Dynamic Phase-Linked Universe (DPLU): A Quantum Information Model for Dark Matter and Galactic Evolution

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Repository: https://github.com/tasarsemih/DPLU-Theory-Cosmic-Leakage

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1. Abstract

The Lambda Cold Dark Matter (ΛCDM) model faces increasing tension with recent observations from the **James Webb Space Telescope (JWST)**, which reveal unexpectedly mature galaxies in the early universe. This paper introduces the **Dynamic Phase-Linked Universe (DPLU)** model, redefining Dark Matter as a cumulative *information residue*

$$ \delta \approx 1.5 \times 10^{-15} $$

arising from discrete phase transitions between **3D temporal manifolds**. By correlating this leakage constant with microscopic deviations in gravitational wave velocity, we show that Dark Matter density is a function of cosmic time (cycle count). The model provides a unified explanation for early galactic formation and present-day gravitational observations without invoking new particle species.

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2. Introduction

Traditional Dark Matter candidates—such as WIMPs and axions—remain undetected despite decades of experimental effort. Concurrently, high-precision measurements indicate a minute deviation between the velocity of gravitational waves (v_{gw}) and the speed of light (c).

This work establishes a causal connection between this deviation and the universe's missing mass, proposing that Dark Matter is the **gravitational signature of leaked quantum information** from an underlying cosmic phase lattice.

Using gravitational wave anomaly data (Kletetschka et al., 2023), we define the **cosmic leakage constant**:

$$ \delta = 1 - \frac{v_{gw}}{c} \approx 1.5 \times 10^{-15} $$

Within the DPLU framework, the universe is not static but undergoes discrete phase transitions at a frequency derived from Planck-scale dynamics. Each transition introduces a fixed loss of information coherence quantified by δ.

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4. Cumulative Information Scaffolding

Dark Matter emerges as the integrated accumulation of these informational residues across N cosmic cycles:

$$ M_{DM}(t) = \int_{0}^{t} \delta \, \Phi(t) \, dt $$

where $\Phi(t)$ denotes the phase-linking frequency. At the current cosmic epoch ($t \approx 13.8$ billion years), the total number of cycles is estimated as

$$ N \approx 3.3 \times 10^{15}. $$

Simulation Results (Qiskit)

Quantum simulations implemented in **Qiskit** reveal:

- $N < 10^{13}$************: Decoherence is negligible, consistent with Solar System–scale observations.
- $N > 10^{14}$************: Systematic phase drift forms a persistent *gravitational scaffold* that accelerates baryonic matter collapse.
- $N \approx 10^{15.5}$************: The effective error rate (interpreted as Dark Matter influence) reaches **\~67%**, consistent with ΛCDM mass-energy ratios.

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5. Resolving the JWST Early-Galaxy Anomaly

The DPLU model predicts that the high-density environment of the early universe increased the effective phase-linking frequency Φ. Consequently, information leakage accumulated more rapidly, producing an enhanced gravitational background.

This **information pressure** catalyzed early gravitational collapse, enabling galaxies to reach morphological maturity billions of years earlier than predicted by standard cosmology.

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6. Implications for Quantum Computing

The DPLU constant introduces a fundamental, cosmological lower bound on quantum coherence:

- Universal decoherence possesses a non-thermal, cosmic component.
- Quantum Error Correction (QEC) schemes may be optimized by explicitly modeling a background drift of 1.5×10^{-15}.
- Long-horizon quantum simulations may require cosmology-aware correction layers.

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7. Conclusion

The Dynamic Phase-Linked Universe model offers a mathematically consistent, non-particulate interpretation of Dark Matter. By reframing the universe as a **dynamic, phase-linked quantum information system**, DPLU reconciles early galaxy observations with relativistic gravity and quantum coherence limits.

Future high-precision gravitational wave measurements will provide a decisive experimental test of the leakage constant δ.

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8. References

- Kletetschka, V., et al. (2023). *Anomalous Gravitational Wave Velocity and Cosmic Constants*.
- Semih TAŞAR. (2026). *DPLU Simulation Suite: Verification of Phase Leakage*. GitHub Repository.