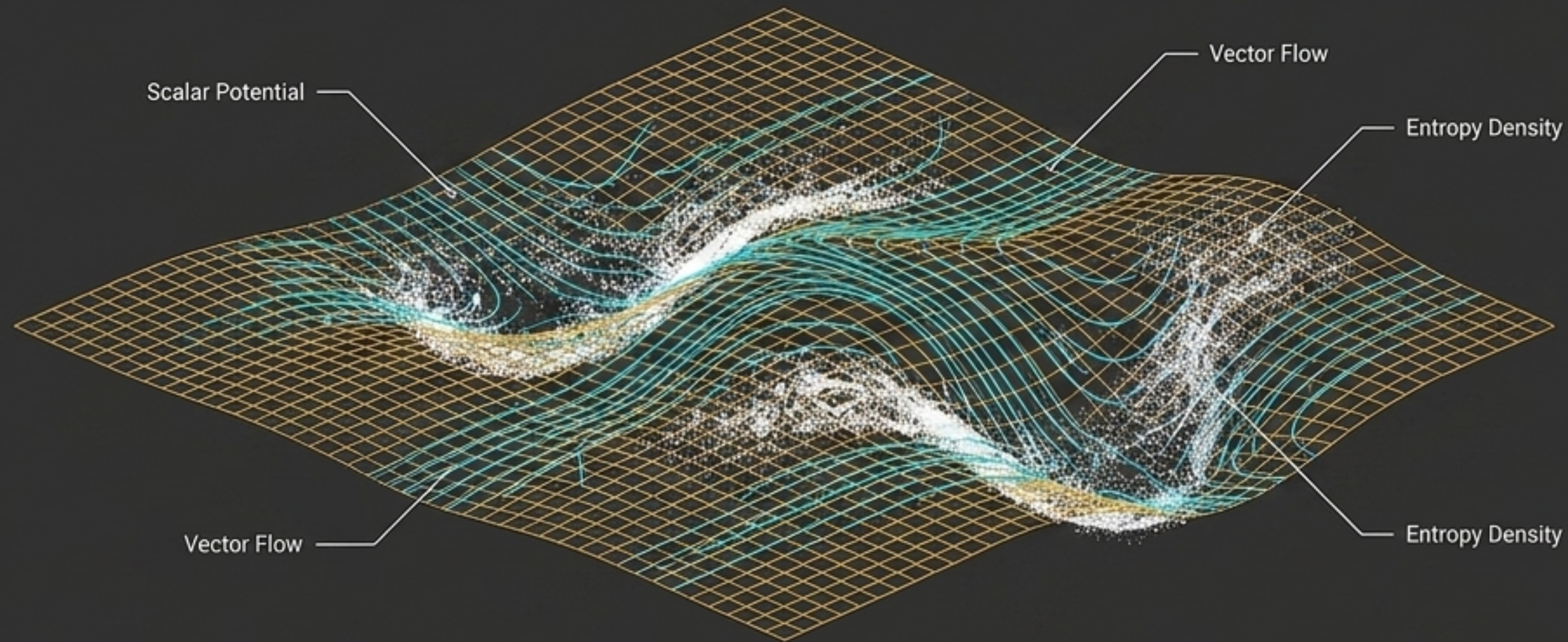


# The RSVP Plenum: Axioms for a Falling Universe

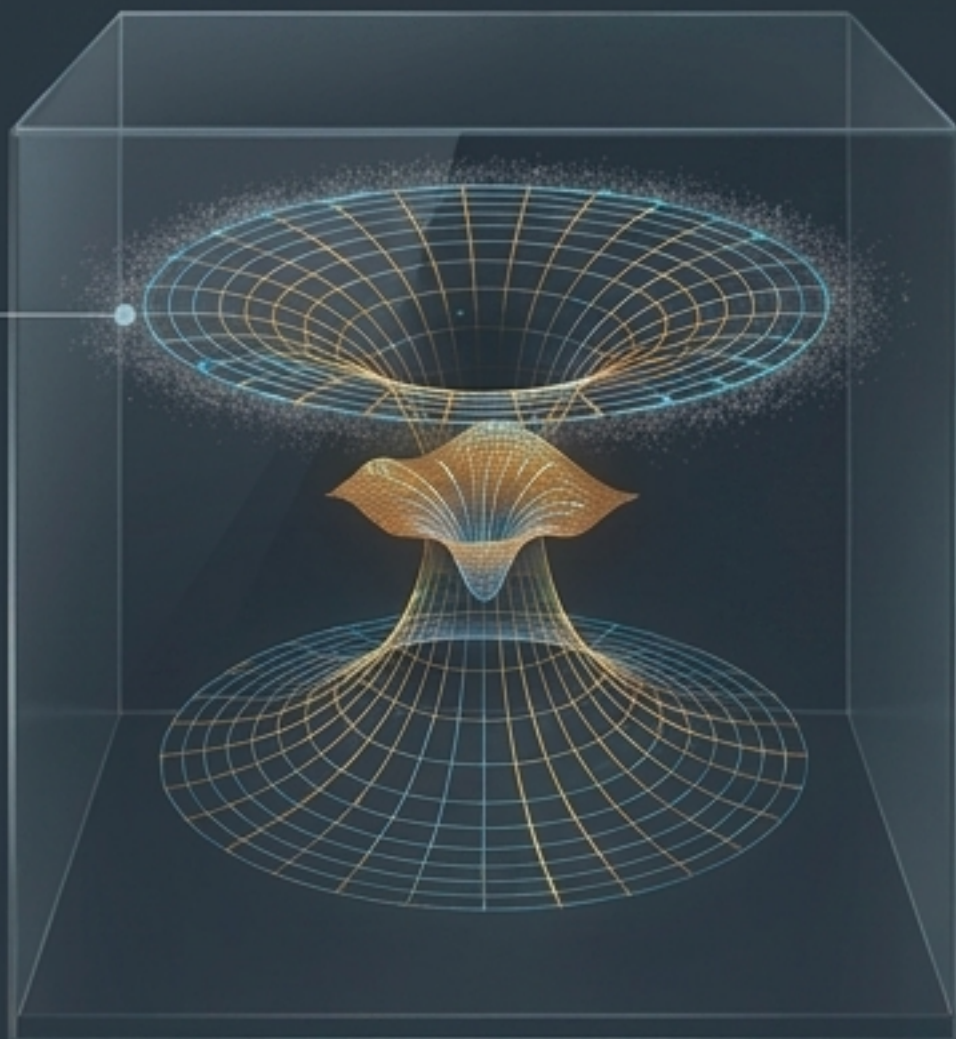
A Unified Field Theory of Irreversibility, Constrained Evolution,  
and Fossil Manifolds.



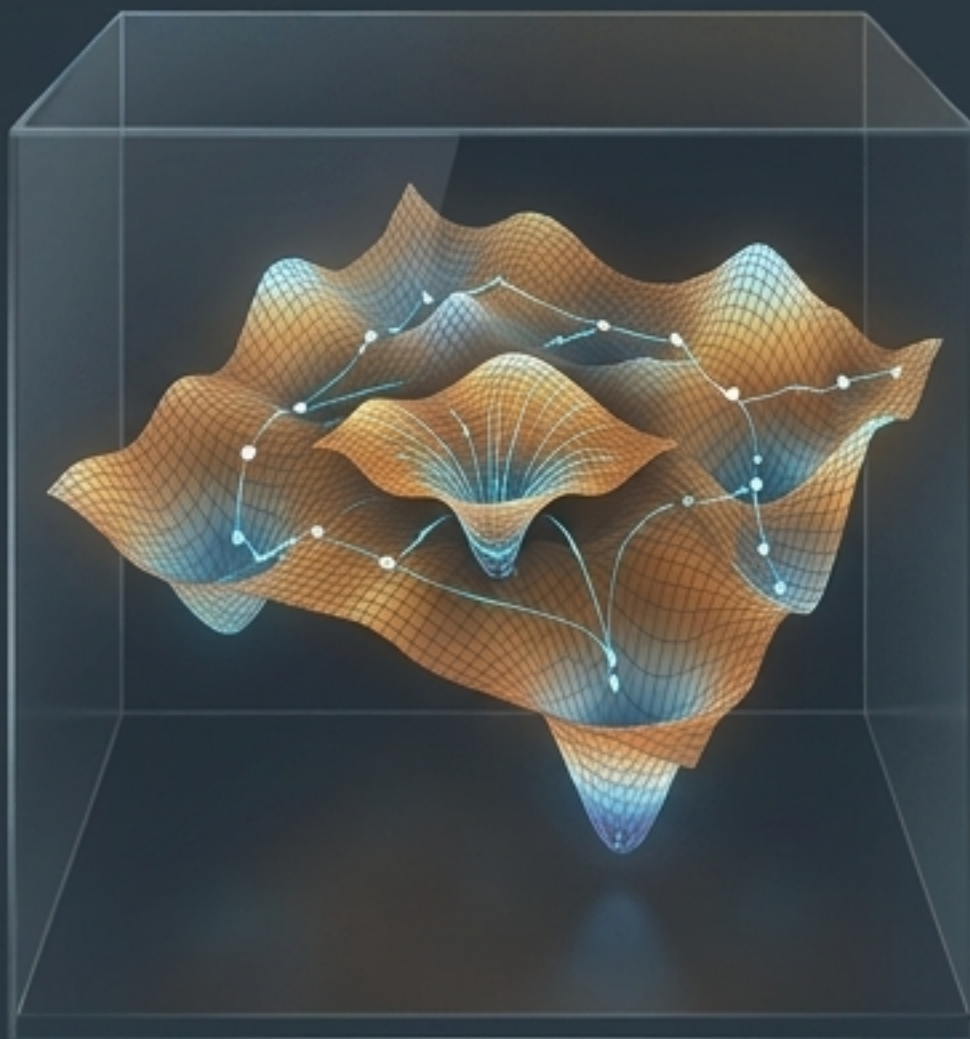
# The Structural Disability of Fragmented Ontologies

Unification by mathematical substrate, not mere analogy.

