Some words about fundamental problems of physics

Part 1: «Electron Orbitals»

George Shpenkov

Although it now goes the second decade of the 21th century but the crisis, in which physics has turned out in the late 19th and early 20th centuries, has not been resolved; and at the turn of 20 - 21 centuries even deepened. A natural question arises: why? The truth of the matter is that, in fact, all efforts of physicists were focused not on cognition of the nature of experimentally detected phenomena, but (in a hurry) on the construction of various abstract theories, the development of abstract mathematical models to describe these phenomena (as a bright example is the Lamb shift), on the accurate adjustment of theoretical results following from these theories and models to experimental data, on the artifice of properties and "fundamental" parameters that do not exist in nature, etc. As a result, it was developed a virtual physics (answering the question: **how?** but does not answer the question: **why?**) where common sense and logic are almost completely absent. Accordingly, there is every reason to state that modern physics is a figment of the individual's imagination, based mostly on schizophrenic logic.

Here I want to draw attention to just one from many other problems unsolvable in the framework of the aforementioned erroneous approach (and, naturally, unsolved therefore): a problem of atomic structure. What are atoms made of, and how? The solution of the latter was and still remains one of the major problems of mankind. Understanding the true structure of matter at micro and macro scales characterizes the level of development of our civilization. In the light of this, a modern picture is, frankly, not cheerful.

It is believed that quantum mechanics (QM) and its successor, quantum electrodynamics (QED), have solved the problem of atomic structure and the problem of the interaction of radiation with matter, but this is misleading. QM (and, therefore, QED) is based on abstract, invented postulates, one of which is the postulate of the so-called Schrödinger equation. The original Schrödinger equation was further developed and, finally, subjected to various modifications (including those that led to the Dirac equation) it became the basis of quantum electrodynamics. An in-depth analysis of the basis of the Schrödinger equation has revealed its logical inconsistency, the complete absence of any common sense, and a number of obvious errors and frauds, coming out of the ordinary. Accordingly, it becomes unclear how such a theory at all could come to light, and it is very strange, how it may flourish until now [1-3]? Whether is so blindly all community of physicists?

Schrödinger equation is absurd in itself, in principle. First, in reality, it does not have the "solutions" which it is credited, and in no way, this equation cannot be treated as wave.

What has been called "solutions" is wishful thinking. Outwardly, the initial Schrodinger equation differs from the classical wave equation only by the wavenumber (the magnitude of the wave vector), but this fundamental distinction has left its imprint on the "solution" of its radial component (in fact, lack of the solution) [1]. Thus, by their form, Schrödinger's and classical wave equations do look like twins, especially because the polar-azimuthal components of both equations and their solutions are the same. However, interpreting of the same polar-azimuthal solutions in both cases differs in principle. Jut on this circumstance I want to draw special attention.

The wavenumber in the physics of wave processes and, consequently, in wave equations, is the quantity inversely proportional to the wavelength, $k = 2\pi/\lambda$, or directly proportional to frequency, $k = \omega/c$, i.e. it has a strictly defined meaning. In the Schrödinger equation, instead of the wavenumber, there introduced the kinetic energy of an electron in the nucleus of an atom, *E*, i.e. the wavenumber is a function of distance of the electron from the atomic nucleus, $k = f(r)$:

$\Delta\hat{\Psi} + k^2\hat{\Psi} = 0$ - Wave equation, $\Delta\hat{\Psi} + f(r)^2\hat{\Psi} = 0$ - Schrödinger's equation

That's the whole difference. But the effect of such a substitution has turned out to be extremely destructive. The wave equation was deprived of any physical meaning after aforementioned Schrödinger's replacement. It is no longer wave in the full sense of the word, although the polar-azimuthal component of the wave equation and its solutions are not changed at the substitution.

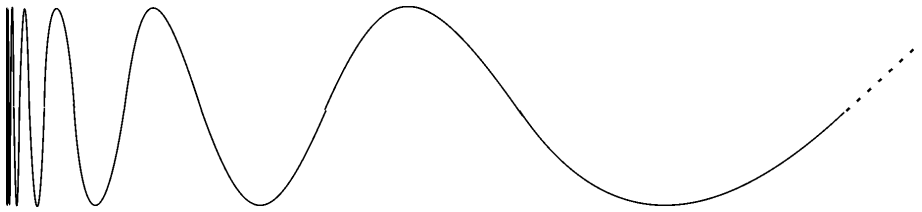
Thus, the main "achievement" of Schrödinger consists in the fact that he picked up and replaced, in the ordinary universal wave equation, the wavenumber with a variable that depends on the distance *r* in the vicinity of the nucleus inside the atom, because

$$f(r)^2 = \frac{2m}{\hbar^2}(W + \frac{e^2}{4\pi\varepsilon_0}\frac{1}{r}), \qquad \text{where} \qquad W + \frac{e^2}{4\pi\varepsilon_0}\frac{1}{r} = E$$

