The UNNS Substrate
An Axiomatic Hierarchy

UNNS Research Collective

Abstract

This document presents a clean axiomatic formulation of the UNNS Substrate. The framework distinguishes between generability, projection, and stabilization as equally fundamental regimes, and defines operators acting between them. The aim is to eliminate terminological ambiguity and provide a stable foundational reference for future UNNS work.

0. Purpose

This document formalizes the UNNS Substrate as a hierarchical foundational framework. The goal is to eliminate ambiguity between the notions of substrate, regime, and operator, and to provide a clean axiomatic structure suitable for mathematical and foundational analysis.

1. Axiom I: The UNNS Substrate

Axiom I (UNNS Substrate). The UNNS Substrate is the total foundational structure underlying all generable, relational, and stable phenomena.

It is not identified with any single mathematical object or state space. Instead, it is defined as the minimal framework that simultaneously supports:

- generability of structure,
- relational projection of structure,
- stabilization and persistence of structure.

Formally, the UNNS Substrate contains multiple structural regimes and the operators that relate them:

$$\text{UNNS} \supset \{\text{Phi}, \text{Psi}, \text{Tau}\}.$$

2. Axiom II: Structural Regimes

Axiom II (Regimes). A regime is a structural mode of the UNNS Substrate characterized by distinct mathematical roles and constraints.

The UNNS Substrate contains at least the following regimes:

- Phi, the generability regime,
- Psi, the projection (relational) regime,
- Tau, the stabilization (survivability) regime.

No regime is ontologically privileged over the others; all are substrate-level.

3. Axiom III: The Phi-Regime (Generability)

Axiom III (Generability). The Phi-regime describes the generative capacity of the UNNS Substrate.

- Phi does not consist of states or values.
- Phi specifies rules, constraints, or grammars that generate families of projectable structures.
- Phi is prior to probability, measurement, and outcome.

Formally, the Phi-regime supports a generator map

$$\text{Gen} : \text{Phi} \to \mathcal{F}(\text{Psi}),$$

where $\mathcal{F}(\text{Psi})$ denotes families of projectable structures.

4. Axiom IV: The Psi-Regime (Projection)

Axiom IV (Projection). The Psi-regime describes how generable structure becomes relationally organized.

- Psi-objects encode correlations, amplitudes, or relational structure.
- Psi-objects may be represented by wavefunctions, density operators, or equivalent mathematical entities.
- Psi is not fundamental; it is induced from Phi.

The Psi-regime provides the mathematical interface between generability and observation.

5. Axiom V: The Tau-Regime (Stabilization)

Axiom V (Stability). The Tau-regime determines which projected structures persist.

- Tau is not epistemic; it is structural.
- Stability is enforced by interaction, dissipation, or irreversibility.
- Observers are special cases of Tau-interfaces, not prerequisites.

Formally, the Tau-regime is represented by a stability functional

$$S : \mathrm{Psi} \to R,$$

with persistence defined by a threshold condition

$$S(\Psi) \geq \theta.$$

6. Axiom VI: Operators

Axiom VI (Operators). An operator is a structural map acting between regimes of the UNNS Substrate.

Operators are not dynamics within a regime, but transformations across regimes.

Canonical examples include:

- Phi to Psi operators (projection),
- Psi to Tau operators (selection),
- Tau to Phi operators (feedback or constraint propagation),
- Operator XII (elimination of non-survivable structure).

Operators define the causal and logical architecture of the UNNS Substrate.

7. Consequence

From these axioms it follows that:

- collapse is selection, not reduction,
- nonlocality reflects shared generative origin,
- observers are internal substrate processes,
- quantum mechanics describes the Psi-regime only.

The UNNS Substrate is therefore a full-stack ontology, not an interpretation.