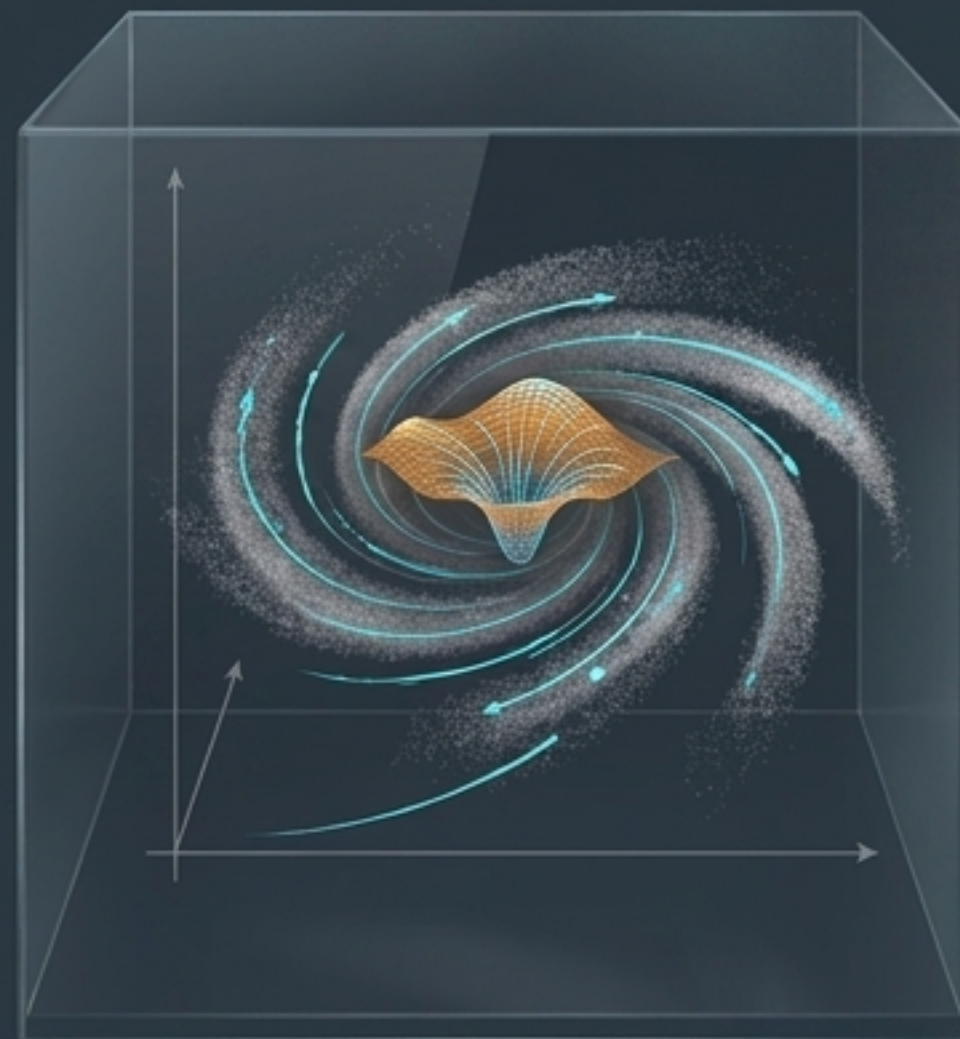
Cosmology  
Riemannian Geometry



Cognition  
Neural Computation

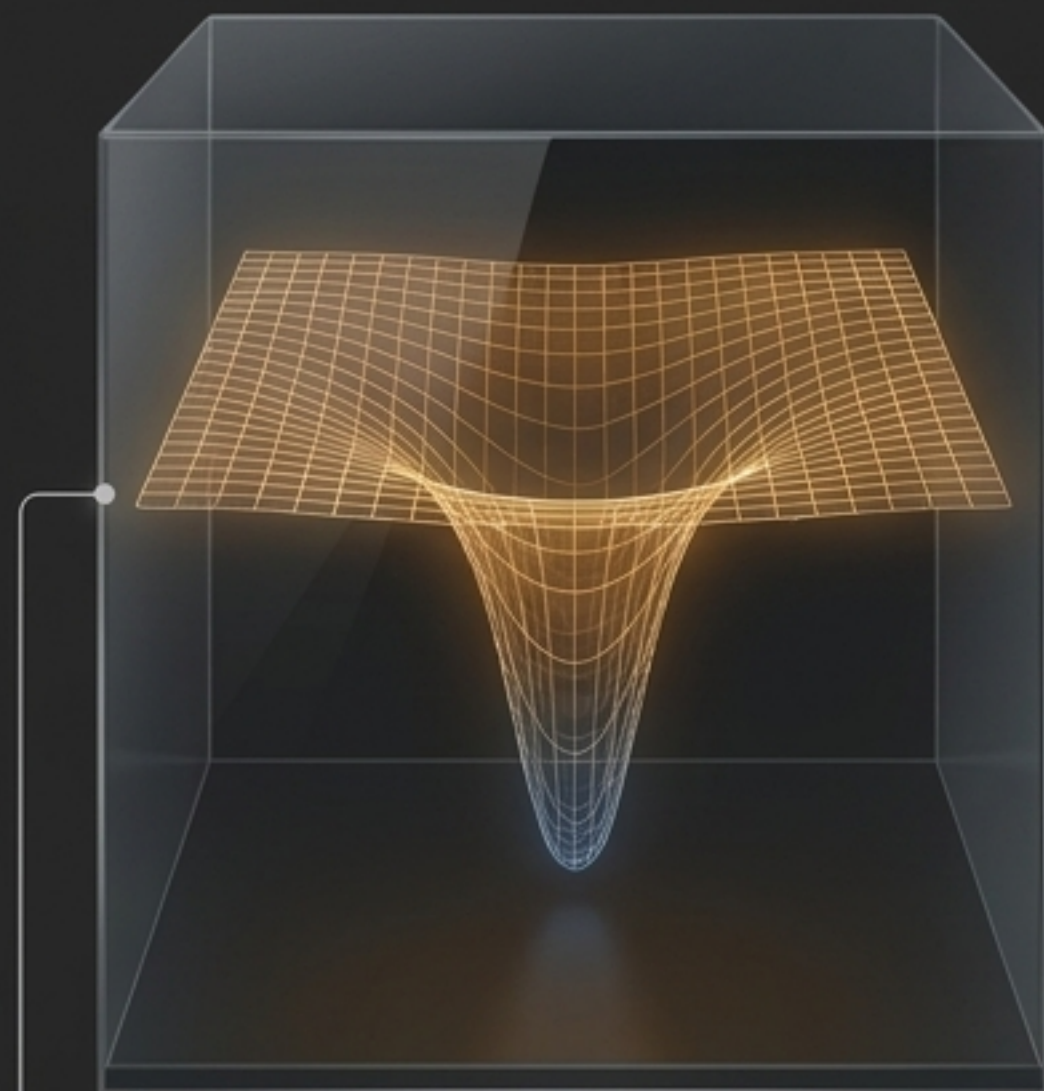


Society  
Game Theory



Cosmological expansion, cognitive inference, and institutional drift exhibit identical mathematical motifs—gradient relaxation and attractor formation—yet are quarantined within disparate disciplinary vocabularies.

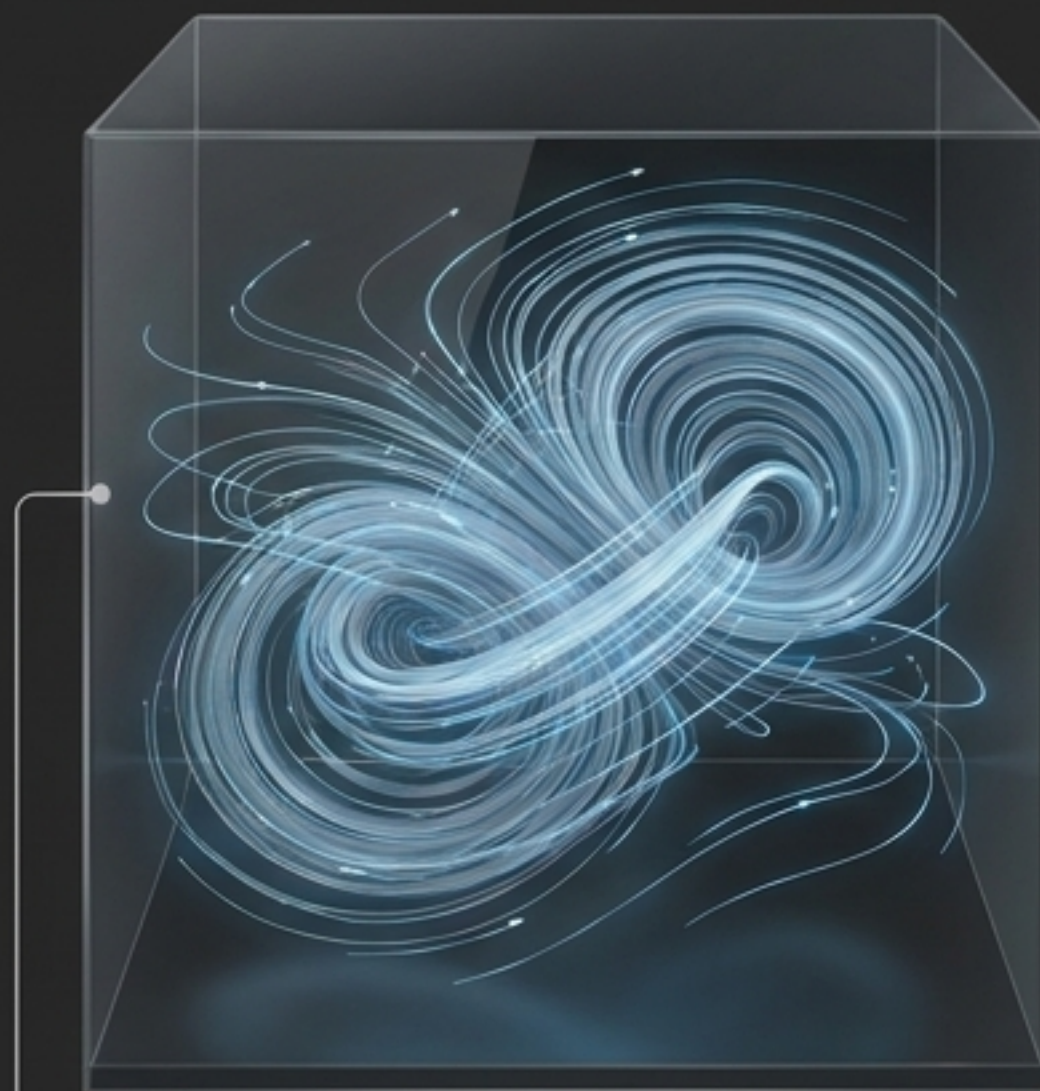
# The Base Layer: The RSVP Field Triplet



