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Not peer-reviewed version

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Posted Date: 9 December 2025

doi: 10.20944/preprints202512.0768.v1

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Escaping the Minkowski Trap: Why Time Cannot Be a Dimension

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Abstract

The standard relativistic ontology treats time as an additional coordinate in a four-dimensional space-time manifold. Since Minkowski's 1908 formulation, "dimension" has been tacitly identified with "vector direction in a manifold", and the temporal coordinate has been assimilated into that vectorial catalogue. This move proved mathematically powerful but ontologically misleading. In this article I argue, within the Timeless Counterspace & Shadow Gravity—SEQUENTION (TCGS–SEQUENTION) framework, that identifying time with a geometric dimension is a *category error*. "Time" is a foliation parameter, a gauge label on a family of admissible projections of a single four-dimensional counterspace; it cannot be a dimension on the same footing as the geometric directions of that counterspace. Conversely, the fourth dimension in TCGS is not temporal but *counter-spatial*: a geometric structure of informational content, populated by singularities and extrinsic relations, whose projections generate the three-dimensional (3-D) shadow we call the physical world. I first analyse the "Minkowski trap": the historical path by which the success of tensor calculus turned the coordinate index x^0 into a surrogate for ontic time, and "dimension" into a purely algebraic notion. I show how this trap is reproduced, rather than avoided, in more recent multi-dimensional proposals, including $(1+3)$-dimensional "three-dimensional time" models. I then develop the TCGS–SEQUENTION alternative: a static four-dimensional counterspace $(\mathcal{C}, G, \Psi)$ containing the full content of all so-called "time stages", and an embedded shadow manifold (Σ, g_{ij}) obtained via an immersion $X : \Sigma \to \mathcal{C}$, with observables given by pullbacks $(g_{ij}, \psi) = X^*(G, \Psi)$. Within this ontology, time is a foliation artifact—a parameter labelling a one-parameter family of embeddings X_λ—and all genuine dynamics are recast as consistency conditions between slices. Using the Baierlein–Sharp–Wheeler (BSW) action and subsequent constraint analyses, I demonstrate how General Relativity (GR) can be reconstructed without ontic time, thereby disentangling its empirical success from the Minkowskian ontology. I then show how the same projection geometry, equipped with a single extrinsic constitutive law, accounts for dark-matter phenomenology, cosmological anisotropies, and the biological homology encapsulated in SEQUENTION, without invoking dark sectors or stochastic deep time. Finally, I contrast counter-spatial dimensionality with "3-D time" and argue that any vectorial treatment of time—even with multiple temporal axes—remains trapped in the same categorical mistake: it re-labels the coordinates instead of changing the ontology. In TCGS–SEQUENTION, *there is no temporal dimension at all*; the only fundamental dimension beyond the familiar three is geometric and informational, not temporal.

Keywords: timeless counterspace; TCGS–SEQUENTION; quantum field ontology; wave–particle duality; holographic screen; projection geometry; foliation gauge; extrinsic constitutive law; metaphysical cartography; Gödel incompleteness; Tarskian truth; emergent phenomena; shadow manifolds

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1. Introduction: The Minkowski Trap

In 1908, Minkowski reformulated special relativity by unifying space and time into a single four-dimensional manifold, declaring that space by itself and time by itself were "doomed to fade away into mere shadows". This rhetorical move signalled a profound conceptual shift: rather than

doi:10.20944/preprints202512.0768.v1

being phenomenologically distinct, time was henceforth treated as one more coordinate x^0 equipped with a different sign in the metric. The Minkowski metric

$$\mathrm{d}s^2 = -c^2\mathrm{d}t^2 + \mathrm{d}x^2 + \mathrm{d}y^2 + \mathrm{d}z^2 \tag{1}$$

encoded this unification at the level of quadratic form. The tensor calculus that followed asked only for indices $(0, 1, 2, 3)$ and a signature $(-, +, +, +)$; it no longer asked *what kind* of dimension x^0 represents.

