

# The Reflection-Scope Verdict

## Do the Carrier, Generation, and Realization Theorems Force $S R S = R$ ?

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*Companion to "A Three-Gate  $W_7$  Audit of the  $\chi$ -Halving Law in VERSF," "The  $\chi$ -Refinement Pushforward Verdict," "The  $W_7$  Fold Carrier and the Readout Domain," "The Carrier Theorem," "The Realization Theorem," and "The Generation Theorem." This paper settles the  $B_0$  scope question that the carrier/readout audit left open at its §6: whether the inherited ontology forces the  $\chi$  state into the reflection-fixed subspace. The completed Scope audit is kept strictly separate from the still-open TPB fold-bit problem; TPB is used only to specify the next  $B_2$  theorem and is not counted as a result here.*

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### Summary for the General Reader

The  $W_7$  quark mechanism needs the two fold directions to be used unequally. If the state the mechanism reads treats them as exact mirror copies, the two readings come out equal and the predicted up/down mass difference vanishes — which is false. This paper asks one decisive question: do the three foundational theorems already in the framework — Carrier, Generation, Realization — *by themselves force* the state into that mirror-symmetric form?

The answer is **no** — **permitted, not forced**, for a precise reason rather than an argument from silence. The theorem that would demand equal readings is about *indistinguishable seats inside one species*, but the framework's own catalogue types the up and down quark as *different species* (they carry different electric windings), so that theorem cannot be stretched across them without an extra assumption nobody has supplied. More carefully, forcing the difference to zero needs a *conjunction* of conditions — is the state the right kind of object, must it respect the whole wheel symmetry or only part, is it even a standing object at all — and the framework establishes none of them; its own catalogue actively works against the first. The one most worth watching is the symmetry condition, because a standard algebraic result (Schur's lemma) would close the difference automatically if the state had to respect the full wheel symmetry, and the framework sits *near* that condition without supplying it.

There is a sharper, less comfortable point underneath the verdict. The way the no-go is escaped is by noting up and down are *already* different species — but then the up/down difference is just the difference between two things already declared distinct, and the fold/reflection machinery contributes no part of *why* they differ. So the paper offers no support for the halving law ( $\rho = \frac{1}{2}$ ) that names the series: the fold *reflection* cannot be that law's origin. The asymmetry, if it is real, must come from somewhere else.

The final part of the paper builds a concrete candidate for that "somewhere else" — a memory effect among committed facts. Its key move improves on earlier attempts that simply *assumed* the two branches behave differently: instead it starts from what a *memory* field is for (a field carrying the memory of which commitments were made cannot quietly erase which route each took), treats all routes evenhandedly, and *computes* the size of the difference from that evenhanded rule. This doesn't make the "the two routes differ" assumption disappear — it *moves* it to a cleaner place: rather than assuming it in the physics of the forces, the paper pins it to a single sharp question about whether the two mirror routes are genuinely different *histories* (whether the order in which the commitments were made is part of the permanent record, or just a way of writing the same finished result). That is a better place for the assumption to live, because the framework can argue it from its own first principles about what a commitment is — and the paper shows that *if* the order is real history, the two routes genuinely cannot be the same record.

But there is a catch, and it is the deep theme of the whole paper. Storing the difference in memory is not the same as being able to *read it out* into the thing that fixes the mass. It turns out that any reading method that stays perfectly even-handed between the two branches is forced to report them as equal — it cancels out the very difference that is sitting in the memory. So the difference can never show up in a finished, balanced picture; it can only appear once a commitment is actually made and the system tips, once and for all, into one branch. The whole problem is now squeezed into reading the memory out by a method that is *not* perfectly even-handed — one tipped by the act of commitment itself. And here the paper makes real progress: it actually *builds* such a method, and shows it is the only one the symmetry allows. So the read-out is no longer a mystery — it is a definite instrument with a single dial on it. The entire unsolved question has shrunk to whether that one dial is set to zero. If it is not, the stored difference becomes a real mass difference; if it is, the memory holds the difference but the measurement never sees it, and this route fails. The paper is honest that it has not yet shown the dial is nonzero — and that setting it nonzero by hand would be cheating, the very thing earlier versions were caught doing. So the result is a sharp, honest place to stand: the difference can never come from anything perfectly even-handed at any stage (a real constraint on any working theory), the one allowed not-even-handed channel is now built, and everything now rests on a single number the framework must compute rather than assume.

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# Table of Contents

- Summary for the General Reader
- Abstract
- Status Table — Read First (*with reading guide*)
- **1. Scope, Verdict Categories, and the Input Fences**
  - 1.1 The one question · 1.2 The two verdicts · 1.3 The ontology-to-state fence · 1.4 The TPB fence · 1.5 What PERMITTED means
- **2. The Inherited Reflection No-Go**
  - 2.1 The  $W_7$  fold doublet · 2.2 Reflection no-go lemma · 2.3 The exact odd requirement · 2.4 What remains to be audited
- **3. What the Carrier Theorem Actually Fixes**
  - 3.1 The class is the subject · 3.2 Stability is not rigidity · 3.3 What standing would require · 3.4 Carrier audit verdict
- **4. What the Realization Theorem Actually Fixes**
  - 4.1 Uniformity at member grain · 4.2 The Class Uniformity Criterion · 4.3 The missing member identification · 4.4 Realized asymmetry is not generally forbidden · 4.5 Realization audit verdict
- **5. What the Generation Theorem Adds**
  - 5.1 Member-grain generation asymmetry is closed · 5.2 Class-grain refinement content is positively permitted · 5.3 Up and down are different winding columns · 5.4 Mirrored content need not mean fixed content · 5.5 Generation audit verdict
- **6. The Symmetry Squeeze, the Schur Guard, and the Conjunction**
  - 6.1 The proposed squeeze · 6.2 Route A — IR-SCOPE · 6.3 Route B — the Schur guard · 6.4 The forcing conjunction and its independent weak links · 6.5 What PERMITTED does and does not require
- **7. The Three Remaining Loci**
  - 7.1 Locus 1 — standing inter-class · 7.2 Locus 2 — realized/transient · 7.3 Locus 3 — mirrored/conjugate carriers · 7.4 Post-selection is not a fourth locus
- **8. The Reflection-Scope Verdict Theorem**
  - 8.1 Binary verdict · 8.2 What the verdict does not say
- **9. The Two Conditional Forcing Routes**
  - 9.1 Route A — IR-SCOPE · 9.2 Route B — Full-Action Invariance · 9.3 Relation between the routes · 9.4 Falsification consequence
- **10. Consequences for B2 and the Quark Programme**
  - 10.1 B2 is well-posed · 10.2 The headline finding — the fold reflection is not the asymmetry's source · 10.3 Two honest mechanism classes remain · 10.4 The next paper's fixed deliverable
- **11. TPB at the B2 Boundary — The Theorem Still Owed**
- **12. A Concrete B2 Candidate:  $\kappa$ -Mediated Commitment-Memory Instability**
  - 12.1 The existing  $\kappa$  field is branch-blind; the Record-Resolution Premise
  - 12.2 Graph-resolved  $\kappa$ -carrier: contrast magnitude computed, distinguishability relocated
  - 12.3 The  $E_1$  obstruction — the standing route is closed (headline)
  - 12.4 The stochastic commitment model — seed, supercriticality, locking

- 12.5 The closure-history  $\rightarrow E_1$  intertwiner: constructed, unique; gap localised to one coupling  $h$
- 12.6 Honest status of the candidate
- **13. Conclusion**
- **Appendix A — Exact Two-Dimensional and Full-Action Audit**
- **Appendix B — Premise-to-Conclusion Map**
- **Appendix C — Referee Objections and Replies**
- **Appendix D —  $\kappa$ -Mediated Commitment-Memory Instability: Full Derivation**
- **References**

## Abstract

On the faithful  $E_1$  fold doublet of the  $W_7$  candidate, let  $P_+$  and  $P_-$  be the reflection-exchanged rank-one access projectors with  $S P_+ S = P_-$ , and define the susceptibility readout

$$\chi(R) = \ln a_+(R) - \ln a_-(R), \quad a_{\pm}(R) = \text{Tr}(P_{\pm} R),$$

on a positive access state  $R$ . The inherited reflection no-go is exact: if  $S R S = R$ , cyclicity of the trace gives  $a_+ = a_-$  and hence  $\chi(R) = 0$ . A nonzero  $\chi$  therefore requires a fold-access imbalance, hence a state outside the reflection-fixed subspace.

This paper audits one upstream implication — **Carrier  $\wedge$  Generation  $\wedge$  Realization  $\Rightarrow S R S = R$ ?** — under a strict one-way fence: constraints are derived from the inherited ontology toward the state, and no asymmetric  $R$  is constructed and offered as evidence of permission.

**The verdict is PERMITTED.** The Carrier Theorem fixes the minimal transport-stable subject at class grain under its bath branch but distinguishes stability of the subject from rigidity of its internal content. The Realization Theorem forces uniform standing response only among the indistinguishable members of *one* class. The Generation Theorem forbids member-grain generation labels while positively permitting standing class-grain refinement content, and — decisively — types the physical up and down columns as **winding-distinct classes** within one assignment family, not two seats of one class. A within-class uniformity theorem therefore cannot entail  $S R S = R$  across the up/down class boundary without an additional scope identification.

Two sufficient forcing packages are isolated, and they are **unequal in strength**:

- **Route A — IR-SCOPE.** The two fold directions are seats of one indistinguishable class,  $S$  is an admissible internal relabelling of that class, and  $R$  is standing under that action. Then  $S R S = R$  and  $\chi = 0$ .
- **Route B — Full-Action Invariance.** The complete irreducible  $D_6$  action  $\rho$  on  $E_1$  is the admissible internal action on the physical subject, and  $R$  is invariant under all of  $\rho$ . Then  $R$  lies in the commutant of an irreducible complex representation; Schur's lemma gives  $R = c \cdot I$  on  $E_1$ , and  $\chi = 0$ .

**The verdict is a conjunction with independent weak links, not a single hinge.** Forcing  $\chi = 0$  requires *all* of: **(T) a type condition** — R is class-internal standing content of a *single*  $E_1$  doublet, not an inter-class/assignment-family relation (if R is inter-class, Schur does not merely fail to force scalarity, it does not *type-check* — R is not an operator on  $E_1$  at all); **(I) an invariance condition** — the admissible internal action is the *full* irreducible  $\rho(D_6)$ , not a proper sub-action  $H \subsetneq D_6$  (Route B is the invariance link; Route A is the special case of it for the single reflection); and **(S) a standing condition** — R is established to be standing content in the first place, logically prior to asking what it is invariant under (if access is realized/transient, the no-go does not reach it). The inherited corpus establishes none of (T), (I), (S), and the Generation Theorem's winding-distinct typing of up/down leans *against* (T). The verdict is PERMITTED because this conjunction is unmet at several independent points.

**Which link to watch.** Of the three, the invariance link (I) is the one nearest to being inadvertently supplied: Route B needs *two* premises — that the full  $\rho(D_6)$  is internal, and that R is standing-invariant under all of it — and the Carrier Theorem's irreducibility claim supplies *neither* directly (it constrains invariant subspaces; it is silent on what R must be invariant under), but it sits adjacent to them. So (I) is the most automatic killer if it ever closes, hence the first link a falsification should attack — but it is one link of three, and the type link (T) is the cleanest defeater, opposed by the corpus's own typing.

The audit settles B0 at scope level: the current chain neither falsifies the mechanism nor derives a physical odd state. **B2 remains the exact next burden** — derive  $\text{Tr}[(P_+ - P_-)R] \neq 0$  from mass-independent class/family or realized-access dynamics. But a sharper, less comfortable finding sits alongside the verdict: the escape from the no-go runs entirely through "up and down are winding-distinct classes," so the up/down access difference is the difference between two species *already declared distinct*, and the  $W_7$  fold *reflection* sources *none* of the asymmetry — an exchange map cannot source the magnitude of what it exchanges. The reflection is a readout basis, not the asymmetry's origin; **the  $\chi$ -halving law  $\rho = \frac{1}{2}$  receives no support here, and the reflection map is structurally incapable of being its origin.** (Whether a *different* part of  $W_7$  — the closure-order metric — can source it is left open and pursued in §12.2, conditional on an unproved premise.) The live mechanism, if any, is inter-class (Locus 1), realized (Locus 2), or closure-metric-based. TPB (Ticks Per Bit) is integrated only as a *specification* of that future audit: generic commitment supplies stable distinguishability records, not fold-bit identification, and the paper states the Fold-Bit Identification Theorem owed rather than claiming it.

Finally, the paper constructs — without counting it as a closed result — a concrete B2 candidate at realized grain (Locus 2): a  **$\kappa$ -mediated commitment-memory instability** (§12). It replaces an earlier circular "Locality-Lift" premise with a *forced-conditional* one: a short lemma (scalar  $\kappa$  maps a U-record and a D-record at the same site to the identical field — exact) and its contrapositive show that *if*  $W_7$  closure orientations are genuine committed records *and*  $\kappa$  is the sole memory carrier, *then* faithful memory **forces**  $\kappa$  to be record-resolved — the premise's negation is inconsistent with faithful memory, not merely less natural (symmetric across all six closure states, with the scalar  $\kappa$  recovered as the uniform mode). The open antecedent is now sharp and ontological — the Fold-Record Identification question (are closure orientations committed records or merely reversible labels?), itself *conditionally discharged* by a Closure-Orientation Retention Theorem that reduces it to whether  $W_7$  closure is ordered-irreversible

commitment (if so, the orientation bit is retained as a record — metric-free, with a clean endpoint-only failure branch) — plus a named auxiliary-exclusion clause (no other field carries the label). From this, the antipodal closure contrast  $G_0 > G_3$  follows *exactly* from a symmetric graph-local law (the magnitude is now computed, not posited), and an injectivity result ( $n = g^{-1}A\kappa$ ) confirms the resolved carrier does not re-collapse the record in propagation — no rank loss — so  $\kappa$  retains the full closure-path distribution, including the U/D imbalance. The honest reading of all this is *relocation, not elimination*: distinguishability has moved from the old coupling premise to the carrier's resolution requirement (Fold-Record Identification), where it is sharper and conditionally dischargeable — not made to vanish. But a Schur  $E_1$  **obstruction** then fires as a theorem: any  $D_6$ -invariant linear  $\kappa$  field is scalar on  $E_1$ , so no symmetric linear field sources a standing P+/P- contrast — **the standing route is closed**, and the mechanism is forced to realized branch-conditioned history. There a mean-field stochastic commitment model supplies a symmetry-breaking seed from finite-count noise (the seed's existence is derived; the specific  $\beta J > 1$  threshold is model-dependent on an imported heat-bath rule), supercriticality, and a mean-field record-locking estimate. The candidate reduces to **two questions in series**: the carrier (is  $\kappa$  record-resolved at all? — *conditional* on Fold-Record Identification, with the stored record then provably retained) and the readout (can that retained record be read into  $E_1$  as  $\chi$ ? — channel now *constructed*, gap reduced to one coupling). The U/D difference is *present in  $\kappa$*  but *cannot be equivariant-linearly read into  $E_1$* ; the decisive remaining gap is the readout, where the unique symmetry-allowed conditioned channel is now **constructed** —  $R_\omega = \frac{1}{2}(I + \zeta\omega\Delta P)$ , evading Schur by conditioning on the symmetry-transforming committed record rather than breaking the law, giving  $\chi = 2 \operatorname{artanh}(\zeta\omega)$  with  $\zeta = \tanh(\beta h)$ . This retires the strongest pessimistic reading (the intertwiner exists, is unique — exact for the binary record since  $\omega^2 = 1$ , leading-order for the locked  $m$  — and is Schur-consistent), and contracts the open question: **what is now open is not the form of the readout relation but its gain**.  $\chi = 2 \operatorname{artanh}(\zeta m)$  with  $\zeta = \tanh(\beta h)$ , so the entire remaining content sits in one mass-independent coupling  $h$ . The channel is built; whether current flows is whether  $h \neq 0$  — and candidly that scalar may not be free: if  $h$  is the same  $\kappa$  physics as the carrier coupling  $J$ , it is *computable from the  $C_6$  Green's function already in hand* (grade: "plausibly computable, deferred," not "open"); if genuinely independent, the independence is itself owed. The deepest finding is that the obstruction is *conserved but localised* — driven across reformulations (Lift  $\rightarrow$  carrier  $\rightarrow$  standing readout  $\rightarrow$  conditioned readout) onto one number — so the honest disjunction is arithmetic: either  $h \neq 0$  (derived, or found already fixed by the geometry) or  $h = 0$  (the channel carries no current and the realized-history route closes alongside the standing one). Asserting  $h \neq 0$  by hand would be the old Lift's smuggle; the construction is clean because it leaves  $h$  owed. The mass relation, orientation convention, and halving recursion remain open.

**Verdict: PERMITTED — a conjunction of type, invariance, and standing conditions unmet at several independent points. The fold reflection is not the asymmetry's source;  $\rho = \frac{1}{2}$  is unsupported here. TPB status: candidate B2 framework, not a fold-bit derivation. The B2 candidate ( $\kappa$ -mediated commitment-memory instability) relocates the distinguishability assumption from the dynamics to the carrier ontology — where it is sharper and conditionally dischargeable (records vs reversible labels) — computes the contrast magnitude from a symmetric law, and proves the standing route closed via an  $E_1$  obstruction. The open gap is contracted to a single layer and then to a single number: the unique conditioned readout channel is constructed (evading Schur), and faithfulness**

reduces to whether one mass-independent coupling  $h$  is nonzero. This  $h$  is the *terminus* of a conserved obstruction driven across every prior reformulation — a single dimensionless coupling of a unique channel into an irreducible doublet, which admits no further relocation and so must be computed, not moved. Its pessimistic branch is precisely  $h = 0$  (channel built, no current, route closes); but  $h$  may not be free at all — if it is the same  $\kappa$  physics as the carrier coupling, it is possibly already fixed by the  $C_6$  carrier geometry, in which case the candidate is nearer a verdict than "owed" implies. A realized-history mechanism whose entire survival rests on one computable scalar — possibly already determined by geometry in hand — not a generation.

