ISSN 2581-3463

AJMS
Asian Journal of Mathematical Sciences

RESEARCH ARTICLE

Can Quantum Mechanics Correlate All Natural Forces – An Experimental and Observational Approach

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Received: 28-07-2021; Revised: 13-08-2021; Accepted: 20-08-2021

ABSTRACT

According to a previous study, mathematical set theory in analogous terms of symbols can be used to relate the body, mind, and spiritual world to develop artificial intelligence. This paper tries to study how the natural forces – electromagnetic, gravitational, and strong-weak – can be explained by applying quantum mechanics (QM) theory. Indeed, body corresponds to strong-weak force, mind refers to the electromagnetic force, and the spirit corresponds to the gravitational force. In this paper, different quantum experiments were performed to verify the above hypotheses. First, the strong-weak forces were tested by the Baryons mass spectrum or the quantum chromodynamics (QCD). For the case of electromagnetic, one may usually refers to the Casimir effects for visualising the (Quantum) electrodynamic (ED/QED). A tabletop experiment was used for the gravitational force or the quantum gravity (QG). That is, we human beings may link the body, mind and spirit with QCD, (Q)ED, and QG through QM. Furthermore, these quantum theories (QCD, (Q)ED, and QG) are self-interconnecting through QM. Finally, the results show that we can also use QM to "experimentally rationalize" the Penrose's philosophy and correlate all presently well-known natural forces. That is the role of "set symbols connections" mentioned in the special rationalization of Penrose's Three Worlds Theory can also be tested experimentally w.r.t. the modern particle physics (in the philosophical sense, Chau, 2020). Thus, QM is analogically as the duty of set theory in my rationalization. Furthermore, these QCD, ED, and QG can be linked with Roger's three-world philosophy (Plato, physical, and mental) by (brain) waves or ontological mathematics. Hence, the QCD, ED, and QG give birth to the unified field theory philosophically (Chau, 2020). In other words, these theories unify all natural forces and relate the elementary particles under a single theoretical framework – the Roger's Three Worlds Theory through the QM and ontological mathematics behind. The outcome is one may investigate more about early universe and black hole.

Key words: Quantum, natural forces, quantum chromodynamics, ED

INTRODUCTION

In July 2019, the author submitted a paper on the specific rationalization of Roger Penrose's three-world philosophy. The basis of this study was set theory or set symbols that make a special rationalization to Roger's theory. It is a kind of philosophy or perspective. As this author's best known, there is no practical evidence to show the truthiness of such philosophy. However, can this theory be verified experimentally? In this study, the rationalization is verified through a series of quantum experiments and observation. It is suggested that, analogically, quantum mechanics (QM) in physics corresponds to set theory in mathematics in the Roger's three-world philosophy. It can be shown that QM correlates atomic strong-weak forces, electromagnetic force, and gravitational force in the philosophical sense. The philosophy is verified through Baryon spectroscopy, Casimir effects, and a tabletop thought experiment. Hence, instead of only presented theoretically and mathematically rationalization, there are also ways in which one can perform tests so that Roger's philosophy becomes true. This is also the novelty of the study – artificial intelligence is feasible. However, the

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gap or the limitations of it is, although machine mind seems to be reasonable, it still requires time for us to develop the corresponding technology progressively and finally turns into our popular daily usage. The final machine minded result is applied to achieve the good purpose of humanity.

EXPERIMENTAL SECTION

Baryon Spectrum

First of all, mass spectroscopes consist of five basic parts: [1]

1. A highly vacuumed system
2. A sample handling system – introduces a sample of investigated
3. An ion source – produces a beam of charged particles with the characteristic of the sample (chemical elements)
4. An analyzer – separates the beam into its component
5. An observer or a separator – observes and collects the separated ion.

The experiment begins with a sample of investigated (chemical) elements that are injected into the highly vacuumed system. Then, the sample is vaporized by a heater and bombarded with electrons. These electrons hit the elements to produce cationic samples. Then, these samples are accelerated by electric plates and deflected by a pair of electric plates with magnetic field. By calculating the deflected angles according to the speed and charge, it is found that heavier ions and those with higher charges are deflected by a smaller amount, and vice versa. The amount of deflected ions is inversely proportional to their mass-to-charge ratio (m/z). The detector also records the m/z values for each type of ions along with the frequency. Finally, the mass spectrum for of the sample is obtained, where the relative abundance is plotted against the mass-to-charge ratio.[1-10]

Next, to determine the mass against the orbital angular momentum of certain baryons called nucleons, N, it is suggested that a circular particle accelerator should be used first. Initially, the baryons are moved in a circle until they attain sufficient energy (e.g. 6.5–13 TeV for beams of proton). Electromagnets are installed to ensure that the particle moves in a circle. When these particles are accelerated in a circular path, they emit synchrotron radiation, which strongly depend on particle mass. Hence, a detector can be used to determine the strength of the radiation and the mass can be calculated.

