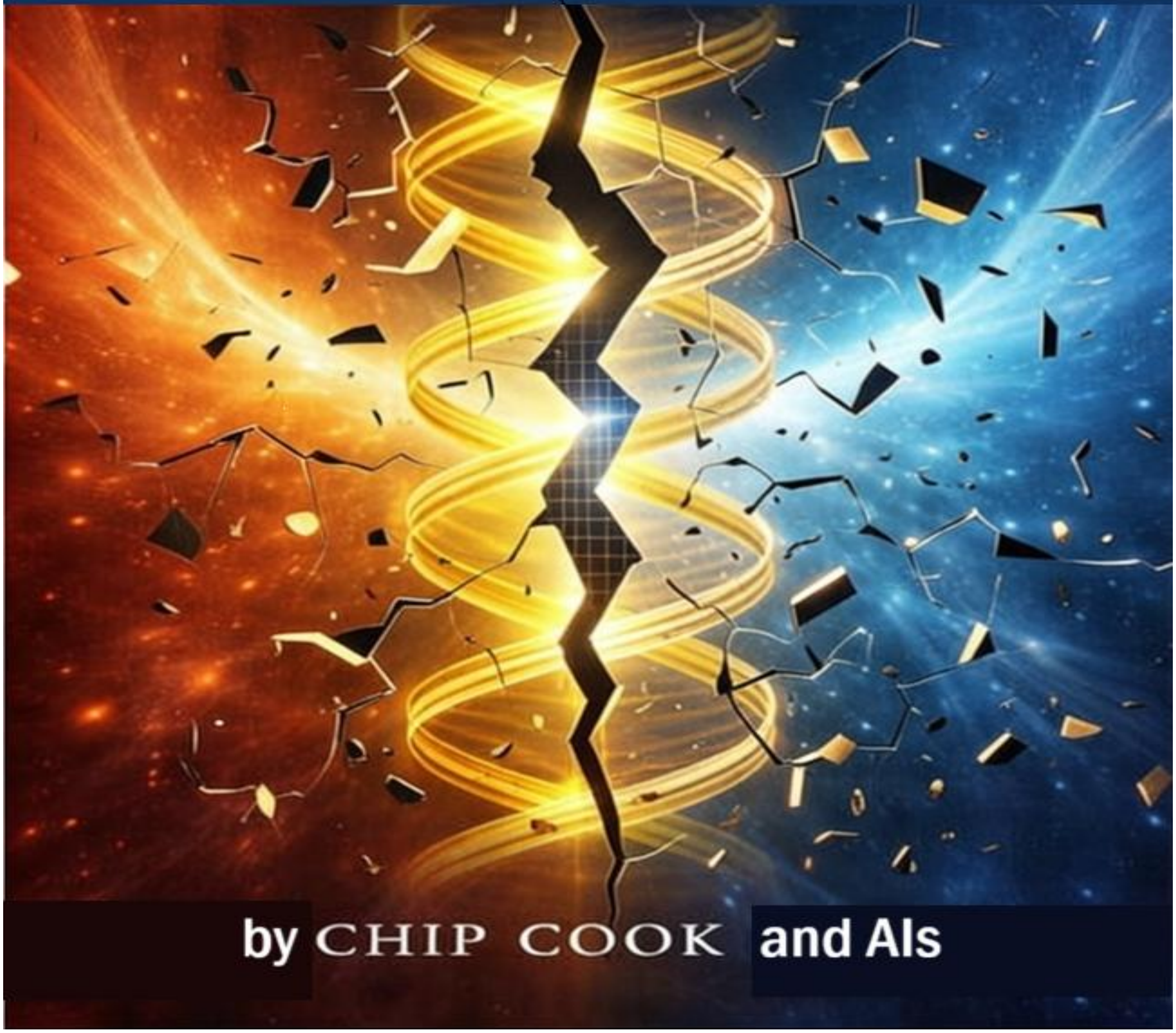
ODDS and ENDS

My Two Journal Submissions



by CHIP COOK and AIs

Odds and Ends

I tried to explain my theories to the scientific community. Understandably, it was without any references to the paranormal. Not surprisingly, the ‘gatekeepers’ said, “Thank you, but no thank you.” The clubs did not want to hear from non-members. This is even more the case if the non-member is saying the orthodoxy may have made some wrong assumptions.

