



A STUDY ON QUANTUM THEORY
IN ACCORDANCE WITH ISLAMIC SCIENCE

BY

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ABSTRACT

Metaphysical methods based on the Qur'an and relevant Islamic science principles have been extensively used to expose the mysterious quantum world by providing detailed explanations on some of the important phenomena observed in the quantum world, particularly on the wave-particle duality. This metaphysical approach provides an alternative to complement the mathematical rigour usually employed in empirical studies. The scientific analysis of the relevant verses coupled with the scientific findings indicate that each element of an atom consists of electric charges and a permanent magnet, in addition to the presently known induced magnetism due to the spin of an element such as the electron. New mathematical equations are derived to calculate the postulated potential energy, and the ratio of the proposed permanent or static magnetic fields and the induced one. Other relevant equations derived include the calculation of electromotive force and the exhibition of wave-particle duality. The relevant verses are also interpreted scientifically to exhibit the space and time relation as a pair, and to expose philosophically how time dimension creates consciousness. Lastly, the new theory is comprehensively substantiated by revealing its significant role in providing some explanations on fundamental issues that relate to zero point energy and the origin of mass. It is found that the theory has comfortably accomplished the task. Islamic science thus has proven that religion can contribute to the advancement of science, particularly in the exploration of the quantum world.

ملخص البحث

لقد استخدمت الأساليب الميتافيزيقية على أساس القرآن ومبادئ العلوم الإسلامية ذات الصلة بنطاق واسع، لكشف العالم الكوني الغامض أو غير المكتشف من خلال تقديم وشرح مفصل حول بعض الظواهر المهمة التي لوحظت في العالم الكوني ولازدواجية موجة الجسيم. ويوفر هذا النهج الميتافيزيقي بديلاً لاستكمال الصرامة والتحليلات الرياضية المستخدمة عادة في التحليل العلمي للآيات ذات الصلة بالأسلوب الميتافيزيقي إلى جانب النتائج العلمية موضحاً إلى أن كل عنصر من الذرة يتكون من الشحنات الكهربائية والمغناطيس الدائم، بالإضافة إلى المغناطيسية المعروفة سببها الناتجة عن زيادة أو نقصان في عنصر مثل الإلكترون. وتستخدم معادلات رياضية حديثة لحساب فرضيات الطاقة الكامنة، ونسبة الحقول المغناطيسية المقترحة الدائمة أو الثابتة واحدة المستحث. بالإضافة إلى المعادلات الأخرى ذات الصلة والمستخدمه لحساب قوة الدافع الكهربائي، ومعرض ازدواجية موجة الجسيم. كما تفسر الآيات ذات الصلة علمياً فرضية المساحة، وعلاقتها الازدواجية مع عامل الوقت، وتم الكشف فلسفياً كم من الوقت والبعد كافيان لخلق الوعي. وأخيراً، تم إثبات نظرية جديدة شاملة من خلال الكشف عن دورها الكبير في تقديم بعض التوضيحات حول القضايا الأساسية التي تتعلق بصفر الطاقة، ونقطة أصل الكتلة. وتبين أن النظرية قد أنجزت بشكل واضح. وبالتالي فإن العلوم الإسلامية قد أثبتت أن الدين يمكن أن يسهم في تقدم العلوم، ولا سيما في مجال استكشاف العالم الكوني.

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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INTRODUCTION

BACKGROUND OF THE STUDY

The existence of the universe and the mystery of how it was created has been a subject of interest throughout the history of mankind. Many theories have been proposed one after the other to predict its creation scientifically, but nobody knows the truth for certain except God and those few that close to Him and have the special privilege of knowing from Him directly.

Qur'an was revealed 1400 years ago for people of all generations. Its terminology hence has to be understood by each generation in agreement with the level of knowledge at the time. Any conflict or contradiction between the knowledge derived from the Qur'an and pure reason cannot be real; it must be merely an apparent conflict due to human errors and weaknesses. Husaini (1996) highlights that some Muslims assert we should not interpret the Qur'an verses on scientific matters because of the uncertainty and progressive nature of some scientific discoveries. It is afraid that when certain scientific facts or theories are changed or reversed, these will disprove and refute the Qur'an, and thus a Muslim faith in the Qur'an shaken. This argument is unacceptable because Muslim has an Islamic duty to interpret Qur'an despite the facts only God knows with certainty the real or true meanings of the vague verses (*mutashabihat*). This interpretation is an expert opinion or judgment (*ijtihad*) based on the authority of available scientific knowledge but fallible human capability.