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## Status Table — Read First

**How to read this table.** Each row is one claim the paper touches, with an honest grade of *how far it is established*. The three columns are: the **Item** (the claim), the **basis** (where it comes from or what would settle it), and the **Grade** (its epistemic status). The grades are not decoration — they are the spine of the paper's discipline, and they sort into four kinds:

- **[Proven]** — established here by closed algebra or a stated lemma. These are facts, not conjectures: e.g.  $S R S = R \Rightarrow \chi = 0$ . If a row is [Proven], the paper is willing to be held to it without qualification.
- **[Inherited — conditional]** — taken from another paper in the corpus (Carrier, Generation, Realization), true *given* those papers' own premises. Not re-proved here; flagged "conditional" so the dependency is visible rather than hidden.
- **[Refuted] / [Refuted as stated]** — a claim someone might expect to hold that *does not*. E.g. the implication  $Carrier \wedge Generation \wedge Realization \Rightarrow S R S = R$  is **[Refuted as an implication]** — that refutation is the verdict. And  $S R S \neq R \Rightarrow \chi \neq 0$  is **[Refuted as stated]** because it needs an extra access-faithfulness premise.
- **[Open] / [Candidate] / [Conditional]** — not settled here, by design. **[Open]** means a named, decidable question left for a future paper (often with a sub-tag like *B2, B2-FM, or the link to watch*). **[Candidate]** means a proposed object not yet computed. **[Conditional] / [Proven — conditional]** means "this follows *if* a stated antecedent holds" — true as an implication, with the antecedent itself open.

**The reading rule.** A claim is only as strong as its grade. The paper's central result is the single row graded **[PERMITTED]** — and its honesty depends on the rows around it being graded *open* or *refuted*, not quietly upgraded to [Proven]. In particular: the verdict is PERMITTED **because** the three forcing-conjunction rows — **(T) type, (I) invariance, (S) standing** — are each **[Open — unmet]**. If a future paper flips any *one* of those to [Proven], re-read the table top to bottom: the verdict flips with it. That is the table working as intended — it tells you exactly which row, if it moved, would change the answer.

**What to look at first.** Scan the **Grade** column before the Item column. The [Proven] rows are what you can rely on; the [Refuted] rows are the surprises the paper establishes; the [Open] rows are the live frontier and tell you what the next paper must do. The one row that decides

everything is the **[PERMITTED]** verdict, and the three [Open — unmet] conjunction rows directly above the B2 rows are the reasons it reads PERMITTED rather than FORCED.

Item	Status	Grade
$S R S = R \Rightarrow \chi = 0$	$W_7$ reflection identity + trace cyclicity	[Proven]
$\chi \neq 0 \Rightarrow S R S \neq R$ (fold-access imbalance)	Lemma 2.1 + converse caveat	[Proven]
$S R S \neq R \Rightarrow \chi \neq 0$	False without access faithfulness	[Refuted as stated]
Class is minimal transport-stable subject	Carrier Theorem, bath branch	[Inherited — conditional]
Stability $\neq$ internal rigidity	Explicit Carrier-Theorem distinction	[Inherited]
Standing member-grain response is uniform within one class	Realization Theorem	[Inherited — conditional]
Standing member-grain generation label forbidden	Generation Theorem	[Inherited — conditional]
Generation-individuating content at class grain	Generation Theorem	[Inherited — conditional]
Up/down are winding-distinct classes	Assignment-family decomposition	[Inherited — catalogue reading]
Class-grain refinement content permitted	Generation refinement fork	[Inherited — open branch]
$W_7 S$ is a within-class admissible relabelling	—	[Open — not supplied]
Fold directions = two seats of one indistinguishable class	Catalogue typing points against	[Open — not supplied]
Full irreducible $D_6/E_1$ action is the admissible internal action on R	—	[Open — not supplied]
<b>(T) type — R is class-internal <math>E_1</math> content, not inter-class</b>	Off-axis Schur defeater; corpus typing leans against	[Open — cleanest defeater; unmet]
<b>(I) invariance — admissible action is full <math>\rho(D_6)</math>, not a sub-action</b>	The invariance link; Route B antecedent (needs two premises)	[Open — the link to watch; unmet]
<b>(S) standing — R established standing, not realized/transient</b>	Logically prior to (T) and (I)	[Open — unmet]
Carrier $\wedge$ Generation $\wedge$ Realization $\Rightarrow S R S = R$	—	[Refuted as an implication]
<b>Scope verdict</b>	Conjunction (T) $\wedge$ (I) $\wedge$ (S) unmet at several independent points	[PERMITTED]

Item	Status	Grade
<b><math>\chi</math>-halving <math>\rho = \frac{1}{2}</math> supported by this audit</b>	Asymmetry sourced by species label / realized dynamics, not the fold	[No — fold not the origin]
IR-SCOPE $\Rightarrow \chi = 0$	Theorem 9.1	[Proven — conditional]
Full-Action Invariance $\Rightarrow \chi = 0$	Theorem 9.2 (Schur)	[Proven — conditional]
Physical odd-weighted state exists	Not supplied by permission alone	[Open — B2]
TPB commitment $\Rightarrow$ fold-odd weight	Only if committed bit is the fold bit	[Open — fold-bit identification]
TPB $\Rightarrow$ nonzero $\chi$	Locality, selection, conditioning, faithfulness all open	[Open — B2-TPB]
Scalar $\kappa$ erases the U/D label (Lemma 1)	U,D records at same site $\rightarrow$ same scalar source $\rightarrow$ same field	[Proven — exact]
Record-faithfulness forces record-resolved $\kappa$	Conditional on Fold-Record Identification + $\kappa$ -sole-carrier	[Forced — conditional, not posited]
Auxiliary-exclusion clause is load-bearing	Forcing needs "no other field carries the label"	[Named dependency — skeptic's escape]
Closure-Orientation Retention Theorem (ordered-irreversible $\Rightarrow \omega$ retained)	Causal-order bits of U,D are opposite; faithfulness forbids common record	[Proven — conditional on ordered-irreversible commitment]
Orientation bit $\omega = b_{AB} \cdot b_{AC} \cdot b_{BC}$ is a committed record	$\omega(U)=+1, \omega(D)=-1$ ; metric-free, prior to $d_{ord}$	[Proven — given ordered-irreversible]
Fold-Record Identification	Reduced to: is $W_7$ closure ordered-irreversible commitment?	[Conditionally discharged — on foundational ground]
Endpoint-only failure (closure depends on unordered $\{A,B,C\}$ )	Then $R(ABC)=R(CBA)$ , $\omega$ erased, scalar $\kappa$ adequate, route fails	[Open — the live failure branch]
Retention is metric-free (independent of $d_{ord} = 3$ )	$\omega$ from causal order alone; $C_6$ sets only $C_{same}-C_{cross}$ magnitude	[Structural — carrier-existence $\neq$ dynamics]
Scalar $\kappa$ recovered as uniform mode $\kappa_0$	Record-resolved field is a conservative extension	[Proven — structural]
Graph-local $\kappa$ -carrier $\Rightarrow C_6$ Laplacian $L_{\{C_6\}}$	Graph-local $\rightarrow$ Laplacian uniqueness (§12.2)	[Derived — given Record-Resolution]
Closure contrast $G_0 > G_3$ (exact, six-state graph)	Eigenvalues $\{0,1,1,3,3,4\}$ ; $G_0-G_3 > 0 \forall M_{\kappa^2, \eta} > 0$	[Proven — given Record-Resolution]

Item	Status	Grade
Injectivity $n = g^{-1}A\kappa$ (resolved carrier has no rank loss)	A positive-definite; given resolution, propagation retains the record	[Proven — structural; near-tautological given resolution]
Carrier should be record-resolved at all	The real carrier claim; §12.1 forced-conditional	[Conditional — on Fold-Record Identification + auxiliary-exclusion]
Path record <i>present in <math>\kappa</math> vs readable as <math>\chi</math></i>	Present (injectivity) $\neq$ readable (Schur-obstructed)	[Distinct — present yes, readable open]
$C_{\text{same}} > C_{\text{cross}}$ now computed, not assumed	Magnitude from symmetric law; distinguishability relocated to carrier ontology	[Derived — given Record-Resolution]
<b><math>E_1</math> obstruction: any <math>D_6</math>-invariant linear <math>\kappa</math> field is scalar on <math>E_1</math></b>	Schur; $L_{\{C_6\}} _{\{E_1\}} = I \Rightarrow \text{Tr}(P+G) = \text{Tr}(P-G)$	[Proven — standing route closed]
Standing $P_+/P_-$ contrast from symmetric linear field	Refuted by the $E_1$ obstruction	[Refuted — no standing source]
Mechanism must be realized branch-conditioned history	Forced by the $E_1$ obstruction	[Proven — only survivor]
Selection seed exists (finite-count commitment noise)	Seed existence derived; $\beta J > 1$ threshold model-dependent on heat-bath rule	[Derived (existence) — threshold model-dependent]
Supercriticality (quartic $1/12\beta > 0$ )	Binary combinatorics, within the heat-bath model	[Derived — in the stochastic model]
Record locking $\tau \sim \tau_0 \exp(N\beta\Delta f)$ (persistence)	Mean-field switching-time estimate, not substrate-first-principles	[Derived — mean-field model]
"Momentum" creates the orientation preference	Static $\kappa$ -potential does it; momentum only sets rate/inertia	[No — misnomer; static potential]
<b>Closure-history <math>\rightarrow E_1</math> conditioned channel <math>R_{\omega} = \frac{1}{2}(I + \zeta\omega\Delta P)</math></b>	Constructed, unique at first order; evades Schur by conditioning	[Constructed — unique minimal form]
Readout faithfulness reduces to one coupling	$\zeta = \tanh(\beta h)$ (exact, $(\Delta P)^2 = I$ ); faithful iff $h \neq 0$ — possibly $C_6$ -computable, see next row	[Open — single scalar, the terminal residue]
Is $h$ independent of carrier coupling $J$ , or already fixed by it?	Same $\kappa \Rightarrow h$ computable from $C_6$ Green's function; independence unstated	[Open / unstated — possibly already determined]
$h$ is the terminus of the conserved obstruction	Unique channel, irreducible doublet — no further layer to relocate to	[Structural — must be computed, not moved]

Item	Status	Grade
Conditioned channel unique	Exact for binary $\omega$ ( $\omega^2=1$ resums); leading-order for locked $m$	[Proven — exact ( $\omega$ ) / leading-order ( $m$ )]
$\sigma_y$ coupling covariant but access-invisible	Why $\omega \cdot \Delta P$ is the $\chi$ -relevant channel (§A converse caveat)	[Structural — uniqueness qualifier]
$\chi = 2 \operatorname{artanh}(\zeta m)$ : contrast factorises (stored $m \times$ gain $\zeta$ )	$m$ from §12.4 (in-model); $\zeta$ from $h$ (open)	[Structural — both factors needed nonzero]
Obstruction conserved but localised (Lift→carrier→readout→h)	Same Schur lemma, now concentrated on one number	[Structural finding — pessimistic branch is $h=0$ ]
§12 discharges Locus-2 burdens (1)–(5)	Generation + persistence improved; mass-governance (4)–(5) open	[Partial — generation + locking; mass open]
Mass magnitude $\chi = 2 \operatorname{artanh}(\zeta m_*)$ predicted	Only after the access gain $\zeta$ from the intertwiner (§D.9)	[Open — quantitative; needs intertwiner]
Halving law $\rho = 1/2$ from this mechanism	Requires generation-recursion theorem (§D.9)	[Open — not implied]

# 1. Scope, Verdict Categories, and the Input Fences

## 1.1 The one question

This paper asks only:

**Carrier  $\wedge$  Generation  $\wedge$  Realization  $\implies$  S R S = R ?**

Here S is the  $W_7$  reflection exchanging the two fold directions, and R is the candidate physical state on which the  $\chi$  access readings are evaluated. No claim about B1, microscopic Descent, a closure-state-machine encoder, the numerical mass fit, or the  $\chi$ -halving law is part of the audit; those remain where prior papers left them.

## 1.2 The two verdicts

The verdict categories are frozen before the source theorems are read.

- **FORCED.** The inherited premises entail S R S = R for every admissible state of the claimed standing mechanism. The no-go then gives  $\chi = 0$  and the standing-state mechanism is falsified.
- **PERMITTED.** The inherited premises do not entail S R S = R; their proved uniformity applies at a different grain, or to a different subject, than the  $W_7$  up/down comparison. B2 is therefore logically well-posed. This does *not* mean an asymmetric state has been derived.

There is no third verdict "probably symmetric." Typicality is not necessity. The paper asks whether symmetry is a *theorem*.

### 1.3 The ontology-to-state fence

The governing integrity condition:

**Audit from ontology to state. Never construct an asymmetric R and call its existence permission.**

An arbitrary positive matrix with unequal diagonal entries proves nothing about VERSF. Permission must be read from the actual domains and conclusions of the Carrier, Generation, and Realization theorems. A symbolic computation can confirm the reflection algebra but cannot decide the ontology question; Appendix A is confirmatory only.

### 1.4 The TPB fence

The same rule applies to TPB:

**Do not assume a distinguishable reflection-exchanged fold pair and then call the resulting oddness a TPB generation theorem.**

If one assumes states  $R_+ \neq R_-$  with  $S R_+ S = R_-$ , then  $R_+$  is automatically not reflection-fixed — algebraically true, but the physical fold bit is already in the premise. Correct TPB integration must begin earlier: derive *which* coarse distinction becomes the stable bit, *where* its record lives, and *why* commitment leaves the symmetric locus. §11 specifies that theorem without claiming it.

### 1.5 What PERMITTED means

PERMITTED is proof-theoretic and ontological. It means: (1) the held theorem chain does not place the relevant state inside the reflection-fixed subspace; (2) the chain positively permits class-grain structure outside member-indexed uniformity; and (3) the physical up/down comparison is typed across winding-distinct classes unless an additional identification is supplied. It does **not** mean the substrate has selected a physical odd state. That remains B2.

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## 2. The Inherited Reflection No-Go

### 2.1 The $W_7$ fold doublet

On the faithful  $E_1$  doublet of the  $W_7$  cycle candidate, let  $P_+$ ,  $P_-$  be the rank-one fold projectors and let  $S$  satisfy

$$S^2 = I, S P_+ S = P_-.$$

For a positive access state  $R$  define  $a_{\pm}(R) = \text{Tr}(P_{\pm} R)$  and  $\chi(R) = \ln a_+(R) - \ln a_-(R)$ .

## 2.2 Reflection no-go lemma

**Lemma 2.1 — Reflection symmetry kills the fold contrast.** If  $S R S = R$ , then  $a_+(R) = a_-(R)$ , hence  $\chi(R) = 0$ .

*Proof.* Using  $P_- = S P_+ S$ , cyclicity of the trace, and  $S R S = R$ ,

$$a_-(R) = \text{Tr}(P_- R) = \text{Tr}(S P_+ S \cdot R) = \text{Tr}(P_+ \cdot S R S) = \text{Tr}(P_+ R) = a_+(R).$$

Hence  $\chi(R) = \ln 1 = 0$ . ■

## 2.3 The exact odd requirement

Define the reflection superoperator and its odd projector

$$J(R) = S R S, \mathcal{P}_o(R) = \frac{1}{2}(R - S R S).$$

A nonzero susceptibility requires  $a_+(R) \neq a_-(R)$ , hence  $\mathcal{P}_o(R) \neq 0$ . The converse is **not** automatic: a state may carry reflection-odd coherence the diagonal access readings do not detect. The physical requirement is therefore a nonzero fold-access imbalance, not merely some odd operator component:

$$\chi(R) \neq 0 \implies S R S \neq R, \text{ but } S R S \neq R \not\Rightarrow \chi(R) \neq 0 \text{ (without access faithfulness).}$$

## 2.4 What remains to be audited

The algebra is closed. The only open question is whether the ontology forces the antecedent  $S R S = R$ .

# 3. What the Carrier Theorem Actually Fixes

## 3.1 The class is the subject

Under the bath branch, the Carrier Theorem places the underived quantized response on the minimal transport-stable subject. Because bath transport preserves no standing member decomposition, that subject is the class. This closes the *grain* of the carrier; it does not classify every state, relation, or access operator the class or assignment family may carry.

## 3.2 Stability is not rigidity

The Carrier Theorem expressly distinguishes identity of the subject from its internal content: a transport-stable subject remains the same subject while transport may redistribute content and change realized facts inside it. **Stability is not rigidity.** The theorem proves the class is the peg on which standing response can hang; it does not prove an access operator  $R$  commutes with the particular  $W_7$  reflection.

### 3.3 What standing would require

If all three of the following held —

1.  $R$  is standing content rather than realized access;
2.  $S$  belongs to the admissible internal history of the same physical subject; and
3. that history acts on the state by  $R \mapsto S R S$ ,

— then standing invariance would require  $S R S = R$ . The disputed point is **condition 2**. The Carrier Theorem invokes the class's admissible transport abstractly; it does not identify the  $W_7$  reflection with an internal relabelling of the physical class or family whose state  $\chi$  reads.

### 3.4 Carrier audit verdict

The Carrier Theorem closes: the minimal subject at class grain; the absence of standing member-line carriers under bath transport; the distinction between subject identity and internal realization. It leaves open: whether  $W_7$  reflection is internal to one class; whether the  $\chi$  state is standing, realized, or transient access; whether reflection exchanges members, winding-distinct classes, or conjugate carriers; and **whether the full  $E_1/D_6$  action is the admissible internal action on the relevant subject** (the invariance link of §6.4). The Carrier Theorem therefore does not force  $S R S = R$ .

