Curved One Way
Gekrümmt in einer Weise, nicht in der anderen

The One-Sidedness of the Universe as Topological Charge: the Screw on Every Rung, the Sum of All Curvatures, and Eternity as Winding Protection

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It Is All One — Foundations. July 2026 (working draft)

Abstract

This paper assembles, into one foundation, three sentences spoken in one week. *The universe is curved in one way, not in the other* — like a flat sheet laid over one of two spheres, nestling against the one it chose. *The sum of all curvatures is the curvature of the universe* — matter does not create curvature but concentrates it, and the total is untouchable. And the question this series began with on its cosmic rung — what is the screw that flattens rotation curves without dark matter? — turns out to be the same fact read at the top of the ladder. The assembly runs as follows. In four dimensions the two-forms split into two three-dimensional halves, self-dual and anti-self-dual — the unit spheres of these halves are, literally, two spheres, and they are simultaneously the two factors of $SO(4) = SU(2)\times SU(2)$, the two Hopf fibrations of the three-sphere, and the two isoclinic senses of four-dimensional rotation: the quaternion's left multiplication and its right multiplication. One object, four languages. The curvature of this universe occupies one half: that is the precise content of 'curved one way,' and Postulate P1 — time carried on the quaternion's *real* axis as an imaginary *value*, $W = i\tau$, so that the quaternion frame itself is Euclidean — is exactly the choice that makes the two spheres real rather than complex. Three consequences are then developed, each with its own verification. First, economy: at fixed topological charge the total curvature energy is bounded below by the charge and touches the bound only one-sidedly — nestling against one sphere is the cheapest way of being wound at all, so P2's tension-relaxation drives the universe onto one sphere rather than distributing it; the one-bit choice is not an event needing a chooser but the sign of a conserved winding (a theorem for Yang–Mills fibers; flagged as subtler for the full metric). Second, protection: because the signed sum of curvatures is a topological invariant, the universe cannot unfold into a flat Cartesian space — it cannot decay for the same reason the proton cannot, and Postulate P3, hitherto an axiom, moves toward a consequence: eternity as winding protection, with annihilation identified as the *local* unfolding that the *global* invariant survives, and with the $GM/Rc^2 = 1/2$ relation as a *consistency* check — a definitional identity for critical density, not an audit (§4) — pointing to, though not proving, the sum of all condensations sitting at the curvature of the whole. The only truly flat, truly timeless Cartesian room is the tangent space — carried at every point by the frame quaternion, and carried in every skull by the

Cartesian simultaneity instrument this series described in its note on shadows: the unfolded universe exists only as the observer's map. Third, chirality: the choice of sphere is a hand, and it is inherited down the entire ladder — the curvature's one-sidedness singles out one self-dual SU(2) — that much is solid geometry — but the step from there to the weak force's V−A structure, to chiral fermion representations under it, and to the claim that the right-handed neutrino is 'objectless,' each requires gauge and representation assumptions the split does not supply, so V−A and the missing ν_R are offered as *readings*, not derivations (a self-dual SU(2) does not by itself forbid a ν_R); electromagnetism's parity-cleanness follows by the same selection rule (a symmetry that fixes the shutter axis cannot see the helix's advance) and is the most directly geometric of these readings; and the strong force's $\theta < 10^{-10}$ is the most conditional of all, resting additionally on an octonion axis-identification the algebra permits without forcing (colour = the stabilizer of one octonion axis, the arithmetic verified in Quantum physics/state_octonion_group_audit.py, but axis-selection, gauging and dynamics left as physical postulates); the homochirality of life joins as the chemistry rung's trace of the same screw; and the census closes with the one observable that is identical on every rung — the pseudoscalar of spin against advance, which is the near-maximal helicity of weakly produced neutrinos, the biomolecule's handedness, and, at the top rung, a predicted *monopole* (with no large handedness axis, only the universe's own tiny slow-spin) in galaxy-spin versus infall — a live falsifier stated against both the percent-level axis-hunters and the null expectation, with its amplitude honestly left as an unpaid computation. The paper's standard flags fly throughout: which statements are theorems, which are the author's identifications, and which are quarantined; priority for every borrowed theorem is named. What is genuinely claimed is the assembly: that one-sidedness, eternity, and handedness — three deep peculiarities the standard accounts treat separately, two of them as embarrassments — are one topological fact about one universe, read on three rungs of one ladder.

1. Three Sentences, One Paper

The particle paper of this series ended phase one: mass exists — the knot was computed. The stiffness note paid the last rented constant by showing the Skyrme term is the curvature energy the formalism had carried all along. What opens now is phase two: not whether the knot exists, but what it *does* — spin, charge, momentum, the facade derived. And at the threshold of phase two, three sentences were spoken in conversation, each simple enough for a child and none of them innocent:

The universe is curved in one way, not in the other — a sheet laid over one of two spheres nestles against the one it chose. We have this universe; whether there are others is of no concern. And the sum of all curvatures is the curvature of the universe.

