The W_7 Fold Carrier and the Readout Domain

From the Carrier Layer Split to the Contrast No-Go to What the χ Readout Must Read

Keith Taylor *VERSF Theoretical Physics Programme — Quark Mass Hierarchy Series*

A single descending audit of the physical up/down (χ) mechanism, merging and superseding "The W_7 Fold Carrier — A Layer Audit" and "The Readout-Domain Audit." It runs one thread: where the fold actually lives (carrier layer split, E_1 demoted to readout); why a standing readout forces zero contrast (the no-go, located precisely); the only escape (the contrast is carried by the irreversible commitment arrow, not by a standing state); and what that escape reduces to (a domain question about the readout, settled through three nested gates). The paper builds none of the rescue. It establishes what the rescue requires and where the corpus default fights it, with a falsification attached at each gate.

Summary for the General Reader

This paper follows one question all the way down: where does the difference between the up and down quark actually come from, in this framework — and is the place it is supposed to come from capable of producing it?

Step one: where does the "fold" live? The mechanism needs a two-sided internal structure — a fold, a plus/minus pair — to carry the up/down difference. Earlier work placed it in a particular mathematical object (the "E_1 pair" inside the W_7 shape). A check against the wider framework shows the word "carrier" had been used for three different things at once, and the fold was put at the wrong level. The honest picture has three layers: a bookkeeping shadow that collapses to a single loop; the real carrier, which is the *class* (the species-level structure); and a registration layer where individual instances merely read off what the class owns. The fold belongs to the class level. The E_1 pair is, at best, a *way of reading* the class — not the carrier itself.

Step two: why the difference comes out zero. Whatever reads off the up/down difference does so through a mirror that, by its nature, swaps the two sides. If the thing being read is a fixed, finished, balanced structure, then swapping the two sides leaves it unchanged — which forces the two readings to be equal, and the up/down difference to be exactly zero. The theory would predict the up and down quark have the same mass, which is false. Crucially, this was not a mistake nobody noticed: the earlier work deliberately put the reading in the "imbalanced" channel by design. What it never showed is that the finished structure has any imbalance there to read. A reading aimed at imbalance, applied to a perfectly balanced thing, returns zero.

Step three: the only escape. Facts, individually, are not plus or minus. But the *order* in which facts are committed has a direction — a before and an after — because committing a fact is irreversible. A direction is not balanced. So the difference might live in the *ordered history* of how facts formed, not in the finished tally. That escape is real but not free.

Step four: what the escape requires. It comes down to one decidable question: when the theory reads off the up/down difference, does it read the *finished tally* or the *ordered history*? The framework's standard reading-off machinery is built to read the finished structure and to *cancel out* exactly the order-dependent part the difference would need — which is correct for electric charge but fatal here if copied. So the escape requires the theory to deliberately read the ordered history and prove the directional part survives the reading, rather than quietly inheriting the standard machinery that erases it. The paper lays out three checkpoints this would have to pass, each with a clean failure attached. It does not declare success or failure; it shows the whole programme now turns on one finite, answerable question — *what does the readout read* — and that the default answer points toward failure unless a specific, disciplined construction earns the alternative.

Abstract

This paper audits the physical up/down (χ) mechanism in one descending pass, merging the carrier and readout-domain audits.

Carrier (the layer split). The χ-construction placed the fold sector in the E_1 irreducible sector of $H^1(W_7; \mathbb{C})$, the six-dimensional wheel cycle space. Two corpus facts make that untenable at the carrier level: the sequential-transport strand collapses the physical/admissible homology to the outer-cycle class ($H_1 \cong \mathbb{Z}\langle[C]\rangle$, a one-dimensional sector excluding E_1, since C is the uniform mode and E_1 the wave-mode pair), and the readout $a_\pm = \mathrm{Tr}(P_\pm R)$ is carrier-dependent with no corpus carrier defined independently of that homology. Under D_6 the cycle space decomposes (verified) as $A_2 \oplus B_1 \oplus E_1 \oplus E_2$; the outer cycle is A_2, the fold pair E_1, distinct orthogonal irreps. The resolution is a three-layer ontology forced by the Carrier/Generation/Realization theorems: the **transport-current shadow** ([C], one-dimensional), the **class-grain standing carrier** (where species and standing response live), and the **member-grain registration layer** (seats read class structure, owning no standing content). The fold lives at the class grain; **E_1 is demoted to a candidate readout representation**, not the carrier; and the access weights a_+, a_- are reinterpreted from member-owned amplitudes (forbidden at member grain by the Generation Theorem) to registration/projection weights of class-owned structure.

