

# The Coherence Phase Threshold Hypothesis: A Matter-Light Reversion Principle of Gravimetric Energy Phase Transitions

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## Abstract

This paper proposes a novel, yet scientifically grounded, reinterpretation of the mass-energy relationship through the lens of graviton-bound coherence collapse. We introduce the Coherence Phase Threshold Hypothesis, which posits that matter is formed through the gravitationally induced phase transition of coherent light, and conversely, that sufficient inverse conditions (such as cold and gravimetric compression) enable matter to revert back into structured light. This framework not only aligns with Einstein's mass-energy equivalence but upgrades it with a coherence-based dimensional model. By unifying thermodynamic entropy, quantum decoherence, and gravitational modulation, we outline a closed-loop matter-light cycle, culminating in the Gravitational Reciprocity Principle (GRP) and the proposed observational signature of coherence decay: gamma-ray emission. Though speculative, this hypothesis does not violate any established physical laws, but rather extends their implications through a logically consistent, field-based interpretation of energy, mass, and gravitational interaction.

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## Section 1: Introduction to Light-Mass Duality and Phase Transitions

Modern physics accepts light as both wave and particle — massless yet momentum-bearing. However, this duality conceals a gap: if photons are structureless, how do they interact with gravitational fields? We challenge the assumption of masslessness and introduce a new interpretation: light possesses structured coherence that, when compressed by gravity, crosses a threshold into mass. This phase boundary — the Coherence Phase Threshold — governs the transformation between energy and matter.

This hypothesis aligns with known gravitational lensing, relativistic momentum, and spacetime curvature phenomena. It builds upon accepted quantum electrodynamics while proposing an extended structure for the photon — one capable of responding to gravimetric modulation.

This hypothesis also sets the stage for a novel mathematical expression of graviton behavior:

$$0^3 = 1 + 1 + 1 \text{ (EMC)}$$

Interpreted metaphorically, this formula reflects a graviton's capacity to collapse from an apparent null state ( $0^3$ ) into a tripartite coherence release — each "1" representing a distinct component of energy, mass, and coherence. Though speculative, this equation offers a conceptual model through which graviton behavior — especially its mass-assignment role — may be better understood. We revisit and develop this model in later sections.

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## Section 2: Coherence Collapse vs. Entropy

Entropy describes disorder, often misinterpreted as the driver of phase change. Coherence collapse, however, is not disorder but transformation — a structural reconfiguration of light into mass via spatial coherence breakdown. Unlike entropy, coherence collapse results in increased local order (i.e., mass with stable form). This understanding redefines mass genesis as a process of gravitationally forced phase transition, not chaotic energy loss.

In astrophysical systems, this process is observable in stellar cores. Heat and pressure drive coherent light (photonic plasma) into collapse, forming the first atomic structures. Hydrogen, as the lightest element, emerges first. As gravitational and thermal pressure intensifies, helium nuclei form through fusion, and later heavier elements cohere via successive collapses of internal coherence fields.

This structured transition creates a cascade of coherence-moderated states — each stabilized by graviton interaction. Notably, lithium — the third element in the periodic table — is often anomalous in stellar processes. It is rarely formed in significant quantities and tends to be destroyed in stellar interiors, suggesting a unique interaction with gravitational coherence thresholds. Some studies indicate lithium does not cohere directly from hydrogen but through intermediary, possibly nonlocal, reactions. This anomaly aligns with the idea that coherence collapse is not merely local but also field-regulated.

We propose that coherence, decoherence, and entropy operate as a triadic system:

- **Coherence** enables energy to retain structure and potential.
- **Coherence collapse** converts that structure into mass.
- **Entropy** represents the decay or breakdown of that mass back toward unstructured energy.

Together, these forces form a closed string of cosmic balance — one that ensures mass formation, stability, and eventual return to light. Without coherence, atoms would not stabilize. Without entropy, mass would never decay. And without collapse, light would never become matter. This triad becomes essential to understanding universal structure.

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## Section 3: Energy-Mass Reinterpretation — $M = E \times C^2$

Einstein's equation  $E = mc^2$  links energy and mass through the constant speed of light squared. In our model, we preserve the algebra but reinterpret  $C^2$  as the Coherence Collapse constant.

This constant expresses the energy required to force coherent light (structured photons) into mass. Thus:

$$\text{Mass} = \text{Energy} \times \text{Coherence Collapse (M = E} \times \text{C}^2)$$

This revision retains dimensional consistency with established physics but introduces a mechanism to describe how mass originates in gravitational contexts.

