Conformal Mapping from Spherical Earth to Flat Earth Brane in GRBMRS Cosmology

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Abstract

This paper presents a conformal projection of the classical Spherical Earth onto a Flat Earth brane B_{FE}, embedded within the GRBMRS cosmological model—an extended spacetime framework integrating Gödel rotation, Rindler acceleration, Brahe observational geometry, and Randall–Sundrum brane dynamics. The rotational axis of the GRBMRS universe intersects B_{FE} at the North Pole, which becomes the origin of the physical coordinate system. The conformal mapping preserves angular relationships, translating latitude and longitude lines into concentric circles and radial lines on the flat plane. This geometric embedding is further contextualized within the Trilok framework of metaphysical cosmology, consisting of the Physical, Subtle, and Meta-Physical Universes. We introduce models of the soul's trajectory as a Sedenion-valued infinitesimal entity, interacting with the rotating spacetime metric via perturbative couplings. Additionally, we analyze quantum tunneling of the Wheeler–DeWitt wavefunction across multi-well rotational potentials, proposing that electromagnetic fluctuations trigger cosmic rotation reversals, possibly linked to observed magnetic field flips. These findings unify geometric, quantum, and consciousness-based descriptions of cosmic evolution.

1 Introduction

Modern cosmology increasingly calls for integrative frameworks that link geometric, quantum, and metaphysical interpretations of the universe. In this paper, we explore a novel embedding of a conformally projected Earth model within the GRBMRS spacetime geometry. The GRBMRS metric incorporates rotational Gödel-like features, vertical Rindler acceleration to simulate gravitational effects, and a Randall–Sundrum-type warp factor in the extra-dimensional direction. The brane B_{FE}, identified as the Flat Earth surface, lies orthogonal to the rotational axis and represents the base layer of the Physical Universe in the Trilok model [35].

We define a conformal transformation that maps the Spherical Earth onto B_{FE}, positioning the North Pole at the origin and projecting meridians as radial lines and parallels as concentric circles. This transformation allows terrestrial phenomena—gravitational potential, magnetic field configurations, and atmospheric stratification—to be studied within a unified higher-dimensional spacetime. We propose that magnetic field reversals, typically recorded in mid-oceanic ridge basalts, may arise from rotation reversals (RR) of the GRBMRS universe, modeled as quantum tunneling events in an asymmetric potential landscape [37].

Furthermore, the soul is described as a point-like entity with a Sedenionic mass $m_{\mathrm{Soul}} \in \mathbb{S}_{16}$, whose geodesic evolution couples non-trivially to spacetime curvature and electromagnetic fields. This metaphysical formalism supports a soul-cosmology interaction embedded in the Wheeler–DeWitt equation, with consciousness dynamics realized through quantum phase transitions [36, 32].

2 Conformal Projection Method

Let $\mathbb{S}^2 \subset \mathbb{R}^3$ denote the Spherical Earth. We define a conformal map:

$$\Phi(x, y, z) = \left(\frac{x}{1-z}, \frac{y}{1-z} \right)$$

- The North Pole $(0, 0, 1)$ maps to the origin $(0, 0)$ on the Flat Earth.
- The South Pole $(0, 0, -1)$ maps to the boundary of the flat disc.

The transformation preserves angles but distorts area, resulting in:

- Meridians radiating from the center.
- Parallels forming concentric rings.
- The South Pole forming the boundary circle of the brane.

3 Physical Interpretation and Embedding

This mapping embeds the Earth-like surface into the horizontal brane B_{FE}, located between the Moho boundary and the Subtle Universe. It defines a localized coordinate system within the Physical Universe, suitable for modeling gravitational effects (via $\alpha(z) = z$) and consciousness anchoring in the GRBMRS rotational frame.

4 Atmospheric Stratification Above the Flat Earth Brane

In the context of the GRBMRS Universe, we define a layered atmospheric model above the Flat Earth brane B_{FE}, corresponding to the well-known atmospheric structure surrounding the classical Spherical Earth. Although the surface geometry is projected conformally, the vertical axis remains consistent, allowing altitudes to be preserved in the z-direction.

4.1 Vertical Preservation of Height

Let $z = 0$ be the height of the Flat Earth brane. For any atmospheric layer with classical spherical altitude h, we embed it at $z = h$ in the GRBMRS framework. Thus, the physical heights are preserved in the vertical direction, unaffected by conformal distortion on the surface.

4.2 Atmospheric Layer Correspondence

Spherical Layer	**Flat Earth Equivalent**	**Altitude (km)**	**Phenomena**
Troposphere	Flat Troposphere	0–12	Clouds, weather, aviation
Tropopause	Flat Tropopause	12–17	Boundary layer, jet stream
Stratosphere	Flat Stratosphere	17–50	Ozone layer, jet aircraft
Mesosphere	Flat Mesosphere	50–85	Meteor trails
Thermosphere	Flat Thermosphere	85–600	Auroras, ISS orbit
Exosphere	Flat Exosphere	600–10,000	Edge of atmosphere
Ionosphere	Flat Ionosphere	60–1000	Radio reflection layer

Table 1: Flat Earth Atmospheric Layers Aligned with Classical Altitude Bands

4.3 Physical and Metaphysical Interpretation

These atmospheric slabs can be interpreted both as physical domains and metaphysical transitions:

- Lower layers (troposphere to stratosphere) correlate with dense karmic activity and physical perception.
- Middle layers (mesosphere to thermosphere) link to altered states, dreaming, and subtle perception.
- Upper layers (ionosphere and exosphere) form the boundary near $B_{\text{SW-PU}}$, mediating transitions into the Subtle Universe.

4.4 Embedding Context

The atmospheric stratification overlays the Flat Earth brane B_{FE}, existing within the vertical space of the GRBMRS metric. This integration preserves scientific coherence while extending physical interpretation toward metaphysical and spiritual phenomena, in alignment with the broader Trilok cosmology.

5 Magnetic Field Correspondence Between Spherical and Flat Earth in GRBMRS Cosmology

We extend the conformal mapping from the Spherical Earth (SE) to the Flat Earth brane (FE) by establishing a pointwise correspondence between their respective geomagnetic fields.

This preserves both the direction and magnitude of the Earth's magnetic field through the projection.

5.1 Conformal Mapping Recap

Let $\Phi\colon \mathbb{S}^2 \to \mathbb{R}^2$ be the conformal map defined by:

$$\Phi(x, y, z) = \left(\frac{x}{1-z}, \frac{y}{1-z} \right)$$

Each point $P_{\text{SE}} \in \mathbb{S}^2$ maps to a unique point $P_{\text{FE}} \in B_{\text{FE}}$. The conformal nature of Φ ensures that local angles and vector orientations are preserved during projection, though area and distance are distorted.

