For Physics of reason against Physics of misconception
(open letter from Dimiter G. Stoinov and Dilian Stoynov, Sofia, Bulgaria)

For more than 50 years scientists have been attempting to solve the problem of controlled nuclear fusion. Vast human and material resources have been engaged, various options have been tested and nonetheless not only an industrial reactor has not been built yet but has not been made even laboratory models with stable parameters. The TOKAMAK concept continues being under development but the successful end is nowhere near. The main role here belongs to theoretical Physics. Accordingly, it is only reasonable to ask whether it fully corresponds to the requirements of practical life. Regretfully, the answer is negative. We maintain the opinion that modern Physics in its present form is portraying false images of the components taking part in nuclear fusion (protons, electrons and atomic nuclei) and misinterprets their interactions. In this respect we agree with Tverdohlebov [1] and Noskov [2] in their statement that modern theoretical Physics compares to the new clothes of the Emperor from the famous fairy tale by Anderssen. The skilful masters in this case were led by Einstein and his followers – the supporters of relativism.

The damage inflicted on Physics by relativism has many aspects, however first and foremost this refers to the rejections of classical principles and existence of mechanical ether. More precisely, after classical principles were cast aside in Physics, a complete disarray occurred. The elementary particles were assigned most various characteristics; entirely new concepts were introduced - like unity of time and space, equivalency of mass and energy, particle-wave duality, etc. And with respect of discarding the ether theory it can be said that the attempts to build Physics without mechanical ether look the same as trying to make new suit of clothes for the Emperor without any cloth.

1. The three primary unsolved problems in Physics
We maintain that the misconceptions of modern Physics stem from the unsatisfactory solution of the following three major problems:

Answer to the question: What is an electrical charge?
Answer to the question: What is the nature of electromagnetic waves?
Answer to the question: What is the physical reason for nuclear forces?

1.1 What is an electrical charge?

If we must criticize something in modern Physics than the logical starting point is the unsubstantiated assumption of assigning electrical charge $e = const$ to the elementary particles. Of course, we acknowledge that at an earlier stage of development of the theory of electromagnetism this step was justified. The trouble is, that the above question had not been asked after the discovery of elementary particles and establishing that they do not obey Coulomb's law. Instead, quantum mechanics was created. In this way a paradox resulted – interactions between the same particles were treated in different ways. Therefore, it is bewildering that, in spite of all difficulties that had arisen, not the slightest doubt was cast on the concept $e = const$. And reasons for doubts do exist. It is well known, that the laws of classical electrodynamics (Coulomb's law, Amper's law) have been derived in experiments involving charged bodies with enormous number of electrical charges. Hence, it is only reasonable to ask whether they will still be valid for only limited number of charges. From statistical mechanics we know that systems composed of large number of bodies are characterized by average values while the individual values of some of the parameters obey probability laws. However, the enthusiasm for relativism keeps preventing any attempt to revise the established misconception and does not encourage anyone to seek more fundamental cause for elementary particles interactions.

The question of the nature of electrical charge, electricity and magnetism can be solved on the basis of quite clear and straightforward mechanism, without any need to assign electrical charge

to the elementary particles. Such theory has already been proposed and it was based on the experimental and theoretical research of Bjorkness and Lebedev [3,4]. The mechanism of interactions is quite simple and can be illustrated with two tuning forks. When we strike one of the forks to emit sound, soon after that the second fork will also begin to sound. This is the phenomenon of acoustic resonance. In the process the two forks exchange energy. The important point here is that the exchange of energy is accompanied by the origination of mechanical forces. Similarly to the origination of mechanical forces between the two tuning forks, it can be assumed that the elementary particles also oscillate and emit waves and this is the reason for their interactions.

The advantage of our theory is that it is based on forces of interaction between the individual elementary particles. At this no special features are being assigned to the elementary particles apart from the classical ones (mass, form, size and energy, allocated according to the principle of energy distribution between the degrees of freedom). We assume, that similarly to the macroscopic bodies, the elementary particles do posses bodily features and respective oscillatory degrees of freedom so that when they move and take part in collisions they will oscillate and emit waves [5,6] transmitted by the surrounding ether and exactly this is the reason why they interact and the reason for having "electrical charge". We will show further on, that based on this theory some of the primary difficulties in quantum mechanics are solvable – as are for example the problem of size and stability and the problem of the discrete spectra of atomic radiation.

1.2 What is the nature of electromagnetic waves?

The issue of the nature of electromagnetic waves should also be an important point in the criticism of modern Physics. From the point of view of common sense the concept of electromagnetic waves being photons (waves-particles without mass), or some field form of existence of the matter, is not only unacceptable, it is absurd. This is so much an important issue as it is directly related to the ether hypothesis.

As it is well known, the greatest difficulties when building the ether model occur because of the transverse nature of electromagnetic waves. It was necessary to assume that the ether is absolutely rigid in order to be able to transmit transverse waves, as only solid matter is able to transmit transverse waves. But if the ether was a dense, space-filling medium, than how the planets and all bodies in general could move through this medium without experiencing any resistance?

