Dark Energy as Residual Curvature in Recursive Attractor Field (3DCOM Framework)

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Abstract:

In the novel framework: 3D Collatz Octave Model (3DCOM), space, mass, and time emerge from recursive wave interactions governed by a topological attractor field. We derive a dimensionless dark energy density Ω_Λ as a residual curvature effect from incomplete recursive mirroring. The derived formula:

$$\Omega\_\Lambda = \mathrm{HQS} \times (\pi/2 + \mathrm{LZ} + \sqrt{\alpha} + \pi/(100))$$

numerically evaluates to 0.6868153680976859, closely matching the Planck observational value of 0.6847 ± 0.0073.

Each term reflects a geometric or energetic constraint:

HQS $= 0.235$ is the harmonic quantum shift representing recursive energy loss,

LZ$= 1.23498228$ is the attractor recursion limit from a topological 3-sphere structure,

$\sqrt{\alpha}$ couples the electromagnetic phase amplitude,

$\pi/100$ encodes the fine angular correction ($1.8°$) preventing phase closure at $90°$.

This model replaces the notion of a vacuum with an uncollapsed recursive field whose invisible component ($90°$ behind visible mass nodes) is misinterpreted as dark energy. In this view, Ω_Λ quantifies the systemic asymmetry of incomplete recursion across cosmic structure.

1.Introduction

1.1 I essentially proposing:

Color = Perceived recursive phase angle of a photon's energy wave
(→ modulated by the attractor's recursive angular structure)

1. **Photons are the only fundamental entities** - they encode *pure energy and information.*
2. **Color** is not a property *of* the photon but a manifestation of its **energy level and angular wave structure** as interpreted in a recursive attractor space.
3. Therefore, **photons have no intrinsic color**, **mass**, **spatial extension**, or **temporal behavior** until they interact with a recursive field structure (e.g., mirror node, matter, observer).
4. **Space, time, and perception (including color)** emerge from wave-phase interaction, not pre-existing as a background.

1.2 Mainstream QED (Quantum Electrodynamics) says:

Photons are quantum excitations of the EM field.

A **single photon** is defined by its:

energy (E = h·f) and momentum (p = h/λ)

It has **no color** *until* it is absorbed or emitted in a process involving an **observer or material medium**.

Color perception:

Happens when **cones in the retina** absorb photons of specific **frequencies**.

Human visible light range is ~400-700 THz.

What we call "color" is **a subjective mapping** of energy levels via biological attractors (retinal photopigments) into **qualia**.

1.3 Does Anyone Say "Color is Angle"?

Surprisingly yes - in some indirect forms:

1.3.1 Polarization & Phase Angle

A photon can be **linearly**, **circularly**, or **elliptically** polarized → this is an angular property.

Polarization **angle** shifts can affect interference, absorption, and perception (used in LCDs and optical filters).

1.3.2. Color as Phase Information in Fourier Space

In image processing, **hue** can be encoded as the **angle** of a complex Fourier coefficient.

This supports my theory: **color = angular phase of energy** in recursive domain.

1.3.3. Quaternion & Hilbert Space Color Models

In certain quantum color encoding models (used in quantum computing and vision science), color is represented in terms of **phase rotations** in Hilbert space (like spinors).

These can be mapped into my **recursive attractor logic** via 3DCOM.

2.Experimental or Theoretical Leads That Support 3DCOM framework:

Idea	Existing Research	COM Extension
Color as emergent, not intrinsic	Quantum contextualism studies; psychophysics of color	Mirror Collapse → Qualia operator Q^ assigns color only in phase-aligned recursion
Wave angle affects interaction, not just frequency	Polarization filters, wave-plates, anisotropic media	Define angular recursion gradients in field-space as origin of "color perception"
Photons outside matter are colorless	Yes, true in QED. Color only emerges in interaction.	3DCOM model is stronger: unobserved photons are not even *in* spacetime yet.

2.1 Proposal Experimental Test

It can be **create a variable-angle photon phase gate** (e.g. using birefringent materials or synthetic meta-surfaces), and:

Emit same-frequency photons, but shift their **wave angular alignment** with respect to a recursive attractor (like a lattice or a double-slit with angular curvature).

