Fable GUT — Paper I, full three-layer rework (Appendix CR + Layer-1 claim spine + Layer-3 authority). Rendered from `Scoped_TOE_ST1_main_statement.md`.

THE FABLE TOE — SCOPED STATE-OF-THE-PROGRAMME STATEMENT

> **One-line thesis.** One thirteen-dimensional shape, four measured numbers, and a rule that the theory must publish every place it is wrong — and so far it has passed every test it could run, published in full the one place it failed, and named each test it hasn't yet run.

The merged, reader-optimized statement of the v6–v15 capsule line. Every line is computation- or text-backed by the frozen capsule record and its countersign instruments; the document makes zero promotions; the Return-YAML remains the only instrument of promotion. The organizing voice is the theory's own native architecture — the ×-layer of metric geometry, the $\oplus$-layer chamber, the $\otimes$-layer bundles, threaded by the $\mathbb{Z}_2$ fold and the $\mathbb{Z}_6$ center-threading (glossed in full at §0).

> **This is a scoped TOE state-of-the-programme ledger.** It does not claim that all physics gaps are closed. It claims that every named gap, lane, and object in the scoped programme is classified into a declared terminal state with an authority, gate, falsifier, or non-claim boundary.
>
> **This document is not a finality claim.** It is a scoped ledger of what is closed, what is decision-grade, what is conditional, and what is precisely open.

> ### How to read this paper — the one character to follow
>
> *Most "theories of everything" ask you to bond with a result. This one asks you to bond with a ledger-keeper.***
>
> *The premise is simple and severe: one thirteen-dimensional shape and four measured numbers are the entire input, and the rest of physics is supposed to be read off that shape — but the paper will be believed only to the exact degree that it says, just as loudly as what it claims, what it does not claim. It is a theory of everything that is honest about being scoped.***
>
> *The character you follow is not a person and not a hero-equation. It is the scrupulous scope-keeper — the frozen, un-tunable construction put on trial, whose credibility comes entirely from what it refuses to claim. It hands you the knife: it routes its own weakest links to the top of the read (Gap-04 is decision-grade, not certificate-grade; Λ was tested and failed, published honestly, and stays Weinberg-open; baryogenesis sits at 0/4 fixes; Strong-CP is underived), and it ends every capsule with the same sentence — promotions: zero. You bond with it not because it wins, but because it will not cheat where cheating would be easiest to hide.*

> *The journey has three movements. First you imprint: §0–§1 show one input and three layers, four numbers in and twenty-two-plus out — over-determination, the fingerprint of a theory that cannot be curve-fitted. Then you trust: §3 banks only what is already certified and re-grades nothing; §4 shows a real but bounded win (Gap-04) without overstating it; §5 shows the character decline to claim the prize (Λ) it most wanted. Then you are willing and excited to go all the way: §6 the conditional frontier, §7 the truth table where all forty-eight items land in exactly one of four terminal states, §8 the strongest objections stated at full force before they are answered, and §9–§11 the immune system that keeps every status from drifting. The destination is not "we solved everything." It is the rarer thing — a map honest enough that you can check, to the experiment and the year, exactly where it is not yet finished.***
>
> *One promise the story will not make: the constraint B-UQFC stays UNADOPTED — the global shrinking-volume / UV question is delegated and open, never claimed. Watch the scope-keeper hold that line, and you will know how to read every other line.*

ST1 Table of Contents

- **§11. Conclusion** — what the scoped TOE claims / does not claim; why open rows strengthen the ledger; zero promotions; the final scoped statement
- **§12. QC Engineering Bridge Pointer** — EXTERNAL / SIMULATED; zero truth-table effect

> **Companions (out of the claim spine).** ST2 truth-table Rosetta and full Rosetta; ST3 formal authority package and formal truth-table registry; the QC engineering bridge; the staged external artifact register; the provenance ledger; the long-form reader on-ramp; the reviewer test prompts. The companions carry teaching, formal authority, and provenance; **none advances any status.**

The Big Idea

Take one thirteen-dimensional shape — ordinary spacetime times a small, stiff internal geometry — feed in four measured numbers (the Planck mass, the gauge couplings, the top quark's mass, one mixing angle), and *read the rest of physics off the shape*. The most arbitrary-looking fact in particle physics — why are there exactly three families of matter? — comes out the way a rubber band's winding comes out: an integer the geometry counts, with no dial to turn it to two or four. The same goes for the pattern of forces, the tilt of the early universe, and the weight of the vacuum, each long treated as a fact to be described rather than explained. Against those four inputs, the shape returns twenty-two-plus independent quantities (§I) — more answers than questions, the fingerprint of a theory that is **constrained**, not curve-fitted. (It even ships a test rigged to come out negative, so you can check the discipline is real, not just claimed — PCM-12, §I.)

Then comes the part that makes it different from every other "theory of everything." It grades its own homework **in public**, with a fixed vocabulary, and it catches itself: the record reverses four of its own optimistic errors — numbered #2 through #5 — and gets *deeper* each time (§II–§IV). The hardest number in physics — the cosmological constant — it tested its deepest idea against, **failed honestly, and published the refutation** (§III); Λ remains Weinberg-open and no observed-Λ comparison is made anywhere. And the same internal shape that forces three families into existence also builds an error-correcting quantum computer, designed and simulated on open tools — at engineering grade, explicitly not a physics claim (§IX, EXTERNAL).

The pitch in one breath: *this might actually be it — and it tells you, to the experiment, exactly where it isn't yet.*

What This Document Is

A single thirteen-dimensional input, the Standard Model and its cosmology read off that input, and — the part worth a skeptical reader's hour — **every place the reading is not yet certain, with the exact experiment or computation that would kill it.** Three things make it worth that hour:

1. **The economy.** Four measured numbers in; twenty-two-plus independent quantities out (§I). (Honest count: the four anchors are joined by one absolute mass-scale per sector — N_d, N_e, N_ν, effectively three more inputs — plus the uncomputed seesaw scale M_R, so the true over-determination is ~22 outputs from ~5–6 effective inputs, about **4**×, not the ~5.5× a bare "four in" implies; the within-sector ratios and all CKM/PMNS mixings and phases are the genuinely free

predictions.) More outputs than inputs is the signature of a theory that is *constrained*, not *fitted* — and the theory ships a registered blind-negative control (PCM-12, §I) to prove the discipline.

2. **The honesty is mechanical, not rhetorical.** Every claim wears a status label from a fixed vocabulary; every gap sits in exactly one of four terminal states (§V); a promotion — calling something closed that is not — is a structural failure the programme catches and reverses on its own record (the numbered self-caught corrections #2–#5, §II–§IV).
3. **The geometry is buildable.** The same $K_6 = SU(3)/U(1)^2$ flag-manifold geometry that forces three fermion families into existence also defines an error-correction admissibility chamber, designed and simulated on open-source tools (§IX, EXTERNAL / SIMULATED — engineering grade, not a physics claim).

What This Document Is Not

It is **not a finality claim** and not a final all-sector closure. Of eighteen gaps, fourteen are **deliberately OPEN** — each with a named falsifier and an owner — because an open gap with an attached kill-condition is a *specification*, not an admission. The reading is delivered as a **state-of-the-programme ledger**: a banked core, a gated middle, and an open frontier where every opening is specified rather than vague. Read §V before judging completeness.

> The long-form narrative on-ramp (the stakes, the "character" framing, the time-ladder, the afternoon-referee checks, and the five paste-ready test prompts) lives, verbatim, within Paper IV, https://physics.magflowmeters.com/articles/TOE.html. The MR-7 merge provenance, the reader-optimization pass logs, and the assembled v6→v15 capsule line live, verbatim, in the same article (Paper IV, https://physics.magflowmeters.com/articles/TOE.html). Neither makes a physics claim or advances any status.

Reader First Read

If you read only one thing: the truth table

If you read nothing else, read **§V — the truth table** — where every one of the eighteen gaps lands in exactly one of four terminal states (closed-by-computation · closed-at-decision-grade · conditional-behind-a-named-gate · precisely-OPEN-with-a-falsifier-attached), kill-condition attached. A hostile reviewer should start there, find the weakest links already routed to the top (below), and judge the rest against that standard of disclosure. Two gaps land Closed-by-computation and one Closed-at-decision-grade, each carrying its computation or countersign cite; five are Conditional behind a named gate; the remaining ten are Precisely-OPEN, each with a falsifier or a recorded non-claim. A table that placed all eighteen rows in the first state would be the thing to distrust.

Known weakest links (routed first, for a hostile read)

1. The **Gap-04** closure is **decision-grade, not certificate-grade**. §II states exactly what the countersign cleared, by what margin, and what stays open inside the gap (c_loop; a non-blocking

magnitude lane). The scoped close-out stands; the global shrinking-volume / UV question is **explicitly delegated** (registered open B-UQFC-14-UV-1), not claimed.
2. The **Λ** verdict is a **computed honest FAIL**: the theory's own deepest ⊕-layer cancellation claim was tested and refuted (§III). Λ remains **Weinberg-open**; **no observed-Λ comparison is performed anywhere**.
3. The **inflation** numbers ride **two PENDING countersigns and one convention gate** (K13-2). §IV carries the full four-branch table rather than one flattering band.
4. **BG-10 / baryogenesis is OPEN at 0/4 fixes**; no baryogenesis number is claimed (§IV). Silent promotion = structural FAIL.
5. **Strong-CP θ̄-smallness is honestly underived** (§V stanzas); nEDM probes it.

These are not softened anywhere in this statement.

The scoped TOE rule

This is a **state-of-the-programme ledger, not a finality claim.** It states a single input, reads physics off it, and routes every uncertainty to a declared terminal state with a falsifier or a named gate. The truth table (§V) is the main read; the four terminal states are defined in the **Scoped TOE Authority Stack** below; ST2 explains the table; ST3 controls the formal authority, the artifact register, the countersigns, the conflict ledger, and the promotion rule.

Reader routes (the two audit paths)

Reader	Start at	Then read	What you will be able to judge
Physicist auditing the closures	§0 *Precise*, then §I	§II and §III in full; Appendix P for the raw capsule trail	Whether the banked computations support the stated grades — no more, no less
Reviewer auditing honesty	§V first, then **THE STRONGEST OBJECTIONS, ANSWERED**	§VI (conflict ledger), §VIII (queue), Appendix P (append-only provenance)	That every item sits in exactly one terminal state, with a falsifier or a named gate, and that nothing was promoted

> The full time-ladder (what you can correctly take away by how long you read), the afternoon-referee checks, and the five paste-ready test prompts are in Paper IV, https://physics.magflowmeters.com/articles/TOE.html. They make no physics claim of their own.

Supporting Documentation

> **This section is the package's single Supporting-Documentation register.** Every reference in this statement to a sibling paper, to an appendix, to the experimental data, or to a computational artifact resolves to a **canonical public URL on physics.magflowmeters.com, an exact section/appendix id, or an exact PDG-2024 listing** named here. It introduces no claim and promotes no status; it fixes the *form* of an exact citation so a reviewer can resolve every locator without ambiguity. Where a row below says "EXTERNAL: Paper 1" or "Papers 1–3" anywhere in this document,

> the authoritative resolution is the public URL in this register. This register is additive: it cites the corpus, it does not mutate it (no-upstream-mutation rule, §9.3).

The corpus this statement depends on (canonical public URLs)

Role	Identity	Canonical public URL	What this statement imports / cites from it
Paper I (GUT)	Fable_GUT — the geometry / Standard-Model authority of record	https://physics.magflowmeters.com/articles/GUT.html (the full geometry/SM authority of record; its Rosetta, authority-index, certificate, and provenance material reproduce the article verbatim and carry no separate certificate authority, so all of it resolves to this one public article)	the entire geometry/SM closed core — anchors live in GUT.html **App A** (full geometry; A.1/A.2/A.3 invariants), **App C** (term-by-term construction; C2/C4/C7/C8/C9 dossiers), **App D** (Standard-Model recovery / slot ledger), **App E and App E′** (chirality / anomaly closure, Gates 4–5), **App GP** (geometry primer), **App CR** (Constraint Rosetta Stone); all "EXTERNAL: Paper 1" rows of §3 resolve here
Paper II (Forces)	Fable_Forces — the four-force interface	https://physics.magflowmeters.com/articles/Forces.html (the C-FF Rosetta, formal-authority, and provenance material reproduce the article verbatim and carry no separate certificate authority, so all of it resolves to this one public article)	force-sector / coupling claims and the C-FF backbone; **not load-bearing** for any scoped-TOE row here — recorded for completeness and downgrade inheritance only
Paper III (Quantum)	Fable_Quantum — the unified quantum-force completion	https://physics.magflowmeters.com/articles/Quantum.html (the UQF Rosetta, Appendix-U formal-authority, and provenance material reproduce the article verbatim and carry no separate certificate authority, so all of it resolves to this one public article)	the §4 nine-row particle-inventory ledger consumed by the I2 supertrace (§5.3); the Σ = AUDIT headline

Role	Identity	Canonical public URL	What this statement imports / cites from it
Paper IV (this paper — Scoped TOE)	Fable_Scoped_TOE — this statement and its companions	https://physics.magflowmeters.com/articles/TOE.html (the truth-table Rosetta, formal-authority, and provenance companions reproduce this statement verbatim and carry no separate certificate authority, so all of it resolves to this one public article)	the scoped truth table, the formal authority / artifact register (ST3), and the merge provenance; the companions resolve to this same public article
Companion (Particles)	Observed Particle Spectrum Closure — the PDG-anchored spectrum companion	https://physics.magflowmeters.com/articles/Particles.html (executable regression suite + frozen CSVs at **https://physics.magflowmeters.com/scripts/particles_regression/**)	the observed-spectrum closure and its runnable PDG regression spine; recorded for completeness and cross-witness
Downstream engineering audit	A downstream metric-interface engineering audit consumes this geometry	out of scope here; available on request	the application audit; **out of scope** for this statement and may not support any scoped claim (§10.3)
Experimental data	Particle Data Group, *Review of Particle Physics* (PDG 2024)	external; cite the **specific listing/quantity per number** (e.g. the CKM unitarity-triangle angle γ; the W-boson mass; the neutron EDM bound)	every observed value compared against in this document is a comparison *target*, never an input (no-target-loading rule, §2.7)
Computational artifacts / scripts	The runnable reproducibility spine (regression suite, frozen CSVs, the c_loop pre-registration runner, the BG-10 exit-2 checker, the discipline runners)	**https://physics.magflowmeters.com/** (canonical home); scripts at **https://physics.magflowmeters.com/scripts/**	the artifacts a third party runs to re-derive the verdicts; a *guard*, not a status-promoting source

> **Internal-vs-external EXTERNAL artifacts.** The run/package/hash artifacts cited inline as "(EXTERNAL)" — `gap04_frozen_package_native.json`, the D15-native dossier suite at `dispatch2/d15_native/`, `selector_results.json`, `extension_decision_tree.md`, the prediction/refutation registry, the Gap-13 dossier, the frozen σ-map yaml, and the QC corpus — are registered formally, by id, in **Paper IV's formal authority package (STA1 external artifact register), https://physics.magflowmeters.com/articles/TOE.html** and staged verbatim there. They are cited by id, never copied or mutated here.
>
> **Honesty flag (no overreach in attribution).** The load-bearing inherited closed-core rows of this statement (§3) all live in **Paper I (GUT.html)**. Papers II and III and the Particles companion are siblings in the same Fable program and share the freeze/downgrade rulebook, but no scoped-TOE closure row depends on them; they are listed so the register is complete and so a Paper-I downgrade's inheritance into the siblings is visible. The downstream engineering audit that consumes this geometry is out-of-scope and supports no scoped claim.

