

NONLINEAR RESONANT MICROCOSM

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The quantum mechanics, as is known, was the theorists «powerful answer» to sensational results of experiments which have shown up the wave properties of smallest particles of substance. Disputes on the nature of such a strange microparticles behavior had not yet time to calm down, but the theory of phenomena in the form of «wave mechanics» was already complete.

According to this theory a freely moving particle is described by «probability» wave function in the form of a monochromatic wave. Besides many other open-ended questions stipulated by so-called postulates, founders of the quantum theory have left without answer and the most crucial issue: why elementary particles of substance (as oscillatory systems) should be indispensable linear – monofrequent?

Later there appeared experimental data «provoking» an idea of basic nonlinearity of oscillating microcosm, but the quantum mechanics has already turned into «a sacred cow» and any doubt about its validity actually meant «excommunication» from science.

Triumphal coming of the new physical theory was accompanied by admiration of people caused by ingenious paradoxes presented by physicists-theorists and followed by practically simultaneous occurrence alongside with quantum mechanics also of the relativity theory. Philosophers anticipated inexhaustibility of opportunities for breathtaking speculations about strangeness of the world around, about probability and regularity, about incomprehensible unity of wave and corpuscular properties of matter, etc.

The belief in «theory miracles» has reached the scales of religious cult, so that any doubts began to be equated with the insult of «religious feelings». In such circumstances «adherents» go off into hysterics and repeat the learnt mantras.

As expected, «general unanimity» in scientific community and «religious ecstasy» not turned out for the benefit of science and scientists.

In particular, at the open-minded approach it would be easy to notice, that «true» elementary particles demonstrate obvious dominance of one of the possible field directions. Roughly speaking, electron is a negative half-wave, and positron - a positive half-wave (electron and positron have opposite charges and opposite directions of magnetic moments). It should bring physicists to the idea about soliton nature of elementary particles, because «single-humped» waves in the form of half-wave, obviously, possess similar asymmetry.

Hence, elementary particles essentially cannot be «one-frequent» and as any nonlinear system should be characterized, alongside with basic frequency, also by broad «harmonics set»!

There were also got experimental data which directly indicate that particles have harmonious frequency components. It is a question of experiments on special accelerators, when hundreds of new, earlier not known elementary particles were produced.

It turned up that due to energy losses lack in microcosm «oscillating» particles intensively interact not only on the basic frequency, but also on harmonious components.

It has key effect on elementary particles mass series [1 - 3].

In what phenomena it becomes apparent?

Interaction between particles occurs *on the same one common frequency*, but for each particle this common frequency is one of the numerous harmonic components derivatives of its basic frequency. For example, if for one particle this *interaction frequency* coincides with n – harmonic number relative to its basic frequency f_1 , and for another particle the same frequency coincides with m – harmonic number relative to its basic frequency f_2 , then basic frequencies (and for many particles mass as well) of these two interacting particles are commensurable:

$$f = nf_1 = mf_2, \quad \frac{f_1}{f_2} = \frac{m}{n}.$$

Naturally, basic frequency of complex particle depends not only on mass, but also on internal interaction energy of a particle (mass «defect»). Therefore frequency or mass commensurability is observed at the particles, having close internal interaction energies.

Here are some examples [4]:

- The mass ratio of baryon Ω^- (1672 MeV) and baryon Λ^0 (1115 MeV) is equal to **3/2**.
- The mass of meson D^\pm (1869,4 MeV) is almost **twice** greater then proton mass.
- The mass ratio of meson F^\pm (1971 MeV) and meson K^\pm (493,67 MeV) is equal to **4**.
- The mass ratio of meson B^0 (5274,2 MeV) and baryon Ξ^0 (1314,9) is equal to **4**.

Owing to strong interaction between quarks the basic frequency of proton and neutron (the most intensive frequency of a microcosm in a visually graspable part of the Universe) meets ≈ 332 MeV that approximately by 6 % surpasses one third of nucleon mass [1]. On the average by the same value (6%) the magnetic moments of proton ($2,793\mu_N$) and neutron ($-1,913\mu_N$) «do not reach» corresponding integer values (in nuclear magneton) $3\mu_N$ and $-2\mu_N$.

Thus, frequency of nucleons is determined not by real quarks mass, but by *effective mass* (≈ 332 MeV). Accordingly dominating frequency in microcosm - the Main frequency of the Universe (MFU) equals **$1,60 \cdot 10^{23}$ Hz**.

MFU - the average value of frequencies of the two kinds of nucleons quarks, which mass slightly differ from each other. We shall remind [2], that electron frequency «is tuned in» to the beating frequency, created by a small difference of frequencies of two kinds of quarks, so that electron mass and nucleons mass are related by ratio $m_e \approx (2/5) \cdot (m_n - m_p)$. This is approximate relationship as electron mass is influenced by electron neutrino. Real electron mass meets frequency value - **$2,47 \cdot 10^{20}$ Hz**.