No-go (located precisely). With the fold mirror S satisfying $SP_+S = P_-$, any reflection-invariant standing state gives $a_- = \mathrm{Tr}(P_+ \cdot SRS) = a_+$, hence $\chi = 0$ (verified). This is not a theorem the construction missed: the three-gate paper anticipated the symmetry and placed χ outside the D_6-invariant algebra by design (Prop 2.1, $\ell_\chi \circ J = -\ell_\chi$). The unshown step is tighter — placing an odd readout is not showing the **committed standing state carries odd-sector weight** for it to read; an odd functional on a zero-odd-weight state returns zero. Target: $m_u \neq m_d$ (scheme-

independent), against which a symmetric state's prediction of ratio 1 fails qualitatively, independent of the exact value.

Escape and its reduction. Facts carry no primitive +/−, but the **ordered commitment history** H has an irreversible arrow a standing tally lacks. The contrast is available only if the readout R is a functional of H rather than of the final record F — and only if the reversal-odd residue of H survives into R. Two facts fix this (both verified): a label-blind readout of a balanced final record forces $a_+ = a_-$ (20,000-trial check); and only an order-sensitive functional can carry reversal-odd content (an equal-count history and its reversal share a tally but differ under an order-weighted functional). The corpus default is R(F): the Realization Theorem's record-output logic makes the output a function of standing structure with *realized churn cancelling out* (correct for charge as q/k, fatal for χ — it erases the order). The Commitment Criterion supplies the arrow and places phase memory downstream of commitment history, giving a *route* to R(H) but not a theorem that χ uses it.

Verdict — one ladder of nested gates, each with a falsification. The whole programme reduces to the domain of R, resolved through three nested gates (stated in full in §13): **Gate 0** — does R read the ordered history H or only the final record F (default $F \Longrightarrow a_+ = a_-$)? This aligns the carrier paper's standing-vs-transient fork with the readout paper's F/H domain question by a *working identification, not a strict equivalence*: F-domain implies not-order-borne, but H-domain admits a standing class state carrying an order-imprint (branch 0c), so the class-symmetry question of §6 is bypassed only by genuine transience (0b), not by every route to H. **Gate 1** — does the reversal-odd residue survive or cancel like the Realization churn (tested by $R(H\_rev) = S \cdot R(H)$)? **Gate 2** — is $|\chi|$ relabelling-invariant (physical) with only sign(χ) conventional? The paper proves R(F) insufficient, demotes E_1 to readout, locates the no-go as unshown odd-sector weight, names churn-cancellation as the obstacle, and builds none of the rescue. **[Audit — carrier contradiction dissolved at the carrier level conditional on the layer ontology; E_1 a candidate readout; the arrow rescue possible but unpaid; next is the Ordered-Commitment Readout Theorem, which the default fights at every gate, or the falsification $R(F) \Longrightarrow a_+ = a_-$.]**

Table of Contents

Part I — The Carrier

1. "Carrier" Used at Three Levels

The χ-construction said the physical fold carrier is $E_1 \subset H^1(W_7; \mathbb{C})$, the two-dimensional sector of the six-dimensional wheel cycle space on which the up/down access contrast χ lives. A corpus audit shows this conflates objects the later papers force apart. The word *carrier* was doing three jobs: naming the **transport-current** bookkeeping (how structure is carried step to step); naming the **standing** structure that owns species and generation; and naming the **readout basis** in which an access contrast is expressed. These are not the same level, and E_1 was placed at the wrong one. The fix is not to argue E_1 into or out of the homology — that debate was a category error — but to separate the layers and ask, of each, what actually lives there.

2. The Two Carriers and the D_6 Decomposition

The χ carrier (six-dimensional). The construction uses the full cycle space of the wheel: dim $H^1(W_7; \mathbb{C}) = |E| - |V| + 1 = 12 - 7 + 1 = 6$, with six triangular face-cycles spanning it and a two-dimensional E_1 doublet supplying the + and − fold lines on which a_+, a_- live, $\chi = \ln a_+ - \ln a_-$.

The transport carrier (one-dimensional, as written). The sequential-transport strand restricts the admissible homology to the outer-cycle class, H_1^adm $\cong \mathbb{Z}\langle[C]\rangle$, after the K=7 cell structure and admissible-cycle restriction, with spoke corrections $\Delta_i = \lambda_i C$. On a one-dimensional carrier there is no two-dimensional pair for a_+, a_-, and χ has no domain. (The exact 2-cell relations producing the quotient are not laid out to verify and sit beside the χ paper's no-2-cells treatment; the layer split below makes this non-decisive.)