We maintain the classical point of view regarding the wave character of electromagnetic waves. It is most natural to assume a gaseous ether model. But first we must decide how the gaseous ether will transmit the transverse waves. We propose the following solution: The waves transmitted through the ether are ordinary longitudinal waves. We called them primary or ether waves [5,6]. They propagate in the gaseous ether in a similar way as sound waves propagate in the air. Actually, electromagnetic waves (radio and television waves, light, x-rays) are not proper waves but transformed, modulated primary waves. The modulation is due to the Doppler effect (because they continuously move) and the frequency of the primary waves, emitted by the elementary particles, will have changed when they reach a particular point in space. But when the frequency changes, the respective forces change as well (in our theory the change of forces of interaction between the elementary particles is reduced to a change in the frequency ratio). Accordingly, it can be concluded that the electromagnetic waves are not proper waves because the question is one of a change in the forces and not in the parameters of the gaseous medium where they propagate. In other words, the electromagnetic waves are waves of change in the force. They are related to the number and the kind of periodic motions of the elementary particles. And this is the main reason for existence of different kinds of electromagnetic waves.

Finally, we should note that the problems of electrical charge and the problem of electromagnetic waves are interrelated. Without solving the problem of electrical charge would

not be possible to solve the problem of the transverse character of electromagnetic waves and without solving the latter it would not be possible to create reasonable gaseous model of ether, which would be able to transmit the primary ether waves.

1.3 What is the reason for nuclear forces to exist?

In order to answer that question the founders of modern Physics opted for the most easy solution by ascribing to some of the elementary particles a nuclear charge apart from the electrical charge. But why is this a privilege only of some particles, e.g. protons? Certainly this answer is not good enough. Apparently, builders of modern Physics realized the need of some kind of illustration and they usually give the example of volleyball game. As if the baryons played volleyball exchanging mesons and this supposedly was the reason for origination of nuclear forces. We consider this explanation not serious, even naive, especially in the part with the explanation of the reason why nuclear forces arise. The nuclear forces are only attractive while in a volleyball game originate only repelling forces – this can be proved based on elementary knowledge of mechanics.

A clear and understandable model of nuclear forces can be proposed as an alternative of the existing point of view. More precisely, it is based on the so called screening effect [7,8]. Let consider two closely positioned spheres. Some devices, firing pellets at the spheres, are situated at some distance apart. We suppose that the collisions between the spheres and the pellets are elastic in nature. Under these conditions, the two spheres would be uniformly fired at and hit by certain number of pellets. However, the strikes would not be distributed uniformly on their full surfaces. The strikes on the external side of each sphere would be more in number than those on the internal side. With other words, they would shield each other internal side, so that it will be hit by less pellets. As a result, their balance would be disrupted and, if the spheres the re free they should move closer to each other. And this is regarded as equivalent to the origination of attractive forces. By the way, when two trains or ships move closely parallel to each other with great speed, the so called dynamic screening effect [7] is observed and it can lead to collision and disaster.

The idea of screening effect was put forward by Le Sage [7]. He used it in his attempt to explain gravity. We propose to use it first and foremost in order to explain how the nuclear forces arise. In support of this approach we will point out to two important coincidences: firstly, both nuclear forces and the screening effect forces are only attractive and secondly, the nuclear forces have limited range of action. This has an easy explanation if we use the screening effect – the limited range of action here depends on the molecules mean free path in the gaseous medium. As a consequence, in order to explain the reason for nuclear interactions, it is necessary to introduce a new gaseous medium in Physics, finer than the ether [8]. In comparison, the approach of introduction of new particles is superfluous and not needed because their number in the adopted now theory is big enough already.

We believe that many of the misconceptions and difficulties in modern Physics can be overcome if we adopt that between ether particles and matter particles arise screening effect forces. We claim that the ether surrounding any electron, proton and atomic nucleus becomes more dense in result of the screening effect and forms an ether atmosphere in the same manner as the air forms the atmosphere around the Earth.

2. Special theory of relativity (STR)

In the past, some scientists called STR a funny joke. Actually, it should be admitted that STR is a very suspicious theory. Accordingly, its scientific merit has been subject of criticism since its very proposal and until now. Regretfully, most often the criticism targets usually those aspects that are hardly susceptible to experimental probation, if susceptible at all and as a result, this turns out in disadvantage of the adversaries of relativism. We believe that this theory is based on

a very limited number of decisive experimental facts and they also contribute to the unsatisfactory solution of the three problems stated above.

2.1 The ratio e/m and the formula of relativistic mass

Probably one of the "proofs" that made many people to believe in STR is the change of the ratio e/m with the speed. This is indisputable fact and the relativism supporters are very proud with it. Often in publications and arguments one can hear "STR is being proved every day in the accelerators of elementary particles." It should be reminded however, that what changes in this case is only the ratio e/m. Combined with the established from the past idea that $e = const$, the conclusion would be that this experimental fact demonstrates a change of mass. However, there is yet another possibility: maybe it is not the mass that changes, but the force exercised on the electron by the electric, respectively magnetic field? We wonder how frivolously the proponents of modern Physics are treating such an important issue. What we have in mind is that until now still there is not a clear answer to the question: what is an electrical charge. The direct consequence of this misconception is, that by adopting the possibility that the particle mass depends on the speed, the supporters of relativism are undermining the trust in classical Physics and classical mechanics.

According to our theory, when the speed changes, what does change is the force and we gave the relevant proof for that in [9], while the concept of $e = const$ is absolutely wrong. It can be stated that SRT is a colossus with feet of clay. One of the clay feet is exactly the assumption of the electrical charge being $e = const$.

