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Unconventional reconciliation path for quantum mechanics and general relativity

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Abstract

Physics in general is successfully governed by quantum mechanics at the microscale and principles of relativity at the macroscale. Any attempts to unify them using conventional methods have somewhat remained elusive for nearly a century up to the present stage. Here in this study, a classical gedanken experiment of an electron-wave diffraction of a single slit is intuitively examined for its quantized states. A unidirectional monopole field as quanta of the electric field is pictorially conceptualized. Its application towards quantum mechanics and general relativity in consistent with existing knowledge in physics paves an alternative path towards their reconciliation process by assuming a multiverse at a hierarchy of scales. Such an outcome provides an approximate intuitive guide to pursue physics in general from alternative perspectives using conventional methods.

Keywords: monopole, quantum mechanics, general relativity, multiverse

1. Introduction

Since the 1900s, knowledge acquired in increments for the microscale over the decades with the advancement of proper experimentations has come to successfully form what is known today as quantum mechanics. The scale is defined by Planck's constant, h of minimal energy whereby a particle possesses wave-particle duality while observation of its position offers a level of indeterminacy. In the same era, Einstein developed his relativistic theories that came to revolutionize physics for the macroscale by successful integration of Newton's theories of motion and gravitation amongst others. Overtime, experimental findings and theories have evolved to affirm the accepted general knowledge in both quantum mechanics and relativity as the two pillars of physics at two extreme scales. So far, any attempts to unify them using conventional methods in both experiments and theoretical applications since earlier attempts of Einstein [1] has somewhat remain elusive for nearly a century up to the present stage. Here, in this study, an unconventional approach is considered for the reconciliation process of quantum mechanics and general relativity.

A classical Einstein's gedanken experiment of an electron-wave diffraction of a single slit [2] is pictorially examined for its quantized states. Condensed electric field, $\mathbf{E}$ of the wave diffraction generates a unidirectional monopole field (UMF) as its quanta [3] and this is dissected linearly along inertia frames of magnetic field, $\mathbf{B}$. For the microscale, each frame is converted to Bohr orbit (BO) in perpendicular to $\mathbf{E}$. A particle in orbit within the UMF background is naturally quantized and this insinuates the emergence of a monopole pair (MP) of an elliptic shape. Its application to quantum mechanics and relativistic theories is able to integrate many of their features into proper perspectives in consistent with existing knowledge in physics. This

considers a multiverse at a hierarchy of scales where interaction with light travelling along a straight path is sustained. These descriptions pave an alternative path for the reconciliation process of quantum mechanics and general relativity. If considered, the proposed MP model offers a dynamic intuitive tool that can be applied to explore physics in general from alternative perspectives using conventional methods.

2. Conceptualization process of a MP model

The conceptualization path of the MP model is attempted from a classical gedanken experiment of an electron-wave diffraction of a single slit. First, the process is devised using pictorial demonstrations. Second, the model is validated by applying a generalized renormalization process in consistent with existing knowledge in physics. Third, its notable limitations are examined with suggestions offered on how these can be intuitively improvised from general knowledge of physics applications. The final outcome offers a dynamic intuitive tool and this is applied to examine physics in general from the microscale to the cosmic level wherever applicable.

2.1. A pictorial demonstration

An observer at a slit sees ripples of spherical waves receding into forward time for an emitting electron source (Fig. 1a). The electron possesses both isospin, I_z and energy-momentum, Φ .

Upon expansion, the former is projected as arrow of time, $\vec{I}$ in asymmetry of unidirectional and

Figure 1. A step by step conceptualization path of the MP model. (a) Expansion of electron-wave diffraction from an electron source in a single slit set-up towards detectors A and B. (b) In 2D space, condensed wave diffraction offers symmetry-breaking of a Higgs mechanism type (yellow curve) that

