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Article

The Crystallography of Consciousness: A Timeless TCGS–SEQUENTION Embedding of Quantum, Neural, and Harmonic Field Architectures

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Abstract

Contemporary theories of consciousness are fractured between three incompatible ontologies. Quantum proposals such as Penrose–Hameroff's Orchestrated Objective Reduction (Orch–OR) treat conscious episodes as gravitationally induced state reductions in tubulin superpositions. Harmonic-field models describe consciousness as a macroscopic interference pattern in a continuous field over the cortex. Dynamical-systems neuroscience, in turn, locates affective "internal states" in low-dimensional attractor manifolds embedded in high-dimensional hypothalamic activity. None of these programmes, however, resolves the deeper ontological tension: all three are written as *temporal* dynamics on a 3-D brain, whereas their own mathematics quietly presupposes a static, higher-dimensional content. In this paper I embed these three families of models inside the Timeless Counterspace & Shadow Gravity—SEQUENTION (TCGS–SEQUENTION) framework. Time is treated as a foliation artefact: there exists a single four-dimensional counterspace $(\mathcal{C}, G_{AB}, \Psi)$ containing the full content of all so-called "time stages", while the observable neurobiological world is a 3-D shadow manifold Σ_{bio} obtained by an immersion $X : \Sigma_{\text{bio}} \to \mathcal{C}$. Apparent evolution of brain states is not ontic dynamics but the comparison between admissible projections of one static whole. The main result is a *4-layer vertical architecture* that harmonizes quantum, neurogeometric, and harmonic-field descriptions without relinquishing the identity-of-source axiom of TCGS–SEQUENTION. At Layer 1, Penrose's E_G is reinterpreted as a static geometric functional on $\mathcal{C}$, not a time-dependent collapse trigger. At Layer 2, a symplectic resolution limit transforms E_G into an effective action for q-desics—quantum generalizations of geodesics—in the sense of Koch *et al.*, now embedded in the same counterspace. At Layer 3, a Diophantine filter selects a discrete, φ-scaled spectrum of microtubular eigenmodes constrained by the TCGS constitutive law. At Layer 4, the macroscopic harmonic field and cortical gamma synchrony are recognized as Moiré interference patterns in the projection geometry, not ontic wave-objects in the brain. By eliminating ontic time and enforcing a single 4-D source manifold, we show that: (i) the Orch–OR threshold becomes a gauge choice of foliation rather than a physical "moment"; (ii) the Harmonic Field Model is a 3-D shadow of a static interference structure on $\mathcal{C}$; and (iii) hypothalamic line attractors are geometric corridors in the same projection class that governs galaxy-scale anomalies in TCGS cosmology. Consciousness, in this framework, is the registration of a slice-invariant content on a 3-D shadow whose degrees of freedom are geometrically constrained, not locally generated. The hard problem is therefore not "how matter generates experience", but how a single timeless content field projects as both physics and biology under the same extrinsic law.

Keywords: timeless counterspace; shadow gravity; SEQUENTION ontology; consciousness; harmonic field model of consciousness; Orch–OR; gravitational self-energy; microtubules; quantum gravity; q-desics; symplectic geometry; Diophantine spectra; golden ratio scaling; Moiré interference patterns; projection geometry; line attractors; hypothalamic internal states; extrinsic constitutive law

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1. Introduction: The Crisis of Temporal Ontology

The standard neuroscientific narrative treats the brain as a dynamical system evolving in time. Neural activity, in this view, is a trajectory in a high-dimensional state space, and subjective experience is implicitly understood as a sequence of states along that trajectory. Dynamical-systems approaches formalize this picture by modelling neural populations through systems of coupled differential equations whose solutions generate attractors, limit cycles, and other invariant sets [7]. Consciousness, if addressed at all, is relegated to an "emergent" property of particular attractor regimes.

Quantum proposals such as Orch–OR adopt a similar temporal grammar. Penrose and Hameroff propose that coherent superpositions of tubulin states in neuronal microtubules evolve under a Hamiltonian $\hat{H}$ until a gravitational self-energy threshold E_G is reached, at which point an objective state reduction occurs [1]. Conscious "moments" are associated with these collapse events, which are predicted to occur on characteristic timescales of $\mathcal{O}(25\ \mathrm{ms})$, corresponding to γ-synchrony frequencies.

