Cosmic Harmony Through Quantum Physics and Literature: An Interdisciplinary Study

Azhar Suhail Atiyah
Basra Educational Directorate, Iraq
AzharSuhail822015@gmail.com

Abstract

Quantum particles, whether electrons or photons, looks as if it had a spirit to communicate telepathically and exchange feelings (states).The behaviors of the particles is an evidence of the harmonization and coordination of our world, this paper presents the conformity and the notion of symphony of the universe. In addition, it offers the correlation between arts and sciences, which have existed side by side for centuries, but there have been few cases in recent academic history in which literary scholars and scientists worked together, having an impact on each other's studies and getting advantages from their different ideas and approaches. Art and Science have to work side by side to interweave the mental creations that are produced by the mind. This study looks at the beneficial results that may come from a discourse between the two cultures for promoting a better understanding of the significance of interdisciplinarity. Literature can be used as a measure to a better understanding of quantum theory whereas this theory also can help us discover and understand new meaning in the literary works. This confirms that no discipline takes precedence over the other and that fill the communicational gaps between them to gather various approaches. Consequently, their diversified viewpoints will have useful results for the two cultures, revealing up a new visions of ideas and theories. The final claim is that like physicists who seek getting a unified theory, literary critics at the same time, traveling through time back to the past seeking to get an entry points to the literary works through interdisciplinarity approach rather than monodisciplinary that frame minds and lead to deal with texts from one side.

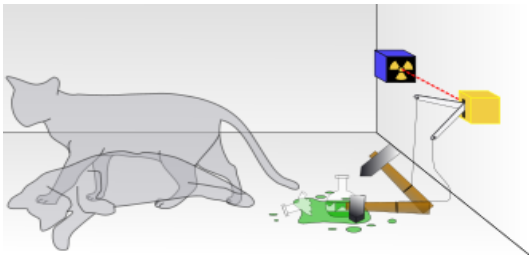
*Keywords***:** harmony, holistically-minded, complete knowledge system, totalitarian, symphony

Introduction

What is photon? The smallest Particle of light, which can be released or absorbed by an atom ,an atom is absorbed it to move one of its electrons from a low energy level to a higher energy level and release it when the opposite is happened. Each photon also has a wavelength corresponding to a certain frequency and energy. Photons are the basic components of light, so it travels at the speed of light, about 300 million meters per second. Scientists finally come up with a finding that, these photons is the phenomenon of telepathy. However, scientists do not call it "Telepathy" but "Quantum Entanglement" so what is entanglement? It is as scientists describe it, a quantum phenomenon in which the physical properties of two quantum objects or more are connected despite of great distances that separated them. For example, if photon1 is on earth and photon2 is on another planet, the two photons have an invisible mutual and unmeasurable effect between them. Any external effect happens to the first photon spontaneously, the same effect on the second photon will happen! To clarify this concept, suppose that we have influenced the phase angle of the first photon, we will observe that the phase angle of the second photon is changed. The only requirement that the two photons are quantitatively entangled therein lies the problem.

Erwin Schrodinger an Austrian theoretical physicist, considered entanglement one of the main principles of quantum mechanics .Other scientists as Einstein completely rejected that, as he afraid of quantum mechanics. We must acknowledge that quantum mechanics is full of facts that the mind rejects at first, because in short it defies the usual logic. However, physicists has not stopped from challenging these facts and trying to prove it mathematically at least. To understand the difficulty of phenomena's estimation quantitatively, let us recall the most controversial mental experiment, that which called "Schrodinger's Cat", which the British physicist Stephen Hawking describes it, by saying, "When I hear about Schrodinger's cat, I reach for my gun." He means that, he intends to kill himself because the phenomena theoretically seems right but in reality, that is impossible. George Johnson in his article "On Skinning Schrodinger's Cat" .1996 explains that, the recently uncovered experiment depends on the thought that an electron can "spin" either counterclockwise or clockwise, and when it is measured, it will spin in the two directions at the same time.

Erwin Schrodinger proposes an experiment; he imagines a cat trapped in a dark iron cage with a chunk of radioactive material like uranium and an electronic detector can count any radiation from a decaying atom. The detector is linked to a hammer on a vial with enough toxic hydrocyanic acid to kill the cat. If an atom of the uranium decays and the electronic detector records any radiation that installs electric current to the arm holding the hammer that will trip a hammer, smashes the vial, and kills the cat. For an observer standing outside the box and cannot see the cat, he has only two possibilities. The first is that the vial is intact and the cat is alive. The second vial is shattered and the cat is dead. These two possibilities are 50% equal for each. This is what we are used to in classical mechanics or Newtonian mechanics, so what does quantum mechanics says?



A thought experiment of Schrodinger's cat

This theory states that, after the time required for the release of radiation passes, the cat will be neither alive nor dead. She is half-alive and half-dead! According to the quantum mechanics, this case is a "superposition" of two states. First, if the atom does not decayed, then the cat is alive, second if the atom decayed, the cat is dead. These two identical cases describe the cat's state before opening the box, that's why the cat has the two characters (dead and alive) at the same time. Therefore, the cat is dead and alive at the same time so that we can confirm one of the two cases by measuring them directly for instance by opening the box! Superposition is not known in the microscopic world, therefore it is difficult to imagine of its results and dimensions. In order to simplify the concept of telepathy or entanglement, we will assume that an observer has opened the box, the cat's state will be immediately apparent to the observer, whether it is life or death. As a part of this new case of the cat, the observer who gets his cognitive status by observing the state of the cat, he is classically associated with the observation and the cat's status is entangled with the observer. Nevertheless, this example is just to knead the idea because quantum entanglement between particles is much more complex.

