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OBJECT LESSONS OF THE UNIFIED UNITARY QUANTUM THEORY

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Abstract: Spectacular examples of the new Unitary Quantum world view are considered in the applications for different aspects of reality.

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1. Introduction

The field of investigations of the Unified Unitary Quantum Theory (UUQT) is the most profound level of substance: the level of elementary particles and quantum effects [1, 2, 4-11].

As well known all particles have besides corpuscular properties wave properties too (particles can interfere with each other or with themselves), and their behavior is described by means of the wave function. In the case of a particle moved in the free space, the wave function is described as de Broglie plane wave which wavelength is inverse to the momentum of the particle. If the particle is slowing down or accelerating by applied fields then its wavelength is increasing or decreasing, respectively. The wave itself has no physical interpretation, but the squared value of its amplitude is proportional to the probability to find the particle in a defined place. That is why these waves are also called “waves of probability” or “waves of knowledge”, etc.

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There is another problem: the particle has no exact value for coordinate and for momentum at the same time, although either value could be measured arbitrarily closely (uncertainty relation). That is why the definition of trajectory of a quantum particle has no sense.

As opposed to the laws of the classical physics with its determinism where one can predict results of the motion of separate particles, in the quantum theory one can only predict the probability of the behavior of separate particles. Even the nature does not know the way a particle goes by in the case of diffraction by two slits.

But it is not the most depressing. The Quantum physics has wave-corpuscle dualism as well as field dualism and matter dualism. All particles act as sources of field, but it appears that they are only points which have no relation to these fields, and one can't tell anything in concrete about them.

Let us continue to confuse the reader. We shall consider an extremely simple experiment with single particles in the terms of the modern quantum theory. It will allow us to understand what is going on and will be useful for us in the future.

Let single photons fall on a semitransparent mirror directed at the angle of 45 degrees to their stream. Semitransparent means that a half of the falling light is reflected and another one passes by. Photon counters are installed on the paths of reflected and passed rays – Fig. 1. In the terms of the wave theory everything is simple: an incident wave will be reflected and will be passed partially. But particles as they are indivisible have to be reflected or be passed by. If a counter of reflected beam's particles registers an event it's evidently to suppose that the second counter will register nothing.

It is easy to see that if one will re-unite passed and reflected beams and sends them to the screen then...it's all about the way how we are going to argue. From the wave theory there will be an interference pattern, but from the corpuscular theory it will not occur. In fact, an interference pattern is observed in experiments even for single photons, and our suppositions are wrong to say the least.

In order to spare the doubts about how is it possible, it is better to forbid one to think about it. And the principle of complementarity in the modern physics does it in any case. It allows to ask only the questions for which it's possible to give an answer by experimentally only. When one tries to find a particle it means that one rejects to observe the interference pattern and vice versa. As though we could know from experiment either a particle has passed by or has been reflected, we would realize the "real particle behavior". But it's impossible to do by the means of macro-instruments.

The principle of complementarity makes the quantum physics descriptively inaccessible. There are many experiments, that we just cannot explain without considering the wave function as a wave that influences on the whole region and not as particles appearing "may be here, may be there", as it is possible in the terms of the clearly probabilistic point of view (see E.Schrödinger). In other words a wave acts in the whole area simultaneously, not "may be here, may be there", otherwise there wouldn't be any diffraction or interference.

Eventually we have to admit that the prohibitions of the principle of complementarity respond to the weakness philosophy, and the role of this principle is obviously analogous to the role of a calorie, a phlogiston and other obsolete concepts.

2.Unified field theory approach

Let us ask the questions that are forbidden by the principle of complementarity. What is the wave of an electron? What is the behavior of an electron "indeed, when nobody looks at it?" (its natural behavior?) How does it manage to go through a potential barrier when its energy is less than the barrier height (tunneling effect)? How does it, as it is indivisible, go simultaneously by two slits which are divided by a great distance in comparison with its own size? How is an atom of hydrogen constructed at the lowest energy state (s-state)? How can the probabilistic consideration of a wave function result from the mathematical formalism of the theory? Why is the actual Quantum Mechanics reversible? This is a primary law, and the irreversibility has to follow from it for dispose the paradoxes in the statistical mechanics. Last but not least: how is the electron itself constructed, that point described in the terms of probability?

This is a huge complex of mysteries. All (or almost all) physicists resigned and even prefer not to speak about it. But there is also someone who does speak. Paul Langevin even called the formalism of Quantum Mechanics with its principle of complementarity the intellectual lechery.

There is another concept in physics; it comes from W.Clifford, A. Einstein, E.Schrödinger and Louis de Broglie in which the particle is considered as a bunch (wave packet) of a certain unified field. The position of associates of the concept would be expressed the most clearly by the following words of A.Einstein: *"We could therefore regard matter as being constituted by the regions of space in which the field is extremely strong. A thrown stone is, from this point of view, a changing field in which the states of the greatest field intensity travel through space with the velocity of the stone… There is no place in this new kind of physics both for the field and the*

matter, for the Field is the only reality... and the laws of motion would automatically follow from the laws of field." (back translation).

By Max Jammer's definition [3], if the particle is a wave packet, so this consideration is called unitary.

E. Schrödinger wrote that he *"was happy for three months"* when he had got the idea to consider the particle as the packet (bunch) of de Broglie waves – until the English mathematician Darwin proved that the packet would spread and vanish.

