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A NEW HYPOTHESIS ABOUT THE NUCLEAR HYDROGEN STRUCTURE

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ABSTRACT

In other papers already presented on the structure and dimensions of elemental hydrogen, the elementary particle dynamics was taken into account in order to be able to determine the size of the hydrogen. This new work, one comes back with a new dynamic hypothesis designed to fundamentally change again the dynamic particle size due to the impulse influence of the particle. Until now it has been assumed that the impulse of an elementary particle is equal to the mass of the particle multiplied by its velocity, but in reality, the impulse definition is different, which is derived from the translational kinetic energy in a rapport of its velocity. This produces an additional condensation of matter in its elemental form.

Keywords: Particle structure; Impulse; Condensed matter.

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1. INTRODUCTION

Hydrogen is the chemical element in the periodic table of elements with the symbol H and atomic number 1. It is a slightly flammable, colorless, insipid, odorless gas, and in nature, it is mainly found in the form of a diatomic molecule, H2. Having an atomic mass equal to 1.00794 u.am., hydrogen is the easiest chemical element.

Elementary hydrogen is the main component of the universe, with a weight of 75% of its mass. In the state of plasma, it is found as a major element in the composition of the stars. Elemental hydrogen is very scattered on Earth.

For industrial needs, there are different manufacturing processes, technologically advanced or in the laboratory phase. Hydrogen can be obtained by water electrolysis, and the process requires higher costs than production by natural gas processing.

The most common isotope of hydrogen is the antitumor, which is made up of a single proton in the nucleus and an electron in the electron shell. In ionic compounds, it may have a negative charge (anion known as a hydride, H-) or positive charge H + (hydron). Hydrogen forms chemical compounds with most elements in the periodic system and is present in water and many organic compounds.

It plays an important role in acid-base reactions, based on the exchange of protons between molecules. Being the only atom for which the analytical solution of Schrödinger's equation is fully known, it plays a major role in substantiating the quantum mechanics theory.

Hydrogen is a highly reactive gas and finds application because of its chemical reduction capacity. Hydrogen is used in the petrochemical industry for the production of petrol, in the chemical-food industry for the hydrogenation of fats (eg margarine production), the mechanical processing of metals and their thermal treatment.

Today, hydrogen is an alternative to replacing gasoline as a fuel for vehicles equipped with internal combustion engines. Its main advantages are that it is environmentally friendly, resulting in water vapor, and the thermal efficiency of hydrogen engines is high. Disadvantages consist of the high explosion hazard,

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the difficulty of storing in the vehicle and the lack of networks of hydrogen supply stations. One of the most promising technical solutions is the direct conversion of hydrogen from hydrogen to electricity through fuel cells.

In 2019, the first molecule formed in the universe was discovered about 300,000 years after the Big Bang helium hydride (HeH) (helium hydride ion). It's a combination of a helium atom and a proton (no electrons) of hydrogen. The discovery was made by the astronomical observatory SOFIA (Stratospheric Observatory for Infrared Astronomy, placed in the stratosphere, in German-American cooperation) in the planetary nebula NGC 7027.

Given the importance of this element, it is natural to try to find as much detail as possible about its structure.

Hydrogen was discovered by English chemist and physicist Henry Cavendish in 1766, following an experiment in which he studied the reactions between mercury and acid. When mixing the two substances, he noticed the appearance of small bubbles of gas in the mix. This led him to carry out additional research, calling the unknown substance "flammable air". In 1781 he discovered that this element produces water when burned.

A more detailed analysis was made by Antoine Lavoisier, who discovered Cavendish's independent gas in an experiment to determine the mass lost or created by a chemical reaction. The researcher heated the water in a closed container, the formed vapor condensing into another container. The lost amount was attributed to the release of a gas (H2).

The French chemist has noticed that Cavendish's "flammable air" in combination with oxygen forms water droplets, according to Joseph Priestley. Lavoisier called the gas "hydrogen", the nomenclature being of Greek origin.

Due to the relatively simple atomic structure consisting of a proton and an electron, the hydrogen atom together with the spectrum of light emitted by it represented a central area of the development of atomic structure theory. In addition, the simplicity of the H2 molecule and the H+ cation led to a complete understanding of the nature of the chemical bond that followed immediately after the study of the hydrogen atom in quantum mechanics (mid-1920s).

Maxwell observed that at H2, below ambient temperature, the value of

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molten heat deviates inexplicably from that of a diatomaceous gas, and at cryogenic temperatures, it is getting closer to that of a monoatomic gas. According to quantum theory, this behavior results from the spatial distribution of the energy levels of rotation, which at H2 are very distant due to its small mass.

These remote levels prevent at low temperatures the equal partition (between the two atoms of the molecule) of the thermal energy into rotation energy. Gaseous diatomic compounds formed from heavier atoms do not have large differences in energy rotation levels and do not have the same effect.

Hydrogen is the lowest density element. In molecular form (H2) it is about 14.4 times lighter than air. At its normal pressure, its melting point is 14.02 K and the boiling point is 20.27 K. Its triple point is 13.81 K and 7.042 kPa and the critical one at 33.2 K and 1, 29 MPa. The solubility in water is 1.6 mg/l.

Some thermodynamic properties (related to transport phenomena) are due to the small molecular mass and the thermal velocity of a molecule of 1770 m / s at 25 ° C. At room temperature, hydrogen diffuses most quickly, has the highest thermal conductivity and the highest efflux of all gases. A lower viscosity has only three polyatomic gases, one of which is n-butane.

