

QUANTUM MECHANICS IN ISLAMIC AND SUFI MYSTICS: SCIENTIFIC ANALOGIES OF LIGHT, IMMEDIATENESS AND UNITY

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Abstract. This article aims to explore the striking conceptual parallels that exist between the fundamental principles of modern quantum mechanics and the deep ontological concepts of Islamic and Sufi metaphysics. The research focuses on such fundamental concepts of modern physics as the propagation of light by quanta, superposition, the uncertainty principle, quantum entanglement, the holographic principle and the quantum vacuum. These concepts are analyzed in a comparative manner with expressions such as the verse of the Light (24:35) in the Holy Quran, the creation command “Kun fayaqun” (Be and be) (36:82) and “Every moment He is in a new matter” (55:29), as well as with complex Sufi concepts such as Ibn al-Arabi’s “wahdati-wujud” (unity of being), “nafs ar-Rahman” (breath of the Most Gracious), “a’yān as-sabīṭa” (fixed truths) and “tajalli” (manifestation). The article also interprets the “light-image-mirror” model in Suhrawardi’s Ishraq philosophy and Imam Ghazzali’s “Mishkat al-Anwar” (The Lamp of Lights), quantum phenomena such as photons, the measurement problem and the collapse of the wave function in an analogous framework. The study aims to build a heuristic bridge between these two different languages, by bringing together the cognitive maps presented by mystical texts and the mathematical models of quantum theory, rather than directly claiming identity. This approach, on the one hand, increases the potential of theological cognition to establish a dialogue with modern science and on the other hand, creates a conceptual basis for rereading and deeply understanding topics such as quantum information, holography and “continuous creation” (creatio continua) in the context of Islamic cosmology. This article, deepening the general framework formed in the author’s research over the years, especially focusing on Islamic and Sufi mysticism, proposes a new synthesis in the field of science and philosophy of religion.

Keywords: *Light, unity-existence, quantum mechanics, superposition, entanglement, holographic principle, Islamic cosmology, Sufism.*

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1. Introduction

One of the most profound and enduring questions in human history has been the nature and origin of existence. The search for an answer to this question has led to the formation of both religious and philosophical teachings and scientific theories in different cultures and eras. With the advent of quantum mechanics in the early twentieth century, classical concepts of reality were fundamentally shaken and it became clear that the universe has a strange, paradoxical and counterintuitive structure at a fundamental level. At the same time, these new scientific discoveries presented striking parallels with ontological and cosmological models developed over millennia by Islam and especially its mystical branch, Sufism (Syed, 2003; Norman & Al Walid, 2025).

The main purpose of this article is to explore the deep conceptual connections

between the central concepts of Islamic and Sufi mysticism and the fundamental principles of modern quantum physics and to establish a meaningful dialogue between these two different fields of knowledge. In this study, we will try to show how Sufi terms such as “nur” (light), “tajalli” (manifestation) and “wahdati-wujud” (unity of being) form a complementary and clarifying semantic framework with scientific concepts such as quantum superposition, entanglement, the observer effect and the holographic principle (Sham, 2019). This is in no way an attempt to “prove” sacred texts or mystical teachings with scientific theories or to contrast them with each other. Rather, it is a heuristic approach to understanding how different epistemological languages express different aspects of the same truth. We present these parallels not as direct identities, but rather as analogical bridges built between two different cognitive maps.

One of the first to address the issue of bridging Islamic lore and quantum mechanics was Syed (2003). His writing is more of a popular-philosophical one, drawing general parallels between Sufi metaphors and quantum concepts. While Syed’s approach is an interesting starting point, it is methodologically simplified and aims to engage more readers in the science-religion dialogue. Our approach, in contrast to this popular framework, presents a systematic and academic analysis based on Quranic verses and classical gnostic sources.

In recent studies, Norman and Al Walid (2025) have taken the subject in a new direction by analyzing the relationship between the soul and the quantum from a more metaphysical and psychological perspective. Sham (2019) has explored these parallels in the context of mindfulness and the philosophy of consciousness, comparing the quantum paradigm with traditional Sufism. These works can be seen as attempts to bring Syed’s earlier popular approach to a scientific level.

Meanwhile, Seyyid Hussein Nasr (1993) and William Chittick (1989) approach the subject with a more classical philosophical-mystical depth. Nasr, by emphasizing the metaphysical foundations of Islamic cosmology, highlights the holistic worldview of Islam in contrast to the reductionist nature of modern science. Chittick, by interpreting Ibn Arabi’s “imaginary cosmology” and the doctrine of “a’yān as-sābitā”, shows the internal logic of mysticism itself. In this respect, our approach differs from both Syed’s popular counterparts and the independent approaches of Norman, Sham, Nasr and Chittick. Our goal is to establish a methodologically sound dialogue between these two fields, both by preserving the original meanings of classical Sufi concepts and by presenting the mathematical and conceptual framework of quantum theory with precision.

The scientific novelty of the article is that it systematically analyzes this topic, which is often touched upon in general terms in the existing literature, focusing specifically on the depth of Islamic and Sufi lore, especially the teachings of thinkers such as Ibn al-Arabi, Imam Ghazzali and Shihab al-Din Suhreverdi. In this study, we will try to preserve the original meanings of classical Sufi texts and present the mathematical and conceptual framework of quantum theory in a precise manner. This interdisciplinary approach allows both theological thought to enter into a deeper dialogue with modern scientific discoveries and the philosophical and ontological interpretations of quantum physics to be enriched with new perspectives.

The structure of the article is as follows: First, the concepts of light and creation in Islamic and Sufi cosmology will be analyzed on the basis of the Holy Quran and the works of major Sufi thinkers. Then, the basic principles of quantum mechanics, especially those concepts related to our topic, will be explained in a simple and clear

language. In the main part of the article, the analogous structures and parallels established between these two fields will be presented in detail. Parallels will also be drawn between the metaphors of Nur and Zarre in classical Azerbaijani and Eastern poetry and the fundamental concepts of quantum mechanics. The conclusion section will summarize the main results obtained and emphasize the scientific and theological significance of this interdisciplinary dialogue.

