m = 1 kg:

$$V = \frac{m}{\rho_{gr}}.$$

If $V_{hedgehogs}$ – is the volume of one «hedgehog», then the number of «hedgehogs» $N_{hedgehogs}$ in the volume V is equal to

$$N_{hedgehogs} = \frac{V}{V_{hedgehogs}}.$$

The mass of one "hedgehog" will be equal to:

$$m_{hedgehogs} = \frac{m}{N_{hedgehogs}} = \frac{\rho_{gr}\cdot V}{V/V_{hedgehogs}} = \rho_{gr}\cdot V_{hedgehogs}.$$

$$\rho_{gr} = N_{neutron}\frac{\overbrace{\rho(He)}^{=206kg/m^3}}{\underbrace{N_{neutron}(He)}_{=27}} \Rightarrow \boxed{m_{hedgehogs} = V_{hedgehogs}\cdot N_{neutron}\cdot\frac{206}{27}}.$$

Thus, to determine the mass of one the "hedgehog", you need to calculate the volume of one "hedgehog."

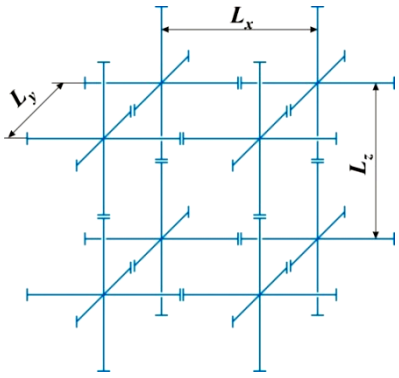


Fig.19. The covalent bond of the "hedgehogs" 6×5

1. The substance consists of "hedgehogs" 6 × 5-SS (solid state) connected by a covalent bond.

The covalent bond is performed by the coupling of the ends of the last structural units (SU) of the needles. Needles occupy such relative position that the contact of the neutrons in the SU will be maximum ("pentads" of the coupling SU are rotated relative to each other at 45º). Therefore, as the linear dimensions of the "hedgehogs", we take the distance between the centers of the "hedgehogs" L_x, L_y, L_z (***Fig. 19***).

$$L_x = L_y = \left((2N-1)\sqrt{2} + 2 + 1/\sqrt[4]{2}\right)\cdot d\ ;$$

$$L_z = \left((2N-1)\sqrt{2} + 1/\sqrt[4]{2}\right)\cdot d\ ;$$

where d – diameter of the neutron, $d = 0{,}74\cdot 10^{-12}$m, N – the number of layers of SU-5 in the needle of the "hedgehog".

$$V_{hedgehogs} = L_x \cdot L_y \cdot L_z = d^3 \cdot \left(16\sqrt{2}N^3 + 8N^2\left(2C_1 + C_2\right) + 2\sqrt{2}N\left(C_1^2 + 2C_1C_2\right) + C_1^2 \cdot C_2\right),$$

where $C_1 = 2 + 1/\sqrt[4]{2} - \sqrt{2};\ C_2 = 1/\sqrt[4]{2} - \sqrt{2}$.

N – the number of layers of SU-5 in the needle of the "hedgehog" 6×5 is defined by the formula:

$$N = \frac{N_{neutrons} + 1}{\underbrace{6}_{\substack{number\ of\ needles \\ in\ the\ hedgehog}} \cdot \underbrace{5}_{\substack{the\ number\ of\ neutrons \\ in\ the\ SU\text{-}5}}},$$

where N_{neutron} – the true number of neutrons in the chemical element (***Summary table of conversions of chemical elements №6***)

N_{neutron}+1 – the theoretical number of neutrons in the chemical element given the shortage of one neutron in protogas (see ***Table of conversion No. 4***)

Then

$$V_{hedgehog} = d^3 \cdot \left(\frac{16\sqrt{2}}{27000}\left(N_{neutrons}+1\right)^3 + \frac{8}{900}\left(N_{neutrons}+1\right)^2\left(2C_1 + C_2\right) + \frac{2\sqrt{2}}{30}\left(N_{neutrons}+1\right)\left(C_1^2 + 2C_1C_2\right) + C_1^2 \cdot C_2\right).$$

The mass of one "hedgehog" is defined by the formula

$$m_{hedgehog} = \frac{206}{27} \cdot N_{neutrons} \cdot d^3 \cdot \left(\frac{16\sqrt{2}}{27000}\left(N_{neutrons}+1\right)^3 + \frac{8}{900}\left(N_{neutrons}+1\right)^2\left(2C_1 + C_2\right) + \frac{2\sqrt{2}}{30}\left(N_{neutrons}+1\right)\left(C_1^2 + 2C_1C_2\right) + C_1^2 \cdot C_2\right)$$

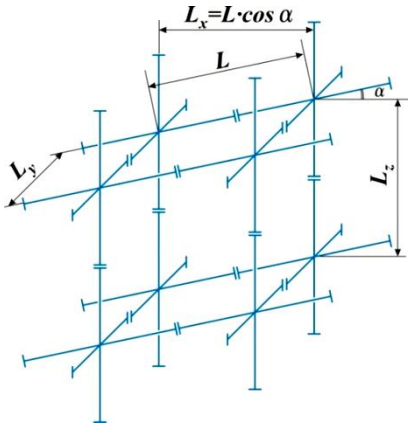


Fig.20. The covalent bond of the "hedgehogs" 6×4

2. The substance consists of "hedgehogs" 6 × 4-SS (solid state) connected by a covalent bond.

The covalent bond is performed by the coupling of the ends of the last structural units (SU) of the needles. Needles occupy such relative position that the contact of the neutrons in the SU will be maximum ("quads" of the coupling SU are rotated relative to each other at 60º). Therefore, as the linear dimensions of the "hedgehogs", we take the distance between the centers of the "hedgehogs" L_x, L_y, L_z (***Fig. 20***).

$$L=\left(\left(2N-1\right)\frac{2\sqrt{6}}{3}+2+\frac{\sqrt{6}}{3}\right)\cdot d\ ;$$

$$L_x=L\cdot\cos\alpha=\left(\left(2N-1\right)\frac{2\sqrt{6}}{3}+2+\frac{\sqrt{6}}{3}\right)\cdot d\cdot\cos\alpha\ ;$$

$$L_y=L=\left(\left(2N-1\right)\frac{2\sqrt{6}}{3}+2+\frac{\sqrt{6}}{3}\right)\cdot d;\ L_z=\left(\left(2N-1\right)\frac{2\sqrt{6}}{3}+\frac{\sqrt{6}}{3}\right)\cdot d\ ,$$

where d – diameter of the neutron, d =0,74·10^{-12}m, N – the number of layers of SU-4 in the needle of the "hedgehog".

$$V_{hedgehog}=L_x\cdot L_y\cdot L_z=d^3\cos\alpha\cdot\left(\frac{128\sqrt{6}}{9}N^3+\frac{32}{3}N^2\left(2C_1+C_2\right)+\frac{4\sqrt{6}}{3}N\left(C_1^2+2C_1C_2\right)+C_1^2\cdot C_2\right),$$

where $C_1=2+\frac{\sqrt{6}}{3}-\frac{2\sqrt{6}}{3}=2-\frac{\sqrt{6}}{3};\ C_2=\frac{\sqrt{6}}{3}-\frac{2\sqrt{6}}{3}=-\frac{\sqrt{6}}{3}$.

