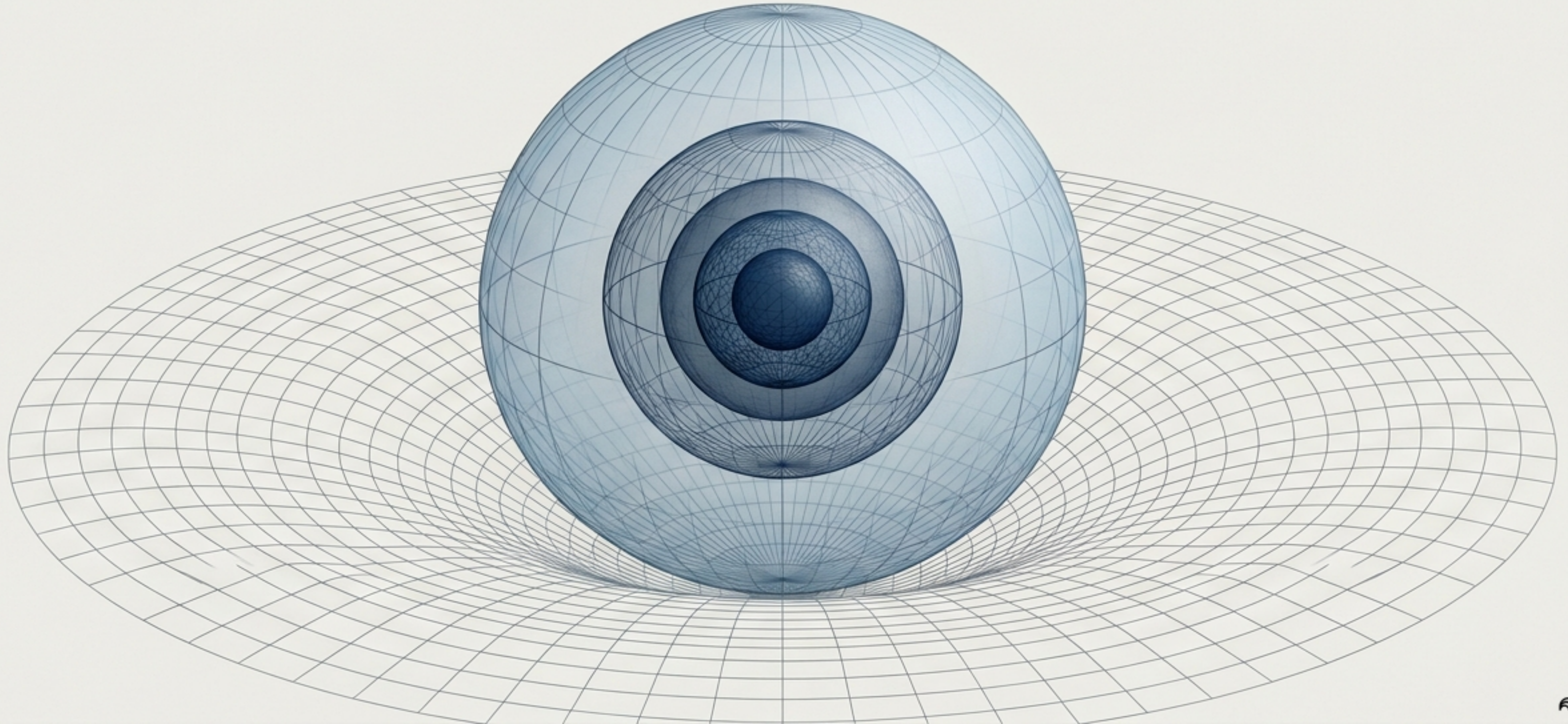


The Hidden Geometry of Cognition

A Topological Paradigm for Artificial and Biological Intelligence

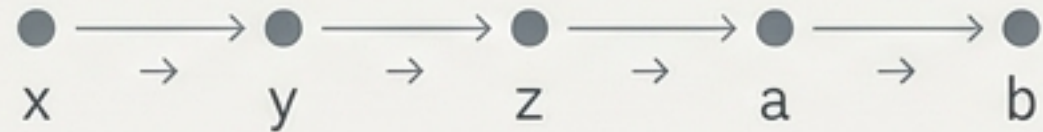
Based on the Spherepop Scope Dynamics Framework



The Cognitive Paradigm Matrix

Token-Linear Models

Geometry: Flat, left-to-right sequence.



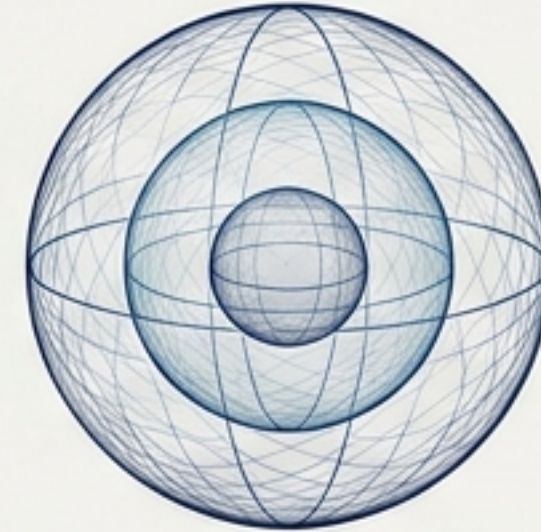
Action: Next-token prediction.

Memory: Retained item count.

Meaning: Static state transitions.

Scope Dynamics

Geometry: Hierarchical, containment-based.