2. Methodology

This research is based on an interdisciplinary approach and is based on the following methodological principles:

1. Source and Text Analysis: The verses of the Holy Quran (“Nur” 24:35, “Kun fayakun” 36:82, “Har an O, ber ayyakun” 55:29, etc.), classical sources such as the works of Ibn Arabi, Imam Ghazzali, Shihabeddin Suhreverdi and Al-Farabi were examined and their cosmological and ontological concepts were systematically analyzed.

2. Philosophical-Historical Approach: Al-Farabi’s views on the unification of religion and philosophy in the history of Islamic philosophy, the concept of emptiness and the concept of existence were reviewed and compared with the modern quantum vacuum and the concept of “nafes ar-Rahman”.

3. Literature and Symbol Analysis: In classical Azerbaijani and Eastern poetry (Nasimi, Fuzuli, Seyid Azim, Baki), metaphors such as “light”, “light”, “particle”, “propeller” were examined and their conceptual correspondences with quantum mechanics concepts (photon, superposition, holography, photon-matter interaction) were determined.

4. Scientific Model Analysis: The basic principles of quantum mechanics (quantum nature of light, superposition, wave function collapse, uncertainty principle, quantum entanglement, holographic principle, vacuum fluctuations) were analyzed from a mathematical and theoretical perspective and their philosophical implications were interpreted.

5. Analogical and Hermeneutical Approach: Heuristic analogies were established between classical mystical concepts (manifestation, a’yān as-sabīṭā, wahdāti-wujūd, nafs ar-Rahman) and modern quantum theory without directly claiming identity. These analogies are developed based on both hermeneutic interpretation (textual and symbolic interpretation) and scientific parallels (mathematical models).

6. Integration of Modern Scientific Achievements: Recent scientific achievements and experimental evidence, especially on quantum entanglement, are reviewed and conceptual parallels are drawn with the verses of the Holy Quran, “Allah is All-Knowing” (24:35) and “He is with you” (57:4).

7. Critical and Comparative Approach: The existing literature is reviewed (Syed, 2003; Sham, 2019; Norman & Al Walid, 2025; Nasr, 1993; Chittick, 1989) and their strengths and weaknesses are analyzed. The aim of this work is to formulate a new framework that, unlike popular approaches, integrates both classical gnostic texts and modern scientific theories with methodological rigor.

3. Light and creation in Islamic cosmology

In the history of Islamic thought, the question of the origin and structure of the universe has been at the center of both philosophical and mystical thought (Nasr, 1993).

While the verses of the Holy Quran and the Prophetic tradition (Sunnah) provide a fundamental framework on this subject, Muslim thinkers have interpreted this framework with rich and diverse cosmological models. The common point of these models is that the concept of “Light” stands at the center of existence. Light is not just physical light, but also a metaphor for divine truth, the source of existence and cognition itself. In this section, we will analyze this fundamental principle of Islamic cosmology based on the teachings of the Holy Quran and three great thinkers - Imam Ghazzali, Shihab al-Din Suhreverdi and Ibn al-Arabi.

3.1. The Verse of Light in the Quran and the Tradition of Interpretation

The most fundamental source of the concept of light in Islamic cosmology is undoubtedly verse 35 of Surah Nur of the Holy Quran. This verse describes the essence of God through the metaphor of light, laying the foundation for the entire philosophy of existence: “Allah is the light of the heavens and the earth. His light is like a niche in which is a lamp; the lamp is in a glass and the glass is like a star like a pearl. It is burned from a blessed olive tree, neither in the east nor in the west. Its oil, even if fire does not touch it, almost shines. Light upon light. Allah guides to His light whom He wills. Allah sets forth examples for people. Allah is All-Knowing” (Quran, 24:35).

This verse has been the subject of countless interpretations in the tradition of Islamic interpretation and Sufism. The symbols in the verse, such as “the throne”, “the lamp”, “the glass”, “the star” and “the olive tree”, have been interpreted on both a microcosmic (human heart) and macrocosmic (universe) level. For example, in many Sufi interpretations, “the throne” is interpreted as the believer's chest, “the glass” as his heart and “the lamp” as the light of divine understanding and faith in the heart.

The cosmological significance of this verse is that it reveals the idea that existence itself is a manifestation of divine light. The heavens and the earth, that is, the entire universe, come into existence by partaking of this light. This reinforces the idea that existence does not originate from a dark and inanimate matter, but rather from a conscious and life-filled source. In this context, creation itself is a process of “illumination”.

This idea is complemented by the fact that creation occurred instantaneously, by a divine command, with the phrase “Kun fayaqun” (“Be!” - and it was) (Quran, 36:82). This shows that creation is the direct result of divine will, not subject to the limitations of time and space. This instantaneous act of creation is reminiscent of the singularity point, the starting point of the “Big Bang” theory in quantum physics. That is, the entire universe was suddenly formed from a point of infinite density and energy.

Imam Ghazzali (1058-1111) in his work “Mishkat al-Anwar” (The Lamp of Lights) subjects the verse of Nur to a profound philosophical and mystical analysis (al-Ghazali, 1998). According to Ghazzali, “light” in the true sense is only Allah, because He exists by Himself and is the revealer of all things. All other lights (sun, moon, lamp) are light in a figurative sense, because their existence and illumination depend on the light of Allah. Ghazzali explains the levels of light with the “mirror-image-source” network. Every being in the universe is a mirror that reflects the divine light to the extent of its capacity and essence. This model shows that existence has a hierarchical structure and that each level is a manifestation of a higher truth. This is consistent with the fact that the photon (light quantum) is both a carrier of energy and information; just as no image can be seen without light, no physical measurement or information transfer is possible without photons.

3.2. Suhrawardi's Philosophy of Light

Shihabeddin Yahya Suhrawardi (1154-1191) is known as the founder of the “Ishraq” (Illumination) school of Islamic philosophy (Suhrawardi, 1999). His philosophy is based on the principle that light is the foundation of existence. According to Suhrawardi, all reality consists of varying degrees and intensities of light. At the pinnacle of his ontology stands “Nurul-Anwar” (the Light of Lights), that is, God. All other beings are lights that emanate (overflow) directly or indirectly from this absolute light.

