VORTEX-FRACTAL-RING STRUCTURES

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Abstract: *This paper is an attempt to attain a better model of the atomic nucleus using vortex-ring-fractal models. The aim of this paper is the vortex-ring-fractal modeling of atoms, which is not in contradiction to the known laws of nature. We would like to find some acceptable models of the atomic nucleus. Our imagination is that the atomic nucleus consists from the ring protons and the ring neutrons. We present here computer calculations and pictures.*

Keywords: *structure of hydrogen atom, vortex-ring-fractal theory, nucleus of atom*

1 Introduction

Most of our knowledge of the electronic structure of atoms has been obtained by the study of the light given out by atoms when they are exited. The light that is emitted by atoms of given substance can be refracted or diffracted into a distinctive pattern of lines of certain frequencies and create the line spectrum of the atom. The careful study of line spectra began about 1880. The regularity is evident in the spectrum of the hydrogen atom. The interpretation of the spectrum of hydrogen was not achieved until 1913. In that year the Danish physicist Niels Bohr successfully applied the quantum theory to this problem and created a model of hydrogen. Bohr also discovered a method of calculation of the energy of the stationary states of the hydrogen atom, with use of Planck's constant *h*. Later in 1923 it was recognized that Bohr's formulation of the theory of the electronic structure of atoms to be improved and extended. The Bohr's theory did not give correct values for the energy levels of helium atom or the hydrogen molecule-ion, H_2^+, or of any other atom with more than one electron or any molecule. During the two-year period 1924 to 1926 the Bohr description of electron orbits in atoms was replaced by the greatly improved description of wave mechanics, which is still in use and seems to be satisfactory. The discovery by de Broglie in 1924 that an electron moving with velocity *v* has a wavelength $\lambda=h/m_e v$. The theory of quantum mechanics was developed in 1925 with the German physicist Werner Heisenberg. Early in 1926 an equivalent theory, called wave mechanics, was independently developed by Austrian physicist Ervin Schroedinger. Important contributions to the theory were also made by the English physicist Paul Adrien Maurice Dirac. The most probable distance of the electron from the nucleus is thus just the Bohr radius r_B; the electron is, however, not restricted to this distance. The electron is not to be thought of as going around the nucleus, but rather as going in and out, in varying directions, so as to make the electron distribution spherically symmetrical. Basic vortex-ring structures ware described in [1-11]. Main ideas and differences between a classical and the new vortex-ring-fractal (VRF) model are presented on Fig.3. The "ring theory" is supported by experiments in [12] and [13] too.

2 Examples of nucleus structures

In the next figures the protons are red (or black), the neutrons are yellow (or grey) and the electrons are blue (or grey).