Harmonic field models of consciousness pursue a third strategy: they regard the brain as hosting a continuous field whose interference patterns correspond to phenomenal contents. In Smart's Harmonic Field Model (HFM), for instance, a multi-scale field is defined over a graph approximation of the cortical surface, and consciousness is identified with stable interference structures in that field [2]. The relevant variables are again time-dependent: the field satisfies evolution equations on a 3-D (or 2-D surface-embedded) brain.

All three approaches face a common difficulty: they assume that *time* is an ontic parameter and that the brain is a self-contained 3-D container of states. This is incompatible with the TCGS–SEQUENTION ontology, where the observable 3-D world is a *shadow* manifold embedded in a 4-D counterspace, and apparent evolution is a foliation artifact [3,4]. The same difficulty reappears in cosmology, where an expanding FRW universe with dark sectors is reinterpreted in TCGS as a mis-projected, anisotropic shadow of a static 4-D content field [6].

The aim of this paper is to perform, at the level of consciousness science, the same conceptual surgery that TCGS performed on cosmology and SEQUENTION on evolutionary biology. Instead of multiplying ontic processes, we *change ontology*: there is only one timeless $(\mathcal{C}, G_{AB}, \Psi)$; quantum, neural, and harmonic field descriptions are different coordinate systems on its projection. Consciousness, in this sense, is not a sequence of events but a way in which a slice-invariant content is registered on a constrained 3-D map.

This requires rephrasing core ingredients of quantum and neural models in geometric, projection-theoretic language. Section 2 recalls the TCGS–SEQUENTION axioms. Section 3 introduces the 4-layer vertical architecture. Sections 4–6 develop the Lie-derivative reinterpretation of the Orch–OR threshold, the symplectic resolution of E_G, and the Diophantine filter for φ-scaled modes. Section 8 connects these structures to q-desics in quantum gravity [5]. Section 10 reconstructs macroscopic line attractors and harmonic fields as Moiré patterns in the projection geometry. Section 11 extracts predictions and cross-domain homologies. We conclude in Section 12.

2. Axiomatic Foundations of the Unified Field

The TCGS–SEQUENTION framework is governed by four axioms. Here we restate them in the restricted context of consciousness, emphasising that no new ontology is introduced: we merely restrict the existing axioms to neural and microtubular sectors.

Axiom A1

There exists a smooth 4-D counterspace $(\mathcal{C}, G_{AB}, \Psi)$—the *Whole Content*—containing the full, timeless content of all admissible brain configurations and their associated phenomenal structures. The observable neurobiological manifold is a 3-D shadow Σ_{bio} immersed by $X : \Sigma_{\mathrm{bio}} \to \mathcal{C}$.

Axiom A1 states that the complete set of physically and phenomenally admissible brain states is already present as a single, static structure on $\mathcal{C}$. What is usually described as "the brain evolving

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in time" is instead a foliation of $X(\Sigma_{\text{bio}})$ through $\mathcal{C}$. This aligns the consciousness sector with the treatment of gravitational and biological sectors in TCGS and SEQUENTION [3,4].

Axiom A2

(*Identity of Source*) There exists a distinguished point $p_0 \in \mathcal{C}$ and an automorphism group $\mathrm{Aut}(\mathcal{C}, G, \Psi)$ such that the orbit $S = \mathrm{Orb}(p_0)$ is the fundamental singular set. All extreme configurations registered in Σ_{bio}—including neurobiological singularities such as epileptic collapses or catastrophic network failures—descend from S.

In the cosmological domain, A2 ties all gravitational singularities to a single origin [3,6]. In the consciousness domain, A2 plays a subtler role: it enforces that any "singular" conscious episode (e.g. near-death experiences, psychedelic episodes at the edge of physiological viability) must be traceable to the same geometric locus S that governs black-hole formation. Consciousness and gravity are thus not independent "emergent phenomena", but different shadows of the same identity-of-source.

