Prologue to Aphysical Quantum Mechanics, a Deeper Quantum Theory

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Abstract:

Aphysical quantum mechanics (AQM) is a deeper quantum theory. It introduces the position parameter. All quantum enigmas are explained. Quantum optics and particle physics undergo dramatic foundational transformation. Quantum laws are not universal. Quantum reality is subset of objective reality. Understanding of quantum reality is expanded by adding two more fundamental categories: aphysical category and elementary consciousness of elementary particles.

The gap between consciousness of non-living matter and living matter is closed. All elementary particles have inner structures of perfect geometry, well-defined position or trajectory. A self-entangled elementary particle can be in several locations at the same time, physically always in one and aphysically in all others. Fundamental understanding of quantum computing is possible only on the basis of AQM.

AQM opens the floodgates of new physics. The gap between quantum physics and classical physics is closed.

Science is the uncompromising search for the truth in objective reality.

No force in the world can stop fundamental scientific truth.

For twelve years, beginning in 2008, I have been working diligently, as an independent scientist outside of the scientific establishment, on problems of foundational physics developing my Aphysical Quantum Mechanics (AQM), a deeper quantum theory. The result of my scientific work is published in three separate volumes under the title "The Second Quantum Revolution" [1], [2] and [3].

Some might say that my statement about the Second Quantum Revolution is an exaggeration.

In fact, it is an understatement!

Aphysical Quantum Mechanics (AQM) is a deeper and more profound quantum theory. In principle, one would not expect AQM to produce immediate scientific revolutions in other branches of fundamental physics, such as quantum optics and elementary particle physics, but that is exactly what has happened. Both of these branches—quantum optics and especially elementary particle physics—have undergone a dramatic foundational transformation.

Briefly, quantum mechanics history began in 1900 when Max Planck postulated the quantization of electromagnetic radiation and successfully explained black body radiation. Then, in 1905, Albert Einstein achieved further progress by postulating the quantization of light. He also introduced wave-particle duality and in 1909 explained photoelectric effect.

Compared with Einstein's theory of special relativity, which originated from a single fundamental concept, the relativity of spacetime, quantum mechanics (QM) is based on several fundamental concepts contributed by individual founders.

In addition to Max Planck and Albert Einstein, other QM founders include Niels Bohr, Werner Heisenberg, Erwin Schrödinger, Max Born, Wolfgang Pauli, Louis de Broglie, and Pascual Jordan.

Other fundamental contributions to QM were made by Paul Dirac (1928), John von Neumann (1930), and John Bell (1964).

At the 5th Solvey Conference in 1927, the Copenhagen group declared that quantum mechanics is complete. It was outstanding scientific achievement. It opened a gate to quantum reality.

However, the quantum physics community was led astray by the Copenhagen group's confused positivist philosophy ("a particle is in all possible quantum states until it is measured"; "a particle has no defined position and momentum at the same time").

For many decades the physics community has proceeded with quantum mechanics under the assumption as if it were a complete theory, seeding confusion, enigmas, fundamental misconceptions, absurdities, and in later years, indulging in mathematical virtuosity without much sense of physics.

As a statistical theory, QM has fundamental limitations. It sees quantum reality through a cloudy statistical prism.

QM denies the existence of trajectories, sizes or inner structures of elementary particles. QM accepts such classical concepts as spin and magnetic moment but separates these concepts from their classical ontological content. How many times we have been told that one should not imagine spin as something actually spinning?

According to Aphysical Quantum Mechanics, QM is not a complete theory. There are huge fundamental conceptual gaps. Several specific fundamental pieces are missing.

Aphysical Quantum Mechanics (AQM) tells us that spin is actually spinning and driving inner structures of elementary particles.

Concepts, such as trajectory, non-zero size, inner structure, spin, self-mass, or magnetic moment, do not belong to the realm of a statistical quantum theory. These concepts are outside of QM competence.

QM is a quantum theory with neither ontology nor visualization. This explains why QM has so many unresolved enigmas and why the best scientific minds do not understand QM.

Due to its statistical nature, QM cannot even pretend to be a genuine foundational science.

Statistical quantum theory does not allow one to observe elementary particles as individual actors, with their individual trajectories, individual characteristics, individual inner structures, and individual interactions in spacetime dynamics.

Inherent limitations of QM as a statistical theory are found in QM principles such as the Heisenberg uncertainty principle, the particle-wave duality, the wave function, or the so-called "measurement problem".

Since 1927, for almost 100 years, QM has remained a frozen monument to quantum dogmatism surrounded by the deficient paradigmatic perimeter.