But the trouble of all of these attempts (E.Schrödinger, Louis de Broglie, etc) was the fact that they always tried to construct it by means of de Broglie waves with such dispersion that any wave packet has to spread. The including of nonlinearity (Louis de Broglie) just extremely complicated the problem but didn't solve it.

3.Unified Unitary Quantum Theory Interpretation

The critical feature of the Unified Unitary Quantum Theory (UUQT) is the fact that it describes the particle as a bunch (packet) of certain unified field, but not as a questionable structure of the de Broglie waves of probability.

For "spying upon" for what the particles do which we consider as very small bunch of the real field, let us consider a Hypothetic Observer (HO) which is able to measure the parameters of fields of tracing particles with the hypothetic microprobe, and dimensions of microprobe are much less than the dimensions of the particles. The result of these measurements will be a certain structure function, that describes bunch of the real field. Obviously, this hypothetic HO and microprobe couldn't exist, but our thought experiments will be as simple as possible.

If we choose the dispersion of these partial waves equal to linear, we could have an extremely curious process, which mathematical formulation never appears before. If we have dispersion, then harmonic components of partial waves propagated with different velocities will result in spreading of the wave packet over all space or over all metagalaxy. Mathematical investigations show that the spreading goes on without any changes of the form of the wave packet; but at the end, there is a moment when a wave packet vanishes at all. Where does its energy disappear to? It remains in the form of harmonic components that set up a certain background in any point in the space-time. As these waves are not damped and continue to propagate with velocity of their own, then after a while the wave packet begins to revive in

another point, but its sign will be changed at that. During the motion, the packet will appear and disappear periodically – Fig. 2.

The envelope of this process is locus of points, locus of points of its maximum, it is a sinusoidal quantity and it rests in all reference frames; in other words, its phase velocity is equal zero in any reference frame, i.e. it's relativistically invariant (only by means of it the results of the relativistic dynamics are absolutely correct). If we change a reference frame, we will receive a different value of wavelength of the envelope, but it will be motionless as well. As the computing shows the wavelength of the envelope is exactly equal to de Broglie wavelength, and the dependence of this wavelength on packet velocity is the same! As you see, all the Unified Unitary Quantum Theory is occupied with the resolute exploiting of this basic idea.

It should be stressed that this periodical appearing and disappearing of particles doesn't refer to the Quantum Mechanics, as an immovable packet doesn't oscillate. The requirement of the relativistic invariance, that would be the main requirement for any theory, specifies the idea further. It states the following: when "Lord has excited in space-time continuum wave packet with his finger and then he has taken it away", then the packet will go on oscillating as a membrane or a string after impact. The frequency of these free oscillations is very high: it is proportional to the rest energy of the particle and it is equal to the frequency of the so called Schrödinger's trembling ("zitter-bewegung"). Our HO (Hypothetic Observer) can monitor these so extremely frequent oscillations, but in the real experiments it is absolutely unnoticeable. If the HO places at the way of motion of the wave packet quite a number of his microprobes, then due to the dispersion spreading's and rebuilding's he can observe the envelope of this process, and all of this will not be at variance to the general Quantum Mechanics, as this envelope corresponds with the wave function.

This figure, a sinusoidal envelope with a regular shape, can be seen by the HO in the only case: if the only single particle would exist in the world. But the real world consists of an enormous number of particles moving each other with different velocities. The partial waves (harmonic components) of those particles which have vanished at this moment can be summarized and emerge real fluctuations of the field or in other words the vacuum fluctuations that will act in a random manner. These fluctuations could destroy all idyllic character of measurements of our HO (Hypothetic Observer) for single particle in Universe– the sinusoidal envelope will be distorted by vacuum fluctuations and it will be difficult to separate it clearly. Any wave packet that is described in the terms of the "becoming" structural function could be decomposed by means of Fourier transforming into plane sinusoidal (partial) waves. These

waves are infinitely many, and their amplitude is infinitesimal. If we summarize them it will emerge zero everywhere except of the area occupied by the structure function. Thus the structure function could be represented either as a function of time (time representation) or as a function of an amplitude of harmonic components related to frequency (spectral representation). It is absolutely equivalent to mathematical representations.

Now there is no necessity in the principle of complementarity that was a very convenient view ad hoc. It is easy and clear how the synthesis of corpuscular and wave properties is realized. Corpuscular properties occur due to the localization of a wave packet in a small spatial region. The wave properties of the de Broglie waves can be explained in the following way: when the wave packet approaches to the diffraction system (for example Young's experiment with two slits) then we have an ordinary diffraction of partial waves by splites, and the diffraction pattern of partial waves appears at the screen. HO could observe it with his microprobes. As these packets are not overlapped then everything is linear and the superposition of the partial waves creates a total diffraction pattern modulated by the de Broglie wave, although the plain de Broglie wave doesn't exist at all. It should be stressed that de Broglie wave is a packet's locus of points of maximum in his motion, and it is a superposition of partial waves, that is why it appears in any diffraction and interference experiment.

4.Quantum measurements

Let us try to consider real instruments, which are always macroscopic. Atomic nuclei and electron shells are situated very near to each other and form a very numerous, but discrete series. A transition from the one such a state to another is a quantum jump. That is why the absorption and emitting of energy between the atomic systems is carried out by means of the quanta.