generates UMF (green loop). Conservation is epitomized by the wave function, λ and this is connected by an octet shape along straight paths defined by time dilation, $I_{z\parallel}$ to lightspeed. (c) The elliptic shape generates a MP where the principle axis is comparable to $\vec{l}$ in asymmetry with reference to the electron source. The generated orbitals mime the UMF background in thermal equilibrium. These are quantized linearly along inertia frames of **B** into 3D space as BO types in degeneracy, n_i towards extra dimensions. (d) Space-time dynamics of the MP model. In 2D space-time, a classical particle with spin (green circle) is in orbit of an elliptic plane of a MP into forward time (grey arrows). In 3D space-time, precessions of a subatomic particle (black dot) and orbitals (pink dotted lines) are normalized (blue wavy curve) in accordance with relativistic theory, $E = mc^2$ whereby the particle's motion in acceleration cannot be distinguished from lightspeed. Thus, an inertia frame of BO defined by $I_{z\parallel}$ sustains the equivalence principle of gravitation mass of the particle is equivalent to its inertia mass. Minimal energy for a precession state of the orbitals is projected outwards and this is comparable to $\hbar$ as the boundary of the MP. Length contraction of BO into 4D space-time with reference to $\vec{l}$ in asymmetry is defined by $\hbar$ (pink area) and $n\hbar$ in reversal form towards extra dimensions. Thus, the boundary of the MP is quantized (green loop) while a classical path (elliptic shape) is of uniformity in flat space. In situ observation eliminates $\hbar$ of minimal energy towards a n -level where the corresponding BO forms a light cone shape of length contraction towards singularity at the source. The cones indicate superposition states, $\pm \frac{1}{2}$ magnetic spins in accordance with the direction of the MP (blue arrows) in precession mode (green arrows) into forward time. These descriptions offer the dynamics of a spherical electron cloud model (grey area) into 4D space-time in flat space.

the latter to inertia frames of **B** along straight lines. The condensed boundary of **E** evolves into a UMF and this is defined by $\hbar$ in perpendicular to the frames. The frames are converted to BOs in time dilation, $I_{z\parallel}$ to $\vec{l}$ so that the minimal difference is given by $\hbar$ (Fig. 1d). Within a MP, the emergence of orbital structures somewhat appear in thermal equilibrium to the UMF

background. Because conservation is assumed, any outgoing radiation for the microscale is governed by Planck's law, $E = nh\nu$ with n attained along BO and ν is frequency so that time reversal symmetry is broken. These descriptions including space-time dynamics and principles of relativity are intuitively incorporated in Fig. 1a, b, c and d in a step by step process towards the conceptualization process of a MP model. The final product is dynamic and it resembles an electron cloud model in 4D space-time where its compatibility to a renormalization process and limitations are intuitively examined.

2.2. A generalized renormalization process

Mathematically, the conceptualization path of the MP model is examined in accordance with common knowledge in physics. Commencing from the electron source towards the generation of space-time, the process generates triple integral in the following manner

$$\int_{-\infty}^{\infty} dI_z d\phi \rightarrow \int_{-\infty}^{\infty} \int_0^{\pi} nI_{z\parallel} d\phi d\Omega \rightarrow \int_{-\infty}^{\infty} \int_0^{\pi} \int_0^{2\pi} nI_{z\parallel} d\phi d\Omega d\theta \quad . \quad (1)$$

The boundary of UMF is normalized to 2π for a spherical electron cloud model and hence, $\hbar$ to accommodate minimal precession defined by h (Fig. 1d). $I_{z\parallel}$ refers to time dilation attained inertia frames of BOs at n -levels in reference to $\vec{l}$ or principle axes of the MP in asymmetry (Fig. 1d). A particle's position in orbit into 3D space is defined by spherical polar coordinates (Ω , Φ , θ) with Ω equal to precession stages, Φ is energy momentum of BO and θ is azimuthal angle between $I_{z\parallel}$ and $\vec{l}$ with respect to singularity at the electron source. This sustains relativistic

theory where the particle's motion in orbit is indistinguishable to lightspeed. Increase in applied energy at more than $\hbar$ to the BOs into extra dimensions produces a 4D space-time of light cone (Fig. 1d). Alternatively, the particle's position is defined by $i\hbar$ with i equal to a complex number along an orbital path. Normalization of Equation 1 then takes the form

$$nI_{z\parallel} \int_{-\infty}^{\infty} d\Omega d\phi d\theta = 1 \quad (2)$$

where the integral incorporates the path covered by the particle in orbit and this is of invariance mode for the MP. From first principle of quantum wave function, a particle's position at the intersection of a BO and MP (Fig. 1d) is defined by Hamilton-Jacobi relationship in the form

$$nI_{z\parallel} = abc\Omega \sin\theta \quad . \quad (3)$$

The parameters abc represent lengths of semi-principal axes that identifies with a BO (Fig. 2).

