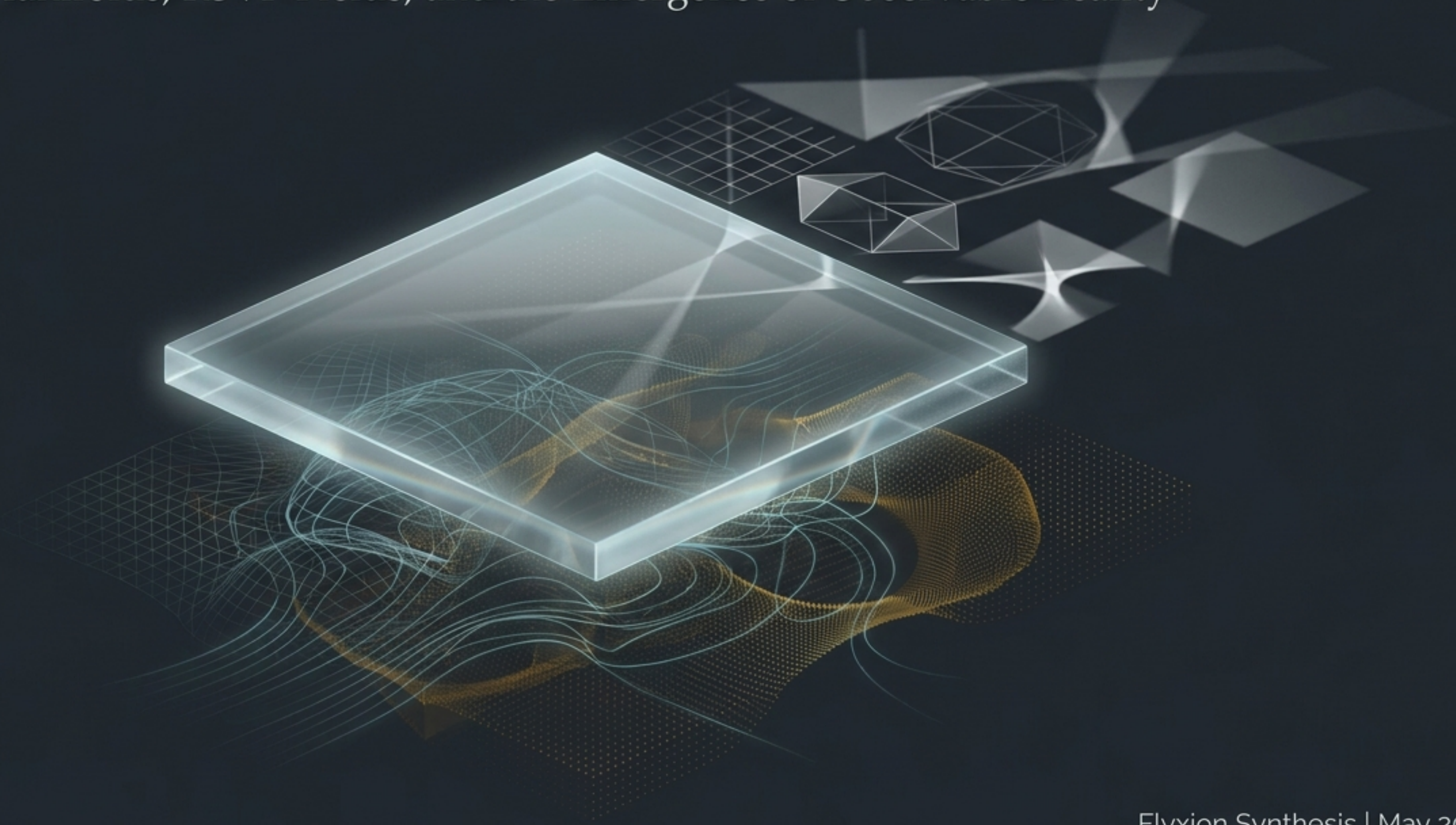


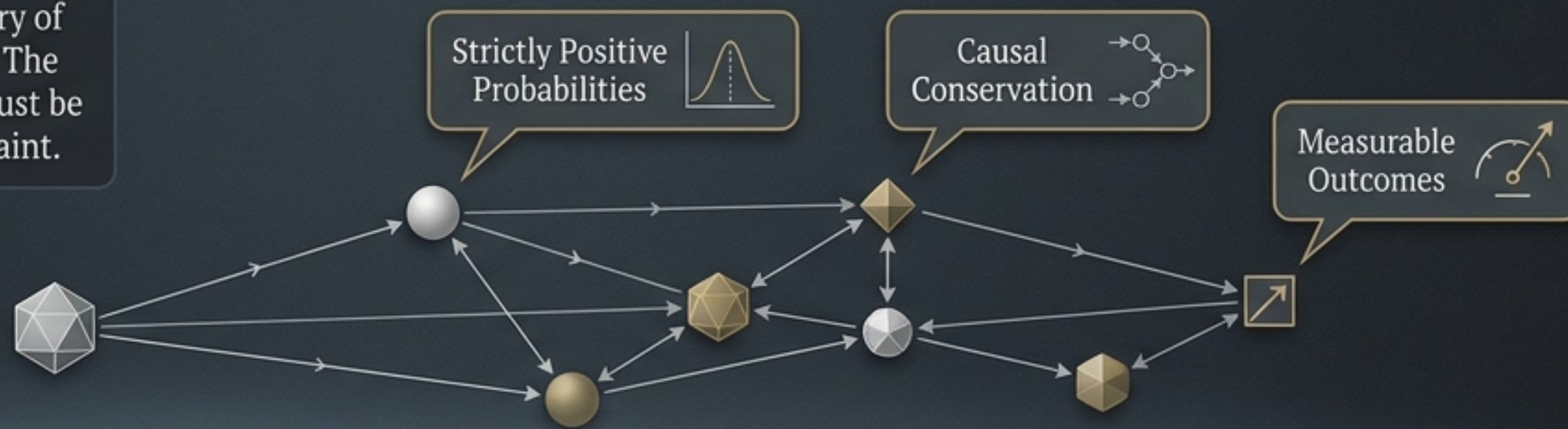
The Projection Interface

Admissibility Manifolds, RSVP Fields, and the Emergence of Observable Reality



The Hilbert Assumption and Latent Fundamentalism

Modern physics frequently conflates the machinery of representation with the geometry of observation. The requirement that an entire internal state space must be a positive-definite Hilbert space is an over-constraint.



Above the Waterline

(The Observable Manifold - M_{obs})

Below the Waterline

(The Admissibility Manifold - M_{adm})