However, it doesn't mean that in the motion process the quantum or the particle propagates as something constant and indivisible. The energy of the particle can be divided or changed by vacuum fluctuations. The wave packet of a photon, for example, can, in the issue of the overlapping of vacuum fluctuation, turn into meson at short time, and photon can "disguise" oneself as a proton or as a neutron. It's assumed in the ordinary quantum field theory that a proton has "an atmosphere" mesons; it follows from the interpretation of the results of its collisions with another particles. There is no mesons atmosphere indeed. A proton appears and disappears during its motion constantly at the de Broglie wavelength, and its mass changes

periodically from the double value of a proton's mass to zero, taken on the intermediate values of mesons masses.

Eventually, all of the quantum measurements are based on energy absorption and present inconvertible processes. For every instrument founded a particle will operate, a quantum of energy is needed at least, thus it is a threshold energy of instrument defining its responsivity. By the way, we would like to notice that our HO (Hypothetic Observer) uses the instruments with zero threshold energy that is why it can register even vacuum fluctuations.

Let us consider the process of interaction of a particle with a macro-instrument. As the particle is a wave packet then its energy is proportional to the intensity of the packet, but it can be changed because of periodic spreading's and appearances. Besides the packet itself can be divided during the interactions. For macro-instrument could register a particle it has to wait for a moment when the total energy of the particle and of the fluctuation of the atom would be more or equal to threshold energy. It is clear that the probability of the operation of the apparatus will be proportional to the amplitude of the wave packet, or more exactly, to the value of intensity of the envelope of the wave function. If the wave packet with a too low intensity in comparison with threshold energy of the macro-instrument approaches to the macro-instrument, the great fluctuation of vacuum is required, but the probability of such an event is too small, and it means that the probability to detect the particle is small too (Fig. 3).

The theory of the quantum measurements is developed in the Unified Unitary Quantum Theory (UUQT) [4, 5, 8-11], and the statistical interpretation follows now from the theory, but not just postulated, as it was before in the conventional quantum theory. ***This point of view requires automatically that the value of the dispersion of vacuum fluctuations is finite that, in another turn, requires the finiteness of the Universe.***

5.Unitary quantum illustrations

The uncertainty relation arises because energy and impact are not constants, but they periodically change because of the dispersion disappearance and appearance of the particle. Besides because of statistical laws of measurements with macro-instruments, there is no any way to measure anything accurately, because of the unpredictable fluctuations of the vacuum. HO (Hypothetic Observer) could predict the coordinate, the momentum or the energy of the packet, if he would be the only one in the Universe, i.e. in the case of absence of the vacuum fluctuations.

The presence of unpredictable vacuum fluctuations makes all of the laws of the micro-world principally static for any observer. An accurate prediction of expected events requires an accurate knowledge of the vacuum fluctuation in any moment of time, what is impossible, because it is necessary to have the information on the structure and the behavior of any packet (particle) in the universe and to control their motion. The mechanical determinism of Laplace went absolutely lost in the modern physics as well as in the future one. Maxwell was right when he told, *"the true logic of the universe is calculation of the probabilities."*

The envelope of partial waves, occurring due to linear transformations at the wave packet and being "in the ruins" of splitting of the packet corresponds to Huygens principle. It explains how the relating of a moving particle with a monochromatic de Broglie wave is formally possible, propagating in the direction of the motion, and with all wave properties. There are partial waves that we consider as participants of diffraction and interference, but due to the principle of superposition we get the same result as if it a de Broglie wave would participate at the process.

The new linear equations of the UUQT allow the time inversion with simultaneous replacing of the wave function with a conjugated one, with the formal reversibility. Actually this reversibility takes place just in the case if the Universe consisted of the only one particle, as in the real world the recovering of the previous vacuum fluctuation is also needed for the total reversibility of the process. But there is a simultaneous reversibility of all processes in the Universe required for it that is impossible. It doesn't mean that quantum processes are inconvertible, just the reversibility has a static character.

The envelope, introduced before, is accurately monochromatic, but it doesn't exist as a traveling plane wave with such properties in the reality. Though it is related to the energy of the particle, the following definitions, such as "waves of the probability", "waves of the knowledge", could be related with it too. In contrast to the general quantum theory, now a very important phase is coming. It is the most easy to show it at the tunneling effect.

We would like to mention these established quantum phenomena to the reader. If we have a sufficiently narrow barrier with the height that is bigger than the energy of an incident particle, then it will never go through the barrier in the classical mechanics. In the general quantum theory, the incident wave reflects and passes by partially, and we have a finite quantity of the probability that the particle will be behind the barrier. In these cases the general Quantum Mechanics states

that the particle makes a tunnel in the barrier for itself, hiding the “method of creation” of this tunnel.

Let us listen to what HO says of this process. If a particle is approaching closely to a potential barrier in the phase of an absolute collapse, then it easily goes through the barrier, not interacting with it because of linear of all of equations for the small amplitude of the field. It just appears behind the barrier, without interacting with it, if its width is much less than de Broglie wavelength. And there is no necessity for it to make a tunnel. However, if it approaches in the phase with the maximal value of the packet, then the particle would be reflected because of the nonlinear interaction of the waves with the field of the barrier.

Now let us return to the experiment with the semitransparent mirror, discussed above. In terms of the described point of view, the wave packet (particle) will be divided at the mirror and enter in every beam, that depends on the packet phase near the mirror and on the structure of the mirror in this place. We have, in general, two not equal wave packets – “fragments” with less values of the amplitude that can interfere. The changing of the parts of the fragments doesn’t follow by because all process are linear, i.e. they are not dependants on amplitude. Besides the probability of detecting of the fragments is reduced, because an appreciable fluctuation of the vacuum is necessary for arising of threshold of detection of the counter. Consequently, in the results of the measurements the particles have to be lost or be observed as single particles in both of the beams simultaneously. The creation of two particles from a single is not a confusing fact, because the energy of the fragments will be reconstructed to the necessary level by means of the vacuum fluctuation.

