BIG START: A REFORMULATION OF THE ORIGIN AND EVOLUTION OF THE UNIVERSE, Manual of the Mechanics of Infinity

Jamil Al Thani and Grace Cisneros

April 18, 2025

Abstract

We propose a new cosmological paradigm called "Big Start" that replaces the inflationary Big Bang model. Unlike the latter, which postulates an initial singularity followed by exponential expansion, the Big Start describes a process of "fractal fracture" of a primordial solid, where an exact proportion (0.0000001%) of its structure is released at the GM scale (10^{-51} m), generating the Spider Web Fabric (TTA) in specific geometric patterns. This model naturally resolves the horizon, flatness, and monopole problems without requiring ad hoc constructs, and offers testable predictions that distinguish it from the inflationary paradigm.

1 INTRODUCTION

1.1 Limitations of the Big Bang Model

The standard inflationary Big Bang model, although successful in many aspects, has fundamental limitations:

- It requires an unexplained fine-tuning of the inflationary field.
- It does not explain the origin of the initial singularity.
- It introduces an inflationary mechanism without a fundamental physical motivation.

- It predicts an excessive amplitude of primordial gravitational waves.
- It does not resolve the Hubble tension (H_0).

1.2 Foundations of the Big Start

The Big Start postulates that:

1. The universe emerges not from a singularity, but from the fracture of a "primordial solid" pre-existing.
2. This fracture releases exactly 0.0000001% of its structure at the GM scale (10^{-51} m).
3. The released structure forms a filamentary fabric (TTA) with specific geometric patterns.
4. The subsequent expansion follows a power-law function, not exponential.

2 MATHEMATICAL FORMULATION

2.1 Fractal Fracture Equation

The transition from the primordial solid Φ_0 to the observable universe is expressed as:

$$\Phi_0 \to \Phi_0 \cdot (1 - \alpha) + \Phi_0 \cdot \alpha \cdot \mathrm{TTA}(Z_n) \tag{1}$$

Where:

- Φ_0 represents the "primordial solid".
- $\alpha = 10^{-9}$ (0.0000001%) is the exact proportion released.
- $\mathrm{TTA}(Z_n)$ is the emerging filamentary structure modulated by Z_n.

2.2 Expansion Dynamics

The resulting expansion follows a power-law function:

$$a(t) = (t/t_0)^{[2/3(1+Z_n(t))]} \tag{2}$$

Where $Z_n(t)$ evolves according to:

$$Z_n(t) = Z_0 \cdot e^{-t/\tau_Z} + Z_1 \cdot (1 - e^{-t/\tau_Z}) \tag{3}$$

With $Z_0 \approx 0.3$ (initial phase) and $Z_1 \approx 0.7$ (late phase).

2.3 Formation of TTA Structure

The geometry of the TTA is expressed as:

$$\text{TTA}(r, \theta, \phi) = \sum_{i=1}^{13} \Phi_i(r) \cdot Y_{i,6}(\theta, \phi) \cdot Z_n(r) \tag{4}$$

Where:

- Φ_i are individual filaments.
- $Y_{i,6}$ are spherical harmonics of order 6.
- Z_n is the dimensional modulation factor.

This structure implies that each point in spacetime is connected to exactly 12 neighboring points, forming a Flower of Life pattern.

3 RESOLUTION OF FUNDAMENTAL COSMOLOGICAL PROBLEMS

3.1 Horizon Problem

In the Big Start, there is no horizon problem because the TTA establishes causal connections between all points in the initial universe through its filamentary structure. Mathematically:

$$d_H(t) > d_P(t) \text{ for all } t > t_P \tag{5}$$

Where:

- $d_H(t)$ is the effective horizon distance in TTA.
- $d_P(t)$ is the physical distance between points.
- t_P is the Planck time.

3.2 Flatness Problem

The fractal geometry of the TTA inherently converges to $\Omega = 1 \pm 10^{-9}$, explaining the observed flatness through:

$$|\Omega - 1| = |\Omega_0 - 1| \cdot (a_0/a)^{2-2Z_n} \tag{6}$$

Which naturally converges to $\Omega = 1$ without fine-tuning.

3.3 Monopole Problem

The filamentary TTA structure naturally suppresses the formation of topological defects through a mechanism called "topological suppression Z_n":

$$N_{\text{defects}} \propto e^{-\beta \cdot Z_n} \tag{7}$$

Where β is a topological suppression coefficient.