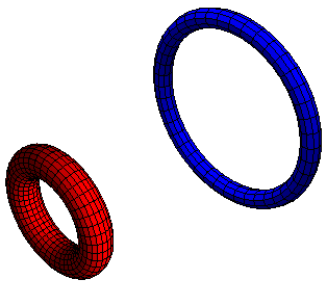

Fig.1 Structure of hydrogen atom

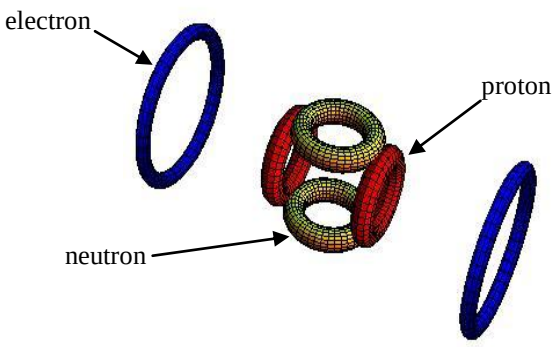

Fig.2 Structure of helium atom

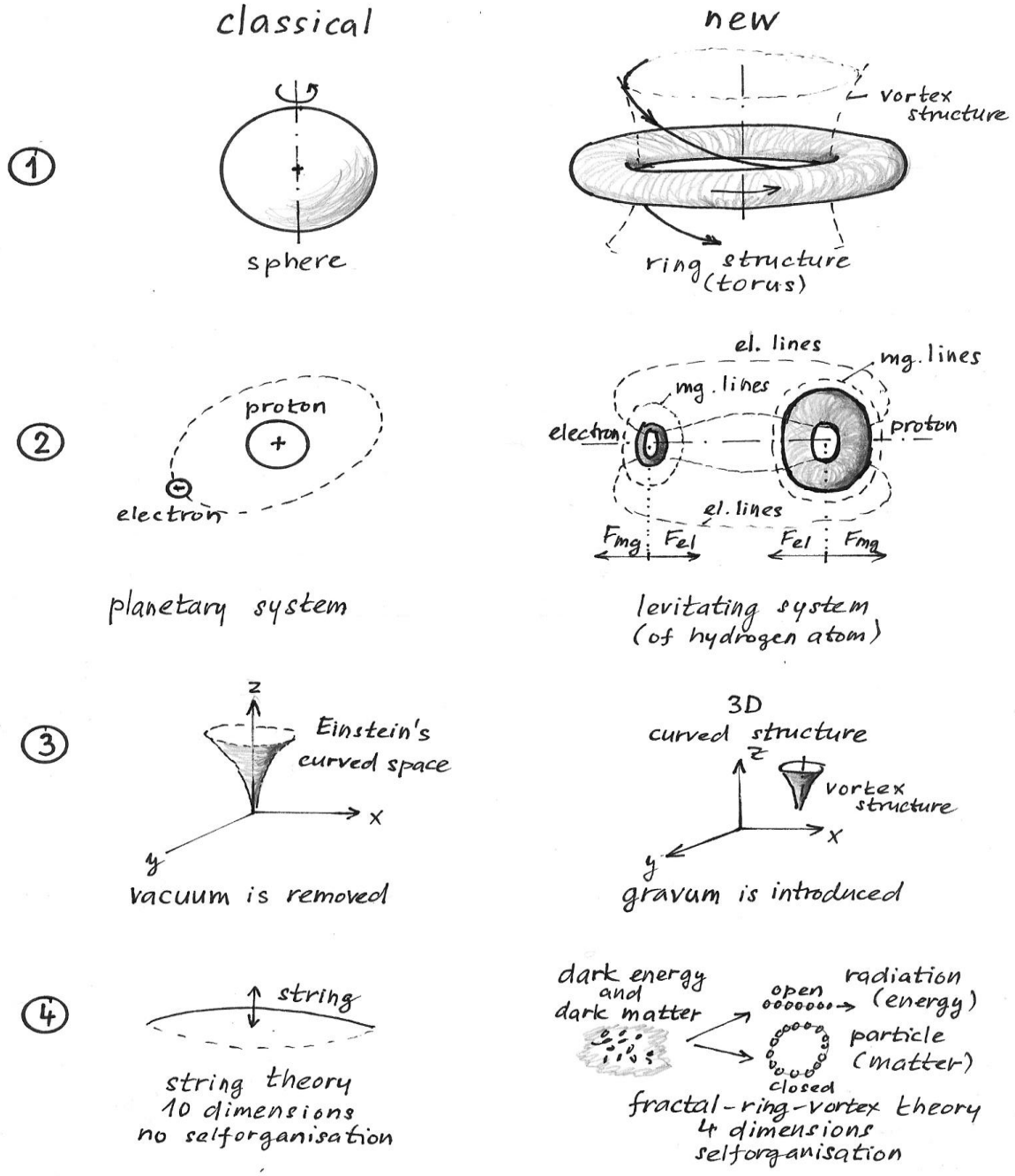

Fig.3 Main ideas and four differences between a classical and the vortex-ring-fractal model

Deuterium is frequently represented by the chemical symbol *D*. Since it is an isotope of hydrogen with mass number *2*, it is also represented by *2H*. IUPAC allows both symbols *D* and *2H*, although *2H* is preferred. Deuterium has large mass compare with protium (*1H*); deuterium has a mass of 2.014102 u, compared to the mean hydrogen atomic weight of 1.007947 u, and protium's mass of 1.007825 u. The isotope weight ratios within other chemical elements are largely insignificant in this regard, explaining the lack of unique isotope symbols elsewhere. The ring model of deuterium structure is on Fig.4.

Tritium, symbol *T* or *3H*, also known as Hydrogen-3 is a radioactive isotope of hydrogen. The nucleus of tritium (sometimes called a triton) contains one proton and two neutrons, whereas the nucleus of protium (the most abundant hydrogen isotope) contains one proton and no neutrons (see Fig.1). Naturally occurring tritium is extremely rare on Earth. The isotope name is formed from the Greek meaning "third". The ring model of deuterium structure is on Fig.5.