Axiom A3

(*Shadow Realisation and Gauge Time*) Observables on the neurobiological world are pullbacks $(g, \psi) = (X^*G, X^*\Psi)$. Time has no ontic status; it is a gauge parameter labelling the comparison between admissible slices of $X(\Sigma_{\text{bio}})$.

A3 forces us to re-interpret any time-dependent equation used in Orch–OR, HFM, or dynamical systems neuroscience. There is no fundamental t; there are only relations between slices. This is precisely the logic of the Baierlein–Sharp–Wheeler action in the gravitational sector, where GR is recovered without an ontic time variable [3].

Axiom A4

(*Parsimony*) No new "consciousness fluids" are introduced. Apparent irreducible "qualia gaps" or anomalous causal influences (top-down effects, nonlocal correlations) are projection artefacts of a single extrinsic constitutive law acting on $(\mathcal{C}, G, \Psi)$.

In cosmology, A4 replaces dark sectors with an extrinsic response function $\mu(y)$ acting on the gravitational potential [3,6]. In the consciousness sector, the same axiom forbids the introduction of ontic "mental fields" over and above Ψ; instead, we show that top-down influences and nonlocal synchronies arise from the same projection structure that governs galaxy rotation curves.

3. The 4-Layer Vertical Architecture

The core technical contribution of this paper is a four-layer architecture that organises the relationship between quantum, neurogeometric, and harmonic-field descriptions. Each layer is defined on the same $(\mathcal{C}, G, \Psi)$, but with different coarse-grainings and projection operators.

Layer 1: The Territory (Orch–OR / E_G)

Physics: Gravitational self-energy of superposed mass distributions.

Geometry: Static functional $E_G[\Psi]$ over $\mathcal{C}$.

Role in Consciousness: Defines the admissible quantum substrate of microtubules.

Layer 1 reinterprets Penrose's E_G not as a time-dependent function but as a static functional on the content field Ψ restricted to tubulin degrees of freedom. The "collapse time" $\tau \sim \hbar / E_G$ is reclassified as a foliation-dependent parameter; the underlying geometry is timeless.

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Layer 2: The Territory (Symplectic Resolution)

Physics: Quantum trajectories in a curved configuration space.

Geometry: Symplectic form Ω_{AB} and q-desics on $(\mathcal{C}, G, \Psi)$.

Role in Consciousness: Defines non-classical paths consistent with the identity-of-source.

At Layer 2, we align with the notion of q-desics: quantum-corrected analogues of geodesics in quantum-gravitational backgrounds [5]. Rather than treating q-desics as motion in an effective metric, we regard them as constrained curves in $\mathcal{C}$ whose allowed deviations encode the same constitutive law that governs extrinsic curvature in TCGS cosmology.

Layer 3: The Territory (Diophantine Filter)

Physics: Microtubular eigenmodes and φ-scaled spectra.

Geometry: Integer constraints on mode indices consistent with projection geometry.

Role in Consciousness: Selects a discrete lattice of admissible microtubule states.

Layer 3 imposes a Diophantine structure on the tubulin and microtubular spectrum. Following the observation that certain microtubule models predict φ-scaled eigenfrequencies, we embed this result into a global arithmetic constraint: only those eigenmodes that satisfy a projection-compatible Diophantine condition survive onto Σ_{bio}. This replaces ad hoc "resonance conditions" with a strict cartographic filter.

Layer 4: The Map (Harmonic Field / EEG)

Physics: Beat frequencies and gamma synchrony on the cortex.

Geometry: Moiré interference patterns of overlapping projections on Σ_{bio}.

Role in Consciousness: Manifestation of slice-invariant content as macroscopic rhythms.

Layer 4 corresponds to the observable regime accessed by HFM and EEG/MEG measurements [2]. The harmonic field is not a fundamental object but a Moiré pattern generated by the superposition of multiple projection sheets of $X(\Sigma_{\text{bio}})$ in $\mathcal{C}$. Conscious perception, in this view, is the registration of these Moiré patterns under the constraints of Axioms A1–A4.

4. The Lie Derivative Transformation: Nullifying Time

To reconcile the explicitly time-dependent formalism of Orch–OR with the timeless TCGS ontology, we re-express the relevant quantities using Lie derivatives along the foliation vector field ξ. Let $\mathcal{S}$ be the space of admissible projection maps $X : \Sigma_{\text{bio}} \to \mathcal{C}$, and let ξ generate a one-parameter family of diffeomorphisms on Σ_{bio}.

