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Discovering Thoughts, Inventing Future

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Nuclear Transmutations and Low Energy Nuclear Reactions at the Unitary Quantum Theory

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Keywords: unitary quantum theory, cold nuclear fusion, low energy nuclear reactions, coulomb repulsion, quantum mechanics, coulomb barrier, nuclear transmutation.

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Nuclear Transmutations and Low Energy Nuclear Reactions at the Unitary Quantum Theory

Leo G. Sapogin [α], Yu. A. Ryabov [σ] & V. A. Dzhanibekov [ρ]

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"…The kernels are pure emeralds, but people, it may be, lie…"

A.S. Pushkin

I. Introduction

Let us to analyze the epoch-making experiments carried out by M.Fleishman and S.Pons in the March of 1989 [1] and revealed for the first time the phenomenon called the cold nuclear fusion (or Low Energy Nuclear Reactions-LENR), i.e. the nuclear synthesis at low temperature. Notice, one of the authors of this article (prof. L.Sapogin) has predicted already in 1983 [2] in his works the possibility of such nuclear reactions at small energies. Without going into well-known details we can say: the phenomenon of the cold nuclear fusion really exists and no one physicist can explain it clearly within the classical mechanics or within the standard quantum mechanics. The series of various mechanisms which explain this intriguing phenomenon is offered but it is hard to believe them because of the following reasons.

The curve of nuclear potential energy in the case of a charged particle interaction with a nucleus is plotted in Fig.1, where the right top part of the curve corresponds to the mutual Cou-lomb repulsion that nucleus and charged particle is experienced.

The repulsion potential is described by formula

$$U(r) = \frac{Zze^2}{r},$$

where Z is the nucleus charge, z is the charge of particle moving to the nucleus, e is the electron charge; r is the distance between given particle and nucleus. At $r=R$ the potential energy curve has a jump that can be explained by the appearance of the intensive nuclear attraction. Nowadays, we do not know any mathematical formula for the potential of the nuclear attraction. If the charged particle is able to overcome the potential barrier of the height

$$B_c = \frac{Zze^2}{R} \approx \frac{Zz}{\sqrt[3]{A}} MeV,$$

then further the particle falls into the region of nuclear forces of attraction and the nuclear reaction will proceed.

Let us consider the nuclear interaction if the charged particle possesses kinetic energy $T < B_c$. From the classical mechanics point of view there will no nuclear reaction at all in that case because reaching some distance $r<R$ to the Coulomb barrier top the particle will be turned back and reflected. Deuteron energy in ordinary electrolytic cell of Fleishman-Pons is near 0.025 *eV*, the height of Coulomb barrier in this case is $B_c = \frac{Zze^2}{\sqrt[3]{A}} = 0.8MeV$. It is naïve to discuss the question about overcoming the barrier with the height dozens of million times more than the kinetic energy from the classical mechanics point of view.

However, from quantum mechanics point of view there is tunneling effect and the probability of such tunneling, or potential barrier transparency D, is given by well-known formula:

$$D \approx \exp\left(-\frac{2}{\hbar}\int_{r_1}^{r_2}\sqrt{2\mu(U-T)}dr\right) \qquad (1)$$

where $\mu = \frac{Mm}{m+M}$ is so called reduced mass, *M* is the nucleus mass, m is the particle mass. The lower limit of integration r_1 coincides with nucleus radius *R*, the upper limit r_2 corresponds to condition $T = \frac{Zze^2}{r_2}$. After integrating we will obtain

$$D = \exp(-2g\gamma)$$

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where; $g = \frac{R}{\lambda_B}$; $\gamma = \sqrt{\frac{B_c}{T}}\, arccos\sqrt{\frac{T}{B_c}} - \sqrt{1-\frac{T}{B_c}}$ and value $\lambda_B = \frac{\hbar}{\sqrt{2mB_c}}$, is de Broglie wavelength, corresponding to the particle kinetic energy equal to the barrier height $T = B_c$. If $T < B_c$, then formula (1) can be easily transformed into the form

$$D = \exp\left(-\frac{2\pi R B_c}{\hbar v}\right) = \exp\left(-\frac{2\pi Z z e^2}{\hbar v}\right) \qquad (2)$$

where *v* is velocity.

If we estimate the values *g* and γ for collision of two neutrons with such energy, then we obtain following:

$$g = \frac{R\sqrt{2mB_c}}{\hbar} = 1.9$$

$$\gamma = \sqrt{\frac{B_c}{T}}\, arccos\sqrt{\frac{T}{B_c}} - \sqrt{1-\frac{T}{B_c}} \approx 8883$$

hence the probability of such a process equals to $\exp(-2 * 1.9 * 8883) = 10^{-7328}$ (!). The cross-section of fusion reaction can be determined as multiplication nuclear cross-section and tunneling probability, i.e.

$$\sigma = \sigma_{nucl} D .$$

Moreover, if the deuteron sighting parameter does not equal zero, then the appearance of centrifugal potential

$$U = \frac{\hbar^2 l(l+1)}{2mr^2}$$

will lead for more reducing of interaction probability.

II. Experimental Results

The obtained values do not require a commentary. It is quite explainable that the official physical science has rejected every talks about the possibility of the LENR. The experiments of M.Fleishman and S.Pons were declared as some misunderstanding. For example, the most serious and responsible edition Encyclopedia Britannica 2001 could not even find a place for the cold nuclear fusion concept. Such official viewpoint can be understood only if one considers standard quantum mechanics as absolutely valid. In spite of all during last 25 years starting from the moment of experimental discovery of M. Fleyshman and S. Pons about 50 international conferences dealing with that subject were organized, there are a lot of books, Journals, and magazines discussing this problem, the number of articles written about it is near to dozen of thousand. Today the situation is changing step by step into positive direction. And the researches are slowly turning away from the high road of hot fusion that have wasted during last 60 years more than 90 billion dollars for nothing.

The LERN experimental data are extremely numerous and various, but we are going to dwell on the most important and fixed results. Thus at classical electrolysis study of the palladium cathode saturated with deuterium there is enormously great heat generation in heavy water: up to 3-*kilowatt*/ *см3* or up to 200 *megawatt-second* in a small sample. There were also detected fusion products: tritium ($10^7 - 10^9\ \frac{t}{sec}$), neutrons with the energy equal to 2.5 *MeV* (10-100*n*/*sec*), helium. The absence in the products of the reaction He^3 shows that heat does not the result from the reaction *d*+*p*. More over one can observe the emanation of charged particles p, d, t, γ. We can study similar processes at gas discharge over palladium cathode, at change of phase in various crystals saturated with deuterium, at radiation treatment of deuterium mixture by strong sonic or ultrasonic flux, in cavitations micro-bubbles in heavy water, in a tube with palladium powder saturated with deuterium under the pressure of 10-15 standard atmospheres and others. In some reactions, (for example at $d + t \rightarrow \propto + p$) neutrons with the energy 14 *MeV* are absent; one can meet the same strange situation in other cases too. Thus the participation of nucleus Li^6, Li^7 ,in reactions with deuterium and protons, while the reaction

$$K^{39} + p \rightarrow Ca^{40}$$

was fixed even in biological objects. But the most intriguing fact in all these processes is the lack of fusion products that could explain the calorific effects. Thus, in some cases the number of fusion products (tritium, helium, neutrons, and quantum) should be million times more to give any explanation of the quantity of the heat evolved. So great energy liberation can be explained neither by chemical or nuclear reactions nor by changes of phase. More details about the magic source of such energy are given in the books [3, 4,17, 21].

There are especially many such facts in the fringe areas, where different sciences are closely and unusually intertwined (for example, biology, physics, chemistry). On the grand scale, life itself, realized as a form of existence of protein objects, is a big mystery. It is an anti anthropic process, maintaining order in the world of chaos. Its explanation from the point of view of a big fluctuation cannot, essentially, explain anything.

Other phenomena occurring in living objects are not less mysterious. Stability of DNA, giving the probability of mutation of no more than 10^{-7}regardless of local conditions and the make up of nutrient media, is one such mystery. This fantastic procreative consistency throughout the whole specter of external conditions cannot be explained by the effect of a DNA polymerase controlling that process. In a nutrient environment, some necessary chemical elements may be missing, external conditions may change, and yet the process of undistorted and non-mutating procreation prevails with constantly high efficiency! Even super powerful radiation

fields cannot disrupt it. The bacterial culture "Deinococcus Radiodurans" comfortably lives, multiplies and does not mutate in radiation fields with the dose exceeding 10 Mrad. Many structural materials cannot sustain such dose of radiation (not to mention such materials as crystallized silicon, which is the basic material for all microelectronic devices, and which completely degrades in such conditions), but a biological object, maintained by the rules of genetic information can successfully live and develop! It appears that biological objects have an internal source of high stabilitv and reliable self-regulation, which inanimate objects do not have. How does it happen? Where is that internal source of stability? What are the limits of self-regulation? Can these processes be controlled?

Why can a living system, seemingly fragile and sensitive to external conditions, perform the process, which is practically impossible to achieve (at least with a comparable degree of efficiency) in inanimate objects? How does it do it? Why does it do it?

When answering these questions, we proceeded strictly from solid facts and methods of modern science. We didn't invent new myths, but based our deliberations on the principle of "not to create any substance in excess of the necessary" and tried to explain all facts using the tested methods, without introducing (as it is often done) a new radical theory to explain each fact. In this respect we are definite conservatives. For this reason, we don't think, that the totality of the effects being analyzed can be called "biological transmutation". That name would give it a semi-mystical flavor, which, by no means, reflects the essence. In reality, it is transmutation of nuclei (isotopes) in biological systems occurring according to strict laws of physics, but induced by certain features of biological objects' structure, functioning as stimulators and intrinsic in dynamic living systems.

The series of works by Louis C. Kervran (Kervran, 1963, 1966, 1968, 1998) holds a special place in the chronology of transmutation of chemical elements and isotopes in biological objects. Effectively, he was the first scientist of the post-nuclear era, who conducted systematized research of possible transmutational processes of chemical elements in biological objects.

In his works Kervran gave numerous examples of unusual changes in the chemical composition of various biological objects, which occurs during their growth. He explained these changes on the basis of existing concepts of transmutation of chemical elements. For example, among the most important, he investigated the reaction of potassium transmutation into calcium in the biological system containing hydrogen (with a participating proton). His works contain reasonably convincing experimental results. This data corresponds to changes in potassium and calcium content in the process of growing seeds and were obtained from the analysis of 840 seeds and 403 sprouts. It can be seen that the decrease in the amount of potassium (K = -0.033 g) and the increase in the amount of calcium (K= 0.032 g) are approximately equal. Meanwhile, the amount of magnesium stays practically unchanged.

Kervran also investigated many other reactions of transmutation of isotopes, among which several should be specifically noted for their vital activity importance in producing essential elements *Ca, K, Mg, P*.

$$Mg^{24} + O^{16} = Ca^{40}$$
$$Si^{28} + C^{12} = Ca^{40}$$
$$Na^{23} + O^{16} = K^{39}$$

The objective of conducted experiments was detection and study of the possibility of running a low-temperature transmutation of isotopes in growing microbiological cultures.

Having acknowledged the need for simple registration, we made the decision to use the Messabauer effect on the basis of isotope Fe^{57} in our first experiments. Iron is the integral part of the majority of live organisms. Importantly, for most biological objects, the "regular' isotope Fe^{57} and the rare Mossbauer isotope $Fe^{57}$are identical. From the point of view of nuclear physics, they are completely different nuclei.Those experiments were based on the expected synthesis reaction of the Mossbauer isotope Fe^{57}

$$Mn^{55} + D^2 = Fe^{57}$$

in a microbiological culture, that grows in the iron-poor water-salt nutrient medium based on the heavy water D_2O containing manganese salt. Among the undisputable advantages of using manganese is its single stable isotope Mn^{55}. This circumstance makes interpretation of experimental results unambiguous.The result of the expected synthesis reaction is formation of a rare stable isotope Fe^{57}, concentration of which in natural iron is very small and equals 2.2%. The apparent advantage of this reaction is because Fe^{57} is the most studied Mossbauer isotope, it can be easily identified using the Mossbauer effect. Accumulation of this isotope with increasing the reaction's efficiency and its duration makes possible (at least in perspective) to study temporary patterns of transmutation process. Above that, since natural concentration of Fe^{57} isotope is small, its synthesis can be easily registered by traditional mass-spectrometry based on the analysis of changes in relative distribution of isotopes of iron.In the course of conducting the experiments, a thorough check for artifacts was performed.

The experimental data has shown that:

Isotope Fe^{57} is not found in significant quantities in the ingredients of the nutrient medium;

Isotope Fe^{57} is not present in heavy water and cannot be extracted from glass or air during the microbiological culture's growth.

The structure of the gamma-absorption specter of Fe^{57}isotope in cultures grown in the media based on light and heavy water is the same.

Therefore, Fe^{57} isotope, detectable after completion of the microbiological cultures' rowth in the optimal nutrient medium is not related to artifacts and is generated in the low-temperature reaction of nuclear transmutation

$$Mn^{55} + D^2 = Fe^{57}$$

in the process of these cultures' growth.

Finally, we shall examine thermodynamic consequences of the given reaction. Since the synthesis reaction $Mn^{55} + D^2 = Fe^{57}$is energetically efficient and should run with energy emission, the average power, which could be generated in the dish with the optimal nutrient medium, can be calculated from the difference of mass defects of the nuclei participating in the reaction $Mn^{55} + D^2 = Fe^{57}$.The difference of mass defects of the isotopes participating in the reaction of transmutation is equal 15.605 *MeV*. Using the experimentally obtained values, authors [17] calculated that the average power, generated during the process of transmutation in a dish with volume *V*= 10 *cm3*, does not exceed the value of 75+40 *mWt*. Leaving aside the special question of distribution of this energy among products of the reaction, we note, that this power — even if fully conversed into heat — could not significantly alter the thermal regime of culture's growth (especially provided that the growing process was performed in an automatic thermostat).

With other hand, may be, there is no nuclear energy liberation, because the nucleus remains stable both before and after reaction. Apparently, that is absolutely new type of nuclear transmutations unacknowledged by modern nuclear science, but experimentally discovered sufficiently long ago.

The deeply studied interaction d+d proceeds along three channels:

D + D ---> T(1.01) + p(3.03) *(1 channel)*

D + D ---> He (0.82) + n(2.45) *(2 channel)*

D + D ---> He + γ (5.5) *(3 channel)*

These reactions are exothermic. The third channel has very low probability. In the result of experiments it have been discovered that these reactions can take place at indefinitely small values of energies. In molecule of D^2 the equilibrium distance between atoms is 0.74A and according to standard quantum theory these two deuterons would be able to come into nuclear fusion by chance. But the value of the interaction is quite small [5] and $10^{-64}c^{-1}$equals . There is an estimate well known in literature [5]: the water of all seas and oceans contain 10^{43} deuterons and there would be only one fusion within 10^{14} years.

It is evident from the sated above that the main obstacle preventing *D+D* reaction is the presence of an extremely high Coulomb barrier. The approach given in the [3, 4, 21] allows to solve that problem. The UQT also gives such possibility. Solutions of some UQT equations show that distance the deuterons could draw close depend strongly on the phase of wave function (by the way that is absolutely evident by intuition).

III. Lern and Nuclear Transmutations at the Unitary Quantum Theory

Let us consider the motion of a charged particle to the nucleus from the viewpoint of UQT using the equation with oscillating charge in one-dimensional case [3, 4, 6-11, 21]. Assume there is an immovable nucleus with the charge *Ze* placed in origin *x=0*, and the particle with the charge *Ze*, and mass *m* is moving towards this nucleus with some initial velocity along axis x. Autonomous and non-autonomous equations of the particle motion were deriving from Schrodinger equation for very small kinetic energy [3, 4, 6-11,21] and have the following form for Coulomb potential :

$$m\frac{d^2x}{dt^2} = \frac{2Zze^2}{x^2}\cos^2\left(\frac{m}{\hbar}\frac{dx}{dt}x + \varphi_0\right), \quad (3)$$

$$m\frac{d^2x}{dt^2} = \frac{2Zze^2}{x^2}\cos^2\left(\frac{m}{2\hbar}\left(\frac{dx}{dt}\right)^2 t - \frac{m}{\hbar}\frac{dx}{dt}x + \varphi_0\right), \quad (4)$$

where $\varphi_0$is the initial phase. These equations were numerically integrated under following starting data: Z=*z*=1,*e*=1,*m*=1, $x_0 = -10, \hbar = 1$ and different initial velocities and initial phases. As it were expected, the particle's braking and acceleration took place in the moments the oscillating charge is big. But at the final stage at some initial phases close to $\pi/2$ a delightful process appeared. The velocity, charge and repulsive force are very small. Due to the phase relationship small charge stay constant during long period, and that means that nothing affects particle (or, rather, its remainder), the particle very long snails with low and constant velocity inside the other particle field ("snail effect") and may approach its center at close distance. That process bears a strong resemblance to slow inconspicuous spy penetration into the hostile camp.

That phenomenon appears within some area of phases and is convenient to call it a phase hole, which is illustrated by plots in Fig.2 (obtained after integration of the equation (4)). Besides, it may be possible now to explain one of the anomalies of the nuclear physics (which as if does not exist according to physics literature). When the nucleon energy equals 1 *MeV* its velocity equals 10^9 *cm./sec*., nucleus radius equal to 10^{-12} *cm*., the time of flight through nucleus equals 10^{-21} *sec*., but time interval within which the nucleon flies out is usually anomalous huge - 10^{-14} *sec*, it is even out of understanding what does the nucleon do

inside the nucleus for such a long time? But it can be easily explained in the frame of our theory by "snail effect". That phenomenon is studied more detailed in books [3,4].

For the same equation, the minimal distance between charges was computed depending as a function of the velocity and at various values of the initial phase. For comparison, the result of classical computation on the base of Coulomb law is shown in Fig.2. We can see from the same plots that the minimal distance at which the particle is able to come near the nucleus does not depend on the kinetic energy. But with the decrease of velocity the width of initial phase interval corresponding to minimal distance decreases too. In other words with decrease of energy the probability of nuclear fusion also decreases. We obtain on the whole the same results for autonomous equation (3).

In accordance with the standard quantum theory the relation of fusion velocity along tritium and neutron channels should be near unity: $\frac{t}{n} \sim 1$. But the results of numerous experiments of the cold fusion show that value greatly differs from unity and equals to $\frac{t}{n} \sim 10^9$. That value is reproduced in different experimental situations and by various experimental groups with a high accuracy. Till now that quite intriguing problem have not been solved. We will try to explain the possible reason for that. Neutrons are influenced at low velocity within the phase hole by forces of nuclear attraction and protons - by the forces of electrostatic repulsion. Under the influence of momentum of given forces the deuteron had enough time to turn in such a way that its neutron parts are turned to each other. After the neutrons attraction the saturation of nuclear forces appears. That weakens the connection between protons and one of them is able to leave the system. Schematically, the reaction may be rewritten in the form

$$d + d \rightarrow p + (n + d) \rightarrow p + t$$

That looks like effect of Oppenheimer-Phillips [12].

But it is precisely known that at high energies the probabilities of the first and the second channels of the reaction are similar and that phenomenon should be anyhow explained. The growth of the probability of neutron channel with the increase of the energy may deal with the secondary neutrons birth in reaction *T + D = He + n (14.1 MeV).* In medium full of heavy hydrogen the most part of being born tritons will transform into neutrons due to that reaction. The cross-section of this reaction is equal to 5 barn at energy of 70 KeV. In accordance with the estimate in [12], the numbers of so secondary neutrons for one triton are $7.9 * 10^{-12}$; $1.7 * 10^{-9}$; $2.7 * 10^{-6}$ for the triton energies 10, 20 and 100 KeV correspondingly. Thus the prevalence $\frac{t}{n} \sim 10^9$ must be expected in those reactions only, where the birth of tritium corresponds to energies higher than 40 *KeV* [12].

