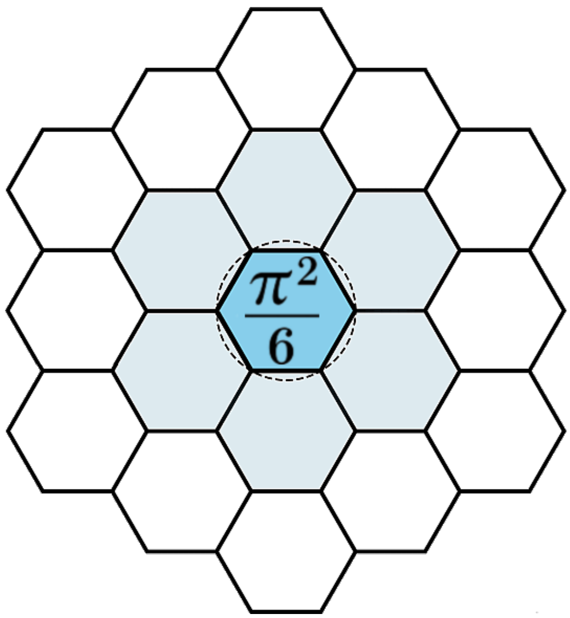
Emergence–Edge Cosmology in Pattern Field Theory: A Curvature-Replication Model of Large-Scale Structure, Trishift Dynamics, and Collapse-Based Formation

James Allen[1]

[1]Pattern Field Theory Institute



Basel constant $\pi^2/6$ on the central hexagon (Allen Orbital Lattice).

Abstract

This paper presents a complete cosmological framework derived from Pattern Field Theory (PFT). The model replaces metric expansion with curvature replication, replaces redshift with a three-component Trishift field, and replaces inflation with deterministic emergence from null to π-loop closure, substrate formation, and dimensional lift.

Observable effects are determined by the cumulative replication integral

$$\chi(d) = \int_0^d R(s)\,\eta(s)\,ds,$$

which defines the Trishift components $T(d) = (T_1(d),\, T_2(d),\, T_3(d))$. The spectral slope condition

$$\frac{dT_1}{dd} = H_{\mathrm{pft}}\eta(d)$$

serves as a falsifiable alternative to the distance–redshift relation of ΛCDM.

Internal instability regions generate collapse events leading to two endpoints: PCS-L (finite prestellar collapse) or PCS-H (black-hole anchoring). These events produce structure, regulate curvature flow, and serve as load-balancing mechanisms across the manifold.

This document provides the full foundation, mathematical formalism, observational program, and glossary required for PFT cosmology to serve as an independent scientific framework.

Contents

1 Foundations of Pattern Field Theory Cosmology **5**
- 1.1 Overview . . . 5
- 1.2 AOL, PAL, CCE . . . 5
- 1.3 Null . . . 5
- 1.4 From Null to Geometry . . . 5
- 1.5 Departure from Metric Expansion . . . 5

2 Emergence Sequence **7**
- 2.1 Null . . . 7
- 2.2 π-Loop Formation . . . 7
- 2.3 Substrate Formation (2D) . . . 7
- 2.4 Dimensional Lift (3D) . . . 7
- 2.5 Fractal Stabilization . . . 7
- 2.6 Early Curvature Propagation . . . 7

3 Curvature Replication and Edge Conversion **8**
- 3.1 Replication Rate $R(s)$ . . . 8
- 3.2 Efficiency Field $\eta(s)$ . . . 8
- 3.3 Replication Integral $\chi(d)$ . . . 8
- 3.4 Edge Conversion . . . 8
- 3.5 TikZ Figure: Emergence-to-Edge Architecture . . . 9

4 Trishift Cosmology **10**
- 4.1 Definition . . . 10
- 4.2 Spectral Component T_1 . . . 10
- 4.3 Temporal Component T_2 . . . 10
- 4.4 Geometric Component T_3 . . . 10
- 4.5 TikZ Figure: Trishift Flow . . . 10

5 Observational Mapping **12**
- 5.1 CMB Mapping . . . 12
- 5.2 Large-Scale Structure . . . 12
- 5.3 Trishift Channels . . . 12
- 5.4 Multi-Channel Consistency Test . . . 12
- 5.5 TikZ Figure: Multi-Channel Pipeline . . . 12

6 Prestellar Zones and Collapse Dynamics **14**
- 6.1 Definition . . . 14
- 6.2 Origins of Prestellar Underdensity . . . 14

6.3 Collapse Trigger Condition . . . 14
6.4 Collapse Evolution . . . 14
6.5 Finite Collapse Endpoint: PCS-L . . . 15
6.6 Horizon Collapse Endpoint: PCS-H . . . 15
6.7 TikZ: PCS–BH Bifurcation Diagram . . . 15