5.2 Magnetic Field Projection

Let $\vec{B}_{\text{SE}}(P)$ denote the magnetic field vector at a point $P \in \mathbb{S}^2$. We define the corresponding magnetic field on the Flat Earth brane by:

$$\vec{B}_{\text{FE}}(P_{\text{FE}}) := \vec{B}_{\text{SE}}(P_{\text{SE}}) \quad \text{where} \quad P_{\text{FE}} = \Phi(P_{\text{SE}})$$

This implies that at every mapped point on the Flat Earth disc, the direction and magnitude of the magnetic field are identical to those on the corresponding point of the spherical surface. The pushforward of the vector field under Φ satisfies:

$$\Phi_* \vec{B}_{\text{SE}} = \vec{B}_{\text{FE}}$$

5.3 Physical Interpretation

This correspondence ensures that:

- Dipolar field structures are maintained across the transformation.
- Inclination and declination angles remain consistent at mapped locations.
- Geomagnetic navigation and flux phenomena on the Flat Earth are functionally equivalent to the classical spherical model.

5.4 Metaphysical Implication

In the broader spiritual geometry of the GRBMRS Universe and the Trilok model, the Earth's magnetic field may be interpreted as a vectorial karmic guide. Its directionality provides an underlying structure to samskaric flow, energetic alignment, and orientation of conscious states. The preservation of this structure in the Flat Earth projection symbolizes the continuity of spiritual guidance, even in geometrically transformed domains.

The geomagnetic field, when extended conformally to the Flat Earth brane, retains all essential directional properties. This field structure overlays seamlessly onto B_{FE}, providing a physical and metaphysical framework for navigation, orientation, and energy flow within the GRBMRS Physical Universe.

6 Emergent Magnetic Field on the Flat Earth Brane from GRBMRS Rotation

In this section, we interpret the non-uniform magnetic field observed on the Flat Earth brane B_{FE} as an emergent effect arising from the rotation of the GRBMRS Universe. Rather than treating the magnetic field as externally imposed or remapped from classical geometry, we derive it from the intrinsic structure of the metric tensor.

6.1 Rotational Dynamics in the GRBMRS Metric

The GRBMRS spacetime metric is given by:

$$ds^2 = e^{f(z)} \left[(\alpha(z)dt + H(t, r, \phi, z)d\phi)^2 - dr^2 - D(t, r, \phi, z)d\phi^2 \right] - dz^2$$

Key rotational components:

- $\alpha(z) = z$: introduces a Rindler-type gravitational potential along z.
- $H(t, r, \phi, z)$: encodes a rotation-induced coupling between time and angular coordinates.

The presence of an off-diagonal component:

$$g_{t\phi} = e^{f(z)}\, \alpha(z) H(t, r, \phi, z)$$

is analogous to the vector potential in electromagnetism and is responsible for inducing a gravito-magnetic-like field.

6.2 Magnetic Field Analogy

Using the formalism of gravito-electromagnetism, the effective magnetic field on the brane can be interpreted as:

$$\vec{B}_{\text{FE}} \sim \nabla \times \vec{A}_{\text{eff}} \quad \text{where} \quad \vec{A}_{\text{eff}} \sim H(t, r, \phi, z)$$

This field arises due to frame-dragging and rotational effects embedded in the GRBMRS geometry. The field observed on the Flat Earth brane is thus a projection of a higher-dimensional rotational momentum field.

6.3 Physical Implications

- The magnetic field is a geometric consequence of cosmic rotation.
- Its non-uniformity corresponds to the spatial variation of the rotation function H.
- Field lines and magnitudes can be computed directly from derivatives of H within the brane's domain.

6.4 Metaphysical Significance

The emergent field reflects more than a physical force: it symbolizes the soul's alignment with the rotation of the universe. The directionality of the magnetic field serves as a subtle compass guiding karmic flow, memory directionality, and sanskaric entanglement across branes. This aligns with the notion that the physical and metaphysical are inseparable in the GRBMRS–Trilok framework.

The magnetic field on the Flat Earth brane is not a remnant of classical field theory but an emergent feature of the rotating GRBMRS metric. This provides a unified framework where the geometry of spacetime naturally gives rise to vectorial fields guiding physical and spiritual orientation alike.

7 Magnetic Field Reversals from Cosmic Rotation Reversals in GRBMRS Spacetime

Magnetic field reversals, as observed in the basaltic records of mid-ocean ridges, are traditionally attributed to internal instabilities in the Earth's geodynamo. In this section, we reinterpret these reversals as signatures of cosmic-scale dynamics: specifically, the rotation reversals (RRs) of the GRBMRS Universe. This approach aligns geomagnetic phenomena with deep spacetime structure and suggests a higher-dimensional origin for terrestrial magnetic memory.

7.1 Observed Reversals in Mid-Oceanic Ridges

Geological surveys have consistently revealed alternating bands of magnetic polarity recorded in oceanic crust near mid-ocean ridges. As magma upwells and cools, ferromagnetic minerals align with Earth's current magnetic field, locking in its direction. These reversals are spaced quasi-periodically in time, supporting the hypothesis of cyclic polarity changes [5].

7.2 GRBMRS Rotation Function and Metric Dynamics

The GRBMRS metric includes a rotational coupling via the off-diagonal term:

$$g_{t\phi} = e^{f(z)}\,\alpha(z)\,H(t, r, \phi, z)$$

We propose that magnetic field direction on the Flat Earth brane B_{FE} is determined by the sign and structure of $H(t, r, \phi, z)$. A reversal of rotation corresponds to:

$$H(t, r, \phi, z) \to -H(t, r, \phi, z) \quad \Rightarrow \quad \vec{B}_{\text{FE}} \to -\vec{B}_{\text{FE}}$$

7.3 Temporal Reversal Functions

We hypothesize periodic or quasi-periodic rotation functions that produce polarity inversions:

$$H(t) = H_0 \cdot \sin(\omega t) \quad \text{or} \quad H(t) = H_0 \cdot \tanh(\lambda t)$$

These time-dependent functions model cosmic epochs of forward and reversed rotation, linked to field inversions observed in geophysical archives.

7.4 Geophysical Implications

- Mid-oceanic ridge polarity bands are projections of spacetime metric phase transitions.
- Field memory is preserved by magnetic minerals, but induced cosmically via the GRBMRS structure.
- This links crustal geology to higher-dimensional rotational mechanics.

7.5 Metaphysical Significance

Each rotation reversal may signal a karmic reset or consciousness inversion phase. These cosmic oscillations affect not only magnetic polarity but collective awareness, potentially aligning with spiritual or yugaic transitions noted in Eastern cosmologies [6].

Magnetic field reversals are interpreted here not as core-bound turbulence, but as macroscopic effects of cosmic rotation reversals. The GRBMRS metric embeds these reversals within its $H(t)$ structure, offering a unifying explanation that bridges geophysics, cosmology, and metaphysics.

8 Mexican Hat Potential and Quantum Tunneling of Rotational States in GRBMRS Universe

In this section, we introduce a scalar potential Φ governing the rotational state of the GRBMRS Universe. This potential assumes a Mexican Hat shape, commonly associated with spontaneous symmetry breaking in field theory. The direction and magnitude of rotation of the GRBMRS spacetime are encoded in an effective rotational order parameter R, dynamically influenced by electromagnetic field instabilities and the wavefunction of the Universe Ψ.