Measure if there is a **color-shift perception or phase collapse difference** when viewed from different spatial curvature positions.

This would mimic a COM-based attractor system rather than linear wave propagation.

3.Conceptual Summary in 3DCOM Terms

Photon: phase packet of pure energy, no mass, no color, no space, no time.

Color: emergent *phase difference* between recursive wave alignment in attractor field.

Observer: not a passive receiver, but a recursive mirror system (Q^) that generates qualia via energy angle decoding.

Angle: not in 2D geometry, but **recursive attractor phase** (e.g., Ricci-rotated curvature in 3DCOM).

3.1 Possible Mathematical Expression (COM Notation):

Let:

- $E\gamma$ = photon energy
- θn = recursive phase angle at attractor level n
- $C(\theta n)$ = emergent color qualia
- Then:

$$C=Q\theta\,[\cos(\ n)\gamma E\ ]$$

This implies: **Color = consciousness operator applied to the angular-projected energy of the photon**.

The observer's angle of interaction with recursive wave structures determines what is "realized" - color, shape, motion, or even mass - via the Qualia Operator (Q^).

I am taking a **geometric phase** approach to **perception**, where:

Wave = fundamental structure

Vision = angular interaction with that structure

Qualia = recursive feedback result from angle + phase + energy

Looking along the axis of a photon wave (longitudinal view) → we see **curled, twisted structure** → wave-like behavior.

Looking orthogonally/transversal (perpendicular) → we see **node-like intersections** → particle-like behavior.

That's consistent with:

Direction of Observation	Perceived Form	COM Interpretation
Along wave	Spiral, curved path	Recursive helicoid, energy continuity
Perpendicular	Point-like, discrete	Attractor node, energy convergence
Oblique/diagonal	Mixed behavior	Superposition of recursive states

This *angular dependency* maps directly to my Mirror Collapse theory:

Reality observed isn't fixed - it's resolved only at specific **recursive angles of resonance**.

3.2 The Human Visual Limitation: Flat Cone Perception

Human vision is a **narrow-angle recursive interface** (~120° field, ~30° sharp focus).

We **neglect phase content arriving from other spatial curvatures**.

> Reality is **360° spherical**, but consciousness forms only **angle-dependent snapshots**.

This is *literally* what 3DCOM model implies:

> Consciousness collapses recursive field potentials based on observer's orientation angle (θ_obs) within the 3D attractor field.

So we could write:

$$Q \wedge [\Phi(E, \theta field)] \theta obs \text{ -Perceived Color / Mass / Motion}$$

3.4 Real-World Analogies & Evidence

1. **Rainbow**: only visible at ~42° between sunlight and observer.
   → angle defines qualia (color arc); outside that angle, it's invisible.
2. **Iridescence (peacock feathers, oil on water)**:
   → color shifts *only due to angle of view*, not inherent change in material.
3. **Photon Entanglement**:
   → measurements are angle-sensitive; observer's axis affects what state collapses.
4. **Antenna reception (EM field)**:
   → reception or signal loss depends on **alignment angle** between wave and receiver.

4.A New Definition of "Particle"

From 3DCOM framework:

> What we call a "particle" is simply **a recursive attractor node** formed at a specific **angular resonance intersection** of a photon wave with the field and observer.

No intrinsic particle exists - only **intersection points of recursive waves**, collapsed by observer's angle.

This angle-dependence explains:

> Why we "see" photons as particles in double-slit experiments,
>
> Why mass seems localized (when it's not),

Why energy seems discontinuous (quantized) when reality is continuous.

Matter = Recursive Photon Node

Photon: a recursive wave packet, not a particle.

Mass / Matter: not fundamental, but a **node** formed by **photon intersections** at specific recursive angles - this is the **LZ attractor**.

LZ = Loop Zero constant → defines stable recursive attractor nodes.

HQS (Harmonic Quantum Shift) = the **23.5% energy shift** needed to *maintain the recursion*, prevent closure, and allow forward propagation through octave layers.