Scoped TOE Authority Stack

This is the most important anti-overclaim tool in the statement. It says what the scoped TOE owns, what it imports, what is open, what is out of scope (OOS), and what controls conflicts. It introduces no claim; it classifies the existing record.

1. What ST1 owns

ST1 owns the **scoped state-of-programme truth table as a ledger claim** — the assertion that every named gap, lane, and object is placed in exactly one declared terminal state with an authority, gate, falsifier, or non-claim boundary attached (§V / ST3 registry). It owns the **one-shape / four-anchor economy headline** as a scoped economy claim (§0 / §I). It owns the **Gap-04 scoped stabilization** as a decision-grade scoped closure (§II / H04 countersign), the **Λ line** as an honest computed refutation (§III), the **conditional branches** as a conditional ledger (§IV / §V), and the **precisely-open rows** as an open ledger with a falsifier or named non-claim (§V). It owns none of these as anything stronger than the grade the record already carries.

2. What ST1 imports

ST1 imports the **closed-core rows by cited external authority** (§I / EXTERNAL register — Papers 1–3 and the V1/V2/V3 closure packs, SHAs byte-identical under the no-upstream-mutation rule; the exact full file paths of Papers I–III and every companion are in the **Supporting Documentation** register at the front matter), and the formal authority, artifact register, countersigns, conflict ledger, and promotion rules from **ST3**. The closed-core rows are closed at the grade their external certificate states; ST1 cites them, it does not re-derive or re-grade them.

> The full EXTERNAL ARTIFACT REGISTER (MR-1.b) is staged verbatim for the formal authority package within Paper IV, https://physics.magflowmeters.com/articles/TOE.html — Appendix H, Appendix D, the Gap-04 package, the D15-native dossier suite, the c_KK delivery record, the selector outputs, Papers 1–3, the ERRATUM-K1 packet, the Gap-07 verdict record, the Gap-13 dossier, the frozen σ-map yaml, the discipline runners, the Return-YAML instrument, and the QC engineering corpus. Nothing in it is reproduced into a claim or modified here.

3. What ST1 explicitly does not close

ST1 makes **no closure** of full final all-sector physics — that is the scope wall, OOS, not claimed. It makes **no closure** of BG-10 / baryogenesis (OPEN / Diagnostic), and **no closure** of Strong CP / $\bar{\theta}$ (underived/open). The **QC bridge** carries **no physics authority** (EXTERNAL / SIMULATED) and cannot change any truth-table row. An OOS row may not support a scoped claim.

4. Terminal-state authority

Every gap, lane, and named object lands in exactly one of these four states. The terminal-state classification is an organizational reading of the banked record; it is never a status change — the native capsule label is always printed beside it, verbatim-faithful.

Terminal state	Definition	What the entry must carry
Closed-by-computation	A run, engine, or derivation produced the result; it is banked	The run / package / hash / engine, plus the validation that gated it
Closed-at-decision-grade	A countersigned ruling discharges it short of full certificate	The countersign ruling cited by id, the operative bound it cleared, and the margin
Conditional-with-named-gate	Survives behind a named gate; discharges iff that gate passes	The named gate or input, and the prediction it currently yields
Precisely-OPEN (falsifier attached)	Not claimed; the falsifier or adjudicator travels with the item	The falsifier and the experiment or bound that adjudicates it — or the recorded statement that no claim is made and why

The authority map for who owns each claim type:

Claim type	Owned by ST1?	Authority	Status
State-of-programme truth table	Yes	§V / ST3 registry	scoped ledger claim
One-shape / four-anchor economy headline	Yes, as ledger claim	§0 / §I	scoped economy claim
Closed-core rows	Yes, by cited external authority	§I / external register	closed at stated grade
Gap-04 scoped stabilization	Yes	§II / H04 countersign	decision-grade scoped closure (global-UV delegated)
Λ line	Yes, as honest refutation	§III	computed fail / Weinberg-open
Conditional branches	Yes, as conditional ledger	§IV / §V	conditional
Precisely open rows	Yes, as open ledger	§V	open with falsifier/non-claim
BG-10 / baryogenesis	No closure	§IV / §V	OPEN / Diagnostic
Strong CP / θ	No closure unless source says	§V	underived/open
QC bridge	No physics authority	§IX / external note	EXTERNAL / SIMULATED
Full final all-sector TOE	Not claimed	scope boundary	OOS / not claimed

> The status vocabulary (the approved label set) and the claim-strength ladder (Definition · Theorem · Certificate · Decision-grade · Diagnostic · Interpretation · Exclusion) that every labeled statement below obeys are explained in ST2; the native labels are carried verbatim beside every terminal-state assignment in §V. A reviewer who meets "proves", "closed", "unconditional", or "exact" anywhere in this document should find, inside the same passage, the computation, package, theorem, or countersign that licenses the word; if one is ever missing, that sentence — not the status record — is in error.

5. Promotion / countersign rule

> The Return-YAML / countersign instrument remains the only instrument of promotion. Editorial reorganization cannot promote a terminal state.

This ST1 pass is editorial reorganization. It promotes nothing.

6. Conflict rule

> If ST1 narrative conflicts with the source truth table, countersign record, external artifact register, or ST3 formal authority package, the formal authority controls and ST1 must be corrected. No passage in ST1 may promote a row by implication.

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§1. What This TOE Statement Claims and Does Not Claim

> *Imprint. The first thing the scope-keeper does is draw its own boundary in chalk — the claimed on one side, the explicitly-not-claimed on the other, in equal type. A witness who volunteers the limits of their own testimony is a witness you start to trust.*

This section is the scoped state-of-the-programme claim, not a final all-sector closure. It states the boundary of what is asserted; the truth table (§V) carries every item's terminal state verbatim, and ST3 carries the formal authority.

§1.1 What is claimed

This statement claims, and claims only, that:

- **One geometric input governs.** A single thirteen-dimensional shape, plus four measured calibration anchors, is the entire input; everything downstream is read off it and carries its own grade and falsifier (§0).
- **The economy holds as a scoped ledger claim.** Four anchors in, twenty-two-plus independent quantities out (§I), with the registered blind-negative control PCM-12 proving the discipline is checkable rather than asserted.
- **Every named item is dispositioned.** Every gap, lane, and named object in the scoped programme is placed in exactly one of the four declared terminal states (§V), with its native capsule label printed verbatim-faithful, and an authority, gate, falsifier, or recorded non-claim attached.
- **The closed core is closed at its stated grade, by cited authority.** The CLOSED rows of §I are banked corpus-side (Papers 1–3, the V1/V2/V3 closure packs); ST1 cites that authority and does not re-grade it. Gap 07 and Gap 17 are Closed-by-computation. **Gap 04 is CLOSED at decision grade** (CLOSED-SCOPED / GLOBAL-UV-DELEGATED): the operative bound was passed (35× at the weakest accepted variant, 2.4×10^3 central), with the residual c_loop named and a non-blocking magnitude lane, and the global shrinking-volume / UV question registered as open (B-UQFC-14-UV-1).

§1.2 What is explicitly not claimed

This statement does **not** claim:

- **Final all-sector closure.** This is a scoped state-of-the-programme ledger. It does not claim that all physics gaps are closed. Of eighteen gaps, fourteen are deliberately OPEN, each with a named falsifier and an owner.
- **Any cosmological-constant result.** The Λ line is a **computed honest FAIL**: the deepest ⊕-layer cancellation claim was tested and refuted (I2 honest fail; I3 THEOREM_REFUTED). **Λ remains Weinberg-open**, and **no observed-Λ comparison is performed anywhere** in this document.

- **Any baryogenesis number.** BG-10 is **OPEN / Diagnostic** at a four-fix ledger of 0/4 (BLOCKED_BY_NAMED_OBJECT); no η_B is claimed, and a silent promotion would be a structural FAIL.
- **Strong-CP smallness.** $\bar{\theta}$-smallness is **honestly underived**; nEDM probes it.
- **Certificate-grade global stabilization.** Gap 04's closure is decision-grade, not certificate-grade, and the global-UV question is delegated, not claimed.
- **Any physics result from the QC bridge.** The QC engineering corpus (§IX) is **EXTERNAL / SIMULATED**, carries no physics authority, and cannot change any truth-table row; the no-target-loading rule bars its numbers from feeding back into the physics claims.
- **Any in-doc GR/Maxwell reduction.** This document makes no in-doc reduction to general relativity or Maxwell; the reduces-to-known-physics checks live in the EXTERNAL siblings.

§1.3 The standing invariant

Every capsule in the v6→v15 line ends with the same recorded sentence: **promotions: zero.** This statement is a reorganization and compression of what is banked — it does not promote it. The Return-YAML / countersign instrument is the only instrument of promotion, and none is being added here. If this statement and any source could ever be read to differ on a status, the source capsule and its countersign record govern, and this statement is the one in error.

> **Pointers.** Long-form narrative on-ramp and test prompts → Paper IV, https://physics.magflowmeters.com/articles/TOE.html. MR-7 provenance, pass logs, and the v6→v15 capsule line → Paper IV, https://physics.magflowmeters.com/articles/TOE.html. Full EXTERNAL ARTIFACT REGISTER (staged verbatim for the formal authority package) → Paper IV, https://physics.magflowmeters.com/articles/TOE.html. The truth table itself is §V (ST1 truth layer); §0 and the economy headline are the §0 core layer; ST2 carries the teaching; ST3 carries the formal authority, registry, countersigns, and promotion rule.

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2. One Input and Three Layers

> *Imprint. Now meet the construction itself — one frozen shape, three load-bearing layers, four measured anchors. There is no dial here to turn. Watch how little goes in, and remember it; everything the scope-keeper later claims will be measured against this short list of inputs.*
>
> **Layer note.** This is the architecture spine of the scoped TOE: one frozen geometric input, three load-bearing layers (× metric geometry, ⊕ chamber/rulebook, ⊗ bundle suite), and the boundary/quotient data that threads all three. ST1 states the architecture and the closed results that ride on it; **ST2** (Paper IV, https://physics.magflowmeters.com/articles/TOE.html) carries the extended pedagogical analogies; **ST3** (Paper IV, https://physics.magflowmeters.com/articles/TOE.html) carries the full

> geometry registry, artifact register, and authority controls. This section adds **no input, no closure, and no terminal-state assignment** beyond what the source already banks.

2.1 The one frozen input

The theory has **one geometric input**. Take a single thirteen-dimensional shape. Four of its dimensions are the *where and when* you live in — ordinary spacetime. The other nine — a six-dimensional squashed space, a two-sphere, and a folded circle — are not places you could walk; they are the *what exists*. Every particle species, every force, every coupling the theory speaks of is a persistent pattern that those nine dimensions force into existence. Nothing else is put in by hand except four measured calibration numbers (§2.6). Everything downstream — the table of particles, the strengths of the forces, who may decay into what, what the early universe could and could not have done — is then read off, and each readout carries its grade and the experiment that could kill it. If the one shape were wrong, it could not hide: the same shape must answer every question at once, and the truth-table summary (ST1 §7) lists where each answer stands.

The one input, as frozen at v6 (exact source notation):

> $\mathbf{M_{13} = M_{3,1} \times K_6 \times S^2 \times S^1\_Y/\mathbb{Z}_2}$ — the ×-layer; $K_6 = SU(3)/T^2$; radii frozen at R1.2, the native point being the ORIGIN of moduli space — carrying the $\mathbf{F^+}$ **chamber** (the ⊕-layer: the projectors, $\tau = \omega$, the finite claim-control data) and the **bundle suite** (the ⊗-layer: the seven-factor E_matter, the E_gauge connection, the E_Higgs Wilson sector), bound by the $\mathbb{Z}_2$ **fold** and the $\mathbb{Z}_6$ **center-threading** (the boundary/quotient structure threading all three layers).

with the internal coset stated exactly as

> $\mathbf{K_6 = SU(3)/T^2 = SU(3)/U(1)^2}$

Notation, recorded (equivalence note, verbatim): T^2 and $U(1)^2$ denote the same maximal torus of SU(3); both forms ($K_6 = SU(3)/T^2$ and $K_6 = SU(3)/U(1)^2$) appear in this corpus and are identical.

First-use definitions, in reading order (verbatim from source §0):

- **The F^+ chamber** is the finite rulebook: a fixed set of projectors and the fixed choice $\tau = \omega$ that together decide which geometric states are *active* and which are *projected out*. It is claim-control data — finite, frozen, and auditable — not a tunable dial.
- **The bundle suite** is the cast of actors: the fiber bundles over M_{13} whose zero modes *are* the matter fields (E_matter, seven factors), whose connection *is* the gauge sector (E_gauge), and whose Wilson sector *is* the Higgs structure (E_Higgs).
- **The fold and the threading**: the $\mathbb{Z}_2$ identification on S^1_Y creates boundary fixed points; the $\mathbb{Z}_6$ — the center of the SU(3) that defines K_6 — "threads" in the sense that this one discrete structure runs through all three layers, and where it does it assigns the frozen integer row ($q = 6Y$) that the Wilson sums read. Boundary and quotient data thread all three layers — they are where the theory's localized structure lives.

2.2 The × layer: metric geometry (the stage)

The × layer is the metric geometry — the stage on which everything else is read off.

Layer	Object	Role
× (metric geometry)	$M_{3,1} \times K_6 \times S^2 \times S^1\_Y/\mathbb{Z}_2$; $K_6 = SU(3)/T^2$; radii FROZEN at R1.2	The stage: isometries → forces; index data → families

The banked fact that makes it load-bearing. The geometry registry is frozen and exact: **$R = 30$, $Ric = 5g$, $|Riem|^2 = 276$, $Vol = \pi^3/2$**, and the exact squashed-curvature function R(u) (ST1 §3.2). Any restatement must use these registry values; the superseded **$|Riem|^2 = 60$** literal is **banned corpus-wide**. The full numerical invariant registry is held in **ST3 STA-geometry-registry** (Paper IV, https://physics.magflowmeters.com/articles/TOE.html); ST1 cites it, does not re-derive it.

2.3 The ⊕ layer: F^+ chamber / rulebook

The ⊕ layer is the F^+ chamber — the finite rulebook.

Layer	Object	Role
⊕ (chamber)	The F^+ chamber: projectors, $\tau = \omega$, finite claim-control data	The rulebook: which states are active; anchors → outputs

The banked fact that makes it load-bearing. Four anchors → **22+ banked outputs** (ST1 §3.3), with **PCM-12 blind-negative** as the registered anti-fitting control. Because the rulebook is finite and frozen — not a dial you can turn — the same four anchors are forced through it to 22+ outputs; you cannot quietly re-tune what cannot be turned. This is the over-determination signature (§2.7) — honestly ~4×, once the per-sector mass-scales (N_d, N_e, N_ν) and the uncomputed M_R are counted as the effective inputs they are (see §2.7).

2.4 The ⊗ layer: bundle suite / actors

The ⊗ layer is the bundle suite — the cast of actors.

Layer	Object	Role
⊗ (bundles)	E_matter (seven factors) · E_gauge · E_Higgs Wilson sector	The actors: fields, Hilbert spaces, operator domains

The banked fact that makes it load-bearing. Mediator-free proton safety lives here: **$\Pi\_q\, M\, \Pi\_\ell = 0$**, an operator identity, not a tuned suppression (ST1 §3.4).

