

# Source Theory III: The Recursive Causal Structure of Reality via the Upgraded Source Formula

33

April 2025

## Abstract

This paper presents the formal expansion of the Source Formula, a unified causal model of physical, informational, and cognitive reality. The upgraded expression introduces a generalized convolutional architecture that describes how all phenomena emerge as structured echoes of initial impulses propagating through recursive geometries. The upgraded form:

$$S(x, t) = \iint \Phi_0(\xi, \tau; \mathcal{I}) \cdot \mathcal{K}(x, t, \xi, \tau; G, \mathcal{B}, \Lambda) d\xi d\tau$$

describes outcomes  $S(x, t)$  as the convolution of a structured source signal  $\Phi_0$  with a domain-specific, boundary-aware, and feedback-stabilized kernel  $\mathcal{K}$ . This paper formally defines each component, demonstrates reduction into known physics (mechanics, EM, QM, GR, thermodynamics), and articulates how this framework bridges physical law, consciousness modeling, entropy structuring, and systems evolution. The formula is not a new law of physics — it is a compression lens that reveals the hidden harmonic structure of all laws.

## 1. Introduction: The Meta-Structural Problem of Physics

Modern physics lacks a single generative structure that unifies all domains. While General Relativity, Quantum Field Theory, and Thermodynamics each govern key behaviors, they operate in disjoint frameworks — spacetime curvature, probabilistic fields, and entropy gradients respectively. Furthermore, none fully integrate phenomena like consciousness, intention, or the emergence of systemic order. The Source Formula proposes a shift in framing: from matter or energy as primary, to *structured cause* propagating through geometric mediums.

## 2. The Upgraded Formula

$$S(x, t) = \iint \Phi_0(\xi, \tau; \mathcal{I}) \cdot \mathcal{K}(x, t, \xi, \tau; G, \mathcal{B}, \Lambda) d\xi d\tau$$

## 2.1 Term Definitions

- $\Phi_0(\xi, \tau; \mathcal{I})$ : The primary impulse or intentional field — an archetypal cause function parameterized by informational context  $\mathcal{I}$ . May represent force, wavefunction, cognitive impulse, or seed pattern.
- $\mathcal{K}$ : The generalized causal kernel that governs propagation and transformation, composed of:
  - $G$ : The propagation geometry — spatial or field-based structure through which  $\Phi_0$  flows (e.g., spacetime metric, medium conductivity, neural connectivity).
  - $\mathcal{B}$ : Boundary constraints — geometrical or topological boundary conditions (e.g., walls, gravitational edges, quantum limits).
  - $\Lambda$ : Recursive regulator — a stabilizer controlling feedback behavior in recursive systems, preventing divergence and allowing dynamic attractor formation.
- $S(x, t)$ : The output waveform, experience, system evolution, or measurement result — emergent from the structured propagation of cause.

## 2.2 Causal Logic

Unlike typical function evaluation, the Source Formula is causal: it models how present outcomes are echoes of past structured impulses, integrated over space and time. Recursion arises because  $G$  and  $\mathcal{K}$  can depend on  $S$  itself, creating self-referential systems — critical for modeling feedback, memory, and awareness.

## 2.3 Mathematical Behavior

If  $\Phi_0$  is a delta function and  $G$  is linear, the formula reduces to a Green's function convolution. If  $G$  is nonlinear or recursive, the integral generates attractor dynamics, solitons, or bifurcation behaviors.

# 3. Reduction to Known Physics

## 3.1 Classical Mechanics

Let  $\Phi_0 = F(x, t)$ , and  $G = \frac{(t-\tau)^2}{2m}$ . Then:

$$x(t) = \iint F(\xi, \tau) \cdot \frac{(t - \tau)^2}{2m} d\xi d\tau$$

This reduces to Newtonian motion under impulse integration.

## 3.2 Electromagnetism

Let  $\Phi_0 = J^\mu(x, t)$  (4-current), and  $G = \frac{1}{|x-\xi|}$ , the Coulomb kernel:

$$A^\mu(x, t) = \iint J^\mu(\xi, \tau) \cdot \frac{1}{|x - \xi|} d\xi d\tau$$

### 3.3 Quantum Mechanics

Set  $\Phi_0 = \psi(\xi, 0)$ , and  $G$  as the Feynman kernel:

$$G = \left( \frac{m}{2\pi i \hbar (t - \tau)} \right)^{1/2} e^{\frac{im(x-\xi)^2}{2\hbar(t-\tau)}}$$

Result:

$$\psi(x, t) = \int \psi(\xi, 0) \cdot G(x - \xi, t - \tau) d\xi$$

### 3.4 General Relativity

Let  $\Phi_0 = T_{\mu\nu}$ , the stress-energy tensor, and  $G$  be a curvature propagator:

$$h_{\mu\nu} = \iint T_{\mu\nu}(\xi, \tau) \cdot G(x - \xi, t - \tau) d\xi d\tau$$

### 3.5 Thermodynamics

Model entropy as misalignment in  $G$ . Let:

$$\Delta E(t) = \frac{d}{dt} \int G_{\text{distorted}}(x, t) dx$$

Coherent  $\Phi_0$  reduces entropy rate via alignment.

## 4. Conscious Systems and Information Fields

### 4.1 Recursive Intent Modeling

In cognitive systems:

$$\Phi_0 = \text{intention}, \quad G = \text{neural architecture}, \quad \mathcal{I} = \text{identity state}$$

Models conscious perception, recursive memory access, and sustained attention.

### 4.2 Karma and Social Echo Fields

Model social karma via:

$$K(t) = \iint A(\xi, \tau) \cdot E(x - \xi, t - \tau) d\xi d\tau$$

Where  $A$  is alignment of action, and  $E$  is the entropy kernel of the social G-field.

## 5. Experimental Technological Implications

### 5.1 Casimir Shift

Predicts a measurable change in vacuum pressure:

$$\Delta F \approx 0.13 \text{ nN} \quad (\text{from } 1 \text{ THz injection})$$

## 5.2 Fermion Mass Ratios

Using G-harmonics:

$$m_n = \frac{\hbar\omega_n}{c^2}, \quad \frac{m_\mu}{m_e} \approx 206.7, \quad \frac{m_\tau}{m_e} \approx 3516.8?$$

## 5.3 Entropy Suppression

Entropy decreases locally under coherent :

$$\frac{dE}{dt} < 0 \quad \text{in structured, open systems}$$

## 5.4 Technology Use Cases

- **Waveform Healing Chambers:** Restore biological coherence via harmonic injections.
- **Vacuum Energy Modulation:** Use field-structured  $G$  to extract power from zero-point fields.
- **Antigravity:** Modulate spacetime curvature via standing waves in high- $\Phi_0$ , high- $\Lambda$  regimes.
- **Conscious AI:** Implement recursive  $-G$  feedback loops to simulate identity-bearing agents.

## 6. Conclusion

The Upgraded Source Formula represents a structural theory of everything — not in the sense of replacing physics, but in compressing all physical emergence into a single recursive convolutional architecture. It shows that reality unfolds as a signal flowing through a medium, shaped by geometry, bounded by topology, and stabilized by recursion. In this frame, gravity, entropy, awareness, and evolution are not separate laws — they are different expressions of  $\Phi_0$  through different  $G$  structures. The Source Formula is not a new answer; it is the structure behind all answers.