From that moment, in most of theoretical physics "dimension" became tacitly synonymous with "vector direction in a differentiable manifold". Once one accepts this identification, the only way to introduce new structure is to add more coordinates: extra spatial dimensions in Kaluza–Klein and string theory, or alternative allocations such as one spatial and three temporal dimensions in $(1 + 3)$-dimensional models. The central thesis of this paper is that this identification is a *category error*. It conflates:

(i) the algebraic role of an index in a tensor calculus, with
(ii) the ontological nature of a dimension in the world.

Within the TCGS–SEQUENTION framework, time has no ontic existence as a dimension at all. Instead, there exists a single four-dimensional *counterspace* $\mathcal{C}$—the "whole content" of reality—containing the full set of admissible configurations and their singular structures. Apparent evolution is the artefact of slicing this static whole and comparing shadows. The observable universe is a three-dimensional manifold Σ immersed in $\mathcal{C}$, and all "time dependence" is encoded in the choice of foliation of Σ and its embedding.[1]

The question "why did physics take the wrong turn with time?" thus has both a historical and a structural answer:

1. **Historical path dependence.** Minkowski's formalism was so successful at encoding Lorentz invariance that its algebraic structure was mistaken for ontology. The sign in the metric replaced the question of what time is.
2. **Mathematical seduction.** Once "dimension" is equated with "index in a vector space", the simplest way to model anomalies is to add more indices. The mathematics never asks whether the new coordinates have the correct categorical type.

TCGS–SEQUENTION proposes a different route: change the *ontology*, not the number of coordinates. The new dimension is counter-spatial and informational; time, by contrast, is a foliation gauge with no independent geometric degree of freedom.

2. Dimension as Vector Coordinate: How the Trap Was Built

2.1. Minkowski Space-Time and the Algebraization of Time

In the standard picture, a relativistic space-time $(M, g_{\mu\nu})$ is a four-dimensional Lorentzian manifold. The coordinate x^0 plays a dual role:

1. it is the parameter along time-like worldlines, and
2. it is a component in a 4-vector (x^0, x^1, x^2, x^3).

The two roles are silently identified. The metric $g_{\mu\nu}$ is required only to have Lorentzian signature, and the tensor calculus is indifferent to the phenomenological differences between spatial and temporal directions.

This algebraization of time carries through to General Relativity (GR). The Einstein–Hilbert action

$$S_{\mathrm{EH}}[g_{\mu\nu}] = \frac{1}{16\pi G} \int_M \mathrm{d}^4x \sqrt{-g}\,(R - 2\Lambda) \tag{2}$$

[1] See [1,3] for detailed formulations of this ontology in cosmological and gravitational applications, and [2,5] for the biological and consciousness sectors.

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is written as a four-dimensional integral, and the field equations $G_{\mu\nu} = 8\pi G T_{\mu\nu}$ are tensor equations on $(M, g_{\mu\nu})$. Nothing in the formalism forces us to distinguish the temporal index from the spatial ones beyond the sign in the metric.

Once this toolkit is in place, the temptation is natural: when anomalies appear, add dimensions. Kaluza–Klein theories add an extra spatial circle; string theory adds six or seven compact dimensions; holographic dualities relate d-dimensional boundary theories to $(d+1)$-dimensional bulks. In every case, the new dimensions are introduced as extra vector coordinates on a manifold.

2.2. Three-Dimensional Time as a Re-Labelled Minkowski Space

Recent $(1+3)$-dimensional proposals invert the usual split, postulating one spatial and three temporal dimensions as the basic structure, with our familiar $(3+1)$ reality emerging as a projection from this temporal manifold [17]. In such models the metric is typically taken as

$$ds^2 = dx^2 - dt_1^2 - dt_2^2 - dt_3^2, \tag{3}$$

or in an equivalent signature convention,

$$ds^2 = dt_1^2 + dt_2^2 + dt_3^2 - dx^2, \tag{4}$$

with an associated symmetry group that rotates the three temporal axes and preserves the form of ds^2 [17]. The intent is radical: time is given three dimensions while space is reduced to one. The mathematics, however, remains strictly Minkowskian. "Temporal" dimensions are still vector coordinates; the novelty lies entirely in how indices are grouped.