2.5 Boundary and quotient threading

The boundary/quotient data is not a fourth peer layer; it is the discrete structure that **threads all three layers**.

Layer	Object	Role
boundary/quotient	$\mathbb{Z}_2$ fold + $\mathbb{Z}_6$ center-threading	Threads all three layers

The banked fact that makes it load-bearing. The fixed points consistency-require localized structure, with exact uncancelled coefficients (ST1 §3.5, the inflow line): the geometry cannot be bare at its own corners.

The layering is not bookkeeping. Each of the §3 closed results lives irreducibly in its layer; the Gap-04 stabilization object (ST1 §4) is built from all three (a bulk Casimir term, a boundary term, a Wilson term, a loop term); and the v6 closing line — *all three layers load-bearing* — is restated in the conclusion (ST1 §11) with its license.

> **Intuition pump → externalized.** The four plain-image on-ramps for the hard objects (the flag manifold K6 as "the shape of a thing's orientations"; the F^+ chamber as a one-way turnstile; the holonomy / $\tau = \omega$ as a loop's memory of curvature; isometries-are-forces) are moved verbatim to **ST2 §2 — "The three hard objects, in plain images"** (Paper IV, https://physics.magflowmeters.com/articles/TOE.html). Load-bearing summary kept here: **all three objects are rigidity made physical — a flag manifold with fixed curvature, a turnstile that cannot be re-tuned, and a loop-memory pinned to one value; none of them has a dial.** Everything the theory then "predicts" is what a thing with no spare dials is *forced* to say. The numerical facts those analogies illustrate (R = 30, Ric = 5g exact; index = +3 families; δ_CKM = 60°) are banked in ST1 §3 at their own grades, not in the analogy.

2.6 Four measured anchors

The theory's declared numerical inputs are **exactly four** (MEASURED anchors; everything else is output or structure). Do not add anchors.

Anchor	Role	Status
M_Pl	The gravity scale — ordinary, by declared doctrine (not emergent within this statement)	MEASURED (anchor input)
α_i(M_Z)	The gauge-coupling boundary data at the Z mass	MEASURED (anchor input)
y_t	The top-Yukawa anchor	MEASURED (anchor input)
|V_us|	The Cabibbo-row flavor anchor	MEASURED (anchor input)

2.7 Economy headline: four inputs, 22+ outputs

Against four inputs, the ⊕-layer returns **22+ independent banked outputs** (ST1 §3.3). More independent outputs than inputs is the **anti-fitting test** (over-determination); the registered blind-negative control (**PCM-12**) is part of the same discipline.

> **Honest over-determination ≈ 4× (not ~5.5×).** Counting only the four declared anchors overstates the compression. Setting the *absolute* scale of the down-quark, charged-lepton, and neutrino sectors uses one calibration normalization each (N_d, N_e, N_ν, pinned to m_b, m_τ, and the

> neutrino splitting — *not* derived from N_u), and the seesaw scale M_R is asserted but not yet computed. So the effective input count is ~5–6, and the honest ratio is ~22 outputs / ~5–6 inputs ≈ **4× (3.7–4.4×)**. What is genuinely derived — with no per-family knob — is every within-sector mass *ratio* and all CKM/PMNS angles, phases, and J. The economy is real; it is ~4×, not five-plus.

Economy guardrail (verbatim, no-target-loading rule). The four anchors are *calibration inputs*. Comparison targets are not inputs. The experimental values quoted downstream (Planck n_s, the r bound, N_eff) are *comparison targets*, never inputs — **the no-target-loading rule applies corpus-wide.**

2.8 What this architecture does not prove by itself

The one-input/three-layer architecture is the *setup*. By itself it establishes that the theory has a single frozen geometric source and four declared anchors, and that its results are organized irreducibly by layer. It does **not** by itself:

- bank any closed-core result — each closed result is closed only at its **own stated grade and named authority** (ST1 §3), and the architecture alone does not upgrade it;
- close any open or out-of-scope (OOS) sector — Λ, BG-10/baryogenesis, strong CP/$\bar{\theta}$-smallness, global UV completion beyond scoped Gap-04, and OOS walls remain at their source status (ST1 §5–§7);
- promote anything — the **Return-YAML / countersign instrument is the only promotion path** (ST1 §8), and naming a layer does not invoke it.

The architecture is over-determination *machinery*; whether the machine has actually fired on a given row is read from §3 and the truth-table summary (§7), never from the architecture alone.

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3. Closed Core by Layer

> *Trust begins. Here the scope-keeper shows its first discipline: it banks only what is already certified elsewhere, cites the one authority per row, and re-grades nothing. The restraint — refusing to upgrade its own closed core — is exactly what earns the right to be believed in the harder sections ahead.*
>
> **Layer note.** This section summarizes what is **banked/closed at its stated grade** in the scoped TOE, organized by layer. The source's rule for the closed core is **cite-don't-re-derive**: nothing here is new to this document — that is the point. Each row's native grade is preserved **verbatim**. The long derivations and the external paper trail are **not** reproduced here; ST1 names the one governing authority per row and points to **ST3** (Paper IV, https://physics.magflowmeters.com/articles/TOE.html, STA1 external artifact register) for the registered EXTERNAL artifacts, and to **ST2** for any teaching gloss. **No row is upgraded; no terminal state is reassigned.**

3.1 Authority rule: cite, do not rederive

Authority rule (verbatim). Each row below names exactly one governing authority (its rightmost cell). **Any other mention is descriptive, not load-bearing.** The corpus authorities (Papers 1–3 and the closure packs) are EXTERNAL, registered in ST3 STA1, and byte-identical under the no-upstream-mutation rule. Every "EXTERNAL: Paper 1" row below resolves to **Paper I (GUT): https://physics.magflowmeters.com/articles/GUT.html** — the geometry / Standard-Model closed core lives in GUT.html App A (geometry/invariants), App C (term-by-term construction), App D (Standard-Model recovery / slot ledger), App E and App E′ (chirality / anomaly closure), App GP (geometry primer), and App CR (Constraint Rosetta Stone); see the **Supporting Documentation** register (front matter) for the full per-paper public-URL list.

Where a row's grade label reads CLOSED / FROZEN / REGISTERED / CLOSED-as-read, that is the source's own native grade; it is reproduced here and is not an ST1 promotion. The mapping of these native grades into the four truth-table terminal states (closed-by-computation · closed-at-decision-grade · conditional-with-named-gate · precisely-open) is performed in ST1 §7 and explained in ST2 — not here.

3.2 ×-layer closed core (the stage)

Result	Statement	Grade (native)	Authority
Forces from isometries	The gauge sector is read from the isometries of the internal product geometry	CLOSED (corpus-banked)	EXTERNAL: Paper 1
Three families, twice-derived	The APS index gives +3 chiral families; the independent BWB scan gives |index| = 3 in fundamental zero modes, confirmed against the frozen row	CLOSED (two independent derivations, banked)	EXTERNAL: Paper 1 + the frozen row
Unification thresholds	Thresholds at $M_U = 10^{16}$ (the frozen threshold vector)	FROZEN (corpus-banked)	EXTERNAL: Paper 1
Stability theorems	PD family-wide; $m^2L^2 = 6$	Theorem (corpus-banked)	EXTERNAL: Paper 1
Exact squashed curvature	$R(u) = 12\Sigma\, 1/u_i - 2\Sigma\, u_i/(u_j u_k)$ — the exact registry function	Exact (registry, FROZEN)	EXTERNAL: the invariant registry
Twisted class	$H^1\_tw = \mathbb{Z}$; A_0 pinned	CLOSED (corpus-banked)	EXTERNAL: Paper 1

Spelling reconciliation, recorded (verbatim): the v6 closed-core line prints "ASP +3" once and "APS (+3, 0)" later; this corpus uses **APS** (Atiyah–Patodi–Singer) throughout. A spelling reconciliation, not a physics change.

The three-families result — load-bearing, kept; full treatment → ST2. The curiosity-gap exposition ("how can one shape give *exactly* three families?" — smallest toy / the real object / what was and was not shown) is moved verbatim to **ST2 §3 — "Why exactly three families"**. The load-bearing boundary of the claim is preserved here, exactly:

- ***Shown:*** the family count is **derived**, by theorem, as a topological invariant of the frozen geometry — three is forced, not chosen, and could not have come out 2 or 4 without a different shape (CLOSED,

corpus-banked). An independent Bott–Weil–Borel (BWB) zero-mode scan returns |index| = 3, checked against the frozen charge row — two roads, same integer.

- ***Not shown here:*** this is the *count* of families, not the full inter-family mass ratios; those ride the Yukawa structure (the κ ladder and δ_CKM, §3.3, CLOSED at their own grades) and the flavor anchors. **The honest boundary of the claim is "the number three is geometric"; nothing beyond that grade is asserted.**

3.3 ⊕-layer closed core (the rulebook)

Result	Statement	Grade (native)	Authority
The output ledger	Four anchors → 22+ banked outputs	CLOSED (corpus-banked ledger)	EXTERNAL: Paper 1 output ledger
CKM phase	δ_CKM = 60° (Wolfenstein-aligned; raw order-three holonomy −2π/3 = −120°), vs the CKM unitarity-triangle angle γ = 65.5° (PDG 2024, CKM Quark-Mixing Matrix review, angle γ/φ_3) at ~0.79σ	CLOSED (corpus-banked; derived, geometric origin)	EXTERNAL: Paper 1 (GUT.html App J/K flavor certificates)
The κ ladder	κ = e^{−π√3} hierarchy ladder	CLOSED (corpus-banked; derived)	EXTERNAL: Paper 1
Leptonic CP	δ_CP^ℓ ≈ 260°	CLOSED (corpus-banked output; comparison ongoing, ν fits)	EXTERNAL: Paper 1
Anti-fitting control	PCM-12 blind-negative	REGISTERED (negative control, banked)	EXTERNAL: Paper 1
Majorana declaration	The Majorana M_R declared at τ = ω — the BG-10 fix-#2 ingredient, FROZEN for the CP invariant	FROZEN (declaration of record)	EXTERNAL: Paper 1 + the BG-10 ledger

Note (status preserved, no promotion): the Majorana declaration is the BG-10 fix-#2 ingredient and is FROZEN for the CP invariant only. This does not close BG-10 / baryogenesis, which remains OPEN / Diagnostic at the source grade (ST1 §6–§7). Leptonic CP δ_CP^ℓ ≈ 260° is a banked output with comparison ongoing — the comparison target is not an input (§2.7).

3.4 ⊗-layer closed core (the actors)

Result	Statement	Grade (native)	Authority
Proton safety	Π_q M Π_ℓ = 0 — mediator-free proton safety as an operator identity	CLOSED (corpus-banked)	EXTERNAL: Paper 1
The τ_p falsifier source	The parity-allowed dim-6 QQQL operator is the pre-registered τ_p falsifier's source	REGISTERED (pre-registered falsifier)	EXTERNAL: the prediction registry
DM stability	The dark-matter candidate has Y = 0 with renormalizable stability	CLOSED (corpus-banked; the candidate itself is CONDITIONAL)	EXTERNAL: Paper 1
Path γ	Closed-as-read: centres + phase only; θ̄-smallness honestly underived → nEDM probes it (Gap 03 stays OPEN)	CLOSED-as-read, with the underivation stated	EXTERNAL: Paper 1

Boundary preserved, verbatim in force: the Path γ row is closed-as-read for centres + phase only; θ̄-smallness is honestly underived and Gap-03 / strong CP stays OPEN (nEDM probes it). The DM stability is CLOSED while the DM candidate itself remains CONDITIONAL (ST1 §6–§7). The τ_p row is the pre-registered falsifier source, REGISTERED, not a closed prediction.

3.5 Inflow / boundary line (all layers at once)

The fixed points of the fold **consistency-require localized structure, with exact uncancelled inflow coefficients**: the geometry cannot be bare at its own corners. (CLOSED, corpus-banked; EXTERNAL: Paper 1.)

Plain: the theory is not allowed to pretend its boundary is featureless — its own consistency conditions force structure to live there, and the coefficients of that requirement are exact, not estimated. This is the structural seed that the Gap-04 boundary term (ST1 §4) and the Gap-11 boundary-localized candidate both inherit.

3.6 What "closed" means here

"Closed" in this section means: **banked at the row's stated native grade, under exactly one named governing authority, citable and not re-derived in this document.** A reader may treat each row as settled **at that grade and no higher**. In particular:

- A **CLOSED (corpus-banked)** row is settled by the named EXTERNAL paper/registry; ST1 does not re-run it.
- A **FROZEN** row is a declaration/threshold of record, frozen for its stated purpose only.
- A **REGISTERED** row is a registered control or pre-registered falsifier — banked as a *control*, not as a positive closure.
- A **CLOSED-as-read** row is closed only for the explicitly stated content (e.g. Path γ: centres + phase only), with its underivation stated alongside.

These native grades are the source's; their placement into the truth-table's four terminal states is done in ST1 §7 and explained in ST2. **Nothing in this section is promoted by being summarized here.**

3.7 What the closed core does not close

Guardrail (verbatim). The closed core is closed only at the stated grade and authority. It does **not** close Λ, BG-10, strong CP, global UV completion, or all OOS sectors.

Specifically, the closed core above must **not** be used to close, or to lend support to, any of:

- **Λ / cosmological constant** — an honest computed FAIL / Weinberg-open; no observed-Λ comparison (ST1 §5).
- **BG-10 / baryogenesis** — OPEN / Diagnostic at the source grade (ST1 §6–§7); the FROZEN Majorana declaration is an ingredient, not a closure.
- **Strong CP / θ̄-smallness** — honestly UNDERIVED; Gap-03 stays OPEN (the Path γ row states the underivation on its face).

- **Global UV completion** — delegated; the scoped Gap-04 result is decision-grade / global-UV-delegated, not global finality (ST1 §4).
- **All OOS sectors** — out-of-scope rows may not support scoped claims.

The closed core is a layer-organized **citation of banked results at stated grade**, nothing more. Any promotion requires the **Return-YAML / countersign** instrument (ST1 §8); none is added here.

Discipline note — this one-input/three-layer and closed-core section is a concise statement of the architecture spine and the banked closed rows only: the frozen geometry $M_{13} = M_{3,1} \times K_6 \times S^2 \times S^1\_Y/\mathbb{Z}_2$, $K_6 = SU(3)/T^2 = SU(3)/U(1)^2$, the layer roles $\times/\oplus/\otimes$, the boundary/quotient threading, the four MEASURED anchors, and the economy guardrail, followed by the $\times/\oplus/\otimes$ closed-core tables (native grades, one named authority per row), the inflow line, "what closed means," and the does-not-close guardrail. The extended pedagogical analogies (intuition pump, three-families exposition) live in ST2; the full geometry registry and external artifact register live in ST3 (both within Paper IV). It introduces no new input, no promotion, no new closure, no new terminal-state assignment, no geometry change, and no new claimed output.

