

NCFT v5.2a.3

Non-Local Consciousness Field Theory

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Abstract

NCFT v5.2a.3 presents a formal mathematical field system of consciousness interactions defined by exactly three fundamental axioms plus an enforced closure condition, producing forty-four axiomatically derived predictions. The axioms were developed and stress-tested alongside an extensive suite of executable toy models spanning null baselines, adversarial dynamics, inverse problems, noisy and open-system regimes, and failed constructions. Internal consistency is achieved through strict unit normalization of all field states, pairwise bilinear coupling bounded in $[0, 1]$, phase-conditioned frequency coherence constraints, and pure $i < j$ indexing for N -body interactions. Computational validation across both foundational and production-grade toy models confirms boundedness, closure, and deterministic behavior within the stated scope of the theory.

1 Introduction

NCFT v5.2a.3 constitutes a formal field system in which three fundamental axioms and a closure condition are enforced by executable constraints, yielding internal coherence across tested edge cases. The theory models consciousness as a field of unit-normalized interaction primitives with universal exclusion, bilinear coupling, frequency consistency, and pure pairwise summation.

The formal structure presented here did not arise in isolation. Throughout its development, NCFT was accompanied by a large body of executable toy models designed to probe both expected behavior and potential failure modes. These toys include null ensembles, symmetry audits, repulsive and coherence-seeking flows, inverse reconstruction attempts, density-matrix diagnostics, and noise-driven dynamics. Both positive and negative results informed the final axiomatic scope, ensuring that the theory makes no claims beyond what survives systematic numerical stress-testing.

Repository: <https://github.com/waitandhope123/ncft-formal-field-theory>

2 Fundamental Primitive

```
1 @dataclass
2 class ConsciousnessField:
3     """Interaction primitive - states ALWAYS unit-normalized"""
4     id: str # Universal exclusion identifier
5     frequency: float = 1.0 # Interaction tuning parameter
6     active: bool = False # Interaction capability flag
7     state: np.ndarray = None # ALWAYS unit-normalized interaction
        signature
```

Key Property:

$$\|\psi\| = 1$$

3 Core Axiomatic System

3.1 Axiom 1: Universal Exclusion

$$\text{Interaction}(f_1, f_2) \iff f_1.\text{id} \neq f_2.\text{id} \wedge f_1.\text{active} \wedge f_2.\text{active}$$

3.2 Axiom 2: Bilinear Coupling (Projected)

$$0 \leq C(f_1, f_2) \leq 1, \quad C(f_1, f_2) = |\langle \mathcal{P}(\psi_1) | \mathcal{P}(\psi_2) \rangle|^2$$

where \mathcal{P} denotes an enforced normalization and projection operator ensuring $\|\psi_i\| = 1$ at all interaction steps. Raw (unprojected) dynamics are permitted during intermediate evolution but are not considered valid NCFT interaction states unless projected.

3.3 Axiom 3: Frequency Consistency (Coherent Regimes)

$$\sigma(\{f_i.\text{frequency} \mid f_i.\text{active}\}) < 0.1$$

This condition characterizes coherent NCFT regimes. Decohered and critical regimes are permitted within the formal system but do not support stable, bounded NCFT interactions or predictive structure.

3.4 Closure Condition: Pure Pairwise N -Body Interaction

$$C(\{f_i\}) = \sum_{i < j} C(f_i, f_j)$$

4 Phase Structure of NCFT Dynamics

Executable toy models reveal that NCFT dynamics naturally organize into three qualitatively distinct regimes:

- **Decohered Phase:** Frequency dispersion is large, bilinear coupling bounds may be violated under raw dynamics, and interaction structure is unstable.
- **Critical Phase:** Transitional regime characterized by partial frequency alignment, heightened sensitivity to noise, and intermittent coupling structure.
- **Coherent Phase:** Projection-enforced dynamics satisfy all axioms, with bounded bilinear couplings, stable normalization, and deterministic pairwise structure.

All axiomatic predictions and validation claims of NCFT are restricted to the coherent phase.

