RING STRUCTURES OF MATTER

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Abstract

The classical approach in particle physics is based on the fact, that the electron has some parameters like charge, mass, etc. but does not have a structure. The electron is calculated as point particle having magnetic and electric properties. Finding a better structure model can give us truer description of particle behavior. For example Coulomb's force between the proton and the electron for very small distances gives quite opposite results for different particle structures (for point particles it is infinity and for ring particles it is zero). Results for larger distances are the same. Ring theory (RT) imagines the electron as semi-fractal particle with a toroidal (ring) shape that is formed by ring substructures connected to each other by vortex electromagnetic fields. The atomic nucleus can be built from the ring protons and neutrons. Knowledge of structure rules of the atomic nucleus and the properties of vortex electromagnetic field allow us to create relatively precisely the structures of individual atoms and molecules (or nanostructures like graphene). It allows us better understand the fundamental arrangement (and topology) of atoms and molecules. RT gives us a new tool that helps create new nanostructures with desired behavior.

Keywords: ring-structures, covalent bond, ring models of atoms and molecules, ring atom of hydrogen, ring structure of graphene

1. INTRODUCTION

Ring theory [9], [10] describes the electron as semi-fractal particle with a toroidal (ring) shape, which is build from ring fractal substructures connected to each other by vortex electromagnetic fields. The atomic nucleus can be built from the ring protons and ring neutrons. Protons and neutrons consist from quarks which are inside their rings. Basic substructures (globules) of the nucleus are created from protons and neutrons, see Figure 1 (red rings are protons, yellow rings are neutrons). Nuclei of atoms with globule substructures (GS) are shown on Figure. 8. Our goal is creation of atomic nuclei from these globules.

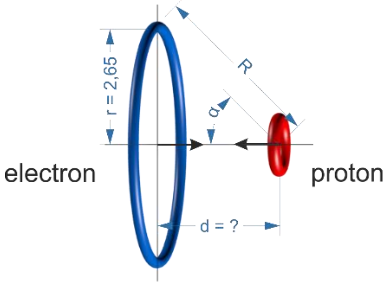
Figure 1 Basic substructures of atom nuclei (globules) [10]

Quantum physics uses field theory to describe matter, but is too abstract and does not allow to do any visual imagery [1]. On the other hand fractal or semi fractal description of matter is very perspective for explaining chemical structures [2], [4]. In our models we use ring structures of electrons, protons and neutrons [10].

2. LEVITATION OF THE RING ELECTRON IN THE MODEL OF HYDROGEN

The ring electron levitates with the ring proton at a distance which is determined by a balance between attractive (electric) and repulsive (magnetic) forces and with magnetic influence of the existing neutrons.

The electron does not circulate around the atomic nucleus but levitates at a certain distance on the common axis of the electron and proton ring structure. Other structure imaginations are in [2], [3], [5], [6], [7], [8].



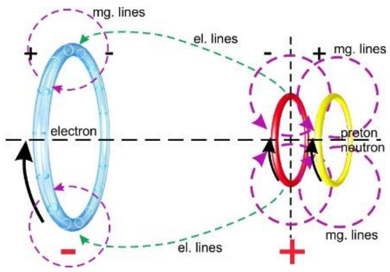


Figure 2 Levitating ring electron in the hydrogen atom **Figure 3** Levitating ring electron in deuterium

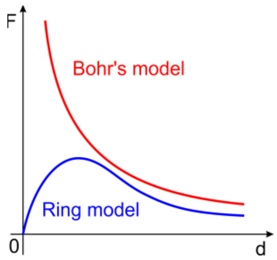
The position of the electrons in the electron shells is not determined only by forces of the corresponding proton, but also by other influences like force effect of other electrons in the surrounding shells, forces of attraction of the other positive protons, and repellent forces of neutrons by their magnetic fields. In a new ring model of the hydrogen atom with a levitating electron is attractive Coulomb's force F+ and repellent magnetic force F- between the proton and the electron. Attractive Coulomb's force F+ for the electron and proton as point particles:

$$F_+ = \frac{e^2}{4\pi\varepsilon_o}\left(\frac{1}{d^2}\right), \tag{1}$$

where d is a distance between the electron and the proton, e are charges of the electron and the proton. For the ring electron with radius r_e=r which is lager then the radius of the ring proton (see Figure 2):

$$F_+ = \frac{e^2}{4\pi\varepsilon_o}\frac{\cos\alpha}{R^2} = \frac{e^2}{4\pi\varepsilon_o}\frac{d}{\sqrt{(d^2+r_e^2)^3}}. \tag{2}$$

For $d=0$ is big difference between (1) and (2). Coulomb's force F_+ between the electron and the proton (as point particles) is the attractive force infinite for d=0 but for ring structures the attractive Coulomb's force F_+ is zero. For d>> r_e = r equations (1) and (2) are the same (red and blue curves on Figure 4).



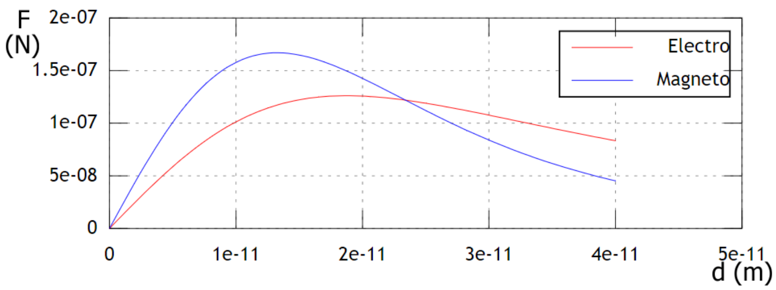


Figure 4 Coulomb's force for point and ring particles **Figure 5** Balance between electric and magnetic force

In the ring hydrogen is balance between attractive electric force F+ and repulsive magnetic force F- [9]:

$$F = F_+ - F_- = \frac{e^2}{4\pi\varepsilon_o}\frac{d}{\sqrt{(d^2+r_e^2)^3}} - \frac{1}{4\pi}I_e\mu_p\mu_0\frac{\sin 2\alpha}{\sqrt{(d^2+r_e^2)^3}} = 0. \qquad (3)$$

where *Ie* is current inside ring structure of the electron (Figure 5) [8].

In the Bohr's model of the hydrogen atom it is balance between electric and acceleration forces. For the levitation model is it balance between electric and magnetic forces with $d = 2.34 \times 10^{-11}$ m (see Figure 5) and $r_e = r = 2.65 \times 10^{-11}$ m.

3. MODELS OF ATOM NUCLEI

The atomic nucleus can be built from the ring protons and neutrons using the following rules [9]:

1. Two protons with parallel spin can be joined on a common axis.
2. Proton and neutron with parallel spins can be joined on a common axis.
3. Two protons with different axes can be connected via a neutron.
4. One or two neutrons can be inserted between the two parallel protons (f.e. isotopes).

It turns out that it is possible to combine these basic rules to create any real nucleus structure of individual atoms of the Periodic Table of Elements (see Figure 8).

Nucleons in the nucleus are not arranged in the shells as in case of electrons, but form spherical globule substructures with a maximum of 10 nucleons. Nuclear forces can bind only a small number of neighboring nucleons. Spherical substructures of the nucleus (globule substructures (GS) on Figure 1 are sub-structures of nucleus) are sequentially occupied by pairs of proton-neutron with 2, 3, 4 and 5 pairs (see Figure 1). These GS are connected via two parallel protons into more complex units (see Figure 7). GS with a maximum and symmetry occupation of nucleons is an extremely stable part of the nucleus. They create the atom with a completely filled electron levels (in noble-gases).