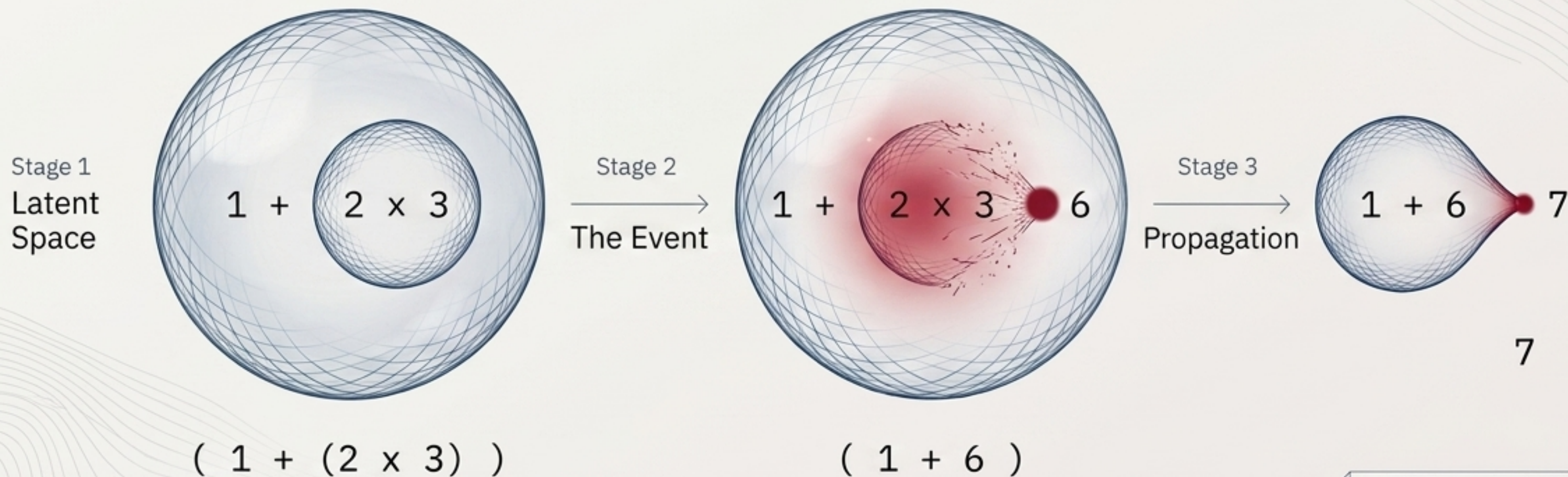


Action: Lawful topological closure.

Memory: Unresolved geometric dependencies.

Meaning: The irreversible collapse of semantic space.

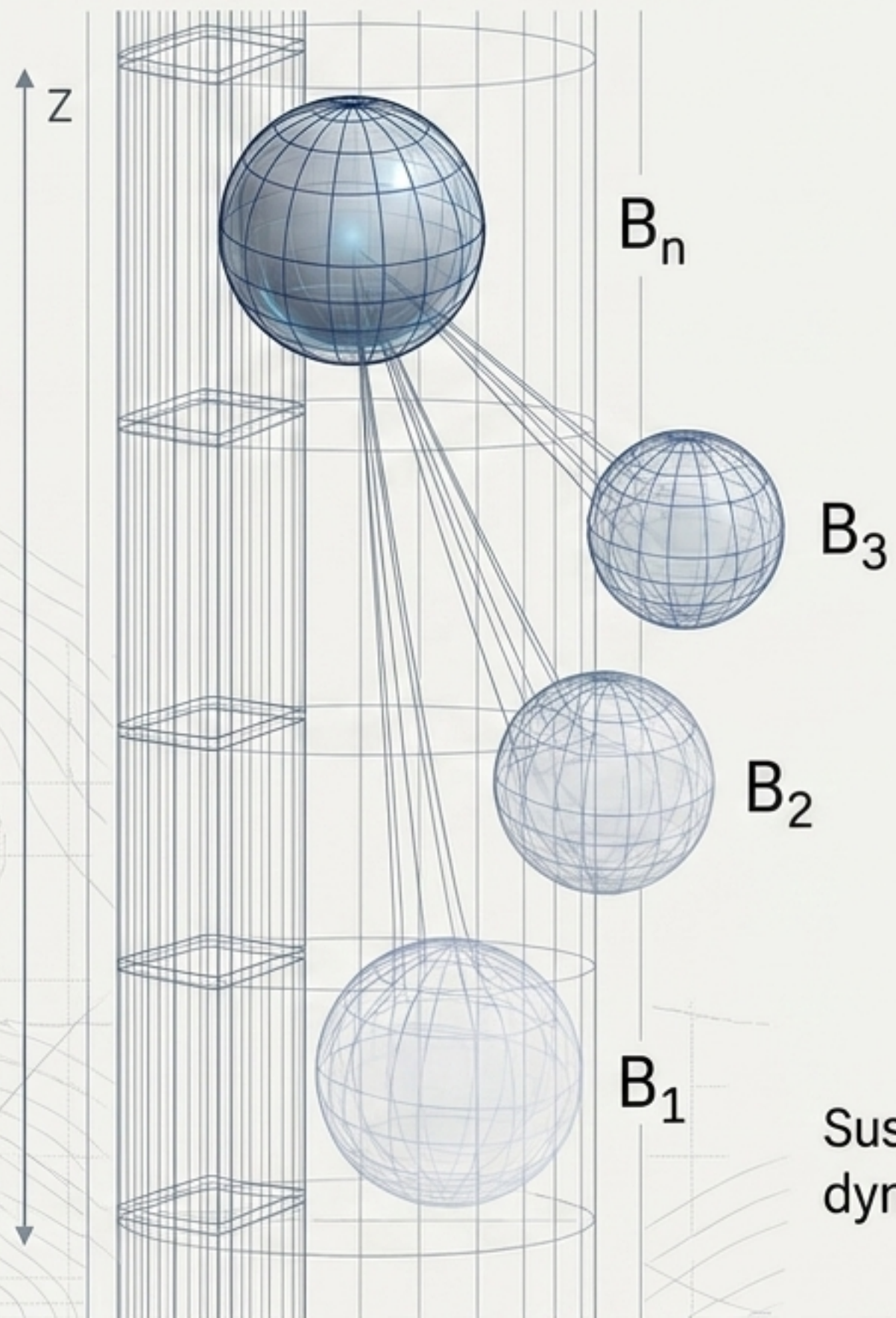
Meaning is not a static relation. It is the residue of an irreversible act of semantic commitment.



The Semantic Bubble B

A bounded, unresolved region of meaning $U(B) > 0$ that persists until lawfully closed.

