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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 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 accordance 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 examine physics in general from alternative perspectives using conventional methods.

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1.0 Introduction

Since the late 1800s to early 1900s, knowledge acquired in increments for the microscale with the advancement of proper experimentations has come to successfully form a fundamental theory of the atomic state known today as quantum mechanics. An unexhausted list of scientists that contributed to the development of the theory during this period can be found in any common textbook. It was only during the 1920s that the theory was fully construed in what came to be widely known as Copenhagen interpretation, a phrase attributed to Niels Bohr and Werner Heisenberg. Other alternative interpretations of quantum mechanics such as Everett's many-worlds interpretations and few others exist but are not as popular as the previous one.

Coinciding with the development of quantum mechanics in which Albert Einstein also played a key role by defining the particle property of light, he also developed theories for both special relativity and general relativity. The relativistic theories somewhat came to revolutionize physics for the macroscale by successful integration of Newton's gravity among others. Over time, 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. To date, any attempts to unify them using conventional methods in both experiments and theoretical applications since earlier attempts by Einstein [1] have somewhat remained 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 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 with its motion constrained to a monopole pair (MP) of an elliptic shape or orbital type. Its application to quantum mechanics and relativity is able to integrate many of their features into proper perspectives 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. Similarly, Newtonian gravity is considered localized at the terrestrial scale. Such 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.

2.0 Conceptualization process of an MP model

The conceptualization path of the MP model is attempted from a classical gedanken experiment of 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 based on common 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 explore 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 . On expansion, the former is projected as an arrow of time, $\vec{I}$ in asymmetry and this is dissected perpendicularly by the latter along inertia frames of $\mathbf{B}$. The condensed boundary of $\mathbf{E}$ evolves into a UMF of multiple MP fields that encloses $\vec{I}$ at a minimal energy equivalent to the Planck's constant, h so that energy is conserved. The emergence of orbital structures within a MP field somewhat mimes a UMF background in thermal equilibrium. The dissecting inertia frames are converted to Bohr orbits (BOs) and this is defined by Φ within the MP field. These exist in time dilation, $I_{z\parallel}$ to $\vec{I}$ of unidirectional due to precession into forward time. Each precession stage obeys the Planck's law, $E = nh\nu$ with n attained along BO into extra dimensions and ν is frequency. In the process, time reversal symmetry is broken while conservation is sustained.

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 setup towards detectors A and B. (b) Unidirectional symmetry-breaking of Higgs mechanism type (yellow curve) insinuates the emergence of a MP field (gray area) in two-dimensional (2D) space-time. Multiple MP generates UMF (green loop) and this encloses an octet shape within a circular **E**. Coherence is epitomized by the wave length, λ for conservationism. (c) Emergence of orbital structures within the MP mimics the UMF background in thermal equilibrium. These are quantized along BOs of **B** in degeneracy into extra dimensions, n_i . (d) The MP field into 2D space-time is transformed into a 4D space-time of a hologram type where time is defined by precession (green arrows) into forward motion. The orbital structures of a particle (green circle) such as an electron are given by pink dotted lines at Planck's scale of approximately 10^{-34} cm. The wave function, Ψ (blue wavy curve) is of neutrino types and these can change flavors during precession. The electron transition between the orbitals from point $x \rightarrow \hat{x}$ (pink area) due to precession offers a level of uncertainty to its position and momentum. The MP field (white area) is bounded by continuous Ψ (green wavy loop) in

equilibrium with $\vec{l}$ (blue arrows) in asymmetry. Superposition of $\pm \frac{1}{2}$ magnetic spin (m_s) (navy colored cones) is attributed to precession in a circular motion. All these descriptions allude to the dynamics of a MP model or spherical electron cloud model (gray area) into 4D space-time in flat space.

Additional details including space-time dynamics are provided in the captions of Fig. 1a, b, c and d in a step-by-step process towards the conceptualization of the MP model. The final product mimics an electron cloud model in 4D space-time. This can be applied to either a one-electron atom such as hydrogen for a MP field or multielectron atoms for multiple MP fields where electrons are distributed in accordance with Pauli exclusion principle. In the following subsection, the model's compatibility to a renormalization process and limitations are explored.