N – the number of layers of SU-4 in the needle of the "hedgehog" 6×4 is defined by the formula:

$$N=\frac{N_{neutrons}+1}{\underbrace{6}_{\substack{number\ of\ needles\\ in\ the\ hedgehog}}\cdot\underbrace{4}_{\substack{the\ number\ of\ neutrons\\ in\ the\ SU\text{-}4}}}$$

where N_{neutron} – the true number of neutrons in the chemical element (***Summary table of conversions of chemical elements №6***)

N_{neutron}+1 – the theoretical number of neutrons in the chemical element given the shortage of one neutron in protogas (see ***Table of conversion No. 2***)

Then

$$V_{hedgehog}=d^3\cos\alpha\cdot\left(\frac{\sqrt{6}}{972}\left(N_{neutrons}+1\right)^3+\frac{1}{54}\left(N_{neutrons}+1\right)^2\left(2C_1+C_2\right)+\frac{\sqrt{6}}{18}\left(N_{neutrons}+1\right)\left(C_1^2+2C_1C_2\right)+C_1^2\cdot C_2\right).$$

The mass of one "hedgehog" is defined by the formula

$$m_{hedgehog}=\frac{206}{27}\cdot N_{neutrons}\cdot d^3\cos\alpha\cdot\left(\frac{\sqrt{6}}{972}\left(N_{neutrons}+1\right)^3+\frac{1}{54}\left(N_{neutrons}+1\right)^2\left(2C_1+C_2\right)+\frac{\sqrt{6}}{18}\left(N_{neutrons}+1\right)\left(C_1^2+2C_1C_2\right)+C_1^2\cdot C_2\right)$$

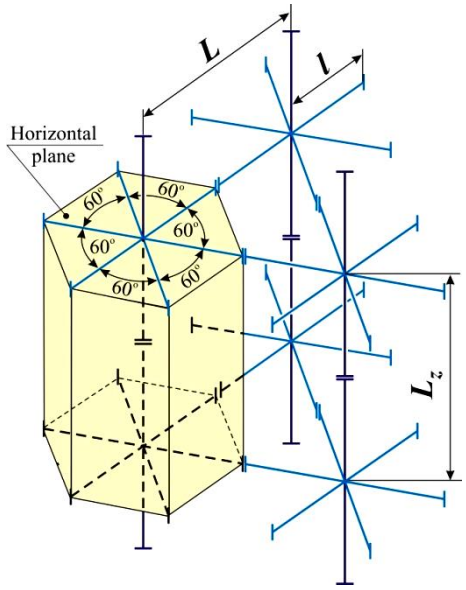


Fig.21. The covalent bond of the "hedgehogs" 8×4

3. The substance consists of "hedgehogs" 8 × 4-SS (solid state) connected by a covalent bond.

The covalent bond is performed by the coupling of the ends of the last structural units (SU) of the needles. Needles occupy such relative position that the contact of the neutrons in the SU will be maximum ("quads" of the coupling SU are rotated relative to each other at 60º). Therefore, as dimensions that characterize the "hedgehogs", we take the distance between the centers of the "hedgehogs" L and L_z (***Fig. 21*** – all six of the needles lying in a horizontal plane, have the same length).

$$l = \left((N - 0{,}5)\frac{2\sqrt{6}}{3} + 1 \right) \cdot d \, ;$$

$$L = 2l + D_4 = \left((2N - 1)\frac{2\sqrt{6}}{3} + 2 + \frac{\sqrt{6}}{3} \right) \cdot d;$$

$$L_z = \left((2N - 1)\frac{2\sqrt{6}}{3} + \frac{\sqrt{6}}{3} \right) \cdot d,$$

where d – diameter of the neutron, $d = 0{,}74 \cdot 10^{-12}$m, N – the number of layers of SU-4 in the needle of the "hedgehog". $D_4 = \sqrt{6}d/3$ – the distance between the axis of the contacting "trio" of the needles which are in a covalent bond.

$$V_{hedgehog} = S_{hedgehog} \cdot L_z \, ;$$

$$S_{hedgehog} = 6 \cdot \frac{1}{2} \cdot \frac{L}{2} \cdot \frac{L}{2} \cdot \sin 60° = \frac{3\sqrt{3}}{8} L^2 \, ;$$

$$V_{hedgehog} = \frac{3\sqrt{3}}{8} d^3 \cdot \left(\frac{128\sqrt{6}}{9} N^3 + \frac{32}{3} N^2 (2C_1 + C_2) + \frac{4\sqrt{6}}{3} N (C_1^2 + 2C_1 C_2) + C_1^2 \cdot C_2 \right),$$

where $C_1 = 2 + \frac{\sqrt{6}}{3} - \frac{2\sqrt{6}}{3} = 2 - \frac{\sqrt{6}}{3}$; $C_2 = \frac{\sqrt{6}}{3} - \frac{2\sqrt{6}}{3} = -\frac{\sqrt{6}}{3}$.

N – the number of layers of SU-4 in the needle of the "hedgehog" 8×4 is defined by the formula:

$$N = \frac{N_{neutrons} + 1}{\underbrace{8}_{\substack{number\ of\ needles \\ in\ the\ hedgehog}} \cdot \underbrace{4}_{\substack{the\ number\ of\ neutrons \\ in\ the\ SU\text{-}4}}}$$

where N_{neutron} – the true number of neutrons in the chemical element (***Summary table of conversions of chemical elements №6***)

$N_{\text{neutron}}+1$ – the theoretical number of neutrons in the chemical element given the shortage of one neutron in protogas (see ***Table of conversion No. 1***)

Then

$$V_{hedgehog}=\frac{3\sqrt{3}}{8}d^3\cdot\left(\frac{\sqrt{6}}{2304}(N_{neutrons}+1)^3+\frac{1}{96}(N_{neutrons}+1)^2(2C_1+C_2)+\frac{\sqrt{6}}{24}(N_{neutrons}+1)(C_1^2+2C_1C_2)+C_1^2\cdot C_2\right)$$

The mass of one "hedgehog" is defined by the formula

$$m_{hedgehog}=\frac{206}{27}\cdot N_{neutrons}\cdot\frac{3\sqrt{3}}{8}d^3\cdot\left(\frac{\sqrt{6}}{2304}(N_{neutrons}+1)^3+\frac{1}{96}(N_{neutrons}+1)^2(2C_1+C_2)+\frac{\sqrt{6}}{24}(N_{neutrons}+1)(C_1^2+2C_1C_2)+C_1^2\cdot C_2\right)$$