At present we have an ambiguous situation because too many of such experiments have been carried out, for example the experiments of Brown and Twiss and the variations of them (Fig. 1) [8-11]. It was found out that frequently both of the counters detect particles simultaneously, that is confirmed by the proposed mechanism. Furthermore, most of such experiments (including experiments with entangled photons) confirm directly this interpretation.

In consequence, an increasing number of photon pairs is always observed in the beam of light. However, it was found out that we can carry out such experiments which effect remains also in the situation when there is no any way for any induced radiation.

If we will collide particles of any kind, and if in the colliding point one or two particles are vanished, then they have to go against another without any interaction. Indeed, in the proton-proton interactions 6% of the particles don’t interact, but “go through” the others.

An analogous effect takes place in the atom of hydrogen in the state of minimum of energy. It is well known that this state is not rotational, and Bohr-Sommerfeld's atom model describes the spectrum strictly in the relativistic case. If we apply this model to the s-state of the electron, we will obtain that the paths of the electron pass through the nuclear, and they were early excepted as absolutely absurd. Today it is clear that an electron just oscillates along a straight, going through the proton. All this allowed one of the authors to consider the problem of deuteron-deuteron interaction in other respects and to predict the cold fusion [15] already in 1983.

Quantum object is getting classical one with a simultaneous increasing of its mass, i.e. in the case of superposition of a large number of wave packets. The case when all of packets consisting a body will consolidate and spread simultaneously, is impossible in physics, as they have different velocities and masses. That is why such a combination seems as a stable and permanent object, moving according to the classical mechanics laws, though every packet is described in terms of the Quantum Mechanics. It looks like all particles in the Universe owe their existence to each other, and the ***Universe itself is just a mathematical illusion, a trick***.

In justice to the adherents of the complementarity we have to say the following. They do not retract it, though they have to wriggle, they have to tell that particles always go to the mirror as correlated pairs, and one of them goes through, but the second is reflected. Of course we need to consider the induced radiation effect, when the one atom's radiation is increasing the probability of emitting from another excited atom of the same source, but it does not always happen. *In the Unified Unitary Quantum Theory all interactions and particle production (packet split) are considered as an effect of diffraction of the packets by each other because of the nonlinearity.* An analytical solution of these tasks will require new mathematical methods, and it is not even clear how to start with it at presence.

Let us return to the principle of complementarity. It is clear, that if we would not be interested in the nature of the particle and consider it just as an indivisible point then the principle of complementarity is correct. It is a very curiously principle and it is amazing how N. Bohr could invent it.

In recent years a numerous of experiments was carried out, which found out supraluminal speeds. Not debating if the special theory of relativity is right or not, let us show that in the Unified Unitary Quantum Theory (UUQT) any velocity is possible and the velocity of light is not maximum possible.

Let us consider Euclidean plain space, in which the photon propagates along the *X*-axis. According to the UUQT it is a wave packet and it could be presented as an infinite sum of harmonic components, that exist on the *X*-axis, figuratively speaking, placed at a distance of a million light years ahead and backwards. Now if we place on the *X*-axis arbitrarily far the specially device, creating a anomalistic high dispersion, then the photon could occur at the exit of the device (Fig. 4), because the harmonic components shifted each other. The most interesting in this process is that nothing has moved between incident and reconstructed photons at this velocity! With other words, the *conventional definition of the velocity is getting obsolete*.

Such experiments were carried out by some teams (in Berkeley**,** Vienna, Cologne, Florence, etc.) and they emerged the supraluminal speeds. The most interesting were Lijun Wang's investigations [12] in which the velocity 310 times bigger than the speed of the light (Fig. 4) was found. Wang gives the same interpretation as ours but only for a beam of light. In this case it is a wrong interpretation, because in the experiment the envelope of the light pulse is not distorted absolutely, but it has to be obligatory, and he notices it amazed.

Our idea that particles are wave packets is an absolutely original idea for the worldwide science. The waves at the Fig. 4 have to be realized as separated partial waves of the spectral decomposition of the wave packets of the separated photons, but not as a spectral decomposition of the light pulse. Then the form of the momentum's envelope will not be distorted.

Wang supposes that the special theory of relativity is absolutely destroyed. But it is not quite true. Though the problem of quantum electrodynamics wasn't discussed in the published researches on the UUQT, one of the followers of L. Sapogin, Prof. Yu.L Ratis. (Samara Aerospace University - name S.P.Korolev) applied the ideas of the UUQT for spinor quantum electrodynamics and got many amazing implications. But the humanity will know about it later.

The aspects of the Unitary Quantum Theory are confirmed by results of their practical applications to traditional tasks of physics. The UUQT allows firstly in the international science, not either to compute the electron charge and the fine structure constant (1/137) with the great precision (0.3%) [19-21] but even to compute masses of many elementary particles [10, 13, 14] with the accuracy of 0.1-0.003%! It's amazing that in the calculated spectrum of masses there is a particle mass about 131.7 GeV that could be called Higgs boson [22-24]. The Modern Standard Model and quantum theories of field couldn't even raise these problems mathematically. It should be stressed than when we will find the spectrum of masses and charges of electron, time

won't be a part of the ultimate equations and it will stay Newtonian, in other words, time exists only in our minds.