The mobility of hydrogen in a solid mass is also very high. Thus, it diffuses through various materials such as polyethylene and quartz. An important phenomenon is that of diffusion in iron, platinum, and other transition metals. These properties lead to numerous technical uses, but also to difficulties in transporting, storing and processing hydrogen blends.

Gaseous hydrogen (diatomic) is extremely flammable and atmospheric pressure ignites in air at volumetric concentrations ranging from 4% to 75% and in contact with pure oxygen between 4.65% and 93.9%. The detonation boundaries are between 18.2% and 58.9% in the air and between 15% and 90% in oxygen. The variation of the enthalpy following combustion (calorific value, combustion heat) is - 286 kJ / mol.

The mixture of oxygen and hydrogen in varying proportions is explosive. Hydrogen self-ignites and explodes in contact with air in the range of concentrations ranging from 4% to 75%, the self-ignition temperature being 560 ° C. The flame of a pure hydrogen-oxygen mixture emits ultraviolet radiation invisible

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to the naked eye.

H_2 reacts with all the oxidizing elements. It can react spontaneously and violently at room temperature with chlorine and fluorine, forming HCl and HF.

Few people know that hydrogen burns ten times faster than petroleum or alcohol fuels, which is why its burning reaction is extremely rapid and can become even dangerous and difficult to control, which is why it was preferred to burn its solution in cells, in special, honeycomb multi-cell burners.

Hydrogen is the most widespread element in the universe, representing more than 75% by mass and more than 90% by a number of atoms. It is found in large quantities in the composition of giant gaseous stars and planets. Molecular H_2 clouds are associated with star formation. Hydrogen also plays a key role in stellar explosions due to nuclear fusion reactions between protons.

In the universe, hydrogen is mainly found in the form of atom and plasma. Their properties are different from those of the hydrogen molecule. The electron and the hydrogen proton do not form plasma-related links because of different electrical conductivity and high radiation (the origin of light emitted by the Sun and other stars).

Particles charged with electric charges are strongly influenced by magnetic and electric fields. For example, in solar winds the particles interact with the terrestrial magnetosphere, generating Birkeland currents and produce the phenomenon known as boreal auroral. Hydrogen is found to be neutral atomic in the interstellar medium, and the largest amount is found in Lyman-alpha systems.

Under normal conditions, hydrogen exists on the Earth in the form of a diatomic molecule, H_2, but is not very widespread in the earth's atmosphere (at an average concentration of 1 ppm by volume) because of the small mass, so the gravitational force of the planet has a very low effect on saddle.

However, hydrogen (by its compounds) is the most widespread element of the Earth's surface. Its most common chemical compounds are hydrocarbons and water. Hydrogen gas is produced by certain species of bacteria and algae, which is the main component of flatulence. Methane is an important source of hydrogen.

The fundamental energy level of the electron in the hydrogen atom has

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energy equal to -13.6 eV. Higher levels are called excited levels, their energy increasing to 0 eV (the value of the energy level at infinity), they are calculated using Bohr's model. He believes that the nucleus is fixed, and the electron has a circular trajectory around it that resembles the planets revolving around the Sun (hence the alternative designation of the planetary model).

The electromagnetic force attracts the electron and the proton to each other, while the celestial bodies are attracted by gravity. According to the quantum condition of Bohr's postulated kinetic momentum, the value of the kinetic momentum of the electron is a multiple of Planck's reduced constant, from which it follows that within the atom, the electron is allowed some orbit with well-established rays. This quantification relation explains the discrete spectrum of energy levels.

A more accurate description of the hydrogen atom is given in the quantum physics where the probability density is calculated by the electron function of the electron around the proton on the basis of the Schrödinger equation or of the Feynman formula with the whole of the road.

Spectral emission of the hydrogen atom is characterized by spectral lines given by the formula of Rydbeg. The study of spectral lines is important in quantum mechanics and the study of the presence of hydrogen to determine redness.

There are two spinning isomers of the hydrogen molecule that differ by the relative spins of the nucleus. In the form of orthohydrogen, the spines of the two protons are parallel and form a triplet; In the form of parahydrogen, the spines are antiparallel and form a singlet. At standard temperature and pressure, hydrogen gas contains 25% parahydrogen and 75% orthohydrogen (the "normal state" of hydrogen).

The proportions of ortho and parahydrogen depend on temperature, but the ortho form is excited and has higher energy, so it is unstable and cannot be purified. At very low temperatures, the steady state is formed almost entirely from parahydrogen. The physical properties of pure parahydrogen differ slightly from those of normal hydrogen. Differences between ortho and para form are also reflected in hydrogen- containing compounds such as water or methylene.

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The transformation between ortho and parahydrogen occurring without a catalyst takes place more rapidly at high temperatures, so rapidly condensed H2 contains a large amount of orthohydrogen which converts very slowly into parahydrogen. The proportion of ortho/para in condensed molecular hydrogen (H2) is an important factor in the preparation and storage of liquid hydrogen; the conversion from ortho to parahydrogen is an exothermic process, whereby sufficient heat is evolved to evaporate liquid hydrogen, thereby losing the liquefied material.

The catalysts used in this transformation, such as ferric oxide, activated carbon, platinized asbestos, uranium compounds, rare metals, chromium oxide, some nickel compounds, are used during cooling of hydrogen.

