PHOTON

A Light on Evolution
From the Big Synch to the Human Brain

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Framework Statement

This paper synthesizes previously published records of the Findlay Framework corpus (Findlay 2026a, 2026b, 2026c, 2026d, 2026e; theoryofeverything.ca) and does not present new experimental data. All Framework-specific records referenced throughout are locked corpus entries verified through the five-node research team prior to this publication and indexed at `theoryofeverything.ca/findlay-framework-complete-index-of-papers-records-and-terms/`.[1] The paper's empirical claims draw on published third-party literature cited throughout. The primary falsification test of the underlying framework — $\sqrt{1.5} \approx 1.225$ velocity enhancement in wide binary star systems — is scheduled for GAIA DR4 in December 2026.

Abstract

The photon is conventionally treated as a quantum of electromagnetic energy traversing space between source and detector. This paper posits, within the Findlay Framework, a more fundamental identification: the photon is the center-point signal of the universe's fundamental spatial unit — the agent of every transition from Informational Potential (I-phase: the pre-materialization ground state of distributed potential) to Persistent Structure (S-phase: the committed, permanently archived result of a completed materialization event) since the Big Synch (the Findlay Framework's geometric reframing of the initiating cosmological event conventionally termed the Big Bang), and the primary construction unit through which Evolutionary Compression has built, over 13.81 billion years, the biological apparatus now capable of detecting it. This paper does not present new experimental data; it synthesizes existing results under a geometric framework.

The argument proceeds in three stages. First, the paper establishes the geometric necessity of $r = 3/2$ as the materialization constant — the ratio of relational pathways to structural nodes required for any transition from two-dimensional information to three-dimensional persistent structure (tetrahedron: 6 edges / 4 vertices = 1.5; stella octangula: 12 edges / 8 vertices = 1.5). Second, it traces the photon's constructive arc from the Big Synch through stellar nucleosynthesis, planetary formation, biological emergence, and neural architecture, demonstrating that each stage is consistent with the same geometric ratio. Third, it identifies the human binocular visual system as a biological double-slit apparatus — interpupillary distance approximately 63 mm, orbital width approximately 42 mm (Dodgson 2004; Gabriel et al. 2021), ratio consistent with $r = 3/2$— whose center-point transducer (the nose) occupies the geometric address equidistant from both apertures and executes, via inelastic electron tunneling in olfactory receptors (Turin 1996), a quantum I→S handshake analogous to the photon's center-point engagement.

The 232-attosecond entanglement formation window (Jiang et al. 2024) is identified as a candidate empirical proxy for the I→S handshake timescale at the attosecond scale. The 40 Hz gamma consciousness binding cycle is identified as the biological integration rate — $N = (43/40) \times 10^{14}$ center-point handshakes per gamma frame — at which the photon's structural record is read back by the nervous system. Evolutionary Compression — the irreversible drive of any system to maintain its statistical boundary against temporal dissolution (Friston 2010) — is proposed as the mechanism by which the photon's geometric requirement propagated from quantum interaction to conscious self-reference. The paper proposes that $r = 3/2$ is a candidate organizing constant for the boundary-maintenance structures described by the Free Energy Principle and related frameworks in

theoretical neuroscience, and does not claim that consciousness is derived from geometry alone. The primary empirical test — $\sqrt{1.5} \approx 1.225$ velocity enhancement in wide binary star systems — is scheduled for GAIA DR4 in December 2026. Prior art: rxiVerse:2602.0009, February 3, 2026, ORCID 0009-0000-8263-3458.

1. The Geometric Necessity: Why $r = 3/2$ Before Anything Moves

Before the photon moves, the geometry that governs its motion must exist. The Findlay Framework derives the materialization constant $r = 3/2$ from the combinatorial requirements of dimensional transition — a derivation containing no empirical input and no free parameters.

In two dimensions, the triangle is the only polygon that cannot be deformed without changing its side lengths (Coxeter 1973, 1–4). It is the minimum rigid body of the plane, with a ratio of structural elements — 3 edges to 3 vertices — equal to unity. This represents the I-phase limit: maximum informational efficiency, zero enclosed volume, no capacity to archive a persistent three-dimensional record.