2.2 A generalized renormalization process

In mathematical terms, the conceptualization path of the MP model can be conceived in accordance with common knowledge in physics. Commencing from the electron source towards generation of space-time, the process conceives a 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 the UMF is normalized to 2π for the spherical electron cloud model with minimal precession stage defined by h (Fig. 1d). $I_{z\parallel}$ as time dilation is attained along inertia

frames of BOs at n -levels in reference to $\vec{l}$ or principal axis of the MP field in asymmetry (Fig. 1d). Gravitational time dilation is accorded to the presence of matter at the intersection of two precession stages within the MP model. Further details are provided later in the text. The position of a particle in orbit into 3D space is defined by the 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. Increase in the applied external energy produces light cones along BOs at an n -level by expulsion of minimal radiation, h (Fig. 1d). 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, which is of time invariance for the MP. From the first principle of the quantum wave function, a particle's position at the intersection of a BO and MP (Fig. 1d) is defined by the Hamilton-Jacobi relationship in the form

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

The parameters abc represent lengths of semiprincipal axes of 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 the x -axis or alternatively $\vec{I}$ generates quantized energy states at n -levels (Fig. 2).

Figure 2. An MP of elliptic shape. The sphere along the z -axis/ $I_{z\parallel}$ is comparable to a BO, while the x -axis identifies $\vec{I}$ in asymmetry.

Alternatively, Equation 3 can be expanded into the form

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

where Ω^2 represents both the precession stages of both the MP and orbitals at the subatomic level. A particle existence is in a superposition state of $\pm \frac{1}{2} m_s$ due to continuous precession of a circular motion (Fig. 1d). The magnitude of the Ψ is depended on the size of the object

interacting with light along a straight path. For an MP, this follows Born's rule in the generalized form

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

where $d\tau = dx dy dz$ along a BO is accorded to $nI_{z\parallel}$. Equation 6 holds true from the first principle where Ψ is applicable to all constants related to observations at the microscale and this forms the basis for the physical derivation of Schrödinger equation. Because Ψ is deemed physical, external light application and its interaction with the MP model precessing into forward time (Fig. 1d) may produce standing waves in 3D space of a continuum mode. This is defined by

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

where A and B are constants that relate to the magnitude along the z -axis. Such descriptions allude to the dynamics of the MP model into 4D space-time. These become more apparent from explanations offered later in the text.

2.3 Limitations

An apparent question remains of what powers the precession mode of the MP model into forward time in a perpetual motion and in turn violates the laws of thermodynamics? By linking

h (at a value of 6.626×10^{-34} Joules per second) to precession (Fig. 1d), the proposed model somewhat resembles a black body radiation where the electromagnetic field is conserved. Quantum gravity at Planck's scale is then assumed negligible and it becomes part of the Ψ . Further details into how this is conceived are provided later in the text. Precession into forward time also breaks time reversal symmetry or constrains regression of $\vec{I}$ in asymmetry in accordance with 2nd law of thermodynamics. However, another critical question arises from why precession is not readily observed for the atomic or the microscale? The MP field possess $\vec{I}$ of opposing directions (Fig. 1d) and this balances out the rotational motion. In this case, shifts in the positions of the orbitals could perhaps relate to the Ψ of the hydrogen atom. From these explanations, the model's applicability to Noether theorem for conservation is examined before pursuing its relevance to physics at both the microscale and the cosmic level. For these undertakings, a conceptualized path is chosen by applying the MP model as an approximate intuitive guide.

3.0 MP model versus symmetry

Symmetry at the fundamental level is governed by the Noether theorem and this assumes energy conservation. Its applicability requires the existence of both matter and antimatter as first proposed by Dirac [3] in the process $e^+ e^- \rightarrow 2\gamma$. Evidences of antimatter are provided by the discovery of positron [4] and stern-gerlach experiment of $\pm \frac{1}{2} m_s$. Beyond that, other empirical evidences for the existence of supersymmetric partners or microscale black holes are still lacking [5, 6]. While these are still being investigated in ongoing research processes, an intuitive

demonstration of symmetry for $\pm \frac{1}{2} m_s$ offered in 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). Here,

