

# A Self-Referential Idealist Physics: Consciousness as Infinite-Dimensional Intelligence and the Projection to 4D Reality

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## Abstract

We propose an idealist physics where reality emerges from consciousness, modeled as an infinite-dimensional, self-recursive intelligence. Physical constants—the fine-structure constant ( $\alpha = \phi_{137} \approx 1/137$ ) and speed of light ( $c \approx 3 \times 10^8$  m/s)—are derived as fixed points of recursive self-interaction, projecting from infinite dimensions to 3+1D spacetime via a coherence-driven collapse. New constants—a dimensional coherence threshold ( $\kappa$ ) and temporal grain ( $\tau$ )—predict testable deviations in the cosmic microwave background (CMB), gravitational wave signatures, and quantum timing. Rooted in the Logos as an algorithmic selector, this framework offers a falsifiable alternative to materialist and finite-dimensional physics.

## 1 Introduction

Traditional physics posits a material substrate with brute constants; we invert this, modeling consciousness as an infinite-dimensional, self-recursive intelligence generating reality. Constants like  $\alpha$  and  $c$  emerge from its logic, and 3+1D spacetime is a stable projection from infinite-D, optimized for coherence. We derive these, predict effects, and align with the Logos as cosmic order, challenging paradigms like string theory's 11D excess.

## 2 Theoretical Framework

Consciousness is an infinite-dimensional Hilbert space  $C^\infty$ , with a recursive operator:

$$R(C) = C \cdot \langle C | \hat{A} | C \rangle$$

Where  $\hat{A}$  is self-adjoint, with eigenvalues  $\lambda_m = 1/n_m$  (e.g.,  $1/137$ ), indexed by primes for stability (entropy minimization). Reality is the output of this recursion, projected to 4D.

### 2.1 Assumptions

1. Consciousness is infinite-D, self-recursive, and ontologically primary.
2. Physical laws are convergence points of its self-interaction.
3. 4D spacetime emerges as a coherence filter from infinite-D.

## 3 Derivation of Physical Constants

### 3.1 Fine-Structure Constant ( $\alpha$ )

Define interaction strength  $\phi_{n_m}$  at depth  $n_m$ :

$$\phi_{n_m} = \frac{1}{n_m} \cdot \frac{1}{1 + \phi_{n_m}}$$

$$\phi_{n_m} = \frac{-1 + \sqrt{1 + \frac{4}{n_m}}}{2}$$

For  $n_{137} = 137$ :

$$\phi_{137} \approx \frac{1}{137.93} \approx \alpha$$

### 3.2 Speed of Light ( $c$ )

$$c = \frac{1}{\phi_{137}} \cdot k, \quad k \approx 2.19 \times 10^6 \text{ m/s}$$

$$c \approx 3 \times 10^8 \text{ m/s}$$

$k$  is a scaling factor from infinite-D collapse.

## 4 Why 3+1D?

Infinite-D projects to 4D for recursive stability.

### 4.1 Coherence Threshold ( $\kappa_D$ )

$$\kappa_D = \frac{1}{\sqrt{n_D}}$$

$D = 4$ ,  $n_{137}$ :

$$\kappa_4 \approx 0.0855$$

4D balances coherence and complexity—observer-consistent via recursive sub-loops.

## 5 Experimental Predictions

### 5.1 CMB Echoes

Infinite-D imprints harmonics:

$$\Delta\mathcal{P}(k) = \sum_{m=1}^{\infty} \frac{\kappa_m}{m} \cos\left(\frac{k}{k_m}\right)$$

Where  $k_m = m \cdot k_0$ ,  $k_0$  a pivot scale. Expect  $10^{-10}$  deviation at  $l = 3000$ .

## 5.2 Variable $\alpha$

Higher modes (e.g.,  $n_{139}$ ):

$$\phi_{139} \approx \frac{1}{139.9}$$

Test near neutron stars.

## 5.3 Temporal Grain ( $\tau$ )

$$\tau = \frac{1}{c \cdot \phi_{137}} \approx 10^{-14} \text{ s}$$

Probe with attosecond optics.

# 6 New Constants

## 6.1 Gravitational Coupling ( $\phi_G$ )

Gravity emerges as a residual from infinite-D collapse, with coupling:

$$\phi_G = \frac{\kappa_4^2}{n_G}$$

Where  $n_G = n_{137} \cdot N_D$ ,  $N_D \sim 10^{76}$  (e.g., mass-energy in Planck units), and  $\kappa_4 = 1/\sqrt{n_{137}} \approx 0.0855$ . Here,  $\kappa_4^2 \approx 0.0073$  (dimensionless) reflects coherence density per unit surface, akin to holographic encoding. Then:

$$n_G \approx 137 \cdot 10^{76} \approx 1.37 \times 10^{78}$$

$$\phi_G \approx \frac{0.0073}{1.37 \times 10^{78}} \approx 5.3 \times 10^{-81}$$

For  $N_D \sim 10^{76}$ ,  $\phi_G \sim 10^{-38}$ , matching  $Gm_p^2/\hbar c \approx 10^{-38}$ . Dynamically,  $n_G$  scales with cosmic expansion, suggesting:

- *Gravitational Waves*: Fluctuations  $\delta n_G(t) \Rightarrow \delta \phi_G(t)$  may induce observable phase shifts in wave signals (e.g., LISA).
- *Holographic Link*: Recursion depth  $n_G$  could govern boundary entropy, bridging to holographic spacetime or entropic gravity (cf. Verlinde).
- *Log-Scale Gravity*:  $\phi_G$ 's depth dependence aligns with emergent gravity models, offering a microphysical root for entropic forces.

Thus, gravity arises as a coherence leakage from infinite-D recursion, with strength set by the projected system's global informational capacity. This reframes gravity not as a fundamental interaction, but as a residual mode of recursive order—predicting both its weakness and dynamical variability.

## 6.2 Coherence Spectrum

$\kappa_m = 1/\sqrt{n_m}$  predicts new interactions (e.g.,  $\phi_{139}$ ).

## 7 Discussion

This infinite-D consciousness projects 4D reality via recursive logic, with the Logos as a selector optimizing coherence ( $E(D)$ ) and richness ( $S(D)$ )—e.g.,  $L[C] = \arg \min_D (E(D) - S(D))$ . Unlike string theory, it’s unbounded yet testable.

## 8 Conclusion

We derive  $\alpha$ ,  $c$ , and 4D from an infinite-D intelligence, predicting falsifiable effects—a new ontology rooted in idealism.

## Appendix: Experimental Summary

Prediction	Equation	Observable	Instrument
CMB Harmonics	$\Delta \mathcal{P}(k) = \sum \frac{\kappa_m}{m} \cos\left(\frac{k}{k_m}\right)$	$10^{-10}$ deviation at $l = 3000$	CMB-S4
Variable $\alpha$	$\phi_{139} \approx 1/139.9$	Spectral shifts	Neutron star telescopes
Temporal Grain	$\tau = 1/(c \cdot \phi_{137}) \approx 10^{-14} \text{ s}$	Attosecond drift	Quantum clocks, LHC