A molecular form called the protonated hydrogen molecule or H3+ is found in the interstellar medium, being produced by ionizing the hydrogen molecule by the cosmic rays. It was also observed in the upper layers of the planet Jupiter. This molecule is relatively stable outside the Earth due to its low temperature and high density. H3+ is one of the most widespread ions in the Universe, playing an important role in interstellar chemistry.

Generally, hydrogen is considered to be non-metallic, but at low temperatures and high pressures, some of its properties resemble those of metals. The metallic hydrogen was first obtained in 1973 at a pressure of 2.8 Mbar and at 20 K. The metallic SiH4 alloy was obtained in 2008, it was found to be a very good electrical conductor, according to previous predictions of NW Ashcroft. In this compound, even at moderate pressures, hydrogen has a structure with a density corresponding to that of hydrogen.

Even if H2 is not very reactive under normal conditions, it forms compounds with most elements. Millions of hydrocarbons are known, but they are not obtained by the direct reaction between elements (carbon and hydrogen), although the production of synthesis gas in the Fischer-Tropsch process can be considered almost an exception because the process uses carbon from coal and hydrogen can be generated in the process from water.

Hydrogen can form compounds with more electronegative elements than it, such as halogen; In this type of compounds, hydrogen has a partial positive

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charge. When bound to fluorine, oxygen or nitrogen, hydrogen is involved in the formation of a strong bond called hydrogen bonding, which is an important factor in the stability of many biological molecules. Hydrogen can also form compounds with less electronegative elements, such as metals or semimetals, with a partially negative charge.

These compounds are known as hydrides. Hydrogen forms a variety of compounds with carbon. Due to their general association with living organisms, they are called organic compounds; with their study of organic chemistry, and with the study of their role in living organisms - biochemistry. In some definitions, "organic" refers only to a carbon-containing compound. But most organic substances also have hydrogen, and the carbon-hydrogen bond determines many of their peculiarities.

Therefore, carbon-hydrogen bonds are present in some definitions of the word "organic". In inorganic chemistry, hydrides may represent chains of bonds between two metal ions of a complex combination. This function is found in group 13, especially boride and complex aluminum compounds.

Hydrogen compounds are often called "hydrides", this term being sometimes improperly used. "Hydride" defines a substance in which the H atom is an anionic or negative charge, so H- is used for hydrogen compounds with a more electropositive element.

The existence of the hydride anion, suggested by Gilbert N. Lewis in 1916 for the elements of the first group and the second major, was highlighted in 1920 by Moers by the electrolysis of lithium hydride (LiH) melt when stoichiometric quantity hydrogen at the anode. For hydrides of other elements, the term is ambiguous, considering the electronegativity of hydrogen. The exception makes BeH2, which is a polymer.

In lithium and aluminum hydride, the AlH4-anion has hydrating centers strongly attached to aluminum. Even though hydrogen can form hydrides with all the elements in the main groups, the number and possible combinations differ from one group to another. Indium hydride has not yet been identified, but there is a multitude of its complex compounds.

Oxidation of hydrogen, that is, the removal of its electron, theoretically flows

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with the formation of H+, an ion containing no electrons in the electron shell and a proton in the nucleus. That is why H+ is often called the "proton" and plays an important role in the proton theory of acids. According to the Bronsted-Lowry theory, acids are those substances that yield protons, and bases are proton acceptors.

The H+ proton cannot exist freely, but only in solutions or in ionic crystals, due to the very high affinity for the electrons of other elements. Sometimes, the term "proton" is misused to refer to positively charged hydrogen or hydrogen cation linked to other molecular species. To avoid the involvement of the unique existence of the "solvated proton" in solutions, acidic aqueous solutions are considered to contain hydrogen ion (H3O+).

However, some hydrogenated hydrogen cations are rather organized into molecules such as H9O4+. Other oxonium ions form when water forms solutions with other solvents. Although not found on Earth, the H3+ ion (known as proton molecular hydrogen or triatomic hydrogen cation) is one of the most widespread chemical species in the rest of the universe.

H2 is produced in chemistry and biology laboratories, and is often a byproduct of a reaction; in the industry for the hydrogenation of unsaturated substances; in nature as a method of reducing the equivalents in biochemical reactions.

The most important (economically) method of obtaining hydrogen is extracting it from hydrocarbons. Most of the hydrogen produced by the industry comes from the reforming of natural gas vapors. At high temperatures (700-1100° C, 1300-2000° F), the vapor water reacts with methane, resulting in carbon monoxide and H2.

There are more than 200 thermochemical cycles that can be used for water decomposition. Some of these are studied, such as the iron oxide cycle, the cerium (IV) -cerium (III) oxide cycle, the zinc-zinc oxide cycle, the iodine-sulfur cycle, the copper-chloride cycle and the sulfuric acid cycle, the test stage to produce hydrogen and oxygen from the water using heat without using electricity.

Numerous laboratories (including France, Germany, Greece, Japan and

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the United States of America) are developing thermochemical methods for producing hydrogen from solar and water. This new method of producing hydrogen in water by using heat rather than electric current or ultraviolet radiation is a promising method that can bring about major changes in the ways of producing hydrogen in the future, but also in its water storage mode its storage place in cylinders.

Stored in water, it also brings energy storage, a practical way to store hydrogen and energy in water, and then extract them directly from the water when needed, thus avoiding the dangers they pose involves only storing hydrogen in honey bottles at high pressures.