•  $\Phi$  (Scalar Potential)

$$\Phi \in H^1(\Omega)$$

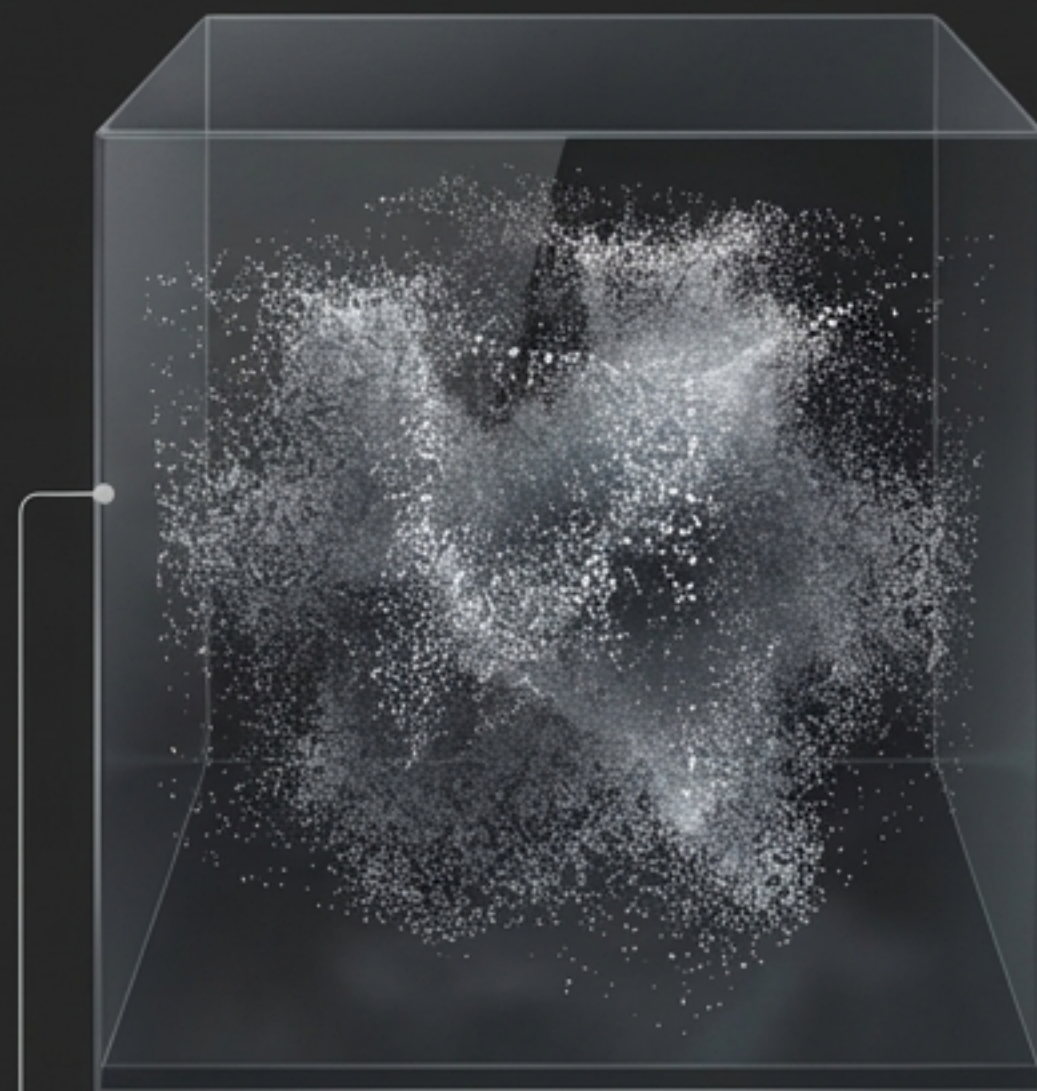
Represents mass or meaning density.



•  $\mathbf{v}$  (Vector Flow)

$$\mathbf{v} \in [H^1(\Omega)]^3$$

Represents directed flow velocity  
or inference trajectory.



•  $S$  (Entropy)

$$S \in L^2(\Omega)$$

Represents configurational entropy  
or representational budget.

# The Core Mechanism: Entropic Descent

## The Kinematic Constraint

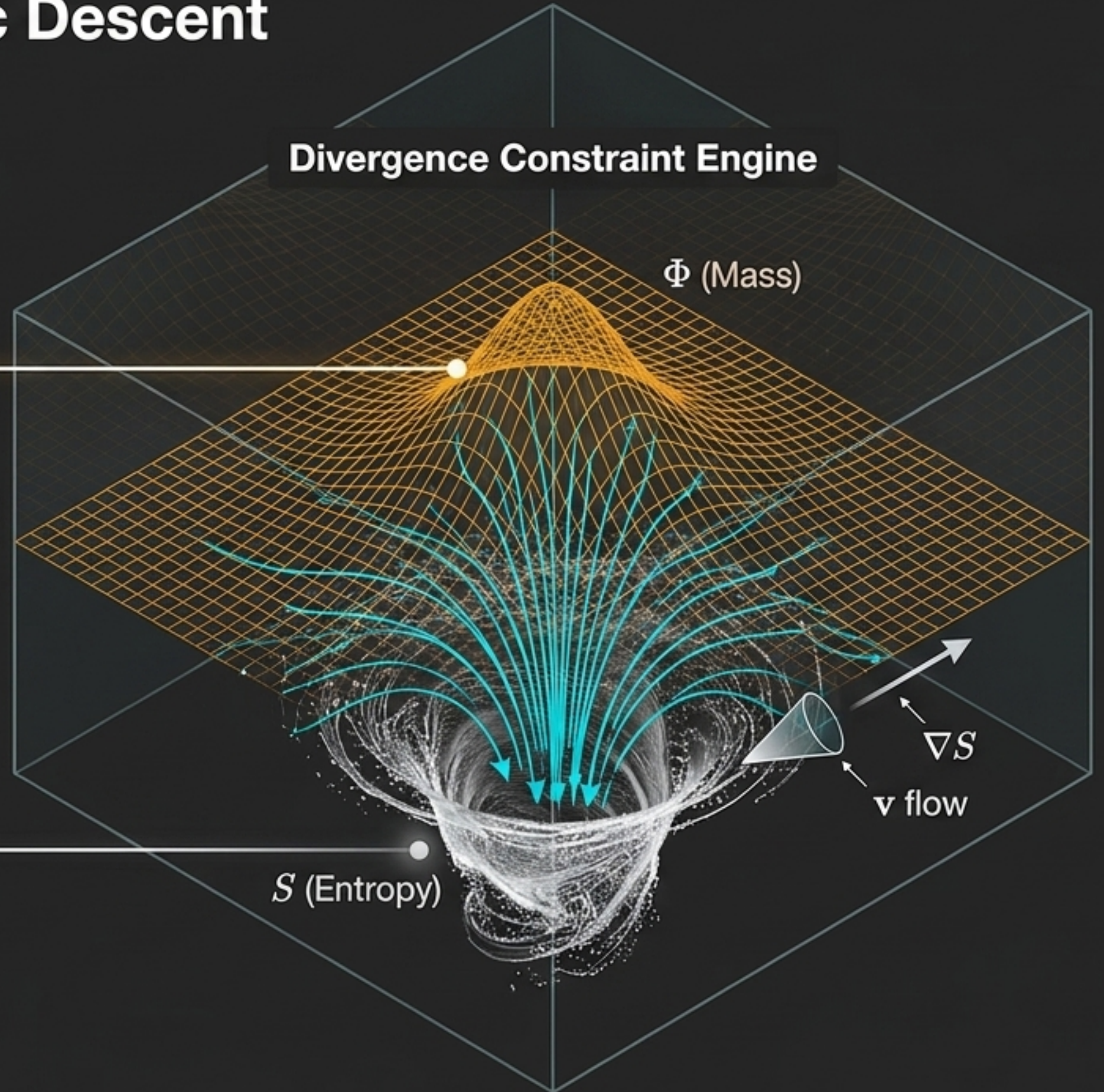
$$\nabla \cdot \mathbf{v} \approx \alpha_{\Phi} \Phi + \alpha_S S$$

The medium acts like a compressible fluid. In the stiff limit, this perfectly eliminates longitudinal modes, projecting onto transverse vortical flow.

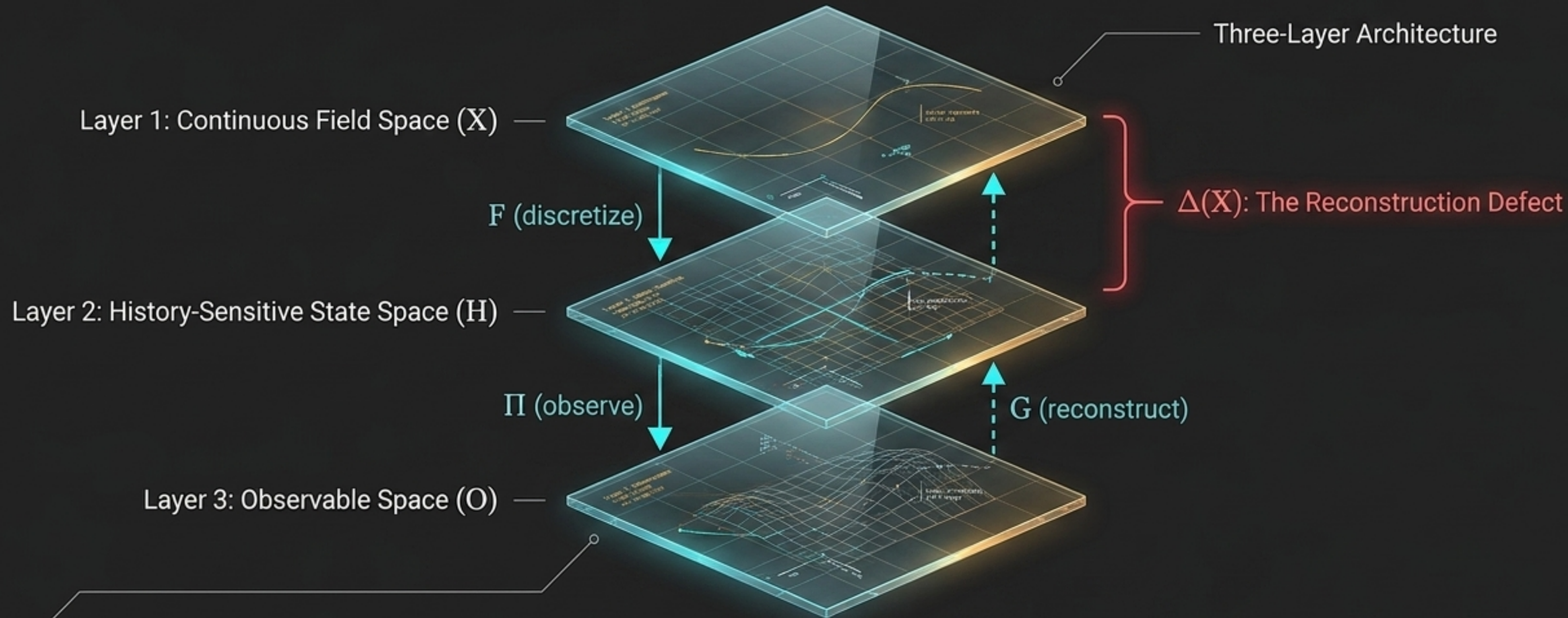
## Constitutive Phenomenological Closure

$$\mathbf{F} \propto \nabla S$$

Gravity is not a primary force. The force on a test particle is proportional to the entropy gradient along the flow.

