Journal of Theoretics Vol.4-4

THE LAW OF CONSERVATION OF ANGULAR MOMENTUM

Ph. M. Kanarev
The Kuban State Agrarian University. Department of Theoretical Mechanics.
13 Kalinina St., 350044 Krasnodar, RUSSIA
E-mail: kanphil@mail.kuban.ru

Abstract: The law of conservation of angular momentum, which controls Planck's constant, plays a fundamental role in the formation of the structure of the electrons, atoms, and molecules is demonstrated. This law changes the gravitational acceleration of rotating gyroscopes, as well as having more pervasive effects.
Keywords: angular momentum, Planck's constant, gravity.

It has been experimentally shown that the law of conservation of angular momentum alters the weight (gravitational acceleration) of a rotating gyroscope [1],[2]. The cause of this phenomenon remains unclear. Nevertheless, the modern state of classical mechanics and classical physics allows us to express the first supposition concerning the law governing this phenomenon.

We omit the numerous publications [3], [5], [10], [11], [14], [16], [17], [21] with the proof of vector properties of the Planck's constant $\overline{h}$. In SI (Système International) units, it has dimensions of angular momentum (kg·m^2/s). This means that the Planck's constant $\overline{h}$ is governed by the law of conservation of angular momentum, one of the main laws of the Nature [11]. It roughly means that *if no external force influences the body, angular momentum, or in other words, the moment of momentum of a body, it remains constant all the time* [10], [11], [15], [18].

Detailed investigations carried out by us [3], [5], [10], [11], [21] have shown that the photon and the electron have such electromagnetic structures during rotation and movement where the radii r are equal to lengths of their waves λ, such as:

$$\lambda = r \qquad . \qquad (1)$$

Now Planck's constant has the following appearance [4], [11]:

$$\overline{h} = m\lambda^2\overline{\omega} = mr^2\overline{\omega} = \left(\frac{kg \cdot m^2}{s}\right) = const. \qquad . \qquad (2)$$

When we have substantiated the model of the electron, we have used the existing Coulomb's and Newton's laws, the spectrum formation law formulated by us [16], [17], Lorentz electromagnetic force and the following constants: velocity of light C, Planck's constant $\overline{h}$, electron rest mass m_e, its charge e, electron rest energy E_e, Bohr magneton $\overline{M}_e$, electrical constant ε, Compton's wavelength of the electron which should be called Compton's radius of the electron. It has been found out that Planck's constant $\overline{h}$ is the spin of the electron (Fig. 1) [4], [7], [8], [9], [10], [11], [12], [13], [16], [17], [21].

The electron has the form of the rotating hollow torus (Fig. 1). Its structure proves to be stable due to availability of two rotations. The first rotation takes place about an axis which goes through the geometrical center of torus perpendicular to the plane of rotation. The second rotation is about the ring's axis which goes through the torus cross section circumference center [4], [11], [21].

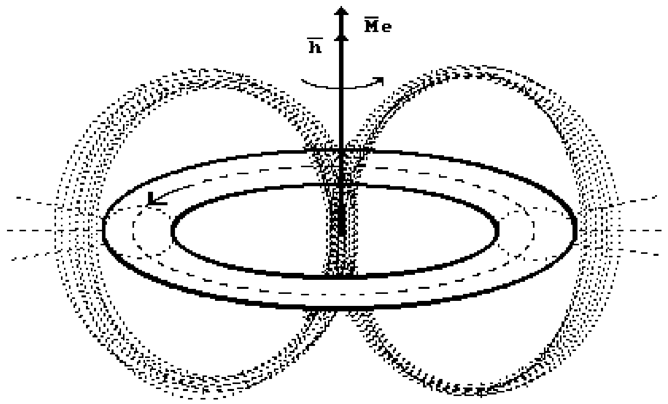


Fig. 1. Diagram of electromagnetic model of the electron
(only a part of electric and magnetic lines of force given in the figure)

Only a part of the magnetic lines of force and the lines which characterize the electric field of the electron are shown in Fig. 1. If the whole set of these lines were to be shown, the model of the electron would assumes a form that resembles an apple. As the lines of force of the electric field are perpendicular to the lines of force of the magnetic field, the electric field in this model will become almost spherical, and the form of the magnetic field will resemble the magnetic field of a bar magnet [4], [21].