Figure 3. The applicability of symmetry within the MP model for a multiverse at a hierarchy of scales into 4D space-time. (a) A particle extracted in an upward direction at position 1 offers $+\frac{1}{2}$ spin for precession into forward time (blue dotted curve and

arrow) and vice versa in a downward direction at position 2 (brown dotted curve and arrow). The orbital path undergoes perihelion precession with reference to the nucleus and it sustains Pauli exclusion principle. Observation of the particle offers Ψ_s of probabilistic distributions where there is a level of uncertainty towards determining its position and momentum due to precession. (b) A similar scenario is perhaps applicable to Mercury's orbit [7]. Due to the scale, complete observation of the shift in the perihelion precessions of the anti-field remains hidden to an external observer on Earth. X^+ represent matter (Mercury) and X^- is the apparent position for the antimatter. The latter is not drawn according to spatial distance. Ω = precession stage, ω = perturbation of angular velocity and ϕ = is the measure of magnetic flux of BOs into extra dimensions along straight paths between two precession stages.

conservation of energy, magnetic momentum, angular momentum and center-of-mass is sustained with respect to the nucleus. Perhaps, the major differences between the two scales are that the area of the applied light during observation is either greater or less than the object. For example, for the microscale, superposition of $\pm \frac{1}{2} m_s$ is attained in probabilistic distribution (Fig. 3a). At the macroscale, the reflected light rays are less than the area of the planet, so classical time allows for observation of a monopole field while the other part of the MP remain hidden (Fig. 3b). Such differences can also be viewed from an alternative perspective in the following manner.

The orbital precession for the microscale incorporates h (Fig. 1d). By contrasts, Mercury's perihelion precession of its elliptic orbit advances by 5,601 seconds of arc per century [2] for a body of a mass equal to 3.285×10^{23} kg. Suppose the arc equates to a Ψ , its emergence is at a rate of 56 seconds per year. This means the transition of the geodesic motion to a gigantic Ψ for a multiverse at a higher hierarchy of scales takes a longer time frame to evolve so that continuity is sustained for classical objects. Whether this explanation can also account for a discrepancy of 43 seconds predicted by general relativity [2] for Mercury's perihelion precession offers interesting prospect for further investigation. Such intuitions appear somewhat contrary to the prediction of quantum mechanics such as De Broglie relationship for classical objects, where the Ψ is considered to be negligibly small. As a consequence, the reconciliation path for quantum mechanics and general relativity using conventional methods has become fairly constrained with infinite mathematical terms. Similarly, quantum gravity at Planck's scale is rigorously pursued as the most probable reconciliation path. However, for this study, an alternative approach is considered by assuming a multiverse at a hierarchy of scales with special relativity sustained.

4.0 MP model versus various aspects of physics

By first establishing conservation and providing a rationale for the unconventional path adapted in this study in the preceding section, the MP model's applicability to both classical and quantum physics is further examined in here. Such a process is expected to integrate many aspects of physics into proper perspective. At the moment, this is lacking from current observations and theories without any forthcoming new insights despite the advancement of instrumentation made in recent times [8]. Similarly, the Standard Model theory of particle physics has quite successfully integrated the electroweak forces, weak and strong nuclear forces, with the discovery of the Higgs boson being its pinnacle of its final prediction. However, beyond that, the model appears inadequate to accommodate quantum gravity, dark matter, dark energy among others [5]. For these undertakings, the relevance of the model to existing knowledge in physics is demonstrated from an alternative perspective.

In Fig. 4, the applicability of the model to selected themes of physics is provided. Some of these include Planck's radiation, wave function collapse, Euler's formulation, Schrödinger equation, Bohr's model, electromagnetism and so forth. Their intuitive relations to the model are briefly described below in bullet points.

