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Short Communication

Comments to Megascopic Quantum Phenomena

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Abstract

We present here the incompleteness of the Copenhagen interpretation regarding the impossibility of explaining the transition from the exact quantum mechanics to the Born-Oppenheimer approximation, where the inaccurate method captures phenomena like spontaneous symmetry breaking, but this is impossible to achieve with exact equations. The solution to this dilemma lies in the revision of quantum field theory which bounds together internal and external (vibrational, translational, and rotational) degrees of freedom in a similar way as the Lorentz transformation deals with space and time. This is the only way how to exactly mathematically justify the corrections beyond the Born-Oppenheimer approximation (Born-Huang ansatz). The consequences are overwhelming: It reveals the wrong BCS theory of superconductivity, derived on the basis of the incomplete quantum field, and all erroneous theories inspired by the BCS one (e.g. Higgs mechanism). Moreover, the second Bohr complementarity emerges from the mechanical wholeness and field fragmentation, opening the door for the megascopic mirror of the microscopic Copenhagen interpretation and for the explanation of megascopic quantum phenomena. Finally, we get an entirely new look at the meaning of physics and chemistry: The first one deals with microscopic and the second one with megascopic phenomena.

As I was asked to contribute with a short paper, I present here brief comments on my previous work Megascopic Quantum Phenomena [1]. I will mention only a few quotations here, the rest can be found there. The mentioned work was dedicated to the megascopic mirror of the microscopic Copenhagen interpretation [2] of quantum mechanics as its complementary part, the unique way to advocate and rescue this only correct interpretation, in spite of many negative critiques and acceptance of various wrong ones today. As a result, we finally find the true borderline between physics and chemistry and will understand, to which discipline the various phenomena belong. We will proceed with the list of questions concerning contemporary problems that are either still open or even falsely answered and misinterpreted.

What is the difference between the exact quantum mechanical calculations and the ones using the Born-Oppenheimer (B-O) approximation?

This approximation [3] is widely used in quantum chemistry and solid-state physics due to its simplicity in how it deals with the separation of electronic and vibration motions. In the first phase, it freezes the nuclear motion and calculates adequate electronic states and the energy of that system. Then in the second phase, it calculates the energetic changes during the nuclear movement in order to gain the vibration states and their energies. This is a very useful a practical method, but it opens one serious philosophical question. Normally we are aware that the solving of exact equations gives us always better results than by using only some of their approximation. Nevertheless, here we encounter very strange paradoxes:

a) Whereas the exact solution does not recognize any spontaneous symmetry breaking (SSB) [4], like isomerism or Jahn-Teller (J-T) effect [5], the B-O approximation does!

b) The exact solution as opposed to the (B-O) approximation does not offer the known hierarchy as e.g. elementary particles → atoms → molecules; instead, it is replaced with the reduced hierarchy elementary particles → molecular atoms or atomic molecules [6].

c) Only the B-O approximation leads to the concept of individual molecules; in the exact solution we can only artificially specify so-called “isolated molecules” [4].

This is still an open problem: How it is possible that an inaccurate method captures phenomena that do not follow in any way from the exact one?

What is the difference between the adiabatic and Bohr-Oppenheimer (B-O) approximation and what is the impact of this difference on the quantum mechanics and quantum field?

From the perspective of quantum mechanics, the adiabatic approximation yields the first correction to the B-O one, which is called the Born-Huang ansatz [7,8]. On the other hand, from the perspective of the quantum field, only the B-O approximation is known and is used in solid-state physics. I have introduced this field theory also in quantum chemistry where it can be easily numerically verified since molecules unlike crystals consist only of a finite number of particles. First I have used the standard center-of-mass (COM) separation known from quantum mechanics, i.e. for an N nuclei system with 3N degrees of freedom 6 (5 for two-atomic molecules) degrees are responsible for the translational and rotational movement of the COM, and only the rest 3N - 6 (3N - 5) degrees of freedom corresponding to inner molecular vibrations are included in the field formulation. The exact same process is routinely used in the solid-state field. But the exact numerical calculations have shown that such a quantum field can never reproduce the adiabatic corrections unless all 3N degrees of freedom are incorporated in quantum field transformation without excluding 6 (5) translational and rotational modes of COM, just a similar process like Lorentz transformation bounds together the space and time coordinates [1]. We will call it the field COM covariant theory. It has a profound consequence: The quantum field does not share COM separation with quantum mechanics. On the other hand, the quantum field shares all three issues 1a), 1b), and 1c) with the B-O approximation. So we have now side by side two different descriptions of matter: quantum mechanics and field with four fundamental differences between them. One group of scientists thinks that mechanical and field descriptions are equivalent, and another group thinks that field descriptions are on a higher level than mechanical ones. But we see now, that these two descriptions of the whole system are in a complementary relationship, exactly as the Bohr complementarity applies to the single entity description as either being a particle or a wave. Finally, we have an answer to one of the most fundamental problems of quantum physics never solved before - a challenge for physicists formulated by Bohm [9]: how to implement categories like wholeness and fragmentation into the quantum theory. We have also fulfilled Jordan's request for the second complementarity [10] because one Bohr complementarity is not sufficient for the explanation of classicality.