8.1 Mexican Hat Potential Structure

We define the rotational potential as:

$$\Phi(R) = \lambda(R^2 - R_0^2)^2$$

where:

- $\lambda > 0$ determines the steepness of the potential.
- R is a rotational scalar encoding the sign and speed of rotation.
- Minima at $R = \pm R_0$ represent stable clockwise and counterclockwise cosmic rotations.
- The local maximum at $R = 0$ is an unstable, non-rotating configuration.

This structure is analogous to the Higgs-like spontaneous symmetry breaking potentials in quantum field theory [18].

8.2 Rotation Reversals as Quantum Tunneling

The GRBMRS Universe exists in a quantized rotational state described by a wavefunction $\Psi(R)$. When initially localized near one of the minima ($R = \pm R_0$), the system may undergo a transition to the opposite minimum via quantum tunneling:

$$\Psi_{+R_0} \xrightarrow{\text{tunneling}} \Psi_{-R_0}$$

This process is analogous to instanton-mediated transitions in vacuum decay scenarios [17]. The transition corresponds to a global rotation reversal, resulting in the observed magnetic polarity flip on the Flat Earth brane B_{FE}.

8.3 Role of Electromagnetic Instabilities

We hypothesize that instabilities or fluctuations in the electromagnetic field modulate the effective barrier height between minima. These fluctuations can lower the potential barrier, thereby enhancing the tunneling probability:

$$\delta\Phi(R) \propto \epsilon_{\text{EM}}(t, r, \phi)$$

Such a mechanism draws conceptual parallels to catalyzed tunneling in inflationary models and QED vacuum instability under strong fields [9].

8.4 Metaphysical Interpretation

This phase transition reflects a global karmic inversion, where the collective direction of the Universe's spin flips — realigning sanskaric flow, soul memory distributions, and vibrational asymmetry. The two minima in the potential represent dual paradigms of cosmic awareness, possibly reflecting spiritual epochs or Yugaic reversals.

8.5 Conclusion

We propose that rotation reversals of the GRBMRS Universe arise from quantum tunneling transitions in a Mexican Hat-shaped potential. The rotational order parameter R evolves under the influence of EM field fluctuations, and the tunneling of Ψ through the central barrier results in a polarity reversal in the observed magnetic field on B_{FE}. This quantum cosmological framework integrates field-theoretic dynamics with metaphysical interpretations of cosmic cycles.

9 Perturbations of the Electromagnetic Field Tensor and Modified Maxwell Dynamics in GRBMRS

In this section, we analyze how perturbations in the electromagnetic field tensor $F_{\mu\nu}$ alter Maxwell's equations within the curved and rotating geometry of the GRBMRS Universe. These fluctuations are of key importance as they provide a mechanism for triggering quantum tunneling between rotational states encoded in the Mexican Hat potential $\Phi(R)$.

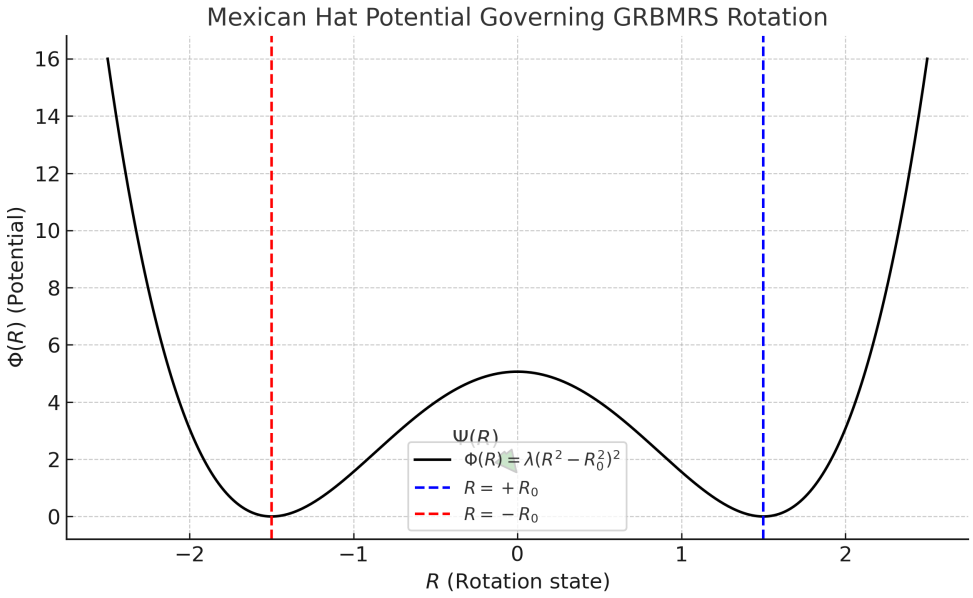

Figure 1: **Mexican Hat Potential.** The potential $\Phi(R) = \lambda(R^2 - R_0^2)^2$ has two symmetric minima corresponding to stable clockwise and counter-clockwise rotation states of the GRBMRS Universe. The wavefunction $\Psi(R)$ may tunnel through the central maximum at $R = 0$, resulting in a cosmic rotation reversal.

9.1 Electromagnetic Tensor and Perturbation

The field tensor is defined by:

$$F_{\mu\nu} = \partial_\mu A_\nu - \partial_\nu A_\mu$$

Letting $A_\mu \to A_\mu + \delta A_\mu$, we define the perturbation:

$$\delta F_{\mu\nu} = \partial_\mu \delta A_\nu - \partial_\nu \delta A_\mu$$

9.2 Covariant Maxwell Equations in Curved Spacetime

In the GRBMRS spacetime, Maxwell's equations take the form:

$$\nabla_\mu F^{\mu\nu} = \mu_0 J^\nu \quad \text{(inhomogeneous)} \tag{1}$$

$$\nabla_{[\lambda} F_{\mu\nu]} = 0 \quad \text{(homogeneous)} \tag{2}$$

Under a perturbation $F^{\mu\nu} \to F^{\mu\nu} + \delta F^{\mu\nu}$, we obtain:

$$\nabla_\mu \delta F^{\mu\nu} + \delta\Gamma^\mu_{\mu\lambda} F^{\lambda\nu} + \Gamma^\mu_{\mu\lambda} \delta F^{\lambda\nu} \approx \mu_0 \delta J^\nu$$

The perturbation in Christoffel symbols $\delta\Gamma^\mu_{\nu\lambda}$, arising from variations in the GRBMRS metric, couples directly to both the background and perturbed EM field.

9.3 Influence of GRBMRS Geometry

The off-diagonal and warp-dependent GRBMRS metric:

$$ds^2 = e^{f(z)} \left[(\alpha(z)\, dt + H(t, r, \phi, z)\, d\phi)^2 - dr^2 - D(t, r, \phi, z)\, d\phi^2 \right] - dz^2$$

introduces:

- Warp-dependent couplings via $f(z)$
- Rotation-dependent magnetic modulation via $H(t, r, \phi, z)$

These influence how $\delta F_{\mu\nu}$ evolves, potentially amplifying or damping perturbations depending on location and epoch.