We should not think that phenomenon of phase hole will result in nuclear reaction over the whole area of the hole. We can assume that along with decrease of Coulomb repulsion value, the value of the strong interaction decreases too. How? Today nobody knows the exact equation for strong interaction potential. Furthermore the particle reaches turning points x_{min} "losing flesh (charge) enough". Will the particle be able to participate in an honest nuclear reaction or just pass it through as an electron in s-states of atom does? But there are very narrow phase areas where shortly after the particle stops its charge is rapidly growing and particle velocity increases abruptly. The charge may be even maximal within the scope of nuclear forces. Apparently this narrow area is responsible for the cold nuclear fusion. And probably at strong interactions the phase hole is working too.

It was discovered long ago that nuclear transmutations are wide spread (it is especially evident for plants and biological objects), but they are faintly connected with energy liberation. The examples of such reactions are:

$$Mn^{55} + p \rightarrow Fe^{56}$$

$$Al^{27} + p \rightarrow Si^{28}$$

$$P^{31} + p \rightarrow S^{32}$$

$$K^{39} + p \rightarrow Ca^{40}$$

In reactions of such a type very slow proton (its kinetic energy is equal practically to zero) is penetrating inside the nucleus by the above-mentioned way and stays there. *There is no nuclear energy liberation,* because the nucleus remains stable both before and after reaction. In accordance with classical nuclear physics, the nucleus, as usual, after a charged proton with great kinetic energy gets inside it, becomes unstable and breaks to pieces, and its fragments obtain bigger kinetic energy. The reactions of above-mentioned type were considered impossible at all at small energies and therefore were not studied in the classical nuclear physics. *Apparently, that is absolutely new type of nuclear transmutations unacknowledged by modern nuclear science,* but experimentally discovered sufficiently long ago. Today there are a lot of experimental data confirming the mass character of nuclear transmutation. Moreover there are many projects of nuclear waste neutralization that use this method. The journals "Infinite Energy", "New Energy", "Cold Fusion", "Fusion Facts" etc. and Internet is full of such projects.

Of course, if the charge of a nucleus changes, then the electron shells of atom also will reform, but the energy dealing with that process will be of few electron-volts order and cannot be compared with in any case with the energies of nuclear reactions that are from units till hundreds of billions electron-volts. By the way,

experts in nucleonic got used to that range energies in nuclear reactions. Exactly that circumstance forces them it to reject a priory the presence of any nuclear processes in biology, because at such debris' energies dozens and hundreds of thousands of complex biological molecules will be destroyed.

Quite far ago Louis C. Kervran [13] has published the book about nuclear transmutations in biology, and now nearly 20 years after it was reissued! Apparently for the first time numerous experimental data describing the above-mentioned phenomena were presented. The reaction of official science was also quite interesting. For example, the well-known physician Carl Sagan after having read the book about experimental results advised Kervran to read an elementary course of nuclear physics!

A little bit later Panos T. Pappas [14] researched one of the nuclear reaction perfectly observed within biological cells, viz.

$$Na_{23}^{11} + O_{16}^{8} = K_{39}^{19}$$

The existence of *K-Na* balance is well known in the classical biology for the long time. The ratio between quantities of *K* and *Na* ions is kept with a great accuracy in spite of presence of any K or *Na* ion in the food. Later in the work [15] that nuclear reaction was called "equation of life" and M.Sue Benford proved with direct physical methods the presence of such nuclear reactions in biological objects. To our regret there are too few researches of those problems in biology. We know about the existence of such groups in Japan (Komaki), India and Russia.

All programs of controlled nuclear fusion are based on meaningless heating and pressing of the respondent material. In spite of successes achieved, the head of such a group in England Dr. Alan Hibson (private communication) announces few years ago that not less than 50 should pass before the construction of reactor for demonstration can be ready. Today that point of view becomes generally accepted. Note that the reactor itself, even if it were constructed in future (the authors greatly doubt that possibility) would be extremely complicated, expensive and environmentally pollutant.

Classical approaches have not achieved positive results yet in spite of investments of many billions and huge number of physicists, engineers, maintenance staff, managers and chief-managers involved. Of course that enormous army of researches became a potential enemy of any alternative projects of fusion. It was note that "vitality" of any idea is directly proportional to the amount of persons involved and capital invested. Those were the reasons why works of M.Fleishman and S.Pons were given a hostile reception.

Each program of controlled nuclear fusion has adjective "controlled", but as a matter of fact there is no control at all. The initial quantity of respondent material is simply very small, quite providently we should say. For example a ball of lithium deuteride used for laser reduction is near 1-2mm in diameter. But nobody has at least examined the question of energy recovery to be generated in the result of that ball explosion. By the way the energy from that explosion is nearly equal to energy obtained in the result of an anti-tank grenade explosion.

Straightforward approach to nuclear fusion used by modern science is absolutely natural because there is no method in the standard quantum mechanics to influence that process. The future of systems of really controlled nuclear fusion will possibly lie not on the path of the primitive and meaningless heating and pressing of the respondent material but on the path leading to the collision of nuclei possessing a small charge and micro adjusted wave function phase.

That is possible in principle by the superposition of controlling external electromagnetic field on the reactive system containing quasi-fixed order atoms of deuterium and free deuterons. The special atomic lattice geometry may produce the same characteristics. Dispersion of a deuterons flow due to diffraction on such lattice will result in automatic selection of deuterons in energies and phases.

Apparently in electrochemical experiments carried out by M. Fleishman and S. Pons, such ordered system existed inside the Pd-D lattice and as the result appeared weak phasing able to explain the results of experiments raised [18,19].

We suppose that in future models of the reactors in contrast to all existing projects will react in any moment of time only the smallest part of deuterons automatically selected relative to initial phases. It could be possible to obtain in result the small energy generating during long period of time until the reserve of light reacting nuclei will not be exhausted. That fusion does really have the right to be called "controlled".

Today we can imagine that in the future the processes of cold fusion will be adopted probably not in energy production but for atomic wastes utilization and isotopes manufacture.

Many experimentalists [18,19] discovered that the quantity of the heat generated in the common water electrolysis over nickel electrodes (in that system we cannot even expect nuclear fusion presence) were the same as in the case with electrolytic lattice with heavy water. That fact confirms the results of other experiments in the process of which it was discovered that the number of fusion products was in millions times less than it was necessary for that quantity of generated heat, and its origin was mysterious. We had examined the question of heat origin in books [3.4, 21].

The thermal cell CETI (created by James Patterson in 1995 [20]), where is going on an electrolyze of specially manufactured nickel bolls in common water, has shocked scientists in USA. American newspaper «Fortean Times» No 85, 1995, wrote about it: "December

the 4th, 1995 will go down to history!". At that day the group of independent experts from five American Universities tested the work of new energy source with stable output heat rating 1.3 kWatt. The electric energy input was 960 times less." All experts noted that generated heat had enigmatic origin and would not be explained neither by chemical or nuclear reactions nor by phase transitions. By American ABC TV there were two telecasts at 7th and 8th of February, 1996 in cycles «Nightline» and «Good Morning America» about Patterson creation of new source of energy, able to generate in hundred times more energy than it had consumed. And again it were accentuated that the origin of generated heat remains mysterious. It is interesting that American Company Motorola made attempts to buy the patent for cell CETI for US$ 20.000.000, but was rejected. We are sure that Motorola Company had spent a certain sum for the study of that problem before making so serious an offer. All processes within the Patterson cell do not concern nuclear reactions (although Patterson thinks otherwise), and at our opinion can be explained with the same processes used here above [3, 4, 21] for the description of proton-conductive ceramics.

IV. Dynamic Processes in Low Energy Nuclear Reactions

Further we will give certain concrete data demonstrating the phase values of a deuteron with an oscillating charge, under which the deuteron can approach the nucleus to a critical distance of 10-12 cm or less, i.e. giving the data for estimating the value of the above-mentioned phase hole in the interval (0,π) of the phase change.

Assume that the stationary nucleus with the charge q is placed at the coordinate origin $x=0$ and a deuteron with the same charge q is placed at the initial moment $t=0$ at the point $x_0 < 0$ on the x-axis, and the deuteron velocity equals $\dot{x_0} = v_0 > 0$. The units of mass, length and time are chosen in such a way that $m=1$ deuteron mass, $c=1$light velocity, $\hbar = 1$. Charge q equals 0.085137266. Our units are connected (up to 4 significant figures) with the system (*kg, m, s*) as follows:

$$1 \text{ mass unit} = 3.345 \cdot 10^{-27} \text{ kg},$$

$$1 \text{ length unit} = 1.049 \cdot 10^{-16} \text{ m},$$

$$1 \text{ time unit} = 3.502 \cdot 10^{-25} \text{ s}.$$

The electron velocity corresponding to its energy of 1 *eV* equals $5.931 \cdot 10^7$ cm/sec. The deuteron velocity corresponding to such energy will be assumed to be 3680 times less, and in our units it will be $5.372 * 10^7$ (if $c = 3 \cdot 10^{10}$ cm/sec). Then the deuteron movement towards the nucleus is described by the equation

$$\ddot{x} = -\frac{2q^2}{x^2}\cos^2\left(\frac{1}{2}(t+t_*)\dot{x}^2 + x\dot{x} + \varphi_0\right), \qquad (5)$$

where the parameter t_* is defined under the condition that the argument of cosine equals φ_0 for

$$t = 0, x = x_0, \dot{x} = \dot{x}_0$$

(thus $t_* = -(2x_0)/\dot{x_0}$), and this parameter may be considered as the initial moment of so called local time.

We are particularly interested in solutions of (5) under very small deviation ε from the phase $\varphi_0 = \frac{\pi}{2} + \varepsilon$ and rewrite (5) in the following form:

$$\ddot{x} = -\frac{a}{x^2}\sin^2\left(\frac{1}{2}(t+t_*)\dot{x}^2 + x\dot{x} + \varepsilon\right), \qquad (6)$$

where a=0.0144967. Let the initial x_0 be equal 500000 of our length units (i.e. approximately $5 * 10^{-9}$ cm) and the initial deuteron velocity v_0 be equal to the velocity v_{00} corresponding to the deuteron energy of 1 *eV* or less. But it turned out that the precision of numerical integration of this equation under such initial conditions and under values $|\varepsilon| = 10^{-15}$ and less is small and besides the interval of the integration must be very large. That is why this equation also had to be transformed by passing to "slow" time $\tau = |\varepsilon| t$ to the equation with respect to the variable $w = \left(\frac{dx}{d\tau}\right)^2$ as a function of x:

$$\frac{dw}{dx} = -\frac{2a}{x^2}\left\{\frac{1}{\varepsilon^2}\sin^2\left[|\varepsilon|\left(\frac{1}{2}(\tau+\tau_*)w + x\sqrt{w} \pm 1\right)\right]\right\}, \qquad (7)$$

where $t_* = -(2x_0)/\sqrt{w(x_0)}$ and $+1$ if $\varepsilon > 0$, and -1 if $\varepsilon < 0$. It must be added also the equation for τ as a function of x

$$\frac{d\tau}{dx} = \frac{1}{\sqrt{w}}. \qquad (8)$$

The system of equations (7,8) is, so to say, a "model" system describing fairly accurately (from viewpoint of quantities data) the deuteron movement under all values of $|\varepsilon|$ from 10^{-24} to 10^{-6}.

The numerical integration of this system was carried out under different values of ε and under following initial conditions:

$$w(x_0) = 2.103, \tau(x_0) = 0 \qquad (9)$$

$$x_0 = -500000\tau_* = 689573.18$$

It may be noted that the initial deuteron velocity v_0 equals 1.450172 (following the relation

$$\dot{x_0} = |\varepsilon|\sqrt{w(x_0)}$$

for given initial $w(x_0)$ and for $|\varepsilon| = 10^{-7}$, i.e. such velocity is approximately 3.7 times less than velocity v_{00} corresponding the deuteron energy of 1

eV. If $|\varepsilon| = 10^{-6}$ then the velocity v_0 is approximately 2.7 times greater than velocity v_{00}.

It turned out that the numerical tables for values of w, τ obtained under different values of $\varepsilon<0$ in the interval $-10^{-24}, -10^{-6}$ don't differ essentially from each other. The following table is true up to three-four significant figures for τ and $\frac{x`}{|\varepsilon|} = \sqrt{w}$

x	τ	$\sqrt{w}$
-500 000	0	1.450
-50 000	$1.426 \cdot 10^6$	0.0493
-500	$1.002 \cdot 10^7$	0.000489
-200	$1.067 \cdot 10^7$	0.000440
-100	$1.090 \cdot 10^7$	0.000425
-80	$1.100 \cdot 10^7$	0.000423.

If reducing the table values of x to centimeters, we obtain the following corresponding approximate values:

$$5 \cdot 10^{-9}, 5 \cdot 10^{-10}, 5 \cdot 10^{-12}, 2 \cdot 10^{-12}, 10^{-12}, 0.8 \cdot 10^{-12}$$

cm

The time interval ΔT, in which the deuteron reaches the critical distance $10^{-12}\,cm$ from the center is $1.090 * 10^7/|\varepsilon|$ of our time units or $1.090 * 10^7/|\varepsilon|$ *3.502*10^{-25} seconds. If nuclear forces are not taken into account then the deuteron may approach the distance less 10^{-12}cm.We present here for illustration the table, where the initial deuteron velocities v_0 in velocities shares v_{00} and the corresponding time intervals ΔT (in seconds) for different values of ε are listed.

ε	$\frac{v_0}{v_{00}}$		$\Delta T\ sec$
-10^{-6}		2.7	$3.82 \cdot 10^{-12}$
-10^{-7}		0.27	$3.82 \cdot 10^{-11}$
-10^{-22}		$0.27 \cdot 10^{-15}$	10.6 hours
-10^{-23}		$0.27 \cdot 10^{-16}$	106 hours

Let us note that the given data change essentially under positive values of ε ($10^{-6}, 10^{-7}$, etc.) There is some asymmetry of solutions behavior under negative and positive values ofε. The calculations show the minimal distance $|x|_{min}$ more than 500 of our lengths units even for relative big initial $w(x_0)$= 10000. Thus, if we limit ourselves to the condition that the deuteron energy is not over $(0.27)^2$eV at a distance of $5 * 10^{-9}$ *cm* from the central nucleus, and the whole process of deuteron movement towards the nucleus does not exceeds approximately 10.6 hours, then the interval $(\frac{\pi}{2} - 10^{-7}, \frac{\pi}{2} - 10^{-22})$ is approximately the sought phase hole in the whole interval $0, \pi$ of phase change φ_0 in eq. (5).

If many deuterons with energy not more than $(0.27)^2$eV at the distance $5 * 10^{-9}\,cm$ from the nucleus are equally distributed along their phases, the ratio of the length of this hole to π, equaling approximately $0.3 * 10^{-7}$, is equal to the share (or the respective percentage of $0.3 * 10^{-5}$ of deuterons overcoming the Coulomb barrier.

The above figures express at least the order of probability of the LERN occurrence, and this order is absolutely incompatible with the figures in the standard quantum mechanics mentioned above. Let us note once again that a one-dimensional problem was solved, and in case of an accurate analysis (not zero sighting distance will be taking into account) this probability will be lower. Let us also pay attention to the large time intervals ΔT calculated if $|\varepsilon|$ is very small. It explains well the effect (observed by many researchers) of continuation of cold fusion reactions even many hours after disconnection of the voltage in the electrolytic cells. This effect was named even "life after death".

As for the analysis of the deuteron movement with the help of the autonomous equation, the calculations lead to initial velocities v_0, exceeding the above mentioned numbers, although the general motion picture is the same. But the autonomous equation is interesting, because in the area of those values $x, x`$, under which the product $xx`$ has a small modulo, it is possible to replace $\sin(xx`)$ with $xx`$, and consider under ε =0 the following equation (describing the deuteron motion from initial point $x_0 > 0$ to the center)

$$\ddot{x} = a\frac{(x\dot{x})^2}{x^2}$$

This equation has a very simple analytical solution. Without giving very simple calculations, we will present the final formulas.

Let us take the following initial conditions: $x(0) = x_0 > 0$, $x`(0) = -v_0 < 0$ Then

$$\dot{x}(t) = -\frac{v_0}{1 + av_0 t}, x(t) = x_0 - \frac{1}{a}\ln(1 + av_0 t)$$

It follows from these formulas that the velocity of a particle moving in accordance with the initial equation never turns to zero, and under

$$t = t_* = \frac{\exp(ax_0) - 1}{av_0}$$

$x(t_*) = 0$ i.e. the particle reaches the center of the nucleus, its velocity at this moment being

$$\dot{x}(t_*) = \frac{-v_0}{1 + av_0 t_*} = -v_0 \exp(-ax_0)$$

so that it passes through the nucleus and moves further!

$$\dot{x}(t_*) = \frac{-v_0}{1 + av_0 t_*} = -v_0 \exp(-ax_0) \qquad (10)$$

so that it passes through the nucleus and moves further!

For example, let a=0.0144967, $x_0 = 1000 \sim 10^{-11} cm, \dot{x}(0) = 5.37 * 10^{-10} \approx 16 cm/s$, Under such initial data, the product $x\dot{x} = -0.0000537$, so it is quite possible to replace $\sin(x\dot{x})$ with $x\dot{x}$. In this case, $t_* \approx 2.3 * 10^7 \approx 8 * 10^{-18}$sec $\dot{x}(t) \approx 29.9 * 10^{-17} \approx 9 * 10^{-6} \frac{cm}{sec}$.

These figures fit well into the reasonable framework, so the autonomous model can also be of use for the movement analysis in the problem under review. The phenomenon of particle passage through the Coulomb potential accounts very well for the existence of pendulum orbits in the Bohr-Sommerfeld model, when in states *1s,2s,3s* etc. the electron passes through the nucleus. Such states in the strict theory and experiment have no impulse, so in the Bohr-Sommerfeld model they were discarded as absurd. Now they have a right to exist. Further, the experimental data for angular distribution of non-elastic scattering by nuclear reactions (including reactions with heavy ions) reveal the big amplitude of the scattering forward. It is impossible to explain such effect by the formation of intermediate nuclei but it may be explained from the viewpoint of our UQT.

V. Harmonics Oscillator at Unitary Quantum Theory and Energy Generation

Let us examine two variants of equations (3,4) for parabolic potential $U \sim x^2$ in the scalar case:

$$\ddot{x} = -2qx\cos^2(-x\dot{x} + \phi)$$

(autonomous equation) and

$$\ddot{x} = -2qx\cos^2(\frac{1}{2}\dot{x}^2 t - x\dot{x} + \phi) \qquad (11)$$

(non-autonomous equation),

where q is the constant part of particle's oscillating charge and ϕ is the initial phase, that may be represented as ϕ =π/2 +ε, where ε - phase deviation from π/2. As far as cosine is squared, it is quite enough to examine different values of ϕ and ε within intervals from 0 to π or from -π/2 to π/2.

The character of the particle motion to be described by these equations essentially depends just on ε. So we substitute equations (10), (11) for the following:

$$\ddot{x} = -2qx\sin^2(-x\dot{x} + \varepsilon), \qquad (12)$$

$$\ddot{x} = -2qx\sin^2(\frac{1}{2}\dot{x}^2 t - x\dot{x} + \varepsilon). \qquad (13)$$

The numerical integration of these equations [21-29] yielded four types of solutions:

1. damped oscillations with amplitude, tending to zero; meanwhile particles sometimes assume a "phantom" state; in that case their wave packets are spread all over Universe;
2. irregular oscillations, remaining constant over a long period of time, thus yielding a quasi-stable situation;
3. oscillations with monotone increasing amplitude. In some cases these oscillations may abruptly enter a trajectory towards infinity; meanwhile cosine argument and the particle's charge approach zero. It may be said that in that case the particle abruptly assumes a "phantom" state;
4. the particle almost immediately enters an escape trajectory and rapidly approaches the "phantom" state without any preliminary oscillations (it can be said without "preliminary doubts").