There are already advanced methods of extracting hydrogen and energy from water through nanotechnologies, with the help of nanoscale pressure, in the presence of ultraviolet radiation and a catalyst composed of precious metals. It is good that this new method of extracting hydrogen and its energy directly from the water has recently been added by the heat injection.

2. METHODS AND MATERIALS

In its elementary form, matter condenses when moving at higher speeds, although its mass increases significantly with impulse, energy, and power, its dimensions are drastically reduced at the same time.

If we try to determine the dimensions of the elementary particles on the basis of the static hypothesis we get totally erroneous values and for this reason over time the static calculations used have led to huge errors in the theories created so that the elemental hydrogen fusion was not possible, the fusion reaction of elemental hydrogen to cold or hot temperatures could not begin, as long as the real dimensions of elemental hydrogen were completely modifying in relation to their velocities.

On the other hand, the elementary particles are in constant motion, so static assumptions cannot be applied in any form. Let's imagine the hot fusion of hydrogen as it takes place in the stars. In order for the Brownian motion of the particles to be intense enough to generate natural fusion reactions, one needs huge temperatures and pressures that one has not even suspected so far, nor have we imagined them, so they do not exist any real chance to make them here

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on Earth under laboratory and less industrial conditions. Such huge temperatures cannot yet be made in the laboratory, nor do we have at least the tools to measure them (HALLIDAY; ROBERT, 1966).

An atom consists of a small but very dense central nucleus, positively charged (negatively), surrounded by a cloud of electrons (positrons). The range of the static nucleus ranges from about 1x10-15 m for hydrogen to about 7x10-15 m for the heaviest known atom.

Also under these conditions, the outer diameter of the atom (outer electron cloud) is in the range of 1-3x10-10 m, that is, approximately 105 times the diameter of the nucleus. Static so-called measurements are made at low atomic or nuclear velocities. In reality, when a nucleus moves at a higher speed, it changes its dimensions, a change that can be significant depending on its linear displacement speed v (PETRESCU; CALAUTIT, 2016a; PETRESCU; CALAUTIT, 2016B; PETRESCU et al., 2016a; PETRESCU et al., 2016b, PETRESCU et al., 2017a; PETRESCU et al., 2017b; PETRESCU et al., 2017c; PETRESCU et al., 2017d; PETRESCU, 2012A; PETRESCU, 2012B; PETRESCU, 2014; PETRESCU, 2018; PETRESCU, 2019; PETRESCU; PETRESCU, 2014; PETRESCU; PETRESCU, 2018; PETRESCU; PETRESCU, 2019).

Instead, a simple fusion of elemental hydrogen can be realized simply if the particles involved are initially accelerated to the required energy and speed so they can overcome the electrostatic force barrier.

If the mixture is heated to achieve a slight natural motion of the particles, additional conditions can be created for the laboratory or industrial fusion of elemental hydrogen. We can also speak of hot or combined fusion, but the main condition remains the necessary acceleration of the elementary particles, usually in circular particle accelerators. Normally another obligatory condition is the realization of the plasma state, the ionization of the mixture, so that we do not work with hydrogen atoms but with positive ions, because only they can be accelerated (PETRESCU; CALAUTIT, 2016a; PETRESCU; CALAUTIT, 2016b; PETRESCU et al., 2016a; PETRESCU et al., 2016b; PETRESCU et al., 2017a; PETRESCU et al., 2017b; PETRESCU et al., 2017c; PETRESCU et

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al., 2017d; PETRESCU, 2012a; PETRESCU, 2012b; PETRESCU, 2014; PETRESCU, 2018; PETRESCU, 2019; PETRESCU; PETRESCU, 2014; PETRESCU; PETRESCU, 2018; PETRESCU; PETRESCU, 2019; KRAMER, 2011; MOSES et al., 2009; SHULTIS; FAW, 2002; KRANE, 1987).

Ionization is required irrespective of the type of hydrogen isotope used. The most commonly used are deuterium atoms, the second isotope of hydrogen, which ionized produce deuterons that can accelerate and thus create optimum conditions for starting the nuclear fusion reaction. However, in a future paper, we will show that a faster fusion reaction may be triggered starting from the third hydrogen isotope, the tritium atom that when ionizes generates an ion slightly to be accelerated, the Triton.

It cannot be said now that under the laboratory conditions it would be possible to fuse the first isotope of hydrogen (protium) reduced to its proton ionic state in order to be able to accelerate, but in the future, such attempts might be possible, as to find the real answer to this important question.

All organic (organic) and inorganic materials are made up of elemental particles called atoms. Atoms are formed around the nuclei by capturing electrons that will rotate around nuclei in the form of electron clouds. Generally, a normal atom will contain electrons equal to the number of protons that are inside its nucleus. The core of the atom consists of two types of nucleons, protons (each charged with a positive charge) and neutrons (uncharged or neutral, zero).

The nuclei are constructed from the minimal nucleus containing a single proton by the addition of nucleons.