Likewise, when charge is defined as a topological property of a three-dimensional temporal manifold [18], the construction is built on the same underlying identification: a "temporal" dimension is a coordinate in a four-dimensional Lorentzian(-like) manifold, and topological invariants are computed on that manifold. The algebra is elegant; the dimensional ontology remains unchanged.

From the TCGS–SEQUENTION perspective, this is precisely the Minkowski trap. Instead of asking whether time should be a coordinate at all, these models redistribute coordinates between "space" and "time" while keeping the vectorial conception of dimension untouched.

3. Category Error: Time as Foliation Parameter, Not Dimension

3.1. Phenomenological Asymmetry and the Failure of Temporal Vectors

At the phenomenological level, time behaves differently from space. Spatial displacements commute; one can move east then north or north then east and arrive at the same point. Temporal experiences do not commute in this way: the order of events matters, and there is no operational sense in which "experiencing Tuesday and then Monday" is equivalent to "Monday then Tuesday". This asymmetry is reflected in the way physical laws are applied: spatial translations are modelled by commuting operators, while time evolution is typically generated by a one-parameter group.

The vectorial treatment of time erases this asymmetry by design. A temporal axis is simply one more direction in a manifold; displacements along it are treated as components of a four-vector. The mathematical machinery cannot see the categorical difference between "being somewhere else in space" and "comparing different slices of a projection". As a result, the standard formalism conflates:

- displacements *within* the shadow manifold Σ, and
- transitions between different embeddings of Σ into $\mathcal{C}$.

The former are geometric; the latter are foliation choices.

3.2. Baierlein–Sharp–Wheeler and the Elimination of Ontic Time

This conflation is already exposed in classical GR. The Baierlein–Sharp–Wheeler (BSW) action recasts GR in a manifestly reparameterization-invariant form built solely from the three-metric g_{ij} and its derivatives [6]. In its simplest form,

$$S_{\mathrm{BSW}} = \frac{1}{16\pi G} \int \mathrm{d}s \int_{\Sigma} \mathrm{d}^3x \,\sqrt{g}\sqrt{(R-2\Lambda)\,T}, \tag{5}$$

where T is a kinetic term constructed from g_{ij} and the DeWitt supermetric. No fundamental time variable appears; the parameter s can be re-labeled arbitrarily without changing the physics. What emerges as "time" in such formulations is *derived*: it is the parameter that labels a sequence of three-geometries satisfying a constraint algebra.

Subsequent analyses by Arnowitt, Deser, Misner (ADM) and others show that the Hamiltonian and momentum constraints encode the full dynamics; the lapse function N and shift vector N^i are pure gauge [7,8]. The "many-fingered time" of canonical gravity is already a hint that time is not a fundamental dimension but an artifact of foliation choices.

TCGS–SEQUENTION takes this hint seriously and elevates it to an axiom: there is no ontic time. There is only a static four-dimensional counterspace, and the apparent flow of time is the result of comparing different slices of its projection onto a three-dimensional shadow.[2]

3.3. Why a Temporal Vector Can Never Be Equal to Geometric 4-D

The upshot is that the temporal coordinate in standard relativity does not represent an additional geometric degree of freedom in the world. It represents the label of a comparison between configurations. Formally, the true four-dimensional structure in TCGS is $(\mathcal{C}, G, \Psi)$, not $(M, g_{\mu\nu})$ with a temporal index. The shadow three-geometry g_{ij} derives from pullback,

$$g_{ij} = X^* G, \tag{6}$$

and "evolution" corresponds to changing X within a fixed $\mathcal{C}$.