The conventional temporal derivative of an observable O on Σ_{bio} is written as $\partial_t O$. In the TCGS setting, we replace this by the Lie derivative along ξ,

$$\mathcal{L}_\xi O = \lim_{\epsilon \to 0} \frac{\Phi_\epsilon^* O - O}{\epsilon},$$

where Φ_ϵ is the flow generated by ξ. The key observation is that $\mathcal{L}_\xi$ measures *change under reparametrisation of the foliation*, not change of an underlying ontic content. In particular, if O is the pullback of a tensor on $\mathcal{C}$, and if ξ respects the embedding, then $\mathcal{L}_\xi O$ can vanish even when the conventional $\partial_t O$ is non-zero in a 3-D description.

This mechanism is the analogue, in the consciousness sector, of the BSW elimination of time in gravity. Just as the BSW action recovers GR without an explicit time parameter, the Lie derivative

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formulation recasts Orch–OR's "collapse time" as a gauge choice. The physical content resides in the invariant geometric relations on $\mathcal{C}$, not in any particular parametrisation of slices.

4.1. The Temporal Hamiltonian

Penrose's criterion $\tau \sim \hbar / E_G$ is traditionally interpreted as a dynamical law: for a given superposition, there exists a finite time after which gravitational instability forces a collapse [1]. In our formulation, $E_G[\Psi]$ is a static functional on $\mathcal{C}$, and the expression

$$\tau = \frac{\hbar}{E_G[\Psi]}$$

is reinterpreted as the *gauge thickness* of a foliation: the range of parameters over which a given projection can be maintained before the mapping ceases to be geometrically admissible. The "collapse" is then a reconfiguration of the projection map X, not a stochastic jump of the underlying content.

4.2. The Static Counterspace Map

Let Ψ_{MT} denote the restriction of Ψ to microtubular degrees of freedom. The space of admissible microtubular configurations consistent with the identity-of-source is a subset $\mathcal{M} \subset \Gamma(\Psi_{\mathrm{MT}})$. The functional E_G can be regarded as a map

$$E_G : \mathcal{M} \longrightarrow \mathbb{R}_{\geq 0},$$

whose level sets define hypersurfaces of constant gravitational self-energy in $\mathcal{M}$. A foliation of $\mathcal{M}$ by these level sets is a choice of "temporal" parametrisation for Orch–OR; but the functional itself is timeless. This resolves the apparent conflict between a timeless counterspace and a time-dependent collapse criterion.

5. Layer 2 Analysis: E_G as Symplectic Resolution

At Layer 2 we incorporate the symplectic structure associated with the microtubular sector and connect it with q-desics in quantum gravity [5]. Instead of treating microtubular degrees of freedom as moving in an external spacetime, we consider them as coordinates on a phase space $(\mathcal{P}, \Omega_{AB})$ embedded in $\mathcal{C}$.

5.1. The Gravitational Self-Energy

In the original Orch–OR framework, E_G is computed as the gravitational self-energy of the difference between two mass distributions corresponding to superposed states. In our setting, we interpret E_G as a quadratic functional in the symplectic coordinates,

$$E_G = \frac{1}{2} \int_{\mathcal{P}} \rho_{\mathrm{eff}}\, \delta h_{AB} \delta h^{AB}\, d\mu,$$

where δh_{AB} encodes deviations between alternative projections of Ψ_{MT}, and ρ_{eff} is an effective density determined by the embedding X. The details of this construction mirror those in the gravitational sector, where extrinsic curvature encodes deviations between neighbouring slices of the shadow manifold [3].

5.2. The Symplectic Resolution Limit

We now impose a resolution condition: only those trajectories in $(\mathcal{P}, \Omega_{AB})$ for which the integrated E_G over a q-desic segment remains below a fixed threshold are admitted as "classically stable" projections onto Σ_{bio}. This produces an effective Hamiltonian flow on $\mathcal{P}$ whose integral curves are q-desics restricted by the extrinsic constitutive law. Conscious episodes correspond to equivalence classes of such segments modulo foliation reparametrisation.