Through partial wave analysis, all the necessary parameters – amplitude, quantum numbers and intensity, etc., for the required experiment are obtained. In other words, one may referenced with the incoming beam pion which is first being excited into an intermediate state (say X-) through pomeron exchange with the target proton. X- is then determined by quantum numbers $J^{PC}\ M^{E}$, where J is the spin, P and C are the eigenvalues of parity and generalized charge conjugation, and M is the magnetic quantum number and reflectivity of X-. The following equation can be obtained by applying the isobar model (Krinner, 2014) which is a kind of formalism:

$$A(m_x,\tau)=\sum_{waves} T_{waves}(m_x)\,\psi_{waves}(\tau)$$

Where, T_{waves} is the production amplitude
Where, $\psi_{waves}(\tau)$ is the decay amplitudes
However,

$$I(m_x,\tau)=\left|A(m_x,\tau)\right|^2=\left|\sum_{waves} T_{waves}(m_x)\psi_{waves}(\tau)\right|^2$$

In addition, the total sum of the waves is given by $J^{PC}\ M^{E}\ [isobar]\pi L$,

The intensity of the particle pion (or baryons) can be bounded by the maximum and the minimum values of the isobar equation and expressed in terms of L, for examples – the quantum number or orbital angular momentum, for example. This event is because according to the first amplitude equation, the amplitude is indeed a sum over different waves but these waves are defined by $J^{PC}\ M^{E}\ [isobar]\pi L$ (Krinner, 2014). Thus, the rate of change of Intensity = $|J^{PC}\ M^{E}\ \nabla\ [isobar]\pi L|^2$

Where, $|\nabla\ [isobar]|$ means the gradient of the isobar model but I remark the existence of an independent particle model.

Next, we may find the corresponding rate of change in angular momentum which is analogous to the force. We may further plot the graph with one against another. The result is we can know the corresponding forces distribution from the gradient of intensity and hence determine the respective masses distribution also. We may balance a seesaw between particles and apply this in the development of optical transistors (quantum computer) or the fusion reactor. In 2007, Forkel stated that

$$M^2 \propto J,\ M \propto N\ M^2 = M_0^2 + W(N+L)\ M^2 = M_0^2 + W\ (N+L)$$

Where, M^2 is the linear Regge trajectories and J is the spin excitation

Where, N is the radial and L is the orbital angular momentum in the excitations

Then, mass can be plotted against orbital angular momentum, L, as shown in Figure 1 (Evans. N, 2005, de Teramond and Brodsky, 2005). In the next section, this author will show a comparison between predicted and experimental mass values for the baryon spectrum.

Casimir Effects

Casimir effects were first demonstrated by Chen *et al*. (2007a, 2007b). Initially, a high vacuum-based atomic force microscope (AFM) was used to measure the change in the Casimir force between an Au-coated sphere and a Si membrane with and without incident light (Mostepanenko *et al*., 2009). The experiment was conducted in an oil-free vacuum chamber with a pressure of approximately 2×10^{-7} torr. A polystyrene sphere coated with an Au layer of 82 nm thickness is mounted at the tip of a conductive cantilever. A specially fabricated Si membrane is mounted on top of the piezo (a piece of suitable crystal), and it is used to vary the separation distance between the sphere and membrane (a). To excite the carriers with the membrane, 5 ms wide light pluses are applied. Using a 100 Hz acousto-optic modulator, a clockwise Ar ion laser light operated at 514 nm is generated. These laser pulses are focused on the bottom surface of the Si membrane.

The resulting Casimir forces that correspond to the carrier excitation are measured by a lock-in amplifier. The function signal generator used to generate the Ar laser pulses is used as a reference (Chen *et al*., 2007a, 2007b).