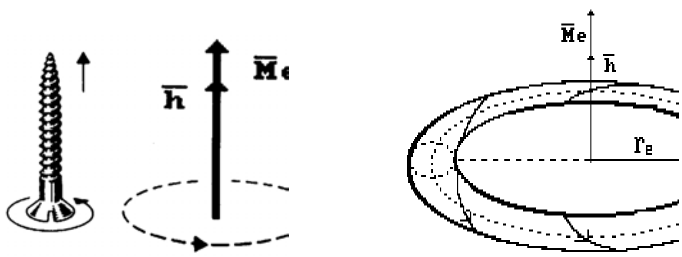
Several methods of torus radius calculation, which include its various energy and electromagnetic properties, give one and the same result $\lambda_e = r_e = 2.4263016 \cdot 10^{-12}$ m, which coincides with the experimental value of Compton's wavelength of the electron, i.e. [19], [20], [21]:

$$\lambda_e(\exp er) = r_e(\exp er) = 2.4263089 \cdot 10^{-12} m, \qquad . \tag{3}$$

Thus, the electron is a rotating gyroscope. It is clear from [4], [21]

$$\overline{M}_e = \frac{e\overline{h}}{4\pi \cdot m_e} \tag{4}$$

and Fig. 1, the directions of the vector of angular momentum $\overline{h}$ (Planck's constant), and the vector of magnetic moment $\overline{M}_e$ of the electron, coincide and correspond to the right-handed rotation of the electron in relation to its axis. Let us call the electromagnetic field, which is formed by this combination the direction of the vectors $\overline{h}$ and $\overline{M}_e$, Plank's field. As this field is available near the electron, which is a connecting link between the atoms in the molecules, it should be manifested in the structure of the molecules.



a) b)

Fig. 2. Directions of the vector of the Planck's constant $\overline{h}$ and of the vector of magnetic moment $\overline{M}_e$, of the electron (b) coincide with the direction of the right-hand movement (a).

Let us also pay attention to the rules, according to which the direction of the vectors $\overline{h}$ and $\overline{M}_e$ is determined. These vectors are directed in such a way that the electron rotates counterclockwise. Such rotation is called right-handed one (Fig. 2) [20].

The lack of the orbital movement of the electron in the atom is the most important result of our research [10], [11], [17]. It is the consequence of the law of the formation of the spectra of the atoms and the ions [5], [10], [16], [17]. The interaction of the electrons with the atom's nucleus can be considered, the hydrogen atom being an example.

Hydrogen is the simplest atom. It has one electron and one proton. The information found out by us concerning the structure of the electron allows us to get a notion about the formation process of this atom [4], [21].

One can suppose that magnetic fields of both the proton P and the electron e are similar to magnetic fields of the bar magnets and have magnetic poles (Fig. 3). As proton mass is much more greater than electron mass, the hydrogen formation will begin with the convergence of the electron to the proton. We know that in free state the electron has magnetic moment $\overline{M}_e$ and rather large magnetic field strength near its geometrical center, that's why both electrical force and magnetic forces will govern the process of the convergence of the electron with the proton at the first stage [10], [11].

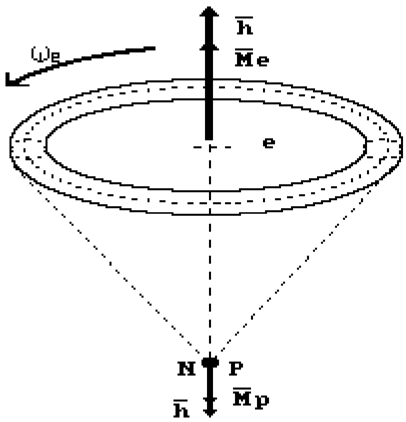


Fig. 3. Diagram of hydrogen atom model

As the magnetic fields of both the proton and the electron have strength about their axes of rotation, the electron e and the proton P will rotate and align during the convergence. If the directions of magnetic moments $\overline{M}_e$ and $\overline{M}_p$ coincide, both the electrical forces and the magnetic ones will draw the electron and the proton together. In this case the proton the electron is absorbed by and becomes a neutron.[1] When the electron is drawn together with the proton and their like magnetic poles $\overline{M}_e$ and $\overline{M}_p$ are directed to meet each other, Coulomb's forces acting normally to toroidal surface of the electron, will draw it together with the proton, and the magnetic forces will repulse them from one another. An equilibrium will therefore be set between these forces, and the structure being formed in such a way is the hydrogen atom (Fig. 3) [10], [11].

As the hydrogen atom is a connecting link between the atoms of many molecules (hydrogen links), the right-handed rotation should be formed in the area of these links. Let us take the formation of a hydrogen molecule as an example.