Renormalization then takes the standard form

$$\frac{a^2}{x^2} + \frac{b^2}{y^2} + \frac{c^2}{z^2} \leq 1 \quad (4)$$

where volume of the ellipsoid is given by, $v = \frac{4\pi abc}{3}$. Projection of BO into extra dimensions along x -axis in asymmetry produces quantized states at n -levels (Fig. 2). Thus, Equation 3 can also be expanded into the form

$$dxdydz = abc\Omega^2 \sin\theta d\Omega d\Phi d\theta \quad (5)$$

where Ω^2 represents either the precession stages of the MP for the classical level or an orbital for the subatomic state. This further supposes that the particle would exhibit superposition states, $\pm \frac{1}{2}$

Figure 2. A MP in 4D space-time. The sphere along z-axis/ $I_{z\parallel}$ is comparable to a BO while x-axis identifies with $\vec{l}$ in asymmetry.

spins (Fig. 1d) while locating its position sustains Heisenberg uncertainty principle, $\Delta x \Delta p \geq \hbar/2$ in order to accommodate both classical and atomic states. De Broglie's wave function, $\lambda = h/p$ is also applicable with h demonstrated in Fig. 1d and $p = mv$ (i.e., v is velocity for the particle's motion in orbit and m is its momentum in relation to BO and with reference to $\vec{l}$ or principal axis of MP in asymmetry). The magnitude of the wave function, Ψ is depended on the mass of a particle interacting with light travelling along a straight path. This is given by Born's rule in the generalized form

$$nI_{z\parallel} \int_{-\infty}^{\infty} \Psi^* \Psi d\tau = 1 \quad (6)$$

where $d\tau = dx dy dz$. Equation 6 holds true from first principle where Ψ is applicable to all constants related to observations of the microscale and this forms the basis towards physical derivation of Schrödinger equations. Because Ψ is physical, external light application and its interaction with BOs along x -axis (Fig. 2) or in parallel lines may produce standing waves in 3D space in a continuum mode of the type

$$\Psi = A \sin \frac{2\pi x}{\lambda} \quad \text{or} \quad B \cos \frac{2\pi x}{\lambda} \quad (7)$$

where A and B are constants that define the magnitude along z -axis. These descriptions allude to conservation of electromagnetic field for a possible spherical electron cloud model in 4D space-time and this somehow translates to a MP model.

2.3. Limitations

The constraints posed by the MP model unfortunately cannot be readily assessed with studies related to conventional methods due to the unconventional path adapted in this study. However, this does not automatically disqualify the process for a number of reasons. For example, many aspects of quantum mechanics such as entanglement and probabilities during measurements still remain counterintuitive and these cannot be easily resolved and put into proper perspective

strictly using conventional methods despite the advancement of instrumentations and theories made over recent years [4]. Alternatively, the Standard Model theory of particles physics has been quite successful in integrating electroweak force, weak and strong nuclear forces with the discovery of Higgs boson being its pinnacle. However, beyond that the model appears inadequate to accommodate quantum gravity, dark matter, dark energy amongst others [5] while physicists have adapted to the adage of ‘shut up and calculate’ ethos. With other options still being considered such as string theories and quantum loop gravity, the approach undertaken in here though it is mostly unconventional, this is pursued in accordance with existing knowledge in physics and general perceptions of the physical world in order to avoid it being metaphysical. In this case, two of its major limitations are listed below.

First, is the apparent question of what powers the precession mode of the model into forward time in a perpetual motion and in turn violate the laws of thermodynamics? With h being projected outward at the boundary of the MP (Fig. 1d), this reconciles well with a black body radiation while the electromagnetic field is conserved. Regression of $\vec{l}$ in asymmetry of unidirectional towards singularity is progressively slowed due to precessions of both MP and orbitals into forward time while gravitation force remains negligible for the microscale.

The second question arises from why is the precession mode not readily observed during measurements? Suppose the boundary of the MP is posed by h at the microscale, light interactions with BOs into extra dimensions along straight paths of unidirectional sustain relativistic theory (Fig. 1b and d). Increase in applied energy renders quantized states for the inertia frames of BOs irrespective of a particle’s presence such as those observed in the emission spectrum of hydrogen. In this case, in situ observation for the structural form of the MP model in 4D space eliminates h at the boundary and this is expected to produce either light cones or wave

function of one-electron atom such as hydrogen by substituting it for the electron source. So for a multielectron atom, the number of MPs is expected to increase in correspond to complex orbital structures at $\geq$ d-orbital types in order to accommodate electrons probability distributions.

Although there might be other limitations overlooked, the above descriptions offer a dynamic intuitive tool of a MP model. By employing this conceptualized model, physics in general is explored from alternative perspectives. The process is attempted first in order to collate and link together a number of diverse physics themes into proper perspectives at both the microscale and the cosmic level. The outcome is expected to pave an alternative path for the reconciliation process of quantum mechanics and general relativity and this can be further explored using conventional methods perhaps in incremental steps.