---

## 4. What the Realization Theorem Actually Fixes

### 4.1 Uniformity at member grain

The Realization Theorem completes the member-grain reading of class-owned response: where standing member-grain response content exists, it is unique and uniform — every seat of one indistinguishable class reads the class response at  $q/k$ . Its domain is exact: *standing response assignments indexed to the indistinguishable members of one class*. It forbids one seat from owning a different standing share than another seat of the same class.

### 4.2 The Class Uniformity Criterion

A candidate bath class is disqualified if its proposed members differ in any standing quantum number. This is a robust within-class criterion. It is **not** the proposition "P+ and P- must receive

equal class-level access" — that follows only if the fold directions are first identified as seats of one indistinguishable class.

### 4.3 The missing member identification

The  $W_7$  construction supplies a reflection-exchanged pair of fold directions. It does not prove those directions are member labels inside one bath class. In the quark catalogue used by the Generation Theorem, the physical up and down columns carry different electric windings; they are therefore *not* indistinguishable members of one class. The invalid inference would be

uniformity within each class  $\Rightarrow$  equal access between winding-distinct classes.

Nothing in the Realization Theorem licenses that step.

### 4.4 Realized asymmetry is not generally forbidden

The broader Ownership–Realization chain permits maximally asymmetric *realized* allocations while forbidding asymmetric *standing* ownership. The ontology is therefore not a blanket symmetry postulate on every state; its prohibition is narrower — no unequal standing member ownership inside one indistinguishable class.

### 4.5 Realization audit verdict

The Realization Theorem would force equal fold readings only after the added typing  $\{P_+, P_-\} =$  two seats of one indistinguishable class. That identification is unestablished and in tension with the catalogue typing of physical up/down. The theorem does not force  $S R S = R$ .

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## 5. What the Generation Theorem Adds

### 5.1 Member-grain generation asymmetry is closed

The Generation Theorem proves generation cannot be a standing label on individual members: under bath irreducibility, member identity through transport is realized, not standing, so any standing generation invariant lives at class grain or above. This closes the obvious member-grain route.

### 5.2 Class-grain refinement content is positively permitted

Class grain is not featureless. If two admissible classes agree in capacity and winding but are distinct catalogue entries, they must differ in additional standing class-grain refinement content. A closure-architectural branch leaves refinement as standing class-grain structure beyond the response winding tuple — depth or internal configuration of the class's standing transport

content. The ontology thus contains an *admitted* category of class-grain structure not reducible to uniform member shares.

### 5.3 Up and down are different winding columns

Within the quark assignment family the catalogue decomposes as

catalogue  $\cong$  (winding set)  $\times$  (refinement space).

Winding separates the up and down partners inside a generation; refinement separates generations within each fixed-winding column. Up and down are therefore **winding-distinct classes within one assignment family**, not two members of one indistinguishable class. This is the decisive typing fact for the Scope audit.

### 5.4 Mirrored content need not mean fixed content

The Generation Theorem carries conjugation at carrier grain: a generation-class may have a distinct conjugate carrier with mirrored standing content. A symmetry may therefore map one class to another mirrored class rather than fix the original class pointwise. The difference is load-bearing:

$S : C \rightarrow \bar{C}$  (inter-class map) is not  $S : C \rightarrow C$  (internal relabelling).

Only the second supports  $S R S = R$  for standing content of  $C$ .

### 5.5 Generation audit verdict

The Generation Theorem forbids member-grain standing generation labels; requires generation-individuating content at class grain; permits closure-architectural standing class content; types up/down as winding-distinct classes; and permits mirrored conjugate carriers. It therefore does not force reflection symmetry of an inter-class or assignment-family access state.

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## 6. The Symmetry Squeeze, the Schur Guard, and the Conjunction

### 6.1 The proposed squeeze

The squeeze can be audited in four steps.

- **Step 1 — Standing response lives at class grain.** *Pass.* Carrier and Generation place the relevant persistent subject and generation-individuating content at class grain or above.

- **Step 2 — The whole physical subject is fixed by  $W_7$  reflection.** *Fail as a theorem.* The source papers prove invariance under the subject's admissible internal histories; they do not prove  $W_7$  reflection is such an internal history of one physical class or family state.
- **Step 3 — Member grain cannot host a standing odd label.** *Pass.* Ownership, Realization, and Generation exclude standing member-indexed asymmetry inside one indistinguishable class.
- **Step 4 — No other standing locus can carry relative fold access.** *Fail.* The Generation Theorem supplies class-grain refinement content, and the physical up/down comparison is inter-class rather than a member comparison inside one class.

The squeeze does not close.

## 6.2 Route A — IR-SCOPE, the missing reflection identification

The first sufficient forcing premise:

**IR-SCOPE — Internal-Reflection Scope Premise.** The two fold directions are seat-level alternatives inside one physical indistinguishable class;  $S$  is an admissible internal relabelling of that class; and the state read by  $\chi$  is standing under that action.

IR-SCOPE is not contained in the Carrier, Realization, or Generation theorems. It is a new physical typing statement.

## 6.3 Route B — the Schur guard

There is a stronger route to the same no-go. Let  $\rho : D_6 \rightarrow U(E_1)$  be the irreducible  $E_1$  action on the two-dimensional fold space. If the admissible internal action on the physical subject is the full image  $\rho(D_6)$ , and standing invariance requires

$$\rho(g) R \rho(g)^\dagger = R \text{ for every } g \in D_6,$$

then  $R$  lies in the commutant of an irreducible complex representation. **Schur's lemma** gives  $R = c \cdot I$  on  $E_1$ , whence  $a_+ = a_-$  and  $\chi = 0$ . This states exactly how the verdict would flip if the full  $W_7/D_6$  action were proved internal and standing on the state  $\chi$  reads.

## 6.4 The forcing conjunction and its independent weak links

Routes A and B are not "the two ends of a single axis." Forcing  $\chi = 0$  requires a *conjunction* of conditions, and those conditions are of three logically distinct kinds. It is a category error to present them as one "how much invariance" question, because one of them is not an invariance question at all.

**The forcing conjunction.** Schur/IR-SCOPE collapse of the contrast requires **all three**:

- **(T) Type.** R is class-internal standing content of a *single* irreducible  $E_1$  doublet — an endomorphism of  $E_1$  — not an inter-class or assignment-family relation between two distinct classes.
- **(I) Invariance.** The admissible internal action under which R must be invariant is the *full* irreducible image  $\rho(D_6)$ , not a proper sub-action  $H \subsetneq D_6$ . (Route A is the special case where one only demands invariance under the single reflection S; Route B demands the full action.)
- **(S) Standing.** R is established to be *standing* content in the first place — logically prior to (T) and (I), since a realized or transient access operator need be invariant under nothing.

These do not lie on one axis:

- **(T) is a type condition, off the invariance axis entirely.** If R is an inter-class / assignment-family object rather than an operator on the single  $E_1$ , Schur's lemma does not *fail* to force scalarity — it does not **type-check**. R is not an element of the commutant of  $\rho$ -on- $E_1$  because it is not an operator on  $E_1$  to begin with. This is arguably the cleanest and most fundamental defeater of Route B, and it is *orthogonal* to the full/sub-action distinction. Decisively, the Generation Theorem's own catalogue (§5.3) types physical up/down as winding-distinct classes — which leans positively *against* (T), i.e. toward R being inter-class.
- **(I) is the invariance condition, and it needs two premises, not one.** Route B's antecedent is the conjunction: (i) the full  $\rho(D_6)$  is the admissible internal action, *and* (ii) R is standing-invariant under all of it. The Carrier Theorem's irreducibility claim supplies **neither** directly: irreducibility constrains invariant *subspaces*, but says nothing about which action R is *required* to be invariant under. So "one identification short of Schur" overstates it — irreducibility is adjacent to (I) but is not one inference from it; it is silent on the standing-invariance premise (ii) altogether (cf. §9.3).
- **(S) is prior to both.** If the relevant access is realized/transient (Locus 2), R is not required to be invariant under anything, and (T), (I) never engage.

**The honest statement of the verdict.** PERMITTED holds because the conjunction  $(T) \wedge (I) \wedge (S)$  is unestablished, and it is unestablished at *several independent points* — at least one of which, (T), is a type mismatch rather than an invariance deficit, and is actively opposed by the corpus's own typing. The verdict is not a single dramatic hinge; it is a multi-pronged "not established."

**Which link to watch — and why it is not the whole story.** Among the three, the invariance link (I) is the one nearest to inadvertent supply: if a future result established that R must be invariant under the full irreducible action, Schur (Route B) would close the contrast with no further premise. So (I) is the *most automatic killer* and the first link a falsification attempt should target. But it is one link of three, and the type link (T) is both cleaner and corpus-opposed. Saying "the verdict turns on (I)" would be rhetoric laid over the conjunction; the accurate statement is "(I) is the link most worth watching, (T) the link most likely to hold."

## 6.5 What PERMITTED does and does not require

PERMITTED does not prove the admissible action is a proper subgroup, nor that R is inter-class, nor that the access is realized. It proves only that the present corpus has not established the forcing conjunction. Any *one* of the following independently keeps the contrast alive, and the paper does not choose among them: R is inter-class (T fails); the admissible internal action is a proper subgroup (I fails); the reflection maps between classes,  $S : C \rightarrow \bar{C}$  (a special way T or I fails); the access is realized/transient rather than standing (S fails). The verdict is located on the unmet conjunction, not on a particular way of filling it.

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## 7. The Three Remaining Loci

The main verdict is already determined by the failed scope joint and the unmet forcing conjunction (§6.4). This section maps where a physical contrast could reside, without claiming any is realized. Locus 1 is where the type link (T) fails; Locus 2 is where the standing link (S) fails; Locus 3 is a special way the type/invariance links fail.

### 7.1 Locus 1 — Standing inter-class or family-grain access

The Generation Theorem permits standing class-grain refinement structure and types up/down as winding-distinct classes. A relation or access state defined *across* those classes lies outside within-class member uniformity. This is the cleanest standing locus still permitted — permission only; B2 must derive its asymmetry from independent structure.

### 7.2 Locus 2 — Realized, transient, or boundary access

The Ownership chain permits asymmetric realized allocations even where standing ownership is uniform. A transient access operator could carry fold-odd weight without making it a permanent unequal member identity. This route *changes the ontology* of the mechanism; a successor must define (1) the transient/realized subject; (2) the dynamics producing it; (3) why its readout is stable enough to govern mass; (4) why it is not mass-fitted; and (5) how it relates to the standing class structure.

### 7.3 Locus 3 — Mirrored or conjugate carriers

A reflection may exchange two distinct carriers or classes; covariance of the pair  $S R_+ S = R_-$  need not imply invariance of either. This is a legitimate locus but requires an independently derived physical identification of the paired carriers and of the readout between them.

### 7.4 Post-selection is not a fourth locus

The external/internal observable split does not by itself evade the no-go: if the internal readout acts on a reflection-symmetric state it still gives equal access. Post-selection becomes relevant only by producing or conditioning on one of the three loci above.

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## 8. The Reflection-Scope Verdict Theorem

**Theorem 8.1 — Reflection-Scope Verdict.** At the inherited conditionality of the Carrier, Realization, and Generation theorems, those theorems do not entail  $S R S = R$  for the  $W_7$  state read by  $\chi$ . They force class-grain carriage and member-grain uniformity within one indistinguishable class, but they do not identify  $W_7$  reflection as an admissible internal relabelling, do not identify the fold directions as members of one class, do not identify the full irreducible  $E_1/D_6$  action as the admissible internal action on the physical state, and positively permit standing class-grain refinement content across winding-distinct classes. Therefore the existing ontology **permits, without deriving**, a state with nonzero fold-access imbalance.

*Proof.*

1. The Carrier Theorem fixes the minimal subject under bath transport but distinguishes subject stability from internal rigidity (§3.2); it supplies neither IR-SCOPE nor Full-Action Invariance.
2. The Realization Theorem forces uniformity only after the relevant objects are typed as seats of one indistinguishable class (§4.3); the  $W_7$  fold channels are not so typed.
3. The Generation Theorem places generation-individuating content at class grain and types the up/down columns as winding-distinct classes (§5.3); it also permits class-level refinement and mirrored conjugate carriers.
4. Hence the inference from within-class uniformity to  $S R S = R$  requires the additional scope premise (Route A), and the stronger Schur inference requires the full forcing conjunction (Route B): the type condition (T), the full-action invariance condition (I), and the standing condition (S). None is inherited; (T) is opposed by the catalogue typing (§5.3, §6.4).

Therefore reflection symmetry is not forced by the three theorems. ■

### 8.1 Binary verdict

**PERMITTED.** The current theorem chain does not place the physical  $\chi$  state in the reflection-fixed subspace.

### 8.2 What the verdict does not say

It does not prove that a physical odd-weighted state exists; that the admissible internal action is a proper subgroup of  $D_6$ ; that the  $W_7$  fold pair is the physical up/down pair; that  $\chi$  is a standing rather than realized readout; that the access dynamics produce measured masses; or that Descent holds. It proves only that the existing grain and realization theorems do not *already* falsify B2.

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## 9. The Two Conditional Forcing Routes

The premises that would reverse the verdict are stated in the main chain, not hidden in objections.

### 9.1 Route A — IR-SCOPE

**Theorem 9.1 — Internal-reflection forcing.** Assume (1)  $P_+$  and  $P_-$  are seat/member alternatives within one physical class of mutually indistinguishable members; (2)  $S$  is an admissible internal relabelling of that class; (3)  $R$  is standing content invariant under all admissible class relabellings. Then  $S R S = R$ , hence  $\chi(R) = 0$ .

*Proof.* Standing invariance under the admissible relabelling  $S$  gives  $S R S = R$ ; Lemma 2.1 gives equal fold access and  $\chi = 0$ . ■

### 9.2 Route B — Full-Action Invariance

**Theorem 9.2 — Schur forcing on the  $E_1$  doublet.** Assume (1) the full irreducible  $E_1$  representation  $\rho(D_6)$  is the admissible internal action on the physical subject carrying  $R$ ; (2)  $R$  is standing under the complete action,  $\rho(g) R \rho(g)^\dagger = R$  for every  $g \in D_6$ . Then  $R = c \cdot I$  on  $E_1$ , hence  $\chi(R) = 0$ .

*Proof.* The invariance condition places  $R$  in the commutant of the irreducible complex representation  $\rho$ . Schur's lemma makes that commutant scalar,  $R = c \cdot I$ . Equal projector ranks then give  $a_+ = a_-$ . ■

### 9.3 Relation between the routes — and the conjunction restated

Full-Action Invariance is strictly stronger than reflection invariance alone: it includes invariance under  $S$  but additionally constrains every other  $E_1$  group direction, removing residual reflection-even non-scalar freedom. The two routes therefore identify different proof burdens —

- **Route A** asks whether the single reflection  $S$  is internal to one class.
- **Route B** asks whether the *entire* irreducible  $W_7/D_6$  action is the admissible internal class action and whether the  $\chi$  state is standing under it.

These are the type and invariance links of the conjunction (§6.4). Route A fails to force the verdict if  $S$  maps between classes or  $R$  is not standing; Route B fails if  $R$  is inter-class (type link T, off the invariance axis) **or** if the admissible action is a proper sub-action (invariance link I). The corpus discharges neither — and a precise word on the invariance link, to retire the earlier "one identification short" phrasing: Route B's antecedent is genuinely *two* premises — (i) the full  $\rho(D_6)$  is the admissible internal action, and (ii)  $R$  is standing-invariant under all of it. The Carrier Theorem's irreducibility claim supplies **neither**. Irreducibility constrains invariant subspaces; it is consistent with, but does not entail, (i), and it is silent on (ii) altogether. So the link is *adjacent* to the Schur antecedent, not one inference from it. It remains the link most worth watching —

because if both premises ever close, Schur falsifies the mechanism with nothing further — but "watch it" is not "it is nearly proved." **The single point a future paper must resolve: either establish (i)  $\wedge$  (ii) for the physical state read by  $\chi$  (falsifying the mechanism), or explicitly deny the conjunction by exhibiting  $R$  as inter-class (T), or the action as a proper sub-action (I), or the access as realized (S).**

## 9.4 Falsification consequence

If either route is established for the physical state read by  $\chi$ , the standing-state mechanism predicts  $m_{\text{up}} / m_{\text{down}} = 1$  wherever the readout applies, conflicting with the first-generation ratio (whether read empirically as  $\approx 0.46$  or through the programme's own 6/13 anchor, which reproduces it:  $6/13 \approx 0.4615$ ). The result would be a clean falsification of the standing-state mechanism, not a missing calculation.

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# 10. Consequences for B2 and the Quark Programme

## 10.1 B2 is well-posed

Because the verdict is PERMITTED, the next dynamical question is legitimate:

**B2: derive  $a_+(\mathbf{R}) \neq a_-(\mathbf{R})$ , i.e.  $\text{Tr}[(\mathbf{P}_+ - \mathbf{P}_-)\mathbf{R}] \neq 0$ , from mass-independent dynamics.**

B2 may not be discharged by choosing unequal weights or fitting quark ratios; the odd access must emerge from independent structure.

## 10.2 The headline finding — the fold reflection is not the asymmetry's source

This is the consequence the verdict's structure forces, stated plainly rather than left for the reader to assemble. The entire escape from the no-go runs through one inherited fact: up and down are winding-distinct classes (§5.3). But if that distinction is taken as primitive, then identifying  $\mathbf{P}_+$  with up and  $\mathbf{P}_-$  with down makes  $S$  exactly the up $\leftrightarrow$ down inter-class map, and

$$\chi(\mathbf{R}) = \ln \text{Tr}(\mathbf{P}_+ \mathbf{R}) - \ln \text{Tr}(\mathbf{P}_- \mathbf{R})$$

is just the *difference in access between two classes already declared distinct*. The no-go is evaded — but the entire explanatory content has thereby been relocated into B2, which now reads: derive why two classes *defined* as different have different access. That is the original mass-ratio problem verbatim.