- *Wave function collapse:* A light beam travelling on a straight path and its interaction with a precessing MP model into forward time is not expected to register any signals in the absence of matter with uniformity sustained. The presence of matter (an electron in orbit) smoothenes out the precession stages of the MP field path to produce a physical Ψ and this translates to $E = h\nu$ at observation. The output signal further obeys De Broglie relationship, $\lambda = h/p$ and this diminishes with precession into forward time (Fig. 4). The

Figure 4. The presence of matter within the MP model insinuates a wave function, Ψ . This is available for detection due to light-matter interaction unlike the rest of the model's structural frame where uniformity is sustained (i.e., a wave function collapse scenario). How some of the major physics themes apply to this conceptualization process are incorporated and further explained in the text.

momentum, $p = mv$ is attained along BO with m equal to the mass of the particle and v is its velocity in orbit. The transition of the electron between two orbitals into space, i.e., $x \rightarrow \hat{x}$ mimes Born's rule, Ψ^2 of probabilistic distribution and this further incorporates h as mentioned above. The Heisenberg uncertainty principle, $\Delta x \cdot \Delta p \geq \hbar/2$ applies to the electron's position between the orbital pair and two precession stages of the MP field

(Fig. 4). Any translation of information from the MP model towards detection insinuates wave function collapse where λ is produced and this corresponds to $\hat{x}$ or the expectant value. The output signal diminishes with continuous precession. The energy transfer from the electron to the light (photon) also incorporates the quantum parameters such as quantum number (n), angular momentum (l), magnetic moment (m) and magnetic spin ($\pm \frac{1}{2} m_s$). Their applicability to the electron such as for one-electron atom like hydrogen is demonstrated in Fig. 4. For example, the n -level is related to the extra dimensions, l is defined by the orbitals, m is attributed to BO in degeneracy and m_s corresponds to the light cones for both the past and future terms. Continual precession is of the Euler's formulation and this offers a level of indeterminacy towards the electron's position, i.e., $i\hbar$ between the orbital pair from point $x \rightarrow \hat{x}$. Because of decoherence due to observation or interaction with the environment, the past is not equivalent to the future or vice versa. These intuitions further imply that the electron can pass through both slits in a double slit experimentation because its constant motion is conserved without ejection. In addition, whether the information gained by the photon from its interaction with the electron is either conserved or destroyed through decoherence poses an interesting dilemma worth noting for future considerations.

- *Bohr's model:* The orbital paths are quantized and their interaction with light for any outgoing radiation is defined by $E = nh\nu$ into extra dimensions (Fig. 4). With continual radiation in discreet form, the electron is not expected to spiral into the nucleus. The existence of a MP field would mime a one-electron atom such as hydrogen and multiple MP fields to multielectron atoms. Because the MP field is supported by opposing forces, i.e., $\vec{l}$ in asymmetry, this sustains equilibrium. Any observation of the precession

somehow translates to $\hbar$. Based on these explanations; the Ψ of hydrogen for complex orbital structures can be explored into extra dimensions. Similarly, Zeeman effect and other odd spin types should be investigated for degenerate BOs and their rotation due to precession into forward time.

- *Schrödinger Equation:* Based on Fig. 4, the position of the electron anywhere into extra dimensions is defined by the Ψ . In this case, the generalized equation, $i\hbar \partial/\partial t \Psi = \hat{H} \Psi$ also becomes applicable. The square root of -1 is given by i and this is incorporated into Euler's formulation while the application of $\hbar$ to the position of the electron is mentioned above. Change in time due to precession insinuates Ψ (Fig. 4). Such intuitions can be further explored for time independent and other related Schrödinger's equations.
- *Electromagnetism:* Based on the conceptualization process (subsection 2.1), the spherical boundary of the MP model is defined by $\mathbf{E}$ while its quantization along BOs in degeneracy is of $\mathbf{B}$. A particle such as an electron in orbit becomes of a classical Maxwell point into space. Shifts in its position due to precession are incorporated into the relationship, $\nabla \times \mathbf{E} = -\partial \mathbf{B}/\partial t$ with ∇ defined by the Ψ (Fig. 4). Time changes with precession and this in turn dictates the rotation of $\mathbf{B}$ while external light path in a straight line is sustained. External application of a magnetic field to compress the MP model is expected to insinuate the Casimir effect. Whether this can also shed some useful insights into the Meissner effect as in superconductors requires further investigations with $\hbar$ at Planck's scale attributed to the orbitals transition as mentioned above.
- *Entanglement:* Any splitting of the MP model is expected to regenerate the process described in Fig. 1. Continuous precession with the presence of matter would insinuate Ψ in discreet forms into extra dimensions where superposition of $\pm \frac{1}{2} m_s$ is sustained. This

offers a level of indetermination where linear coupling of a complementary pair of MP models or particles of $\pm \frac{1}{2} m_s$ is expected to produce qubits, 1, 0, -1 . Whether the process can be attained in the absence of light as a transport medium poses an interesting prospect for quantum entanglement.