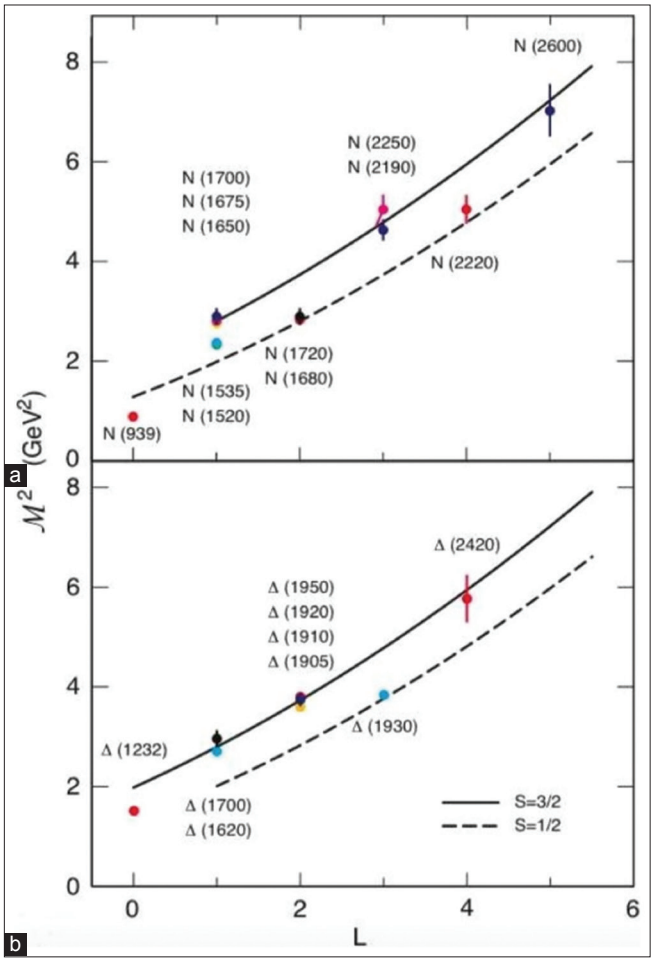

Figure 1: Light baryon orbital spectrum for (a) N ∗ and (b) Δ ∗. The dashed curves correspond to baryon states dual to spin-1/2 modes in the bulk, and the solid curve corresponds to states dual to spin-3/2 modes (de Teramond and Brodsky, 2005)

Tabletop Experiment

A thought experiment, known as the tabletop experiment, is discussed in this section[2]. The experiment considers two spherical crystals, which are most likely (micro-) diamonds that can become entangled quantum mechanically. This is due to the mutual gravitational attraction between them[3]. Entanglement is a quantum phenomenon in which particles become inseparably entwined and share a single physical description. Whenever different possible states coexist, it is known as "superposition;" this is a characteristic of quantum systems.

For example, the spin directions of particles are always opposite. In other words, for a pair of entangled particles, the spin of one particle will point upward and that of the other particle will point downward, or vice versa. However, the outcome cannot be determined in advance. The entanglement of two objects can only be explained by a force between them – gravity or a quantum interaction mediated by gravitons.

The micro-diamonds are modified by artificially introducing a defect, called a nitrogen vacancy center, in the center of each crystal. This is because nitrogen atoms are located near these defects. The two crystals are separated by at least 100 microns. They are kept aloft by laser beams. To ensure the superposition of the spinning of the particles in the defects, magnets and microwaves are used. Simultaneously, crystals should be cooled so that the induced heat does not disrupt the super positions. In addition, the particles are stored in vacuum to prevent collision. Hence, all interactions, except the gravitational pull of the crystals, are avoided.

Finally, the crystals are dropped simultaneously to detect quantum entanglement.

At the end of the drop, the crystals are illuminated using with suitable wavelength lasers. If the crystals fluoresce, the particles in the defects are spinning in one direction. If they do not fluoresce, it implies that they are spinning in the other direction. Indeed, the spins of these crystals are in the same direction, implying that their masses are entangled. Further, if only the action of gravity can cause entanglement, it must be quantized, or gravitons must exist.

EXPERIMENTAL RESULTS

Achievements Obtained from Baryon's Spectrum

The achievements of Baryon's spectrum are compared with the predicted results of the experiment mentioned in the previous section. These achievements are shown be low in Figure 2 – Baryon spectrum obtained experimentally (Eichmann, 2016).

The above experimental results are compared with the predicted results in the following discussion section; their implications are also described.

Experimental Achievements for Casimir Forces

The Casimir forces measured during the aforementioned experiment (Chen *et al*., 2007a, 2007b) discussed in the previous section are shown in Figure 3:

Experimental Results that Similar to Those of the Tabletop

Several methods, other than a tabletop thought experiment, can be used to show the existence of gravitons. During the two photon beams (pp) collision experiments in Large Hadron Collider (LHC), a hadronic jet was observed along with a graviton emission. This is because there was missing energy; this points to the existence of the hypothesized particles. Figure 4 plots the detected missing energy against the high-dimensional gravity scale M-along with a hadronic jet.

The emission of Hawking radiation in the bulk under tensor gravitational modes by a high-dimensional black hole with one angular momentum component can also be considered. According to Kanti *et al*., (2009), the following energy emission can be obtained Kanti *et al*., (2009) the following energy emission can be obtained for tensor type gravitons for D =9, a* =1.2 (black line) for different angular momentum [Figure 5].

Finally, the gravitational wave by Cardoso, in 2017, can be considered. The signal describes what happens when a small star falls into a black hole. Figure 6 shows the echoed waves results.