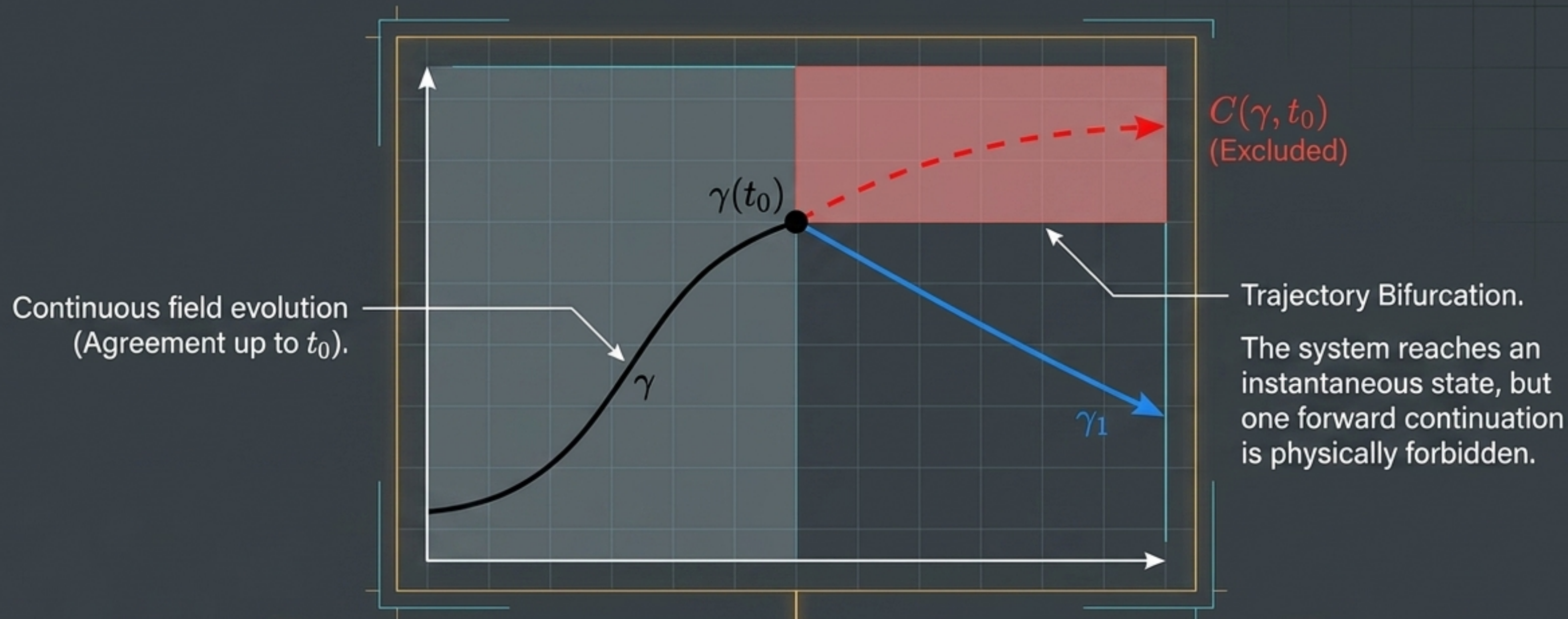


# The Origin of Time: Structural Projection Loss



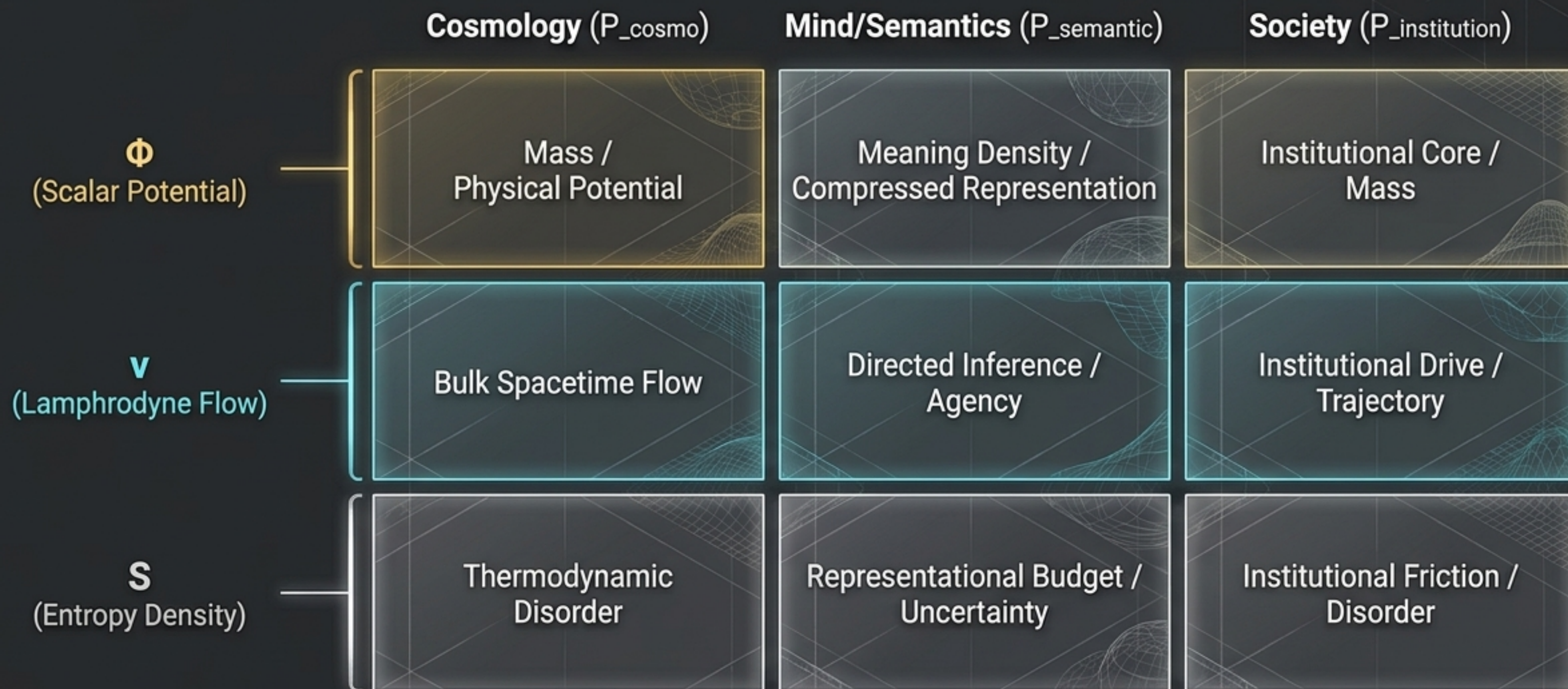
Irreversibility is not a phenomenological gloss; it is the non-isomorphism of the adjunction unit.  
Time is the measure of what cannot be mathematically reconstructed.

# The Discrete Filter: The Refuse Operator



**History is encoded not by what is present,  
but by what was prevented from happening.**

# The Ontological Translation Matrix



## The Lineage of Giants

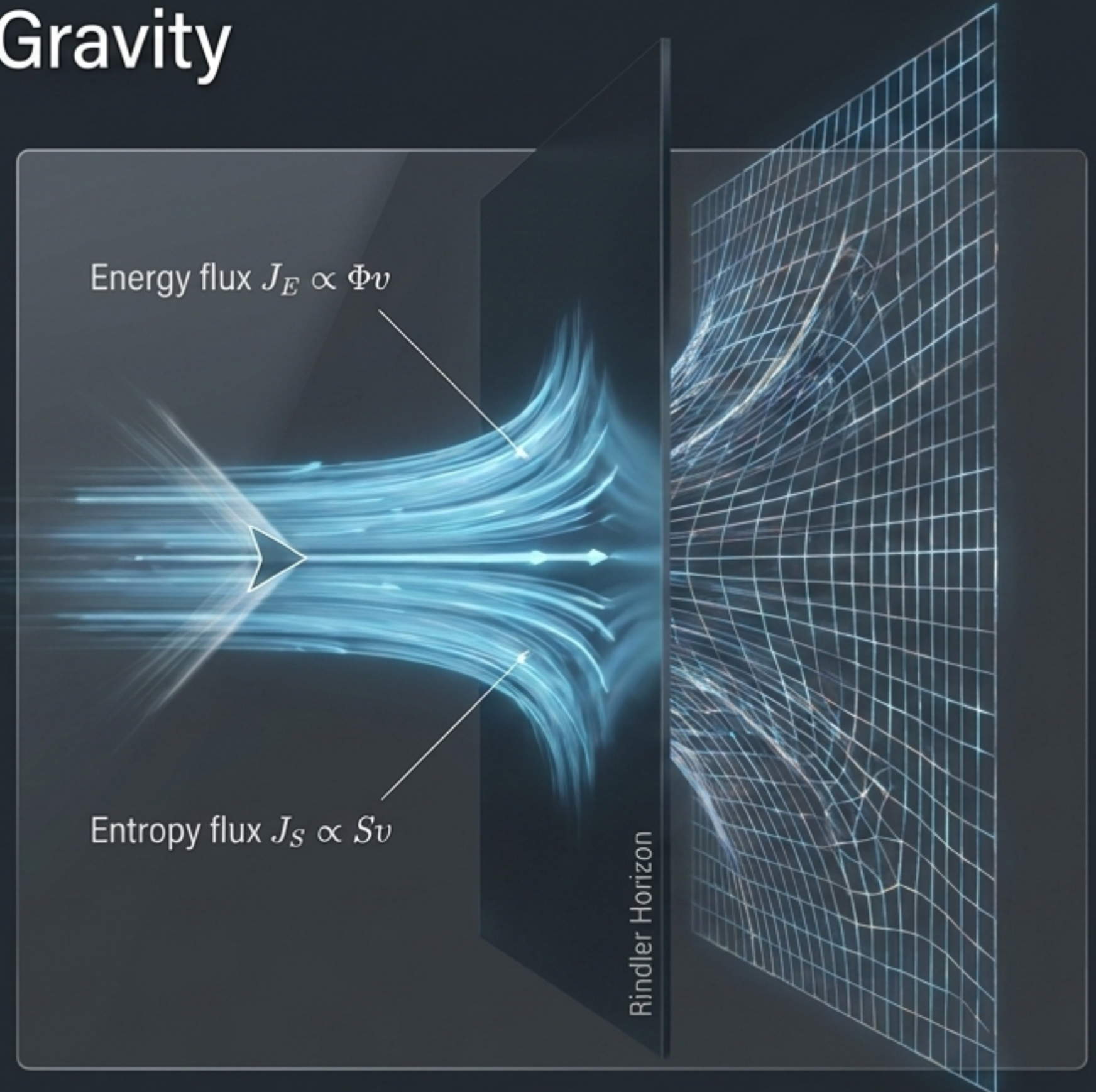
Deriving Einstein, Friston, and SpheroPop from a single mathematical substrate

