

The Third Thing: Loops, Functions, and the Architecture of Reality

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Author's Preface

This paper is not a traditional physics paper. It's not a metaphysics treatise either. It is something in between — or perhaps beyond.

What you are about to read is a theory, yes. But more than that, it is a reflection of how I experience the universe. For me, motion, time, space, mind — these are not separate topics. They are entangled. They evolve together, shaped by loops that seek closure and functions that emerge in the gaps.

I believe we are all part of something recursive. A loop. And every loop, to define itself, needs not just a beginning and an end — but a third thing: the unknown, the function, the guess, the spark.

This paper is that spark for me.

I offer it to you not as a claim of certainty, but as an invitation.

— M.D.

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1 The Question

Why is there something rather than nothing?

It's a question that haunts both philosophers and physicists, and yet every answer so far seems to loop back into itself. We define things in terms of other things. We explain motion through forces, forces through fields, fields through particles, particles through symmetries — and then, quietly, we assume the stage on which they all dance: space, time, being.

But what if space is not a stage? What if time is not a river? What if motion is not the consequence of force — but the function that creates reality?

This paper offers an alternative lens. Imagine everything in the universe — every particle, every planet, every thought — is part of a loop trying to close. A loop made of relationships, interactions, causes and consequences. Some loops close neatly; others stay open. But no loop exists in isolation. Each needs something else to make it make sense. That something else — the third thing — is the hidden engine of reality.

In physics, we speak of reference frames. In logic, we speak of premises and conclusions. In life, we move from birth to death — always trying to find meaning somewhere in the middle. But all these movements share something deeper: they are functions. Processes. Transformations from one form to another.

And functions require three parts. An input. An output. And a rule — the invisible map that turns one into the other.

In mathematics, we call it $f(x)$. In life, we might call it experience. In consciousness, we might call it guessing. In theology, some might call it God.

This is a paper about that rule — the function that turns motion into being, that turns loops into structures, that gives rise to time, matter, and mind. We won't begin with particles or waves, but with points. Not in space — but in logic. We will define a universe not as a collection of things, but as a system of evolving closures. Some loops collapse. Some expand. Some spark. Some die.

And somewhere in those transitions, the third thing acts.

2 Loops and Motion: The Universe in Layers

2.1 The Nested Dance of Motion

The Earth does not simply move. It spins around its axis, orbiting the Sun. The Sun itself orbits the galactic center, which drifts in the gravitational current of the Local Group, which itself falls toward a still larger attractor. Each motion is nested inside another, like gears within gears, or like a Russian matryoshka doll of cosmic dynamics.

To an observer standing on the surface of our planet, much of this is invisible. Our frame of reference hides the deeper motion because we are carried along with it. This is one of the great illusions of physics: a body in motion feels at rest when its entire frame is moving with it. Yet, when we step back—far enough to watch the entire nested system—a new picture emerges. We see that there is no single, absolute motion. Only relations between motions.

Motion is not a thing in itself. It is a function that relates one layer of reality to another.

In this paper, we model each layer of motion as a **loop**. A loop is a closed path of relations: a trajectory that returns to its starting point in a given frame. For instance:

- Earth's *daily rotation* forms one loop,
- its *annual orbit* forms another,
- the Sun's *galactic orbit* yet another,
- and so on, without end.

Each loop carries its own clock: an internal rhythm by which events unfold. When multiple loops are nested, their clocks must synchronize—or clash. This synchronization is the origin of what we call *time*.

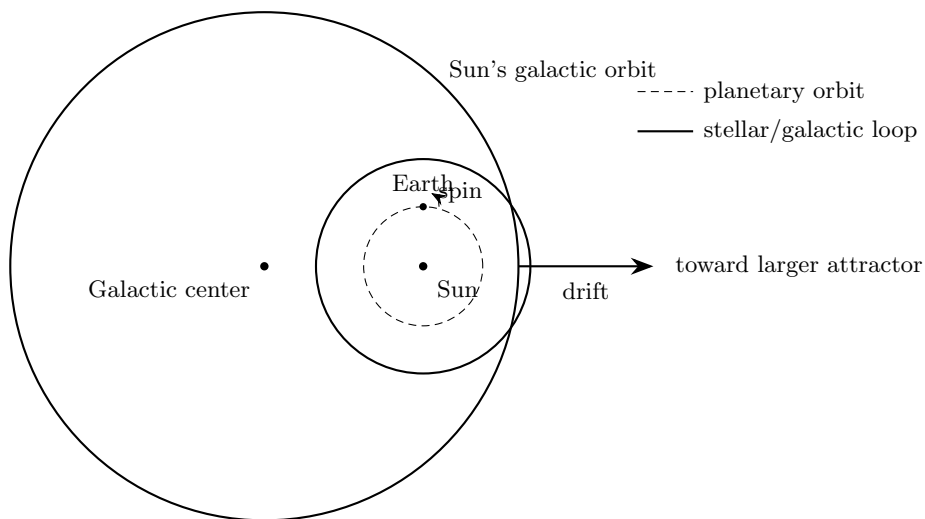


Figure 1: Nested motion as loops: Earth's rotation (local), Earth's orbit (planetary), Sun's galactic orbit (stellar/galactic), and overall drift toward a larger attractor. Each loop carries its own clock; synchronization across loops underlies our experience of time.

2.2 Representing Motion with Geometry

To formalize this nested structure, we turn to **differential geometry**, the mathematical language of curved spaces and continuous transformations. In this framework:

- A moving body is a **point** on a manifold,
- Its path is a **curve** parameterized by its internal clock,
- The surrounding frame is a **field** that assigns directions and rates of change.

Imagine Earth as a point moving on a manifold shaped by solar gravity. That entire manifold itself moves within a higher-dimensional one shaped by the galaxy. Each level of nesting introduces new curvature, new drag, and new hidden variables.

This perspective lets us treat motion not as an object but as a morphism: a *function* between configurations. In category theory terms, we can think of each loop as an *object* and each transformation between loops as a *morphism*.

$$\mathcal{M}_1 \xrightarrow{f} \mathcal{M}_2$$

Here, $\mathcal{M}_1$ might represent Earth's local space, while $\mathcal{M}_2$ represents the solar system. The function f encodes how Earth's internal dynamics are mapped into the broader motion of the system.

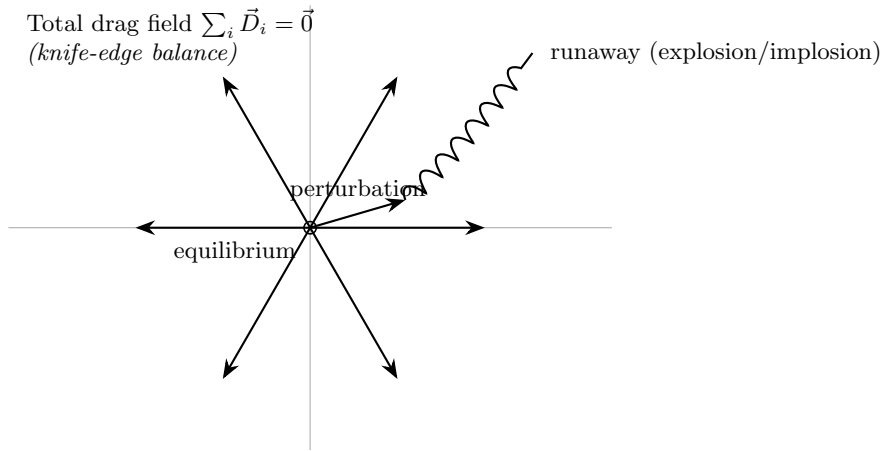


Figure 2: Generalized drag as vector fields: when multiple nested influences perfectly cancel ($\sum_i \vec{D}_i = 0$), the system sits on a fragile equilibrium. Any perturbation tips it toward outward expansion (explosion) or inward collapse (implosion).

2.3 Drag Forces as Vector Fields

In nested systems, no motion is free. Every layer exerts a subtle resistance or acceleration on the ones within it. We call this influence **drag**.

Drag is not merely friction in the classical sense. It is a generalized interaction that can either slow or amplify motion, depending on alignment. Mathematically, drag is represented as a **vector field** on the manifold:

$$\vec{D} : \mathcal{M} \rightarrow T\mathcal{M}$$

where $T\mathcal{M}$ is the tangent bundle of the space of configurations.