Let me remind, the wave motion is a **collective** process of transfer of excitation in the space from one particle to another by chain, and this process is completely independent of what is happening inside each individual particle. Schrödinger unfoundedly combined two unrelated processes (phenomena) in one equation. He has distorted thus the wave equation that, naturally, made impossible to get the radial solution without, as it turned out, forced manipulations. Since then the mutilated wave equation, named the Schrödinger equation, became regarded as a basic postulate of quantum mechanics - a new scientific branch which emerged in result in physics. According to the next postulate (from other ones on which the QM is based), any dynamic physical quantity is associated with a linear self-adjoint operator. Thus, there were introduced quantum-mechanical operators, and the Schrödinger equation

itself became presented in the operator form, etc. However, a complete introduction of abstract mathematics for presentation of the theoretical concepts in the QM did not affect the main result of its "solutions" manifested in the appearance of so-called "atomic orbitals", about which I'll talk further. These "solutions" have turned out to be crucial for accepting the quantum mechanical model of the atom.

Think of the absurdity the replacement by Schrodinger the wavenumber with the function. An introduction of the frequency-dependent function, $f(r) = k(r) = 2\pi / \lambda(r)$ (the specific form of the presented above function is taken from [2], see Eq. 3.4), means that the wavelength increases continuously, and its frequency, respectively, decreases from point to point as the wave propagates in intra-atomic space moving away from the atomic nucleus. Period (but not the amplitude) of oscillations varies in a wave so rapidly that even at distance from the nucleus equal to the diameter of the *n*-th Bohr orbit the wavelength, increasing, achieves infinity (and the frequency comes to zero); i.e. the wave process subsides completely - no oscillations anymore.



However, similar wave processes where a sharp damping is not associated with a decrease in amplitude, but is caused by the continuous change of the oscillation period in the same wave, do not exist. In nature, there are only relatively minor changes in the wavelength (frequency) of a wave beam as it propagates over macroscopic distances. This phenomenon is known due to effects such as the Doppler shift, the cosmological redshift, and etc.

Secondly, the following fundamental error when creating the QM has been and still remains. It is the identification of spherical harmonics, the polar-azimuth functions - solutions of the stationary wave equation (its polar-azimuthal component), with the so-called "electron orbitals" ("clouds"). Such identification is unfounded due to ignorance of the real meaning of these mathematical functions. In fact, spherical functions (harmonics) of the solutions of the wave equation (still regarded by physicists as "real" and "imaginary", being actually both real) indicate the angular (polar-azimuthal) coordinates of nodes and, respectively, the coordinates of antinodes in a standing wave formed in three-dimensional spherical space-field due to interference (superposition) of waves. To understand it physicists must simply look closely guides for math and insight into the meaning of the ready-made solutions of the wave equation, which were well known in Schrodinger's times too. Thus, polar-azimuth functions (spherical harmonics) do have no relation to mystic „electron clouds". The latter were arbitrarily ascribed to the aforementioned wave formations, spherical harmonics.

In the light of clarifying the nature of the polar-azimuth functions, as absurd it looks the following so-called "hybridization" of the obtained "atomic orbitals": the mathematical mixing of "real" and "imaginary" components of polar-azimuth functions, i.e. in fact, a mixture of angular coordinates of nodes with angular coordinates of antinodes of standing waves. Hybrid polar-azimuth functions obtained by this way, “atomic and hybrid atomic orbitals” (s, p_x, p_y, p_z, d_{xy}, $d_{x^2-y^2}$, d_{xz}, d_{yz}, d_{z^2}, …,), were called "**electron configuration of atoms**”. But a purely mathematical mixing has no physical meaning. We cannot just pick up and mix anything that is not miscible physically, in principle, by their very nature. For example, it is absurd to imagine a mixing of two energies, potential and kinetic, or two fields, electric and magnetic. Do we get unknown to us new energy and a new field as a result of this mixing? The absurdity of this question is obvious.

We see that instead of studying nature, physicists, using quantum mechanics and quantum electrodynamics, have actually built a non-existent illusory world. But for all that, what about the main goal of physics - cognition of nature?

We can develop this theme further by continuing the list of other absurdities, upon which it rests quantum mechanics (and, accordingly, quantum chemistry). But in order to not overwork the reader, for a beginning, the data presented is quite sufficient and appropriate. Details can be found in the cited literature [1-3] and other articles cited there. Having read these works, the meticulous reader will be convinced in the veracity of conclusions about the impasse to that have landed themselves a modern physics and chemistry, where quantum mechanics, recognized as one of the greatest discoveries of the last century, plays the main role. He also will find there the concrete solutions proposed to exit from the dead end.

REFERENCES

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