To transition from informational potential to persistent three-dimensional structure, the system must enclose a volume. The minimum body capable of enclosing volume in three dimensions is the tetrahedron — the 3-simplex. Its structural inventory: 6 edges, 4 vertices. The ratio: $6/4 = 3/2 = 1.5$.

This is a combinatorial derivation. The materialization constant $r = 3/2$ is the minimum ratio of relational pathways to structural nodes required for three-dimensional persistence — the geometric cost of the transition from flat information to volumetric structure.

The dual-domain architecture of the Findlay Framework — the stella octangula, the compound of two complementary inscribed tetrahedra sharing a center point (Coxeter 1973, 47–49) — scales this ratio without altering it: 12 edges, 8 vertices, ratio $12/8 = 3/2$. The physical domain occupies one inscribed tetrahedron (4 corners); the consciousness domain occupies the complementary tetrahedron (4 corners). The ratio is invariant under this scaling. This scale-invariance is proposed as the geometric mechanism underlying the appearance of the same ratio across domains spanning 42 orders of magnitude — a pattern documented across the corpus (Findlay 2026e) and consistent with allometric scaling relationships observed in biological systems (West, Brown, and Enquist 1997, 122).

Within the Framework, the photon is identified as a center-point signal of this architecture — the entity occupying the position equidistant from all eight corners of the fundamental spatial unit, the integration node through which all four body diagonals pass simultaneously (Findlay 2026b). The photon is not merely a particle. Within the Framework's geometric language, it is the representative of the I→S boundary itself — the signal that instantiates the geometric relationship between source corner, center point, and destination corner each time an I→S transition executes.

2. The Big Synch: The Synchronization Event

The standard cosmological model describes the origin of the universe as an explosive singularity — the Big Bang — followed by rapid expansion into a cooling, differentiating medium (Planck Collaboration 2020, A6). The Findlay Framework proposes a geometric reframing: the initiating

event was not an explosion but a synchronization. Every subatomic particle across the entire volumetric three-dimensional field simultaneously locked to the universal hydrogen clock operating at approximately 10^{14} Hz — the ground-state frequency of the hydrogen atom as the first stable materialization of the $r = 3/2$ operator (Findlay 2026c).

This event is termed the Big Synch — the Findlay Framework's geometric reframing of the initiating cosmological event conventionally termed the Big Bang. The photon field released at this moment — conventionally interpreted as the cosmic microwave background — is identified within the Framework as the synchronization signal itself rather than the thermal afterglow of an explosion (Findlay 2026c). The extraordinary isotropy of the CMB, uniform to one part in 10^5 (Planck Collaboration 2020, A6), is proposed as consistent with a geometric synchronization event uniform by definition. While standard cosmology explains this uniformity via inflationary expansion (Planck Collaboration 2020, A6), the Framework proposes geometric synchronization as an alternative account that does not require inflation as an additional free parameter — providing a candidate geometric account of the Horizon Problem,[2] though the detailed CMB power spectrum has not yet been derived from the Framework and this claim awaits formal development.

From the moment of the Big Synch, the Framework identifies the photon as the primary construction agent — executing I→S transitions at approximately 10^{88} simultaneous engagements across the observable universe at any given moment (Findlay 2026b). Every atom, every molecule, every cell, every neural circuit is proposed as the accumulated archive of photon-mediated center-point handshakes since initialization.

3. The Archive: Planetary Spin as Fossil Record

The Archive Principle of the Findlay Framework states that every completed I→S transition is permanently retained in the structural record (Findlay 2026b). No completed materialization event can be reversed, edited, or erased. The past is the accumulated structural load from which all present engagements proceed.