2.2 The problem of mass defect and the formula $E = mc^2$

The other clay foot of modern Physics and of SRT in particular is related to the problem of mass defect (or deficit) and the so called formula of equivalency of mass and energy $E = mc^2$. How do the proponents of modern Physics proceed here? If we start from the formula of the relativistic mass and develop it in a series [10] we will arrive to a formula of equivalence between the mass and the energy. In this way, several misconceptions become linked (the formula of relativistic mass, the formula of equivalence of mass and energy and the Einstein principle of relativity) and together with the Lorentz transformations they represent the core of the modern relativistic theory. But doing so, they neglect the fact that those phenomena have different physical interpretations. We believe that the formula of the relativistic mass is connected to the explanation of the experiment of Kaufmann, which has an electromagnetic character. Lorentz transformations and Einstein principle of relativity are connected with the Michelson experiment and the astronomical aberration, which have kinematics character, while the phenomenon of mass defect and the formula of equivalence between mass and energy have, we believe, thermo dynamical character. Hence, the three problems should not be treated in combination.

Referring to the problem of mass defect, we can take as an example the launch of rockets in space. The rockets need to burn fuel in order to accelerate and to gain energy. The exhaust gases of combustion are released in space. The mass of the rocket decreases, i.e. a mass defect is observed. As a second example, in technology applications often are used tools working with compressed gas and the compressed gas is usually delivered in bottles. When the tools are used, the spent gas has done some work. Here also, a mass defect is observed, but actually the mass has not disappeared as it passed from one media into other. Therefore, it is reasonable to ask ourselves whether the case of nuclear fusion reactions does not represent a similar process.

One of the preferred approaches in modern Physics is the so called axiomatic method based on postulates. For instance, the statement that the ether becomes more dense and that around the elementary particles an ether atmosphere is formed in the same way as the air atmosphere is

formed around the Earth, could be assumed as a postulate. This means that the elementary particles and the atomic nuclei could be regarded as bottles of compressed ether gas. In this way, it becomes possible to explain the problem of mass defect, as well as the origin of the nuclear fusion energy. The reasons to suggest such a postulate follow bellow. As far ago as in the 19-th century, trying to explain a number of optical phenomena as refraction, reflection and astronomical aberration, Fresnel and Stokes [11-13] took as their starting point the assumption of existence of a greater ether density in all refracting media. During his experiments on Coulomb scattering of high energy electrons on atomic nuclei [14], Hofstadter and all. established that there existed a certain area on the nucleus surface where the electric charge density decreased with increasing the distance from the centre. Provided that the electric charge is not material, this experimental fact could be regarded as supporting the hypothesis of a real mechanical ether which is denser around the atomic nuclei. In [8] we name also the reason for this densification – the screening effect. In addition, we should point out that the mass defect is directly related to the limited range of action of the forces resulting from the screening effect and respectively the nuclear forces. That is the reason why the lighter nuclei have a larger relative share of ether atmosphere. And when heavier nuclei originate from lighter ones, than part of their atmosphere becomes superfluous and is emitted in the surrounding space. The congested ether expands in the process and releases its energy into the environment. In fact, no mass vanishes anywhere and there is no equivalence of mass and energy in the sense usually ascribed to the energy equation of Einstein. The relation is one of classical mechanics. At this, there is a strict theory in thermodynamics, postulating how to calculate the energy resulting from expansion of a mass Δm. As shown in [8], this energy should be $E = 0,9 \Delta m c^2$, where Δm is the mass defect and c is the speed of the waves in the relevant gaseous medium.

2.3 The "ever escaping" ether wind

The scientific arguments over whether the ether existed and, if it is existed - how it interacted with celestial bodies (or the so called ether wind) - have been around for centuries. The main dispute is about the explanation of the phenomenon of astronomical aberration and the interpretation of Michelson experiments. Precisely the confusion resulting after those debates prepared the ground for the advent of SRT.

We believe that all discrepancies related to ether problems, could be solved, provided that we assume:
   - mechanical gaseous ether model
   - model of elementary particles with ether atmosphere

Let consider first as example the issue of ether dragging. In the past, three theories competed in this respect: Lorentz theory of undraggable ether [15], Fresnel theory of partially draggable ether [11] and Stokes theory of a full drag of ether [12,13]. Actually, as already noted in [9], they do not contradict, but complement each other. In more detail, this can be described as follows: Taking as a starting point the planetary model of the atom with electron orbits and taking into account the ratios of atomic nucleus size and the orbits, we come to the conclusion that any electron and any atomic nucleus are surrounded and move through an infinite ether medium. Hence, when we discuss ether dragging, we should assume that the source of the drag are the separate elementary particles (electron and proton) and the atomic nuclei. So to say, any electron and any atomic nucleus is a runner of its own through ether. From this point of view, it is easy to see the logical connection between the hypotheses of Lorentz, Fresnel and Stokes. In his electron theory Lorentz examines the motion of limited number of charges, respectively elementary particles, when the ether drag should be negligible. The situation will change when a large number of particles move simultaneously - as it was the case in the Fizeau experiment [16], where several litres of water were set in motion. In this case we can speak of a partial ether drag and confirmation of Fresnel hypothesis. What will be the magnitude of ether drag, when a body

the size and the mass of the Earth moves in the same direction, with the same speed and during a significant span of time simultaneously with an enormous number of elementary particles and atomic nuclei? The ether drag will be accumulated and therefore for the case of Earth motion we should accept Stoke hypothesis of full ether drag.

