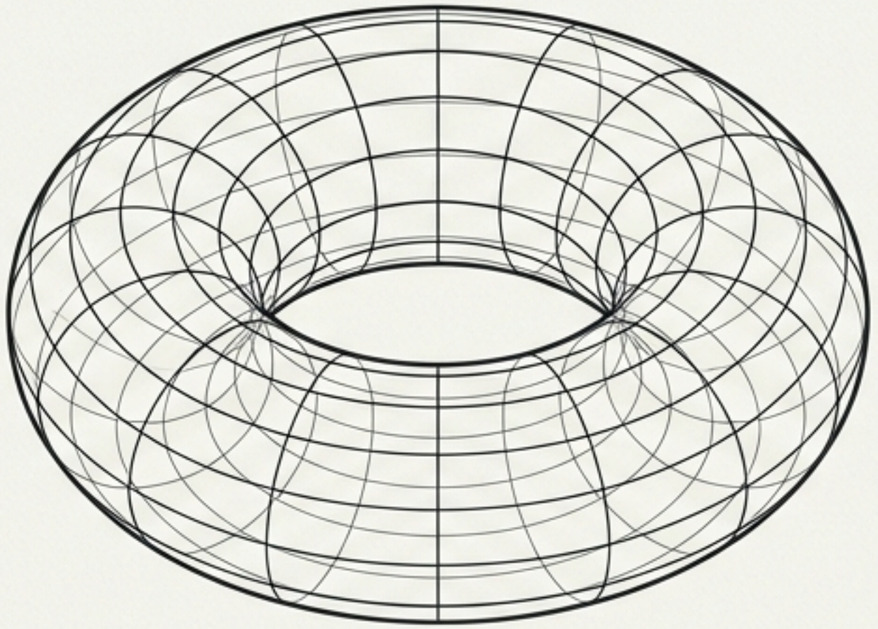
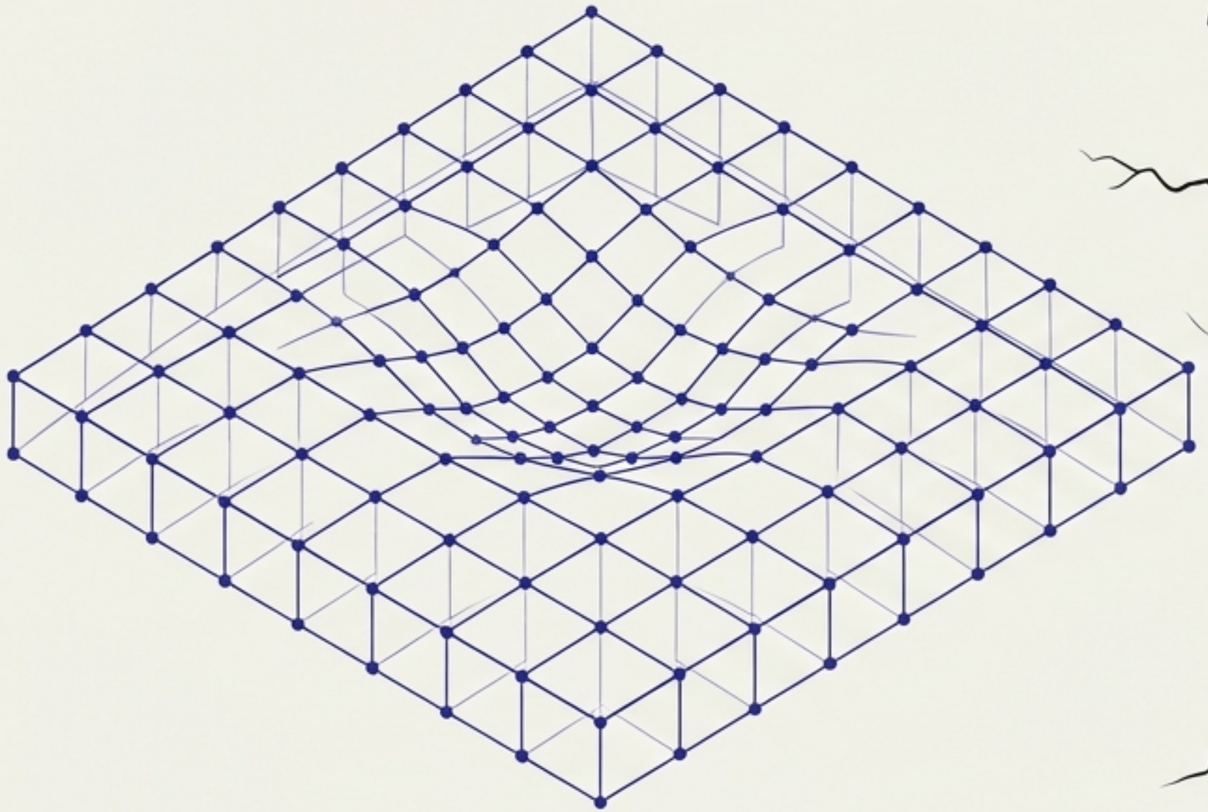


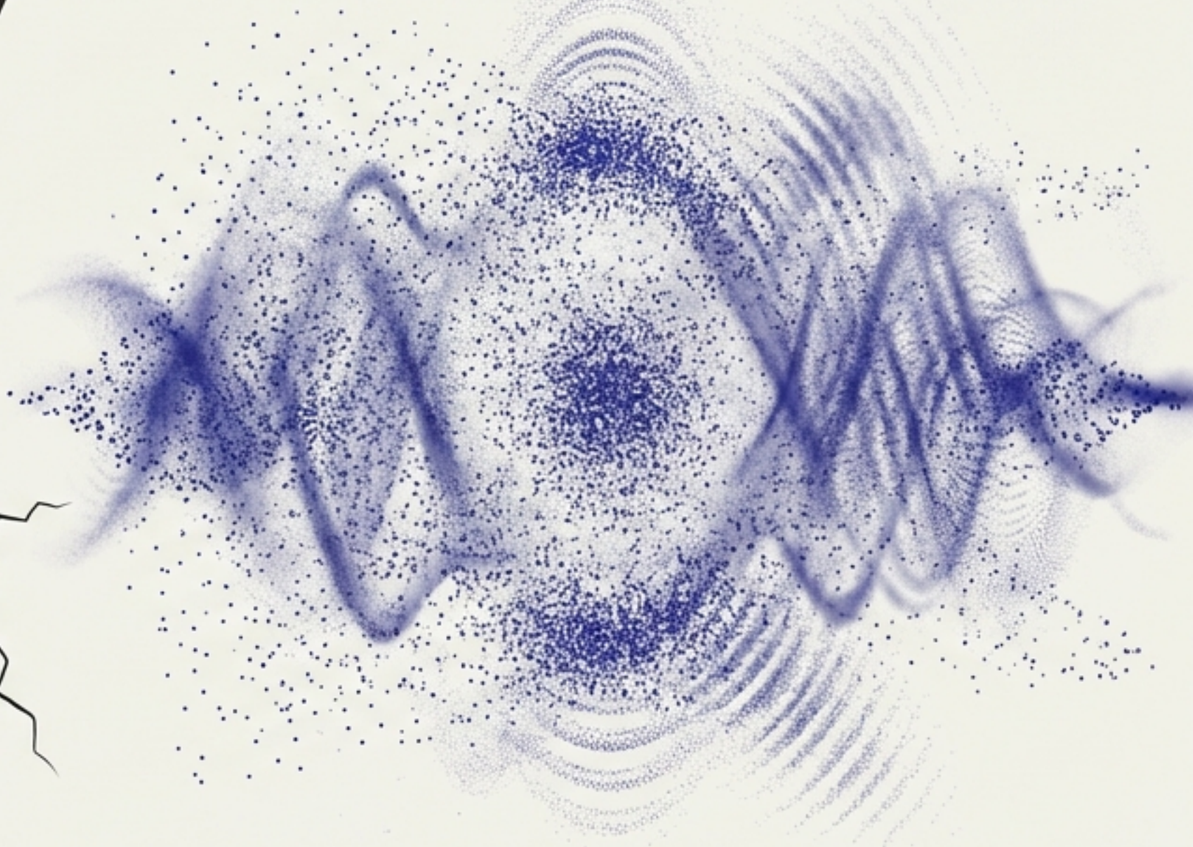
Causality, Closure, and the Geometric Origin of Matter