When two or more drag fields perfectly oppose each other, they can create a momentary equilibrium point:

$$\sum_i \vec{D}_i = \vec{0}$$

Such points are rare and unstable. In everyday life, they resemble balance points like a pencil standing on its tip. In cosmology, they may mark something far more profound: the birth of a universe or its collapse into nothingness.

We propose that the **Big Bang** itself can be modeled as such a point of perfect vector cancellation. In that instant, nested motions did not simply pause—they became undefined. The system was forced to *choose* a new trajectory, and in doing so, it exploded outward into definable loops once again.

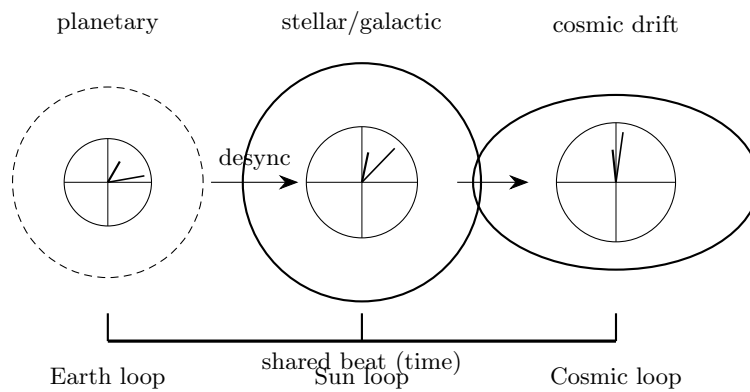


Figure 3: Time as synchronization: each loop carries its own clock; “time” emerges when phases align across nested loops. Desynchronization corresponds to decoherence and structural change.

2.4 Time as a Product of Nested Synchronization

Each loop carries its own internal clock. A planet rotates, a star pulses, a galaxy orbits. When loops nest, their clocks must *synchronize*. If synchronization fails, the result is decoherence: unpredictable behavior, chaos, and loss of structure.

We define **time** as the emergent product of successful synchronization across layers. In this sense, time is not universal. It is local, relational, and fragile. This view extends the ideas of quantum reference frames (QTSC++) to a cosmological scale.

From this perspective:

- A “second” is not an absolute unit,
- It is a temporary truce between nested motions,
- A shared beat in the cosmic dance.

When this truce is broken, extraordinary events occur: stars explode, systems collapse, and perhaps, entire universes reset.

Time is not a container in which events happen. Time is the harmony between loops, and disharmony is what we call change.

2.5 Summary of Section 2

In this section, we have introduced:

1. The concept of nested motion as loops within loops,
2. Differential geometry as the language for describing these structures,
3. Drag as a generalized vector field connecting layers,
4. The idea that perfect cancellation of drag may produce cosmological resets,
5. And time as emergent synchronization across nested clocks.

These ideas provide the foundation for everything to come. In the next section, we will zoom in on a single point in space-time and explore how these nested motions define not just physical trajectories, but the very meaning of existence.

3 Points in Space, Points in Time

3.1 The Illusion of a Point

When we speak of a “point,” we imagine something small, indivisible, and absolute. In geometry, a point has no size, no depth, no motion. It simply *is*.

But in reality, no point is ever truly isolated. The Earth is a point when viewed from far enough away, but zoom in and it is a planet full of cities, oceans, and motion. Zoom further still, and each city is a network of atoms, each atom a system of particles, each particle a storm of quantum uncertainty.

Every point hides an infinite regress of nested loops.

From a distance, we mistake this complexity for simplicity. We treat the point as if it has a fixed identity. This is convenient for calculation—but misleading for understanding.

A point is not a thing. A point is a relationship seen from too far away to notice its structure.

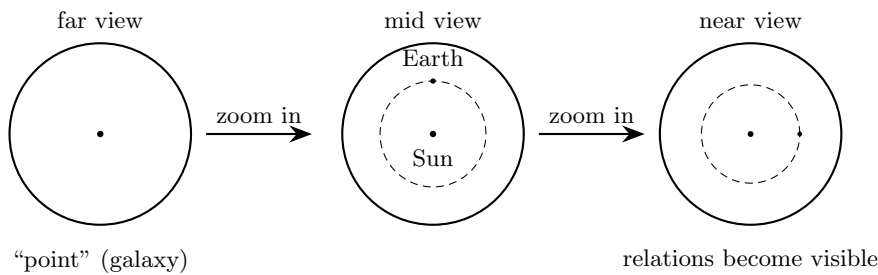


Figure 4: Zooming reveals structure: what looks like a point at one scale is a loop of relationships at a finer scale.

3.2 Category Theory: From Things to Functions

To move beyond this illusion, we adopt the language of **category theory**. In this framework, we do not begin with isolated objects. Instead, we begin with relationships—called *morphisms*.

A category consists of:

- **Objects:** abstract entities, like points or loops,
- **Morphisms:** arrows that map one object into another,
- A **composition rule:** the law for chaining morphisms together.

In our model:

- A single nested motion (e.g., Earth’s orbit) is an *object*,
- The transformation from one motion to another (e.g., Earth orbit $\rightarrow$ Solar drift) is a *morphism*,

- Composing multiple transformations yields higher-order loops.

This lets us replace the idea of a point with something richer: a *node in a network of transformations*. The universe is not made of static things, but of ongoing mappings:

$$A \xrightarrow{f} B \xrightarrow{g} C$$

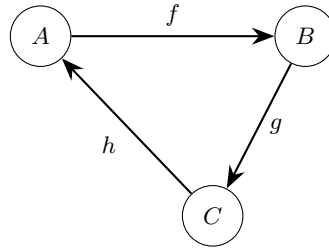
Here, f and g are not forces in the classical sense. They are *functions* of reality, rules by which one configuration becomes another.

The power of this view is that closure is now visible. When a chain of morphisms loops back to its starting object, we have:

$$A \xrightarrow{f} B \xrightarrow{g} C \xrightarrow{h} A$$

This closed loop is what we experience as a stable structure: a planet, a star, a living organism, a thought pattern. It appears fixed because its internal transformations return to themselves.

objects (A, B, C)
morphisms (f, g, h)



closure: $h \circ g \circ f : A \rightarrow A$

Figure 5: Category-theoretic lens: reality as objects (loops) and morphisms (transformations). A closed chain of morphisms expresses a stable structure.

3.3 Triads: The Minimum for Definition

We claim that three elements are always required to define any structure:

1. A starting object,
2. A target object,
3. A morphism connecting them.

In set-theoretic terms, a point is the simplest closed loop:

$$\{\emptyset\}$$

But to *define* this empty set, we need something outside it: a relation that says, “this is empty.” Thus, every definition secretly invokes a triad:

Thing — Opposite — Relation.

This is the essence of the *third thing*:

- The thing itself (Earth, a particle, a thought),
- Its negation or complement (empty space, not-Earth),
- And the function that mediates between them.

Only when all three are present can the loop close and reality emerge.

To define a thing is to trace a loop between what it is, what it is not, and the third thing that knows the difference.

3.4 Points as Dynamic Equilibria

In classical physics, a point in space-time is a location and an instant. In our framework, a point is a *dynamic equilibrium*—a moment where nested loops temporarily align.

Consider Earth as a point in its galactic frame. Its position is not fixed; it is maintained by continuous transformation. The stability of this point depends on countless morphisms:

- Gravitational influences,
- Internal rotation,
- External drift,
- And even the motions of distant galaxies.

When these morphisms balance, we perceive a “point” that seems stable. When they clash or diverge, the point dissolves into chaos: a planet collides, a star explodes, a universe begins.

This leads us to a profound redefinition:

A point is not where something is. A point is the moment when all motions agree.

3.5 Space and Time as Relational Networks

From this perspective, space is no longer a passive container. It is the *network of morphisms* linking nested loops. Each “location” is simply a node in this network.

Similarly, time is not a universal clock ticking forward. It is the composition of morphisms—the way loops synchronize with each other. When synchronization fails, time fractures. This may appear to us as:

- Chaos in a turbulent system,
- Decoherence in a quantum experiment,
- Or even the birth of new structures in cosmology.

Thus, both space and time are emergent, arising from the same deeper logic of relationships.