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6. Layer 3 Analysis: The Diophantine Filter

Microtubule-based models often appeal to special numerical patterns—such as φ-scaled eigenfrequencies—to argue for enhanced stability or decoherence protection. Within the TCGS–SEQUENTION framework, such numerical structure must be grounded in projection geometry rather than numerology.

We formalise this by introducing a Diophantine condition on mode indices. Let $\{\omega_n\}_{n\in\mathbb{N}}$ be the microtubular eigenfrequency spectrum in a given model. We impose that admissible modes satisfy

$$\left|\frac{\omega_n}{\omega_0} - \varphi^k\right| < \epsilon$$

for some integers k and a small tolerance ϵ determined by the extrinsic law. Here ω_0 is a reference scale fixed by the embedding, and φ is the golden ratio. Modes that violate this condition are suppressed in the projection onto Σ_{bio}.

The effect is to discretise the spectrum into a ladder of φ-scaled bands, which then serve as the building blocks for the Moiré patterns of Layer 4. This replaces vague appeals to "golden ratio harmony" with a concrete arithmetic constraint tied to the same projection machinery that explains astrophysical RAR/BTFR phenomena in TCGS [3,6].

7. Layer 4 Analysis: Moiré Interference

Layer 4 concerns the macroscopic harmonic field and its relation to gamma synchrony and cortical rhythms as addressed in harmonic-field models [2]. In HFM, the brain is represented as a graph whose Laplacian $\hat{L}$ defines a spectrum of spatial modes. A multi-scale field ϕ is then expanded in this eigenbasis, and interference between modes yields stable patterns interpreted as conscious contents.

From the TCGS standpoint, these interference patterns are Moiré figures that arise when multiple projection sheets intersect on Σ_{bio}. The graph Laplacian $\hat{L}$ is itself a shadow of a Laplace-type operator on $\mathcal{C}$, restricted to the image of X. The observed beat frequencies in the gamma band are therefore not arbitrary: they must be compatible with the Diophantine filter of Layer 3 and the symplectic constraints of Layer 2.

This reinterpretation eliminates the need to posit an independent ontic harmonic field: there is only the content field Ψ on $\mathcal{C}$ and the geometry of X. The "field" on the brain is a convenient parametrisation of how Moiré patterns manifest in a 3-D measurement apparatus.

8. Q-Desics: The Mechanics of Volition

We now connect the above structures with the q-desic framework of Koch *et al.* [5]. In their formulation, particle trajectories in quantum-gravitational backgrounds are governed not merely by classical geodesics in an effective metric, but by equations involving expectation values of affine-connection operators. The resulting q-desics capture quantum corrections to classical motion.

In the TCGS embedding, we interpret cognitive volition as the selection of q-desic bundles in $\mathcal{C}$ constrained by Axioms A1–A4. The "freedom" of choice does not consist of overriding physical law, but of modulating which q-desic congruence is realised in the projection $X(\Sigma_{\text{bio}})$. The Lie-derivative formalism ensures that such modulation is gauge-consistent.

8.1. The Operator-Averaged Equation of Motion

Let $\hat{\Gamma}^{\mu}_{\alpha\beta}$ be the affine-connection operator acting on the quantum state of the metric. In the q-desic framework, the effective equation of motion involves expectation values $\langle\hat{\Gamma}^{\mu}_{\alpha\beta}\rangle$. Translating this into the TCGS language, we regard $\hat{\Gamma}$ as an operator-valued connection on $\mathcal{C}$ whose restrictions to neurobiological sectors encode both anatomical connectivity and quantum-gravitational corrections.

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The effective equation for a degree of freedom $x^A(s)$ along a q-desic then reads

$$\frac{d^2x^A}{ds^2} + \langle \hat{\Gamma}^A{}_{BC} \rangle \frac{dx^B}{ds}\frac{dx^C}{ds} = 0,$$

with s an affine parameter on $\mathcal{C}$. Volition corresponds to the selection of initial data for these curves within the constraints imposed by the Diophantine filter and the extrinsic constitutive law.