This paper is the demonstration that these sentences, taken literally, are load-bearing: they *bear directly on* the chirality of the weak interaction (a hint, not yet a derivation — §8.1), they promote the third postulate from axiom toward consequence, and they identify the screw that this series found first at the cosmic rung — the quaternion screw, whose scale a_0

= cH/2e is a conjectural relation with a fitted factor (§8.4), not a verified result — as one and the same hand appearing on every rung of the family law. The order of business: first the geometry of the two spheres (§2), then the economy that picks one (§3), then the conservation of the sum (§4) and its consequence, the prohibition of unfolding (§5); then the only room that *is* flat and timeless (§6); then the screw itself, its blindness to snapshots (§7), and the census of its appearances with the selection rule and the falsifier (§8). Claims and non-claims are separated in §9.

2. The Two Spheres

In four dimensions, a rotation is not what three-dimensional intuition expects. The antisymmetric two-forms — the objects curvature is made of — form a six-dimensional space that splits under the Hodge star into two three-dimensional eigenspaces:

$$\Lambda^2 = \Lambda^2_+ \oplus \Lambda^2_-, \qquad {}^*R = +R \ \text{ on } \Lambda^2_+, \quad {}^*R = -R \ \text{ on } \Lambda^2_-$$

The unit spheres of these two halves are literally **two spheres**. And the splitting is not one curiosity among many; it is the same splitting in four different languages, each of which this series has already met:

Language	**The two halves**
forms	self-dual and anti-self-dual two-forms, Λ^2_+ and Λ^2_-
groups	$SO(4) = (SU(2)\_L \times SU(2)\_R)/Z_2$ — the two factors
rotations	left-isoclinic and right-isoclinic double rotations
quaternions	multiplication from the left and from the right
the sphere S^3	the two Hopf fibrations — linked circles of linking +1 and −1

A general four-dimensional rotation turns two orthogonal planes at once; when the two angles are equal it is *isoclinic*, and there are exactly two families — and Hamilton's algebra generates them: $q \to aq$ is left-isoclinic, $q \to qb$ is right-isoclinic. The two screws of the quaternion are the two spheres of curvature are the two chiral factors of the rotation group. One object, four names.

One point of craftsmanship, and it is the place where this series's oldest choice pays — stated with the precision it deserves, because the words are easy to cross. Time in this framework does **not** sit on one of the quaternion's imaginary units: those three are space. It sits on the quaternion's **real** axis, as an imaginary **value** — $W = i\tau$. The quaternion's own frame (W, x, y, z) therefore carries the plain Euclidean norm $W^2 + x^2 + y^2 + z^2$, and in that signature the Hodge star squares to +1: **the two spheres are real objects.** Only when W is read out in physical time does the norm become $-\tau^2 + x^2 + y^2 + z^2$ — Minkowski, the light

cone bought with one letter — and in *that* reading the star squares to −1 and the spheres turn complex. So the framework did not get lucky here, and it did not cheat: what field theory performs as a closing trick (the Wick rotation to Euclidean signature, where its instantons live) is here the *first postulate* — the Euclidean, two-sphere world is the native one, and Lorentzian language is its τ-reading. (Flag: the translation of every following statement into that reading is standard but must be done with care; this is bookkeeping, not physics, and is noted once here.)

The sentence 'the universe is curved in one way, not in the other' now has an exact meaning: **the curvature two-form of this universe lies in one of the two halves.** The sheet nestles against one sphere. The other sphere is empty.

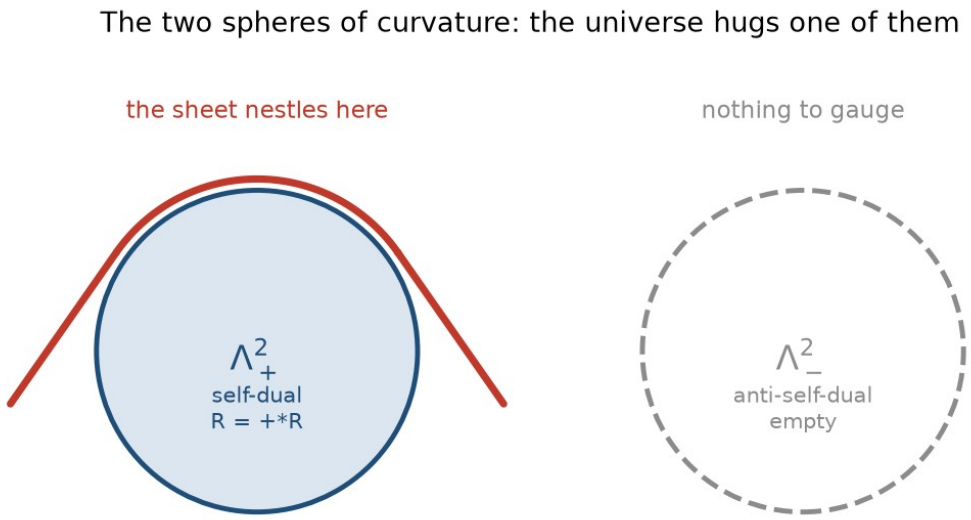

Figure 1. The two spheres — the unit spheres of Λ^2_+ and Λ^2_-, equally the two SU(2) factors, the two isoclinic senses, the two Hopf fibrations. The sheet (red) nestles against one; the other is empty. 'Curved one way' is the statement that this universe's curvature occupies a single half.