There have been multiple attempts by many quantum physicists to explain QM on a basis of numerous QM interpretations. Predictably, all those interpretations have failed because these attempts have been made *within* the deficient paradigmatic perimeter of QM dogma.

There have also been numerous attempts to get through the perimeter with single issues, such as search for the electron three-dimensional inner structure or exploring role of consciousness in quantum reality. These efforts have failed as well.

My approach is different. I have the advantage of being an independent scientist outside of the scientific establishment. During my 12 years of scientific work, I did not need to endure the overwhelming and depressing quantum dogmatism and the imposing groupthink pressure. I proceeded in a systematic way to destroy the QM deficient paradigmatic perimeter with massive blows directed at multiple points, by applying the mass of fundamental concepts in the form of 30 postulates in Volume One, 14 postulates in Volume Two and 31 postulates in Volume Three. Those fundamental concepts are not conflicting but rather reinforcing each other. As a result, the paradigmatic perimeter has been crushed, and *a deeper and more profound quantum reality has shown up.*

The conclusion is that the first quantum revolution has never been completed.

My scientific work sets in motion the second quantum revolution. It brings at the outset an avalanche of fundamental concepts and scientific discoveries. It especially promises to have a tremendous impact in particle physics.

AQM dramatically expands fundamental understanding of quantum reality by postulating, in addition to the physical category, two more fundamental categories: the aphysical category and the elementary consciousness of elementary particles (see Figure 1).

Quantum laws are not universal. Quantum reality is a subset of objective reality. Aphysical Quantum Mechanics denies conceptual and scientific validity of the universal wave function and the universal quantum connections. The humans are not a subset of quantum reality.

AQM explains three-dimensional inner structures with perfect geometry for each class of elementary particles, and their individual interactions in spacetime dynamics, which can be visualized in the human mind at every step. New principles and new particles (in fact, new classes of elementary particles!) are postulated, with a plethora of new fundamental properties.

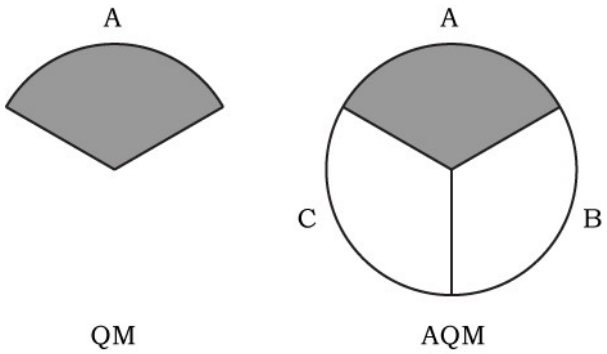

Figure 1. Quantum Reality: QM vs AQM
A – physical category, B – aphysical category, and
C – elementary consciousness of elementary particles.

A divide between classical physics and quantum physics does not exist.

It turned out that "the bread and butter" particles, such as the electron, the photon, the neutrino, the proton, and the neutron, have been left behind and, surprisingly, fundamentally hardly explored. Whatever we have previously known about these particles is only the tip of the iceberg.

The paradigmatic power of Aphysical Quantum Mechanics is such that I was able to uncover 53 fundamental misconceptions/absurdities in the Standard Model theory of particle physics; and to make 27 fundamental scientific discoveries all presented in three Volumes.

AQM opens the floodgates of new physics. It brings democracy into foundational physics. Graduates and undergraduates will be able to select new physics problems to work on among the thousands immediately available. Hundreds of doctoral dissertations will be written based on AQM. And most importantly, for a change, the general public will be brought along.

In his book, "*The Structure of Scientific Revolutions*," Thomas S. Kuhn observes that a genuine scientific revolution is manifested by the destructive-constructive paradigm, meaning the massive destruction of old information and its replacement by new.

I have to state that not all pre-revolution theories and concepts are destroyed. Those that are along the natural scientific trajectory toward a deeper understanding of objective reality survive and flourish.

That exactly what is happening in the Second Quantum Revolution driven by Aphysical Quantum Mechanics. It is not by chance the Second Quantum Revolution originated outside the scientific establishment.

The Copenhagen and other interpretations are destroyed and replaced by a new AQM paradigm. All quantum enigmas, paradoxes, and mysteries are resolved. As far as QM is concerned, its role is about to be shifted from foundational physics to a mathematical quantum application tool, to be used for calculations of statistical values with some paradigmatic limitations recognized and applied.