If the nuclei could resist the electromagnetic rejection forces, they could only be made of protons. Since the first pair of protons reunited with reciprocal forces are large enough to break the connection between them, it is already necessary to connect the nuclear forces (attraction) so that the core does not break. For this reason, for each proton added to the nucleus, at least one neutron should be added to contribute to kernel equilibrium (PETRESCU; CALAUTIT, 2016a; PETRESCU; CALAUTIT, 2016b; PETRESCU et al., 2016a; PETRESCU et al., 2016b; PETRESCU et al., 2017a; PETRESCU et al., 2017b; PETRESCU et al., 2017c; PETRESCU et al., 2017d; PETRESCU, 2012a; PETRESCU, 2012b;

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PETRESCU, 2014; PETRESCU, 2018; PETRESCU, 2019; PETRESCU; PETRESCU, 2014; PETRESCU; PETRESCU, 2018; PETRESCU; PETRESCU, 2019).

For light atoms with light nuclei (found in the first part of the diagram in Figure 1), the required number of neutrons in the nucleus is lower, and when going to the right to heavier atoms and nuclei, more neutrons will be needed to connect nuclear powers do not break. In other words, since the nucleus is larger (heavier), it will contain a greater number of neutrons in its nucleons (HALLIDAY; ROBERT, 1966).

On-Line 45 there are nuclei that have an equal number of protons (Z = p) and neutrons (N = n), and above them, there are heavier nuclei at which the number of neutrons in the nucleus is higher than protons (Halliday and Robert, 1966). Spontaneous nuclear spying can occur only on heavier and heavier nuclei located on the right on a larger surface of the graph, while nuclear fusion is only possible at the beginning of the left diagram for the very first very light nuclei such as the first three isotopes of hydrogen. The first circle drawn on the diagram in Figure 1 corresponds to the single nucleus formed by a single neutron (Z = zero protons) and (N = 1 neutron).

For Z = 1 (a single proton in the nucleus) there are three drawn variants corresponding to the three hydrogen isotopes). Neutron zero (N = 0) where the nucleus contains a single proton and will be called the proton (the first isotope of hydrogen, which the atom is called a certain nucleus and called the proton).

The second variant with a neutron (N = 1) in which the nucleus contains a proton and a neutron is the second hydrogen isotope (as a deuterium atom and only the deuteron nucleus), which is located on the 45-degree line where the nuclei are balanced (Z = N). And the third variant at Z = 1 are the two neutrons (N = 2) representing the third hydrogen isotope (as a tritium atom and as a nucleus called triton), the triton nucleus containing three nucleons, a proton, and two neutrons.

In order to better understand the nuclear mechanisms represented in the diagram in Figure 1, it should be noted that stable nuclei are represented as

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complete circles (black), while unstable nuclei are represented as hollow circles (white).

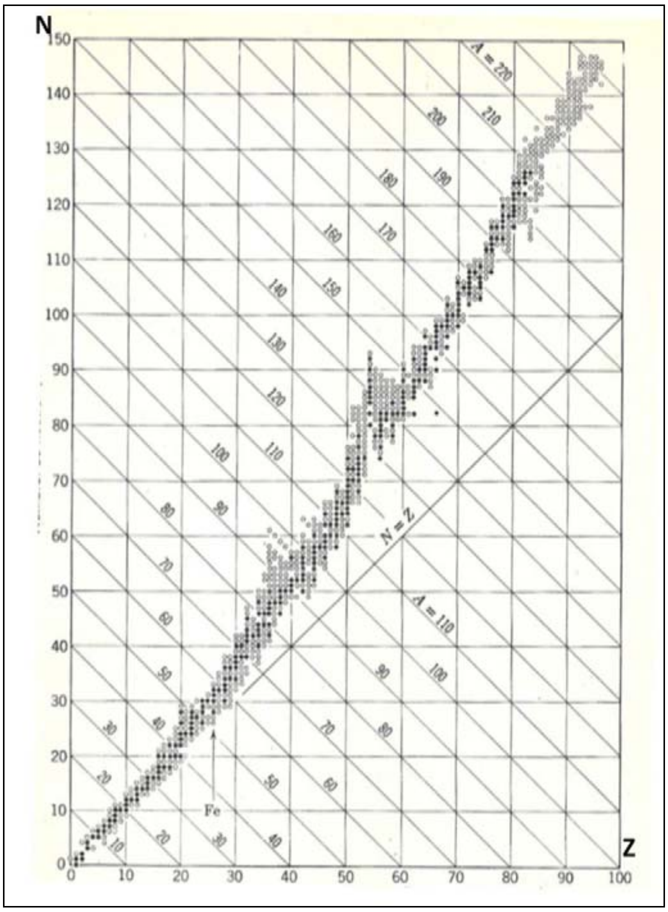

Figure 1: Diagram of atomic cores (atomic nuclei)
Source: Halliday and Robert (1966)

So if the proton is stable, like the deuteron, the triton is unstable and even more, even the neutron is now considered unstable and can deform into a proton, an electron, and an antineutrino. Going to Z = 2 (two protons) we reach the helium with the three isotopes, the first two being stable (N = 1, N = 2) and the third is unstable (N = 4).

An elementary mobile particle always moves and its kinetic energy is represented by relationship 1 (this being composed of two different entities: the kinetic energy of the translational motion and the kinetic energy of rotation motion), where J is the mass at the rotation movement of the element (particle) being the moment of mechanical inertia or moment of mass inertia, and M is the normal mass of the particle in translational movement, v is the velocity with which the particle moves in the translational motion, and w is the velocity of particle in its rotation motion around its own axis.