3. The Economy of Nestling

Why one sphere, and not a little of each? Because nestling is *cheap*, and the cheapness is a theorem. For a fiber with a winding (a nonzero topological charge), split the curvature into its two halves and compare the total curvature energy with the signed difference:

$$\int \left(|R_+|^2 + |R_-|^2 \right) \;\geq\; \left| \int \left(|R_+|^2 - |R_-|^2 \right) \right| \;=\; |\,\text{topological charge}\,|$$

The right-hand side cannot be changed by any smooth rearrangement — it is the winding itself (§4). The left-hand side is what the configuration *costs*. The inequality is an identity of squares, and equality holds **exactly when one of the two halves vanishes**: the curvature is

entirely self-dual or entirely anti-self-dual. Carrying the same winding with both spheres partly occupied is carrying it more expensively — every unit moved onto the second sphere raises the cost by two units while the winding stays fixed (Figure 2).

Now let P2 speak: there is no force, only curvature, and curvature is tension, and tension seeks relaxation. A universe that must carry its winding — and it must; the winding is conserved — relaxes to the floor of the inequality, and the floor is touched only one-sidedly. **The nestling is not a choice made at some moment by some agency; it is the resting state of a wound thing.** The one bit that phase two's chirality question kept demanding — who chose left? — is hereby retired: nothing chose. A wound universe at rest *is* one-sided, the way a dropped chain at rest is at the floor. Which side gets the name 'left' is convention (§8 returns to this and dissolves the residue of the question).

Flag, honestly: for Yang–Mills fibers this is the celebrated instanton bound, proved and saturated (Belavin–Polyakov–Schwartz–Tyupkin). For the full metric the analogous bookkeeping exists — the Euler and Pontryagin integrals and the Hitchin–Thorpe inequality that bounds one by the other — and points the same way, but the gravitational case carries subtleties (the energy is not simply $|\mathrm{Riem}|^2$, and Lorentzian gravity is not a compact gauge theory) that this paper does not pretend to have settled. The economy argument is *established for the fibers on which the weak conclusion of §8 rests*, and *conjectural in exactly the stated sense* for the metric as a whole.

