

Rupture Theory

A Mechanically Grounded Model for the Origin of Our Universe

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Abstract

Rupture Theory, formally defined as Pressure-Release Cosmology (PRC), proposes a physically consistent and observationally anchored model for the origin of our universe. It describes the universe not as a creation *ex nihilo* or the product of quantum fluctuation, but as the result of a rupture event within a black hole in a pre-existing Domain. In this framework, black holes serve as containment structures for matter-energy. When internal conditions exceed a critical pressure threshold, a portion of that matter-energy is released into a causally isolated region of spacetime—a new Domain. This model avoids reliance on singularities (Hawking & Penrose, 1970), multiverse constructs (Guth, 1981), or exotic inflation, and builds instead on established thermodynamic (Bardeen et al., 1973) and gravitational dynamics.

I. Introduction

The prevailing Λ CDM cosmological model presumes a singular beginning marked by the Big Bang. Yet its reliance on inflation, singularities, and hypothetical scalar fields introduces constructs that remain empirically unverified (Guth, 1981; Ashtekar et al., 2006). Rupture Theory offers an alternative narrative grounded in known black hole physics. Rather than positing a beginning from nothing, PRC asserts that our universe emerged from a rupture event inside a black hole residing within an Ancestral Domain (Hawking & Penrose, 1970).

II. Conceptual Foundations

A. Domain Structure

- **Domain:** A causally isolated spacetime region.
- **Ancestral Domain:** The higher-level spatial context that contains the Antecedent and Descendant Domains.
- **Antecedent Domain:** The domain hosting the black hole which undergoes a rupture.
- **Descendant Domain:** The newly formed domain emerging from the rupture event.

B. Lineage and Embedding

Domains form through successive rupture events and are embedded spatially within the Ancestral Domain. There is no direct causal relationship between sibling Domains; each rupture represents a self-contained genesis event.

III. Mechanistic Description

A. Black Hole Pressure Threshold

Black holes accumulate matter-energy over time. According to classical general relativity, this should lead to singularities (Hawking & Penrose, 1970), but singularities represent mathematical breakdowns, not physical mechanisms. PRC replaces the singularity with a pressure threshold mechanism: when the internal conditions of density, curvature, and pressure surpass a limit, a rupture occurs.

B. Rupture Event Dynamics

The rupture releases only the minimum necessary matter-energy to relieve critical internal pressure. This expelled content expands as a new Domain within the physical volume of the Ancestral Domain. The black hole stabilizes post-event, maintaining its structure and potentially continuing to evolve until a future rupture.

C. Causal Isolation

The condition where the newly formed Descendant Domain is no longer part of the Antecedent Domain. This separation occurs because the rupture event releases matter-energy outward into the Ancestral Domain.

IV. Thermodynamic and Observational Considerations

A. Low Entropy Initial Conditions

The initial state of the Descendant Domain reflects a low entropy condition consistent with our observations of the early universe (Bardeen et al., 1973). This aligns with known thermodynamic principles: energy dispersal reduces localized pressure and entropy gradients emerge from high-density ejections.

B. Event Horizon Constraints

The inability to observe rupture events stems from the fact that they occur behind black hole event horizons. The release is directed not into the black hole's own spacetime but outward into the Ancestral Domain, leaving no observable residue within the Antecedent Domain.

C. Probability of Detection

Given the spatial scale of Ancestral Domains relative to the energy content of a single rupture event, any detection of new Domain formation from within the Ancestral Domain would be vanishingly improbable.

V. Illustrative Analogy

The Carbonated Water Bottle

Imagine a sealed bottle of carbonated water suspended inside a large room. The bottle represents our Domain; the room represents the Ancestral Domain that contains it. As pressure builds inside the bottle—analogue to matter-energy accumulating within a black hole—the system approaches a rupture threshold.

When the cap is slightly loosened, a spray of pressurized fluid is released into the surrounding room. This release represents a rupture event: a portion of the bottle's contents escaping into a larger space. That escaping fluid does not return to the bottle, nor is it detectable from inside. Instead, it continues to expand outward, forming a new, self-contained structure—analogue to a newly formed Descendant Domain.

If the bottle is moved to different locations in the room and the cap is loosened again, additional sprays occur. These multiple rupture events are spatially disconnected and do not interact. They represent the independent, isolated creation of additional Domains—all existing within the same Ancestral Domain (the room) but each originating from distinct rupture events.

VI. Comparative Evaluation

Theory	Uses Proven Physics	Unproven Constructs	Origin Mechanism
Rupture Theory (PRC)	✔ Yes	✔ None	Pressure threshold rupture
Big Bang (Λ CDM)	⚠ Partial	✘ Singularity, inflation	Unknown singularity
Inflationary Multiverse	⚠ Partial	✘ Eternal inflation, quantum tunneling	Bubble universes from vacuum fluctuations
Loop Quantum Bounce	⚠ Partial	✘ Quantum gravity models	Bounce from prior universe
Cyclic Models	⚠ Partial	✘ Repeating Big Bangs	Eternal contraction/expansion

VII. Summary

Rupture Theory, formally known as Pressure-Release Cosmology (PRC), reframes the origin of our universe as a continuation of black hole dynamics, not a beginning from nothing. By removing reliance on speculative constructs and using known thermodynamic and gravitational principles, PRC offers a simplified, consistent, and physically grounded account for cosmological genesis. In this framework, our universe is a Descendant Domain formed by a pressure release from a black hole in an Antecedent Domain, expanding within the spatial frame of an Ancestral Domain.

Definitions

- **Domain:** A self-contained, causally isolated spacetime region.
 - **Antecedent Domain:** The domain containing the black hole from which a rupture initiates.
 - **Descendant Domain:** A new domain created via rupture.
 - **Ancestral Domain:** The physical environment in which both Antecedent and Descendant domains reside.
 - **Rupture Event:** A pressure-driven release of matter-energy from a black hole that initiates domain formation.
 - **Causal Isolation:** The condition by which a Descendant Domain is no longer part of its Antecedent Domain.
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References

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