The shape of these globule substructures is created by repulsive electric forces (green arrows) of positively charged protons (red rings) and magnetic attraction forces (purple arrows) of the magnetic field of the protons and adjacent magnetic fields of the neutrons, (Figure 6). Neutrons have the opposite spin relative to the proton and, therefore, at the point of contact have the same direction of the magnetic field. This magnetic field attracts and holds the two nucleons together (nuclear forces).

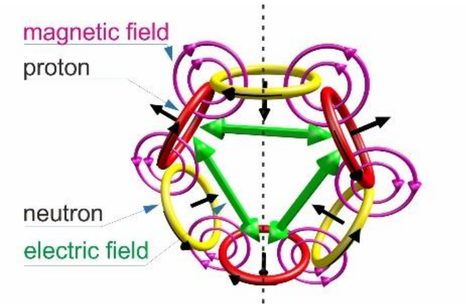


Figure 6 Electric repulsive forces (green) and attractive magnetic forces (purple)

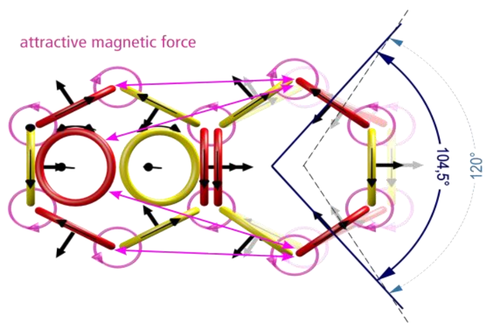


Figure 7 Forces inside of the oxygen nucleus

These globule substructures are connected through proton-proton bridges to more complex entities (see Figure 7). GS models can not only have the shape of a ball, but also a flattened ellipsoid (carbon), an elongated ellipsoid, or even more complex shapes. Some nuclei of element atoms may exist in more shape modifications (allotropic structures).

The neighboring globule substructures with their magnetic fields interact with each other according to the number of their own nuclides and their relative position, which is manifested by the deformation of the shape of the individual globule substructures towards the proton bond in the middle (Figure 7).

With these globule substructures, we can assemble the nucleus structures of individual elements (according to the number of protons and neutrons) of the periodic table of elements. (Figure 8).

