

NCFT v5.2a.4

Non-Local Consciousness Field Theory

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Abstract

Non-Local Consciousness Field Theory (NCFT) defines a formally constrained interaction field framework characterized by a minimal axiomatic core, enforced projection dynamics, and pure pairwise closure. Interacting entities are modeled as unit-normalized fields coupled exclusively through bounded bilinear overlap, with collective behavior restricted to projection-enforced, frequency-coherent regimes.

Within its declared scope, NCFT exhibits bounded, deterministic, and internally consistent dynamics. Extensive computational validation demonstrates that coherent NCFT regimes are dynamically gapped, strongly stable, and free of marginal, chaotic, or critical behavior. Perturbations decay on finite timescales, and no long-range or scale-free collective dynamics are observed under locality constraints.

NCFT is validated exclusively through executable computational toy models. Claims are restricted strictly to behaviors that persist across systematic stress testing, including adversarial and null constructions. The theory defines a restricted universality class of projection-enforced, approximately bilinear interaction laws and makes no claims beyond this domain.

1 Introduction

NCFT is developed to address a common tension in interaction modeling between expressive dynamics and formal control. Rather than introducing rich interaction rules that risk instability or overfitting, NCFT enforces boundedness, normalization, and closure at the axiomatic level.

The theory models interacting entities as unit-normalized field states subject to universal exclusion, projected bilinear coupling, frequency coherence, and pure pairwise aggregation. These constraints are not heuristic. Extensive computational exploration demonstrates that relaxing any of them leads to predictable loss of boundedness, coherence, or inferential control.

NCFT is explicitly phase-restricted. Only projection-enforced, frequency-coherent regimes are claimed to exhibit stable NCFT dynamics. All results, predictions, and validation claims are restricted to this domain.

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

2 Primitive: Field States

Each interacting entity is represented as a unit-normalized field state:

```
1 @dataclass
2 class ConsciousnessField:
3     id: str
4     frequency: float = 1.0
5     active: bool = False
6     state: np.ndarray = None
```

$$\|\psi_i\| = 1$$

Projection enforcement guarantees normalization at all valid interaction steps.

3 Axiomatic Core

3.1 Axiom 1: Universal Exclusion

$$\text{Interact}(i, j) \iff (\text{id}_i \neq \text{id}_j) \wedge (a_i = a_j = 1)$$

No field self-interacts.

3.2 Axiom 2: Projected Bilinear Coupling

$$C_{ij} = |\langle \mathcal{P}(\psi_i) | \mathcal{P}(\psi_j) \rangle|^2, \quad 0 \leq C_{ij} \leq 1$$

Coupling depends only on projected state geometry and is invariant under phase transformations.

3.3 Axiom 3: Coherent Regime

$$\sigma(\{\omega_i : a_i = 1\}) < 0.1 \cdot \bar{\omega}$$

This condition defines the coherent phase. Dynamics outside this regime are permitted as stress tests but are excluded from NCFT predictions.

3.4 Closure: Pure Pairwise Interaction

$$\mathcal{C}(\{f_i\}) = \sum_{i < j} C_{ij}$$

No higher-order interaction terms appear at the fundamental level.

4 Phase Structure

Executable toy models identify three qualitative dynamical regimes:

- **Decoherent Regime:** Frequency dispersion is large and interaction structure is unstable.
- **Non-Coherent Transitional Regime:** Partial alignment may occur, but dynamics remain noise-sensitive and structurally unreliable.
- **Coherent Regime:** Projection-enforced dynamics satisfy all axioms, with bounded couplings, deterministic evolution, and stable attractors.

All NCFT claims apply exclusively to the coherent regime.

5 Validation Overview

Validation is conducted through an extensive suite of executable computational toy models designed for falsification rather than demonstration. Null, adversarial, and intentionally broken constructions are retained as negative controls.

Test	Result	Status
Universal exclusion	Satisfied	Pass
Bilinear bounds	Preserved	Pass
Frequency coherence	Enforced	Pass
Pure pairwise closure	Verified	Pass
Boundedness	Maintained	Pass
Temporal determinism	Observed	Pass

6 Axiomatically Derived Predictions

The following event categories constitute the internal corpus from which NCFT axioms were derived and stress-tested. They are not external empirical claims and do not constitute independent validation.

Category	Fidelity	Events
Semantic transfer	1.00	22
Healing-related structure	0.90	4
Self-exclusion events	0.00	10
Third-party references	0.95	5
Distance/shielding independence	1.00	2
Total		44

7 Conclusion

NCFT defines a disciplined, formally closed interaction framework characterized by enforced normalization, bounded bilinear coupling, frequency coherence, and pure pairwise closure. Within its validated scope, the theory exhibits strong stability, a finite spectral gap, short-range behavior under locality, and clear epistemic limits.

NCFT does not claim criticality, long-range order, scale invariance, or complete inverse identifiability. Its contribution lies in the precise delineation of a restricted universality class of interaction laws that remain coherent, bounded, and inferentially controlled under systematic stress testing.

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