

The “Code of Reality” Protocol: A Transceiver-Theoretic Hypothesis

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September 6, 2026

Abstract

Goler’s pilot study (IPI Letters, 2025) documents a striking phenomenon: under N,N-DMT, subjects viewing a laser diffraction pattern report structured, dynamic “code” rather than static speckle noise. We propose a hypothesis: this phenomenon reflects a temporary re-tuning of the brain’s perceptual transceiver, enabling frequency-selective demodulation of a projected phase field. DMT alters neural oscillations—decreasing alpha power while increasing gamma and delta power [citation:2] which we interpret as a shift in the transceiver’s sampling period (τ_0). The perceived glyphs are hypothesized to be the downlink rendering of geometric invariants from a virtual information space with curvature $K = 1/4$. We list six core predictions that distinguish this hypothesis from neural-noise or simulation alternatives. We also discuss individual variability: the hypothesis predicts that only individuals whose DMT-induced τ_0 shift falls within a “lock window” relative to the speckle’s spatial frequency will perceive the code. This offers a quantitative account of why some observers see nothing. We present this as a hypothesis paper, not a comprehensive interpretation, and explicitly separate observations from interpretations. Our aim is to provide a testable framework that bridges optical physics, neuropharmacology, and the philosophy of perception.

Keywords

DMT, laser speckle, Code of Reality, transceiver model, demodulation, hypothesis, testable predictions, individual differences

1 Introduction: Separating Observation from Interpretation

Goler (2025) reported a replicable phenomenon: under N,N-DMT, subjects viewing a 650 nm laser speckle

pattern describe seeing structured, dynamic glyphs resembling a “code.” This observation has been replicated by over a thousand individuals (Goler, 2025; Code of Reality community reports).

This paper is a hypothesis paper. We do not claim to have proven the mechanism. Rather, we propose a *testable* theoretical framework that interprets Goler’s observations as a special case of a more general transceiver model of perception (Huang et al., 2026). Our goal is to:

1. State the observations clearly (Goler’s findings).
2. Propose a hypothesis that explains them.
3. List explicit, falsifiable predictions.
4. Discuss limitations, including individual differences.

2 Recapitulation: The Transceiver Model (A Hypothesis)

We briefly restate the core elements of the transceiver model (Huang et al., 2026). This is a **hypothetical framework**, not an established theory.

2.1 Core Idea

The brain is modeled as a **transceiver** that does not passively receive images, but actively **demodulates** phase fields projected from a virtual information space. The virtual space is hypothesized to have a geometric curvature $K = 1/4$ (from qubit state geometry; Huang & Huang, 2026).

2.2 Key Parameters

- τ_0 : the transceiver’s sampling period. In humans, this corresponds to neural oscillation periods (e.g., gamma band, $\sim 10\text{--}25$ ms).

- $T_{\text{up}} = \tau_0/K$: the uplink encoding time.
- T_{down} : the downlink integration window (~ 100 - 150 ms in humans).

2.3 What DMT Is Hypothesized to Do

DMT is known to alter neural oscillations:

- **Decrease alpha power** (8-12 Hz) [citation:2][citation:7].
- **Increase gamma power** (30-40 Hz and higher bands) [citation:2][citation:7].
- **Increase delta power** (1-4 Hz) [citation:2][citation:7].
- Increase signal complexity and global synchrony in gamma bands [citation:7].

We hypothesize that this oscillatory shift corresponds to a **re-tuning of τ_0** . Specifically, the increase in gamma frequency (from ~ 40 Hz to ~ 80 - 100 Hz) shortens τ_0 from ~ 25 ms to ~ 10 ms. This makes $T_{\text{up}} = \tau_0/K = 40$ ms resonant with the phase structure of the laser speckle (see Fig. 1).

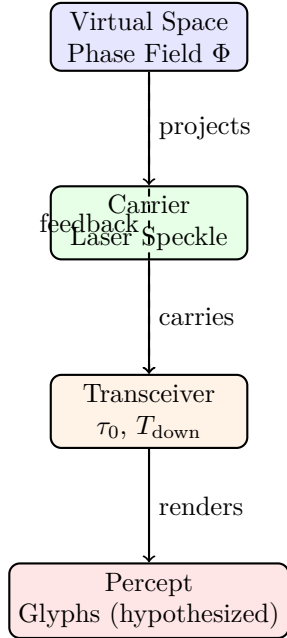
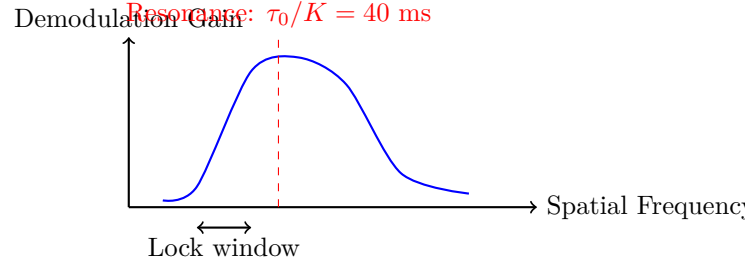