A First Principles Construction of the Differential Expansion Framework (DEF)

BASED ON THE THEORETICAL WORK OF JOHN SIKORA | FEBRUARY 2026

The Great Schism





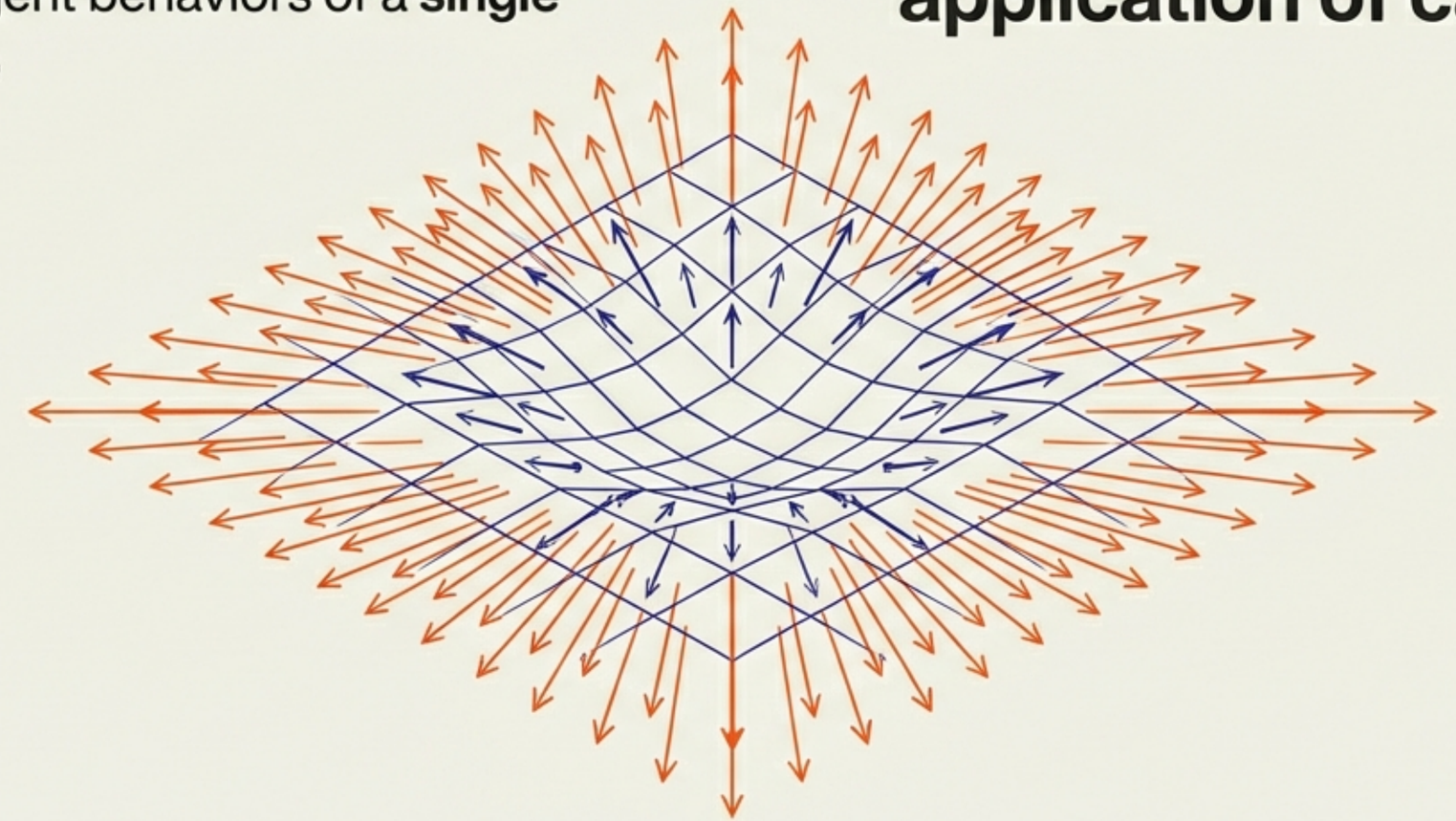
Modern physics operates on two fundamentally separate operating systems. Relativity governs the macro through geometry; Quantum Mechanics governs the micro through probability.

The missing link is a unified geometric principle that explains both.

Complexity from Constraint

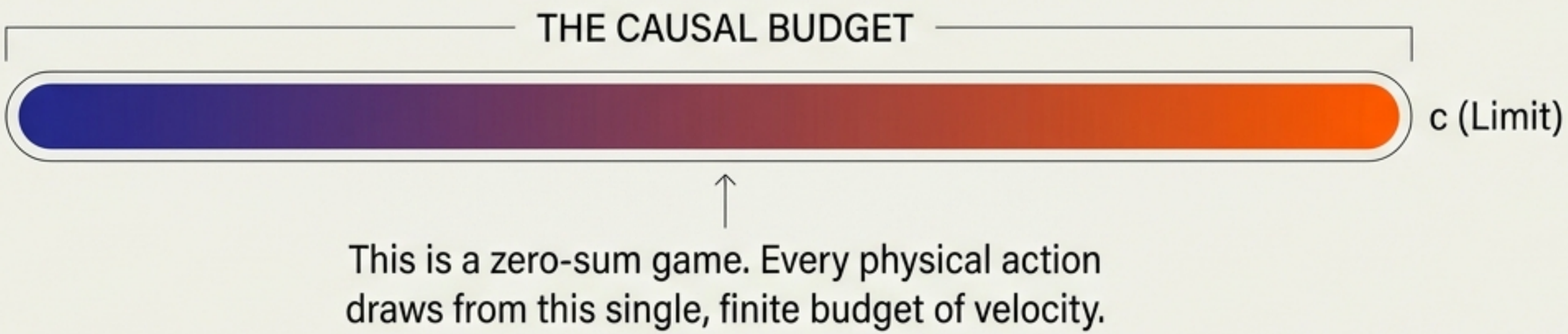
The Differential Expansion Framework (DEF) proposes that **Relativity** and Quantum Mechanics are not separate postulates. They are emergent behaviors of a **single geometric rule.**

We do not need dualism. We need a rigorous application of causality.