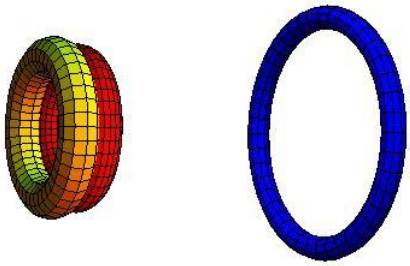

Fig.4 Structure of deuterium

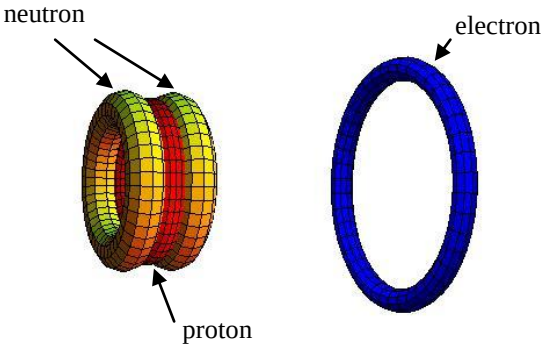

Fig.5 Structure of tritium

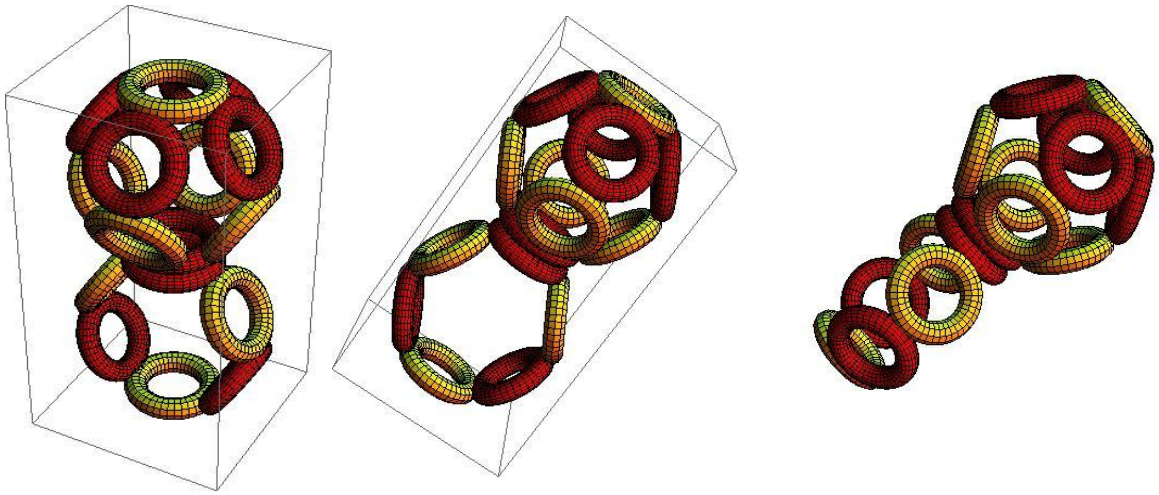

Fig.6 Structure of oxygen nucleus

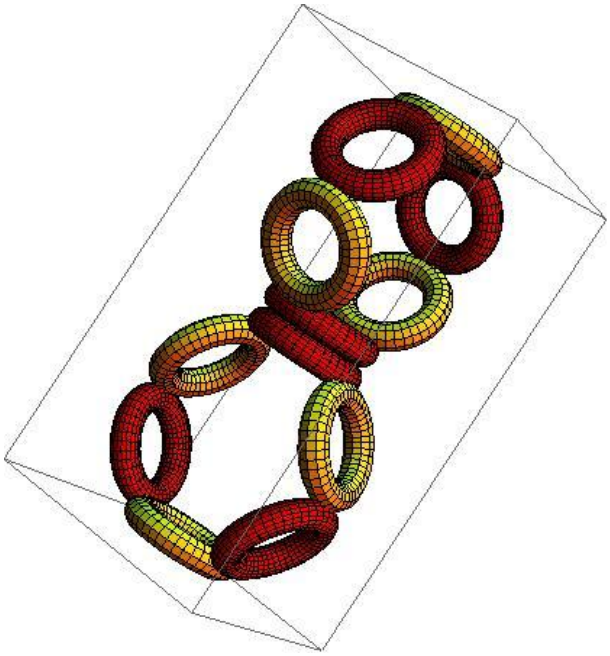