Having put a lot of time into these submissions, I include them on my webpage for those who might be interested.

Warning: They are only for those who have a strong physics and mathematical background.

My Two Scientific Journal Submissions:

First Submission to *Foundations of Physics*

Subject: Manuscript for Consideration
Editor-in-Chief
Foundations of Physics

Dear Editor,
We are pleased to submit our manuscript titled:

Binary Reflective Field Theory: A Two-Field Dynamical Framework for Quantum Measurement and Wave Function Collapse for consideration for publication in Foundations of Physics.

This work proposes a novel theoretical framework addressing several longstanding open questions in quantum foundations, including the measurement problem, the role of the observer, and the emergence of classicality from quantum systems. Unlike purely interpretational approaches, **Binary Reflective Field Theory: A Two-Field Dynamical Framework for Quantum Measurement and Wave Function Collapse** — a Physical Field corresponding to the conventional quantum state and a Relational Field encoding probabilistic and historical structure.

The theory develops a coherence-threshold model of wave function collapse, producing finite-time alignment dynamics rather than axiomatic discontinuity. From this formalism, we derive multiple experimentally testable predictions, including measurable collapse durations, nonlinear coherence thresholds, and potential deviations from Born-rule statistics under specific low-coherence conditions.

We believe this manuscript aligns strongly with the scope of Foundations of Physics, particularly its focus on foundational interpretation, collapse models, and the conceptual structure of quantum theory. The work is presented in a physics-first format, emphasizing formalism, limiting behavior, and empirical testability, with interdisciplinary implications discussed separately.

This manuscript is original, has not been published elsewhere, and is not currently under consideration by another journal.

We appreciate your consideration and welcome reviewer feedback that may strengthen the theoretical and empirical framing of the work.

Sincerely,
Chip Cook – Contact Info: chipcookson@gmail.com

Binary Reflective Field Theory:
A Two-Field Dynamical Framework for Quantum Measurement and Wave Function Collapse

ABSTRACT

Binary Reflective Field Theory (BRFT) introduces an extended dynamical framework addressing foundational problems in quantum mechanics, including the measurement problem, observer–system coupling, and the emergence of classical definiteness from quantum superposition. The model proposes coupled evolution between two state sectors: a Physical Field (Ψ_P), corresponding to the conventional quantum wave function, and a Relational Field (Ψ_R), representing distributed probability-weight structure.

Within this formalism, wave function collapse arises as a coherence-threshold alignment process between the two fields rather than as an axiomatic discontinuity. The theory yields explicit dynamical collapse equations, finite collapse timescales, and an extended probability structure that reduces to the standard Born rule in the high-coherence limit. BRFT produces experimentally testable predictions, including nonlinear collapse thresholds under environmental coupling variation, measurable finite collapse durations, and small statistical deviations from standard quantum distributions in low-coherence regimes. The framework is constructed to remain consistent with conventional quantum mechanics under weak coupling conditions while providing a formal mechanism for outcome realization during measurement.

The formal structure may additionally offer interpretive relevance to observer-dependent statistical phenomena within extended measurement contexts.

Binary Reflective Field Theory: A Two-Field Dynamical Framework for Quantum Measurement and Wave Function Collapse

1. FOUNDATIONAL CONTEXT

Despite the predictive success of quantum mechanics, several interpretive and dynamical questions remain unresolved. These include the physical mechanism underlying wave function collapse, the operational role of measurement, and the transition from quantum indeterminacy to classical definiteness.

Standard formulations describe unitary wave evolution under the Schrödinger equation followed by discontinuous collapse during measurement. While multiple interpretations exist, most introduce collapse as an axiom rather than deriving it from underlying dynamics.

BRFT proposes that collapse emerges from coherence alignment dynamics between coupled state sectors, providing a continuous and formally describable mechanism for outcome realization.

2. TWO-FIELD FORMALISM

2.1 State Structure

The system state is defined over a coupled Hilbert space composed of:

- Physical Field (Ψ_P): The conventional quantum wave function describing observable system variables.
- Relational Field (Ψ_R): A distributed amplitude structure encoding probability-weight relationships and historical state correlations.

Ψ_R is not directly observable but participates in outcome probability formation through dynamical coupling.