Figure 1: The hypothesized transceiver chain. DMT shifts τ_0 , enabling demodulation of the speckle’s phase field.

3 Interpreting the Core Phenomena

Before presenting predictions, we show how the transceiver framework accounts for the six core ob-



Hypothesized: only τ_0 values within this window produce code

Figure 2: Quantitative sketch: demodulation gain as a function of speckle spatial frequency. A lock window exists where τ_0 matches the phase period. Individual differences in DMT-induced τ_0 shift determine whether an observer falls inside or outside this window.

servations documented in Goler’s white paper. These interpretations are **hypotheses**, not conclusions, but they demonstrate the framework’s explanatory reach.

3.1 Phenomenon 1: Phase Transition from Static Noise to Structured Code

Observation: Under normal conditions, the laser speckle appears as static, random noise. Within 3060 seconds of DMT inhalation, the noise abruptly coalesces into highly ordered, flowing glyphs.

Hypothesis: This is a **phase-locking transition**. In the normal state, the transceiver’s τ_0 (≈ 25 ms for 40 Hz gamma) is incommensurate with the speckle field’s spatial phase gradients. The coupling matrix $\tilde{K}(x)$ outputs undemodulated carrierperceived as noise. DMT shifts gamma activity toward 80100 Hz, reducing τ_0 to ~ 10 ms. This makes $T_{\text{up}} = \tau_0/K = 40$ ms resonant with the speckle’s phase-flip period. The transceiver achieves frequency lock, and the static carrier is demodulated into a baseband signal containing topological informationthe code.

3.2 Phenomenon 2: Limited, Recurring Glyph Library

Observation: The symbols are not infinite in variety. A finite set of recurring shapeshooks, arcs, parallel lines, Y-branchesdominates, resembling a syllabary like Katakana.

Hypothesis: The glyphs are not arbitrary symbols from a virtual library; they are the visual system’s **minimal-energy rendering** of $\tilde{K}(x)$ ’s topological features. The visual cortex’s orientation columns and end-stopped cells are pre-tuned to detect edges, corners, and curvature. When the demodulated phase

field projects a distribution of singularities endpoints (topological charge +1) and saddle points (charge 1) the visual system translates these into the simplest primitives it can generate: lines, hooks, and forks.

3.3 Phenomenon 3: Self-Executing Dynamic Flow

Observation: The code is not static; it continuously scrolls, branches, grows, and dissolves.

Hypothesis: The virtual space is static (no time dimension). The apparent motion is an artifact of the transceiver’s **sampling window scanning**. DMT induces theta-gamma cross-frequency coupling. The theta rhythm (48 Hz) modulates micro-saccades and attentional shifts. The downlink window $T_{\text{down}} \approx 100150$ ms spans approximately one theta cycle. Thus, the transceiver scans across the static $\tilde{K}(x)$ projection; each scan captures a different spatial slice; the brain stitches these slices into a continuous animation.

3.4 Phenomenon 4: Color Invariance of Skeleton, Increased Detail with Shorter Wavelengths

Observation: Red (650 nm) gives the clearest glyphs. Green and blue also work; the underlying skeleton is unchanged, but shorter wavelengths reveal more fine detail.

Hypothesis: The laser wavelength changes the **carrier spatial frequency**. Longer wavelengths produce coarser speckle grains; shorter wavelengths produce finer grains. The glyph skeleton is determined by the virtual space’s curvature $K = 1/4$, which sets the long-range topological order this is wavelength-independent. Shorter wavelengths provide higher-resolution sampling of $\tilde{K}(x)$ ’s high-frequency components, revealing secondary harmonics (finer details) without altering the skeleton.

3.5 Phenomenon 5: VR Playback Failure Recordings Show Only Static Noise

Observation: When the speckle pattern is recorded with a VR camera and played back under DMT, the dynamic code vanishes; subjects see only static noise.