Fig.7 Structure of carbon nucleus

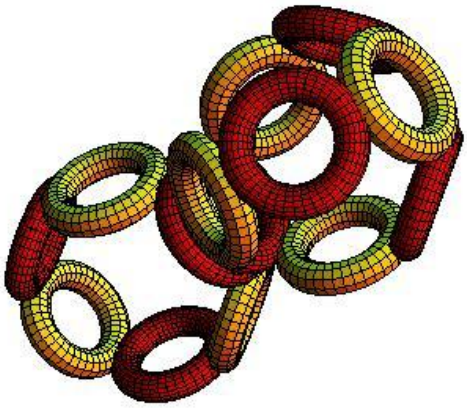

Fig.8 Structure of nitrogen nucleus

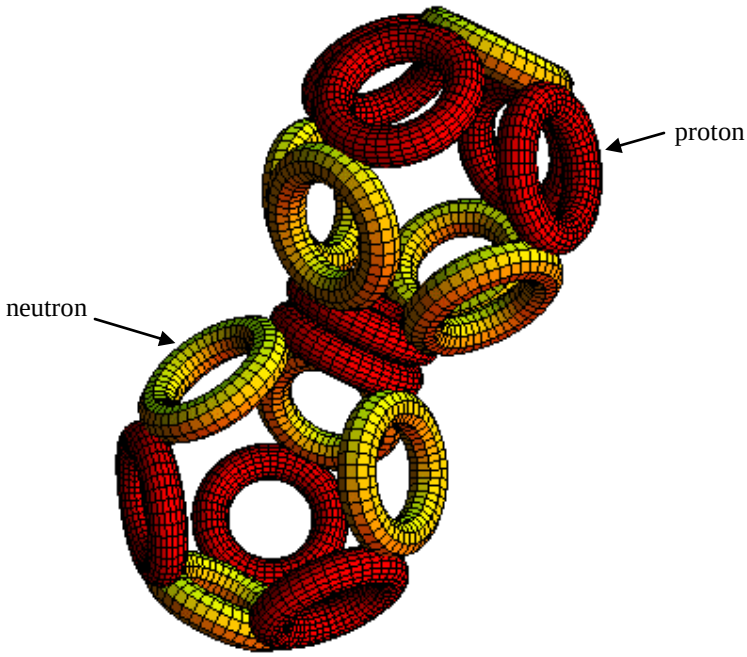

Fig.9 Structure of fluor nucleus

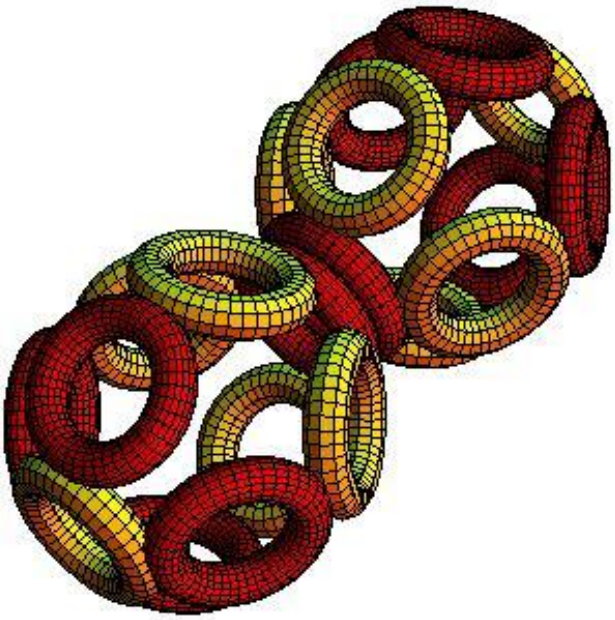

Fig.10 Structure of neon nucleus (the symmetrical structure)