Finally, after this quantitative headache, we have left to say, these quantum particles, whether photons or electrons, seems as if it had a spirit to exchange feelings and communicate telepathically. The behaviors of these particles is an evidence of the consistency of this universe.

Aims of the Study:

1. Depiction of the connections and the harmonization in our world.
2. Foster the understanding of the significance of interdisciplinarity.
3. Using the holistic approach when dealing with literary text.

Research Questions:

1. Where is magic and beauty! if not in nature and picturesque phenomena?
2. Concerning quantum theory as critical model, Where is the world of theghost of the Hamlet's father?

Theoretical Framework

Oliver 1989 proposed interdisciplinary approach; it is a modern cultural model, which requires academic interdisciplinarity. This paradigm get the mind, spirit, and body in knowing, considers our correlation to nature, besides taking into consideration the development capacity of the human kinds: the distinction between the various disciplines must break down. For the study of such questions requires that we be able to move between and interrelate the fields of physics, biology, religion, history, and poetry in a single conversation.

Methodology

The study deals with cosmic harmony thus; the first part of this paper discusses symmetries and correlations in the universe. In addition, and from the notion of "the connection of everything to everything else" by Da Vinci, the paper offers in the second part, the mating between arts and sciences, it presents quantum theory to represent the sciences and the Shakespearean play "Hamlet" to represent the arts. In other words, the first part of this work explains interrelations, symmetries and physical theories without using mathematical formulae to make them much easier to a wider audience. In the next part, the study presents the relation between quantum physics and literary studies with an analysis of Shakespeare's Hamlet in the light of the quantum theory.

Literature Review

Barad (2007) in his book "Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning" explains that "It is crucial that we understand the technologies by which nature and culture interact". The book shows how and why we have to understand in a complete method the roles of nonhuman and human, discursive and material, natural and cultural and how these factors have an impact role in knowledge production by checking how it works together.

Peat (1991), demonstrates that the resolution of the schism, along with many other dualities and paradoxes in the workings of nature and the universe, have been and continue to be the provocative "quantum questions" of investigation for holistically-minded scientists. away from limited ideas and regular order toward more subtle notions of creativity, chaos as an infinitely complex order, and the breaking down of barriers between life and the inanimate, between mind and matter.

Consequently, the study shows a representation of the entanglements and the harmonization of our universe. It proposes using the holistic approach when dealing with literary text that reinforces the significance of interdisciplinarity. However, there is no complete approach is able to interpret the literary text and achieves its meaning by all its configurations procedure. It is an extremism to follow one approach thinking that it is a fit one and it is a best method to follow. Extremism is unscientific and even an immoral manner. If we grant that, every approach is insufficient, every insufficient matter have no perfection and every perfection have no place in our world.

Results

Physicists consider this elegant universe, which is full of beauty and fascinations to be a symphony that played by superstring and every different tone means different material, color or behavior. Hence, the laws of physics, which are highly complex, it is only an attempt to reveal the harmony of these strings that are very precise and have highly sweetness. Besides, if a certain concept, is not so obvious depicted, that does not mean, it is not here, exactly like the quantum world, it is not observable to the human eye, but it pervades and defines each level of the existence. However, the connection between difficult sciences and utilizing interdisciplinary discourse will raise a new world of progress and possibilities and by allowing the humanities and the sciences alternately to teach one another and to learn from one another, a new discourse is raised that introduces a new realm of progress and possibilities.

Discussion

Philosophy of Beauty and the Theory of Everything

Will Durant says "Heart answers beauty's call but you will find few minds that ask why was beautiful is beautiful" Beauty is a word that attracts hearts and take humans spirits away. Humans might not differ on any concept as they differ on the concept of beauty, perhaps this disagreement is inevitable consequence due to differing capabilities and creativity of humans. Beauty is a sweet word; it is as a music to ears and a singing to hearts, it becomes so difficult when we try to define it or interested in framing it. Let us be one of the few who ask about the concept of beauty .While we believe in the difficulty of that question, we consider these questions a literary- scientific attempt to anticipate the meaning of beauty for visioning the beauty.

Aristotle believes that beauty is the harmony. Plotinus said that beauty is life, and everything that has life shine is beautiful while Italian philosopher Benedetto Croce see that beauty is Art. Moreover, Muslim philosophers see that beauty in lay in the concept of harmonization that exist in nature and they leave the judgment for the scientists of nature. Nature is full of beauty. Scientists and researchers are the first and foremost people of this question. So, what do scientists of nature say about beauty? Particularly the physicists as researchers in the rules and phenomenon of this vast universe.