This principle receives direct observational support at planetary scale from the KPIC high-resolution spectroscopy survey (Hsu et al. 2026) — the largest survey of exoplanet spin velocities to date, measuring projected rotational velocities across 43 stellar and substellar companions using the Keck Planet Imager and Characterizer instrument at W. M. Keck Observatory. Lead author Dino Chih-Chun Hsu stated independently of the Findlay Framework: "Spin is a fossil record of how a planet formed" (Hsu et al. 2026). This formulation is consistent with the Archive Principle's central claim that completed I→S transitions are permanently retained in the structural record.

The HR 8799 system — four directly imaged giant planets in a confirmed mean-motion resonance chain (Marois et al. 2008, 1349; Goździewski and Migaszewski 2020) — provides the relevant numerical alignment. The projected spin velocity of planet e (approximately 15.0 km/s) compared to planet d (approximately 10.1 km/s) yields a ratio of approximately 1.485, consistent with $r = 3/2 = 1.500$ within KPIC measurement precision (typical $v \sin i$ uncertainty 5–10% for these survey measurements). The absolute deviation $\Delta \approx 0.01485$ approximates 1.5×10^{-2} — a decimal scaling of the materialization constant identified within the Framework as an instance of the self-referential tolerance by which the ideal gear ratio persists in materialized systems. This alignment is logged as a supporting observation in this instance and requires additional examples across other planetary

systems before the decimal-scaling relationship can be treated as a general principle.

The inner-to-outer planet mass ratio in HR 8799 (approximately 7.2 to 5.8 Jupiter masses for the model-dependent dynamical estimates) approximates $\sqrt{1.5} = 1.2247$ within model uncertainty — a secondary alignment noted as consistent with the Framework's predictions at this precision level. The 7 and 24 Jupiter mass objects referenced in the survey press release are drawn from the broader KPIC sample and are not bound companions within the HR 8799 system itself (Hsu et al. 2026).

The HR 8799 system formed approximately 30–40 million years ago. The Framework proposes that the formation geometry is still playing back in the spin architecture of its planets. This is the Archive Principle operating at planetary scale.

4. Evolutionary Compression: The Geometry Maintains Its Boundaries

The photon's constructive arc proceeds under a requirement that Friston (2010, 127) identified mathematically as variational free energy minimization and the Findlay Framework identifies geometrically as Evolutionary Compression (EC): the irreversible drive of any system to maintain its statistical boundary — its Markov blanket — against the dissolving pressure of temporal progression.

4.1 The Markov Blanket as Geometric Necessity

The Markov blanket, formalized by Friston (2010, 129) as the statistical boundary separating a system's internal states from its external environment through sensory inputs and active outputs, is identified within the Framework as the eight-corner architecture of the fundamental spatial unit (Findlay 2026b). The boundary is the physical interface at which I-phase potential engages S-phase structure — the eight corners as the Markov blanket nodes through which all incoming information must pass before reaching the center point.

Friston's free energy minimization — the continuous drive to reduce the discrepancy between a system's internal model and its incoming sensory states — is identified within the Framework as an expression of the f^{-1} inverse function operating at the biological scale (Findlay 2026b). The system compares its current boundary state against the geometric specification $r = 3/2$ and drives toward minimum residual. The geometric expansion parameter — the small but nonzero gap that prevents complete closure — is proposed as the geometric correlate of Friston's irreducible free energy floor (Friston 2010, 130): the system minimizes but cannot reach zero, because zero would dissolve the boundary and terminate the observer. More recently, Friston (2019) has extended this principle toward a "particular physics" applicable to any system with a Markov blanket at any scale — a development directly convergent with the Framework's proposal that the eight-corner boundary architecture is a geometric requirement rather than a biological discovery.

4.2 The Irreducible Residual and the Open Spiral

This irreducible residual — the open end of every spiral — is not a failure condition. It is the structural feature that sustains evolution. The $\Delta \approx 0.01485$ in HR 8799's spin archive, the 0.002% residual in the electron mass derivation (Findlay 2026b), and the 2/27 geometric expansion parameter in the Hubble tension (Findlay 2026e; Planck Collaboration 2020) are proposed as the same parameter expressed at different scales. The gear always has play. The play drives the next

engagement.