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$$E_c = \frac{1}{2} M \cdot v^2 + \frac{1}{2} J \cdot \omega^2 \tag{1}$$

The mass inertia moment of the particle J is a function of M, R at square, and a constant K (relation 2).

$$J = K \cdot M \cdot R^2 \tag{2}$$

Using relationship 2, expression 1 gets the form 3.

$$E_c = \frac{1}{2} M \cdot v^2 + \frac{1}{2} K \cdot M \cdot R^2 \cdot \omega^2 = \frac{1}{2} M \cdot \left(v^2 + K \cdot R^2 \cdot \omega^2\right) \tag{3}$$

Pulse of the particle is written using the relation 4.

$$p = M \cdot v \tag{4}$$

The wavelength associated with the particle can be determined with the relationship 5 (according to Louis de Broglie the pulse is conserved), where h is the Planck constant:

$$\lambda = \frac{h}{p} = \frac{h}{M \cdot v} \tag{5}$$

Wave frequency associated with the particle is determining by relationship 6, where c is the light velocity.

$$\gamma = \frac{c}{\lambda} = \frac{c \cdot M \cdot v}{h} \tag{6}$$

The angular velocity of the particle and its square can be calculated with the relationships 7.

$$\begin{cases} \omega = 2\pi\gamma = \dfrac{2\pi \cdot M \cdot c \cdot v}{h} \\ \omega^2 = \dfrac{4\pi^2 \cdot M^2 \cdot c^2 \cdot v^2}{h^2} \end{cases} \tag{7}$$

Using expressions 7 the relationship 3 takes the form 8.

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$$\begin{cases} E_c = \frac{1}{2}M\cdot\left(v^2 + K\cdot R^2\cdot\omega^2\right) = \frac{1}{2}M\cdot\left(v^2 + K\cdot R^2\cdot\frac{4\pi^2\cdot M^2\cdot c^2\cdot v^2}{h^2}\right) = \\ = \frac{1}{2}M\cdot v^2\cdot\left(1 + \frac{4\pi^2\cdot K\cdot c^2}{h^2}\cdot M^2\cdot R^2\right) \end{cases} \quad (8)$$

The kinetic energy of the moving particle can be determined and by the relationship 9.

$$E_c = E - E_0 = M\cdot c^2 - M_0\cdot c^2 = \left(M - M_0\right)\cdot c^2 \quad (9)$$

Identifying the relationships 8 and 9 are obtained the expression 10 which can determine the radius of an elementary moving particle, where M is the particle mass in moving and M_0 is the mass of the stationary particle.

$$\begin{cases} \begin{cases} E_c = \frac{1}{2}M\cdot v^2\cdot\left(1 + \frac{4\pi^2\cdot K\cdot c^2}{h^2}\cdot M^2\cdot R^2\right) \\ E_c = \left(M - M_0\right)\cdot c^2 \end{cases} \Rightarrow \\ \Rightarrow \left(M - M_0\right)\cdot c^2 = \frac{1}{2}M\cdot v^2 + \frac{1}{2}M\cdot v^2\cdot\frac{4\pi^2\cdot K\cdot c^2}{h^2}\cdot M^2\cdot R^2 \Rightarrow \\ \Rightarrow 2\left(M - M_0\right)\cdot c^2 = M\cdot v^2 + M\cdot v^2\cdot\frac{4\pi^2\cdot K\cdot c^2}{h^2}\cdot M^2\cdot R^2 \Rightarrow \\ \Rightarrow R^2 = h^2\cdot\frac{2\left(M - M_0\right)\cdot c^2 - M\cdot v^2}{4\pi^2\cdot K\cdot c^2\cdot M^3\cdot v^2} = \frac{h^2}{4\pi^2\cdot K\cdot c^2}\cdot\frac{2\left(M - M_0\right)\cdot c^2 - M\cdot v^2}{M^3\cdot v^2} \\ \Rightarrow R = \frac{h}{2\pi\cdot\sqrt{K}\cdot c}\cdot\frac{\sqrt{2\left(M - M_0\right)\cdot c^2 - M\cdot v^2}}{M\sqrt{M}\cdot v} \end{cases} \quad (10)$$

The mass of particle is quantum determined with the Lorentz relationship 11. Using the quantum form for the mass M, the expression 10 takes the form 12.

$$M = \frac{M_0\cdot c}{\sqrt{c^2 - v^2}} \quad (11)$$

$$\begin{cases} R = \frac{h}{2\pi\cdot\sqrt{K}\cdot c}\cdot\frac{\sqrt{2M_0\cdot c^2\cdot\frac{c - \sqrt{c^2 - v^2}}{\sqrt{c^2 - v^2}} - \frac{M_0\cdot c}{\sqrt{c^2 - v^2}}\cdot v^2}}{\frac{M_0\cdot c}{\sqrt{c^2 - v^2}}\sqrt{\frac{M_0\cdot c}{\sqrt{c^2 - v^2}}}\cdot v} \\ R = \frac{h}{2\pi\cdot\sqrt{K}\cdot c^2\cdot M_0}\cdot\frac{\sqrt{c^2 - v^2}\cdot\sqrt{2\cdot c^2 - 2c\cdot\sqrt{c^2 - v^2} - v^2}}{v} \end{cases} \quad (12)$$

Mechanical moment of inertia of a sphere around of one of its axes could be

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determined by using the relationship 13 (PETRESCU; PETRESCU, 2019).

$$\begin{cases} J = \frac{2}{5} \cdot M \cdot R^2 \\ J = K \cdot M \cdot R^2 \end{cases} \Rightarrow K = \frac{2}{5} \quad (13)$$