In summary, only four variants of particle motion are possible: energy increase or decrease, stable and with vanishing particle (transformation into the "phantom" state).

These solutions have been reported for the first time by one of the authors (L.S.) at the conference ICCF5 taking place in Monte-Carlo [26] and published in [21-29], and called: «maternity home», «crematorium», stable and "ghostly". The first three solutions correspond, in general, to Fig. 4. The solution passing into "phantom" state has analogous to solutions of Shroedinger's equation containing Hermite functions, because the exponential "tails" of the wave function exist always out of parabolic well.

The standard quantum theory carefully avoids the question of conservation laws for single events at small energies. Usually that question either does not being discussed at all, or there are said some words that quantum theory does not describe single events at all. But these words are wrong, because the standard quantum theory describes, in fact, single events, but is able to foreseen only the probability of that or other result. It is evident that at that case there are no conservation laws for single events at all. These laws appear only after averaging over a large ensemble of events [30]. As the matter of fact it can be easily shown that classical mechanics is obtained from quantum one after summation over a large number of particles. And for a quite large mass the length of de Broglie wave becomes many times less than body dimensions, and then we cannot talk about any quantum-wave characteristics any more.

VI. Conclusion

Discussing LERN problems, it seems as a good idea to pay some attention on dramatic story of extremely interesting results in biological investigations of transmutation of isotopes in biosystems. The problem of transformation of the matter became perfectly real.

Some words from russian scientists V.Vysotskyj and A.Kornilova in their book "Nuclear fusion and transmutation of isotopes in biological systems" [17] : ... - "On the grand scale, life itself, realised as a form of existence of protein objects, is a big mystery. It is an anti anthropic process, maintaining order in the world of chaos. Its explanation from the point of view of a big fluctuation cannot, essentually, explain anything... Stability of DNA, giving the probability of mutation of no more than 10^{-7}regardless of local conditions and the make up of nutrient media, is one such mystery.

This fantastic procreative consistency throughout the whole specter of external conditions cannot be explained by the effect of a DNA polymerase controlling that process. In a nutrient environment, some necessary chemical elements may be missing, external conditions may change, and yet the process of undistorted and non-mutating procreation prevails with constantly high efficiency! Even super powerful radiation fields cannot disrupt it. The bacterial culture Deinococcus Radiodurans comfortably lives, multiplies and does not mutate in radiation fields with the dose exceeding 10 Mrad. Many structural materials cannot sustain such dose of radiation (not to mention such materials as crystallized silicon, which is the basic material for all microelectronic devices, and which completely degrades in such conditions), but a biological object, maintained by the rules of genetic information can successfully live and develop! It appears that biological objects have an internal source of high stability and reliable self-regulation, which inanimate objects do not have.How does it happen? Where is that internal source of stability? What are the limits of self-regulation? Can these processes be controlled?"...

Numerous experiments with the LERN (including the latest of Andrea Rossi - Italy) have shown that nuclear reactions do exist but the nuclear reactions products by themselves are not enough for the explanation of huge amount of heat being produced. It is the responsibility of the UQT solutions "Maternity home" [3, 4, 21]. So it looks like catalysis mechanism described [3, 4, 22]. Besides all the equation with oscillating charge (3, 4, 5, 21-29) is quite good in describing the wave properties of the particle. We predict that experiments on the diffraction reflection of electrons from the lattice (classical experiments of Davisson-Germer) can be simulated by supercomputer, but authors do not have such possibility.

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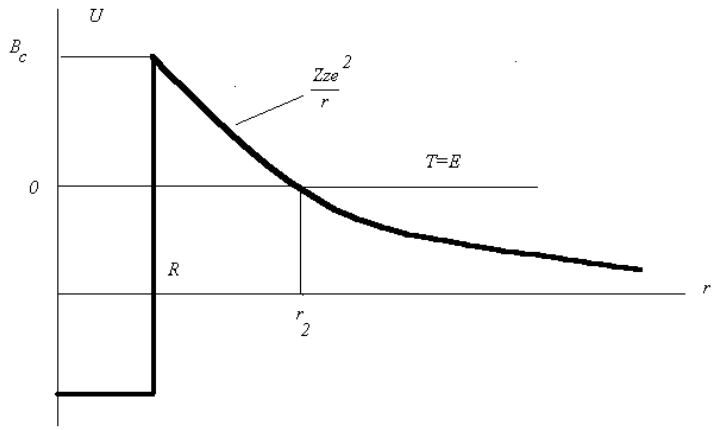

Fig. 1 : Potential corresponding to nuclear fusion

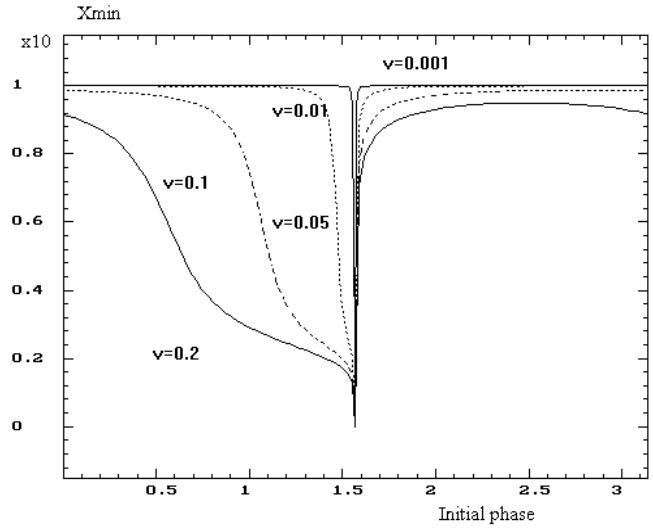

Fig. 2 : Distance to the turning point of moving charge in respect to value of initial phase for different velocities

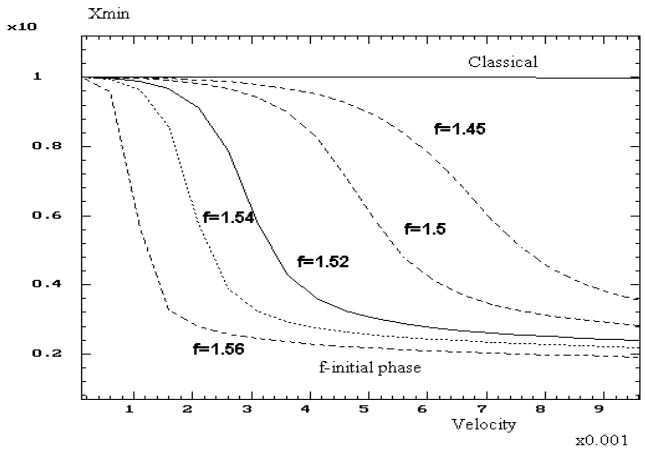

Fig. 3 : Minimal distance between charges in respect to initial velocity for different values of initial phase

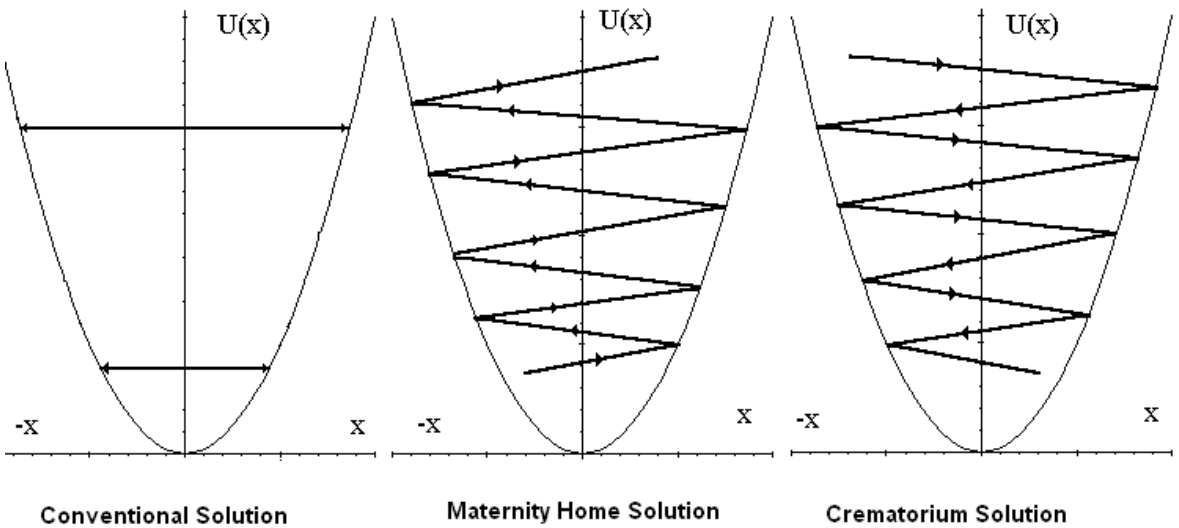

Fig. 4

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On the Practical Assessment of Signal Strength of GSM Network Service Providers

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Abstract- This paper assessed the signal strength of GSM network service providers in Kwara State Polytechnic permanent site and Ara village. The latitude, longitude and elevation of the two reference locations where the study would be carry out were picked with Global Positioning System. The first location was at the gate of Kwara State Polytechnic permanent site at latitude $08^0\ 32^1\ 37.6^{11}$ and longitude $04^0\ 38^1\ 07.7^{11}$ and Ara village at latitude $08^034^1\ 27.9^{11}$ and longitude $04^0\ 38^1\ 17.3^{11}$ with elevation of 350 and 364 meters respectively. The signal strength of MTN, GLO, AIRTEL and ETISALAT networks were measured with TECNO D3 Android mobile receiver from the Base Transceiver Station (BTS) at intervals of 100 meters. The measured data were analysed graphically and compared with each other to see the performance of each of the GSM network operators in the study area. The results revealed that the performance of these network providers are yet to be adjudged satisfactory.

GJSFR-A Classification : FOR Code: 029999

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On the Practical Assessment of Signal Strength of GSM Network Service Providers

Salawu, Mufutauabiodun

Abstract- This paper assessed the signal strength of GSM network service providers in Kwara State Polytechnic permanent site and Ara village. The latitude, longitude and elevation of the two reference locations where the study would be carry out were picked with Global Positioning System. The first location was at the gate of Kwara State Polytechnic permanent site at latitude 08^0 32^1 37.6 ^{11} and longitude 04^0 38^1 07.7^{11} and Ara village at latitude 08^034^1 27.9 ^{11} and longitude 04^0 38^1 17.3^{11} with elevation of 350 and 364 meters respectively. The signal strength of MTN, GLO, AIRTEL and ETISALAT networks were measured with TECNO D3 Android mobile receiver from the Base Transceiver Station (BTS) at intervals of 100 meters. The measured data were analysed graphically and compared with each other to see the performance of each of the GSM network operators in the study area. The results revealed that the performance of these network providers are yet to be adjudged satisfactory.

I. Introduction

The penetration of telecommunications has been found to have a significant positive impact on growth. Mobile penetration in particular, being easier and cheaper to supply than fixed telephony, can be expected to play a crucial role in the economic growth of African and other developing countries Sridhar, (2004). From time immemorial, information and communication have fashioned the basis of human existence. People want to communicate their family and friends and to be communicated. This desire has been a driving force, inspiring people to continuously seek for a new and effective means of dissemination of information to one another on real time basis irrespective of distance. The development in technology ushered in this desire with advent of the first generation cellular telephone systems that enable people to communicate with one another irrespective of time and place. This first generation cellular telephone system, which was analog system, was launched in 1960s before digital communication became prevalent [Hillebrand, (2001), Popoola et al, (2009), Codebreaker, (2011), Redl, Weber, Matthias and Oliphant, (1995) and (1998)].

The rollout of GSM services across Kwara State and Nigeria at large has positively altered the socio-economic landscape of the State and has brought huge revenues to the operators as well as the government through tax and license fees (Popoola et al, 2009). Similarly, the citizenries have benefited immensely from the services, not only as a means of communication but it has also provided job opportunities for thousands of people in the state. However, the principal development that mars these benefits is the aggressive complaining raised by GSM subscribers regarding poor quality of services (QoS) rendered by the GSM operators in the study area. The most pathetic aspect of it is the fact that all the GSM subscribers irrespective of the operator are being affected. Based on this ugly experience, this study was embarked upon to examine the causes of this problem and find ways of ameliorating the observed defects. The paper therefore measures signal strength of GSM networks (MTN, AIRTEL, GLO and ETISALAT) in Kwara State Polytechnic permanent site and Ara village with the view to address the complaint of the subscribers.

II. Materials and Method

Two reference locations were picked within the study area with Global Positioning System. The first location was at the gate of Kwara State Polytechnic permanent site at latitude 08^0 32^1 37.6 ^{11} and longitude 04^0 38^1 07.7^{11} and Ara village at latitude 08^034^1 27.9 ^{11} and longitude 04^0 38^1 17.3^{11} with elevation of 350 and 364 meters respectively. The gate of Kwara State Polytechnic permanent site that was picked as the first location consist of arrays of cell sites. The signal strength of MTN, GLO, AIRTEL and ETISALAT networks were measured with TECNO D3 Android mobile receiver from Base Transceiver Station (BTS) at intervals of 100 meters. The linear distance covered from the array of cell site was 3,100 meters. The primary data obtained were analysed graphically and compared with each other to see the performance of each of the GSM network operators in the study area.