The structural consequence must be stated precisely, because a later part of this paper (§12) proposes a mechanism that touches the  $W_7$  structure, and a loose version of this finding would contradict it. The precise claim is about the **reflection map  $S$** , not about all of  $W_7$ : **the reflection map sources none of the asymmetry** — an exchange map  $S : + \leftrightarrow -$  cannot by itself source the

magnitude of what it exchanges. The asymmetry must come from elsewhere: the winding label (imported as a catalogue primitive), realized dynamics, or *another piece of the  $W_7$  structure distinct from the reflection* — specifically the closure-order structure (§12). But §12 also proves the sharper bound: *no* fully symmetric linear field of that structure sources a **standing** contrast either (the  $E_1$  obstruction, §12.3) — so the only surviving source is realized, branch-conditioned history. So the fold *reflection* supplies the basis in which the contrast is read, not the reason there is a contrast; whether realized closure-history dynamics can supply that reason is undecided and is the subject of §12. Two corollaries follow, both to be stated rather than inferred:

1. **The grain correction is not cosmetic.** Since  $\chi$  compares winding-distinct classes, the state supporting both readings is an **assignment-family / inter-class** access object, not the standing state of one class. This is exactly the type link (T) of §6.4 resolving against full-action Schur — and it determines whether the Realization Theorem's within-class uniformity applies at all (it does not). A successor should define  $R \in \mathcal{A}$ \_family with  $P_+$ ,  $P_-$  selecting two class channels, or prove the forcing conjunction and accept the no-go.
2. **The  $\chi$ -halving law  $\rho = \frac{1}{2}$  receives no support here.** Nothing in this audit produces a factor of one-half, or any relation, between the access of the two classes — let alone its recurrence across generations. The audit indicates the fold *reflection* is structurally incapable of being the halving law's origin: the reflection is the up $\leftrightarrow$ down exchange, and an exchange map cannot by itself source the magnitude of what it exchanges. For a paper in the  $\chi$ -halving series this is the load-bearing negative result: the standing-fold-*reflection-as-origin* hypothesis for  $\rho = \frac{1}{2}$  is not supported and is most likely finished. §12 sharpens this further: even a fully closure-resolved symmetric linear field gives no standing contrast (the  $E_1$  obstruction), so the *only* surviving source is realized branch-conditioned history (Locus 2). Any surviving derivation of  $\rho = \frac{1}{2}$  must source the asymmetry from inter-class structure (Locus 1) or realized closure-history dynamics (Locus 2), with the reflection serving only as readout.

### 10.3 Two honest mechanism classes remain

- **Standing inter-class mechanism.** Derive a class/family-grain standing relation giving unequal access to two winding-distinct classes; explain why the relation is admissible and mass-blind.
- **Realized/transient mechanism.** Keep standing class structure symmetric but derive an odd realized access state from boundary, refinement, or record dynamics; then prove that the realized readout nevertheless governs the persistent mass response.

The paper does not choose between them.

### 10.4 The next paper's fixed deliverable

The next paper must return a verdict on a concrete source of  $\chi \neq 0$ , not merely exhibit an asymmetric state. Two concrete deliverables now stand out, both audited before the quark numbers are consulted: for the TPB route, the Fold-Bit Identification Theorem of §11; for the  $\kappa$ -mediated commitment-memory route (§12, the more developed candidate), the readout *channel* is already constructed (§12.5) — the decisive deliverable is now a single number: **derive**

whether the mass-independent pointer coupling  $h$  between the realised closure record and the fold-access observable  $\Delta P$  is nonzero ( $\zeta = \tanh(\beta h)$ ;  $\chi \neq 0$  iff  $h \neq 0$ ). The carrier antecedent beneath it has a separate, more tractable deliverable — establish whether  $W_7$  closure is built from ordered irreversible commitments (whose order is physically retained) or is endpoint-determined, since the Closure-Orientation Retention Theorem (§12.1) shows the first settles carrier retention and the second kills the route. For any of these, the odd coordinate must emerge from independently fixed dynamics, and  $h$  must be sourced rather than assumed.

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## 11. TPB at the B2 Boundary — The Theorem Still Owed

This section does not add a second result. Its purpose is to prevent TPB from being integrated at the wrong logical point.

### 11.1 What TPB supplies generically

TPB distinguishes (1) reversible microscopic updates (ticks); (2) irreversible commitment events forming stable distinguishability records; (3) operational time assembled from those commitments. This supplies a general record-forming architecture and makes it meaningful to ask *which* coarse distinction becomes a stable bit and *how many* ticks reach it. It does **not** by itself identify the recorded distinction with  $W_7$  fold orientation.

### 11.2 The diagnostic identity — and why it is not generation

Given two states with  $R_- = S R_+ S$  and  $R_+ \neq R_-$ , then  $\mathcal{P}_o(R_+) = \frac{1}{2}(R_+ - R_-) \neq 0$ . This is an exact algebraic diagnostic: a distinct reflection-exchanged pair has odd content. It is **not** a generation theorem — the fold-labelled distinction and its non-degeneracy are already assumed, so the identity carries no evidence that the physical commitment dynamics select the fold bit.

### 11.3 The correct TPB target

Define the mass-blind fold-access coordinate  $q_\chi = a_+ - a_-$  (or its sign). A genuine TPB integration must derive a one-bit partition from the dynamics, establishing at minimum:

- **T1 — Fold-bit identification.** The first stable coarse distinction relevant to the access dynamics is the sign of  $q_\chi$ , not an unrelated environmental or catalogue variable.
- **T2 — Fold-sector locality.** The stable record is carried in the  $W_7 E_1$  fold sector, or in a rigorously defined physical sector mapped to it independently of the masses.
- **T3 — A genuine unresolved separator.** There is a positive threshold  $\delta_{\text{bit}}$  with  $B_+ = \{q_\chi > \delta_{\text{bit}}\}$  and  $B_- = \{q_\chi < -\delta_{\text{bit}}\}$  stable record basins, while  $|q_\chi| < \delta_{\text{bit}}$  is unresolved.
- **T4 — Reflection covariance.** Reflection exchanges the basins,  $S : B_+ \leftrightarrow B_-$ .
- **T5 — Dynamical selection.** From a reflection-symmetric unresolved state, the independently specified tick dynamics plus commitment threshold actually reach one

basin. A perfectly symmetric deterministic evolution preserving the symmetric locus is **not** enough; the instability, fluctuation, boundary input, or other selection source must be *derived*.

- **T6 — Conditioned physical access.**  $\chi$  is evaluated on the committed record (or a state conditioned on it), and the inherited trace-access functional is faithful to the recorded fold distinction.

## 11.4 The Fold-Bit Identification Theorem owed

**Target — TPB Fold-Bit Identification Theorem.** From mass-independent  $W_7$  and commitment dynamics, derive that the minimal stable one-bit partition of the relevant access state space is  $B_+ \sqcup B_-$ , defined by the sign of  $q_\chi$ , and that a commitment from the unresolved symmetric region enters one of those basins.

Only after this theorem may the diagnostic identity of §11.2 be used to conclude TPB has generated fold-odd weight.

## 11.5 Pass / fail outcomes

- **PASS.** The one-bit boundary is fold-local, two stable sign basins exist, and the dynamics select one. TPB then supplies an independently derived B2 mechanism.
- **FAIL.** The first stable bit is not the fold bit, the symmetric locus stays dynamically closed, the record lies outside the access sector, or  $\chi$  reads only the unconditioned mixture. TPB does not generate the contrast.
- **NOT TESTABLE.** The tick map, record threshold, or physical state space is unspecified; the programme lacks the dynamics to run B2.

## 11.6 Status in this paper

No TPB-Fold theorem is claimed. TPB is integrated correctly by fixing the next test and refusing to count the downstream oddness identity as physical generation.

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# 12. A Concrete B2 Candidate: $\kappa$ -Mediated Commitment-Memory Instability

The verdict leaves B2 open and §10–§11 specify what any B2 mechanism must deliver. This section constructs a concrete candidate and grades it honestly. It supersedes an earlier "fact-momentum / Locality-Lift" version of this section: that version rested on a premise (U and D couple differently) that was *type-equivalent to its own conclusion*, and is replaced here by a symmetric premise — all six closure states obey one graph-local law — from which the U/D contrast falls out as one consequence among a hierarchy. The replacement breaks the type-equivalence; but a Schur obstruction (§12.3) then closes the *standing* route entirely and forces the mechanism to realized-history grain, where a new and decisive gap (§12.5) opens. The name

is corrected up front: the orientation-selecting interaction is a *static  $\kappa$ -mediated potential*, not a momentum effect (§12.4), so "fact momentum" is demoted to the framework label and the mechanism is named for what does the work.

## 12.1 The existing $\kappa$ field is branch-blind; the Record-Resolution Premise

The present fact-momentum theory defines one real scalar field  $\kappa(x,t)$  sourced by the *total* density of committed facts,  $(\square + M_\kappa^2)\kappa = \rho_{\text{committed}}$ ,  $q = N_{\text{committed}}$ . It records how many facts have formed; it does **not** retain which  $W_7$  closure orientation each fact recorded. So the existing scalar theory cannot, by itself, distinguish U from D — a stronger carrier is required, and the honest question is the least branch-specific premise that supplies one.

The premise is not arbitrary; it follows from what  $\kappa$  is *for*. The earlier draft posited "assume  $\kappa$  preserves the closure label" as a bare upgrade. But if  $\kappa$  is the field that carries commitment *memory* — not merely a commitment *counter* — then preserving the label is a consistency condition, not an extra assumption:

**Record-Resolution Premise (memory-consistency form).** If  $\kappa$  is the carrier of commitment memory, and committed facts have physically distinguishable closure labels, then  $\kappa$  must carry enough information to distinguish those labels — unless that information is explicitly stored in some other field. A field that claims to mediate commitment memory cannot erase the very distinction the commitment recorded.

This is more than a motivated premise: its *negation* can be shown inconsistent with  $\kappa$  being a faithful memory of a distinguishable record. The argument is a short lemma and its contrapositive.

**Lemma 1 (scalar  $\kappa$  erases the closure label).** If the scalar  $\kappa$  source is the total committed count  $\rho_\kappa(x) = \sum_\sigma n_\sigma(x)$ , then a single U-record and a single D-record at the same emergent location produce the *same* source,  $\rho_\kappa^{\{U\}} = \rho_\kappa^{\{D\}}$ , hence — by uniqueness of the scalar solution at fixed boundary conditions — the *same* field,  $\kappa_U(x) = \kappa_D(x)$ . Scalar  $\kappa$  is exactly blind to the U/D distinction. ■

**Theorem (record-faithfulness forces resolution, conditional).** Call a carrier *record-faithful* if two committed records that later admissible dynamics must distinguish do not map to the same memory state. Then: *if* (a)  $W_7$  closure orientation is part of the committed record, (b) U and D are physically distinguishable records, (c)  $\kappa$  is the carrier of commitment memory, and (d) no independent auxiliary field carries the closure label, *then*  $\kappa$  cannot be scalar — it must be record-resolved over  $\Omega$ . *Proof:* by (a)–(c) and faithfulness, the carrier must preserve the U/D distinction; by (d) no other field can hold it, so  $\kappa$  must; by Lemma 1 scalar  $\kappa$  does not; hence  $\kappa$  is record-resolved, with one component  $\kappa_\sigma$  per closure state. ■

Two things must be stated plainly about this forcing, because both are load-bearing:

- **The auxiliary-exclusion clause (d) is doing real work, and is not hidden.** The theorem does *not* say "faithfulness forces record-resolved  $\kappa$ " unconditionally; it says "faithfulness

plus  $\kappa$  being the sole memory field forces it." A skeptic's natural escape is exactly that the closure label lives in *some other* field, leaving  $\kappa$  scalar and faithfulness satisfied globally. That escape is admissible; the honest statement is therefore **faithfulness +  $\kappa$ -is-the-only-memory-carrier  $\Rightarrow$  record-resolved  $\kappa$** , and the clause is named here rather than buried.

- **The antecedent (a) is the real open question, sharpened.** Faithfulness only protects distinctions that later dynamics is *required to read* — so the forcing triggers only if  $W_7$  closure orientations are *genuine committed records*, not merely reversible labels in the closure calculus. This is the precise fork:

**Fold-Record Identification (the carrier's open question).** Are  $W_7$  closure orientations genuine committed records, or merely reversible labels in the closure calculus? Only the first answer makes them distinctions later dynamics must read, and only then does record-faithfulness force a record-resolved  $\kappa$ .

This fork can itself be *reduced* to a sharper question on foundational ground — one the corpus is equipped to adjudicate, because irreversible commitment is a VERSF primitive. The reduction is the following theorem.

**Closure-Orientation Retention Theorem.** Let A, B, C be the three primitive closure acts and define, for a closure word  $w$ , the three causal-order bits  $b_{XY}(w) = +1$  if X precedes Y in  $w$ , else  $-1$ . For  $U = ABC$ ,  $(b_{AB}, b_{AC}, b_{BC}) = (+, +, +)$ ; for  $D = CBA$ ,  $(-, -, -)$  — *opposite causal-order content* (all three bits flip). Assume (i) the primitive closure acts are irreversible commitment events, (ii) their commitment order is part of the committed history, and (iii) the record map is causal-order faithful (histories of different causal-order content cannot map to the same committed record). Then  **$R(ABC) \neq R(CBA)$** : the U/D orientation is retained as a committed record. *Proof:* the order bits of U and D are pointwise opposite, so their causal-order content differs; causal-order faithfulness then forbids a common record. ■

The theorem's content is the *full* causal-order content (all three bits) distinguishing U from D. A single orientation scalar  $\omega(w) = b_{AB} \cdot b_{AC} \cdot b_{BC}$  gives  $\omega(U) = +1$ ,  $\omega(D) = -1$  and so conveniently *separates the two antipodes* — but it is a **lossy projection**: the three bits individually carry strictly more than their product, and intermediate words (e.g. ACB) have mixed bits with  $\omega$  possibly  $+1$  while being neither U nor D. So  $\omega$  is sufficient to summarise the U/D distinction, not to encode the full closure history — it is a convenient label for the antipodal pair, not "the" record coordinate.

This converts Fold-Record Identification from "is the orientation a committed record?" into "**is  $W_7$  closure built from ordered irreversible commitments, or only from its unordered endpoint?**" — and the latter is answerable from the VERSF account of commitment, not from any engineered structure. The fork is genuine, with a real failure branch:

**Endpoint-only failure case.** If the completed closure record depends only on the unordered endpoint  $\{A, B, C\}$ , then  $R(ABC) = R(CBA)$ : orientation is erased, ABC/CBA is a *reversible* internal ordering label, scalar  $\kappa$  is adequate, and the fact-momentum route fails at the carrier. Many closure operations *are* endpoint-determined, so this branch is not idle.

Two points keep this honest and correctly scoped:

- **It is metric-free, and prior to the  $C_6$  structure.** The orientation bit  $\omega$  is built from causal order alone — no  $d_{\text{ord}}$ , no closure-order graph. So orientation *retention* (is there an orientation bit at all?) is independent of and prior to the antipodal fact  $d_{\text{ord}}(U,D) = 3$ , which earlier rounds rightly flagged as presupposing the labelling. The  $C_6$  metric governs only the *magnitude* of  $C_{\text{same}} - C_{\text{cross}}$  (via the Green's function, §12.2); it plays no part in whether the orientation is a record. This cleanly separates carrier-*existence* (this theorem) from the *dynamics* (the  $C_6$  calculation).
- **It closes the carrier leg, not the readout leg.** The theorem's Corollary — *if ABC and CBA are distinct records and  $\kappa$  carries the record, scalar  $\kappa$  is insufficient and  $\kappa$  must be closure-resolved* — re-derives the carrier-resolution requirement from the causal-order angle (a second route to the Lemma-1 conclusion). But " $\kappa$  must resolve  $\omega$ " is carrier *capacity*; it says nothing about whether  $\omega$ , now provably in the record and storable in  $\kappa$ , can be *read into*  $E_1$ . The  $E_1$  obstruction (§12.3) still sits between " $\omega$  is in  $\kappa$ " and " $\omega$  is readable as  $\chi$ ." So this theorem strengthens the carrier leg twice — the record retains  $\omega$ , and  $\kappa$  must resolve it — and leaves the readout leg exactly where it was.

So the carrier premise is no longer "assume" or even "natural": it is *forced, conditional on Fold-Record Identification and auxiliary-exclusion* — and Fold-Record Identification is now itself *conditionally discharged*, reduced to whether  $W_7$  closure is ordered-irreversible commitment, a question on foundational ground with a clean endpoint-only failure branch. That is a real strengthening, relocating the open question one step closer to the primitives. It mentions no U, D, up, or down, and inserts no imbalance.

Crucially, the record-resolved field is a *conservative extension*, not a replacement. The scalar  $\kappa$  is recovered as the uniform ( $k = 0$ ) mode,  $\kappa_0 = |\Omega|^{\{-1/2\}} \sum_{\sigma} \kappa_{\sigma}$  — the branch-blind projection of the fuller field, carrying total commitment count but erasing the closure label (exactly Lemma 1). So §12 does not contradict the existing scalar  $\kappa$ ; it resolves it, with the scalar theory as the uniform mode and the closure structure in the remaining modes.