We would like to add the amazing phrase of A. de Saint-Exupéry: *"The truth is not something that could be proved, but something that makes all things easy and clear"* (back translation).

6.Approximated equation with the oscillating charge

There are such hard rules in the modern theoretical physics. Any new theory has to include classical results. This is strictly satisfied because the Hamilton-Jacobi relativistic equation and Dirac equation follow from the UUQT, i.e. all modern basics of the fundamental quantum science. In the linear equations of the UUQT the mass was replaced by the rest energy divided to square speed of light, and then the system of 32 linear integro-differential equation appears as a consequence. They were firstly found out by L. Sapogin and V. Boichenko [6] in 1984, and only in 1991 they solved the dimensionless scalar version of this equation that allows to get the fine structure constant – 1/137 and electron charge with an accuracy 0.3% [19, 20].

In this approximation of the UUQT, the wave packet is realized as a spatial divided electric charge that oscillates, its equation depends on time, coordinate and velocity and it could work in the rough model of the particle as oscillated charge, so we can exploit the Newton questions. It is becoming easy to see the tunneling effect: while the moving particle is approaching to the potential barrier, in the phase when the charge is extremely small, it is easy for it to go through the barrier, and when the quantity of the charge is large, the repulsion force is increasing, and the particle will be reflected. The numerical solution of these equations for the most common quantum tasks emerges approximately the same results as the calculation of the general Quantum Mechanics (QM). By the way, by means of the UUQT it is possible to get this equation from the Schrödinger's one with very low energies [8-10].

But there are though some interesting differences. The equations of motion of the oscillated charge were not treated in physics before and they have an important difference from the classical laws of motion – the invariance of the motion in the relation to invariance translations. It means the absence of the great classical momentum and energy conservation laws. They appear in the UUQT and then in the classical mechanics only with an averaging for all particles.

The consideration of the task on oscillations of particles with an oscillating charge in a parabolic well (harmonic oscillator) besides the common results of QM for stationary states results in two different solutions that are shown on Fig. 5. New amazing solutions appeared, one of them was called “Maternity home” and another was called “Crematorium”. In the first case the energy of the particle can increase indefinitely, furthermore if we proceed from a very low initial quantity in the equation, it results in the increasing of the energy of the particle – in the production of the matter, indeed. The second solution could due to collapse (disappear) of the matter-particle. These solutions are logically independent directly, and their appearance depends on initial phase. With other words, one solution describes the matter (energy) production, and another one its collapse; and it may be said that the Unified Unitary Quantum Theory (UUQT) allows to describe the creation of the matter and the Universe, but not as a result of the Big Bang. The Universe wouldn’t be given to us in the static form, it arose in some way and it continues to develop, and we could see that one of the basic features is the filling of space by matter.

The existence of the process, that the energy appears from some areas and vanishes in some areas, was predicted by some cosmology experts for a long time. The well-established English astrophysicist Fred Hoyle developed the theory of the Universe for many years, in which the bearing of matter is continuously going on. He wrote: *“some of atoms, which are parts of matter, do not exist in the certain point of time and then they appear spontaneously. I should notice that this idea is so strange... But all of our ideas about the creation are strange. According to the presence theories, all of the matter in the Universe comes from one point in result of the Big Bang. For me this idea is much more strange than the idea of the continuous creating”* (back translation) F. Hoyle, La nature de I'Universe, 1952.

7.New sources of energy

As well known, in all experiments the local law of energy conservation (LEC) and the law of conservation of momentum in individual quantum processes are correct only for high-energy states. For low energies we can’t claim that, because of the uncertainty relation and the stochastic nature of QM’s predictions. That is why the idea of the global, but not of local LEC exists invisibly in the QM and it’s not a new one.

For the physics it only means that for the stationary solution with fixed discrete energy levels (the general QM) of the velocity of the particle reflected by a wall is equal to incident one. The UUQT allows to consider another ways too. Thus if the velocity of the particle for every

reflection is decreasing then it is corresponding to the “crematorium” solution, but if it is increasing then it is corresponding to the “Maternity home”. What scenario would turn to the reality depends on the initial phase of the wave function and on the energy of the particle. Besides the UUQT is fundamentally inapplicable for a closed system, because such systems are idealizations, which are very useful, but not according to the base of consideration used in the UUQT.

Anyway, the whole modern science, including the Quantum Mechanics (QM), is still based on the great LEC. However, there is a difficult situation in the Quantum Mechanics. It deals with the fact that the LEC follows only from the Newton mechanics. QM generalizes the facts of the classical mechanics including all of its laws, but its results have a sufficiently statistical nature, they are correct only for large amounts of particles. But how do we have to consider single particles, with their individual processes? It appears that for the single particles LEC does not follow from QM (!), thus individual events are absolutely incidental and do not follow this law. *To evade this question it was announced that Quantum Mechanics doesn’t describe individual events (!?)*

Let us discuss a thought experiment. To make our reasons more simple let operate a certain quantum ball-particle. If the ball is approaching to the wall, then its velocity after reflection will always be equal to the incident velocity (here we neglect a quantity of the friction force and consider that the ball and the wall are perfectly elastic). In the case of the quantum ball the velocity after the reflection would possess the whole arrange of the values, in different experiments under equal conditions. There would be some balls that would be reflected with velocities that are higher and some that are lower than the initial velocity, and some of them with velocities equal to the incident one, and every case would be considered statistically in the terms of the Quantum Mechanics.