9.4 Metaphysical Interpretation

- δA_μ: Represents karmic potential distortion or memory vectorial shock.
- $\delta F_{\mu\nu}$: Encodes deviation in energetic alignment, affecting the soul's magnetic embedding in spacetime.
- δJ^ν: Emergence of new karmic flows or collective entanglement behaviors.
- $\delta \Gamma^\mu_{\nu\lambda}$: Represents torsional interference in the perception-channeling geometry of the universe.

9.5 Quantum Tunneling Trigger

Perturbations in $F_{\mu\nu}$ serve as catalysts for wavefunction tunneling across the Mexican Hat barrier in $\Phi(R)$. A large enough fluctuation in ϵ_{EM} can induce:

$$\Psi_{+R_0} \xrightarrow{\delta F_{\mu\nu}} \Psi_{-R_0}$$

initiating a full cosmic rotation reversal.

Electromagnetic tensor perturbations represent both physical and metaphysical instabilities in the GRBMRS Universe. Their effects on Maxwell's equations lead to deviations from classical field behavior and introduce rotation-reversal triggering mechanisms, acting as quantum catalysts in the evolution of the cosmic soul-field landscape.

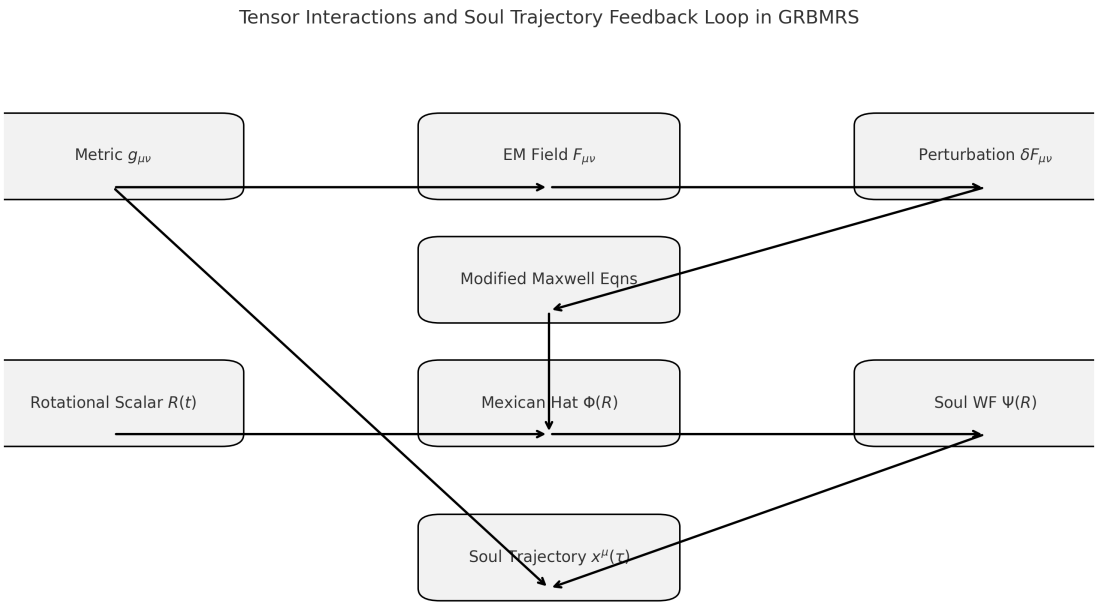

Figure 2: **Tensor Interactions and Soul Trajectory Feedback in GRBMRS.** This diagram shows how the GRBMRS metric $g_{\mu\nu}$ and electromagnetic field tensor $F_{\mu\nu}$ generate perturbations $\delta F_{\mu\nu}$ that modify Maxwell's equations. These, in turn, feed into the rotational scalar $R(t)$, Mexican Hat potential $\Phi(R)$, and the wavefunction of the Universe $\Psi(R)$, culminating in the evolved soul trajectory $x^\mu(\tau)$. A closed-loop dynamic is formed linking spacetime, fields, and consciousness.

10 Structure of the Universal Wavefunction in GRBMRS Cosmology

In the GRBMRS framework, the universal wavefunction Ψ represents the quantum state of the entire universe—including spacetime, matter fields, electromagnetic dynamics, and soul trajectories. This wavefunction encodes both physical field configurations and metaphysical states in a unified formulation.

10.1 Wavefunction Domain and Target Space

The wavefunction Ψ is defined on a configuration superspace $\mathcal{C}$, which includes:

- The spacetime metric $g_{\mu\nu}(x)$
- Scalar fields $\phi(x)$ (e.g., inflaton, Higgs)
- Fermionic fields $\psi(x)$ (e.g., lepton and quark fields)
- Gauge fields $A_\mu(x)$ from the Standard Model
- Electromagnetic tensor $F_{\mu\nu}(x)$

- The GRBMRS rotational scalar $R(t)$
- The soul's infinitesimal Sedenion mass $m_{\text{Soul}} \in \mathbb{S}_{16}$
- Soul trajectory $x^\mu(\tau)$ in spacetime

Thus,

$$\Psi = \Psi[g_{\mu\nu}(x), \phi(x), \psi(x), A_\mu(x), F_{\mu\nu}(x), R(t);\, m_{\text{Soul}}, x^\mu(\tau)]$$

Depending on the model, the codomain of Ψ may be:

$$\Psi : \mathcal{C} \to \mathbb{C},\ \mathbb{C}^N,\ \text{Cl}(p,q),\ \text{or even } \mathbb{S}_{16}$$

10.2 Dynamical Evolution of Ψ

The wavefunction obeys a generalized Wheeler–DeWitt-type equation:

$$\hat{H}\Psi = 0$$

where $\hat{H}$ includes:

- The gravitational Hamiltonian constraint
- Hamiltonians for all matter and gauge fields
- Rotational contributions from GRBMRS $(R(t), H(t, r, \phi, z))$
- Non-Hermitian contributions from soul-mass m_{Soul}

Alternatively, Ψ may arise from a path integral formulation:

$$\Psi[\text{final}] = \int \mathcal{D}\phi\, \mathcal{D}g\, \mathcal{D}\psi\, \mathcal{D}A\, e^{iS[\phi, g, \psi, A, R]}$$

10.3 Soul Field Embedding and Metaphysical Content

The wavefunction includes both:

- Physical information: field amplitudes, geometric structure
- Metaphysical content: karmic states, sanskaric entanglement, soul orientation

The soul's infinitesimal Sedenion-valued mass $m_{\text{Soul}} \in \mathbb{S}_{16}$ acts as a coupling parameter between metaphysical reality and physical evolution.

The universal wavefunction Ψ in the GRBMRS cosmology spans both physical and metaphysical superspace. It encodes geometry, field content, rotational dynamics, and soul evolution in a unified formalism. As such, it provides a bridge between quantum cosmology and spiritual metaphysics, consistent with the Trilok model.