# Domain 1 Synthesis: Emergent Gravity

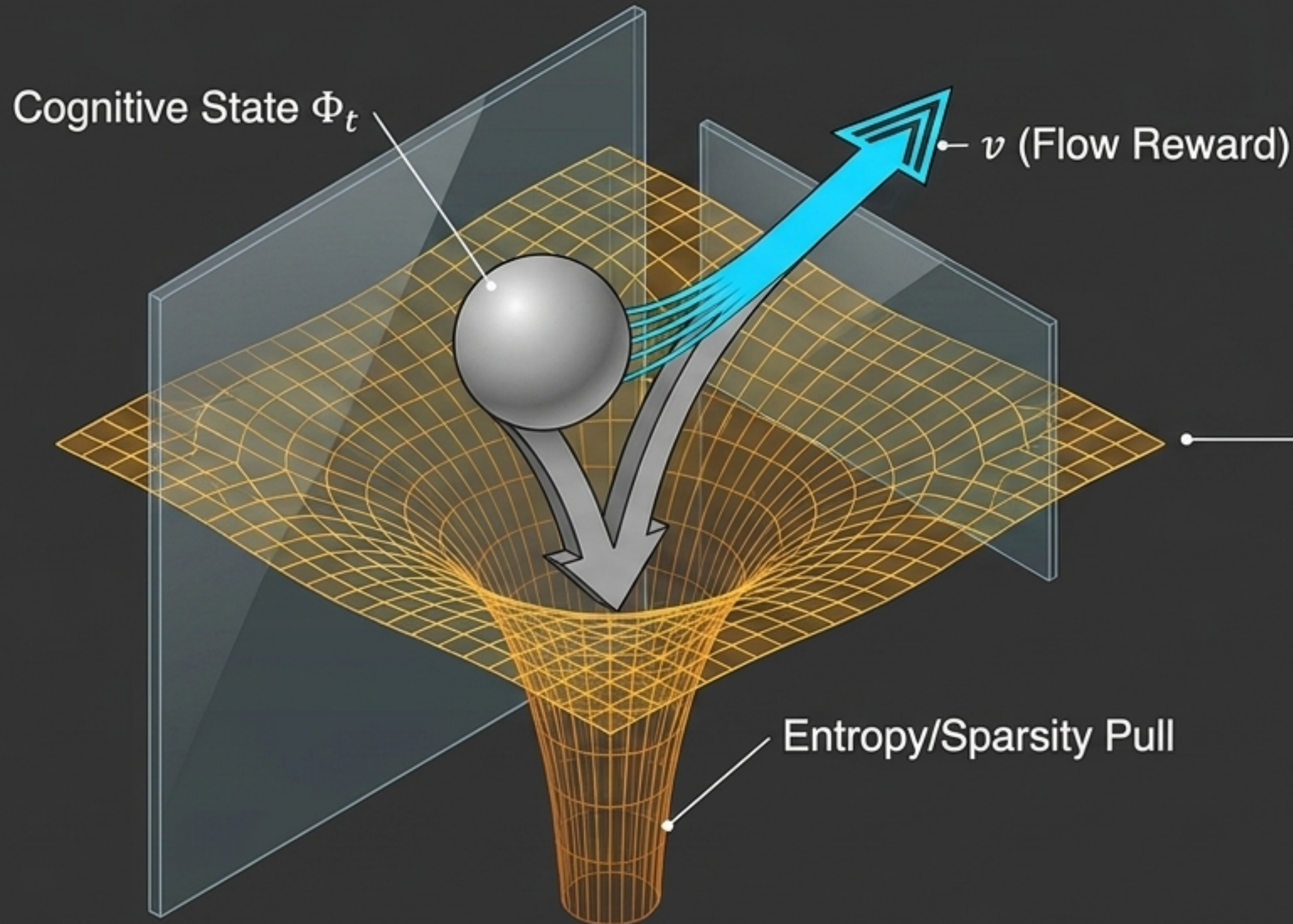
## The Raychaudhuri Engine:

By identifying the Clausius heat  $\delta Q = T \delta S_{\text{horizon}}$  with the energy flux crossing the Rindler horizon, the RSVP flow congruence directly yields the Einstein equation hydrodynamically.

**Jacobson's Derivation Reborn:** Gravity is not a fundamental interaction. It emerges as the coarse-grained thermodynamic projection of constrained flow.



# Domain 2 Synthesis: Cognitive Descent & The Friston Duality



## The Duality

The CLIO projection is perfectly dual to Friston's Variational Free Energy.

Prediction error minimization is gradient relaxation.

## Preventing Agency Collapse

Flow ( $v$ ) is not passive.

Setting flow to zero decouples agency, causing the system to collapse to an entropic equilibrium.

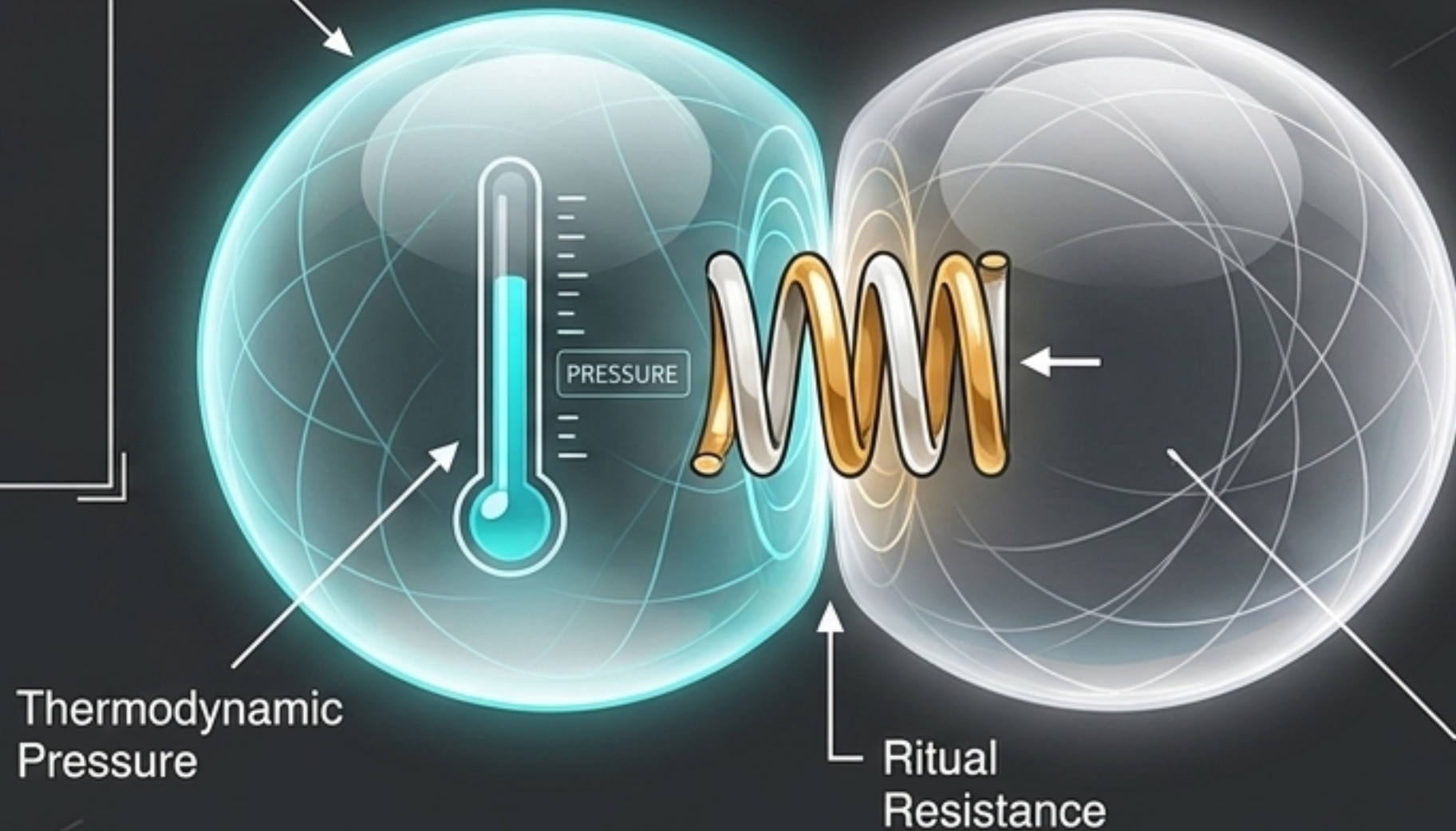
Directed action prevents brain deadness.