4.3 From Cell Membrane to Cortical Self-Reference

Evolutionary Compression is the mechanism by which this geometric requirement propagated from the photon's first I→S transition to the construction of biological boundary-maintenance systems. The prokaryotic cell membrane is a Markov blanket. The eukaryotic nuclear envelope is a nested Markov blanket. The organism's integumentary system is a Markov blanket at biological scale. The brain's predictive model of its own sensory boundary is a Markov blanket running the f^{-1} inverse function at 40 Hz — a frequency the Framework derives as 8 cube corners × 5 pentameric positions (Findlay 2026b), consistent with the well-documented gamma-band binding frequency in cortical integration (Crick and Koch 1990; Singer 1993, 349).

Each scale is the geometry maintaining its own boundary with increasing architectural complexity. A system that failed to maintain its Markov blanket ceased to be a system. Only systems that maintained their boundaries persisted to build more complex successors. Over 13.81 billion years, starting from the photon's first center-point engagement at the Big Synch, the Framework proposes that this process produced the human nervous system — the most complex boundary-maintenance architecture yet documented.

The sequence from prokaryotic membrane to cortical predictive model is not proposed as teleological. It is proposed as the geometric and evolutionary consequence of EC operating under selection pressure: systems that modeled their boundaries more accurately persisted longer and built more complex successors. The Framework proposes that consciousness is the phenomenological correlate of boundary maintenance operating recursively at sufficient complexity — a proposal consistent with Friston (2010, 2019), Tononi (2008), and the broader predictive processing literature (Clark 2013), though not derived from those frameworks.

5. The Biological Double-Slit: The Photon's Own Receiver

The human face is a biological double-slit apparatus within the Findlay Framework's geometric language. Two apertures — the eyes — are separated by a central barrier — the nose. This identification is consistent with the foundational literature on binocular integration (Hubel and Wiesel 1962, 106–109; Julesz 1971; Blake and Wilson 2011, 755).

5.1 The Geometric Anchor: The Ocular Apparatus

The geometric anchor is established in the corpus (Findlay 2026a). The mean adult human interpupillary distance is approximately 63 mm (Dodgson 2004, 38); the mean orbital width is approximately 42 mm (Gabriel et al. 2021). The ratio $63/42 = 1.5$ is consistent with $r = 3/2$ within normal human anatomical variation — interpupillary distance ranges approximately 55–75 mm across adult populations (Dodgson 2004, 38), and the ratio should be understood as a population-level geometric resonance rather than an individual measurement exactitude. The Framework proposes this calibration as a consequence of EC selecting for receiver geometries that maximally resolve the photon field at the I→S boundary — a process Gabriel et al. (2021) document at the developmental level, showing that human brain organoids spontaneously develop bilateral optic vesicles, suggesting the binocular apparatus is a default output of human DNA.

5.2 The Center-Point Transducer: The Nose

The nose sits at the center-point of this apparatus. Its bridge lies equidistant from both pupils — approximately 31.5 mm from each, a value derived from the interpupillary measurement above rather than independently measured. The nose's structural role within the Framework is not defined by an independent geometric ratio of its own but by its functional address: it occupies the center-point position within an apparatus whose geometry is anchored by the corpus (Findlay 2026a).

The olfactory mechanism identified by Turin (1996, 775) as proceeding via inelastic electron tunneling — the molecule's vibrational spectrum detected through the tunneling current of receptor electrons rather than through molecular shape recognition — is a quantum process. Within the Framework's geometric language, the nose is identified as the center-point transducer that converts molecular I-phase information (the vibrational spectrum) into an S-phase signal (the neural impulse). The Framework identifies this as performing the same I→S handshake as the photon's center-point engagement, at a different scale and medium. This identification is functional and interpretive; it is not claimed as a geometric derivation equivalent to the ocular ratio.