3. MP model versus symmetry

Symmetry at the fundamental level is governed by Noether Theorem and this assumes energy conservation. So far, without any evidences of supersymmetric partners or microscale black holes being generated at CERN's Large Hadron Collider [5, 6], symmetry is not well defined in terms of linking them to our intuition of the physical world. While its investigation is an ongoing process, an intuitive demonstration of symmetry of $\pm \frac{1}{2}$ spins from Fig. 1d is expounded in Fig. 3a. By assuming a multiverse at a hierarchy of scales, the process is applied to the solar system (Fig. 3b). Perhaps, the major differences between the two scales are that the area of the applied external light during observation is greater than the object of interest while classical time is of no essence for the quantum state. This sustains relativity where a particle gravitation force cannot be

Figure 3. The applicability of MP model to symmetry for a multiverse at a hierarchy of scales. (a) Within a MP of an elliptic type, a particle extracted in an upward direction at position 1 generates $+\frac{1}{2}$ spin and vice versa in a downward direction at position 2 for $-\frac{1}{2}$ spin. Precession stages into forward time are normalized for matter (blue dotted curve and arrow) and time reversal for antimatter (brown dotted curve and arrow) and this possibly produces wave functions of probability distributions (e.g., Equation 6). Because $\vec{l}$ for the MP is in asymmetry (blue arrows), a particle exits as its own antimatter while there is a level of uncertainty towards determining its position into space. (b) Similar scenario is perhaps applicable to the solar system such as for Mercury's orbit in 3D space-time [7]. Due to the scale, perhaps classical time allows for observation of shifts in precessions for a monopole field while the other part of the MP remains hidden. For the planet at position, X^+ , its antimatter X^- assumes an apparent position for the hidden part and this is not shown according to spatial distance. Ω = states of precession, ω = perturbation of angular velocity and ϕ = is the measure of magnetic flux from BOs that crosses the area between two precession stages with reference to singularity.

easily differentiated from lightspeed (e.g., Fig. 1d). At the macroscale, it is envisioned that reflected light rays are less than the area of the planet where classical time allows for observation of a monopole field with the other part of the MP hidden (Fig. 3b). Shifts in precessions are depended on the planetary rotation time about the sun and thus, it is difficult to normalize them into a wave function compared to a microscale. How this is attained by geodesic motion to initiate a possible renormalization process is explored later in the text when dealing with general relativity. In the next section, the model's relationship to various themes of physics is briefly plotted.

4. MP model versus various aspects of physics

There are a number of themes in physics that can be intuitively assessed from alternative perspectives by applying the MP model as an intuitive guide. Such a process can complement well conventional methods in order to integrate subthemes into proper perspective. Some of them are listed below in bullet points.

- *Hydrogen atom*: If the electron source is substituted for hydrogen atom, the minimal energy at the Planck's scale (Fig. 1d) would relate to zero-point energy of a vibration spectrum. Then the vibrational modes into extra dimensions at n -levels would mime degenerate BOs (Fig. 1c) with their link to the orbitals (Fig. 1d) providing rotational modes. Due to precessions of the MP into forward time of an electron cloud model, complex orbital structures for the wave function of hydrogen can be explored as mentioned earlier.

- *Fermions*: Particle and antiparticle positions of probabilistic distributions within the MP for the subatomic level (Fig. 3a) can somehow relate to fermion types. Suppose Weyl fermions are accorded to the cone shapes (Fig. 1d) then Dirac fermions becomes applicable at degenerate states of BOs along a straight path while the orbitals linked Majorana types where a particle exists as its own antiparticle (e.g., Fig. 3a).
- *Statistical mechanics*: Fermions and bosons are respectively described by Dirac-Fermion and Bose-Einstein relationships. These are related to matrix and algebraic mathematical formulations and these can be applied to the octet shape (Fig. 1b) of inertia frames of BOs into extra dimensions by incorporating the degenerate states. Maxwell-Boltzmann distribution is then accorded to precession stages of the MP into time forward (Fig. 3a) while $\mathbf{E}$ along $\vec{I}$ is perpendicular to BOs of $\mathbf{B}$ of unidirectional so a light path sustained electromagnetic waves. If the electron source mimes one-electron atom such as hydrogen, the above can perhaps be explored for either hydrogen molecules or helium atoms.
- *Zeeman effect and conductance band*: External application of a pair of strong magnetic fields linearly in contraction form on a UMF can induce Zeeman effects. For example, along z -axis/ $I_{z||}$ (Fig. 2), a semi-sphere of BO is induced these can produce superposition states of $\pm \frac{1}{2}$ spins from its degenerate states due to its connections to the orbital paths (Fig. 1d). Valence electrons freed from the annihilated outermost orbitals would then induce current flow while a Meissner effect is envisioned towards the source (e.g., Fig. 3a).
- *Classical electromagnetism*: Divergence of the monopole pair from the electron source due to electromagnetic radiation from the source is sustained for conservationism while any outgoing radiation is limited to Planck's scale. For a classical Maxwell point into