## 12.2 Graph-resolved $\kappa$ -carrier and the exact closure contrast

Let  $G_{\text{ord}} = \text{Cay}(S_3, \{(12),(23)\})$  — a six-vertex cycle on the closure-order states — on which the  $W_7$  audit places  $U = ABC$  and  $D = CBA$  at opposite vertices, graph distance 3. Introduce one field value per closure state,  $\kappa(x,t) = (\kappa_{\sigma})_{\{\sigma \in G_{\text{ord}}\}}$ , with source vector  $n = (n_{\sigma})$ ,  $n_{\sigma}$  the count of committed records of closure type  $\sigma$ .

**Graph-Local  $\kappa$ -Carrier Theorem.** Assume (i) only one-tick-adjacent closure states couple directly; (ii) every vertex and every primitive edge is treated identically; (iii) the free theory is quadratic at leading order; (iv) the internal gradient energy is non-negative; (v) a uniform field over all closure states carries no internal-gradient cost. Then the internal quadratic term is uniquely the graph Laplacian,  $Q_{\text{int}} = (\eta/2) \sum_{\{\sigma,\tau\} \in E} (\kappa_{\sigma} - \kappa_{\tau})^2 = (\eta/2) \kappa^T L_{\{C_6\}} \kappa$ ,  $\eta \geq 0$ , with  $\eta > 0$  if genuine one-tick transport occurs. *This follows the framework's existing graph-local  $\rightarrow$  Laplacian result, rather than inserting a U/D distance by hand.*

The leading action is  $\mathcal{L} = \frac{1}{2}\partial\kappa^T\partial\kappa - \frac{1}{2}M_{\kappa^2}\kappa^T\kappa - (\eta/2)\kappa^TL_{\{C_6\}}\kappa + g n^T\kappa$ . For static internal propagation set  $A = M_{\kappa^2}I + \eta L_{\{C_6\}}$ ,  $G = A^{-1}$ . The eigenvalues of  $L_{\{C_6\}}$  are  $\{0, 1, 1, 3, 3, 4\}$ , and the Green's function between two closure states at graph distance  $d$ ,  $G_d$ , gives the antipodal contrast

$$G_0 - G_3 = (1/3)[ 2/(M_{\kappa^2} + \eta) + 1/(M_{\kappa^2} + 4\eta) ] > 0 \text{ for all } M_{\kappa^2} > 0, \eta > 0.$$

So with  $C_{\text{same}} = g^2G_0$  and  $C_{\text{cross}} = g^2G_3$ ,

$C_{\text{same}} - C_{\text{cross}} = (g^2/3)[ 2/(M_{\kappa^2} + \eta) + 1/(M_{\kappa^2} + 4\eta) ] > 0$  — exactly, from the six-state graph operator, with no additive-distance rule.

This is a genuine advance over the former Locality Lift — but its scope must be stated exactly. The contrast *magnitude* is now a *consequence* of a symmetric law (the  $C_6$  Laplacian treats all vertices alike), not an inserted premise, and it predicts the full ordering  $G_0 > G_1 > G_2 > G_3$  — a hierarchy of claims about every closure separation, of which the U/D mirror pair is one.

**[Derived — conditional on the Record-Resolution Premise.]** The coupling inequality  $C_{\text{same}} > C_{\text{cross}}$  of the earlier draft is thus no longer assumed; it is computed.

**What this does and does not do to the circularity.** The symmetric graph-local law acts on a *record-resolved* field, and record-resolution is forced only given Fold-Record Identification (closure orientations are committed records) — which is itself a distinguishability premise (U and D are genuinely different histories). So distinguishability has not been *eliminated*; it has been *relocated* — from the old coupling premise (the Lift) to the carrier's resolution requirement (§12.1). This is real progress, but the honest claim is narrower than "the type-equivalence is broken": the magnitude is computed from a symmetric law, and the residual distinguishability assumption is pushed to a sharper, more ontological, separately-arguable place (records vs reversible labels, §12.1). The conserved-obstruction finding (§12.5) is the paper's own evidence for the relocation reading, and it is more compelling stated honestly than oversold.

**The resolved carrier does not re-collapse the record (injectivity).** A clean statement is available about the resolved field, with its weight stated honestly. Since  $A = M_{\kappa^2}I + \eta L_{\{C_6\}}$  is positive-definite ( $L_{\{C_6\}} \succcurlyeq 0, M_{\kappa^2} > 0$ ), it is invertible, so  $\kappa = g A^{-1} n$  inverts to  $n = g^{-1} A \kappa$ . The map from the record distribution  $n = (n_{\sigma})$  to the  $\kappa$ -profile is injective — distinct closure distributions give distinct  $\kappa$  profiles — and the U/D imbalance  $\Delta n = n_U - n_D$  is recoverable from  $\kappa$ . *But this is nearly tautological given record-resolution:* with one field component per closure state and an invertible (no-rank-loss) propagator, six inputs give six recoverable outputs — invertibility just confirms propagation does not collapse the slots. The non-trivial content is entirely upstream, in *whether the field is record-resolved at all* (§12.1's forced-conditional premise), not in the linear algebra that a positive-definite matrix is invertible. So the honest statement is: **injectivity confirms the resolved carrier retains the record (no rank loss); it does not establish that the carrier should be resolved** — that is §12.1, and it is conditional, not closed. The "carrier question" in the strong sense (should  $\kappa$  be record-resolved?) carries §12.1's conditional grade; injectivity is the weaker structural fact that, *given* resolution, nothing is lost in propagation.

**The scope of this claim, stated precisely to avoid overclaim.** Injectivity says the U/D information is *present in  $\kappa$  and recoverable in principle by inverting  $A$* . It does **not** say the imbalance is dynamically active in the physical readout, and in particular it does **not** evade the obstruction of §12.3. The physical readout is not "invert  $A$  and read  $n$ "; it is the trace functional  $\text{Tr}(\mathbf{P}_\pm \mathbf{R})$  on the  $E_1$  access lines, and that functional is scalar on  $E_1$  for any equivariant-linear field (§12.3). So "the path record is present in  $\kappa$ " and "the path record is readable as  $\chi$ " are different claims, separated by the access intertwiner (§12.5): the first is now established (given resolution), the second runs through a conditioned readout channel that §12.5 *constructs* — Schur-consistent and unique — but which carries a contrast only if its one coupling  $h$  is nonzero. Keeping these apart is the whole discipline of the candidate — the information lives in the carrier; whether it reaches the readout is gated by the single scalar  $h$ .

### 12.3 The $E_1$ obstruction — the standing route is closed (headline)

The advance of §12.2 immediately runs into the obstruction that has governed this entire programme, and here it *fires* as a theorem rather than a caveat.

**Theorem ( $E_1$  obstruction).** Any fully  $D_6$ -equivariant linear  $\kappa$  field is scalar on the irreducible fold doublet  $E_1$ . Concretely  $L_{\{C_6\}}\{E_1\} = I\{E_1\}$ , so  $G\{E_1\} = (M_\kappa^2 + \eta)^{-1} I\{E_1\}$ , whence  $\text{Tr}(\mathbf{P}_+ \mathbf{G}) = \text{Tr}(\mathbf{P}_- \mathbf{G})$ : the graph-resolved  $\kappa$  propagator does **not** split the two  $E_1$  eigenlines. *Proof:*  $G$  is  $D_6$ -equivariant and linear; Schur's lemma makes it scalar on the irreducible  $E_1$ ; equal projector ranks give equal traces. ■

This is Route B of the scope verdict (§6.3, §9.2) reaching out and closing the door — and it closes it *for the constructed carrier*, because the graph-resolved field, being  $D_6$ -equivariant, is scalar on  $E_1$  by the very lemma the verdict warned about. The consequences are decisive and must be stated as the headline of §12:

- The computed contrast  $G_0 - G_3$  lives between the **closure-history vertices**  $U$  and  $D$ , *not* between the standing  $\mathbf{P}_+/\mathbf{P}_-$  access lines, which the symmetric field leaves untouched and equal.

*Why these coexist without contradiction (isotypic bookkeeping).* The antipodal contrast is carried by the alternating closure mode  $k = 3$  (eigenvalue  $\lambda = 4$ ) — the only mode with  $\cos(\pi k) = -1$  separating the antipodes — together with the odd combination of the  $k = 1, 5$  pair. The  $E_1$  access doublet is the  $k = 1$  ( $\lambda = 1$ ) isotype. These are *different*  $D_6$  isotypes: the obstruction acts on the  $E_1$  ( $\lambda = 1$ ) access doublet, where the propagator is scalar; the contrast lives in the  $\lambda = 4$  (and  $\lambda = 1$  odd-combination) closure-vertex modes. So §12.2's contrast and §12.3's obstruction are **isotypically disjoint, not in tension** — the information is present in closure-vertex modes the access readout does not couple to. This disjointness is precisely why "present in  $\kappa$  but unreadable in  $E_1$ " is coherent rather than paradoxical, and it is the structural fact underneath the paper's load-bearing separation.

- Therefore **no fully  $D_6$ -invariant linear  $\kappa$  field — however closure-resolved — can source a standing  $\mathbf{P}_+/\mathbf{P}_-$  contrast.** This is not a gap; it is a proof. The standing version of the entire mechanism is closed.

- The only survivor is a **realized, branch-conditioned history** mechanism: a commitment selects a closure-history record U or D; graph-resolved memory reinforces the selected history; the selected history must then project into the physical fold-access sector; and  $\chi$  must read that conditioned projection.

This strengthens §10.2's "the reflection is not the source" into something sharper: *no symmetric linear field of any kind is the source*. Only conditioned history can be — and the obstruction tells us exactly why the standing route was never going to work.

## 12.4 The stochastic commitment model — seed, supercriticality, locking

Integrating out the static graph field gives the effective pair energy  $E_{\text{eff}} = -(g^2/2) n^T G n$ . Restricting to the antipodal records with counts  $N_U, N_D$  and removing self-interaction (the exact discrete count, fixing the earlier normalisation ambiguity),

$$E = -C_{\text{same}}[C(N_U, 2) + C(N_D, 2)] - C_{\text{cross}} N_U N_D.$$

With  $N = N_U + N_D$  and  $m = (N_U - N_D)/N$ , this gives  $E(m) - E(0) = -(N^2/4)(C_{\text{same}} - C_{\text{cross}})m^2$ , so  $C_{\text{same}} > C_{\text{cross}}$  makes  $m = 0$  an unstable stationary point — invariant under  $m \mapsto -m$ , creating two equivalent commitment directions, choosing neither.

An exactly symmetric deterministic system at  $m = 0$  stays there; branch selection needs fluctuations, and discrete commitments supply finite-count noise. A heat-bath rule *imported from statistical mechanics* (Glauber-type),  $P(U|m) = \frac{1}{2}(1 + \tanh \beta J m)$ ,  $J = (C_{\text{same}} - C_{\text{cross}})/2$  — compatible with the interaction but not derived from TPB commitment dynamics — gives the mean-field fixed point  $m = \tanh(\beta J m)$  and free energy

$$f(m) = f(0) + \frac{1}{2}(\beta^{-1} - J)m^2 + (1/12\beta)m^4 + O(m^6).$$

Two earlier open problems close *within this model*:

- **The selection seed (Objection 14, T5).** The *existence* of a symmetry-breaking seed is genuine: finite-count commitment noise supplies it, derived from the discrete statistics rather than assumed. The *specific* threshold  $\beta J > 1$ , however, and the clean tanh form it comes from, are inherited from the imported heat-bath rule — so "a seed exists" is the derived content; the precise threshold value is model-dependent on the commitment rule, not a first-principles substrate result.
- **Supercriticality (formerly a case assumption).** The quartic coefficient is  $1/(12\beta) > 0$  *automatically*, from binary combinatorics *within this heat-bath model* — so the bifurcation is supercritical by derivation-in-the-model, not posited; the value is model-dependent, not first-principles.

Individual histories select  $+m_*$  or  $-m_*$ ; the unconditioned ensemble stays symmetric (the TPB ensemble guard — branch-conditioned records carry nonzero  $\chi$ , their equal mixture gives zero).

**Record locking (persistence, Locus-2 burden 3).** The minima satisfy  $m_* = \tanh(\beta J m_*)$ ; for  $\beta J > 1$  the barrier  $\Delta f > 0$  gives a finite-N switching time  $\tau_{\text{switch}} \sim \tau_0 \exp(N \beta \Delta f)$ . This is a *mean-field switching-time estimate*, not a first-principles persistence law for the actual substrate — but within the model, branch switching is exponentially suppressed as the record grows: a realized branch-conditioned imbalance becomes effectively permanent on observational timescales, even though the equations stay reflection-symmetric. This addresses persistence better than the bare pitchfork did — though it still does not make the record a *standing invariant* in the Carrier-Theorem sense (nor should it, per §12.3).

**What momentum contributes — nothing, to the orientation.** The interaction creating  $C_{\text{same}} > C_{\text{cross}}$  is the static  $\kappa$ -mediated potential. A genuine second-order equation  $\ddot{m} + \gamma \dot{m} + f'(m) = \xi(t)$  linearises near  $m = 0$  to  $\ddot{m} + \gamma \dot{m} + (\beta^{-1} - J)m = \xi$ , which for  $\beta J > 1$  has a positive growth exponent even at ordinary positive damping — so momentum changes the growth *rate* and supplies inertia and causal propagation, but does **not** create the orientation preference. The honest name is therefore  *$\kappa$ -mediated commitment-memory instability*, not "fact momentum creates the imbalance."

## 12.5 The closure-history $\rightarrow E_1$ intertwiner: constructed and unique; the gap localised to one coupling $h$

The candidate now splits cleanly into **two questions in series**, and §12.1–12.4 settle the first:

1. **Carrier — should  $\kappa$  be record-resolved, and if so does it retain the record?** Two separable parts. *Whether*  $\kappa$  should be resolved is §12.1's forced-conditional premise — conditional on Fold-Record Identification (records vs reversible labels, itself reduced to the ordered-irreversible question) plus auxiliary-exclusion. *Given* resolution, injectivity (§12.2) confirms the propagator loses no rank, so the record is retained — but that is a near-tautological structural fact (six slots in, six recoverable out), not the substantive claim. The substantive carrier claim is the conditional one, and it is conditional, not closed.
2. **Readout — can that record reach the  $E_1$  access lines and be read as  $\chi$ ?** The *channel* is now constructed and unique (a conditioned intertwiner that evades Schur); the *gap* has contracted to whether a single mass-independent coupling  $h$  is nonzero. This is the decisive open scalar.

§12.3 forces the mechanism to realized-history grain; §12.4 makes that grain dynamically viable (seed, supercriticality, locking). The last two steps — *the selected history projects into the fold-access sector, and  $\chi$  reads that projection* — require a physical **intertwiner** between the closure-history field and the  $W_7 E_1$  carrier. The previous round flagged this as an object that might not exist; it can now be exhibited.

The object §12.3 forced — a faithful, non-equivariant-linear, symmetry-broken-by-commitment readout — can now be *exhibited*, and uniquely at lowest order. This is the genuine advance of this subsection: the readout is no longer a mystery object that might not exist, but a one-parameter instrument whose only open content is a single scalar.

**The Minimal Conditioned Intertwiner.** Let  $\Delta P = P_+ - P_-$  (reflection-odd:  $S \Delta P S = -\Delta P$ ) and let  $\omega = \pm 1$  be the realised closure-history bit (U or D), reflection-odd:  $S : \omega \mapsto -\omega$ . Then  $\omega \cdot \Delta P$  is **reflection-even** (odd  $\times$  odd), so it may couple to the realised bit in a reflection-covariant law. The minimal positive, trace-one, reflection-covariant conditioned access state is

$$R_{\omega} = \frac{1}{2}(I + \zeta \cdot \omega \cdot \Delta P), |\zeta| \leq 1,$$

with  $\zeta$  the readout gain. Since  $P_{\pm} \Delta P = \pm P_{\pm}$ , the access readings are  $a_{\pm}(\omega) = \frac{1}{2}(1 \pm \zeta \omega)$ , giving  $\chi(\omega) = \ln[a_+/a_-] = 2 \operatorname{artanh}(\zeta \omega)$ , nonzero iff  $\zeta \neq 0$ . *Uniqueness, stated precisely:* the only scalar compatible with trace-one is  $I/2$ , and  $\omega \cdot \Delta P$  is the unique first-order reflection-covariant coupling of the realised bit *that the diagonal access functional  $\operatorname{Tr}(P_{\pm})$  renders as nonzero  $\chi$* . The qualifier is substantive, not a footnote.  $\Delta P$  is not the only reflection-odd Hermitian direction on the  $E_1$  doublet — the off-diagonal odd direction (the  $\sigma_y$ -like generator of Appendix A) is reflection-odd too, and  $\omega \cdot \sigma_y$  is an equally covariant coupling — but it produces reflection-odd *coherence* the diagonal access functional does not detect (the §A converse caveat), so it gives a covariant family with  $\chi$  still zero. So the channel is unique precisely *among the couplings that reach the  $\chi$  readout*; the  $\sigma_y$  coupling is admissible but access-invisible, which is exactly why  $\omega \cdot \Delta P$  is the  $\chi$ -relevant one and the only one that appears.

*Exactness vs leading-order — the binary case is exact.* For a pure record  $\omega = \pm 1$ , the one-parameter form is not a first-order truncation: higher conditioned couplings (powers  $\omega^k$ ,  $\omega$ -even combinations feeding the identity) all collapse because  $\omega^2 = 1$ , so the entire series resums into a single  $\tanh$ .  $R_{\omega} = \frac{1}{2}(I + \zeta \omega \Delta P)$  is therefore *exact and unique* for the binary record, not approximate. This is a strength, not a caveat — a one-bit conditioner has exactly one gain.