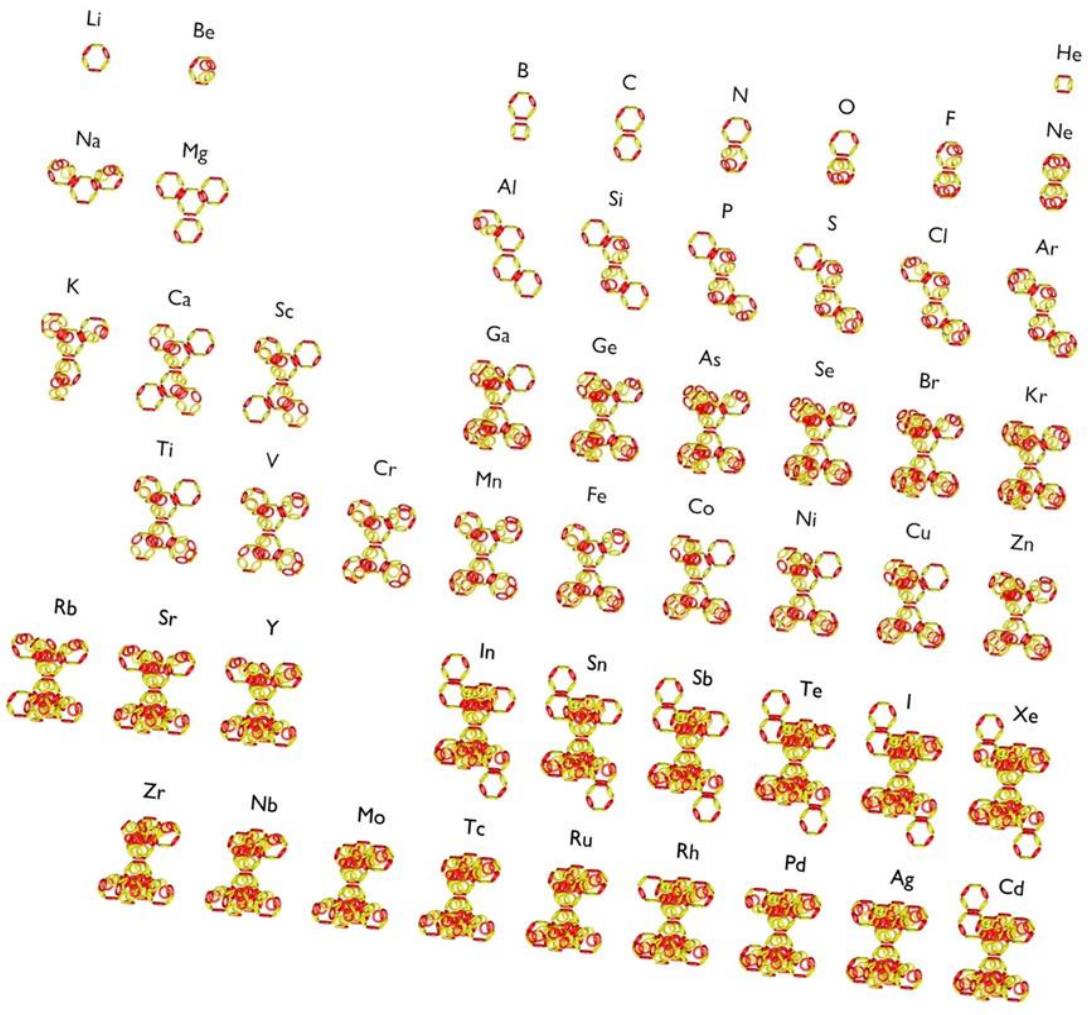


Figure 8 Models of atom nuclei from He to Xe

Atoms with a similar outer nucleus structure have similar properties (see Figure 9).

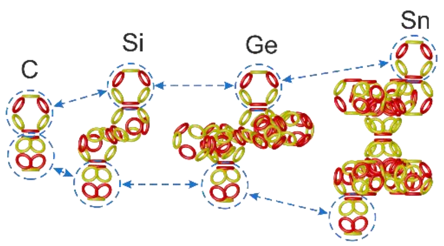


Figure 9 Models of nuclei with a similar outer structure

4. APLICATION OF RING THEORY

The modeling of atoms and molecule structures using RT allows creation even the most complex organic compounds, to explain phenomena such as diamagnetism, ferromagnetism (Figure 10) and behavior of electrons in the outer magnetic field. Symmetry of nucleus is very important for ferromagnetism.

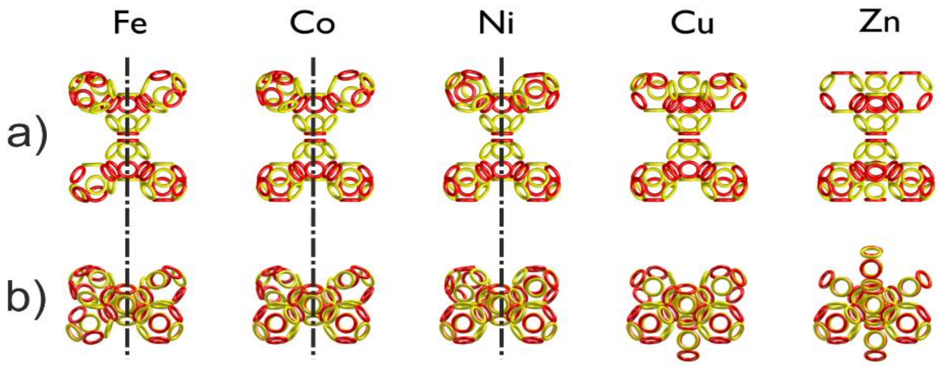


Figure 10 Symmetric structures of Fe, Co, Ni and asymmetric structures of Cu, Zn: a) side view b) top view

Recently, well known material is the graphene. Classical chemistry shows us the graphene as atoms arranged into hexagons), but it does not explain its exceptional qualities. Our two types of ring hexagons are shown on Figure 11 and Figure 12. Ring structures of atoms and their connection in a side view shows us the electrons which are in one plane above and below the nuclei of carbon atoms (see Figure13). This parallel placement of electrons in one plane allows their easy movement across the surface of the graphene. It can explain the highest conductivity of the graphene.