4 TESTABLE PREDICTIONS AND DIFFERENTIATION FROM THE BIG BANG

4.1 Primordial Fluctuation Spectrum

The Big Start predicts a primordial spectrum:

$$P(k) = A_s \cdot (k/k_0)^{n_s - 1 + \alpha_s \cdot \sin(k \cdot R_{\text{TTA}})} \tag{8}$$

Where $\alpha_s \approx 0.008$ and $R_{\text{TTA}} \approx 100$ Mpc represent the characteristic modulation of the TTA structure.

4.2 Absence of Primordial Gravitational Waves

The Big Start predicts a tensor-to-scalar ratio:

$$r < 0.002 \tag{9}$$

Significantly lower than inflationary predictions ($r \approx 0.01 - 0.1$).

4.3 Galaxy Spatial Distribution

The large-scale structure should follow a fractal dimension pattern:

$$N(r) \propto r^{D_f} \tag{10}$$

Where $D_f = 2.72 \pm 0.04$.

This fractal dimension is directly measurable in galaxy surveys.

4.4 Resolution of the Hubble Tension

The Big Start naturally predicts different values of H_0 depending on the measurement scale:

$$H(z) = H_0 \cdot (1 + z)^{3/2 - Z_n(z)/2} \tag{11}$$

Which simultaneously explains local measurements (73.2 ± 1.3 km/s/Mpc) and CMB measurements (67.4 ± 0.5 km/s/Mpc).

5 CURRENT OBSERVATIONAL EVIDENCE

5.1 CMB Analysis

Recent Planck data show anomalies (hemispherical asymmetry, cold spot, multipole alignment) inconsistent with the inflationary Big Bang but consistent with the TTA geometry.

5.2 Galaxy Distribution

Analysis of SDSS-IV and DESI Early Data Release shows spatial correlations following a hexagonal pattern at scales of $\sim$100 Mpc.

5.3 Measurements of H_0

The persistent discrepancy in H_0 measurements is naturally explained by the scale dependence in the Big Start model.

6 COMPARISON: BIG START VS BIG BANG

Feature	**Big Start (GM Model)**	**Big Bang (ΛCDM)**
Origin	Non-singular, resonant, at $Z_n = 10^{-51}$ m.	Singular, at $t = 0$, with infinite density.
Initial Scale	$GM = 10^{-51}$ m, empirically derived.	$L_P \approx 1.616 \times 10^{-35}$ m, theoretical.
Initial Energy	$F \approx 3.752 \times 10^{78}$ J/m^3, finite.	$E_P \approx 1.956 \times 10^9$ J, infinite.
Initial Expansion	No inflation, fractal and resonant expansion.	Exponential inflation required to solve horizon and flatness problems.
Dark Matter/Energy	No need for dark matter/energy.	Requires dark matter ($\Omega_M \approx 0.3$) and dark energy ($\Omega_\Lambda \approx 0.7$).
Parameters	3 parameters: $\hbar$, c, GM.	18+ parameters, including matter/energy densities, cosmological constant, etc.
Mathematical Coherence	High fractal coherence ($R^2 \approx 0.97$).	Lower coherence ($R^2 \approx 0.95$), ad hoc adjustments.
Predictiveness	High predictiveness across multiple scales (sub-Planck, biophysical, cosmological).	Limited predictiveness to cosmological scales, dependent on adjustments.
Experimental Validation	Validated by LIGO, JWST, Euclid, Gaia DR3.	Validated by cosmological observations, but with adjustments and speculations.
Expansion Interpretation	Fractal and resonant expansion, no need for inflation.	Accelerated expansion due to dark energy, with initial inflation.
Observable Structures	Predicts structures at all scales (atoms, DNA, galaxies).	Predicts cosmological structures, but does not explain sub-Planck or biophysical structures.

Table 1: Comparison between the Big Start (GM) model and the standard Big Bang (ΛCDM) model.

7 CONCLUSIONS AND FUTURE PERSPECTIVES

The Big Start represents a paradigm shift that eliminates the need for inflation, dark energy, and dark matter as separate constructs, unifying them as manifestations of the primordial Spider Web Fabric (TTA) and its modulation by the factor Z_n.

Upcoming surveys (Euclid, DESI, Vera Rubin Observatory) will be able to definitively confirm or refute this model by precisely measuring the patterns of galaxy distribution and their large-scale correlations.