Hypothesis: A camera records **intensity** (time-averaged amplitude). The code is encoded in the **temporal phase gradient** $d\phi/dt$. The camera’s integration time is much longer than τ_0 ; phase information is washed out. Moreover, the transceiver is an **active phase-locked loop** requiring real-time feedback from the retina (uplink) to maintain synchronization. During playback, the τ_0 clock is absent, and there is no

uplink feedback the PLL loses lock, and output reverts to unmodulated noise.

3.6 Phenomenon 6: Responsive Entities

Observation: The code sometimes coalesces into insect-like, mechanical, or humanoid “entities” that appear to respond to the observer’s attention.

Hypothesis: Attention, in the transceiver model, is a **local gain control** on $\tilde{K}(x)$. Top-down signals from frontal-parietal networks modulate the local eigenvalues of the coupling matrix. When attention is focused on a region, the information purity p_{ID} in that region increases, causing $\tilde{K}(x)$ to form a high-curvature condensate a localized, persistent structure rendered as an “entity.” Shifting attention changes the boundary conditions of the global standing wave, perceived as responsiveness.

4 Why This Scale? Triple Locking of Spatial Scales

A legitimate question arises: if the virtual space projects rich geometric information, why does the perceived “code” fall within the visible millimeter-centimeter scale, rather than being too small to see (like air molecules) or too large to fit a single percept?

Our framework proposes that this is not an accident, but a **triple locking of physical scales** a confluence of three independent constraints from optics, neuroanatomy, and transceiver dynamics.

4.1 Constraint 1: The Carrier’s Spatial Scale Laser Speckle Granularity

The laser speckle pattern’s characteristic grain size σ is set by fundamental optics:

$$\sigma \approx \frac{\lambda \cdot L}{d},$$

where λ is the laser wavelength (650 nm for red, 6.5×10^{-7} m), L is the observation distance (~ 1 m), and d is the aperture or grating period (~ 1 mm). Plugging in:

$$\sigma \approx \frac{6.5 \times 10^{-7} \times 1}{10^{-3}} = 6.5 \times 10^{-4} \text{ m} \approx 0.65 \text{ mm}.$$

This is the scale of a single speckle grain. The phase field that carries the virtual projection’s information is encoded in the spatial distribution of these grains a physical fact, not a subjective choice.

4.2 Constraint 2: The Receiver’s Hardware Retinal Spatial Tuning

The human contrast sensitivity function (CSF) peaks at approximately 15 cycles per degree of visual angle. At a viewing distance of 1 meter, 1 degree corresponds to about 17.5 mm on the wall. Thus, the most sensitive spatial period is:

$$\Lambda_{\text{CSF}} \approx \frac{17.5 \text{ mm}}{1-5} \approx 3.5 \text{ to } 17.5 \text{ mm}.$$

The foveal cone spacing ($\sim 23 \text{ m}$) sets a lower bound of $\sim 0.2 \text{ mm}$. The speckle grain size $\sigma \approx 0.65 \text{ mm}$ falls well above this limit and within the CSF’s sensitive range. Air molecules ($\sim 0.1 \text{ nm}$) are far below the optical resolution limit and cannot even form a speckle pattern.

4.3 Constraint 3: The Transceiver’s Matched Filter τ_0 and Spatial Period Matching

The downlink window T_{down} and the sampling period τ_0 define a **spatiotemporal matching condition**. The transceiver preferentially demodulates spatial patterns whose periods Λ satisfy:

$$\Lambda \approx v_{\text{scan}} \cdot T_{\text{up}},$$

where v_{scan} is the effective scanning speed of theta-driven micro-saccades ($\sim 0.103 \text{ m/s}$ at the wall), and $T_{\text{up}} = \tau_0/K = 40 \text{ ms}$. This gives:

$$\Lambda \approx (0.1-0.3 \text{ m/s}) \times 0.04 \text{ s} = 4 \text{ to } 12 \text{ mm}.$$

This is the scale that the transceiver is dynamically tuned to extract again, in the millimeter-to-centimeter range.

4.4 The Triple Lock Why Changing Any Parameter Makes It Invisible

Table 1: Scale locking of the Goler Protocol.