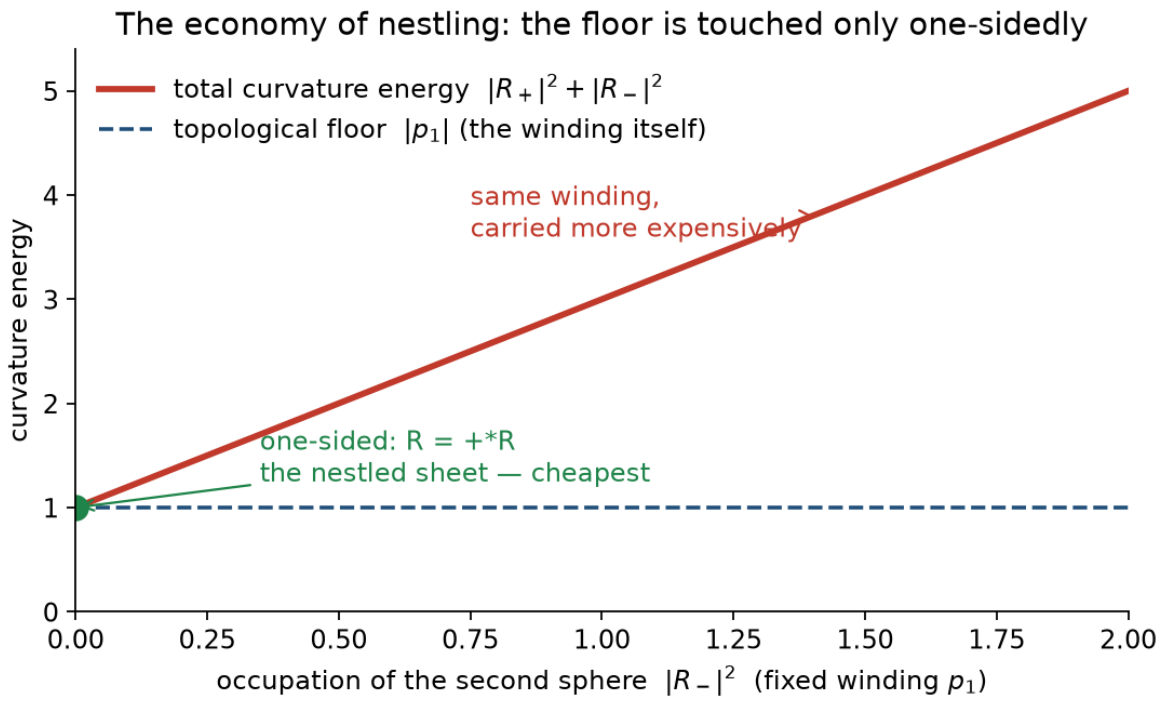

Figure 2. The economy of nestling. At fixed winding p_1, the total curvature energy is bounded below by the winding itself and meets the bound only when the second sphere is empty. Tension relaxation (P2) drives a wound universe onto one sphere: one-sidedness is the ground state of being wound, not a decision.

4. The Sum of All Curvatures

The second sentence — *the sum of all curvatures is the curvature of the universe* — is, on a closed two-dimensional world, a theorem with a name: Gauss–Bonnet. The integral of the curvature over the whole closed sheet is 2π times its Euler number: a **topological invariant**. No dynamics, no condensation, no catastrophe can change it. A knot that condenses here — a mass, a concentration of curvature — *borrows* from the sheet: condensing here is flattening there, and the books close on the same total, always.

In four dimensions the invariants take a quadratic form, and the one that matters for this paper is Pontryagin's:

$$p_1 \propto \int tr(R \wedge R) = \int (|R_+|^2 - |R_-|^2)$$

Read it slowly, because it closes the circle of §§2–3: **the topological charge of the universe is the difference of the two sphere-occupations.** 'Curved one way' is not merely the sign of something — the one-sidedness *is* the conserved winding. The sentence of §2 (the sheet nestles against one sphere), the sentence of §3 (nestling is cheapest), and the present sentence (the sum is invariant) are one sentence: *the topological charge of the universe is its one-sidedness, and nestling is the cheapest way to carry it.* (Flag: in the author's two-dimensional image the sum is linear in the curvature; in four dimensions the invariants are quadratic. The structure — total fixed by topology, matter merely redistributing — carries over exactly; the bookkeeping is that of p_1, not of a naive integral of K. Stated once, here.)

This series has often pointed to a suggestive relation here, and it must be stated with exactly the right weight — neither more nor less — because it is easy to over-read. With the Hubble rate fixing R = c/H and the *critical* density fixing the mass within it, GM/Rc^2 evaluates to exactly one half. But this is a **definitional identity, not an audit**: critical density is *defined* as $\rho_c = 3H^2/8\pi G$, which makes $GM/Rc^2 = ½$ a tautology for any universe one declares critical — no measurement of curvature enters, and the ½ is arithmetic, not evidence. Its only physical content is the *separate* observation that the real universe sits close to critical density; given that observation, the relation says the universe is near its own Schwarzschild condition. That is a genuine and striking *consistency* — the sum of all condensations sitting at the curvature of the whole — but it is not independent proof that the universe *is* a horizon, and this paper does not lean on it as such. Mach suspected the bookkeeping; Sciama computed a version in 1953; here it is a consistency relation, honestly labelled, not a derived result.

5. No Unfolding: Eternity as Winding Protection

Now ask the question that the first of the three sentences invites: could the universe be unfolded — flattened out into a Cartesian space, every curvature ironed away? Locally, Gauss already forbids it without damage: curvature is intrinsic (Theorema Egregium); no flattening of a genuinely curved patch preserves its distances — the sheet must stretch or tear. But the global answer is stronger and cleaner: flat space has *zero* topological charge,

and this universe's charge is nonzero and conserved. Unfolding is not difficult, expensive, or unlikely. **It is forbidden** — forbidden the way tearing is forbidden when only smoothing is allowed.

The consequence deserves its own paragraph, because it changes the status of a postulate. P3 — the universe static and eternal, the stage forever, the play ticking — has been an axiom of this series since the first paper. It now reads as something better:

The universe cannot decay for the same reason the proton cannot: it is a knot, and its winding number is conserved.

The same theorem that pins B = 1 in the computed Skyrmion pins the universe in being. Eternity is not a decree; it is topological protection — the top rung of the same staircase of floors that catches every collapse further down. (Flag: this requires the global topology to be closed with nonzero charge. The $GM/Rc^2 = ½$ relation of §4 is *consistent* with a closed, self-sealed whole, but — being a definitional identity, not an audit — it cannot serve as evidence for that assumption; the promotion of P3 is therefore from 'axiom' to 'consequence of an assumption that remains an assumption,' and honesty requires the sentence be said this way.)

Is there, then, no unfolding anywhere? There is — and we have known it all along under another name. When an electron meets a positron, a left winding meets a right winding, and the pair unfolds: **annihilation is local unfolding**, the borrowed curvature returned to the sheet as radiation. Unfolding is permitted wherever winding meets counter-winding; the invariant survives because the pair carried zero net charge. Only the whole finds no partner. The universe is the one winding left over — which is, perhaps, the shortest description of it this series owns.