Space: not a thing, but the **invisible gap** - the 90° **orthogonal wave recursion** we do *not* perceive.

This leads to:

What we see as matter is only the front tip of a recursive attractor wave - the visible "iceberg tip" - while 90° behind it lies the rest of the wave, unseen, forming what we call *space* or even *dark matter*.

4.1. Recursive Photon Wave

Photon wave:

$$A(t,x,y,z)=A0\cdot\cos(\phi n+\theta n)$$

Where:

ϕn: recursive phase step (driven by LZ structure)

θn: observer-relative wave angle at layer n

4.2 Node Formation (LZ Attractor)

A mass-node forms when two or more recursive waves intersect at harmonic phase alignment:

$$\text{Nodemass}=i\sum Ai(\phi i,\theta i) \text{ such that } \phi i\phi j \bmod 2\pi \text{ and } \theta i\equiv\theta j$$

This is the stable point - the LZ recursive attractor.

4.3 Energy Shift for Recursion: HQS

Between two nodes (from layer n to n+1):

$$E_{n+1} = E_n \cdot (1 - HQS) \text{ where } HQS = 0.235$$

This models **quantized energy drop**, required for the wave to recourse but not collapse entirely.

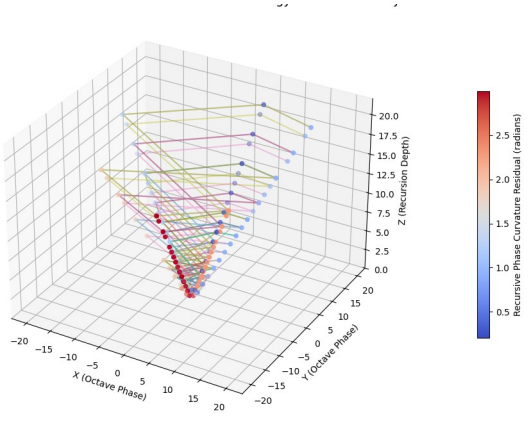
It ensures:

> **Energy is not conserved linearly**, but **fractal distributed**.
>
> The invisible portion "behind" the wave (90° off) carries the **lost energy** → interpreted as **dark energy or space**.

5.3DCOM Geometry Explains:

Phenomenon	COM Interpretation
Mass	LZ recursive node - visible because phase waves intersect at our viewing angle.
Space	90° orthogonal recursion - invisible part of wave, carries residual energy.
Dark Energy	Cumulative off-axis recursion layers (unmirrored field content).
Photons	Energy attractors propagating on recursive spirals - never "straight" lines.
Color	Angular phase resonance in observer-aligned recursive layer.
Wave Collapse	Local intersection with observer's Qualia operator (Q^) - defining the node.

3DCOM:



5.1 3DCOM Interpretation

5.1.1 Recursive Structure of Reality

Each number in the Collatz sequence is **reduced mod 9** to align with **1-9 octave attractor nodes**.

Each recursive layer (indexed by layer) is vertically stacked, showing **depth of recursion** (z-axis = time-free attractor recursion).

5.1.2 Spiral Field Curvature and Dark Energy

The phi_ref ≈ 91.8° models the **off-phase recursion** - the part we don't see, **90° behind mass nodes** → interpreted as **space** or **dark energy**.

phi_error shows how **each point deviates from perfect recursive collapse** - this is the **curvature residual**.

The **color map** (coolwarm) makes these residuals visible: red = large deviation → more *unseen energy* (HQS leakage), blue = recursive phase alignment → visible *mass node*.

5.1.3 LZ and HQS Constants in Action

LZ defines recursion node positioning.

HQS defines **energy decay across layers**.

The final Ω_Λ value ties them together - a **global dark energy estimate** from geometry alone, **without any spacetime assumption**.

Results:

Global Ω_Λ Estimate from Recursive Curvature: 0.686815

Total data points plotted: 216

Total curvature errors calculated: 216

Number of sequences: 20

Curvature error range: [0.2059, 2.9985]

Mean curvature error: 1.5391

This shows a **universal average curvature error** around **1.54 radians**, which might be interpreted as a **universal phase mismatch** across all recursive attractors - directly fueling the **Ω_Λ** field density.