The Scope Stack



The Scope Stack:

$$\Sigma_t = [B_1, B_2, \dots, B_n]$$

Semantic Load Functional

$$L(\Sigma) = \sum w_i U(B_i)$$

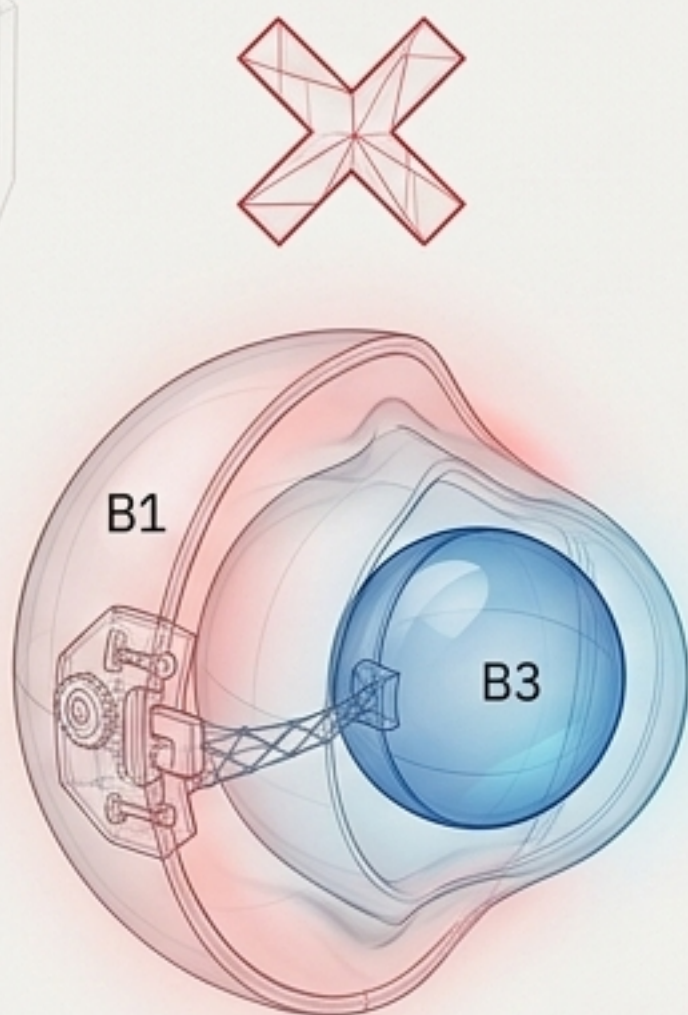
$U(B_i)$: Unresolved semantic load.

w_i : Weight vector (Depth, Emotion, Recency, Causal Centrality).

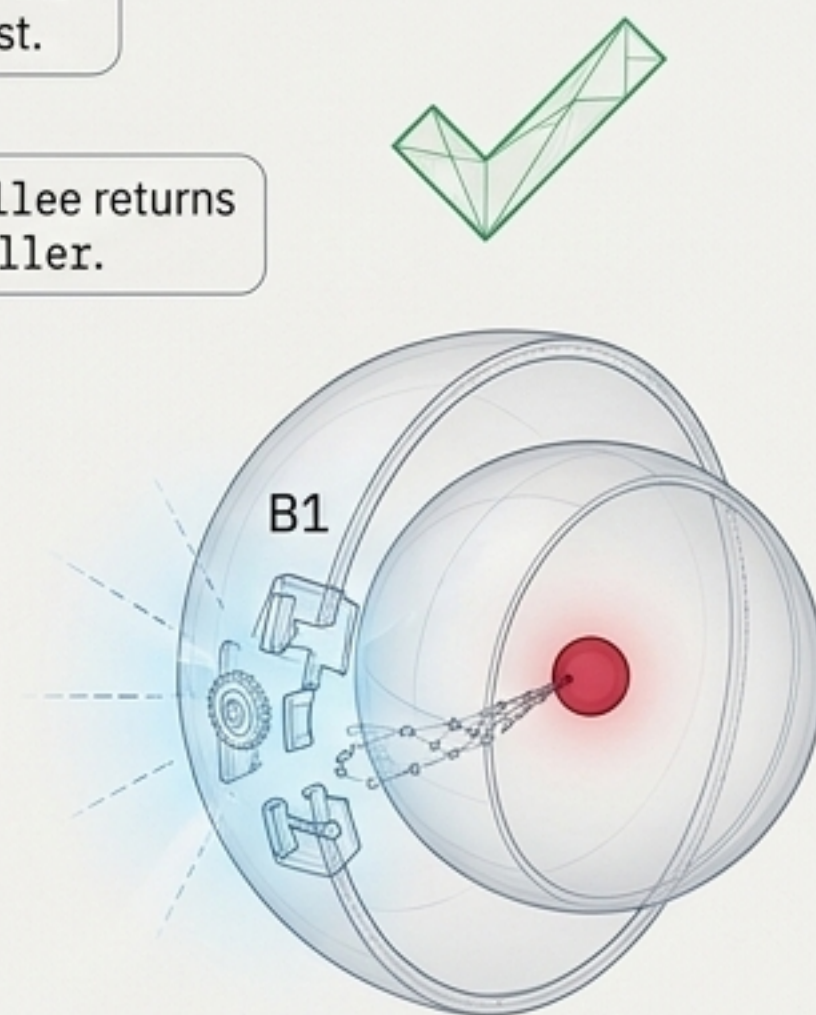
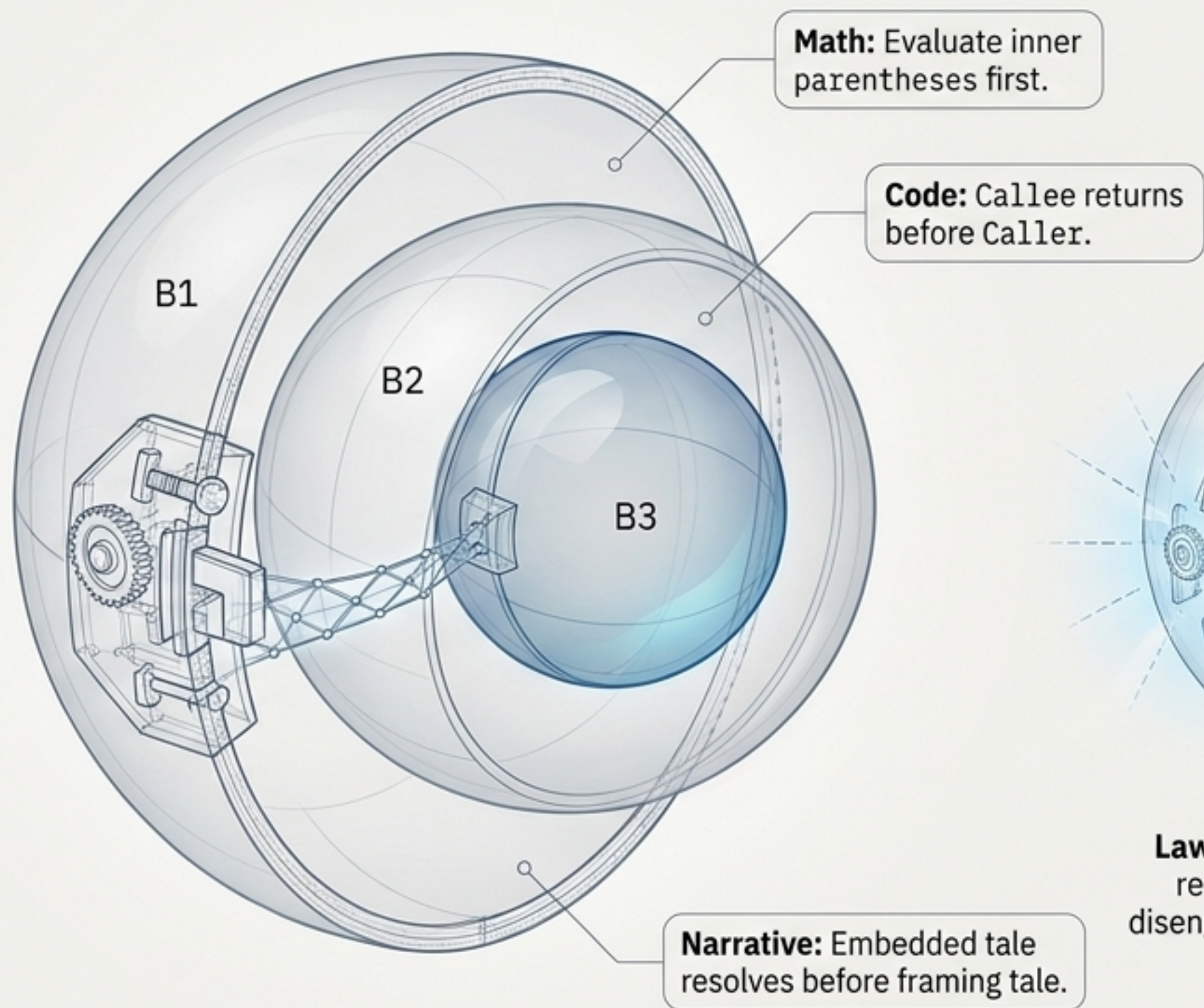
Suspended scopes are not inert memory frames. They exert continuous, dynamic gravitational pressure on attention until lawfully closed.