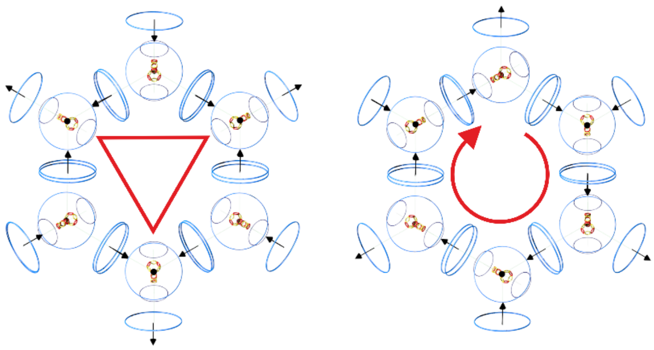


Figure 11 Two types of substructures of graphene with arranged bonds into hexagons (top view)

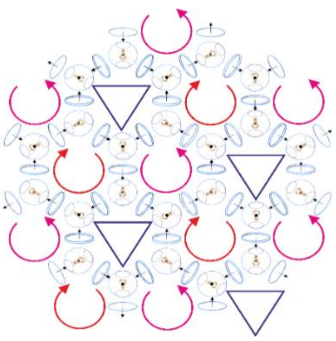


Figure 12 Topological model of graphene with two types of bonds (top view)

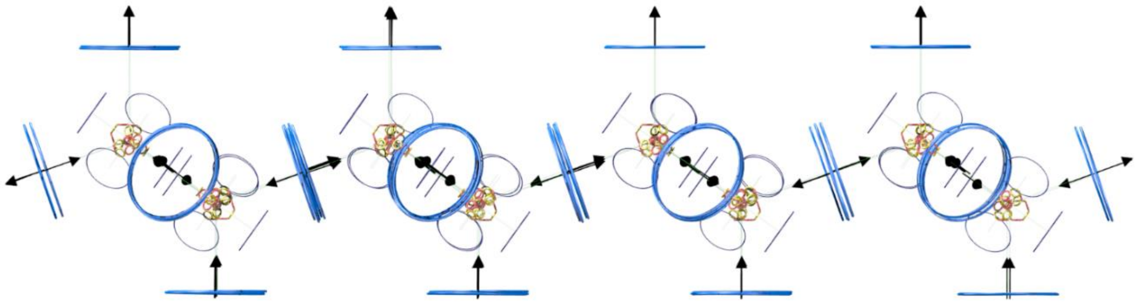


Figure 13 Topological model of graphene (side view, blue rings are electrons, yellow rings are neutrons, red rings are protons)

5. CONCLUSION

The ring theory presents a new view of the arrangement of elementary particles - the structure of atomic nuclei, atoms and molecules. Its basics are simple to understand thanks to the ability to use comprehensible graphics with the ability to use understandable figures that do not need to use complex mathematics. With ring theory it is easy to imagine microworld, as opposed to just a quantum abstract description. This theory, based on the use of a multilevel, vortex and ring structures links all contemporary knowledge based on quantum theory. Ring theory is trying to make progress in understanding some of the phenomena of elemental particle physics and atomic structure which we were unable to clarify by using existing theories. Intuition and imagination play an important part in this new scientific method. It can lead to rapid development of chemical structure theory. We must try to discover the structure laws that summarize facts that were obtained by experiments. Ring theory gives us a new tool that helps us create new nanostructures with desired behavior.

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