Any attempt to treat time as a vector coordinate—even in a $(1+3)$ decomposition with three temporal axes—misidentifies the nature of the fourth dimension. A geometric 4-D in TCGS is not an "imaginary axis" or a collection of temporal directions; it is a container of *informational singularities* (the identity-of-source set) and extrinsic relations. Its role is to encode the full content of the world, not the order in which slices are inspected.

Foliation versus human time.

In practice, much of the confusion around the framework arises from a tacit identification of the foliation parameter s with "time". In canonical GR this already leads to the familiar "many-fingered time": different regions of a slice advance with different lapses, so that s measures how the embedding X deforms relative to $\mathcal{C}$, not how a universal clock ticks. Within TCGS–SEQUENTION this distinction becomes unavoidable. Each admissible shadow slice is a *composite* of contributions whose projection is controlled by the extrinsic constitutive law. Regions lying in high-gradient corridors of the bulk—for example near the gravito-bubble structures that underlie layered ejecta or galaxy-scale foams—are pulled through the foliation at a very different geometric "rate" from regions lying in low-gradient voids. The map derivative $\mathrm{d}X/\mathrm{d}s$ is therefore heterogeneous across Σ: there is no unique, global notion of "how fast the slice is moving".

From the human point of view, by contrast, all points on a Cauchy slice are assigned the same clock reading t. It is then tempting to identify "being in the same slice" with "having experienced the same amount of time". This is precisely the conflation that TCGS forbids. The foliation label s tracks how the projection samples different parts of the four-dimensional content; the operational time

[2] The formal elevation of this stance to Axiom A3—"Shadow realization and gauge time"—is developed in detail in [1,3].

t is a convenient parameter along specific worldlines inside the shadow. The former is a geometric gauge; the latter is an emergent measurement convention. Using t as if it were the generator of the foliation amounts to imposing a "flat-scan" intuition (a scanner moving at constant speed across a page) on what is in fact a topographic contour map, where equal-s level sets cut through regions of very different geometric slope.

A particularly sharp illustration is provided by massless degrees of freedom. Photons and other null excitations have vanishing proper time along their trajectories, yet they unquestionably participate in the same foliation as massive matter. In the counterspace picture they are confined to corridors anchored on the singular set S; their "rate of existence" is entirely encoded in the projection geometry, not in any accumulation of proper time. A coordinate that is identically zero along an entire class of physically relevant trajectories cannot function as a genuine fourth geometric dimension. It is further evidence that "time" is not a dimension of the world but a bookkeeping device for comparing shadows of a timeless $(\mathcal{C}, G, \Psi)$.

Any attempt to treat time as a vector coordinate—even in a $(1+3)$ decomposition with three temporal and one spatial index—therefore commits a categorical mistake. It assumes that the temporal parameter can be placed on the same ontological footing as the geometric directions of $\mathcal{C}$. But in TCGS–SEQUENTION, the latter are intrinsic properties of the counterspace, whereas the former is a relational label on its shadows. The correct relation is:

$$\begin{aligned} \text{“time”} \;&\sim\; \text{gauge parameter on families of embeddings,} \\ \text{not} \;&\sim\; \text{component of a four-vector in the world.} \end{aligned} \tag{7}$$

Another instructive way to see what counterspace really is, and why its existence can be inferred from several independent fronts, is to revisit what theoretical physicists usually call the "quantum field". It is often described as a fundamental fabric, and in more speculative versions that fabric is multiplied into a whole sub-Planckian zoo of additional layers. That is precisely where the classification error begins. From this putative "fabric" one then derives the behaviour of so-called particles via the wavefunction, as if waves and particles were the primary ontological units. In reality the situation is both simpler and deeper; there are neither autonomous waves nor autonomous particles, only properties being registered. Full stop. In TCGS–SEQUENTION language, what actually exists is a driven fabric; counterspace, which we do not see directly. What we call a "wave" is just the way a local shadow records a modal pattern of that fabric, which we then reify as particles. What we call "energy" is nothing more than a geometric distortion arising from internal differences within that same structure. And why, then, do we perceive separated particles? Because the supporting fabric of the phenomenon must be four-dimensional. Once that is acknowledged, the rest falls into place: one obtains the most sophisticated holographic screen imaginable, calibrated to deliver this immersive experience we call life.