By physicist's viewpoints and in short, the beauty is a telepathy (Symmetry). Symmetry is associated with beauty. It has magic on the human mind. Human like everything that is symmetrical, such as large balls like sun, planets, ice crystals and some flowers. The greater symmetry proportion the more beautiful the objects become. The square, for example, has a degree of symmetry. It returns to its normal whenever it is rotated by 90 degrees similar to many crystals, it takes the same shape when rotated by any degree. We also as human creatures have large amount of symmetry. Our limbs are left and right, it is symmetrical, which gives us a kind of a beauty. How can we see deeply and clearly if we do not have double symmetrical eyes? This principle dealing also with many animate beings that have super-symmetries. Bird wings, fish fins and insect legs are

all created for great purposes beyond a mere beauty. Is symmetry just an aesthetic issue or it is nature, which give precedence to symmetry in the universe? That is the question. Inevitably, the universe is not symmetrical in all cases, but it sometimes also appears asymmetric, there is no symmetry in broken rocks and unshapely clouds at least in what is visible and in what we can observe it. By contrast, in the case of the invisible atomic, symmetry is inherent in all forms and laws of nature.

Physicists' obsession with symmetry was the secret behind the observation, which says nature does not prefer symmetry in all its forms and laws, but also it goes beyond that when it requires this symmetry. This physical obsession with symmetry has led physicists to timeless struggle with the laws of physics. Symmetry seems more beautiful in law than in entities. Likewise, the law is symmetrical if its results do not change even if for example we apply a certain action, such as displacement or rotation on it.

That beauty which Paul Dirac, one of the founders of quantum mechanics, meant when he wrote that, "physical law is not without a mathematical beauty" in the guest book in his visit to Moscow university. Symmetry is one of the aspects that shows beauty of Einstein's theory of relativity, its second hypothesis provides that the laws of physics take the same form, which gives the same results in all the inertial frame of references. Far away from scientific subtle interpretation, what is concern us is to state the most prominent features of the scientific struggle of physicists, to create a grand unified theory encompassing all the laws of nature. Moreover, it necessarily contains a greatest amount of absolute symmetry. That is Einstein's dream which he died before achieved it. That is really a crazy idea. Can all natural's laws be shortened to one theory or by a subtle expression, to one equation, that includes simplicity as much as complexity and beauty as much as symmetry? So what was impossible yesterday is now a reality, the drums of war and the state of alert sound off among scientist to get what is called the "grand unified theory". Successes were achieved in 1873 by Maxwell when he unified the electric and magnetic force in his famous theory "the electromagnetic theory". Newton had created gravitational laws two centuries earlier, but he was unable to explain what that gravity is? At the beginning of the twentieth century, Einstein explained and designed the force of gravity in his remarkable general theory of relativity, which is one of the most important achievements of this century. Before that, he was able by using the electromagnetic theory to get the principle of a unified and to understand the deep symmetry that surrounds all components of divergent nature such as time, space and energy through his famous theory of special relativity. However, Einstein's delight had not been completed when the unification of light and gravity failed namely, the unification of electromagnetic and general theory.

Then a new scientific revolution in physics called quantum mechanics revolution has taken place. It was able to explain atomic phenomena with high accuracy. It has given rise to a new tidal wave of controversy because it contains no determinations and an awful lot of possibilities. This revolution increased scientists' confusion and depression of possibility of achieving the unified theory. Despite the discovery of two other forces, weak nuclear power and large nuclear power , a glimmer of hope appeared at the end a of the tunnel when a group of scientists in 1979 was able to combine electromagnetic force with weak force in a theory called "Electroweak Force". Then quantum mechanics achieves a great success in the unification of three forces electromagnetism and weak, large nuclear power but it failed miserably in trying to include the gravity force. The attempt to reconcile quantum theory with general relativity was like a fantasy. The former deals with the world of particles such as atoms and molecules and the second deals with major objects such as stars and planets. However, naturalists did not despair and continued their struggle to witness the birth of the greatest theories of history in the 1980s, the mother

theory, is the superstring theory. String theory is a varied and broad subject, which tries to deals with a kind of deep questions of essential physics. It has been applied to different problems in black hole physics, early universe cosmology, and nuclear physics. This theory potentially provides a unified description of gravity and particle physics; it is a candidate for a theory of everything. This theory involved the largest amount of analogies all time in any physical model. In addition, proving it experimentally takes time, effort and lead to another stage of the struggles among scientists to formulate a unified theory for the universe. Finally, Did "Ilya Ibu Madi" a Lebanese poet, realize the concept of beauty and symmetry by physicists that made him enunciate his famous wisdom? “Be beautiful on inside, you will see a beautiful universe”

Travelling Through Time: Outside of the Self

Since the concept of travelling is related only to a place, no one can imagine that he traveled one day through time, it is definitely a travel we have never been used to. People think about how to travel vast distances from one place to another that what we call a travelling, therefore, and since time is of one dimension, how we can travel through it! It is either the past that run out or present when we live at or the future that we look forward. Therefore, travel means that people travel either to the past or to the future! This seems as manifestation of insanity, but it reflects only a flash of what is in the minds of scientists.

So can we travel through time? Moreover, how can that be happen? To answer these questions, we need a simplified explanation of one of the greatest theories in history. It's a special theory of relativity developed by Einstein. This theory added a fourth dimension; it is a time dimension to the spatial three dimensions that is known by all the length, width and height. Accordingly, any object can be located in four dimensions, three to its spatial position and the fourth to its time position; hence, the term “space-time” comes from. Therefore, if the body can change its spatial position, what prevents it from moving in its time dimension.