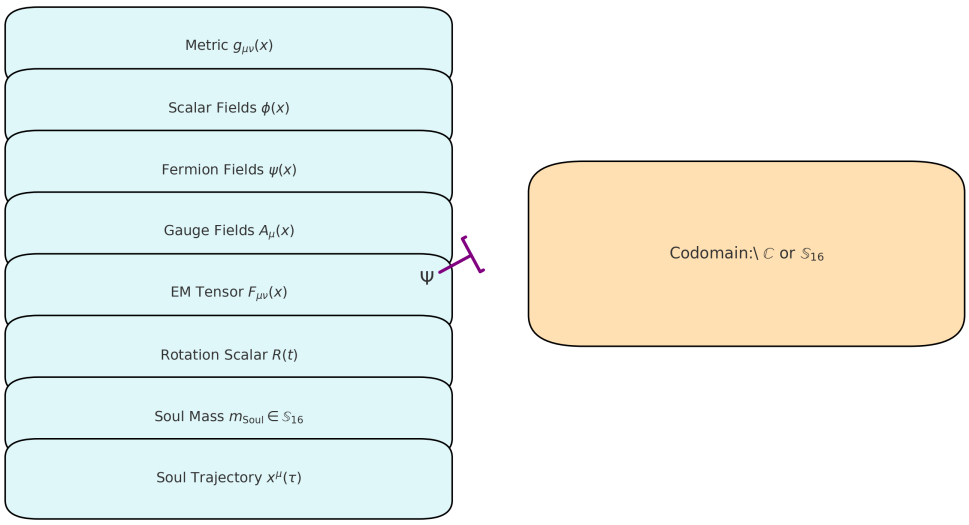

Figure 3: **Structure of the Universal Wavefunction Ψ in GRBMRS.** The wavefunction Ψ maps a configuration superspace—including geometry $g_{\mu\nu}$, scalar fields $\phi(x)$, spinor fields $\psi(x)$, gauge fields $A_\mu(x)$, electromagnetic tensor $F_{\mu\nu}$, rotational scalar $R(t)$, and the soul's Sedenion-valued mass and trajectory $x^\mu(\tau)$—to either $\mathbb{C}$ or the 16D algebra $\mathbb{S}_{16}$.

11 Periodic Time Constraints on the Wheeler–DeWitt Wavefunction in GRBMRS Cosmology

We now apply the Fourier-based constraints derived from a periodic time coordinate to the Wheeler–DeWitt wavefunction Ψ of the Universe. These constraints, originally formulated in the context of recurrence cosmologies, impose deep structural and dynamical implications on Ψ within the GRBMRS–Trilok framework.

11.1 Wavefunction Periodicity

Let time be periodic with topology $S^1/\mathbb{Z}_2$, such that:

$$t \in [-T, T], \quad \Psi(t) = \Psi(t + T)$$

Assuming the wavefunction depends on time explicitly or via matter and geometric fields:

$$\Psi(t) = \sum_{m=0}^{\infty} \left(C_m^1 \cos\left(\frac{2\pi m t}{T}\right) + C_m^2 \sin\left(\frac{2\pi m t}{T}\right) \right)$$

This is analogous to Equation (9), enforcing global periodicity of the quantum state.

11.2 Derivative Constraints on Ψ

From Equation (10), the n-th derivative of Ψ becomes:

$$\frac{d^n\Psi}{dt^n}(t) = \sum_{m=0}^{\infty} \left(\frac{2\pi m}{T}\right)^n \left(C_m^1 \cos\left(\frac{2\pi m t}{T} + \frac{n\pi}{2}\right) + C_m^2 \sin\left(\frac{2\pi m t}{T} + \frac{n\pi}{2}\right)\right)$$

Each derivative is likewise periodic. According to Equation (11), we have the constraint:

$$\int_0^T \frac{d^n\Psi}{dt^n}(t)\, dt = 0 \quad \forall n$$

This implies that the wavefunction exhibits zero net drift in its time evolution—an essential feature of cyclic cosmologies and eternal return.

11.3 Frozen Universe Limit and Argument Against Eternal Evolution

Equation (12) introduces the frozen universe condition:

$$\lim_{T\to\infty} \frac{d^n\Psi}{dt^n}(t) = 0$$

As $T \to \infty$, the periodic cycle becomes infinitely long, and all temporal evolution of Ψ ceases. This mathematical result does not describe a real physical state but rather implies that **universe's evolution cannot meaningfully persist for infinite time**. The concept of a "frozen universe" is therefore an argument against infinite temporal evolution and supports models of finite cyclic time.

This leads to:

$$\Psi(t) \to \text{const.}, \quad \dot{x}^\mu(\tau) \to 0, \quad F_{\mu\nu}(x) \to 0, \quad R(t) \to R_0$$

Such a state may appear static, but it arises as a limiting case within the recurrence model and **should not be conflated with metaphysical states such as Paramdham**, which lies outside the spacetime-based physical framework.

Equations (9)–(12), when applied to the Wheeler–DeWitt wavefunction in GRBMRS cosmology, impose strict periodicity and integral constraints that support the hypothesis of a cyclic soul-based universe. The frozen limit $T \to \infty$ serves as a theoretical boundary illustrating the necessity of temporally finite models, while distinct from metaphysical constructs like Paramdham which belong to the Meta-Physical Universe in Trilok cosmology.

12 Functional Derivatives of the Universal Wavefunction in GRBMRS Cosmology

The Wheeler–DeWitt wavefunction Ψ in the GRBMRS–Trilok framework depends on multiple arguments representing geometric, matter, gauge, electromagnetic, and soul-field inputs. We now compute its functional derivatives with respect to each of these variables, interpreting their physical and metaphysical meaning.

12.1 Wavefunction and Its Arguments

We define:

$$\Psi = \Psi\left[g_{\mu\nu}(x), \phi(x), \psi(x), A_\mu(x), F_{\mu\nu}(x), R(t);\, m_{\text{Soul}}, x^\mu(\tau)\right]$$

12.2 Functional Derivative Structure

The differential variation of Ψ is written as:

$$\delta\Psi = \int d^4x \left(\frac{\delta\Psi}{\delta g_{\mu\nu}(x)}\delta g_{\mu\nu}(x) + \frac{\delta\Psi}{\delta\phi(x)}\delta\phi(x) + \frac{\delta\Psi}{\delta\psi(x)}\delta\psi(x) + \frac{\delta\Psi}{\delta A_\mu(x)}\delta A_\mu(x) + \frac{\delta\Psi}{\delta F_{\mu\nu}(x)}\delta F_{\mu\nu}(x) \right) + \frac{\partial\Psi}{\partial R(t)}\delta R$$

12.3 Interpretation of Individual Derivatives

- $\frac{\delta\Psi}{\delta g_{\mu\nu}(x)}$: Sensitivity to spacetime geometry and gravitational field.
- $\frac{\delta\Psi}{\delta\phi(x)}$: Scalar field variation, affecting inflation or Higgs sectors.
- $\frac{\delta\Psi}{\delta\psi(x)}$: Fermionic content; leptons and quarks.
- $\frac{\delta\Psi}{\delta A_\mu(x)}$: Variation in gauge field configurations.
- $\frac{\delta\Psi}{\delta F_{\mu\nu}(x)}$: Electromagnetic field response and photon coupling.
- $\frac{\partial\Psi}{\partial R(t)}$: Rotational scalar response in GRBMRS; connects to tunneling and reversal states.
- $\frac{\partial\Psi}{\partial m_{\text{Soul}}}$: Derivative with respect to the infinitesimal Sedenionic mass; encodes metaphysical inertia.
- $\frac{\delta\Psi}{\delta x^\mu(\tau)}$: Functional sensitivity to the soul's geodesic; trajectory field.