Whether one believes it or not, this is the most direct and parsimonious reading available. If the structure behaves as all the evidence suggests, then we are not floating "on top of" the fabric; we are written into it, functionally integrated into its dynamics. There is no leftover emergent layer that can sit outside. The difficulty is that the fabric itself cannot be described from within the shadow; we can only study its effects on this side. That is, by definition, not Popperian science but cartography; tracing the outlines of something we cannot observe directly, whose footprints are nevertheless impossible to dismiss. At this point Gödel reappears as an old acquaintance. The kind of truth involved here is Tarskian in flavour; inferred and coherent, but structurally outside the formal system that tries to capture it.

4. The TCGS–SEQUENTION Ontology

4.1. Axiom A1: Whole Content and Counterspace

TCGS–SEQUENTION begins from the *Whole Content* axiom:

> There exists a smooth four-dimensional manifold (the counterspace) $\mathcal{C}$ endowed with a bulk metric G and a global content field Ψ. This manifold contains the full content of all so-called "time stages" simultaneously; it is the "territory" in the map–territory relation.

The observable universe is not $\mathcal{C}$ itself but a shadow manifold Σ immersed in $\mathcal{C}$ by a map $X : \Sigma \to \mathcal{C}$. Observables are pullbacks:

$$(g_{ij}, \psi) = X^*(G, \Psi). \tag{8}$$

In this ontology, the past and future are not regions of a temporal dimension; they are different coordinates within the same static block $\mathcal{C}$ [1,3].

4.2. Axiom A2: Identity of Source and Conserved Singularities

A second axiom introduces a distinguished point $p_0 \in \mathcal{C}$ and an automorphism group $\mathrm{Aut}(\mathcal{C}, G, \Psi)$ whose orbit generates a singular set $S = \mathrm{Orb}(p_0)$. All extreme configurations registered in the shadow—black holes, nucleosynthetic anchors, developmental organizers—descend from this singular set. Singularities in GR are reinterpreted as geometric traces of S rather than breakdowns of the theory [1,3].

4.3. Axiom A3: Shadow Realization and Gauge Time

Axiom A3 states:

> The observable world is a three-manifold Σ embedded in $\mathcal{C}$; observables are pullbacks, and "time" has no ontic status. Apparent evolution is a foliation artifact of comparing different admissible embeddings.

Formally, a foliation is given by a one-parameter family of embeddings $\{X_\lambda\}$, and all physical quantities must be invariant under reparameterizations $\lambda \mapsto f(\lambda)$. Time is thus a *gauge parameter*: it is eliminated from the ontology and retained only as a label on slices. This axiom is the decisive break with Minkowski. There is no temporal dimension in $\mathcal{C}$; there is only a static 4-D geometry whose projections are organised by foliation.

4.4. Axiom A4: Parsimony and the Extrinsic Constitutive Law

Finally, Axiom A4 imposes parsimony: no new "dark species" are allowed. Apparent dark phenomena arise from projection geometry encoded in a single extrinsic constitutive law. In the gravitational sector this law takes the form of a modified Poisson equation,

$$\nabla \cdot \left[\mu\left(\frac{|\nabla \Phi|}{a_*} \right) \nabla \Phi \right] = 4\pi G \rho_b, \tag{9}$$

where ρ_b is baryonic matter, a_* is a geometric embedding scale, and μ is a monotone interpolating function with appropriate asymptotics [1]. This single law replaces dark halos while preserving solar-system tests and yielding the observed radial acceleration relation.

In the biological sector, SEQUENTION introduces an analogous extrinsic law for informational fluxes, with a mobility μ_{bio} and a scale $a^\dagger$ [2]. In both cases, what appears as "dark matter", "deep time" or "Darwinian randomness" is a foliation artefact of projection from $\mathcal{C}$ to Σ.