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III. Results and Discussion

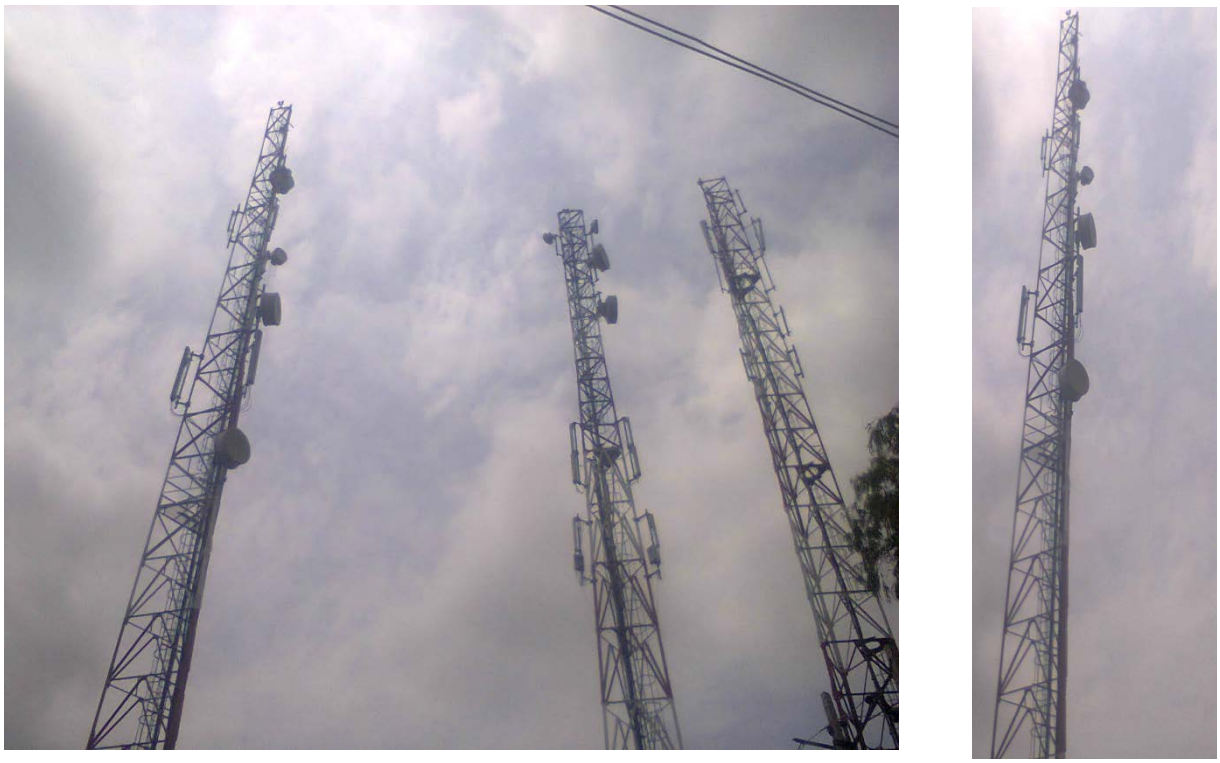

Figure 1: Array of cell sites in the study area

Figure 2 : Attenuating structures in the study area

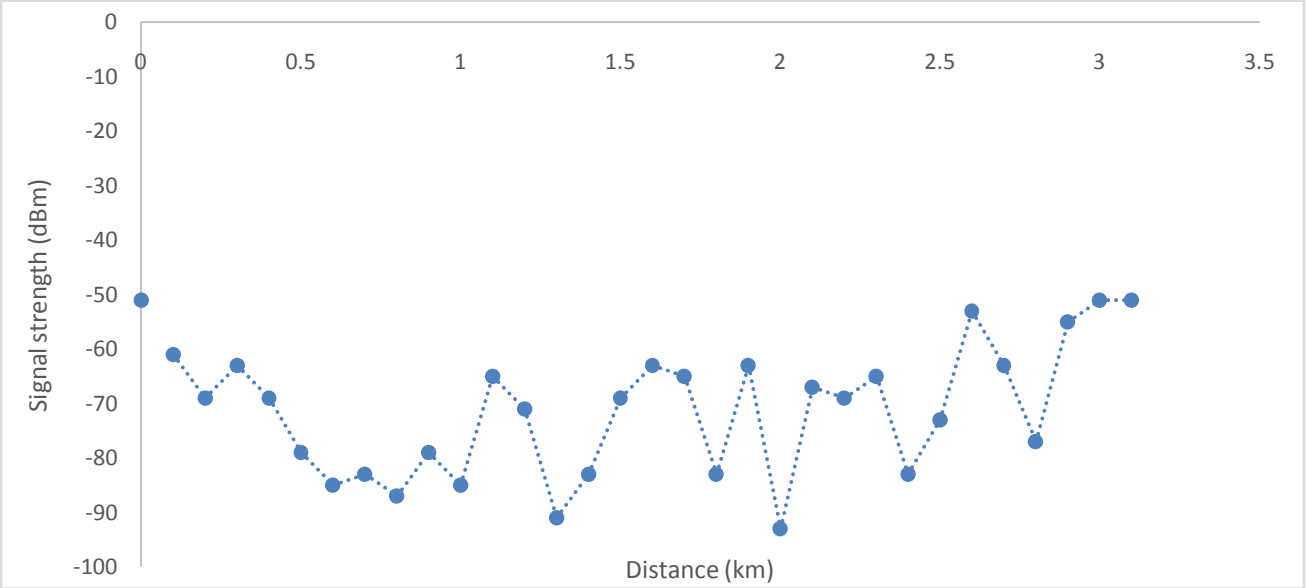

Figure 3 : Signal strength (dBm) against Distance (km) for MTN network

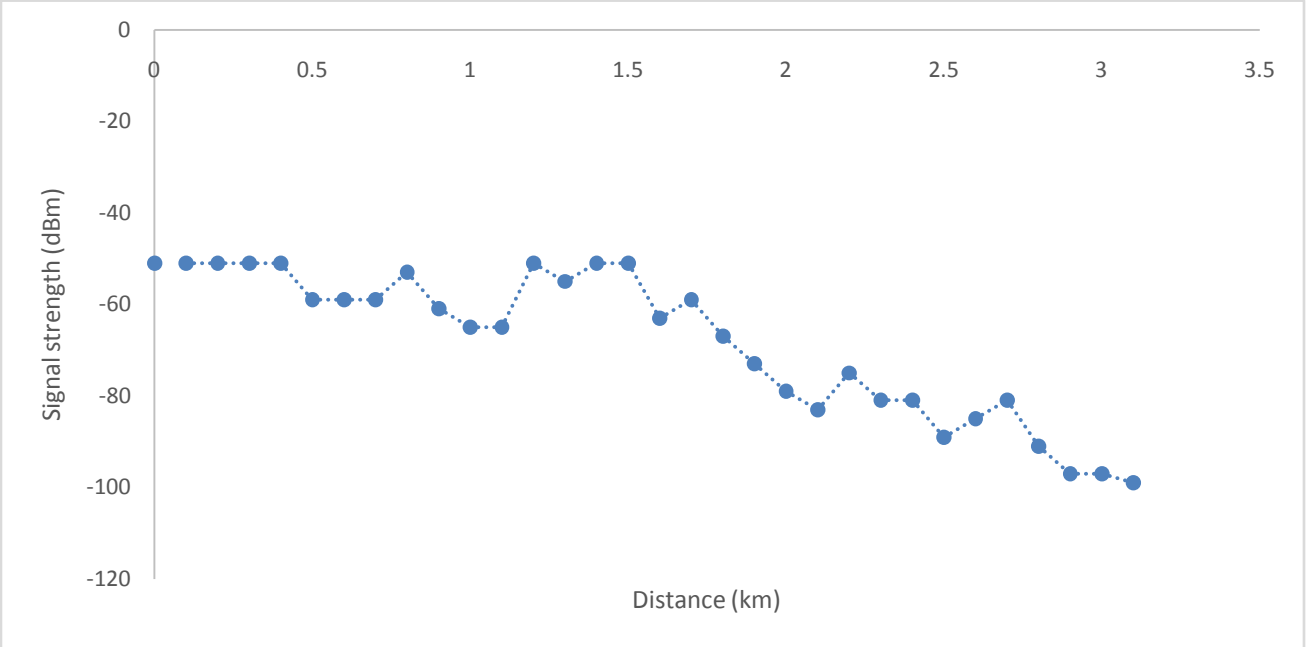

Figure 4 : Signal strength (dBm) against Distance (km) for AIRTEL network

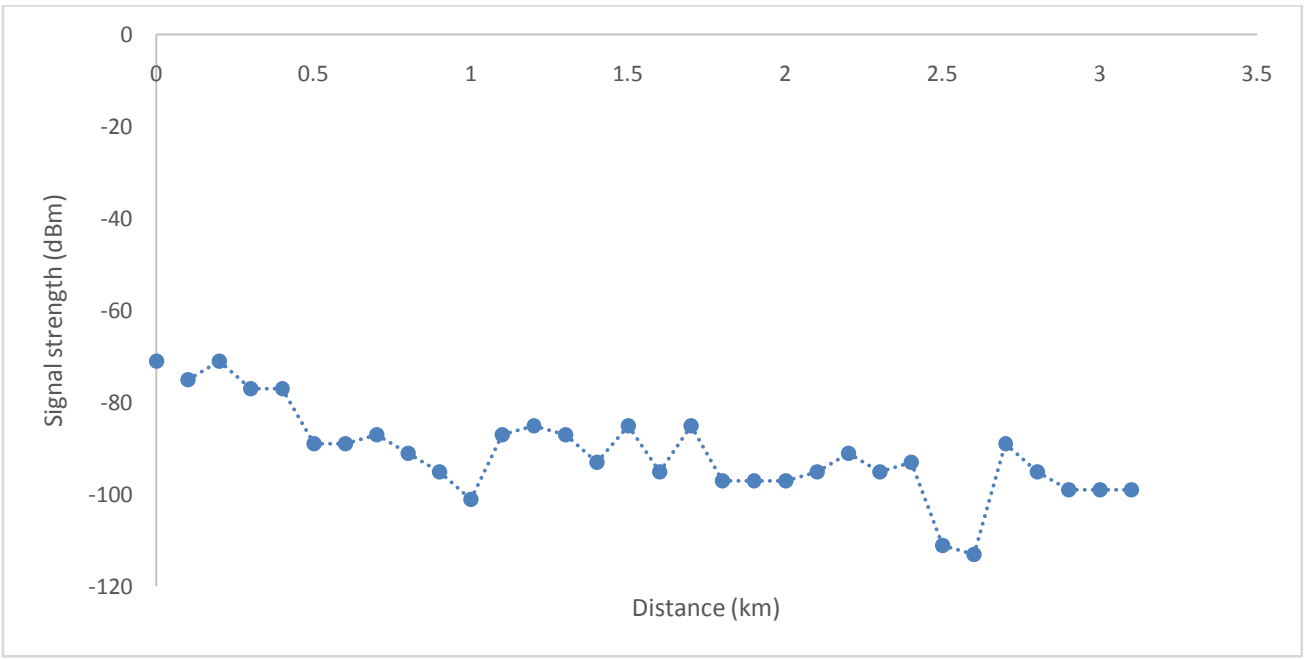

Figure 5 : Signal strength (dBm) against Distance (km) for GLO network

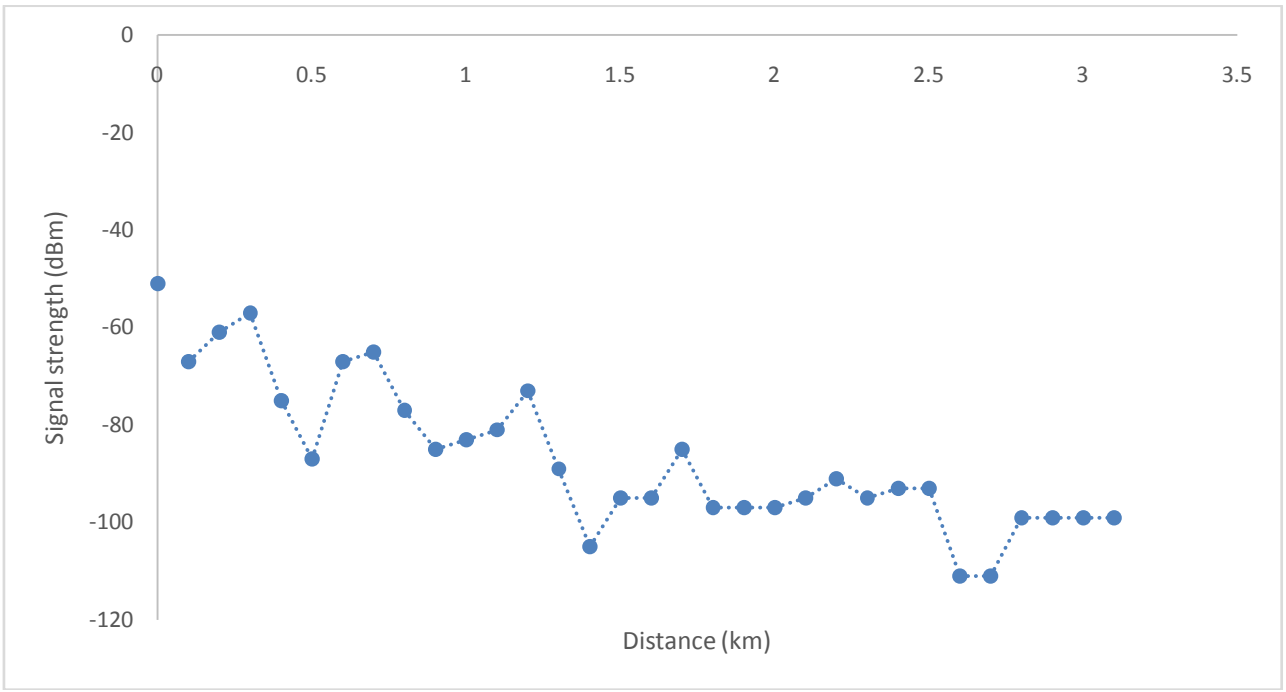

Figure 6 : Signal strength (dBm) against Distance (km) for ETISALAT network

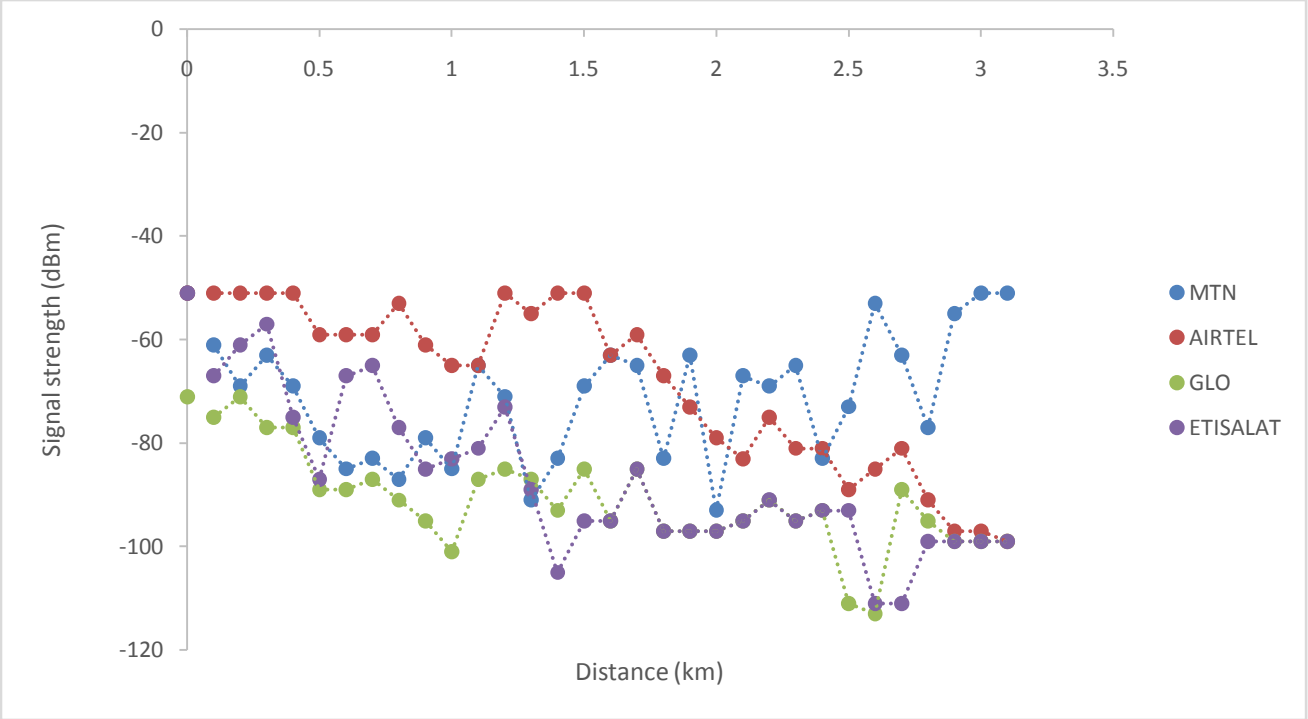

Figure 7 : Signal strength (dBm) against Distance (km) for MTN, AIRTEL, GLO and ETISALAT network

Figures 1 to 2 showed the array of cell site and the attenuating structures in the study area. Figures 4 to 7 showed the plot of signal strength (dBm) against Distance (km) for MTN, AIRTEL, GLO and ETISALAT networks. The minimum signal strength recorded for MTN is -93, AIRTEL is -97, GLO is -113 and ETISALAT is -111.From literature, it was established that gsmsignal strength of -105 to -100 dBm, call users experiences bad/drop call, -99 to -90 dBm, call users getting bad call or signal break up, -89 to -80, call users shouldn't have call problems, -79 to -65 dBm, call users experiences good call and over -65 dBm, the call is excellent. The minimum strength recorded for all the network providers in this area falls under the bad/drop call or user getting signal break up. Figure 7 compares the performance of each of the gsm network providers in the study area. With the observed values, there is no way the subscribers of all the network providers in this areas would not be encountering some bad call or signal break up.

The gsm signal fading could be associated to atmospheric ducting, ionospheric reflection and refraction and reflections from terrestrial objects such as mountain and high buildings and also to the thick vegetation in the study area. The signal strength limitation could also be associated to the uplink transmit power of the transmitters.

IV. Conclusion

Within the limits of the experimental error, the results of the signal strength measured during the field work for all the GSM networks in the study areas are unsatisfactory.

V. Recommendation

Based on the study carried out, we therefore recommend the following:

1. The GSM operators are advised to improve their quality of service to enhance mobile communication performance in the study area.
2. The GSM operators in this study areas are also advised to build more Base Transceiver Stations (BTSs) in order to increase their network coverage.
3. The thick vegetation in the study area needs to be cleared

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Paradoxes of the Theory of Gravity

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Abstract- Showing the contradictions in the physics calculations using the equations of the classical theory of gravitation. Alternatively, investigate the physical properties of space objects on the basis of the theory of vortex gravitation, cosmology and cosmogony. The obtained results allow us to evaluate and compare the above objective, physical theories.

Keywords: *ether, theory of vortex gravitation.*

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Paradoxes of the Theory of Gravity

Dr. Sergey Orlov

Abstract- **Showing the contradictions in the physics calculations using the equations of the classical theory of gravitation. Alternatively, investigate the physical properties of space objects on the basis of the theory of vortex gravitation, cosmology and cosmogony. The obtained results allow us to evaluate and compare the above objective, physical theories.**

Keywords: *ether, theory of vortex gravitation.*

I. Introduction

In the world of science, from the time of Isaac Newton (1664), the attraction of bodies to celestial objects are explained only by the fact that the mass - the amount of matter - attracts other mass. In 1915, Einstein's theory of relativity has perfected the idea.

Over the 350 years of its existence, this unproven interaction of gravity and mass of bodies turned into a canonical, the fundamental theory. In addition to this theory, in the academic, modern science does not recognize any alternative scientific concepts.

During its existence, the classical theory of gravitation has generated a lot of controversy. Generally accepted explanation for these discrepancies are not currently exist.

In this paper we propose an explanation of the paradoxes of the mutual attraction of bodies on the basis of the vortex theory of gravity.

In the second section is a summary of the basic theory of vortex gravitation.

II. Vortex Theory of Gravity

Vortex theory of gravity [1] is based on well-known astronomical fact - all the heavenly bodies revolve. The most logical explanation of the cause of this movement can be only one - the rotation of celestial objects generated vortex rotation of cosmic matter - ether. Ether forming a global system of interconnected space vortices. The orbital speed of the ether in each vortex (torsion), decreasing from the center to the periphery of the law of the inverse square of the removal. If the orbital velocity decrease of ether, then, according to the laws of aerodynamics, increased pressure in the stream. The pressure gradient generates a force pushing towards the zone with the lowest pressure, i.e. towards the center of the torsion bar. Thus, in the center of the torsion accumulates cosmic matter and creates a celestial body. Body or substances that move in orbits with torsion first cosmic velocity, are constant companions of the space system (torsion).

Consider the equation of vortex gravitation theory obtained in [1].

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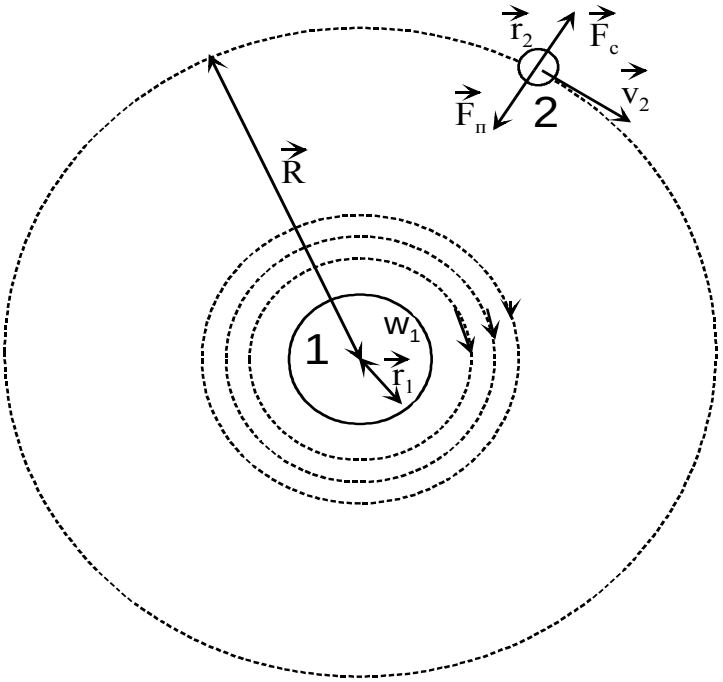

Fig. 1 : Two-dimensional model of gravitational interaction of two bodies. The forces are shown acting on body 2: F_c – the centrifugal force, $F_п$ – the force of attraction of body 2 from body 1; v_2 – linear velocity of body 2 at the orbit, r – the radius of the orbit, r_1 – the radius of body 1, r_2 – the radius of body 2, w_1 – angular velocity of ether rotation at the surface of body 1, and m_2 are the mass of body 2.

As already mentioned, due to the vortex pressure gradient arises. The radial distribution of pressure and velocity in the ether [1] defined on the basis of the Navier-Stokes equations for the motion of a viscous fluid (gas).

$$\rho\left[\frac{\partial}{\partial t}+\vec{v}\cdot \text{grad}\right]\vec{v}=\vec{F}-\text{grad}\,P+\eta\Delta\vec{v} \quad (1)$$

in cylindrical coordinates with the radial symmetry $v_r = v_z = 0 = v(r)$, $P = P(r)\varphi$, v can be written as an equation system

$$\begin{cases} -\dfrac{v(r)^2}{r}=-\dfrac{1}{\rho}\dfrac{dP}{dr} \\ \eta\cdot\left(\dfrac{\partial^2 v(r)}{\partial r^2}+\dfrac{\partial v(r)}{r\,\partial r}-\dfrac{v(r)}{r^2}\right)=0 \end{cases} \quad (2)$$

where $\rho = 8.85 \times 10^{-12}$ kg \ m^3 - the density of [2] - the velocity vector of the ether, P - pressure of ether ,η - toughness.

In cylindrical coordinates for the module gravity $\vec{F}_п$

$$F_п = V\cdot\frac{\partial P}{\partial r} \quad (3)$$

then comparing (2) and (3) for incompressible ether ρ = const, we find that

$$F_п = V\cdot\rho\cdot\frac{v(r)^2}{r} \quad (4)$$

After the necessary transformations (full account of the theory presented in [1]) is obtained:
1. equations for the force of gravity, depending on the rotational speed ether

$$F_п=\frac{4\cdot\pi\cdot r_n^{\,3}\cdot\rho}{3\cdot m_n}\cdot\frac{w_1^{\,2}\cdot r_1^{\,3}\cdot m_2}{r^2} \quad (5)$$

r_n, m_n - the radius and the mass of the nucleon.
2. The equations for determining the dependence of the pressure on the body surface P_0, the speed of rotation of

$$P_0 = P_b-\rho\cdot w_1^{\,2}\cdot r_1^{\,2} \quad (6)$$

where P_0 - ether pressure at the surface of the body, using the boundary condition $P(\infty)=P_b$ Fig. 1 is a graph showing the pressure distribution in accordance with formula (6).