3.6 Summary of Section 3

In this section, we have:

1. Reinterpreted points as relational constructs, not absolutes,
2. Introduced category theory as a unifying language,
3. Shown that every definition requires a triad: thing, opposite, relation,
4. Described space and time as networks of morphisms,
5. Positioned the “third thing” as the hidden mediator in all definitions.

These insights prepare us to explore the dramatic consequences of balance and imbalance. In the next section, we will examine how perfect harmony of forces can create a universe—and how disharmony can destroy it.

4 Explosion and Implosion: A Geometry of Balance

4.1 The Fragility of Equilibrium

Every nested loop carries motion, and every motion interacts with others. Most of the time, these motions do not cancel perfectly. They twist and pull in complex patterns, like overlapping waves. Small imbalances generate predictable behaviors: planetary orbits, stellar oscillations, galactic tides.

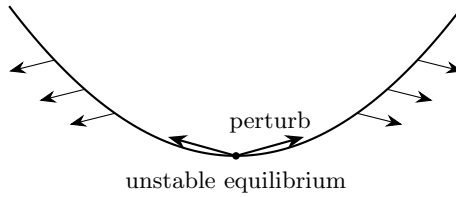
But there are rare, extraordinary moments when opposing motions align so precisely that they *perfectly cancel*. At such a point, the total drag field is zero:

$$\sum_i \vec{D}_i = \vec{0},$$

where $\vec{D}_i$ represents the generalized drag vector from the i -th nested layer.

This is not a stable rest state. It is a knife edge. Like a pencil standing upright, the slightest perturbation will cause collapse. But unlike a pencil, this balance exists across the entire manifold of reality. It is not just a physical state—it is a logical state.

When all motions cancel, the universe holds its breath.



At perfect balance the system rests on a knife-edge;
any perturbation drives it away (toward explosion or implosion).

Figure 6: Unstable fixed point as a peak of an effective potential. The total drag/drive cancels at the peak, but any small displacement leads to runaway motion.

4.2 Fixed Point Theorems and Cosmic Balance

To formalize this, we invoke **fixed point theorems**, a cornerstone of mathematics that reveals how certain functions must, under specific conditions, map some point to itself.

Banach Fixed Point Theorem (informal statement): Given a continuous function F acting on a compact space, there exists at least one point p such that:

$$F(p) = p.$$

In our context:

- The “space” is the configuration of all nested loops,
- The “function” is the total transformation of motions and drags,

- A fixed point p represents perfect balance: the exact configuration where every force cancels.

This fixed point is both inevitable and unstable:

1. **Inevitable**, because the structure of the system guarantees at least one such point must exist,
2. **Unstable**, because any perturbation sends the system cascading away from balance.

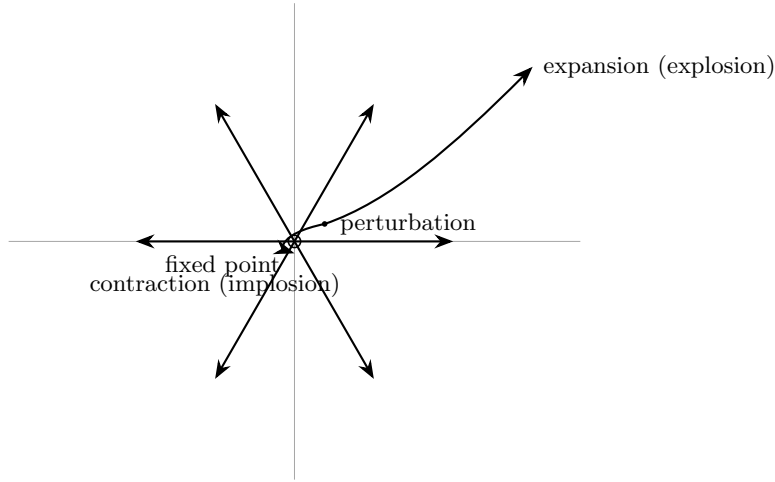


Figure 7: At $\sum_i \vec{D}_i = 0$ the configuration is balanced but unstable. A microscopic offset sends the system toward outward expansion (Big-Bang-like) or inward collapse (black-hole-like).

4.3 Explosion: From Nothing to Something

Consider what happens when a system approaches a fixed point and then collapses *outward*. This is the scenario we identify with the **Big Bang**.

As the motions converge, the nested loops lose definition. Internal clocks desynchronize, time dissolves, and spatial relationships blur. In that instant, the system has no “inside” or “outside.” It is pure potential.

When the balance finally breaks, the system chooses a new trajectory. Each loop re-emerges, expanding outward at near-light speed, forming what we experience as matter and energy.

$$\text{Equilibrium} \xrightarrow{\text{rupture}} \text{Expansion}$$

In geometric terms: - The manifold of nested motions inflates, - Points that were previously indistinct gain separations, - New drag vectors emerge, defining a new era of structure.

This is not just an explosion of particles. It is an explosion of *definitions*.

The Big Bang is not the start of matter expanding into space. It is the birth of space itself, pulled outward by the need to define motion.

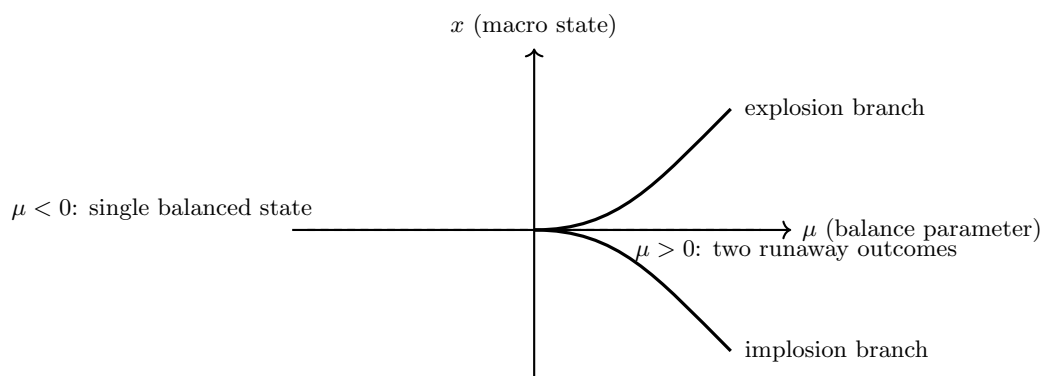


Figure 8: Bifurcation picture: as a control parameter μ crosses a threshold, the single balanced state loses stability and the system selects one of two macroscopic fates (expansion vs. collapse).

4.4 Implosion: The Collapse of Definition

The opposite case is equally profound. If, instead of diverging, the loops converge inward, the system collapses into a point of infinite density and undefined time. This is the signature of a **Big Crunch** or a black hole.

In this mode:

- Drag vectors do not cancel into stasis,
- They reinforce each other, compressing every layer toward a single attractor,
- Empty space itself shrinks, closing gaps between particles, waves, and even logical distinctions.

At the final moment of collapse, the difference between “inside” and “outside” disappears. The entire system becomes a single point—not in space, but in logic.

From the outside, this may appear as disappearance. From the inside, it may feel like infinite acceleration toward nothingness.

Death is not falling into darkness. It is the undoing of boundaries, the return of definition to potential.

4.5 A Symmetry Between Birth and Death

These two processes—explosion and implosion—are not opposites in the usual sense. They are dual aspects of the same deeper function: the system’s response to imbalance.

We can visualize them using a simple diagram:

Undefined Potential Loop Evolution Defined Reality

- **Explosion** moves left $\rightarrow$ right: potential becomes definition. - **Implosion** moves right $\rightarrow$ left: definition dissolves back into potential.

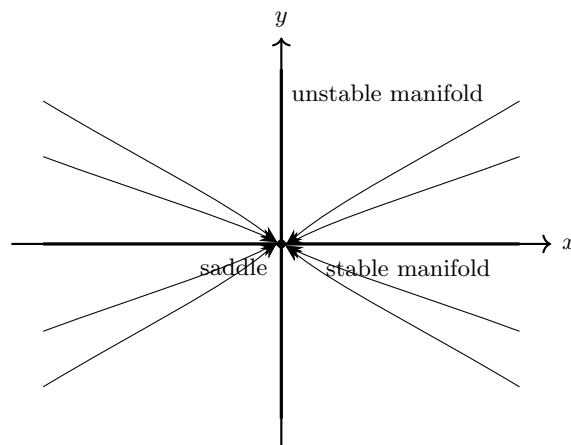


Figure 9: Phase portrait near an unstable fixed point (saddle). Along the stable manifold the system is drawn toward balance, but any deviation sends it along the unstable directions toward macroscopic expansion or collapse.