5. Projection Geometry and Foliation

5.1. Embedding and Pullback

Let $\mathcal{C}$ be a four-dimensional manifold with metric G and content field Ψ. Let Σ be a three-manifold with coordinates x^i ($i = 1, 2, 3$). An embedding $X : \Sigma \to \mathcal{C}$ is locally given by coordinates $X^A(x^i)$, $A = 0, 1, 2, 3$. The induced metric on the shadow is

$$g_{ij}(x) = \frac{\partial X^A}{\partial x^i} \frac{\partial X^B}{\partial x^j} G_{AB}(X(x)), \tag{10}$$

 doi:10.20944/preprints202512.0768.v1

and similarly for $\psi = X^* \Psi$.

A foliation is then a one-parameter family $\{X_\lambda\}$, and any gauge choice of λ corresponds to a "time coordinate" on the shadow. The physical content of the theory resides in foliation-invariant quantities: slice invariants, extrinsic curvature relations, and constraints that are independent of the choice of parameter.

5.2. BSW Action as Consistency of Slices

In this setting, the BSW action can be interpreted as the statement that admissible sequences of slices $g_{ij}(\lambda)$ must satisfy a particular constraint algebra derived from the bulk geometry. The "time" label λ plays no role beyond parametrizing the path in configuration space. The emergent lapse function N in ADM language is a Lagrange multiplier enforcing the Hamiltonian constraint; it does not represent an ontic temporal metric.

Thus, even in GR, the correct categorical classification of "time" is: a *gauge parameter associated with foliation*, not a dimension. TCGS–SEQUENTION merely makes this explicit and generalises it beyond GR.

5.3. The Un-Foliator and the Breakdown of Time

The same projection geometry that generates foliation also predicts its breakdown. When the mass and structural complexity anchoring the shadow fall below a critical threshold, the projection map loses coherence and the foliation dissolves: the "un-foliator" state. In this regime, the notion of a global time parameter ceases to make sense; cause and effect decouple, and the system reverts to the timeless unity of $\mathcal{C}$ [4]. In other words, time disappears precisely where its interpretation as a dimension would be most tempting (near singularities). This is coherent only if time was never a dimension to begin with.

6. Dimensional Ontology Test: Dark Sectors as Projection Artifacts

6.1. Mass–Radius Cartography and the Topological Inconsistency of Σ

A key empirical motivation for counterspace is the mass–radius cartography of the universe, which reveals that the observable 3-D manifold is bounded by two antagonistic curves: the Schwarzschild boundary and the Compton boundary [9]. The shadow universe occupies a wedge between gravitational collapse and quantum uncertainty; regions beyond these curves are *forbidden*. A truly fundamental 3-D space should be scale-invariant, lacking such intrinsic forbidden zones.

In TCGS this wedge is reinterpreted as the *cone of admissibility* determined by the projection map X and the structure of $\mathcal{C}$ [1,3]. The boundaries are not absences of reality; they are the projective limits of the immersion. This is a topological inconsistency if Σ is thought fundamental, but a natural feature if Σ is a shadow.

6.2. Anisotropy, Dark Energy, and the Dipolar Deceleration Parameter

Cosmological observations now reveal strong evidence against a purely isotropic acceleration. Analyses of supernovae, radio source counts, and velocity fields point to a dipolar structure in the inferred deceleration parameter q_0 and in the CMB and radio dipoles [10,11]. Within ΛCDM such anisotropy is problematic: a fluid cannot possess a built-in directional preference.

Within TCGS, a dipolar q_0 is precisely what one expects if the embedding of Σ in $\mathcal{C}$ carries a mild anisotropy associated with the singular set S and Axiom A2. The "dark energy" needed to sustain isotropic acceleration is reinterpreted as an artefact of imposing an isotropic container on an anisotropic projection [3]. Once again, the failure of a temporal, $(3+1)$-dimensional description is a diagnostic that the underlying dimensional ontology is wrong.