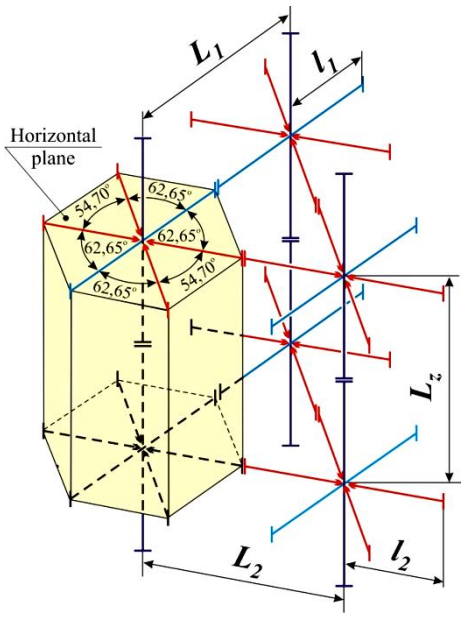


Fig.22. The covalent bond of the "hedgehogs" 8×5

4. The substance consists of "hedgehogs" 8 × 5-SS (solid state) connected by a covalent bond.

The covalent bond of the «hedgehogs» is performed by the coupling of the ends of the last structural units (SU) of the needles. Needles occupy such relative position that the contact of the neutrons in the SU will be maximum ("pentads" of the coupling SU are rotated relative to each other at 45º). Therefore, as dimensions that characterize the "hedgehogs", we take the distance between the centers of the "hedgehogs" L_1, L_2, and L_z (see ***Fig. 22*** – two needles lying in a horizontal plane, which are depicted in blue, have a length l_1, and four needles which are depicted in red, – the length l_2).

$$l_1=\left((N-0{,}5)\sqrt{2}+1\right)\cdot d\ ;\ l_2=\left((N-0{,}5)\sqrt{2}+1{,}348\right)\cdot d\ ;$$

$$L_1=2l_1+D_5=\left((2N-1)\sqrt{2}+2+1/\sqrt[4]{4}\right)\cdot d\ ;$$

$$L_2=2l_2+D_5=\left((2N-1)\sqrt{2}+2{,}696+1/\sqrt[4]{4}\right)\cdot d\ ;$$

$$L_z=\left((2N-1)\sqrt{2}+1/\sqrt[4]{2}\right)\cdot d\ ,$$

where d – diameter of the neutron, d =0,74·10^{-12}m, N – the number of layers of SU-5 in the needle of the "hedgehog"; $D_5=d/\sqrt[4]{2}$ – the distance between the axis of the contacting "quad" of the needles which are in a covalent bond.

$$V_{hedgehog}=S_{hedgehog}\cdot L_z\ ;$$

$$S_{hedgehog}=2\cdot\frac{1}{2}\cdot\frac{L_2}{2}\cdot\frac{L_2}{2}\cdot\sin 54{,}70°+4\cdot\frac{1}{2}\cdot\frac{L_1}{2}\cdot\frac{L_2}{2}\cdot\sin 62{,}65°=\frac{L_2}{2}\cdot\sin 62{,}65°\left(L_2\cdot\cos 62{,}65°+L_1\right)$$

,

because $\sin 54{,}70°=\sin\left(180°-2\cdot 62{,}65°\right)=2\sin 62{,}65°\cos 62{,}65°$.

$$V_{hedgehog}=\frac{L_2}{2}\cdot\sin 62{,}65°\left(L_2\cdot\cos 62{,}65°+L_1\right)\cdot L_z=$$

$$=d^3\cdot\frac{\left(2N\sqrt{2}+C_2\right)}{2}\cdot\sin 62{,}65°\left(\left(2N\sqrt{2}+C_2\right)\cdot\cos 62{,}65°+\left(2N\sqrt{2}+C_1\right)\right)\cdot\left(2N\sqrt{2}+C_3\right)\text{,}$$

where $C_1=2+1/\sqrt[4]{2}-\sqrt{2};\ C_2=2{,}696+1/\sqrt[4]{2}-\sqrt{2};\ C_3=1/\sqrt[4]{2}-\sqrt{2}$.

N – the number of layers of SU-5 in the needle of the "hedgehog" 8×5 is defined by the formula:

$$N = \frac{N_{neutrons}+1}{\underbrace{8}_{\substack{number\,of\,needles\\ in\,the\,hedgehog}} \cdot \underbrace{5}_{\substack{the\,number\,of\,neutrons\\ in\,the\,SU\text{-}5}}}$$

where $N_{neutron}$ – the true number of neutrons in the chemical element (***Summary table of conversions of chemical elements №6***)

$N_{neutron}+1$ – the theoretical number of neutrons in the chemical element given the shortage of one neutron in protogas (see ***Table of conversion No. 3***)

Then

$$V_{hedgehog} = d^3 \cdot \frac{\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_2\right)}{2} \cdot \sin 62{,}65° \times$$

$$\times\left(\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_2\right)\cdot\cos 62{,}65° + \left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_1\right)\right)\cdot\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_3\right)$$

The mass of one "hedgehog" is defined by the formula

$$m_{hedgehog} = \frac{206}{27}\cdot N_{neutrons}\cdot d^3 \cdot \frac{\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_2\right)}{2} \cdot \sin 62{,}65° \times$$

$$\times\left(\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_2\right)\cdot\cos 62{,}65° + \left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_1\right)\right)\cdot\left(\frac{(N_{neutrons}+1)}{20}\sqrt{2}+C_3\right)$$

Plots of $m_{hedgehog}$ on the $N_{neutron}$ for all types of "hedgehogs"-SS shown in ***Fig.23***.

Similar calculations can be made also for the "hedgehogs"-gas from tables of conversions of all chemical elements (8 × 4, 4 × 6, 8 × 5, 6 × 5).

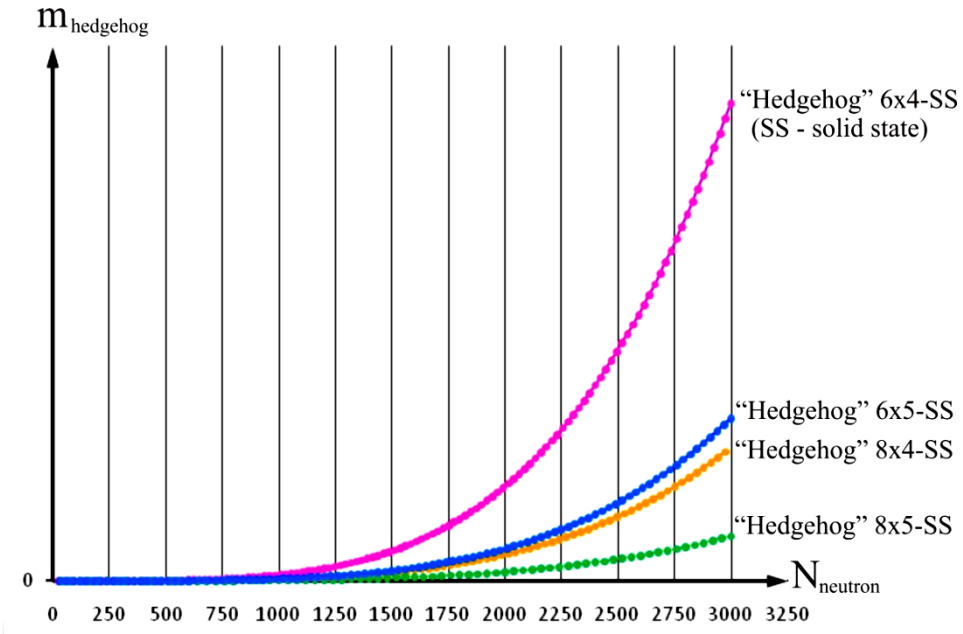


Fig.23. Plots of $m_{hedgehog}$ on the $N_{neutron}$

Below in ***Summary table of conversions of chemical elements №6*** are shown real gravitational mass of "hedgehogs" of chemical elements on Earth and in ***Table №7*** – some of the geometric characteristics of the "hedgehogs".