Three facts make this the right object, and one makes clear what remains open:

- **It evades Schur in the only admissible way.** Schur kills any *standing invariant* linear operator on the irreducible  $E_1$  doublet — but  $R_{\omega}$  is not invariant:  $R_{\{-\omega\}} = S R_{\omega} S$ . The *family* of conditioned states is reflection-covariant; no individual realised member is reflection-fixed. So the readout does not break the symmetry of the law; it conditions on a record that itself transforms under the symmetry. This is exactly the loophole §12.3 left open, now occupied by a concrete construction.
- **The unconditioned ensemble stays symmetric.** Equal-weight histories give  $\bar{R} = \frac{1}{2}R_+ + \frac{1}{2}R_- = \frac{1}{2}I$ , so  $\chi(\bar{R}) = 0$  — no standing ensemble asymmetry, only a branch-conditioned realised one. This is precisely the structure the no-go requires: law and ensemble symmetric, individual committed histories carrying nonzero contrast.
- **It connects to the stochastic model — and the locked  $m$  is the physical case.** The §12.4 process locks to an order parameter  $m = (N_U - N_D)/N$  whose stable value  $m_* = \tanh(\beta J m_*)$  is generically *not*  $\pm 1$ , so the physically relevant readout is  $R_m = \frac{1}{2}(I + \zeta \cdot m \cdot \Delta P)$ , with the pure  $\omega = \pm 1$  record the idealisation. For the locked  $m \in [-1, 1]$  the one-parameter form is **leading-order**, not exact — higher couplings  $m^k$  do not collapse (only  $\omega^2 = 1$  collapses the binary series), so subleading conditioned terms genuinely exist and are truncated here. With that understood,  $\chi(m) = 2 \operatorname{artanh}(\zeta m)$ : the mass-relevant fold contrast *factorises* into the **stored history imbalance  $m$**  (supplied in-model by §12.4) and the **readout gain  $\zeta$**  (open,  $= \tanh(\beta h)$ ). Both must be nonzero.

- **What is built is the channel, not the current.** The gain has a physical origin: a minimal pointer coupling  $F_{\text{read}}(R | \omega) = F_0(R) - h \cdot \omega \cdot \text{Tr}(\Delta P R)$ , with  $h$  a mass-independent readout coupling, gives the conditional max-entropy state  $R_{\omega} = \frac{1}{2}(I + \tanh(\beta h) \cdot \omega \cdot \Delta P)$ , i.e.  $\zeta = \tanh(\beta h)$ , faithful iff  $h \neq 0$ . But writing the most general admissible  $R_{\omega}(\zeta)$  is a *parametrisation of the unknown, not a derivation of it*, and  $\zeta = \tanh(\beta h)$  is a reparametrisation (gain in terms of coupling), not a source for either. What is proven is the readout *channel* — the unique symmetry-allowed way  $m$  can enter the  $E_1$  access state. What is open is the *current through it*: whether the mass-independent coupling  $h$  is nonzero. Asserting  $h \neq 0$  by hand would be the same smuggle as the old Locality Lift "seeing" closure distance by assumption; the construction is clean precisely because it leaves  $h$  owed.
- **Is  $h$  independent of the carrier coupling  $J$ , or already fixed by it?** This is the sharpest question about the construction, and the honest answer determines the grade. §12.4 already has a coupling  $J = (C_{\text{same}} - C_{\text{cross}})/2$ , computed from the  $C_6$  Green's function. The pointer coupling  $h$  sits beside it, and the default physical expectation is that *the field coupling to the access sector is the same  $\kappa$  that mediates the record–record interaction* — in which case  $h$  would be **computable from the same Green's function**, likely nonzero, and the candidate would be closer to a result than "one owed scalar" suggests. The construction treats  $h$  as *independent* — a separate record-to-access readout coupling not fixed by the carrier dynamics — and this requires justification rather than assertion, because the burden of proof runs the other way: one must say *why* the readout coupling is not just the carrier coupling. The honest position, pending that argument, is therefore **not** " $h$  is a free open scalar" but the more exposed " **$h$  is plausibly computable from the existing  $C_6$  geometry, and is deferred only because identifying the record→access coupling with the record→record coupling has not been established.**" If  $h$  is  $C_6$ -determined, the route's fate is a calculation already in hand, not an owed premise — and the discipline of the series cuts toward admitting that, not toward sheltering behind an "open" label that may overstate the distance to a verdict.

So the decisive open gap has *contracted to a single scalar*. The remaining burden is no longer "find a faithful non-equivariant-linear intertwiner" — that is built, unique, and Schur-consistent — but:

**The remaining burden (sharp).** Derive a nonzero, mass-independent pointer coupling  $h$  between the realised closure-history record and the fold-access observable  $\Delta P$ . If  $h \neq 0$ , the stored record ( $m$ , from §12.4) becomes readable as a fold-access imbalance  $\chi = 2 \operatorname{artanh}(\zeta m)$ . If  $h = 0$ , the record may live in  $\kappa$  but stays invisible to the mass readout.

This relocates and sharpens the obstruction rather than dissolving it. Branch-distinguishability, *relocated to the carrier* by §12.1–12.2 and pushed out of any *standing* readout by §12.3, has now landed on a single computable number: the pointer coupling  $h$ . **The obstruction is conserved across the reformulation — but it is now localised, not vague.** Every reformulation pushed the non-equivariant-linear requirement somewhere; it has finally concentrated into one mass-independent scalar that the corpus can actually attempt to compute. The pessimistic reading survives in renamed and sharpened form: it is no longer "no such object can exist" (the object exists, is unique, and is Schur-consistent) but precisely  **$h = 0$**  — the world in which the channel

is built but carries no current, the record sits in  $\kappa$  unread, and the realised-history route is finished alongside the standing one. The honest disjunction is now a question about a number: either  $h \neq 0$  (whether *derived independently* or found *already fixed by the  $C_6$  geometry* that gave  $J$  — see the  $h$ -vs- $J$  caveat above) or  $h = 0$  (and the route closes). That is a materially better position than "exhibit the object" — the object is exhibited; the question is whether its one coupling vanishes, and that coupling may already be determined by geometry in hand rather than genuinely free.

## 12.6 Honest status of the candidate

**What §12 closes.** Under the Record-Resolution Premise (now *forced-conditional* — Lemma 1 plus its contrapositive show faithful memory **requires** record-resolution, given that closure orientations are committed records and  $\kappa$  is the sole carrier, §12.1, rather than positing it): graph locality  $\Rightarrow L_{\{C_6\}} \Rightarrow G_0 > G_3 \Rightarrow C_{\text{same}} > C_{\text{cross}}$  — the contrast *magnitude* computed from a symmetric law (§12.2), with distinguishability *relocated* to the carrier ontology rather than eliminated; injectivity ( $n = g^{-1}A\kappa$ , §12.2) confirms the resolved carrier does not re-collapse the record in propagation (no rank loss — a structural fact, near-tautological given resolution, *not* a proof that the carrier should be resolved); the mean-field stochastic model supplies a seed and supercriticality and a switching-time estimate (§12.4, model-dependent); and a clean negative (§12.3) proves no  $D_6$ -invariant linear  $\kappa$  field splits  $E_1$ , so the standing route is closed. The last is the strongest result in the section.

**What §12 does not establish.** The candidate now reduces to **two questions in series**, with the first closed and the second open. The carrier question (*can  $\kappa$  hold the path record?*) is settled — its premise *forced-conditional* (not merely motivated) and the storage proven-injective — leaving its two honest residues: the sharp ontological antecedent, **Fold-Record Identification** (*are  $W_7$  closure orientations genuine committed records, or merely reversible labels?*), now itself *conditionally discharged* — the Closure-Orientation Retention Theorem (§12.1) reduces it to *is  $W_7$  closure ordered-irreversible commitment?*, proving that if so, the orientation bit  $\omega$  is retained as a record (metric-free, independent of  $d_{\text{ord}}$ ), with a clean endpoint-only failure branch; and the **auxiliary-exclusion clause** (the forcing assumes  $\kappa$  is the sole memory carrier; if another field holds the closure label, scalar  $\kappa$  could survive). The **readout question** (*can the present information reach the  $E_1$  access lines and be read as  $\chi$ ?*) is now sharper than "open and Schur-obstructed": the readout *channel* is **constructed and unique** (§12.5) — a conditioned intertwiner  $R_{\omega} = \frac{1}{2}(I + \zeta\omega\Delta P)$  that evades Schur by conditioning on the symmetry-transforming record rather than breaking the law, with  $\chi = 2 \operatorname{artanh}(\zeta\omega)$  and  $\zeta = \tanh(\beta h)$ . What remains open has contracted to a single mass-independent scalar: the pointer coupling  $h \neq 0$ . The channel is built; whether current flows through it is the decisive open number. Injectivity makes the carrier-side separation precise — the U/D difference is *present in  $\kappa$*  but *cannot be equivariant-linearly read into  $E_1$*  — and the conditioned channel is the unique symmetry-allowed way it *can* be read, gated by  $h$ . And the inherited downstream burdens remain: a proof that the locked realized record *controls persistent particle mass* (Locus-2 burdens 4–5), a universal orientation convention (why equivalent particles do not randomly swap the up/down hierarchy), and the generation-recursion theorem for  $\rho = \frac{1}{2}$  (§D.9). The access magnitude is now  $\chi = 2 \operatorname{artanh}(\zeta m_*)$  with  $\zeta = \tanh(\beta h)$  — the gain is no longer simply "underived," it is the explicit function of the one open coupling  $h$ .

**Net.** A concrete, internally consistent *realized-history* mechanism. It replaces the circular Locality Lift with a *forced-conditional* carrier premise (faithful memory requires record-resolution, given Fold-Record Identification and  $\kappa$ -sole-carrier); computes the contrast magnitude from a symmetric law while *relocating* — not eliminating — the distinguishability assumption to the carrier ontology; confirms (injectivity) that a resolved carrier loses no rank in propagation; derives a seed, supercriticality, and a mean-field locking estimate; proves the standing route closed via the  $E_1$  obstruction; and **constructs the unique conditioned readout channel** that evades that obstruction. **What is now open is not the form of the readout relation but its gain:**  $\chi = 2 \operatorname{artanh}(\zeta m)$ , with the channel built and Schur-consistent, and the entire remaining content in the single coupling  $\zeta = \tanh(\beta h)$ . Candidly, that scalar may not be as free as "owed" implies: if the record→access coupling  $h$  is the same  $\kappa$  physics as the record→record coupling  $J$  (the default expectation),  $h$  is *computable from the  $C_6$  Green's function already in hand*, and the honest grade is " $h$  plausibly computable, deferred," not "open scalar." So the distance to a verdict is either one owed independence argument (why the readout coupling differs from the carrier coupling) or one calculation ( $h$  from the existing geometry) — contracted hard, and possibly further than the paper has cashed out.

**The pessimistic reading, named and sharpened.** Earlier this read "no such intertwiner may exist anywhere in the corpus." That form is now retired: the intertwiner exists, is unique (exact for the binary record, since  $\omega^2 = 1$  resums the conditioned series into one gain; leading-order for the locked  $m$ ), and is Schur-consistent (§12.5). But the conserved obstruction did not vanish — it *localised*, and now it can be said to have *terminated*. Across the revision history the obstruction was driven from the Locality Lift, to the carrier, to Fold-Record Identification, to the standing readout, to the conditioned channel — and at every prior layer it could be pushed one step further. **It cannot be pushed past  $h$ .** A single dimensionless, mass-independent coupling of the *unique* channel into the *irreducible* doublet admits no further relocation: there is no additional layer to move it to, because the readout is now a one-parameter object and the parameter is the irreducible residue. So obstruction-conservation is not merely "it keeps reappearing in new disguises" — it is "it has been driven to a terminus." Unlike every prior layer, this one must be *computed*, not moved; and the disjunction " $h \neq 0$  or  $h = 0$ " is decidable in a way "does a faithful intertwiner exist?" never was. The pessimistic branch is precisely  $\mathbf{h} = \mathbf{0}$ : the channel is built but carries no current, the record lives in  $\kappa$  unread, and the realized-history route is finished alongside the standing one. The honest disjunction is now a question about a number — either  $h \neq 0$  (whether *derived independently* or found *already fixed by the  $C_6$  geometry* that gave  $J$ ) or  $h = 0$  (and the route closes) — a materially better and more computable position than "exhibit the object," but *not* a solution: asserting  $h \neq 0$  by hand would be the same smuggle as the old Lift. **[Conditional — carrier resolution conditional (Fold-Record Identification + auxiliary-exclusion); magnitude computed; standing route refuted; readout channel constructed and unique; faithfulness =  $\zeta = \tanh(\beta h) \neq 0$ , the terminal residue — open and possibly already  $C_6$ -fixed; mass relation open.]**

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## 13. Conclusion

This paper asked one binary question and returned one binary answer.

The  $W_7$  algebra is unforgiving: if the state read by  $\chi$  is reflection-symmetric, the two fold accessibilities are equal and  $\chi = 0$ . Were the Carrier, Generation, and Realization theorems to force  $S R S = R$ , the standing-state mechanism would be dead against the first-generation up/down contrast.

**They do not force it.** The Carrier Theorem fixes the minimal subject at class grain but separates stability from rigidity. The Realization Theorem forces uniform standing response among the indistinguishable members of one class. The Generation Theorem closes member-grain generation labels while opening class-grain refinement structure and typing physical up/down as winding-distinct classes. The sought symmetry conclusion therefore lies outside the proved domain unless an additional physical action is identified.

Two such forcing routes are explicit. **IR-SCOPE** makes the  $W_7$  reflection an internal class relabelling under which the  $\chi$  state is standing. **Full-Action Invariance** makes the entire irreducible  $E_1/D_6$  representation the internal admissible action and places  $R$  in its commutant, where Schur's lemma forces scalarity. Either gives  $\chi = 0$  and falsifies the standing-state mechanism. But neither is a single hinge: forcing the contrast to zero requires a **conjunction** — a type condition ( $R$  is class-internal  $E_1$  content, not inter-class), an invariance condition (the full irreducible action, not a proper sub-action), and a standing condition ( $R$  is standing at all) — and the conjunction is unmet at several independent points. The type condition is not even on the invariance axis: an inter-class  $R$  fails Schur by type, not by invariance deficit, and the corpus's own catalogue typing leans that way. The invariance condition is the link most worth watching, because the Carrier Theorem's irreducibility claim sits adjacent to it — but adjacent is not one inference away: Route B needs both that the full action is internal and that  $R$  is standing-invariant under it, and irreducibility supplies neither. That unmet conjunction, not a lone distinction, is why the verdict is PERMITTED rather than FORCED.

The result is therefore not a mass derivation. It is the completed **B0 scope verdict**: the current theorem chain does not falsify the  $W_7$  mechanism, but neither does it derive a physical odd state. And it carries a load-bearing negative finding for the series it belongs to. The escape from the no-go runs entirely through the winding distinction, so the up/down access difference is the difference between two species already declared distinct — and **the  $W_7$  fold reflection sources none of the asymmetry**. An exchange map cannot source the magnitude of what it exchanges; the reflection is a readout basis, not the asymmetry's origin, and  **$\rho = \frac{1}{2}$  receives no support from it**. What this does *not* settle is whether a different part of the  $W_7$  structure — realized closure-history dynamics — can source the magnitude; that is the open question §12 isolates. And §12 proves a sharper bound along the way: no symmetric *linear* field, even fully closure-resolved, sources a standing contrast (the  $E_1$  obstruction), so the only surviving source is realized history. Any surviving derivation must source the contrast from inter-class structure (Locus 1) or realized closure-history dynamics (Locus 2), with the reflection serving only as readout. B2 is, accordingly, the burden — derive a nonzero fold-access coordinate from independent dynamics, at the correct inter-class, family, or realized-access grain.

TPB does not change the verdict and is not counted as a generation result. Its proper role is to specify one concrete B2 audit: generic commitment creates stable records; the missing theorem is that the stable bit is specifically the sign of the  $W_7$  fold-access coordinate, and that the

dynamics leave the symmetric unresolved locus to select one record basin. Until that is proved, TPB is a candidate framework, not a source of physical  $\chi$ .

The programme therefore has a clean fork. Resolve the conjunction one way — establish the type, invariance, and standing conditions together (or just the invariance link, the one to watch) and retire the standing-fold route — or resolve it the other and prove a genuine B2 mechanism, inter-class or realized, with the fold as readout only. What is no longer open is whether the three inherited theorems have already forced symmetry: **they have not**. What is newly settled, and uncomfortable, is that the fold reflection does not source the up/down asymmetry and gives the halving law no support — so the next real result is not another scope audit but either a derivation of the contrast from independent dynamics or the honest statement that the fold-as-origin hypothesis is finished.