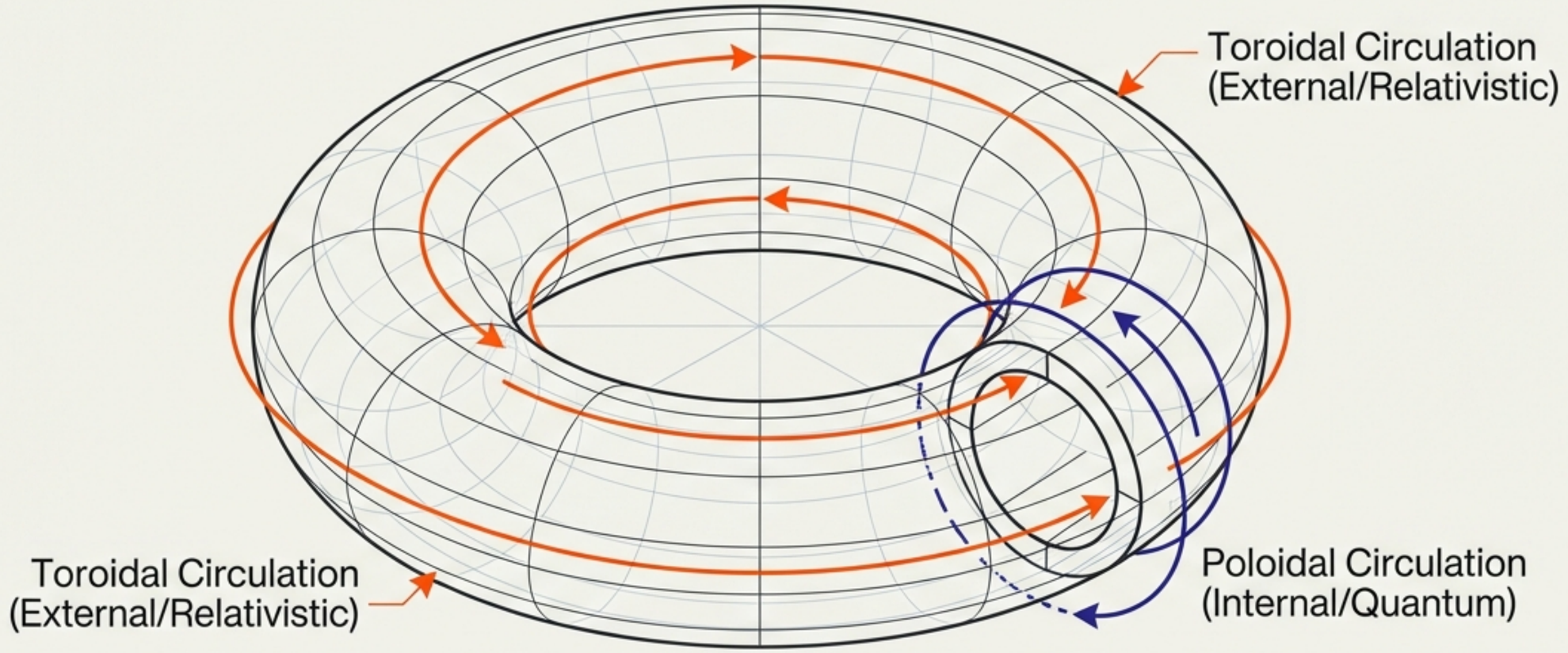


The Fundamental Axiom

“Local phase transport cannot exceed the causal speed *c*.”

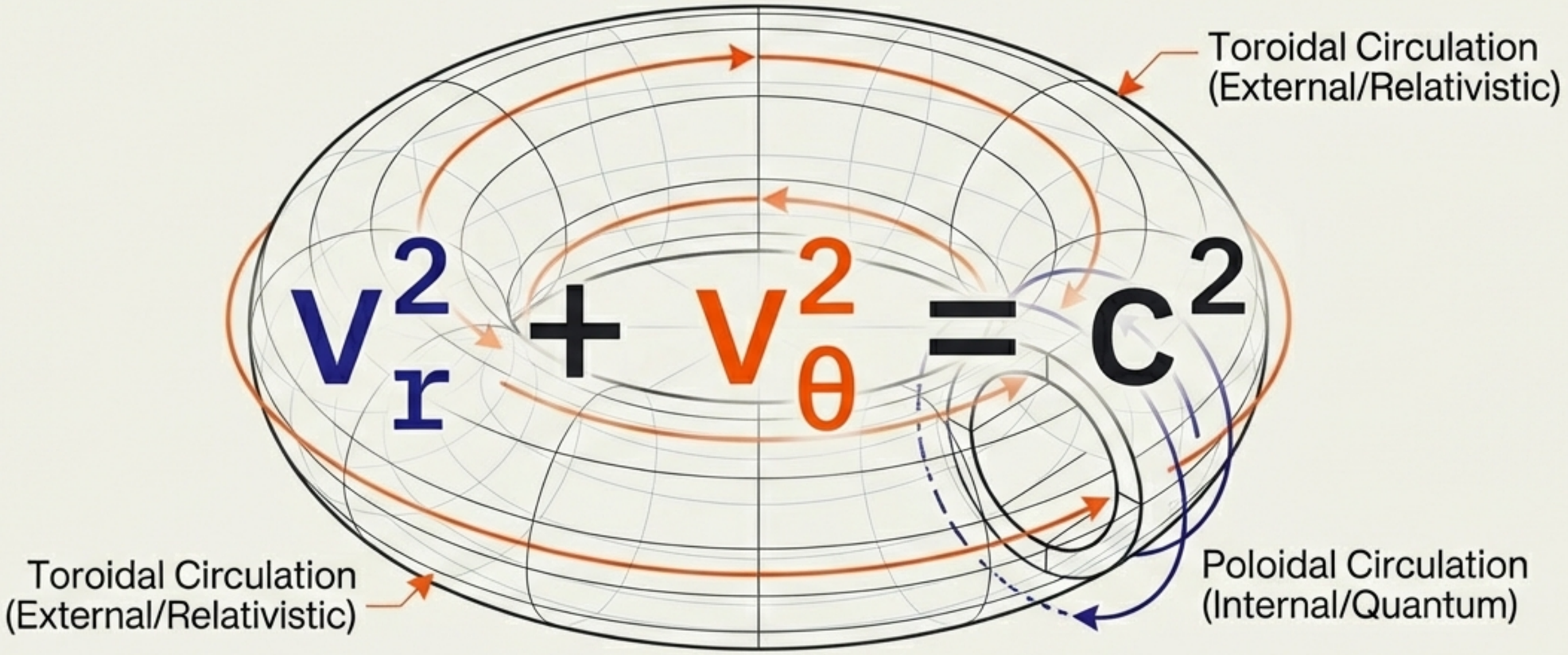


The Electron is a Rotor



Matter is not a static point; it is a closed circulation of the expansion field.
The electron is defined by these coupled phase motions.