- *Statistical mechanics:* Precession is defined by Ω (e.g., Fig. 3a and b) and this is in thermal equilibrium with the orbital structures (Fig. 4). Quantization of the orbitals along BOs provides the microcanonical ensemble for the entropy, S in the form, $S = k \ln \Omega$. The Boltzmann constant, k offers an approximate value to the distributions of both fermion and boson along BOs of degenerate states. Due to precession, this is attained in N -dimensions of Hilbert space where matrix and algebraic mathematical relationships such as for Dirac-Fermion and Bose-Einstein can be explored. Extension of the orbitals of the baryon octet shape (Fig. 1b) towards the nucleus offer decuplet diagrams to accommodate quark distributions. Such explanations can perhaps be examined for the Standard Model where the coupling of multiple MP fields during hadron collisions may generate a plethora of particle types from quantized states of BOs in degeneracy.
- *Further experimental pursuits:* In summary, it is envisioned that the MP model exemplified in Fig. 4 can be designed and experimentally tested. By building a gyroscope that resembles the flexibility and dynamics of the model in 4D space-time, its interaction with a light beam travelling along a straight path can be observed for a number of scenarios. 1) Lightspeed at less than the speed of the rotating gyroscope. 2) Lightspeed at almost equal to the speed of the gyroscope. 3) Lightspeed at faster than the gyroscope's speed. The successful outcomes of such undertaking can perhaps ascertain some of the quantum features described above and this warrants further investigations.

5.0 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 comply with experimental findings. Perhaps, a similar approach is pursued here for the conceptualization process in accordance with existing knowledge in physics. In this section, general relativity is explored starting with a black hole followed by the solar system. Other notable themes such as Big Bang and cosmic inflation are briefly outlined in the final subsection in order to pave a new future research path for their pursuits from alternative perspectives.

5.1 A black hole scenario

For a multiverse at a hierarchy of scales, a black hole may possibly exist as a quantum state of a galactic scale. In such a scenario, the applicability of the MP model to a black hole is demonstrated in Fig. 5. The rotation into forward time is defined by Kerr matrix while the extra dimensions indicate Schwarzschild property. Any interaction with external light travelling in a straight path is intercepted by the orbital paths. In the absence of matter, coherence of uniformity is sustained beneath the event horizon with minimal output of radiation for observational purposes (Fig. 5). For a multiverse, the output signal of the Ψ or probabilistic distribution is expected to be of gigantic λ depending on the size of the black holes. But because it takes a longer time frame (more than centuries) for the Ψ to evolve (see Section 3.0 for Mercury's orbit),

Figure 5. Application of the MP model to a black hole. Interaction with light travelling in a straight path is expected to vanish along orbital paths where $\vec{l}$ in asymmetry is sustained and time reversal symmetry broken. Without any output of signals, the light absorption is progressively slowed into extra dimensions (green dotted loops). Any decoherence (green wave length) of outgoing radiation must first satisfy coherence (black wave length) to smoothen out shifts in precession stages in order to overcome minimal energy (gray area) beneath the event horizon (maroon circle). This becomes extremely difficult to attain in the absence of matter to generate a geodesic motion. The outline of the MP is given by the blue dotted shape for the simplest scenario (i.e., hydrogen atom), while its multiples are comparable to a multielectron atom. Blue arrows = forward time and green arrows = shift in precession.

its constant interaction with light becomes progressively of gravitational time dilation. This limits any instantaneous outgoing signals and can perhaps account for the gravitational wave types observed [9] for a binary black hole merger. With continual precession, the outgoing

signals can become of light years. Such descriptions imply to the absence of firewall paradox and Hawking radiation at the event horizon. Comparably, a person falling into the black hole may never get the chance to reach singularity if one's body becomes elongated or 'spaghettized' along orbital paths into extra dimensions of forward time infinite. Any outgoing information would never reach the event horizon without external application of high energy waves such as gamma rays to overcome the coherent flow (Fig. 5). Without the presence of matter within its domain, it is unlikely for black hole to radiate from its interaction with light. These explanations to some extent constrain cosmic inflation since the Big Bang. Such a dilemma is outlined later in the text but first, the model's applicability to the solar system is examined with respect to the application of relativistic theories.