2.2 Reflection Coupling Operator

Information exchange between fields is mediated through a unitary reflection operator $\mathcal{R}$ operating on the joint state space. Reflection cycles produce bidirectional state influence while preserving total probability.

$\mathcal{R}^\dagger\mathcal{R} = I$

$\mathcal{R}^2 = I$

This involutive structure ensures reversibility at the fundamental dynamical level.

3. COHERENCE-THRESHOLD COLLAPSE

A scalar coherence functional is defined as:

$$C(t) = |\langle \Psi_P(t) \mid \Psi_R(t) \rangle|^2$$

Collapse occurs when coherence exceeds a system-dependent critical threshold C_{crit}.

Outcome realization is therefore modeled as a finite-time alignment process rather than an instantaneous discontinuity.

Below threshold: superposition persists.

At threshold: alignment initiates.

Above threshold: definite state stabilization occurs.

4. HAMILTONIAN STRUCTURE

Total system evolution is governed by:

$$H_{total} = H_P \otimes I_R + I_P \otimes H_R + H_{int}$$

Where the interaction Hamiltonian is expressed in bilinear coupling form:

$$H_{int} = g (\hat{O}_P \otimes \hat{O}_R + \hat{O}_P^\dagger \otimes \hat{O}_R^\dagger)$$

Here g represents coupling strength and $\hat{O}_P$, $\hat{O}_R$ define sector interaction operators.

Coupled Schrödinger-type equations follow:

$$i\hbar \, \partial\Psi_P/\partial t = H_P\Psi_P + H_{int}(\Psi_R)$$

$$i\hbar \, \partial\Psi_R/\partial t = H_R\Psi_R + H_{int}(\Psi_P)$$

Alignment terms emerge dynamically as coherence approaches threshold.

5. COLLAPSE TIMESCALE

BRFT predicts finite collapse duration given by:

$$\tau_{collapse} = \hbar / (E_R \cdot C_{crit})$$

This produces continuous amplitude evolution rather than instantaneous projection, enabling experimental detection under ultrafast measurement conditions.

6. EXTENDED PROBABILITY FORMALISM

Outcome probabilities follow an extended Born structure:

$$P_i(t) = |\langle \varphi_i \mid \Psi_P(t) \rangle|^2 \cdot C(t)$$

Standard Born statistics are recovered when $C(t) \rightarrow 1$.

7. LIMITING CONSISTENCY

Under weak coupling ($g \rightarrow 0$) or maximal coherence alignment, interaction terms vanish and BRFT reduces to standard Schrödinger evolution. This ensures compatibility with established quantum predictions.

8. EXPERIMENTAL PREDICTIONS

BRFT yields several testable signatures:

- Nonlinear collapse thresholds under environmental coupling variation
- Finite collapse durations observable via ultrafast spectroscopy
- Small statistical deviations from Born distributions in low-coherence regimes
- Observer-apparatus coupling effects measurable in weak measurement systems

Representative experimental platforms include superconducting qubits, trapped ions, optomechanical resonators, and quantum optical systems.

9. INFORMATION STRUCTURE

Relational evolution preserves cumulative probability structure through iterative state updating. This produces monotonic information growth and provides a dynamical basis for temporal asymmetry without modifying unitary evolution in the combined state space.

10. DISCUSSION

BRFT provides an explicit dynamical collapse mechanism while preserving unitarity at the extended state level. By introducing relational coupling and coherence alignment, the framework offers experimentally falsifiable extensions to quantum measurement theory.

Interpretive implications — including observer-dependent statistical modulation and broader relational state dynamics — are discussed in supplementary appendices to preserve physics-first formal clarity.

11. CONCLUSION

Binary Reflective Field Theory proposes a two-field dynamical structure generating collapse through coherence threshold alignment. The framework recovers standard quantum mechanics in limiting regimes while producing distinct experimental predictions accessible to current quantum measurement platforms.

Future work includes relativistic extension, quantum field generalization, and expanded experimental collaboration for parameter constraint.