Another objection on behalf of supporters of relativism is based on the Michelson-Gale experiment [17]. The question was asked: why during the annual motion of Earth (Michelson experiment) there is an ether drag and there is no drag during the daily rotation (Michelson-Gale experiment). The answer should be as follows: The ether drag is related to the motion of separate electrons and atomic nuclei entering into contact with the external ether. Consequently, when we speak of a body, we must take into account the sum of the dragging effect produced by all electrons and atomic nuclei composing the body, i.e. we must keep in mind their absolute motion with respect of the external ether. This means, that referring to the Earth we must add as vectors the daily, the annual and most importantly, the galactic speed which is the speed of the motion of Earth in which it is involved together with the Sun. It has been established already that the galactic speed of the Solar system exceeds many times the daily and the annual speed of Earth. Therefore, the direction of ether wind will be predominantly along the direction of galactic speed. The daily and the annual motion of Earth will cause only small variations. From this point of view the most correct approach was adopted by Miller, who precisely searched galactic ether wind. During his experiments he reached to the conclusion [18] that ether wind did exist and that the speed of the Solar system exceeded $200\ km/s$. He also defined the direction of the ether wind. Now, when the speed and the direction of motion of Solar system are definitely known, we can estimate whether Miller was right or not. If his experimental data were wrong or void as supporters of relativism claim, it would not be possible to coordinate them with the new data. In that case we must ask: How could he reach the above results with "wrong" experimental data? We are not aware of any preliminary information of Solar system motion which Miller might have used. Therefore Stokes theory stands out as the most acceptable and explaining the astronomical aberration and the Michelson experiment. Even Michelson had made a supportive mention of Stokes theory when interpreting his own experiment [19].

One of the reasons for underestimation of Stokes theory is the objection made by Lorentz. However, he admitted [20] that the theory could be acknowledged if a possibility for congestion of ether was allowed and if it could be supposed that it condensates around celestial bodies as if subjected to compression. In this respect our theory comes into agreement with the requirements set by Lorentz. Yes, there is a compression of the ether but it is related to the ether atmosphere of the elementary particles and the atomic nuclei.

We believe that the current underestimation of Stokes theory, used to explain the astronomical aberration even by the opponents of relativism, is unreasonable. If the proponents of modern Physics want to see the inconsistency of SRT they should make an experiment of Michelson type far away from the surface of the Earth, e.g. on a space ship [9,21]. A very direct and demonstrative experiment is necessary, for example using a pointed laser beam.

3. Quantum mechanics

As one can suggest, the unsatisfactory solution of some of the above problems was reflected as well upon quantum mechanics. Until now we have succeeded in dealing only with the problem of hydrogen atom. The solution of this simplest task is the more important as it is the probing stone for solving the main problems of quantum mechanics:
-   the problem of atoms size and stability
-   the problem of their discrete spectrum of radiation

In this respect we can say that although they had available all the necessary experimental data, the proponents of modern Physics failed to solve this simplest of problems. In result, the adopted

models of the mechanics of the atom as a whole and the one of the elementary particles composing the atom are unreal and artificial.

3.1 The constant defining the scale of the matter in Universe

After creating the planetary model of the atom and taking into account Coulomb's law it turned out that the electrons should immediately fall on the nuclei and the so called UV catastrophe would occur. The theory predicted also that the radii of the orbits of the electrons could have arbitrary size and there is no reason to prefer any one in particular. However, neither of the predictions was fulfilled. The atoms continue to be stable and continue to exist and all atoms of the same kind have the same size in Universe.

The logical development would have been that this discrepancy between theory and experiment should have led to conclusions along the lines that Coulomb's law maybe had a flaw or that the concept of electrical charge might be not quite perfect. Nothing of this kind happened. Classical mechanics was pointed at as a culprit, claiming that it was inapplicable to atomic theory and that a new, quantum mechanics, was needed. That is why after the discovery of Planck's constant the proponents of modern Physics satisfied themselves with the idea that the problem of atoms size and stability were related to Planck's constant. And from here many misconceptions arose.

We took up into quantum mechanics only in 2004 when established that a law, derived by us many years ago, contained also the solution of the stated problems [22,23].

If we expand in a series a function, expressing the force of interaction between atomic nucleus and the electron (in the simplest case of a hydrogen atom), even in the most rough estimate we reach to the expression [24-26]

$$F = \frac{e^2}{r^2}\left[1 + \frac{f'(1)}{0,75}\frac{\dot{r}}{c}\right] \tag{1}$$

where e is the electrical charge, r is the distance, $\dot{r}$ is the radial speed of the electron, $f'(1)$ is the first derivative of the force function at $\dot{r} = 0$ (lack of relative motion between the electron and the atomic nucleus) and c is the speed of light. Obviously, if we substitute $\dot{r} = -0,75c/f'(1)$ the expression in the brackets vanishes and the interaction force becomes zero. Hence, further acceleration and increase of the electron energy are impossible. It is not difficult to guess that the maximum speed the electron may reach by acceleration is the Bohr's speed, i.e. $\max \dot{r} = v_0 = \alpha c$ where v_0 is Bohr's speed and α is the fine-structure constant.