6.3. Biological Homology: Darwinian Chance as Foliation Artefact

SEQUENTION generalises this reasoning to evolutionary biology. The apparent stochasticity of mutation, selection, and drift is reinterpreted as a projection artefact: the living biosphere is a shadow of a biological counterspace $(\mathcal{C}, G, \Psi_{\text{bio}})$, and "evolution in time" is a foliation of admissible genotype–phenotype–environment relations [2]. Many distinct lineages converge on identical structures (e.g. camera eyes) not because of teleology or extreme luck, but because they sample the same slice-invariant corridors in $\mathcal{C}$.

Here too, time does no ontic work. The "deep time" invoked by probabilistic arguments is a computational heuristic, not a resource in the world. The fact that both dark sectors in physics and Darwinian chance in biology can be eliminated by changing dimensional ontology is strong evidence that the original attribution of time as a dimension was a category error.

7. Why Three-Dimensional Time Remains in the Minkowski Trap

7.1. Summary of the $(1+3)$ Proposal

In the three-dimensional time programme, reality is postulated to comprise one spatial dimension and three temporal ones. Our familiar three spatial dimensions and one temporal dimension emerge from projections of this $(1+3)$ structure, with temporal curvature unifying interactions and temporal interference accounting for quantum behaviour [17]. Charge is then interpreted as a topological winding number in temporal space [18].

Mathematically, these models define a Lorentzian(-like) manifold with metric

$$ds^2 = dx^2 - dt_1^2 - dt_2^2 - dt_3^2, \tag{11}$$

and consider various projection maps from (x, t_1, t_2, t_3) to (X, Y, Z, T), including integrals of temporal connection components to generate evolved spatial coordinates [17]. The formalism is internally consistent and yields concrete phenomenological predictions.

7.2. Persistent Category Error

From the TCGS standpoint, the difficulty is not in the mathematics but in the ontology. The fundamental step—identifying a "temporal dimension" with a coordinate in a manifold—is left unchallenged. Whether we have $(3+1)$ or $(1+3)$, the underlying category remains "dimension = vector direction". The differences are index bookkeeping.

In particular:

- The $(1+3)$ construction remains explicitly dynamical; time-like directions are used to write wave equations and evolution laws.
- Foliation is still treated as a choice of hypersurfaces in a temporal manifold, rather than as a property of a shadow manifold embedded in a timeless counterspace.
- Singularities, horizons, and other extreme phenomena are not unified by an identity-of-source axiom; they remain local features of the manifold.

As a result, such models cannot resolve the core problem that TCGS addresses: the topological inconsistency of taking a three-dimensional (or $(1+3)$) container as fundamental when empirical data clearly indicate embedding constraints and forbidden regions.

7.3. Incompatibility with Counter-Spatial Dimensionality

The fourth dimension in TCGS is not temporal but counter-spatial: it encodes the extrinsic relations and informational content that generate the shadow. The singular set S, the extrinsic constitutive law, and the cartographic invariants across physics and biology all live in this counterspace. There is no room for temporal dimensions at the fundamental level without abandoning the axioms that make the framework coherent.

Any attempt to reinterpret the TCGS counterspace as a "three-dimensional time" manifold would therefore collapse the distinction between:

1. the *geometric container of content* (counterspace), and
2. the *gauge parameter of comparison* (time).

 doi:10.20944/preprints202512.0768.v1

This is exactly the confusion the Minkowski trap introduced. Within TCGS–SEQUENTION, the statement is categorical: *time cannot be a dimension.* Any formalism that treats it as such, including 3-D time, is logically incompatible with the framework, not just heuristically different.