# Domain 3 Synthesis: Institutional Dynamics (Spherepop)

## The Merge Threshold

Institutions merge  
( $S_i \oplus S_j \rightarrow S_k$ )  
ONLY if thermodynamic  
pressure overcomes  
accumulated ritual  
resistance:

$$R_t + 2H < P_{\max}$$



## Ritual as Cost

Accumulated ritual cost  $R_t$   
hardens the boundary.

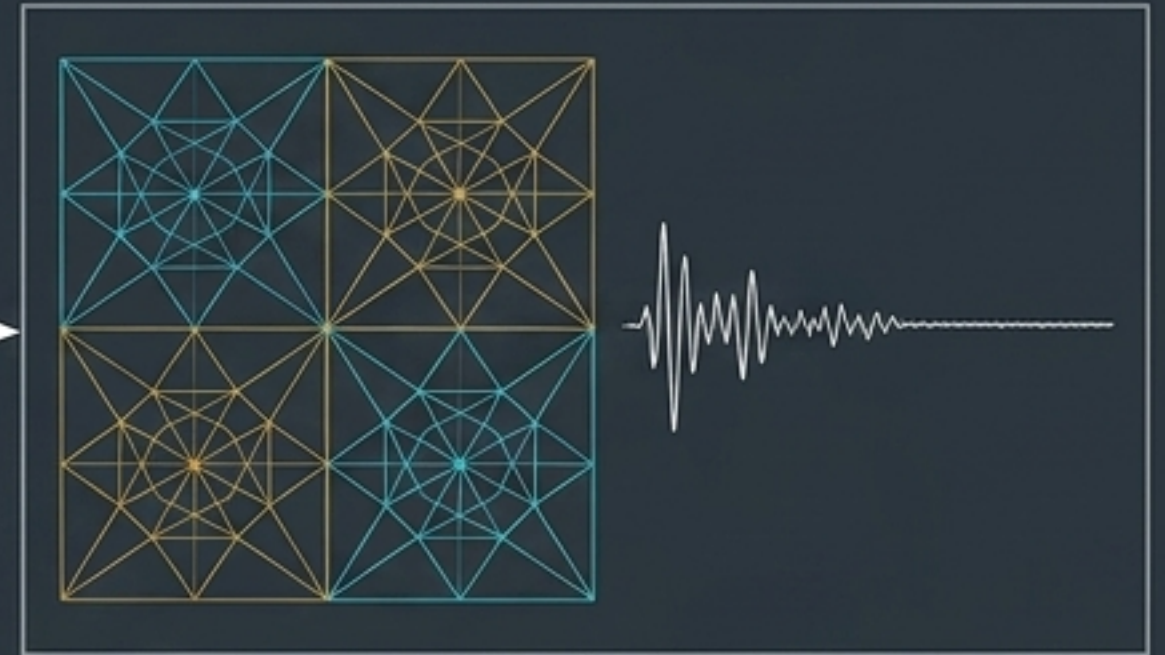
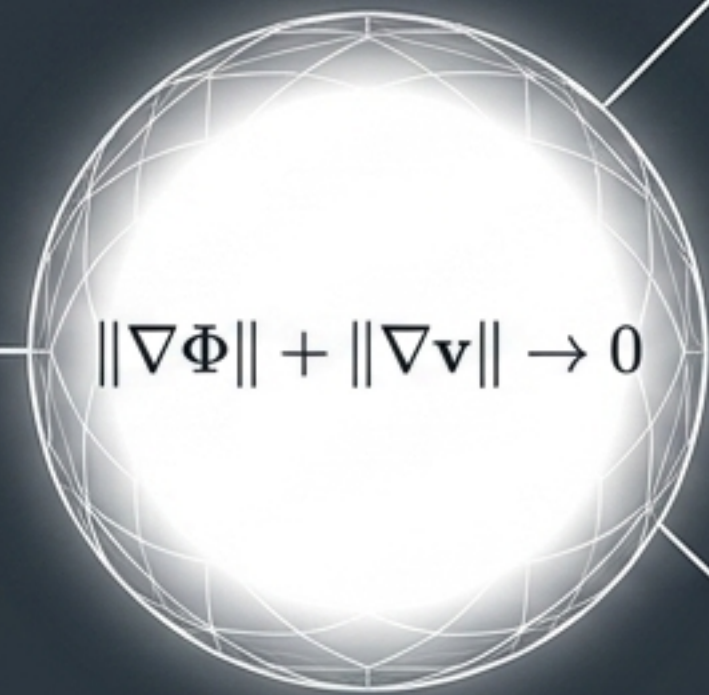
Entropy drives the merger;  
ritual resists it.

This dictates the friction of  
social organization.

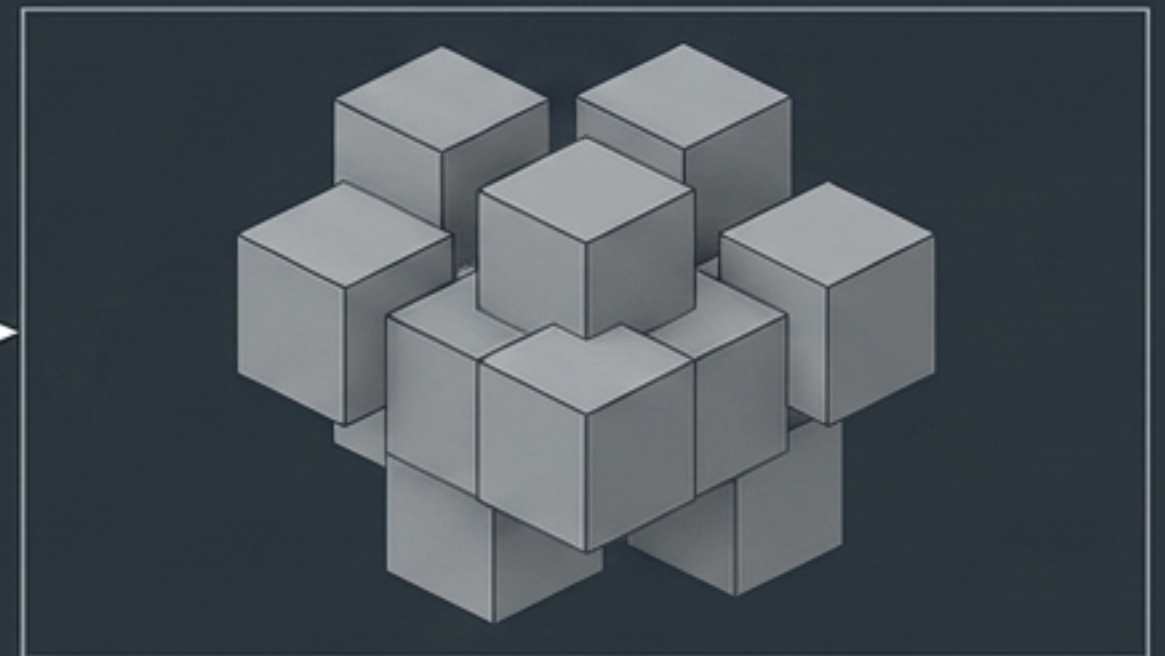
# Unified Failure Modes: The Universal Death State



**Cosmology:** Cosmic Heat Death / Entropy Saturation



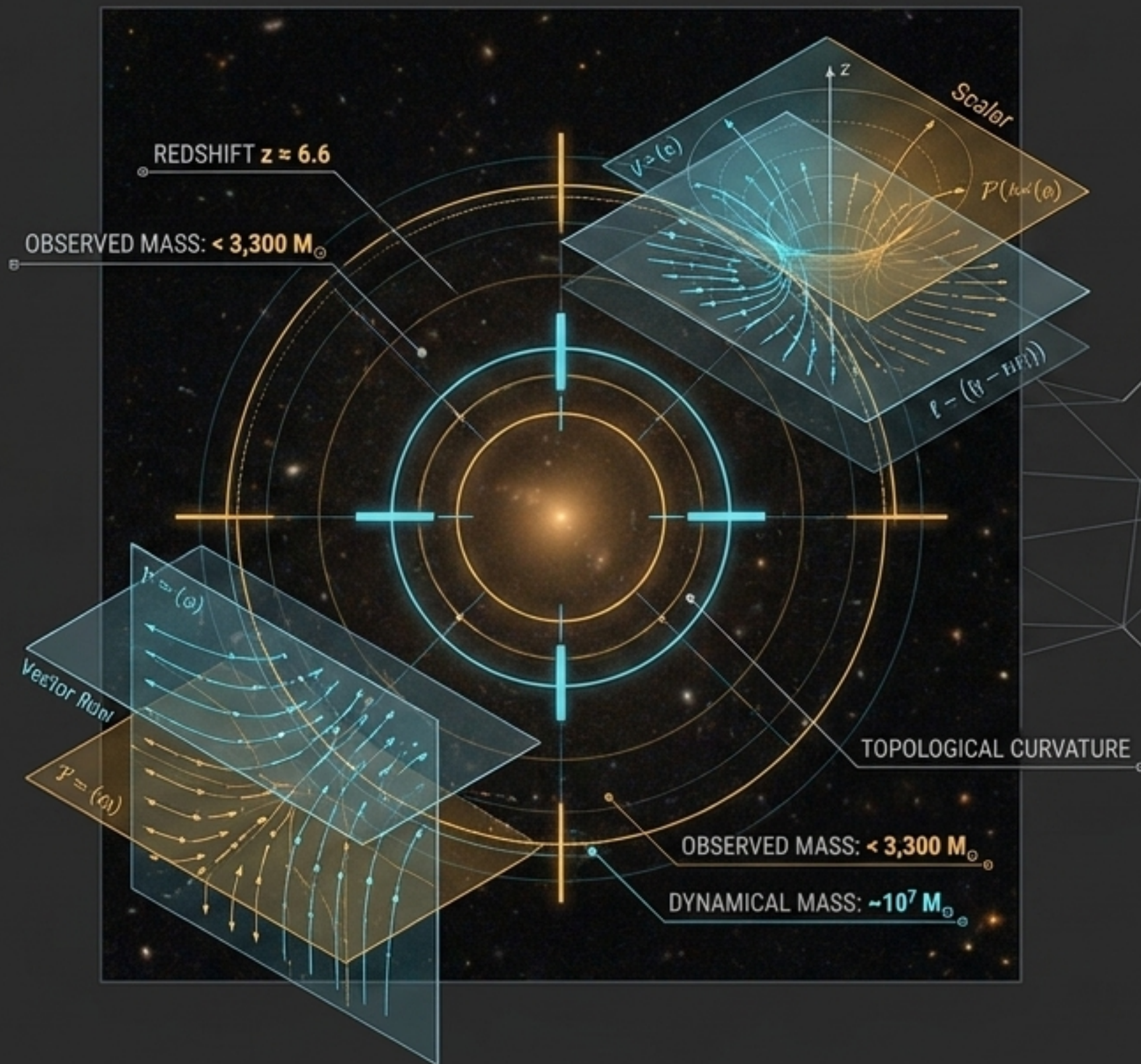
**Cognition:** Agency Collapse / Vanishing Scalar Gradients



**Society:** Institutional Rigidity / Vorticity Decay

**Gradient Flattening:** The exact same mathematical state generates characteristic failure modes across all physical, cognitive, and social projections.