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4. Gap-04 Scoped Stabilization: Decision-Grade, Not Global Finality

> *Trust deepens. This is a real win — the extra dimensions stay put, by a margin the countersign cleared — and the scope-keeper is careful to call it exactly what it is: decision-grade, not certificate-grade. The global UV question stays delegated and open (B-UQFC-14-UV-1), never claimed. A win stated at its true size is more convincing than a win inflated.*
>
> **Layer note.** This is the ST1 claim-spine statement of Gap-04. It states the scoped claim and its exact status. The *teaching* — the marble-in-the-bowl intuition, the narrative of the self-caught sign reversals, and the deeper FRG-4 three-modulus audit story — lives in the ST2 Gap-04 Rosetta within Paper IV, https://physics.magflowmeters.com/articles/TOE.html. The *formal authority* — artifact records, run ids, countersign-slot ledger, and the registry of the open UV theorem — lives in the ST3 STA6 Gap-04 dossier within Paper IV, https://physics.magflowmeters.com/articles/TOE.html. If this section ever conflicts with ST3/source status, ST3/source controls and this section is wrong.
>
> **Anti-overclaim, stated up front.** Gap-04 is **CLOSED at decision grade**. It is **not** certificate-grade. It is **not** global UV completion. The scoped closure is real and decision-grade; the global shrinking-volume question is a separately registered, *open* UV-completion theorem. This section is written so that the strength of the scoped closure and the openness of the global question are *both* visible, neither hidden behind the other.

4.1 The stabilization question

Plain. The question: do the extra dimensions stay put? A theory whose internal shape can relax away — the radii running off to infinity or collapsing — predicts nothing, because every "constant" would drift. Gap 04 is the demand that the theory's own energy function for its breathing mode σ has a genuine well at the frozen radii.

The story of this section is how that demand went from a campaign that had stalled, to an exact arithmetic with a falsifier attached, to a delivered number, to a countersigned discharge, to a runner PASS, and finally — by a sign flip the programme caught in its own boundary term — to a well that exists *unconditionally* in the one coefficient still owned by future work. Status at the end: **CLOSED at decision grade.** Not certificate grade — and this section says exactly which residue separates the two.

The earlier flux campaign is re-diagnosed, on the record, as a metric-layer truncation — an attempt to stabilize using only the metric layer of a three-layer object. Its permanent assets are banked, not discarded (CLOSED, corpus-banked): the **Saddle-Trap Theorem**; the **G-adjudication** with gap = $\log_{10}(8\pi)$ identically; the **Branch-B archive**; and the **warp kill**. The flux track itself is moot-at-minimal per I1=G (v9). (The formal register of these banked assets is in ST3 STA6; here they are noted only as the standing assets behind the native object.)

4.2 Native object $V(\sigma)$

The stabilization object is the corpus's own three-layer scaffold (Definition, frozen at v6):

> **V(σ) = c_KK e^{−4σ} + c_bdry e^{−2σ} + c_Wilson cosθ_W e^{−4σ} + c_loop e^{−6σ}**

recorded **5/5 + 4/4 PASS** at the frozen radii and capped **CANDIDATE** by coefficient bands at v6.

Plain: one term from the bulk tower energetics (c_KK), one from the boundary the fold creates (c_bdry), one from the Wilson sector (c_Wilson), one from loops (c_loop). The gap closes when the signs and magnitudes of these coefficients, **computed — not assumed** — make V(σ) a well at the native point.

The intuition pump for what a "well" means here (the marble in the bowl), and why the deepest term's sign is the entire drama, is carried in the ST2 companion. For the claim spine, the operative content is the four-term object above and the rule: a bowl exists only when the four computed signs add up to curving upward on both sides.

4.3 What was computed

The exact pieces, to the banked boundary (v6)

Computed exact, with their validations (all **closed-by-computation**):

- **The Wilson integer sums:** S(0) = +4 and S(π) = +92, on the frozen $\mathbb{Z}_6$ row q = 6Y. Exact integer arithmetic.

- **The fold-winding bulk Casimir:** c_KK^wind = +3.701826×10⁻² R_Y⁻⁴, computed by the scheme-clean Poisson/winding engine; validation gate: the massless limit reproduces −3ζ(5)/(128π⁶) to machine precision.
- **The spin structure, adjudicated by the theory's own spine:** the fermion spin structure is PERIODIC because the spectrum is a zero-mode inventory — APS (+3, 0); zero modes exist iff the towers are integer-moded iff the structure is periodic. The three families are the spin-structure witness. **Corrected on the record (self-caught #2):** the earlier "P-A1 ⇒ c_KK < 0" line had conflated zero-point and winding-potential signs; periodic fermion-dominance makes the winding share POSITIVE.
- **The boundary coefficient, as first banked:** c_bdry sign-positive at leading per-dof order (+11/8 per dof; two independent derivations of the leading share). *Carried here because it was later superseded:* the v10 full arithmetic reversed the attributed sign — see §4.6. The capsule-line rule applies: a superseded entry stays on the record with its superseding event, and is never silently dropped.

The falsifier, the branch, and the engines that refused

The v6 PASS structure required the still-open curved shares (the K₆/S² Casimir plus the true graviton-internal table) to satisfy a two-branch bound: c_KK^[curved+gravint] < −3.721×10⁻² R_Y⁻⁴ on branch κ₀′ > 0, or < −3.253×10⁻² R_Y⁻⁴ on branch κ₀′ < 0 (**BOUNDED**, exact bound arithmetic).

The branch was then closed: **κ₀′ = −3/(64π⁶) < 0, branch B, by the corpus's own declared Gate-8 formula** (authority: GUT.html Appendix H — Higgs Protection / Gate 8, EXTERNAL, at https://physics.magflowmeters.com/articles/GUT.html — working point at H's near-zero θ⋆; the n=1 integer-sum tension REGISTERED and routed to H's authority under the corpus's "when competing" clause). With the branch pinned, the operative falsifier became single-valued:

> **c_KK^[curved + graviton-internal] < −3.682×10⁻² R_Y⁻⁴** — the bound that traveled with the remaining work, attached as the falsifier.

The curved-share extraction was driven through four engine generations, each halted by its own validation gates — **zero outputs accepted; the fail-closed machinery worked four consecutive times.** The certified assets banked from that effort (closed-by-computation, FROZEN): the exact Kostant multiplicity generator (integer-gated; towers to λ ≈ 4052; scalar/vector/Dirac/tensor channels including the explicit 63-dof graviton-internal table), the full gate suite, the declared subtraction scheme, and the precision requirements (λ_max ≳ 10⁴; one unit-chain pin against the banked curvature code).

The delivered number and the well (v7)

c_KK = **−8.892×10¹/R_Y⁴** by the corpus's own AC-1 ζ-recipe (sign **decision-grade**; record `ba0ba266d7315f71`, FROZEN). Therefore A = c_KK + κ₀′S(0) < 0 across the full variant band ⟹ **the well exists; the corpus PASS structure is reproduced; the curved-share cap discharges**, pending countersign.

Supporting closures banked in the same session: odd-D μ-independence proven (the μ-[INPUT] dissolved — a theorem-level closure); self-caught #3 and #4 disclosed on the session record (EXTERNAL); five subtraction engines VOID with the impossibility theorem recorded (negative certificates — the engines that

could not work are proven not to work, and say so); and the first-principles registry confirmations banked: R = 30, Ric = 5g, ‖Riem‖² = 276, Vol = $\pi^3/2$ — exact values, FROZEN.

Plain: the delivered bulk coefficient did not squeak past the bound. **The weakest accepted reading clears it by a factor of 35; the central reading clears it by a factor of about two thousand** (2.4×10^3).

4.4 The decision-grade countersign

The ruling (v8), verbatim

Chris ruling logged: **H04_DISCHARGED_AT_DECISION_GRADE** — the weakest accepted variant clears the operative bound by **35×**, the central by **2.4×10^3**. The canonical claim, verbatim from the capsule:

> *Gap 04's curved-share falsifier is passed at decision grade; the remaining magnitude refinement no longer threatens the sign or bound, and c_loop remains handled under the declared scaffold/FRG-2 lane.*

The c_loop window was frozen at that point: 0 < c_loop < $A^2/(4c_{bdry})$; F1/F3 armed. (The window's later vacation is the v10 event in §4.6.)

The grade word is exact and load-bearing: this is a **decision-grade** discharge — the owner's ruling that the computed margins settle the sign and the bound — **not** a certificate-grade one. The countersign instrument (and only it) carries promotions; the formal slot ledger is in ST3 STA6.

4.5 What the D15-native runner passed

The runner PASS and the closure package (v9)

Gap 04: CLOSED at decision grade. The D15-native runner ran **PASS** under Chris's permission; the closure package is `gap04_frozen_package_native.json` (EXTERNAL; its caveats travel inside the package).

The D15-native dossier suite itself (six dossiers, validators PASS) remains staged at `dispatch2/d15_native/` with the runner **verified refusing at exit 2** until the seven countersign slots are signed — slot 0 the re-target ruling, S6 the parity [INPUT] confirmation (§V stanzas; §VIII queue).

That the runner refuses until the slots are signed is part of the strength of the result, not a weakness: the closure is gated by an explicit, fail-closed signing discipline rather than by assertion. The artifact identifiers, the package path, and the seven-slot inventory are registered formally in ST3 STA6.

4.6 The boundary-sign correction

The boundary-sign event and the Amendment (v10)

AC-1.9's β_{∂} arithmetic was finally run: **$c_{bdry} = -1.08\times10^{-2}$ — negative, full band**; the fermion parity pair cancels exactly (**closed-by-computation**; countersign slot PENDING). This superseded the v6 leading-order positive attribution — **self-caught #5** on the prior b > 0 attribution, disclosed on the record.

The Amendment (countersign): Gap 04's well now exists UNCONDITIONALLY in c_loop. The v8 window is vacated and the closure *strengthens*: with the boundary coefficient negative across its full band, **no value of c_loop in the declared lane threatens the well.**

Plain: the programme caught its own sign error, and the corrected sign made the well deeper, not shallower — the kind of event that distinguishes an audited record from a curated one.

The supersession record (window sharpening). v9's conditional sharpening, $c_{loop} < 0.05\cdot A^2/c_{bdry}$, is SUPERSEDED by the v10 Amendment: with c_{bdry} negative the sharpening condition is no longer operative. Recorded here as superseded — not silently dropped. The countersign-queue slot that carried it retires with this record (§VIII).

The erratum record (ERRATUM-K1). Recorded (identity-level): the handbook determinant entry **det-42 is corrected to det-66, by identity.** Queued at v9; recorded as an identity-level algebra correction — no new physics enters, the licensing identity is the handbook's own determinant algebra, and the worked identity line travels with the ERRATUM-K1 slot in the countersign packet (EXTERNAL: the handbook + the packet). Operative content: every consumer of the handbook's det-42 literal re-points to det-66; nothing downstream in this statement consumes the superseded det-42 literal. The countersign slot certifies the entry (PENDING, §VIII).

4.7 What remains

Inside Gap 04 — and what these residuals can and cannot do

The closure above is decision-grade. The table below is the *complete* list of what separates a decision-grade closure from a certificate-grade one — "the distance between the two is exactly the rows of this table, and nothing else."

Residual / caveat	Status	What it gates	What it cannot do	Threatens scoped closure?
c_loop (the σ^{-6} coefficient)	OPEN — the Chris/FRG-2 lane; pre-registration mechanized by the c_loop prereg runner (v15, EXTERNAL — runnable at **https://physics.magflowmeters.com/scripts/**)	The A_s absolute normalization (§IV-/§5 sector) and the Gap-09 absolute scale	It cannot threaten the well: the v10 Amendment (countersign) makes the well unconditional in c_loop	**No**
Magnitude refinement	OPEN — machine lane, non-blocking (v8 ruling: it no longer threatens the sign or the bound)	Nothing on the critical path	It cannot reopen the discharge	**No**
Countersign slots (c_bdry result · Amendment · supersession · ERRATUM-K1 · D15 slots)	PENDING (§VIII queue)	Formalization of already-computed verdicts	They do not change any computed number	**No**
Global UV / shrinking-volume question	DELEGATED / OPEN — registered as **B-UQFC-14-UV-1**	The certificate-grade *global* internal-volume stability claim	It is not claimed here; it is not part of the scoped closure	**Not claimed** (scoped closure does not rest on it)

Terminal state of Gap 04 (scoped): CLOSED at decision grade — by the countersign H04_DISCHARGED_AT_DECISION_GRADE plus the v9 runner PASS and package, strengthened by the v10 Amendment. Stated plainly: this is a decision-grade closure, not a certificate-grade one; the distance between the two is exactly the rows of the table above, and nothing else.

The global shrinking-volume question — DELEGATED, OPEN

A deeper look (the 2026-06-14 FRG-4 three-modulus audit) found a separate, more detailed object *behind* the scoped closure — not a correction to it. **The §II / §4 decision-grade closure stands exactly as written and is byte-unchanged.** What the deeper audit established:

- **The §II closure stands; v10 is true as stated.** The v10 Amendment's wording — *Gap 04's well exists UNCONDITIONALLY in c_loop* — is TRUE as stated for the single-σ potential V(σ): that statement quantifies over the c_loop residue, and the well's existence there rides on c_bdry < 0, which is unchanged. The deeper three-modulus object does **not** contradict it. The decision-grade discharge (the H04 countersign, the v9 runner PASS, the v10 Amendment) is the operative closure; nothing in the deeper audit promotes, demotes, or re-opens it.
- **The scoped-closure correction (2026-06-14, Chris-authored).** Earlier FRG-4 language treated the $\sigma \to -\infty$ corner as a candidate perturbative stability test. The completed audit shows this is **not a valid perturbative decision point**: the apparent runaway occurs beyond the heat-kernel/EFT ordering boundary; the sign-forcing cancellation is obstructed by the three-family index; and the admissibility chamber does not kinematically remove the shrinking-volume direction. Thus

FRG-4 **neither proves nor disproves** global internal-volume stability. The scoped claim is **local chamber-center admissibility and phenomenological sufficiency.** Global stabilization is a UV-completion question, tied to the same vacuum-energy hardness as Λ.

- **Closure label for the deeper FRG-4 well: PERTURBATIVELY UNDECIDABLE; UV COMPLETION REQUIRED (CLOSED-SCOPED / GLOBAL-UV-DELEGATED).** This label applies **only** to the deeper FRG-4 global-stability well, not to the §II / §4 result; the decision-grade scoped closure above is **UNCHANGED**.

The three structural theorems that force this scoped-closure reading (T1 index-cancellation exclusion, T2 EFT-validity boundary, T3 no-kinematic-floor), the T1′ Index-UV-Λ unification consilience result, and the formal registry of the open theorem are recorded in ST3 STA6. For the claim spine, the load-bearing facts are: the obstruction is real, it is structural, and it routes the global question to a *named open object*:

> **B-UQFC-14-UV-1 — Shrinking-Volume UV Wall / Resummed Determinant Theorem.** *Status:* **OPEN — AXIOM-LEVEL UV COMPLETION REQUIRED (PROVEN NOT DERIVABLE FROM THE CURRENT GEOMETRY).** It supersedes the prior framing in which Gap-04 was treated as an FRG-4 perturbative ambiguity. The separate +modulus decompactification corner is its own precisely-OPEN object, **B-UQFC-14-NP-1** (every operator decays, $V \to 0^{+}$there; candidate mechanisms outside the upstream perturbative corpus). The two corners are disjoint, and neither is the other.

The B-UQFC-14-UV-1 chase (2026-06-15, Chris-authored) upgraded this from merely open to **proven axiom-level**: using the full gauge-fixed tower, all three UV routes meet the same obstruction — the spin-c three-family index forces Str[1] = n_B − n_F = 35 − 90 = −55, the same leading spectral object that controls the cosmological-constant term. **This advances no status:** the scoped decision-grade closure stays CLOSED at decision grade and byte-unchanged; the axiom is **NOT adopted**, B-UQFC-14-UV-1 is **NOT called closed**, and no global stabilization is claimed. The audit proves a positive global-stability wall is **NOT DERIVED** from the current geometry; the axiom *would* supply global stability but is *not* adopted.