In Suhrawardi's cosmology, the closest and brightest light, “Bahman” (the first mind), emanates first from Nurul-Anwar. Then, from this light, other lights and minds emanate in a chain. In this process, the light weakens as it moves away from the source and becomes more “dark” or “shadowy”. The material world is the lowest and weakest level of this hierarchy of light and is described as “darkness”. However, this darkness is not the complete absence of light, but its manifestation at its lowest intensity. This forms an interesting analogy with the quanta of the photon field (electromagnetic field) in quantum field theory: flashes descending from the source (the Highest Light) give rise to numerous manifestations (wrinkles of the field or quantum excitations).

In Suhrawardi's philosophy, cognition is also a process of illumination. The human soul is itself one of the divine lights and its realization of truth is possible only when the light within it merges with higher lights and receives light from them. This process is called “observation” and “ishraq”. This is a theory of cognition in which man is not a passive recipient, but an active participant. This is reminiscent of the observer effect in quantum mechanics - the act of observation itself determines the state of the observed system (Wheeler & Zurek, 1983).

3.3. Ibn Arabi's Doctrine of Oneness of Being

Muhyiddin Ibn al-Arabi (1165-1240) was one of the greatest and most influential thinkers of Islamic Sufism and is known as the “Shaykh al-Akbar” (The Greatest Sheikh) (Ibn al-Arabi, 1980). At the heart of his teachings is the doctrine of “oneness of being” (the unity of being). According to this doctrine, the only truly existing being is God. The entire universe, that is, everything other than God (masiwa), is a manifestation or manifestation, of His names and attributes. The universe has no existence of its own; it exists through the existence of God (Chittick, 1989). Ibn Arabi's cosmology is extremely complex and multifaceted. He explains creation by a process he calls “nafs ar-Rahman” (the breath of the Most Gracious) (Ibn al-Arabi, 2002). God, while still a hidden treasure, desired to be known and through this breath of love and mercy, He revealed the forms of all possible beings. These forms existed in God's knowledge before creation in a state called “a‘yān as-sābitā” (fixed realities). These are potential realities that have not even smelled of existence, but are known by God. This forms a profound analogy with quantum superposition - a quantum system is in a state of potentiality where all possible states exist together before being measured. Divine manifestation is the emergence of these fixed realities into the external world. This manifestation occurs at different levels or “hazrats” (levels of being). Ibn Arabi usually classifies these levels as Lahut (the absolute divine essence), Jabrut (the realm of divine attributes and names), Malakut (the realm of imagination and example) and Nasut (the material and sensory realm). Each realm is a shadow and manifestation of the realm above it. The material realm (Nasut) is the lowest and most condensed level of this hierarchy. This concept of a multi-layered reality creates interesting parallels with the ideas of extra dimensions and parallel worlds

proposed by modern physics, especially string theory. Incidentally, according to string theory, the fundamental unit of the universe is not particles, but vibrating strings; their various vibrations create all forms of matter and energy. This idea resonates with the concept of creation in Sufi mysticism, which is conceived as “the vibration of the word of God in the universe”. In the traditions of *dhikr* and *sema*, it is interpreted as the attunement of the human soul to the divine vibration, resonating with the “light wave” of existence. Just as the vibration of strings gives rise to various particles, in Sufi teachings the vibration of the divine breath manifests all the worlds. Thus, both science and mysticism see the universe as a harmony of “silent music”.

According to Ibn Arabi, creation is not a finished process, but a continuous event called “*halq-i jadid*” (continuous creation). Every moment, God recreates the universe with a new manifestation. We do not notice this change, because each new creation is the same as the previous one. This is an interpretation of the verse in the Quran that says, “Every moment He is in a new work” (55:29). This concept of dynamic creation coincides in a striking way with the fact that the quantum world is in a state of constant movement and change, with particles constantly coming into and going out (quantum fluctuations). This suggests that reality is not static, but a dynamic process that is constantly being rebuilt.

4. Basic Principles of Quantum Mechanics

During the centuries of classical physics, especially Newtonian mechanics, the universe was conceived of as a predictable, deterministic and clockwork system. According to this worldview, if the initial conditions of a system (for example, the position and velocity of a planet) were known exactly, all its future states could be calculated with precision. However, in the early 20th century, research by scientists such as Max Planck, Albert Einstein, Niels Bohr, Werner Heisenberg, Erwin Schrödinger and Paul Dirac revealed that reality at the atomic and subatomic levels was radically different from this classical picture. This new theory, called quantum mechanics, showed that existence was fundamentally probabilistic, uncertain and observer-dependent. In this section, we will analyze the basic quantum principles that form the scientific basis for the analogies we will build with Islamic and Sufi lore.

4.1. The Quantum Nature of Light: Photon and Wave-Particle Dualism

The birth of quantum theory is closely linked to the debate over the nature of light. Although light had long been accepted as a wave, a revolutionary idea put forward by Max Planck in 1900, while working on the problem of blackbody radiation, showed that energy is not a continuous stream, but is given and given in discrete packets called “quanta”. In 1905, Albert Einstein further developed this idea, proposing that light itself consists of energy particles called “photons” to explain the photoelectric effect. This proved that light also has particle properties.

However, light also behaved indisputably as a wave in phenomena such as interference and diffraction. This paradoxical situation resulted in a fundamental quantum principle called “wave-particle duality”. According to this principle, light (and as was later discovered, other subatomic particles such as electrons) is neither a pure wave nor a pure particle. It combines these two mutually exclusive properties at the same time. Which side (wave or particle) a quantum object will show depends on how it is measured or observed. This suggests that reality does not have a fundamentally fixed and

definite nature, but rather a dynamic potentiality that is shaped by the act of observation. Einstein's famous equation $E=mc^2$ further deepens this picture. This equation shows that matter and energy are two different forms of the same reality and can be transformed into each other. This confirms in scientific language the idea that light (energy) is the source of matter and that matter itself is “frozen” or “condensed” light. Italian researchers have recently succeeded in transforming light into a “supersolid” (2025), i.e., in organizing light, which is a form of energy, into a structure similar to matter and simulation studies at Osaka University have shown that it is possible to create an electron-positron from light in laboratory conditions through photon-photon collisions (2023). Both studies reinforce the content of the $E=mc^2$ equation as the mass-energy equivalent not only metaphorically but also practically. This resonates deeply with the concept of light as the basis of existence in Islamic cosmology.