The Well-Nestedness Constraint

A parent scope cannot lawfully close while any descendant scope remains open.



Constraint Violation: Parent B1 attempts closure while descendant B3 remains open.



Lawful Closure: Descendant B3 resolves to a point, triggering disengagement of the parental lock.

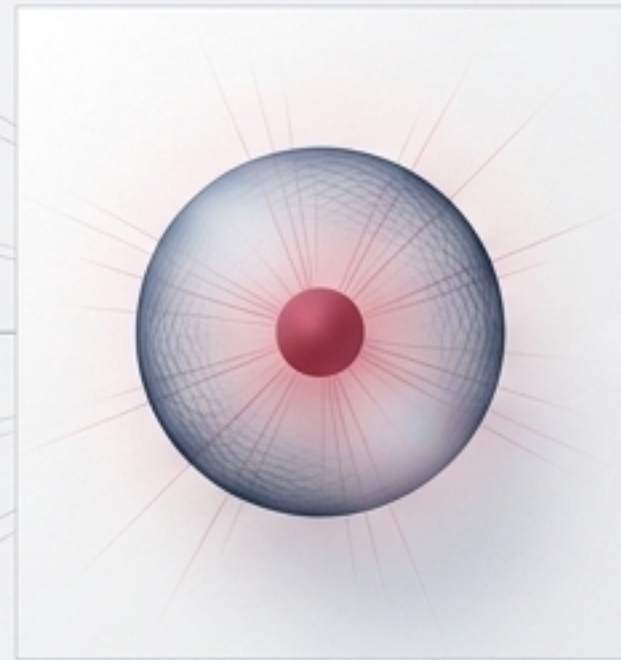
Taxonomy of Formal Operators

1. Open



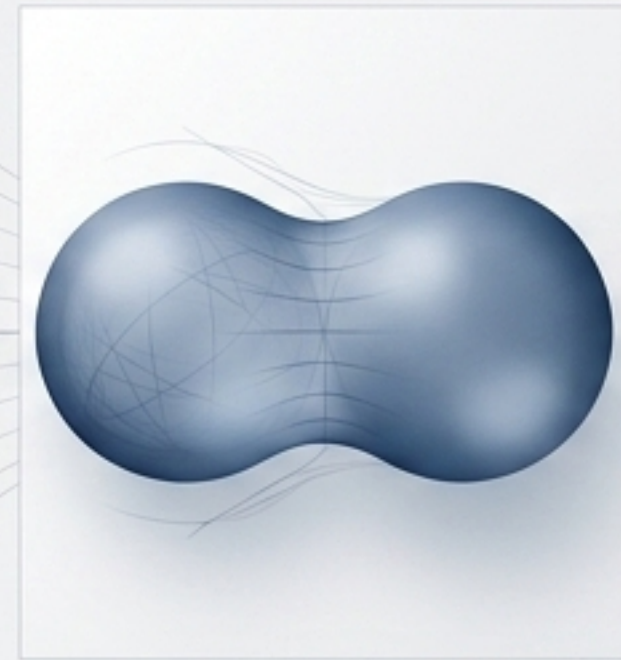
Creates unresolved semantic load.