Imagine two planes traveling at the same speed 700 km / h in the same direction and there is an observer on the ground. The observer will see the two planes fly at the same speed. However, this is quite different for the observer sitting in one of the plane; he inevitably will see the other plane as if it is not moving. Therefore, we can say that the speed of one of the plane for the observer on the ground is 700 kilometers per hour while its speed is zero for an observer sitting in the other plane. If we assume now that the two planes are moving in opposite directions, the speed of one relative to the other will be 1400 km / h, which is the outcome of their speeds. Therefore, the speed of any object is different depending on the observer or according to what scientists call it the reference frame that is exactly what relativity does mean. Nevertheless, this theory does not stop there; it goes further to a hypothesis, which is the reason of its beauty and the secret of its essence. Special relativity states that the absolute speed in this universe is the speed of light, which is approximately 300,000 kilometers per second; this speed is consistent, does not change and does not vary depending on the frame of reference or what we called the observer. This hypothesis may not seem meaningful, but its results is certainly meaningful, one of the results of this theory, is the access to this speed or near it that makes the world seems very different for us. Time will remarkably slow down, but we will not feel it until it returns to the normal speeds from which it began and the length will also extend in unusual way. Hence, the twins paradox posed by scientists, if we suppose the two twins, one of them journeys into space as fast as the speed of light , the other stays at home, on Earth. Later on, when the twins are reunited on Earth, the travelling twin is markedly younger, compared to the other at the end of the travel. The exact age difference depends on the details of the journey. The year that will pass on the twin who traveling

into space will be equivalent to many years on earth. Einstein did not stop at this insanity until he came out with the general relativity that we talked about earlier. That provided the effect of light by gravity. Since light is our time scale, time will go slower near the high gravitational spaces, which is later called black holes, than if it is far away from those holes. In other words, the meaning of space-time that we mentioned, will suffer from large distortions near the black holes where gravitational fields are high.

Well, what does all this have to do with time travel? Imagining this universe as a four-dimensional curve made scientists simply suggest a characteristic feature of this trend, which they called wormholes, that means there is a hole in the time-space regard that enables us to travel through time. Although scientists have been able to prove the existence of these holes mathematically, the practical proof of this theory is still very complex as the theory itself provides the difficulty and even the impossibility of human to reach neither an equal speed of light nor an approximate speed of it. However, with all this, scientists still dream of traveling through time, especially through future because its few results, it is easier to understand, and the days will remain full of many surprises.

Away from all these hypotheses, suddenly, and in one way or another we travel through time. We run around the past and future in a few seconds. God Almighty has given us a wonderful memory capable of taking us to the stories and imaginations. It is in our mind as the tape recording that make us live that moments in all its details and even we may see and hear what we have gone through there ,interact with it and it may have raised our tears or smiles. Even more surprising is that memory can be provoked by very simple things. A whiff of perfume may take us to another world and a whisper of sound may send us memories and nostalgia. We remain weaker than the resistance of this travel by our spirit to the past time. This travel is not only confined to the past. Our minds and imagination is also take us to the future, when some people dream an awakening dream, they live all the details of that dream ,but he becomes absent, as if he has already moved to another place in the time dimension. All that happen because the mind and the imagination, which Allah has honored us by and which we should utilize in whatever beneficial and valuable. Our ability to navigate the world of imagination is unimaginable; we can only believe it when we are fascinated by some creative works, ideas, or theories. Is it possible for man to reach what he have reached without traveling with his mind outside the boundaries of time and space? Invention that did not come from contemplation and thinking, it is absolutely discovered by a coincidence and a great luck.

Finally, we observe that the inconsistency between the mind which embodied by mathematical equations and reality, was the source of the insomnia of Einstein like other scientists. Einstein summarizes the suffering by saying that ""the closer the laws become to reality, it becomes unstable and if it becomes closer to the stability, it becomes unrealistic". However, scientists still believed that the truth is only that is proven in their labs. Einstein was not only constantly asking lots questions, but also he had a very wide imagination that leading him into a contemplative state. He says that "imagination is more important than knowledge" and also explains, “The most beautiful sense is the mystery that it is the source of art and science” in addition he states that “the most precious thing in the world is intuition or brilliant idea”. Hence, it is clear how this man was fond of diving into the world of ideas and seeks ambiguities. He seizes the brilliant ideas and adapt them; such characteristic requires a man who is free from every restrictions and limitations. He states, “Everything that is great and inspiring is done by a man who has worked freely”. In addition, and by a brilliantly way, he also says that, “A person starts to live when he can live outside himself”.

The Mating Between Art and Science

Lord Robert Winston in his article What-scientists-can-gain-from-literature-philosophy 2015" states, As scientists, we have to realize the power we have and the limitations of that power**.** Science is the finest type of knowledge. It is a trigger for facts and fantasies to work side by side to interweave the mental creations that are produced by the mind. The mentality of the humanist, especially literature, may differ from that of the experimental scientist. Thus, literature expresses the mind in its affective state. Experimental science expresses the mind in its intellectual state after consulting all senses and the cells brain to come up with an equation or interpretation of an observation. Therefore, dealing with literature is definitely required an affective state, which may be penetrated by an intellectual state of mind, while dealing with science requires an intellectual state that may be permeated by an affective state of mind. The finest types of knowledge are generated and formed from the mating of literature and science.