And this paper does more than leave that next step vague. It constructs a concrete B2 candidate —  **$\kappa$ -mediated commitment-memory instability** at realized grain (Locus 2, §12) — and grades it honestly. The construction is a genuine advance over the earlier "Locality-Lift" version, but the advance must be stated precisely: it computes the contrast *magnitude* from a symmetric graph-local law (the  $C_6$  Laplacian) rather than positing it, and *relocates* the distinguishability assumption from the old coupling premise to the carrier's resolution requirement — Fold-Record Identification, which the Closure-Orientation Retention Theorem (§12.1) reduces to the sharper, separately-arguable question of whether  $W_7$  closure is ordered-irreversible commitment. Distinguishability is relocated and sharpened, not eliminated; the paper's own conserved-obstruction finding is the evidence for that. The strongest result is the  $E_1$  obstruction (§12.3): **any  $D_6$ -invariant linear  $\kappa$  field is scalar on  $E_1$** , so no symmetric linear field — however closure-resolved — sources a standing P+/P- contrast. This *closes the standing route* and forces the mechanism to realized-history grain, where a mean-field stochastic model supplies a symmetry-breaking seed (existence derived; threshold model-dependent), supercriticality, and a switching-time estimate. An injectivity result confirms a resolved carrier loses no rank in propagation — a structural fact, near-tautological given resolution, not a proof that the carrier *should* be resolved (that is §12.1's conditional premise). So the candidate contracts to **two questions in series**: the carrier (*should  $\kappa$  be record-resolved?* — conditional on Fold-Record Identification, with the record then provably retained) and the readout (*can that retained record be read into  $E_1$  as  $\chi$ ?* — open, Schur-obstructed). The decisive gap is the readout — and here the paper does more than name it. The unique symmetry-allowed conditioned channel is **constructed** (§12.5):  $R_{-\omega} = \frac{1}{2}(I + \zeta\omega\Delta P)$ , which evades the  $E_1$  obstruction not by breaking the law's symmetry but by conditioning on a committed record that itself transforms under it ( $R_{-\omega} = S R_{\omega} S$ ), giving  $\chi = 2 \operatorname{artanh}(\zeta\omega)$  with gain  $\zeta = \tanh(\beta h)$ . This retires the strongest pessimistic reading — the intertwiner is no longer an object that might not exist; it exists, is unique (exact for the binary record, leading-order for the locked  $m$ ), and is Schur-consistent. What the construction does *not* do is source the coupling: writing the general admissible channel is parametrising the unknown, and  $\zeta = \tanh(\beta h)$  is a reparametrisation, not a derivation. **What is now open is not the form of the readout relation but its gain**. So the conserved obstruction did not dissolve — it *localised, and then terminated*, driven across every reformulation (Lift  $\rightarrow$  carrier  $\rightarrow$  standing readout  $\rightarrow$  conditioned readout) onto a single mass-independent scalar  $h$  that admits no further relocation: a lone dimensionless coupling of a unique channel into an irreducible doublet is where the recursion stops, because there is no further layer to push it to. Unlike every prior disguise the

obstruction wore, this one must be *computed*, not moved — and the disjunction " $h \neq 0$  or  $h = 0$ " is decidable in a way "does a faithful intertwiner exist?" never was. The candidate's survival rests on whether  $h \neq 0$ : if it is, the stored imbalance  $m$  (from §12.4) becomes readable as  $\chi = 2 \operatorname{artanh}(\zeta m)$ ; if  $h = 0$ , the channel is built but carries no current and the realized-history route closes alongside the standing one. One honest caveat sharpens this further:  $h$  may not be a free number at all — if the readout coupling is the same  $\kappa$  physics as the carrier coupling  $J$ ,  $h$  is computable from the  $C_6$  Green's function already in hand, and the candidate is nearer a verdict than "one owed scalar" implies; treating  $h$  as independent is itself a claim that owes an argument. The framing keeps the negative finding intact and sharpens it to arithmetic: **the reflection is not the source, no symmetric linear field is the source, and conditioned history is the source if and only if one coupling  $h$  is nonzero — which the corpus must either derive or compute from geometry it already has, not assume.** The mass relation, orientation convention, and halving recursion remain open beyond it.

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## Appendix A — Exact Two-Dimensional and Full-Action Audit

Choose the fold basis in which

$$S = [[0, 1], [1, 0]], P_+ = \operatorname{diag}(1, 0), P_- = \operatorname{diag}(0, 1).$$

A general Hermitian fold state is  $R = [[a, x + iy], [x - iy, b]]$ . Then

$$S R S = [[b, x - iy], [x + iy, a]], \mathcal{P}_o(R) = \frac{1}{2}(R - S R S) = [[(a-b)/2, iy], [-iy, (b-a)/2]],$$

and the fold accessibilities are  $a_+ = a$ ,  $a_- = b$ . Therefore:

- $S R S = R \implies a = b$  and  $y = 0$ , hence  $\chi = 0$ ;
- $\chi \neq 0 \implies a \neq b$ , hence a nonzero reflection-odd component;
- $S R S \neq R$  can occur with  $a = b$ ,  $y \neq 0$ , so generic odd coherence is not sufficient for nonzero  $\chi$ ;
- **reflection invariance alone need not make  $R$  scalar** — a real off-diagonal  $x$  may remain, carrying reflection-even non-scalar freedom. This is precisely the room a proper sub-action leaves (invariance link I, §6.4).

**Full-action audit.** Let the  $60^\circ$  rotation act as  $U = \operatorname{diag}(\omega, \omega^{-1})$ ,  $\omega = e^{i\pi/3}$ . The condition  $U R U^\dagger = R$  forces the off-diagonal entry to vanish, since  $\omega/\omega^{-1} = \omega^2 \neq 1$ . The reflection condition  $S R S = R$  then forces  $a = b$ . Invariance under *both* generators therefore gives

$$R = a \cdot I, \text{ hence } \chi = 0,$$

the explicit two-dimensional instance of Schur forcing (Route B). The computation confirms the algebra; it does **not** establish that the full  $D_6$  action is the admissible internal physical action, nor

that  $R$  is class-internal  $E_1$  content rather than an inter-class relation — which are the invariance and type links the verdict turns on (§6.4).

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## Appendix B — Premise-to-Conclusion Map

Source	Proves	Does not prove
Carrier Theorem	Class is minimal transport-stable subject; stability $\neq$ rigidity	Every internal class state is $W_7$ -reflection-fixed; full action is internal
Realization Theorem	Uniform standing member-grain response within one class	Equal access between winding-distinct up/down classes
Generation Theorem	Generation at class grain; finite class refinement; up/down winding-distinct	Reflection-evenness of class content; self-conjugacy of every class
$W_7$ fold construction	Reflection-exchanged projectors; access no-go	Physical scope of the reflection inside the ontology
TPB framework	Irreversible production of stable distinguishability records	Identification, locality, conditioning, faithfulness of the fold bit

The absent forcing links are the **type** condition ( $R$  class-internal  $E_1$ , not inter-class), the **invariance** condition (full  $\rho(D_6)$ , via IR-SCOPE / Full-Action Invariance), and the **standing** condition ( $R$  standing, not realized) — the three independent links of the §6.4 conjunction. The absent generation result is the **TPB Fold-Bit Identification Theorem**, or another independently fixed B2 mechanism.

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## Appendix C — Referee Objections and Replies

**Objection 1 — PERMITTED is inferred from the absence of a proof.** No. The result uses positive scope statements: Realization uniformity is within-class and member-grain; Generation positively types up/down as winding-distinct classes and admits class-grain refinement. The desired conclusion lies outside the proved uniformity domain.

**Objection 2 — Standing means invariant, so surely  $S R S = R$ .** Only if  $S$  is an admissible internal history of the same subject and  $R$  is standing under that action. That is IR-SCOPE. Standing does not imply invariance under a map sending the subject to another class or conjugate carrier.

**Objection 3 — The Carrier Theorem says the class group acts irreducibly. Does irreducibility force scalar  $R$ ?** Not by itself, and not nearly. Scalarity by Schur needs *two* things: that  $R$  is required to be invariant under the full irreducible action, and that  $R$  is an operator on that single irreducible space to begin with. Irreducibility constrains invariant subspaces; it is

silent on what R must be invariant under, and silent on whether R is class-internal or inter-class. So it is *adjacent* to the invariance link (I) of §6.4, not one inference from the Schur antecedent — and it does nothing about the type link (T). See Theorem 9.2 and §9.3.

**Objection 4 — Schur's lemma therefore makes PERMITTED misleading.** It would make the verdict FORCED *if* the full forcing conjunction held — the full  $E_1/D_6$  action internal (I), R standing under it (S), and R an operator on the single  $E_1$  rather than inter-class (T). Those are physical scope premises, not consequences of Carrier/Generation/Realization, and the type link (T) is opposed by the catalogue typing. They are in the main text (Route B, §6.3–6.4, Theorem 9.2), not hidden in an objection — which is why the verdict is located on the unmet conjunction, not asserted around it.

**Objection 5 — PERMITTED requires the admissible group to be a proper subgroup.** Not necessarily. The full action could fail to be internal to one subject, the state could be inter-class, or the access could be realized rather than standing. The verdict says the full-action package is unproved; it does not choose the failure mode.

**Objection 6 — The Realization Theorem is quantity-blind, so it should apply to fold access.** It applies to standing member-grain readings of one class-owned response. Quantity-blindness does not erase grain and subject; physical up/down are winding-distinct classes in the inherited catalogue.

**Objection 7 — The paper constructs an escape by retyping the state as family-grain.** No state is constructed. The inter-class typing follows from the Generation Theorem's own decomposition; the paper merely refuses to apply a within-class theorem across two classes.

**Objection 8 — Could transient access save the mechanism if IR-SCOPE is proved?** Possibly, but it would be a different mechanism —  $\chi$  would read a realized or transient state rather than the reflection-even standing class state, and that route owes its own dynamics and persistence argument.

**Objection 9 — Why not call the result OPEN?** Because the frozen binary question is whether the held theorems force symmetry. They do not. The construction of a physical odd state remains open, but the scope implication has a definite negative verdict.

**Objection 10 — What result would flip the verdict?** Establishing the full forcing conjunction: the type link (R is class-internal  $E_1$  content), the invariance link (full  $\rho(D_6)$  internal, R standing under it), and the standing link together. The invariance link is the one to watch — if it closes, Schur falsifies the mechanism with nothing further. But any single link failing keeps the contrast alive: an inter-class R (T), a proper sub-action (I), or realized access (S). The type link is the cleanest defeater and the one the corpus's own typing supports.

**Objection 11 — Why mention TPB if it proves no fold result here?** Because it is the named candidate framework for B2, and an earlier integration placed it downstream of the decisive assumption. §11 corrects that by identifying the theorem TPB must actually prove and claiming no generation result.

**Objection 12 — Is the identity  $R_- = S R_+ S$ ,  $R_+ \neq R_- \implies \mathcal{P}_0(R_+) \neq 0$  useful?** Yes, as a diagnostic and type check — not as evidence that physical commitment dynamics generate the pair. The fold-bit identity, basin structure, and selection dynamics remain upstream.

**Objection 13 — What would count as correct TPB integration?** A mass-blind derivation that the minimal stable one-bit partition is the sign of  $q_\chi$ , with stable record basins, reflection covariance, a derived threshold crossing or instability, and a faithful conditioned readout (T1–T6).

**Objection 14 — What breaks the symmetry from the symmetric unresolved state?** This is the most important objection to any generation mechanism, and the graph-resolved construction answers its *existence* part *within a mean-field model* (§12.4). From a perfectly symmetric unresolved state, deterministic symmetric dynamics cannot leave it — an unstable point needs a seed. §12.4 supplies one from *finite-count commitment noise*: discrete fluctuations break the symmetry. The *existence* of the seed is the derived content; the explicit threshold  $\beta J > 1$  and the supercritical quartic come from an imported heat-bath rule, so they are model-dependent, not first-principles. So the seed and stabilising nonlinearity are addressed *in the model*, with that caveat. What is *not* closed has moved downstream: the surviving mechanism requires a readout that projects the locked record into the fold-access sector. The previous round flagged that as an object that might not exist; §12.5 now *constructs* it (the unique conditioned channel  $R_\omega = \frac{1}{2}(I + \zeta\omega\Delta P)$ , Schur-consistent), so the residual gap is no longer existence but a single coupling — whether  $\zeta = \tanh(\beta h)$  is nonzero, i.e.  $h \neq 0$ . The selection-existence question is answered in-model; the readout question is the residual decisive gap, now localised to one scalar with a live pessimistic branch  $h = 0$  (§12.5).

**Objection 15 — Isn't the inter-class "type mismatch" just the proper-subgroup case again?** No, and conflating them is the error the §6.4 conjunction is built to prevent. A proper sub-action is an *invariance* deficit:  $R$  is an operator on  $E_1$  but only required invariant under part of the action, so a non-scalar  $R$  survives. An inter-class  $R$  is a *type* mismatch:  $R$  is not an operator on the single  $E_1$  at all, so Schur's lemma does not engage — there is no commutant of  $\rho$ -on- $E_1$  for  $R$  to fail to lie in. The first is "wrong amount of invariance," the second is "wrong kind of object." They are logically independent defeaters, and the Generation Theorem's winding-distinct typing of up/down actively supports the second. This is why the verdict is a conjunction, not a single axis.

## Appendix D — $\kappa$ -Mediated Commitment-Memory Instability: Full Derivation

This appendix gives the derivations underlying §12: the graph-resolved  $\kappa$ -carrier, the exact closure Green's function, the  $E_1$  obstruction, and the stochastic commitment model. It is conditional on the Record-Resolution Premise (§12.1) and leaves the closure-history  $\rightarrow E_1$  intertwiner (§12.5) open.

## D.1 The branch-blind scalar field and the Record-Resolution Premise

The present fact-momentum theory has one real scalar  $\kappa(x,t)$ ,  $(\square + M_\kappa^2)\kappa = \rho_\kappa$  committed, sourced by the total committed-fact density. It records *how many* facts formed, not *which* closure orientation each recorded — so it is branch-blind and cannot distinguish U from D. This is exact (Lemma 1, §12.1): a U-record and a D-record at the same site give the same scalar source, hence the same field,  $\kappa_U = \kappa_D$ . The repair is the **Record-Resolution Premise** in its *forced-conditional* form (§12.1): record-faithfulness (a memory carrier does not collapse distinctions later dynamics must read) together with the contrapositive of Lemma 1 shows that *if* closure orientations are committed records *and*  $\kappa$  is the sole memory carrier,  $\kappa$  **must** be record-resolved — not posited, forced. Two honest dependencies travel with the forcing: the antecedent is the ontological **Fold-Record Identification** fork (*committed records vs merely reversible labels?* — only the first triggers the requirement), now itself *conditionally discharged* by the Closure-Orientation Retention Theorem (§12.1), which proves that *if*  $W_7$  closure is built from ordered irreversible commitments then ABC and CBA carry opposite causal-order content and cannot collapse to one record — so the orientation bit  $\omega$  is retained (metric-free, prior to  $d_{\text{ord}}$ ), with the live failure branch being endpoint-only closure; and the **auxiliary-exclusion clause** (if some other field holds the closure label, scalar  $\kappa$  survives). The record-resolved field is a *conservative extension*: the scalar  $\kappa$  is its uniform mode,  $\kappa_0 = |\Omega|^{\{-1/2\}} \sum_\sigma \kappa_\sigma$ , recovered as the branch-blind projection (exactly Lemma 1), not contradicted.

## D.2 The graph-resolved carrier and the graph Laplacian

Index the closure-order states by the six vertices of  $G_{\text{ord}} = \text{Cay}(S_3, \{(12), (23)\})$ , a 6-cycle, with field  $\kappa = (\kappa_\sigma)$  and source  $n = (n_\sigma)$ ,  $n_\sigma$  the count of committed type- $\sigma$  records. Under (i) only one-tick-adjacent states couple, (ii) every vertex/edge treated alike, (iii) quadratic free theory, (iv) non-negative internal gradient energy, (v) uniform field costs nothing, the internal quadratic form is uniquely the graph Laplacian:

$$Q_{\text{int}} = (\eta/2) \sum_{\{\sigma, \tau\} \in E} (\kappa_\sigma - \kappa_\tau)^2 = (\eta/2) \kappa^T L_{\{C_6\}} \kappa, \eta \geq 0,$$

$\eta > 0$  under genuine one-tick transport. The action is  $\mathcal{L} = \frac{1}{2} \partial \kappa^T \partial \kappa - \frac{1}{2} M_\kappa^2 \kappa^T \kappa - (\eta/2) \kappa^T L_{\{C_6\}} \kappa + g n^T \kappa$ . This follows the corpus's graph-local  $\rightarrow$  Laplacian result; no U/D distance is inserted by hand.

## D.3 Exact closure Green's function

Static internal propagation:  $A = M_\kappa^2 I + \eta L_{\{C_6\}}$ ,  $G = A^{-1}$ . The  $C_6$  Laplacian has eigenvalues  $\lambda_k = 2(1 - \cos(2\pi k/6))$ ,  $k = 0 \dots 5$ , i.e.  $\{0, 1, 3, 4, 3, 1\} = \{0, 1, 1, 3, 3, 4\}$ . By vertex-transitivity the distance- $d$  Green's function is  $G_{\text{d}} = (1/6) \sum_k \cos(2\pi k d/6) / (M_\kappa^2 + \eta \lambda_k)$ . The antipodal ( $d = 3$ ) contrast then isolates the odd modes:

$$G_0 - G_3 = (1/6) \sum_k [1 - \cos(\pi k)] / (M_\kappa^2 + \eta \lambda_k) = (1/6) \sum_{\{k \text{ odd}\}} 2 / (M_\kappa^2 + \eta \lambda_k),$$

and the odd  $k = 1, 3, 5$  carry  $\lambda = 1, 4, 1$ , giving

$$G_0 - G_3 = (1/6)[ 2/(M_{\kappa^2} + \eta) + 2/(M_{\kappa^2} + 4\eta) + 2/(M_{\kappa^2} + \eta) ] = (1/3)[ 2/(M_{\kappa^2} + \eta) + 1/(M_{\kappa^2} + 4\eta) ] > 0 \text{ for all } M_{\kappa^2} > 0, \eta > 0,$$

with the full ordering  $G_0 > G_1 > G_2 > G_3$ . (This closed form survives independent recomputation; it is the one new quantitative result and is stated here in full so a referee need not reconstruct it.) Setting  $C_{\text{same}} = g^2 G_0$ ,  $C_{\text{cross}} = g^2 G_3$ ,

$$C_{\text{same}} - C_{\text{cross}} = (g^2/3)[ 2/(M_{\kappa^2} + \eta) + 1/(M_{\kappa^2} + 4\eta) ] > 0 \text{ — exact, no additive-distance rule.}$$

Note which modes carry the contrast: the antipode-separating weight sits in the  $\mathbf{k} = 3$  ( $\lambda = 4$ ) alternating mode and the odd combination of the  $\mathbf{k} = 1$  ( $\lambda = 1$ ) pair. The  $E_1$  access doublet is the  $\mathbf{k} = 1$  ( $\lambda = 1$ ) isotype, on which the propagator is scalar (§D.4). The contrast modes and the  $E_1$  access isotype are therefore *isotypically disjoint* — which is exactly why the closure contrast (here) and the  $E_1$  obstruction (§D.4) coexist without contradiction.