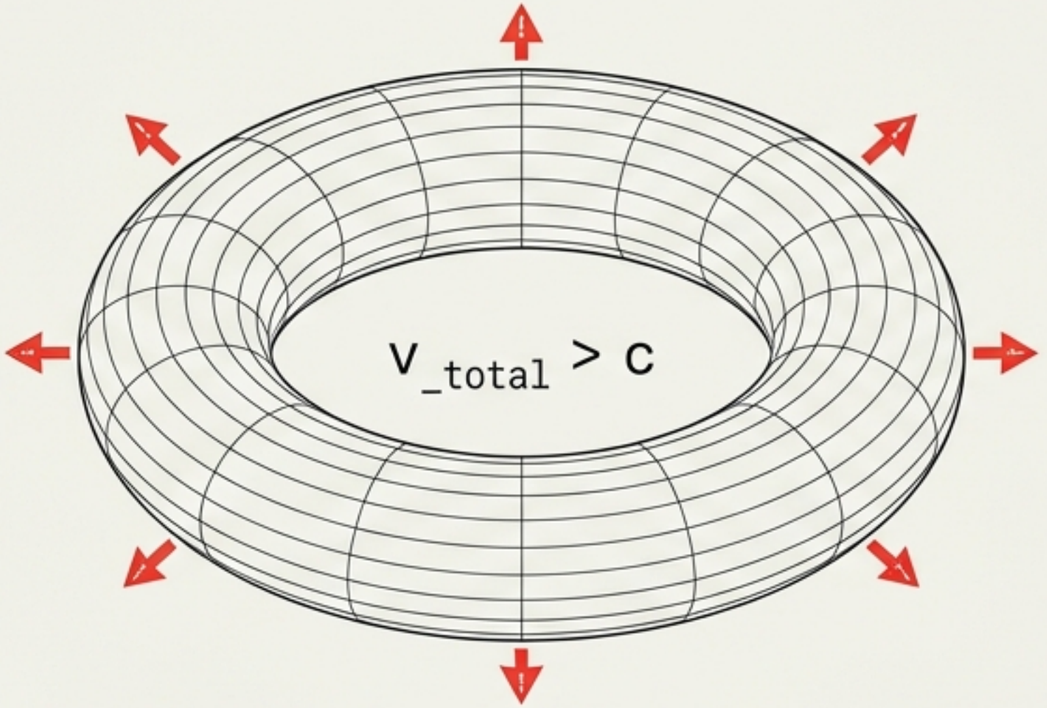
Causal Saturation



The electron is a ‘saturated’ object.
It is using its entire causal budget just to exist.

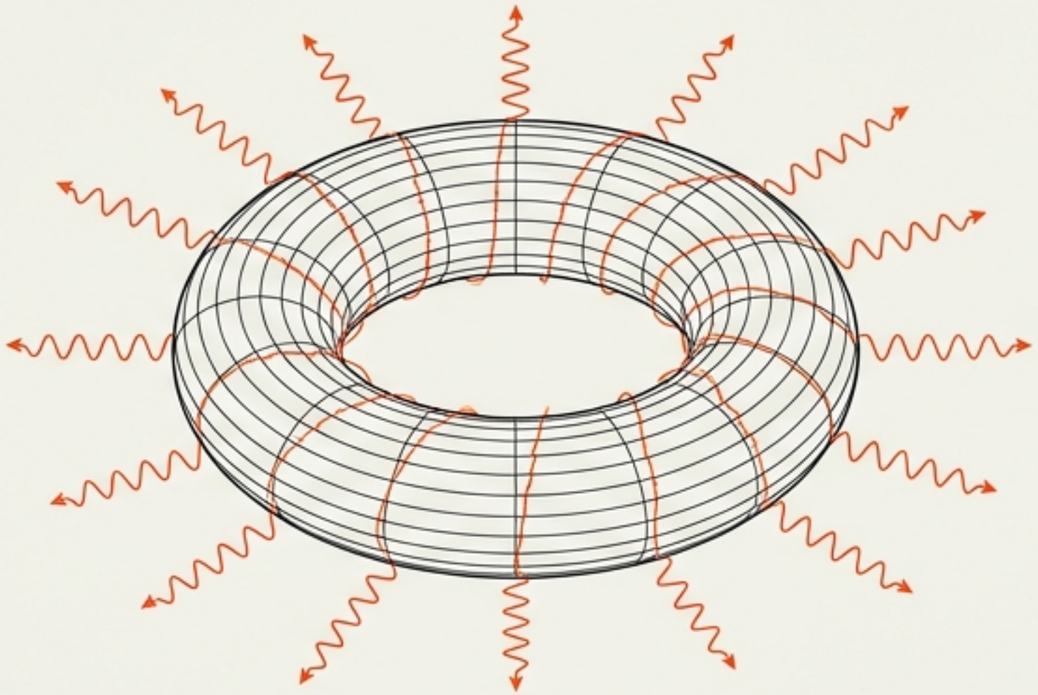
Genesis and Radiative Shrinkage

FORMATION (Too Large)



Causal Overflow

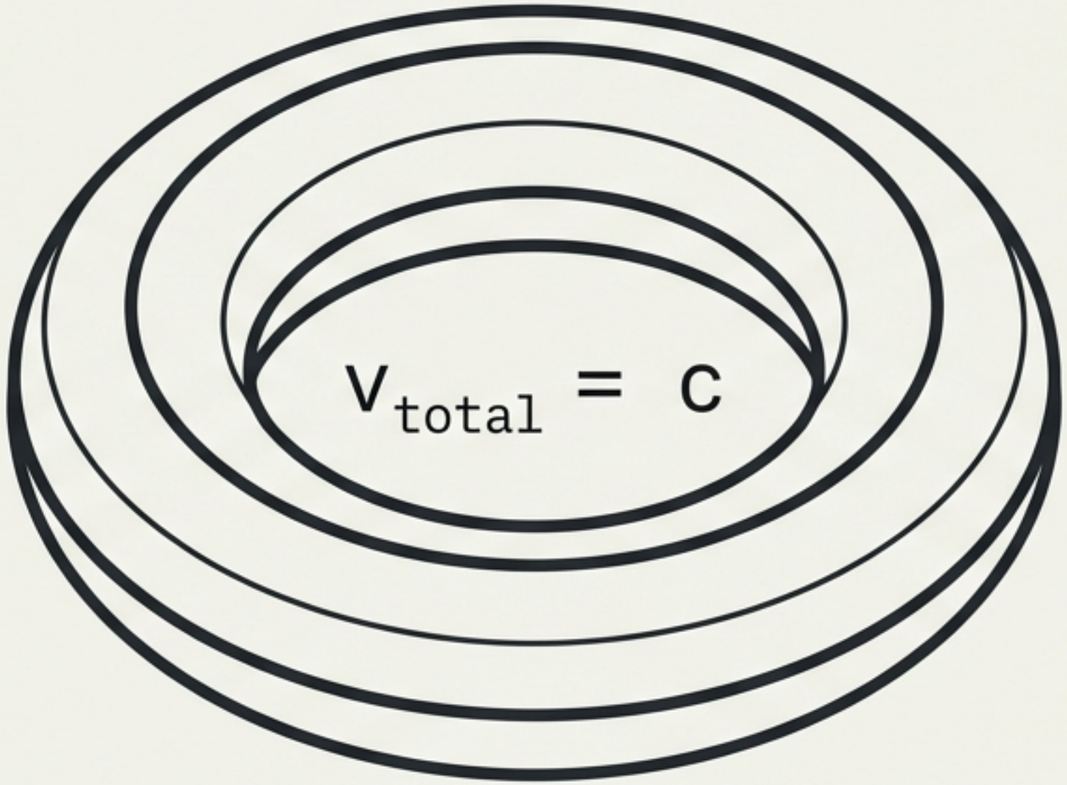
REACTION



Radiative Loss

A newly formed rotor that is too large exceeds the causal limit.
It must shed excess phase energy as electromagnetic radiation.

