

# NCFT v5.2a5

## Non-Local Consciousness Field Theory (Core)

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January 2026

### Abstract

Non-Local Consciousness Field Theory (NCFT-core) defines a formally closed, projection-enforced interaction framework characterized by unit-normalized field states, bounded bilinear coupling, and pure pairwise closure.

Extensive executable computational toy models demonstrate that NCFT-core dynamics are well-posed *only* on the unit-norm manifold and possess a single global attractor. All valid flows are bounded, deterministic, strongly damped, and non-critical. No clustering, metastability, long-range order, or phase transitions are observed under any tested perturbation.

Frequency coherence plays no dynamical role in stabilization or alignment and serves only as a classificatory descriptor of regimes. NCFT-core admits no soft, stochastic, or continuous extension off its projected state space.

All claims are restricted strictly to behaviors that persist across systematic stress testing, including null and adversarial constructions. NCFT-core defines a sharply delimited universality class and makes no claims beyond this scope.

## 1 Introduction

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

Interacting entities are modeled as unit-normalized field states coupled exclusively through projected bilinear overlap. These constraints are not heuristic. Executable computational stress testing demonstrates that relaxing any of them leads to immediate loss of well-posedness, boundedness, or deterministic behavior.

NCFT-core is not a theory of emergence, pattern formation, or critical phenomena. Its contribution lies in the precise delineation of a restricted, fully characterized universality class of interaction laws.

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 is constitutive.** NCFT-core dynamics are defined only on the unit-norm manifold. Projection is not a numerical correction but a defining element of the theory. All softened, delayed, or stochastic projection variants are ill-posed and diverge.

### 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 global phase transformations.

#### 3.3 Regime Classification: Frequency Coherence

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

Frequency coherence defines a *classificatory regime label only*. Computational results demonstrate that frequency dispersion, static or dynamical, does not alter state alignment, attractor structure, or stability. Coherence does not stabilize, destabilize, or select NCFT-core dynamics.

#### 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. All dynamics are fully determined by pairwise couplings.

## 4 Regime Classification (Non-Critical)

Executable toy models identify transient regimes of behavior based on parameter choices and initial conditions:

- **Incoherent Regime:** Frequency dispersion is large; convergence may be slower.
- **Transitional Regime:** Partial alignment occurs during transient dynamics.
- **Aligned Regime:** All valid flows converge to full global alignment.

These regimes do not correspond to distinct phases or phase transitions. All valid NCFT-core dynamics share the same asymptotic behavior.

## 5 Dynamical Characterization

Across all tested constructions, NCFT-core exhibits:

- A single global attractor
- Finite spectral gap
- Strong damping of perturbations
- Absence of chaos, marginal modes, or criticality
- No clustering, fragmentation, or metastability

There are no alternative basins of attraction.

## 6 Validation Overview

Validation is conducted exclusively through executable computational toy models designed for falsification rather than demonstration. Negative and null results are retained as first-class outcomes.

Test	Outcome	Status
Projection enforcement	Required for well-posedness	Pass
Bilinear bounds	Preserved	Pass
Pairwise closure	Verified	Pass
Single-attractor behavior	Observed	Pass
Boundedness	Maintained	Pass
Criticality / clustering	Absent	Pass

## 7 Internal Event Classes Used for Axiom Stress-Testing

The following categories constitute the internal corpus from which NCFT-core axioms were reverse-stressed and delimited. They are not empirical predictions and do not constitute external 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

## 8 Conclusion

NCFT-core defines a projection-enforced effective interaction theory with unit-normalized state space, bounded bilinear coupling, and pure pairwise closure. Within its validated scope, the theory is fully characterized.

NCFT-core:

- Is bounded, deterministic, and non-critical
- Possesses a single global attractor
- Admits no soft continuation off the projective manifold

- Does not support emergent structure or phase transitions

Any extension beyond this framework requires explicit modification of the state space or axioms and constitutes a new theory rather than a refinement of NCFT-core.

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