The decomposition. Under the wheel's D_6 symmetry the cycle space is (Appendix A)

$H^1(W_7; \mathbb{C}) \cong A_2 \oplus B_1 \oplus E_1 \oplus E_2$, dimensions 1 + 1 + 2 + 2 = 6,

multiplicity-free. The outer-cycle class $C = \Sigma\, T_i$ is the uniform $k = 0$ mode — rotation-invariant, reflection-odd — i.e. the **A_2** component. The fold pair is the $k = \pm 1$ doublet — the **E_1** component. A_2 and E_1 are distinct, orthogonal irreps; neither contains the other, and no D_6-equivariant map produces one from the other. So an outer-cycle-only admissible sector retains A_2 and kills E_1: the χ carrier and the transport carrier are *different irreps*, not the same object described twice.

3. The Three Layers

The Carrier Theorem places quantized standing response at the **minimal transport-stable subject**. Under bath transport, individual members are not standing transport-stable subjects (their identity is realized, not standing); the **class** is. This forces a three-layer ontology:

Layer 1 — Transport-current shadow. The σ/spoke-current sector; collapses to [C], one-dimensional. The dynamics' shadow, **not** the fold carrier.

Layer 2 — Class-grain standing carrier. The PFD representation class. Where standing response, generation, and species identity live. The genuine carrier.

Layer 3 — Member-grain registration. Seats read class-owned structure (Realization Theorem: a member record reads q/k, class winding over capacity, identically across seats). Members own no independent standing content.

The fold/species carrier is Layer 2; [C] is Layer 1, its shadow; the readout (where E_1 was placed) is at most a *basis* over Layer 2, expressed through Layer 3. The old paper put the fold in a sector of the bare-graph cycle space — neither Layer 1 nor Layer 2 — a workspace floating free of the standing structure that owns the fold. **This dissolves the carrier contradiction at the carrier level, conditional on the adopted layer ontology:** the two strands stop conflicting because they named different layers (transport shadow vs access workspace), with the unverified one-dimensional quotient downgraded to Layer-1 bookkeeping rather than formally settled.

4. The Demotion of E_1; What a_+, a_- Can Be

E_1 is demoted. It is not the physical carrier (the carrier is Layer 2). It is at best a **candidate readout representation** — a basis in which a binary fold-access registration over the class carrier might be expressed. Not the transport-current carrier (Layer 1 = [C]), not the class carrier (Layer 2). To upgrade it from candidate to content one must prove $E_1 \longrightarrow$ class-grain fold/access split, not merely $E_1 \subset H^1(W_7)$. Until then it is load-bearing for nothing physical. **[Candidate — representation bridge open.]**

a_+, a_- reinterpreted. The Generation Theorem forbids a standing generation invariant at member grain, so a_+, a_- **cannot** be two member-owned fold amplitudes. They must be class-grain response components, or member-grain registrations of class-owned structure, or representation-basis projections of the class carrier. In every admissible reading they are *derived from class facts*, not primitive seat variables: **registration/projection weights of class-owned standing fold structure.** This reinterpretation has a severe consequence, which Part II draws out.

Part II — The No-Go

5. The Contrast No-Go, Located Precisely

Whatever a_+, a_- are, they are read by $a_\pm = \mathrm{Tr}(P_\pm R)$, with P_+, P_- the fold projections and R the access state. The corpus fixes the reflection S exchanging the fold lines, $SP_+S = P_-$. For any reflection-invariant state, $SRS = R$,

$$a_- = \mathrm{Tr}(P_-R) = \mathrm{Tr}(SP_+S\cdot R) = \mathrm{Tr}(P_+\cdot SRS) = \mathrm{Tr}(P_+R) = a_+,$$

hence $\chi = \ln a_+ - \ln a_- = 0$ (exact; 20,000-trial verification, Appendix B).

This is not a theorem the construction missed. The three-gate paper *anticipated* the symmetry and answered by design: Prop 2.1's observable split placed χ *outside* the D_6-invariant algebra, as an explicitly odd functional, $\ell_\chi \circ J = -\ell_\chi$. The reflection S here is the same S used as transport B and as the realiser of the exchange involution J (bridge (c)) — the operator that certified the fold genuine. So the readout's odd-sector placement was legitimate; the earlier paper did not miss the symmetry. **The unshown step is tighter: placing an odd functional on the table is not the same as showing there is anything in the odd sector for it to read.** What was asserted is odd-sector *access*; what was never shown is that the **committed standing state carries odd-sector weight** for that access to see. An odd readout on a zero-odd-weight state returns zero. That — not "the construction secretly fails" — is the precise, defensible no-go.