Which scientific branches are misinterpreted due to the use of the incomplete quantum field?

First of all, surely the superconductivity, namely the microscopic Bardeen-Cooper-Schrieffer (BCS) theory [11]. The hardest task was the derivation of the ground state from the conducting band of a conductor after its transition into the superconducting state. This theory uses Fröhlich's effective two-electron interaction [12] for the construction of so-called Cooper pairs of electrons, responsible for the lowering of the ground state and phase transition, as well as for the transport of electric current.

a) This means, that the BCS theory is two-particle, as opposed to the results of a full COM covariant field yielding the one-particle mechanism of superconducting phase transition and excitation process. When I discussed this one- versus two-particle dilemma many years ago with Max Wagner, the former director of the department of physics at the Stuttgart University in Germany, he said to me, that Fröhlich always claimed that it must be the one-particle mechanism and that the BCS theory is a fraud. I told him that I never find this information anywhere, and Wagner answered me, that he was his student and that Fröhlich repeated this to his students many times. Then he encouraged me in further development and progress of the one-particle concept of superconductivity.

b) Unlike the field COM covariant theory the BCS theory is unable to explain the SSB, which occurs after the condensation into the superconducting state, i.e. no symmetry breaking follows from the BCS equations.

c) The BCS theory does not explain the Meissner effect [13], therefore it does not explain superconductivity [14]. It only argues that the measured current indicating the carriers with the charge 2e proves the Cooper-pair concept and does not take into account at all the fact that the state and phenomenon of superconductivity are two different concepts, i.e. the first one is of one-particle origin, and the second one of the two-particle origin.

d) The BCS theory violates the fundamental nature law - the Goldstone theorem [15]: every spontaneous breaking of a continuous symmetry must correspond to one massless spinless particle. We have 3N degrees of freedom with broken symmetry, and only 3N - 6 phonons, whereas the rest - 3 translons and 3 rotons, descending from the translational and rotational degrees of freedom, are missing! These 6 additional quasiparticles play absolutely no role in other solids, like conductors, semiconductors, or insulators, but superconductors are truly responsible for the superconducting phase transition.

Now imagine that on the basis of BCS theory yet another theory was developed: the theory of "God's particle", the so-called Higgs boson. As Comay has shown [16], the Higgs theory violates yet another fundamental nature law - the Bohr principle of correspondence and has proved it on examples of density, Hamiltonian, Lagrangian, and Euler-Langrange equations for Higgs bosons. Today only a few scientists care about violating natural laws, and some actually celebrate their breaking. This is really perverse and blasphemous. Higgs even named his Nobel lecture "Evading the Goldstone Theorem" [17].

Is the microscopic quantum description the ultimate tool for understanding our Universe?

Even in the era of classical physics, most scientists believed that having available parameters of all the smallest particles could predict the motion of the whole universe. On the other hand, scientists like Newton, Leibnitz, Maxwell [18], or Peirce [19] were aware of the limitations of the "corpuscular philosophy", especially in the cases of symmetry-broken states. And the microscopic quantum theory is also of corpuscular type, based on the materialistic atomic ideas of Democritus. We mention here three basic reasons, why superconductivity cannot have a microscopic explanation, and this crucial cognition forces us to introduce the megascopic quantum theory.

a) Every microscopic theory must result in Born's rule for the probabilities related to the density and the velocity of the superconducting carriers, and these quantities have to be experimentally measurable. But as we know, they are in principle non-measurable.

b) No microscopic theory allows us to avoid the universal concept of Bloch states for the description of superconducting carriers. It means that the carrier mass must take the effective mass of the electrons into account. This, however, is in direct contradiction with measurements of the London moment, where only bare electronic masses are reported.

c) According to the second form of van Fraassen's argument [20], asymmetry cannot arise ex nihilo. Although we know that the original asymmetry around the superconductor can be present in the form of an external magnetic field, no microscopic theory is able to explain the Meissner effect mechanism, when the superconductor is cooled below the critical temperature and the constant magnetic field cannot bring about any acceleration of the superconducting carriers.

