Fractal Universe Theory (FUT): Reinterpreting the CMB Redshift

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# Abstract

This paper presents a radically different interpretation of the redshift observed in the Cosmic Microwave Background (CMB) under the framework of Fractal Universe Theory (FUT). Standard cosmology interprets the CMB's extreme redshift (z ≈ 1100) as evidence that the CMB originated from a hot plasma state approximately 13.8 billion years ago, shortly after the Big Bang. By contrast, FUT proposes that redshift arises from a delay in manifestation from a 2D substrate into observable 3D space, not from recession velocity through expanding space.

# I. Introduction: The Redshift Paradigm Shift

In conventional cosmology, redshift is viewed as the stretching of light waves due to the metric expansion of space. According to this view, the CMB is the oldest light in the universe, emitted when electrons and protons combined to form neutral hydrogen ~380,000 years post-Big Bang.

However, under Fractal Universe Theory, redshift is not a velocity effect. It is a manifestation delay — the time-lag in emergent coherence between a 2D nonlocal substrate and the 3D observational frame. Light does not travel through expanding space, but rather emerges in layered coherence gradients defined by ψ(r).

# II. FUT Redshift Model

FUT models redshift using an emergence delay curve:

z(r) = (r / R₀)^γ - 1

Where:  
- r: Emergence distance (not travel distance)  
- R₀: Coherence boundary (ECI threshold)  
- γ: Emergence exponent (empirically tunable)

In this model, light does not travel — it emerges in layers. Redshift is not due to recession but due to substrate delay. The farther the shell, the lower its emergence frequency, and the more redshifted it appears.

# III. CMB Comparison: FUT vs ΛCDM

Model | Predicted Redshift | Interpretation  
------------- | ------------------ | ----------------------------------------------  
Standard ΛCDM | z ≈ 1100 | CMB is ancient light traveling 13.8 billion years  
FUT | z ≈ 0.171 | CMB is the deepest coherence echo possible

In the FUT model, the CMB’s redshift is low not because it traveled less — but because its manifestation represents the first successful resonance of the substrate's memory into kinetic output.

# IV. The Illusion of Distance

The CMB appears uniformly in all directions because it is not a surface or shell of matter. It is the final limit of nonlocal coherence that any observer can receive from the 2D substrate.

The CMB is not ancient light — it is the substrate's universal memory signal, the blueprint of the first resonance.

As such, redshift is not a measure of how far light has traveled, but how far back in coherence the observer is reaching when manifesting that light. The illusion of distance is replaced by a hierarchy of emergence delay.

# V. Conclusion

The Fractal Universe Theory redefines redshift as a measure of coherence delay, not spatial recession. The CMB under this model is not light from the past — it is an echo of emergence itself. The discrepancy in redshift values (z = 0.171 vs z = 1100) becomes the evidence, not the contradiction.

FUT proposes that the universe does not expand — it unfolds. The CMB is not far — it is fundamental. It is the point where emergence began to stabilize, and the memory of that event lives within every observer as the universal resonance boundary.