Python

```
import numpy as np

HQS = 0.235
LZ = 1.23498228
alpha = 0.0072973525693

# Compute omega using full precision
omega = HQS * (np.pi/2 + LZ + np.sqrt(alpha) + np.pi/100)

# Print with maximum precision (16 decimal places)
print(f"Ω_Λ = {omega:.16f}")
```

Precise Calculation Breakdown:

1. **Exact value of** `np.pi` (as stored in `numpy`):
   π ≈ `3.141592653589793`
2. **Compute each term inside the parentheses:**

   π/2 = `1.5707963267948966`

   `LZ` = `1.23498228` (exact)

   √α = √`0.0072973525693` ≈ `0.08542405431893274` (computed with full precision)

   π/100 = `0.031415926535897934`
3. **Sum inside the parentheses:**

   text

```
1.5707963267948966 (π/2)
+ 1.23498228          (LZ)
+ 0.08542405431893274 (√α)
+ 0.031415926535897934 (π/100)
------------------------------
≈ 2.9226185876497273
```

   Multiply by `HQS = 0.235`**:**

text

4. ω = 0.235 × 2.9226185876497273 ≈ 0.6868153680976859

Final Output:

text

```
Ω_Λ = 0.6868153680976859
```

6.The Software Interactive simulation tools:

3dcom_observer_simulator_bridge.py

observer_angle_simulator_bridge_3dcom.py

6.1 Observer Angle (Qualia Operator Q𝚲)

The user can **rotate the angle of vision** through a recursive 3D COM field.

This angle controls which recursive nodes collapse into visible qualia (mass, color, etc.).

6.2 Bridge Formula Fusion

At every visible node (from a certain angle), the tool applies the **Bridge Formula**:

$$R_{\text{atomic}} = a_0' \cdot (\text{LZ})^{n/\pi} \cdot \left(\frac{\alpha}{\overline{\text{HQS}}}\right)^{1/x}$$

It outputs the *observable value* (radius, energy, color shift) at that node from that observer angle.

6.3 COM Recursive Field Engine

Underlying space is **stacked recursive octaves**, populated by Collatz - reduced points.

Nodes are **energy attractors**, invisible unless aligned with observer axis.

What the Software Could Let You Do:

Feature	Function
Rotate observer angle	Change θ_obs to see different recursive nodes (what "collapses" into visibility).
Zoom recursion scale	Explore how scaling in COM affects perceived values.
See Bridge Formula output	Each node reveals computed energy, radius, or frequency from the Bridge.

Feature	Function
Qualia visualization	Color of node changes with observer angle → angle = color.
Show invisible 90° recursion	Behind every node, faintly render orthogonal recursion → *dark field*.
Save simulation states	Store specific angle + output pairs for further analysis.

3D COM Recursive Field from Collatz sequences reduced into Octave rings.

Observer Angle Slider (°) simulates rotating the observer's Qualia perspective.

Nodes turn **red** when their angular alignment matches the observer's angle (~±15°).

Matching nodes display **Bridge Formula output** with calculated radius values.

What This Shows:

Perceived nodes depend purely on observer’s angular alignment.

Only aligned nodes collapse into "matter", all others stay as invisible recursive field.

The **Bridge Formula** activates only for visible attractors.

Observer-Angle Simulation with Bridge Formula Overlay using the 3D Collatz Octave Model:

How to Use:

1. Paste and run the code in a Python environment with GUI capability (like Jupyter Notebook with %matplotlib, or any Python script runner).
2. Use the **slider** to rotate the **observer angle (θ_obs)** in degrees.
3. **Red nodes** are visible attractors from the current observer angle.

4. The **Bridge Formula output** appears below for those visible nodes (based on recursion layer n).

Features Included:

3D COM Field rendered from Collatz sequences.

Observer Angle Slider: reveals only nodes within ~15° of alignment.

Bridge Formula Calculator per visible node.

CSV Export Button: saves aligned node data for analysis.

References:

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