**A Bridge Between Universes: Exploring a Novel Pre-Big Bang Hypothesis**

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 **Abstract**

This essay examines an innovative cosmological hypothesis that proposes a connection between black holes and white holes via Einstein-Rosen bridges in the pre-Big Bang regime. Central to this proposal is a new "cosmic information preservation principle" that suggests observational limits are not constraints but essential features of our expanding cosmos. Drawing from observations of the unusual gamma-ray burst GRB 060614, early universe supermassive black holes, and cosmic microwave background radiation anomalies, the hypothesis offers a novel framework for understanding universe formation and information preservation across cosmic boundaries. This work demonstrates how theoretical imagination, guided by observational phenomena, can advance our understanding of fundamental physics and cosmology.

**Introduction**

Einstein's assertion that "imagination is more important than knowledge" serves as a guiding principle for this exploration into the nature of our universe. This work proposes that what we traditionally view as observational limitations may actually be fundamental features of cosmic structure, essential to the preservation and propagation of information across universal boundaries.

**The Cosmic Information Preservation Principle**

A key insight of this hypothesis is that the apparent limitations of our observational capacity—our cosmic horizon, the finite speed of light, and our position as observers within the system we study—may not be mere constraints but rather essential features of how information is structured and preserved in our universe. This "cosmic information preservation principle" suggests that:

1. Information preservation occurs through mechanisms analogous to Hawking radiation, where quantum information is maintained across cosmic boundaries

2. The observable universe's limits are fundamental features necessary for maintaining cosmic information coherence

3. Our position as "inside observers" is intrinsic to how information is structured in the cosmos

This principle provides a new framework for understanding how information might be preserved across universe-spanning Einstein-Rosen bridges and offers insights into the nature of cosmic structure itself.

 **The Hypothesis**

The proposal suggests that the Big Bang emerged from a white hole connected to a black hole via an Einstein-Rosen bridge. This connection would have facilitated energy and information transfer between universes while preserving quantum information through mechanisms such as entanglement and tunneling. The unusual characteristics of GRB 060614 serve as a potential observational anchor for this theoretical framework.

 **Observational Context and Evidence**

Several phenomena provide context for this hypothesis:

1. JWST's detection of early universe supermassive black holes

2. The CMB cold spot as a potential universal connection point

3. Dark matter distribution patterns

4. The nature of GRB 060614, with its unusual 102-second duration

These observations gain new significance when viewed through the lens of the cosmic information preservation principle, suggesting they might be manifestations of fundamental information-preserving processes rather than anomalies.

 **Theoretical Implications**

The cosmic information preservation principle extends our understanding of quantum mechanics and information theory to cosmic scales. It suggests that:

1. Quantum processes like entanglement may operate across cosmic scales

2. Information preservation mechanisms similar to Hawking radiation might function at universal boundaries

3. The observable universe's limits play a crucial role in maintaining cosmic information coherence

**The Role of Observational Limits**

What traditionally might be viewed as observational limitations takes on new significance in this framework. The cosmic horizon (~46.5 billion light-years), the finite speed of light, and our position as observers within the system we study are recast as essential features that maintain the coherence of cosmic information. These "limits" may actually be necessary features for:

1. Preserving quantum information across cosmic scales

2. Maintaining the stability of universe-spanning structures

3. Enabling the operation of fundamental physical processes

**Future Research Directions**

This hypothesis suggests several promising research directions:

1. Investigation of information preservation mechanisms across cosmic scales

2. Study of potential signatures of cross-universal information transfer in the CMB

3. Analysis of unusual gamma-ray bursts as potential white hole candidates

4. Exploration of the relationship between quantum information and cosmic structure

**Conclusion**

This hypothesis presents a novel perspective on the nature of our universe, suggesting that what we typically consider observational limits are actually essential features of cosmic structure. By reconceptualizing these limits through the cosmic information preservation principle, we gain new insights into how information might be preserved and transmitted across universal boundaries.

The proposal demonstrates the continuing value of imaginative theoretical work in physics, showing how careful speculation grounded in observational phenomena can suggest new ways of understanding reality's deepest nature. Whether future observations support this specific proposal or not, the approach of connecting seemingly disparate phenomena through novel theoretical frameworks remains vital to advancing our understanding of the cosmos.