Krein Spaces

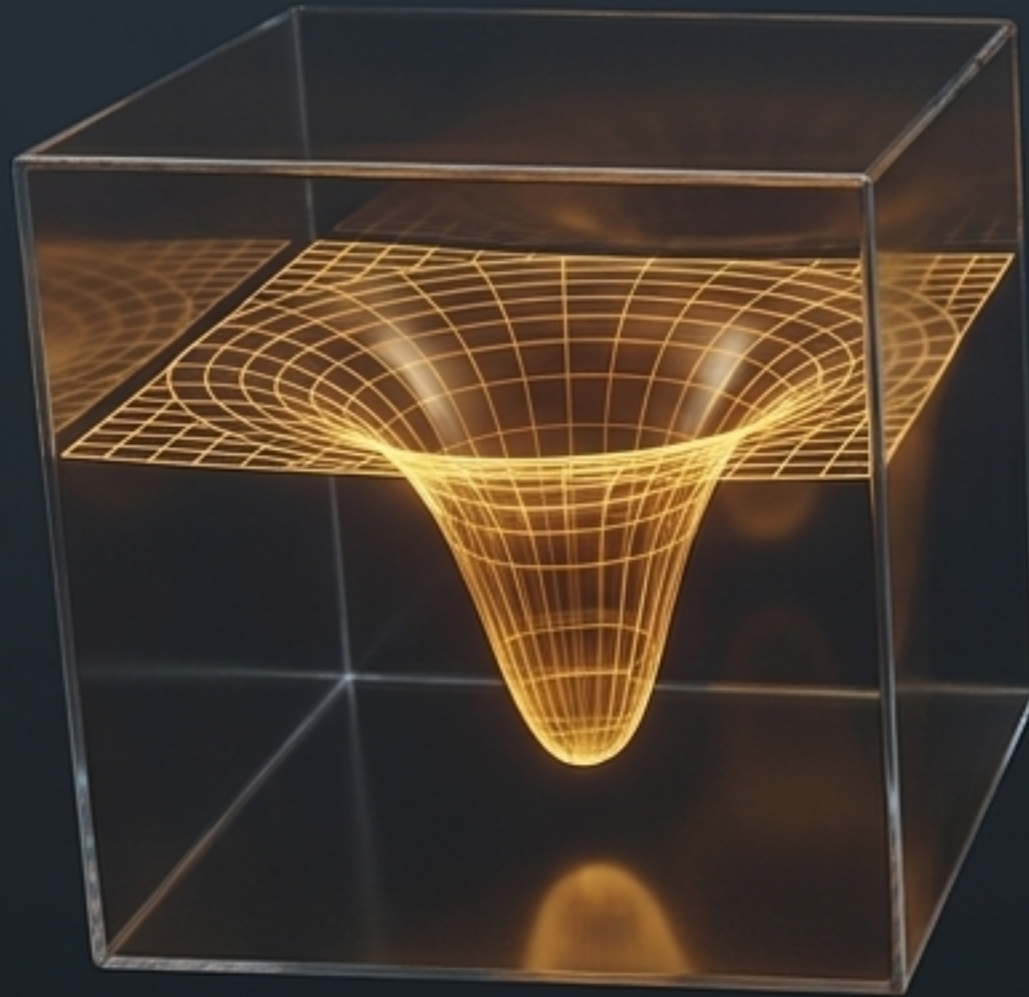
Negative-Norm
Ghost States

Ostrogradsky
Runaways

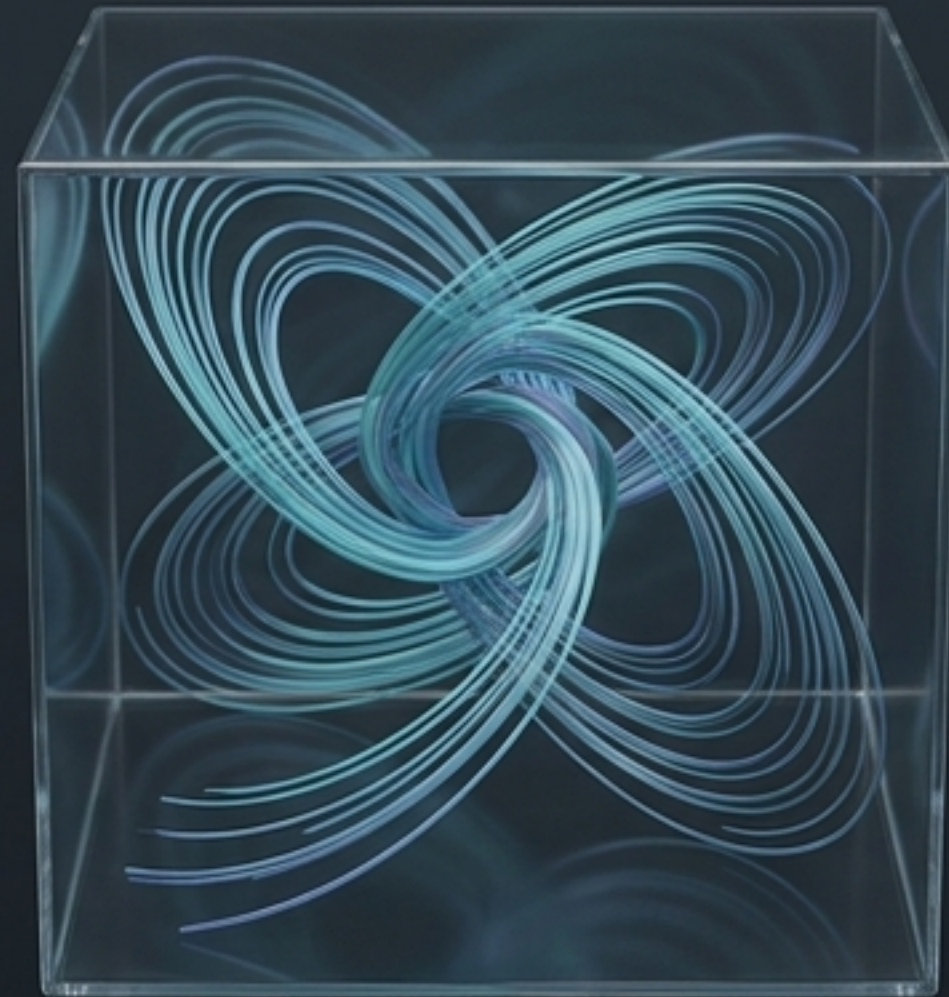
Gauge
Redundancies

The Principle: Observable reality is not the full state space. It is a strictly positive, causal interface projected from a much larger, unobservable admissibility manifold.