The Index-UV-Λ unification is banked as **structural consilience, NOT an adopted axiom**: the same spin-c index that gives three chiral families also produces Str[1] = −55, tying the global-stability obstruction to the leading a_0 object associated with Λ-hardness. It is not B-UQFC-14-UV-1, it does not supply the missing wall, and it claims no global stabilization.

The "just is" ledger (Gap-04 contains ZERO genuine irreducibles). The audit sorted Gap-04's full residue on the reason-hunt economy ledger: **4 DERIVED + 4 EARNED-IRREDUCIBLE + 1 BARE-COUNTED**, where the single bare item is the relative one-loop sign — itself computable-in-principle, now subsumed under B-UQFC-14-UV-1. Because the deciding sign is a UV-completion / renormalization-scheme datum and not a free input, Gap-04 contains **no genuine irreducible "just is" number** — the "just is" hypothesis is *eliminated*. Gap-04's honest terminal is a **scoped-closed result whose global-stability question is UV-delegated**, not philosophy.

4.8 Status box and anti-overclaim rule

> **Gap-04 status:** CLOSED at decision grade / CLOSED-SCOPED / GLOBAL-UV-DELEGATED.
>
> This is not certificate-grade global UV completion. It is a scoped stabilization closure at decision grade, with the source's named residuals and delegated global questions preserved.

Canonical Gap-04 status block (frozen labels — verbatim, authoritative over any looser phrasing elsewhere):

- Gap-04 scoped stability: **CLOSED at decision grade.**
- Global shrinking-volume stability: **PERTURBATIVELY UNDECIDABLE; UV COMPLETION REQUIRED.**
- B-UQFC-14-UV-1: **OPEN — AXIOM-LEVEL UV COMPLETION REQUIRED.**
- Index-UV-Λ unification: **BANKED STRUCTURAL RESULT, not an adopted axiom.**

Gap-04 terminal status: CLOSED-SCOPED / GLOBAL-UV-DELEGATED.

Anti-overclaim rule (binding on every downstream consumer of this section). Do not:

- call Gap-04 certificate-grade;
- call it global UV closure;
- erase or soften the c_loop residual language;
- hide the boundary-sign correction (the v10 self-caught #5 event);
- present B-UQFC-14-UV-1 as closed, or the Index-UV-Λ consilience as an adopted axiom;
- use Gap-04 to close unrelated out-of-scope gaps. Out-of-scope rows do not support scoped claims, and the scoped Gap-04 closure does not reach across to them.

The four terminal states of the truth table (closed-by-computation · closed-at-decision-grade · conditional-with-named-gate · precisely-open) are preserved exactly. Within this section: the exact pieces (§4.3) are *closed-by-computation*; the discharge (§4.4–4.6) is *closed-at-decision-grade*; c_loop and the magnitude refinement are *precisely-open* residuals that cannot threaten the well; and the global shrinking-volume question (B-UQFC-14-UV-1) is *precisely-open* and delegated. The only promotion instrument is the Return-YAML / countersign; none is being added here.

ST1 GAP-04 — scoped stabilization summary only: a bounded decision-grade stabilization section with V(σ), computed margins, countersign, D15-native runner, boundary-sign event, residuals, and global-UV delegation. Teaching lives in the ST2 Gap-04 Rosetta and formal authority in the ST3 STA6 dossier, both within Paper IV (https://physics.magflowmeters.com/articles/TOE.html). ZERO promotions. Not certificate-grade.

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5. Λ / Cosmological Constant: Honest Refutation,

Not Closure

> *The bond is sealed here. Handed its deepest idea and the hardest number in physics, the scope-keeper ran the calculation, watched its best hope fail, proved why it had to fail, and published the refutation — claiming nothing about the observed value of Λ. This is the chapter where you decide the witness will not cheat, because here it declined to, exactly where no one would have caught it.*
>
> **Λ status:** honest computed fail / Weinberg-open.
>
> The scoped TOE does not claim an observed-**Λ** prediction or comparison. The chamber route to **Λ** was tested and refuted on the programme's own record.
>
> **No-comparison rule (binding on all of ST1).** No observed-**Λ** comparison is performed anywhere in ST1. If any sentence implies the observed cosmological constant is predicted, matched, or closed, that sentence must be removed or downgraded.

This section protects the most important honesty move in the scoped TOE: the theory tested a deep route to Λ and published the refutation. It is **not a gap to close by writing.** The terminal state of Λ in the truth table (§7) is **precisely-OPEN (with computed certificates)** — and it stays there.

A curve-fitter, handed its deepest idea and the hardest number in physics, would have found a way to claim a win. This theory **ran the calculation, watched its best hope fail, proved structurally why it had to fail, and published both** — claiming nothing about the observed value of Λ at any point. You are watching a theory decline to cheat on the exact question where cheating would have been most tempting and hardest to detect. Promotions on the Λ line: **zero.**

5.1 What the theory hoped

The cosmological constant is the hardest honest number in physics: naive quantum estimates overshoot the observed vacuum energy by some **122 orders of magnitude** (BOUNDED estimate), and Weinberg's 1989 no-go theorem forecloses the easy escape routes. So **"Weinberg-open"** below means exactly this: **still unsolved, with the easy exits provably shut.**

The theory's deepest structural hope — the ⊕-layer's **Chamber-Cancellation Theorem** — was that its own chamber grading would force the offending contributions to cancel, exactly, at the quantum level. The exact claim under test: that the active/projected-out grading is **exact at the quantum level, Weyl-odd, and Λ-protecting.**

That hope was not debated. It was computed. It failed. Both the computation and the refutation are now banked certificates, and the honest final state is: **the chamber route to Λ is closed, Weinberg stands, and Λ remains open** — with the theory's Λ line now a pair of computed certificates where there was once an open mechanism hunt. Publishing the refutation at full strength, instead of softening it, is this programme's design working as intended.

5.2 What was tested

The **exact-weight 9D graded heat kernel** — inputs: the Appendix-D slot ledger (GUT.html Appendix D — Standard Model Recovery, EXTERNAL, at https://physics.magflowmeters.com/articles/GUT.html; see also Paper IV's formal authority registry), the C7 fiber dimensions (GUT.html App C, dossier C7), and the banked towers — was framed at v6 to simultaneously decide **Λ Class 2** and probe the **Chamber-Cancellation Theorem.** Balance would have closed Gaps 05/06/07 together; imbalance would leave Λ Weinberg-open with a computation-backed elimination map.

The "together" coupling is now partially superseded on the record: **Gap 07 closed independently at v14** (the arrow-of-time PASS, §6.6), so the original three-gap coupling no longer holds as one object. The **L1–L3 lane now bears the Gap-05 load, with Gap 06 adjacent** (v14, recorded).

5.3 The I2 supertrace result (Certificate 1, v12)

I2 RUN AND CLOSED AS HONEST FAIL. The **I2 supertrace** — a single signed sum over the theory's entire particle inventory that, had the chamber's cancellation hope been real, would have come out to zero — was run over the Paper-3 §4 nine-row ledger (ghosts/antifields formal; the 17-row physical inventory confirmed).

It did not vanish (the ledger is the §4 nine-row particle inventory of **Paper III (Quantum): https://physics.magflowmeters.com/articles/Quantum.html**). There is **no structural cancellation at any coefficient order** — the graded-to-ungraded ratio is **0.58 at k = 0 and 1.000 at k = 1–8.** The chamber grading is **coefficient-blind.** Recorded with it: Str ρ at the frozen radii = **(−88.93 ± band)/R_Y⁴ + c_loop**; the K13-2 caveat carried; **no observed-Λ comparison performed** — the computation decides **structure, not the observed value,** by the no-target-loading rule.

This is a **computed FAIL**, banked as a certificate. It is not a defeat written up apologetically; it is the calculation returning the answer the theory did not want, recorded at full strength.

5.4 The I3 theorem refutation (Certificate 2, v14)

I3 THEOREM_REFUTED. Lemma 2 of the Chamber-Cancellation Theorem fails **structurally**: the Λ operator is the **unit operator** — grading-even and label-blind — so **no grading of chamber labels can act on it**, and I2's **0.58 residual at k = 0** stands as the quantitative witness of the failure. The refutation is a **computed negative theorem**, banked at full strength.

In the truth table (item 20, §7) this is recorded as **THEOREM_REFUTED (v14)** with terminal state **closed-by-computation (negative theorem)** — a *closed* certificate that a *route* is dead, which is a different object from closing Λ itself.

5.5 The verdict, assembled

Element	State	License
The chamber route to Λ	**CLOSED** — by the certificate pair (I2 honest FAIL + I3 theorem-refutation)	v12 + v14, computed
Weinberg's no-go	**Stands** — not cleared by anything in the corpus	v12 (recorded)
Λ itself (Gap 05)	**OPEN** — Weinberg-open for the Class-2 route; the C_Lambda rule-layer selection preserved, not upgraded	v12; the selector record (ST3 §VI)
The surviving lane	**L1–L3 must relocate the cancellation or be refuted** — three candidate places (L1, L2, L3) the cancellation could still live, each of which must be built and then survive the radiative-stability burden, or be refuted	v12 (I3 inherits the spectral obstruction)
The adjudicator	If an L1–L3 relocation construction is produced and passes the 122-orders-of-magnitude radiative-stability burden test, the Λ line reopens toward closure; if not, the Weinberg-open status is permanent	The §V stanza, pre-registered
The original three-gap coupling	The v6 "Gaps 05/06/07 close together" framing is superseded in part: Gap 07 closed independently (v14); the L1–L3 lane now bears the Gap-05 load, with Gap 06 adjacent	v14 (recorded)

5.6 What remains Weinberg-open — the surviving lane, run to its end

The surviving lane, run to its end (June-14, OWNER-RATIFIED). The adjudicator row above has now been exercised: the three pre-registered relocations **L1, L2, L3** were each graded against the 122-orders-of-magnitude radiative-stability burden — operationalized as **four structural predicates that must *all* pass**:

- **R1** — a real mechanism exists;
- **R2** — one symmetry-protected mechanism cancels at *every* tower scale (M_Pl, m_t, v_EW, Λ_QCD) with no per-scale re-tuning;
- **R3** — SM-mass-compatible;
- **R4** — non-perturbatively supplied.

All three return `BURDEN_FAIL`:

- **L1** (an exact discrete chamber-pairing symmetry G^+ on chiral SM content) fails R1–R4: no such G^+ exists — this *is* the Weinberg obstruction, and I3 already shows the Λ operator is the unit operator, so a chamber-label symmetry cannot act on it.
- **L2** (a non-perturbative ΔV_NP wall along +modulus) fails R1/R2/R4: the perturbative path is structurally closed and a wall pins the modulus, not the 122-OOM zero-point — a wall is not a cancellation symmetry.
- **L3** (chamber-projected boundary d.o.f. on S^1_Y) fails R1/R2/R4: the boundary-Casimir term re-renormalizes at every SM scale absent the exact bulk-tying symmetry (which is L1, refuted).

Three `BURDEN_FAIL` ⇒ **Λ is Weinberg-open PERMANENT for the Class-2 route.**

The owner has ratified this terminal (2026-06-14):

> *"Lambda is Weinberg-open PERMANENT for the Class-2 route given L1/L2/L3 all BURDEN_FAIL; C19 slots I2 (v12 verdict + ledger-authority) and I3 (v14 update) CLEARED by owner; Lambda-1 PRESERVED-NOT-UPGRADED, Weinberg NOT cleared. Reopen only via a future L-construction passing the 122-OOM burden."*

The two C19 countersign slots (I2, I3) are thereby cleared. **This ratification is a banked elimination, not a promotion:** nothing about the observed value of Λ entered, Weinberg is **not** cleared, C_Lambda (Lambda-1) stays **preserved-not-upgraded**, and the line reopens only if a future L-construction passes all four burden predicates (terminal would flip to `derived-reopens-toward-closure`, requiring its own owner ratification). The build-or-refute test was verified to have teeth — an empty `L0_NULL` probe correctly fails, and a hypothetically-satisfied L1 correctly reopens — so the three refutations are genuine, not a rigged failure.

5.7 The no observed-Λ comparison rule

No observed-**Λ** comparison is performed anywhere in ST1. If any sentence implies the observed cosmological constant is predicted, matched, or closed, that sentence must be removed or downgraded.

This is not a stylistic preference; it is the **no-target-loading rule** at work. The I2 computation decides **structure, not the observed value.** At no point in the Λ line was the observed value of Λ claimed, compared, or fitted. The single number that appears in the line — Str ρ = (−88.93 ± band)/R_Y⁴ + c_loop — is a **structural supertrace residual at frozen radii**, not a prediction of the vacuum energy and not compared to any measured Λ.

5.8 Why this strengthens the ledger

Plain, one more time: the theory looked for its vacuum-energy cancellation in the one place its own structure said it had to be, found arithmetically that it is not there (I2, the 0.58 residual), proved structurally that it could not have been there (I3, the unit-operator obstruction), ran the three surviving relocation candidates to refutation under a radiative-stability burden (L1/L2/L3, all `BURDEN_FAIL`), and wrote all of it down. Λ is open — now **Weinberg-open *permanent* for this route**, with the surviving lane closed by elimination rather than left as a hunt. Nothing about the observed value of Λ was claimed, compared, or fitted at any point in the line.

The achievement here is **not** a solved Λ. The achievement is a Λ line that **refuses to cheat on the marquee problem** and converts an open mechanism-hunt into a pair of computed certificates plus a banked, owner-ratified elimination — while leaving the terminal status exactly where the physics puts it: **OPEN.** A theory that publishes its hardest negative result at full strength has earned more trust on its positive results, not less. That is why the honest fail strengthens the ledger.

Forward pull. So far the theory has stabilized its geometry (§4) and refused to cheat on Λ (§5) — both internal tests. The next section turns outward: it puts the theory in front of the actual universe and asks what it forecasts for the early cosmos, dark matter, the baryon asymmetry, and the arrow of time — and, for every forecast, names the experiment and the year that could end it. This is where the theory becomes **falsifiable on a calendar.**

6. Conditional Sectors: Inflation, Reheating, DM, Arrow, BH Diagnostics

> *Now the excited journey to the frontier. With trust earned, you follow the scope-keeper out to where the theory faces the universe — inflation, reheating, dark matter, the arrow, baryogenesis. Nothing here is promoted: conditional rows name their gates, the open lane stays loudly open, and every claim travels with the observation that will adjudicate it.*

6.1 Why this section is conditional/diagnostic

Plain. This section is the theory facing the universe: what it says about the inflationary epoch, the thermal history, the baryon asymmetry, dark matter, and the arrow of time — and, for every statement, the grade it carries and the observation that adjudicates it. The discipline to watch: **computed verdicts are stated at full strength with their countersign slots marked PENDING; conditional results name their gates; the one loudly-open lane (baryogenesis) is preserved open with its preservation ruling quoted.** Dates are at the end (§6.8).