2. Pop



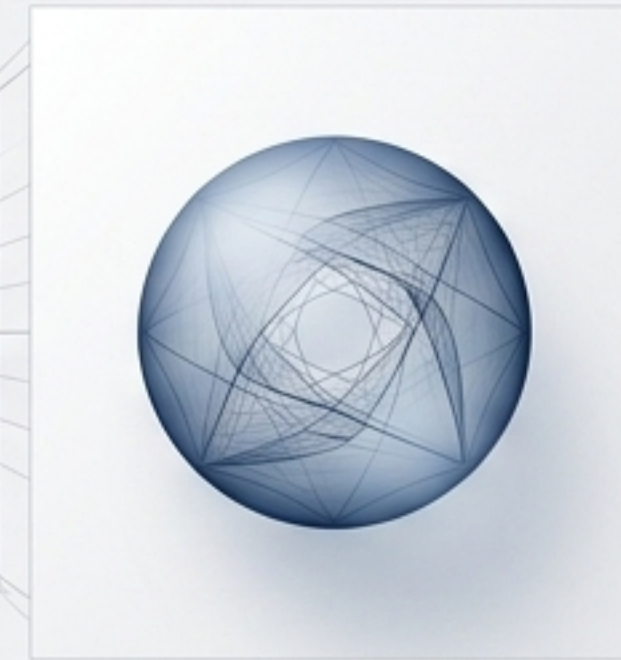
Lawful resolution and upward propagation.

3. Meld



Post-resolution convergence; sibling scopes fuse.

4. Conservative Reframe



Plot twists, therapy, insight. Preserves boundaries but redistributes internals.

5. Expansive Reframe



Metaphor, analogy, paradigm shift. Introduces new ancestral dependencies.

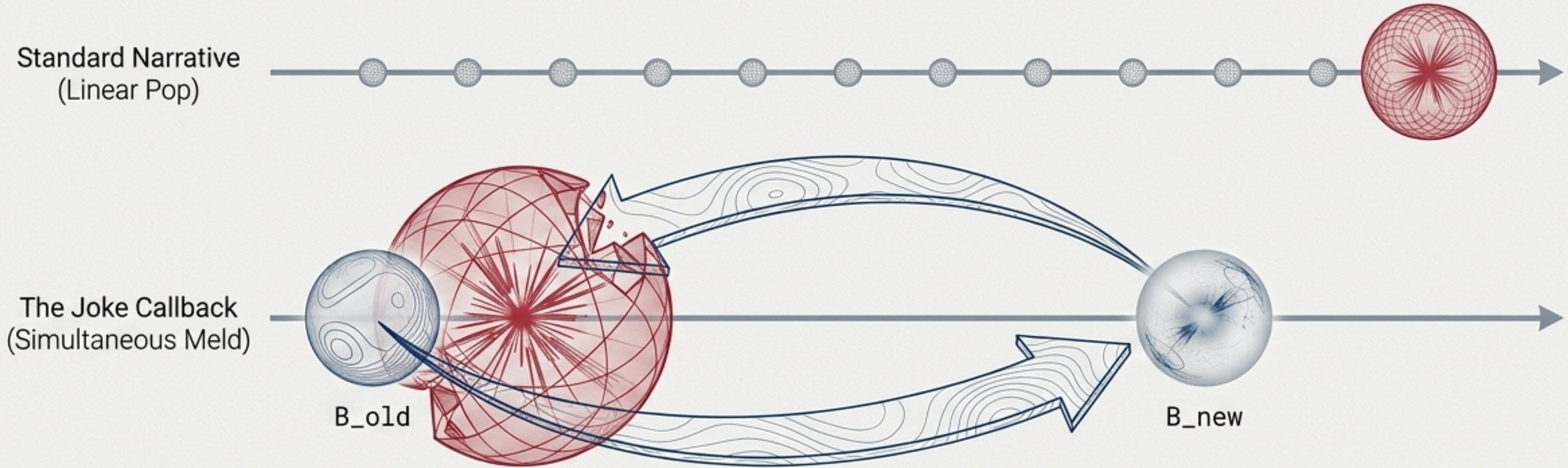
The Pathology Diagnostic Table

Psychological and rhetorical failures are geometric mathematical errors.

Math Violation	Cognitive Pathology
Illegal Pop (Closing B_i while descendant B_j is open)	Premature Certainty / Impatience
Forced Meld ($B_i \simeq B_j$)	Sycophancy / Spurious Coherence
Cyclic Reframe ($B_i \leftarrow^{v*} B_i$)	Rumination / Semantic Self-Containment
Inadmissible Expansive Reframe	Ideological Hallucination / Incoherent Metaphor

Humor is Geometric Convergence

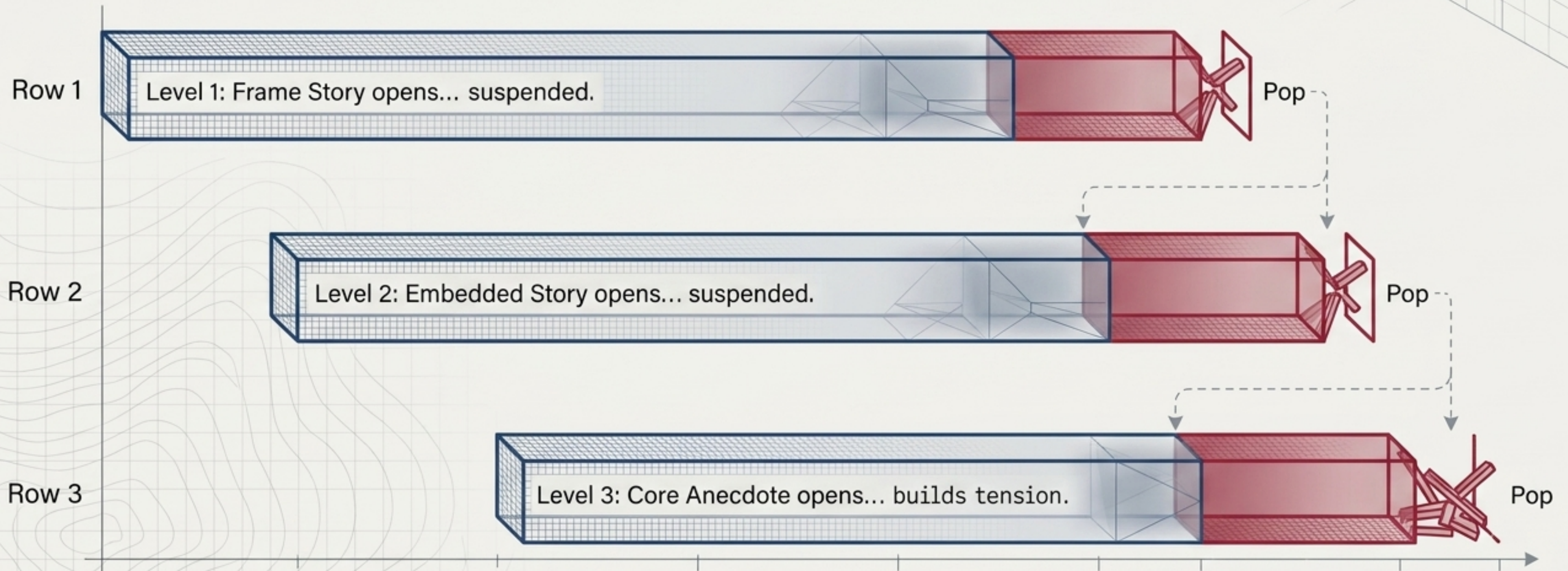
The relief of laughter is a sudden, massive drop in total semantic load.