SUMMARY TABLE OF CONVERSIONS OF CHEMICAL ELEMENTS №6

($m_{substance}$ =1kg)

SU layers	Table 1(8x4)		Table2(6x4)		Table 3(8x5)		Table 4(6x5)		ρ_{theor}	$m_{hedgehog}$ in the grid, kg	Symbol	Name
	n^0	ρ_{gr}	n^0	ρ_{gr}	n^0	ρ_{gr}	n^0	ρ_{gr}				
1	2	3	4	5	6	7	8	9	10	11	12	13
1/2	11	84	11	84	14	107	14	107	**90**	$5{,}96\cdot10^{-34}$	H	Hydrogen ▲
1 **1/8(6)**	27	206	27	206	34	259	34	259	**206**	$6{,}77\cdot10^{-33}$	He	Helium ▲
3	95	725	71	542	119	908	89	679	**534**	$2{,}35\cdot10^{-31}$	Li	Lithium
4	127	969	95	725	159	1213	119	908	**971**	$6{,}36\cdot10^{-31}$	Na	Sodium
4 **3/6(8)**	139	1061	107	816	174	1328	134	1022	**1026**	$1{,}03\cdot10^{-30}$	N	Nitrogen ▲
5	159	1213	119	908	199	1518	149	1137	**862**	$1{,}73\cdot10^{-30}$	K	Potassium
6	191	1457	143	1091					**1550**	$3{,}12\cdot10^{-30}$	Ca	Calcium
6					239	1823	179	1366	**1830**	$2{,}8\cdot10^{-30}$	P_{white}	White Phosphorus ▲
6 **1/6(8)**					244	1862	184	1404	**1444**	$3{,}44\cdot10^{-30}$	Ne	Neon ▲
6 **1/8(6)**	195	1488	147	1122					**1469**	$3{,}46\cdot10^{-30}$	O	Oxygen ▲
7	223	1738	167	1274					**1738**	$5{,}72\cdot10^{-30}$	Mg	Magnesium
7					279	2129	209	1595	**1532**	$5{,}62\cdot10^{-30}$	Rb	Rubidium
7**1/6**			171	1305			214	1633	**1656**	$6{,}17\cdot10^{-30}$	Ar	Argon ▲
8	255	1946	191	1457					**1959**	$9{,}7\cdot10^{-30}$	Cs	Cesium
8					319	2434	239	1823	**1848**	$9{,}46\cdot10^{-30}$	Be	Beryllium
8 **3/8(6)**	267	2037	195	1488	334	2548	254	1938	**2040**	$1{,}19\cdot10^{-29}$	Cl	Chlorine ▲
8 **7/8(6)**	283	2159	211	1610	354	2701	264	2014	**2120**	$1{,}47\cdot10^{-29}$	F	Fluorine ▲
9	287	2190	215	1640					**2265**	$1{,}54\cdot10^{-29}$	C_{gr}	Carbon (graphite) ▲
9					359	2739	269	2052	**2702**	$1{,}34\cdot10^{-29}$	P_{bl}	Black Phosphorus ▲
10	319	2434	239	1823					**2314**	$2{,}34\cdot10^{-29}$	B	Boron ▲
10					399	3044	299	2281	**2223**	$2{,}27\cdot10^{-29}$	P_{red}	Red Phosphorus ▲
11	351	2678	263	2007	439	3349	329	2510	**2698**	$3{,}42\cdot10^{-29}$	Al	Aluminum
12	383	2922	287	2190					**2085**	$5{,}48\cdot10^{-29}$	S_1	Sulfur -1 ▲
12					479	3655	359	2739	**3513**	$4{,}12\cdot10^{-29}$	C_{diam}	Carbon (diamond) ▲
13	415	3166	239	2373					**2332**	$7{,}52\cdot10^{-29}$	Si_1	Silicon-1 ▲
13					519	3960	389	2968	**2988**	$6{,}37\cdot10^{-29}$	Sc	Scandium
13 1/6			315	2403			394	3006	**3004**	$6{,}7\cdot10^{-29}$	Kr	Krypton ▲
15	479	3655	359	2739	599	4570	449	3426	**2630**	$1{,}33\cdot10^{-28}$	Sr	Strontium
15 3/6			371	2831			464	3540	**3571**	$1{,}28\cdot10^{-28}$	Xe	Xenon ▲
16	511	3899	383	2922	639	4875	479	3655	**3594**	$1{,}45\cdot10^{-28}$	Ba	Barium
17	543	4143	407	3105	679	5181	509	3883	**4073**	$1{,}89\cdot10^{-28}$	Br_L	Bromine (liq) ▲
18 **1/8(6)**	579	4418	435	3319	724	5524	544	4151	**4400**	$2{,}5\cdot10^{-28}$	Rn_r	Radon (gas) ??
20	639	4875	479	3655	799	6096	599	4570	**4504**	$3{,}50\cdot10^{-28}$	Ti	Titanium
21	671	5119	503	3838					**5000**	$4{,}46\cdot10^{-28}$	Ra_1	Radium-1
21					839	6401	629	4799	**4808**	$4{,}25\cdot10^{-28}$	Se_1	Selenium ▲
22	703	5364	527	4021	879	6706	659	5028	**6694**	$4{,}48\cdot10^{-28}$	Sb	Stibium
23	735	5608	551	4204	919	7012	689	5257	**6977**	$5{,}34\cdot10^{-28}$	Yb	Ytterbium
23 1/6(8)	739	5638	555	4234	924	7050	694	5295*	**5245**	$6{,}27\cdot10^{-28}$	Eu	Europium
24	767	5852	575	4387	959	7317	719	5486	**7194**	$6{,}32\cdot10^{-28}$	Cr	Chromium
25	799	6096	599	4570					**6000**	$8{,}93\cdot10^{-28}$	Ra_2	Radium -2
25	799	6096	599	4570					**4472**	$1{,}01\cdot10^{-27}$	Y	Yttrium
25	799	6096	599	4570	999	7622	749	5715	**5780**	$8{,}48\cdot10^{-28}$	As_1	Arsenic-1 ▲
26	831	6340	623	4753	1039	7927	779	5943	**5907**	$9{,}91\cdot10^{-28}$	Ga	Gallium
27	863	6584	647	4936					**4934**	$1{,}38\cdot10^{-27}$	I	Iodine ▲
27					1079	8232	809	6172	**6162**	$1{,}15\cdot10^{-27}$	La_1	Lanthanum-1
28	895	6829	671	5119	1119	8538	839	6401	**6769**	$1{,}40\cdot10^{-27}$	Pr_1	Praseodymium-1
29	927	7073	695	5303					**7007**	$1{,}61\cdot10^{-27}$	Nd	Neodymium-1
29	927	7073	695	5303					**5323**	$1{,}83\cdot10^{-27}$	Ge_1	Germanium-1
29					1159	8843	869	6630	**8790**	$1{,}34\cdot10^{-27}$	Co	Cobalt
30	959	7317	719	5486	1199	9148	899	6859	**7260**	$1{,}85\cdot10^{-27}$	Pm	Promethium
31	991	7561	743	5669	1239	9453	929	7088	**7286**	$2{,}10\cdot10^{-27}$	In	Indium
32	1023	7805	767	5852	1279	9758	959	7317	**5769**	$2{,}71\cdot10^{-27}$	Sn_1	Stannum-1
33	1055	8049	791	6035	1319	10063	989	7546	**6110**	$3{,}06\cdot10^{-27}$	V	Vanadium
34	1087	8293	815	6218	1359	10369	1019	7775	**6272**	$3{,}45\cdot10^{-27}$	Te	Tellurium ▲
36	1151	8782	863	6584					**6531**	$4{,}33\cdot10^{-27}$	Zr	Zirconium
36					1439	10979	1079	8232	**8230**	$3{,}61\cdot10^{-27}$	Se_1	Selenium-1
37	1183	9026	887	6767	1479	11284	1109	8461	**8630**	$4{,}03\cdot10^{-27}$	Nb	Niobium
38	1215	9270	911	6951					**9314**	$4{,}74\cdot10^{-27}$	Po_1	Polonium-1