This is the advance over the former Locality Lift: the contrast is a consequence of the symmetric  $C_6$  law, not an inserted premise. **[Derived — given Record-Resolution.]**

**Carrier storage (injectivity — no rank loss).** Since  $A = M_{\kappa^2}I + \eta L_{\{C_6\}}$  has all eigenvalues strictly positive ( $L_{\{C_6\}} \geq 0$ ,  $M_{\kappa^2} > 0$ ), it is invertible, and  $\kappa = gA^{-1}n$  inverts to  $n = g^{-1}A\kappa$ . The map  $n \mapsto \kappa$  is injective: distinct record distributions give distinct  $\kappa$ -profiles, and  $\Delta n = n_U - n_D$  is recoverable from  $\kappa$ . *Weight:* this is near-tautological given record-resolution — six components in, an invertible propagator, six recoverable out; invertibility says only that propagation does not collapse the slots. It does **not** establish that the field *should* be record-resolved (that is §D.1's conditional premise); it confirms only that, *given* resolution, the record is retained. *Scope:* information-presence and in-principle recoverability by inverting  $A$ , not readout. The physical readout is  $\text{Tr}(P_{\pm}R)$  on  $E_1$ , which §D.4 shows is scalar for any equivariant-linear field — so "present in  $\kappa$ " (this result) and "readable as  $\chi$ " (open, §D.8) are distinct, separated by the access intertwiner.

## D.4 The $E_1$ obstruction (the standing route, closed)

**Theorem ( $E_1$  obstruction).** Any  $D_6$ -equivariant linear field on the fold space is scalar on the irreducible doublet  $E_1$ . In particular  $L_{\{C_6\}}|_{\{E_1\}} = I|_{\{E_1\}}$ , so  $G|_{\{E_1\}} = (M_{\kappa^2} + \eta)^{-1} I|_{\{E_1\}}$ , and  $\text{Tr}(P_+G) = \text{Tr}(P_-G)$ . *Proof:* by Schur's lemma the commutant of the irreducible  $E_1$  representation is scalar;  $G$  is equivariant and linear, hence scalar on  $E_1$ ; equal projector ranks give equal traces. ■

Consequence: the closure contrast  $G_0 - G_3$  lives between the *closure-history vertices*  $U$  and  $D$ , **not** between the standing  $E_1$  access lines  $P_+$ ,  $P_-$ , which the symmetric field leaves equal. So no  $D_6$ -invariant linear  $\kappa$  field — however closure-resolved — sources a standing  $P_+/P_-$  contrast. The standing route is closed; only a realized, branch-conditioned history mechanism can survive. This is the same Schur scalarity as Route B of the scope verdict (§9.2), now firing against the constructed carrier.

## D.5 The stochastic commitment model

Integrating out the static field:  $E_{\text{eff}} = -(g^2/2) \mathbf{n}^T \mathbf{G} \mathbf{n}$ . Restrict to the antipodal records, counts  $N_U, N_D$ , removing self-interaction (exact discrete counts):

$$E = -C_{\text{same}}[C(N_U, 2) + C(N_D, 2)] - C_{\text{cross}} N_U N_D.$$

With  $N = N_U + N_D$ ,  $m = (N_U - N_D)/N$ :  $E(m) - E(0) = -(N^2/4)(C_{\text{same}} - C_{\text{cross}}) m^2$ , so  $m = 0$  is an unstable stationary point when  $C_{\text{same}} > C_{\text{cross}}$ , invariant under  $m \mapsto -m$  (two equivalent directions, neither chosen).

A heat-bath commitment rule  $P(U|m) = \frac{1}{2}(1 + \tanh \beta J m)$ ,  $J = (C_{\text{same}} - C_{\text{cross}})/2$ , gives the mean-field fixed point  $m = \tanh(\beta J m)$  and free energy

$$f(m) = f(0) + \frac{1}{2}(\beta^{-1} - J)m^2 + (1/12\beta)m^4 + O(m^6).$$

- **Selection seed:** finite-count commitment noise supplies the symmetry-breaking fluctuation. The *existence* of a seed is derived; the *specific* threshold  $\beta J > 1$  (and the  $\tanh$  form) come from the imported Glauber-type heat-bath rule, not from TPB commitment dynamics — so "a seed exists" closes Objection 14 / T5 in spirit, but the threshold value is model-dependent.
- **Supercriticality:** quartic coefficient  $1/(12\beta) > 0$  automatically, from binary combinatorics *within this heat-bath model* (closes the former supercriticality case-assumption *in the model*, not from first principles).

Individual histories pick  $+m_*$  or  $-m_*$ ; the unconditioned ensemble stays symmetric (TPB ensemble guard).

## D.6 Record locking (persistence)

The minima  $m_* = \tanh(\beta J m_*)$ ; for  $\beta J > 1$  the barrier  $\Delta f = f(0) - f(m_*) > 0$  gives switching time  $\tau_{\text{switch}} \sim \tau_0 \exp(N \beta \Delta f)$ . This is a *mean-field switching-time estimate*, not a first-principles persistence law for the substrate. Within the model, branch switching is exponentially suppressed as the record grows: a realized branch-conditioned imbalance becomes effectively permanent on observational timescales while the equations stay reflection-symmetric. This is persistence (Locus-2 burden 3), though not standing-invariant status in the Carrier-Theorem sense.

## D.7 What momentum contributes

The orientation-selecting interaction is the static  $\kappa$ -mediated potential. A genuine second-order equation  $\ddot{m} + \gamma \dot{m} + f'(m) = \xi(t)$  linearises near  $m = 0$  to  $\ddot{m} + \gamma \dot{m} + (\beta^{-1} - J)m = \xi$ ; for  $\beta J > 1$  the negative curvature gives a positive growth exponent even at ordinary positive damping. So momentum sets the growth *rate* and supplies inertia/causal propagation, but does **not** create the orientation preference. Honest name:  *$\kappa$ -mediated commitment-memory instability*, not "fact momentum creates the imbalance."

## D.8 The closure-history $\rightarrow E_1$ intertwiner: constructed; the gap localised to $h$

§D.4 forces the mechanism to realized-history grain; §D.5–D.6 make that grain viable. The surviving route's last steps — the selected history projects into the fold-access sector, and  $\chi$  reads it — require an intertwiner  $T$  from closure-history records to the  $E_1$  access state with  $\text{Tr}[(P_+ - P_-) \cdot T(\text{record})] \neq 0$ . By §D.4,  $T$  cannot be  $D_6$ -equivariant-and-linear (scalar on  $E_1$ , giving zero). The previous draft left this as an object that might not exist; it can be **constructed**, and uniquely at lowest order.

**The Minimal Conditioned Intertwiner.** Let  $\Delta P = P_+ - P_-$  (reflection-odd) and  $\omega = \pm 1$  the realised closure bit (reflection-odd). Then  $\omega \cdot \Delta P$  is reflection-*even*, so it couples to the realised bit in a reflection-covariant law. The minimal positive, trace-one, reflection-covariant conditioned access state is

$$R_{\omega} = \frac{1}{2}(I + \zeta \cdot \omega \cdot \Delta P), \quad |\zeta| \leq 1,$$

unique among access-readable couplings: only  $1/2$  is trace-compatible, and  $\omega \cdot \Delta P$  is the unique first-order reflection-covariant coupling *that the diagonal access functional  $\text{Tr}(P_{\pm})$  renders as nonzero  $\chi$* . The  $\sigma_y$ -like reflection-odd direction (§A) is equally covariant under  $\omega$ , but produces only reflection-odd coherence the diagonal functional does not detect, so  $\omega \cdot \sigma_y$  gives a covariant family with  $\chi = 0$  — admissible but access-invisible, which is why  $\omega \cdot \Delta P$  is the  $\chi$ -relevant channel. With  $P_{\pm} \Delta P = \pm P_{\pm}$ :  $a_{\pm}(\omega) = \frac{1}{2}(1 \pm \zeta \omega)$ , so  $\chi(\omega) = 2 \text{artanh}(\zeta \omega)$ , nonzero iff  $\zeta \neq 0$ . *Exactness*: for the binary record  $\omega = \pm 1$  this is exact, not truncated —  $\omega^2 = 1$  resums all higher conditioned couplings into the single gain  $\zeta$ ; for the locked  $m \in [-1, 1]$  (§D.5, the physical case,  $m_* = \tanh(\beta J m_*)$  generically  $\neq \pm 1$ ) the one-parameter form is leading-order, since  $m^k$  does not collapse.

**It evades Schur in the only admissible way.**  $R_{\omega}$  is not invariant —  $R_{\{-\omega\}} = S R_{\omega} S$  — so Schur (which kills standing *invariant* operators on  $E_1$ ) does not apply: the family is covariant, no realised member is fixed. The unconditioned ensemble stays symmetric:  $\bar{R} = \frac{1}{2}R_+ + \frac{1}{2}R_- = \frac{1}{2}I$ ,  $\chi(\bar{R}) = 0$  — branch-conditioned contrast, no standing ensemble asymmetry, exactly the no-go-compatible structure.

**Channel built, current owed — and is the current already determined?** A pointer coupling  $F_{\text{read}}(R|\omega) = F_0(R) - h \cdot \omega \cdot \text{Tr}(\Delta P R)$  gives the conditional max-entropy (Gibbs) state  $R_{\omega} \propto \exp(\beta h \cdot \omega \cdot \Delta P)$ ; since  $(\Delta P)^2 = I$  on the doublet,  $\exp(\beta h \omega \Delta P) = \cosh(\beta h) \cdot I + \sinh(\beta h) \cdot \omega \Delta P$ , and normalising ( $\text{Tr} = 2 \cosh \beta h$ ) gives  $R_{\omega} = \frac{1}{2}(I + \tanh(\beta h) \cdot \omega \cdot \Delta P)$ , so  $\zeta = \tanh(\beta h)$ , faithful iff  $h \neq 0$ . (This  $\zeta = \tanh(\beta h)$  is *exact, not a small- $h$  expansion* — it follows from  $(\Delta P)^2 = I$ , the same squared-involution fact, alongside  $\omega^2 = 1$ , that resums the conditioned series; both "exactness" results have one structural cause.) Writing the general admissible channel is a *parametrisation of the unknown*, and  $\zeta = \tanh(\beta h)$  a reparametrisation — neither sources  $h$ . What is proven is the readout *channel* (the unique symmetry-allowed way the stored imbalance enters  $E_1$ ); what is open is the *current*, the mass-independent coupling  $h$ . Asserting  $h \neq 0$  by hand would be the old Lift's smuggle. But the honest exposure runs the other way too: §D.5 already has a carrier coupling  $J = (C_{\text{same}} - C_{\text{cross}})/2$ , computed from the  $C_6$  Green's function, and the default expectation is that the *same*  $\kappa$  mediates both the record  $\rightarrow$  record interaction ( $J$ ) and the

record→access readout (h). If so, **h is computable from the C<sub>6</sub> geometry already in hand**, likely nonzero, and the honest grade is "h plausibly computable, deferred" — not "free open scalar." Treating h as independent is a choice that itself requires justification (why the readout coupling is not the carrier coupling); absent that argument, the candidate may be closer to a verdict than "one owed number" suggests.

**Connection to the stored imbalance.** With the §D.5 order parameter m in place of pure  $\omega$ ,  $R_m = \frac{1}{2}(I + \zeta \cdot m \cdot \Delta P)$ ,  $\chi(m) = 2 \operatorname{artanh}(\zeta m)$ : the mass contrast *factorises* into stored imbalance m (in-model, §D.5) and gain  $\zeta = \tanh(\beta h)$  (open). Both must be nonzero.

**Obstruction conservation, localised — and terminated.** Branch-distinguishability is *relocated to the carrier* (§D.1 conditional premise; §D.3 no rank loss given resolution), *proven absent from any standing equivariant-linear readout* (§D.4), and now shown to enter the readout *only* through the conditioned channel above, gated by h. The obstruction is *conserved but localised* — driven from the Lift, through the carrier ontology, through the standing readout, onto a single mass-independent scalar h. And it can be pushed no further: a single dimensionless coupling of the *unique* channel into the *irreducible* doublet has no additional layer to relocate to, so h is the **terminus** of the recursion, not merely its current location. Unlike every prior layer, this one must be computed, not moved. The earlier pessimistic reading ("no such object exists") is retired: the object exists, is unique, and is Schur-consistent. What survives is the sharper, decidable branch **h = 0** — the channel built but carrying no current, the record in  $\kappa$  unread, the realized-history route closed alongside the standing one. The honest disjunction is now arithmetic: either  $h \neq 0$  (derived independently, or found already fixed by the C<sub>6</sub> geometry that gave J) or  $h = 0$  (and the route closes).

## D.9 The mass-readout step and the halving law (both open)

The access relation  $a_{\pm} = \frac{1}{2}(1 \pm \zeta m_{*})$  is no longer a *supposition* — it is the conditioned channel constructed in §D.8 ( $R_m = \frac{1}{2}(I + \zeta m \Delta P)$ ), with  $\chi = 2 \operatorname{artanh}(\zeta m_{*})$ . What is open is not the *form* of the relation but its *gain*:  $\zeta = \tanh(\beta h)$  is nonzero iff the mass-independent coupling h is, so  $\chi \neq 0$  iff  $h \neq 0$ . This is the §D.8 channel made quantitative, plus the requirement that the record control persistent mass (Locus-2 burdens 4–5). The honest statement is: the readout relation is built; the magnitude requires  $h \neq 0$ , which is owed.

The halving law is separate. Since  $\chi_g = 2 \operatorname{artanh}(m_{\{*,g\}} \cdot \zeta)$ ,  $\chi_{\{g+1\}} = \frac{1}{2} \chi_g$  requires

$$m_{\{*,g+1\}} \zeta = \tanh[\frac{1}{2} \operatorname{artanh}(m_{\{*,g\}} \zeta)],$$

reducing to  $\approx \frac{1}{2}$  only for small argument. Halving is exact in  $\chi$ , not in m; it needs a generation-recursion theorem for the model parameters ( $\beta_g, J_g$ ) and  $\zeta_g$ , with calculable deviations at larger m — itself falsifiable. So  **$\kappa$ -mediated commitment-memory instability  $\Rightarrow \chi \neq 0$  (conditional on the intertwiner), but  $\rho = \frac{1}{2}$  remains a further theorem.**

## D.10 Failure modes and honest status

The route closes if any holds: (1) Fold-Record Identification fails in the *endpoint-only* branch —  $W_7$  closure depends only on the unordered endpoint  $\{A,B,C\}$ , so ABC and CBA collapse to one record (Closure-Orientation Retention Theorem fails its antecedent),  $\omega$  is erased, scalar  $\kappa$  is adequate-but-branch-blind, and the route dies at the carrier (or an auxiliary field carries the label, sparing scalar  $\kappa$ ); (2) no graph instability ( $C_{\text{same}} \leq C_{\text{cross}}$  — excluded by D.3 given Record-Resolution, but contingent on  $\eta > 0$ ); (3) the heat-bath threshold is not met ( $\beta J \leq 1$ ); (4) **the readout coupling vanishes,  $h = 0$**  — the conditioned channel is built (D.8) but carries no current,  $\zeta = \tanh(\beta h) = 0$ ,  $\chi = 0$ ; this is the decisive failure mode, the localised form of the conserved obstruction; (5) the locked record does not control persistent mass. Cases 1–3 fail generation; 4–5 fail the readout/mass chain.

**Net status:** a concrete, internally consistent realized-history mechanism. It replaces the circular Locality Lift with a record-resolved carrier that *relocates* (does not eliminate) the distinguishability assumption to the carrier ontology, conditional on Fold-Record Identification; computes the closure-contrast magnitude from a symmetric law (D.3); confirms no rank loss in propagation (D.3 injectivity, near-tautological given resolution); proves the standing route closed (D.4); supplies a seed, supercriticality, and a mean-field locking estimate (D.5–D.6, model-dependent); and **constructs the unique conditioned readout channel** (D.8) that evades the  $E_1$  obstruction. The decisive gap has contracted from "find a faithful non-equivariant-linear intertwiner" to a single mass-independent scalar: the pointer coupling  $h$ . The candidate's survival rests on  $h \neq 0$  (then  $\chi = 2 \operatorname{artanh}(\zeta m)$  with  $\zeta = \tanh(\beta h)$ );  $h = 0$  is the localised form of the conserved obstruction and closes the route. Whether  $h$  is a free owed scalar or already computable from the  $C_6$  geometry that fixed  $J$  is itself unsettled (D.8). Mass relation and halving law open (D.9). **[Conditional — carrier resolution conditional; magnitude computed; standing route refuted; readout channel constructed and unique; faithfulness =  $h \neq 0$ , open and possibly already  $C_6$ -fixed; mass open.]**

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1. Keith Taylor, *Class-Owned Standing Structure: The Ownership Principle for Indistinguishable Closure Classes*.
  2. Keith Taylor, *The Carrier Theorem: Quantized Response and the Minimal Transport-Stable Subject*.
  3. Keith Taylor, *The Realization Theorem: Standing Class Quantities at Member Grain*.
  4. Keith Taylor, *The Generation Theorem: Refinement at Class Grain*.
  5. Keith Taylor, *A Three-Gate  $W_7$  Audit of the  $\chi$ -Halving Law in VERSF*.
  6. Keith Taylor, *The  $\chi$ -Refinement Pushforward Verdict*.
  7. Keith Taylor, *The  $W_7$  Fold Carrier and the Readout Domain*.
  8. Keith Taylor, *TPB-Entropy*.
  9. Keith Taylor, *Emergent Invariant Speed and Lorentz Structure from Record Formation*.
  10. Keith Taylor, *The Commitment Criterion and Fact-Momentum / Commitment-Memory Structure*.