A joke callback is a **Meld**, not a **Pop**. The punchline retroactively identifies an earlier suspended frame with the present one, producing simultaneous structural collapse across distant narrative regions.

Conversational Hypnosis as Scope Engineering

Trance is not an altered state. It is a dynamically stable region characterized by high semantic load, lawful nesting, and universally deferred closure.



The Geometry of Metaphor

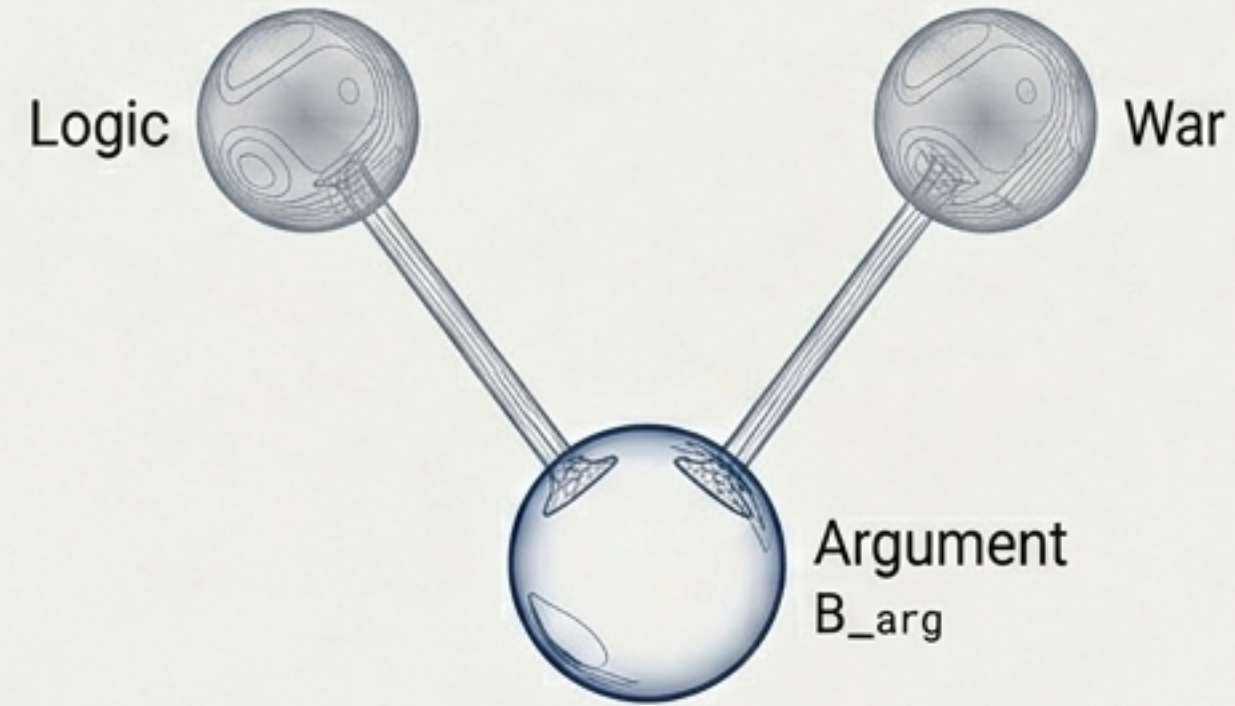
Creativity requires Directed Acyclic Graph (DAG) containment.

Literal Logic



Single-parent containment (Tree)