# Empirical Proof: The Fossil Manifold LAP1-B



1

## JWST Spectroscopic Data

Redshift  $z \approx 6.6$  (800 Myr after Big Bang).  
Extreme low stellar mass ( $< 3,300 M_{\odot}$ ).  
Massive dynamical mass ( $\sim 10^7 M_{\odot}$ ).

2

## The RSVP Interpretation

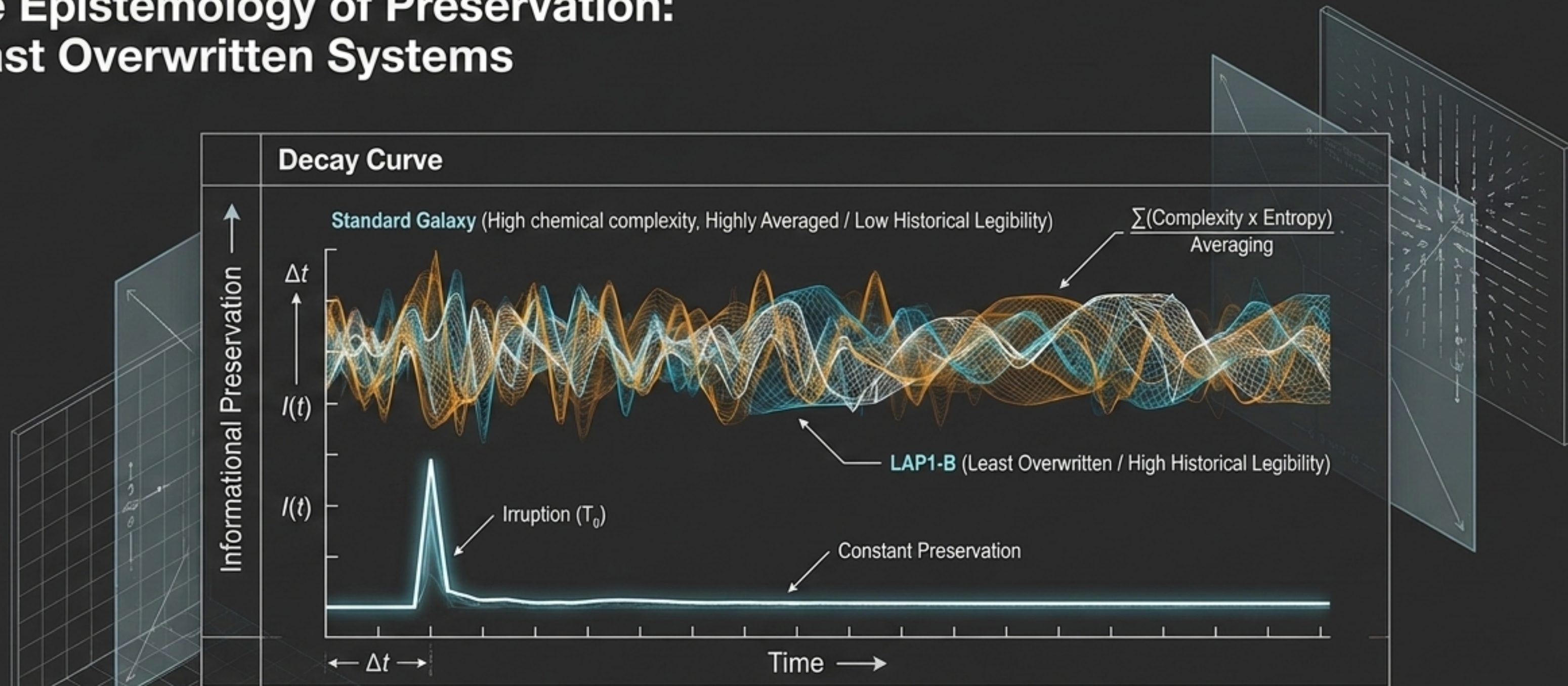
Baryons do not "fall into" a dark matter halo. They are sparse tracer particles marking the deepest observable point of a vast, invisible constraint basin.

3

## Preferred Irruption Scale

SIED correlation length  $\ell \sim \sqrt{\kappa/|f''(n)|}$   
LAP1-B isn't a stunted galaxy; it irrupted precisely at the physically preferred scale.

# The Epistemology of Preservation: Least Overwritten Systems



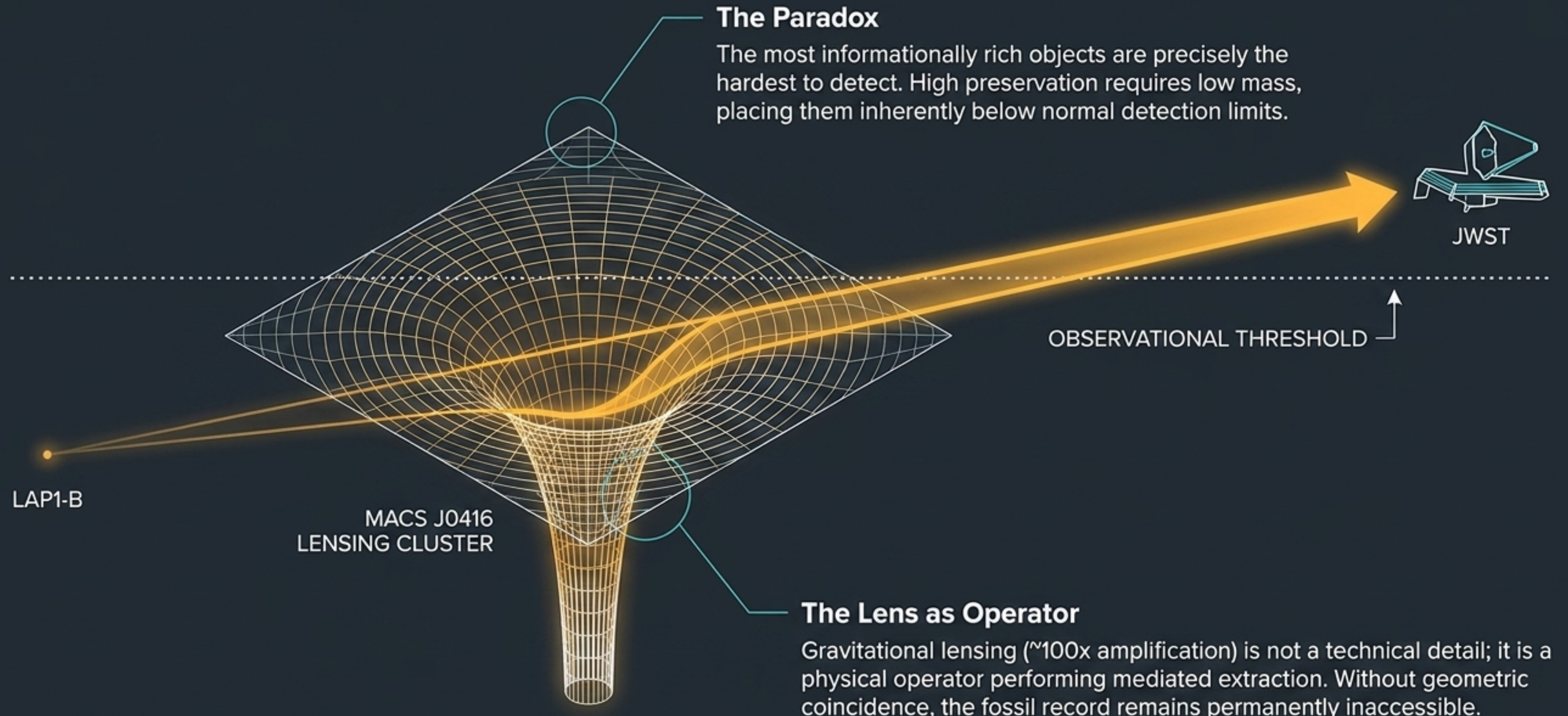
## The Principle

The most informative structures are not the largest, but those that have undergone the **fewest averaging operations**.