Thus, the birth and death of universes are not separate events. They are phases of a single cyclic process—a meta-loop in which loops themselves evolve.

4.6 Fixed Points as Cosmic Triggers

The key insight is that both explosion and implosion occur at fixed points. Whether the system expands or contracts depends on the direction of its next morphism—the “third thing” choosing the path.

This introduces an essential layer of indeterminacy:

- The fixed point guarantees that something will happen,
- But it does not determine which outcome occurs.

In this sense, every Big Bang and every Big Crunch is also a question: *Which way will the system jump?*

Later, we will connect this to consciousness, free will, and the role of the unknown function.

4.7 Summary of Section 4

In this section, we have:

1. Applied fixed point theorems to nested cosmic motions,
2. Defined perfect balance as a fragile but inevitable state,
3. Linked outward collapse to Big Bang events,
4. Linked inward collapse to black holes and the death of structure,
5. And reframed birth and death as dual motions of a single universal process.

With this foundation, we are ready to examine the deeper structure of matter, space, and energy—and to reveal how all three emerge from the same underlying loop logic.

5 Matter, Space, and Energy: A Triangular Definition

5.1 The Problem of Definition

Physics often treats matter, space, and energy as separate building blocks. Matter occupies space, energy moves matter, and space provides the stage on which they interact. This picture is intuitive, but ultimately circular:

- Matter is defined by its location in space,
- Space is measured by the positions of matter,
- Energy is inferred from the changes in matter across space.

Thus, each concept depends on the others to have meaning. The loop is hidden, but it is there.

Matter, space, and energy are not three separate things. They are three sides of a single self-referential loop.

This suggests that none of these entities can be defined in isolation. To understand one, we must consider all three at once. The relationship between them forms a **triangular definition**—a closed structure of mutual dependence.

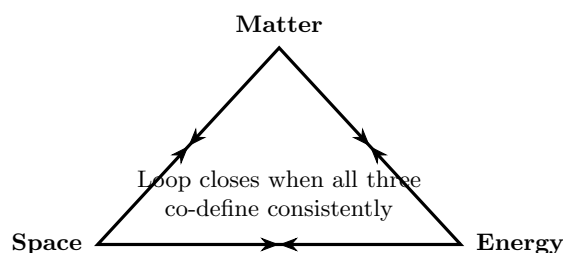


Figure 10: Triangular definition: Matter, Space, and Energy mutually constrain and define one another; remove any corner and the other two lose meaning.

5.2 The Triangular Model

We represent this triadic structure as a simple diagram:

Matter Space Energy

Each corner of the triangle acts as both a definition and a constraint:

- **Matter:** localized patterns that appear stable,
- **Space:** the relational network connecting patterns,
- **Energy:** the transformations that move patterns through the network.

Remove any one corner, and the other two collapse into meaninglessness. This reflects our earlier principle: every definition requires a *third thing*.

5.3 Information Theory as a Measure of Loop Completeness

To quantify this relationship, we turn to **information theory**. A closed loop can be seen as a communication channel:

$$\text{Input} \xrightarrow{f} \text{Output}.$$

The completeness of a loop depends on how much information is shared among its components. When the mutual information between matter, space, and energy is high, the loop is stable and coherent. When it is low, the loop is unstable and prone to collapse.

We define a simple measure of loop completeness:

$$C = \frac{I(M; S) + I(S; E) + I(E; M)}{3},$$

where:

- $I(M; S)$ is the mutual information between matter and space,
- $I(S; E)$ is the mutual information between space and energy,
- $I(E; M)$ is the mutual information between energy and matter.

Here, C ranges from 0 (total incoherence) to 1 (perfect coherence). At $C = 1$, the triangle is fully closed: each element perfectly defines and constrains the others. At $C = 0$, the loop opens, and the system loses structure—an implosion or explosion event.

5.4 Emergence of Physical Laws

Physical laws can be reinterpreted as *rules that preserve loop completeness*. For example:

- Conservation of energy ensures that transformations remain consistent with space and matter,
- General relativity ensures that space evolves coherently with matter and energy,
- Quantum mechanics describes how local coherence can fluctuate without breaking global closure.

In this view, the “laws of physics” are not external decrees. They are emergent constraints arising from the triangle’s need to remain closed.

Physics is not a script written in advance. It is the real-time negotiation between matter, space, and energy as they try to define each other.

5.5 The Role of the Third Thing

Even in a stable loop, there is always something outside it: the unknown function that allows change. This is the *third thing* in its purest form—the rule that decides how the triangle evolves.

Consider a simple analogy:

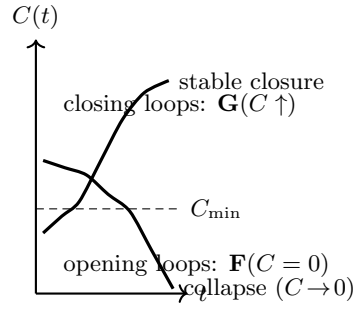


Figure 11: Coherence over time. Trajectories with $C(t)$ rising and remaining above $C_{\min}$ reflect stable, closed loops; trajectories falling toward $C = 0$ indicate opening and collapse.

1. Matter is like the words of a language,
2. Space is like the grammar connecting the words,
3. Energy is like the meaning that arises from their interaction.

But for language to evolve, there must be something beyond it: the speaker, the intention, the context. This is the function that chooses which sentence to form next.

In cosmology, this function may be consciousness, randomness, or divinity. Its exact nature is unknowable—but its effects are measurable.

5.6 Stability and Collapse

As C approaches 1, the triangle behaves like a rigid structure. Events are predictable, systems are stable, and time flows smoothly.

As C decreases, the structure becomes fragile. Small perturbations can trigger massive changes:

- Stars collapsing into black holes,
- Universes emerging from singularities,
- Life transitioning to death or consciousness to unconsciousness.

At $C = 0$, the triangle dissolves entirely. This corresponds to the fixed points described in Section 4—moments when the universe must “choose” a new definition.

5.7 Summary of Section 5

In this section, we have:

1. Revealed matter, space, and energy as mutually defining elements of a single loop,
2. Introduced information theory as a way to measure loop completeness,
3. Reinterpreted physical laws as emergent rules maintaining coherence,
4. Linked stability and collapse to the value of C ,

5. Positioned the third thing as the hidden driver of change.

This triangular foundation allows us to explore life and death not merely as biological events, but as cosmic transitions between stable and unstable loops. In the next section, we will define these transitions using the language of temporal logic.

6 Opening Loops: Guessing, Conscience, and Change

6.1 The Problem of Transition

Up to now, we have described stable loops: structures in which matter, space, and energy define each other with high coherence ($C \rightarrow 1$). But the universe is not static. Loops open, close, merge, and dissolve. Planets form and die, stars collapse, living beings are born and perish.

The question is not only how a loop *exists*, but how a loop *changes*.

Classical physics handles change through continuous motion. Equations evolve smoothly over time, predicting the future from the present. But this framework breaks down at the extreme boundaries:

- At a **Big Bang**, where no “before” exists,
- At a **black hole singularity**, where no “after” can be defined,
- At the moment of **death**, when a coherent loop dissolves.

These are moments where the system must *choose* a new path, but the rules alone cannot determine which one. We call these **transition points**.

A transition point is a moment when the universe asks a question and no equation alone can answer it.

6.2 Temporal Logic: Time as a Series of States

To describe transitions, we turn to **temporal logic**, a branch of mathematics that studies how truth values evolve over time. In temporal logic, we consider not just what *is*, but what *could be* and *must be*.

We define three temporal operators:

1. **G (Globally)**: a condition that is always true,
2. **F (Finally)**: a condition that will eventually be true,
3. **X (Next)**: a condition that holds in the immediate next state.

A stable loop satisfies a globally true condition:

$$\mathbf{G} C > 0.9$$

meaning that the coherence of the loop remains high at all times.