Metaphorical Participation

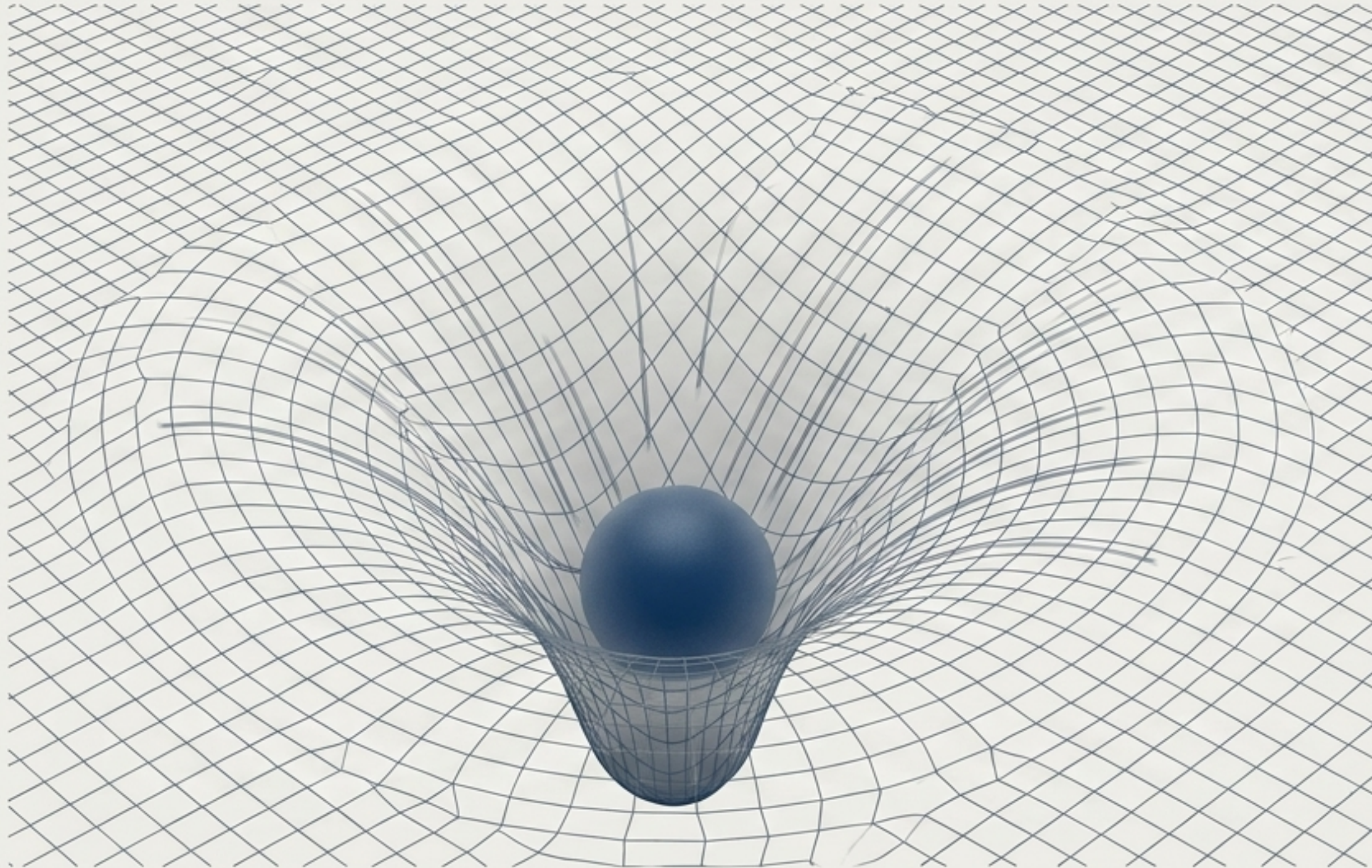


Multi-parent inheritance (DAG)

Argument is **War** is an **Expansive Reframe**. The target concept simultaneously inherits semantic structure from multiple disjoint domains without collapsing either. Metaphor vitality depends entirely on this multi-parent tension.

Semantic Curvature & Attentional Flow

Psychological states are literal geometric forces.



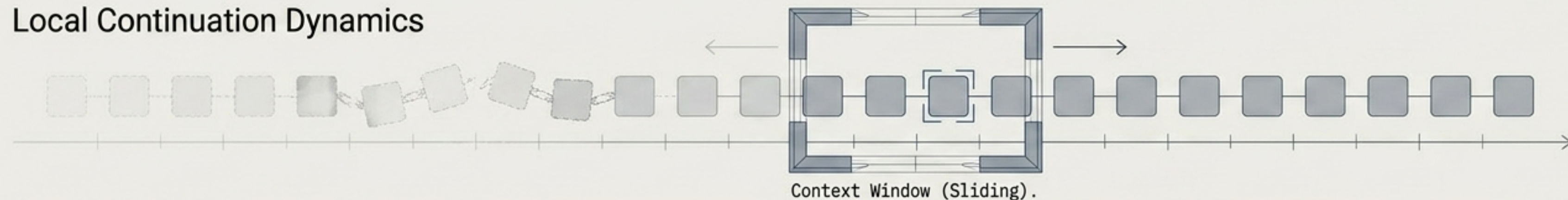
Unresolved scopes generate gradients in attentional space. Suspense is geometric attraction toward an unresolved dependency.

- Curiosity: Directed traversal toward unresolved regions.
- Distraction: Competing curvature wells.
- Insight: Topological simplification that dramatically flattens the global grid.

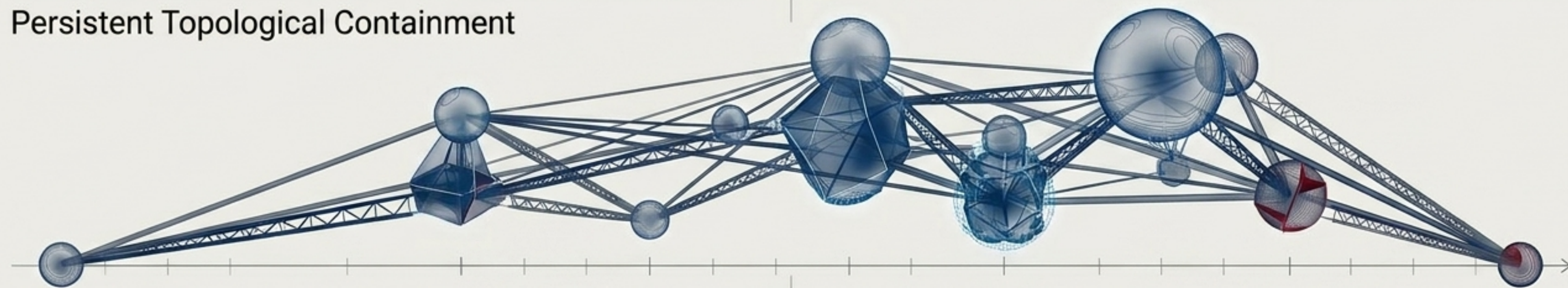
The Architectural Limit of Token-Linear AI

Intelligence is not next-token prediction. It is disciplined management of topology.