For many decades, dissatisfaction with QM has led quantum physicists to come up with their own QM interpretations. One such interpretation, de Broglie-Bohm's Pilot Wave-Quantum Potential, is a serious scientific attempt to find an alternative to the Copenhagen interpretation. Another, Everett's Many Worlds, is an absurdity of the highest order. There are no such things as "the universal wave function" or "universal connections". Quantum reality is a subset of objective reality. Humans (and cats!) are not subset of quantum reality. In any case, all these interpretations have failed. Why? Because these interpretations are attempts to reconstruct QM from within QM, while keeping intact its deficient paradigm and ignoring QM's fundamental limitations in the understanding of quantum reality.

The key point is not difficult to grasp. One cannot reform QM without removing the paradigmatic deficiencies imposed by QM's interpretation of the quantum reality. One must go outside QM and focus on individual elementary quantum entities and their interactions, and stop worrying about the probabilistic Heisenberg uncertainty principle, which is not even applicable to individual quantum interactions.

These numerous QM interpretations have never been able to penetrate through the deficient paradigmatic perimeter of quantum mechanics. Furthermore, a breakthrough in a single point of the perimeter would not be sufficient. It requires a critical mass of foundational ideas and concepts in order to arrive at the Second Quantum Revolution. Incremental progress and incremental breakthroughs are not sufficient. It would take exceptional talent, superior intuition, determination, and hard work over a period of many years, preferably in isolation from incessant bombardment by leading quantum theorists, including those with Nobel Prizes. The proof of validity of my position is the ongoing stagnation of foundational quantum physics, with no end in sight from the time of the first quantum revolution of 1927.

The concept of aphysical energy is one of my fundamental discoveries.

Here is a brief explanation:

Physical energy and aphysical energy are two intertwined fundamental entities. They operate within the spacetime dynamics in proportionality. One cannot function without the other. Physical spin coexists with aphysical spin. Physical angular momentum coexists with aphysical angular momentum. Physical kinetic momentum coexists with aphysical kinetic momentum. Physical charge coexists with aphysical "imitation" charge. All of them coexist in strict proportionality within the energy conservation law and in strict compliance with the universal constant U. Aphysical energy brings aphysical determinism into quantum interactions.

It would be an oversimplification to think that aphysical energy properties are always aligned with physical energy properties. Aphysical energy has its own set of unique properties, such as *entanglement, self-entanglement, and instantaneous action at any distance. Aphysical energy brings aphysical determinism into quantum interactions. Aphysical energy has no inertial or gravitational properties.*

Physical energy is responsible for physical properties of elementary particles and can be described to a significant extent in a classical way. Surprisingly, physical energy plays no role in interference or

diffraction. *It is aphysical energy that is responsible for interference and diffraction*. Physical energy allows us to detect and register interference and diffraction patterns produced by aphysical energy. The role of the self-entanglement for photon spacetime dynamics is massive.

Elementary consciousness is responsible for the origin of spin and for "the collapse of the quantum state vector". In my terminology, elementary consciousness is responsible for the instantaneous reconstruction of the self-entangled quantum state into the full-fledged quantum state. In addition, elementary consciousness is responsible for entanglement, self-entanglement, non-locality, and instantaneous action. I foresee strong opposition to the concept of elementary consciousness of non-living matter, but a genuine scientific revolution should expect strong resistance from the status quo defenders.

Elementary consciousness of non-living matter is one of AQM's principal concepts. Elementary consciousness of elementary particles should be understood in totality of its specific properties. Nothing more, nothing less. It is not an excuse, as in the case of the Schrödinger cat or Many Worlds interpretation, for endless and mindless speculations.

Progress in fundamental physics is based upon the balance of intuition and mathematical logic. We currently have a paradoxical situation where mathematical logic is predominant and excessive at the expense of intuition. The ample reservoir of intuition in foundational physics remains unused. My work is based predominantly on intuition (in fact, *super intuition*), which, as Einstein states, is more important than mathematical logic.

A probabilistic approach obscures fundamentals of quantum reality and hides many properties and principles of elementary particles. By removing the paradigmatic constraints and focusing on individual elementary particles and individual elementary quantum processes, I was able to discover and explain, with minimum mathematics, three-dimensional inner structures, the origin of self-mass, new particles, new properties, and new principles. In the process, I have developed new scientific terminology, which is as challenging as the development of the theory itself.

My scientific work is presented in Volume One [1], Volume Two [2] and Volume Three [3].