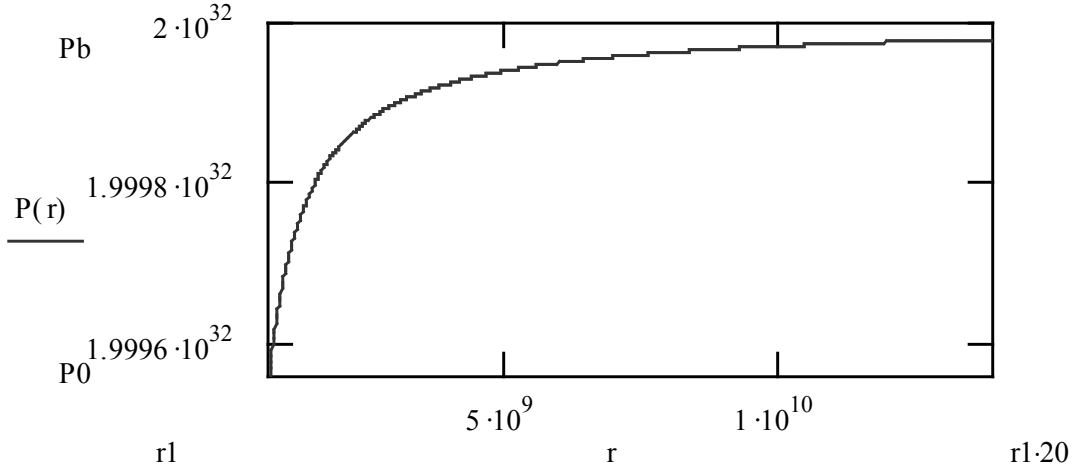

Figure 2 : The radial distribution of the ether pressure for the Sun

Equations vortex gravitation (3) and (4) show the force of gravity acting on any body (point) depends on the pressure gradient at the point in ether. The pressure is inversely proportional to the rate of ether considered orbit.The orbital velocity of the ether decreases from the center to the periphery of torsion.

III. Controversy

a) *Non-compliance of the gravitational interaction of three bodies*

In classical Newtonian mechanics, the force of gravity is determined by the Fn-known equation –

$$F_{п} = G \cdot \frac{m_1 \cdot m_2}{r^2} \qquad (7)$$

where m_1, m_2 - mass of bodies 1 and 2, respectively, G = 6.672 · 10-11 N · m^2/kg^2 - the gravitational constant, r - the distance between the bodies. Consider a few contradictions in the theory of gravitation and their explanations in terms of the vortex theory of gravity.

Approx. The units used in SI.

i. *The strength of the gravitational interaction of three celestial bodies on the basis of the theory of universal gravitation (Equation 7) –*

Determine the force effect of gravity on the moon:

- Earth's gravity - $F_{em} = 2{,}6 \times 10^{-3} \times m_m$
- Solar gravity - $F_{sm} = 6{,}0 \times 10^{-3} \times m_m$

The strength of the solar gravity is 2.3 times more than the Earth's. Therefore, the moon can not be a satellite of the Earth.

Determine the force of gravity on the actions of the Oort cloud:

- Solar gravity – $F_{sg} = 5{,}6 \times 10^{-13} \times m_o$
- Galactic gravity - $F_{go} – 2{,}3 \times 10^{-10} \times m_o$

The strength of the galactic gravity 410 times more solar. Consequently, the Oort cloud can not be a satellite solar system.

ii. *The gravitational interaction of three celestial bodies on the basis of the vortex theory of gravity. Fig. 2.*

According to equation (3) determines the strength of the vortex gravitation pressure gradient in the etheric vortex (torsion). The pressure gradient and the absolute value of a torsion bar is always directly proportional to the orbital velocity of circulation of ether, in accordance with the formulas 4 and 5.

Ether - over a low-density gas environment, consisting of very small particles - it. So he (ether) freely permeates any substance, other than nucleons. Consequently, the eddy currents crossing the torsion bars - Earth, the Sun and the Galaxy pass freely through each other. The pressure in the crossing areas depends orbital streams having the lowest speed. This is due to the fact that any counterclaim and a faster flow can not change (increase) the speed of the slower flow of another torsion. Hence, this is less high velocity determines the amount and pressure gradient. That is, we have the addition of velocities Ve + Vs = Ve. Where Ve - orbital velocity of air flow of the Earth torsion, Vs - orbital velocity air stream sun torsion.

We make a payment reduction of the absolute value of the pressure at the intersection of torsion on the basis of the equations of the theory of gravity vortex.

In the theory of vortex gravitation [1] the linear velocity of the orbital sun torsion ether flows on the surface of the Sun - $V_s = 7{,}1 \times 10^{19}$ m / c.

In accordance with the formula $v(r) \sim \frac{1}{\sqrt{r}}$

[1] on the Earth's orbit of the moon or sun vortex decreases its speed to a value V_{se} = 4,5 x 10^{18} m/c. Absolute pressure value in accordance with equation (6) is reduced by

$$- \rho \times V^2 = - \rho \times 2{,}0 \times 10^{37}$$

Linear velocity of air flow on the surface of the Earth $V_e = 1,3 \times 10^{18}$ m / c. In lunar orbit the Earth torsion live stream has a velocity $V_{em} = 1,6 \times 10^{17}$ m/c. Pressure is reduced by

$$- \rho \times V^2 = - \rho \times 2,6 \times 10^{34}.$$

Consequently, the pressure in the vortex of the Earth torsion on the Moon's orbit for three orders of magnitude higher than the pressure in the orbital stream sun torsion in the same space point. Therefore the bodies orbiting the Earth, the location of the orbits are determined by the pressure gradient only in the Earth torsion.

The dominance of the Earth torsion to determine the pressure is up to that orbit the torsion to which it can hold air in the thread.

Consider the interaction of gravitation and pressure values at the farthest satellite solar systems Oort cloud.

According to the theory of gravity vortex velocity of the ether sun torsion in orbit Oort.

$V_{so} = 1,4 \times 10^{16}$ m/c. Reducing the pressure on $- \rho \times V^2 = - \rho \times 2,0 \times 10^{32}$.

Ether velocity galactic torsion in orbit of the Sun (the Oort cloud)

$V_{so} = 1,2 \times 10^{20}$ m/c. Reducing the pressure on $- \rho \times V^2 = - \rho \times 1,4 \times 10^{40}$.

The pressure in the sun torsion eight orders of magnitude higher than in the galactic. Consequently, the position of the orbit of the Oort cloud completely determines the pressure gradient in the sun torsion.

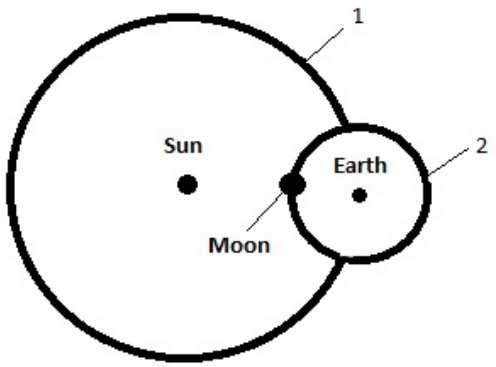

Fig. 3 : Scheme ethereal, space and gravitational torsion bars. 1 - Earth's orbit of the sun torsion ether, 2 - lunar orbit in the earth's ether torsion

b) Paradox Neumann – Seliger

Named for the German scientists K. Neumann and H. Seliger 19-th c. Has a less obvious character and the fact that Newton's law of gravity does not give a reasonable answer to the question of the gravitational field created by an infinite system of celestial bodies.

According to Section 1.2 of this article, the paradox is explained by the fact that the gravitational torsion bars do not interact with each other and, consequently, the strength of the vortex gravitation can not be combined. Consequently, the strength of the vortex gravity can not be infinitely large.

c) The masses of celestial bodies

Determine the weight of the celestial bodies can be known only by values of the forces of gravity, in accordance with equation (7). The method of selection of these masses were "determined". According to the "known" to the masses and volumes were calculated average densities of the planets and stars.

Below are the values of density (ρ) the force of gravity on the surface (Fg) and radius (r) of the Earth, the Sun and Saturn.

Earht [3] - $\rho = 5515$ kg/m^3, $F_g = 9,8$ m, $r = 6,37 \times 10^6$ m,

Sun [4] - $\rho = 1409$ kg/m^3, $F_g = 274,0$ m, $r = 6,96 \times 10^8$ m,

Saturn [5] - $\rho = 687$ kg/m^3, $F_g = 10,4$ m, $r = 6,03 \times 10^7$ m

This comparison is obvious physical disparity - the Earth's gravitational field is the smallest, and the density of the Earth - the largest. This is contrary to the laws of physics as well as the density of a substance is directly proportional to the compression force (gravity) acting on it and inversely proportional to the resistance of the structural links that connect the elements of the substance. In addition, the above comparison of gravitational forces can not be an objective, as their operation is shown at different distances from the center of the body. For an objective assessment of the forces of gravity to determine the magnitude of the force at the same distances (r) from the center. That is inside them.

The classical theory of gravitation can not determine the gravitational forces acting within the body.

In the theory of vortex gravitation and cosmology [1], the solution of this problem is not difficult. According to this theory, gravity and celestial bodies create ethereal, cosmic vortexes (torsion bars). Ether has such a low density of matter, which is free to penetrate any body. Therefore, in each celestial body torsion bar continues its rotation, increasing its orbital speed, according to the law of inverse square of the distance to the center of rotation. On the basis of this relationship ($F \sim 1/r^2$) can determine the force of gravity in any celestial object.

We define the gravity of the objects at the same distance (the radius of the Earth) $r = 6,37 \times 10^6$ from the center of the body (torsion).

Earth $F_{ge} = 9,8$ m,
Sun $F_{gsun} = 3,3 \times 10^6$ m,
Saturn $F_{gsat} = 846$ m

Comparing the magnitude of the forces of gravity, it can be argued that the density of the substance of Saturn, and the more of the sun, should be significantly higher than the density of the Earth.

Therefore, the generally accepted value of the mass of celestial bodies are very far from the actual values.

In the space, there are objects in which gravity is so large that they hold any body, including light. These objects are called the Black Hole. In 1915, Karl Schwarzschild [6] on the basis of exact solutions of Einstein's equations to determine the radius of the Black Hole as follows –

$$r_s = \frac{2GM}{c^2}, \qquad (8)$$

Where r_s - radius of the Black Hole, M - mass of the black hole, with the speed of light, G = 6.672 · 10 $^{-11}$ N · m2/kg2 - the gravitational constant.

From equation (8) we obtain the equation for determining the mass of the Black Hole –

$$M = r_s c^2/2G, \qquad (9)$$

Equations (8) and (9) has a physical mismatch. It its members - C and G - constant, and the mass of the body is directly proportional to the radius only. But the mass as the volume of the body, can only be directly proportional to the cube of the radius of the body, since every body has a three-dimensional measurement, and the radius - linear.

Due to this inconsistency in the use of equations (8) and (9) obtained absurd results :

-A black hole with tons of earth, according to (9) will have a radius R = 9 mm. This means that the density of the black hole will be measured in the order of 10^{30} kg/m3. This density is much larger than the density of an atomic nucleus. But if we calculate the density of the Black Hole of our galaxy with a radius Rs = 6,75 x 10^{12} m, defined in [7], it will be in the order of 5 kg/m3!? But this density corresponds to the density of the gas. Suppose that there is a black hole with a radius of R_{bh} = 10^{20}m. It should have a density of matter in the order of 10^{-14} kg/m3? But such a density less than the density of ether

From these calculations, we can conclude - Schwarzschild equation (8) and the **classical equations of universal gravitation does not correspond to physical laws.**

d) "The collapse of the" bodies

After the approval of Newton's law of gravity, it was found that some of the bodies under its own gravity to shrink uncontrollably and "collapsing" - virtually disappear from their surroundings. Vortex theory of gravity based on the fact that ether can not penetrate the nucleons or material with a density of nucleons. Consequently, under the influence of great strength of the vortex gravitation, in the center of the torsion forms the core with the same enormous density. For the ether surface of this core is the inner boundary of proper rotation. That is, the speed of rotation of ether and force of gravity on the surface of the vortex core is the maximum attainable for this torsion. Thus, the problem of "collapse" of bodies in the vortex theory of gravity does not exist.

e) Dark Matter

The first indication of the fact that with the estimated mass of the universe is something wrong, there was in the mid 30-ies of XX century. Swiss astronomer Fritz Zwicky measured the speed with which the Coma galaxy cluster (which is one of the largest known concentrations of us, it contains thousands of galaxies) are moving around a common center. The result was discouraging: the velocity of galaxies were much larger than could be expected from the observed total mass of the cluster. This meant that the actual mass of the Coma cluster is much more visible. But the bulk of the material present in this region of the universe, is for some reason invisible and inaccessible to direct observation, showing itself only gravitationally, that is just as mass. This mass is called dark matter.

In the theory of vortex gravitation attraction is not due weight, and speed of the ether. Therefore, the presence of additional mass - dark matter to explain the force of gravity in any region of the universe is not required. This requires corresponding figure out speed, ether torsion in this area.

f) The ebb and flow

As is well known appearance in the seas tides in 24 hours and 50 minutes due to the influence of the gravitational field of the moon. But the earth's surface is drawn relative to the Moon only once during that time and tides happen twice. In order to eliminate this trouble scientific world (Galileo, Descartes, Newton, and others) came up with the hypothesis that the second time the tides are caused by the centrifugal force. So far, the science-based calculation of occurrence and the effect of centrifugal force does not exist.

The second trouble is that the lunar gravity acting on the earth's surface is 200 times fainter than the sun. Therefore it is necessary to declare that the sun - the main culprit of the tides. But the earth's surface turns to the sun for 24 hours, and the tides occur twice in 24 hours and 50 minutes. It is clear that the classical explanation of the tides is very controversial, but still, it is - and the only universally accepted.

The model of vortex gravitation allows you to put forward new explanation for this phenomenon, which is as follows.

On the basis of the vortex gravitation, the shape of the earth, air, gravitation torsion - a disc-shaped, flat-symmetric [1]. The orientation of the Earth torsion largely coincides with the plane of the lunar orbit. The equatorial plane of the Earth has an inclination to the plane of the

Earth torsion about 24 degrees. The geometrical relation of these moods is evident that each point of the surface of the Earth is drawn in the plane, which has a significant inclination with respect to the plane of the Earth's gravitational torsion. Thus, one and the same point of the equatorial surface of the earth gravitational constant torsion transversely intersects its direction. In this case, accordingly, the strength of the vortex Earth's gravity acting on that point (see Fig. 3).

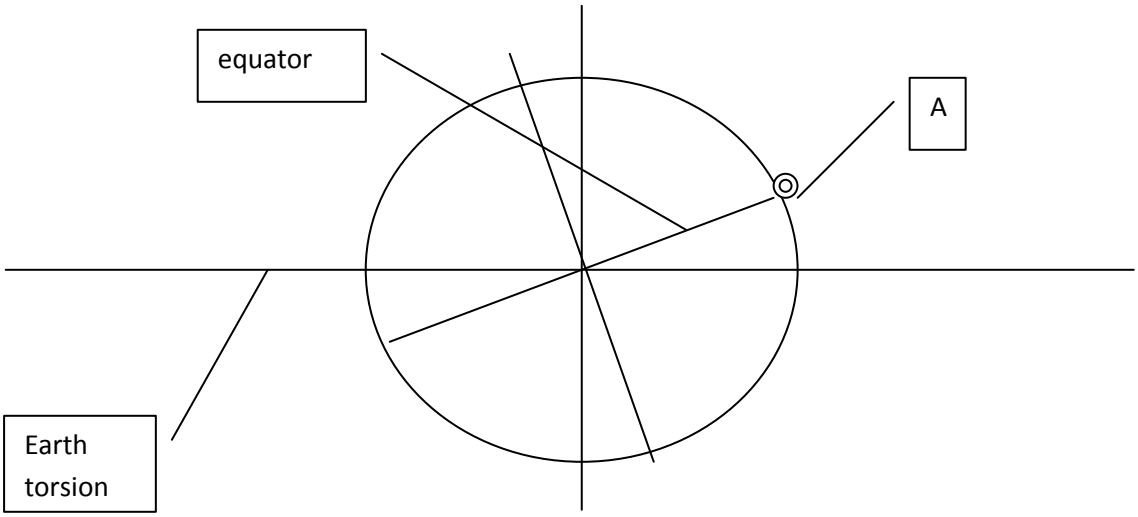

Fig. 4 : Inclination of the Earth's equator

The point A is located on the equator, with its daily motion around the center of the Earth to double-cross the central plane of the Earth torsion and twice removed from it. Consequently, the forces of the Earth's gravity twice a day and reach a maximum two times the minimum impact on the point A, which causes the tides. This explains the fact that the tides occur at the same point twice in one day. At the time of the passage of the Earth's gravity that A plane gravitational force acts on this point with the maximum value, which "crushes" the water surface and low tide occur. After crossing the plane of the Earth that P torsion force of gravity decreases and there is rush of water.

g) Elliptical orbits

As you know, all the planets revolve around the Sun is not a circle but an ellipse. According to the laws of dynamics, inertial movement of the body around the center, in a centrally symmetric gravitational field can only occur in a circle. The reason for non-compliance of planetary motion law of dynamics is explained by the laws of vortex gravitation and cosmology - gravitational pulls torsion bar, not the body. That is the solar gravitational field is symmetric relative to the plane and the center of gravity (the Sun). The forces of attraction decrease in inverse proportion to the square of distance from the sun only in the sun torsion. At a distance from this gravitational plane gravity decreases like the inverse cube of the removal. The calculation of the direction and magnitude of the gravitational forces of the above specified in [1]. In general, the strength of the vortex gravitation force at any point of space, defined by the formula

$$Fgv = Fgn \cos^3 \alpha, \quad (10)$$ where

Fgn - the power of gravity in two-dimensional model (Form 5 or Newton's equation)
Fgv - the force of gravity in a three-dimensional vortex model.

α - angle of deflection of the line connecting the center of torsion and of the point to the plane of the gravitational torsion.

$\cos \alpha = b/a$, where

a - the length of semi-major axis of the ellipse of the orbit of the planet,

b - the length of semi-minor axis of the ellipse of the orbit of the planet.

Based on the above of the forces of gravity of the planet in its treatment twice crossed the plane of the solar gravitation torsion. At this point, the planets, the influence of solar gravity, which leads to increase the curvature of the trajectory of the planets treatment. At a distance from the plane of gravity, the force of attraction and the weakening of the orbit of the planets "straighten". Consequently, in its orbital motion of the planet in the most deviate from the solar gravitational plane at the vertices of semi-minor axis of its orbit.

In the theory of vortex gravitation [1] calculated the force of solar gravity acting on the planets Mercury and Pluto, in the tops of small semi-axes of the orbits. The calculation is performed in accordance with Newtonian physics equation (7) and equation theory vortex gravity (10). According to the laws of dynamics of the gravitational forces acting on the planet, should be equal to the centrifugal forces. To assess the accuracy

of the calculations, the values were compared with the values of the forces of gravity centrifugal forces in these astronomical points. The coordinates of the planets taken by [8].

Mercury

The centrifugal force $F_c = 36{,}503\ M_m$, where M_m - the mass of Mercury, **в/а = Cos A = 0,9786.**

The sun gravitation:

According to Newton $F_{gn} = 39{,}09\ M_m$, **(deviation from the centrifugal forces +7.1%)**

According to the theory of gravity vortex $F_{gv} = 39{,}09 \times 0{,}9372 = 36{,}63\ M_m$ **(divergence + 0.35%)**

Pluto

The centrifugal force $F_c = 0{,}00344\ M_p$, where M_p - mass of Pluto, **в/а = Cos A = 0,9685,**

The power of solar gravity:

According to Newton $F_{gn} = 0{,}00382\ M_p$ **(divergence from the centrifugal forces + 11.1%)**
According to the theory of gravity vortex $F_{gv} = 0{,}00382 \times 0{,}9084 = 0{,}00347$ **Мп (divergence + 0.87%).**

Note. Equation (10) shows - if the space body would be deviated from the plane of the sun, the gravitational torsion of 60 degrees, the solar gravity acted on the body with the force of gravity on the value of 0.125 calculated from the classical theory of gravitation.

Obviously, classical equation gravitation can be used only in one plane - in the plane of gravitational torsion.