On the target. Quark masses are scheme- and scale-dependent inferred parameters; the no-go does not rest on the value $m_u/m_d \approx 0.4596$ ($\chi \approx -0.78$). It requires only the scheme-independent fact $\mathbf{m_u \neq m_d}$. The symmetric state predicts ratio exactly 1; nature requires not-1.

The argument is about predicted degeneracy versus observed non-degeneracy, robust to all scheme choices.

6. The Standing-State Squeeze and Its Two Unequal Jaws

The contrast needs reflection-**odd weight** in whatever state the readout sees. Among **standing** states (SRS = R), the layer ontology has two jaws — graded differently, because they are not equally firm:

- **Member jaw (firm).** The member grain is forbidden, by the Generation Theorem, from carrying *standing* asymmetry at all. A theorem of the corpus; the jaw is shut.
- **Class jaw (not established as forced).** The class-grain standing state is, *under the current corpus reading*, naturally reflection-symmetric (the standing structure of the whole class). But whether this naturality is **forced** or merely **typical** is not settled here. The class jaw is shut only under an unproven symmetry-naturality assumption.

So the standing-sector squeeze is **not airtight**: one jaw is a theorem, the other an assumption. The fatal case requires *both* — the contrast forced to live in a standing state *and* the class symmetry forced. Neither is established, which is what keeps the no-go from being an immediate falsification and routes it into the gate ladder of Part IV.

7. Facts Are Not +/−; the Escape Is the Commitment Arrow

The escape the no-go leaves open: the contrast need not be a standing quantity. Individual facts carry no primitive +/− label — orientation is not a property a single commitment is born with. But **commitment is irreversible**, and the *history* of fact-formation carries an arrow a standing tally does not. The Commitment Criterion ties the arrow of time to the irreversible succession of commitment resolutions. If χ is read from that ordered history rather than from a standing state, the mirror argument — a statement about standing states — need not reach it.

This is the only admissible source of contrast left: not the facts (orientation-free), not the standing tally (symmetric), but the *order* of commitment. Whether that escape is open reduces entirely to one question — **on what object does the readout R act?** — which is the subject of Part III.

Part III — The Readout Domain

8. Three Objects: Fact, Final Record, Ordered History

Keep three objects distinct.

- **A fact** f: a committed distinction, written irreversibly; *no primitive +/− label.*

- **The final record** F: the standing tally of facts committed — order discarded. Order-blind by construction: *what* was committed, not *in what sequence*.
- **The ordered history** $H = (f_1, \ldots, f_n)$: the sequence in commitment order. Carries the arrow — H and H_rev are distinct because commitment is irreversible.

The +/− fold structure is not in the facts and not automatically in F. If it exists anywhere physical, the readout *extracts* it, and the question is which object it extracts from.

9. Fact 1 — A Label-Blind Final-Record Readout Forces $a_+ = a_-$

Lemma 9.1. Let R act on the final record F, label-blind in the sense that the physical content of F is invariant under the fold relabelling S (SFS = F — the tally privileges neither fold name). Then $a_+ = a_-$, $\chi = 0$.

Proof. $a_- = \mathrm{Tr}(P_-F) = \mathrm{Tr}(SP_+S\cdot F) = \mathrm{Tr}(P_+\cdot SFS) = \mathrm{Tr}(P_+F) = a_+$. ■

This is the no-go, now attributed to the *domain* of R: F, being an order-discarded tally, has no structure for a label-blind readout to latch onto except the symmetric tally itself. Verified over 20,000 random balanced positive tallies, zero exceptions (Appendix B). The escape must deny the first hypothesis — R must not read only F.

10. Fact 2 — Only an Order-Sensitive Functional Carries a Reversal-Odd Residue

Lemma 10.1. A functional of the ordered history H can distinguish H from H_rev even when their tallies are equal; a functional of the tally F cannot. Reversal-odd content is available only to an order-sensitive functional.

Illustration. H = (+, −, −, +, +, −): equal counts (3, 3), so tally(H) = tally(H_rev) = (3, 3) — balanced. An order-weighted functional gives ordered(H) = (10, 11), ordered(H_rev) = (11, 10): reversal swaps the components (Appendix C).

The structural point is general: any functional factoring through the tally is reversal-blind (the tally is reversal-invariant); only sequence-dependence can be reversal-odd. So the *necessary* form of any readout escaping the no-go is an order-sensitive functional of H — nothing factoring through F will do.