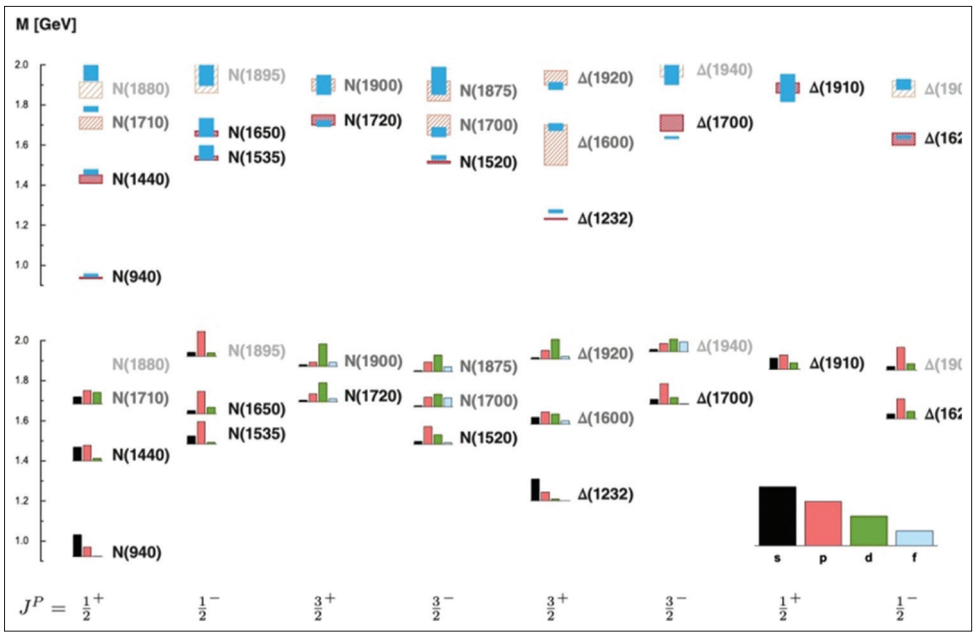

Figure 2: Experimental baryon spectrum

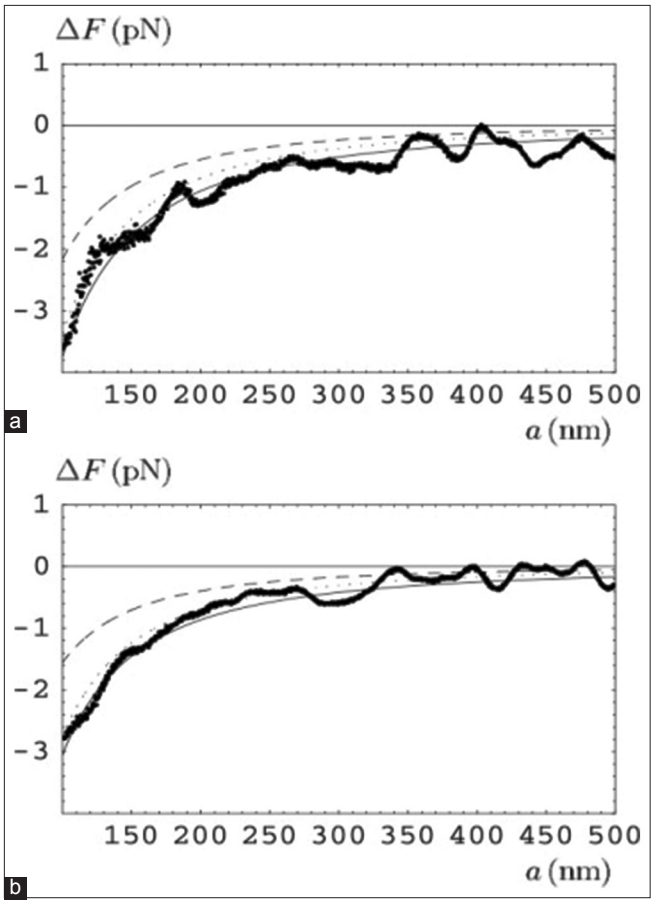

Figure 3: (a and b) Casimir forces measured in Chen's experiment (Chen et al., 2007a, 2007b)

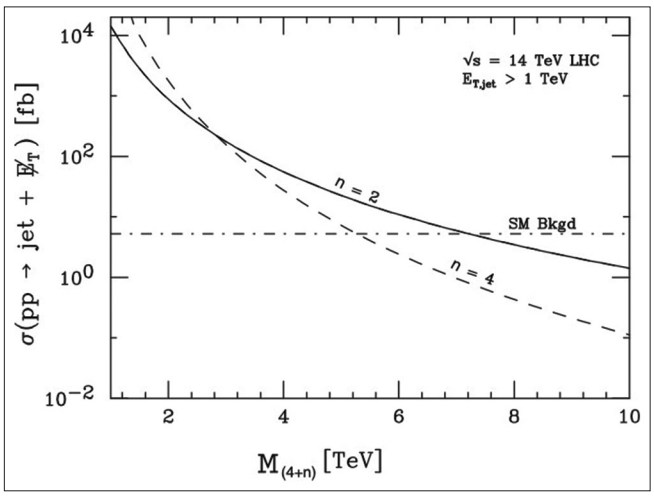

Figure 4: Missing energy against the high-dimensional gravity scale during a photon-photon (pp) collision (Antoniadis, 2005)