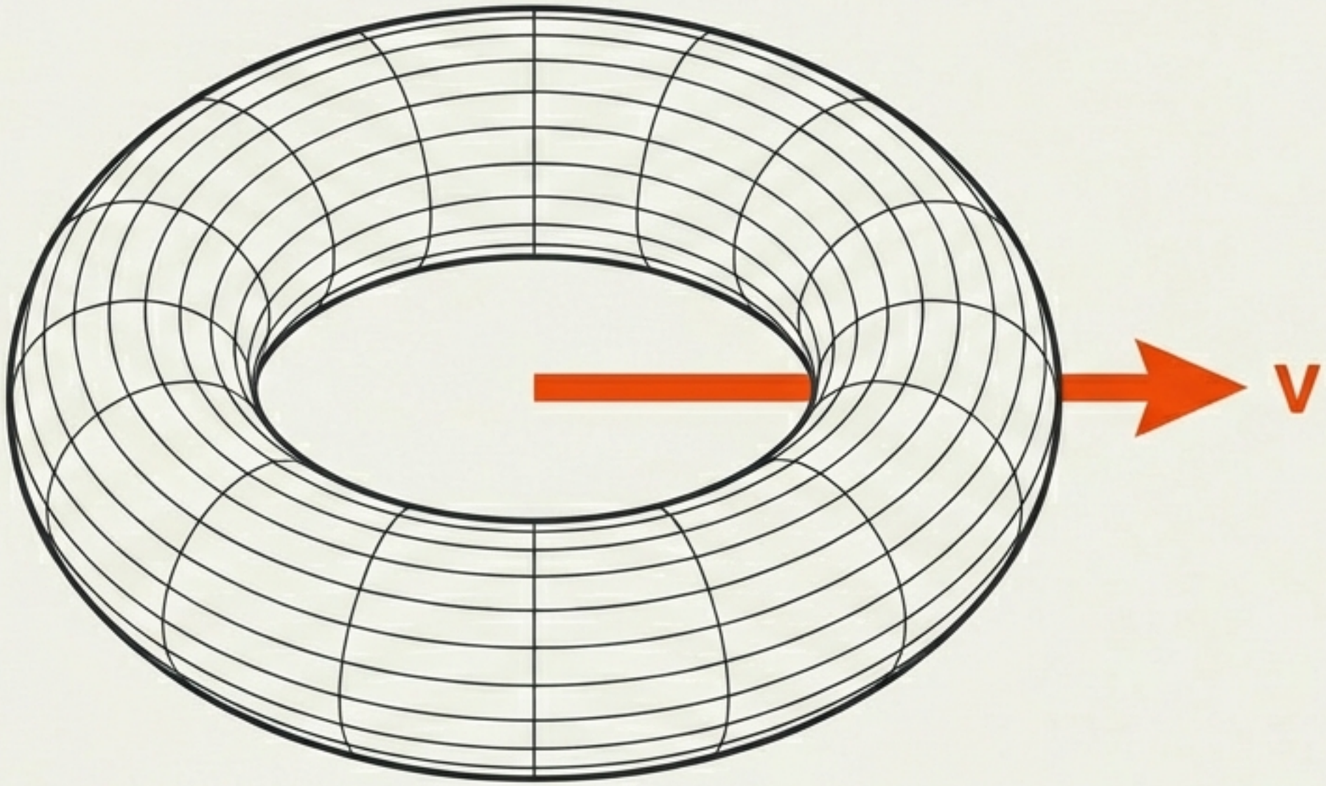
Finding Equilibrium



Contraction stops the moment causal saturation is achieved ($v_r^2 + v_\theta^2 = c^2$).

Key Insight:
The electron is the minimal non-radiating structure. Its size is not arbitrary; it is mandated by the speed of light.