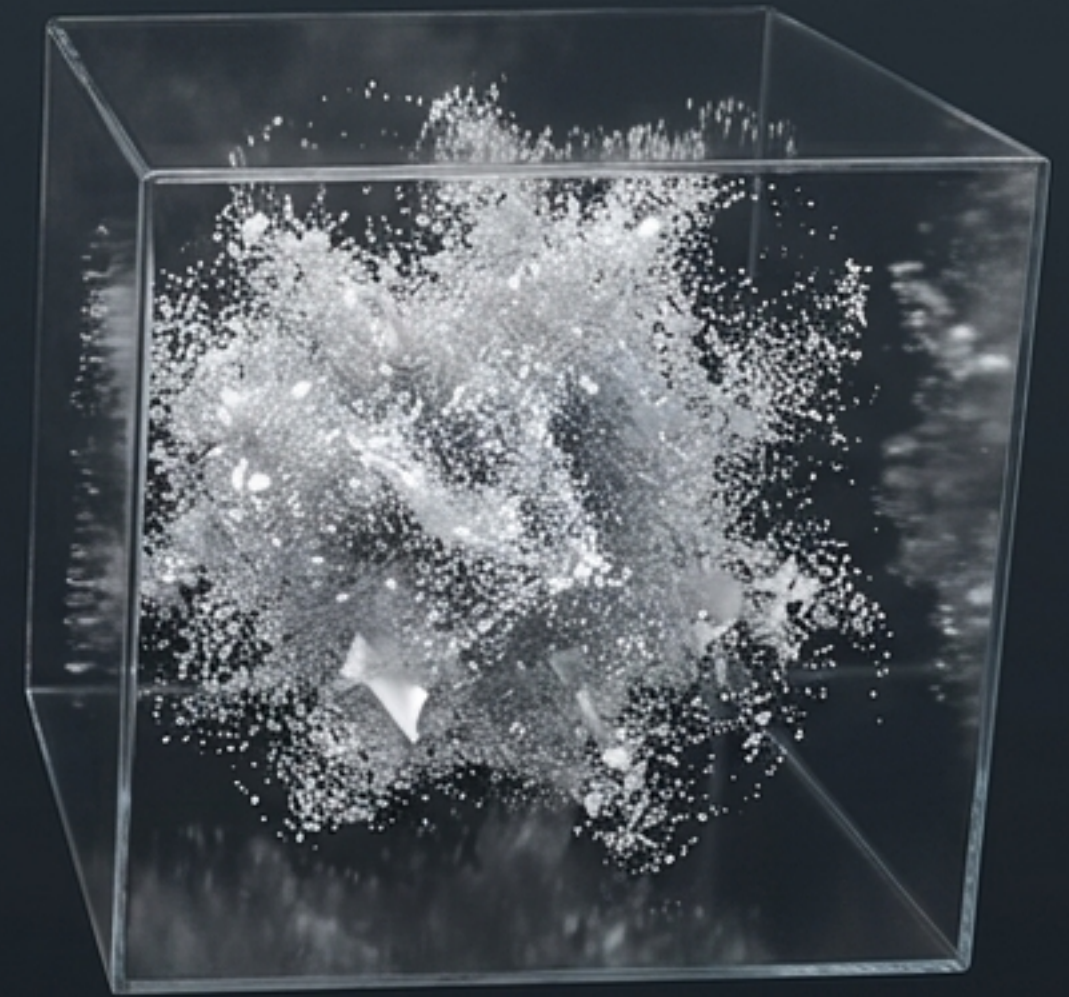
The Relativistic Scalar-Vector Plenum (RSVP)



Φ (Scalar Coherence): Deep Orange.
Represents mass, meaning density,
or structural constraint.



v (Vector Transport): Cyan.
Represents directed inference,
lamphrodyne flow, and trajectory.



