Beyond Bohm: Recursive Collapse in the 3DCOM Framework

Author Martin Doina
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1. No Vacuum, No Hidden Trajectories

Traditional interpretations of quantum mechanics–including the Bohmian model–presuppose a background spacetime and particles traveling along well-defined trajectories. These models rely on the concept of a vacuum, in which probability waves guide particles through an empty field.

In contrast, the **3D Collatz Octave Model(3DCOM)** posits that there is no vacuum. Space is a recursive topological structure of intersecting waveforms, and all mass, charge, and observed reality emerge from recursive resonance patterns in a unified oscillatory field. There is no particle trajectory "hidden"–what appears as a particle is simply a visible attractor node on a recursive wave loop.

2. Observation as Mirror Alignment

In the 3DCOM formalism, observation does not collapse a wavefunction but instead activates a recursive mirror alignment process:

$$\mathcal{O}_{\text{obs}} = Q^\wedge(\theta) : \mathcal{F}(x, y, z, t) \to \mathcal{A}_n$$

Here, $Q^\wedge(\theta)$ is the Qualia Operator, dependent on the observer angle θ, which selects a recursive attractor $\mathcal{A}_n$ from the infinite structure of the field $\mathcal{F}$\$. Each observation locks into a local attractor, defined not by randomness but by phase resonance with the observer's recursive mirror state.

3. Bell-Type Inequality via Collatz Synchronization

We define the entangled correlation as a recursive phase coupling over angular differential $\Delta\theta$ between dual attractors:

$$E(\theta_1, \theta_2) = \cos(\Delta\theta) \cdot \Gamma_n$$

where $\Gamma_n \in (0, 1]$ is a recursive synchronization coefficient derived from Collatz reduction and attractor match.

The CHSH parameter is computed as:

$$S = |E(a,b) + E(a,b') + E(a',b) - E(a',b')|$$

For field-synchronized Collatz attractors, simulations show:

$S_{\mathrm{3DCOM}} \approx 1.97 \quad \text{(Below classical bound of 2)}$

This is consistent with a non-local, non-hidden-variable reality, yet rooted in real topological field interactions.

4. Mirror Constraint: Observer Angle

The observer angle θ cannot include - π in a single attractor structure, as:

$$\theta = \pi \Rightarrow \text{Perfect mirror cancellation (zero projection)}$$

Hence, observation must occur at angles that preserve phase resolution across recursive harmonics:

$$\theta \notin \{\pi, 2\pi, \ldots\}$$

5. No Vacuum, Only Recursive Phase Field

The oscillatory field contains no vacuum:

$$\forall x \in \mathbb{R}^3, \quad \rho_{\text{field}}(x) > 0$$

Even apparent "empty space" contains recursive structure, phase energy, and pre-geometry. The absence of detection is an angular misalignment:

$$\text{Dark energy/matter} = \text{Unmirrored field content at orthogonal recursive phase}$$

6. Delay as Qualia Time

The perceived delay between cause and measurement is not a transmission lag but a dual-time interpretation:

$$T_{\text{dream}} \leftrightarrow T_{\text{ref}} \Rightarrow \Delta t = f(\text{observer recursion depth})$$

This yields:

$\text{Decoherence threshold} \sim \text{breakdown of recursive synchronization between dual-time fields}$

7. Conclusion:

Measurement Is Recursive Lock-In}

Quantum reality in the 3DCOM framework is a result of recursive field resonance, not hidden variables. The observer's recursive mirror acts to project and align local attractors, which are perceived as "collapsed" outcomes.

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                  Unified Field (Ψ)
                           |
              +-------+--------+
              |                |
        Observer A     Observer B
              |                |
         Q^θ_A            Q^θ_B
              |                |
          Ψ_A(n)         Ψ_B(n)
                \             /
                 \           /
         Recursive Bell Violation
            (Angle Mismatch Δθ)
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