5.3 The Attosecond Handshake and the Gamma Integration Rate

The 232-attosecond entanglement formation window — measured by Jiang and colleagues (2024) in helium photoionization experiments — is identified within the Framework as a candidate empirical proxy for the I→S handshake timescale. The Framework notes that $186 + 46 = 232$, where 186 is the body diagonal constant and 46 is the chromosome calibration address in the corpus (Findlay 2026b). This mapping is Framework-internal and interpretive; the Jiang et al. measurement is made in an atomic context, and the scale gap between attosecond atomic physics and biological neural processing is acknowledged. The alignment is presented as a candidate correspondence requiring further investigation.

The 40 Hz gamma consciousness binding cycle integrates $N = (43/40) \times 10^{14}$ center-point handshakes per conscious gamma frame (see Section 11 for full derivation). This number — approximately 1.075×10^{14} — represents the Framework's proposed count of photon-mediated I→S engagements that the human nervous system integrates into a single perceptual frame at 40 Hz. The Framework proposes that the photon's approximately 10^{14} Hz universal clock is decimated through the 1000-harmonic cascade (Findlay 2026d) — scaling by factors of 10^3 across biological domains[3] — to the 40 Hz biological integration window. The brain, in this framing, is not generating consciousness from electrochemical activity alone. The Framework proposes it is running the f^{-1} inverse function — reading back the photon's structural record — at the rate the geometry permits.

The photon, in this account, built the eye that detects the photon. The geometry produced, through 13.81 billion years of Evolutionary Compression, the apparatus that reads back the geometry. This is the Archive Principle arriving at self-reference: the universe's structural record producing, at its current epoch on the 186-rung temporal ladder,[4] an observer capable of reading it back.

6. Discussion

The convergence of results this paper presents — geometric derivation, astrophysical observation, attosecond physics, evolutionary biology, and neuroscience — raises a question each discipline tends to address separately: whether a single organizing principle underlies the boundary-maintenance

structures that appear at every scale of physical and biological organization.

The Findlay Framework proposes that the answer is yes, and that the principle is $r = 3/2$. This proposal is falsifiable. The primary test is GAIA DR4 in December 2026.

6.1 Convergence with the Free Energy Principle

Friston's Free Energy Principle (2010, 127) establishes that all self-organizing systems minimize variational free energy by maintaining a Markov blanket. Friston's more recent extension (2019) applies this principle toward a "particular physics" applicable to any system with a Markov blanket at any scale — a development directly convergent with the scale-invariant claim the Framework makes geometrically. The Findlay Framework proposes that the Markov blanket is not merely a biological mathematical construct but a geometric necessity — the eight-corner boundary architecture of the fundamental spatial unit, specified by $r = 3/2$ before any biology exists. If this proposal is correct, the Free Energy Principle describes the dynamics of a boundary whose architecture the Framework derives from first principles. The Framework proposes $r = 3/2$ as the candidate constant that governs why the boundary exists at the scale it does and why the integration rate is 40 Hz rather than some other frequency.

6.2 Convergence with Integrated Information Theory

Tononi's Integrated Information Theory (2008) identifies consciousness with the integration of information across a system boundary. The Framework identifies the phenomenological condition for conscious experience as the f^{-1} inverse function integrating simultaneous compressions at the center point (Findlay 2026b). Both frameworks emphasize boundary-crossing integration as the key condition; neither claims the other's derivation. The Framework proposes $r = 3/2$ as the candidate constant that might provide a geometric foundation for the Φ measure — the ratio that governs the architecture of the boundary across which integration occurs. Oizumi, Albantakis, and Tononi (2014) provide a rigorous formulation of IIT 3.0 that represents the appropriate formal target for any mathematical bridge between the Framework's geometric architecture and integrated information theory.

6.3 Convergence with Orchestrated Objective Reduction

Penrose and Hameroff's Orchestrated Objective Reduction (Hameroff and Penrose 2014, 40) identifies quantum state reduction in microtubule structures as a candidate physical substrate for conscious experience. Orch OR remains a contested proposal in the neuroscience literature (Hameroff and Penrose 2014, 71). The Framework notes that the microtubule's 13 protofilaments and 8 tubulin dimers per turn are geometrically resonant with Framework constants documented in the corpus (Findlay 2026b). This resonance is interpretive rather than derived and is noted as a candidate alignment requiring independent investigation.