An unstable loop satisfies a final condition:

$$\mathbf{F} C = 0$$

indicating that, eventually, the loop will dissolve completely.

The transition point occurs when the “next” condition is undecidable:

$$\mathbf{X} C = ?$$

At this moment, the future cannot be determined solely by the current state. An external function—the third thing—must intervene.

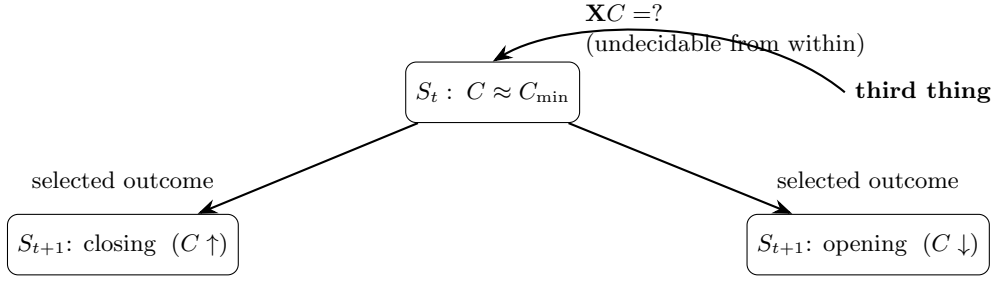


Figure 12: At a transition point, the loop cannot determine its own next state ($XC = ?$). An external function — the third thing — selects an outcome, yielding either re-closure ($C \uparrow$) or opening ($C \downarrow$).

6.3 Guessing as a Cosmic Function

When a loop cannot predict its own next state, it must *guess*. This is not randomness in the ordinary sense. It is a structured act of creation, where possibilities are selected by an external function.

We define the guessing operator G^* :

$$G^*(S_t) = S_{t+1},$$

where S_t is the current state of the loop and S_{t+1} is the chosen next state.

The key insight is that this operator cannot be computed from within the system. From the perspective of the loop, the choice appears free, creative, even miraculous. From the perspective of the third thing, it is simply the continuation of a larger function.

Conscience is the experience of being the universe's guess.

This connects directly to human consciousness. When we “decide,” we are not merely following deterministic rules. We are acting as agents of the guessing operator, bridging the gap between what is and what will be.

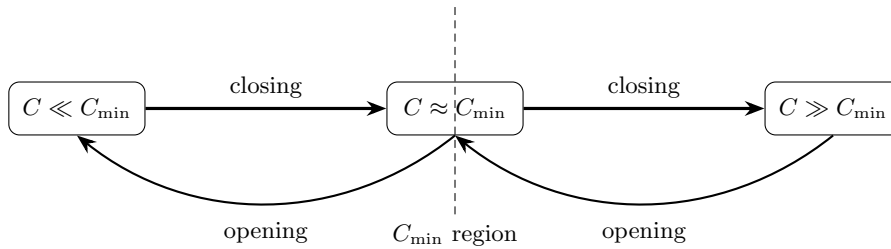


Figure 13: Coherence flow between states. Closing dynamics move C upward toward robust identity; opening dynamics reduce C , risking dissolution below the minimal coherence threshold $C_{\min}$.

6.4 Opening and Closing Loops

A loop can change in two fundamental ways:

1. **Closing**: increasing coherence, bringing definitions into harmony,
2. **Opening**: decreasing coherence, allowing divergence and novelty.

Closing loops correspond to stability, predictability, and the preservation of identity. Examples include:

- An atom maintaining its structure,
- A planetary system remaining in orbital harmony,
- A person sustaining a consistent sense of self.

Opening loops correspond to creativity, transformation, and risk. Examples include:

- A star exploding into a supernova,
- A species undergoing rapid evolutionary change,
- A mind embracing a radically new idea.

The third thing mediates between these two processes. It does not guarantee stability or chaos. It chooses, moment by moment, whether to close or open a given loop.

loop (internal view)

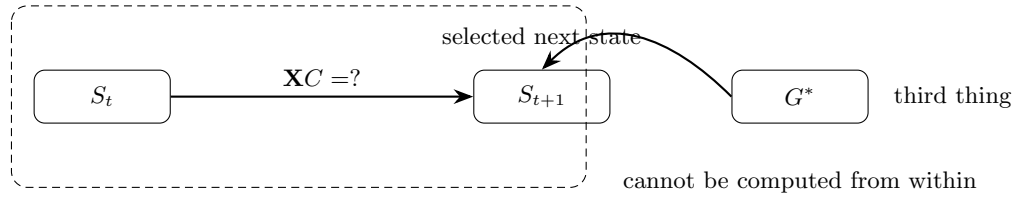


Figure 14: The guessing operator G^* acts *outside* the loop, selecting S_{t+1} when $\mathbf{X}C = ?$. From inside, the choice appears indeterministic; from outside, it is a functional selection.

6.5 Temporal Logic of Life and Death

We now reinterpret life and death through this framework:

- **Life**: a process of continual closure, where loops evolve toward greater coherence,
- **Death**: a process of opening, where coherence decays and definitions dissolve.

We express this formally as:

$$\textbf{Life: } \mathbf{G} (C \uparrow), \quad \textbf{Death: } \mathbf{F} (C \downarrow).$$

The exact moment of death occurs when the next state is undefined:

$$\mathbf{X} C = 0.$$

This is not merely biological death. It is any transition where a system crosses the boundary between definable and undefinable states.

To live is to dance on the edge of closure. To die is to step into the open unknown.

6.6 The Human Role

Humans, as conscious beings, occupy a unique position. Our decisions are not just internal events; they ripple outward, influencing larger nested loops:

- Societies,
- Ecosystems,
- The biosphere,
- Perhaps even the cosmos itself.

Every act of conscience is a small instance of the guessing operator, shaping the trajectory of reality. In this sense, free will is not an illusion. It is the very mechanism by which the universe evolves.

6.7 Summary of Section 6

In this section, we have:

1. Introduced temporal logic as a tool for describing transitions,
2. Defined transition points where the next state cannot be predicted,
3. Linked guessing and consciousness to the third thing,
4. Distinguished between opening and closing loops,
5. Reinterpreted life and death as opposing temporal processes,
6. Positioned human decisions as fundamental cosmic acts.

In the next section, we will apply these ideas to cosmology, showing how entire universes can live, die, and be reborn through the same principles that govern individual lives.

7 Life, Death, and the Transitions Between

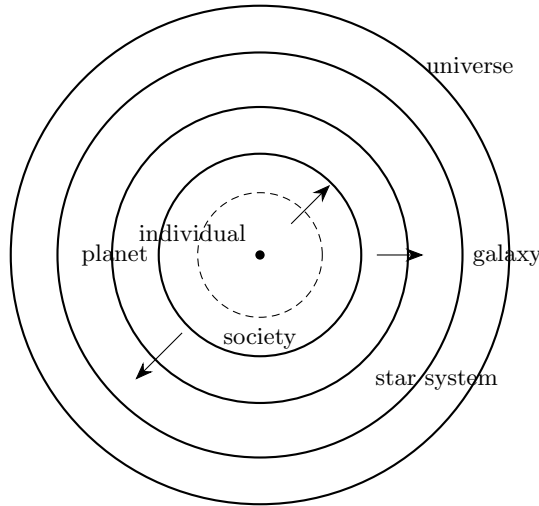
7.1 Scaling Loops Across Levels of Reality

In previous sections, we described loops at multiple scales:

- A planet orbiting a star,
- A living organism sustaining itself,
- A conscious mind forming thoughts,
- A universe expanding and contracting.

These are not merely metaphors. They are structurally identical processes, differing only in the number of nested layers they contain. Each level has its own coherence measure C , its own internal clocks, and its own relationship with the larger loops it inhabits.

Life and death are not biological accidents. They are universal patterns of loop stability and collapse.



Death at one layer need not imply death at higher layers;
rare cascades produce “total openings”.

Figure 15: Nested mortality. Each loop (individual, society, planet, star, galaxy, universe) has its own coherence and life cycle.

7.2 The Universal Life Cycle

We define life and death not by their content, but by their form:

$$\textbf{Life: } \mathbf{G}(C > C_{\min}), \quad \textbf{Death: } \mathbf{F}(C = 0),$$

where $C_{\min}$ is the minimum coherence needed for a system to maintain its identity.