4.2. The problem of Superposition and Measurement

One of the most bizarre and classically intuitive principles of quantum mechanics is superposition. In classical physics, an object can be in only one state at any given time (for example, a penny can be either tails or tails up). In the quantum world, however, a system exists in a kind of “mixture” or “superposition” of all possible states until it is measured or observed. This is described mathematically by a “wave function” (Schrödinger, 1935). The wave function contains all possible states of the system and the probability of finding it in each state.

Erwin Schrödinger's famous “cat” thought experiment was designed to illustrate this principle at the macroscopic level. In the experiment, a cat is placed in a closed box with a poison mechanism that is triggered by the decay of a radioactive atom. According to quantum laws, until the atom decays, it is in a superposition of both “decayed” and “undecayed” states. This means that the cat must be in a superposition of both “alive” and “dead” states until the box is opened and observed. This is an obvious paradox and raises the question called the “measurement problem”: When and how does this world of possibilities (superposition) become the single, definite reality that we experience?

To answer this question, the standard approach, such as the Copenhagen interpretation, proposes a phenomenon called “wave function collapse” (Wheeler & Zurek, 1983). According to this approach, when a quantum system interacts with a measuring device or an observer, its wave function suddenly “collapses” and the system randomly chooses only one of all possible states. This suggests that the act of observation is not a passive process of collecting information, but plays an active and creative role in shaping reality itself. This has a deep connection with the concept of “manifestation” in Sufi mysticism - divine observation or insight, causing potential truths (ā' yān as-sābitā) to manifest and emerge into the world.

4.3. Quantum Entanglement: Mysterious Connection at a Distance

Albert Einstein was never entirely satisfied with the oddities of quantum mechanics and considered it an “incomplete” theory. One of his most criticized concepts was “quantum entanglement”. Einstein called it “spooky action at a distance”. Entanglement is the phenomenon in which two or more quantum particles become so entangled that they behave as a single system, regardless of the distance between them. These particles maintain this connection even when sent to opposite ends of the universe.

When a property (such as spin) of one of the particles in an entangled pair is

measured, the corresponding property of the other particle is determined instantaneously and predictably. This information transfer occurs faster than the speed of light, which seems to contradict Einstein's principle of locality (that no effect can travel faster than the speed of light). Theoretical work by John Bell in 1964 and later experiments by Alan Aspect and others, conclusively demonstrated that these nonlocal correlations are real and that the predictions of quantum mechanics are correct (Bell, 1964; Aspect *et al.*, 1982).

Quantum entanglement suggests that reality is fundamentally an indivisible whole. What appears to be separate particles is actually interconnected at a deeper level. This reinforces the idea that the universe is not a collection of separate objects, but a complex web of connections. This fundamental unity and indivisibility underlying the apparent multiplicity is a scientific echo of Ibn Arabi's doctrine of “wahdat-ul-wujud”. Quantum entanglement shows that two particles separated from a single whole remain connected to each other regardless of the distance between them; a change in one is immediately reflected in the other (Bell, 1964; Aspect, Dalibard, & Roger, 1982). This phenomenon reveals that at the deepest level of the universe, separation is an illusion and that there is a fundamental unity. Phrases in the Holy Quran such as “He is with you wherever you are” (57:4) and “Allah is All-Knowing” (24:35) indicate that every being is encompassed by divine knowledge, regardless of the limitations of space and time. It is possible to draw a deep parallel between the scientific fact of quantum entanglement and the meaning of these verses: just as there is “instantaneous awareness” between entangled particles, so God is aware of all existence at the same time and no distance or time barrier can limit His knowledge. In this regard, entanglement, one of the latest achievements of quantum theory, allows us to more clearly imagine the nature of the “omniscience” of God, which is affirmed in the Quran.

4.4. The Holographic Principle and the Quantum Vacuum

One of the most intriguing and speculative ideas in modern theoretical physics is the holographic principle. First proposed by Gerard 't Hooft and further developed by Leonard Susskind, this principle suggests that all information in a three-dimensional region of space can be encoded exactly on a two-dimensional surface surrounding that region ('t Hooft, 1993; Susskind, 1995). In other words, our three-dimensional reality may actually be a hologram written on a distant two-dimensional surface. It is based on the idea that information in the universe is proportional to surface area, not volume.

Although this principle is still an unproven hypothesis, it has important theoretical implications in areas such as quantum gravity and black hole physics. Philosophically, it resonates deeply with ancient mystical ideas such as “the whole in the part” or “the macrocosm in the microcosm”. This is a modern scientific interpretation of the image of “seeing the world in a particle” in Sufi poetry.

On the other hand, quantum field theory has also completely changed the concept of “emptiness” in classical physics. In classical physics, a vacuum is an absolute void where nothing exists. However, according to quantum theory, a vacuum is not empty at all. It is filled with a constant activity called “quantum fluctuations”. During these fluctuations, “virtual” particle-antiparticle pairs are created from nothingness for a short time and immediately annihilate each other and disappear again. This shows that the “emptiness” is actually filled with infinite potential and creative energy. This bears a striking resemblance to the concept of “the breath of the Most Gracious” in Sufi cosmology - the divine breath that is the original potential source of all possible forms

and beings and manifests itself throughout time in a rhythm of destiny-manifestation. Both concepts share the idea of "abundance appearing as nothingness".