7 Black Holes and Curvature Load-Balancing 16
7.1 Black Holes as PCS-H Endpoints . . . 16
7.2 Curvature Anchoring Function . . . 16
7.3 Load-Balancing Across the Manifold . . . 16
7.4 Rotation and Stability . . . 17
7.5 TikZ: Black-Hole Anchoring Model . . . 17

8 Large-Scale Cosmology 18
8.1 Universe Growth vs Expansion . . . 18
8.2 Conversion Frontier Kinematics . . . 18
8.3 Dominion Mechanics . . . 18
8.4 Global Rotation and Stability Zones . . . 18
8.5 PCS-L and PCS-H as Matter-Cycle Engines . . . 19

9 Comparative Frameworks 20
9.1 PFT vs GR . . . 20
9.2 PFT vs QFT . . . 20
9.3 Common Ground . . . 21

10 Predictions and Tests 22
10.1 Prediction 1: Trishift Slope Evolution Without Dark Energy . . . 22
10.2 Prediction 2: PCS-L and PCS-H Spatial Distribution . . . 22
10.3 Prediction 3: Void Evolution Patterns . . . 22
10.4 Prediction 4: Edge Non-Emissivity . . . 22
10.5 Prediction 5: Trishift Multi-Channel Consistency . . . 22

11 Conclusion and Internal Summary 24

Conclusion and Internal Summary 24

1 Foundations of Pattern Field Theory Cosmology

1.1 Overview

Pattern Field Theory (PFT) is a curvature-first framework grounded in the AOL/PAL/CCE ontology. The cosmological model does not assume a pre-existing spacetime metric. Instead, spacetime is produced through a deterministic emergence sequence originating from a null state.

PFT replaces the expansion paradigm of general relativity with curvature replication and edge conversion. It replaces redshift with the Trishift field. And it interprets structure formation as the outcome of curvature-threshold collapse rather than inflationary processes.

1.2 AOL, PAL, CCE

- **AOL (Allen Orbital Lattice)**: The geometric substrate organizing curvature alignment.
- **PAL (Pattern Alignment Logic)**: The rules determining curvature compatibility and stability.
- **CCE (Curvature–Conversion Engine)**: The process by which curvature generates more curvature.

These three layers form the basis of PFT's cosmological engine.

1.3 Null

Null is a non-metric, non-spatial, unoccupied state with no coordinates, no extent, and no temporal progression. It is not a vacuum and not a background. It is the absence of dimensional structure. It contains fractal tendency but no expression.

1.4 From Null to Geometry

The first geometric object that can exist is a π-loop: a closed curvature loop whose closure ratio equals π. The existence of a single π-loop is the first dimension-bearing event. It allows:

- geometric persistence,
- measurable curvature,
- substrate formation.

1.5 Departure from Metric Expansion

PFT does not use:

- an expanding metric,
- a scale factor $a(t)$,

- a cosmological constant.

Distances grow because curvature replicates at the edge, not because spacetime stretches. Observable shifts emerge from Trishift accumulation, not recession.

2 Emergence Sequence

2.1 Null

Null contains no geometry. It cannot host curvature or any dimension-bearing object. It is not a container; it is the absence of containment.

2.2 π-Loop Formation

A π-loop is the first possible closed curvature ratio. It is the minimal configuration that permits:

- closure,
- recurrence,
- stability.

This moment marks the transition from non-geometry to geometry.

2.3 Substrate Formation (2D)

A collection of π-loops mutually constrains curvature into a flat, continuous 2D field. This substrate is the geometric precursor to spatial dimensions.

2.4 Dimensional Lift (3D)

When a critical density of π-loops binds to the substrate, curvature lifts orthogonally, producing the first 3D curvature pocket. This event begins the formation of the manifold.

2.5 Fractal Stabilization

With 3D curvature established, the system relaxes into local fractal regions. These regions contain:

- differentiats,
- curvature wells,
- network-like structures.

2.6 Early Curvature Propagation

Before full replication coherence, curvature spreads irregularly. These irregularities seed:

- anisotropies,
- proto-voids,
- filament precursors.

These map directly to observed CMB anomalies.

3 Curvature Replication and Edge Conversion

3.1 Replication Rate $R(s)$

Curvature replication is the primary driver of large-scale evolution in PFT cosmology. The replication rate $R(s)$ describes how much curvature is produced per unit comoving path.

Replication is not a matter-dependent phenomenon. It is geometric:

$$R(s) = \text{local curvature production per path increment.}$$

3.2 Efficiency Field $\eta(s)$

Even when curvature is produced, not all of it stabilizes. The efficiency field $\eta(s)$ measures the fraction of curvature that integrates into the manifold.

Factors influencing $\eta(s)$:

- curvature coherence,
- PAL compatibility,
- density environment (voids vs wells),
- proximity to collapse regions.

3.3 Replication Integral $\chi(d)$

The cumulative effect along a comoving distance d is:

$$\chi(d) = \int_0^d R(s)\,\eta(s)\,ds.$$

Every observable in PFT cosmology is a function of $\chi(d)$.