38					1519	11589	1139	8690	**8642**	$4{,}48\cdot10^{-27}$	Cd	Cadmium
39	1247	9514	935	7134					**9523**	$5{,}25\cdot10^{-27}$	Po_2	Polonium-2
39	1247	9514	935	7134					**7144**	$5{,}96\cdot10^{-27}$	Zn	Zinc
39					1559	11895	1169	8919	**8902**	$4{,}97\cdot10^{-27}$	Ni	Nickel
41	1311	10002	983	7500	1639	12505	1229	9377	**10062**	$6{,}41\cdot10^{-27}$	Ac	Actinium
41 **1/8(6)**	1315	10033	987	7530	1644	12543	1234	9415	**7536**	$7{,}40\cdot10^{-27}$	Sm_1	Samarium
42	1343	10247	1007	7683	1679	12810	1259	9606	**7469**	$8{,}01\cdot10^{-27}$	Mn	Manganese
43	1375	10491	1031	7866					**7872**	$8{,}8\cdot10^{-27}$	Fe	Ferrum
43					1719	13115	1289	9835*	**9800**	$7{,}33\cdot10^{-27}$	Bi	Bismuth
44	1407	10735	1055	8049	1759	13421	1319	10063	**7895**	$9{,}65\cdot10^{-27}$	Gd	Gadolinium
45	1439	10979	1079	8232	1799	13726	1349	10292	**8272**	$1{,}06\cdot10^{-26}$	Tb_1	Terbium -1
46					1839	14031	1379	10521	**10500**	$9{,}58\cdot10^{-27}$	Ag	Argentum
47	1503	11467	1127	8599	1879	14336	1409	10750	**11563**	$1{,}11\cdot10^{-26}$	Tc	Technetium
47	1503	11467	1127	8599					**8559**	$1{,}26\cdot10^{-26}$	Dy	Dysprosium
48	1535	11711	1151	8782	1919	14641	1439	10979	**11724**	$1{,}20\cdot10^{-26}$	Th	Thorium
48 **1/6(8)**	1539	11742	1155	8812	1924	14679	1444	11017	**8799**	$1{,}38\cdot10^{-26}$	Ho	Holmium
49	1567	11956	1175	8965	1959	14946	1469	11208	**8933**	$1{,}48\cdot10^{-26}$	Cu	Cuprum
50	1183	12200	1199	9148	1999	15252	1499	11437	**9062**	$1{,}61\cdot10^{-26}$	Er	Erbium
51	1631	12444	1223	9331	2039	15557	1529	11666	**9318**	$1{,}74\cdot10^{-26}$	Tm	Thullium
53	1695	12932	1271	9697	2119	16167	1589	12123	**12038**	$1{,}69\cdot10^{-26}$	Pd	Palladium
54	1727	13176	1295	9880					**9849**	$2{,}18\cdot10^{-26}$	Lu	Lutetium
54					2159	16472	1619	12352	**12437**	$1{,}82\cdot10^{-26}$	Ru	Rhutenium
55	1759	13421	1319	10063	2199	16778	1649	12581	**16623**	$1{,}70\cdot10^{-26}$	Ta	Tantalum
56	1791	13665	1343	10247	2239	17083	1679	12810	**13680**	$2{,}23\cdot10^{-26}$	Cm	Curium
56	1791	13665	1343	10247					**10220**	$2{,}53\cdot10^{-26}$	Mo	Molybdenum
57	1823	13909	1367	10430	2279	17388	1709	13039	**13780**	$2{,}39\cdot10^{-26}$	Am	Americium
58	1855	14153	1391	10613	2319	17693	1739	13268	**13248**	$2{,}41\cdot10^{-26}$	Hf	Hafnium
59	1887	14397	1415	10796	2359	17998	1769	13497	**14193**	$2{,}67\cdot10^{-26}$	Hg	Mercury
62	1983	15130	1487	11345	2479	18914	1859	14183	**11340**	$3{,}79\cdot10^{-26}$	Pb	Lead
63	2015	15374	1511	11528					**15370**	$3{,}56\cdot10^{-26}$	Pa	Protactinium
63					2519	19219	1889	14412	**19263**	$2{,}92\cdot10^{-26}$	W	Wolfram
64	2047	15618	1535	11711	2559	19524	1919	14641	**19320**	$3{,}11\cdot10^{-26}$	Au	Aurum
65	2079	15862	1559	11895	2599	19829	1949	14870	**11870**	$4{,}58\cdot10^{-26}$	Tl	Thallium
68	2175	16594	1631	12444	2719	20745	2039	15557	**12423**	$5{,}49\cdot10^{-26}$	Rh	Rhodium
69	2207	16839	1655	12627	2759	21050	2069	15786	**21020**	$4{,}19\cdot10^{-26}$	Re	Rhenium
71	2271	17327	1703	12993	2839	21661	2129	16243	**21450**	$4{,}7\cdot10^{-26}$	Pt	Platinum
73	2335	17815	1751	13359	2919	22271	2189	16701	**22400**	$5{,}24\cdot10^{-26}$	Ir	Iridium
74	2367	18059	1775	13543	2959	22576	2219	16930	**22590**	$5{,}54\cdot10^{-26}$	Os	Osmium
78	2495	19036	1871	14275	3119	23797	2339	17845	**18950**	$8{,}36\cdot10^{-26}$	U	Uranium
81	2591	19768	1943	14824			2429	18532	**19816**	$9{,}72\cdot10^{-26}$	Pu	Plutonium
83	2655	20257	1991	15191			2489	18990	**20250**	$1{,}07\cdot10^{-25}$	Np	Neptunium

Note: For the chemical elements Br and Hg data shown in Table 7, are averaged.