Where is the borderline between physics and chemistry?

Physics and chemistry were historically two different disciplines. When quantum physics started to be successfully developed, many chemical quantities were calculated by means of physics, and this somehow put chemistry under one roof with physics. Chemistry was grasped either as some subdivision of physics, or was classified according to the size of investigating entities: from elementary particles up to atoms it was physics, molecules - chemistry, and solids - physics again. Introducing second complementarity on the megascopic level and creating megascopic mirrors of all microscopic quantum laws, we can finally identify chemistry with all megascopic phenomena. Besides chemical reactions true quantum chemistry deals with superconductivity and superfluidity, the J-T effect, isomeric transitions, the Einstein-de Haas effect [21], and brittle fracture. All these mentioned phenomena have no microscopic rationale. So physics deals with microscopic causal phenomena, whereas chemistry with megascopic teleological ones. It means that one and the same object, like a superconductor, can be investigated from the physical point of view, concerning e.g. phase transition or one-particle excitation process, or from the chemical point of view, as far as the two-particle mechanism of supercurrent. Superconductors due to the possibility of their precise formulation serve us as the best tutorial to comprehend the factual difference between physics and chemistry. Exactly in the same way how the Cartesian split was reversed in quantum physics and our conscious mind plays its role again during the wave function collapse, it must be done in quantum chemistry as well, and our unconscious mind, which was part of the old pre-Cartesian alchemy [22], must reappear. For more details, please, see the complete work [1].

What are the philosophical consequences of introducing the megascopic quantum theory?

Understanding the role of the unconscious mind descending from old alchemy in context with megascopic quantum theory is not easy at all. We must realize that we have been educated in the Judeo-Antique-Christian philosophical system, but the mentioned knowledge goes far and far back in history and is recorded only in a small torso - The Emerald Tablet [23]. Probably this knowledge originates from Enoch, who survived the flood, but after the confusion of tongues in Babel mankind lost the key to understanding it, especially the verse 8: "This ascends from the earth into the sky and again descends from the sky to the earth, and receives the power and efficacy of things above and of things below." Since we all share the same unconscious mind - collective unconscious, it creates in us the common illusion of time and the whole Universe around us. The Universe is constant as long as our unconscious mind is constant. The last moment this mind was changed, is connected with the Original Sin, when Adam and Eve have fallen from the Garden of Eden down in this "vale of tears" and started to live in a quite distinct Universe with different natural laws. Therefore any extrapolation before the moment of Original Sin has absolutely no meaning, like e.g. Big Bang or the evolution of man from ape - it's all a pure phantasm without any connection to some reality. The end of this Universe will be exactly the inverse process of its beginning: As the New Heaven and New Earth appear people will be raptured (regardless if it will be pre-, mid-, or post-trib rapture), so at the moment when the last man disappears from this Earth, the collective unconscious of this Universe will be empty, and this Universe will no more exist and will be forever forgotten. We are now living in the last days. We are just exposed to such tremendous deceptions on the global level - in religion, politics, economy, medicine, etc. like never before in the history of mankind. If you look around - at your relatives, fellows, friends, colleagues, and neighbors - you can easily notice, how people who accepted at least one of the two (ape + Big Bang) evolution fakes, are vulnerable to all kinds of contemporary deceptions and lies.

Conclusion

Until the half of the 20th century there was a unique agreement among the majority of scientists on the question of physical interpretations. Then various strange ad-hoc theories and interpretations started to be developed and till now the scientific community is divided regarding the problem of which theory is the correct one. Many scientists usually prefer such an interpretation that supports their own ideas and research trends, like e.g. cosmologists in their "Big Bang" infatuation need the Everett interpretation [24], which is so bizarre and even psychologically dangerous: After Everett's death, his own daughter committed suicide with belief to meet him in some parallel universe. As we have seen, surely the most effective way how to proceed consists in finding holes in well-established theories, like quantum field theory, which contrary to quantum mechanics does not separate internal and external degrees of freedom. And it helps us to find the true nature of superconductivity and spontaneous symmetry breaking. The second Bohr complementarity suddenly appears, and in a natural way, it leads to the megascopic mirrors of all microscopic axioms of the Copenhagen interpretation of quantum physics. The mentioned megascopic mirrors then constitute the true quantum chemistry.

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