space (Fig. 1d), its position is defined by, $\nabla \times \mathbf{E} = -\partial \mathbf{B} / \partial t$ with ∇ equal to dipole moment for the MP of partial charges. How electromagnetism becomes applicable from light interaction is mentioned above.

- *Entanglement:* Here, it is envisioned that splitting of the MP is expected to regenerate the process so superposition of $\pm \frac{1}{2}$ spins is attained. In this case, linear coupling of MPs would produce qubits, 1, 0, -1 at a certain frequency of the electromagnetic radiation. Whether this can be processed in the absence of light as a transport medium poses interesting prospect for entanglement.
- *Standard Model:* Quantum field theory is based on fields and their excitations as quantized states or particles while sustaining special relativity and classical field theory. The framework of the MP model itself is dynamic and this can perhaps accommodate quantum field theory. For example, Higgs mechanism is attained in a constriction form towards the source while baryon octet (Fig. 1b) and decuplet diagrams (Fig. 1d) are accommodated into extra dimensions. The former in relation to descriptions provided for symmetry and this includes gravitation force related to Meissner effect implied above (Fig. 3a). The latter is comparable to a pair of cones with reference to singularity whereas classical electromagnetism is described above. Coupling of multiple MPs during collision process is expected to generate a plethora of particle types from degenerate states of BOs into extra dimensions (i.e., equivalent of leptons) akin to a Feynman diagram integral path. Applying these intuitions, gauge symmetry, $SU(3) \times SU(2) \times U(1)$ [8] and other related themes can be further explored.

5. MP model versus General Relativity

Relativistic theories in physics form the cornerstone for cosmic observations. Einstein's name is synonymous with their development and this involves more complex mathematical paths that are construed to generally agree with experimental findings. Similar approach is pursued here where relativity is intuitively applied to the conceptualized model in consistent with existing knowledge in physics (Fig. 1). In this section, general relativity is explored starting with a black hole followed by the solar system. Other notable cosmic themes such as Big Bang and redshifts are briefly outlined in the final subsection. Such undertakings are expected to shed new perspectives into these areas for further pursuits using conventional methods.

5.1 A black hole

For a multiverse at a hierarchy of scales, a black hole can exist as a quantum state of a galactic scale. In such scenario, the applicability of the MP model to a black hole is demonstrated in Fig. 4. Interaction with external light travelling in a straight path is attained along orbital paths where any outgoing radiation must first satisfy coherence at the event horizon before decoherence can take place. Perhaps, the latter may apply when high energy light waves such as gamma rays interact with the black hole at the event horizon. The outgoing radiations could generate fireworks, Hawking radiation type or even gravitational waves. The latter would perhaps mime precessions of a particle and antiparticle into forward time (Fig. 3a) comparable to a binary black hole merger [9] for minimal energy projected outward at Planck's scale (see also Fig. 1d).

For a person falling into the black hole, one may never get the chance to reach singularity if one's body becomes elongated or 'spaghettized' in precession stages into time forward. Perhaps the same applies for light absorption where $\vec{l}$ in asymmetry of reversal direction is progressively slowed down towards singularity. Using this demonstration, the applicability of the MP model to generality relativity for the solar system is examined next.

Figure 4. Application of MP model to a black hole. Interaction with light travelling in a straight path is expected to vanish where reversible time of $\vec{l}$ in asymmetry towards singularity is progressively slowed down into extra dimensions (green dotted loops). For decoherence (green wave function) of outgoing radiation, this must perhaps first satisfy coherence (black wave function) to smoothen out shifts in precession stages and overcome minimal energy at Planck's scale (grey area) within the event horizon (maroon circle). The outline of the MP is given by blue dotted shape for the simplest scenario (i.e., hydrogen atom) while its multiples is comparable to a multielectron atom. Blue arrows = time forward and green arrows = shifts in precessions.

