2. The Pre-Spacetime Substrate

At the core of this hypothesis lies a radical simplification: the assumption that the universe did not begin with space, time, mass, or energy, but with a homogeneous, structureless probability wave field-a canvas of infinite potential. This pre-universal state is devoid of any distinguishable entity or measurement framework. There are no dimensions, no reference points, no direction of time, and no separation between subject and object.

The transition from this state to a relational universe occurs through probabilistic collapse events where the superposition of infinite possibilities resolves into specific wave patterns that interact with one another. These patterns create the illusion of objects, forces, and dimensions. The wave function itself is not embedded within spacetime; rather, spacetime is an emergent effect of the wave function's relational structure.

This premise aligns with and extends quantum theory while rejecting the need for classical constructs as primary. Unlike deterministic systems that rely on initial conditions and laws of motion, the Universe Wave Function operates on the principle that relational probability collapses generate localized structures. These collapses are not driven by external triggers but emerge from internal thresholds of interaction density-a mechanism that leads to spontaneous emergence.

Importantly, this hypothesis retains compatibility with Einstein's relativistic constraints. Entanglement is reinterpreted not as faster-than-light information transfer, but as simultaneous, co-originated collapse within a shared wave field. What

appears as superluminal influence is simply a projection of a deeper nonlocal simultaneity, preserving causality within the framework of emergence rather than violating it.

Mathematical Foundation

Mathematically, the pre-universal wave field can be represented by a uniform, non-local probability amplitude field:

$$\Psi_0(r, t) = A \cdot e^{i\phi}$$

Where:

- Ψ_0 is the foundational, structureless wave function representing the pre-universal state,
- A is a constant amplitude (homogeneous across all space),
- ϕ is a randomly distributed global phase uncorrelated across space or time.

Since no space or time exists in the pre-universal state, the parameters r and t are not physical coordinates but placeholders for potential relational configuration. Collapse into relational structures begins when fluctuation thresholds are probabilistically exceeded, governed by a collapse function $C(\Psi)$ such that

$$C(\Psi_0) \rightarrow \sum_n \Psi_n(r, t)$$