In accordance with the existing notions the hydrogen molecule, it can have two structures. In the structure of orthohydrogen the directions of the vectors of the magnetic moments of the protons are turned in one direction, and in the structure of parahydrogen its directions is opposite [27]. The value of the magnetic moment of the proton is less than that of the magnetic moment of the electron by a factor of 10^2, hence the hydrogen molecule classification adopted in modern chemistry should be determined not by magnetic moment of the proton, but by the magnetic moment of the electron [11]. If this peculiarity is taken into consideration, the hydrogen molecule will have a difference in its structure as shown in Fig. 4 [10], [11].

[1] The detail of this process can be found in the book [11].

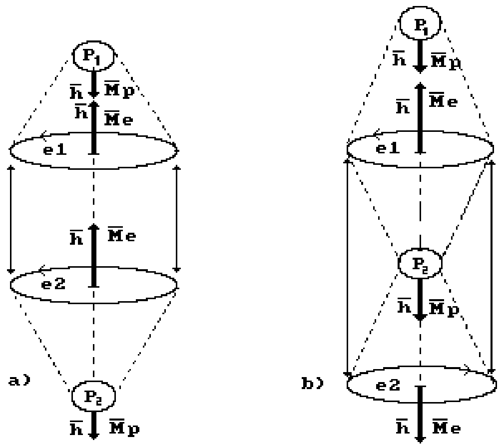


Fig. 4. Diagram of hydrogen molecule H_2 :
a) - orthohydrogen, b) - parahydrogen

The directions of the vectors of the magnetic moments $\overline{M}_e$ and the directions of the vectors of their angular momentum $\overline{h}$ of both electrons coincide (Fig.4,a). Let us call this structure orthohydrogen. If the above-mentioned vectors are opposite (Fig.4b), such a structure is parahydrogen [10], [11].

Let us pay attention to the logical actions connected with orthohydrogen. Electrostatic forces of mutual attraction of the first electron e_1 and the first proton P_1 are balanced by magnetic forces of these particles turned to opposite directions. That's why vectors $\overline{M}_e$ and $\overline{M}_p$ of their magnetic moments are turned in opposite directions. Electrostatic forces of repulsion existing between the first electron and the second one are balanced by the magnetic forces converging them, that is why the direction of vectors $\overline{M}_e$ of their magnetic moments coincide. In order to compensate electrostatic forces of mutual attraction of the second electron and the second proton, it is necessary to make the directions of the vectors $\overline{M}_p$ and $\overline{M}_e$ of magnetic moments of these particles be opposite. The logic of bond formation between the first electron and the first proton of parahydrogen remains the same. The forces of mutual attraction of the first electron and the second proton are balanced by their oppositely directed magnetic forces.

It is easy to see that the distances between the second proton and both electrons are less than that between the first electron and the second one. That is why the electrostatic forces of attraction of these electrons to the second proton will be greater than electrostatic forces of repulsion acting between the first electron and the second one. As the magnetic moment of the electron is greater than the magnetic moment of the proton by a factor of 10^2, the vector $\overline{M}_e$ of magnetic moment of the second electron should be directed opposite to the vector of the magnetic moment of the first electron (Fig.4b).

It is easy to see that the orthohydrogen molecules are more stable than the parahydrogen ones, that is why ¾ of the molecules are orthohydrogen [27]. Thus, the electrons acting as right-handed electromagnetic gyroscopes that unite the atoms into molecules by their electromagnetic fields. The availability of the rotation process of the electrons allows for the possibility for us to suppose that this process forms the right-handed Planck's field near the electron. As the direction of the vectors of Planck's constant $\overline{h}$ and the magnetic moment $\overline{M}_e$ coincide, the direction of the electron's rotation characterizes the direction of its Planck's field as well. It is natural that the interaction between such rotating fields should exist.

As the electron and the hydrogen atom are the main connecting links between the atoms in the molecules, their right-handed Planck's fields should influence this process. It is known that the DNA molecule's helix is twisted to the right (Fig. 5) [24].

Fig. 5. Model of DNA double helix twisted by the Planck's fields to the right

We have every reason to believe that the direction of DNA helix twisting to the right is stipulated by the Planck's fields of the electrons and the hydrogen atoms, which mainly form the chemical bonds between the atoms of this molecule [24]. Thus, the direction of DNA helix twisting is connected with the rotation direction, which is characterized by the most fundamental law of the Nature – the law of conservation of angular momentum.