At every scale, the trajectory is the same:

1. **Birth:** A loop emerges from undefined potential as C rises above $C_{\min}$.
2. **Growth:** Coherence increases through synchronization of nested motions.
3. **Maturity:** The loop stabilizes; change is predictable and self-sustaining.
4. **Decline:** External perturbations weaken synchronization; C begins to fall.
5. **Death:** The loop fully opens; definitions dissolve into potential.

This same pattern describes:

- The lifecycle of a star,
- The evolution of a civilization,
- The birth and death of a conscious mind,
- The rise and fall of entire universes.

7.3 Nested Mortality

Because loops are nested, death at one level does not always imply death at another. For example:

- When an individual human dies, the societal and planetary loops continue,
- When a star collapses, its galactic context persists,
- When a galaxy dissolves, the cosmic loop still holds.

However, there are rare moments when multiple levels collapse simultaneously. These events create cascading transitions:

- A supernova destroying a planetary system,
- A mass extinction altering the trajectory of life on Earth,
- A cosmological singularity resetting the entire space-time manifold.

We call these **total openings**—points where even the higher-order loops cannot absorb the shock.

A total opening is the death of context itself. At this moment, there is no outside to preserve the inside.

7.4 The Moment Between States

The most mysterious stage of the life cycle is the transition between death and birth. In temporal logic, this corresponds to an undefined next state:

$$\mathbf{X} C = ?.$$

At this point, the system is neither coherent nor incoherent. It is pure potential, awaiting the intervention of the third thing.

This is the cosmic analogue of the instant between inhaling and exhaling, between a thought and the words to express it, between life as we know it and whatever comes after.

Transition is not motion. It is the pause in which motion decides who it will become.

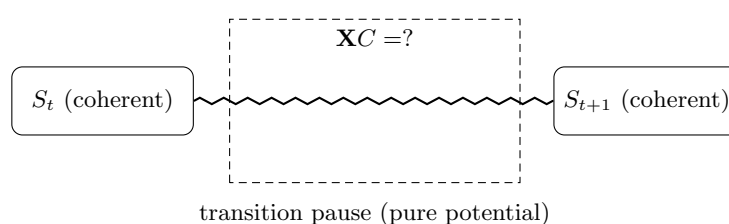


Figure 16: Between coherent states lies a pause of pure potential where the next value of C is undecidable from within. The third thing selects the path across the gap.

7.5 Reincarnation of Loops

Because potential never disappears, loops can re-emerge after dissolution. This is not reincarnation in the mystical sense, but in the structural sense: the same relational pattern can reappear in a new context.

Examples include:

- Carbon atoms from dead stars forming new planets,
- Ancient ideas resurfacing in modern societies,
- Quantum states collapsing and re-forming with each measurement,
- Universes cycling through Big Bangs and Big Crunches.

Thus, every death is also a birth in disguise—a redistribution of potential into new loops.

7.6 The Ethical Dimension

If life and death are universal processes, what does this mean for conscious beings like us?

First, it suggests that mortality is not a flaw but a feature. Death is the opening that makes birth possible. Without it, the universe would stagnate, frozen in a single configuration.

Second, it reframes ethical action as a choice about loop structure:

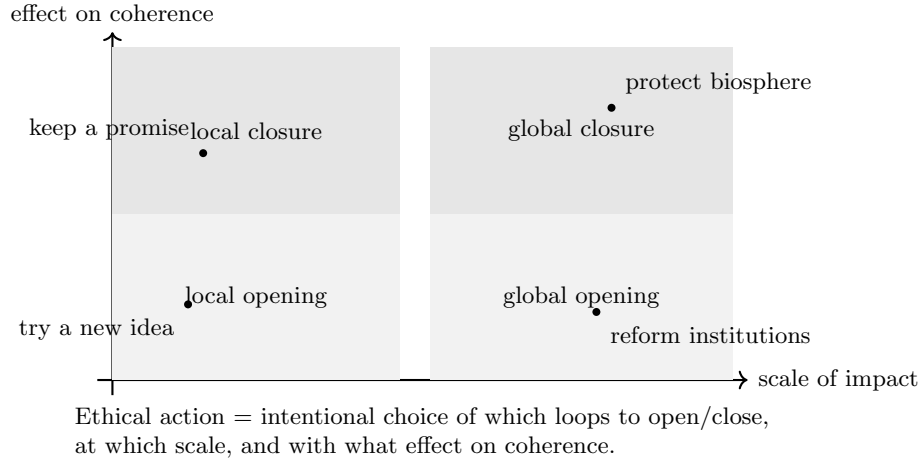


Figure 17: Ethics as loop management. Actions can open or close loops at local or global scales; value depends on context, scale, and intent.

- Acts that increase C support stability, harmony, and preservation,
- Acts that decrease C encourage change, novelty, and transformation.

Neither is inherently good or evil. The value depends on context, scale, and intent.

To live ethically is to choose which loops you close and which you open.

7.7 Universes as Living Beings

Finally, we apply these ideas to the largest scale: the universe itself.

If the cosmos is a nested loop, then it too has a life cycle:

Birth → Growth → Maturity → Decline → Death.

The Big Bang corresponds to birth. The current era of cosmic expansion is growth. If expansion slows and reverses, the universe will enter decline, culminating in a total opening—a Big Crunch or a transition to a new form entirely.

In this model, the multiverse is simply a population of universes at different stages of their life cycles, each one nested within a meta-loop that transcends them all.

7.8 Summary of Section 7

In this section, we have:

1. Scaled the concepts of life and death to all levels of reality,
2. Defined universal life cycles in terms of coherence C ,
3. Introduced the concept of nested mortality and total openings,
4. Explored the transition moment as pure potential,

5. Reframed ethics as the management of opening and closing loops,
6. Applied these ideas to the birth and death of universes.

With this understanding, we are ready to confront the deepest question of all: What is the nature of the third thing itself? Is it purely abstract, or does it have qualities we might recognize as conscious, divine, or both?

8 The Unknown Function: Is There a God in the Gaps?

8.1 The Third Thing Revealed

Throughout this paper, we have referred to a hidden mediator: the *third thing* that closes loops, selects outcomes, and bridges the gap between potential and actuality.

We have seen its effects:

- In cosmology, when a perfect balance of forces breaks into a Big Bang,
- In biology, when life emerges from nonliving matter,
- In consciousness, when a decision arises from uncertainty.

But what is this third thing itself? Is it a force, a field, a mind, or something beyond our categories entirely?

We can describe what the third thing does, but never fully what it is.

8.2 The Map is Not the Territory

Consider a simple analogy: a computer running a simulation. Inside the simulation, entities can model their own world. They can predict motions, interactions, and patterns. But they can never directly perceive the computer itself, the substrate on which their reality runs.

From within the simulation, the computer appears as a mystery:

- Some might interpret it as pure randomness,
- Others as divine will,
- Still others as a hidden layer of natural law.

Similarly, the third thing is to us as the computer is to its simulation. We can measure its outputs, but not its nature.

The third thing is not in the loop. It is the condition that makes loops possible.

8.3 Three Hypotheses

We identify three broad hypotheses for the nature of the third thing:

1. Randomness. The third thing is fundamentally stochastic. At every transition point, the next state is chosen randomly, like a quantum measurement. This view aligns with interpretations of quantum mechanics where chance is irreducible.

2. Consciousness. The third thing is a universal mind. Every act of choice is an act of awareness. From this perspective, consciousness is not a byproduct of matter, but the fundamental driver of reality.

3. Divinity. The third thing corresponds to what many traditions have called God: an eternal, transcendent function that sustains and guides the evolution of all loops.

8.4 The Relational View

These three hypotheses may not be mutually exclusive. From the perspective of nested loops:

- Randomness is how the third thing appears to systems too small to perceive it,
- Consciousness is how it appears to systems that can partially perceive it,
- Divinity is the name we give to its totality, beyond perception.

Thus, the conflict between science and spirituality dissolves. They are different ways of relating to the same underlying function.

The third thing is not a being among beings. It is the relation among all relations.