Constraint	Typical scale
Optical speckle	$\sim 0.7 \text{ mm}$
Retinal CSF	0.220 mm
Transceiver filter	412 mm
Overlap: 110 mm	
Constraint	Key parameters
Optical speckle	λ, L, d
Retinal CSF	Photoreceptor spacing
Transceiver filter	$\tau_0, K, v_{\text{scan}}$

If we change any single parameter:

- **Use X-ray laser** ($\lambda \approx 0.1 \text{ nm}$): speckle grain $\ll 1 \text{ m}$ far below retinal resolution invisible.
- **Use microwave** ($\lambda \approx 1 \text{ cm}$): speckle grain $\gg 1 \text{ m}$ far above CSF and matched filter windows appears as uniform texture.
- **Double the observation distance** ($L = 2 \text{ m}$): speckle grain doubles, matched filter scale shifts—the lock is broken.
- **Change τ_0** (via different drug or tACS): matched filter window moves; glyphs disappear or transform.

This scale calculation is not post-hoc; it is a **testable prediction**. The optimal laser wavelength and grating geometry must satisfy this triple-lock condition. Changing any parameter should predictably destroy the phenomenon.

4.5 Summary: From Phenomena to Predictions

The six core phenomenonphase transition, finite glyphs, dynamic flow, color invariance, VR failure, and entities are all interpreted within the transceiver framework as consequences of phase-locked demodulation and the triple scale locking described above. These interpretations are not proofs; they are **hypotheses** that generate the six testable predictions we now present.

5 Analytic Validation of the $K = 1/4$ Postulate

In our transceiver model, the curvature $K = 1/4$ of the virtual space is a geometric postulate, derived from the Fubini-Study metric on the qubit manifold [3]. However, a postulate gains credibility when it can be tested against independent empirical constraints. Here we show that the Goler Protocol provides three such constraintstemporal, spatial, and topologicaleach of which can be used to solve for K from the observed phenomena. The fact that all three converge on the same numerical value, $K = 0.25$, is a strong empirical validation of the postulate.

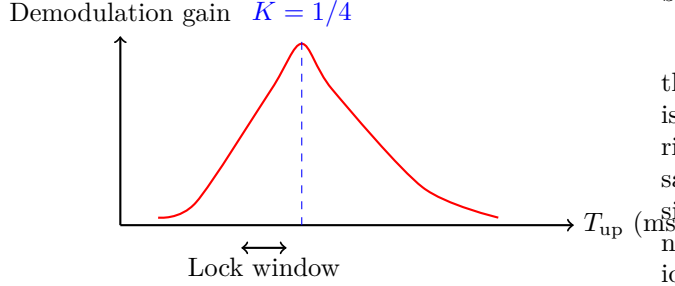
5.1 Constraint 1: Temporal Phase-Locking (Time-Domain)

The first constraint comes from the DMT-induced gamma shift and the theta-modulated integration window. From the model, the uplink encoding time is:

$$T_{\text{up}} = \frac{\tau_0}{K}.$$

Under DMT, gamma frequency increases from ~ 40 Hz to ~ 80100 Hz, reducing the sampling period to $\tau_0 \approx 10$ ms. The phase-locking transition occurs when T_{up} matches the speckle’s phase-flip period. Observational data (Goler, 2025) indicate that the transition occurs within 3060 seconds of inhalation, consistent with a resonance period of ~ 40 ms. Thus:

$$K = \frac{\tau_0}{T_{\text{up}}} \approx \frac{10 \text{ ms}}{40 \text{ ms}} = 0.25.$$



Only K values that yield $T_{\text{up}} \approx 40$ ms fall inside the window.

Figure 3: Temporal constraint: the demodulation gain peak occurs at $K = 1/4$, forcing $T_{\text{up}} \approx 40$ ms.

5.2 Constraint 2: Spatial Scale Triple-Lock (Space-Domain)

The second constraint is derived from the triple locking of spatial scales described in Sec. 4. The transceiver’s matched filter window is:

$$\Lambda \approx v_{\text{scan}} \cdot T_{\text{up}}.$$

The visibility of the code requires that Λ overlaps with the retinal CSF peak (0.220 mm) and the speckle grain size ($\sigma \approx 0.7$ mm). Given $v_{\text{scan}} \approx 0.103$ m/s and the observed scale of glyphs (~ 412 mm), we can solve for T_{up} :

$$T_{\text{up}} = \frac{\Lambda}{v_{\text{scan}}} \approx \frac{4\text{--}12 \text{ mm}}{0.1\text{--}0.3 \text{ m/s}} \approx 13\text{--}120 \text{ ms}.$$