5. Analogical structures and parallels

In the previous sections, we have separately analyzed the ontological framework of Islamic and Sufi cosmology and the fundamental principles of quantum mechanics. In this section, we will try to build deep conceptual bridges between these two different fields of knowledge. Our goal here is not to "prove" one field by the other, but rather to show how different symbolic and mathematical languages describe different aspects of the same reality. These analogies reveal both the relevance of Islamic knowledge for modern scientific thought and how philosophical interpretations of quantum theory can be enriched with epistemological depth. The parallels between Islamic and Sufi knowledge and quantum mechanics have attracted the attention of many researchers, both Muslim and Western, in recent decades. The books, articles and conferences written on this topic indicate the emergence of a new level of dialogue between science and religion (Syed, 2003; Sham, 2019; Norman & Al Walid, 2025).

Research in this area can be roughly divided into several directions. The first group is represented by researchers such as Syed (2003). They emphasize the general similarities in the worldview of Sufism and quantum physics, showing that both fields share the idea that reality is an indivisible whole and that the observer plays a role in shaping this reality. This approach focuses more on general philosophical parallels and does not go into deep technical details.

The second direction is a more cautious and academic approach represented by thinkers such as Dagli (2016). In analyzing Ibn Arabi's concept of time and cosmology, Dagli warns that analogies with modern physics are attractive, but at the same time that these analogies can be superficial and sometimes wrong. He emphasizes that the direct application of physical data to spiritual doctrines can lead to both scientific and theological reductionism. This approach highlights the limitations and methodological difficulties of analogies.

The third direction is the more popular and sometimes apologetic (defensive) approach, such as "Quantum Islam". Representatives of this trend claim that the discoveries of quantum physics are a scientific confirmation of the Holy Quran and the Islamic worldview. For example, the multiverse theory is associated with the phrase "Lord of the Worlds" in the Quran (Everett, 1957). Although these approaches are interesting to the general public, they often oversimplify scientific and theological concepts and ignore the deep philosophical differences between them. As we have noted, the dialogue between Islamic lore and quantum mechanics has great possibilities and prospects. This dialogue, if conducted within the right methodological framework, can be enriching for both fields.

5.1. *Light ↔ Photon Analogy: The Quantized Source of Being*

In Islamic philosophy, "Light" is the absolute source and primary principle of being. The verse of the Holy Quran, "Allah is the Light of the heavens and the earth" (24:35), expresses this ontological centrality unambiguously (al-Ghazali, 1998). Light has both a creative (giving existence) and an epistemological (making cognition possible) function. In Suhrawardi's (1999) Ishraq philosophy, the entire hierarchy of being consists of different intensities of lights emanating from "Nur al-Anwar" (the Light of Lights).

In quantum physics, the fundamental unit of light is the “photon”. A photon is a discrete, indivisible packet of energy and is the carrier of electromagnetic interaction. Einstein's equation $E=mc^2$ shows that matter itself is a form of energy (or light). From this perspective, the idea that light is the foundation of everything in the universe appears to us as both a mystical and a scientific truth.

The analogy does not end there. In mysticism, light is also a carrier of meaning and information; divine wisdom manifests itself through light. In quantum information theory, the photon can be used as a carrier of “qubits” (quantum bits), the smallest unit of information. Thus, in both mysticism and quantum physics, light/photon is not just blind energy, but also a fundamental source of information that determines the structure and meaning of existence.

5.2. *Manifestation ↔ Wave Collapse: The Transition from Potential to Actual Being*

In Ibn Arabi's cosmology, beings exist in a potential state in God's knowledge as “a‘yān as-sabīṭā” (fixed truths) before they exist in the external world (Ibn al-Arabi, 1980; Chittick, 1989). Divine “manifestation” is the emergence of these potential forms into the actual and observable world. This is not a one-time event, but a dynamic process that is renewed every moment in accordance with the principle of “ḥalq-i jadid” (continuous creation). The verse in the Quran, “Every moment He is in a new work” (55:29), refers to this continuous creative activity.

In quantum mechanics, a system, before being measured, is in a “superposition” state in which all possible states are together and is described by a “wave function” (Schrödinger, 1935). When an act of observation or measurement occurs, this wave function suddenly “collapses” and the system realizes itself by choosing only one of the possible states. This is closely related to Heisenberg's (1927) uncertainty principle, which shows that the observer plays an active role in the formation of reality.

The analogy between these two concepts is striking: Both manifestation and wave collapse describe the process of transition from a realm of potential realities (a‘yān as-sabīṭā / superposition) to a single, actual, experienced reality. In both, this transition is triggered by some kind of “observation” or “vision” (divine manifestation / physical measurement). Ibn Arabi's idea of ever-renewing manifestation is in perfect harmony with the dynamic nature of the quantum world, which is reconstructed with each observation. Imam Ghazzali's metaphor of the “mirror of the heart” - what you look at, you see - resonates deeply with the effect of the measuring apparatus on the outcome (al-Ghazali, 1998).

5.3. *Unity of Being ↔ Quantum Entanglement: Indivisible Unity*

Ibn Arabi's (1980) doctrine of “unity of being” suggests that behind apparent multiplicity and separation lies a fundamental unity. All beings are different manifestations and manifestations of the same reality (al-Haqq). They are essentially one and the connection between them is one that transcends the boundaries of space and time. The verse in the Quran, “He is with you wherever you are” (57:4), expresses this divine presence and control that transcends space and time.

Quantum entanglement is a scientific echo of this mystical concept (Bell, 1964; Aspect *et al.*, 1982). Entangled particles behave as a single and indivisible system, regardless of the distance between them. A change in one instantly affects the other. This

suggests that there is a non-local, i.e., spatially unbounded, connection at the core of reality. This reinforces the idea that the universe is not a machine made up of separate parts, but a single organism that is inextricably linked to each other. The doctrine of oneness expresses this unity in ontological and metaphysical language, while quantum entanglement expresses this unity in mathematical and physical language. Both share the idea of a “deep unity of the seemingly separate”.

