

# The LOCK Hypothesis

A Unified Model of Cosmogenesis via Geometric Unfolding and Residual Curvature

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Date of Completion: May 2025

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## Appendix: Mathematical Scaffold for the LOCK Hypothesis

This appendix outlines a foundational mathematical framework to support the qualitative concepts in the LOCK Hypothesis. The aim is not to replace general relativity or develop a full quantum gravity theory, but to provide a scaffold from which simulations and formal models may grow.

### 1. Geometric Tension Field (T)

Define a scalar tension field  $T(x, t)$  representing the stored geometric stress at a point in spacetime:

- $x$  = spatial position
- $t$  = time since emergence from the Axis of Silence
- High  $T$  indicates tightly folded, high-curvature regions (wrinkles)
- Low  $T$  indicates relaxed, flat geometry

We propose that local spacetime expansion is driven by the gradient of tension:

$da/dt$  proportional to  $-\text{grad}T$

Where  $a(x, t)$  is the local scale factor.

### 2. Wrinkles as Residual Curvature Anchors

Wrinkles are modeled as persistent deviations in the Ricci curvature tensor:

$W_{\mu\nu} = R_{\mu\nu}(\text{wrinkled}) - R_{\mu\nu}(\text{smooth})$

These  $W_{\mu\nu}$  fields:

- Are long-lived and weakly interacting
- Bend light and affect matter gravitationally
- Mimic dark matter without mass

### 3. Lockwave Interference: Phase Discontinuities in Metric Flows

Let two or more metric flows  $g_{1\mu\nu}(x)$  and  $g_{2\mu\nu}(x)$  collapse non-uniformly. Their mismatch creates interference:

$$\Delta g_{\mu\nu} = |g_{1\mu\nu} - g_{2\mu\nu}|$$

Where  $\Delta g_{\mu\nu}$  exceeds a critical threshold, wrinkles form.

### 4. The Axis of Silence: Boundary Conditions

The Axis is defined as a hypersurface with:

- $T = 0$
- $\text{grad}T = 0$
- $dR_{\mu\nu}/dt = 0$

It is a null, wrinkle-free symmetry line--a causal discontinuity where time and entropy begin.

### 5. Evolution Equation for Tension (Toy Model)

To simulate geometric unfolding:

$$dT/dt = -\alpha T + \beta \text{grad}^2 T - \gamma |\Delta g|$$

Where:

- $\alpha$  = spontaneous relaxation
- $\beta$  = diffusion of tension
- $\gamma$  = collapse interference injection coefficient

### Conclusion

This scaffold gives a mathematically inspired backbone to the LOCK Hypothesis, aligning its

metaphors with field dynamics, tensor structure, and evolution rules. It invites further simulation, refinement, and theoretical integration.