Literature and science are mated as the mating of soul with the body. The mechanics of the body does not give rise to feelings and does not transcend the affection in it unless the spirit be in the body. Science is the body of mechanics, biology, agriculture and technology. Literature is the spirit that lives in the body of science; it releases feelings, sensations, and intellectual inventions in it. When the body and the soul mate, no one looks at the body as much as looking at the intellectual impressions in general and the emotional impressions in particular. Similarly, when science and literature mate, no one views the scientific product as much as viewing the emotional and intellectual product. Therefore, as the spirit transcend and go beyond the body, literature transcend and go beyond science, makes it seems fine in its appearance, sensational and sweet. On the other hand, science structure literature and make people see and interact with it. In contrast to our societies, the West has realized this intimate and necessary relation between science and literature and they have established specialized colleges in science and literature. It is necessary to study both side by side and apply their respective approaches to each other. Although private universities and some public universities have applied this approach in their curricula, the goal is still unclear for students and faculty and most courses are optional and not compulsory. The programs in public universities also do not apply this mating especially the faculties of human sciences, which rarely include experimental science in its courses.

The big problem is that every professor studies his specialized subject, whether it is human or experimental, without linking it with the other science, which reduces the benefit and leaves to the student the function of linking between sciences if he did. The main purpose of the mating between humanities and experimental sciences in the same course is to arouse the student's mind thinking in emotional and contemplative way in the experimental sciences. Moreover, thinking scientifically in the human sciences to satisfy the mind with all the various needs of the soul. The scientist is capable of using a scientific method in writing with its various tools, laws that make it express its scientific results easily, and easily by using the method of narration, analysis, comparative and philosophical, it is easy for him to use this method in literary writing. Therefore, the scientist who possesses literary talent is the most capable of writing a high-level literary text simply because he possesses the tools of writing that can be easily used in literature, as he wants. In addition, scientist also has a large and diverse scientific information that can also be adapted to serve his or her literary texts, especially in science fiction. The mating between science and literature and its demonstration in art, media, teaching in schools and universities is the simplest and fastest way to form the soul's self-image sentiment in a natural way to receive life's affairs in beauty, depth, and stability. Hence, mentalities, whether technical, medical, military, engineering, or other, and the intellectual

and emotional understanding between everyone with different functions and degrees would formed.

Many scholars correlate science and literature. They enrich the literary life with innovations that remain between the reader and the intellectual hands, which protect the heart from the drought of life like the Egyptian Yusuf Idris who is known as a doctor of writers and writer of doctors. In "Scientists as Writers" 1965 ,James Harrison produces that writings of Aristotle, Francis Bacon, Isaac Newton, Charles Darwin, Sigmund Freud, Bertrand Russell, Michael Faraday offer a recourse to the commonly notion that the scientific process prevents the subjective element. The mating between science and literature is evident in the Holy Quran through the Quranic stories, which present the scientific situation in a wonderful literary way. Many basic scientific concepts are completely accessible to the general reading public and to students in the humanities as well as those in the sciences. If science is a necessity for reality, literature is a beauty that preserves science.

Integral Correlation Between Quantum Physics and Literature

The Interaction of quantum theory and literary studies is mostly reflect with regard to the metaphoric concept which is as David Bohm and Peat state "essential to all science, gather the matchless thoughts in a completely new ways" (1989: p:35), as in an imaginative literature. Literary scholars similar to physicists, they depend on images and metaphors to clarify the structure and formations of matter. According to Bohm and Peat in their book "Science, Order, and Creativity" metaphors "have an unusual power, not just to widen and develop the thought procedure of science, but also to break through unknown areas of reality that are in certain extent implied in metaphor" (1989: p 41). If hermeneutic procedure and metaphoric conception link literature and physics, it looks clear that the limits that part them are more holey than sturdy. Quantum notions such as, lack of certainty, complementarity, entanglement, to name but a few, non-locality, are among the inter conceptions of scientific knowledge practices and humanistic, that make up an intermediation between both disciplines. To that effect, the quantum realm is not merely a scientific domain of complicated experiments expressed by mathematical equation, but a wealthy land of imagination as well, ignited with confusing condition of virtual particles and vibrations of matters. The metaphoric dialogue that pictures literary imagination is, therefore, inevitable in layout the complicated and progressively antithetical dynamics of quantum mechanics that physicists themselves are fascinated by it. As Lisa Randall, for example (2005: p:130), express that "particles 'commitment phobia" when indicating an individual electron which acts as a wave when we know it is a particle, which shows a status of uncertainty and undecidability. Does not this comical metaphor indelibly make the complex nature of the wave-particle schism the subject of literary imagination? like Dirk Vanderbeke a literary critics says yes, he come out with that "the most important aspect of linking literature and physics is the imaginative process" (Vanderbeke 2011: 200). The concepts that literary critics have evolved, such as Dennis Bohnenkamp's "physics fiction", Steven Carter's "quantum poetics", and Susan Strehle's "actualist fiction" are symptomatic of that imagination.

> Despite that both quantum physics and literature make hazy and obfuscate the borders between fiction and fact, the matter that physicists address is that the existence of a virtual (fictional) world, which is one of ontology, that requires to be visualized, beyond that of fabricated fictional or completely discursive worlds. This leads us to questions like; does the virtual cosmos govern the laws of quantum

> mechanics? If so, does it involves the factual existence of possible cosmos or is this universe completely fictional, representing the experience of creative imagination?