11. The Dangerous Default: the Realization Theorem Cancels Churn

The corpus's standard record-output machinery does not merely happen to read F; it is *built to discard order*. The Realization Theorem's record-output logic makes a member-grain output a function of the *specification and the standing transport structure*, with *realized churn cancelling out*, yielding the unique standing seat-grain response q/k. "Realized churn" is the dynamical, sequential, path-dependent content — and the theorem's achievement is to make it *cancel*, so charge emerges as a clean order-independent number.

For charge this is correct: charge is genuinely standing. For the fold readout it is **fatal**: the order-dependence it cancels is exactly the reversal-odd residue χ needs. A χ readout inheriting this machinery inherits R = R(F) in effect, and Lemma 9.1 forces $a_+ = a_-$. The two readouts stand in *opposite* relation to order — charge needs churn to cancel, χ needs it to survive — so they cannot be the same machinery on different sectors. The χ readout must be one where the cancellation *fails to apply*, and any construction owes an account of *why* χ sits in the non-cancelling regime when charge sits in the cancelling one.

12. The Corpus Route That Exists but Is Not Yet a Theorem

The corpus supplies raw material for an order-sensitive readout — enough to make the escape *possible*, not *secured*. The Commitment Criterion establishes that an arrow genuinely exists at the commitment level (irreversible succession, no reversal). The strict staging contest → commitment → persistence → phase memory places **phase memory downstream of commitment history**, so a readout drawing on phase memory could in principle be a functional of H. That is the route to R(H). But a route is not a theorem: that order *exists* upstream, and that phase memory *could* carry it, does not establish that the χ readout *is* a reversal-odd functional of the ordered history. That gap is the obligation Part IV states.

Part IV — The Obligation

13. The Gate Ladder

The escape is open only if a future construction passes three nested gates, each prior to the next, each with a falsification attached. Gate 0 absorbs both the carrier audit's standing-vs-transient fork and the readout audit's domain question — but the two are aligned by a **working identification, not a strict equivalence**, and the seam must be named because a real case hides in it.

The identification and its one exception. The forward direction is clean: if R reads the final tally F, the commitment order has been discarded, so the contrast cannot be carried by that order — *F-domain ⟹ not order-borne*. The reverse is **not** an iff. "R reads the ordered history H" does not entail "the contrast is transient rather than standing," because of one case: a **standing state whose preparation left an order-dependent imprint**. Such a state is reflection-symmetric *as an object* (SRS = R, so the trace readout $Tr(P_\pm R)$ still gives $a_+ = a_-$ by Lemma 9.1) yet carries, frozen into its structure, a record of the order in which it was committed — which a *history*-functional R[H], not being the trace functional, could read as reversal-odd. This is a **standing**

carrier read by an H-functional: the standing/transient dichotomy (an ontology of the state) and the F/H dichotomy (a domain of the readout) are aligned in the two clean cases but come apart precisely here. We therefore do not claim the iff; we state Gate 0 as a three-branch fork.

Gate 0 — Domain. On what object does the χ readout R act, and where does any order-content live? **Default: F** (§11), which by Lemma 9.1 forces $a_+ = a_-$. Three exits:

- **(0a) R reads F** — the order-discarded tally; trace-read; **no-go bites, $a_+ = a_-$, falsification.** This is the default.
- **(0b) R reads H, order in transient structure** — the contrast is carried by transient/refinement structure (the access operator), genuinely not standing. Escape open; **the class jaw of §6 is bypassed** (no standing state hosts the contrast).
- **(0c) R reads H, order as an imprint in a standing class state** — the contrast is read by a history-functional from the order frozen into a *standing* Layer-2 class state. Escape open, and arguably preferable (it keeps the contrast on the species-owning class carrier); but **the class jaw of §6 is *not* bypassed** — the state is standing, so whether the class symmetry is forced or merely typical still applies, and a forced class symmetry could still erase the imprint the history-functional reads.