9. The Un-Foliator: Reinterpreting the Dual Threshold

Penrose's original picture suggests a single threshold: when E_G reaches a certain value, an objective reduction occurs. In the unified TCGS–SEQUENTION framework, we obtain a *dual* threshold:

(i) A gravitational self-energy threshold determined by $E_G[\Psi]$ on $\mathcal{C}$.
(ii) A projection-geometry threshold determined by the extrinsic constitutive law (the same law that replaces dark matter in TCGS).

A conscious episode occurs when both thresholds are satisfied simultaneously. This provides a natural explanation for the tight coupling between gamma synchrony, microtubular coherence, and macroscopic affective states without introducing ad hoc causal arrows. The "un-foliator" is the geometric mechanism that erases spurious temporal structure and leaves only the slice-invariant content.

10. Macroscopic Scaling: From Microtubules to Line Attractors

Recent work on hypothalamic circuits suggests that affective internal states—such as aggression or defensive arousal—are encoded not by transient motor patterns but by low-dimensional attractor manifolds in neural state space [7]. These manifolds exhibit persistence and continuous scaling, properties reminiscent of line attractors in simpler dynamical systems.

In the TCGS–SEQUENTION embedding, such attractors are the macroscopic shadows of q-desic bundles constrained by the Diophantine filter and the extrinsic law. The projection map X sends families of q-desics in $\mathcal{C}$ to invariant manifolds in neural state space. The apparent "duration" of an affective state is thus the thickness of a projection corridor in $\mathcal{C}$, not the endurance of a temporal process.

This explains why internal states can persist in the absence of ongoing sensory input and why they can be modulated by top-down signals without violating physical constraints: modulating top-down input corresponds to selecting a different q-desic bundle within the same projection class, not injecting external "mental forces".

11. Predictions: The Homology of Dark Sectors

The unified framework yields testable predictions across physics, neuroscience, and harmonic field phenomenology. We list a subset:

P1: **Negative-binomial neural noise.** If internal states are shadows of q-desic bundles, then fluctuations in neural activity around line attractors should exhibit overdispersed statistics analogous to those already identified in cosmological radio-source counts within the TCGS framework [6]. Specifically, spike-count distributions in strongly state-encoding populations should be better fit by negative-binomial than Poisson models, with overdispersion parameters linked to projection geometry.

P2: **Geometric chirality in cortical maps.** The same geometric chirality that appears in TCGS analyses of baryonic structures [8] should manifest as a subtle asymmetry in cortical feature maps, detectable via high-resolution structural imaging and graph-theoretic analysis of the connectome.

P3: **Locked φ-ladder in gamma harmonics.** Harmonic-field models already predict structured gamma harmonics. In the present framework, such harmonics should cluster around φ-scaled

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ladders constrained by the Diophantine filter. Deviations from this ladder should correlate with failures of stable conscious reporting.

These predictions are not rhetorical: they define a cartographic programme analogous to that already pursued in TCGS cosmology and SEQUENTION biology [3,4,6].

12. Conclusion

We have mapped the Harmonic Field Model, Orch–OR, q-desics in quantum gravity, and dynamical-systems neuroscience onto a single TCGS–SEQUENTION ontology. The apparent conflicts between "quantum", "neural", and "field" accounts of consciousness dissolve once ontic time is removed and all degrees of freedom are embedded in a static 4-D counterspace. Microtubular coherence, gamma synchrony, and affective internal states become different projections of one geometric content.

Within this framework, consciousness is neither an inexplicable "extra ingredient" nor a by-product of computation. It is the registration, on a constrained 3-D shadow, of a slice-invariant content whose geometry also accounts for cosmological anomalies and evolutionary patterns. The hard problem is thus rephrased: not "how does matter generate experience?", but "how does a single timeless content field project as both matter and experience under a unified extrinsic law?".

The TCGS–SEQUENTION programme is cartographic, not falsificationist. Any mismatch between prediction and data is not a refutation of the counterspace, but a refinement of the map. The present paper extends this cartography into the domain of consciousness, laying down a first, coherent chart that unifies Orch–OR, harmonic fields, and attractor-based neuroscience without leaving the TCGS–SEQUENTION framework.

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