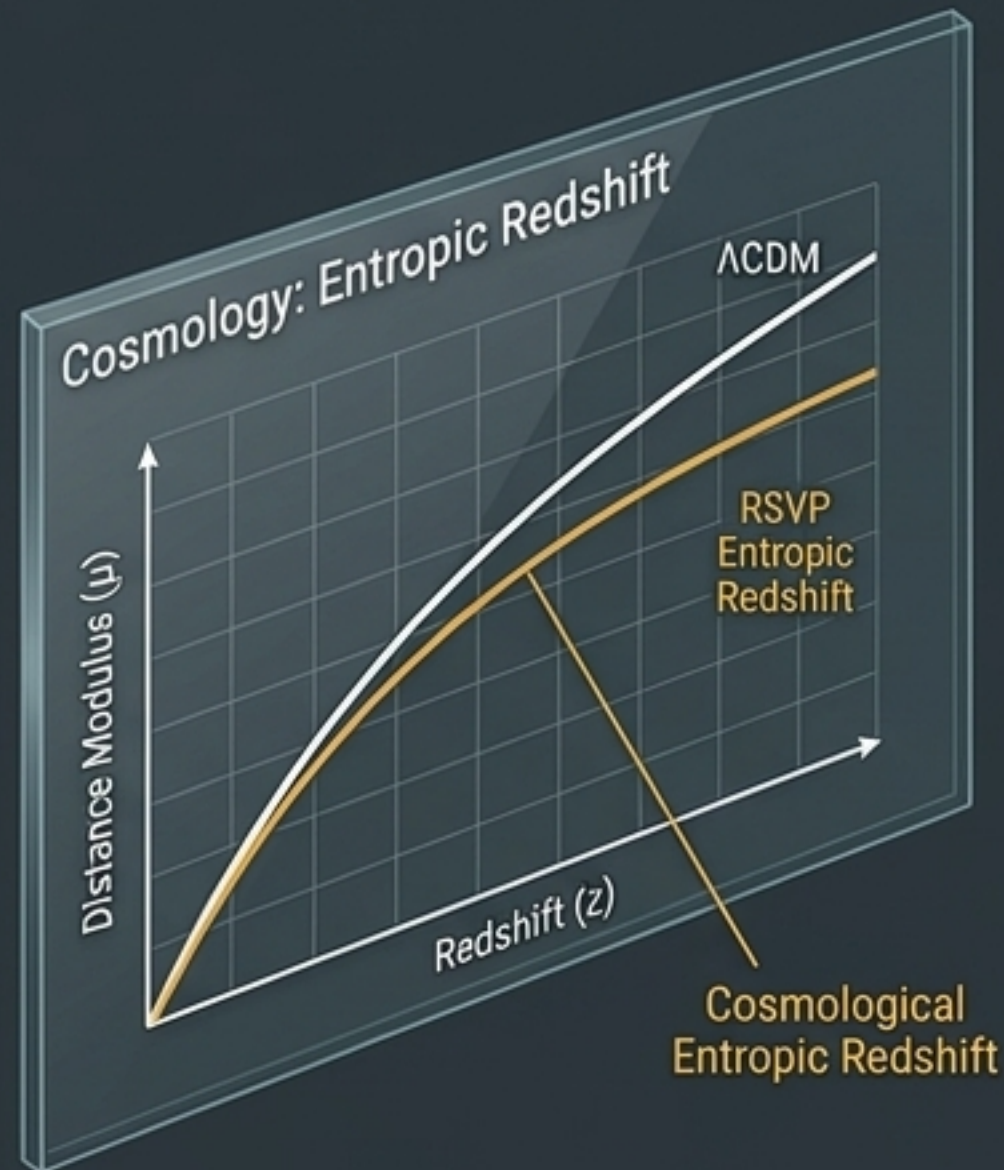
## The Event Log

LAP1-B's elevated C/O ratio is an un-erased physical record of a **'Refuse'** operator in action during faint Population III supernovae fallback. The oxygen was physically forbidden from propagating forward.

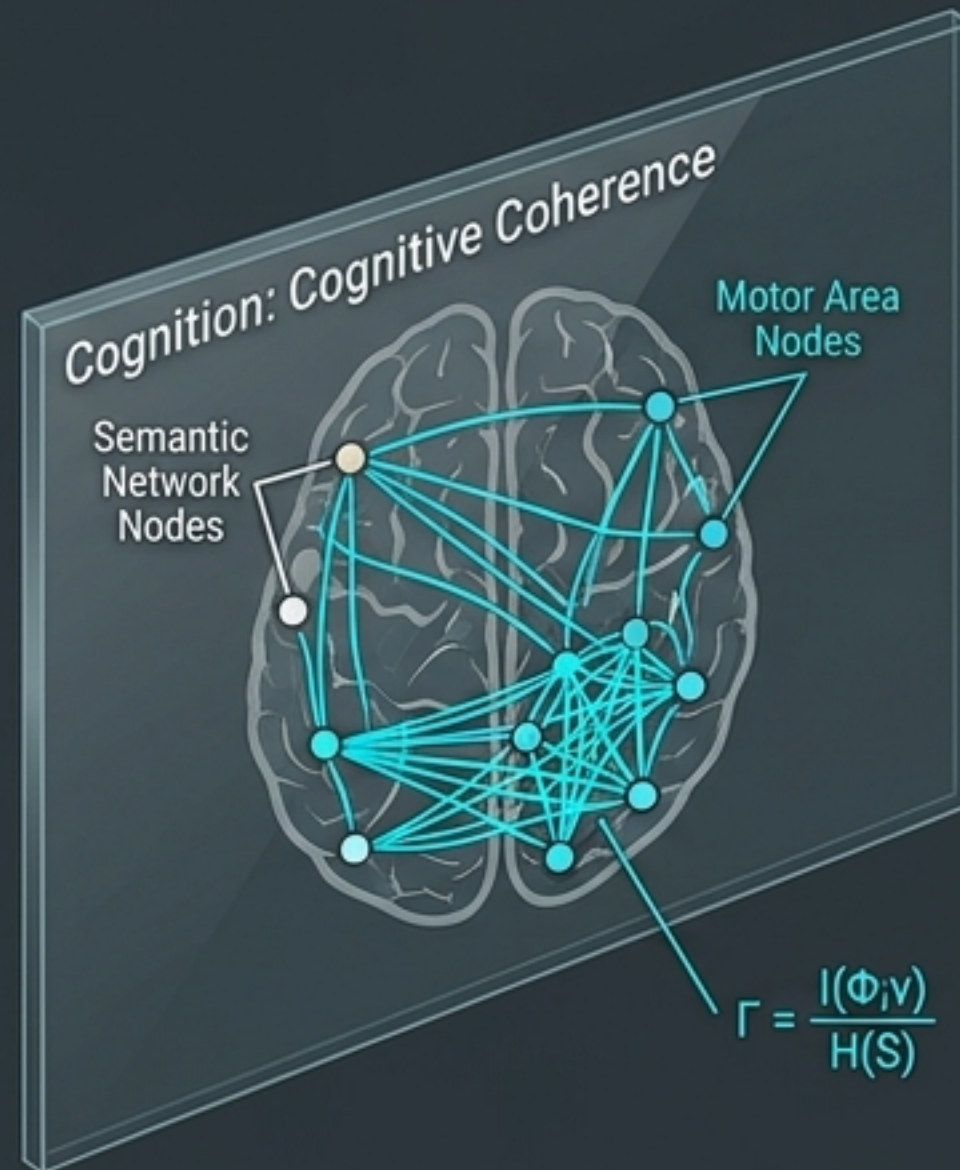
# The Geometry of Observability: Mediated Extraction



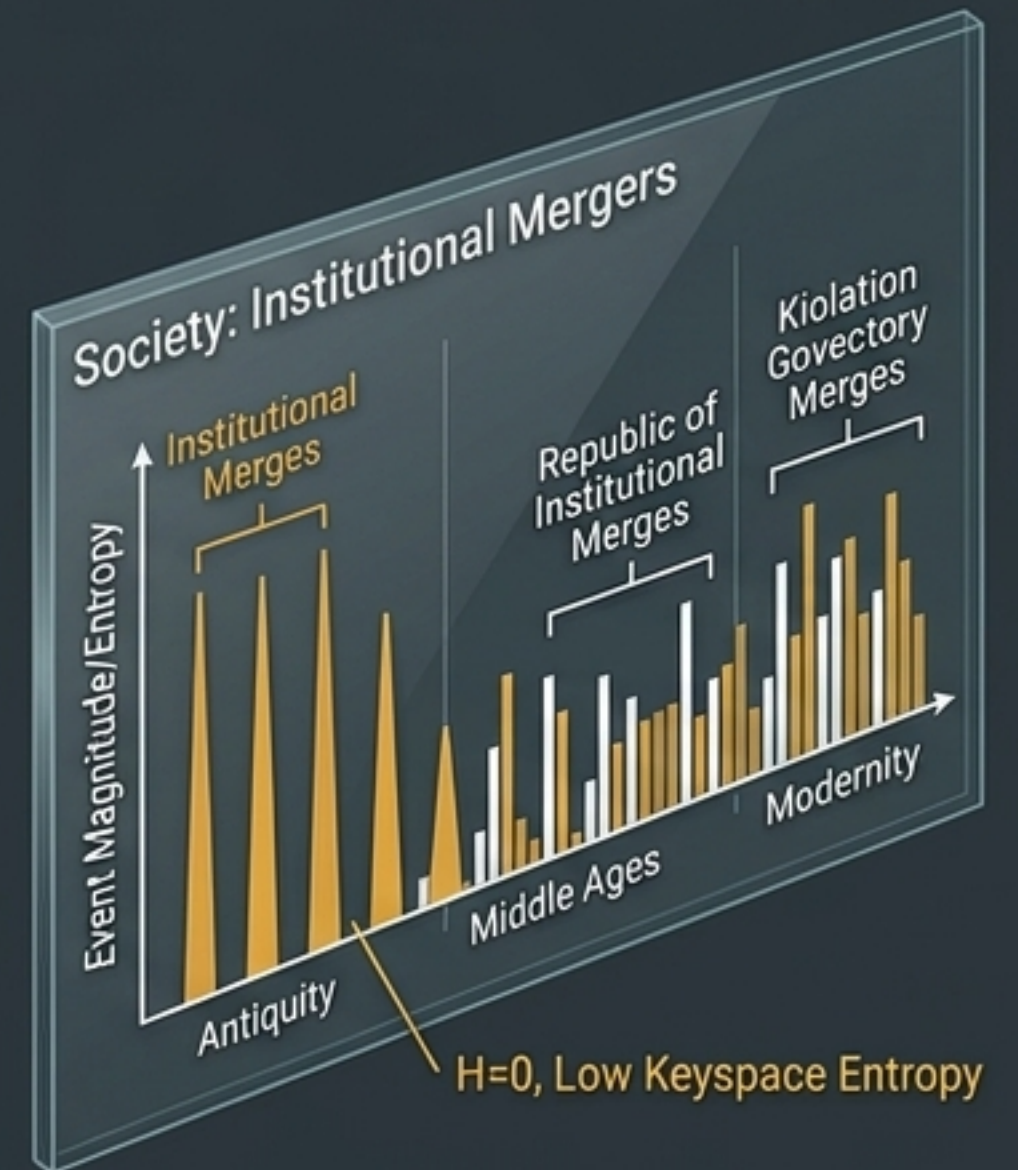
# Conclusion: A Falsifiable Paradigm



Cosmological redshift via integrated entropy production.



Cognitive microstate duration bounded by  $\Gamma = I(\Phi;v) / H(S)$ .



Pre-modern institutional merge rates dictated by low keyspace entropy ( $H=0$ ).

The RSVP Plenum is not a metaphorical alignment. It is a constrained non-equilibrium effective field theory whose coarse-graining induces spacetime, mind, and society. It lives or dies on testable boundaries.