An extension to R(H) (branches 0b, 0c) must be *justified from the commitment dynamics* (Commitment Criterion's order; phase memory downstream of commitment history), not installed because χ requires it. **Fail (0a) ⟹ falsification: degenerate masses.**

The class jaw, restored as a named open item. §6 left open whether the class-grain standing symmetry is *forced* (a theorem) or merely *typical* (an assumption). That question is retired *only* under branch 0b (pure transience, no standing state involved). Under 0a it is the falsification itself; under 0c it survives in full force, because 0c reads a standing class state. So the class jaw is not disposed of by "going to H" — it is disposed of only by the specific sub-branch 0b, and it must be carried forward as open wherever a standing state remains in play. **[Open — bypassed only by 0b; live under 0a and 0c.]**

Gate 1 — Survival. Given R = R(H) (branch 0b or 0c), does the reversal-odd residue *survive* into the readout, or cancel as the Realization churn cancels (§11)? A functional formally history-dependent but order-cancelling is R(F) in costume. Test: **$R(H_{rev}) = S\cdot R(H)$** — if reversal swaps the projections, the residue survived; if $R(H_{rev}) = R(H)$, it cancelled. **Fail ⟹ falsification in disguise: a cancelling R(H) is R(F).**

Gate 2 — Canonicity. Given surviving reversal-odd content, is the +/− assignment canonical or conventional? Required: **$|\chi|$ invariant under arbitrary fold relabelling** (magnitude physical, convention-free) while **only sign(χ) is reversal-odd** (which fold is "up" is convention). If relabelling changes $|\chi|$, the contrast is pure convention. **Fail ⟹ the contrast is a labelling artifact, not a mass difference.**

All gates must pass. Gate 0 is where the corpus default bites (0a, R reads F); Gate 1 is where the Realization cancellation threatens (order may cancel even in a history-functional); Gate 2 is where convention threatens. A physical up/down contrast exists iff a non-default Gate-0 branch

(0b or 0c) holds *and* Gates 1–2 pass — and, under 0c, the class jaw additionally resolves to "typical" rather than "forced." Failure at any gate, or a forced class jaw under 0c, is a clean, publishable negative.

14. Why This Is Not a Construction Smuggle

The discipline, stated so the next paper cannot evade it. The extension to R(H) (Gate 0) and the survival of the odd residue (Gate 1) must be derived from how commitment *already* works in the corpus — the irreversibility of the Commitment Criterion, the phase-memory staging — and checked **before** looking at whether the resulting sign matches the observed quark ordering. The tell of a smuggle: if R is defined history-sensitive *because* χ needs history, or non-cancellation assumed *because* χ needs a residue, the construction has imported its conclusion.

This is the spatial-mirror temptation moved to the time axis. The reversal H → H_rev is *itself* a $\mathbb{Z}_2$ mirror, now on histories; "is there a reversal-odd residue" is structurally the same question as "is there a reflection-odd component," one axis over. The escape is principled *only* because commitment irreversibility genuinely breaks the temporal mirror ($H \neq H\_rev$ physically, per the Commitment Criterion) where no standing structure could break the spatial one. But that asymmetry must be *read by R*, not merely exist upstream — which is exactly Gate 1, and §11 is the warning that the default machinery is built to cancel it.

15. Status Table

Item	Status	Grade
dim $H^1(W_7;\mathbb{C})=6$; D_6-decomp $A_2 \oplus B_1 \oplus E_1 \oplus E_2$	Exact character computation (App. A)	[Proven]
Outer cycle $[C] = A_2$; fold pair = E_1; distinct irreps	$r(C)=C$, $m(C)=-C$; orthogonal	[Proven]
Three-layer ontology (shadow/class/registration)	Carrier/Generation/Realization theorems	[Adopted]
Fold/species carrier = class-grain standing structure	Carrier Theorem	[Adopted]
Carrier contradiction dissolved at carrier level	Conditional on layer ontology; $H_1 \cong \mathbb{Z}\langle[C]\rangle$ downgraded to Layer-1	[Resolved — conditional]
E_1 as physical carrier	**Withdrawn** — wrong level	[Rejected]
E_1 as candidate readout representation	Retained as hypothesis	[Candidate — bridge open]
a_+,a_- as member-owned amplitudes	**Forbidden** (Generation Theorem)	[Rejected]
a_+,a_- as class registration/projection weights	The admissible reading	[Adopted]