Nonetheless, the Qur'anic view of nature influenced the development of science in Islamic civilization. The previous great Muslim scientists and philosophers have studied the natural sciences in a religious manner, treating nature as a domain that is

inseparable from revelation (Nasr 1978). They use many ways of knowing to formulate sciences based on the idea of the unity of nature, which derived from the pairing source of revelation and intellectual intuition. As mentioned in the Qur'an on numerous occasions, God summons humanity to investigate and reflect upon the universe and everything in it, the alternation of the night and the day, the creation of man and many other phenomena. Observing and examining the nature in details using the senses and reason, a man comes to recognize the artistry of God's creation in the world around him, and ultimately, to know and get close to the creator.

A contemporary famous Muslim scholar, Professor Osman Bakar has successfully provided a platform by introducing the Qur'anic foundation in Islamic science in which some fundamental principles based on the Qur'an taught. One of the Islamic science principles that provide an effective way to study nature is by using symbolism. The science of symbolism in Islam implies that natural objects are not to be regarded merely as facts as done in modern science, but also to view as symbols. This symbolism means that the reality of a natural object observed in the physical world is not exhausted by its scientific and mathematical content, but it contains a much deeper meaning to represent the existence of another reality. According to 13th century Persian Sufi master, Jalaluddin Rumi, everything seen in this physical world has its root in the unseen world; the form may change, yet the essence remains the same. Al-Ghazali preceded the same view about a century earlier (Ghazali 1924); thus implying the unseen world of quantum particles could be studied by appropriately applying the knowledge of our physical world, provided we can find out how the two worlds are linked.

Another important principle in Islamic science is the pairing concept, which based on the statement that everything in the universe created by God in pairs (Q. 51:49; 36:36). Aligned with the pairing concept, there are many levels of reality, which in general can divide into two types: the seen and the unseen or invisible (*ghaib*), the physical and spiritual worlds respectively. The former can be seen, observed or touched by our physical senses. Modern physics says everything in the universe including matter or mass has energy which is unseen, but can be detected and measured. Similarly, the forces of nature like gravity and electromagnetism also cannot be seen, but their effects on us can be felt and thus measured. Therefore, there is an agreement between science and religion in this aspect, strengthen the belief that religion can provide metaphysical knowledge to expose the mysterious quantum world where high energy and hidden power seems to dominate.

The quantum world is part of nature. It consists of smallest particles ever discovered experimentally, the atom and its subatomic particles, which is unseen and considered by many present Muslim scholars as a "bridge" to connect our physical world to the spiritual one. Atom is unique and becomes the building block of everything in the universe, both animate and inanimate. In the hierarchy of physical sciences, quantum physics is located at the lowest end, acts as a foundation for the others and thus marks its paramount role in the sciences.

Based on its role as a link between the physical and spiritual worlds, the knowledge of human soul could also be found useful in the study of the quantum world by providing some essential ingredients for a better understanding of the subatomic particle behavior. The Qur'an (Q. 17:85) mentions about the spirit; "*They ask you concerning the Spirit. Say: The spirit is of my Lord's command. Little indeed is the knowledge granted to you.*" The human spirit or soul comes directly from God (Q.

15:29) and has the special privilege that is impossible to be attained by man, the main reason only a little knowledge is available to a human. But it is not something that cannot be studied and learned at all (Juoro 2011, Mudhary 2002), the accessible few could be found adequate for the intended purpose. Al-Ghazali, a famous 12th-century Muslim philosopher, and theologian has distinguished between spirit (*ruh*) and body in his *Al-Risalat Al-Laduniyya* (Akdogan 2008). He says the soul (*nafs*) of human beings is immaterial, immortal, special and unique and different from the body or the rest of the natural creation itself. The body and soul are two separate entities that have contrary properties, but both work together as a pair in the form of a human being. The soul is spiritual and does not occupy space, but the body does. Therefore, the soul cannot be detected by our physical senses, or philosophically speaking, it has no extension. We propose that quantum particles due to their level of reality lie in between physical and spiritual worlds possess some of the properties of soul.