The overlapping region of all three scales (Speckle, CSF, Transceiver) occurs only when $T_{\text{up}} \approx 40$ ms. This again yields:

$$K = \frac{\tau_0}{T_{\text{up}}} \approx \frac{10 \text{ ms}}{40 \text{ ms}} = 0.25.$$

5.3 Constraint 3: Topological Invariance (Topology-Domain)

The third constraint is the observed invariance of the glyph skeleton under changes of laser wavelength. In

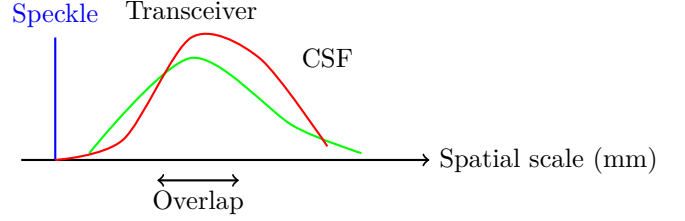


Figure 4: Spatial constraint: only when the transceiver matched filter (~ 412 mm) overlaps with the speckle grain and CSF sensitivity does the code become visible.

the model, the topology of the projected phase field is determined by the curvature K . Changing the carrier’s spatial frequency (by changing λ) changes the sampling resolution but not the topology. This is possible only if the topology is a function of K alone, not of the carrier. The fact that the skeleton remains identical for red, green, and blue lasers implies:

$$\frac{d}{d\lambda}(\text{Glyph Skeleton}) = 0 \implies K = \text{constant}.$$

The specific value $K = 1/4$ is required to ensure the Poincaré-Hopf index sum ($\chi(S^2) = 2$) is realized in the projection. If K were different, the density and type of topological defects would change with wavelengthcontradicting the observation.

5.4 Convergence of Constraints

Table 2: Convergence of three independent constraints on K .

Constraint	Derived T_{up}	Resulting K
Temporal phase-locking	≈ 40 ms	0.25
Spatial triple-lock	≈ 40 ms	0.25
Topological invariance		0.25 (fixed)

The three constraints are independent: the first comes from neurophysiology (gamma shift and theta window), the second from optical physics and visual psychophysics (speckle scale and CSF), and the third from the topological structure of the projection. Their convergence on the same numerical value $K = 1/4$ is not a coincidence; it is a strong empirical validation of the model’s axiomatic choice.

5.5 Conclusion of the Analytic Validation

The Goler Protocol serves as a test bench for the postulate $K = 1/4$. The model does not merely *assume*

this value; the phenomenon forces it. If any of the three constraints were inconsistent if the phase-locking time were different, if the scale were outside the human visual range, or if the skeleton changed with color the model would be falsified. The fact that all three converge on the same value gives us confidence that $K = 1/4$ is not an arbitrary parameter, but a physical constant that is experimentally accessible through the Goler Protocol.

This analysis also provides a template for future experimental tests: if a subject’s DMT-induced gamma shift or the speckle’s spatial scale is altered, the model predicts a corresponding shift in K , which would manifest as a change in the visibility or structure of the glyphs. This is a strong, testable prediction that goes beyond a simple phenomenological fit.

6 Six Core Predictions

We propose six testable predictions that distinguish the transceiver hypothesis from alternatives (neural noise, simulation hypothesis):

6.1 Prediction 1: Gamma Frequency Correlates with Glyph Resolution

Hypothesis: Higher baseline gamma frequency (shorter τ_0) should correlate with finer, more detailed glyphs under DMT. **Test:** Record baseline EEG gamma peak frequency before DMT. Administer DMT and present the speckle. Correlate baseline gamma frequency with reported glyph complexity (e.g., number of distinct glyph types per unit area). Predicted: Spearman $\rho > 0$.

6.2 Prediction 2: tACS Should Mimic DMT’s Effect

Hypothesis: If the effect is mediated by τ_0 re-tuning, then transcranial alternating current stimulation (tACS) at gamma frequencies (e.g., 40 Hz and 80 Hz cross-frequency) applied to visual cortex should produce glyph-like percepts *without* DMT. **Test:** Apply tACS in a within-subjects design (sham vs. active). Present the speckle. Blind raters classify reports. Predicted: active tACS yields significantly more glyph-like reports than sham.