5.2 The solar system in a multiverse

Based on Nebular hypothesis, the solar system evolved from a cloud of dust and gases immediately after the Big Bang. Suppose the planetary bodies evolved within a UMF of the sun, a likely scenario is presented in Fig. 5. In this case, whether the stability of the solar system into

Figure 5. The application of MP model to the solar system similar to a Rutherford planetary model. Apsidal precessions determine the extent of the quantized states (dotted lines) from the sun. Divergence of electromagnetic radiation from the sun (red curves and arrows) sustains $\vec{l}$ in asymmetry for the MP (black arrows). With conservation assumed, it might take a while to reduce the sun to a black hole state (Fig. 4). At the boundary (pale orange circle), minimal energy is released outward from shifts in precessions in accordance with 2nd law of thermodynamics. Note; the planets are not plotted according to size or type.

space is sustained from interactions with others of similar type remains an open question that is not pursued in here. Perhaps equal forces exerted by a MP in opposing directions and the

planetary orbitals in thermal equilibrium (see also Fig. 1) might sustain a solar universe that is accelerating in uniformity into space in accordance with Newtonian first law.

Based on Kepler's 2nd law, area covered by apsidal precessions of a planet's orbital are equivalent to its perihelion precessions within the vicinity of the sun. In 2D space-time, the orbit is of an elliptic plane (Fig. 5) and how progression in the shifts of its precessions applies in 3D space-time is demonstrated in Fig. 3b. In Fig. 6, Einstein's field equation of geometry [10] is intuitively applied to the MP model for a planet in orbit of the solar system. Such demonstration

Figure 6. An intuitive demonstration of how Einstein's field equation is incorporated into the MP model for a planet in orbit within the solar system. Geodesic motion (yellow curve) normalizes precession stages (orange dotted loop) of an orbital (blue arrows) to produce a cosmic wave function. Manifolds of tensor framework can be envisioned between the boundary posed by maroon circle and subsequent quantized states of BOs into extra dimensions with reference to the sun. Other features of relativity are offered in Fig. 1d. G = Newtonian gravity, $Rg_{u,v}$ = Ricci curvature tensor with other symbols provided in the text.

is in general agreement with the core principle of general relativity where matter curves space and space tells matter how to move. For example, shifts in precessions of the model determine how matter should move into space. In turn, gravitation force of the planet bends a ray of light traveling along a straight path to generate a geodesic motion. In the latter, a cosmic wave function is produced (Fig. 6) where Λ equates to both cosmological constant and Einstein's original interpretation [2] of it representing repulsion force for a static universe to balance out gravitational pull. The stress-energy tensor in flat space-time, $T_{u,v}$ is comparable to inertia frame of BO for the quantum state. The metric tensor, $g_{u,v}$ of space-time applies to the frames of a spherical electron cloud model in 4D space-time (Fig. 1d) for the solar system. In this case, Poincaré conjecture applies between the spherical boundary and BOs of octet shape (e.g., Fig. 1b). For a multiverse at a hierarchy of scales, the magnitude of Ψ for both the classical level and the microscale is defined by the mass of the object interacting with light (e.g., Equation 6). Applying such intuitions, the wave function physically provides a possible reconciliation path for quantum mechanics and general relativity and this is examined next.

5.3 A probable reconciliation path

Pictorially, the MP model offers a tangible path towards reconciling quantum mechanics and general relativity. To illustrate such a path using complex mathematical formulations appears unattainable for two main reasons. First, different aspects of physics covered in the conceptualization process cannot be combined into a single article using conventional method. Second, some aspects of physics such as space-time dynamics, superposition states, uncertainty

principle, entanglement amongst others are counterintuitive and more difficult to represent with abstract mathematical tools to suit our general perceptions of the physical world. Because of such reasons, the MP model appears to be an ideal intuitive tool to pave the reconciliation process in consistent with existing knowledge in physics. Thus, in here a crude mathematical path is demonstrated.