Item	Status	Grade
Standing no-go: $SP_+S=P_-$, $SRS=R \Longrightarrow a_+=a_-$	Lemma 9.1; 20k-trial (App. B)	[Proven]
No-go origin: readout placed odd by design (Prop 2.1)	Anticipated symmetry; not a missed theorem	[Proven — not a missed theorem]
Unshown step: standing state carries odd-sector weight	Odd readout on zero-odd-weight state = 0	[Open — the actual gap]
Class jaw forced vs typical	Argued symmetric; not established forced	[Open — bypassed only by branch 0b; live under 0a and 0c]
Facts carry no primitive +/−	Orientation is readout-imposed, not born-in	[Adopted]
Only order-sensitive functionals carry reversal-odd residue	Lemma 10.1 (App. C)	[Proven]
Corpus default readout = R(F) (standing)	Realization Theorem record-output logic	[Established — default]
Realization Theorem cancels churn (order)	Correct for charge (q/k), fatal for χ	[Established — the obstacle]
Arrow exists at commitment level	Commitment Criterion	[Established — raw material]
Phase memory downstream of commitment history	contest→commitment→persistence→phase memory	[Established — route to R(H)]
Gate 0 — χ readout is a functional of H, not F	**Not shown**; default is F	[Open — fail ⟹ falsification]
Gate 1 — reversal-odd residue survives into R(H)	**Not shown**; default cancels churn	[Open — fail ⟹ falsification in disguise]
Gate 2 — assignment canonical ($\|\chi\|$ convention-free)	**Not shown**	[Open — fail ⟹ convention]
R(F) sufficient for the contrast	**Refuted** — forces $a_+=a_-$	[Proven insufficient]
Arrow rescue already paid for	**No** — R(H) required, not supplied	[Open — the obligation]

16. Conclusion: What the Readout Must Read

The audit runs one thread to its end. **Where the fold lives:** at the class grain, not in the bare cycle space; E_1 is a candidate readout representation, not the carrier, and a_+, a_- are registrations of class-owned structure, not member amplitudes. **Why a standing readout gives zero:** the fold mirror S, the same S that certified the fold genuine, forces $a_+ = a_-$ on any symmetric state; the three-gate paper legitimately placed χ in the odd sector, but never showed the committed standing state has odd-sector weight for that placement to read — and an odd functional on a zero-odd-weight state returns zero. **The only escape:** facts carry no orientation, but the irreversible *order* of commitment does, so the contrast might be carried by that order — either in genuinely transient structure (0b) or as an imprint frozen into a standing class state that a history-functional reads (0c) — rather than by the order-blind tally a trace readout sees. **What the escape requires:** that the readout R be a functional of the ordered history H, not the final record F — and the corpus default is F, with the dominant Realization machinery built to cancel exactly the order the contrast needs.

So the whole programme reduces to one decidable question — *what does the readout read* — resolved through three nested gates, each with a falsification: Gate 0, does R read the ordered history or the final tally (default tally $\Longrightarrow a_+ = a_-$); Gate 1, does the reversal-odd residue survive or cancel like the Realization churn ($R(H\_rev) = S \cdot R(H)$, or it is $R(F)$ in costume); Gate 2, is the assignment canonical or convention ($|\chi|$ relabelling-invariant, only the sign conventional). Pass all three and the up/down difference is a physical readout of the commitment arrow. Fail any and it is degenerate (Gate 0/1) or conventional (Gate 2), and the mechanism is cleanly falsified.

This paper builds none of the rescue. It dissolves the carrier contradiction, demotes E_1, locates the no-go as unshown odd-sector weight, identifies the ordered commitment history as the only admissible source of contrast, proves the final-record readout insufficient, and names the Realization Theorem's churn-cancellation as the specific obstacle the default imposes — converting "the contrast might be transient" from a hopeful phrase into a three-gate obligation. The next paper is the **Ordered-Commitment Readout Theorem**, and it may not succeed: the default fights it at Gate 0, the cancellation logic at Gate 1, convention at Gate 2. But the question is finite and honest.

The fold lives at the class grain; E_1 is at most how it is read. The arrow of commitment is real. Whether the readout reads that arrow — rather than the finished, balanced tally — is the whole question. A tally, read through the fold mirror, gives no contrast at all.

Appendix A — The D_6 Decomposition

Cycle space spanned by $f_i = s_i + e_i - s_{i+1}$ (i mod 6) in the 12-dim edge space; rank 6. D_6 generators in the f-basis: $r(f_i) = f_{i+1}$; $m(f_i) = -f_{-i-1}$; relations $r^6 = m^2 = (mr)^2 = I$ verified. Character of the 6-dim rep: $\chi(e) = 6$, $\chi(r^3) = 0$, $\chi(r) = \chi(r^2) = 0$, $\chi(m\_vertex) = 0$, $\chi(m\_edge) = -2$. Reduction against the D_6 table (class sizes 1,1,2,2,3,3; order 12): multiplicities A_2:1, B_1:1, E_1:1, E_2:1; A_1:0, B_2:0. Hence $A_2 \oplus B_1 \oplus E_1 \oplus E_2$. Outer cycle $C = \Sigma f_i$: $r(C) = C$, $m(C) = -C \Longrightarrow A_2$; $\langle E_1, C \rangle = 0$ (machine precision) $\Longrightarrow E_1 \perp A_2$.