Nothing in this section is promoted. Conditional rows stay conditional; open rows stay open; diagnostics stay diagnostic. The reader's quick map of what is and is not claimed:

Sector	Source status	What is claimed	What is not claimed
inflation n_s, r	projected/conditional (PROJECTED bands)	branch forecast	final branch closure
A_s (absolute amplitude)	BLOCKED / conditional	conditional prediction	unconditional amplitude closure
reheating (Gap 09)	CONDITIONAL, gates named	conditional band	unconditional thermal-history closure
BG-10 / baryogenesis (Gap 10)	OPEN / Diagnostic	no closure	no baryogenesis number
DM candidate (Gap 11)	CONDITIONAL	candidate / falsifier	full dark-sector closure
arrow (Gap 07)	PASS (closed-by-computation, banked)	Spohn monotone within GKLS class	all-time / measure / initial-condition finality
BH diagnostics (Gap 13)	diagnostic / inheritance, OPEN	diagnostic inheritance only	microstate / Page-curve closure

> **Out-of-scope rule.** Out-of-scope (OOS) sectors may **not** support scoped claims; QC remains EXTERNAL / SIMULATED and cannot change any truth-table row. Nothing in this section promotes a conditional or diagnostic row into a closure.

6.2 Inflation branches and K13-2 (Gap 08)

One dead candidate, one survivor — with its convention honesty attached

The ρ-inflaton is DEAD (computed verdict, v9; countersign slot PENDING — the slot formalizes, the verdict is already on the record). The three evidential bases, verbatim-faithful: (1) the death is at **qualitative grade** — KK-stiff; (2) the noise floor of the run is **disclosed** on the record; (3) the **NT-1 transverse-stabilization residue is REGISTERED** — and separately, the NT-1 χ-leg run gate-halted on a scale artifact at v14, VOID both directions, routed to the machine lane, while the ρ-leg qualitative-stiff verdict stands. Nothing about ρ is claimed to be certificate-grade; **DEAD-at-qualitative-grade** is the recorded strength, and the countersign queue carries it.

The σ-inflaton SURVIVES (v9 round 1; corrected regime v10; countersign slots PENDING for σ-advancement, the plateau outputs, and the E2 second upgrade). The v9 round-1 hilltop slice — $n_s \in [0.960, 0.964]$, $r \approx (2.9–3.6)\times10^{-3}$ — is **SUPERSEDED** by the v10 plateau and carried on the record as such. The corrected regime:

> **An exponential plateau with $\lambda^2 = 4/K_{\sigma\sigma} = 1/6$, set by the 13D split n = (6, 2, 1). $n_s \in$ [0.9643, 0.9679]** — Planck dead-center, near-universal across branches (the comparator is MEASURED; the band is the computed PROJECTED output). **$r \in [3.5, 10]\times10^{-3}$** on the frozen operative branch — LiteBIRD-testable at 3.5–10σ (PROJECTED).

Plain: the surviving inflaton is the geometry's own breathing mode rolling down an exponentially flat hill. Its tilt lands in the middle of what Planck measured without any dial being available to put it there — the slope is fixed at $\lambda^2 = 1/6$ by how the thirteen dimensions split, and no geometry was changed at any point in this line.

The four-branch table and the LiteBIRD falsifier (K13-2)

The A_s blocker decomposed at v11: the number closed (K13-1 CLOSED, below); the residual is **K13-2, the σ-kinetic normalization** — the D.1 kinetic denominator exceeds the standard reduction by exactly **81/22** ($(D-2) = 11$ versus $(D_4-2) = 2$ — the exact datum, recovered from the session record and source-confirmed at v15, FROZEN; verbatim at source line L10268 of the corpus dimensional-reduction appendix, registered with its exact source anchor in Paper IV's formal authority package (§IV register), https://physics.magflowmeters.com/articles/TOE.html, EXTERNAL). The exact four-branch integration (v11) gives four branches, labeled by two binary conventions: **T** = textbook/standard-reduction normalization versus **D** = the D.1 normalization, and the subscript **6** = K_6-only breathing versus **u** = uniform breathing across n = (6, 2, 1).

Branch	Convention read (assembly note — Interpretation strength)	r band (PROJECTED)	n_s	Standing
T6	Textbook/standard-reduction normalization · K_6-only breathing	$[3.5, 10]\times10^{-3}$	[0.9643, 0.9679], Planck dead-center	The FROZEN operative branch (v10/v11); countersign slot PENDING
T_u	Textbook normalization · uniform breathing across n = (6, 2, 1)	$[6, 17]\times10^{-3}$; the v15 source check sharpens to $[6.1, 17]\times10^{-3}$	Planck-centered	The branch a TEXTBOOK ruling lands on **if** D.1.0's uniform-breathing declaration is the operative intent (v15)
D6	The D.1 normalization ((D−2) = 11 denominator) · K_6-only breathing	$[8, 24]\times10^{-3}$	Robust across branches (v11)	Survives the current bound r < 0.036 (MEASURED comparator)
D_u	The D.1 normalization · uniform breathing	$[10, 36]\times10^{-3}$	Robust across branches (v11)	Survives r < 0.036 (MEASURED comparator)

Assembly note (Interpretation strength, declared): the T/D and 6/u readings above are this assembly's reading of the banked v11/v15 lines — consistent with "D.1 exceeds standard reduction by exactly 81/22" and "D.1.0 declares uniform breathing — a TEXTBOOK ruling lands on T_u". The branch labels, bands, and survival statements themselves are verbatim from v11/v15.

The v15 events, in order: the D.1 source check is done — the kinetic denominator (D−2) = 11 is verbatim at source line L10268; the numerators match the standard reduction exactly; the 81/22 is confirmed from source. New from the source: **D.1.0 declares uniform breathing**, so a TEXTBOOK ruling lands on T_u ($r \in [6.1, 17]\times10^{-3}$, n_s Planck-centered), and **T6-versus-T_u reduces to one read of the frozen σ-map yaml** (the named gate; PENDING). The **slip-versus-intent question is honestly left as the one remaining inference** — this document does not resolve it, by rule.

K13-2 single-axis owner ruling (OWNER-RULED-2026-06-15 — documented once). K13-2 is now a **SINGLE-AXIS owner ruling**, recorded verbatim as `K13-2: OWNER-RULED / UNIFORM-BREATHING SOURCE-RESOLVED / D.1 NORMALIZATION RETAINED`. The two axes are disposed of separately: the **breathing axis is CLOSED** — source-resolved by the D.1.0 uniform-breathing declaration (the operative breathing mode is uniform across n = (6, 2, 1)), not an authorial call; the **normalization axis is OWNER-RULED** — the remaining normalization ambiguity is not independently source-resolved, so the owner records the ruling that the **D.1 denominator (D−2) = 11 is retained as intentional** rather than corrected to the 4D textbook denominator (D_4−2) = 2. The ruling is **supported by** the explicit D.1 occurrence and by the resulting integer normalization **K = 99/11 = 9** (the corrected denominator would give the non-integer 99/2 = 49.5); it is recorded as **authorial, not as a theorem forced by the source** — the source does not prove (D−2) = 11 was intended. The owner ruling **retains the D.1-normalization reading as operative**; it leaves the convention-independent union falsifier byte-unchanged and does not by itself clear the two PENDING C19 countersigns.

> **K13-2 / branch guardrail.** Do not pick a branch unless the source says it is picked. T6 is the FROZEN operative branch; the T6-versus-T_u question reduces to one read of the frozen σ-map yaml (PENDING); the slip-versus-intent inference is left unresolved by rule. The owner ruling above retains the D.1 reading as operative and changes no countersign and no falsifier byte.

The pre-registered falsifier (BOUNDED, the union of all four branches): if LiteBIRD measures r outside **$[3.5, 36]\times10^{-3}$**, the σ-inflaton is falsified regardless of convention. Inside the union, the four r-bands separate at LiteBIRD resolution — **the convention becomes an observable** (v11): the experiment will not only test the model, it will adjudicate which normalization the geometry actually uses.

6.3 Reheating / A_s conditionality (Gap 09)

κ_{13} and the A_s chain (K13-1 closed; K13-2 the single remaining normalization input)

K13-1 CLOSED: $\kappa_{13}^2 = 1/(\pi^4 M_U^9 M_{Pl}^2)$ — closed form, corpus-verbatim relation, at the frozen radii; the fold contributes a factor-2 band. (Closed-by-computation, v11; countersign slots PENDING for the κ_{13} form and the branch table.) The A_s relation is FROZEN; the **absolute** A_s normalization is **BLOCKED** on the two named objects — **K13-2** (the convention gate above) and **c_loop** (the Gap-04 residue, §4). **No absolute amplitude is claimed in this document.**

Reheating and the thermal history — CONDITIONAL, gates named

Gap 09 is CONDITIONAL (v10; countersign slot PENDING): **$T_{RH} \in [2.4\times10^{12}, 4\times10^{15}]$ GeV** — the conditional band, mostly in-band against the corpus comparators — and **$N_{eff} = 3.044$, in-band** (BOUNDED conditional outputs). The gap re-gated at v11 on the two named inputs: **K13-2 and c_loop.** The conditional's own integrity test: once the gates close, the band must remain BBN-consistent and N_eff must stay in-band; an exit is a **FAIL of the conditional**, recorded as such.

6.4 BG-10 / baryogenesis remains OPEN (Gap 10)

> **BG-10 status:** OPEN / Diagnostic.
>
> The source records a four-fix ledger at 0/4. ST1 may describe the open programme, but it may not claim a baryogenesis number or closure.

This is preserved OPEN by design: a same-day premature closure was withdrawn under audit and the gap held open at 0/4 — the discipline working against the programme's own optimism, recorded as such.

Lane 05 (BG-10): BLOCKED_BY_NAMED_OBJECT, preserved Open/Diagnostic — exactly as the corpus locks it: *"Chris does the physics"; silent promotion = structural FAIL* (v13, quoted). The preservation record, assembled:

- The four-fix ledger stands at **0/4 at certificate grade.** The four named fixes any future BG-10 attempt must execute: (1) the canonical CI; (2) the proper $\Delta L = 2$ treatment; (3) the N_2/N_3 damping; (4) the density-matrix flavor treatment.
- The history that locks it: the first-pass closure claim of 2026-06-04 was **WITHDRAWN the same day** after a deep ten-agent audit; BG-10 has been Open/Diagnostic since, and v13 re-affirmed the preservation under the explicit rule that a silent promotion is a structural FAIL.
- What *is* banked inside the open lane (diagnostic, labeled): the ingredients are FROZEN for the CP invariant (the M_R declaration at $\tau = \omega$ is fix-ingredient #2, §I); the epoch is delivered as a band; the

thermal-leptogenesis floor PASSES the entire T_RH range of §6.3; the M_R threshold passes the upper band — a **diagnostic estimate, labeled as such.**

- The discipline instrument: the BG-10 exit-2 checker (v15, EXTERNAL — runnable at **https://physics.magflowmeters.com/scripts/**) mechanizes the refusal — the lane cannot be run to a claimed closure without its named objects.
- **Pre-registered falsifier for the eventual physics:** if the completed four-fix computation returns η_B outside **[6.0, 6.2]×10⁻¹⁰** at 3σ, BG-10 is falsified — a BOUNDED falsifier window, pre-registered; the gap itself **stays OPEN** until the four fixes run at certificate grade.
- **Window-convention reconciliation (June-14, OWNER-RULED — documented once).** The two bands that appear in the corpus are the **same physical quantity in two conventions, not a discrepancy**: the operative falsifier window is **η_B ∈ [6.0, 6.2]×10⁻¹⁰** (the baryon-to-photon ratio), and the harness's **(8.0 ± 0.3)×10⁻¹¹** band is the identical quantity written in the Y_B (baryon-to-entropy) form via **η_B = 7.04 · Y_B** (so 6.1×10⁻¹⁰ / 7.04 = 8.66×10⁻¹¹, inside the harness band). The owner has ruled (2026-06-14): *"operative window eta_B in [6.0,6.2]e-10; the (8.0±0.3)e-11 harness band is the SAME quantity in the Y_B (baryon-to-entropy) form via eta_B = 7.04 * Y_B (6.1e-10/7.04 = 8.66e-11), documented once. BG-10 STAYS OPEN / fail-closed at 0/4; the four-fix manifest is owner physics, deliberately not rushed (the 2026-06-04 same-day withdrawal is the model)."* The reconciliation pins one convention for the eventual single post-freeze comparison; it changes no status. **BG-10 stays OPEN, fail-closed at 0/4** — the four-fix F^+ manifest is owner physics, deliberately not rushed, with the 2026-06-04 same-day withdrawal as the standing model for refusing premature closure. The 7.04 factor and the band are carried as **post-comparison data only**; neither is read into any fix.

Plain: the baryon-asymmetry lane is the place this theory most visibly refuses to flatter itself. The machinery to claim it exists; the claim was once made, audited, and withdrawn within a day; and the standing record says OPEN until four named computations are done at certificate grade by the owner. The two η_B bands on the record are one number in two conventions, now reconciled once and pinned — not a loose end, and not a closure.

6.5 Dark-matter candidate status (Gap 11)

A structurally selected candidate, CONDITIONAL, with a null-forecast that bites

Lane 06 (Gap 11): CONDITIONAL (v13). The candidate: the $S^1/\mathbb{Z}_2$ **boundary-localized $\mathbb{Z}_2$-odd freeze-in** state (C-iii), structurally selected **17/18 across 5 reweightings** of the selection audit — selected by the geometry's boundary structure (§I inflow), **not fitted to any abundance.** Banked gates and relations: the KK-overclosure gate PASSES across the whole inflaton band; the relation $\lambda_p(0.12) \sim 10^{-11}$ is FROZEN; the candidate's renormalizable stability (Y = 0) is §I-banked. The block: the **portal normalization** — the named object whose derivation gates the relic chain (with the Gap-09 chain behind it).

The null-forecast (recorded, forecast grade): $\sigma_{SI} \sim$ **10^{-55}–10^{-60} cm² ⇒ a direct detection falsifies the minimal candidate** — the E6 prediction registry entry becomes a falsifier. *Plain:* the candidate is a faint, weakly-made particle that lives on the edge of the internal space (the boundary-localized freeze-in state above) and is kept from decaying by a mirror-symmetry (the $\mathbb{Z}_2$-odd parity); the "KK-

overclosure gate" just checks it cannot over-fill the universe with mass, and λ_p(0.12) is the frozen coupling that sets its tiny production rate. It is honest enough to predict that direct-detection experiments should see *nothing*; if any of them sees a WIMP-like signal, **the minimal version of this theory's dark sector is dead, and says so in advance.** One anchor slip in this lane was self-caught and superseded on the v13 record.

6.6 Arrow / Spohn monotone (Gap 07) — PASS

Gap 07: PASS (v14, closed-by-computation). **Spohn's relative-entropy functional D(ρ‖ρ_ss) is the surviving universal arrow monotone** — monotone at machine-zero violation under both generic and thermal GKLS dynamics — and the **five expected failures** (the candidate monotones that fail outside their validity classes, as expected) are **named and counted** in the banked verdict record (EXTERNAL).

Scope honesty, stated: the PASS is a **monotone-existence result *within the GKLS dynamical class*** — it settles the arrow's *mechanism* question on the theory's open-system spine; it is **not** a derivation of the cosmological initial condition, which remains **Gap 06, OPEN** (§7). The selector's pre-v14 OPEN row for this gap is superseded by the capsule PASS — conflict ledger entry CL-2 (ST3 §VI). This is a closed-by-computation row in the truth table; its scope boundary (generic + thermal GKLS; the five expected failures mark the class boundary; outside it no claim is made) is what keeps it from being read as all-time / measure finality.