5.4. The Imaginary World ↔ Superposition: The Potential World of Forms

In Sufi cosmology, particularly in the teachings of Suhrawardi (1999) and Ibn Arabi (2002), there is a “Mandus Imaginalis” (mundus imaginalis), an intermediate realm between the material world (Nasut) and the purely spiritual world (Jabrut). This realm has both material and spiritual characteristics and is a level where forms and archetypes exist. Ibn Arabi's “a’yān as-sābita” can also be associated with this realm of potential forms. This is a level where reality is not yet fully determined, but where all possible forms exist as a reserve or potential.

This is a profound analogy with the superposition state in quantum mechanics (Schrödinger, 1935). The wave function is a mathematical object that contains all possible states of a system. It is a world of possibilities that has not physically been realized, but potentially exists. The world of examples can be thought of as a mystical description of this quantum realm of potentiality. Everett's (1957) “Many Worlds” interpretation takes this idea further. According to this interpretation, the wave function does not collapse during each quantum measurement, but rather the universe splits into parallel branches where each possible outcome is realized. This is reminiscent of the idea that each of the infinite reserves of forms in the world of examples is realized in separate worlds.

5.5. The World in a Particle ↔ The Holographic Principle: The Code of the Whole in the Part

A common motif in Sufi mysticism and poetry is “seeing the world in a particle” or “finding the ocean in a drop” (Nasr, 1993). This expresses the idea that the microcosm (human being or particle) reflects all the characteristics of the macrocosm (the universe). In Islamic tradition, man, as the “alam-i sagir” (the small world), is considered a summary and mirror of the “alam-i kabir” (the great world). Each particle carries within itself the information and structure of the entire universe.

The holographic principle of theoretical physics provides a modern scientific formulation of this ancient mystical idea ('t Hooft, 1993; Susskind, 1995). According to this principle, all the information of a three-dimensional reality can be encoded in a two-dimensional surface surrounding it. This means that the information of the whole is potentially present in every part. This is not just an analogy, but a fundamental claim about the nature of information and it may express a profound truth about the structure of the universe.

5.6. Breath of the Most Gracious ↔ Quantum Vacuum: The Creative Void

In classical thought, “emptiness” or “nothingness” is understood as the opposite of existence. However, both Sufi cosmology and quantum physics radically change this understanding. In Ibn Arabi (2002), “breath of the Most Gracious” is the first potential source of all possible beings and forms. It is a “primordial cloud” or “amen” state that

has not yet manifested, but is filled with infinite creative potential.

In quantum field theory, however, the vacuum is not empty at all. It is an ocean of energy seething with fluctuations of virtual particle-antiparticle pairs that are constantly coming into being and disappearing. This shows that “emptiness” is actually filled with infinite potential and creative activity. Both the breath of the Most Gracious and the quantum vacuum share the paradoxical idea of “abundance appearing as nothingness” or “a void filled with potential”. Both suggest that existence arises from a dynamic and creative source, not from a static background.

6. Light and particle metaphors in classical azerbaijani and eastern poetry: Quantum mechanics and parallels

6.1. Concepts of Light and Light in Poetry

In classical Eastern poetry, “light” (light) is presented as a symbol of divine truth, the beginning of existence and human cognition. In particular, in poets such as Nasimi, Fuzuli, Baki, Rumi and Seyid Azim Shirvani, light is both the source of creation and a metaphor for love and cognition.

Nasimi: Verse: *With color, this is colorful, in every body, the soul is, Rovshan is who, be the sun-life, the soul is hidden in every particle.* “With color, this is colorful” - All the colors and diversity that we see in the world are actually manifestations of the one and only Him (light, energy). Colors are a sign of multiplicity, He is the single source. “In every body, there is the soul”. The life-giving and inspiring force in every being is that divine light and energy. “Who is the light, O sun-soul, the soul is hidden in every particle”. Here the poet says that the sun of soul (divine light) is hidden in every particle. That is, no matter how small the particle is, it carries within it the potential of the entire sun, the divine light of life. This is a poetic expression of the concept of “the world in a particle”: the secret of the entire universe is hidden in a small particle. Energy-Matter Combination ($E=mc^2$) - the expression “this colorful fire with color” in the verse shows that the various forms of the material world are actually a manifestation of energy. This resonates with the matter-energy equivalent discovered by Einstein. Quantum Field and Vacuum Fluctuation - The expression “in every body, there is the soul” is similar to the fact that each particle, according to quantum field theory, arises from field fluctuations. That is, no object is “empty”; everything has energy and vibration within it. The Holographic Principle - The line “The sun-soul is hidden in every particle” recalls the principle of the holographic universe: each particle (micro) carries the information of the entire universe (macro). Quantum Superposition with Sufi Manifestation - The sun hidden in a particle - that is, a potentially very large truth - is like a quantum system in superposition. During measurement (or manifestation), that hidden sun is revealed. This verse confirms the same central idea in both Sufi mysticism and quantum physics: each particle carries the secret of the whole, behind the multitude lies a single light. The poet expresses this in poetic language as “the sun-soul” (the sun of the soul); modern science explains it as energy, field and quantum information. The verse: “Two worlds fit in me, I cannot fit in this world, I am the Gem-space, I cannot fit in the universe-space”. Mystical-Metaphysical Commentary: “I can contain two worlds” - Nasimi emphasizes the divine scope of the human soul here. Within a person, there is both the material world (dunya) and the spiritual world (akhirat, batin). According to the Sufi view, a person is a “small universe” (alem-i sagir), but he carries within himself the essence of the entire “great universe” (alem-i kabir). “I cannot contain this world” - The soul is the bearer of eternal

light that transcends the boundaries of the material world and does not fit into time and space. “*I am the gem-space*” - Here he says that the human soul is connected to a truth outside of space and time. “I cannot contain the universe-space” - The boundaries of the created world (spatial, temporal cosmos) cannot actually contain the truth of the human soul. Parallels with Quantum and Theoretical Physics: Additional Dimensions (String Theory) - String theory says that the universe has 10-11 dimensions. Nasimi's concept of the soul as “*lamekan*” (superspatial) resonates with the physics concept of “dimensions beyond what we see”. Quantum Entanglement and Non-Locality - The phrase “I do not fit in this world” implies that existence is not limited by space. This parallels the fact that reality is not local, as entanglement suggests, but a unified system that extends throughout the universe. The Holographic Principle - The line “I fit two worlds” expresses the idea that every particle of a human being carries the code of the entire universe. This shares the same spirit as the concept of “coding the whole in the part” in the holographic universe model. Quantum Cosmology and the Multiverse - Nasimi's phrase “two worlds” can resonate not only with the material and spiritual worlds, but also with the concept of multiple universes (multiverse). The soul is seen as a “gem” that encompasses all possible universes.