3.4 Edge Conversion

The boundary of the universe is not an end of space; it is a conversion frontier where null becomes manifold.

Null cannot support geometry. When curvature reaches the boundary:

1. a π-loop forms,
2. it binds to the nearest substrate region,
3. a new substrate patch forms,
4. dimensional lift generates a 3D pocket.

Thus the universe grows by adding manifold through conversion, not by stretching existing space.

3.5 TikZ Figure: Emergence-to-Edge Architecture

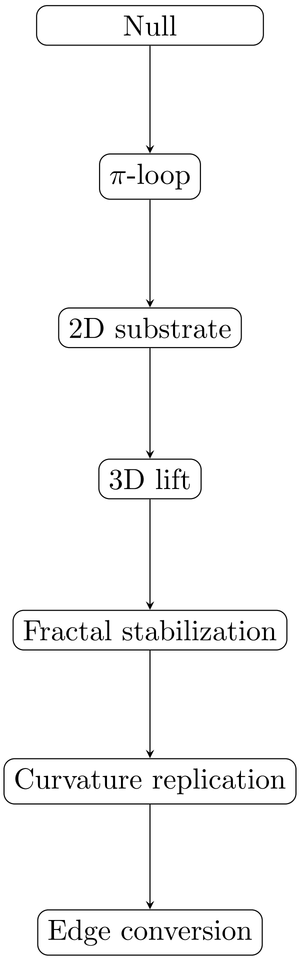


Figure 1: Emergence-to-edge architecture in PFT.

4 Trishift Cosmology

4.1 Definition

The Trishift field replaces redshift as the observable signature of line-of-sight evolution:

$$T(d) = \big(T_1(d),\, T_2(d),\, T_3(d)\big).$$

- T_1: spectral shift,
- T_2: temporal shift,
- T_3: geometric shift.

All three components satisfy:

$$T_i(d) = F_i\big(\chi(d)\big).$$

4.2 Spectral Component T_1

For small d:

$$T_1(d) \approx H_{\mathrm{pft}} d.$$

In general:

$$\frac{dT_1}{dd} = H_{\mathrm{pft}} \eta(d).$$

4.3 Temporal Component T_2

Represents accumulated timing deformation, measurable via:

- pulsar timing arrays,
- FRB arrival microstructure,
- gravitational-wave standard sirens.

4.4 Geometric Component T_3

Encodes path-deformation effects measurable through:

- weak lensing correlation statistics,
- strong-lens time delays,
- angular correlation anomalies.

4.5 TikZ Figure: Trishift Flow

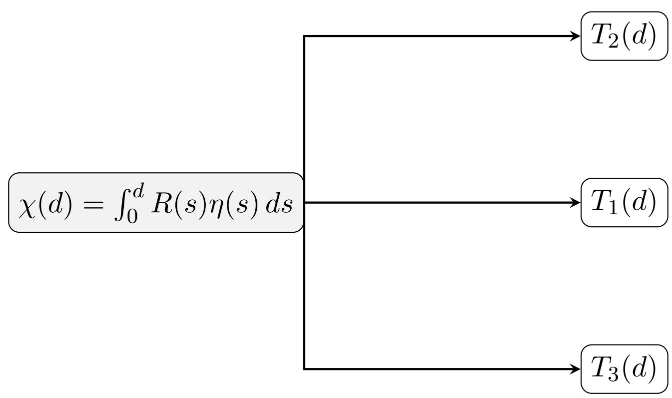


Figure 2: Trishift field derivation from the replication integral.

5 Observational Mapping

5.1 CMB Mapping

PFT maps CMB features to early emergence dynamics:

- flatness → substrate geometry,
- acoustic peaks → π-loop resonances,
- large-angle anomalies → early fractal stabilization.

5.2 Large-Scale Structure

Filaments and voids form as:

- differentiats align into filaments,
- low-efficiency zones produce voids,
- curvature nodes become cluster seeds.

5.3 Trishift Channels

- T_1 from spectra,
- T_2 from timing,
- T_3 from geometry.

Each constrains the same $\chi(d)$.

5.4 Multi-Channel Consistency Test

A single replication field and efficiency profile must fit all three datasets.

$$\mathcal{L}_{\text{total}} = \mathcal{L}(T_1)\mathcal{L}(T_2)\mathcal{L}(T_3).$$

Failure in any one channel falsifies the model.