Pay attention to the fact that the majority of the shells (Fig. 6) of the mollusks and snails is twisted to the right, hence we have reason to believe that this direction of the shell twisting is the result of the sequence of the right-handed Planck fields of the electrons and the hydrogen atoms. This reason may be a determining factor in the prior development of the right-handed nature of a human being. But the influence of the Planck's field on various natural phenomena may not be restricted by it.

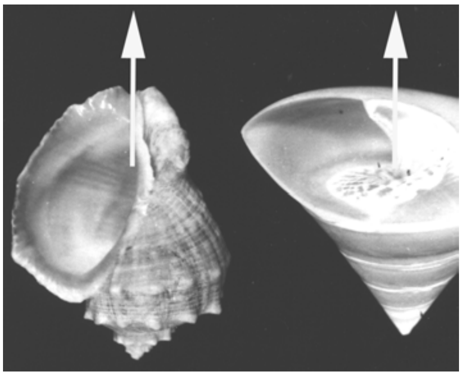


Fig. 6. Rotation direction of the Planck's field coincides with the direction of twisting of the majority of the shells.

If one were to sum all vectors of the spins $\overline{h}$ of the electrons and the atoms of the Earth, a part of them $\overline{H}_0$ would remain uncompensated near the surface of the Earth (Fig. 7). As a result, near the surface of the Earth the weak right-handed Planck's field should be formed, which determines the direction of shell twisting (Fig. 6). How is it possible to discover the existence of such field? The simplest way would be to weigh the rotating gyroscope.

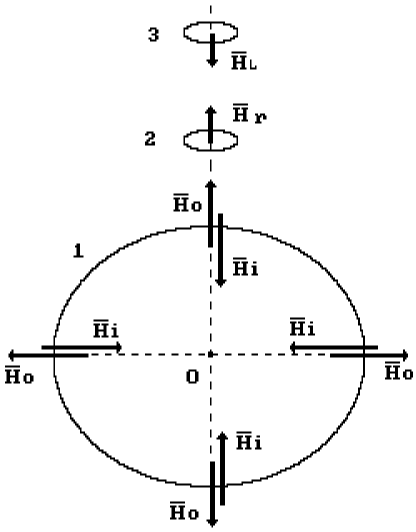


Fig. 7. Diagram of formation of non-compensated right-handed Planck's field on the surface of the Earth.

Vector $\overline{H}_L$ of a left-handed gyroscope (Fig. 7) will be opposite to the direction of vector $\overline{H}_o$ near the Earth's surface, with weak Planck's fields corresponding to the directions of these vectors will be interacting with each other and pushing them to be registered during the experiment [1].[2]

If the right-handed gyroscope falls on the surface of the Earth, the vector of its Planck's field $\overline{H}_r$ will be coincide with the vector of the Planck's field $\overline{H}_o$ near the surface of the Earth. The poles of the magnetic fields being formed will be directed to each other. As a result, the weight and free fall acceleration of such a gyroscope should be increased. This fact has been confirmed experimentally [1], [2].

It is natural to suppose that this phenomenon should be more manifested in space. There are the experimental results, which confirm the existence of zones on the surface of the Earth, which have different Planck's fields. The Russian scientists call them 'torsion fields' [25]. It is natural that the strength of such a field would be maximal in such zone of the surface of the Earth where the substance molecules are rather free to position their rotating Planck's fields in relation to the general Planck's field near the surface of the Earth. First of all, there are the zones of bedding for oil and gas. Such a field is found in our galaxy too [23], [26]. Vector $\overline{A}_r$, which characterizes this field has been found by Yu A. Baurov, the Russian scientist, and his colleagues, and has been called a cosmologic vector potential [25], [26]. Now it is known that the direction of this vector influences the forming of solar prominence [23].

CONCLUSION

The law of conservation of angular momentum controls Planck's constant. This constant is a vector value. The direction of this vector coincides with the direction of the vectors of the magnetic moments of the electron and the proton. The same law that governs the formation of the Planck's (torsion) fields near the surface of the Earth probably also has its effect on the right-handed twisting of DNA, the reduction of the weight of the left-handed gyroscopes, their acceleration towards the Earth, and on the largest scale, manifestation in the cosmologic vector potential.

Acknowledgment:
The author is deeply grateful to Dr. James P. Siepmann for his assistance in the final formulation of this text.

[2] Pay attention, that we correct the name of the direction of the rotation of these gyroscopes.