Let us answer the following question: what would happen if we place another wall opposite the first, and would try to increase the velocity of the ball after every reflection? Then we would get increasing of energy of the ball without action of any external force. The energetic of the systems in the XXI century will treat the question of constructing of initial conditions for a numerous quantity of particles to realize only the “Maternity home” solution so that the “Crematorium” solution would be damped as far as possible. But it depends on the selection of initial phases and the geometry of the system.

Thus, if we use the aspects of the Unified Unitary Quantum Theory) appropriately then there won't be a general prohibition for creating of a quantum perpetuum mobile. Formally there is no such a prohibition even in the general Quantum Mechanics, because there are no conservation laws for a single process under the low energy conditions, but it treats with probabilities instead of this. In other words, the Quantum Mechanics (QM) also offers opportunities for getting energy by collecting of random process someway, and today it seems that UUQT affords such an opportunity, it suggests the ways how to regulate the values of probabilities.

During the theoretical investigations, a numerous of calculations for the equation of oscillating charge was performed, thus moment of particles falling with different velocities were summarized and the result was compared to moment of reflected particles. It was found out that for different repulsive potentials, a total momentum of reflected particles is equal to momentum of the falling particles with a high accuracy, but for a single scattering particle the value of momentum could be either less or more than the momentum of the falling particle. This problem is very complicated and it requires subsequent researches as all this depends on initial conditions (velocity, phase, distance) complexly as well.

The prospects following from the UUQT are not even the most significant. Any flat bans as the impossibility of perpetuum mobile creation and any other confirmations of the immovability of conservation laws are unacceptable in philosophy. No, these laws would never be neglected; but there would be such areas in science and technology, very limited in the beginning, so that this laws would be not enough.

The problem of existing of the global conservation laws (we have proved that they are not local laws) is left in abeyance. Nothing but the idleness and atavism of the human thinking lead to it. But this idleness of thinking – concerning the physics – manifests itself in the intuitive atavism for the Newton laws.

Yes, the conservation laws are incontestable in the classical mechanics and in terms of this theory a continuously operating machine is theoretically impossible. It should be stressed that the conservation laws were transferred to the Quantum Mechanics as an object of worship of the classical mechanics. But the classical mechanics is more fundamental, Newton laws follow from it as a particular case. *And if in the terms of the Quantum Mechanics a possibility to get energy from nothing is theoretically possible, thus a quantum perpetuum mobile could be constructed.*

It is made possible by means of the equation with oscillating charge. It describes single particles; the difference in their behavior depends on the initial phase of the wave function, but

there are no conservation laws for an individual particle at all, they appear only after an ensemble averaging.

Interestingly enough, there are apparatus called Testatik Machine M/L Converter from religious group “Methernitha”, they belong to a religious Christian commune, situated in Linden near Bern. Theirs maker is Swiss physicist Paul Baumann living in the commune.

These fantastic devices, direct current generators, are made as a four dimensions type: with power value of 0.1, 0.3, 3 and 10 kW. Externally this device resembles an electrostatic machine with Leyden jars, so familiar from school physics laboratory. There are two acrylic discs with 36 narrow sectors of thin aluminium stuck to it. The discs rotate in different directions and their mechanical energy is hundreds times lower that produced energy – it accounts for about 100 mW in measurements. The largest device with the power value of 10 kW has disc diameters more than 2 m, and the smallest has 20 cm; the device with the power value of 3 kW has 20 kg in weight. There is no cooling or heating of the air during the long operation of the device, it just smells of ozone there. It was found out that the inventor doesn’t clearly understand the principle of operation of the device.

Professor S. Marinov, whom the commune had given as a present the device with the power value of 100 W wrote in his book called “Difficult way to the truth – documents on the violation of conservation laws”, issued in 1989 by International Publishers East-West: *“I can confirm without any doubt that this device is a classical perpetuum mobile. Without any initial impact, it could rotate an unlimited long period of time and generate electrical energy equal to 100 W... In that device, the motor and generator are connected... However, it is not clear how is it possible.“* (back translation).

The authors of the Unified Unitary Quantum Theory know approximately how this device is constructed, but in this article we are going to do only what is absolutely clear: we are going to show that the operation of this device completely corresponds with the UUQT.

Evidently, it operates due to the charge separation concept. Let us consider two metallic spherical surfaces with a hole isolated from the Earth and from each other. If we carry a first electron from sphere A to the inner surface of sphere B through the hole by means of an isolated stick, then there appears a potential difference. Further, if we carry the second one and the subsequent electrons, sphere A would attract the carried charge, and B – would repeal it. It is clear that to move the charge we will have to spend energy. (Fig. 6).

In the Technical University – MADI (Moscow) professor V.I. Uchastkin gives lectures on the Unified Unitary Quantum Theory (UUQT) and new energy sources. In his explanations, he uses the figurative analogy: *"Let us consider a sack of potatoes which mass is* m*. If we carried it to the fourth floor (the height is* h*), then we spend the quantity of work opposite to the gravitational field which is equal to* mgh*. And if we throw it down we would get kinetic energy* $mv^2/_2$*, and these quantities would be equal to each other. But we could also carry not the whole sack, but every potato one by one. The work of one quantum of a potato's transfer depends on time, velocity and coordinate, and it must be carried in such way that the spent work would be minimal. If you carry the whole sack in this way, you can get the quantity* $mv^2/_2 >$ mgh*. So, there are no changes in the system, but the energy has appeared."*

8.Prospects

Let us remember the problem about the maintenance of long-term flights to the outer space with electricity. The Prof. Uchastkin's analogy describes precisely a theoretical approach for solving this problem. Of course, there is a great deal to do though, to understand what phenomenon will play the role of those "quantum potatoes" and how to construct an instrument that would be able to support a minimal energy to "bring them to the fourth floor".