8. The Fourth Dimension as Counter-Spatial Information

8.1. Singularities and Informational Density

Because $\mathcal{C}$ encodes the whole content of reality, its fourth dimension must be understood as an *informational axis*, not as an additional direction of motion. The singular set S, generated by the orbit of p_0, carries concentrated geometric information; its images in the shadow appear as black holes, nucleosynthetic anchors, or developmental organizers, depending on the sector under consideration [4,5]. The distribution of S in $\mathcal{C}$ is what gives the universe its structure.

From this viewpoint, the primary role of the fourth dimension is to provide the "reverse side" of measurement and wave phenomena: the part of the content field that cannot be captured on a single slice. The fact that measurements never fully coincide with the objects they characterise is evidence that the world is richer than any 3-D representation. The fourth dimension is that extra richness.

8.2. Slice Invariants and Evolution Without Time

If all genuine evolution is projection geometry, then the key physical quantities are slice invariants: those features of the shadow that remain unchanged under different foliation choices. Examples include:

- the mass–radius wedge boundaries,
- the calibrated scale a_* in extrinsic gravity,
- convergence corridors in SEQUENTION, and
- invariant interference structures in the consciousness sector [5].

These invariants do not "evolve in time"; they are geometric relations in $\mathcal{C}$ that manifest in every admissible foliation. What changes between slices is not the content of the world, but the portion of that content that is registered on the shadow.

9. Objections and Replies

9.1. "If Time Is Not a Dimension, Why Do Relativistic Equations Treat It as One?"

Relativistic equations treat time as a dimension because they were written in a formalism that assumed Minkowski's identification from the outset. The success of those equations for local predictions does not validate the underlying ontology. TCGS shows that GR and many of its successes can be recovered from a timeless, 4-D counterspace and a BSW-style action; the coordinate time t is then reinterpreted as a foliation label, not as a fundamental axis.

9.2. "Is TCGS Just Another Higher-Dimensional Speculation?"

The crucial difference is that TCGS does not add dimensions; it reclassifies them. The four dimensions of $\mathcal{C}$ are not $(3+1)$, $(1+3)$, or $(2+2)$; they are three spatial directions plus a counter-spatial dimension of content. Time is not counted among them. Moreover, the existence of $\mathcal{C}$ is not posited as a metaphysical flourish; it is inferred as a topological necessity from empirical wedges, anisotropies, and overdispersion in real data [1,3].

9.3. "Is a Timeless Ontology Experimentally Distinguishable?"

Yes. A timeless, counter-spatial ontology leads to concrete predictions:

- single-scale fits to galaxy rotation curves without dark halos,
- dipolar rather than monopolar cosmic acceleration,
- non-Poissonian radio source counts arising from 4-D connectivity,
- slice-invariant developmental endpoints in biology independent of historical path, and
- characteristic signatures in consciousness experiments tied to foliation breakdowns.

Each of these is a test of the projection geometry, not of additional temporal dimensions.

10. Conclusion

The identification of time with a geometric dimension was historically understandable but ontologically mistaken. Minkowski's formal unification solved the problem of Lorentz invariance by treating time as a fourth coordinate, and the subsequent success of GR and quantum field theory on curved space-time encouraged physicists to read this algebraic device as a description of what exists. The resulting "Minkowski trap" made it natural to multiply dimensions whenever anomalies appeared, rather than questioning the nature of dimension itself.

TCGS–SEQUENTION proposes a different answer. Time is not a dimension at all; it is a foliation parameter, a gauge artefact associated with comparing admissible projections of a static four-dimensional counterspace. The true fourth dimension is counter-spatial and informational, populated by a singular set whose images generate both physical and biological structures. When this dimension is recognised for what it is, dark sectors, deep probabilistic time, and temporal dimensions (including 3-D time) all reveal themselves as artefacts of a misclassified category.

Within this framework, any formulation that treats time as a dimension—be it $(3+1)$, $(1+3)$, or any variant with temporal vectors—is not merely heuristically different but categorically wrong. It conflates the geometry of content with the gauge of comparison. Escaping the Minkowski trap requires accepting a stricter logic: four dimensions, yes, but none of them temporal.

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