To further unpack this transformation, we must ask: if energy is a wave field and mass cannot exist without energy contained, then mass requires energy to be compressed into a single point — an atom — via entropic cohesion. The graviton, operating within this regime, becomes the field regulator that induces this transformation.

If light is represented by a 1-0-1 state (coherent structure with phase potential) and complete entropy or dark energy/dark matter represents either 1-1-1 or 0-0-0 respectively, then mass formation requires coherence collapse toward a singular, fixed point — and mass decay requires expansion outward. The need for a balanced cosmological system implies the presence of a recursive counter-state — an inverse or return pathway from mass to energy. This underpins the rationale for proposing a recursive complement to Einstein's equation — one governed by gravimetric coherence thresholds and the behavior of the  $0^3 = 1+1+1$  model.

In short, the coherence state of light determines whether it collapses into mass or remains unmanifest. Gravity provides the catalyzing condition, and entropy ensures the return.

This framework provides a more complete energy-matter-coherence loop, rooted in the interplay of wave collapse, entropic decay, and gravimetric modulation.

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## Section 4: The Matter-Light Loop & the Role of Gravity

Among the first atoms formed in the nuclear cores of stars are hydrogen and helium. But lithium, which should theoretically follow, is often absent or depleted in post-supernova environments. Mainstream astrophysics acknowledges this lithium deficiency — sometimes referred to as the "cosmic lithium problem" — but no consensus has been reached on why this deficiency exists. Our hypothesis suggests that lithium represents a photonic midpoint — an unstable or boundary-state molecule — between the gas phase of early atoms and the heavier, solid-forming elements.

Lithium's light molecule equivalent (Gg [G-B4/UV] Gg) may inherently lack the thermal IR and yellow spectronic structures needed to stabilize as an atom under post-collapse conditions. When subjected to extreme gravimetric compression, such as in a supernova, lithium may not transition forward like heavier elements, nor revert cleanly into light-like hydrogen or helium. Instead, it may shatter or collapse back into structured photonic forms.

Beryllium, by contrast, appears to offer greater resistance to reversion. Slightly denser, and hypothesized to carry a yellow/IR spectral balance, it may straddle the stability boundary just enough to endure phase collapse and reform as atomic matter. Hydrogen and helium, being semi-metals in behavior and essentially formless, can exist either as gases or near-light states. Their structural softness may render them immune to the same gravimetric fracture that destabilizes lithium.

This may explain why lithium is often destroyed (or missing) rather than preserved: it exists too close to the phase boundary between structured light and atomic solidity. In this view, lithium's apparent fragility is not a failure of fusion pathways but rather an inherent property of its coherence balance — a balance that cannot withstand the cosmic turbulence of star death.

If true, this makes lithium a key signature of coherence thresholds in nature. Its behavior — its absence — is not an anomaly but a marker of the light-matter reversion zone. A lattice built of graviton-stabilized UV structures would appear black, absorbent, and optically inert — a precursor signature of dark matter object (DMO) formation. If such a structure accrues mass or destabilizes, it may draw additional UV/blue light, compress under coherence inversion, and eventually become encased in extra graviton boundaries to protect spacetime lattice continuity. This inversion describes the reverse of star formation — and highlights lithium's pivotal role in determining a system's structural fate.

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## Section 5: The Gravitational Reciprocity Principle (GRP)

The GRP posits that every emission of matter-energy from a star is cosmically mirrored by an absorption elsewhere, typically by a black hole or DMO. This balance does not occur locally but across spacetime, maintaining coherence-energy equilibrium.

This principle is most clearly modeled by **quantum entanglement**, where the action or measurement of one particle instantaneously correlates with another, regardless of distance. Likewise, we consider the GRP to be a spacetime-wide entanglement structure — balancing energy emergence and disappearance across the cosmic lattice.

**Superposition** plays a complementary role: before collapse, energy exists in a distributed state of probabilistic coherence. A star's emission or a black hole's absorption acts as the collapse point — choosing a coherent path among all possible states. The GRP thus implies not just balance, but *selective coherence resolution* at large scales.

**Traditional Newtonian Law:** For every action, there is an equal and opposite reaction.

**GRP Reformulation:** For every energetic emergence, there is a coherent absorption elsewhere, preserving spacetime balance.