Keeping in mind the above, (1) can be transformed to become

$$F = \frac{e^2}{r^2}\left(1 + \frac{\dot{r}}{\alpha c}\right) \tag{2}$$

representing Coulomb's law for the hydrogen atom. And so we arrive to a physical interpretation of the fine-structure constant. On one side, it sets the limits (the boundary speed) for electrons' acceleration in the atomic nuclei force field. On the other side, it is a componentt of the expression for the force function (2) and in this way it links electrodynamics with quantum mechanics. Its magnitude is inversely proportional to the first derivative of the force function. Obviously, this is a natural constant and it is precisely the constant defining the scale of the matter in Universe.

Removing the brackets in (2) we arrive to the expression

$$F = \frac{e^2}{r^2} + \frac{e^2}{\alpha c}\frac{\dot{r}}{r^2} = \frac{e^2}{r^2} + \frac{\hbar}{r^2}\dot{r} \tag{3}$$

where $\hbar = e^2/\alpha c$ is Planck's constant.

It can be seen that Planck's constant is a secondary quantity, expressed by three natural constants: the electrical charge, the speed of light and the fine-structure constant. It plays the role of a resistance coefficient during the electron revolution in the force field of the atomic nucleus and this is its physical interpretation.

3.2 Discrete atomic emission spectrum

We have been pleasantly surprised to discover that from point of view of our theory we are in the position to explain the discrete emission spectrum of the atoms without sacrificing any classical principles and without using the myth of quanta.

When the law (2) or (3) is known we can compose a differential equation of the electron motion in the hydrogen atom. There are two distinct cases and one of them is at $\dot{r} = 0$ when the second term of the force (3) vanishes and only the coulomb's component of the force acts between the electron and the nucleus. By substituting $r = 1/\rho$ we arrive to the following differential equation

$$\frac{d^2\rho}{d\varphi^2} + \rho = \frac{me^2}{M^2} \tag{4}$$

where m is the electron mass and M is the angular momentum.

Equation (4) can bee seen in some textbooks of Atomic physics [30]. Solving it as a purely mathematical equation would result in an electron revolution along stationary circular or elliptical orbits. However, elliptical orbits should be excluded from the point of view of our theory because they would require a change of the orbit radius, i.e. the condition $\dot{r} = 0$ would be infringed. In addition, taking into account that in this case the resistance term of the force (3) is zero, there is no loss of energy in the motion. In this way, we arrived naturally at Bohr's postulate of stationary circular orbits.

The atoms are subjected to continuous external influence. In this case they receive additional energy and get into excited state. In the general case the following equation is valid

$$\frac{d^2\rho}{d\varphi^2} + \frac{e^2}{\alpha c M}\frac{d\rho}{d\varphi} + \rho = \frac{me^2}{M^2} \tag{5}$$

As shown already in [24-26], the solution of equation (5) is not stationary one. The electron motion occurs at continuous change of all its parameters – energy, angular momentum, radius, orbit eccentricity, etc. The motion continues until all surplus energy is dissipated and the orbit is transformed from elliptical into circular. Than the dissipation of energy stops. The most important point here is that all elliptical electron orbits are always accompanied by precession. We stress: when the electron is in excited state, it always moves along precessing elliptical trajectories. Here precisely is hidden the secret of the discrete character of atomic emission spectra.

The name of the reason for the discrete character of atomic emission spectra is "resonance". When it moves along precessing elliptical trajectory, the electron is involved actually in two periodic motions. One of them is related to the time needed for closing the ellipse (full revolution), while the other is related to the time needed for the axis of the ellipse to make a full 360° circle. Emission of light occurs only when the two periodic motions of the electron become commensurate.

It is easy to explain the need for resonance. The force (2) is polarized. Its direction can be related to the direction of the large axis of the ellipse. Therefore when the direction of this axis changes as a result of precession, the direction of the force (2) also changes. This change has a chaotic character. However, in order that the effect of the force (2) on the environment to be noticeable, its action in a certain direction should be periodically repeated. This is exactly the requirement for resonance.

As shown already in [26], in order to achieve the resonance it is necessary that

$$M = \frac{1}{2} \frac{\hbar}{\sqrt{1 - \left(1 - \dfrac{n^2}{m^2}\right)^2}} \tag{6}$$

where M is the angular momentum and n and m are the principal and azimuthal quantum number respectively. At this, all parameters of the electron motion change continuously. Hence, everything occurs according to the classical laws. There is no any step-like changes of energy and there is no quanta in the sense adopted in the existing theory.

3.3 Uncertainty relation

Heisenberg relation of uncertainty is the foundation of the so called Copenhagen (probability) interpretation of quantum mechanics with the main assertion being that the elementary particles can not simultaneously have determined coordinates and speed. We consider this as one of the biggest misconceptions not only in quantum mechanics but in all theoretical physics. According to our theory, there is no uncertainty whatsoever, in particular in the hydrogen atom mechanics and if there was, it should refer to an uncertainty in the knowledge of the proponents of quantum mechanics.