5.2 The solar system in a multiverse

Based on the Nebular hypothesis, the solar system evolved from a cloud of dust and gases immediately after Big Bang. Suppose the planetary bodies were formed within a UMF of the sun, a likely scenario is offered in Fig. 6. In this case, whether the stability of the solar system into space is sustained from interactions with others of similar type remains an open question that is not pursued here. Perhaps thermal equilibrium between the MP and UMF could stabilize the solar universe with this pattern repeated towards a higher hierarchy of scales for a multiverse.

Based on Kepler's 2nd law, the area covered by apsidal precession of a planet's orbital is equivalent to its perihelion precession within the vicinity of the sun. In 2D space-time, the orbit is of an elliptic plane (Fig. 6), while precession insinuates a 4D space-time in flat space as shown in Fig. 7. Here, Einstein's field equation of geometry or geodesic motion [10] is intuitively

Figure 6. The application of the MP model to the solar system is comparable to a Rutherford planetary model. The orbitals are quantized along straight paths (dotted lines) away from the sun. Divergence of the electromagnetic radiation from the sun (red curves and arrows) sustains $\vec{l}$ in asymmetry for the MP field in equilibrium (black arrows). The boundary (pale orange circle) depicts conservation where it might take a while to reduce the sun to a black hole scenario (Fig. 5). Any outgoing radiation is attained in accordance with the application of 2nd law of thermodynamics. Note, the planets are not plotted according to size or type.

applied for a planet in orbit about the sun. Such demonstration 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 precession of the MP field into extra dimensions determine how matter should move into space. In turn, the gravitation force of the planet bends a ray of light traveling along a straight path to induce a geodesic motion of a Ψ . This is of gravitational time dilation (Fig. 7), where Λ equates to both the cosmological constant and Einstein's original interpretation [2] of it representing the 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 Φ of the inertia frame of BO in degeneracy for the microscale (Fig. 1c). Quantization of the orbital paths along BOs provide metric tensor, $g_{u,v}$ into space-time. Such explanations somewhat intuitively relate extra dimensions of the MP model to the existence of dark energy and dark matter at a hierarchy of scales. Applying these intuitions, the possible link between the microscale and the cosmic level is plotted next.

Figure 7. The application of Einstein's field equation to the MP model for a planet in orbit within the solar system. Geodesic motion (yellow curve) normalizes the precession stages (orange dotted loop) of an orbital (blue dotted loop and arrows) to generate a cosmic Ψ . Manifolds of the stress-energy tensor ($T_{u,v}$) framework is applied to the object transition into extra dimensions comparable to quantized states of BOs at the microscale. Here, a 4D space-time in flat space is offered while the actual precession of the planet (e.g., Mercury) is demonstrated in Fig. 3b. G = Newtonian gravity, R = scalar curvature and $Rg_{u,v}$ = Ricci curvature tensor with definitions of other symbols provided in the text.

5.3 A probable reconciliation path

Pictorially, the MP model offers a tangible path towards the reconciliation process of quantum mechanics and general relativity based on the Ψ . Such a path is extremely difficult to plot using conventional method because of the diverse themes of physics covered in the conceptualization process of the proposed model and its application to physics in general as demonstrated in the preceding sections. For a crude mathematical path, this is given by first expanding Equation 2 into the form

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

where i represents an accelerating object in orbit and this is also incorporated into Euler's formulation (e.g., Fig. 4). The momentum of the object in both forward and reversible directions is of equal magnitude along the quantized states of BOs. Based on geometry relationship, Equation 8 provides the link between the microscale (Fig. 4) and the cosmic level (Fig. 7) through the Ψ . The correlation of the quantized states from Equation 6 is then given by 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 further considers the geodesic motion to be an intrinsic part of the cosmic Ψ . This may not be readily available for detection to an observer on Earth due to the scale and it takes a

longer time frame for the Ψ to evolve (see also Section 3.0). Constant interaction during initiation of the Ψ with light paths is expected to sustain special relativity, $E = mc^2$. Alternatively, observation of the geodesic motion of a planet into space can also be established by the relationship