This principle reconciles Newtonian mechanics with quantum entanglement by shifting the concept of action-reaction into a coherence-field perspective. While Newton's law assumes

spatial locality, GRP extends that conservation law to quantum-coherent fields, where actions may be entangled or distributed across nonlocal distances.

This approach parallels speculative but increasingly discussed ideas such as **ER=EPR** — the proposition that entangled particles are connected via Einstein-Rosen bridges — and the **Holographic Principle**, where spacetime geometry emerges from entangled quantum states. The CPT framework is consistent with these interpretations, suggesting that graviton-bound coherence may provide the physical substrate from which both mass and space derive structure.

Note:

ER = EPR: A Conceptual Bridge Between Gravity and Quantum Mechanics

**ER = Einstein-Rosen bridge**

This is a *wormhole* — a hypothetical tunnel in spacetime that connects two distant points.

**EPR = Einstein-Podolsky-Rosen entanglement**

This refers to quantum entanglement — where two particles remain connected across space and time, such that a change in one instantly affects the other.

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## Section 6: Phaseon Decay and Gamma-Ray Emission

High-energy astrophysical phenomena, such as gamma-ray bursts, may be interpreted as the result of coherence collapse or reversion events. Theoretical particles like the graviton or axion — both proposed coherence regulators — may decay or phase shift under extreme conditions. This decay, rather than destroying the particle, releases its bound coherence in the form of gamma radiation.

We note that tau particles — short-lived and energetic — are often observed in the aftermath of high-energy particle collisions. These particles may serve as the intermediary between coherence collapse and gamma emission, potentially acting as the threshold-trigger for graviton-regulated decay.

Experiments such as CAST (CERN), and observations from the Fermi Gamma-ray Space Telescope support the possibility of exotic particle decay into photons. We interpret these events as signatures of the matter-light reversion process.

We further clarify that while the graviton and phaseon (sub-photon particles, analogous to quarks) families in this model are novel postulates, axions are not. They are widely accepted hypothetical particles proposed to solve the strong CP problem in quantum chromodynamics and serve as viable candidates for dark matter. Their mention here is not as original theory, but as a compatible precedent.

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## Section 7: The Coherence Phase Threshold

We define the Coherence Phase Threshold (CPT) as the energetic boundary at which structured light transitions to mass under gravitational force. This threshold is not arbitrary but field-conditional:

- **High heat + pressure = mass formation (e.g., stellar formation/ignition)**
- **Extreme cold + compression = mass reversion (e.g., black hole/DMO formation/inversion)**

Once CPT is reached, the internal coherence collapses or expands, allowing for mass-light interchange.

In this context, the formation of a star represents a forward-phase coherence collapse: fusion initiates, and matter ignites into radiant light and energy. Conversely, the formation of a black hole or DMO represents the inverse: the object collapses not into visible ignition, but into graviton-dense inversion — converting matter back into unobservable, coherent field-bound light. This inversion is not destruction but reversion — a return to the pre-manifest state of coherent light held in gravitational suspension.

Together, these dual pathways define the coherence balance of the cosmos — a symmetry of ignition and inversion, of radiant emergence and structural return.

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## Section 8: MAGNETS — Mass Anchoring Gates & Network Exchange Trips

Gravitons may be conceptualized as **Mass Anchoring Gates** — field-level decision nodes that regulate whether energy manifests as mass. Within the 0-1-0 graviton model, gravitons may hold states of total mass, partial mass, or no mass. This enables them to mediate transitions between coherent light and observable matter.

Simultaneously, large cosmic mass structures like stars and black holes can be understood not just as endpoints, but as **Network Exchange Trips** — transfer points where coherence is rerouted across spacetime.

Together, these elements form a linguistic and conceptual acronym: **MAGNETS** — *Mass Anchoring Gates & Network Exchange Trips*. This aligns metaphorically with real magnets, which require external objects or fields to express their attractive forces. In isolation, a magnet's influence remains latent — a superposition of potential.

In this model, gravimetric coherence behaves similarly. Without interaction (such as a star, black hole, or graviton gate), light's latent mass potential remains unexpressed. It is the structured topology of spacetime — the signaling of coherent objects — that actualizes motion, phase change, and observable matter.

From a physics standpoint, this MAGNETS model introduces a bidirectional control system:

- **Mass Anchoring Gates (Gravitons):** Function as quantum state selectors for energy—assigning, withholding, or modifying mass states based on local field conditions. This is conceptually consistent with the idea of gravitons as discrete carriers of gravitational influence, mediating phase stability and spacetime curvature.
- **Network Exchange Trips (Cosmic Mass Objects):** Act as coherence routing hubs—analogue to switch nodes in a magnetic levitation (mag-lev) system—where energy or mass is rerouted based on gravitational topology and coherence phase. These structures determine path bifurcations for mass-energy based on spacetime conditions.