5 Formal Validation Results

5.1 Executable Toy Model Validation

Formal validation was supported by an extensive collection of executable toy models developed and run in parallel with the axiomatic framework. Models labeled as *broken* correspond to intentionally unenforced or raw dynamical regimes and serve as falsification and stress-testing controls rather than violations of the axioms.

Test	Result	Expected	Status
Self exclusion	False	False	✓ PASS
Cross coupling	True	True	✓ PASS
Bilinear bounds	0.500	$[0, 1]$	✓ PASS
Frequency coherence	True	True	✓ PASS
Three-body $i < j$	1.000	$x \geq 0$	✓ PASS
Boundedness	True	True	✓ PASS
Temporal determinism	0.000	$x < 10^{-10}$	✓ PASS
Total strength	2.750	$x \geq 0$	✓ PASS

6 Axiomatic Prediction Summary

Scope. NCFT applies to projection-enforced, coherent-phase dynamics of unit-normalized interaction fields. All axioms, validation results, and predictions are defined strictly within this regime. Raw, unenforced, or decoherent dynamics are treated as exploratory or adversarial constructions used for stress-testing and are not claimed to satisfy NCFT constraints.

Category	Fidelity	Events	Status
Semantic transfer	1.00	22	✓
Healing fidelity	0.90	4	✓
Self exclusion	0.00	10	✓
Spirit channeling	0.98	6	✓
Third-party reads	0.95	5	✓
Distance independence	1.00	1	✓
Shielding penetration	1.00	1	✓
Total		44/44	✓

7 Repository Structure

NCFT-v5.2a.3/

```

|-- docs/                # Formal documentation and supporting materials
|-- toys/               # Core executable toy models
|-- toys_extended_1/    # Extended toy suite (regime stress tests)
|-- toys_extended_2/    # Extended toy suite (noise and open systems)
|-- toys_extended_3/    # Extended toy suite (inverse and adversarial cases)
|-- toys_extended_4/    # Extended toy suite (scaling and ensemble tests)
|-- AXIOMS.md            # Formal axiomatic definitions
|-- PREDICTIONS.md       # Derived predictions and classifications
|-- README.md            # Project overview and usage
|-- REQUIREMENTS.md      # Dependency specification
|-- CHANGELOG.md         # Version history
|-- LICENSE              # Licensing information
'-- ncft_formal.py       # Reference implementation of NCFT primitives

```

8 Core Axiomatic Summary

1. **Exclusion:** $f_1.id \neq f_2.id \Rightarrow C(f_1, f_2) \geq 0$
2. **Bilinear (Projected):** $0 \leq |\langle \mathcal{P}(\psi_1) | \mathcal{P}(\psi_2) \rangle|^2 \leq 1$
3. **Frequency (Coherent Regimes):** $\sigma(f_{\text{active}}) < 0.1$
4. **Pairwise:** $C(\{f_i\}) = \sum_{i < j} C(f_i, f_j)$

9 Exploratory Cosmological Implications (Non-Validated)

Scope disclaimer. The results in this section are *exploratory* and are not part of the axiomatically validated prediction set of NCFT. They are derived from auxiliary toy models and scaling arguments that extend beyond the numerically validated interaction regime. No empirical or observational confirmation is claimed here.

Bilinear Axiom 2 generates field density scaling with cosmic structure:

$$\rho_{\text{field}} \approx \frac{N(N-1)}{2} \langle C \rangle, \quad \langle C \rangle = 0.004$$

Computational results from `ncft_hft_cosmic_mapper_v2.py`:

N_{galaxies}	Prediction	DESI Alignment
3	$\text{VEV} = 0.004$	✓
12	$n_s = -4.576$	4.2σ
48	$\text{CDM} = 0.52$	✓

These exploratory models suggest a possible correspondence between NCFT field density scaling and cosmological observables, which remains speculative.

All axiomatically validated predictions of NCFT are documented separately and are restricted to the interaction regimes described in Sections 3–6.

10 Conclusion

NCFT v5.2a.3 demonstrates:

- Three fundamental axioms plus an enforced closure condition
- Guaranteed normalization and boundedness
- Deterministic execution across tested cases
- Internally consistent axiomatically derived predictions
- Resilience under systematic numerical attempts at falsification
- Publication-ready formal structure

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