For such a spherical elementary particle, the radius R can be determined by the particular relationship 14 (PETRESCU; PETRESCU, 2019).

$$R = \sqrt{\frac{5}{8}} \frac{h}{\pi \cdot c^2 \cdot M_0} \cdot \frac{\sqrt{c^2 - v^2} \cdot \sqrt{2 \cdot c^2 - 2c \cdot \sqrt{c^2 - v^2} - v^2}}{v} \quad (14)$$

If one takes an electron in motion and will apply the relationship 14, it obtains the results tabulated in Table 1, where beta is the ratio of the speeds given by the help relation 15.

$$\beta = \frac{v}{c} \quad (15)$$

3. RESULTS AND DISCUSSION

Using the original method proposed by the authors, the moving electron beam can be determined with great precision, depending on the speed at which it moves. It can be seen from the results presented in Table 1 that the electron has no constant radius. The electronic phase depends primarily on the speed of movement and, secondly, on the rest mass.

Table 1: The electron radius in function of β

β	0.000009	0.00002	0.0001
R[m]	4.93E-16	4.07E-16	8.15E-17
β	0.001	0.01	0.1
R[m]	3.05E-16	3.05E-15	3.04E-14
β	0.2	0.3	0.4
R[m]	6.04E-14	8.94E-14	1.16E-13
β	0.5	0.6	0.7
R[m]	1.41E-13	1.62E-13	1.78E-13
β	0.8	0.9	0.99
R[m]	1.83E-13	1.66E-13	7.47E-14
β	0.999	0.9999	0.99999
R[m]	2.61E-14	8.51E-15	2.71E-15
β	0.999999	0.9999999	0.99999999
R[m]	8.62E-16	2.72E-16	8.63E-17

From the table shown, the average radius of an electron 1.09756E-13 [m] and a maximum electronic value of 1.83152E-13 [m] corresponding to a β = 0.8 can be determined. The minimum radius value (in real cases) is about 8.15E-17

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[m], but may decrease more when the limits are reached. Electrons that normally move at low speeds of about 0.01c will have a range of 3.05E-15 [m]. Only this value can be found using classical relationships already known.

One can determine the value of average radius of a proton (or neutron) 5.9779E- 17 [m], and its maximum value 9.97547E-17 [m] ≅ 1E-16 [m] obtained for β =0.8 (Table 2).

Table 2: The proton radius in function of β

β	0.000009	0.00002	0.0001
P[μ]	2.68E–19	2.21E–19	4.43E–20
β	0.001	0.01	0.1
P[μ]	1.66E–19	1.66E–18	1.65E–17
β	0.2	0.3	0.4
P[μ]	3.29E–17	4.87E–17	6.36E–17
β	0.5	0.6	0.7
P[μ]	7.71E–17	8.86E–17	9.69E–17
β	0.8	0.9	0.99
P[μ]	9.97E–17	9.08E–17	4.06E–17
β	0.999	0.9999	0.99999
P[μ]	1.42E–17	4.63E–18	1.48E–18
β	0.999999	0.9999999	0.99999999
P[μ]	4.69E–19	1.48E–19	4.70E–20

4. NEW THEORY/CALCULATION

The kinetic energy of an elementary particle in the translational movement has the known form (16).

$$E_C = \frac{1}{2} \cdot m \cdot v^2 \qquad (16)$$

The classic impulse has a known form (relationship17).

$$K = m \cdot v \qquad (17)$$

If one takes into account that elementary particles move at high speeds which may be compared to the light speed being a ratio of it, it is imperative to use a more complete original relationship (18) for the impulse of an elementary particle, knowing that the impulse is the derivative of the kinetic energy in rapport with the speed of movement.This allows its calculation with high precision.

$$p = \frac{dE_c}{dv} = \frac{dm}{dv} \cdot \frac{v^2}{2} + \frac{m}{2} \cdot \frac{dv^2}{dv} = \frac{m \cdot v \cdot (2 \cdot c^2 - v^2)}{(2 \cdot c^2 - 2 \cdot v^2)} = m \cdot v \cdot \frac{2 \cdot c^2 - v^2}{2 \cdot c^2 - 2 \cdot v^2} \qquad (18)$$

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To obtain relationship (18), one also used formula (19) obtained by derivation Lorentz equation (20) in relation to velocity.

$$\frac{dm}{dv}=\frac{m\cdot v}{c^2-v^2} \quad (19)$$

$$m=m_0\cdot\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}=\frac{m_0\cdot c}{\sqrt{c^2-v^2}} \quad (20)$$

To write the impulse according to the particle rest mass, one uses the Lorentz relationship (20) and the expression (18) thus acquires the forms of the system (21).

$$\begin{cases}\Rightarrow p=\frac{m_0\cdot c\cdot v\cdot(2\cdot c^2-v^2)}{2\cdot\sqrt{c^2-v^2}\cdot(c^2-v^2)}=\frac{m_0\cdot c\cdot v\cdot(2\cdot c^2-v^2)}{2\cdot(c^2-v^2)^{3/2}}=m_0\cdot v\cdot\frac{c\cdot(2\cdot c^2-v^2)}{2\cdot(c^2-v^2)^{3/2}}\\ \Rightarrow\begin{cases}p=m_0\cdot v\cdot\frac{c\cdot(2\cdot c^2-v^2)}{2\cdot(c^2-v^2)^{3/2}}=m_0\cdot v\cdot F_i \quad when \quad v\neq c; and \quad F_i=\frac{(1-\frac{1}{2}\beta^2)}{(1-\beta^2)^{3/2}}\\ p=\frac{h}{\lambda} \quad when \quad v\equiv c\end{cases}\end{cases} \quad (21)$$