This creates a **dynamic spacetime lattice**, where coherence, mass, and trajectory are governed not by isolated interactions but by networked phase transitions and gravimetric signaling. In this sense, **MAGNETS reflect the deeper symmetry of natural systems**, encoding balance between emission and absorption, presence and potential, through graviton-field interactions.

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## Section 9: Photonic Inversion and the Structural Symmetry of Black Holes

Revisiting the lithium light molecule — modeled as 3–4–3 (Gg [G–B<sub>4</sub>/UV] Gg) — we propose that black holes arise from an inversion of this structure. In this state, blue/UV coherence becomes dominant, rendering the structure non-radiative, optically black, and gravitationally dense.

This inverted molecule, with B-UV at its center, functions as a crystalline coherence trap, where light's structural energy is locked within a graviton shell. The result is a graviton-bound phase lattice — a photonic mirror of the star's forward-fusion process.

Where stars represent forward coherence collapse into mass and radiance, black holes become the endpoint of coherence inversion — structured darkness. Spacetime, in response, encapsulates this inverted coherence via extra graviton density, creating isolation boundaries we observe as event horizons.

This understanding reflects the full cycle:

- Light → Mass (coherence collapse)
- Mass → Inverted Light (coherence inversion)

And this inversion completes the cosmological equation:

**Matter is light inverted by gravity.**  
**Darkness is light encapsulated by gravity.**

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## **Conclusion: A Unified Matter-Light Framework**

The Coherence Phase Threshold Hypothesis proposes a graviton-centered cosmological cycle, integrating fundamental theories of physics into a unified model of matter-light conversion. Before diving into the core implications outlined below, it is helpful to revisit the gravitational and coherence concepts that guide this hypothesis. The Gravitational Reciprocity Principle (GRP) — derived from observations of balance in stellar and black hole activity — echoes the symmetry at the heart of classical mechanics, while the Coherence Phase Threshold (CPT) expands our understanding of phase boundaries under gravitational and thermal conditions.

Spelled out, the GRP (Gravitational Reciprocity Principle) is the assertion that for every energetic emergence (e.g., mass ejection or radiative output), there exists a complementary absorption elsewhere in spacetime. This law of energetic pairing expands Newton's third law into a nonlocal, field-based framework. The CPT (Coherence Phase Threshold), meanwhile, identifies the energetic tipping point at which light coheres into matter or, inversely, reverts under specific gravimetric conditions — as in the ignition of stars or the formation of graviton-dense DMOs (dark mass objects/black holes).

Together, these principles allow us to reframe fusion and collapse events not as independent occurrences, but as field-interlinked transformations of light and structure. Whereas fusion ignites stars into self-sustaining brilliance, coherence inversion inverts that process — capturing light into graviton-bound darkness. Both are essential to a balanced universe.

The Coherence Phase Threshold Hypothesis integrates:

- Classical mechanics (Newtonian action-reaction)
- Quantum mechanics (entanglement, decoherence)
- Relativistic models ( $E = mc^2$ )
- Gravitational theory (Gravitational Reciprocity Principle and Coherence Phase Threshold)

By viewing mass as light under gravimetric coherence pressure, and gamma-ray bursts as coherence decay events, we unify disparate physics into a coherent cycle: light → mass → light.

The universe, through this lens, is a closed-loop coherence field where stars, black holes, gravitons, and gamma rays all act as phases in a dynamic, balanced energy-matter continuum.

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## Addendum 1: Phase-State Taxonomy of Light, Mass, and Coherence

### Abstract

This supplement formalizes the expanded photonic phase-state model introduced in the Fusion Polarity framework, distinguishing four binary coherence states that govern the behavior of light, mass, and matter formation. It introduces the crucial difference between dark mass and dark matter, establishing that dark matter aligns with the total collapsed state (0–0–0)—a graviton-only field devoid of coherent light—while dark mass represents structured, graviton-dense light packets (e.g., UV/Green configurations) in a hidden or inverted state. The distinctions made herein align with cosmological observations and propose a novel, coherence-based explanation for dark matter without invoking exotic particles.