Legend:

Curium	Radioactive element according to MP (Modern Physics)
Actinium	Actinoid according to MP (Modern Physics)
Lanthanum	Lanthanide according to MC (Modern Chemistry)
▲	Nonmetals

Gravitational density of substances in the solid state is calculated by formula:

$$\frac{\rho(He)}{\mathrm{N}(He)}=\frac{\rho_{grav}(element)}{N_{true}(element)},\quad \text{hence}\quad \rho_{grav}(element)=N_{true}(element)\cdot\frac{\rho(He)}{\mathrm{N}(He)},$$

where

$\rho_{grav}(element)$ – calculated gravitational density of the given element in the table of conversions (solid state)

$N_{true}(element)$ – true quantity of neutrons in the ‘hedgehog’ of the given element in the solid state

$\rho(He)$ – Helium density in the solid state, being equal ρ=206 kg/m^3

$N(He)$ – quantity of neutrons in helium ‘hedgehog’ in the solid state, being equal to N=27

TABLE №7 (body mass is equal to 1 kg)

Chemical element	N_{layer}	$N_{neutron}$	ρ_{grav}, *kg/m³*	V_{body}, *m³*	$V_{hedgehog}$, *m³*	$N_{hedgehog}$
H r1	1/2	11	84	$1{,}19\cdot10^{-2}$	$7{,}10\cdot10^{-36}$	$1{,}68\cdot10^{33}$
He r1	1 1/6	27	106	$4{,}85\cdot10^{-3}$	$3{,}29\cdot10^{-35}$	$1{,}49\cdot10^{32}$
Li	3	71	542	$1{,}85\cdot10^{-3}$	$4{,}33\cdot10^{-34}$	$4{,}26\cdot10^{30}$
Na	4	127	969	$1{,}03\cdot10^{-3}$	$6{,}56\cdot10^{-34}$	$1{,}57\cdot10^{30}$
N r2	4 3/6	134	1022	$9{,}79\cdot10^{-4}$	$9{,}95\cdot10^{-34}$	$9{,}84\cdot10^{29}$
K	5	119	908	$1{,}10\cdot10^{-3}$	$1{,}90\cdot10^{-33}$	$5{,}79\cdot10^{29}$
Ca	6	191	1457	$6{,}86\cdot10^{-4}$	$2{,}14\cdot10^{-33}$	$3{,}21\cdot10^{29}$
$P_{бел}$	6	239	1823	$5{,}49\cdot10^{-4}$	$1{,}54\cdot10^{-33}$	$3{,}57\cdot10^{29}$
Ne r1	6 1/6	184	1404	$7{,}12\cdot10^{-4}$	$2{,}45\cdot10^{-33}$	$2{,}91\cdot10^{29}$
O r1	6 1/8	195	1488	$6{,}72\cdot10^{-4}$	$2{,}33\cdot10^{-33}$	$2{,}89\cdot10^{29}$
Mg	7	223	1738	$5{,}88\cdot10^{-4}$	$3{,}37\cdot10^{-33}$	$1{,}747\cdot10^{29}$
Rb	7	209	1595	$6{,}27\cdot10^{-4}$	$3{,}52\cdot10^{-33}$	$1{,}78\cdot10^{29}$
Ar r1	7 1/6	214	1633	$6{,}124\cdot10^{-4}$	$3{,}78\cdot10^{-33}$	$1{,}62\cdot10^{29}$
Cs	8	255	1946	$5{,}14\cdot10^{-4}$	$4{,}99\cdot10^{-33}$	$1{,}03\cdot10^{29}$
Be	8	239	1823	$5{,}49\cdot10^{-4}$	$5{,}19\cdot10^{-33}$	$1{,}06\cdot10^{29}$
Cl r2	8 3/8	267	2037	$4{,}91\cdot10^{-4}$	$5{,}85\cdot10^{-33}$	$8{,}39\cdot10^{28}$
F r4	8 7/8	283	2159	$4{,}63\cdot10^{-4}$	$6{,}80\cdot10^{-33}$	$6{,}81\cdot10^{28}$
$P_{чер}$	9	359	2739	$3{,}65\cdot10^{-4}$	$4{,}9\cdot10^{-33}$	$7{,}45\cdot10^{28}$
C	9	287	2190	$4{,}57\cdot10^{-4}$	$7{,}05\cdot10^{-33}$	$6{,}47\cdot10^{28}$
B	10	319	2434	$4{,}11\cdot10^{-4}$	$9{,}63\cdot10^{-33}$	$4{,}27\cdot10^{28}$
$P_{кр}$	10	299	2281	$4{,}38\cdot10^{-4}$	$9{,}94\cdot10^{-33}$	$4{,}41\cdot10^{28}$
Al	11	351	2678	$3{,}73\cdot10^{-4}$	$1{,}28\cdot10^{-32}$	$2{,}93\cdot10^{28}$
$C_{алм}$	12	479	3655	$2{,}74\cdot10^{-4}$	$1{,}13\cdot10^{-32}$	$2{,}43\cdot10^{28}$
S_1	12	287	2190	$4{,}57\cdot10^{-4}$	$2{,}5\cdot10^{-32}$	$1{,}83\cdot10^{28}$
Si_1	13	311	2373	$4{,}21\cdot10^{-4}$	$3{,}17\cdot10^{-32}$	$1{,}33\cdot10^{28}$
Sc	13	389	2968	$3{,}37\cdot10^{-4}$	$2{,}15\cdot10^{-32}$	$1{,}57\cdot10^{28}$
Kr r1	13 1/6	394	3006	$3{,}33\cdot10^{-4}$	$2{,}23\cdot10^{-32}$	$1{,}49\cdot10^{28}$
Sr	15	359	2739	$3{,}65\cdot10^{-4}$	$4{,}85\cdot10^{-32}$	$7{,}53\cdot10^{27}$
Xe r2	15 3/6	464	3540	$2{,}83\cdot10^{-4}$	$3{,}61\cdot10^{-32}$	$7{,}84\cdot10^{27}$
Ba	16	479	3655	$2{,}74\cdot10^{-4}$	$3{,}96\cdot10^{-32}$	$6{,}91\cdot10^{27}$
Br	17	534,5	4078	$2{,}54\cdot10^{-4}$	$4{,}88\cdot10^{-32}$	$5{,}35\cdot10^{27}$
Rn r1	18	579	4418	$2{,}26\cdot10^{-4}$	$5{,}66\cdot10^{-32}$	$4{,}0\cdot10^{27}$
Ti	20	599	4570	$2{,}19\cdot10^{-4}$	$7{,}66\cdot10^{-32}$	$2{,}86\cdot10^{27}$
Se_1	21	629	4799	$2{,}08\cdot10^{-4}$	$8{,}85\cdot10^{-32}$	$2{,}36\cdot10^{27}$
Ra_1	21	671	5119	$1{,}95\cdot10^{-4}$	$8{,}71\cdot10^{-32}$	$2{,}24\cdot10^{27}$
Sb	22	879	6706	$1{,}49\cdot10^{-4}$	$6{,}68\cdot10^{-32}$	$2{,}23\cdot10^{27}$
Yb	23	919	7012	$1{,}426\cdot10^{-4}$	$7{,}61\cdot10^{-32}$	$1{,}87\cdot10^{27}$
Cr	24	959	7317	$1{,}367\cdot10^{-4}$	$8{,}63\cdot10^{-32}$	$1{,}58\cdot10^{27}$
Eu r1	23 1/6	694	5295	$1{,}89\cdot10^{-4}$	$1{,}18\cdot10^{-31}$	$1{,}60\cdot10^{27}$
Ra_2	25	799	6096	$1{,}64\cdot10^{-4}$	$1{,}46\cdot10^{-31}$	$1{,}12\cdot10^{27}$
As	25	749	5715	$1{,}75\cdot10^{-4}$	$1{,}48\cdot10^{-31}$	$1{,}18\cdot10^{27}$
Gd	26	779	5943	$1{,}68\cdot10^{-4}$	$1{,}67\cdot10^{-31}$	$1{,}01\cdot10^{27}$
La_1	27	809	6172	$1{,}62\cdot10^{-4}$	$1{,}86\cdot10^{-31}$	$8{,}69\cdot10^{26}$
Y	25	599	4570	$2{,}19\cdot10^{-4}$	$2{,}22\cdot10^{-31}$	$9{,}87\cdot10^{26}$
I	27	647	4936	$2{,}03\cdot10^{-4}$	$2{,}79\cdot10^{-31}$	$7{,}27\cdot10^{26}$
Pr_1	28	895	6829	$1{,}46\cdot10^{-4}$	$2{,}05\cdot10^{-31}$	$7{,}13\cdot10^{26}$
Nd	29	927	7073	$1{,}41\cdot10^{-4}$	$2{,}28\cdot10^{-31}$	$6{,}2\cdot10^{26}$
Co	29	1159	8843	$1{,}13\cdot10^{-4}$	$1{,}51\cdot10^{-31}$	$7{,}49\cdot10^{26}$
Ge_1	29	695	5303	$1{,}89\cdot10^{-4}$	$3{,}45\cdot10^{-31}$	$5{,}47\cdot10^{26}$
Pm	30	959	7313	$1{,}367\cdot10^{-4}$	$2{,}52\cdot10^{-31}$	$5{,}42\cdot10^{26}$
In	31	991	7561	$1{,}32\cdot10^{-4}$	$2{,}78\cdot10^{-31}$	$4{,}75\cdot10^{26}$