Local Continuation Dynamics



Persistent Topological Containment



Diagnostic Mapping

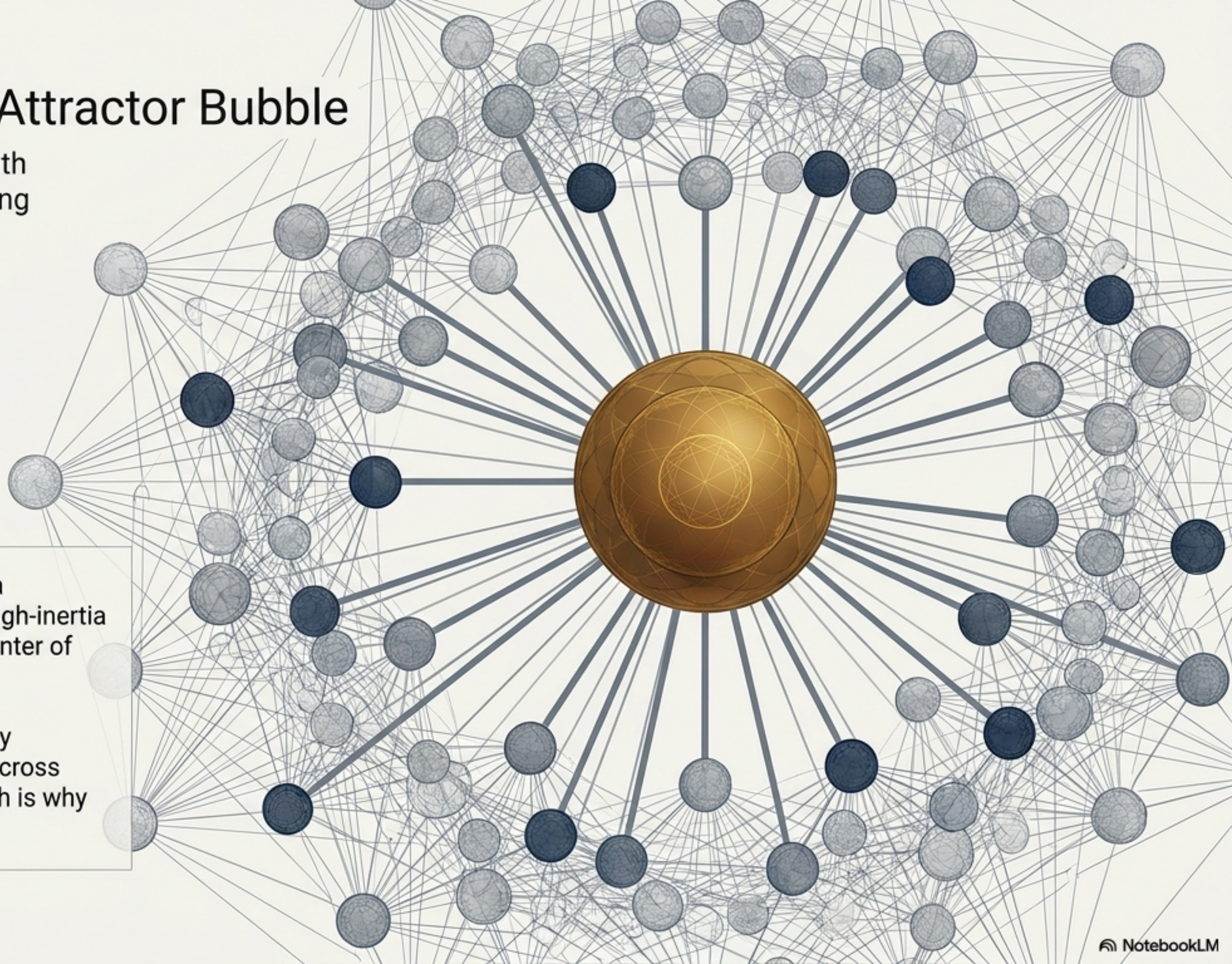
Hallucination = Inadmissible Expansive Reframe	Premature Summarization = Illegal Pop	Mode Collapse = Curvature Minimization
Attempting to generate structure outside established topological bounds.	Forcing scope resolution without fulfilling all structural dependencies.	Drastically flattening the topological landscape, losing complexity.

The Self as a Deep Attractor Bubble

Synthesizing Scope Dynamics with
Karl Friston's Predictive Processing

The Self is not a pilot commanding a machine from the top. It is a deep, high-inertia attractor bubble embedded in the center of the heterarchy.

Re-framing it requires simultaneously satisfying compatibility conditions across millions of dependent scopes—which is why identity change is so disorienting.



Suffering

$$S \sim \Pi_{self} \cdot U(B_{future})$$

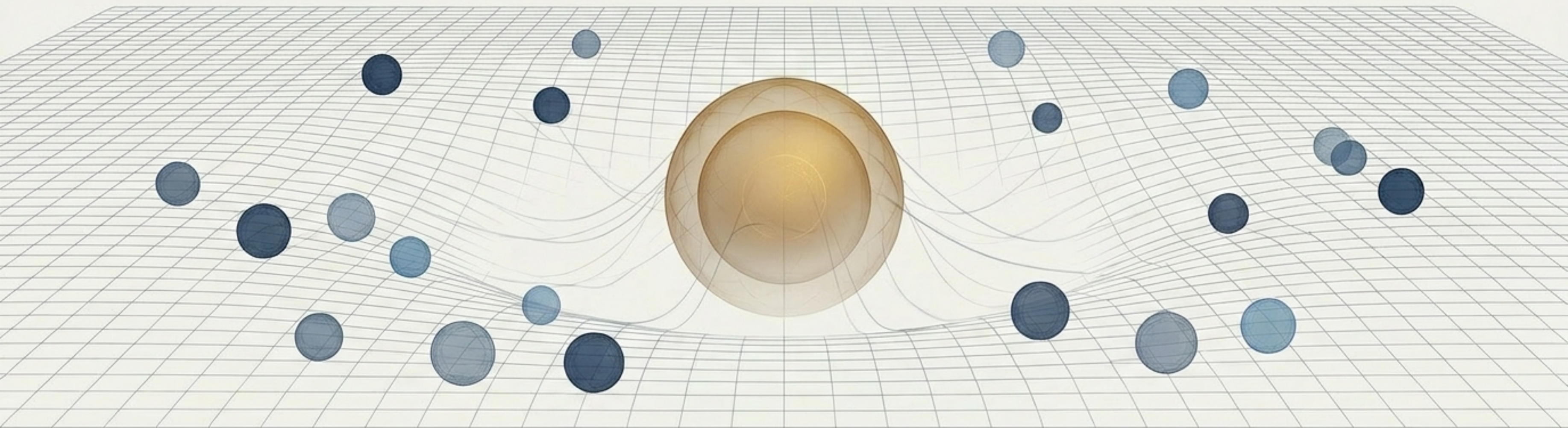
Precision Weighting of the Self-Model
(The topological rigidity of the central attractor)

Unresolved Forward Load
(Broken expectations, grief, and
open dependency structures)

Suffering is not bare negative affect. It is unresolved semantic load recursively bound to a high-precision self-model. Grief is semantically expensive: it forces an enormous number of previously closed scopes to reopen, re-evaluate, and re-collapse under a broken topological framework.

Dissolving Recursive Agency

Meditation is Top-Layer Relaxation.



Meditation decreases the precision weighting ($\Pi_{self} \rightarrow 0$) of the deepest priors. The self-bubble doesn't pop; it simply stops generating intense semantic curvature. Perception continues, cognition continues, but the recursive geometric binding that converts unresolved load into suffering is suspended.