IV. Conclusion

The above contradictions of the classical theories of gravity world are only some of the many physical challenges faced by these theories. The presence of gravitational properties of objects or substances, and no one has ever been proven. Based on this we can conclude that the theories of Newton and Einstein are mathematical or empirical gravity model, which deflect the development of science in the wrong direction.

Vortex theory of gravity does not contain any contradictions for physical settlement of any properties cosmic substance. This proves the objectivity of its principles for further scientific research.

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Scattering of Electrons in the Field of the Binomial Potential of a PROTON

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Abstract- On the basis of the strict solution of the classical problem of two bodies, it is shown that the interaction of an electron with the proton occurs by the law of binomial potential. With regard for this law, we obtain a formula for the calculation of the angles of deviation of electrons at the scattering by protons. The formula allows one to find the angles for the energies of electrons from several eV to hundreds of MeV and for the impact parameters down to 10-13 cm. Generally, we may assert that the classical mechanics with the binomial potential can sufficiently exactly represent any phenomena in the microworld.

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Scattering of Electrons in the Field of the Binomial Potential of a PROTON

V. K. Gudym [α] & E. V. Andreeva [σ]

Abstract- **On the basis of the strict solution of the classical problem of two bodies, it is shown that the interaction of an electron with the proton occurs by the law of binomial potential. With regard for this law, we obtain a formula for the calculation of the angles of deviation of electrons at the scattering by protons. The formula allows one to find the angles for the energies of electrons from several eV to hundreds of MeV and for the impact parameters down to 10^{-13} cm. Generally, we may assert that the classical mechanics with the binomial potential can sufficiently exactly represent any phenomena in the microworld.**

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I. Introduction

At the present time, the interaction of an electron with a proton is described with the use of several mechanics, which are fundamentally different from one another: classical, quantum, relativistic, etc. But the absence of a single approach to the description of the electron – proton system indicates that the two-body theory for this system needs an essential additional development. We are sure that such situation in the description of these particles does not allow one to understand the real physical essence of phenomena in the microworld or complicates their interpretation.

Classical mechanics has always dealt with the velocities of bodies, which are smaller than the light velocity. Therefore, all consequences following from the main postulates and laws of the Newton mechanics were confirmed with high accuracy in various experiments. Only in the world of elementary particles moving with velocities close to the light velocity, the relativistic mechanics should be used. In addition, it is commonly considered that the classical mechanics is unfounded for the description of the motion of separate atoms, electrons, and other microscopic (elementary) particles composing the atomic nuclei, atoms, and molecules.

Therefore, in order to overcome the difficulties arising at the application of the classical mechanics to such objects, there appears the necessity to impose the limitations on the energy of interacting particles and on the admissible distances between them. In other words, some limitations on the region of applicability of the classical mechanics were established.

Thus, the opinion has been formed till now that the classical mechanics should be considered as a limiting case of the relativistic mechanics or the special relativity theory (SRT) and as a partial case of the nonrelativistic quantum mechanics.

But, in our opinion, the reason for the neglect of the Newton dynamics and the idea of a localized electron does not lie in the fundamental shortcomings of the classical mechanics. The real reason consists in that the model of microworld commonly accepted now does not completely correspond to the reality. For example, the interaction potential of particles in the macroworld (Coulomb law) was accepted without modifications for the interaction of particles in the microworld. In this case, all arisen difficulties in calculations were referred to the apparent shortcomings of the classical mechanics, rather than to those of the accepted model. But, in essence, the classical mechanics is a mathematical scientific trend. It does not care of a potential to deal with. But the results of calculations will be different for different potentials. At the present time, we have no complete representation of the forces acting between the electron and the proton, as well as between a nucleus and atomic electrons, in the general case. Therefore, the calculations by the classical scheme give erroneous results.

To support this viewpoint, we will solve the classical problem of two bodies interacting by the law of binomial potential. This calculation allowed us to theoretically trace, for the first time, the trajectories of motion of an electron in the atom without the necessity to impose some limitations on the energy of interacting particles and on the admissible distances between them. We note that such results cannot be obtained with the Coulomb law. In other words, the classical mechanics is innocent, since all difficulties follow from the accepted Coulomb-law-based model of microworld.

The study of the processes of scattering is the basic experimental method, with which the character of the interaction of scattered particles is esatblished. The main formula describing the process of scattering is the Rutherford formula [1] based on the assumption that the particles participating in the process of scattering interact by the Coulomb law. It is known that the significant deviation of the distribution of electrons scattered on protons from that calculated by the

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Rutherford formula is observed at medium and high energies [2]. This disagreement of the experimental data and the results of calculations by the Rutherford electrons had led the physicists to the thought that the Coulomb law is not valid at small intraatomic distances [3], including the interaction of an electron and a proton.

In this work, we have shown that the potential of interaction of the electron with the proton at intraatomic distances must be presented in the form of a binomial formula

$$V = -\frac{e^2}{r} + \frac{\Gamma}{r^2}, \qquad (1)$$

where e is the electron charge; Γ is a constant calculated by us and equal to $6.10276 \cdot 10^{-28}$ CGSE units; and r is the distance between the electron and the proton. Then, by solving the classical problem of motion of the electron in the centrally symmetric field of the proton with potential (1), which is represented by the relation

$$E = \frac{m\dot{r}^2}{2} + \frac{M^2}{2mr^2} - \frac{e^2}{r} + \frac{\Gamma}{r^2}, \qquad (2)$$

we obtained the results that cannot be obtained with the Coulomb potential. Such basic notions as the discreteness of energy levels, Balmer formula, Planck's constant and relation, and Bohr's postulates follow in a mathematically strict way from the solution of Eq. (2). In essence, we have shown that, potential (1) give the possibility to study the intraatomic processes by methods of only the classical mechanics without limitations on the energies of interacting particles and on the distance between them [4].

In the present work, we will demonstrate that if the interaction of the electron with the proton is described by the law of binomial potential, then we can obtain the formulas for the description of the processes of scattering in a wide energy range in good agreement with experimental data without attraction of the auxiliary notions of relativism and quantum mechanics. Thus, we extend the principles of the classical mechanics without limitations onto the intraatomic processes.

II. Substantiation of the BinomialPotential of Interaction of An electron with a Proton

The binomial interaction potential of an electron with a proton is based [4-7] on the indisputable fact that the electrons in atoms are constantly located at some distance from the nucleus. According to the Bohr hypothesis, the electrons are held in such a position as a result of the equlibrium between the force of the Coulomb attraction and the centrifugal force. It is known that the Bohr hypothesis allows one to satisfactorily explain many phenomena occurring in hydrogen atoms. But it met the insurmounable difficulties in the consideration of structures with two and more electrons. In our opinion, these difficulties can be overcome only if we assume the existence of an additional field counteractive to the Coulomb attraction between an electron and a proton.

Then the interaction of the electron with the proton in a hydrogen atom can be described by the potential energy function

$$V = -\frac{e^2}{r} + \frac{\Gamma}{r^x} \qquad (3)$$

where the first term on the right-hand side represents the Coulomb interaction, and the second term is related to the hypothetical interaction, which counteracts the Coulomb attraction.

In (3), the constant Γ and the exponent x can be determined from the system of two algebraic equations corresponding to a certain state of a hydrogen atom, for which the experimental data are available. Consider the ground state of a hydrogen atom. We have [3]

$$-\frac{e^2}{r_0} + \frac{\Gamma}{r_0^x} = E_0, \quad \frac{e^2}{r_0^2} - \frac{x \cdot \Gamma}{r_0^{x+1}} = 0 \qquad (4)$$

where E_0 – the ground-state energy of a hydrogen atom; r_0 – its equilibrium radius, and e – electron charge. The second equation in (4) represents the sum of forces acting on the electron in the ground state.

By transforming system (4) to the form

$$-\frac{e^2}{r_0} + \frac{\Gamma}{r_0^x} = E_0, \quad \frac{e^2}{xr_0} - \frac{\Gamma}{r_0^x} = 0 \qquad (5)$$

and by adding both relations, we obtain

$$-\frac{e^2}{r_0} + \frac{e^2}{xr_0} = E_0 \qquad (6)$$

or

$$\frac{1}{x} - 1 = \frac{E_0 \cdot r_0}{e^2}. \qquad (7)$$

Substituting the numerical tabular values of E_0, r_0, and e^2, we obtain $1/x - 1 = -0.5$. Hence, $x=2$. From the second equation in (2), we obtain

$$\Gamma = \frac{e^2 \cdot r_0}{2}. \qquad (8)$$

Thus, the solution of system (4) relative to Γ and x gives

$$\Gamma = 6.10276 \cdot 10^{-28} \text{ CGSE units, and } x=2. \qquad (9)$$

Let us focus attention on the right-hand side of relation (7)

$$\frac{E_0 \cdot r_0}{e^2} = \frac{1}{2}. \qquad (10)$$

Writing (10) as

$$E_0 = \frac{e^2}{2 \cdot r_0}, \qquad (11)$$

we see that it determines the ground-state energy of a hydrogen atom.

We recall that the Bohr theory yields also an analogous formula[3] as a result of the equality of the centrifugal force and the Coulomb attraction to the nucleus.

It is also known that the solution of the Schrödinger equation gives the same formula, as well as the relation $r_0 = \hbar^2 / me^2$. By substituting the last relation in (8), we obtain $\Gamma = \hbar^2 / 2m$.

We recall these facts in order to show the logical connection of the binomial potential with the Bohr theory and the Schrödinger theory of a hydrogen atom. Indeed, the positive addition to the Coulomb law was included in the previous theories as well. But there, it was a centrifugal force on the basis of the postulate about some motion of electrons around a nucleus. As is known, the postulate of the circular motion of electrons around the nucleus creates insurmountable basic difficulties for the theory of multielectron structures. But our hypothesis about the presence of a repulsive potential removes these obstacles and allowed us to develop a simple model of multielectron atoms.

We will pay attention to some specific features of result (9). First, it is the small value of constant Γ as compared with e^2 ($23.06112 \cdot 10^{-20}$). Therefore, the contribution of the positive addition in (3) to the total interaction energy is insignificant already at a distance of about two equilibrium radii. Hence, at larger distances, the energy of interaction of the electron with the proton has only the electrostatic nature.

Second, the value of the exponent x equal exactly to 2 indicates that the dependence of the positive addition in the binomial potential (3) on the distance is the same as that for a centrifugal force. Hence, the meaning of the positive addition to the Coulomb law for a one-electron system (e.g., a hydrogen atom) is not significant: it can be a result of the circular motion of the electron (the centrifugal force) or a result of the action of some constant hypothetic field.

For this reason, the planetary Bohr model for a hydrogen atom gave good results (though it is far from the reality by its essence). Moreover, it is quite regular that this model cannot describe two- and multielectron systems, because the Coulomb attraction of electrons to the nucleus in such systems cannot be compensated by centrifugal forces. The different possibility is given by the binomial potential. Assuming that the positive addition in the binomial potential (3) characterizes some constant field, we showed in[30] that it is easy to model systems with two and more electrons..

Third, the constant

$$\Gamma = \frac{\hbar^2}{2m}, \qquad (12)$$

where $\hbar$ is the Planck's constant, and m is the electron mass, corresponds to the proportionality coefficient postulated by E. Schrödinger for his equation. Just this allowed V. Weisskopf [8] to deduce a potential analogous to (3), by basing on the quantum-mechanical premises of the Schrödinger theory. Hence, two basically different approaches (classical and quantum-mechanical ones) have led to the same function representing the potential energy of interaction of an electron with a proton. This also confirms the logical connection between the binomial potential and quantum theory. Therefore, function (3) can be perceived as a coordinating link between the classical theory and the quantum mechanics of a hydrogen atom. As will be shown below, these two theories with the binomial potential complement each other and are a single unit.

The difference between them consists in the following. The positive addition to the Coulomb law in quantum mechanics is perceived as a minimum kinetic energy [8], whereas it has meaning of a physical field counteracting the Coulomb interaction. The consideration of multielectron systems will allow us to answer the question: Which of two possibilities is more natural? It was mentioned above that the postulated circular motion of an electron around the nucleus had led to basic obstacles in the construction of the theory of multielectron systems. But the postulate introducing some counteracting potential removes these obstacles and opens a possibility to model multielectron systems in the frame of classical mechanics [9,10]. The results of such a modeling should be considered as the experimental corroboration of the validity of the interpretation of a positive addition to the Coulomb law as some counteracting physical potential.

Generally speaking, by introducing the binomial potential, we replace, in essence, the postulate about some motion of an electron around the nucleus, which is extraneous to classical mechanics, by a more natural hypothesis about the presence of some repulsive potential. It is worth noting that the proposed binomial potential (3) does not contradict the foundations of quantum mechanics[7, 11, 12] and opens a way for the construction of the classical mechanics to multielectron systems.

In Fig. 1, we show the dependence of the energy of interaction of an electron with a proton with the binomial potential on the distance between them. It is obvious that the dominating components are the Coulomb interaction at distances more than two equilibrium radii ($\sim 1 \cdot 10^{-8}$ *cm*) and the positive addition at distances less than a half of the equilibrium radius

(~0.25·10^{-8} *cm*), respectively. Hence, the positive addition to the Coulomb component in (3) is a short-range force. This fact explains the circumstance that no deviations from the Coulomb law were measured at macrodistances.

III. Scattering of Electrons by the Field of the Binomial Potential of a Proton

For a trajectory, the solution of Eq. (2) with regard for potential (3) takes the form

$$r = \frac{P}{1-\varepsilon\sin(k\varphi)}, \qquad (14)$$

where $\varepsilon = \sqrt{1+\frac{2E(2m\Gamma+M^2)}{me^4}}$ - the orbit eccentricity; (15)

$$P = \frac{2m\Gamma+M^2}{me^2} \text{ - the orbit parameter;} \qquad (16)$$

$$k = \frac{\sqrt{2m\Gamma+M^2}}{M} \text{ - some coefficient,} \qquad (17)$$

which characterizes the closedness of an orbit; m – electron mass, E – total energy of the system, M – angular momentum, and e - electron charge.

If the total energy in (3) is positive, then the trajectory of motion of an electron in the central field of a proton is an open curve, whose ends tend to infinity. In this case of infinite motion, it is convenient to introduce the so-called impact parameter ρ instead of the angular momentum M:

$$M = \sqrt{2mE\rho^2}\,. \qquad (18)$$

To calculate the trajectory of motion of an electron scattered by a proton, it is necessary to substitute (18) in relations (15)-(17) and to pass to the Cartesian coordinates

$$x = r\cdot\cos\varphi \qquad y = r\cdot\sin\varphi, \qquad (19)$$

where the values of r are determined by formula (14).

In Fig. 2, we present) the trajectories of motion of scattered electrons with energies of 400, 188, and 40 *MeV* calculated by (19).

The deviation angle χ for the flight of a particle past the scattering center takes the form

$$\chi = \pi - 2\varphi_0, \qquad (20)$$

where the angle φ_0 is determined in terms of the integral

$$\varphi_0 = \int_{r_{\min}}^{\infty} \frac{M\cdot dr}{r^2\sqrt{2m\left[E-U(r)\right]-\frac{M^2}{r^2}}} \qquad (21)$$

taken between the positions of the particle, which are nearest to the center and infinitely remote[1]. Here, $r_{\min}$ is a root of the radicand.

With regard for relation (18), formula (21) takes the form

$$\varphi_0 = \int_{r_{\min}}^{\infty} \frac{dr}{r^2\sqrt{\frac{1}{\rho^2}\left[1-\frac{U(r)}{E}\right]-\frac{1}{r^2}}}. \qquad (22)$$

Substituting potential (1) in (22) and integrating, we obtain

$$\varphi_{0b} = \sqrt{\frac{E\rho^2}{E\rho^2+\Gamma}}\cdot\arccos\left[\frac{1}{\sqrt{1+\frac{4E(E\rho^2+\Gamma)}{e^4}}}\right]. \qquad (23)$$

Thus, we obtain the analytic formula for the deviation angle χ for an electron scattered by a proton as a function of the energy E and the impact parameter ρ under the assumption that they interact by the binomial potential law (3). If we set Γ=0 in (23), which corresponds to the interaction of the electron with the proton by the Coulomb law[1], we obtain

$$\varphi_{0k} = \arccos\left[\frac{1}{\sqrt{1+\frac{4E^2\rho^2}{e^4}}}\right] \qquad (24)$$

Hence, the distinction of the scattering formulas obtained with the help of the Coulomb and binomial potentials consists only in the presence of the coefficient

$$k = \sqrt{\frac{E\rho^2+\Gamma}{E\rho^2}} \qquad (25)$$

in (23).

In the general case, formulas (23) and (24) together with (20) allow one to calculate the deviation angles χ of an individually scattered electron as a function of its kinetic energy and the impact parameter in the cases where the electron interacts with the proton

by the binomial potential law (1) and by the Coulomb law, respectively.

In Fig. 3, we present the results of calculations by formulas (23) and (24).

It is worth noting that the scatterings of electrons in the fields of the Coulomb and binomial potentials are almost identical al low energies. The noticeable difference of the scattering angles χ is observed only at energies of hundreds and more *eV*. In the relativistic region of energies, the scattering in the Coulomb potential is not observed at all (Fig. 4b). Here, the Rutherford theory of scattering by the Coulomb potential contradicts the experiment. In due time, this contradiction was one of the main reasons to think that the laws of classical mechanics must be corrected for atoms at small distances at high energies. Then the theory of scattering was developed with the attraction of the main positions of the special relativity theory [2]. However, our calculations with the binomial potential testify that the contradiction between the Rutherford theory and the experiment is only due to our insufficient knowledge of the forces between an electron and a proton.

The experimental data on the process of scattering are presented in terms of the so-called effective scattering cross-section $d\sigma$. In view of the one-to-one connection (23) between the scattering angle χ and the impact parameter ρ, the efficient cross-section of the scattering into the solid angle $d\Theta$ can be presented as [1]

$$d\sigma = \frac{\rho(\chi)}{\sin(\chi)} \cdot \frac{d\rho}{d\chi} \cdot d\theta . \qquad (26)$$

Let us denote $k\varphi_0 = (\pi - \chi)/2$. Then formula (23) yields

$$\rho^2 = \frac{e^4}{4E^2} \cdot ctg^2\left(\frac{\chi}{2}\right) - \frac{\Gamma}{E} \qquad (27)$$

Differentiating relation (27) with respect to χ and substituting in the formula for the efficient scattering cross-section (26), we obtain

$$d\sigma = \frac{e^4}{16E^2} \cdot \frac{1}{\sin^4\left(\frac{\chi}{2}\right)} \cdot d\theta . \qquad (28)$$

Formula (28) coincides with the Rutherford formula by its external form[3]. But formula (28) and the Rutherford formula are basically different by their essence. The difference consists in the definition of χ with regard for coefficient (25):

$$\chi = \pi - 2k\varphi_0 . \qquad (29)$$

Generally speaking, this result is surprising, because it is commonly accepted[1,2] that the Rutherford formula is not valid at the relativistic energies. However, we have shown, by performing successively all mathematical operations made by E. Rutherford, that the same formula for the efficient scattering cross-section can be obtained with the binomial potential.

Thus, the Rutherford theory of scattering with the use of the binomial potential is in good agreement with the experiment in the whole ranges of energies and impact parameters. Hence, there is no need to introduce the relativistic corrections and the form-factor into the Rutherford formula, as was made by the author of work [2].

In Fig. 4, we compare the curve calculated by formula (28) for the efficient scattering cross-section of electrons with energies of 400 and 188 *MeV* with the experimental data given in [2].

In view of Eq. (2), the quite rightful questions about the energy of the particle, its velocity, and its mass can arise. Moreover, which velocity will an ultrarelativistic electron have?

We start the discussion of these questions by the citation of work [13]: "Now the time comes, when it is necessary to stop the fraud of a new generation …, which is suggested that the increase of the mass with the velocity is the experimental fact". We note that no direct experiment that will show the dependence of the mass on the velocity was realized till now [14]. But we should like to attract the attention of the reader to formula (2).