3 Plasma structures

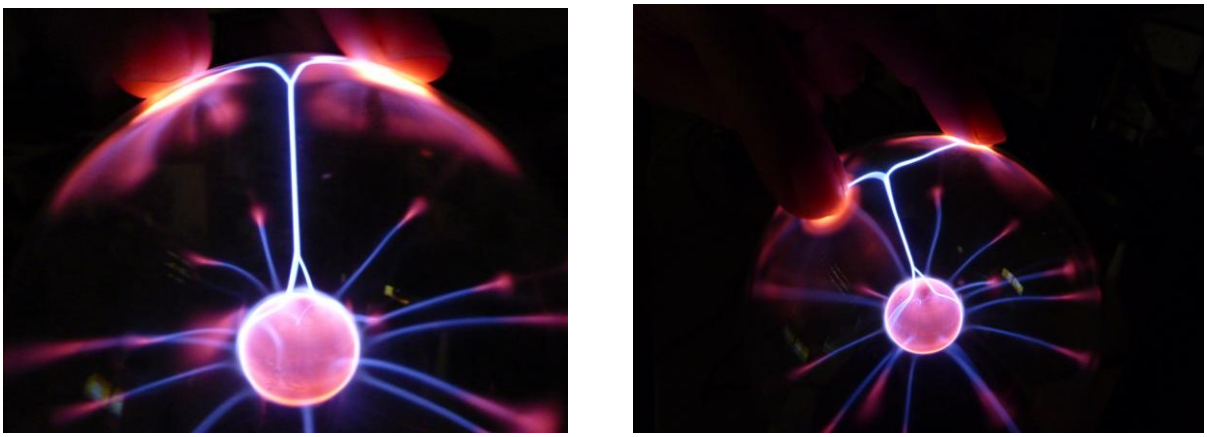

Fig.11 Vortexes and rays in the plasma ball

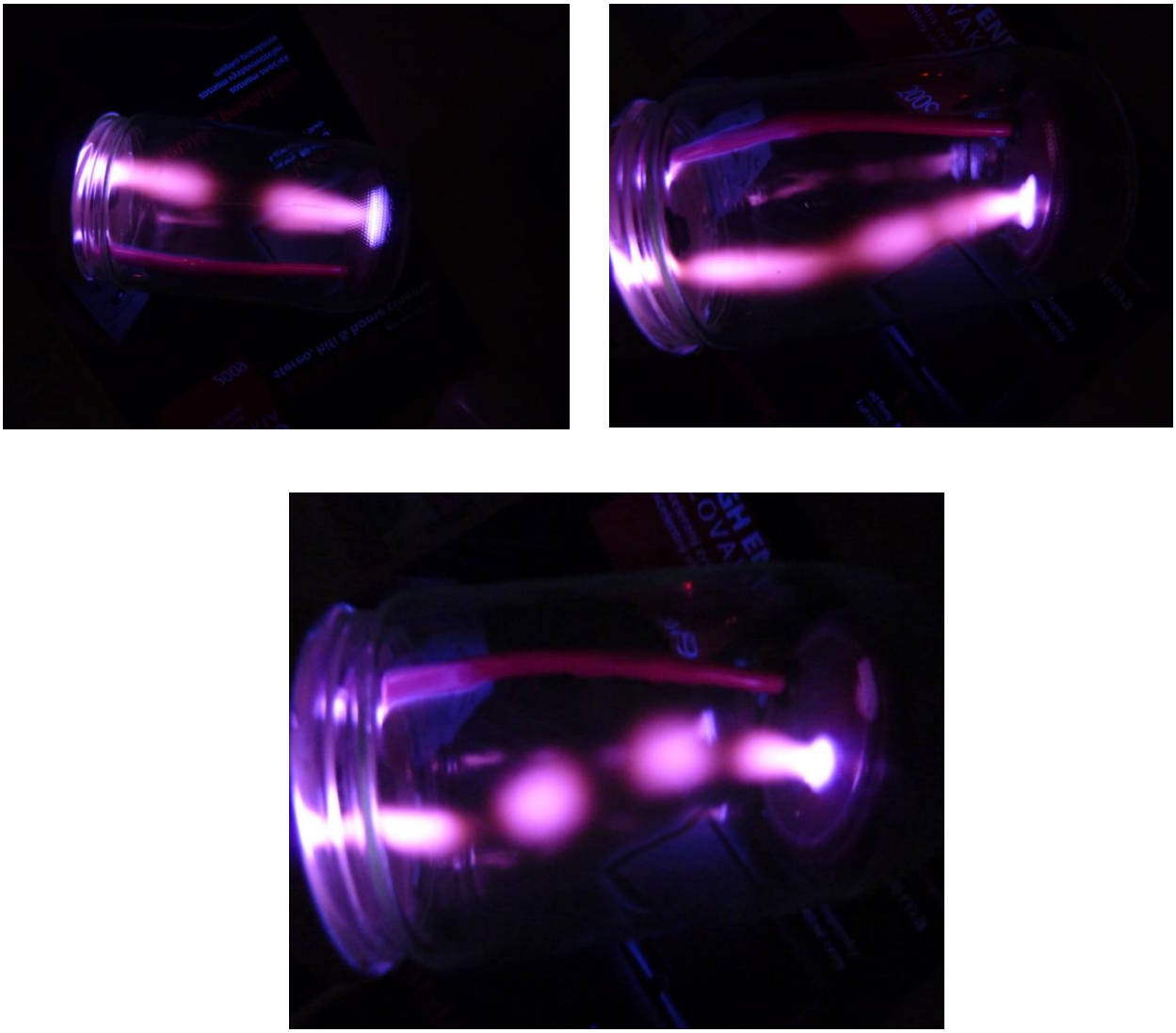

Fig.12 Creation of the lightning ball

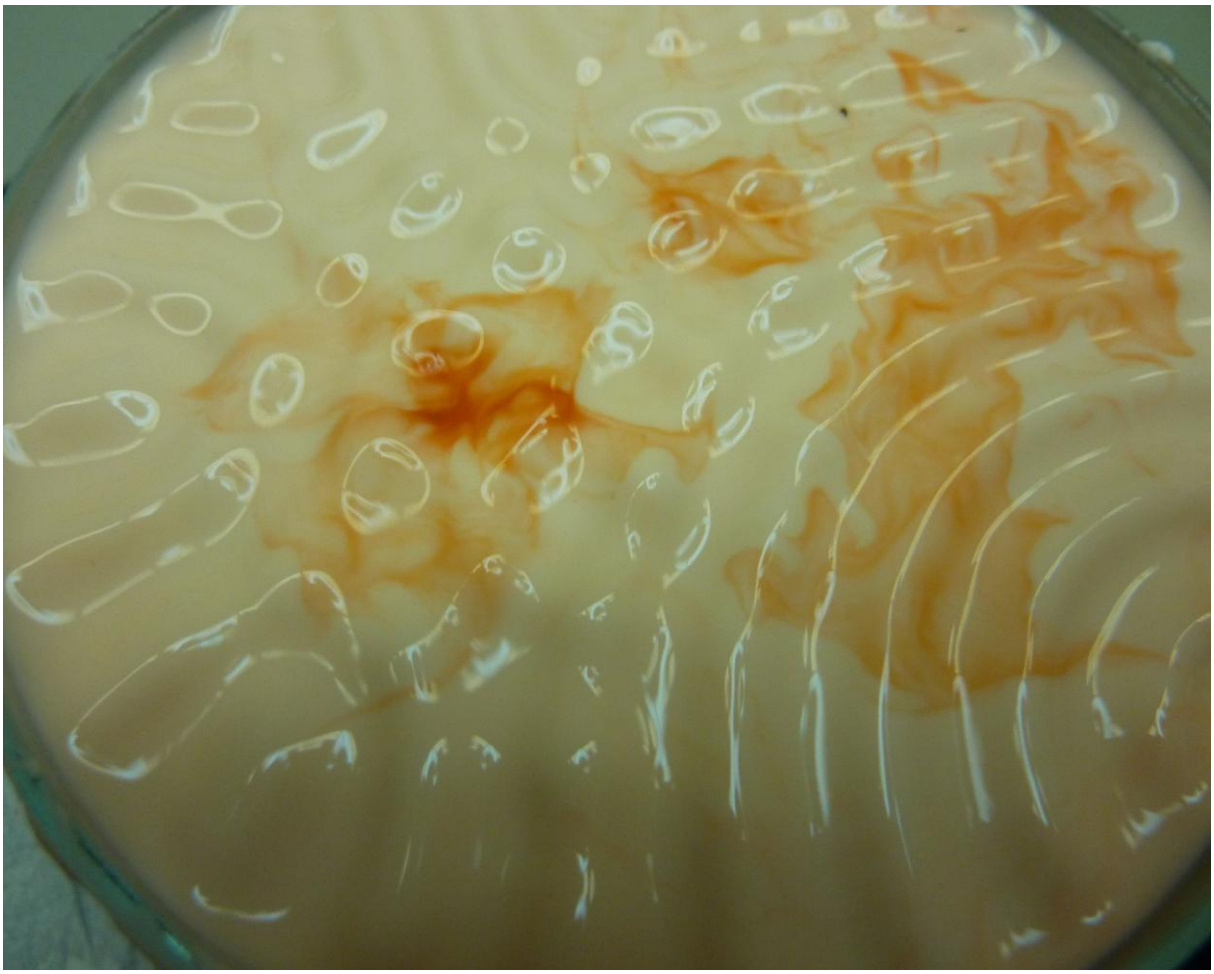

Fig.13 Creation of a vibration structure

Ball lightning is interesting stuff (see Fig.12). It's been seen to enter a house, drift around as if contemplating the scenery, then exiting out a wall, leaving everything untouched. It's also been known to blast holes in roofs, blow out every electrical outlet in the place and punch it's way out 2 seconds after quietly waltzing in. One report said the ball lightning came into the room, gently lifted up papers on a desk as if reading, wandered over to the man who was sitting there, stunned, seemed to look him up and down, then drifted up the chimney where it blasted the whole thing to bricks and soot, which rained on the houses next door.

Ordinary ball lightning is probably "normal plasma." It is the kind of ball lightning produced in the laboratory. It spontaneously appears in the open-air, closed rooms, aircraft at altitude, and was seen in at least one submarine.

However, it can be distinguished extreme ball lightning (EBL) by the following characteristics:
• it glows in air;
• it originates from nothing visible;
• it lasts between 10 and 1200 seconds;
• it floats at about 1 meter/second;
• it is lethal or potentially lethal;
• it causes significant damage;
• it contains energy estimated at 100,000 to 1 billion Joules, far in excess of the energy density attributable to chemicals or electrostatics;
• it penetrates walls, glass and metal, generally without leaving a hole;