For instance, if we denote

$$2b = \frac{e^2}{\alpha c M}$$

and substitute in (5), we will arrive at the following characteristic equation

$$\lambda^2 + 2b\lambda + 1 = 0$$

having as roots

$$\lambda_{1,2} = -b \pm \sqrt{b^2 - 1}$$

This same kind of roots is observed when solving the problem of free vibration of a body placed in a resisting medium. Of practical interest is only the case of $b^2 - 1 \le 0$ - the only roots corresponding to a fading periodical motion. Therefore, only in this case light waves can be emitted. And this is the physical interpretation of Heisenberg relation of uncertainty. As can be seen, following the solving of the inequality with respect to M and making the necessary transformation, one arrives at

$$M \ge \frac{\hbar}{2} \text{ and } 0 \le b \le 1 \tag{7}$$

where M is the angular momentum. Now, accounting for $M = pr$, where $p = \Delta p$ denotes the change of momentum and $r = \Delta x$ denotes the change of radius, it can be assumed that the inequality (7) is equivalent to Heisenberg inequality. We hope that the reader will guess easily the physical reasoning behind the inequality (7). In order to maintain the electron periodic motion, the angular momentum should be big enough. The electron should possess enough stored energy to compensate for the loss and to be able to make more than one oscillation.

3.4 On the physical interpretation of the equation $E = \hbar\omega$ and the de Broglie formula

If in (3) we account for the second resistance term $F_r = \hbar\dot{r}/r^2$ two very important differential equations can be composed

$$F_r dt = \hbar \frac{dr}{r^2} \tag{8}$$

$$F_r r d\varphi == \hbar\dot{\varphi}\frac{dr}{r} \tag{9}$$

where

$$\dot{r} = \frac{dr}{dt} = \frac{dr}{d\varphi}\frac{d\varphi}{dt} = \frac{dr}{d\varphi}\dot{\varphi} \qquad (10)$$

As shown already in [25,26], solving the equation (8) results in the de Broglie formula and solving the equation (9) we arrive at the expression

$$E_r = 2 ln\left(\frac{1+\varepsilon}{1-\varepsilon}\right)\hbar\omega \qquad (11)$$

and their physical interpretation is as follows:
- the de Broglie formula is actually a quantitative expression of the momentum lost by the electron in one full oscillation period
- the equation (11) defines quantitatively the amount of energy lost by the electron in the same period. Therefore, it can be said that the de Broglie formula and the equation (11) represent both sides of the same phenomenon, expressed as an energy loss into the environment due to radiation

3.5 Photoelectric effect

One of the reasons the myth of light quanta (photons) was created is related to the phenomenon of photoelectric effect. We believe that the photoelectric effect can be explained using a simple wave framework. In [5,6] we examined this issue first and foremost from the point of view of the specific features of interactions between the elementary particles. Here we can point out on further quantitative criteria as e.g. more clear answer to the question: why the speed of ejected photoelectrons does not depend on the intensity of the absorbed radiation but only of its frequency? The answer is contained directly in the relations (10). It can be seen. that the frequency ω is directly proportional to the radial speed $\dot{r}$ ($\omega \sim \dot{r}$). Therefore, the larger the radial speed, the bigger the frequency and respectively - the energy of the light quantum.

3.6 The question of energy

If we speak of misconceptions, than one of the gross ones in quantum mechanics is related to the question of how to calculate the energy. In the adopted now theory the energy of the atoms is expressed by the equation $E = \hbar\omega$. Our theory proposes otherwise. For instance, the full energy (Hamiltonian) of the electron in the hydrogen atom in polar coordinates should be calculated using the equation

$$E = \frac{1}{2}m\left(\dot{r}^2 + r^2\dot{\varphi}^2\right) - \frac{e^2}{r}\left(1 + \frac{\dot{r}}{\alpha c}\right) \qquad (12)$$

The energy may be considered as composed by two components: $E = E_{min} + \Delta E$, where

$E_{min} = \frac{1}{2}mr^2\dot{\varphi}^2 - \frac{e^2}{r}$ is the energy supporting the revolution

$\Delta E = \frac{1}{2}m\dot{r}^2 - \frac{e^2}{r}\frac{\dot{r}}{\alpha c}$ is the energy of excitation

Although from theoretical point of view the energy (12) can acquire negative values ($E < 0$) without affecting the integrity of the atom, actually this is not true. There exists a number of limiting conditions. It has been said already that the maximum speed to which the electron accelerates in the force field of atomic nucleus is αc. Accordingly, an isolated hydrogen atom can acquire and can possess energy of $E_0 = 13,6\ eV$ [26], corresponding to its ground state energy. But, as far as the atoms are never isolated and are continuously subjected to the influence of the environment, resulting in impacts with other atoms and radiation, its energy is subject to change. New limitations surface here:

- in order to preserve the periodic motion and to emit light waves, the condition (7) must be satisfied, i.e., $0 \le b \le 1$;
- in order to preserve the integrity of the elliptical orbit, its eccentricity should stay in the range $0 \le \varepsilon \le 1$

Provided these conditions are met, the electron energy may change within the following limits:

$$-4b^2 E_0 \le E \le -4b^4 E_0 \qquad (13)$$

so that the atom can "absorb" or "emit" maximum excitation energy of

$$\Delta E = 0 \div 4b^2 (1 - b^2) E_0$$

This is the reason why the energy ΔE can be related to the equation $E = \hbar\omega$ and exactly this is the energy which the atom may exchange with the environment.