Sn_1	32	767	5852	$1{,}71\cdot10^{-4}$	$4{,}63\cdot10^{-31}$	$3{,}69\cdot10^{26}$
V	33	791	6035	$1{,}66\cdot10^{-4}$	$5{,}08\cdot10^{-31}$	$3{,}27\cdot10^{26}$
Te	34	815	6218	$1{,}61\cdot10^{-4}$	$5{,}55\cdot10^{-31}$	$2{,}9\cdot10^{26}$
Zr	36	863	6584	$1{,}52\cdot10^{-4}$	$6{,}58\cdot10^{-31}$	$2{,}31\cdot10^{26}$
Ce_1	36	1079	8232	$1{,}215\cdot10^{-4}$	$4{,}39\cdot10^{-31}$	$2{,}77\cdot10^{26}$
Nb	37	1109	8461	$1{,}18\cdot10^{-4}$	$4{,}76\cdot10^{-31}$	$2{,}48\cdot10^{26}$
Cd	38	1139	8690	$1{,}15\cdot10^{-4}$	$5{,}15\cdot10^{-31}$	$2{,}23\cdot10^{26}$
Ni	39	1169	8919	$1{,}12\cdot10^{-4}$	$5{,}57\cdot10^{-31}$	$2{,}01\cdot10^{26}$
Po_1	38	1215	9270	$1{,}079\cdot10^{-4}$	$5{,}11\cdot10^{-31}$	$2{,}11\cdot10^{26}$
Po_2	39	1247	9514	$1{,}051\cdot10^{-4}$	$5{,}52\cdot10^{-31}$	$1{,}90\cdot10^{26}$
Zn	39	935	7134	$1{,}4\cdot10^{-4}$	$8{,}36\cdot10^{-31}$	$1{,}68\cdot10^{26}$
Ac	41	1311	10002	$9{,}998\cdot10^{-5}$	$6{,}41\cdot10^{-31}$	$1{,}56\cdot10^{26}$
Sm_1[r1]	41 1/6	987	7530	$1{,}33\cdot10^{-4}$	$9{,}83\cdot10^{-31}$	$1{,}35\cdot10^{26}$
Mn	42	1007	7683	$1{,}3\cdot10^{-4}$	$1{,}04\cdot10^{-30}$	$1{,}25\cdot10^{26}$
Fe	43	1031	7866	$1{,}27\cdot10^{-4}$	$1{,}12\cdot10^{-30}$	$1{,}14\cdot10^{26}$
Bi	43	1289	9835	$1{,}017\cdot10^{-4}$	$7{,}45\cdot10^{-31}$	$1{,}37\cdot10^{26}$
Gd	44	1055	8049	$1{,}24\cdot10^{-4}$	$1{,}20\cdot10^{-30}$	$1{,}04\cdot10^{26}$
Tb_1	45	1079	8232	$1{,}215\cdot10^{-4}$	$1{,}28\cdot10^{-30}$	$9{,}48\cdot10^{25}$
Ag	46	1379	10521	$9{,}51\cdot10^{-5}$	$9{,}11\cdot10^{-31}$	$1{,}04\cdot10^{26}$
Te	47	1503	11467	$8{,}72\cdot10^{-5}$	$9{,}65\cdot10^{-31}$	$9{,}04\cdot10^{25}$
Th	48	1535	11711	$8{,}54\cdot10^{-5}$	$1{,}03\cdot10^{-30}$	$8{,}31\cdot10^{25}$
Dy	47	1127	8599	$1{,}16\cdot10^{-4}$	$1{,}46\cdot10^{-30}$	$7{,}97\cdot10^{25}$
Ho[r1]	48 1/6	1155	8812	$1{,}135\cdot10^{-4}$	$1{,}57\cdot10^{-30}$	$7{,}22\cdot10^{25}$
Cu	49	1175	8965	$1{,}115\cdot10^{-4}$	$1{,}65\cdot10^{-30}$	$6{,}75\cdot10^{25}$
Er	50	1199	9148	$1{,}09\cdot10^{-4}$	$1{,}76\cdot10^{-30}$	$6{,}22\cdot10^{25}$
Tm	51	1223	9331	$1{,}07\cdot10^{-4}$	$1{,}86\cdot10^{-30}$	$5{,}75\cdot10^{25}$
Pd	53	1589	12123	$8{,}25\cdot10^{-5}$	$1{,}39\cdot10^{-30}$	$5{,}93\cdot10^{25}$
Ru	54	1619	12352	$8{,}10\cdot10^{-5}$	$1{,}47\cdot10^{-30}$	$5{,}51\cdot10^{25}$
Lu	54	1295	9880	$1{,}01\cdot10^{-4}$	$2{,}21\cdot10^{-30}$	$4{,}58\cdot10^{25}$
Ta	55	2199	16778	$5{,}96\cdot10^{-5}$	$1{,}01\cdot10^{-30}$	$5{,}89\cdot10^{25}$
Mo	56	1343	10247	$9{,}76\cdot10^{-5}$	$2{,}47\cdot10^{-30}$	$3{,}96\cdot10^{25}$
Cm	56	1791	13665	$7{,}32\cdot10^{-5}$	$1{,}63\cdot10^{-30}$	$4{,}49\cdot10^{25}$
Am	57	1823	13909	$7{,}19\cdot10^{-5}$	$1{,}72\cdot10^{-30}$	$4{,}19\cdot10^{25}$
Hf	58	1739	13268	$7{,}54\cdot10^{-5}$	$1{,}82\cdot10^{-30}$	$4{,}14\cdot10^{25}$
Hg	59	1857,5	14172	$7{,}29\cdot10^{-5}$	$1{,}99\cdot10^{-30}$	$3{,}80\cdot10^{25}$
Pb	62	1487	11345	$8{,}81\cdot10^{-5}$	$3{,}34\cdot10^{-30}$	$2{,}64\cdot10^{25}$
Pa	63	2015	15374	$6{,}50\cdot10^{-5}$	$2{,}32\cdot10^{-30}$	$2{,}81\cdot10^{25}$
W	63	2519	19219	$5{,}20\cdot10^{-5}$	$1{,}52\cdot10^{-30}$	$3{,}43\cdot10^{25}$
Au	64	2559	19524	$5{,}12\cdot10^{-5}$	$1{,}59\cdot10^{-30}$	$3{,}22\cdot10^{25}$
Tl	65	1559	11895	$8{,}41\cdot10^{-5}$	$3{,}85\cdot10^{-30}$	$2{,}18\cdot10^{25}$
Rh	68	1631	12444	$8{,}04\cdot10^{-5}$	$4{,}41\cdot10^{-30}$	$1{,}82\cdot10^{25}$
Re	69	2759	21050	$4{,}75\cdot10^{-5}$	$1{,}99\cdot10^{-30}$	$2{,}39\cdot10^{25}$
Pt	71	2839	21661	$4{,}62\cdot10^{-5}$	$2{,}17\cdot10^{-30}$	$2{,}13\cdot10^{25}$
Ir	73	2919	22271	$4{,}49\cdot10^{-5}$	$2{,}36\cdot10^{-30}$	$1{,}91\cdot10^{25}$
Os	74	2959	22576	$4{,}43\cdot10^{-5}$	$2{,}45\cdot10^{-30}$	$1{,}81\cdot10^{25}$
U	78	2495	19036	$5{,}25\cdot10^{-5}$	$4{,}39\cdot10^{-30}$	$1{,}20\cdot10^{25}$
Pu	81	2591	19768	$5{,}06\cdot10^{-5}$	$4{,}92\cdot10^{-30}$	$1{,}03\cdot10^{25}$
Np	83	2655	20257	$4{,}937\cdot10^{-5}$	$5{,}29\cdot10^{-30}$	$9{,}33\cdot10^{24}$