Relation (2) is basic in the two-body problem. The result of calculations will depend on the choice of the interaction potential or, in other words, on the model. In macroworld, the Newton model is accepted. It corresponds to the reality, and, therefore, the results of calculations correspond always to experimental data.

As for the microworld, it was assumed that the interaction of two particles occurs by the law Coulomb. We note that the calculations involving the Coulomb law give sometimes the positive result, for example, for the scattering of α-particles in the Rutherford experiment. However, the model of microworld with the Coulomb law give very frequently a negative result. This is demonstrated by results of work [2]. This and analogous works forced the physicists to come to the thought that the classical mechanics should be modified at the description of the microworld and to accept the relativistic mechanics or SRT. However, our studies have shown that the introduction of the binomial potential in the two-body problem removes all difficulties related to the Coulomb law.

But if this classical formula (2) is proper and restricts neither the energy of interacting particles nor the distance between them, then it cannot, apparently, restrict the velocities of interacting particles. Therefore, the introduction of formulas restricting the velocity of particles into the classical mechanics has no physical sense and does not correspond to the reality.

It is worth considering the rightfulness of the application of the Lorentz formulas (see work [2]) to the model of scattering of electrons, as well as the preconditions of the derivation of the Lorentz formulas. The formulas for the Lorentz transformation and a number of consequences following from them (notions "body's size", "time interval between two events", "dependence of body's mass on the velocity", and "limitation of a velocity") were based on the model of two reference systems that move "straightforwardly" and "uniformly" relative of each other. .

What do we see in our model of the scattering of electrons on protons? First of all, we have one reference system, and the "straightforwardness" and "uniformity" are not present. Then we may ask: Why did the authors of work [2] introduce formulas of the Lorentz theory, which limit the velocities and were obtained under other preconditions, in Eq. (2)? We think that the reason for a disagreement of the scattering theory [2] based on the Coulomb law with experiments lies not in "the inability of the classical mechanics to describe the physical phenomena in the microworld", but because the model of the microworld based on the Coulomb law is far from the reality.

Since few persons believe now that body's mass is independent of its velocity and, hence, of its kinetic energy, we will make a brief digression to the history and see how A. Einstein understood this question

A. Einstein introduced the notion of rest energy and showed that body's mass is a measure of body's energy, but he never asserted that the mass depends on body's velocity.

Generally speaking, the idea of the velocity-dependent mass arose in the years before the creation of the relativity theory and for the first years of its existence. This idea was formed in articles, where the authors tried to conform Maxwell's equations of electromagnetism with the Newton equations. Later on, those works stimulated the experiments performed by W. Kaufmann and A. Bucherer, whose data were processed with the help of formulas of the Newton nonrelativistic mechanics with the use of the Coulomb law. In our opinion, such processing of experimental data was incomplete and did not correspond to the reality. But it led to the conclusion that the mass increases with the velocity. We are sure that if those calculations were based on the more suitable binomial potential, then the results would be different.

Here, it is worth noting the very foundation of the nonrelativistic mechanics, where the mass is a measure of body's inertia. At that time, it was not realized yet that the notion "body's inertia" has a more general character, and the measure of body's inertia is its total energy equal to the sum of the rest energy and the kinetic energy, rather than body's mass. But the subsequent development of the theory showed that the notion of mass should be referred only with the rest energy, rather than with the total energy.

VI. Conclusion

Thus, we have solved the problem of two bodies interacting by the law of binomial potential, by considering the interaction of the electron with the proton. Moreover, the solution of this problem met no difficulties concerning the energy of interacting particles. The interacting particles can possess any energy from several eV to ultrarelativistic values. In this case, we have first obtained the possibility to theoretically observe the trajectories of motion of ultrarelativistic particles at their any approach down to intraatomic distances.

It is known that nothing similar to this result can be obtained, if the two-body problem is solved on the basis of the Coulomb law, where the problem of limitation of the energies of interacting bodies and the distances between these particles arises immediately.

In the past, these problems generated the opinion of physicists that the classical mechanics cannot describe the motion of particles with high and superhigh energies and their motion at intraatomic distances. The modification of the classical mechanics by positions of the relativistic mechanics only strengthened this viewpoint. We should like to notice two following aspects of this modification. On the one hand, this confirms supposedly that the classical mechanics cannot describe the intraatomic processes. On the other hand, this gives a practical conformation to the conclusions of the relativistic theory. Therefore, we are faced now with the steady dominating opinion that the classical mechanics is the theory of sufficiently slow motions of macroscopic bodies consisting of a great number of atoms and molecules and can be considered as a limiting case of the relativistic mechanics and as a partial case of the nonrelativistic quantum mechanics.

However, our studies of the scattering of electrons on protons have shown that if the binomial potential is taken instead of the Coulomb potential, then all difficulties of the scattering theory for these particles disappear, and no limitations are required for the calculations performed on the purely classical principles.

Hence, the present work indicates that the classical mechanics with the binomial potential (1) can quite properly represent all aspects of states of the electron – proton system without limitations of the energy of particles starting from a hydrogen atom up to the scattering of ultrarelativistic electrons.

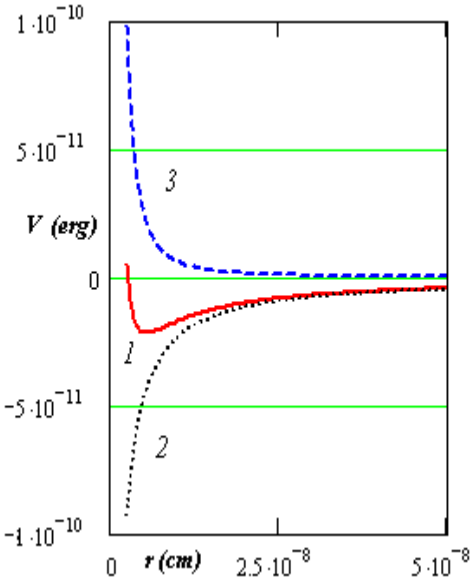

Figure captions

Fig. 1 : Interaction energy of an electron and a proton *vs* the distance between them (1), the Coulomb component (2), the hypothetical component Figure (3)

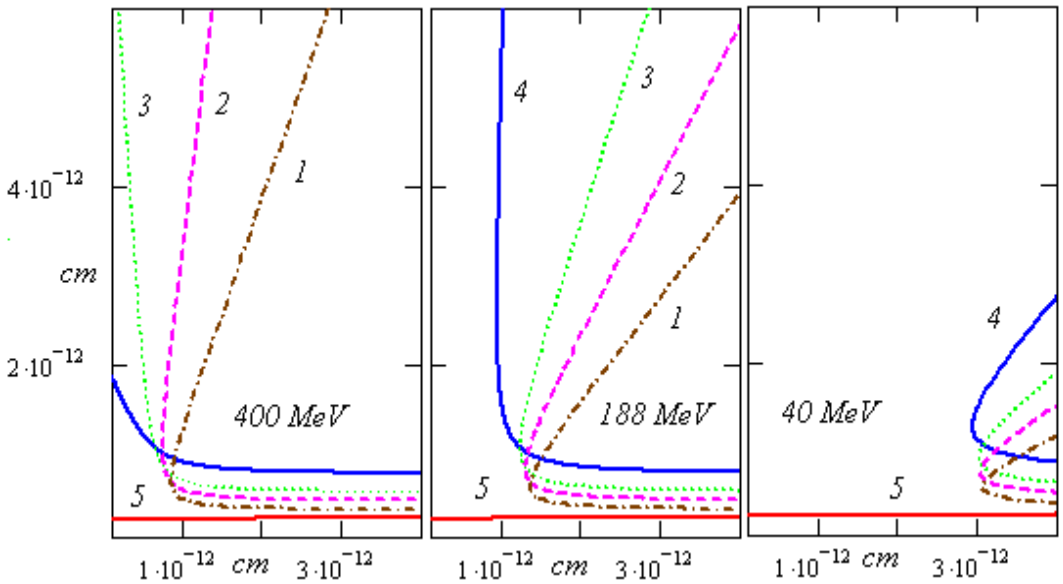

Fig. 2 : Trajectories of motion of electrons with energies of 400 (a), 188 (b) and 400 (c) MeV scattered by a proton. Calculations are performed by formula (8) for impact parameters ρ : 1 - $4\cdot10^{-13}$; 2 - $5\cdot10^{-13}$; 3 - $6\cdot10^{-13}$; 4 - $8\cdot10^{-13}$ cm; 5 – a trajectory of motion of an electron in the Coulomb potential

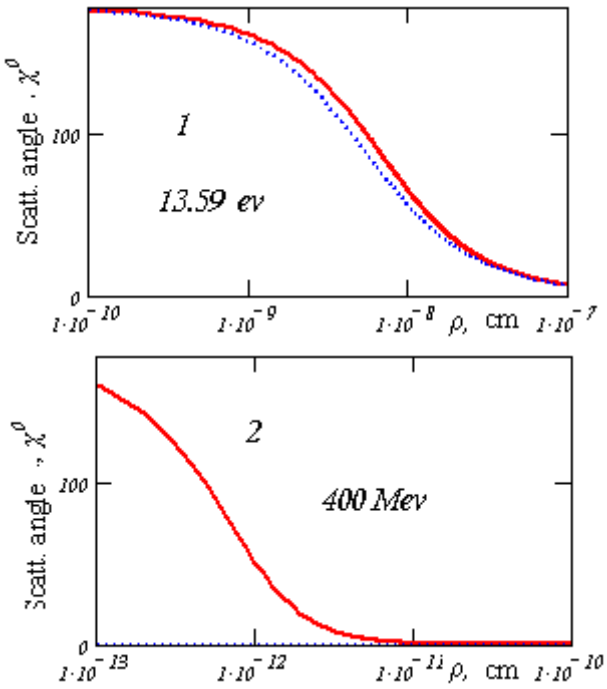

Fig. 3 : Dependence of the scattering angle | on the impact parameter ⟩ for the interaction according to the binomial law (—) and the Coulomb law (---) with electron energies of (a) 13.59 eV and (b) 400 MeV

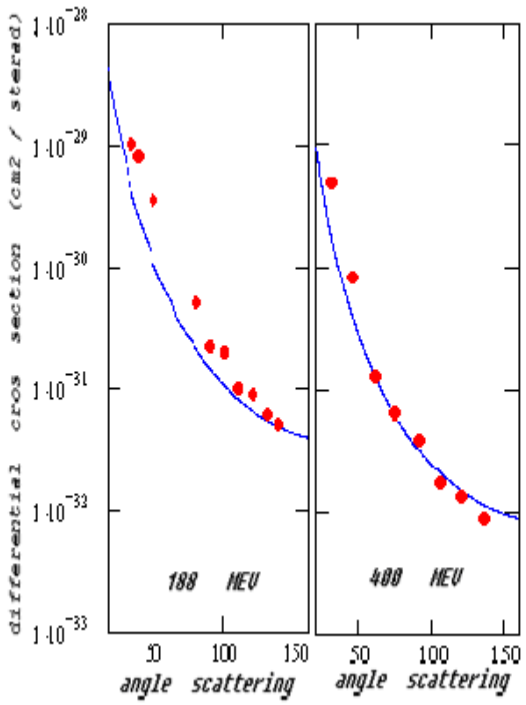

Fig. 4 : Comparison of the calculated effective cross-sections for electrons with energies of 400 and 188 MeV with experimental values: points – experiment [2]; curves – calculated data

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Equivalence of Energy and Mass Atomic Gravity

By Sergey Orlov

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Abstract- Investigated directly proportional dependence of the energy end mass of a physical object on the strength of the vortex gravitation, which created the object.

Keywords: *theory of vortex gravitation.*

GJSFR-A Classification : *FOR Code: 010505p, 260201*

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Equivalence of Energy and Mass Atomic Gravity

Sergey Orlov

Abstract - Investigated directly proportional dependence of the energy end mass of a physical object on the strength of the vortex gravitation, which created the object.

Keywords: *theory of vortex gravitation.*

I. Introduction

In 1900, Henri Poincaré noticed that the radiation energy has a mass m, equal to the energy divided by the square of the speed of light: m = E/c2. Later this relationship used by Einstein in his work on the principle of relativity. Since then, the claim that the mass can generate energy and vice versa has been called "The principle of the equivalence of mass and energy," and became a fundamental, which prohibit criticism.

In the theory of vortex gravitation, cosmology and cosmogony, [1] the evidence that the ether vortex rotation in space alter the pressure in it, create gravity and celestial bodies.

In the paper the rationale that there are torsion bars not only on a cosmic scale, but also essential mikro torsion, the epicenter of which the pressure is several orders of magnitude smaller than in free ether. The sharp decrease in pressure causes a mikro torsion elementary particles.

Relationship between the rotation and change of air pressure in the ether based on the principle of Bernoulli: changing the flow rate of a continuous medium is inversely proportional to the pressure in this thread. Therefore, the increase of the orbital velocity of ether causes a decrease in the torsion pressure towards the center of torsion.

Pressure change in the gaseous environment, in addition to creating the forces pushing (gravity) and generates energy in a given volume of etherr. This pattern is represented by the equation Mendeleev-Clapeyron.

$$E = 3/2\ PVt \quad (1), \text{ where}$$

E - energy,

P - pressure,

Vt - volume of ether's torsion.

Consider the model of the atom in Figure 1

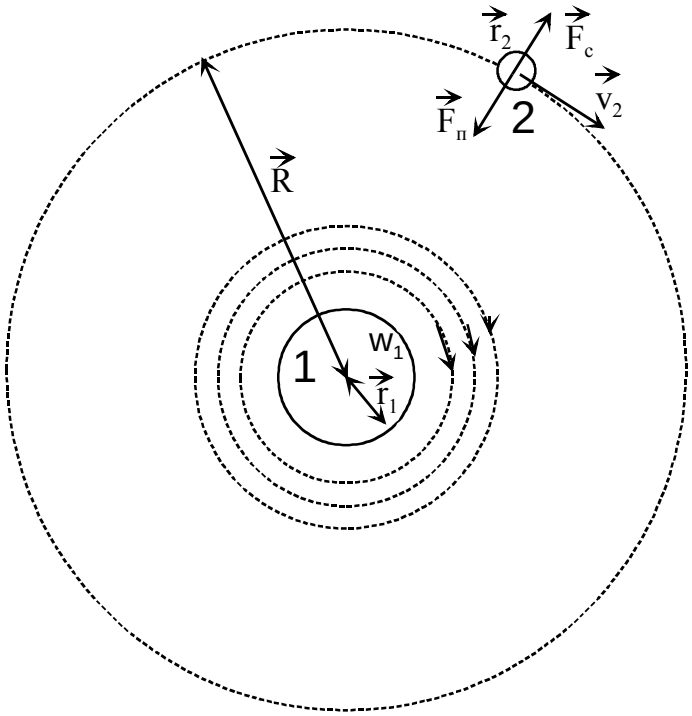

Fig.1 : Two-dimensional model mikro torsion

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$F_п$ - the force of gravity of the body 2 of the body 1,
R - radius of atomic torsion
r_1 - radius of the nucleus of the atom 1,

Around the nucleus of the atom radius r_1 rotates broadcast. Density of the nucleus of an atom is so large that air can not penetrate it. Consequently, the surface of the core is lower barrier to rotation of the ether in torsion. Velocity v_1 - the maximum, the orbital velocity of the ether.

The pressure in the volume of gaseous medium depends on $-\rho$ density of the medium and its speed – v_1. According to the theory of vortex gravitation [1] pressure is the orbital speed of ether the following relationship.

$$P = \rho v^2_1 \qquad (2), \text{ where}$$

$\rho = 8.85\rho \times 10^{-12}$ kg / m^3 - the density of ether, an indication, according to [2].

V_1 - linear orbital velocity of the ether at the surface of the nucleus.

Substituting (2) into (1)

$$E = 3/2 \ \rho v^2_1 Vt \qquad (3)$$

To determine the rate of ether flow v in atomic torsion bars assume that the force of gravity vortex has little effect on the periphery of the torsion bar, order $F_п \sim 10^{-4}$ m. Based on the theory of vortex gravitation [1] with a force of gravity and orbit radius of the order of atomic torsion $R \sim 10^{-7}$, the linear velocity of the ether should be $v \sim 10^9$.

For the dependence of $v \sim r^{-1/2}$, it is determined that the surface of the nucleus, at $r \sim 10^{-15}$ linear velocity is $v_1 \sim 10^{13}$.

Substitute in equation (3) values of the following orders:

linear velocity of the ether – $v_1 \sim 10^{13}$,
amount of air torsion – $V_t \sim 10^{-22}$ at $r \sim 10^{-7}$, with the compactness torsion.
density of the ether $\rho \sim 10^{-12}$

We obtain the energy of the order of:

$$E \sim 3/2 \times 10^{-12} \times 10^{26} \times 10^{-22} \sim 10^{-8} \ J \qquad (4)$$

To determine the energy in a defined volume of uranium mass m, the amount of energy to a single atom as defined by formula (4) multiplied by the number of atoms in the bulk. The number of atoms is defined as the mass of a substance to the mass of one atom of $\sim 10^{-25}$.

$$Na = m / ma = m/10^{-25} \qquad (5)$$

We substitute (5) into (4):

$$E = m/10^{-25} \times 10^{-8} = m \times 10^{17} \sim m \times c^2 \qquad (6)$$

Based on the formula of Poincare define the order of the energy of the uranium atom in its mass

$$m \sim 10^{-25} \text{ и } c^2 \sim 10^{17}$$
$$E = m c^2 \sim 10^{-25} \times 10^{17} \sim 10^{-8} \ J \qquad (7)$$

Consequently, the value of one atomic energy torsion theory calculations of the vortex gravitation (Formula 3), corresponds to the energy of the atom defined by the classical, experimental formula.

In the theory of vortex gravitation [1] that the gravitational torsion create body. That is, the mass of any celestial body depends on the speed of rotation of the corresponding torsion. This statement is valid for the mass of a particle of air speed in the corresponding micro torsion.

Thus, on the basis of the theory of gravity vortex can conclude - the energy and mass of one body created by the same process - gravitational torsion. We can therefore say that the mass of a body (atom) does not create the energy of the body (an atom). To the extent it can be argued that the energy of the body does not produce mass. These physical properties of a body are each only an indirect relationship, as they are generated by the same rotation of the vortex ether.

At fracture (splitting) of the atom (nucleus) breaks down and the nuclear torsion. The pressure in the torsion increases sharply to values of free ether, which should be accompanied by a release of energy, according to the formula (3).

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Doppler Shift Extraction from QPSK Mapped OFDM Signal Constellation

By A. Hakhoumian, Kh. Tovmasyan & E. Gabrielyan

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Abstract- Doppler effect gives a frequency offset on received OFDM signal in radar system. That offset can be seen as a distortion and rotation of reflected signals QPSK mapping vectors. It is possible to determine moving target velocity by estimating expected value of the distorted signal and then calculating the rotated angle. A mathematical relationship between Doppler frequency shift and rotated angle of QPSK mapping vectors was obtained. The recommended systems will require less computing resources, because Doppler frequency shift calculation could be done during one OFDM symbol.

Keywords: OFDM, radar, constellation, signal processing, QPSK, doppler shift, target.

GJSFR-A Classification : FOR Code: 090609

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A. Hakhoumian [α], Kh. Tovmasyan [σ] & E. Gabrielyan [ρ]

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Keywords: OFDM, radar, constellation, signal processing, QPSK, doppler shift, target.

I. Introduction

Utilization of OFDM (Orthogonal Frequency Division Multiplexing) signals in radar systems is trending higher on the year over year basis, so does the number of publications and investigations. Several methods and proposals has been designed and developed to solve various OFDM radar applications.