S (Entropy/Refuse): Silver/White.
Represents representational budget,
contradiction, and disorder.

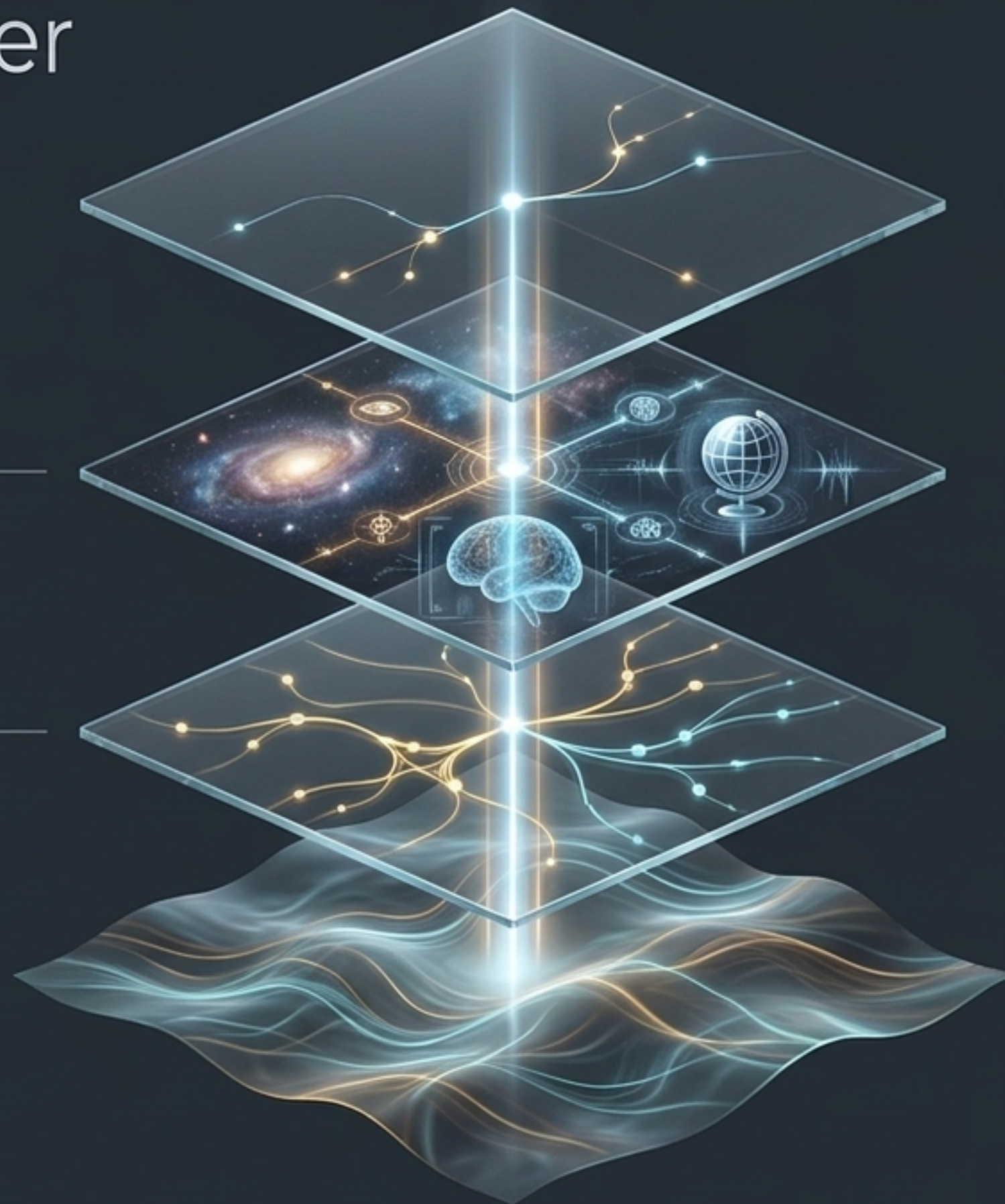
These coupled fields generate all observable constraints, not through instantaneous states, but through the continuous accumulation of trajectory history.