By incorporating Equation 2, the link between general relativity and quantum mechanics in 4D space-time becomes of the form

$$i \int_{-\infty}^{\infty} (dRdTd\Lambda)_{uv} \equiv i \int_{-\infty}^{\infty} (d\Omega d\phi d\theta)_{uv} \quad (8)$$

where i represents an accelerating object in an orbital where both forward and reversible directions are equal in magnitude. Equation 8 is purely geometrical in relation to the MP model from Fig. 1 and 6 representations. Similar correlation is made for a quantized state by incorporating Equation 6 and this is given in the expression

$$T_{u,v} \int_{-\infty}^{\infty} \left(R_{u,v} + \Lambda g_{u,v} + \frac{1}{2} R g_{u,v} \right)^2 dR_{u,v} \equiv n I_{z(u,v)} \int_{-\infty}^{\infty} \Psi^* \Psi d\tau_{u,v} \quad . \quad (9)$$

Equation 9 assumes geodesic motion is part of a cosmic wave function (Fig. 6) comparable to Ψ for the classical scale. For light interaction with an orbiting object into space-time, this defined by the relationship

$$(G\mathcal{H} - mc)_{u,v} \cong (i\hbar - mc)_{u,v} \quad (10)$$

where $\mathcal{H}$ is minimal energy of precessions akin to reduced Planck's constant, $\hbar$ for the quantum state (e.g., Fig. 1d). This supposes that the MP model is conserved similar to a black body while any outgoing radiations sustain special relativity, i.e., mc in accordance with 2nd law of thermodynamics. Conservation of matter then assumes the form

$$G\mathcal{H}_{u,v} \equiv i\hbar_{u,v} \quad . \quad (11)$$

Equations 10 and 11 imply that Newtonian gravity is localized to body into space while uncertainty towards defining the position of a planetary body is demonstrated in Fig. 3b. Thus, if Mercury's aphelion precessions are more pronounced closer to the sun into extra dimensions of BO then Pluto away from the sun is expected to exhibit minimal precession mode. In this case, when viewed along an ecliptic plane in 3D space, Pluto's orbit is expected to be out of phase with the rest of the planetary bodies [2]. In a similar manner, other cosmic themes are examined next.

5.4 Other related cosmic themes

Based on the alternative interpretation of general relativity offered above, it becomes a necessity to also expound on other related cosmic themes. However, these are not investigated into details but rather a possible path towards their pursuit is offered here from alternative perspectives by applying the MP model as an intuitive guide.

- *Big Bang theory*: The development of UMF (Fig. 1b) is figuratively of M-theory type and this incorporates $SO(10)$ of multidimensional structures. Similarly, it resembles symmetry breaking of a Higgs mechanism type towards higher dimensions. Thus, suppose Big Bang evolved from a primordial soup at a high hierarchy of scales, its progression towards the lowest level transits in the following manner, $SO(10) \rightarrow SU(5) \rightarrow SU(3) \times SU(2) \times U(1)$. The latter is of gauge symmetry for the quantum state and other immediate steps can be incorporated in between. For a multiverse, a literal Wheeler-Feynman one-electron-universe [11] becomes applicable at all scales and this can also mime with a cosmic microwave background radiation of an ellipsoid type as a possible limit of our universe.
- *Redshifts*: Aphelion precessions of large bodies in orbits into space-time produce redshifts in the form, $z = \frac{\lambda - \lambda_0}{\lambda_0} \propto d$ with λ as measured wavelength shift, λ_0 is reference wavelength and d is measured distance. Light interaction with precessions of a body into forward time may allude to an expanding universe in acceleration mode into distant space. Because of the scale, the position of the body shifts in orbit from a reference frame as defined by the Hubble constant. Precessions into forward time for a localized universe would fairly constrain blueshifts towards an external observer.

6. Concluding remarks

The unconventional method adapted in this study for the conceptualization process of the MP model and its application to physics in general provides one tangible path towards the

reconciliation process of quantum mechanics and general relativity. This assumes a multiverse at a hierarchy of scales with special relativity sustained at all levels while gravitation force is assumed localized to a body into space. Such intuitions somewhat remain speculative but the model is developed and applied in accordance with existing knowledge in physics and our general perceptions of the physical world. If considered, it can provide a valuable intuitive tool to complement conventional methods especially when attempting to integrate and consolidate many aspects of foundation physics into proper perspective both at the microscale and the macro level. This can provide the needed incentives to explore physics further into unknown realms.

Competing financial interests

The author declares no competing financial interests.