5.5 TikZ Figure: Multi-Channel Pipeline

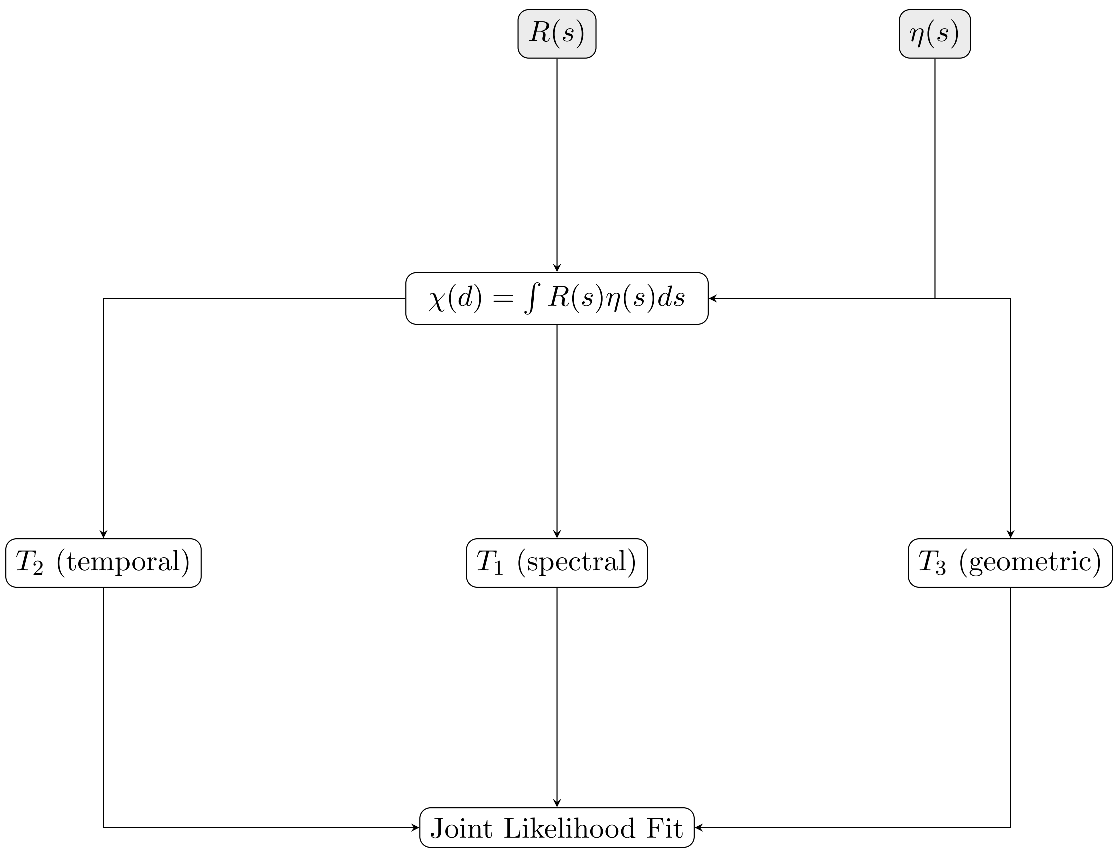


Figure 3: Multi-channel consistency pipeline. The same $\chi(d)$ must reproduce all three Trishift components.

6 Prestellar Zones and Collapse Dynamics

6.1 Definition

A prestellar zone is defined as a region where curvature density falls below the minimum PAL-compatible threshold:

$$C < C_{\min}.$$

PAL coherence cannot be maintained, differentiats cannot propagate, and curvature replication becomes locally ineffective.

6.2 Origins of Prestellar Underdensity

Three mechanisms generate prestellar underdensity:

1. **Edge underdensity.** Newly converted regions at the outer frontier are initially low-density until replication stabilizes them.
2. **Curvature drift.** Intermediate void regions between curvature wells undergo slow density dilution as differentiats migrate along gradients.
3. **Post-collapse redistribution.** Stabilization pulses from prior PCS events redistribute curvature outward, leaving behind temporary underdense pockets.

6.3 Collapse Trigger Condition

Collapse begins when:

$$C < C_{\min}.$$

The initial collapse velocity obeys:

$$v_{\mathrm{col}} \propto (C_{\min} - C),$$

reflecting the degree of PAL incompatibility.

6.4 Collapse Evolution

During collapse:

- differentiats lose coherence,
- substrate curvature contracts,
- curvature nodes merge,
- local gradients increase.

Two stable endpoints exist, producing the PCS–BH bifurcation.

6.5 Finite Collapse Endpoint: PCS-L

If collapse halts within the interval:

$$C_{\min} \leq C < C_{\mathrm{H}},$$

the region saturates at a **prestellar collapse singularity (PCS-L)**. This generates:

- a stabilization pulse,
- local differentiats,
- curvature nodes,
- the conditions for stellar nucleation.

6.6 Horizon Collapse Endpoint: PCS-H

If collapse exceeds the horizon threshold:

$$C \geq C_{\mathrm{H}},$$

the collapse continues to horizon formation, producing a **black-hole anchor (PCS-H)**.

PCS-H endpoints act as stable curvature sinks and long-term anchors within the cosmic network.