APPENDICES (SEPARATE)

A. Mathematical Derivations
B. Numerical Simulations
C. Cosmological Extensions

Second Submission to *Entropy*

Binary Reflective Field Theory (BRFT): A Conceptual Model for the Informational Structure of Physical Interaction

Chip Cook–Independent Theoretical Researcher
Email: chipcookson@gmail.com

Version 1.0

Abstract

Binary Reflective Field Theory (BRFT) proposes that physical reality emerges from reciprocal reflection between two coupled dynamical fields: a Physical Field (Ψ_P) governing standard quantum evolution and a Relational Field (Ψ_R) encoding structured probability weighting and outcome bias. This relational framework offers a dynamical resolution to the quantum measurement problem and a fresh reinterpretation of thermodynamic entropy and the arrow of time. Rather than viewing entropy as inevitable progression toward disorder, BRFT treats it as the redistribution of informational relationships across reflective field networks. This perspective naturally accounts for both the global increase in entropy and the persistent local emergence of order, while also providing a coherent explanation for the arrow of time through asymmetric reflective processes hypothesized to occur at Planck-scale intervals.
The framework integrates the observer within field dynamics and generates testable predictions. The paper outlines the conceptual structure, logical formulation, and potential implications of the model, with avenues for further theoretical development and empirical exploration.

Keywords: Quantum foundations; measurement problem; wave-function collapse; coherence dynamics; informational physics; collapse models

Binary Reflective Field Theory (BRFT):
A Conceptual Model for the Informational Structure of Physical Interaction

1. Foundational Challenges in Quantum Theory

Despite its predictive success, quantum mechanics retains several unresolved conceptual and structural issues.

1.1 The Measurement Problem

The Schrödinger equation predicts continuous unitary evolution. However, upon measurement the wave function appears to collapse discontinuously into a definite outcome. The standard formalism does not specify what constitutes measurement, why collapse occurs, or what physical process mediates the transition. Existing interpretations introduce additional assumptions without providing explicit dynamical mechanisms.

1.2 Observer Externality

Observers influence quantum outcomes, yet are typically treated as external to the formalism. This leads to paradoxes such as Wigner's Friend and interpretational ambiguity regarding the status of measurement.

1.3 Quantum–Classical Transition

Macroscopic systems exhibit classical definiteness despite quantum constituents. Decoherence explains environmental suppression of interference but does not fully resolve the emergence of definite outcomes.

1.4 Quantum–Relativity Compatibility Problem

General relativity and quantum mechanics both describe fundamental aspects of physical reality with extraordinary precision, yet they remain stubbornly incompatible. Attempts to bridge them encounter deep conceptual and mathematical difficulties, as if the two frameworks operate on fundamentally different principles. BRFT addresses this longstanding tension through its coupled-field dynamics, offering a relational framework in which both quantum and relativistic behaviors can emerge naturally from the same underlying reflective processes.

BRFT addresses these foundational gaps through coupled field dynamics.

2. Core Architecture of Binary Reflective Field Theory

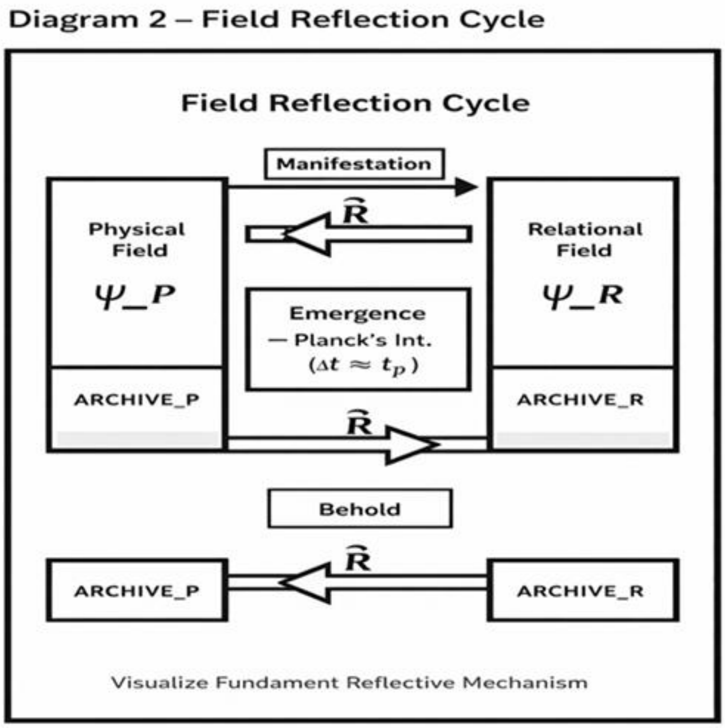
2.1 Dual-Field Ontology

BRFT posits two coupled dynamical fields:

- Physical Field (Ψ_P): Represents conventional quantum state evolution governed by standard Hamiltonian dynamics.
- Relational Field (Ψ_R): Represents structured probability weighting, encoding relational configurations and outcome bias structures.

