

# **B**lack Hole Dynamics: Transition Across Temporal Spectra (241111.41)..... .....bu Paul J. Caracristi

**Abstract.** This paper presents a novel interpretation of black holes, proposing that they represent a transitional process between realms of increasing and decreasing entropy. The event horizon is redefined as the beginning of this transition, where matter and energy shift from dynamic states of high gravitational interaction to a latent realm of static energy. Within this framework, space, time, entropy, and gravity progressively diminish, forming a temporal spectrum of decreasing frequency values. The core of the black hole is characterized as an asymptotic state of stasis and potentiality, a latent realm of pure potential energy. This theory challenges traditional notions of singularities and offers new perspectives on the cyclical nature of dynamic and latent realms.

**Introduction.** Black holes have traditionally been described as regions of spacetime dominated by intense gravitational forces, culminating in a singularity of infinite density. However, such descriptions conflict with the principles of general relativity and quantum mechanics. This paper introduces a revised model of black holes as transitional systems that mediate between realms of increasing and decreasing entropy, described by a temporal spectrum of energy values. This reinterpretation replaces the singularity concept with a latent realm of static energy at the black hole's core.

**The Event Horizon as the Beginning of Transition.** The event horizon marks the start of the transition from the dynamic universe to the latent realm within the black hole. This transitional zone extends inward to the core, where fundamental properties of the universe diminish:

## 1. Dynamic Realm (Exterior to Event Horizon):

- Gravitational forces intensify, attracting more matter and energy.
- Space and time are expansive and dynamic.
- Entropy and energy levels increase.

## 2. Transitional Zone (Interior to Event Horizon):

- Gravitational strength steadily decreases as matter dematerializes into energy and reaches the latent realm.

- Space, time, and entropy diminish progressively through a temporal spectrum.
  - Energy transitions from dynamic to latent, following a temporal spectrum of decreasing frequency values.
3. Latent Realm (Core of the Black Hole):
- Space, time, entropy, and gravity asymptotically approach zero before reaching a latent state.
  - A state of pure potentiality emerges, characterized by static energy.

Temporal Spectrum and Energy Transformation. The transition from dynamic to latent realm can be described as a temporal spectrum, where the frequency of energy steadily decreases:

1. Approaching the Event Horizon:
  - Time Dilation: Time slows as gravitational forces increase:
  - Spatial Contraction: Space compresses, disassembling matter into fundamental components:
2. Inside the Event Horizon:
  - Entropy Reversal: Entropy decreases as order increases:
  - Energy Transition: Energy shifts from dynamic to latent:
3. Reaching the Core:
  - Asymptotic Stasis: Space, time, entropy and gravity approach zero values:
  - Static Energy State: A pure potential energy state emerges, devoid of dynamism, referred to as the latent realm:

Implications for Gravity and Entropy. This model redefines gravity and entropy in black holes:

### 1. Exterior Dynamics:

- Gravitational forces intensify, drawing matter into the black hole.
- Entropy increases with accumulating matter and energy.

### 2. Interior Transition:

- Gravitational strength diminishes with decreasing energy density.
- Entropy decreases, reversing the conventional thermodynamic trend.

### 3. Latent Core:

- Gravity becomes negligible as space and time collapse.
- Entropy reaches zero, achieving maximal order and potential.

The Latent Realm: A State of Pure Potentiality. At the core of the black hole, space, time, entropy, and gravity cease to exist dynamically, reaching a latent realm of static energy. This realm:

- Represents an asymptotic limit of decreasing temporal frequency values.
- Serves as a reservoir of potential energy, distinct from dynamic states.
- Challenges traditional physics by existing beyond observable laws.

Therefore, the latent realm provides a conceptual framework for understanding the cyclical relationship between the dynamic and latent realms of the universe.

Conclusion. This model reinterprets black holes as transitions across temporal spectra, mediating between realms of increasing and decreasing entropy. The event horizon is not merely a boundary but the beginning of a process leading to a latent realm of pure potentiality. This framework offers a robust perspective on black holes and their role in the universe by addressing the inconsistencies of singularities and entropy accumulation.

Future Work. To substantiate this model, future research should:

1. Develop detailed mathematical models for the temporal spectrum transitions.
2. Investigate observational evidence supporting entropy reversal and latent realms.

3. Explore the integration of quantum mechanics to further refine the theory.
4. Examine potential implications for cosmological models and the nature of the universe.

By pursuing these avenues, this model may illuminate the intricate dynamics of black holes and their fundamental role in cosmic evolution.

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