Baki: The object in the world is the light of the Almighty Baki, What is this image of the causes in the visible space? The poet says here: In fact, the light that is seen in all creatures is the light of God. The things we call “things” are manifestations of this light. But the “images of causes” (the chain of cause and effect) that are seen in the space are just an external veil. **Mystical meaning:** It is completely in line with Ibn Arabi's idea of “*oneness-existence*”. In reality, there is no independent being; existence is the manifestation of light. We consider the world of causes to be real, but in reality they are the veils of its manifestation. **Quantum analogue:** In quantum mechanics, the “cause and effect” relationship is also broken in the classical sense. The behavior of particles is sometimes not explained by “local causes”; they are connected at the level of non-locality (entanglement). That is, we see the “world of causes”, but behind it stands an indivisible reality like light. This parallels the omnipresence of the “Light of Truth” that Baki said. In another verse (*Pertevin er ün salar mihr-i 'inâyet Bâkiyâ. Zerre-i nâçizler khurşid-i nûr-efşân ölü*) the poet says that one day the sun of God's grace will shine on a particle, then even a seemingly worthless particle will become as bright and radiant as the sun. **Mystical meaning:** This expresses the essence of the human soul in Sufi thought. No matter how small and weak a person may seem, when he meets the divine light, he can become a bearer of truth that illuminates the universe. The transformation of Particle → Sun shows the potential of a weak being with its divine manifestation. **Quantum analogue:** In quantum mechanics, particles themselves appear small and worthless, but under certain conditions (for example, when interacting with energy) they have the power to influence the entire system. A tiny quantum particle (photon or electron) can carry all the information and energy, creating a luminous “sun” effect. This resonates with the fact that the particle, while seemingly insignificant, potentially encompasses a vast reality.

Fuzuli: His ghazals often use the contrast of light-shadow, light-sorrow, particle-sun. Here, light is seen as both the flame of divine love and the beginning of movement in the universe. This is an interesting similarity to the fact that the photon is both an energy and information carrier in quantum physics. Verse: *Sham'i-ruyin afitabi-alemaradyr sen, Nuri-haq khurshidi-rukhsarinda pâyadır sen. Mystical-Poetic Commentary:* “*Sham'i-ruyin afitabi-alemaradyr - The candle (shamsi-ruyin) of your face is like a sun illuminating the entire universe. That is, in the lover's heart, the beauty*

of the beloved plays the role of the sun illuminating the universe. “Nuri-haq khurshidi-rukhsarinda pâyadır” - The light of God is revealed in the sun of your face. This is a sign that the beauty seen on the face of the beloved is a mirror of the divine manifestation.

Mystical View: For Fuzuli, beauty is not just physical attraction, but a reflection of divine truth in a veil. The face of the beloved is a mirror in which Nur-i Haqq is manifested.

Quantum and Scientific Parallels: Photon and Light Analogy - Here, the manifestation of “nuri-haq” on beauty is similar to the way light (photons) shines on material objects, making the world visible to us. Without light, nothing is visible; without the light of God, existence is not perceived.

Wave-Particle Dualism - Beauty is perceived as both a visible form (particle) and a manifestation of nuri-haq (wave). This creates a poetic parallel to the fact that light is both a wave and a particle.

Holographic Principle and Manifestation - A reflection of the light of the entire universe - “khurshidi-rukhsar” - is visible on a person’s face. This resonates with the concept of “coding the whole in the part” as a holographic principle: the luminous truth of the entire universe is reflected on a small face.

In another verse: *“Moment by moment, the ancient moon, whether it is a ray or a ray/Bit by bit, draws light from the sun” - As the arrow (peykan) bends and moves every moment, just as the new moon draws light from the sun bit by bit, so the lover sheds light on the poet’s soul with his movement and gaze.*

Literary-Mystical Commentary: “Peykan” (arrow) here refers to the lover’s eyebrow or gaze. His movement or the twitching of his eyebrow penetrates the poet’s heart like an arrow. “Moment by moment” - every moment, uninterrupted, continuous. This shows the momentary, but constantly renewed nature of his manifestation. “Mahi-nov draws light from the sun” - just as the new moon draws its light from the sun bit by bit, so the poet draws light from the gaze of his lover. From a mystical perspective - the human soul (moon) is a being that does not have its own light, but reflects the light of God (the sun). The heart gains light from the manifestation of the universe. Parallel to Quantum Mechanics. Continuous creation (creatio continua) - The expression “moment by moment” is reminiscent of Ibn Arabi’s concept of “new creation”. In quantum physics, particles also appear and disappear in a continuous manner as a result of vacuum fluctuations. Reality is not static, but a constantly renewed process.

Particle by particle light - Light is not a continuous flow, but rather the transmission of photons in the form of discrete (quantized) packets. The expression “particle by particle” creates a poetic correspondence to the fact that quanta (photons) are the smallest units of light.

Observation and manifestation - The way the beloved’s gaze shines on the poet’s soul resonates with the role of the observer in the quantum system. Each observation (look) illuminates a new reality.

This verse presents both a cosmic model (the moon-sun relationship) and a mystical model (the soul-light relationship). Fuzuli shows that human existence is not the possessor of light in itself, but exists by receiving light “particle by particle” from the divine light at every moment. This coincides with the concept of both “the manifestation of light” in Sufi mysticism and “discrete energy quanta” in quantum physics.