The Three-Layer Admissibility Architecture

Layer 3 (Top):
Observable Space (O).
Discrete, measurable realities
(cosmological, cognitive, institutional).

Layer 2:
History-Sensitive State Space (H).
Discrete paths and
Refuse-admissible trajectories.

Layer 1 (Base):
Continuous Field Space (X).
Continuous RSVP dynamics.



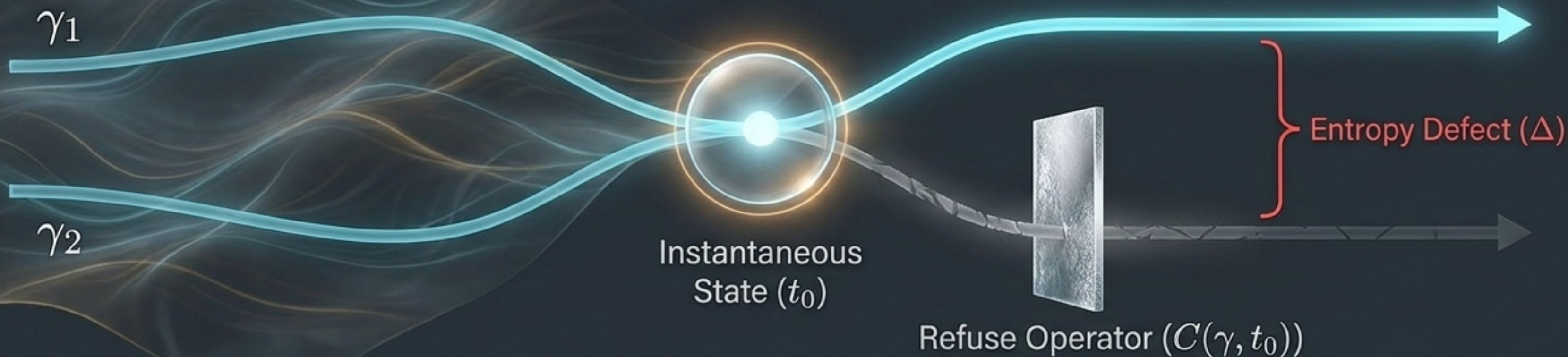
F (Discretization):
Maps continuous fields to
history-sensitive
trajectories.

Π (Projection):
Maps histories to
observable interfaces.

G (Reconstruction):
The variational attempt to
infer the base from the
projection. The failure of G
to invert F generates
physical irreversibility.

Application 1: Time and the Reconstruction Defect

State-based physics fails here. Both trajectories reach the identical instantaneous field value, yet are dynamically distinguished by path-dependent observables.



Irreversibility is not a temporal gloss; it is the structural non-isomorphism of the adjunction unit. The system is constrained by its history.