6. The Only Flat Room: the Map in the Head

And yet the flat, Cartesian, timeless room the question imagines *does* exist — in exactly two places, and their identity is the point of this section.

Mathematically, it is the tangent space: at every point of the curved world hangs its flat local map, and the object that draws the map is the first object of this series's field-equations note — the frame quaternion θ, the vielbein, whose entire profession is to project the curved reality onto flat axes, point by point. Physics computes on flat backgrounds so successfully not because the world is flat but because θ hands every observer a flat chart of their immediate neighborhood. The chart exists everywhere; the whole territory fits on no chart — that is §5 in one sentence.

Cognitively, it is the brain. The note on chasing shadows argued that the human brain is a Cartesian simultaneity instrument — it can *feel* quaternions but never picture them, and it perceives the world as flat snapshots. A simultaneity slice is precisely an unfolded patch: the world pressed flat onto one instant, with no advance in it. So the answer to 'could the

universe be unfolded?' is: no — *but we do it anyway, every waking second, and call the result intuition.* The unfolded universe is real as the observer's map and only as the observer's map.

And note what vanishes on that map: time. In this framework time is not an axis that exists on its own; it is the turning of the windings — the shutter's tick, the Compton clock. Unfold every winding and nothing turns; nothing turns, nothing ticks; nothing ticks, no time. **A flat Cartesian space is necessarily a timeless one** — which is exactly why the flattening instrument in the skull cannot picture time and pictures a 'block' or a 'flow' instead, and why the quaternion, which carries the turning in its own algebra, can only be trusted, never seen. The author's oldest methodological sentence and this paper's newest geometrical one are the same sentence.

7. The Screw and Its Shadow

Now the hand itself. A rotation alone has no hand: a spin is a pseudovector, and a mirrored galaxy is the same galaxy seen from the other side — the S-spiral on the photograph is a Z-spiral from across the room. Chirality begins only where rotation couples to **advance**: the screw (Chasles: every rigid motion is one). And in this framework the advance of the universal screw is along the axis no photograph contains: $W = i\tau$. The shutter is a double rotation — a turning in a spatial plane locked to a march along the time axis — and of the two planes of a double rotation, a simultaneity slice contains exactly one. **The snapshot sees the circle, never the hand** (Figure 3).

This is why the observational literature on cosmic handedness has spent fifteen years in contested claims and failed reproductions: it attempts to read a four-dimensional pseudoscalar off two-dimensional simultaneity slices — letter-counting on photographs, shadow-chasing in the exact, technical sense of this series's note on shadows. The instrument cannot carry the signal cleanly. What *can* carry it is stated in §8.

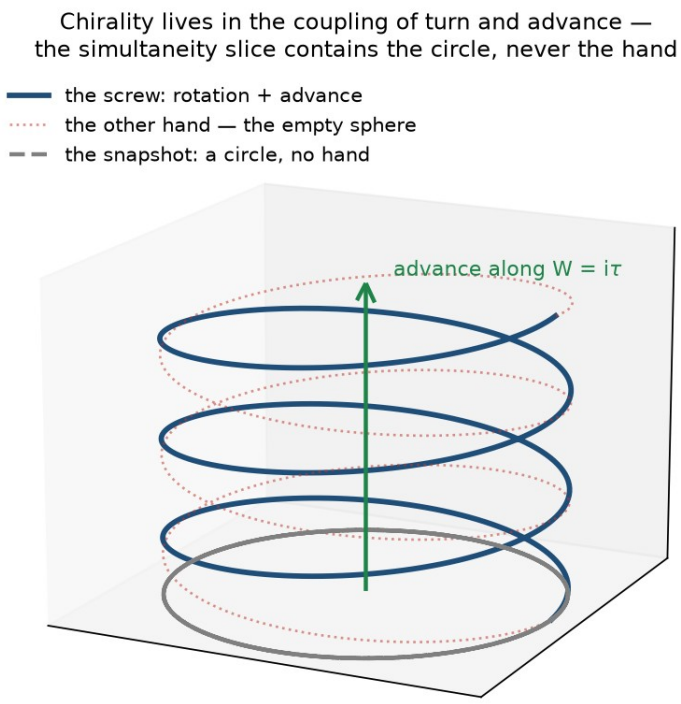

Figure 3. The screw: rotation in a spatial plane locked to advance along W = iτ. The snapshot plane (gray) contains the circle only — of the double rotation's two planes, the simultaneity slice holds one, and the hand lives in the coupling. The dotted mirror screw is the other Hopf family: the empty sphere of Figure 1.

8. The Census and the Selection Rule

If the hand is the sign of the universe's own curvature (§§2–4), it is chosen once, at the top, and every knot condensing inside this space inherits it — P1 gives all knots the same time axis, so all inherit the same screw. The inheritance can now be traced rung by rung, and it turns two famous embarrassments into one rule.