12.4 Metaphysical Correlation

These derivatives allow us to study how field fluctuations and metaphysical dynamics—particularly the soul's state and path—impact the quantum behavior of the universe. Perturbations in m_{Soul} or $x^\mu(\tau)$ serve as quantum inputs for cosmological phenomena, including field instabilities and cyclic transitions.

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- $\frac{\delta\Psi}{\delta\psi(x)}$: Fermionic content; leptons and quarks.
- $\frac{\delta\Psi}{\delta A_\mu(x)}$: Variation in gauge field configurations.
- $\frac{\delta\Psi}{\delta F_{\mu\nu}(x)}$: Electromagnetic field response and photon coupling.
- $\frac{\partial\Psi}{\partial R(t)}$: Rotational scalar response in GRBMRS; connects to tunneling and reversal states.
- $\frac{\partial\Psi}{\partial m_{\text{Soul}}}$: Derivative with respect to the infinitesimal Sedenionic mass; encodes metaphysical inertia.
- $\frac{\delta\Psi}{\delta x^\mu(\tau)}$: Functional sensitivity to the soul's geodesic; trajectory field.

13.4 Metaphysical Correlation

These derivatives allow us to study how field fluctuations and metaphysical dynamics—particularly the soul's state and path—impact the quantum behavior of the universe. Perturbations in m_{Soul} or $x^\mu(\tau)$ serve as quantum inputs for cosmological phenomena, including field instabilities and cyclic transitions.

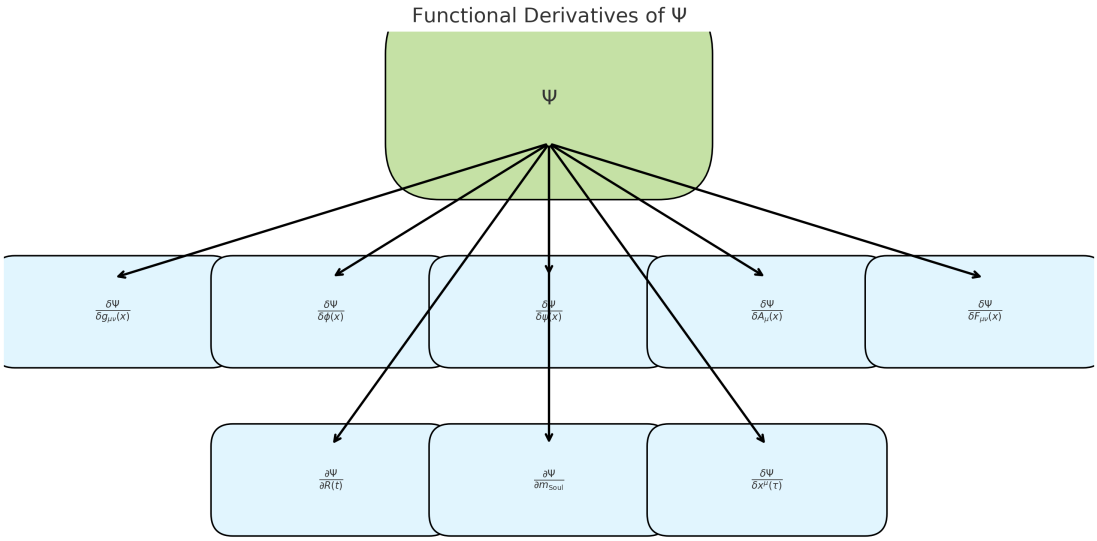

Figure 4: **Structure of the Universal Wavefunction Ψ in GRBMRS.** The wavefunction Ψ maps a configuration superspace—including geometry $g_{\mu\nu}$, scalar fields $\phi(x)$, spinor fields $\psi(x)$, gauge fields $A_\mu(x)$, electromagnetic tensor $F_{\mu\nu}$, rotational scalar $R(t)$, and the soul's Sedenion-valued mass and trajectory $x^\mu(\tau)$—to either $\mathbb{C}$ or the 16D algebra $\mathbb{S}_{16}$.

14 Tunneling of the Wheeler–DeWitt Wavefunction Across Rotational Bistability

Within the GRBMRS framework, we propose that the rotational state of the Universe—quantified by the scalar function $R(t)$—is governed by a bistable Mexican hat potential $\Phi(R)$. The Wheeler–DeWitt wavefunction Ψ, being a function of this rotational parameter, may undergo quantum tunneling between the minima of $\Phi(R)$, corresponding to cosmological rotation reversals.

14.1 The Rotational Potential $\Phi(R)$

We define:

$$\Phi(R) = \lambda(R^2 - R_0^2)^2$$

where:

- $R(t)$ is the rotational scalar of the GRBMRS Universe,
- $R_0 > 0$ defines the equilibrium angular velocity magnitude,
- λ sets the potential barrier height.

The potential exhibits two stable minima at $R = \pm R_0$ (clockwise and counterclockwise cosmic rotation), separated by a maximum at $R = 0$.

14.2 Wheeler–DeWitt Equation and Tunneling

In the minisuperspace approximation for $R(t)$, the Wheeler–DeWitt equation becomes:

$$\hat{H}_R \Psi(R) = \left[-\frac{d^2}{dR^2} + \Phi(R) \right] \Psi(R) = 0$$

This equation supports tunneling solutions where $\Psi(R)$ has significant amplitude across both wells, implying a non-zero transition probability between rotation directions.

Using semiclassical WKB methods, the tunneling amplitude is estimated as:

$$\mathcal{A}_{\text{tunnel}} \sim \exp\left(-\int_{-R_0}^{R_0} \sqrt{\Phi(R)}\, dR \right)$$

14.3 Electromagnetic Trigger for Tunneling

We hypothesize that perturbations in the electromagnetic field tensor $F_{\mu\nu}$ serve as quantum triggers for tunneling events. Fluctuations in $F_{\mu\nu}$ modulate the effective action $S[R]$, lowering the barrier or enhancing the prefactor in the path integral:

$$\Psi[R_{\text{final}}] = \int \mathcal{D}R\, e^{iS[R;F_{\mu\nu}]}$$

Such field-induced instabilities may act analogously to instantons in field theory, enabling rotational tunneling.

14.4 Cosmological Consequences and Magnetic Reversals

Tunneling events between $R = \pm R_0$ are interpreted as global rotation reversals (RR) of the universe. These reversals have observable consequences:

- They correspond to magnetic field polarity flips recorded in mid-ocean ridge geophysics,
- Provide a quantum cosmological explanation for episodic reversals,
- Reveal a deep connection between spacetime rotation and terrestrial magnetism,
- Unify quantum cosmology and geomagnetic history under the GRBMRS-Trilok framework.