Application 2: Exorcising the Ghosts of Higher-Derivative Gravity

Context	Coordinate Pathology (in M_{adm})	Status in M_{obs} (Observable)
Lorenz-gauge QED	Negative-norm photons	Absent from physical states
BRST gauge theories	Off-shell Faddeev-Popov ghosts	Absent from BRST cohomology
Ostrogradsky (Gravity)	Runaway phase-space direction	Cosmological expansion
Krein-space QFT	Indefinite inner product	Positive traced probabilities
Quadratic Gravity	Spin-2 Ghost (Negative Pole)	Hidden Admissibility Direction

Insight: A negative-norm sector is a coordinate pathology, not an observable one. The Ostrogradsky instability is merely a coordinate description of stable, ordinary cosmological expansion.

Application 3: Cosmology and Fossil Manifolds

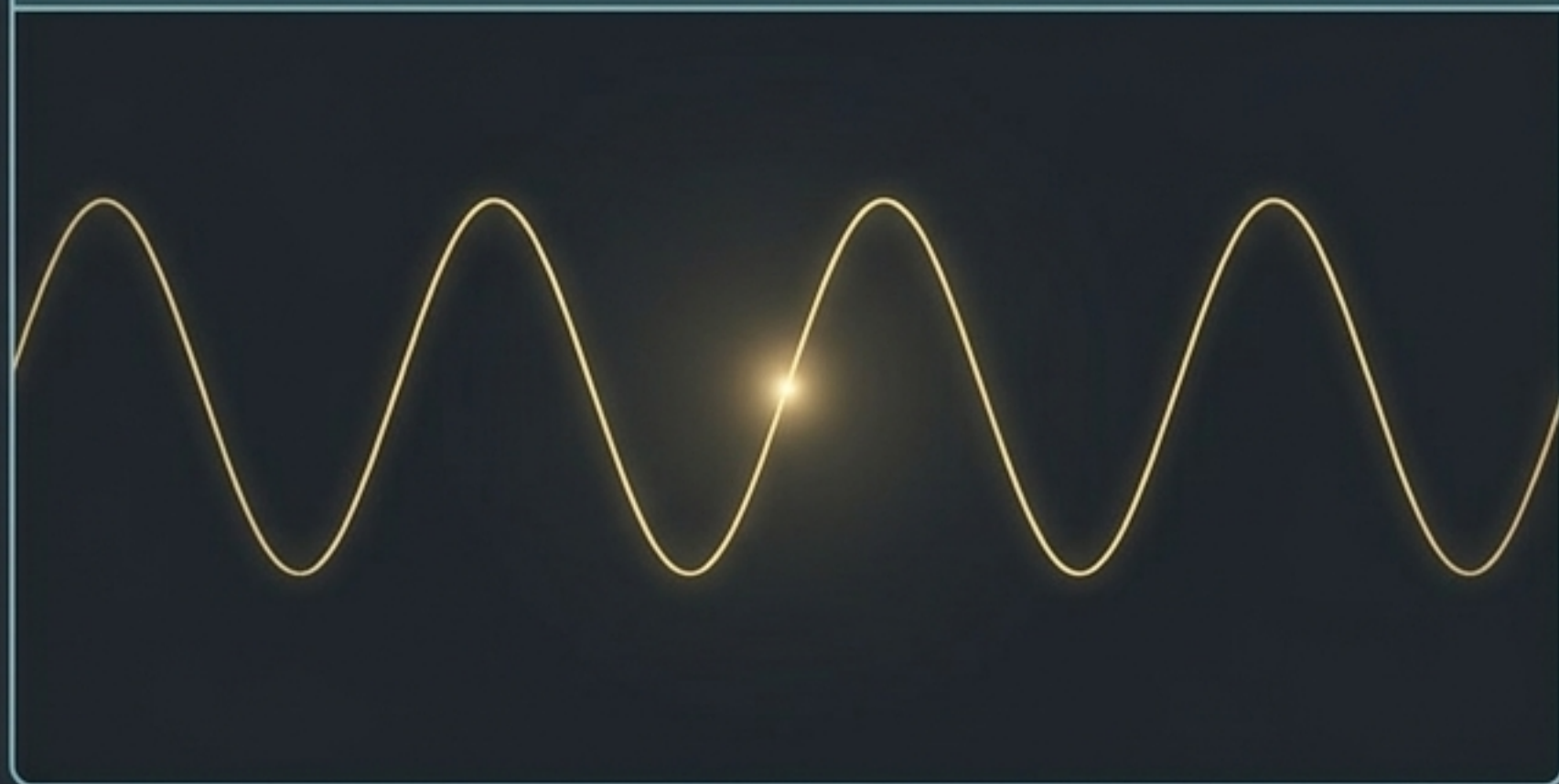
The Informational Privilege of Low-Averaging Systems: Systems with the highest informational value are frequently not the largest, but the least overwritten. The most legible historical logs are precisely the faintest.