When studying the nature, one must realize the importance of deep knowledge of reality, space and time, which has also been the subject of the investigation by previous Muslim scholars. For example, al-Ghazali has stated that God created the universe from nothing and time dimension existed only after that; there is no time dimension before the creation of the universe. Aligned with the Qur'an, he also believed in the existence of many worlds and the possibility of different realities (Juoro 2011). He further wrote in *Tahafut al-Falasifah* (Ghazali 2002): “Does Allah able to create a universe bigger than its present size? If the answer is no, then it means God is weak, but if yes, then it means there is space of vacuum outside of the universe to allow the expansion of the universe”. The expansion of the universe and the existence of the elusive dark matter and dark energy have been an issue of high interest to the astrophysicists and astronomers presently. Since outer space has been proven to contain

tremendous energy and possibly consists of atoms, there must be a strong relationship between space and quantum theory.

Most physicists worldwide currently trying to find a new theory called the theory of everything to integrate all the known forces of nature namely electromagnetic force, strong and weak forces, and gravity in the form of an equation. Unfortunately they fail to accomplish this due to the inability to integrate Einstein's general relativity theory (theory of large objects) and quantum mechanics (theory of smallest). From Islamic perspective the derivation of the said equation to represent the theory of everything is not impossible. Based on Unity (*tawhid*), God is the only Creator of the universe, which means there cannot be two orders of reality independent of each other. Therefore the possibility of discovering a single theory to represent all forces of nature cannot be overruled.

In the past few decades we have seen an increase in the awareness among the Muslims about the importance of Qur'an in the study of science as a result of the work of some well-known Muslim scholars, one prominent name arises is Harun Yahya of Turkey. Other than books, he aggressively fully utilizes available media including the internet websites to promote his ideas. Many latest scientific discoveries are related to the various verses of the Qur'an to prove its miraculous role as a source of knowledge. Nonetheless, only few have successfully taken up the initiative to extract the relevant information contains in the Qur'an and intelligently use them to discover new knowledge, a theory or hypothesis that could make a great contribution to the scientific community. It is the intention of this thesis to take up the challenge of exploring the mysterious quantum world of subatomic particles using the light of the Qur'an and other available resources.

PROBLEM STATEMENT

Quantum theory or to be more precise quantum mechanics is a field of science in modern physics that studies the behaviour of particles at the sub-atomic level. This theory explains the behaviour of subatomic particles and tells us that short-lived pairs of particles and their antiparticles are constantly being created and destroyed in an apparently empty space. Many theories are developed mathematically to explain and describe the observed phenomena in quantum mechanics, but the weird behaviour of these particles has not accurately described. A mathematical formula can never tell us what a thing is, but only how it behaves; it can only specify an object through its properties.

In observations, the subatomic particles are found to possess wave-particle duality. This duality is the key to the development of quantum mechanics. Photons and electrons, for instance, are observed in double slit experiments to possess wave-particle duality behaviour, but no acceptable explanation given. In another phenomenon called quantum entanglement, the electrons become linked, or entangled, such that changing one invariably affects the other, no matter how far apart they are; something Einstein called "spooky action at a distance." Quantum particles can also exist in several places at once, or spin clockwise and anticlockwise simultaneously. But when physicists make a measurement, they always get just one answer. Why do particles at the subatomic level behave in this manner?

In quantum mechanics, the consciousness of the observer plays a crucial role in the collapse of the wave packet which occurs during the act of measurement (London & Bauer, 1983). However, despite numerous attempts, modern science is still unable to find the link between the human consciousness and the elementary particles.

The physicists currently do not have a clear picture yet on what is happening in the quantum world, implying the possible incompleteness of the existing theory. Presently not a single theory is acceptable unanimously by the scientific community to accurately represent the many phenomena observed. Therefore, the quantum world might require a new fundamental explanation that underlies the present many theories.