Appendix B — The $a_+ = a_-$ Collapse on a Balanced Tally

With $SP_+S = P_-$, any label-blind tally $SFS = F$ gives $a_- = \mathrm{Tr}(P_-F) = \mathrm{Tr}(SP_+S \cdot F) = \mathrm{Tr}(P_+ \cdot SFS) = \mathrm{Tr}(P_+F) = a_+$. Tested over 20,000 random reflection-symmetrized positive 2×2 tallies: $a_+ = a_-$ in every case, zero violations. Exact and unconditional given the two hypotheses (R reads F; R label-blind).

Appendix C — Tally versus Ordered Functional

H = (+, −, −, +, +, −), counts (3, 3). Tally: tally(H) = (3,3) = tally(H_rev) — reversal-blind. Position-weighted: ordered(H) = (10,11), ordered(H_rev) = (11,10) — reversal swaps components. A functional factoring through the tally is necessarily reversal-blind (the tally is reversal-invariant); only an order-sensitive functional carries a reversal-odd residue. The weighting is illustrative; the structural claim (tally ⟹ reversal-blind) is general.

Appendix D — Referee Objections and Replies

Objection 1 — You inflated the readout to save E_1. The opposite: E_1 is *demoted* from carrier to candidate readout, load-bearing for nothing physical. The fold is relocated to the class grain. No rescue is built.

Objection 2 — The layer split is ad hoc. The three layers are the Carrier/Generation/Realization theorems, applied not invented — and applied symmetrically: the split costs the old E_1 result and sharpens the no-go against the mechanism. An ad hoc rescue would not damage its own mechanism; this does.

Objection 3 — You assume R is label-blind in Lemma 9.1. If R is not label-blind, χ depends on which fold we arbitrarily call +, and the contrast is conventional (Gate 2 failure) — the mechanism dies the other way. Label-blindness is what makes χ physical rather than a naming artifact.

Objection 4 — The arrow exists in the corpus, so the rescue is done. Necessary, not sufficient. The arrow existing at the commitment level does not make the *readout* a reversal-odd functional of it; the default readout cancels exactly that order-content. "Arrow exists upstream" and "readout reads it" are separated by Gates 0–1.

Objection 5 — Why not define R on the history and be done? Gate 1. A functional formally on H can still cancel the order-dependence (as the Realization churn cancels), leaving R(H) = R(F) in effect. Defining R on H is necessary; proving the residue survives (R(H_rev) = S·R(H)) is the separate, harder requirement, and it must be derived, not installed (§14).

Objection 6 — This just moves the spatial mirror to a temporal one. Structurally yes (§14). The escape is principled only because commitment irreversibility genuinely breaks the temporal mirror (H ≠ H_rev physically) where no standing structure broke the spatial one. The asymmetry must be read by R — Gate 1.

Objection 7 — Charge works on the standing readout; why not χ? Opposite relation to order. Charge is genuinely standing; the Realization Theorem *should* cancel churn to give clean q/k. χ, if physical, must be carried by the order the same cancellation destroys. They cannot share machinery; the χ readout must be one where churn survives, owing an account of why χ sits in the non-cancelling regime.

Objection 8 — The 2-cell quotient $H_1 \cong \mathbb{Z}\langle[C]\rangle$ is unverified, so the contradiction isn't resolved. Correct that it is unverified; after the layer split the fold question no longer hinges on it (Layer 1 is the transport shadow, not the fold carrier). The unverified quotient is downgraded to Layer-1 bookkeeping.

Objection 9 — Does this kill the programme? It might — and the paper says which single construction decides. The honest answer is not a reassuring "no": §5 locates an unshown load-bearing step (odd-sector weight of the committed state), §6 grades one jaw firm (the member jaw, a theorem) and the other only typical-not-forced, and the default readout (0a) gives outright falsification. What the audit establishes is that the verdict is now *finite and decidable*: the carrier sits at class grain; facts carry no +/−; the only admissible source of contrast is the ordered commitment history; and the readout must be shown a surviving, canonical, reversal-odd functional of it (Gates 1–2) reached by a non-default Gate-0 branch (0b or 0c), with the class jaw additionally resolving to "typical" under 0c. The programme is one construction — the Ordered-Commitment Readout Theorem — from either a physical up/down contrast or a clean falsification, and the default fights it at every gate. So: possibly fatal, decided by one nameable next step, with the failure as publishable as the success.