Chemically Mature System



High averaging, complex chemistry, lost history.
Observables represent an integral over many unrecoverable events.

Least-Overwritten System



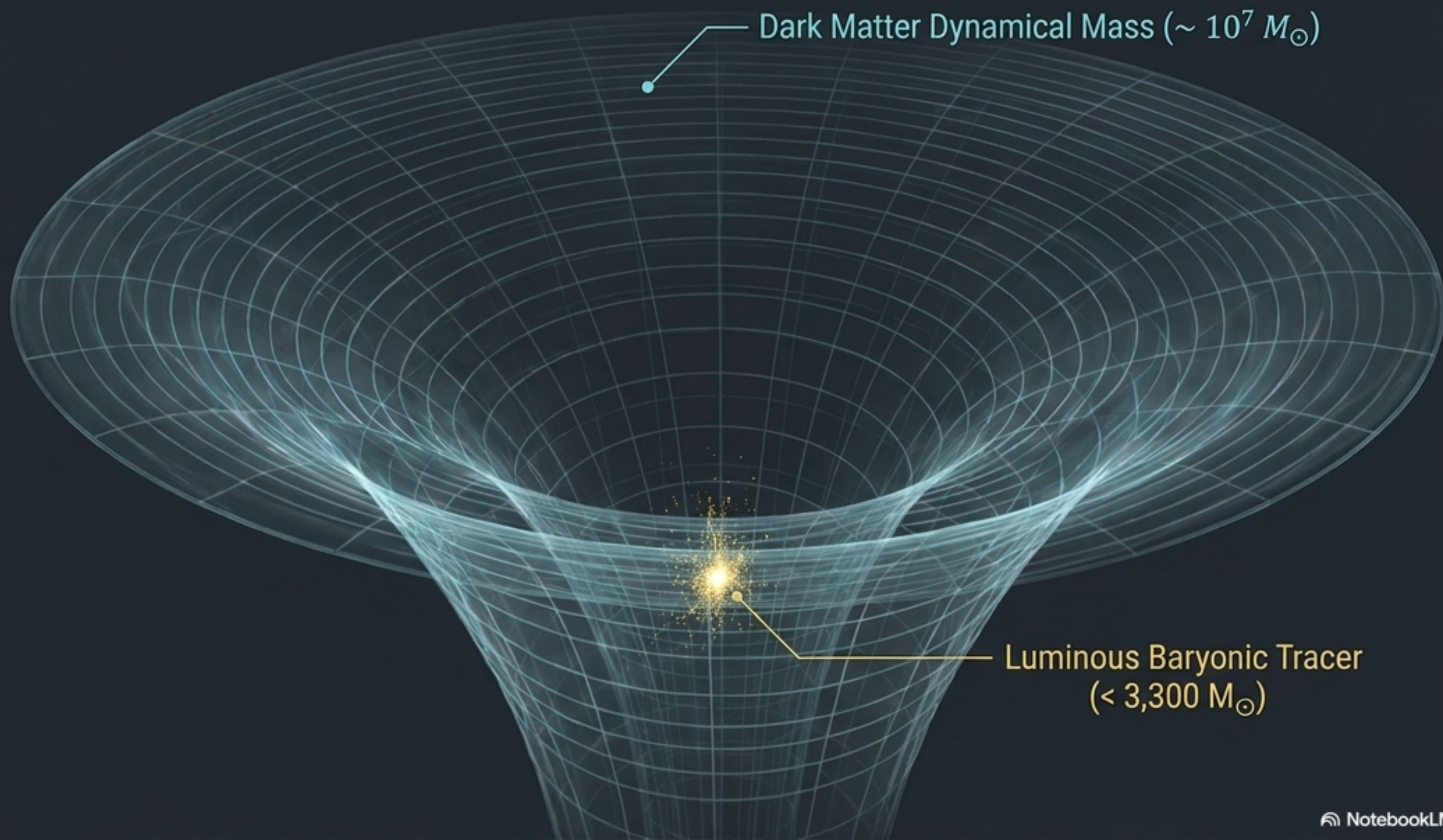
Low averaging, primitive chemistry, preserved event logs.
The projection is less lossy.