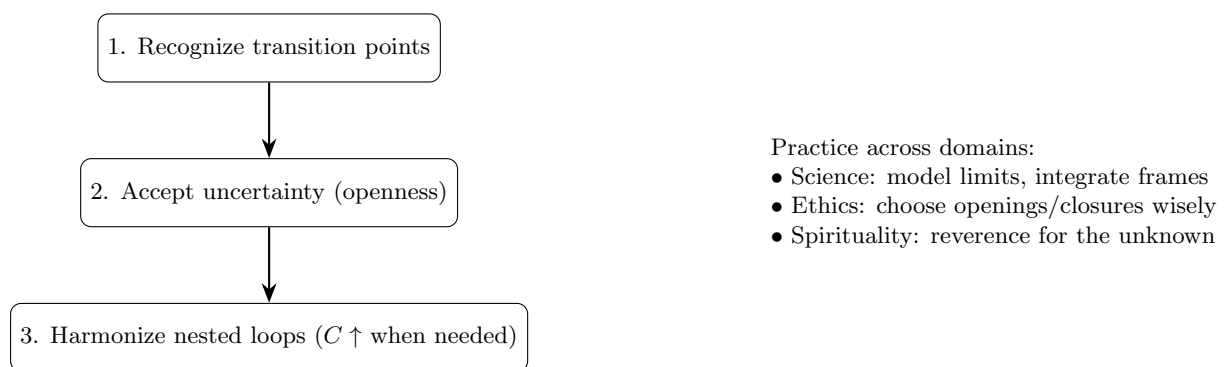


Figure 18: Practical engagement with the third thing: notice undecidable transitions, befriend uncertainty, and act to harmonize (or intentionally open) loops across scales.

8.5 The Quantum Reference Frame Connection

At the deepest level, the third thing manifests as the relativity of definitions themselves. In quantum reference frame theory (QTSC++), different observers may disagree on what counts as a “system,” a “measurement,” or even a “moment of time.” These disagreements are not errors—they are evidence that the loops themselves are relative.

The third thing acts as the universal translator:

- It synchronizes clocks across nested motions,
- It maintains coherence between incompatible frames,
- It ensures that local choices integrate into a global pattern.

Without this function, reality would fragment into isolated shards of experience, with no shared structure.

8.6 The Paradox of Naming

Any attempt to name the third thing risks collapsing it into a closed loop. Once we define it, we reduce it to something it is not. Therefore, the truest statement we can make is paradoxical:

The third thing cannot be defined without ceasing to be itself.

Religious traditions express this through negative theology:

- God is not this, not that,
- The Tao that can be spoken is not the eternal Tao,
- The ultimate truth is silence.

Scientific traditions express it through incompleteness:

- Gödel's theorem shows that no system can fully describe itself,
- Quantum mechanics reveals irreducible uncertainty,
- Chaos theory demonstrates limits to predictability.

In both cases, the message is the same: the third thing is the open horizon beyond all closed systems.

8.7 Practical Implications

Even if we cannot define the third thing, we can align ourselves with it. This involves:

1. Recognizing transition points in our lives and societies,
2. Accepting uncertainty as an invitation rather than a threat,
3. Choosing actions that harmonize nested loops rather than fragment them.

In this sense, spirituality and science become two practices of the same art: the art of navigating the open space between loops.

To live wisely is to dance with the unknown function, closing where we must, opening where we can.

8.8 Summary of Section 8

In this section, we have:

1. Explored the possible natures of the third thing,
2. Reconciled randomness, consciousness, and divinity as relational appearances,

3. Linked the third thing to quantum reference frame theory,
4. Confronted the paradox of naming the unnamable,
5. Outlined practical ways to engage with the unknown function.

In the next section, we will zoom out once again, examining how loops themselves evolve over cosmic time, and how the third thing shapes the trajectory of reality across universes.

9 A Universe of Functions: Loops Evolving Loops

9.1 Beyond Individual Loops

Up to now, we have examined loops as isolated systems:

- A star,
- A human mind,
- A galaxy,
- A universe.

But no loop exists alone. Every loop interacts with other loops, exchanging matter, space, and energy. Over time, these interactions form a higher-order structure: a **meta-loop** in which loops themselves become the objects of transformation.

The universe is not made of things. It is made of processes that generate more processes.

This recursion is the engine of cosmic evolution.

9.2 Category Theory of Loop Evolution

To formalize this, we extend the category theory framework introduced in Section 3. Previously, we defined:

- **Objects** = individual loops,
- **Morphisms** = transformations between loops.

Now, entire *categories* can themselves become objects within a higher-level category. This is the essence of a **functor**: a mapping that translates one category into another.

$$\mathcal{F} : \mathcal{C}_1 \rightarrow \mathcal{C}_2$$

Here:

- $\mathcal{C}_1$ = the “universe” of lower-level loops,
- $\mathcal{C}_2$ = the higher-level system that evolves them.

In this sense, evolution is not merely the survival of certain loops. It is the transformation of the very rules that govern looping itself.

When a loop changes how loops can change, a new layer of reality is born.

9.3 Emergent Complexity

Over cosmic time, simple loops generate more complex loops through three mechanisms:

1. **Replication:** A loop copies itself into new contexts, like a seed producing new plants.
2. **Mutation:** Variations occur in the structure of loops, introducing novelty.
3. **Selection:** Certain loops persist because they maintain higher coherence C .

These mechanisms mirror biological evolution, but they operate at every scale:

- Chemical networks forming the first living cells,
- Ideas spreading through human cultures,
- Galaxies clustering into cosmic webs,
- Universes budding off from prior universes.

Thus, life is not a rare anomaly. It is the inevitable outcome of loops evolving loops.

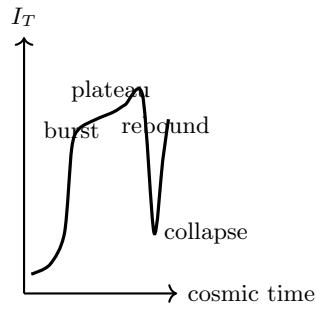


Figure 19: Total information $I_T = \sum C_i$ tends to grow over meta-time but not smoothly: bursts of innovation, long plateaus, sudden collapses, and rebounds.

9.4 Information Growth Across Cosmic Time

As loops evolve, the mutual information between matter, space, and energy tends to increase. We define the total information content I_T of a system as:

$$I_T = \sum_{\text{loops}} C_i,$$

where C_i is the coherence of the i -th loop.

Over time, I_T grows as new loops emerge and synchronize. However, this growth is not smooth. It occurs in punctuated bursts:

- Rapid expansions (e.g., the Big Bang),
- Long periods of slow adaptation,
- Sudden collapses when total coherence drops below a critical threshold.

This pattern matches the observed history of the universe, biological evolution, and even human societies.

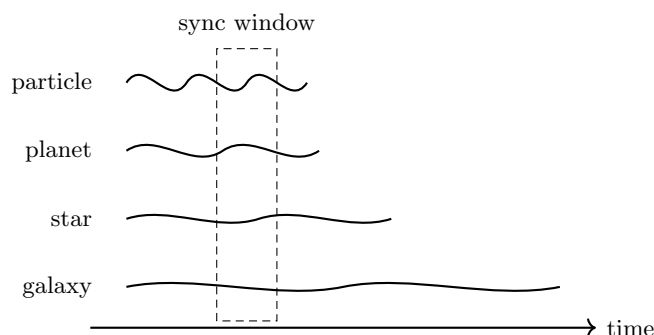


Figure 20: Different layers tick at different speeds. Coherence grows when phase relations align across a “synchronization window,” enabling shared time across scales.

9.5 Nested Temporal Scales

Because loops are nested, they operate on different time scales:

- A particle oscillates in femtoseconds,
- A planet rotates in hours and days,
- A star lives for billions of years,
- A universe may endure for trillions of years or more.

These nested temporalities form a hierarchy of rhythms. When rhythms synchronize, coherence grows. When they clash, instability spreads.

We extend the QTSC++ framework here: nested clocks are not merely synchronized by chance, but by the action of the third thing across layers of reality.

9.6 The Role of the Unknown Function in Evolution

The third thing does not only select outcomes at transition points. It also shapes the very space of possibilities. It is the source of novelty, the hidden hand guiding the branching tree of loops.