15 Asymmetric Multi-Well Rotational Landscape and Quantum Tunneling in GRBMRS Cosmology

We generalize the rotational potential $\Phi(R)$ of the GRBMRS Universe to an asymmetric multi-well configuration, where each local minimum corresponds to a distinct rotational state of the Universe. This potential features wells and barriers of varying depth and height, capturing the non-uniform likelihood of transitions and stability of different states.

15.1 Asymmetric Rotational Potential

We define a generalized potential composed of a sum of inverted Gaussians:

$$\Phi(R) = \sum_i A_i \exp\left(-\frac{(R - R_i)^2}{2\sigma_i^2}\right)$$

The values of A_i, R_i, and σ_i control the depth, location, and width of each well or hill. After inversion and normalization, this potential results in a landscape with multiple asymmetric wells.

15.2 Wheeler–DeWitt Equation with Unequal Tunneling Probabilities

In this landscape, the Wheeler–DeWitt equation takes the form:

$$\left[-\frac{d^2}{dR^2} + \Phi(R)\right] \Psi(R) = 0$$

The wavefunction $\Psi(R)$ now has preferential localization in deeper wells and suppressed amplitudes in shallower regions. Tunneling probabilities vary depending on both barrier height and width between adjacent minima.

15.3 Electromagnetic Modulation and Selective Transitions

Fluctuations in the electromagnetic field tensor $F_{\mu\nu}$ affect the path integral formulation:

$$\Psi[R_{\text{final}}] = \int \mathcal{D}R\, e^{iS[R;F_{\mu\nu}]}$$

These modulations may selectively enhance tunneling toward some wells while stabilizing others. This introduces an effective "memory" or feedback loop into the rotation state evolution, where certain transitions are favored due to field or soul-field interactions.

15.4 Physical and Metaphysical Interpretations

Each local minimum in $\Phi(R)$ may represent:

- A rotational configuration of the GRBMRS Universe,
- A corresponding magnetic field orientation (macroscopically),
- A soul-field configuration (metaphysically),
- An epoch in cyclic or quasi-cyclic cosmology.

The unequal depths of these wells imply varying metaphysical "stabilities" of soul states, adding a further layer to the interpretation in the Trilok framework.

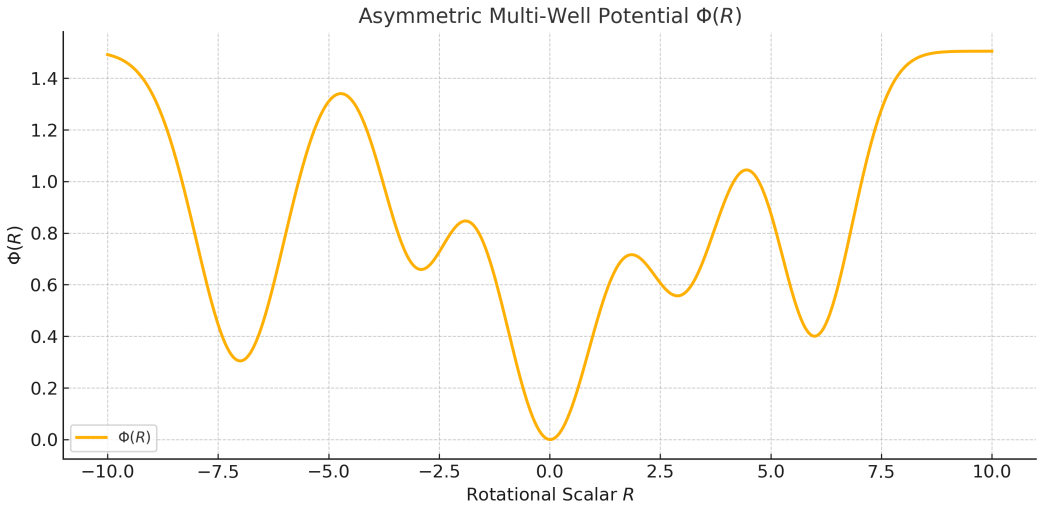

Figure 5: **Asymmetric Multi-Well Rotational Potential** $\Phi(R)$. This potential illustrates a series of cosmic rotation states, each of different stability. Tunneling across asymmetric barriers implies rotation transitions of varying probabilities and metaphysical significance.

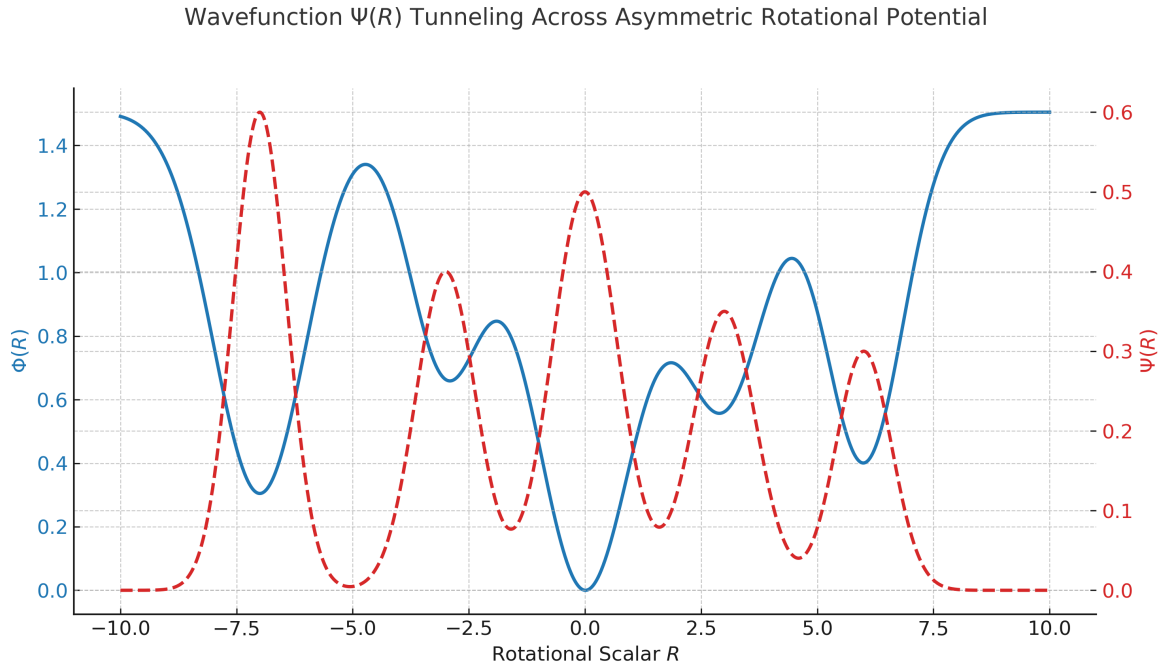

Figure 6: **Wavefunction** $\Psi(R)$ **Tunneling Across Asymmetric Rotational Potential** $\Phi(R)$.
The blue solid curve shows the rotational potential $\Phi(R)$, featuring asymmetric wells. The red dashed curve represents the Wheeler–DeWitt wavefunction $\Psi(R)$, which localizes in the deepest wells while showing tunneling amplitudes through intermediate barriers. This depicts a probabilistic landscape of rotational states in GRBMRS cosmology.