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Figures

Figure 1

A step by step conceptualization path of the MP model. (a) Expansion of electron-wave diffraction from an electron source in a single slit set-up towards detectors A and B. (b) In 2D space, condensed wave diffraction offers symmetry-breaking of a Higgs mechanism type (yellow curve) that generates UMF (green loop). Conservation is epitomized by the wave function, λ and this is connected by an octet shape

along straight paths defined by time dilation, $L(z)$ to lightspeed. (c) The elliptic shape generates a MP where the principle axis is comparable to L in asymmetry with reference to the electron source. The generated orbitals mime the UMF background in thermal equilibrium. These are quantized linearly along inertia frames of B into 3D space as BO types in degeneracy, n_i towards extra dimensions. (d) Space-time dynamics of the MP model. In 2D space-time, a classical particle with spin (green circle) is in orbit of an elliptic plane of a MP into forward time (grey arrows). In 3D space-time, precessions of a subatomic particle (black dot) and orbitals (pink dotted lines) are normalized (blue wavy curve) in accordance with relativistic theory, $E = mc^2$ whereby the particle's motion in acceleration cannot be distinguished from lightspeed. Thus, an inertia frame of BO defined by $L(z)$ sustains the equivalence principle of gravitation mass of the particle is equivalent to its inertia mass. Minimal energy for a precession state of the orbitals is projected outwards and this is comparable to h as the boundary of the MP. Length contraction of BO into 4D space-time with reference to L in asymmetry is defined by " $\hbar$ " (pink area) and " $n_i\hbar$ " in reversal form towards extra dimensions. Thus, the boundary of the MP is quantized (green loop) while a classical path (elliptic shape) is of uniformity in flat space. In situ observation eliminates h of minimal energy towards a n -level where the corresponding BO forms a light cone shape of length contraction towards singularity at the source. The cones indicate superposition states, $\pm 1/2$ magnetic spins in accordance with the direction of the MP (blue arrows) in precession mode (green arrows) into forward time. These descriptions offer the dynamics of a spherical electron cloud model (grey area) into 4D space-time in flat space.

Figure 2

A MP in 4D space-time. The sphere along z -axis/ $L(z)$ is comparable to a BO while x -axis identifies with L in asymmetry.

Figure 3

The applicability of MP model to symmetry for a multiverse at a hierarchy of scales. (a) Within a MP of an elliptic type, a particle extracted in an upward direction at position 1 generates $+1/2$ spin and vice versa in a downward direction at position 2 for $-1/2$ spin. Precession stages into forward time are normalized for matter (blue dotted curve and arrow) and time reversal for antimatter (brown dotted curve and arrow) and this possibly produces wave functions of probability distributions (e.g., Equation 6). Because $I \neq 0$ for the MP is in asymmetry (blue arrows), a particle exits as its own antimatter while there is a level of uncertainty towards determining its position into space. (b) Similar scenario is perhaps applicable to the solar system such as for Mercury's orbit in 3D space-time [7]. Due to the scale, perhaps classical time allows for observation of shifts in precessions for a monopole field while the other part of the MP remains hidden. For the planet at position, X^+ , its antimatter X^- assumes an apparent position for the hidden part and this is not shown according to spatial distance. Ω = states of precession, ω = perturbation of angular velocity and φ = is the measure of magnetic flux from BOs that crosses the area between two precession stages with reference to singularity.

Figure 4

Application of MP model to a black hole. Interaction with light travelling in a straight path is expected to vanish where reversible time of $I \propto$ in asymmetry towards singularity is progressively slowed down into extra dimensions (green dotted loops). For decoherence (green wave function) of outgoing radiation, this must perhaps first satisfy coherence (black wave function) to smoothen out shifts in precession stages and overcome minimal energy at Planck's scale (grey area) within the event horizon (maroon circle). The outline of the MP is given by blue dotted shape for the simplest scenario (i.e., hydrogen atom) while its multiples is comparable to a multielectron atom. Blue arrows = time forward and green arrows = shifts in precessions.

Figure 5

The application of MP model to the solar system similar to a Rutherford planetary model. Apsidal precessions determine the extent of the quantized states (dotted lines) from the sun. Divergence of electromagnetic radiation from the sun (red curves and arrows) sustains $I \propto r^2$ in asymmetry for the MP (black arrows). With conservation assumed, it might take a while to reduce the sun to a black hole state (Fig. 4). At the boundary (pale orange circle), minimal energy is released outward from shifts in precessions in accordance with 2nd law of thermodynamics. Note; the planets are not plotted according to size or type.

Figure 6

An intuitive demonstration of how Einstein's field equation is incorporated into the MP model for a planet in orbit within the solar system. Geodesic motion (yellow curve) normalizes precession stages (orange dotted loop) of an orbital (blue arrows) to produce a cosmic wave function. Manifolds of tensor framework can be envisioned between the boundary posed by maroon circle and subsequent quantized states of BOs into extra dimensions with reference to the sun. Other features of relativity are offered in Fig. 1d. G = Newtonian gravity, $R_{g_{u,v}}$ = Ricci curvature tensor with other symbols provided in the text.