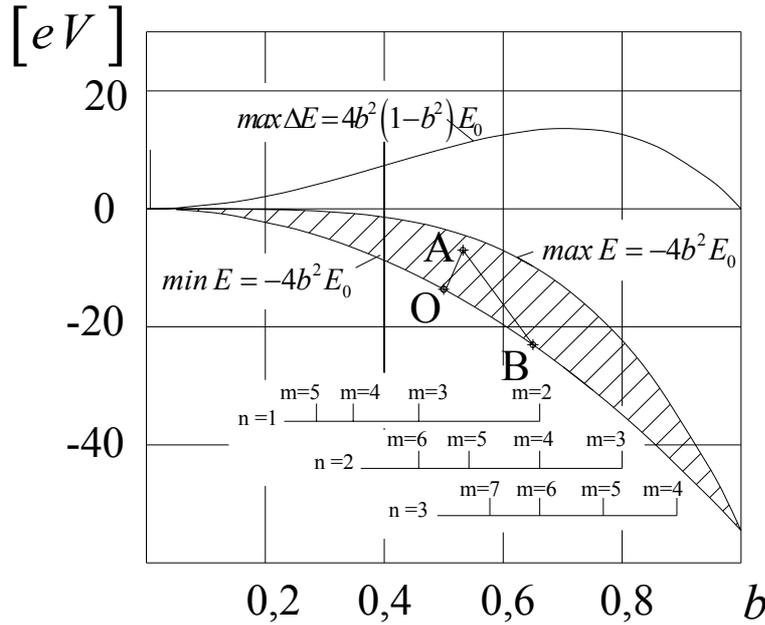The range of change of hydrogen atom energy is illustrated on Fig.1.

Figure 1. Range of change of hydrogen atom energy as a function of the parameter b, where $b = \hbar/2M$. In point O the atom is in ground state.

The misconception that atom energy may be calculated using the equation $E = \hbar\omega$ has also led to the other gross misconception: that the energy could be transferred in single portions or quanta. We already stated our position on this issue. All elements of electron motion are continuous functions of time. For example, in excited state the equation of the electron trajectory is [26]:

$$r = \frac{r_0}{4b^2} \frac{1}{1 + exp\left(-8b^4 \omega_0 t\right) \varepsilon \, cos\left(8b^3 \omega_0 \sqrt{1-b^2} \, t - \gamma\right)}$$

where

$r_0 = \dfrac{\hbar^2}{me^2} = 0{,}529 \times 10^{-10}$ m is the Bohr's radius

$\omega_0 = 4{,}13 \times 10^{16} \ s^{-1}$ is the Bohr's angular frequency

$\varepsilon = \dfrac{1}{\sqrt{1-b^2}} \sqrt{1 + \dfrac{2EM^2}{me^4}}$ is the orbit eccentricity

$$\gamma = arc\,tg\left(\frac{b}{\sqrt{1-b^2}}\right)$$ is the phase shift angle

M and E are the flowing value of the angular momentum and energy

$\hbar = 1,054\text{x}10^{-34}$ Nms is the Planck's constant

$b = \dfrac{\hbar}{2M}$ is parameter

It can be seen, that the electron motion is non-stationary one and it is accompanied by a loss of energy. All elements of the orbit are continuous functions of time. At this, the orbit of the electron is precessing.

Let assume that in the initial moment the atom is in ground state in point O. Suppose that in result of some external influence the energy E, respectively the angular momentum M, have changed so that the atom went into excited state, corresponding to point A on the graph. It is implied that in the initial moment the condition for resonance (6) is not satisfied, i.e. there is no emission. But, because in its initial state the electron moves along a precessing orbit with a loss of energy, than E and M will decrease with the time. The orbit radius will also decrease and so will the parameter $b = \hbar/2M$ until point B of the stationary state is reached and the loss of energy stops.

Here is appropriate once more to draw the attention to the fact, that emission of spectral line is possible only when the condition (6) is fulfilled. This is equivalent to the condition:

$$\sqrt{1-b^2} \approx 1 - \frac{n^2}{m^2}$$

where n and m are the principal and azimuthal quantum numbers respectively [24-26]. We write "$\approx$", meaning that the emission of certain spectral line is not related to a stepwise change of angular momentum and energy. This transition is gradual and its speed depends on the attenuation coefficient, equal to the product Rb. Exactly this gradual transition defines the spread of frequency over an interval $\Delta\omega$ in a time interval $\Delta\tau$, while the angular momentum changes in a range ΔM. This result corresponds fully to the spectroscopic research which established that the spread in frequency (linewidth) of a given spectral line is not infinitely small.

Evidently, with the gradual change of parameters of motion the electron can pass through one or more resonances and can emit one or several spectral lines consecutively. In the specific case we consider on Fig.1 (lower right on the graph), the transition from point A to point B is accompanied with two resonance values of the parameter b ($n = 2, m = 5$ and $n = 3, m = 7$) and hence, must be emitted two waves with wavelengths $\lambda = 4341$ Å и $\lambda = 10052$ Å.

What exactly spectral lines will be emitted depends on the initial state. The probability that more atoms will be in its ground state is the largest and therefore those spectral lines will be emitted most frequently which are next to the ground state. With the rise of the temperature more and more atoms will go into excited state and their initial position will move toward left on the graph. At this, waves with larger frequency should be emitted. This is how can be explained the shift of the maximum towards shorter waves in Planck's law of radiation.