• it induces large currents but is in radial force equilibrium;
• it leaves black streaks on corpses without the spasm of electrocution;
• it can excavate tons of earth.

What we know about it. It’s a ball of light (orange, red, yellow, blue, or other colors) that slowly drifts parallel to and a few yards (meters) above the ground, sometimes apparently unaffected by breeze or wind. Often it spins as it moves. Sometimes it bounces off the ground or other solid objects. Observers see the light spheres clearly in the daytime — about as bright as a 25 to 100 watt incandescent light bulb. The balls, usually grapefruit size, can be as small as a pea or

as large as a beach ball. They last an average of 25 seconds — from a few seconds long up to several minutes.

Why does it happen? We don't know. Although theories number in the hundreds, none is generally accepted. So far, even the best theories only explain some aspects of ball lightning — but not all. The theories propose various causes of ball lightning:

•an atmospheric maser,
•a stable plasma ball (we support this model),
•a standing wave of electromagnetic radiation,
•an electrical discharge similar to corona discharge,
•a vortex structure (we support vortex-plasma model),
•a suspension of fine particles in the air (an aerosol), that interact.

The existence of ball lightning as atmospheric phenomena is still a controversial topic among meteorologists, with many scientists even calling them a hoax. Now plasma physicists from Humboldt University in Berlin seem to have developed a way to artificially create these objects in a laboratory environment.