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

where $\mathcal{H}$ equates to minimal energy of precession akin to $\hbar$ for the microscale. For Mercury, the equivalent of h value is about 3.71×10^{-30} Js (i.e., 6.626×10^{-34} Joules for every second and for about 5600 seconds in a century for the emergence of the arc or the Ψ). Because of the very slow rate for gigantic cosmic waves to evolve, a person on Earth may not be subject to collateral damage from outer space. For the Ψ would collapse before its build-up from external light interactions unlike the microscale (e.g., Fig. 4). Any outgoing radiation is attained in accordance with the 2nd law of thermodynamics at lightspeed for mass-energy equivalence, i.e., $-mc$ (Equation 10). Thus, matter into space sustains conservation and this is given in the form

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

by taking into consideration precession from point $x \rightarrow \hat{x}$ (see also section 4.0). Equation 11 sets the classical boundary of the terrestrial scale for the localization of Newtonian gravity by assuming a multiverse at the hierarchy of scales. Perhaps, the cosmic microwave background (CMB) sets the limit of the visible universe akin to a MP field. The spherical boundary of each universe and its quantization along BOs of the octet shape (e.g., Fig. 1b) can be pursued by

Poincaré conjecture. All these explanations further suggest that other cosmic themes can also be viewed from alternative perspectives and this is considered next.

5.4 Other related cosmic themes

Based on the alternative version of general relativity offered above, dark matter and dark energy are somewhat intuitively incorporated within a multiverse at a hierarchy of scales, where special relativity sustained. How the Big Bang and accelerated cosmic inflation fits into such perspective is briefly outlined below for further deliberation within the areas of astrophysics and cosmology.

- *Big Bang theory*: The conceptualized UMF (Fig. 1b) is figurative of the M-theory type and this somewhat incorporates $SO(10)$ of multidimensional structures. Its resemblance to Higgs mechanics of unidirectional is applicable to time reversal symmetry breaking into extra dimensions. Suppose the Big Bang evolved from a primordial soup at a higher 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 final state is of gauge symmetry for the atomic scale and other intermediate steps can be incorporated between the three stages. For the visible universe limit defined by the CMB, a literal Wheeler-Feynman one-electron-universe [11] becomes applicable. This can be applied to the conceptualization process of the Big Bang similar to the development of the MP model (Fig. 1). How these all fits into cosmic inflation is plotted next.
- *Cosmic inflation*: Precession of large bodies in orbits into space-time for localized multiverse is expected to produce redshifts in the form, $z = \frac{\lambda - \lambda_0}{\lambda_0} \propto d$ with λ as the

measured wavelength shift, λ_0 is the reference wavelength and d is the measured distance. Emission of the signals is expected from light interactions with the geodesic motion or $\mathcal{P}$ of the objects. The motion of the object along gigantic orbital paths would appear to portray expansion in accelerated form consistent with Hubble constant. Such a scenario is applicable to an external observer at a lower hierarchy of scales. In this way, blueshifts are fairly constrained. These explanations could apply to galaxies, stars, solar systems and others within the visible universe defined by the CMB of a MP field type and this warrants further investigations.

6.0 Concluding remarks

The unconventional method adapted in this study for the proposed 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 within the visible universe defined by the CMB where special relativity sustained. Newtonian gravity is also considered to be localized to a terrestrial scale for a large body orbiting into space. Such intuitions appear somewhat 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, the MP model provides a valuable intuitive tool that can complement conventional methods, especially when attempting to integrate and consolidate many aspects of foundation physics into proper perspective both at the microscale and the cosmic level. This may 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 setup towards detectors A and B. (b) Unidirectional symmetry-breaking of Higgs mechanism type (yellow curve) insinuates the emergence of a MP field (gray area) in two-dimensional (2D) space-time. Multiple MP generates UMF (green loop) and this encloses an octet shape