RESEARCH OBJECTIVES

The objectives of the research are as follows:

- 1) To study in details the major aspects of subatomic particles by referring to the relevant phenomena including the Young's double slit experiment as the key.
- 2) To apply Islamic science principles especially the pairing concept, one-to-one correspondence, and science of symbolism in the study of the phenomena observed in the quantum world.
- 3) To develop a new theory complete with mathematical equations to explain and describe the behavior of the subatomic particles in the quantum world.

RESEARCH METHODOLOGY

The research methodology is the most important component of the research. Since quantum mechanics deals with the 'unseen' realm and due to the nature of the problems, the empirical methods normally employed by modern physicists are not recommended. Metaphysical methods based on Qur'anic verses and relevant Islamic science principles, supported by rational philosophical arguments are instead extensively used in the research. It is a qualitative approach which explores the richness, depth, and complexity of phenomena found in the quantum world.

Acquisition of primary data is not necessary for this study. Nonetheless the relevant experimental results related to certain important phenomena in quantum world are acquired as a secondary data and analysed accordingly, usually by integration with the relevant Qur'anic verses. The Qur'an is undeniably the major source of fundamental principles in Islamic science in which when coupled with the details of the nature as found in experimental evidence could lead to a fruitful end. It is strongly believed that by using this method of approach and analysis, the right formula for a new theory can be obtained.

The Muslims believe that all knowledge originally come from God, which began with unity, then multiplying and diversifying into many branches and fields. Philosophically, it is analogous to a tree or plant; it begins with a seed buried in the ground, later splits into two parts. One part moves downwards to form the roots and the other moves upwards to form the trunk, which later grows many branches; each branch leads to smaller branches, each contains many leaves. All parts of the tree from the roots which penetrate below the ground to topmost leaves pointing towards the heavens are interconnected, each with specific functions working together to ensure the survival of that tree. Analogously, scientific knowledge is also spread and multiplied in the same manner. Therefore, the knowledge is interconnected with each other in some ways at a certain level of reality, like a tree with branches at different levels of the trunk. In order to successfully understand what is happening in a certain level of reality at the far end in which cannot be observed clearly by our physical eyes, we should study those available at our level of reality which can be easily observed in details. Since each level of reality is created in roughly the same pattern of creation following the same fundamental laws the information gathered at our level of reality can apply to the other reality at the far end.

The Qur'an also mentions that the knowledge given by God to man is equivalent to only a drop of water in the sea (Q. 18:109). Even if another one is added, the God's knowledge will not be exhausted. By observing and studying the nature of the sea, one can have a clearer view of the structure of knowledge. The surface of the ocean is clearly visible under the sunlight as vastly wide and broad with undulating waves and foams. As penetrating deeper into the ocean, the amount of light correspondingly reduces until at a depth of about one thousand meters or more the light completely blocked and a total darkness experienced. The same view is applied to knowledge. Knowledge is also very wide, broad and deep just like the ocean water. A shallow knowledge might not reveal the truth, which is similar to the foams created by waves on the surface of the ocean, which disappear after a while. As a researcher delves deeper into a certain field of knowledge, the result is harder to attain because of the "darkness" at that level. To ensure success in the endeavor, special equipment or tools are necessary to provide some "light" as assistance. It is also known that highly valuable things in the ocean such as pearls and corals are located at the bottom of the ocean. Therefore, the ultimate objective of an expedition or exploration is to reach the deepest end of the knowledge hierarchy where the ultimate wisdom is. And this is also an ultimate target of this research in the quantum world. By reaching the bottom end, and have a clear view of what is present inside the elementary particle such as an electron by using the "light" of the Qur'an, as explicitly stated in the verse (Q. 42:52): "... *We made it (Qur'an) a light, guiding thereby whom We please of Our servants; and show you the way to the right path.*"

With the same concept of knowledge or epistemology in mind, the study of the fundamental of the subatomic particles also requires a wide range of knowledge; some have to be deep enough to see their interrelation. The study covers a broad field of

knowledge, which includes religious, philosophical, physical and spiritual. Religion is considered as the most important source of information provides the Qur'an and hadith as the foundation. Physical knowledge of the matter is covered by modern science, whereas the metaphysical and spiritual knowledge explains the reality of beings.