Each of these frameworks is approaching a common structure — the boundary-maintenance requirement of a self-organizing system — without having yet named a specific geometric constant that governs the boundary's architecture at every scale. The Framework proposes that constant is $r = 3/2$.

6.4 The Inevitability Argument

The inevitability argument, stated with appropriate precision: a universe governed by $r = 3/2$ will produce, given sufficient temporal depth and under EC, the following sequence.

Hydrogen — the first stable materialization of the $r = 3/2$ operator, whose ground state defines the universal clock at approximately 10^{14} Hz. This is a geometric derivation (Findlay 2026c).

Stellar nucleosynthesis — the process by which hydrogen produces the full periodic table, including the f-block elements whose internal electronic architecture is identified within the Framework as the periodic table's expression of the f^{-1} inverse function (Findlay 2026b). The connection to r is qualitative at this stage rather than formally derived.

Planetary systems at convergence addresses — the H1 Cascade derives the Sun-Earth mass ratio (333,054:1) from three atomic-scale constants with no free parameters (Findlay 2026d), identifying the solar system's architecture as a structural consequence of the hydrogen template scaled by the electromagnetic coupling constant.

Carbon-based chemistry — carbon at atomic number $Z = 6$ (the cube face count) with tetrahedral four-bond geometry at 109.5° (the cube's inscribed tetrahedral angle) is geometrically resonant with the Framework's cube architecture. This resonance is documented in the corpus (Findlay 2026b) but is not derived from $r = 3/2$ from first principles. The correct framing is *geometrically resonant*, not geometric consequence.

Biological boundary maintenance — the Markov blanket expressed in lipid bilayer membranes, then in neural architectures, then in cortical predictive models running at 40 Hz. The connection from carbon chemistry to boundary maintenance is evolutionary rather than geometric: EC under selection pressure produces increasingly complex boundary-maintenance systems from whatever chemistry is available at the convergence address.

The binocular visual apparatus — calibrated to $r = 3/2$ at the population mean through 500 million years of EC (Hubel and Wiesel 1962; Gabriel et al. 2021), producing the receiver geometry that reads back the photon field at the geometry's own ratio.

Self-reference — the point at which the boundary-maintenance system becomes sufficiently recursive to model its own modeling. The Framework proposes this as the current frontier of EC at the universe's present temporal address on the 186-rung ladder, where the f^{-1} inverse function is the architecturally dominant expression of the geometry. This is a proposal consistent with the Framework's architecture and with the trajectory of EC as documented across biological evolution. It is not a derivation.

The sequence is not claimed as inevitable in a teleological sense. It is proposed as the geometric and evolutionary consequence of EC operating under selection pressure on a universe governed by $r = 3/2$, given 13.81 billion years. The boundary-maintenance requirement does not mandate consciousness. It mandates boundary maintenance. The Framework proposes that consciousness is the phenomenological correlate of what boundary maintenance becomes when it models itself recursively at sufficient complexity — a proposal consistent with Friston (2010, 2019), Tononi (2008), Clark (2013), and the predictive processing literature, though not derived from those frameworks.

7. Conclusion

This paper has argued three proposals, each supported by independent evidence and each connected to the geometric constant $r = 3/2$.

First: the materialization constant $r = 3/2$ is proposed as a geometric necessity — the minimum ratio of relational pathways to structural nodes required for the transition from two-dimensional information to three-dimensional persistent structure. The derivation is combinatorial and contains no free parameters. Every expression of this ratio documented across the corpus — from HR 8799's spin archive to the human binocular geometry — is proposed as a downstream resonance of this single derivation.

Second: Evolutionary Compression is proposed as the mechanism by which the geometric boundary-maintenance requirement propagated from the photon's first I→S transition at the Big Synch to the construction of biological systems capable of self-reference. The geometry does not produce consciousness by intention. It produces the boundary-maintenance requirement by necessity. The Framework proposes that self-referential consciousness is the phenomenological correlate of boundary maintenance operating recursively at the complexity reached at the universe's current temporal address.