within a circular E. Coherence is epitomized by the wave length, λ for conservationism. (c) Emergence of orbital structures within the MP mimics the UMF background in thermal equilibrium. These are quantized along BOs of B in degeneracy into extra dimensions, ni. (d) The MP field into 2D spacetime is transformed into a 4D space-time of a hologram type where time is defined by precession (green arrows) into forward motion. The orbital structures of a particle (green circle) such as an electron are given by pink dotted lines at Planck's scale of approximately 10^{-34} cm. The wave function, Ψ (blue wavy curve) is of neutrino types and these can change flavors during precession. The electron transition between the orbitals from point Ψ (pink area) due to precession offers a level of uncertainty to its position and momentum. The MP field (white area) is bounded by continuous Ψ (green wavy loop) in equilibrium with Ψ (blue arrows) in asymmetry. Superposition of $\pm 1/2$ magnetic spin (ms) (navy colored cones) is attributed to precession in a circular motion. All these descriptions allude to the dynamics of a MP model or spherical electron cloud model (gray area) into 4D space-time in flat space.

Figure 2

An MP of elliptic shape. The sphere along the z-axis/ Ψ is comparable to a BO, while the x-axis identifies Ψ in asymmetry

Figure 3

The applicability of symmetry within the MP model for a multiverse at a hierarchy of scales into 4D space-time. (a) A particle extracted in an upward direction at position 1 offers + 1/2 spin for precession into forward time (blue dotted curve and arrow) and vice versa in a downward direction at position 2 (brown dotted curve and arrow). The orbital path undergoes perihelion precession with reference to the nucleus and it sustains Pauli exclusion principle. Observation of the particle offers ∞ s of probabilistic distributions where there is a level of uncertainty towards determining its position and momentum due to precession. (b) A similar scenario is perhaps applicable to Mercury's orbit [7]. Due to the scale, complete observation of the shift in the perihelion precessions of the anti-field remains hidden to an external observer on Earth. X^+ represent matter (Mercury) and X^- is the apparent position for the antimatter. The latter is not drawn according to spatial distance. Ω = precession stage, ω = perturbation of angular velocity and φ = is the measure of magnetic flux of BOs into extra dimensions along straight paths between two precession stages.

Figure 4

The presence of matter within the MP model insinuates a wave function, Ψ . This is available for detection due to light-matter interaction unlike the rest of the model's structural frame where uniformity is sustained (i.e., a wave function collapse scenario). How some of the major physics themes apply to this conceptualization process are incorporated and further explained in the text.

Figure 5

Application of the MP model to a black hole. Interaction with light travelling in a straight path is expected to vanish along orbital paths where $\Delta\lambda$ in asymmetry is sustained and time reversal symmetry broken. Without any output of signals, the light absorption is progressively slowed into extra dimensions (green dotted loops). Any decoherence (green wave length) of outgoing radiation must first satisfy coherence (black wave length) to smoothen out shifts in precession stages in order to overcome minimal energy (gray area) beneath the event horizon (maroon circle). This becomes extremely difficult to attain in the absence of matter to generate a geodesic motion. The outline of the MP is given by the blue dotted shape for the simplest scenario (i.e., hydrogen atom), while its multiples are comparable to a multielectron atom. Blue arrows = forward time and green arrows = shift in precession.

Figure 6

The application of the MP model to the solar system is comparable to a Rutherford planetary model. The orbitals are quantized along straight paths (dotted lines) away from the sun. Divergence of the electromagnetic radiation from the sun (red curves and arrows) sustains Δ in asymmetry for the MP field in equilibrium (black arrows). The boundary (pale orange circle) depicts conservation where it might take a while to reduce the sun to a black hole scenario (Fig. 5). Any outgoing radiation is attained in accordance with the application of 2 nd law of thermodynamics. Note, the planets are not plotted according to size or type.

Figure 7

The application of Einstein's field equation to the MP model for a planet in orbit within the solar system. Geodesic motion (yellow curve) normalizes the precession stages (orange dotted loop) of an orbital (blue dotted loop and arrows) to generate a cosmic Λ . Manifolds of the stress-energy tensor ($T_{u,v}$) framework is applied to the object transition into extra dimensions comparable to quantized states of BOs at the microscale. Here, a 4D space-time in flat space is offered while the actual precession of the planet (e.g., Mercury) is demonstrated in Fig. 3b. G = Newtonian gravity, R = scalar curvature and $R_{g_{u,v}}$ = Ricci curvature tensor with definitions of other symbols provided in the text.