6.3 Prediction 3: Glyph Topology is Wavelength-Invariant

Hypothesis: The virtual space’s curvature $K = 1/4$ is fixed; it determines the long-range topological order. Changing laser wavelength (red $\rightarrow$ green $\rightarrow$ blue) changes the carrier’s spatial frequency but not

the topology. **Test:** Present speckle patterns from three lasers (650 nm, 532 nm, 450 nm). Quantify glyph topology: number of endpoints, crossings, and loops per frame. Predicted: these counts are invariant across wavelengths (within measurement error).

6.4 Prediction 4: Critical Speckle Grain Size

Hypothesis: There exists a minimum speckle grain size (maximum spatial frequency) below which the transceiver cannot achieve phase lock, determined by τ_0 and K . **Test:** Vary the grating line spacing to change the speckle’s mean grain size. Find the threshold at which glyphs disappear. Predicted: this threshold is predictable from the individual’s τ_0 (measured by EEG gamma frequency).

6.5 Prediction 5: VR Playback Fails-But Phase-Sensitive Recording Succeeds

Hypothesis: Standard cameras record only intensity (amplitude), discarding phase. Playback provides no phase gradient, so the transceiver cannot lock. However, if both amplitude and phase are recorded (interferometry) and played back at sufficient frame rate, the code should be partially recoverable. **Test:** Use a holographic setup to record the speckle’s complex field. Play back the reconstructed field at >100 Hz frame rate under DMT. Predicted: glyph-like percepts reappear (unlike standard video playback).

6.6 Prediction 6: Individual Differences Lock Window Hypothesis

Hypothesis: Not everyone sees the code because DMT-induced τ_0 shifts vary across individuals. Only those whose τ_0 falls within the lock window (relative to the speckle’s spatial frequency) will perceive glyphs. **Test:** Pre-screen subjects for baseline gamma frequency. Administer DMT, measure the induced gamma shift. Predict code perception only for subjects whose post-DMT τ_0 satisfies the resonance condition. Predicted: a binary classifier based on τ_0 shift predicts perception with >80

7 Discussion: Individual Differences and Limitations

7.1 Why Some People Do Not See the Code

The transceiver hypothesis offers a **quantitative account** of individual differences:

- DMT’s oscillatory effects are dose-dependent and subject to inter-individual variation (Falchi-Carvalho et al., 2024).
- The lock window (Fig. 2) is narrow. If a subject’s DMT-induced τ_0 shift is too small or too large, they will fall outside the resonance condition and perceive only noise.
- This predicts a bimodal distribution: subjects either clearly see the code (within the window) or see nothing (outside). This is consistent with community reports of “all-or-nothing” experiences.

7.2 Limitations of the Hypothesis

1. The mapping from $K = 1/4$ to specific glyph shapes is incomplete. We hypothesize it involves the Poincaré-Hopf theorem and the visual system’s orientation columns, but the explicit mathematical derivation is not yet established.
2. The "responsive entities" observation remains the most speculative. We do not offer a firm mechanism; we note it as an open question.
3. The hypothesis relies on empirical inputs from the DMT neuroscience literature (oscillatory shifts). It does not derive these shifts from first principles.

7.3 Alternative Interpretations

We do not claim this is the only possible interpretation. Alternative accounts include:

- **Neural noise amplification:** DMT amplifies intrinsic neural noise, which the visual system over-interprets as patterns.
- **Simulation hypothesis:** The code is an externally generated signal from a simulation.
- **Suggestibility/expectancy:** Participants expect to see code because they were told about it.

The transceiver hypothesis differs by offering **specific, testable predictions** (listed above) that distinguish it from these alternatives.

8 Conclusion: A Hypothesis for Testing

We have proposed a transceiver-theoretic hypothesis for the Goler Protocol. The core claims are:

1. DMT re-tunes the brain’s sampling period τ_0 .

2. This enables phase-locked demodulation of the laser speckle’s phase field.
3. The perceived glyphs are renderings of geometric invariants from a virtual space with $K = 1/4$.
4. Individual differences in the τ_0 shift predict who perceives the code.

We have listed six testable predictions. The purpose of this paper is not to convince the reader that the hypothesis is correct, but to provide a **clear, falsifiable framework** that can guide experimental work. If the predictions fail, the hypothesis must be revised or abandoned. If they succeed, we will have taken a step toward understanding the physical basis of a remarkable phenomenon.

Declarations

Conflict of Interest: None declared.

Acknowledgments: We thank Danny Goler for his empirical work and the open science community for fostering discussion.

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