Here are some principal points of quantum reality according to Aphysical Quantum Mechanics:

- Quantum reality consists of three fundamental categories: physical, aphysical, and elementary consciousness.
- One of the core principles of AQM is three-dimensional visualization of individual elementary particles and individual elementary quantum processes. *Physics without three-dimensional visualization has no future*.
- All elementary particles have non-zero size. All elementary particles have three-dimensional inner structures consisting of *the physical energy c-ring(s), the aphysical energy cylinder(s), and elementary consciousness.*

- The inner structure of the fundamental elementary particle has a single c-ring and a single aphysical cylinder; the inner structure of the composite particle has two or more c-rings and two or more aphysical cylinders.
- Spin is the expression of elementary consciousness. Spin is the actual rotation in three-dimensional space at the Compton angular velocity and the circumferential speed of light. Spin is the mode of existence of the elementary particles and is eternal over their lifetimes. There are no elementary particles without spin. Spin can be visualized in a classical way. No elementary consciousness – no spin.
- Elementary particles are particles, not waves. Wave property is a probabilistic expression only. It is well known that a detection screen always shows individual dots.
- All elementary particles in free space have trajectories. The full-fledged elementary particle has a single trajectory. The self-entangled elementary particle has several trajectories but only one carries physical substance. All other trajectories are aphysical.
- An elementary particle has a well-defined position in its frame of self-reference with zero momentum. This is also valid for bosons in their frames of self-reference v = c. The origin of self-mass ("self-energy") for fermions and bosons (yes, for bosons!) is established and explained. Both, fermions and bosons have self-mass (inherent mass). There is no more division of "massles" and "massive". Yes, bosons are no longer "massles". Bosons have self-mass and zero kinetic energy in their frames of self-reference, v = c. Boson self-mass is invariant in all systems of reference. Virtual energy does not exist.
- A self-entangled elementary particle can be in several locations at the same time, physically always in one and aphysically in all the others. Just prior to physical-physical interaction, a particle is instantaneously reconstructed to the full-fledged quantum state regardless of the separating distance, with no violation of special relativity.
- After physical-physical interaction of one elementary particle with another elementary particle or with a macroscopic entity, such as a measurement device, no entanglement between them remains in the aftermath of their interaction. Without much ado, the perennial "measurement problem" exists no longer.
- AQM has expanded understanding of determinism and causality in the description of the quantum world. Yes, indeed, there are "hidden variables", such as the position parameters. For example, no two muons are identical. The difference in their lifetimes is explained by the difference in initial values of their position parameters acquired at their formation. A decay of an individual particle is a deterministic process.
- AQM explains the fundamental source of the statistical nature of the quantum reality – *the irreducible quantum randomness of the position of the physical inner structure of the elementary particle relative to its aphysical inner structure – called the position parameter.*

- In the world of elementary particles, there exists a harmonious coexistence of the classicality and the quantum. The classical-quantum divide does not exist. *In AQM, the classicality has found its perfect expression.*
- Quantum laws are not universal. Quantum reality is a subset of objective reality. For example, gravity is not part of quantum reality. Humans (and cats) are not a subset of quantum reality.

A new challenge for the mathematically inclined physicists is to develop a mathematical formalism for the description of elementary quantum processes in spacetime dynamics. This is what is on the horizon and coming to quantum physics in the near future. However, even without new mathematics, I was able to reconstruct, to a large extent, the spacetime dynamics of selected elementary quantum mechanism and processes, such as the muon decay and the subsequent formation of the electron, in all details.

In my view, consciousness is the most important and enormously significant fundamental category. However, there is very little understanding of consciousness as a fundamental category of objective reality. Consciousness cannot be derived from anything and neither can it be reduced to anything.

In fundamental physics, materialism is a mental block. According to some physicists with a materialistic mindset, consciousness is the emerging property of the complex systems. Such statement is totally in agreement with the principal postulate of discredited dialectical materialism — "consciousness is a product of matter".

My work relates to the elementary consciousness of non-living matter, namely the elementary particles. The gap between consciousness of non-living matter and living matter is closed.

I realize that I have a tendency to repeat some of my statements, but I have no choice. After almost 100 years of dominant quantum dogmatism and relentless repetition of absurdities in hundreds of thousands of published papers and thousands of books, corrective countermeasures must be applied. In my scientific work, I compare at every turn AQM precisely and directly with QM.

By publishing "*The Second Quantum Revolution*," I have fulfilled my promise given in my book, "*Prologue to Super Quantum Mechanics*," (2012)[4].

Comment: A full spectrum of quantum dogmatism is on display in the book "*Elegance and Enigma*", by M. Schlosshauer, (ed.) in the form of interviews of eleven leading quantum scientists, answering 17 identical questions posed by the Editor [5].

References

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