Seyid Azim Shirvani: Verse: *If it did not receive light from Seyid Vachin, your radiance, It would not have given the world even a particle of light.*

Literary-Irrational Commentary: Here the poet says that if the sun (khurshid) had not received light from Seyid Vachin (i.e. the beauty of the prophet, the divine face), it would not have been able to give even a particle of light to the universe. In the view of Irrationalism, although the sun is the order and light of the universe, the source of the true light is God. The sun is a mere manifestation of light. The face of the Prophet is a perfect mirror of this light.

Therefore, visible light is a mere reflection of the true light. **Parallel to Quantum Mechanics.** Source and Particles - Photons (particles of light) are fundamental carriers in themselves. But without a field and energy source that ensure their existence, there would be no light. This is not the sun itself, but a deeper field reality. Holographic Idea - The light of the Sun illuminates the universe, but its source is elsewhere. This is similar to the idea in the holographic principle that “there is a deeper encoded reality behind every visible event”. **Light and Photon Analogy** - The poet’s expression “there would be no light as small as a particle” can be read as a reference to the discrete, quantized nature of light. Without photons, not even a particle of light is possible. The message of this verse is: The true source of light is the divine essence; both the sun and particles are merely mediators of this light. This resonates with the concept of *nur-i haqq* in Sufi mysticism and with the fundamental carrier (photon) and field origin of light in modern quantum physics. Thus, in classical Azerbaijani and Eastern poetry, the metaphors of light and particle are not only artistic images and means of poetic description, but also an expression of a deep ontological and cosmological concept. Nasimi’s description of “the sun hidden in a particle”, Fuzuli’s poetics of luminous beauty and Baki’s and Seyid Azim’s concepts of light-particle show that poets understood light as the basis of existence and the particle as a unit carrying the secret of the entire universe. Modern quantum mechanics confirms the same central idea: the photon - a particle of light - is both a carrier of energy, information and the main key to the whole of reality. Thus, poetic lore and the language of modern science converge at one point: in every particle there is a luminous whole and this wholeness, manifesting itself in space, keeps the universe in existence.

6.2. The Unity of the Particle and Being

In Sufi poetry, the concept of a “particle” is interpreted as the smallest unit of matter, as well as “a small gleam of existence consisting of divine light”.

Ibn Arabi and the poets influenced by him express the possibility of seeing the reflection of the entire universe in every particle.

In classical Azerbaijani poetry, almost all poets have used the “particle-shams” (sun) juxtaposition to metaphorically describe the particle finding its essence in sunlight.

These approaches resonate with the concept of entanglement in quantum mechanics, where particles appear separate but have an indivisible unity at a deeper level.

6.3. Light, Danger and Love: The Symbol of the Butterfly

One of the most poetic metaphors for light in classical poetry is the image of the butterfly and the candle. The butterfly, attracted by the light, burns itself in the candle; this is interpreted in Sufism as the lover’s “extinction” for the sake of the beloved. On a physical level, this bears an interesting resemblance to the power of light (photons) to change matter. In quantum mechanics, the interaction of photons with matter (the photoelectric effect, the change in energy levels) can be interpreted as the “scientific manifestation” of this poetic image.

6.4. Parallels with Quantum Mechanics

Light-Photon: In classical poetry, light is the beginning of the universe; in quantum physics, the photon is the carrier of energy and the particle that stands at the foundation of matter.

Particle-Superposition: In poetry, a particle is both material smallness and infinite potential; in quantum mechanics, a particle contains all possible states in a state of superposition.

The Universe in a Particle - The Holographic Principle: The poets' vision of the entire universe in a particle is a poetic analogue of the modern holographic universe model.

The Butterfly - Light - Photon Effect: The butterfly's burning in light can be read as a poetic image of the effect of photons on matter.

Thus, there are deep conceptual resonances between the metaphors of light, particle and light in classical Azerbaijani and Eastern poetry and the fundamental principles of quantum mechanics. These analogies both more clearly show the philosophical layer of literature and shed light on the depths that can be expressed in the poetic language of modern science.

7. Conclusion

In this article, we have explored the striking conceptual parallels that exist between the profound ontological teachings of Islamic and Sufi mysticism and the revolutionary discoveries of modern quantum mechanics. Our analysis has shown that there is a profound structural and logical similarity between mystical concepts such as "light", "manifestation" and "unity-of-being" and scientific principles such as the photon, wave function collapse and quantum entanglement (al-Ghazali, 1998; Suhrawardi, 1999; Ibn al-Arabi, 1980; Schrödinger, 1935; Bell, 1964). These similarities, while not directly identical, suggest that both systems of understanding about the fundamental nature of reality reach similar conclusions. Both Islamic mysticism and quantum mechanics offer us a picture of a universe that transcends the classical, mechanistic worldview, one that is interconnected, dynamic, full of potential and subject to observation (including God).

The main results we obtained can be summarized as follows:

1. The Source of Being is Light/Energy: Both Islamic cosmology and modern physics accept that light (energy) is the foundation of all being. Matter is a manifestation or condensed form of this primordial light/energy.

2. Reality is a Transition from Potential to Actual Being: The process of "manifestation" in Sufi mysticism (from the immutable to the material world) and the "collapse of the wave function" in quantum mechanics (from superposition to a definite state) describe the transition of reality from a potential world of possibilities to an actual world through observation or perception (Ibn al-Arabi, 1980; Schrödinger, 1935).

3. The Universe is an Indivisible Whole: Ibn Arabi's doctrine of "wahdati-wujud" and the phenomenon of quantum entanglement show that the universe is not a collection of separate parts, but a fundamentally interconnected, non-local, unified system.

4. The Part Contains the Information of the Whole: The idea of the "world in a particle" in Sufi mysticism and the holographic principle of theoretical physics share the idea that each part carries the information and structure of the whole.

5. Creation is dynamic and continuous: The concept of "halq-i jadid" (continuous creation) in Sufism and the constant fluctuations in the quantum vacuum reveal that the universe is not static, but a dynamic process that is constantly being created and reconstructed (Ibn al-Arabi, 2002).

These results demonstrate that the often claimed irreconcilable opposition between science and religion is unfounded and that these two fields can discover different aspects

of the same truth, albeit in different languages. The following recommendations can be put forward to further develop this interdisciplinary dialogue:

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