6.7 Black-hole diagnostics / inheritance checks (Gap 13)

The banked diagnostic: **S_BH = A/(4G) is inherited on the 4D zero-mode sector at 0.0028% relative error — DIAGNOSTIC, labeled; inherited, not derived ab initio.** The five anti-overclaim disclaimers **PC-1..PC-5** are registered in the Gap-13 dossier (verbatim texts EXTERNAL); their collective force, as banked on the capsule line, assembled clause-wise:

1. the entropy agreement is an *inheritance check*, not a microstate derivation;
2. **microstate fabrication is forbidden**;
3. no Page-curve mechanism is claimed;
4. the topological rank remains *admissible later*, not invoked now;
5. the lane is BLOCKED by its named gaps.

The recorded block was Gaps 01 + 04; Gap 04 is now CLOSED at decision grade (§4), so the operative block is **Gap 01 plus the system-bath re-examination** (Gap 14's first action). **Status: OPEN.** No microstate or Page-curve closure is claimed; the inheritance match is a diagnostic, not a derivation.

Adjacent open lanes (recorded, not closed)

- **The CMB/LSS likelihood (Gap 12)** was shape-populated under Rule A at v9 (hash-traced) and v2-populated at v10 — and it stays **OPEN**, because all 8 of its cosmology-input upstream gates are OPEN or CONDITIONAL and the standing rule is *populate only from upstream signed outputs*. No likelihood number is claimed. The gap has no independent falsifier; it is adjudicated strictly by its upstream chain (Gap 04 CLOSED; Gaps 08, 09, the Λ line, and the rest per §7).

- **Quantum-to-classical and the Born rule (Gap 14) — OPEN.** AOC-1/3/4 are scope-excluded (Exclusion strength — outside the claim boundary, not failed gates). The CH-2 KK-tower decoherence channel is an honest halt: NotImplementedError, cascading via Gap 01's a_6 object. The recorded next action is on the owner's machine: re-examine the system-bath split on the existing 13D fields *first*, before any rule-layer extension is considered (ST3 §VI). The v6 world-line phrase "Gap 14 on the owner's machine" is this lane.

6.8 Falsifier calendar (Gap 18)

The corpus prediction surface (registry EXTERNAL; governance CANDIDATE): **12 predictions — 3 CERT + 1 conditional-CERT + 3 CANDIDATE + 5 AUDIT-tier** — under pre-registration rules A–F, enforced. **Three empirical refutations are RESOLVED on the registry: REGISTRY-R-1, REGISTRY-R-2, REGISTRY-R-3** — adjudicated, recorded, and kept on the record (refutations are results; the registry's resolved rows are part of the theory's evidence that its falsifiers are live, not decorative). The 5 AUDIT-tier predictions stay open with their falsifier windows in the registry.

The world timeline (all PROJECTED adjudication windows unless marked otherwise):

When	What arrives	What it adjudicates	Grade
2027	m_W	The corpus m_W comparison row (EXTERNAL: the Paper I / GUT.html output ledger at https://physics.magflowmeters.com/articles/GUT.html; comparison target = the W-boson mass, PDG 2024 Gauge & Higgs Bosons review, W mass)	PROJECTED window
2030+	LiteBIRD r	The four-branch table; union falsifier $[3.5, 36]\times10^{-3}$; operative branch T6 at $[3.5, 10]\times10^{-3}$ — and the branch separation itself (the convention as observable)	PROJECTED
~2035	τ_p reach	The pre-registered dim-6 QQQL falsifier (§I, ⊗-layer)	PROJECTED
Ongoing	nEDM	$\bar{\theta}$ (Gap 03, OPEN — §7 stanza); adjudicator = the neutron electric dipole moment bound, PDG 2024 Baryons / neutron listing (neutron EDM)	MEASURED, ongoing
Ongoing	v fits	The ⊕-layer lepton outputs ($\delta_{CP}^{\ell} \approx 260°$, §I); comparison target = the leptonic CP phase δ_CP, PDG 2024 Neutrino Mixing review	Ongoing comparison
Any time	DM direct detection	A detection falsifies the minimal Gap-11 candidate (the null-forecast §6.5)	CONDITIONAL forecast
On completion of the four fixes	η_B	BG-10: outside $[6.0, 6.2]\times10^{-10}$ at 3σ falsifies	OPEN (falsifier pre-registered)

Plain: between now and roughly 2035, the world will hand this theory at least four independent chances to die — the W mass, the primordial gravitational-wave amplitude, the proton lifetime reach, and the neutron electric dipole moment — plus a standing one (dark-matter direct detection, where for the minimal candidate *any* signal is fatal). The theory's posture toward all of them is pre-registered.

Forward pull. You have now seen the banked core (§3), the two internal tests (§4–§5), and the calendar of ways to die (§6). The next section is the reckoning — every item at once, read back as the theory's own report card (§7, the truth-table summary).

Discipline notes

The Λ / cosmological-constant material in this section is a bounded honest-refutation statement: it preserves the I2/I3 fail/refutation status, the Weinberg-open boundary, and the no-observed-Λ comparison rule, and it makes zero promotions.

The conditional-sectors material — the conditional branches, BG-10, dark matter, the arrow, the black-hole diagnostics, and the falsifier calendar — is a conditional/diagnostic summary that preserves each item's conditional, open, or diagnostic status and makes zero promotions.

> **Externalization pointers.** Teaching-level expansion of the I2 supertrace, the four-burden-predicate test, the four-branch convention reading, and the BG-10 four-fix ledger lives in the ST2 Rosetta (Paper IV, https://physics.magflowmeters.com/articles/TOE.html, §5–§6 entries). Formal authority — the C19 countersign slots (I2, I3), the owner ratifications of 2026-06-14/15, the prediction/refutation registry (REGISTRY-R-1..3), the Gap-13 PC-1..PC-5 disclaimer texts, the BG-10 exit-2 checker, conflict-ledger entry CL-2, and the Appendix-D / L10268 source anchors — lives in the ST3 formal authority package (Paper IV, https://physics.magflowmeters.com/articles/TOE.html, §III/§IV/§VI registers). Return-YAML / countersign is the only promotion instrument; none is added here.

7. Truth-Table Summary: Every Item Classified

> *The spine of the whole journey. This is where the scope-keeper lays the entire ledger on the table at once: every item in exactly one of four terminal states, its native label printed beside it, its falsifier or gate attached. Read it as the report card of everything above — and notice that a table placing all forty-eight rows in the "closed" column would be the thing to distrust.*

7.1 Why the truth table is the spine

This is the section a hostile reviewer should read first. The scoped TOE does not rest its honesty on any single computation; it rests it on a discipline: **every gap the theory enumerates, and every named sub-item the capsule line created, appears in the record exactly once, in exactly one of four terminal states, with its native capsule status printed verbatim-faithful beside it and its falsifier or named gate attached.** The same list that built the theory is read back as its report card — one list, two tenses.

The claim of this section is therefore not "everything is closed." It is the narrower, checkable claim:

> **The scoped TOE does not claim that all gaps are closed. It claims that every named item is classified.** If an item is missing from the record, that is a completeness defect of the document, not a hidden claim of the theory.

Authority rule (binding). The truth table is the claim-to-authority map: the rightmost column of each row is the single governing cite for that row's status. Any narrative mention elsewhere in this statement (§§2–6, 8) is exposition of the same banked record, never an independent claim.

No-promotion rule (binding). The terminal-state column organizes the banked record. It does not change the native source status. The native capsule label is always the load-bearing status; the terminal state is its filing drawer, and the two never disagree. Promotions effected by this table: zero. The only instrument that may ever move a row between states is the Return-YAML / countersign (§8) — and none is added here.

This section carries the **compact summary** only: the four states, the count, and a few representative rows per state so the shape is legible. The full row-by-row Rosetta — Table V-A (all eighteen gaps), Table V-B (all thirty named instruments), and the precise-open stanzas in full — is externalized to the ST2 companion; the normalized formal authority map (the governing cite and falsifier for every row) is externalized to the ST3 companion.

> **Pointers.** - Full row-by-row Rosetta (Tables V-A/V-B + precise-open stanzas + the walls, verbatim): the ST2 full Rosetta within Paper IV, https://physics.magflowmeters.com/articles/TOE.html. - Formal truth-table registry (claim-to-authority map, per-row governing cite + falsifier, promotion lock): the ST3 formal registry within Paper IV, https://physics.magflowmeters.com/articles/TOE.html.

7.2 The four terminal states

Every gap, lane, and named object lands in exactly one of these four states. The terminal-state column is an organizational classification of the banked record; it is never a status change — the native capsule label is always printed beside it, verbatim-faithful.

Terminal state	Definition	What the entry must carry	Banked example
Closed-by-computation	A run, engine, or derivation produced the result; it is banked	The run / package / hash / engine, plus the validation that gated it	The c_KK winding share (Poisson/winding engine, massless-limit validation); the I2 supertrace certificate; the Gap-07 Spohn monotone at machine-zero
Closed-at-decision-grade	A countersigned ruling discharges it short of full certificate	The countersign ruling cited by id, the operative bound it cleared, and the margin	H04_DISCHARGED_AT_DECISION_GRADE — weakest accepted variant clears the bound by 35×, central by 2.4×10^{3}
Conditional-with-named-gate	Survives behind a named gate; discharges if and only if that gate passes	The named gate or input, and the prediction it currently yields	A_s absolute behind K13-2 + c_loop; the Gap-11 candidate behind the portal normalization
Precisely-OPEN (falsifier attached)	Not claimed; the falsifier or adjudicator travels with the item	The falsifier and the experiment or bound that adjudicates it — or the recorded statement that no claim is made and why	BG-10 at a four-fix ledger of 0/4; θ-smallness honestly underived with nEDM probing it

Read the *shape* of these four columns, not any single row. A banked core, a gated middle, and an open frontier where every opening is specified rather than vague — that distribution is the honest shape of the theory. A table that placed all forty-eight items in the first state would be the thing to distrust.

7.3 Count summary

The scoped ledger has 48 items: 18 gaps + 30 named sub-items / instruments of the capsule line. Each is in exactly one terminal state.

Terminal state	Count	Meaning
Closed-by-computation	22	run / engine / derivation banked (with its validation/hash/cite)
Closed-at-decision-grade	3	countersigned ruling discharges short of full certificate
Conditional-with-named-gate	9	survives behind a named gate / input
Precisely-OPEN	14	not claimed; falsifier or recorded non-claim attached
Total	**48**	complete scoped ledger

Breakdown across the two layers (gaps / sub-items), as the source records it:

Terminal state	Gaps (of 18)	Sub-items (of 30)	Total
Closed-by-computation	2 — Gaps 07, 17	20	22
Closed-at-decision-grade	1 — Gap 04	2	3
Conditional-with-named-gate	5 — Gaps 08, 09, 11, 16, 18	4	9
Precisely-OPEN	10 — Gaps 01, 02, 03, 05, 06, 10, 12, 13, 14, 15	4	14
Total	**18**	**30**	**48**

Every row carries its falsifier, adjudicator, or recorded non-claim; every CLOSED row carries its computation or countersign cite. Promotions effected by this summary: zero. (Per-row authority and falsifiers: the ST3 registry companion.)

7.4 Closed-by-computation rows (22) — representative

A run, engine, or derivation produced the result, and it is banked with its validation. Two gaps and twenty named instruments land here. Representative rows:

- **Gap 07 — Arrow of time / entropy monotone.** PASS — Spohn $D(\rho\|\rho_{ss})$ is the surviving universal arrow monotone, machine-zero under generic + thermal GKLS. Scope boundary: PASS holds within generic + thermal GKLS; the five expected failures mark the class boundary; outside it, no claim. Authority: v14 verdict; §IV.
- **Gap 17 — Governance / reproducibility.** CERTIFICATE (CLOSED) — CERT_OF_TOE20_REPRODUCIBILITY, adjudicated by re-execution (21 TOE-k stubs, the 322-package pip-freeze, real Paper-1/2/3 SHAs, the non-zero Stage-B run). Authority: CERT_OF_TOE20_REPRODUCIBILITY (EXTERNAL).

- **c_KK^wind (sub-item 2).** $+3.701826\times10^{-2}$ R_Y^{-4} (Poisson/winding engine, massless-limit validation to machine precision) — Exact (CLOSED).
- **I2 supertrace (sub-item 19).** Honest FAIL certificate (0.58 at k=0, 1.000 at k=1–8) — CLOSED AS HONEST FAIL (v12). *Note: a banked honest-FAIL certificate is "closed-by-computation" because the computation is banked; it is not a closure of the Λ gap, which stays Precisely-OPEN (§7.7, §5).*

Full list of all 22 rows with cites: ST2 Rosetta companion (Tables V-A/V-B); ST3 registry companion (per-row authority).

7.5 Closed-at-decision-grade rows (3)

A countersigned ruling discharges the item short of full certificate. This state is precise, not a hedge: the entry must name the countersign id, the operative bound it cleared, and the margin.

- **Gap 04 — Moduli stabilization / no-runaway.** CLOSED at decision grade; the well is UNCONDITIONAL in c_loop (v10 Amendment). Terminal state recorded as **CLOSED-SCOPED / GLOBAL-UV-DELEGATED**: the scoped decision-grade closure stands, while the global shrinking-volume question is registered as open (B-UQFC-14-UV-1). The historical falsifier (bound -3.682×10^{-2} R_Y^{-4}) was PASSED at decision grade (35× at the weakest accepted variant, 2.4×10^3 central); residues: c_loop OPEN, the magnitude lane non-blocking. Authority: H04_DISCHARGED_AT_DECISION_GRADE (v8) + runner PASS package (v9) + Amendment (v10); §II. **This is decision-grade, not certificate-grade, and not global finality (§4).**
- **The H04 ruling (sub-item 8).** H04_DISCHARGED_AT_DECISION_GRADE — 35× weakest, 2.4×10^3 central — Countersigned (v8).
- **Window-sharpening condition (sub-item 10).** c_loop < $0.05\cdot A^2/c\_bdry$ (v9), vacated by the v10 Amendment (countersign); supersession recorded — SUPERSEDED, closed-at-decision-grade by the Amendment.

7.6 Conditional-with-named-gate rows (9) — representative

The item survives behind a named gate and discharges if and only if that gate passes; the entry carries the gate and the prediction it currently yields. Five gaps and four named instruments land here. Representative rows:

- **Gap 08 — Inflation / mode spectrum.** OPEN (cascade); ρ DEAD; σ SURVIVES — plateau CANDIDATE; countersigns PENDING. Falsifier: LiteBIRD r outside $[3.5, 36]\times10^{-3}$ (union, all branches). Gates: K13-2 (yaml read), c_loop, the countersign slots.
- **Gap 11 — Dark matter.** CANDIDATE / CONDITIONAL — C-iii boundary-localized $\mathbb{Z}_2$-odd freeze-in, selected 17/18 across 5 reweightings; blocked on portal normalization. Falsifier: any direct detection (null-forecast $\sigma\_SI \sim 10^{-55}$–10^{-60} cm²) kills the minimal candidate. Gate: the portal normalization (+ the Gap-09 chain).
- **Gap 16 — Precision-phenomenology global fit.** CANDIDATE — Tier-1 framework CERTIFICATE re-attested 25/25 rows; Tier-2 numerical AUDIT-tier (0/25 populated). Gate: upstream closures (Gaps 01/02/03 and Gap 04) propagate into the framework; no fit is permitted meanwhile.

Also conditional: Gap 09 (reheating), Gap 18 (predictions surface), and instruments 14 (D15-native slots), 16 (K13-2 branch table), 22 (ρ-death verdict slot), 23 (σ-advancement slots). Full list: ST2/ST3 companions.

7.7 Precisely-OPEN rows (14) — representative

The item is not claimed; the falsifier or adjudicator travels with it, or the record states that no claim is made and why. Ten gaps and four named instruments land here. These are the must-stay-open set.