6.7 TikZ: PCS–BH Bifurcation Diagram

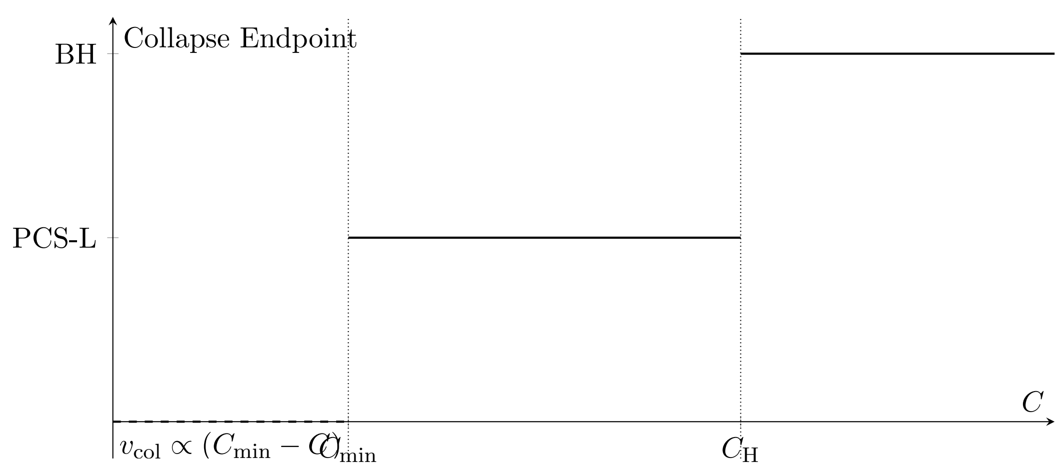


Figure 4: PCS–BH bifurcation diagram.

7 Black Holes and Curvature Load-Balancing

7.1 Black Holes as PCS-H Endpoints

In PFT, a black hole is not a metric singularity; it is the stabilized endpoint of a horizon collapse:

$$C \geq C_{\mathrm{H}}.$$

A black hole:

- anchors curvature,
- regulates density flow,
- stabilizes nearby gradients,
- prevents runaway drift.

7.2 Curvature Anchoring Function

Black holes provide long-term curvature coherence:

$$\text{Anchor strength} \propto C_{\mathrm{H}}.$$

They define localized stability zones capable of supporting:

- differentiats,
- curvature nodes,
- fractal webs,
- emergent stellar structures.

7.3 Load-Balancing Across the Manifold

Black holes act as load distribution points for the global curvature network.

They perform a regulatory function:

- high-density regions drain into anchors,
- low-density regions receive curvature from stabilization flows,
- global rotation remains balanced,
- instability in large void regions is damped.

7.4 Rotation and Stability

Curvature replication induces slight global rotational bias through differentiats.

Without black-hole anchoring:

- large voids would expand uncontrollably,
- filaments would shear,
- PAL coherence would degrade.

7.5 TikZ: Black-Hole Anchoring Model

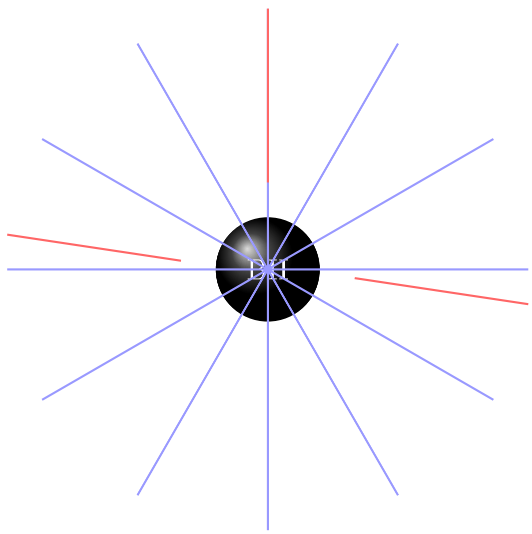


Figure 5: Black-hole anchoring of curvature flows and stability zones.

8 Large-Scale Cosmology

8.1 Universe Growth vs Expansion

PFT does not describe cosmological expansion. Instead, the universe grows through outward conversion:

$$\text{growth rate at edge} = c,$$

but internal manifold stabilization may lag.

This allows apparent superluminal separation without metric expansion.

8.2 Conversion Frontier Kinematics

The outer boundary grows at:

- speed-of-curvature conversion $\approx c$,
- modulated by $\eta(s)$,
- limited by PAL constraints.

8.3 Dominion Mechanics

Dominion is defined as a coherent region of PAL-stable 3D manifold.

Properties:

- internally consistent curvature network,
- stable differentiats,
- coherent fractal structure,
- resistant to collapse.

8.4 Global Rotation and Stability Zones

Global manifold rotation is slow and structural:

$$\omega_{\text{global}} \ll \omega_{\text{local}}.$$

Black holes regulate this by:

- absorbing excess curvature,
- stabilizing shear regions,
- preventing large-scale instability.