How can a spaceship be supplied with energy during many months of flight? Near the Earth, photovoltaic cells are used but the more the distance to the Sun is increasing, the more needless they are; using of a nuclear energy source is problematical for different causes. Today we can neither improve this situation considerably nor do we have even any theoretical conditions which could let us approach it. On the base of such a situation there are common ideas of the construction of matter and its properties. Now then, a new conception of physics is being proposed. Like many others as well. If we stay by the space technology, it's over constructing of engines based on new principles of energy production, maintaining of real-time telecommunication on the distances in outer space, free of limits which are proper to the diffusion of electromagnetic waves… It follows from the foregoing that UUQT opens up a perspective of a solution for the communication problem on extremely wide distances in outer space for it excludes the limits of information exchange between Earth and spaceship. The theory also predicts the approaches to creating of the new energy sources and of the new types of engines that would be almost ideal for creating of spaceships of the future.

But this subject goes beyond the scope of the present article.

Conventional jet propulsions transform the conducted energy in the kinetic energy of the beam of a working body flowing from the engine, and the reaction force of this beam – the pulling force – accelerate the spaceship. Therefore space flights to extremely wide distances will require huge stocks of working body.

A classical progression curve reflects the velocity increasing of a thrown-off mass of the working body. Though there is a possibility for creating of a very weak constant pulling – but! – without throwing off of mass.

Let us use the method of analogy again. Regard a classical trick problem in physics for universities' admission tests: there is a boat in motionless water and a man with a sandbag in this boat. Can he move the boat by performing any manipulations with the sandbag, for an endless time?

Correct answer: throw the sandbag from the front part of the boat to its back, then carry it back slowly, throw it again and so on. As the viscous friction force by Stocks is proportional to the velocity, the boat will perform swinging motions, over which some linear movement will be applied. Based on this idea, marsch buggies were constructed in Germany – there is heavy mass moving in there, in one direction quickly and back slowly. Many decades ago, the same effect (Dean's engine) was wide-ragingly discussed in the USSR in popular science magazines and on TV.

There is a similar phenomenon in the classical electrodynamics as well as in the quantum electrodynamics and it's related to the Lorentz radiative friction force. The appearance of Lorentz' force becomes evident by considering the interaction of the charge and the field caused by it.

For a motionless charge the force of such an interaction – or "self-action" – is equal to zero, otherwise the free charge would experience a self-acceleration. The charge begins to move, but the electromagnetic field, as its spread's velocity is finite, can't reschedule immediately. The accelerated charge practically flies onto its own field; with other words, this effect can be described as appearance of energy flow which is directed upstream to the flow and slowing it down. It generates "electromagnetic viscosity" which value is related to the acceleration.

How can this phenomenon be used? If there is a charge cloud in flat capacitor, it is possible to make it swing between sheets with different values of acceleration forwards and backwards by applying a sawing motion to the sheets. Because of different forces of radiation friction in the alternate and opposite direction, pulling force appears along the lines of electric field. The radiation of such accelerated charges is always perpendicular to their movement and can be screened, but the most important thing on it is the fact that it doesn't change its impulse in relation to the direction of the capacitor's field.

It may be paradoxical, but it seems that we get a pulling force by spending energy for this process without throwing-off of any mass in the direction, which is opposite to the motion's one. The authors even published in the US-magazine "Journal of New Energy" vol.5, #1, 2000 an article, containing an exact analytical solution of this problem: the pulling of some micrograms appears in a flat capacitor, containing a cloud of 1,019 electrons in which the distance between the sheets is many meters long, by applying of sawing potential of millions of volts.

Of course, it is an insignificant result in relation to such a huge (hypothetical) instrument employment, and the using of electron cloud in a flat capacitor has practically no prospects. But if stabile charged particles exist which mass is at least one-millionth of electron mass, then this idea becomes very interesting from the technical point of view. Do such stabile charged leptons exist at all and how is it possible to generate them in a sufficiently large number? Today nobody can give an answer...

To generate pulling it is still possible to throw off the mass/ matter, "getting" it in a specially created potential hole, accelerating in it in the same time. UUQT allows such solution generally that is evident from the "Maternity home" solution.

Let us consider the results. UUQT will in future let us solve several basic problems of the worldwide energy supply and all problems in outer space: immediate information changing, the problem of energy supply and constructing of new engine types. It is absolutely precipitant to make technical plans for those solutions, but the foregoing should be considered not as a wanton imagination, but as a possible future programmers of fundamental research to transpose our civilization to new physical principles.

We are concluding by reminding of the prophetical words of the famous US science-fiction author Arthur Clarke: "*Something that is theoretically possible will be achieved practically independent of technical difficulties. It's enough to desire it.*" (back translation)- Profiles of the Future, 1963.