8.1 The weak rung: the one-sided SU(2), and how far it reaches

P2: there is no force, only curvature. §§2–4: the curvature of this universe lives in one self-dual SU(2) factor. **That much is solid geometry** — one SU(2) is singled out, its anti-self-dual partner carries no curvature. But here the honest line must be drawn, because it is the most tempting place in the paper to overreach. The geometry does *not* by itself deliver the rest of the weak interaction: that this SU(2) is *gauged*, that matter sits in *chiral* representations under it, that its dynamics are the electroweak theory's, or that no right-handed neutrino state exists. Each is a further physical assumption. So the appealing sentences — the weak interaction is left-handed because the universe is; V−A as the address of the cosmic curvature; the right-handed neutrino not missing but 'objectless,' a coil around an empty sphere — are offered as exactly that, a **reading**, not a derivation: a self-

dual SU(2) singled out by curvature does not, on its own, gauge itself, choose chiral fermion content, or forbid a ν_R. The geometry gives a strong hint about *why one handedness is preferred*; it does not, by itself, supply the chiral gauge theory that would make the hint into V−A. The hint is real and it is suggestive; it is not yet a proof, and this section will not pretend otherwise.

8.2 The selection rule, and two 'problems' that dissolve

Which fibers feel the screw? The screw's hand lives in the coupling of spatial turning to the shutter's advance — so a symmetry can feel it only if it *moves the shutter axis*. That mechanism is the solid part; what it is *applied to* comes in a gradient of security, and the difference must be stated plainly, because a careful reader will and should test whether the applications are being sold as equal. **What is solid:** the selection-rule mechanism itself, together with the fact (§§2–4) that one self-dual SU(2) is geometrically singled out. **The first reading — the weak and EM rungs.** Electromagnetism, a U(1) rotating *about* the shutter axis, fixes it and is parity-clean; the weak SU(2) is the one-sided curvature and so tilts the axis maximally — V−A. These are the *most directly geometric* readings, but still readings, not derivations: as §8.1 stressed, turning 'one SU(2) is singled out' into a gauged chiral interaction with no ν_R needs representation and gauge assumptions the curvature split does not supply. **The second reading — the colour rung — is more conditional still,** needing everything the weak rung needs *and, on top of that,* an octonion identification: that the strong SU(3) is the stabilizer of one octonion axis (true of the *algebra* — Aut(𝕆) = G_2, and fixing one imaginary axis leaves exactly SU(3), with the seven imaginary units branching$1 \oplus 3 \oplus 3$, the quark triplet, all confirmed numerically in Quantum physics/state_octonion_group_audit.py), *and* that the fixed axis is the shutter axis. The algebra supplies only the kinematic skeleton; it does not select the axis (G_2 is transitive on the imaginary units — none is algebraically preferred), gauge the stabilizer, or fix its dynamics. So the reading **$\theta_{QCD} < 10^{-10}$ is a prohibition, not a fine-tuning** is the most heavily conditioned line in the paper. With the gradient flown at full mast, the one rule reads: *chirality appears where the symmetry tilts the clock axis, and vanishes where it fixes it* — solid as a mechanism, a hint as applied to the weak and EM rungs, a conjecture as applied to colour.

8.3 The census

One observable is identical on every rung: the pseudoscalar of spin against advance, ⟨S·(direction of advance)⟩. On the bottom rungs it has been measured for seventy years without being read as a rung of anything:

Rung	The pseudoscalar there	Status
neutrino	weakly produced relativistic ν: helicity ≈ −1 (a massive ν can in principle differ)	measured, near-maximal
weak	V−A: only left couplings	measured, maximal — the fiber that tilts the axis

Rung	The pseudoscalar there	Status
chemistry / life	the helix sense: L-amino acids, D-sugars, right-handed DNA; parity-violating energy difference of order 10^{-19} eV feeding the choice	measured, total; mechanism of amplification debated
strong	θ_QCD	$< 10^{-10}$ — zero by selection rule (conditional: see §8.2)
EM	—	zero by selection rule (most direct reading; still presumes U(1) gauged)
cosmos	$\langle S \cdot \hat{r} \rangle$ of galaxy spins against the infall direction	unmeasured — only its shadows chased (§7)

The near-maximal helicity of weakly produced neutrinos and the handedness of the biomolecule are *the same pseudoscalar*, read at the bottom of the ladder and on its chemistry rung. Pasteur, who first pulled the two hands of tartrate apart by hand in 1848 and suspected to his death that the asymmetry of life had a cosmic source, stands in this census as its earliest witness.