The German scientists managed to create ball lightning just by dipping two electrodes into a tub filled with water. As a result, a small fire ball, similar to a mushroom cloud, ascends from the water surface and simply disappears after a second. The Germans now believe ball lightning observed in real nature could be the result of a lightning strike in a puddle, for example. According to the research team, even just a glass of water is enough to create artificial ball lightning.

We created ball lightning as tuned plasma. The frequency of a high voltage generator was increased to the state with stable ball (see Fig.12). It is tuned plasma. On Fig.13 is shown a wave vibration structure that changes to separated islands.

4 Conclusions

The subject of physics has been developed over the past 200 years by some very ingenious people, and it is not easy to add something new that is not in discrepancy with them. The vortex model of atom nucleus was inspired by vortex structure in the PET-bottle experiment with one hole-connector [3]. The "ring theory" is supported by experiments in [8] and [9] too. Now we realize that the phenomena of chemical interaction and, ultimately, of life itself are to be understood in terms of vortex-rings structures.

Electric lines or plasma rays repel each other. The same types of substructures (sub-plasma lines) attract each other and create braids (see Fig.11). The similar behavior has magnetic field - magnetic lines. Electric lines are formed from electron subparts ^{-4}e [10], [11]. Magnetic lines are formed from electron subparts (^{-3}e) [9]. Electric lines or rays are perpendicular to magnetic lines or rays. The ray is a "braid" of lines.

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