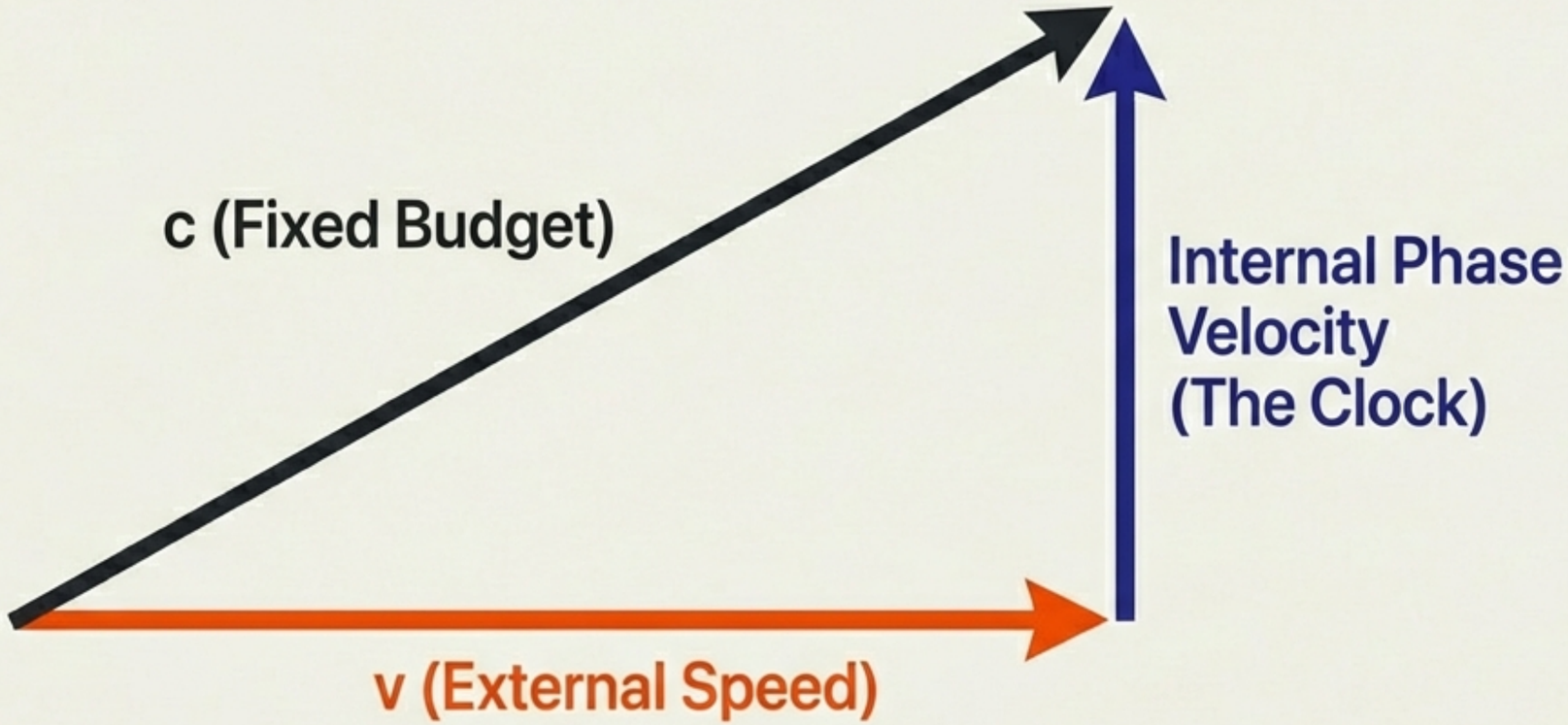
The Cost of Motion



Causal Budget

$$v^2_{internal} + v^2_{external} = c^2$$

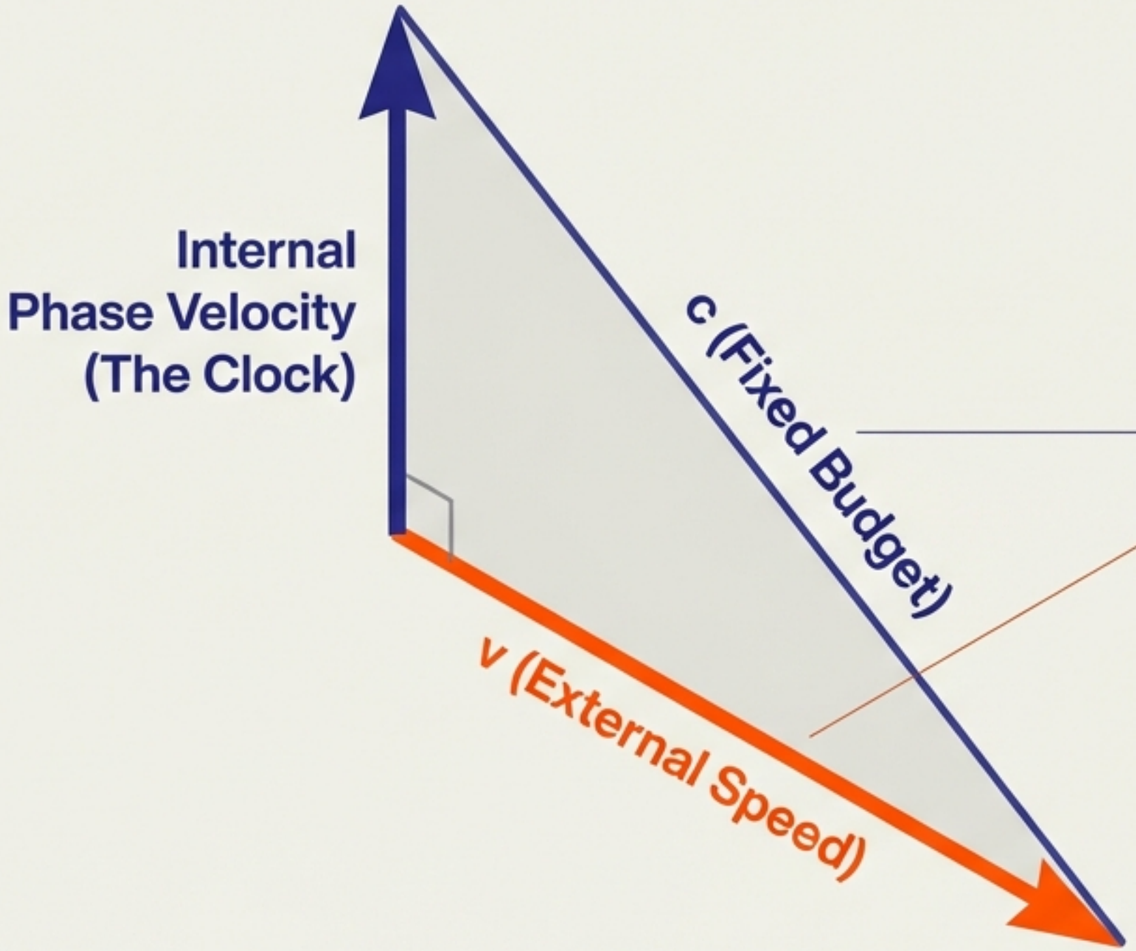
Visualizing Time Dilation



Internal phase circulation defines the local clock rate. As external speed (v) increases, the available budget for internal circulation shrinks to maintain c.

The clock must tick slower.

The Geometry of the Lorentz Factor

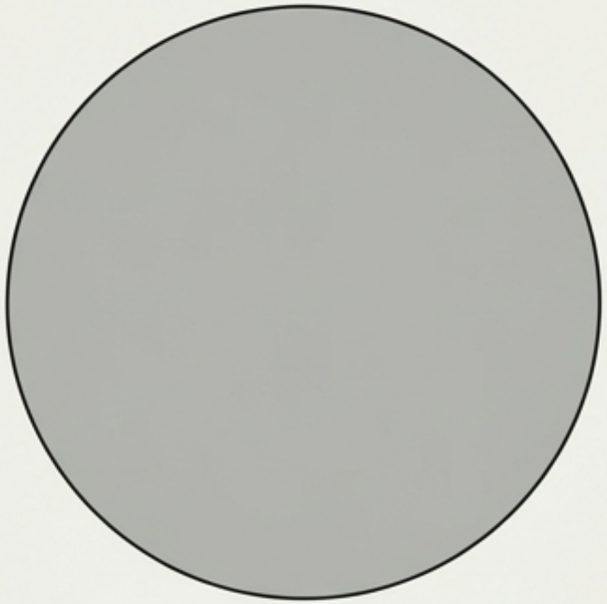


$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

The Lorentz factor is simply the ratio required to keep the hypotenuse equal to c. Relativistic math is just Pythagorean geometry.

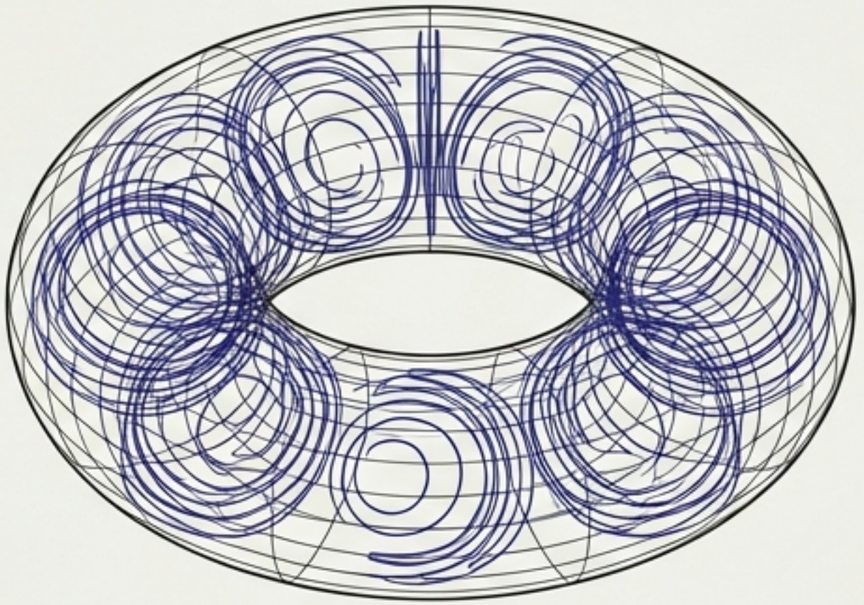
Redefining Mass

OLD



Newtonian Substance

NEW

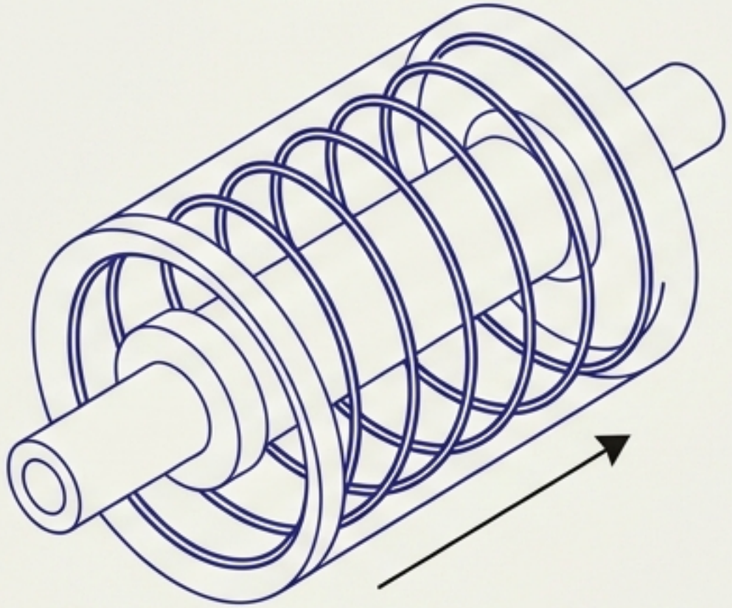


DEF: Internal Phase Density

Mass is not static substance. Mass is Internal Phase Density. In DEF, inertia is a measure of how densely the phase loops are packed within the rotor.