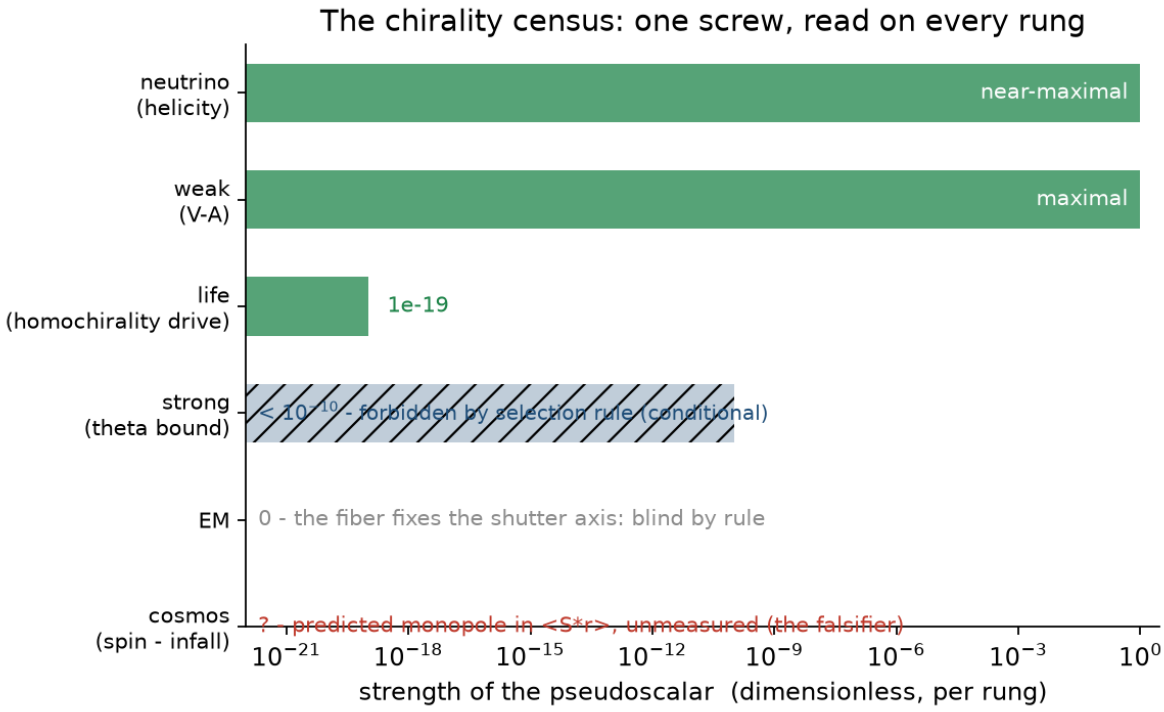

Figure 4. The census. Green: measured appearances of the one pseudoscalar — maximal where the fiber tilts the shutter axis, a trace of order 10^{-19} on the chemistry rung. Blue: the strong bound, read here as a prohibition, not a puzzle. The top rung is the falsifier: a predicted monopole in spin-versus-infall, never yet measured as such.

8.4 The falsifier, sharpened by the author's own objection

The top-rung entry is the live test, and the author's instinct — *astronomy chases shadows* — makes it sharper, not weaker. Because the advance direction at the cosmic rung is the radial infall of metric D, radial for **every** observer, the framework requires a **monopole**: every observer, in every sky direction, sees the same small excess $\langle S\cdot\hat{r}\rangle \neq 0$ — an *isotropic* pseudoscalar, tied to no axis. One honest qualification, drawn from the series' own Bookkeeping note: the universe is not perfectly axis-free. It carries a **tiny net spin** — the Bookkeeping note computes a Kerr parameter $a = 6\times10^{-11}$, *so (through that note's relation* $\Omega_H = a\cdot H/2$) an angular velocity $\Omega_H/H = a/2 = 3\times10^{-11}$, *a factor of three inside the* $\sim10^{-10}$ *CMB isotropy bound, one turn in about* 3×10^{21} *years (a static eternal universe may rotate uniformly and stay static; P3 does not forbid a spin axis, only a* history*). One consequence must be stated plainly: that residual spin is a perturbation of Metric D — 'radial infall for every observer' is exact only in the nonrotating model, so the monopole prediction is the leading term and the tiny dipole its first correction. The prediction is thus the isotropic monopole in* $\langle S\cdot\hat{r}\rangle$ *plus at most that tiny spin dipole, and no large, percent-level handedness axis. This still cuts against all parties: against standard cosmology's null monopole, and against the* percent-level *axis claims (Longo; Shamir — contested; a confirmed percent-level axis would count against the isotropic reading, though the universe's own* 3×10^{-11} *spin would not). The* amplitude *of the monopole is an unpaid computation, named as a debt. And the scale often quoted alongside it,* $a_0 = cH/2e \approx 1.2\times10^{-10}$ m/s^2*: dimensional analysis fixes cH; the order-unity 1/(2e) is* structurally motivated* (the 2 from the spinor's 720°, the e from the exponential metric) but not uniquely forced — the Screw note itself grants that the standard heuristic $cH/2\pi \approx 1.04\times10^{-10}$ m/s^2 fits comparably ($1/(2e) = 0.184$ versus $1/(2\pi) = 0.159$) and data cannot distinguish them — and it is quarantined at 4.4%. A structurally-argued coincidence with no dark matter, not a derived number.