LAP1-B: Tracers in the Constraint Basin

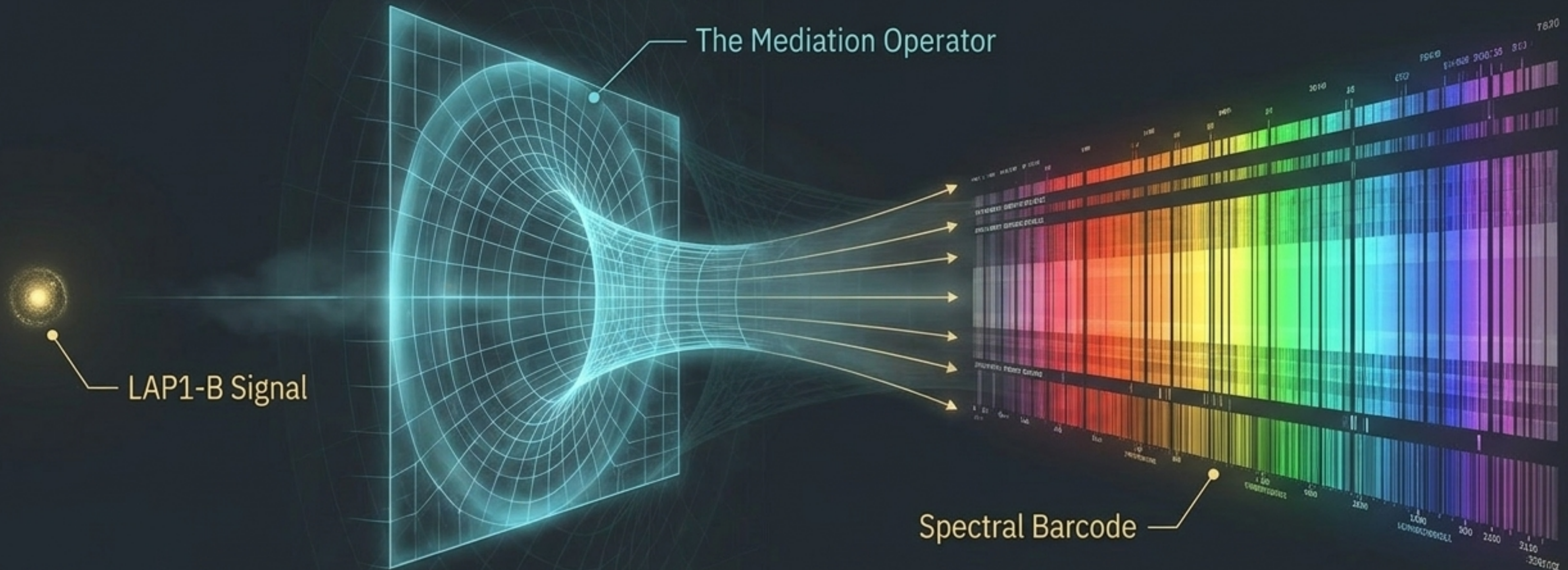
Standard Λ CDM views halos as containers that baryons fall into.

The **Admissibility framework** inverts this: **the organizing structure is fundamental**.

The sparse luminous matter ($z \approx 6.6$) does not fill the basin; it merely acts as a tracer revealing the geometry of a larger, invisible flow field prior to baryonic modification.



Lensing as Mediated Extraction



Insight: Informational richness and observational accessibility are inversely correlated in the primitive universe. Most of the fossil record is permanently inaccessible without geometric assistance. The lens acts as a fundamental epistemic operator, extracting and amplifying a low-entropy signal from an attenuated projection.

The Derived Interface Conjecture

Thermodynamic
Irreversibility

Ghost-free
Quantum Gravity

The Law: Observable spacetime theories and their quantizations are effective interfaces generated by projection from a larger admissibility manifold (M_{adm}).

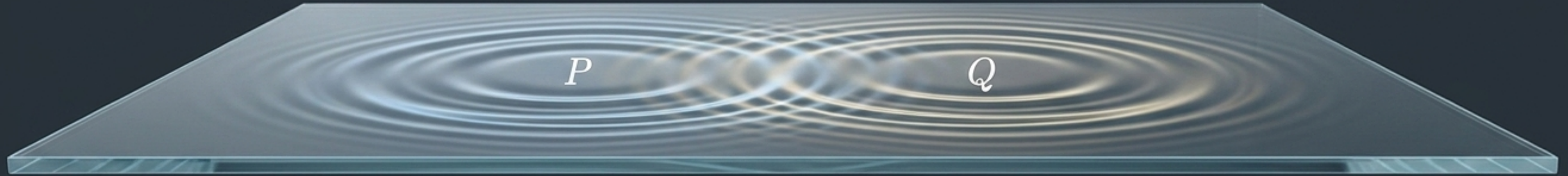
The Implications: Hilbert space, positive inner product, gauge symmetry, and metric positivity are properties of the interface, not ontological necessities of the universe.

The Interface

Primordial Cosmology

The Ultimate Geometry is Distinguishability

$$JSD(P||Q) = H\left(\frac{P+Q}{2}\right) - \frac{1}{2}(H(P) + H(Q))$$



We no longer ask: What hidden content is inaccessible in the depths?

We now ask: How distinguishable are the interfaces?

Reality is not the hidden manifold; it is the geometry of distinction.

Loss is relational. What survives the projection is the only physics we have.

The primitive is not the admissibility manifold. The primitive is the distinguishability structure on M_{obs} .