DISCUSSION AND IMPLICATIONS

Both the predicted and experimental results of our Baryon spectrum can be explained well by quantum chromodynamics (QCD). According to the results obtained by Roberts *et al*. (2019), the mean-absolute-relative-difference between the predicted (or the calculated) values for the baryon (0, 1/2+) ground states and the empirical masses is 5.2 (2.8%). While for the baryon (0, 3/2+) states, this difference is 2.6 (1.6%). The average of the above two states differences is 4.2 (2.7%) which is in the acceptable error range. In other words, the predicted values in Figure 1 fit well with the experimental values in Figure 2 for spin 1/2 and 3/2. String theory and the standard model of particle physics are related; this is known as the duality (Evans, 2005). String theory is the description of the sub-atomic world in terms of lengths and loops of infinitesimal strings. They exist in higher spatial dimensions, instead of our present three dimensions. The standard model describes strong-weak and electromagnetic forces (quantum electrodynamics [ED]) in terms of gauge theories. All interactions between elementary particles are mediated by "gauge bosons". However, the standard model does not consider gravity. The string-standard model duality may lead to a new gauge theory for the strong force – QCD.

In QCD, massless gluons are considered to be mediators for the interactions between the six quarks (up, down, charm, strange, bottom, and top). The larger the distance between two quarks, the stronger the nuclear force between these particles. Thus, it is difficult to separate them at long distances. Although it is difficult to solve QCD equations owing to such so-called asymptotic freedom, the theory finally has been tested because of the developments in computing (Evans, 2005). That is, QCD is strongly coupled in the calculation of observable particles masses, or QCD particle spectrum can be calculated from the dual theory using simple instruments. As mentioned above, the predicted outcomes of Baryon particles agree well with the experimental results; this implies that the QCD theory is the best explanation for this situation.

Figure 3 shows the differences between Casimir forces in the presence and absence of light against separation for different absorbed powers. In the upper part of Figure 3, the power is for 9.3 mW, and the lower one for 4.7 mW. The measured differences $\langle F^{expt} \rangle$ are shown by the dotted line, and the theoretical ones are shown by the other lines. It is found that the magnitude of the Casimir force difference attains maximum values at the shortest separations and decreases until the separation is minimum. The same trend is observed for absorbed laser power. To explain this phenomenon, theory of ED is considered. Casimir effect arises from the quantum theory of electromagnetic radiation. The

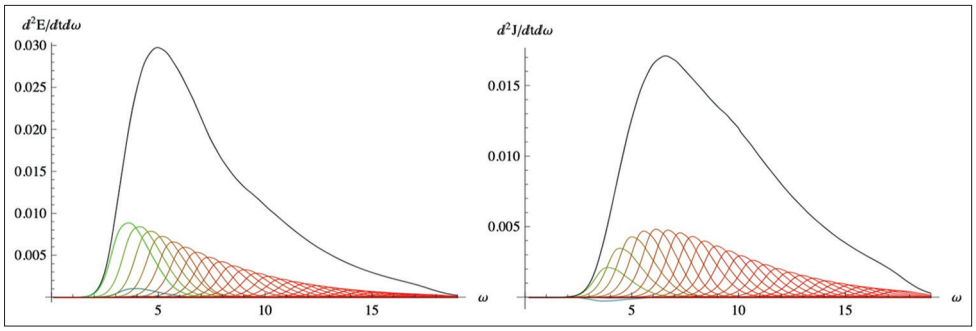

Figure 5: Tensor type graviton observed from Hawking radiation versus different quantum numbers, Kanti et al. (2009)

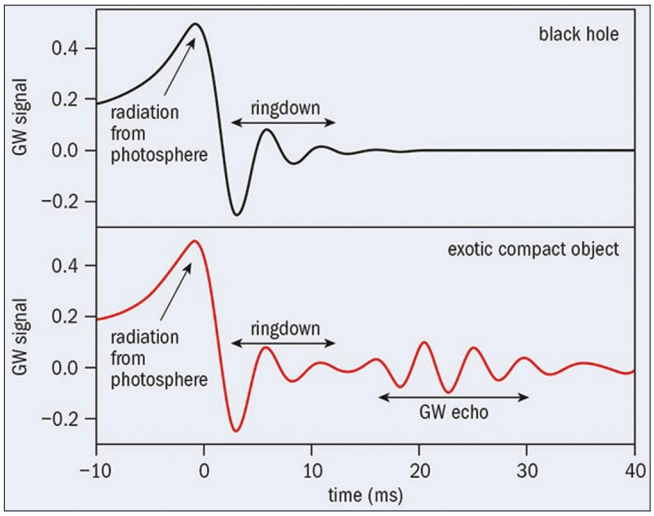

Figure 6: Gravitational wave detected from a small star falling into a massive compact object. GW echo was recorded for a case without a horizon but with a photosphere