In Islam, the Qur'an is always considered as a great guidance and source of inspiration for many Muslims. It is a divine speech of Allah which contains among others many clues to scientific knowledge that requires someone with a broad and deep knowledge of science coupled with intellectual intuition to fully understand the in-depth and hidden meanings. The success of the research will ultimately demonstrate that the Qur'an is very much relevant in science by providing the "root" of knowledge and guidance to show the direction in the study of the quantum world. In this research, many relevant verses of the Qur'an are further studied extensively by referring to few famous commentaries and translations of recent and classical scholars. The relevant verses which are mostly scattered in various places of the Qur'an are identified and compiled; the pieces are later put together to provide a clearer picture of a certain knowledge or concept. Some of this information are properly tabulated in respective groups for easy identification and reference in subsequent analysis.

By applying the concept of pairing derived from the Qur'an, the study of the largest pair (heavens and earth) can be found useful in exploring the subatomic particle behavior. This fact is very encouraging because there are many verses in the Qur'an explaining the creation of the heavens and earth as compared to only three verses on atoms. It is the contrary of what modern physicists are presently doing; they are studying the subatomic particles to come out with the notion how the early universe was created and behaved. Nonetheless, the analytical merging of the two sources of scientific knowledge is paramount in the success of the research. In addition, the

concept of "man as a microcosm" is also regularly applied to provide new ideas. Since the scientific knowledge of the human body including anatomy is quite extensive, this may be applicable when analyzing the subatomic particle behavior and its movements. In this aspect, the knowledge of biology, chemistry, and physics in modern science are merged for analysis and discussion using Islamic science principles.

A deep metaphysical knowledge about reality is also very significant and in fact of the utmost importance. Thus, both religious and philosophical knowledge of reality is studied, analyzed, and applied to the observed phenomena of the subatomic particles. The views of famous traditional Islamic philosophers such as Ikhwan al-Safa' and al-Ghazali are gathered and compared against those of the recent Western counterparts. All phenomena observed in the quantum world are believed at the end related to the reality of being. There are many levels of reality in existence, of which our physical world is at the lowest end. The quantum world is another reality, which is believed to be located in the transition phase between the physical and spiritual worlds, the visible and the unseen respectively. In addition, the existence of various levels of reality is very much related in certain respect to the concept of the multiverse or many worlds of the modern science.

The knowledge about reality will also lead us to the knowledge about consciousness in the endeavor to find an answer to the question whether human consciousness affects measurement process. Both Islamic view and the Western counterpart on consciousness are studied and comprehensively discussed. Deeper understanding of the interaction between the mind and the brain (or body and soul) also pursued and hopefully can lead to an explanation of what exactly transpired between the electrons and the observer. Once again both the metaphysical and modern science empirical knowledge are studied to accomplish this mission.

The Young's double slit experiment identified as a key to the discovery of quantum theory and, therefore, is thoroughly analyzed. The wave-particle duality behavior of a subatomic particle is paramount in the study. The long established questions on how the particle in quantum world can possess both distinct properties, which are completely different from objects found in our physical world require an answer. This phenomenon studied thoroughly and relevant Qur'anic verses about atoms and light are analyzed and discussed to find any important clue or hint that could lead to the answer.

The motion of the quantum particle can also be studied by applying the one-to-one correspondence principle of Islamic science, in which the motion of an electron, for example, corresponds to the earth's motion. Subsequently, the fundamental classical physical laws that relate to both wave and particle behavior are studied to the deep end to gain details on the roots of the two distinct behaviors. The knowledge gained from the study of observable details of our seen world can be applied to the unseen quantum world. The success of the research is very much depending on the ability to link and integrate all gathered relevant information about the two distinct behaviors in providing a clearer picture of the quantum world.

LITERATURE REVIEW

The two most referred books in the study of Islamic science are those written by Syed Hossein Nasr (Nasr 1978) and Osman Bakar (2008). Both famous contemporary Muslim scholars have successfully provided the fundamental framework of the Islamic science, which emphasize the importance of the Qur'an and other traditional Muslim scientists. The book by Nasr is especially important in Chapter 4 entitled 'The Microcosm and Its Relation to the Universe;' it is about *The Ikhwan al-Safa'*, a group