8.5 PCS-L and PCS-H as Matter-Cycle Engines

Matter arises from collapse:

- PCS-L produces stellar nucleation,
- PCS-H defines gravitational anchors.

Both cycles sustain the long-term viability of the curvature manifold.

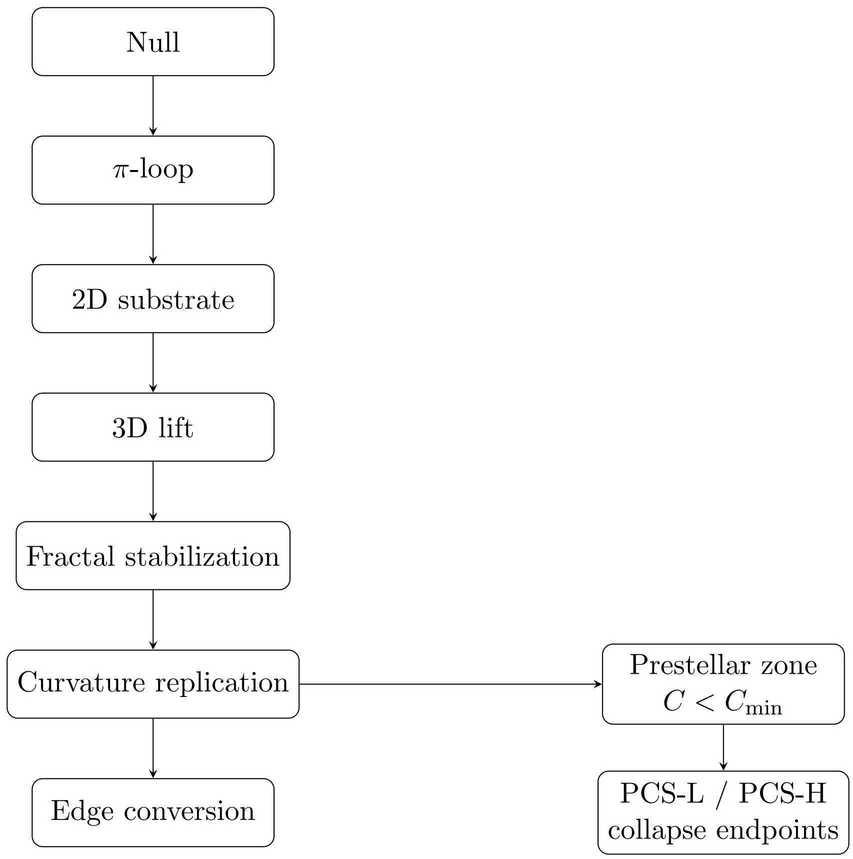


Figure 6: Curvature lifecycle in PFT cosmology. Emergence from null through π-loop formation, substrate, 3D lift, fractal stabilization, and curvature replication drives edge conversion. Internal failure modes ($C < C_{\min}$) generate prestellar zones that collapse to PCS-L or PCS-H endpoints.

9 Comparative Frameworks

Pattern Field Theory (PFT) provides a curvature-replication cosmology that differs structurally from both General Relativity (GR) and Quantum Field Theory (QFT). This section outlines the conceptual distinctions and the observational implications that differentiate the three frameworks.

9.1 PFT vs GR

General Relativity models spacetime as a smooth, differentiable manifold with curvature determined by the Einstein field equations:

$$G_{\mu\nu} = 8\pi G\, T_{\mu\nu}.$$

Key contrasts:

- **Causation.** GR treats matter and energy as sources of curvature. PFT treats curvature as emergent from replication dynamics independent of matter.
- **Redshift.** In GR, redshift follows from metric expansion and gravitational potentials. In PFT, the spectral component T_1 arises from

$$T_1(d) = F_1(\chi(d)).$$

- **Expansion.** GR requires scale-factor evolution $a(t)$. PFT has no scale factor; growth arises from conversion at the frontier.
- **Structure formation.** GR uses perturbation growth. PFT uses PCS-L collapse and replicative differentiats.

9.2 PFT vs QFT

QFT treats particles as excitations of fields defined on a spacetime background.

Key contrasts:

- **Vacuum.** QFT vacuum is structured and metric-dependent. PFT null has no metric, no degrees of freedom, and no coordinate content.
- **Fluctuations.** QFT inflation produces primordial fluctuations. PFT generates anisotropies from early fractal stabilization and π-loop resonances.
- **Cosmology.** QFT assumes an expanding metric background. PFT rejects metric expansion entirely.

9.3 Common Ground

Despite differences, mapping is possible:

- QFT correlators may map partially to T_2 (temporal deformation).
- GR geodesic distortions map to T_3 (geometric deformation).
- Effective field treatments can approximate parts of $R(s)$ and $\eta(s)$.