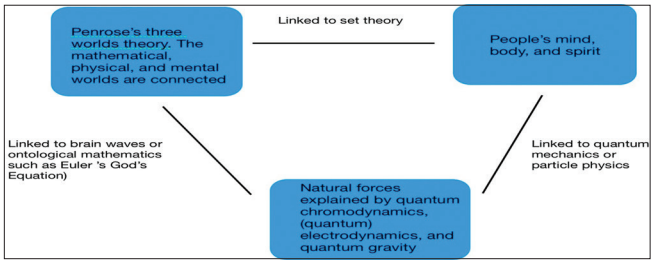

Figure 7: How our mathematical, physical, and mental worlds are connected to the body, mind, and spirit, together with the Four Fundamental Forces of Nature (electromagnetic, gravitational, strong nuclear force, and weak nuclear force)

theory states that the energy between two objects in an empty space may produce a tiny force. In other words, oscillating electromagnetic fields can be described in terms of different standing wave fields in a vacuumed metal box. Classical physics states that whenever there is no field in the box, there will be no energy in any normal mode.

However, QM predicts that the vacuum still contains normal modes of vibration, and each possess a tiny amount of energy, called the zero-point energy (without any field). The number of modes in a closed box is smaller than those in the outside space; hence, the zero-point energy inside the box is smaller than that outside. Thus, a finite tiny inward force is observed on the walls of the box. This explains the experimental results of the previous section. Hence, the ED theory can be used to explain the Casimir forces.

The quantum gravity (QG) theory hypothesizes a quantum of gravity or an elementary particle that mediates gravitational force (gravitational interactions carrier at the quantized level) – graviton. By QG, the study refers to the theoretical physics that describes gravity based on the principles of QM while considering quantum effects. The virtual particle is hypothesized as an analogous diagram for the gravitational interaction between two electrons that require a graviton exchanged. This is similar to the emission of a photon when an electron interacts with another electron. The standard model is a quantum field theory that fits to the observed data with the prediction of graviton when a photon interacts with a photon. In the practical experiment performed by LHC, such results give us in the detection of missing (or loss of) energy. This indicates the existence of the graviton. This is because gravity becomes weaker when there are more dimensions and leads to the more space for the gravitons to escape from the gravitational field.[5] According to the research by the COMPTEL instrument, the decay of bulk gravitons to photons will not generate a spike in the energy spectrum of the photon background. A large amount of gravitons is expected to be produced from the thermal radiation brane well before the nucleosynthesis. The production starts at the temperature of approximately 1 MeV and increases with the temperature. Finally, at energies higher than the string scale, new spectacular phenomena related to string physics and QG effects are expected to occur. This may include micro-black hole production. Therefore, a particle

accelerator should be used for the study of the above two theories (Antoniads, 2007).

The second experiment to study QG is the investigation of the emission of tensor-type gravitational degrees of freedom from a high-dimensional, simply rotating black hole in the bulk. The experimental results shown in Figure 3 indicate that a bulk of tensor-type gravitons have been detected in Hawking radiation. The outcome implies that the black hole is evaporating through Hawking radiation. This may contradict with QM. By establishing a correlation between the string theory and anti-de Sitter (adS)/conformal field theory (CFT), the information paradox associated with the black hole can be solved. For the paradox, one may refer to the fact in which contradiction appeared between Hawking's calculation and the unitarity postulate of QM. If black holes with Ads/CFT are considered, this will then correspond to a configuration of particles on the boundary of adS space. These particles obey the rules of QM so as the unitary fashion of QM. This will also apply to black holes with respect to the principles of QM. Hence, the paradox was completely solved in 2005. Finally, many experts believe that Einstein's general relativity is not complete[6]. It requires QM as a supplement. By QM, the author is referring to the scientific theories related to the behavior of matter and light at the atomic and subatomic level. As mentioned above, the inclusion of QM in general relativity leads to the information paradox. This is because relativity states that everything (including information) will be lost when it comes within the event horizon of a black hole. However, QM shows that information cannot be created or destroyed. Therefore, if one can detect the gravitational wave echo, black holes should not be surrounded by a classical event horizon but a Planck quantum mechanical scale-like structure. This is because the structure acts as a firewall that will destroy any object passing through it, while retaining the object's information outside the black hole. Thus, the gravitational wave echo should be measured [Figure 6]. Any outgoing waves generated between the membrane and the event horizon will bounce off the barrier and pass through the horizon. The information will never be seen again.