In "Six possible worlds of quantum mechanics" essay John Stuart Bell asks this question differently "To what sense are these worlds fictions?" (Bell 1987: 194). His answer is obviously unambiguous, especially in the discourse of the "Many Worlds Interpretation" (MWI) which proposed by Hugh Everett 1957. Bryce DeWitt also explains MWI in "many-universes interpretation"1970 as follows:

> Every quantum moving happening every galaxy or star, in every outlying corner of the world is dividing our universe on Earth into countless of copies of itself.

DeWitt explains Many Universes are like "Many Sheets" of paper. Every sheet is a world. The sheet splits in parallel sheets when something is observed to happen. We (life history our memory, and all that) live in a sheet, however there are countless of other versions of you in other sheets.

Although the virtual reality sounds like a fictional world, "fiction have to make foretelling that can be examined", (Harris 2000: 214). In spite of the clear variance, the two realms are judged sometimes by their degree of probability and both domain postulate hypothetical worlds.

> Both scientific and literary fictions can be interesting; both can be a matter of concern. (Bohnenkamp 1989: 20).

The quantum domain is like an open-ended book where anything can happen .Both novelists and physicists meet at the meeting point. "Languaging the Universe" (Livingston 2006: 65). That point of convergence is more obvious between postmodern theories and quantum and can be described as "Meeting the Universe Halfway"(Karen Barad: 2007).

It is through the engagement and interrelation of physics and humanistic discourses that we can meet the universe halfway in forming narrative codes concerning the interaction of meaning and matter, and in decipher the evasive principles of reality established upon a substantially "crazy" quantum logic, which is apparently more nonhuman than human.

The interconnection between quantum theory and literary discourse reveal a complementarity correlation related to knowledge production and meaning-making practices. Thus, the conceptual affinities between scientific and literary discourses, the

concatenation of issues and the complication of their cross –currents that cover the link between literary texts and quantum theories; shape an important form of interdisiciplinary work in the humanities. The Cosmic Web, Chaos, and Order by N. Katherine Hayles are the most persuasive theoretical consideration of physics and literature. Combing the shared properties of both fields with theoretical efficiency, Hayles offers the "field concept" to clarify their integrations. Instead of discussing about whether humanists utilize physics models in a right or wrong way, Hayles assume that we should surpass the concern of influence and consider both culture regarding their returned impact on each other:

> Literature has an effect on the scientific models the same as the models influence on literature, that both influence our grasp of what the domain concept means,(Hayles 1984: 10).

The discourse between physicists and humanists, nevertheless, has not always been a simple one. The tenseness becomes even more obvious when literary critics deal with concepts and questions comparable to the ones raised in quantum physics. From the point of view of physics, humanist placement in interdisciplinary work produces a constant "hermeneutics of suspicion" (Kirby 2012:197), and severe arguments eventuate when scientists see that as a plan to pass into their authority. Whereas in humanities the literary repercussion of quantum metaphors unavoidably magnetize many literary critics.

Both humanists and physicists raise and deal with the same question of how to make this ontology meaningful for the general cultural imaginary when interpreting a physical reality, which its central ontology remains ambiguous and difficult to find. Consequently, in spite of that still observed with misgiving by physicists, the endeavor of humanities scholars to break and overstep disciplinary limits have come to be significant in the interposition of scientific knowledge. The current development says that interdisciplinary work on the relations between scientific exploration and literary studies sheds light on how effective scientific and literary effects on each other and collaborations can be built. Like physicists, literary critics have rejected "the mistaken and limited duality between antirealism and realism", (Strehle 1992: 6). Furthermore, humanists building on quantum theories as important background. They "offer a viable framework for meeting the universe halfway, exploring in depth the world of infinite possibilities, a world of entangled agencies, and meaningful symmetries between modern science and the humanities". (Serpil Oppermann p:101: 2015).

The Second Hamlet Conveying the Discourse of Physics

Shakespeare's Hamlet has been analyzed by using several critical approaches but to take a closer look, it becomes obvious that quantum theory is everywhere and it aids to define every level of our existence. In Hamlet also, the quantum physical references are obvious.

First, although it's not obvious, there are also two worlds in Hamlet. In "The Science of Shakespeare", Falk has already explained that Hamlet take place in two worlds, where the prince sounds stuck in, throughout the whole play. In terms of many- world interpretation worlds and in act one we see Hamlet 'moving between earth and heaven' (1.2.129).His uncle asks him about his bad temper, he pretends to have been, on the contrary, 'too much in the sun' (1.2.67). The acts later, we find that the prince was invoking the planets above and looking harder at Ophelia's recently excavated grave at the same time. He mentions, "Laertes' sorrow 'hurts the plants and make it stand in the

heaven" (5.1.249). The ghost has informed Hamlet that his tale will 'make thy eyes as stars leap out of their spheres' (1.5.17), that cancelling the thought that make us imagine the stars are moving across the sky peaceably. The prince will soon be complaining that the world "this earth is nothing and empty for me, 'a sterile promontory' (2.2.298-99). Falk is dealing with the science of cosmology and indicates to the two worlds as earth and heaven whereas the study proposes other interpretation, as Tanja Vierrether: 2016 states "where the being of one world defines the actions within the other". The first universe is the customary one, the classical world which we familiar with. The another one is the universe of the ghost of Hamlet's father, a sort of a place between alive and death, where the ghost is destined for a certain time to walk at night in the earth, while for the day "I'm confined in fires of purgatory world , until the foul crimes burnt and penance done" (1.5.10-13). That world looks over the unreasonable notions that cannot be clarify regarding our own knowledge in our world. So considering the ghost, there is a thingummy that no human could figure out.