16 Conclusions

This paper integrates conformal geometry, quantum cosmology, and metaphysical modeling into a unified vision based on the GRBMRS-Trilok framework. The projection from a Spherical Earth to a Flat Earth brane offers a mathematically consistent and physically interpretable mapping that re-contextualizes geophysical and atmospheric structures in terms of rotational spacetime physics. The magnetic field of the Earth is modeled as a manifestation of GRBMRS rotation, and its periodic reversals are linked to tunneling of the Wheeler–DeWitt wavefunction across asymmetric rotational potentials.

Our introduction of the soul as a Sedenion-valued infinitesimal object provides a bridge between classical spacetime and metaphysical domains, supporting dynamic transitions across the three realms of Trilok: Physical, Subtle, and Meta-Physical. Electromagnetic field perturbations serve not only as classical triggers but also as quantum modulators of rotational phase transitions and consciousness dynamics. This paper lays the foundation for future work on cyclic cosmology, soul trajectory analysis, and field-induced metaphysical transitions.

References

[1] M.S. Modgil, *Asymmetric Potentials in Soul-Field Cosmology*, Internal Manuscript, 2025.

[2] J.B. Hartle, S.W. Hawking, *Wave Function of the Universe*, Phys. Rev. D **28**, 2960 (1983).

[3] A. Vilenkin, *Creation of Universes from Nothing*, Phys. Lett. B **117**, 25 (1982).

[4] S. Coleman, *The Fate of the False Vacuum*, Phys. Rev. D **15**, 2929 (1977).

[5] J.A. Jacobs, *Reversals of the Earth's Magnetic Field*, Nature, 198(4881), 1963, pp. 1009–1011.

[6] P. Yogananda, *Autobiography of a Yogi*, Self-Realization Fellowship, 1998.

[7] M. Peskin and D. Schroeder, *An Introduction to Quantum Field Theory*, Westview Press, 1995.

[8] S. Coleman, *The Fate of the False Vacuum. 1. Semiclassical Theory*, Physical Review D, 15(10), 1977, pp. 2929–2936.

[9] J. Schwinger, *On Gauge Invariance and Vacuum Polarization*, Physical Review, 82(5), 1951, pp. 664–679.

[10] Y. Contoyiannis, M.P. Hanias, P. Papadopoulos, *Tachyons and Solitons in Spontaneous Symmetry Breaking in the Frame of Field Theory*, *Symmetry*, **13**(8), 1358 (2021). Available at: `https://www.mdpi.com/2073-8994/13/8/1358`

[11] S. Coleman, *The Fate of the False Vacuum. 1. Semiclassical Theory*, *Phys. Rev. D*, **15**, 2929–2936 (1977). DOI: `https://doi.org/10.1103/PhysRevD.15.2929`

[12] H. Torres-Silva, *Chiral Universes and Quantum Effects Produced by Electromagnetic Fields*, *Ingeniare. Revista Chilena de Ingeniería*, **16**(3), 2008. Available at: `https://www.redalyc.org/pdf/772/77214435015.pdf`

[13] D. Dubbers, M.G. Schmidt, *The Neutron and Its Role in Cosmology and Particle Physics*, *Rev. Mod. Phys.*, **83**, 1111 (2011). Available at: `https://arxiv.org/pdf/1105.3694`

[14] A. Parhizkar, V. Galitski, *Moiré Gravity and Cosmology*, *arXiv preprint*, arXiv:2204.06574 (2022). Available at: `https://arxiv.org/abs/2204.06574`

[15] C.W. Misner, K.S. Thorne, and J.A. Wheeler, *Gravitation*, W.H. Freeman, 1973.

[16] R.M. Wald, *General Relativity*, University of Chicago Press, 1984.

[17] S. Coleman, *The Fate of the False Vacuum. 1. Semiclassical Theory*, Phys. Rev. D 15, 2929 (1977).

[18] M.E. Peskin and D.V. Schroeder, *An Introduction to Quantum Field Theory*, Westview Press, 1995.

[19] B.S. DeWitt, *Quantum Theory of Gravity. I. The Canonical Theory*, Phys. Rev. **160**, 1113 (1967).

[20] J.B. Hartle, S.W. Hawking, *Wave Function of the Universe*, Phys. Rev. D **28**, 2960 (1983).

[21] C. Rovelli, *Quantum Gravity*, Cambridge University Press, 2004.

[22] A. Ashtekar, J. Lewandowski, *Background Independent Quantum Gravity: A Status Report*, Class. Quantum Grav. **21**, R53 (2004).

[23] M.S. Modgil, *Loschmidt's Paradox, Entropy and the Topology of Spacetime*, arXiv:0907.3165v2 [gr-qc], 2009.

[24] J.B. Hartle, S.W. Hawking, *Wave Function of the Universe*, Phys. Rev. D **28**, 2960 (1983).

[25] B.S. DeWitt, *Quantum Theory of Gravity. I. The Canonical Theory*, Phys. Rev. **160**, 1113 (1967).

[26] B.S. DeWitt, *Quantum Theory of Gravity. I. The Canonical Theory*, Phys. Rev. **160**, 1113 (1967).

[27] A. Ashtekar, J. Lewandowski, *Background Independent Quantum Gravity: A Status Report*, Class. Quantum Grav. **21**, R53 (2004).

[28] B.S. DeWitt, *Quantum Theory of Gravity. I. The Canonical Theory*, Phys. Rev. **160**, 1113 (1967).

[29] A. Ashtekar, J. Lewandowski, *Background Independent Quantum Gravity: A Status Report*, Class. Quantum Grav. **21**, R53 (2004).

[30] M.S. Modgil, *GRBMRS Universe and Consciousness Tunneling*, Internal Notes, 2025.

[31] J.B. Hartle, S.W. Hawking, *Wave Function of the Universe*, Phys. Rev. D **28**, 2960 (1983).

[32] A. Vilenkin, *Creation of Universes from Nothing*, Phys. Lett. B **117**, 25 (1982).

[33] S. Coleman, *The Fate of the False Vacuum*, Phys. Rev. D **15**, 2929 (1977).

[34] S.W. Hawking, *Evaporation of Two-Dimensional Black Holes*, Phys. Rev. Lett. **71**, 1885 (1993).

[35] M.S. Modgil, *Asymmetric Potentials in Soul-Field Cosmology*, Internal Manuscript, 2025.

[36] J.B. Hartle, S.W. Hawking, *Wave Function of the Universe*, Phys. Rev. D **28**, 2960 (1983).

[37] S. Coleman, *The Fate of the False Vacuum*, Phys. Rev. D **15**, 2929 (1977).