In summary, this study suggests various testable (thought) experiments from the above three to verify the quantum theory proposed thus far. First, a high-energy particle collision should be performed in a particle hadron collider. This can produce a bulk of gravitons, and finally induce a micro-black hole. Next, both tensor gravitons and gravitational waves (echo) are detected from manmade black hole, similar to the experiments discussed above. These imply that our gravity has both particle and wave duality. There- fore, it can be explained by the QM theory. The tensor-type gravitons act as the energy carriers in the context of Hawking radiation during the measurement. The black hole is expected to disappear through the emission of gravitons. While the gravitational wave (echo) is detected, it shows a Planck-scale structure on the event horizon of the man-made black hole. All these evidences (if being tested to be true) imply that the gravitational field must be explained by QM. A suitable QG theory must be developed to relate gravity and quantum effects.

All matter is made up of building blocks of chemical elements. In turn, these elements are governed by their internal and external forces[7]. Naturally, our bodies consist of those very same chemical elements and are related to QCD. With regard to our nervous system, its functions can be mapped through electrical signals. Indeed, nervous cells conduct current in extremely small quantities. Electricity is necessary for our nervous system to send signals throughout our body and to the brain. The result being that we can move, think, and feel[8]. As such, electromagnetic forces play an integral part in the human nervous system and, by association, our physical minds. In 1868, Darwin explained that our emotions are influenced by electricity[9]. He showed that behind (Q)ED, through QM, there is a connection between our minds (feelings) and electricity. Hence, this author believes that feelings, such as logic and sense – in terms of the mind or non-physical heart (a person's attitude or character) – usually refer to electrical current generated inside our own bodies. Conscious force always works on all entities. This is because all matter can be considered to be conscious.[10] The double-slit experiment is an example of the relationship between the spirit and QG through QM. As such, this author believes consciousness or the spiritual mind is connected to gravity. Putting it another way, one might consider the conscious mind as the non-physical part of a person's spirit after death.[11] All of the above show us that QM connects body, mind, and spirit with QCD, ED, and QG, respectively. In addition, QCD, ED, and QG are themselves interconnected through QM.

Thus, QM plays analogically the same role as set theory in this author's rationalization of Penrose's Three Worlds Theory. The periodic table can be expressed in Fourier terms of (brain) wave functions (ontological mathematics).[12] Therefore, this author believes that QCD among chemical elements can also be represented by ontological mathematics. To be more precise, chemical elements that work under QCD link well within the mathematical world. The wave functions (sine and cosine) perfectly depict all of the world's matter, meaning that it is possible to connect ED theory with the physical world through ontological mathematics. This is because the six basic elementary boson particles can only be photons (Hockney, 2015) together with electrons best describe the model of our physical elements. If the ED theory connects the physical world through (brain) wave functions, even electrons can be expressed as wave functions. Brain waves are associated with our physical brain. However, there are also "mind waves" which connect our dimensionless minds with our non-physical minds[13]. Electromagnetic (EM) waves or true light waves can be linked with brain waves. Moreover, photons are carriers of EM forces or, in other words, the forces of ontological mathematics – the mental forces of the monadic mind. This author proposes that QG is associated with the mental aspect of Penrose's Three Worlds Theory through wave functions (or Euler's "God's equation"). Hence, QCD, ED, and QG are connected to the mathematical, physical, and mental aspects of the Three Worlds Theory. In other words, because the strong (weak) force is explained by QCD, electromagnetic force is explained by ED, and gravity is explained by QG, it can be philosophically unified under a single theoretical framework, that of Roger Penrose's Three Worlds Theory, QM, and the ontological mathematics behind it. An outlined proof of unified field theory is thus obtained, however not in abstract mathematics. One can even go a step further and create a theory of everything. These philosophies can be generalized into the study of our universe's origin and of cosmology. In addition to rationalization, this paper also provides evidence showing that it is possible to practice Penrose's philosophy in the real world through the aforementioned experiments. These being examples of direct realization of such a philosophy.[11-19] Figure 7 summaries How our mathematical, physical, and mental worlds are connected to the body, mind, and spirit, together with the Four Fundamental Forces of Nature (electromagnetic, gravitational, strong nuclear force, and weak nuclear force).