> Ghost. But I am deprive To tell the unknown matters of my lockup place, if I weren't prevented to tell you, I could tell you things that would hurt your soul, freeze your young blood, Make your two eyes, as stars, leap out from their spheres, (1.5.13-23).

From this point on and in terms of the role of observer in quantum theory Hamlet is brought into the knowledge of the second world, which explains his further behaviors and looks to continually be on every sides of him. Hamlet is talking to his mother concerning her adultery and the wicked nature of her husband, the brother and killer of her former husband, the ghost appears again to remind the prince of his mission: "Do not forget. I have come to agitate your appetite for revenge (3.4.111-112). Hamlet can hear and see the ghost whereas his mother cannot. She believed that Hamlet has begun to go insane because he catches sight of things that aren't there, at least in her universe, so she said to him:" This is just a fabrication protects by of your imagination, Madness can created hallucination" (3.4.138-140). This shows a distinct and clear parallel to the quantum world, drawing an image tell us that without perception , one cannot really see. The quantum world is unrealizable and cryptic to our eyes because it is too small to reveal; thus, the scientists need an instrument to build observations in the quantum world. In this work of art the distinction between the protagonist and his mother are his powerful emotions. The thing that makes him able to see the ghost is the instrument that he gets from his anguish concerning his father's death, the reactions of betrayal and loss, and his yearning for revenge.

Considering non-equilibrium concept of quantum theory, the continual trying of Ophelia and Hamlet to become acclimatized to their surroundings is identical to that of a particle attempting to come to equilibrium. Hamlet's and Ophelia's complete existence is determined by the enslavement of this determination and no matter how much and how hard they try, they never be able to free themselves or accomplish the requirements and wishes of the others. Every decision by Ophelia is decided and set by someone else that she ultimately loses herself. However, Hamlet does not entirely go down into madness, the diverse wishes that pulls him apart leads him to a state of uncertainty about a conflicting options that he is unable to find a way to satisfy all of them. Their end is the same end for both, they are vainly die attempting of fulfilling other's requirements. This process is essentially the same as that of particles. It goes through when attempting to get to a status of equilibrium with its surroundings. Firstly, it is just have to let down fragments of itself

by merging with a surrounding particle, that late status will then have qualities of both former particles. However, with each new connections attempt, the form and effect of the main particle becomes smaller again and again, till it is dropped and lost in its surroundings. In the same way as Hamlet and Ophelia were lost in the willingness of the other, and they lastly stop to exist and come to an end without reaching the state of cosmic equilibrium.

According to quantum entanglement phenomenon in the quantum theory, which is ”If two particles have entangled and a form of measurement is applied on one particle, that will change the main quality of the other particle”. (Bes 153-154). That looks contradictory because these particles do not require to directly connecting with each other that is similar with Ophelia and Hamlet. Thus, both lovers are in an entangled status, effecting each other even if they are miles away. So, Ophelia and Hamlet are not only related and effected by the fact that they are purposed to the willingness of the other, whereas also by the effect of their personal decisions on the other, without paying attention to the special closeness of both. In the time of Shakespeare, it would not have been a consideration of that much influence on a man to a woman to attribute that to it. It is clear that they are connected by a powerful bond of love and that actions, Ophelia’s decisions however, her death ultimately have an effect on Hamlet and caused varied reactions. What is determined the way they gaze towards each other change is actions that happened either when they were apart from each other or while they were talking to each other.

However, regardless of this close relationship, they also still have a cause and an effect that cause a change in the other one. Firstly, what is causes Hamlet’s madness is Ophelia’s letter, and it is his reaction that causes Ophelia’s desperation because she realizes what she has done to the person she loves. The facing between them in the nunnery scene make Ophelia frightened and Hamlet angry, however they cannot be apart from each other. In the end, the one of circumstances that cause Ophelia’s suicide is Hamlet’s leaving, and when he knows about it, he lastly realizes how deeply fond and attached to Ophelia he was and what her suicide means to him :“I loved Ophelia. Forty thousand brothers, Could not with all their quantity of love. Make up my sum” (5.1.271-273)?

The analysis of this work clarify that quantum theory cannot merely be utilized to chosen literary texts, whereas also to those that are “rarely examined from the point of view of science ”(Falk (2014): 146). Only because the scientific side is not in an obvious and loud manner, it does not mean, it is not there.

Limitations

Difficulty in conceptualization and understanding the quantum theory.

Recommendations

The significant matter is the unity of intellect. It is crucial, to use a holistic approach when dealing with the literary texts. Literary critics, teachers or students have to delve into aspects of philosophy, psychology, history and science. The domain of theatre, dance, and music are closely related to Humanities. Film studies is another realm we cannot set aside.