3.7 The problem of probability

We already have mentioned the Copenhagen (probability) interpretation of quantum mechanics. The founders of quantum mechanics failed to solve this problem as well. It is true that in our theory we also allow for probability but we refer to the probability for the electron to acquire different values of the excitation energy ΔE.

As mentioned above, if the hydrogen atom was isolated it would be in base (ground) state (revolving along circular orbit without energy loss and without emission). However, surrounded by an enormous number of other atoms, it is subject to accidental external influence, resulting in

continuous change of its energy. In fact, it can acquire arbitrary values of the excitation energy ΔE. At this, only provided that this energy is within the range (13), the emission of a given spectral line would be possible. It is important here to underline, that once the initial state is known (the energy and angular momentum) all orbit parameters and elements of electron motion are completely defined and determined. In this respect, there is no room for probability or, in other words, the electron coordinates and momentum can be precisely determined in any moment.

Challenge!

The misconceptions in modern Physics are numerous and they are all interconnected. Ones of the misconceptions justify another ones until they reach such a degree of interrelation that, considered as a whole, they seem truthful. It can be claimed that the point of complete self-deception has been reached. The trouble is that the founders of modern Physics have imposed their point of view in all areas of science and education. Even bigger trouble is the fact that they have the most reputable scientific journals under their control. So that works criticizing the adopted scientific theories are hardly ever published. It is only encouraging that in this hostile environment the flame of the common sense continues to glow.

When we embarked on the current work we intended to support the cause of dissenters. We would like to appeal to them for consolidate because judging by the degree of criticism pointed to modern scientific theories, it is clear that in these circles there is no unity. Figuratively speaking, everyone is digging in his own field. And there is no point of chaotic critics as they strengthen the positions of supporters of relativism even more.

While finishing this article, in the end of December 2008 we received a letter from Dr. Synthia Whitney, editor of Galilean Electrodynamics, where inter alias she referred to the issue of the Rydberg constant. In the process of our work we already have dealt with this problem when solving the hydrogen problem. For instance, we were quite astonished to notice that Rydberg constant ($R = 2,065x10^{16} \ s^{-1}$ in angular frequency) is exactly twice smaller than Bohr's angular frequency ($\omega_0 = 4,13x10^{16} \ s^{-1}$). We were also very curious why in the hydrogen spectrum there is no emission with the Bohr frequency and there is no corresponding quantum of energy. Now, returning back to the questions which have arisen, we discovered a direct quantitative relation between the Rydberg and the Bohr angular frequencies and it is expressed in a beautiful kinematics peculiarity in the motions within hydrogen atom. Therefore we would like to launch a challenge.

The Nature is hard working to keep its secrets. Many secrets are related to the mechanics of the atoms and the mechanics of multielectron atoms in particular. In order to solve complex problems one must be certain that the simpler ones are solvable. In this sense, the problem of the hydrogen atom is the most simple. We can claim firmly that it has not been solved until now. Partially it was solved by Bohr and Sommerfeld. However, it can not be solved neither on basis of Schrödinger's wave mechanics neither on basis of Heisenberg's matrix mechanics. On the contrary, after Bohr and Sommerfeld research, it was pushed deep into the swamp of the misconceptions. Hence, if there is a question of criticism, it must be pointed first here. Precisely here one may ask specific questions and may seek specific answers. In this respect the issue of Balmer-Rydberg formula and the Rydberg constant has principal importance.

Obviously, being unable to answer some of the questions asked, the founders of quantum mechanics abandoned the way drawn by Bohr and Sommerfeld. Using mathematical operation, very dubious in sense of its physical interpretation, they related two empirical formulas (the equation $E = \hbar \omega$ and the Balmer-Rydberg formula). In this manner, the kinematics interpretation of Balmer-Rydberg formula was changed. The so-called spectral terms were pushed to the foreground and the myth of energy quanta became a central issue for quantum

mechanics. The atoms became regarded as some miracle of nature, real black boxes. By some incredible mechanism they can absorb some fantastic particles – photons. In the same incredible way they can emit those photons. In the process there is no any need of mechanics or kinematics. All quantum mechanics has been reduced to the probability of presence. We do not believe this is the real interpretation of quantum mechanics. Such interpretation creates mutilated, unreal and false image not only of the mechanics of the atom but also of the elementary particles composing the atoms. We contrast this "pseudo" mechanics with an ordinary mechanic, where all elements of motion are entirely determined and comply with the rigorous laws of mathematical logic.

We hope that when this will realise, many of the blind people (as in Anderssen fairy tale) will see again. Than many of the myths of modern Physics will become redundant and new horizons will open. Than the necessary conditions will be created to solve the problem of controlled nuclear fusion.

PS. Some of the derived results (of the hydrogen atom problem) have already been submitted for publication. There is still more to be done, for example to substantiate the kinematics character of Balmer-Rydberg formula, to answer the question why the spectra are divided in series and most importantly – to explain the different frequencies of electron motion and of the radiation emitted by it. Therefore, we will be happy if some reputable scientific journal expressed interest and would like to publish our work. We would prefer a bigger journal.

We would be happy if any of the readers succeeds in solving this problem in order to be able to feel the pleasure and the excitement of the process. We will give a hint: the answer is contained in the interpretation of the solution of differential equation (5).

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* Some of the referred articles will be published on a special web page
** Not published. It was submitted to the attention of several prominent Bulgarian
  physicists

Monday, 16 February 2009

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