OFDM signals have two significant characteristics that make them usable in radar applications: their long duration and wide spectrum. Long duration helps to measure the Doppler shift with high accuracy. Its wide spectrum, from the other side, allows finding the time delay of the received echo signal. These two values will lead us to get both velocity and distance of the target from the radar station. The major advantage of the proposed method described in this paper is very low computing resource constraint, since the calculations could be done during one OFDM symbol of the signal.

Various OFDM radar signal processing methods has been proposed so far. First we would like to mention the method of the target velocity detection via OFDM signal constellation by passing reflected signal trough the bank of filters [1]. The main drawback of that method is that it needs huge computational and technical resources. In another presented proposal the frequency offset is initially estimated using an autocorrelation method, then it is further fine-tuned by applying an iterative phase correction by means of pilot-based Wiener filtering method[2].Recently a paper was published that introduced walking mobile user's Doppler shift calculation algorithm using 8-PSK modulation [3]. There is another method called novel approach, where the proposed algorithm operates directly on modulated symbols [4-5].In other technique both OFDM and CE-OFDM (Constant-envelope OFDM) are used to overcome peak-to-average ratio (PAPR) problem [6].

In this paper we illustrated the determination algorithm of the reflected signal's frequency offset caused by Doppler Effect. First paragraph presents the OFDM radar processing principles. Further we proposed a mathematical relationship of constellation vector angle and Doppler frequency. The target velocity detection algorithm and the simulation results are presented afterwards.

II. Ofdm in Radar Processing

Generally OFDM signal can be presented as

$$s(t) = \frac{1}{N}\sum_{n=0}^{N-1} F_n \cos(2\pi f_n t + \varphi_n) = \frac{1}{N} Re\left\{\sum_{n=0}^{N-1} \dot{F}_n \exp(j2\pi f_n t)\right\} \quad (1)$$

Where N is the number of subcarriers, $(\dot{F}_n)$ are complex modulated symbols, and $\dot{F}_n = F_n \exp(j\varphi_n)$ Orthogonality condition is fulfilled when

$$\int_0^T f_l(t) f_m(t) dt = \delta_{lm} \quad (2)$$

Therefore $\Delta f = f_l - f_{l-1} = 1/T$. For QPSK modulated symbols $F = 1$ and $\varphi_1 = \frac{\pi}{4}, \varphi_2 = \frac{3\pi}{4}, \varphi_3 = \frac{5\pi}{4}, \varphi_4 = \frac{7\pi}{4}$. Taking into account the sufficiently large quantities of subcarriers, we can consider that the number of subcarriers with the same QPSK symbols will be the same $N_1 = N_2 = N_3 = N_4 = N/4$. So we will have four different sets of subcarriers $\{f_k\}, \{f_l\}, \{f_m\}, \{f_n\}$ with corresponding angles $\varphi_1, \varphi_2, \varphi_3, \varphi_4$.

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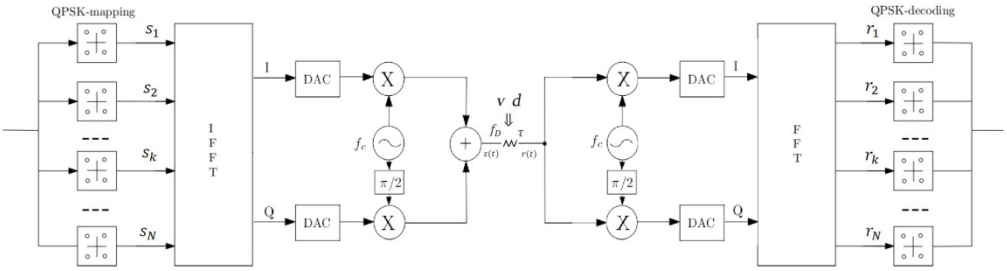


Fig. 1 : OFDM Radar transmission and reception system

OFDM transmission and reception can be implemented with Fast Fourier Transformation (FFT) [7]. As shown in Fig. 1, just performing an Inverse Fast Fourier Transform with s_n symbols and converting the data signal from digital to analog format we will get the s(t) signal, which will be transmitted from the radar station [8]. After reflecting from the target object, the echo signal gets both Doppler frequency shift as well as a time shift, which occur because of the moving target velocity and its distance from the radar station. The received signal will be the convolution of transmitted signal and the impulse response. In order to get the velocity of the target we should first get the Doppler shift that is present in the pulse response of our signal. By looking at the Fig. 1, it is obvious that one can easily implement OFDM translation and reception by FFT, since each block on the transmitter has a corresponding inverse done on the receiver site, therefore all of the data will be perfectly recovered. The main condition would be to satisfy the orthogonality.

III. Mathematical Relation Between Signal Phase Change and Doppler Frequency

Let's consider the impact of the Doppler frequency shift of the reflected signal on the position of received signal modulated symbol vectors. We assume that $|2\pi f_d T| < \pi/4$, therefore $f_d < 1/(8T)$; $f_d < \Delta f/8$. For Doppler Effect we also have

$$f_d = 2\frac{v_r}{c} f_c \tag{3}$$

Where v_r is the velocity of moving target, c is the speed of light and f_c is the carrier frequency. Since OFDM signal spectrum is $N\Delta f \ll f_c$ we can suppose that Doppler shift is the same for all subcarriers

$$f_{d_n} = (f_c + n\Delta f)\frac{v_r}{c} \approx f_c \frac{v_r}{c} = f_d \tag{4}$$

Reflected OFDM signal will be

$$s(t) = \frac{1}{N} Re\left\{\sum_{n=0}^{N-1} \dot{F}_n \exp(j2\pi(f_n + f_d)t)\right\} \tag{5}$$

It is important to call out that the Doppler shift will not affect the system orthogonality; instead it will lead to a spectrum shift. In-phase and quadrature parts on n-th subcarrier of the reflected signal which already has an impact of Doppler frequency are

$$I_n = Re\{g(t)\}\int_0^T [\cos 2\pi(f_n + f_d)t - \sin 2\pi(f_n + f_d)\,t]\cos 2\pi f_n t dt \tag{6}$$

$$Q_n = -Im\{g(t)\}\int_0^T [cos\, 2\pi(f_n + f_d)t + sin\, 2\pi(f_n + f_d)t]\, sin\, 2\pi f_n t dt \tag{7}$$

Considering any symbol, whose constellation point is in the positive side of both I and Q axis, we put √2/2 instead of Re{g(t)} and Im{g(t)}(in the other quarters of the coordinate system only the amplitude sign will change, but not the value). By doing some simple trigonometrical operations we will get both in-phase and quadrature components of the symbol we considered. In-phase component for n-th subcarrier will be

$$I_n = \frac{\sqrt{2}}{4}\left[\frac{1}{2\pi f_d}(sin2\pi f_d T + cos2\pi f_d T - 1) + \frac{1}{4\pi f_n + 2\pi f_d}(\sin 2\pi(2f_n + f_d)T + (\cos 2\pi(2f_n + f_d)\,T - 1)\right] \tag{8}$$

and for quadrature we get

$$Q_n = -\frac{\sqrt{2}}{4}\left[\frac{1}{2\pi f_d}(cos2\pi f_d T - sin2\pi f_d T - 1) + \frac{1}{4\pi f_n + 2\pi f_d}(sin2\pi(2f_n + f_d)T - cos\,2\pi(2f_n + f_d)T + 1)\right] \quad (9)$$

Both (8) and (9) consist of two expression parts with similar denominators. f_n is present in denominators of both second expression parts in (8) and (9); since $f_n = n/T$ and $f_n \gg f_d$ we can easily ignore them. Also it is obvious that existence of f_n in sine and cosine components leads them to have random values, depending on subcarrier number. By estimating the expected values of both in-phase and quadrature components we will prevent their negligible dependency from the subcarrier number. That is the main reason why we can make the calculation during a single OFDM symbol. Picking another symbol from a different quarter of constellation axis led to the similar results (with possible negative sign when in-phase and quadrature components signs were different)

Therefore we get

$$E[I_n] = I = \frac{\sqrt{2}}{8\pi f_d}(sin2\pi f_d T + cos2\pi f_d T - 1) \quad (10)$$

$$E[Q_n] = Q = \frac{\sqrt{2}}{8\pi f_d}(sin2\pi f_d T - cos2\pi f_d T - 1) \quad (11)$$

To get Doppler shift phase change of reflected signal we have to calculate an arctangent of I and Q division.

$$\varphi = \tan^{-1}\left(\frac{sin2\pi f_d T - cos2\pi f_d T - 1}{sin2\pi f_d T + cos2\pi f_d T - 1}\right) \quad (12)$$

IV. Distorted QPSK Mapped OFDM Radar Signal Expected Value Calculation

We achieved very positive results by reviewing the OFDM signal constellations. Fig. 2.a shows the transmitted signal constellation, while in Fig 2.b we can obviously see what kind of changes happen to the signal after reflecting from a target.

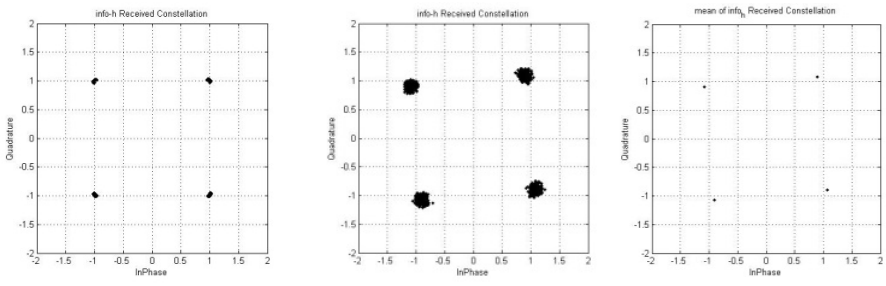
In Fig. 2.b we see that after the Doppler shift impact and time delay our graph has been rotated and scaled. Simulation results has shown that the Doppler shifting make the constellation graph to rotate and scale at the same time.

Simulations were done in Matlab environment. The carrier frequency $f_c = 24GHz$ OFDM symbol $T = 11\mu s$. Guard interval $T_G = 1.375\mu s$. During the simulation our system generated a moving target with randomly selected actual velocity $v_{act} = 59.4kM/h$. Then from the distorted signal constellation via our algorithm we calculated expected value of the signal (Fig 2.c). We get $\Delta\varphi \approx 5.44^{\circ}$ for phase vector rotation of signal. Using (12) we get Doppler frequency offset equal to 2440Hz. Consequently from (3) it is measured target velocity decided by proposed algorithm $v_{meas} = 54.9kM/h$. For absolute error we get

$$E_{abs} = |v_{act} - v_{meas}| = 4.5kM/h \quad (13)$$

And relative percent error will be

$$E_{rel} = \frac{E_{abs}}{v_{act}} \cdot 100\% = 7.57\% \quad (14)$$



a) b) c)

Fig. 2 : (a) The constellation of transmitted OFDM signal, (b) The constellation of received OFDM signal with the existence of Doppler shift, (c) The constellation of the distorted signal's estimated expected value

V. Conclusion

Constellation of QPSK mapped OFDM signal expected value estimation gives an opportunity to easily determine Doppler frequency offset and consequently the target velocity. As we make Doppler shift extraction during one OFDM symbol we get very effective mechanism with very high performance and low computing recourses.

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FARSS designated members are entitled to avail a 40% discount while publishing their research papers (of a single author) with Global Journals Incorporation (USA), if the same is accepted by Editorial Board/Peer Reviewers. If you are a main author or co-author in case of multiple authors, you will be entitled to avail discount of 10%.

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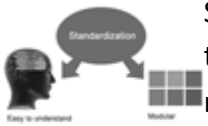
We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The FARSS can go through standards of OARS. You can also play vital role if you have any suggestions so that proper amendment can take place to improve the same for the benefit of entire research community.

As FARSS, you will be given a renowned, secure and free professional email address with 100 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.



The FARSS will be eligible for a free application of standardization of their researches. Standardization of research will be subject to acceptability within stipulated norms as the next step after publishing in a journal. We shall depute a team of specialized research professionals who will render their services for elevating your researches to next higher level, which is worldwide open standardization.

The FARSS member can apply for grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.
Once you are designated as FARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria. After certification of all your credentials by OARS, they will be published on your Fellow Profile link on website https://associationofresearch.org which will be helpful to upgrade the dignity.

The FARSS members can avail the benefits of free research podcasting in Global Research Radio with their research documents. After publishing the work, (including published elsewhere worldwide with proper authorization) you can upload your research paper with your recorded voice or you can utilize chargeable services of our professional RJs to record your paper in their voice on request.

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The FARSS is eligible to earn from sales proceeds of his/her researches/reference/review Books or literature, while publishing with Global Journals. The FARSS can decide whether he/she would like to publish his/her research in a closed manner. In this case, whenever readers purchase that individual research paper for reading, maximum 60% of its profit earned as royalty by Global Journals, will be credited to his/her bank account. The entire entitled amount will be credited to his/her bank account exceeding limit of minimum fixed balance. There is no minimum time limit for collection. The FARSS member can decide its price and we can help in making the right decision.

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MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (MARSS)

The ' MARSS ' title is accorded to a selected professional after the approval of the Editor-in-Chief / Editorial Board Members/Dean.

The "MARSS" is a dignified ornament which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., MARSS or William Walldroff, M.S., MARSS.

MARSS accrediting is an honor. It authenticates your research activities. After becoming MARSS, you can add 'MARSS' title with your name as you use this recognition as additional suffix to your status. This will definitely enhance and add more value and repute to your name. You may use it on your professional Counseling Materials such as CV, Resume, Visiting Card and Name Plate etc.

The following benefitscan be availed by you only for next three years from the date of certification.

MARSS designated members are entitled to avail a 25% discount while publishing their research papers (of a single author) in Global Journals Inc., if the same is accepted by our Editorial Board and Peer Reviewers. If you are a main author or co-author of a group of authors, you will get discount of 10%.

As MARSS, you will be given a renowned, secure and free professional email address with 30 GB of space e.g. johnhall@globaljournals.org. This will include Webmail, Spam Assassin, Email Forwarders,Auto-Responders, Email Delivery Route tracing, etc.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time.This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

The MARSS member can apply for approval, grading and certification of standards of their educational and Institutional Degrees to Open Association of Research, Society U.S.A.

Once you are designated as MARSS, you may send us a scanned copy of all of your credentials. OARS will verify, grade and certify them. This will be based on your academic records, quality of research papers published by you, and some more criteria.

It is mandatory to read all terms and conditions carefully.

AUXILIARY MEMBERSHIPS

Institutional Fellow of Global Journals Incorporation (USA)-OARS (USA)

Global Journals Incorporation (USA) is accredited by Open Association of Research Society, U.S.A (OARS) and in turn, affiliates research institutions as "Institutional Fellow of Open Association of Research Society" (IFOARS).

The "FARSC" is a dignified title which is accorded to a person's name viz. Dr. John E. Hall, Ph.D., FARSC or William Walldroff, M.S., FARSC.

The IFOARS institution is entitled to form a Board comprised of one Chairperson and three to five board members preferably from different streams. The Board will be recognized as "Institutional Board of Open Association of Research Society"-(IBOARS).

The Institute will be entitled to following benefits:

The IBOARS can initially review research papers of their institute and recommend them to publish with respective journal of Global Journals. It can also review the papers of other institutions after obtaining our consent. The second review will be done by peer reviewer of Global Journals Incorporation (USA) The Board is at liberty to appoint a peer reviewer with the approval of chairperson after consulting us.

The author fees of such paper may be waived off up to 40%.

The Global Journals Incorporation (USA) at its discretion can also refer double blind peer reviewed paper at their end to the board for the verification and to get recommendation for final stage of acceptance of publication.

The IBOARS can organize symposium/seminar/conference in their country on behalf of Global Journals Incorporation (USA)-OARS (USA). The terms and conditions can be discussed separately.

The Board can also play vital role by exploring and giving valuable suggestions regarding the Standards of "Open Association of Research Society, U.S.A (OARS)" so that proper amendment can take place for the benefit of entire research community. We shall provide details of particular standard only on receipt of request from the Board.

The board members can also join us as Individual Fellow with 40% discount on total fees applicable to Individual Fellow. They will be entitled to avail all the benefits as declared. Please visit Individual Fellow-sub menu of GlobalJournals.org to have more relevant details.

We shall provide you intimation regarding launching of e-version of journal of your stream time to time. This may be utilized in your library for the enrichment of knowledge of your students as well as it can also be helpful for the concerned faculty members.

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.
The board can also take up the additional allied activities for betterment after our consultation.

The following entitlements are applicable to individual Fellows:

Open Association of Research Society, U.S.A (OARS) By-laws states that an individual Fellow may use the designations as applicable, or the corresponding initials. The Credentials of individual Fellow and Associate designations signify that the individual has gained knowledge of the fundamental concepts. One is magnanimous and proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice.

Open Association of Research Society (US)/ Global Journals Incorporation (USA), as described in Corporate Statements, are educational, research publishing and professional membership organizations. Achieving our individual Fellow or Associate status is based mainly on meeting stated educational research requirements.

Disbursement of 40% Royalty earned through Global Journals : Researcher = 50%, Peer Reviewer = 37.50%, Institution = 12.50% E.g. Out of 40%, the 20% benefit should be passed on to researcher, 15 % benefit towards remuneration should be given to a reviewer and remaining 5% is to be retained by the institution.

We shall provide print version of 12 issues of any three journals [as per your requirement] out of our 38 journals worth $ 2376 USD.

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The individual Fellow and Associate designations accredited by Open Association of Research Society (US) credentials signify guarantees following achievements:

- The professional accredited with Fellow honor, is entitled to various benefits viz. name, fame, honor, regular flow of income, secured bright future, social status etc.

- In addition to above, if one is single author, then entitled to 40% discount on publishing research paper and can get 10%discount if one is co-author or main author among group of authors.
- The Fellow can organize symposium/seminar/conference on behalf of Global Journals Incorporation (USA) and he/she can also attend the same organized by other institutes on behalf of Global Journals.
- The Fellow can become member of Editorial Board Member after completing 3yrs.
- The Fellow can earn 60% of sales proceeds from the sale of reference/review books/literature/publishing of research paper.
- Fellow can also join as paid peer reviewer and earn 15% remuneration of author charges and can also get an opportunity to join as member of the Editorial Board of Global Journals Incorporation (USA)
- • This individual has learned the basic methods of applying those concepts and techniques to common challenging situations. This individual has further demonstrated an in–depth understanding of the application of suitable techniques to a particular area of research practice.

Note :

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- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
- In case of "Difference of Opinion [if any]" among the Board members, our decision will be final and binding to everyone.

"

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

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- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
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- Two Column with Equal Column with of 3.38 and Gaping of .2
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- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
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You can use your own standard format also.
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1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

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The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

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2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

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Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and to make suggestions to improve briefness.

It is vital, that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

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All manuscripts submitted to Global Journals Inc. (US), ought to include:

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Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy and planning a list of possible keywords and phrases to try.

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

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Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

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Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

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Before start writing a good quality Computer Science Research Paper, let us first understand what is Computer Science Research Paper? So, Computer Science Research Paper is the paper which is written by professionals or scientists who are associated to Computer Science and Information Technology, or doing research study in these areas. If you are novel to this field then you can consult about this field from your supervisor or guide.

TECHNIQUES FOR WRITING A GOOD QUALITY RESEARCH PAPER:

1. Choosing the topic: In most cases, the topic is searched by the interest of author but it can be also suggested by the guides. You can have several topics and then you can judge that in which topic or subject you are finding yourself most comfortable. This can be done by asking several questions to yourself, like Will I be able to carry our search in this area? Will I find all necessary recourses to accomplish the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

5. Ask your Guides: If you are having any difficulty in your research, then do not hesitate to share your difficulty to your guide (if you have any). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work then ask the supervisor to help you with the alternative. He might also provide you the list of essential readings.

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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