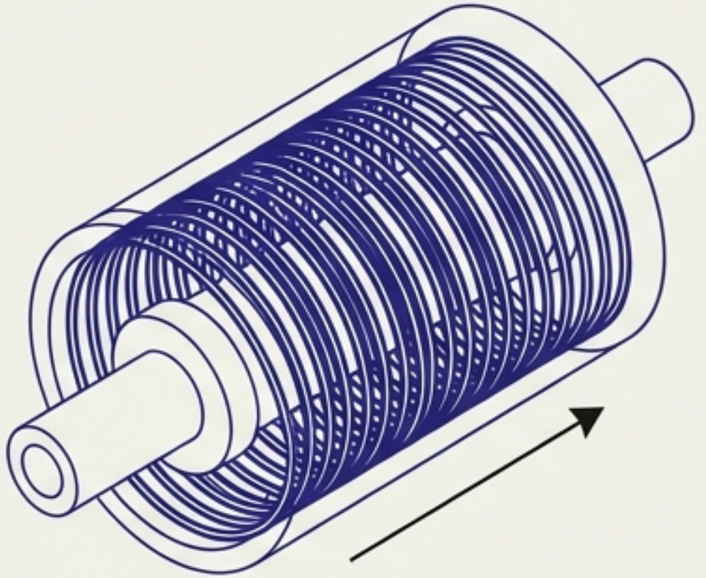
The Mechanics of Mass Increase

Rest Mass



$$m = \gamma m_0$$

Relativistic Mass

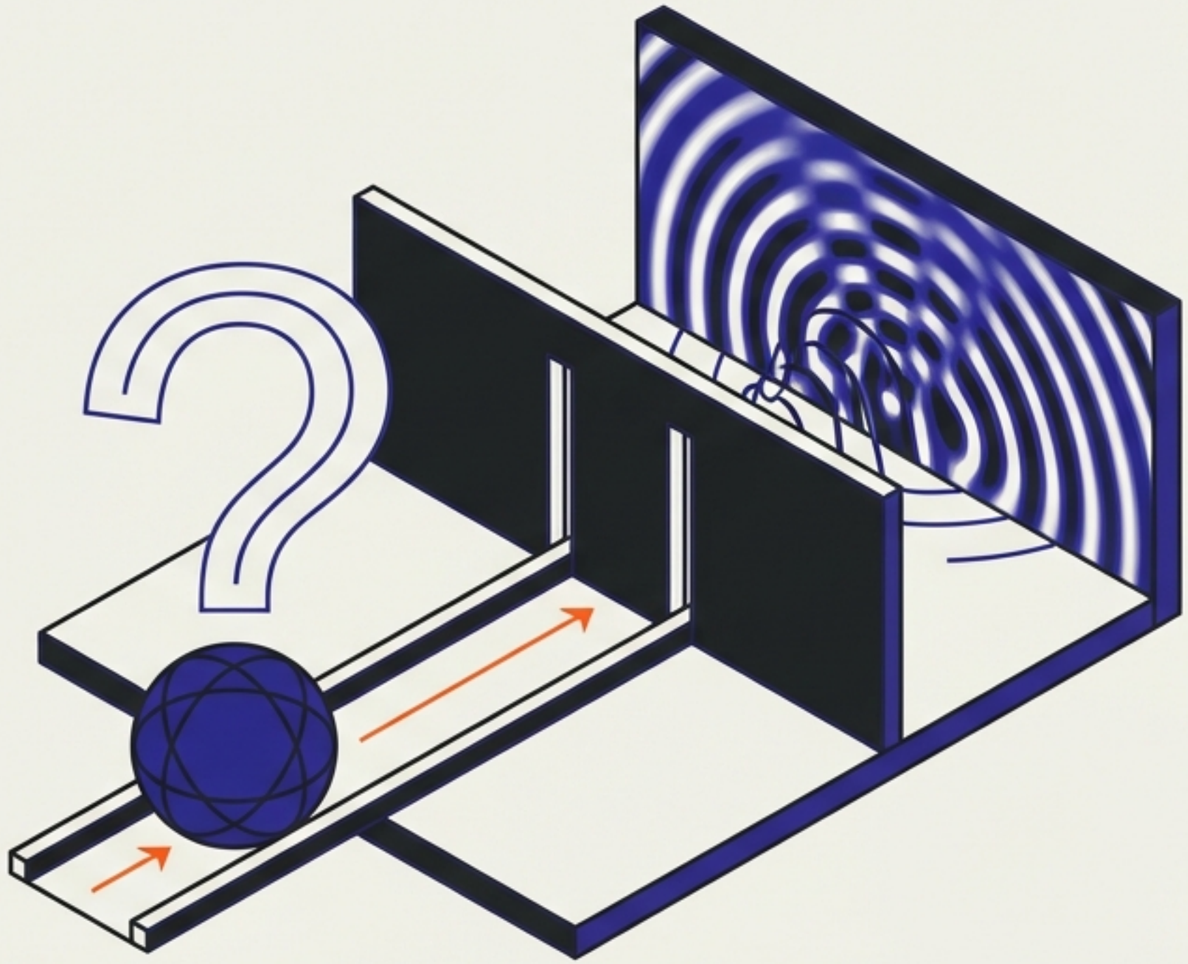


Topology requires a fixed 4π closure. When internal circulation slows (due to motion), the phase loops must pack more tightly to complete the circuit. Denser phase circulation resists acceleration more strongly.