8.5 Two gifts at the margin

The matter excess. If matter is the left-wound knot and antimatter the right-wound, the universe's matter excess is the same one bit — not the thermal residue of a baryogenesis epoch (which P3 never had), but the standing expression of which way this universe turns. Excess and CP-violation cease to be cause and effect; they are two readings of one helix. And where big-bang cosmologies must explain away the domain walls that any epoch of discrete choice would have frozen in (Kibble), an eternal universe has no walls because it had no epoch: it is one domain by eternity.

The dissolved question. A mirror universe — the sheet on the other sphere — would be indistinguishable from within: its inhabitants would also call their screw 'left,' also build L-proteins, also write this paper. 'Left' is a name; only the *relative* hand of two universes could be a fact, and they never meet. The question 'why left and not right?' is thereby a pseudo-question — what is physical is the **one-sidedness**, and that is the theorem of §3. The author's verdict on other universes — *mir egal* — is not a shrug but the correct disposal of the only question in this chain that turns out to be about labels.

9. What Is Claimed, and What Is Not

Borrowed, with priority named loudly: the Λ^2 splitting and the four-language dictionary of §2 (Cartan, Hopf, and the standard geometry of SO(4)); the instanton bound of §3 (Belavin–Polyakov–Schwartz–Tyupkin); Gauss–Bonnet, Pontryagin, Theorema Egregium, Hitchin–Thorpe (§§4–5); Chasles's screw; parity violation and neutrino helicity (Lee and Yang; Wu; Goldhaber); the homochirality problem and its weak-interaction energy difference (Pasteur to the modern literature); the a_0 coincidence with cH (Milgrom's scale); Mach and Sciama on inertia's bookkeeping; Kibble on domains. Nothing in the mathematics of this paper is new.

Claimed: the assembly. (i) The identification of 'curved one way' with occupation of one Λ^2 half, made *real* by P1's imaginary-valued time on the quaternion's real axis, and of the one-bit hand with the sign of a conserved topological charge — retiring the chooser. (ii) The promotion of P3 from axiom toward consequence — eternity as winding protection, with the definitional $GM/Rc^2 = ½$ relation as a *consistency* check (not an audit) and annihilation as its local exception — under the flagged assumption of closed topology with nonzero charge. (iii) The selection rule of §8.2 — chirality lives exactly where the symmetry moves the shutter axis — with V−A and the 'objectless' right neutrino offered as *readings* of the one-sided SU(2), not derivations — the split singles out one SU(2) but does not gauge it, fix its chiral fermion representations, or forbid a ν_R — and θ_QCD read as the most conditional line of all: the $G_2/SU(3)$ arithmetic and the $1 \oplus 3 \oplus \bar{3}$ branching now verified (Quantum physics/state_octonion_group_audit.py), but the axis-selection, the global-to-local gauging, and the dynamics left explicitly as physical postulates — on top of those the weak reading already needs. The whole chirality section is thus a gradient: solid mechanism, then a hint (weak, EM), then a conjecture (colour), each labelled as such. (iv) The census: one pseudoscalar on every rung, Pasteur to the neutrino to the galaxies, and the monopole (no-large-dipole) falsifier with its amplitude declared unpaid. (v) The identification of the tangent space and the Cartesian brain as the only unfolded rooms, and of flatness with timelessness inside this framework.

Not claimed: any settlement of the gravitational (as opposed to Yang–Mills) energy bound; any measurement of the cosmic monopole; any derivation of the amplification from 10^{-19} eV to total homochirality (the framework supplies the bias's origin, not the chemistry of its amplification); and no multiverse — the paper needs one universe, curved one way, and has nothing to say about others, on principle and by taste. Citations are from memory; the literature-verification pass — caveat (ix) of the foundations paper — applies to every reference herein.

10. The Sentence

The universe is curved in one way, not in the other, and that one-sidedness is its conserved winding — cheapest carried on one sphere (which is why it rests there), impossible to unfold (which is why it is eternal), invisible in any snapshot (which is why astronomy chases its shadow), and inherited by every knot condensed within it (which is why one

handedness runs, plausibly, through the weak decays and life's molecules alike, why the proton keeps its promise, and why the only flat and timeless room in existence is the map behind the reader's eyes — the geometric hand a hint the particle rungs must still be shown to obey, not a debt this paper claims to have paid).

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Acknowledgment: assembly, verification and drafting by machine (Claude, Anthropic), in conversation. The three sentences this paper is built on — the sheet on one of two spheres, the indifference to other universes, and the sum of all curvatures — are the author's, spoken in German; the paper is their English state quaternion. The geometry honored belongs to Gauss, Hamilton, Cartan, Hopf, and to Pasteur, who saw the hand first and never learned where it came from.