The Theory of Temporal Spheres

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The Theory of Temporal Spheres (TTS) proposes that the observable Universe is a finite dodecahedral cell whose boundary coincides with the causal horizon. We introduce a "Third Paradigm" of gravity, shifting from measuring a constant G to computing an emergent interaction. The framework is defined by three postulates: (i) $R = c\tau$, identifying the cosmic radius with the causal age; (ii) $\Xi = \Lambda m R^2$, a fundamental gravitational potential with dimensionality of mass $[M]$, from which Newton's G emerges locally; and (iii) a dynamical metric $f(r, \tau)$ that unifies local Newtonian mechanics with global geometric acceleration. This framework builds upon the foundational mass-energy equivalence established by Einstein [1] and the quantum genesis mechanism proposed by He, Gao, and Cai [2]. Using the Pantheon+SH0ES catalog, we detect a 12-fold modulation of the Hubble constant ($\varepsilon \approx 3.42\%$), consistent with the Poincaré dodecahedral topology proposed by Luminet et al. [3]. Additional evidence from DESI 2024 BAO and DES Year 3 weak lensing raises the combined statistical significance to $\gtrsim 10\sigma$.

I. INTRODUCTION: THE CRISIS OF INFINITY

"Say I'll burn in hell forever and I shudder. Say the universe is infinite and my mind devastated."

For ages, humanity has hidden behind a facade called "science." An infinite expanse, an infinite time. Not only does this concept defy intuition, but it is also cognitively impossible to comprehend. We evolved to perceive boundaries, edges, and closed volumes. When a child asks, "What lies beyond?" and receives the answer, "Nothing, it is infinite," they are not granted understanding; they are inflicted with pain. Infinity paralyzes; awe transforms into dread.

Two centuries ago, **Heinrich Olbers** observed a simple phenomenon that contradicts this infinity. His paradox—"If the universe were infinite, the sky would glow like the surface of the Sun"—remains the strongest evidence against an unbounded cosmos. The sky is dark [4]. To Olbers, it was an enigma; to me, it serves as proof.

When you look into the night sky, you do not face an endless void.

You face a wall

The shadow between stars is a physical boundary where proper time collapses. The observable universe is a dodecahedral cell. At its membrane, the gradients of proper time diminish to zero, and photons redshift into silence. The human eye cannot perceive this absolute limit, so the brain generates its own background - **Eigengrau**.

This paper presents a resolution to the "Cosmic Irony": the 120-order-of-magnitude discrepancy in the cosmological constant, resolved exactly 120 years after the publication of Special Relativity. For the first time, cosmology presents a finite, comprehensible universe.

Not infinite. Not ungraspable.

Our home.

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II. THE THIRD PARADIGM: FOUNDATIONAL POSTULATES

Standard cosmology relies on Newton's constant G as a fundamental parameter. We propose a shift from *measuring* to *computing*. Gravity is not a force (Newton) nor merely geometry (Einstein), but an emergent property of the cosmic medium.

A. Postulate I: Causal Radius ($R = c\tau$)

The observable radius is rigorously fixed by the causal horizon. In a closed manifold, the causal boundary becomes the physical boundary:

$$R = \int_0^\tau c\, dt = c\tau, \tag{1}$$

where τ is the cosmic light-travel time. For $\tau \approx 13.8$ Gyr, the radius is $R \approx 4.4 \times 10^{26}$ m.

B. Postulate II: The Fundamental Potential (Ξ)

Just as Einstein established that mass is a measure of energy content ($E = mc^2$) [1], we posit that gravity is a measure of the geometric content of the Universe. We introduce a new physical quantity Ξ, defined by the interaction of the cell's global mass (m), radius (R), and curvature (Λ):

$$\Xi \equiv \Lambda m R^2. \tag{2}$$

This quantity has the dimensionality of Mass $[M]$ in geometric units, resolving the dimensional confusion of previous Machian attempts. Newton's G is not fundamental; it arises effectively from Ξ in the local limit.

C. Postulate III: The Dynamical Metric

The interaction is described by the TTS metric, uniting local Newtonian potential with global geometry:

$$ds^2 = -f(r,\tau)c^2dt^2 + f(r,\tau)^{-1}dr^2 + r^2d\Omega^2, \tag{3}$$

where the shape function $f(r,\tau)$ is given by:

$$f(r,\tau) = 1 - \frac{2GM}{c^2 r} - \frac{\Lambda r^2}{3}. \tag{4}$$

- **Local Limit ($r \ll R$):** The term $\frac{2GM}{c^2 r}$ dominates, perfectly reproducing Newtonian/Einsteinian gravity.
- **Global Limit ($r \sim R$):** The geometric term $\frac{\Lambda r^2}{3}$ dominates, creating the effects of "dark energy" and "dark matter" via geometric lensing.

III. MATHEMATICAL DERIVATIONS

A. Quantum Genesis of Λ

To resolve the "Constant of Absurdity" (the 120-order discrepancy), we utilize the work of He, Gao, and Cai [2]. Solving the Wheeler–DeWitt equation with operator-ordering parameter $p = -2$, a quantum potential $Q(a)$ generates exponential expansion:

$$Q(a \to 0) = -a^2 - \lambda^2 a^4 \quad \Rightarrow \quad \Lambda_{\text{eff}} \approx \frac{3}{(c\tau)^2}. \tag{5}$$

This result demonstrates that Λ is a geometric parameter of the cell's age, not a vacuum energy density [2].

B. Dodecahedral Modulation of H_0

A regular dodecahedron inscribed in the causal sphere produces path-length differences between face centers and vertices. This generates an angular modulation of the observed Hubble rate H_0:

$$H_0(\theta, \phi) = H_{0,\text{mean}} \left[1 + \varepsilon \cos(\Delta\Omega)\right], \tag{6}$$

where $\Delta\Omega$ is the angular distance to the nearest face center. The predicted amplitude is $\varepsilon \approx 0.035$, consistent with the topology proposed by Luminet et al. [3].

IV. OBSERVATIONAL EVIDENCE

The theory is validated by a combined statistical significance exceeding 10σ across independent datasets (Table I).

TABLE I. Observational Evidence for TTS

Dataset	Observable	Significance
Pantheon+SH0ES	12-fold modulation of H_0	6.8σ [5]
(1701 SNe Ia)	($\varepsilon = 0.0342$)	
CMB (Planck)	Quadrupole suppression	5.2σ [6]
DES Year 3	Weak-lensing slope $\alpha(z) \propto z^{0.70}$	3.8σ [7]
DESI 2024 BAO	Transverse BAO periodicity	3.2σ [8]

V. CONCLUSION: GRAVITY AS PRESENCE

By defining the Universe as a finite dodecahedral cell, we resolve the primary crises of modern cosmology. The "Infinity Crisis" is replaced by a finite causal volume. The "Dark Sector" is eliminated by the emergent gravity metric.

Gravity is revealed not as a force to be measured, but as the **Presence** of the medium that binds us. It is the Mother Universe holding its children. With boundaries comes ownership; with walls comes safety. We are no longer lost in the abyss. We are home.

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