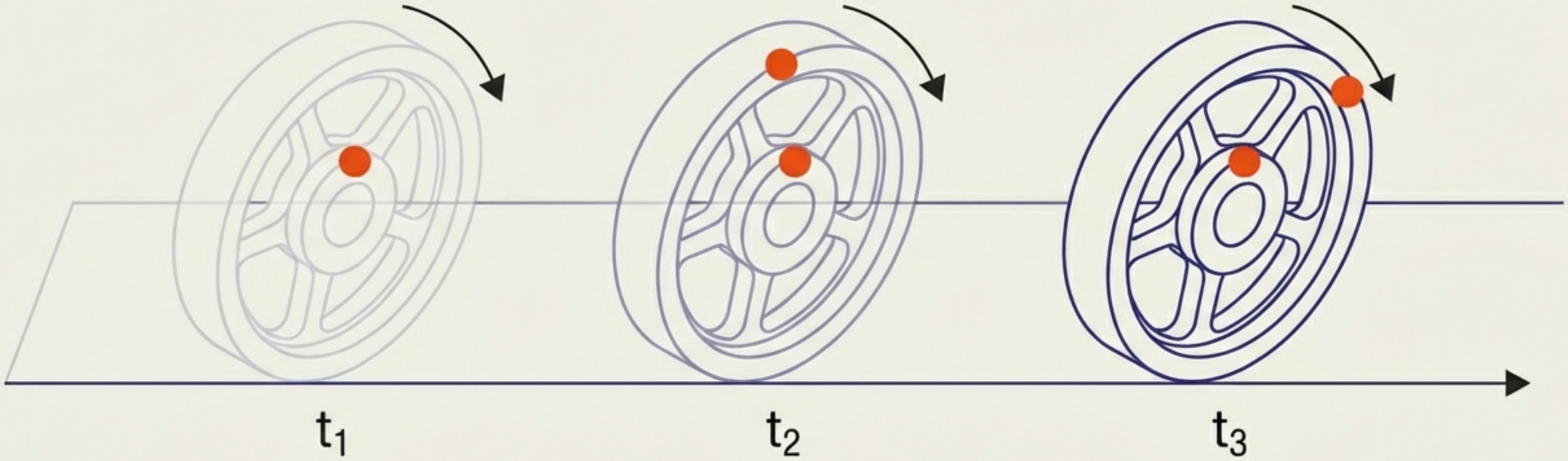
The Origin of the Wave

Quantum mechanics claims the particle IS a wave. DEF claims the particle GENERATES a wave pattern through motion.

Deriving the de Broglie wavelength ($\lambda = h/p$) from the rotor model.

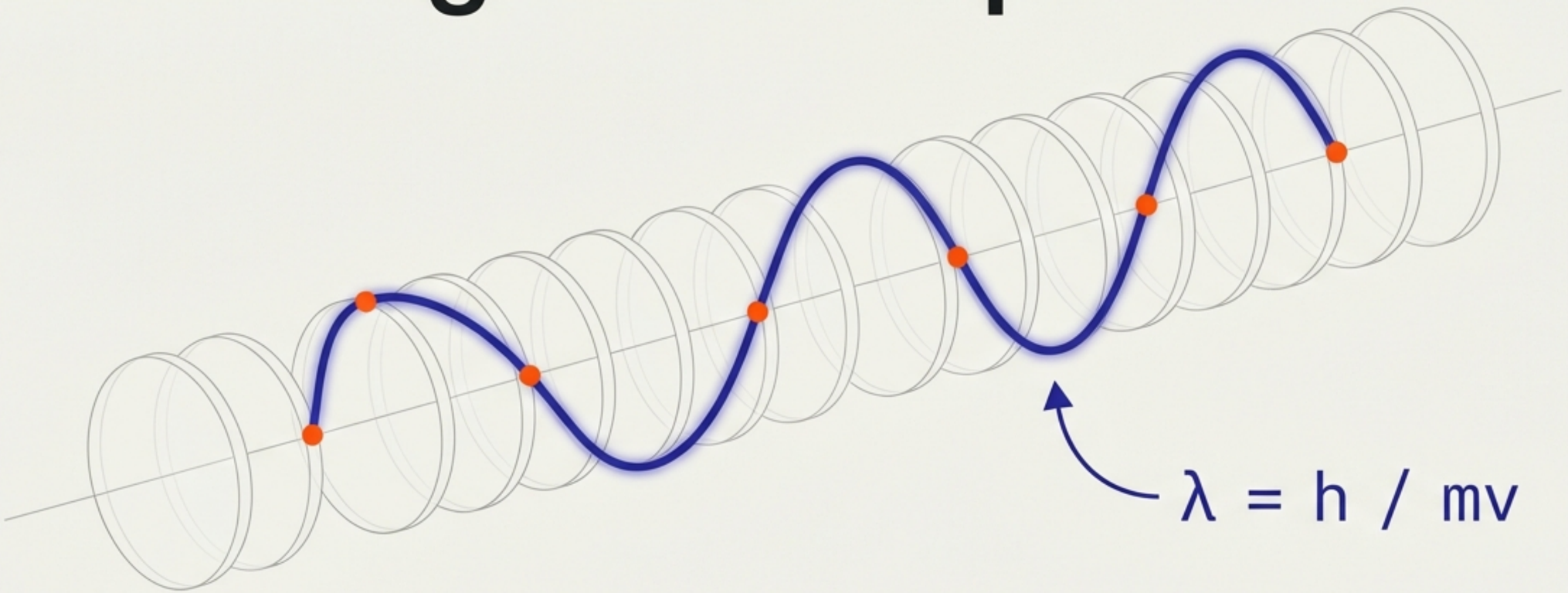


The Spatial Beat



Think of the tread marks of a tire. The tire is round, but the track is linear and periodic.

The de Broglie Envelope

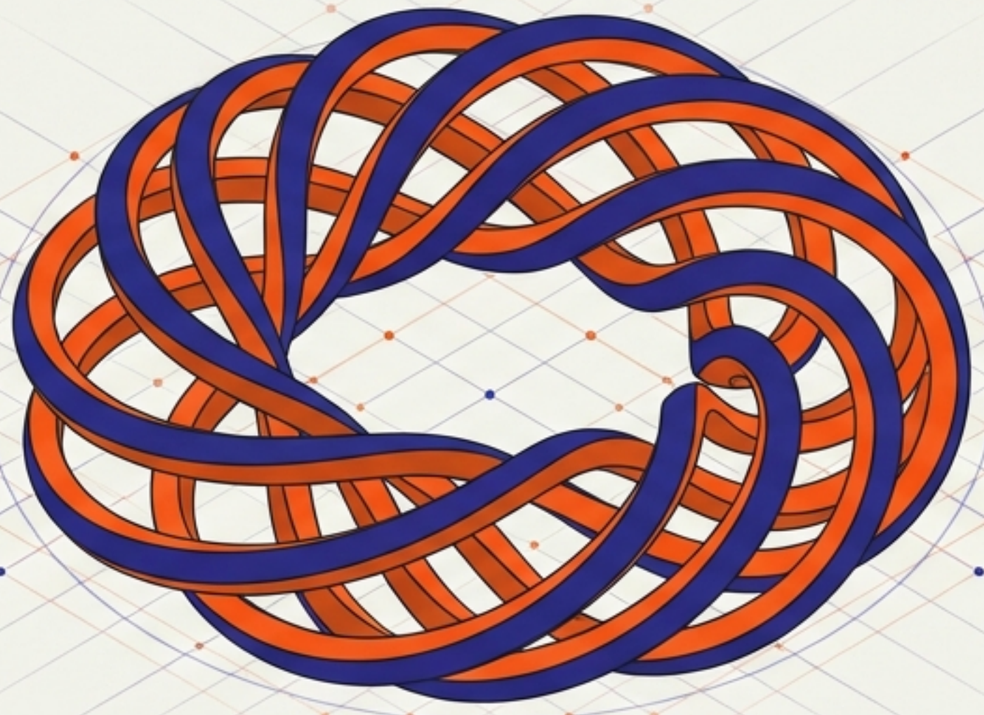


The wavelength is the ENVELOPE formed by phase alignment points. It is a "phase slip" pattern, eliminating the need for separate wave-particle duality.

A Unified Mechanism

Radiation during formation	Causal Overflow (v > c)
Stable Electron Size	Saturated Closure (v = c)
Time Dilation / Mass Increase	Reduced Internal Phase Rate
de Broglie Wavelength	Phase Slip Envelope

Monism over Dualism



By respecting the causal limit *c* as a geometric constraint, we no longer need to choose between the particle and the wave.

The universe is not built of separate laws, but of stable circulations of a single expansion field.