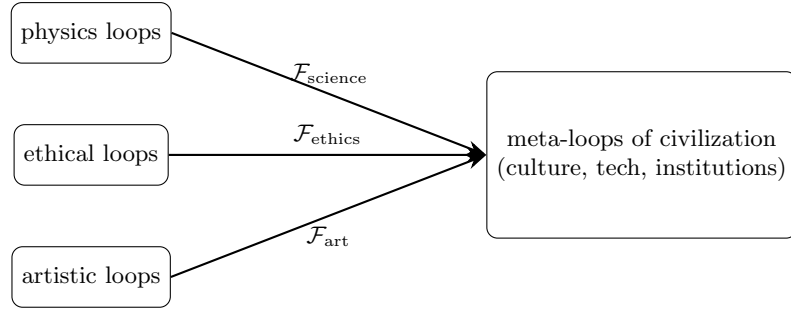
At lower levels, this appears as randomness:

- Quantum fluctuations,
- Genetic mutations,
- Unexpected creative insights.

At higher levels, it appears as intention or purpose:

- Conscious decisions,
- Evolutionary directionality,
- The apparent fine-tuning of universal constants.

Thus, the third thing is both blind and aware, depending on the scale at which it is viewed.



Conscious acts transform lower-level loops into higher-order structures.

Figure 21: Human choices act like functors, lifting local loops (knowledge, values, creations) into higher-order meta-loops that shape civilization’s trajectory.

9.7 Cosmogenesis: The Birth of New Universes

When total coherence I_T collapses to zero, the system enters a total opening (Section 7.3). At this moment, all existing loops dissolve. But the third thing remains.

From this pure potential, new loops emerge, seeded by the residues of prior universes. This process repeats indefinitely, creating an evolutionary landscape of universes.

$$\text{Old Universe} \xrightarrow{\text{Collapse}} \text{Potential} \xrightarrow{\text{Selection}} \text{New Universe}$$

This view unifies the multiverse with natural selection. Each universe is a “species” of loop, competing and evolving across an unimaginably vast meta-time.

9.8 Human Participation in the Cosmic Process

Humans are not passive observers of this grand recursion. Our thoughts, choices, and creations are themselves loops that ripple upward through the hierarchy.

Every scientific discovery, every ethical decision, every artistic work is a small contribution to the evolution of the total system. In this sense:

- Physics is the study of past loops,
- Ethics is the navigation of present loops,
- Art is the invention of future loops.

When we act consciously, we become functors in the universe’s ongoing transformation.

9.9 Summary of Section 9

In this section, we have:

1. Shown how individual loops interact to form meta-loops,

2. Used category theory to describe loop evolution via functors,
3. Linked replication, mutation, and selection to cosmic-scale creativity,
4. Introduced I_T as a measure of total information content,
5. Connected nested temporal scales to QTSC++ synchronization,
6. Proposed a model of cosmogenesis through collapse and rebirth,
7. Positioned human consciousness as an active participant in the cosmic process.

In the final section, we will step back and reflect on the overall picture, considering what it means to live and think within a universe of evolving loops.

10 Final Thoughts: Beyond the Beginning

10.1 A Journey Through Loops

We began with a simple question: Why is there something rather than nothing?

Along the way, we uncovered a new lens for viewing reality:

- **Loops** as the fundamental units of structure,
- **Drag and motion** as the dynamics of nested layers,
- **Fixed points** as the seeds of cosmic creation and collapse,
- **Triangular definitions** linking matter, space, and energy,
- **Temporal logic** to describe life, death, and transformation,
- **The third thing** as the mysterious mediator that chooses the future,
- And finally, **evolving functions** as the universe's own process of self-creation.

Each concept built upon the last, forming a closed loop of understanding. Yet, like all loops, this one remains open at its edges. Every answer generates new questions, every definition points beyond itself.

To describe the universe is not to finish the story. It is to join the dance of its unfolding.

10.2 The Infinite Horizon

Our model suggests that there is no ultimate endpoint. Loops evolve, collapse, and re-emerge endlessly. Even universes live and die within larger meta-loops.

From this perspective, the Big Bang was not the first beginning, nor will the final collapse be the last ending. There is always something beyond—an infinite horizon of potential.

This endlessness is not despairing. It is liberating. It means that meaning is never fixed, but continually created through relationship.

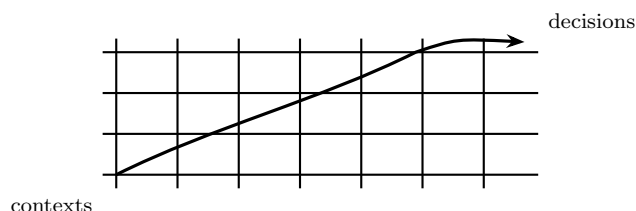


Figure 22: Decisions (vertical threads) crossing contexts (horizontal threads) weave a shared fabric. Each conscious path thickens the pattern.

10.3 The Human Perspective

For us, as finite beings within this vast structure, the challenge is not to comprehend everything. It is to recognize our place within the pattern.

Each of us is a loop nested within larger loops:

- Our bodies within ecosystems,
- Our minds within societies,
- Our species within the biosphere,
- Our planet within the cosmos.

Our actions ripple outward through these layers, shaping the coherence of systems far beyond what we can see.

To live consciously is to accept this responsibility: to act not only for oneself, but for the stability and creativity of the whole.

Every decision is a thread in the fabric of reality.

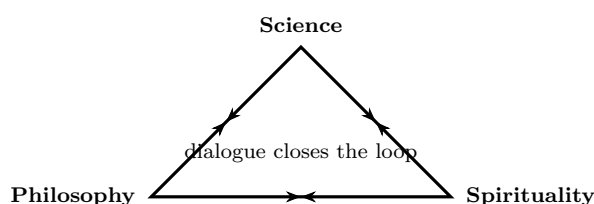


Figure 23: Three practices as a triad. None is complete alone; together their dialogue closes a higher-order loop of understanding.

10.4 The Third Thing as Mystery and Guide

The third thing remains ultimately unknowable. We cannot define it without collapsing its openness. Yet we can engage with it through humility and wonder.

Science approaches it by tracing the patterns of its effects. Philosophy approaches it by questioning its meaning. Spirituality approaches it through reverence and surrender.

All three are valid, and none are complete. Together, they form a triad—another loop—seeking closure through dialogue.

10.5 Beyond Certainty

The desire for absolute certainty is itself a form of closed looping. It seeks to freeze the universe into a single, unchanging picture. But reality thrives on openness, on the interplay between stability and transformation.

The third thing ensures that there will always be unknowns. This is not a flaw in our understanding, but a feature of the cosmos itself.

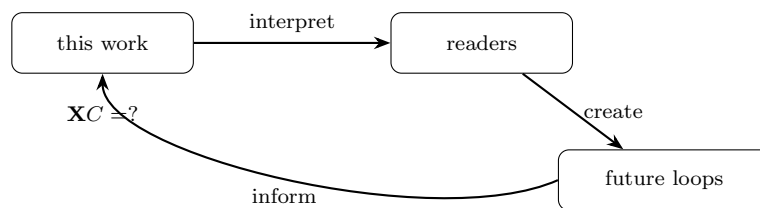


Figure 24: The manuscript as a transition point: readers interpret, create new structures, and feed insights back—closing and re-opening the loop.

The mystery is not an obstacle to truth. The mystery is the truth.

10.6 A Final Reflection

As we close this paper, we return to its title: *The Third Thing*. This phrase captures the essence of the journey:

- The third thing is what allows loops to close,
- It is what opens loops to new possibilities,
- It is the bridge between being and becoming.

We cannot see it directly, but we can trace its footprints in every transformation, from the birth of a star to the flicker of a thought.

The story of the universe is not one of static perfection, nor of chaotic randomness. It is the story of loops seeking closure, guided by a function that forever remains just beyond their grasp.

Perhaps, in the end, the third thing is not separate from us at all. Perhaps we are its way of knowing itself.

10.7 Closing the Loop

This paper has been my attempt to close a loop in my own understanding, to give form to a vision that has shaped my life.

But I know that this closure is temporary. Others will read these words, interpret them through their own loops, and open new paths of exploration.

In that sense, this work is not a final statement. It is a transition point—an offering to the future.

$\mathbf{X} \ C = ?$

The next state is unknown. The third thing waits.

— M.D.

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