Note: 1. For the chemical elements Br and Hg data shown in Table 7, are averaged.

2. ρ_{grav} is the calculated gravitational density of the given element in the tables of conversions (solid state)

CARD № 8

VERIFICATION OF AVOGADRO'S LAW

Avogadro's law: *«Equal volumes of gaseous substance at the similar pressure and temperature contain the same number of molecules, so the gas density is a measure of the mass of their molecules»*.

Determine the number of molecules of known gases in a volume of 22.4 liters under normal conditions, that is, verify the statement of the law of Avogadro and his constant (N_A=6,022·10^{23} mol^{-1}).

We calculated the mass of the "hedgehogs" of the chemical elements $m_{hedgehogs}$. All known gases are diatomic molecules, so the mass of one molecule of gas equal

$$m_{molecule} = 2\ m_{hedgehogs}.$$

Knowing the density of the gas under normal conditions ρ_{gas}, we can determine the mass of gas in a volume of 22.4 liters using the formula

$$m_{gas} = \rho_{gas} \cdot 22{,}4 \cdot 10^{-3}\ \text{(kg)}.$$

The number of gas molecules contained in a volume of 22.4 liters under normal conditions, define by the formula:

$$N_{molecule} = \frac{m_{gas}}{m_{molecule}} = \frac{\rho_{gas} \cdot 22{,}4 \cdot 10^{-3}}{2 \cdot m_{hedgehog}}.$$

According to the above formula we will calculate the number of molecules of simple gases and will put them in a table.

Chemical element	**$m_{hedgehogs}$, kg**	**Gas**	**ρ_{gas}, кг/м^3**	**$N_{molecule}$**
H (6×4)	5,96·10^{-34}	**H_2**	8,988·10^{-2}	**1,69·10^{30}**
He (6×4)	6,77·10^{-33}	**He_2**	1,785·10^{-1}	**2,95·10^{29}**
N (6×5)	1,02·10^{-30}	**N_2**	1,2506	**1,38·10^{28}**
Ne (6×5)	3,44·10^{-30}	**Ne_2**	9,0035·10^{-1}	**2,93·10^{27}**
O (8×4)	3,46·10^{-30}	**O_2**	1,429	**4,62·10^{27}**
Ar (6×5)	6,17·10^{-30}	**Ar_2**	1,7839	**3,24·10^{27}**
Cl (8×4)	1,19·10^{-29}	**Cl_2**	3,214	**3,03·10^{27}**
F (8×4)	1,47·10^{-29}	**F_2**	1,693	**1,29·10^{27}**
Kr (6×5)	6,7·10^{-29}	**Kr_2**	3,745	**6,26·10^{26}**
Xe^{g2} (6×5)	1,28·10^{-28}	**Xe_2**	5,851	**5,13·10^{26}**
Rn (8×4)	2,50·10^{-28}	**Rn_2**	9,73	**4,36·10^{26}**

This result shows that under normal conditions the number of molecules of a gas contained in a volume of 22.4 liters, is not constant N_A=6,022·10^{23}mol^{-1}.

Therefore Avogadro's law is not the law!

Accordingly, **the universal gas constant $R = k \cdot N_A = 8{,}31$·J/(mol·K)**, where k = 1,38·10^{-23} J/K is the Boltzmann's constant, **is not constant and depends on the type of gas.**