“Learn how to see, realize that everything connects to everything else”
Leonardo da Vinci

Conclusion

Considering quantum entanglement phenomenon in the quantum theory, quantum particles, seems as if it had a spirit to communicate telepathically. The behaviors of the particles is another evidence of the world coordination. The study suggests a holistic conception of reality, figure out and seeing things fully that required interdisciplinary focus, which is a motion to search for a "complete knowledge system" (Harman, 1988, p. 99). Thus, the entry point to a reciprocal understanding and the reciprocity of the ideas is the metaphor. Metaphors can be used to clarify a seemingly mysterious and unclear idea by depending on an idea recognized to the respective people. This kind of metaphorical discourse is processed in the second part through the analysis of Hamlet. By closer examination, it clearly observed that Hamlet also incorporate of two worlds. Hamlet and Ophelia, the two main characters have an obvious and constant subjugation to the desire of the Other which is apparent throughout the play, that can also be pointed out as particles struggling for equilibrium. Their relation to each other and harmful connection is a metaphor for quantum entanglement, which raise a new grasp to interpretation of the play and can also be used to clarify the scientific thought through the play or conversely. This purposed to confirm that even if a specific concept is not so clearly depicted, that does not mean, it is not present, exactly like the quantum world, it is not seeable to the human eye, but it pervades and defines each level of the existence. Thus, Interdisciplinary discourse is known as a fundamental method for moving across networks of thought and holistic expressions.

References

Alhuseiny, Najm Ibn Musfer. 2014. Between Physics of Literature and Literature of Physics. Books world. Al Riyadh, Saudi Arabia.

Barad, Karen. 2007. Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning. Durham: Duke University Press.

Bell, John Stuart. 1987. Speakable and Unspeakable in Quantum Mechanics. Cambridge: Cambridge University Press.

Bès, Daniel R. Quantum Mechanics: A Modern and Concise Introductory Course. Berlin: Springer-Verlag, 2004. Print.

Bricmont, Jean .(2016). Making Sense of Quantum Mechanics. Springer International Publishing AG Switzerland. Dabrowski, Irene J. (1995).

Bohm, David and F. David Peat. 1989. Science, Order, and Creativity.London: Routledge.

Bohnenkamp, Dennis. 1989. "Post-Einsteinian Physics and Literature: Toward a New Poetics".Mosaic 22.3: 19–30.

David Bohm's Theory of the Implicate Order: Implications for Holistic Thought Processes. issues in integrative studiesNo. 13, pp. 1-23 (1995).

Falk, Dan. The Science of Shakespeare: A New Look at the Playwright's Universe. 1st ed. NewYork, NY: St. Martin's, 2014. Print.

Harman, W. (1988). Global mind change. Indianapolis, IN: Knowledge Systems, Inc.

Harris, Wendell V. 2000. "Physics is Physics, Literature is Literature and Criticism is Something Else Again". Philosophy and Literature 24.1: 210–222.

Harrison, E. (2000). Cosmology: The Science of the Universe. Cambridge: Cambridge University Press.

Harrison, James. 1965. Scientists as Writers. https://mitpress.mit.edu/books/scientists-writers

Hayles, Katherine N. 1984. The Cosmic Web: Scientific Field Models and Literary Strategies in theTwentieth Century. Ithaca: Cornell University Press.

Johnson, George.1996. On Skinning Schrodinger's Cat. https://www.nytimes.com/1996/06/02/weekinreview/on-skinning-schrodinger-s-cat.html
Kirby, Vicki. 2012. “Initial Conditions”. Differences: A Journal of Feminist Cultural Studies 23.3: 197–205.
Kragh, Helge. Physics and the Totalitarian Principle. Niels Bohr Institute, Copenhagen University.
Labib, Mohammed Salem.2015.Mating of Science and Literature. http://arsco.org/article-detail-1204-8-0
Livingston, Ira. 2006. Between Science and Literature: An Introduction to Autopoetics. Urbana and Chicago: University of Illinois Press.
Oliver, D. W. (1989). Education, modernity, and fractured meaning. Albany, NY: University of NewYork Press.
Oppermann, Serpil.(2015). Quantum Physics and Literature: How They Meet the Universe Halfway. Anglia 2015 | Volume 133 | Number 1.
Peat, F. D. (1991). The philosopher's stone: chaos, synchronicity, and the hidden order of the world. New York: Bantam Books.
Prisco, Giulio. 2017.All those Everett worlds. https://turingchurch.net/all-those-everett-worlds-f1f2277f96f3.
Randall, Lisa. 2005. Warped Passages: Unveiling the Mysteries of the Universe’s Hidden Dimensions. New York: An Ecco Book, Harper
Strehle, Susan. 1992. Fiction in the Quantum Universe. Chapel Hill: The University of North Carolina Press.
The Tragedy of Hamlet, Prince of Denmark. Ed. Sylvan Barnet. 2nd ed. New York, NY:Penguin Group, 1998. Print.
Vanderbeke, Dirk. 2011. “Physics”. In: Bruce Clarke and Manuela Rossini (eds.). The Routledge Companion to Literature and Science. New York: Routledge. 192–202. Perennial.
Vierrether, Tanja. (2016).Merging Literature And Science: Shakespeare Through The Scope Of Quantum Physics And Lacan. The Graduate College of Bowling Green State University.
Winston, Lord Robert.2015. What scientists can gain from literature and philosophy?**.** https://www.britishcouncil.org/voices-magazine/what-scientists-can-gain-from-literature-philosophy.

Appendix

Dedication

To those who adore literature and physics and go awry in differentiate between them.
"The world is numbers and tunes"-Pythagoras