The Beauty Behind QM Assumptions

It should be noted that Einstein proposed his gravitational and general relatively theories by assuming the space-time continuum. However, according to this author's master's thesis (2014–2015, HKU[14]), even the cultural continuum model can be disproved. In fact, this can also be extended to astronomy. If true, our assumptions about the space-time continuum would prove to be incorrect. That is, Einstein's gravitational theories may be wrong or at least need modification. While general relativity predicts gravity very well through curved space time, it fails at the atomic level. According to modern QM, atoms are somehow quantized. This allows for prediction of the atomic world. These two fields of study give rise to the question: "Will objects be attracted by electromagnetic force in the same way as the gravity of a nearby planet?" However, this leads to a subsequent question as to whether physicists should try to unify all of the natural forces. To unify both general relativity and the atomic level, the universe must be assumed to be discrete. This results in loop QG – a QG theory that attempts to link Einstein's theory of general relativity with QM. Although loop QG assumes that the universe is discrete, Pithis (2019) believes that discreteness can be seen as a form of mathematical tool. Hence, the continuum path integral can be transformed into a discrete form. In practice, we can use programmable logic controller (PLC) for the interchange between continuous time series and the discrete quantity or the converse. However, one flaw in loop QG is that the spin network does not incorporate any time dimension. Crucially, this theory has not been subjected to any experimentation as of yet. It is worth noting that there is another possible means of unifying general relativity and QM that of assuming there is a five-dimensional universe instead of four-dimensional space-time. However, the case of higher dimension is still controversy.

The recent discovery of the ×17 particle or even a new quantum field – fifth force carrier shows the possibility in the existence about the fifth dimension, c.f.

Indeed, to handle the high dimensional space, one may need to employ the famous string theory which suffices to the defect that it leaks the ability to handle the matter of quantization. To solve the problem, the

loop QG theory may be applied. As both of the string and loop QG have their own deficiency, this author's proposed that suggestion is to employ a mixed or hybrid way of these two theories for solving the dispute. The last point that this author wants to mention is that mathematics seems to be more fundamental than the QM since all of the related equations or models are based under the subject – mathematics. Indeed, the practical implication of this paper is the rationalization of QM (or the relational QM) that gives rise to the visualization of chemical catalyst reaction. The result may thus help us develop next generation drugs for various diseases.

CONCLUSION

Roger Penrose's three-world philosophy can be experimented or observed (and maybe even proved) in the real world. Quantum theory is analogous to set theory in this special rationalization of Roger's three-world philosophy on the subject of physics. This event can experimentally conclude the quantum nature of our mind. We may even build a quantum robot by the use of the quantum mind that controls the quantum computer as an example (Zizzi, 2008). Furthermore, one may even apply my HKLam Theory (a type of futurism) in the simulated prediction of flipping a quantum coin (Gu *et al*., 2018, and Lam Jan, 2019). The implication is the establishment of a practical memorization system for the quantum computer. One can then verify the proposition through different QCD, quantum ED experiments as mentioned in the previous sections. While one may observe the effects of graviton – loop QG through my suggested three experiments (or observations), although the concept – loop QG itself has not been proved or disproved. In this sense, QM can correlate all of the well-known natural forces in the field – philosophy of science or the assumption in the fact that electrons do exist (except the most newly discovered fifth force which needs more investigations about the X17 particles or the fifth dimension). To be precise, when the electron and graviton conjectures are accepted, one will get my aforementioned elegant and consistent "quantum mechanics can link all-natural forces" outcomes (to be more precise – the quantum fields or even the mathematical models/equations behind). All these experiments and observations have led to go ahead a step that: There is a unifying theory behind Einstein's gravitational theory and QM that is yet to be discovered. Based on the depicted picture in outlining unified theory (from Roger's philosophy), one may further extend the theory into a unified theory of everything. It can help us to understand some current hot topics in physics such as dark energy, early universe, and black holes or even time machine. One of the implementations from black hole's research is the propulsion engine. The mechanism is based on the pair creation model[15] or the Penrose process. Hence, human beings can travel freely in the universe space. However, as this author has mentioned at the beginning of the paper, the application of such new technology requires time to develop and becomes popular. This is because the pair-creation model has been developed for over 30 years but not yet have a practical and efficient spacecraft propulsion engine for a long-distance universe space travel.

Finally, this author believes the existence of the creator God. If one applies this author's proposed HKLam Theory, one may have the probabilities for those cosmology constants which correspond to the domino sequences of our present universe. However, one may get another probability for other cosmology constants which relate to another form of the universe (such as without life form). Conversely, from the observation of our universe, one may find out different cosmology constants w.r.t their corresponding probabilities. Hence, one may show the existence of the creator God. This is very interesting for people who study the origin of life such as the theory of creationism and evolutionism. Then, last but not least, based on Roger's three-world philosophy and my hypothesized realization, all experimental evidence, detections, and observations may also be extended into the religion sense in Christianity – Father: Jehovah, Son: Jesus, and the Holy Spirit. Or one may have the theory of Trinity.

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