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### 1. Binary Coherence States of Photonic–Mass Structures

Every unit of light, mass, or atomic structure is described by a three-phase binary triplet: one value for each of the photonic subcomponents—typically mapped to spectrums (color core), phaseons (UV/IR shell), and graviton envelope (Green field). These represent the internal phase conditions, not classical quantum numbers.

0–0–0 Collapse / Null Phase      All components inactive; no light, no coherence, only gravity

0–1–0 Stable Mass                      Central phase coherence; standard atoms or structured molecules

1–0–1 Full-Spectrum Light      Outer coherence active; internal void; FS light with mass potential

1–1–1 Over-Cohesion / Fission      All phases active; unstable; triggers molecular division or explosion

### 2. Reclassifying Dark Mass vs Dark Matter

#### 2.1. Dark Matter — 0–0–0

Dark Matter is redefined here as a collapsed graviton field, in which no spectrums or phaseons remain active. It does not absorb, reflect, or emit light of any wavelength. Its gravitational effect persists, but all light-based coherence has been lost.

*Dark Matter is the residual graviton lattice of collapsed light. It is dead coherence—a shadow of former energy.*

#### 2.2. Dark Mass — (Graviton-Dense, UV/Green Phase Structure)

Dark Mass is not collapsed light. It is cohered light, specifically dominant in Blue/UV spectrums and encased by a Green graviton shell. Unlike dark matter, it may contain or emit low-level radiation, particularly radio frequencies, and it exhibits structural form and mass density.

*Dark Mass is not lightless, but phase-shifted light with graviton-locked mass. It's not collapsed—it's encoded.*

**3. Coherence and Fusion: A Dynamic Taxonomy**

These states offer a reinterpretation of fusion behavior, not just as thermonuclear activity (as seen in stars), but as a contextual function of coherence:

- 1–1–1 Over-coherence      Fission, mitosis, light emission
- 1–0–1 FS Light coherence    Mass potential, inversion
- 0–1–0 Balanced coherence    Stable atom or mass object
- 0–0–0 Collapse of coherence    Residual graviton field (Dark Matter)

During atomic division, a stable 0–1–0 atom may emit light as it momentarily transitions toward 1–1–1 and splits—releasing light-phase components previously held in balance.

**4. Summary & Implications**

This coherence-based model proposes:

- Dark Matter is the 0–0–0 end-state of light collapse—invisible, non-interacting, but gravitational.
- Dark Mass is a structured light object, graviton-heavy and phase-shifted, not collapsed.
- Fusion polarity arises from the surrounding phase context—hot fusion (in stars) versus cold fusion (in DMOs like Teleios).
- Atomic behavior can now be described as light-coherence logic—where mass is an organized phase state, not a separate substance.

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**Addendum 2: Glossary**

<u>Term</u>	<u>Definition</u>
<b>GRP (Gravitational Reciprocity Principle)</b>	A field-based extension of Newton's third law, proposing that every energetic emission (e.g., radiative output) has a corresponding energetic absorption elsewhere in spacetime.

<b>CPT (Coherence Phase Threshold)</b>	The tipping point at which light coheres into matter or, conversely, decoheres into structured light under gravimetric or thermal pressure.
<b>Phaseon</b>	A component of photonic matter representing the IR/UV shell in the two-part structure: Spectron = Color/Chromatic core. Phaseons, affecting phase control/visibility are linked to field modulation and coherence dynamics.
<b>Spectron</b>	The central color-core particle within structured light (photeons), defining the spectral identity (e.g., yellow, green, blue) of the photon.
<b>Graviton</b>	A proposed foundational particle that anchors coherence and gives structure to mass via gravity. In this model, it is also the final remnant in the 0–0–0 collapse phase (dark matter). It is also theorized to be the phaseon to the green spectron.
<b>Dark Mass</b>	Structured, graviton-dense light in a Blue/UV-Green configuration. Unlike dark matter, it has form, density, and limited radiation.
<b>Dark Matter</b>	A graviton-only field where all coherent light components (spectrons and phaseons) have collapsed. Invisible and non-radiative, yet still gravitationally active.
<b>1–1–1, 1–0–1, etc.</b>	Binary coherence states describing the activation or collapse of the three core photonic components. Used to classify matter-light phase transitions.
<b>FS Light (Full-Spectrum Light)</b>	A coherence state (1–0–1) indicating potential for mass formation through compression and inversion.

## Coherence Collapse

A gravimetric or thermal inversion that forces mass to revert into structured light, typically through supernovae or black hole formation.

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