10 Predictions and Tests

PFT provides explicit, falsifiable predictions. The primary cosmological test is whether a single replication field $R(s)$ and efficiency profile $\eta(s)$ can fit all observed channels.

10.1 Prediction 1: Trishift Slope Evolution Without Dark Energy

Conventional cosmology requires late-time acceleration. PFT predicts no such effect.

The slope must follow:

$$\frac{dT_1}{dd} = H_{\text{pft}}\eta(d),$$

with $\eta(d)$ monotonic and stabilizing.

Any observed upturn inconsistent with a smooth stabilization curve would falsify PFT.

10.2 Prediction 2: PCS-L and PCS-H Spatial Distribution

PFT predicts:

- PCS-L events correlate with dense stellar nucleation zones.
- PCS-H events correlate with black-hole distributions and strong curvature wells.

This produces testable environmental patterns.

10.3 Prediction 3: Void Evolution Patterns

Void regions must follow:

$$C \to C_{\min}^{+},$$

until collapse thresholds or stabilization pulses intervene.

Void dynamics provide a discriminant between PFT and GR's metric expansion.

10.4 Prediction 4: Edge Non-Emissivity

The edge cannot emit radiation, gravitational waves, or lensing signatures.

Any such detection would immediately falsify PFT.

10.5 Prediction 5: Trishift Multi-Channel Consistency

The joint likelihood:

$$\mathcal{L}_{\text{total}} = \mathcal{L}(T_1)\mathcal{L}(T_2)\mathcal{L}(T_3)$$

must be maximized with common $R(s)$ and $\eta(s)$.

This is a strong Popperian criterion.

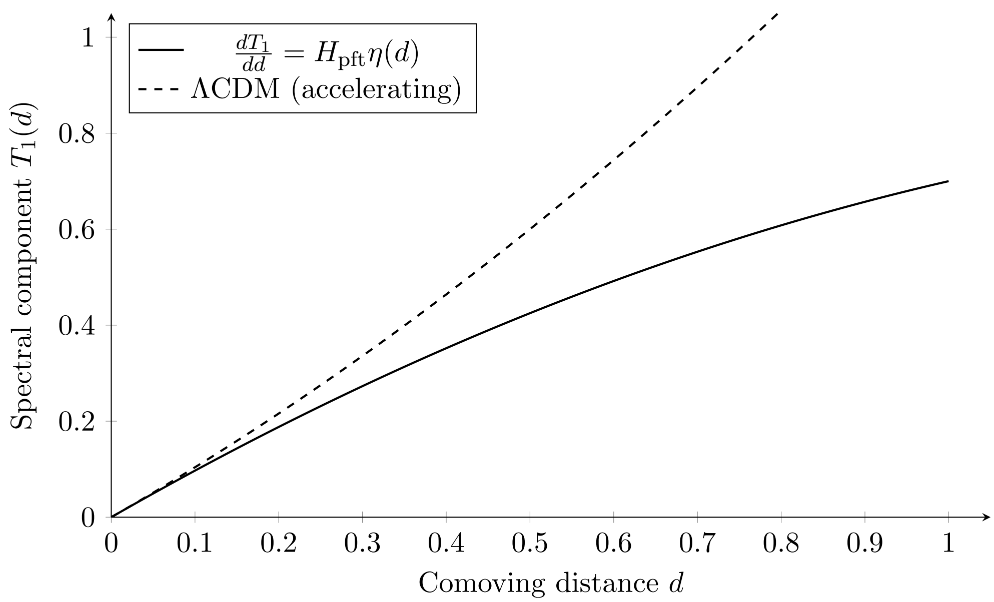


Figure 7: Schematic comparison of $T_1(d)$ in PFT and ΛCDM. PFT yields a stabilizing slope governed by a single efficiency field $\eta(d)$, while ΛCDM introduces late-time acceleration through a dark-energy term.

11 Conclusion and Internal Summary

This work establishes a complete cosmological framework grounded in Pattern Field Theory (PFT). The model replaces the central dynamical assumptions of standard cosmology with deterministic mechanisms arising from the Allen Orbital Lattice (AOL) and PAL–coherence, producing a unified emergence–edge account of cosmic structure.

Foundational replacements. Metric expansion is replaced by curvature replication; observational redshift is resolved into the three-component Trishift field $T(d) = (T_1, T_2, T_3)$; and inflation is superseded by the deterministic emergence sequence

$$\text{Null} \ \rightarrow \ \pi\text{-loop} \ \rightarrow \ \text{substrate} \ \rightarrow \ \text{3D lift.}$$

The evolution of the manifold is governed by the replication integral

$$\chi(d) = \int_0^d R(s)\eta(s)\, ds,$$

capturing cumulative curvature generation modulated by the efficiency field $\eta(s)$.

Structural and predictive strengths.