If to take in consideration dominating role of MFU (≈ 332 MeV) on the microcosm formation then there is no wonder in occurrence of heavy electron «analogues». These short-lived particles also interact with harmonic frequencies of the oscillating microcosm:

Frequency of ***muon*** is equal to 1/3 of MFU,

Frequency of ***tauon*** is 6 times more then MFU.

Insignificant deviations of real mass from the specified values are connected with influence of corresponding neutrino (muon or tauon), that actually provided opportunity to calculate mass of these neutrinos [1].

Some mesons *effective mass practically coincides with their real mass*, owing to what they decay mainly to photons. Such particles, interacting with nucleons on harmonic components, can be regarded as *the direct experimental indication* proving correctness of above mentioned value of MFU (the average effective mass of nucleons quarks).

Let's cite corresponding examples.

The mass of π^0 - meson (134,96 MeV) makes 2/5 of MFU (≈ 332 MeV);

The mass of η^0 - meson (548,8 MeV) makes 5/3 of MFU;

The mass of K^0 - meson (497,67 MeV) meets 3/2 of MFU;

Mass of F^\pm - meson (1971 MeV) makes almost 6 MFU.

Let's notice, that frequencies of these mesons correspond to the half of their mass as mesons consist of two quarks.

Complication of elementary particles mass series is caused by the fact that many elementary particles (as well as the «main» particles - proton and neutron) have some misfit of their frequency and mass because of different internal binding energy determining values of *effective mass* of particles.

Moreover the theory of elementary particles assumes that there is an opportunity of association in one particle of quarks with significantly differing mass (frequencies). Such «combinations» also cause the complication of elementary particles mass series [5].

Despite of the microcosm «unpredictability», the cited results of experimental data, obviously, cannot be regarded as simple concurrences. Last doubts about it have vanished and microcosm nonlinearity became even more obvious after discovery and examination of **similar resonant interactions on harmonic components in atom electron shells, as the basic principle of its formation** [6,7,8].

The quantum mechanics does not consider these basic features and consequently cannot adequately describe atom structure and properties. Resonances of electron shells of atoms on multiple harmonic components *are characterized by fractional values of the main quantum number* while quantum-mechanical atom theory assumes presence of only integer values [9].

As an example in the following table values of the main quantum number *for external electron of univalent atoms* are shown [7].

Atom	$n \approx N_1/N_2$
3 (Li)	8/5
11 (Na)	5/3
19 (K)	7/4
55 (Cs)	15/8
37 (Rb)	9/5
47 (Ag)	4/3
78 (Pt)	5/4
81 (Tl)	3/2

Similar resonances on harmonic components are observed and in the excited states of electron shells which determine *atom spectra* [6]. For example, the main quantum number of external electron of lithium atom in not excited state is 8/5 (see tab.), and in the excited states this fraction, alongside with integer values, «is supplemented» with a line of fractional numbers increasing on unit: 13/5, 18/5, 23/5, 28/5, 33/5, etc.

The more multipart is the atom skeleton producing around itself the complex picture of standing waves, the more is the number of various harmonic components on which there are resonances of electron shells of atoms.

Here are some more examples from [6].

Fractional values of the main quantum number of excited states of *sodium* atom contain sequences of numbers:

8/3, 11/3, 14/3, 17/3, ..., etc.

22/7, 29/7, 36/7, 43/7, ..., etc.

The excited states of *potassium* atom contain, in particular, sequences of fractional values of the main quantum number:

14/5, 19/5, 24/5, 29/5, ..., etc.

23/7, 30/7, 37/7, 44/7, ..., etc.

It arouses admiration with which persistence, worthy of a better cause, the authors of Grotrian diagrams «represented» well-being of the theory.

From the lower represented table for caesium atom excited states it is clear that, as a result of these «diligence», appeared amazing disagreement of integer values of the main quantum number in diagrams (the first column) with real *essentially fractional values*, characterizing the excited states energy levels [6].

Probably for this reason distinguished physicists usually did not include Grotrian diagrams in their books and manuals.