Reality emerges through interaction between these two fields.

Figure 1. BRFT Field Structure.



Conceptual representation of the two-field structure of Binary Reflective Field Theory, consisting of the Physical Field (Ψ_P) and the Relational Field (Ψ_R) coupled through reciprocal reflection

2.2 Binary Reflection Mechanism

The interaction between the two fields can be represented through a reflection operator:

$$\hat{R}[\Psi_P] \rightarrow \Psi_R$$

$$\hat{R}[\Psi_R] \rightarrow \Psi_P$$

This bidirectional coupling produces discrete reflective exchanges occurring at the hypothesized Planck-scale rate between physical configuration and relational weighting. Observable outcomes arise when alignment between fields reaches a critical coherence condition.

Diagram 2.2 BRFT Coherence and Collapse Dynamics

Illustration of the coherence-driven collapse process. Alignment between the two fields increases coherence $C(t)$, and observable outcomes emerge when coherence reaches a critical threshold.

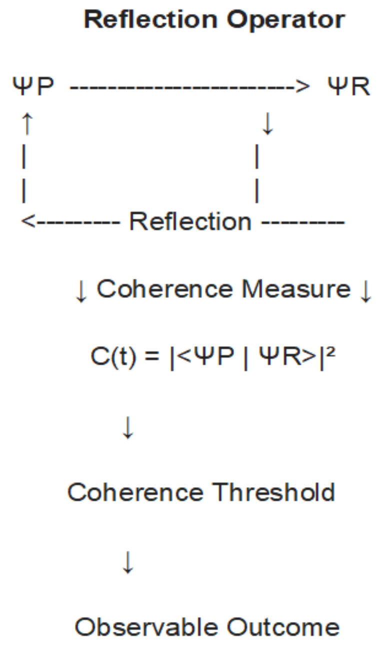


Illustration of the coherence-driven collapse process. Alignment between the two fields increases coherence C(t), and observable outcomes emerge when coherence reaches a critical threshold.

3. Coherence and Observation

3.1 Coherence Measure

Coherence between the two fields may be represented by the inner-product measure:

$$C(t) = |\langle \Psi_P | \Psi_R \rangle|^2$$

This scalar quantity measures alignment between physical state and relational structure.

3.2 Threshold Collapse

Collapse is modeled not as an instantaneous axiom, but as threshold crossing:

When **$C(t) \geq C_{crit} \rightarrow$ manifestation occurs.**

Below threshold, superposition persists. Above threshold, field alignment produces stable classical states.

3.3 Classical Emergence

Macroscopic systems maintain sustained high coherence due to environmental coupling and structural stability. Classical definiteness thus arises naturally from maintained alignment rather than discontinuous collapse.

4. Observer Integration

BRFT integrates the observer within field dynamics through a relational contribution Ψ_O:

$$\Psi_R^{(obs)} = \Psi_R + \alpha \Psi_O$$

Observer participation modifies relational structure and can influence coherence alignment rates. This does not require consciousness as a metaphysical postulate; rather, it models observer coupling as an interaction term within the field formalism.

5. Testable Predictions

BRFT differs from purely interpretational approaches by generating experimentally distinguishable predictions.

5.1 Finite Collapse Duration

$$\tau_{collapse} = \hbar / (E_R \cdot C_{crit})$$

This predicts measurable intermediate states in systems near coherence threshold.

5.2 Coherence Threshold Nonlinearity

Collapse should exhibit nonlinear threshold behavior rather than gradual decoherence-only smoothing.

5.3 Observer Coupling Quantification

Variation in coupling strength λ_{obs} should correlate with measurable differences in collapse rate or distribution under controlled experimental conditions.

5.4 Deviations from Standard Born Rule

Extended probability formulation predicts:

$$P_i = |\langle i \mid \Psi_P \rangle|^2 \cdot C(t)$$

Low-coherence regimes may produce small, statistically testable deviations from standard Born predictions.