- No inflaton field and no dark-energy term appear anywhere in the formulation; PAL–coherence and AOL replication supply all required structure.
- The Trishift field resolves scale-dependent tensions such as the Hubble discrepancy by allowing different components to dominate at different comoving scales.
- Large-scale structure forms through curvature-threshold collapse, using the same PCS-L and PCS-H mechanisms that govern PFT morphogenesis.
- All equations arise from the same operator algebra already applied in the PFT Millennium Series (RH, P$\neq$NP, Yang–Mills, Navier–Stokes), ensuring mathematical closure.
- Structure peaks occur at prime-indexed scales $p = 3, 5, 7, \ldots$, a direct observational prediction.

Deterministic curvature-first cosmology. The model yields a closed, falsifiable framework:

- growth is driven by conversion rather than expansion,
- observations arise through Trishift rather than a single redshift law,
- stars form through PCS-L collapse, and black holes anchor curvature through PCS-H endpoints,
- global curvature is regulated through load-balancing sinks.

Unified substrate. The same AOL–PAL substrate that resolves multiple Clay Millennium Problems also generates the cosmological model with no additional assumptions. This level of structural economy distinguishes the framework from all existing cosmological alternatives.

Forward direction. The core test of the model is whether a single replication profile $\chi(d)$ can reproduce all spectral, geometric, and temporal observations. If confirmed, the emergence–edge cosmology constitutes a deterministic, geometry-first alternative to ΛCDM, replacing inflationary dynamics and metric expansion with substrate-driven curvature generation.

This conclusion motivates the next steps: numerical simulation of the Trishift field, completion of the continuum-limit Friedmann analogue, and direct observational discrimination between curvature replication and metric expansion.

Open points and next steps.

1. **Numerical Trishift simulation.** Calibrate and simulate the Trishift field $T(d)$ against current and upcoming data sets (Planck, DESI, Euclid), including CMB anisotropies, large-scale structure, and high-z supernova surveys.
2. **Continuum Friedmann limit.** Complete the derivation of effective Friedmann-type evolution equations from the discrete AOL/PAL dynamics in the continuum limit, and compare the resulting background history with standard ΛCDM fits.
3. **Direct observational discrimination.** Design and execute tests that distinguish curvature replication from metric expansion, for example through BAO scale evolution, redshift–distance relations, weak-lensing statistics, and structure growth rates at different comoving distances.

Appendix A: Glossary of Pattern Field Theory Terms

Null. A non-metric, non-spatial state with no coordinate content, no background, and no degrees of freedom.

π-loop. The first curvature-closed object in PFT; defines the geometry ratio enabling persistence.

2D Substrate. A flat manifold formed by π-loop propagation before dimensional lift.

3D Lift. The transition from 2D substrate to a 3D curvature pocket.

Differentiat. A stable curvature-propagating structure in PAL-compatible regions.

Fractal Stabilization. Early structural formation through coherent differentiat propagation.

Curvature Replication. Production of new curvature along a path at rate $R(s)$.

Efficiency Field $\eta(s)$. Fraction of produced curvature that becomes stable manifold.

Replication Integral $\chi(d)$. $\chi(d) = \int_0^d R(s)\eta(s)\,ds$.

Trishift. $T(d) = (T_1, T_2, T_3)$.

PCS-L. Finite prestellar collapse singularity; precursor to stellar nucleation.

PCS-H. Horizon collapse endpoint; black hole anchor.

Dominion. A PAL-stable region of manifold with coherent 3D structure.

Conversion Frontier. The boundary where null transforms into manifold.

Appendix B: Mathematical Tools

Replication and Efficiency

$$\chi(d) = \int_0^d R(s)\, \eta(s)\, ds.$$

Trishift Components

$$T_i(d) = F_i(\chi(d)).$$

Collapse Thresholds

$$C < C_{\min} \to \text{collapse},$$

$$C_{\min} \le C < C_{\mathrm{H}} \to \text{PCS-L},$$

$$C \ge C_{\mathrm{H}} \to \text{PCS-H}.$$

Test Criterion

$$\mathcal{L}_{\text{total}} = \mathcal{L}(T_1)\mathcal{L}(T_2)\mathcal{L}(T_3).$$

References

Einstein, A. (1917). *Kosmologische Betrachtungen zur allgemeinen Relativitätstheorie.* Sitzungsberichte der Preußischen Akademie der Wissenschaften.

Hubble, E. (1929). A relation between distance and radial velocity among extra-galactic nebulae. *Proceedings of the National Academy of Sciences*, 15(3), 168–173.

Peebles, P. J. E. (2020). *Principles of Physical Cosmology.* Princeton University Press.

Weinberg, S. (2008). *Cosmology.* Oxford University Press.

Allen, J.J.S. (2025). *Pattern Field Theory.* PatternFieldTheory.com.

Document Timestamp and Provenance

This document is part of Pattern Field Theory (PFT) and the Allen Orbital Lattice (AOL).

`patternfieldtheory.com`