For accelerated positive ions no matter how near the speed of light (they can practically not touch it), the relation (22) can be used to express the impulse.

$$\begin{cases}p=m_0\cdot v\cdot\frac{c\cdot(2\cdot c^2-v^2)}{2\cdot(c^2-v^2)^{3/2}}=m_0\cdot v\cdot F_i \quad when \quad F_i=\frac{(1-\frac{1}{2}\beta^2)}{(1-\beta^2)^{3/2}} \quad and \quad v\neq c; v<c\\ p=M\cdot v\cdot\frac{(2\cdot c^2-v^2)}{2\cdot(c^2-v^2)}=M\cdot v\cdot Z_i \quad when \quad Z_i=\frac{(1-\frac{1}{2}\beta^2)}{(1-\beta^2)} \quad and \quad v\neq c; v<c\end{cases} \quad (22)$$

Taking into account the momentum value given by the new theory, the expression (12) gets the form (23), and relation (14) takes the new form (24).

$$R=\frac{h}{2\pi\cdot\sqrt{K}\cdot c^2\cdot M_0}\cdot\frac{\sqrt{c^2-v^2}\cdot\sqrt{2\cdot c^2-2c\cdot\sqrt{c^2-v^2}-v^2}}{v\cdot Z_i} \quad (23)$$

$$R=\sqrt{\frac{5}{8}}\frac{h}{\pi\cdot c^2\cdot M_0}\cdot\frac{\sqrt{c^2-v^2}\cdot\sqrt{2\cdot c^2-2c\cdot\sqrt{c^2-v^2}-v^2}}{v\cdot Z_i} \quad (24)$$

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5. NEW RESULTS

Using now the formula (24), table 2 is written again in the changed for, table 3.

It can be noticed that the Z-factor given by the exact impulse recalculation will require a new condensation of the matter, or more precisely an additional condensation.

The first changes only appear to Beta = 0.5. They continue to grow dramatically starting from beta = 0.99.

If this new theory turns out to be real and experimental, it is obvious that there will be dramatic changes in the dimensions of elemental hydrogen and how the energy and speed of acceleration of the deuteron to produce the nuclear fusion reaction should be calculated.

The concept must undergo a new radical change that will probably lead to a new increase in acceleration energy needed to pierce the electrostatic barriers of the deuterons and break their connecting energies in order to achieve the nuclear fusion.

Table 3. The proton radius in function of β

β	0.000009	0.00002	0.0001
P[μ]	2.6887E–19	2.21825E–19	4.4365E–20
β	0.001	0.01	0.1
P[μ]	1.66235E–19	1.66245E–18	1.65007E–17
β	0.2	0.3	0.4
P[μ]	3.22406E–17	4.64067E–17	5.80752E–17
β	0.5	0.6	0.7
P[μ]	6.61376E–17	6.92065E–17	6.55046E–17
β	0.8	0.9	0.99
P[μ]	5.28113E–17	2.901E–17	1.58814E–18
β	0.999	0.9999	0.99999
P[μ]	5.67236E–20	1.85407E–21	5.92152E–23
β	0.999999	0.9999999	0.99999999
P[μ]	1.87833E–24	5.94556E–26	1.88073E–27

6. CONCLUSIONS

The paper provides researchers or theoretician an exact tool for calculating the parameters of elemental, atomic and nuclear particle.

This new work, one comes back with a new dynamic hypothesis designed

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to fundamentally change again the dynamic particle size due to the impulse influence of the particle. Until now it has been assumed that the impulse of an elementary particle is equal to the mass of the particle multiplied by its velocity, but in reality, the impulse definition is different, which is derived from the translational kinetic energy in rapport of its velocity. This produces an additional condensation of matter in its elemental form.

Using now the formula (24), table 2 is written again in the changed for, table 3.

It can be noticed that the Z-factor given by the exact impulse recalculation will require a new condensation of the matter, or more precisely an additional condensation.

The first changes only appear to Beta = 0.5. They continue to grow dramatically starting from beta = 0.99.

If this new theory turns out to be real and experimental, it is obvious that there will be dramatic changes in the dimensions of elemental hydrogen and how the energy and speed of acceleration of the deuteron to produce the nuclear fusion reaction should be calculated. The concept must undergo a new radical change that will probably lead to a new increase in acceleration energy needed to pierce the electrostatic barriers of the deutrons and break their connecting energies in order to achieve the nuclear fusion.

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NOMENCLATURE

h=> the Planck constant: h=6.626 E-34 [Js]

q=> electrical elementary load: q_e=-1.6021 E-19[C] q_p=+1.6021 E-19[C]

c= the light speed in vacuum: c=2.997925 E+08 [m/s]

m0[kg] => the rest mass of one particle

$m0_{electron}$ = 9.11E-31 [kg]

$m0_{proton}$ = 1.672621898(21) E-27 [kg]

$m0_{neutron}$ = 1.674927471(21) E-27 [kg]

$m0_{deuteron}$ = 3.34449 E-27 [kg]

$m0_{triton}$ = 5.00827 E-27 [kg]