REFERENCES

1. V.G. Labeysh *Experiments on Asymmetrical Mechanics*. Galilean Electrodynamics. Vol. 11, Special Issues 1. 2000, pag. 8 - 11.
2. Hideo Hayasaka. *Generation of Anti-Gravity and Complete Parity Breaking of Gravity*. Galilean Electrodynamics. . Vol. 11, Special Issues 1. 2000, pag. 12 - 17.
3. Ph. M. Kanarev. *New Analysis of Fundamental Problems of Quantum Mechanics*. Krasnodar. 1990. 173 p.
4. Ph. M. Kanarev. *Model of Electron. Apeiron*. Vol. 7, no. 3-4. 2000. Pages 184 - 194.
5. Ph. M. Kanarev. *On the Way to the Physics of the 21st Century. Krasnodar*. 1995. 269 pages (In English).
6. Richerd H. Wachsman. *The Quirks and Quarks of Physics and Physicists*. "Infinite Energy". Volume 4, Issue 22. 1998. Pages 22-25, 62.
7. G. Spaniol and J. F. Sutton *Classical Electron Mass and Fields*. Journal of Physics Essays. Vol. 5, No. 1, pp. 60-61, 1992.
8. David L. Bergman, Ph. D. And J. Paul Wesley, Ph.D. Spining *Charged Ring Model of Electron Yielding Anomalous Magnetic Moment*. Galilean Electrodynamics. Vol. 1, No. 5, pp. 63067. (Sept./Oct., 1990)
9. G.K. Grebenshchikov. *Helicity and Spin of the Electron. Hydrogen Atom Model*. Energoatomisdat. St.-Petersburg. 1994. 60 pages.
10. Ph.M. Kanarev. *Crisis of Theoretical Physics. The third edition*. Krasnodar, 1998. 200 pages.
11. Ph.M. Kanarev. *Water as a New Energy Source*. Krasnodar. The third edition, 200 pages (In English).
12. H. Daniel, Ph. D. Deutsch. *Reinterpreting Plank's Constant*. Galilean Electrodynamics. Vol. 1, No. 6, pp. 76-79 (Nov/Dec., 1990).
13. Cl. E. Suorts. *Unusual Physics of Usual Phenomena*. Volume 2. M.: "Nauka", 1987.
14. Ph.M. Kanarev. *Analysis of Fundamental Problems of Modern Physics*. Krasnodar. 1993. 255 pages.
15. D.A. Bezglasny. *Law of Conservation of Angular Momentum during Formation of the Solar System*. Proceedings of the international conference "Problem of space, time, gravitation". St.-Petersburg. Publishing house "Polytechnic", 1997, pages 118-122.
16. Ph.M. Kanarev. *Law of Formation of the Spectra of the Atoms and Ions*. Proceedings of the international conference "Problems of space, time, gravitation". St.-Petersburg. Publishing house "Polytechnic", 1997, pp. 30-37.
17. Ph. M. Kanarev. *The Analytical Theory of Spectroscopy*. Krasnodar, 1993. 88 pages. (In English).
18. *Quantum metrology and fundamental constants*. Collection of articles. M.: Mir. 1981.
19. E.V. Shpolsky. *Atomic Physics*. Volume 1. M.: 1963. 575 pages.
20. *Physical encyclopaedic dictionary*. M., "Sovetskaya entsiklopedia". 1984. 944 pages.
21. Ph. M. Kanarev. *A Model for free Electron*. Galilean Electrodynamics. Volume 13, Special Issue 1. 2002. pages 15 – 18.
22. A.R. Striganov, G.A. Odintsova. *Tables of spectral lines*. M.: Nauka. 1977.
23. A.A. Shpitalnaya, Yu. A. Zakoldaev, A.A. Efremov. *Astronomic and geological aspect of the new interaction*. Problems of space, time, gravitation. Polotekhnika. St. Petersburg, 1997. P. 382…393
24. M.D. Frank-Kamenetsky. *The main molecule*. M: "Nauka" 1983. 159 pages.
25. Yu. A. Baurov. *On Physical Space Structure and New Interaction in Nature*. New Ideas in Natural Sciences. Part 1. Physics. St. -Perrsburg 1996. Pag. 45 - 60.
26. Yu. A. Baurov. *Space Magnetic Anisotropy and New Interaction in Nature*. Physics Letters A 181 (1993) 283-288. Horth Holland.
27. *Short Chemical Encyclopaedia*. Volume 1. M.: Sovetskaya Entsiclopedia. 1961.