

From Brick to Sponge: RSVP Cosmology and the Entropic Emergence of Structure

Anonymous Trailblazer

May 2, 2025

Abstract

We propose a novel cosmological framework where gravity emerges from entropy redistribution, modeled through the Recursive Scalar-Vector Plenum (RSVP) theory. The early universe transitions from a thermally vibrating “brick” to a scalar-permeable “sponge,” with the Cosmic Microwave Background (CMB) serving as an entropy field map. We introduce modular engines driving cosmic evolution and outline simulation and observational strategies to test the model.

Contents

1	Introduction	2
2	Thermodynamic Foundations of RSVP Cosmology	2
2.1	Gravity as Entropic Redistribution	2
2.2	The Dual-Shell Feedback Model	2
2.3	Cosmogenesis: From Brick to Sponge	2
3	RSVP Framework: Recursive Modules of Cosmic Evolution	2
3.1	Plenum Architecture and Scalar-Vector Dynamics	2
3.2	The Five Modular Engines	2
4	The CMB as Entropic Blueprint	3
4.1	Rethinking the Cosmic Microwave Background	3
4.2	Multipole Alignment and Entropic Shear	3
5	Mathematical Framework and Analogs	3
5.1	Entropy-Curvature Field Equations	3
5.2	Physical Analog: Paper Mâché in Detergent Water	3
6	Simulation Framework and Results	3
7	Observational Testing Strategy	3
7.1	CMB–Void Cross-Correlation	3
7.2	Filament Orientation and CMB Multipoles	3
7.3	Gravitational Weakening and Entropic Saturation	3
8	Discussion	3
9	Conclusions	4
A	Mathematical Formulations of Entropic Dynamics	4

B RSVP Modular System and Recursive Architecture	4
C Simulation Code and Parameter Tuning	4
D Summary and Integration of Theoretical Framework	4

1 Introduction

The quest for a unified theory of quantum gravity, entropy, and structure formation remains fraught with inconsistencies in standard models like Λ CDM. This paper introduces RSVP cosmology, where gravity is reinterpreted as thermodynamic smoothing within a recursive entropic geometry. We outline major contributions, including a novel cosmogenesis model and observational validation strategies.

2 Thermodynamic Foundations of RSVP Cosmology

2.1 Gravity as Entropic Redistribution

Inflationary residue seeds curvature potential, with vacuum expansion and matter collapse acting as entropy transfer mechanisms. This aligns with entropic gravity approaches (??).

2.2 The Dual-Shell Feedback Model

Inner matter shells collapse inward while outer vacuum shells expand, coupled through scalar and vector fields via recursive plenum tension. Gravity emerges as curvature memory encoded in entropy differentials.

2.3 Cosmogenesis: From Brick to Sponge

The early universe begins as a thermally vibrating “brick,” with Baryon Acoustic Oscillations (BAOs) as energy-exchange resonances. Recombination triggers scalar field irruption, transitioning to a sponge phase with curvature and intervoidal clumping.

3 RSVP Framework: Recursive Modules of Cosmic Evolution

3.1 Plenum Architecture and Scalar-Vector Dynamics

A crystal plenum retains inflationary memory, with scalar field Φ , lamphron Λ^\bullet , and lamphrodyne Δ^- driving entropic smoothing and curvature generation.

3.2 The Five Modular Engines

- **GAS** – Gradient Anisotropic Smoothing
- **DTR** – Deferred Thermodynamic Reservoirs
- **PTLR** – Poincaré-Triggered Lattice Recrystallization
- **SIED** – Scalar Irruption via Entropic Differential
- **NFR** – Neutrino Fossil Registry (CMB entropy traces)

4 The CMB as Entropic Blueprint

4.1 Rethinking the Cosmic Microwave Background

Cold regions map to entropy reservoirs (voids), while warm regions indicate compression scars (filaments and walls). BAO imprints form a topological lattice for scalar tension lines.

4.2 Multipole Alignment and Entropic Shear

Quadrupole and octopole alignments reflect scalar-field fossil stress, with filamentBSL filament orientation statistics correlating with CMB angular modes.

5 Mathematical Framework and Analogs

5.1 Entropy-Curvature Field Equations

Coupled partial differential equations govern ρ_m , Φ , σ , S , and \mathbf{v} , with the scalar field inducing curvature via entropy gradient feedback.

5.2 Physical Analog: Paper Mâché in Detergent Water

Pulp represents matter, detergent mimics inflaton residue, and water acts as the scalar plenum, visualizing curvature relaxation dynamics through surface tension collapse.

6 Simulation Framework and Results

Python-based simulations model scalar-vector plenum dynamics, visualizing matter clustering, void formation, and entropy flow, with parameter sensitivity analysis.

7 Observational Testing Strategy

7.1 CMB-Void Cross-Correlation

Cold spot alignments with underdensity regions validate entropy reservoir predictions.

7.2 Filament Orientation and CMB Multipoles

Structural coherence with quadrupole/octopole axes supports the model.

7.3 Gravitational Weakening and Entropic Saturation

Predictions include curvature flattening and void lensing anomalies.

8 Discussion

RSVP cosmology challenges Λ CDM, holography, and inflationary field theories, offering implications for dark energy, early structure formation, and a philosophical shift from force to feedback.

9 Conclusions

RSVP bridges thermodynamics, field theory, and cosmology, redefining gravity as informational smoothing in a recursive cosmogenesis model from brick to sponge to stars.

A Mathematical Formulations of Entropic Dynamics

Detailed derivations of entropy-curvature field equations.

B RSVP Modular System and Recursive Architecture

Specifications of the five modular engines and their interactions.

C Simulation Code and Parameter Tuning

Python code snippets and parameter sensitivity results.

D Summary and Integration of Theoretical Framework

Comprehensive overview of RSVP cosmology's theoretical underpinnings.