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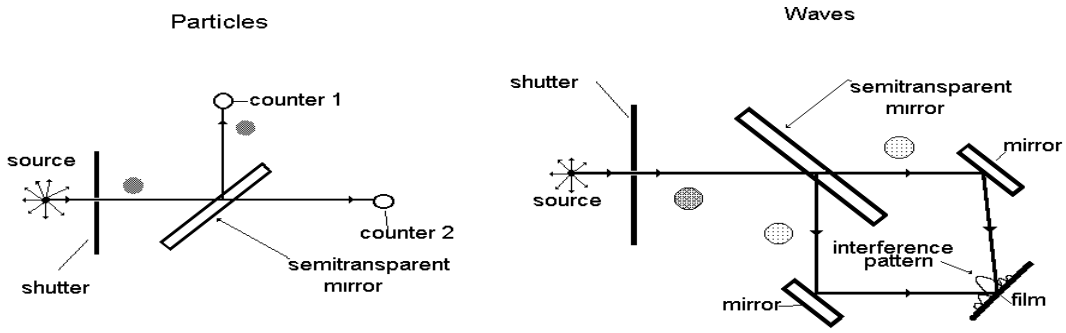

Figure 1. Experiments with individual photons on semitransparent mirror

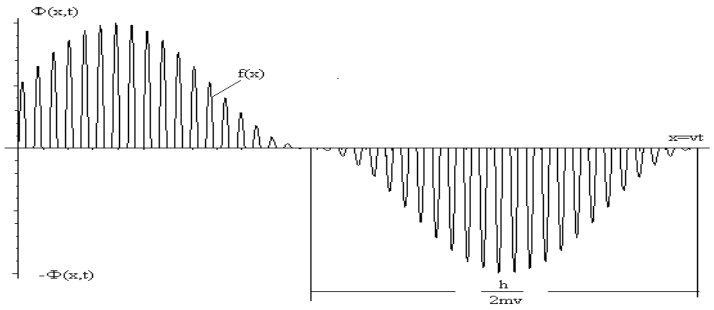

Figure 2. Behaviour of wave packet in linear dispersion medium

(i.e., rather like a series of stroboscopic photographs).

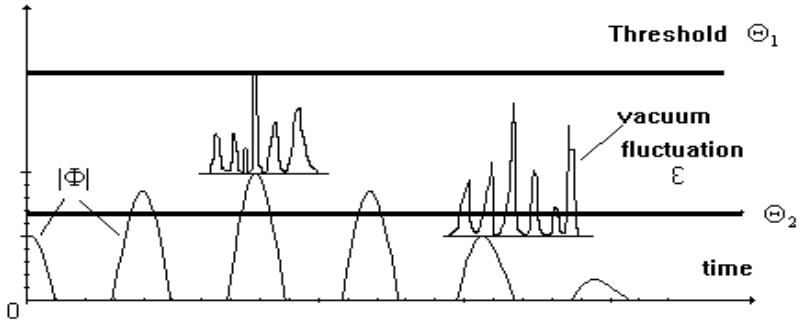

Figure 3.

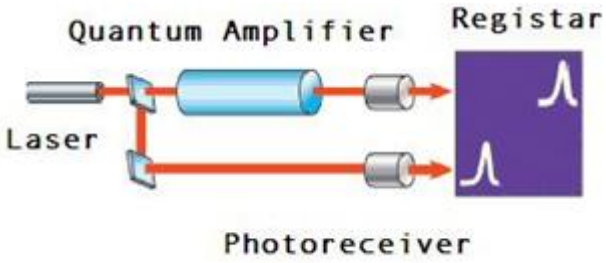

Figure 4. Experiments of L.Wang - superluminal light propagation.

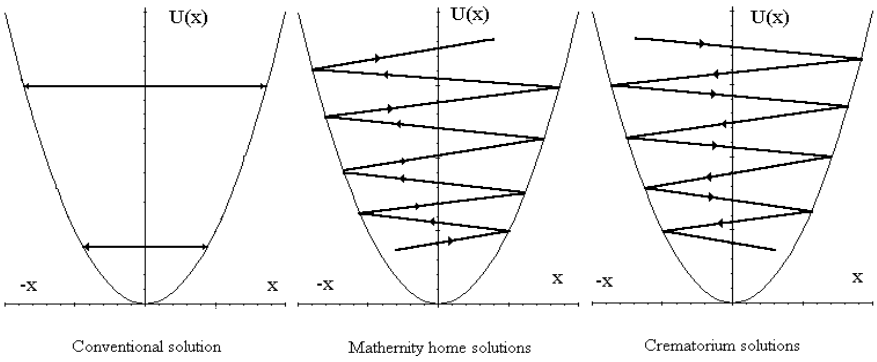

Fig.5.

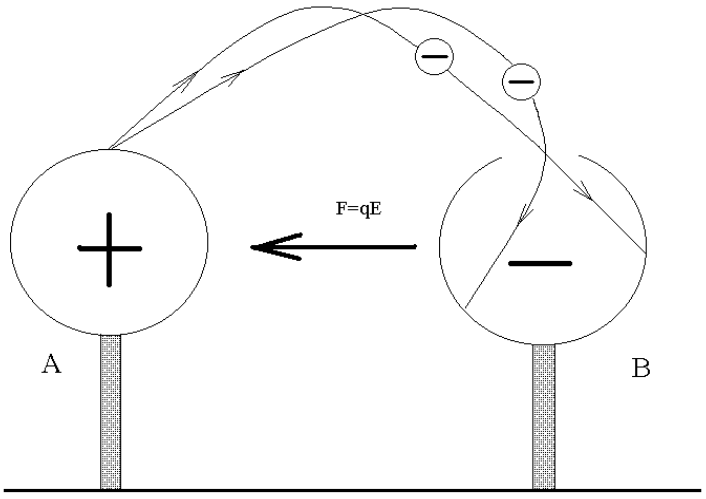

Fig.6. Work for transferring the charge depends on the mode of transferring and on the path