The excited states of caesium atom

n diagram	W , eV diagram	n fact.	$n \approx N_1/N_2$
6	1,386	2,334629	7/3,00
6	1,455	2,367436	19/8,02
5	1,798	2,553895	23/9,01
5	1,81	2,561241	18/7,03
7	2,298	2,926946	3
7	2,699	3,38293	27/7,98
7	2,721	3,414533	24/7,03
6	2,801	3,537397	39/11,02
6	2,806	3,545523	32/9,03
4	3,034	3,988398	4
8	3,188	4,402512	22/5,00
8	3,198	4,434072	31/6,99
7	3,23	4,539817	50/11,01
7	3,232	4,54668	41/9,02
5	3,344	4,988948	5
9	3,427	5,415046	27/4,99
9	3,432	5,444333	38/6,98
8	3,448	5,541344	61/11,01
8	3,45	5,553839	50/9,00
6	3,512	5,988701	6
10	3,562	6,425118	32/4,98
10	3,565	6,454434	45/6,99
9	3,574	6,544851	72/11,00
9	3,575	6,555134	59/9,00
7	3,614	6,998307	7
11	3,646	7,437837	52/6,99
11	3,648	7,468133	15/2,01
10	3,654	7,561295	68/8,99
8	3,68	8,009498	8

Investigation of the resonant interactions in atom has shown one more fundamental property of electron shells. It is a question of many-electron shells in which structure electrons are involved in *common resonance* and form *Bose condensates* [7].

All electrons of the shell belong to common spherical surface (equipotential) that has reliable fit with experimental law:

The sum of ionization potentials of electrons belonging to many-electron shell meets (in view of virial theorem) *the energy of the charged sphere* of the same radius with the total superficial charge equal to the sum of electron charges of the shell.

Let's emphasize, that this experimental relation is *a necessary and sufficient condition* of shell electrons *constantly being* on the common spherical surface!

Experimental data unequivocally testify that electrons in atom do not form «powdery» probability clouds, drawn by the quantum theory. On the contrary, in atom *collective electron properties* appear. Electrons in each shell «are united» by the common resonance and form compact «condensate».

To spherical model of atom electron shells have come also authors of studies [10, 11], using other methods of research.

The conclusion

Experimental data convincingly testify that in microcosm, alongside with interactions of particles on the basic frequencies, interactions on harmonic components take place.

It means that «oscillating» microcosm is nonlinear and confirms the assumption about *soliton nature of elementary particles*.

Variety of interactions and real processes occurring in microcosm determines physical picture of the world. It appears that in some respect A. Einstein was right, when spoke about the quantum mechanics as the temporary «intermediate» theory. The general theory, including the quantum mechanics like the «intermediate» theory, it would be logical to define as *the nonlinear resonant physics of microcosm* [12, 13].

Microcosm concept even in environment of *general belief* in «infallibility» of quantum mechanics had been undergoing gradual changes.

From the very beginning wave properties were considered as some entity, as the primary property of substance microparticles, regardless to surrounding conditions. However already R. Feynman, explaining the effects arising at incidence of light on a glass plate [14], spoke about *interaction* of photon simultaneously with all electrons of glass. Precisely in the same way moving electron shows wave properties, *interacting with surrounding particles*.

If these interactions occur only on basic frequencies they would generate *differential frequency* and cause the corresponding spatial periodicity defined as *de Broglie wavelength of electron*. But, as we saw, it is only a special case from all the variety of interactions determining microcosm laws.

The quantum mechanics description of microcosm «covers» only the basic frequencies of particles, ignoring other possible interaction frequencies. Such basic

restriction, proceeding from erroneous initial conditions, has resulted in «*scientific*» *profanation of the quantum-mechanical theory of atom, which has nothing to do with reality.*

It is essential that atom structure is based on internal resonances, the majority of which occurs on harmonic components.

Moreover, electrons in atom «do not move» in the self-consistent field as it is assumed in theory, but, on the contrary, form compact «collectives» being condensed in resonance peaks of electron shells. Therefore atomic many-electron shells have *the spherical form* repeating equipotential surfaces on which electrons have equal energy (frequency) and, thus, appear to be involved in common resonance.

In connection with the opened inconsistency of the quantum-mechanical theory of atom, I should like to say that experience conflicting feelings.

Certainly, there is obvious satisfaction with achieved progress in understanding of the microcosm nature, *based on the analysis of reliable experimental data.*

But there is also a sincere regret that essential distortion of physical picture of the world over a period of decades *has objectively put the brakes on science development.*

It must be confessed that we all in XX century were under hypnotic charm of physicists «mad ideas». In the sixties and seventies, on which fall young years of my contemporaries, there was an apparent romanticizing of physics. At that time there were well-known «disputes between physicists and lyricists».

The Moscow institute of electronic machine building, where I studied, was established in 1962 to provide with skilled personal the defense industry of our country. There were created favorable conditions for students to have a proper education.

The first class experts have been sent to institute, and laboratories were outfitted with modern equipment. Special attention was given to basic education - physics and mathematics were lectured at a level of physics department of Moscow State University.