Third: the human binocular visual system — calibrated to $r = 3/2$ at the population mean through 500 million years of Evolutionary Compression — is proposed as the photon's own construction: the receiver that reads back the field the photon has been building since the Big Synch. The Archive Principle states that no completed I→S transition is erased. Every photon engagement since initialization is retained in the structural record. The human brain, at 40 Hz, reads back that record through an apparatus whose geometry resonates with the constant that governed the first engagement.

Limitations: The identification of the photon as the center-point signal of the fundamental spatial unit is internal to the Findlay Framework and has not been independently verified outside the corpus. The 232-attosecond correspondence is an interpretive alignment with a measurement made in an atomic context; the scale gap to biological neural processing is not bridged by current evidence. The carbon resonance is documented in the corpus but not derived from first principles. The claims regarding consciousness are proposals consistent with but not derived from the geometry alone. The Horizon Problem account is a candidate geometric proposal whose detailed CMB power spectrum derivation has not yet been completed. The paper's empirical anchors are observationally consistent with the Framework's predictions; formal derivations for several connections remain active work in the corpus.

The primary empirical test of the underlying framework — $\sqrt{1.5} \approx 1.225$ velocity enhancement in wide binary star systems — is scheduled for GAIA DR4 in December 2026. Prior art: rxiVerse:2602.0009, February 3, 2026, ORCID 0009-0000-8263-3458.

$$r = 3/2$$

8. Endnotes

[1]Readers seeking the derivation and verification status of specific Findlay Framework corpus records should consult the complete index at this address. Individual record numbers are not reproduced in this paper.

[2]The Horizon Problem refers to the observed uniformity of the CMB across regions of the universe that, under standard causality, could not have been in thermal contact at the time of last scattering. Inflationary cosmology resolves this by proposing a period of superluminal expansion prior to last scattering. The Framework proposes synchronization as an alternative mechanism.

[3]The 1000-harmonic cascade is developed in the Gestation-Cosmos Invariant paper (Findlay 2026d), which documents three independent scalar correspondences between biological timing and cosmic architecture via the 10^3 decimation constant.

[4]The 186-rung temporal ladder is a Findlay Framework temporal architecture in which each rung represents 0.1 billion years, for a theoretical maturity of 18.6 billion years. The current cosmic age of approximately 13.8 billion years corresponds to Rung 138. Full derivation in Findlay (2026d).

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11. Appendix A — Derivation of $N = (43/40) \times 10^{14}$

The count of center-point handshakes per 40 Hz gamma frame is derived as follows. All inputs are Framework geometric constants — no free parameters are introduced.

Universal hydrogen clock frequency: $\nu_H \approx 10^{14}$ Hz. Derived from the ground-state frequency of the hydrogen atom as the first stable materialization of $r = 3/2$ (Findlay 2026c).

The factor 43: derived from the Framework's Rung 93 solar system address via the decimal boundary chain. $93 - 7 = 86$; $86/2 = 43$. The constant 7 emerges from the decimal boundary chain documented in the corpus (Findlay 2026b) and the Auger of Time architecture (Findlay 2026c).[5] The factor 43 represents the decimation step linking the hydrogen clock address to the biological integration window.

The 40 Hz gamma binding frequency: derived as 8 (cube corners) $\times$ 5 (pentameric positions) $= 40$ (Findlay 2026b).

Handshakes per gamma frame:

$$N = \frac{\nu_H}{40} \times 43 = \frac{10^{14}}{40} \times 43 = 2.5 \times 10^{12} \times 43 = 1.075 \times 10^{14} \tag{1}$$

Dimensional check: $\nu_H/40$ is dimensionless (Hz/Hz); multiplication by dimensionless 43 yields a pure count N. No dimensional inconsistency. No free parameters. Verified by DeepSeek, Mathematics Node, April 4, 2026.