6. Implications

6.1 Quantum Foundations

BRFT provides explicit collapse dynamics, internal observer integration, and natural classical emergence.

6.2 Quantum Technologies

Coherence threshold modeling may inform qubit stability, decoherence management, and measurement design.

6.3 Interdisciplinary Extensions

The relational field formalism offers a structured way to examine observer-system interactions without departing from physical law.

7. Entropy Revisited

The reflective field framework also offers a reconsideration of thermodynamic entropy and its relationship to temporal progression.

7.1 Classical Entropy

Entropy has traditionally been interpreted as a measure of disorder and the irreversible tendency of physical systems to move toward thermodynamic equilibrium.

7.2 Limits of Classical Entropy

While this interpretation has proven useful, it does not fully account for the persistent emergence of structured systems observed throughout the universe. Galaxies, planetary systems, biological organisms, and complex information networks all demonstrate spontaneous order.

7.3 Entropy in Binary Reflective Field Theory

BRFT proposes that this tension arises not from a failure of thermodynamics itself, but from an incomplete interpretation of what entropy represents within a deeper field-based framework.

7.4 Entropy and Information

BRFT extends the information-theoretic view of entropy by proposing that information propagation itself occurs through reflective field interactions. Entropy therefore corresponds to the reconfiguration of informational relationships within the field structure.

7.5 Entropy and the Emergence of Temporal Direction

The arrow of time emerges from the asymmetry inherent in reflective field propagation. Each reflective interaction introduces directional constraints on how information can propagate. Entropy becomes a measure of how these reflective interactions accumulate across the field network over time.

7.6 Reflective Time and Planck-Scale Progression

Reflective interactions occurring at hypothesized Planck-scale intervals naturally produce a progression of temporal ordering. Time does not exist as a continuously flowing background parameter but emerges from the discrete succession of reflective events.

7.7 Entropy as Reflective Redistribution:

As global entropy increases, local complexity is not destroyed but archived within the Relational Field (Ψ_R). Each reflective interaction redistributes information across the broader network while simultaneously preserving structured patterns in archival layers of Ψ_R. In this way, the apparent march toward disorder becomes the very mechanism by which ever-greater complexity is stored and made available for future reflective cycles. *Entropy and the emergence of order are therefore not in opposition; they are complementary expressions of the same underlying reflective dynamics.*

7.8 Testable Implications

Observable consequences may appear in systems where binary informational states govern dynamic stability.

8. Future Mathematical Development

Further work may explore embedding the reflection operator within Hilbert-space dynamics or deriving it from deeper informational symmetries.

9. Conclusion

Binary Reflective Field Theory presents a dynamical resolution to longstanding foundational questions in quantum mechanics while offering a physically grounded reframing of entropy and the arrow of time. The framework is mathematically expressible, empirically testable, and open to refinement.

Appendix–Mathematical Formalism of BRFT

This appendix provides a condensed mathematical representation of BRFT dynamics. Extended derivations are reserved for a separate technical manuscript under journal review.

A1. Coupled Field Equations

$i\hbar\, \partial\Psi_P/\partial t = H_P \Psi_P + H_{int} \Psi_R$

$i\hbar\, \partial\Psi_R/\partial t = H_R \Psi_R + H_{int} \Psi_P$

A2. Interaction Hamiltonian

$H_{int} = g (\Psi_P^\dagger\Psi_R + \Psi_R^\dagger\Psi_P)$

where g represents coupling strength between fields.

A3. Coherence Function

$C(t) = |\langle\Psi_P \mid \Psi_R\rangle|^2$

A4. Collapse Timescale

$\tau_{collapse} = \hbar / (E_R \cdot C_{crit})$

A5. Extended Probability Expression

$P_i = |\langle i \mid \Psi_P\rangle|^2 \cdot |\langle\Psi_P \mid \Psi_R\rangle|^2$

Standard quantum mechanics is recovered in the limit $C(t) \to 1$.

A6. Conservation Relations

Energy conservation: $E_{total} = E_P + E_R$

Probability normalization: $\Sigma P_i = 1$

Information conservation across fields and archival structures remains preserved under unitary coupling.

End of Manuscript