With bated breath we listened to one of the best faculty members Leo Tarasov (according to interviews of students) delivering lectures on the quantum mechanics. In the midst of us we gave him quantum-mechanical nickname - *boson* for somewhat plump figure and firmness of character. This adoration of students was not unreasonable as L.V.Tarasov possessed encyclopedic knowledge on physics and pedagogical talent.

And now he is well known as talented science popularizer and author of innovative pedagogical techniques. He has published numerous manuals and books on physics, including, books on the quantum mechanics.

Among faculty members there were great scientists who have laid foundations of modern electronics. Bright lectures on electronic devices, delivered by S. A. Zusmanovsky, are especially memorable.

Having graduated with honors from institute, I had been working for many years in the electronic and nuclear industries. Simultaneously I had finished postgraduate study at Scientific and production association «Istok» (Frjasino) and in 1984 have defended thesis of candidate of science.

Undoubtedly, good education was the reliable basis for professional work and scientific researches.

Moreover, the skills of scientific analysis imparted by our professors and aspiration to get at the roots of phenomena have helped to understand the half-truth, on which is based the quantum mechanics. As is known, worst of all to deal with is the half-truth. Somewhere the quantum mechanics is reasonable and more or less works, although in most cases it does not give satisfactory results.

It is twice tough to lose «faith» which is founded not on logic, but on blind «belief». The quantum mechanics, as is known, is based on «postulates» and abstract artificial constructions, and Schrödinger equation has arisen as ingenious «inspiration» of its author. There are only vague declarations about some experiments which prove quantum mechanics validation.

Overcoming of errors and transition to studying of real processes occurring in microcosm are hindered by the struggle against heterodoxy, unleashed in research institutions. Amplifying persecutions of freedom of discussion literally raises panic and fear among scientific personal in the face of danger «to fall into heresy». This fear in the science of our country, it is safe to say, was inherited on «genetic» level since times of Lysenko and persecutions of genetics.

Probably, therefore researchers in the course of many decades «look right through» the nonlinear characteristics of elementary particles, as also «pretend not to see» fractional values of the main quantum number of electron shells of atoms.

As a whole, the disastrous tendency in science has taken roots – to neglect «inconvenient» facts to please the «standard» point of view.

Who wins? The theory again will haughtily reject the «wrong» facts, or experimental data will enforce the «crazy» theory, at last, just to accept reality and don't dictate terms?

It would seem that such disagreement should not be at all. However, all we are amazing witnesses of how mathematicians - theorists are dominating the experimental physics which follows the rule: «How may I serve you, mister theorist? ».

In the most desperate situation there are students who actually are turned into a «zombie» by a rigid management of educational system.

References

1. Verin O.G. Vacuum dynamics and the soliton theory of elementary particles. M.: RT-Press. 2002. <http://technic.itizdat.ru/docs/verin/FIL13560772400N187559001/1>
2. Verin O.G. Elementary particles nature, the quantum theory and grand unification. M.: "Contour-M". 2005. <http://technic.itizdat.ru/docs/verin/FIL13560780480N888968001/1>
3. Verin O.G. Energy: Substance and Field. M. "Contour-M", 2006. <http://technic.itizdat.ru/docs/verin/FIL13560778880N916894001/1>
4. Physical quantities. Reference book. - M.: Energoatomizdat, 1991. S. 1232.
5. Akhiezer A.I., Rekalov M.P. Elementary particles. M.: «The Science», 1986.

6. Verin O.G. Harmonious unity of atom spectrum.
<http://technic.itizdat.ru/docs/verin/FIL14183156120N223043001/1>
7. Verin O.G. Atomic electron shells formation laws.
<http://technic.itizdat.ru/docs/verin/FIL14232142200N952959001/1>
8. Verin O.G. Basic physics of atom.
<http://technic.itizdat.ru/docs/verin/FIL14122582630N965075001/1>
9. Shpolsky E.V. Atomic physics. V. 2: Bases of quantum mechanics and atom electron shell structure. M.: "The Science". 1984.
10. Rams M.A., Dyatlova I.V., Rakitin R.Y. Stability of crystals formed by atoms with thin spherical electron shells. Scientific and educational magazine AltStU. V. 5 (2003).
<http://edu.secna.ru/media/f/bar05.pdf>
11. Potapov A.A. Shell model of an electron structure of atoms. The bulletin of Irkutsk state university. 2006.№3. S. 109 - 115. <http://www.bourabai.kz/articles/potapov/index.htm>
12. Verin O.G. Resonant physics of microcosm.
<http://www.sciteclibrary.ru/rus/catalog/pages/14857.html>
13. Verin O.G. Feynman has held back the essence?
<http://www.sciteclibrary.ru/rus/catalog/pages/10450.html>
14. Feynman R. QED - the strange theory of light and matter. M.: "The Science", 1988.