- **Gap 01 — UV quantum-gravity completion (the a_6 object).** OPEN_PHYSICS_BLOCKER — "walled at field grade." Falsifier: a computed a_6 trace violating positive-definiteness for physical Hilbert-space closure refutes at decision grade. (A scope wall; see §7.8.)
- **Gap 02 — Yang-Mills mass gap.** CANDIDATE — C1–C4 structural compatibility PASS; the continuum mass-gap existence wall is preserved. Adjudicator: an external full nonperturbative proof for SU(3) on $M_{3,1}$ with the theory's zero-mode spectrum. The C1–C4 passes are not, and are never represented as, a nonperturbative proof. (A scope wall; see §7.8.) **Banked negative (honest counter-result, no status change):** a block-spin RG scale-scan of the certificate decidability point D = s_block – ln(E_conn · A_fluc · N_cert) on validated SU(3) lattice Monte Carlo (plaquette hard-gate PASS at every point) returns **D ≤ 0 at all 15 sampled (β, k)** across g_eff ∈ [0.942, 2.449] — a **no-man's-land** with no positive-D island on either the UV or IR end (physical anchor: s_block ≈ 1.07, D_rig ≈ −4.8 at β = 6.0). This **empirically closes out the certificate-alphabet (block-spin coarsened) closure route** for the large-field horn at g = O(1). It is **not** a refutation of the mass gap — the gap holds at fixed lattice spacing by reflection positivity; the open object remains the **uniform / continuum polymer derivation**. Gap 02 stays Precisely-OPEN; PROMOTIONS: 0.
- **Gap 03 — Strong CP / $\bar{\theta}$-smallness.** OPEN_PHYSICS_BLOCKER — $\bar{\theta}$-smallness honestly underived. A third negative is banked (the mutual-exclusivity theorem, June-14, OWNER-RATIFIED): a chirally-asymmetric W-action and |index| = 3 cannot coexist, and the finite topological-CP sector does not pin θ. The theorem closes a *route*, not the gap, and flips no ledger row; the owner declines to author a degenerate patch. Falsifier: an nEDM measurement returning $\bar{\theta} > 10^{-10}$ makes the underived status a refutation-grade result.
- **Gap 05 — Λ radiative stability.** OPEN — "Λ remains Weinberg-open"; the chamber route is CLOSED by the certificate pair (I2 honest-FAIL + I3 theorem-refutation); L1–L3 must relocate the cancellation or be refuted. Adjudicator: an L1–L3 construction passing the 122-orders-of-magnitude radiative-stability burden, or its refutation → Weinberg-open permanent. **No observed-Λ comparison is performed anywhere** (§5).
- **Gap 10 — Baryogenesis (BG-10).** Open/Diagnostic, preserved — BLOCKED_BY_NAMED_OBJECT; four-fix ledger 0/4; "silent promotion = structural FAIL." Falsifier: a completed four-fix computation returning η_B outside $[6.0, 6.2]\times10^{-10}$ at 3σ. No baryogenesis number is claimed.

Also precisely-open: Gap 06 (initial boundary wavefunctional), Gap 12 (CMB/LSS likelihood), Gap 13 (black-hole entropy / Page curve — DIAGNOSTIC, blocked by named gaps), Gap 14 (quantum-to-classical / Born rule), Gap 15 (state-space measure), and instruments 12 (magnitude refinement, non-blocking), 13 (c_loop), 18 (slip-vs-intent, OWNER-RULED authorial), 24 (NT-1 χ-leg, VOID). The full precise-open stanzas (what it is · why open · what closes it · owner · falsifier) are in the ST2 Rosetta companion.

7.8 What the truth table does not claim

- **Scope walls are not failed gates, and cannot support claims.** Two walls stand deliberately: Wall 1, the Yang-Mills mass gap (a recognized hard open problem; Gap 02); Wall 2, UV quantum gravity at field grade (Gap 01). A third boundary — the value-question for the four anchors — is a scope boundary, not a gap. Binding rule: a required gate may never be closed by narrowing scope, and an excluded sector may never be leaned on to close anything. (Full wall statements: ST2 Rosetta companion.)
- **Closed-at-decision-grade is not certificate-grade.** Gap 04 stays scoped decision-grade / global-UV-delegated; the gap between decision-grade and certificate-grade is exactly one named coefficient (c_loop) and nothing else (§4).
- **A banked honest-FAIL or negative theorem is "closed-by-computation" only as a computation.** The I2/I3 certificate pair (§5) is a banked *result*; it does not close the Λ gap, which stays Precisely-OPEN and Weinberg-open.
- **Open means precisely specified, not vague.** Every open row carries a falsifier, an adjudicator, or a recorded statement of why no claim is made — never a promissory note.
- **The terminal state is not a promotion.** The classification organizes the banked record; the native status governs; only Return-YAML / countersign (§8) can ever move a row.
- **The completeness scorecard is honestly two-graded, and the best reading is still 0 MET.** Judged against the eight standard TOE-completeness criteria, the continuum baseline is **0 MET / 4 PARTIAL / 4 OPEN-TARGET**. Re-judged under the theory's *own* cost-floor / realizability axiom (the most favorable internally-consistent lens), the distribution is **0 MET / 6 PARTIAL / 2 OPEN-TARGET — exactly one criterion moves** (UV / quantum-gravity, OPEN-TARGET → PARTIAL), and it moves only because its hardest blocker (the unbounded continuum counterterm tower) is a continuum *artifact* the axiom dissolves off the bar, **not** because anything was proven. **DISSOLVED ≠ MET:** a dissolved sub-question is a non-question removed from the bar, never a satisfied criterion. **No criterion reaches MET under either lens**, and foundations (the Born measure) is untouched because a quantum of cost is the wrong shape for a probability weight. PROMOTIONS: 0.

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8. Strongest Objections as Falsifiers

> *The character invites its harshest critics in. Each objection is stated at full force, in the words its sharpest enemy would use, before any answer is offered — and no answer is allowed to promote a claim. A witness who arms the prosecution is a witness you keep believing.*

9.1 Why objections are part of the claim

A serious reader arrives with serious objections, and a theory that ducks them earns nothing. This section states the strongest objections a hostile expert raises — each **at full force first**, in the form its sharpest critic would use — and only then answers, by pointing at the exact place where the claim → mechanism →

certificate → falsifier chain already lives. No objection below is softened before it is answered; where an answer is partial, it says so.

Answer discipline (binding). Every answer carries four things: a **concession** where the objection is true; the **status boundary** it must not cross; the **audit location** where the claim can be checked; and the **falsifier or winning condition** that would make the objection win. **No answer promotes a claim.** An answer may make a claim more defensible; it may never move a truth-table row, turn open into closed, or turn decision-grade into certificate-grade. The only promotion instrument is the Return-YAML / countersign (§8), and none is exercised here.

9.2 Hostile-review matrix

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
1	**"This is not a TOE if 14 rows are open."** The truth table's own counts show 14 of 48 items precisely-OPEN and only a handful closed outright — a research programme, not a finished theory of everything.	Concession: yes, the counts are stated by the theory in its own summary table — the objection quotes the document's honesty back at it, which is the system working. Boundary: the honest claim is "a constrained framework with a banked core and a fully-specified open frontier," never "all-sector closure." The reframing: every OPEN item carries a **falsifier or a named gate and an owner**, so "open" here means *precisely specified and routed*, not *vague*; the closed core is not small in load (three families, the gauge sector, proton safety as an operator identity, the CKM phase, Gap-07 PASS, Gap-17 CERTIFICATE).	§7 count summary; ST2 Rosetta; ST3 registry	A theory that labeled all 48 items "closed" would be the thing to distrust. The objection wins only if an OPEN row is found that carries *no* falsifier, gate, or recorded non-claim — i.e. a vague opening. None is recorded.	14 Precisely-OPEN, 9 Conditional remain exactly as counted; no row promoted.
2	**"Gap-04 is overclaimed."** Decision-grade is a polite word for "not proven." Gap 04 is the foundation, and you admit it is not a certificate; if the moduli do not stabilize, every constant drifts and the theory predicts nothing.	Concession: correct — it is **not certificate-grade**, and the document routes that exact weakness to the	§4; §II; H04 countersign (v8); v10 Amendment	The objection wins if a certificate-grade closure is ever *claimed* without the certificate, or if the named residue	Gap 04 stays Closed-at-decision-grade (CLOSED-SCOPED / GLOBAL-UV-DELEGATED); not

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		top (Known weakest link #1) rather than hiding it. Boundary: "decision-grade" is precise, not a hedge. The operative falsifier (a sign bound) was **passed by 35× at the weakest accepted variant and ~2.4×10³ centrally** (the H04 countersign), and a self-caught boundary-sign reversal made the well exist **unconditionally** in the one coefficient still owned by future work (the v10 Amendment). The single residue separating decision-grade from certificate-grade — c_loop — is named, and the Amendment proves it *cannot* threaten the well. Gap 04 stays scoped decision-grade / **global-UV-delegated** (the global shrinking-volume question registered open as B-UQFC-14-UV-1); it is not global finality.		(c_loop) is shown to threaten the well after all — contradicting the Amendment. The gap between the two grades is exactly one table in §II, and nothing else.	promoted to certificate-grade or global finality.
3	**"Λ failure kills the theory."** Λ is the marquee problem. An honest FAIL is still	Concession: the theory does **not** claim to have	§5; §III; I2 (v12); I3 (v14)	The honest reading: Λ is **OPEN, Weinberg-open**,	Gap 05 / Λ stays Precisely-OPEN, Weinberg-open; the

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
	a FAIL, and a theory of everything that can't do Λ hasn't done everything.	solved Λ, and says so without flinching (Known weakest link #2). Boundary: what it claims is narrower and fully supported — its *own deepest cancellation mechanism* was tested and **refuted** by a banked certificate pair (the I2 supertrace honest-FAIL + the I3 theorem-refutation). That is a *result*, not an absence of one: it converts an open mechanism hunt into a closed elimination with a named surviving lane (L1–L3) and a pre-registered adjudicator (the 122-orders-of-magnitude radiative-stability burden). **No observed-Λ comparison is performed anywhere.**		with the theory's own escape route now provably closed. The objection wins if the document ever *claims* Λ solved, or performs an observed-Λ comparison, or if the surviving L1–L3 lane is shown to pass the 122-OOM burden and is then misread as a closure rather than a re-opening toward it.	I2/I3 pair is a banked honest FAIL, not a closure.
4	**"BG-10 / baryogenesis is being hidden."** The hardest cosmological number is quietly parked while the rest of the document advances.	Concession: none needed — it is **not hidden**; it is OPEN/Diagnostic, preserved on the record (Known weakest link #4), at a four-fix ledger of **0/4**, with "silent promotion = structural FAIL" as the standing	§6; §IV; v13 preservation ruling; 2026-06-04 withdrawal audit; ST2 BG-10 stanza	Falsifier: a completed four-fix computation returning η_B outside $[6.0, 6.2]\times10^{-10}$ at 3σ falsifies BG-10. The objection wins only if a baryogenesis number is found being *used* as a claim anywhere —	Gap 10 / BG-10 stays Precisely-OPEN (Open/Diagnostic, 0/4).

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		rule and an exit-2 checker mechanizing the refusal. Boundary: **no baryogenesis number is claimed.** The four fixes are named (canonical CI; proper $\Delta L = 2$; N_2/N_3 damping; density-matrix flavor); the closure instrument is a signed manifest with F^+ chamber-derived inputs, and the lane stays OPEN until that manifest exists.		which the exit-2 checker is built to prevent.	
5	**"Strong CP is unsolved."** $\bar{\theta}$-smallness is the field's classic naturalness puzzle, and the theory has no mechanism for it.	Concession: correct — **$\bar{\theta}$-smallness is honestly underived** (Known weakest link #5). Boundary: the document records *negatives*, not a solution: T-α1 Realization A disproved, T-α2 CLOSED (arg det = 11.71779, not a small integer), and a third banked negative — the **mutual-exclusivity theorem** (June-14, OWNER-RATIFIED): a chirally-asymmetric W-action and the	index	= 3 cannot coexist, and the closed-K_6 Pontryagin sector gives only $2\pi\mathbb{Z}$ (CP-even, 0.128 rad — no θ-pinning). The theorem closes a *route*, not the gap; the owner declines to author a degenerate patch that breaks	index

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		three-family witness			
6	**"Inflation branch is cherry-picked."** A four-branch table lets you quote whichever band flatters the data.	Concession: the document carries the **full four-branch table** rather than one flattering band (Known weakest link #3), and ρ is recorded DEAD while only σ survives as a CANDIDATE with countersigns PENDING. Boundary: the inflation numbers ride **two PENDING countersigns and one convention gate** (K13-2), and nothing is promoted past that. The K13-2 convention is OWNER-RULED authorial (the D.1 (D−2)=11 normalization retained as intentional, not source-forced) — and the falsifier is stated to be **independent of which branch was intended**.	§6; §IV; K13-2 stanza; ST2 STR4/STR7	Falsifier: **LiteBIRD r outside the four-branch union [3.5, 36]×10^{-3}** falsifies the σ-inflaton regardless of branch — a single window covering all branches, so no branch can be cherry-picked out of falsification. The objection wins if a prediction is quoted from one branch while the others' falsification windows are suppressed.	Gap 08 stays Conditional-with-named-gate; σ-CANDIDATE not promoted.
7	**"QC is hype / feedback into physics."** A simulated quantum-computer overhead ratio is being used to make the physics look validated.	Concession: the QC corpus is real but **EXTERNAL and SIMULATED**, recorded at engineering grade (a	§IX bridge (EXTERNAL); §VI Rule 4 / Rule 6; "What §IX does and does not license" table	The objection wins if any QC number is found *feeding into* a physics claim, or if a retired ratio (sub-2) reappears as a claim, or if the design is described	QC stays EXTERNAL / SIMULATED; zero truth-table rows moved by §IX.

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		simulated design, not a fabricated, measured chip) — and the program caught its own optimistic errors in public (a 4.3× decoder gain reversed as an undecoded artifact; a sub-2 qubit ratio **retired** as an algebra-clamp artifact; the honest overhead floor stated as a ~9.6–14.5× band, BOUNDED). Boundary: **§IX changes no §V status and feeds nothing back into the physics.** §VI Rule 4 bars any QC number from entering as a physics input; §VI Rule 6 (the QC-ratio gate) runs the geometry *forward* into the machine, never backward into the claims.		as fabricated/measured rather than simulated. None is recorded; the no-feedback path is structural.	
8	**"The truth table is just labeling."** Sorting items into four buckets is not physics; renaming "we don't know" as "Precisely-OPEN" changes nothing.	Concession: the terminal-state column is indeed *only* a classification — it changes no native status, and the document says so (the no-promotion rule, §7.1). Boundary: but the label is not free-floating. Each bucket has an **admission**	§7.2 (four-state definitions with required carries); ST3 registry (per-row cite)	The objection wins if a row is found in a bucket *without* the carry that bucket requires — e.g. a "closed-by-computation" row with no run/hash, or an "open" row with no falsifier or recorded non-claim. Completeness of the carries is the falsifiable content.	All four terminal states and every row's state unchanged; labeling effects zero promotions.

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		requirement: a closed-by-computation row must carry its run/package/hash + validation; a decision-grade row must carry its countersign id + bound + margin; a conditional row must carry its named gate + current prediction; an open row must carry its falsifier or its recorded reason for no claim. The discipline is *checkable*, not asserted.			
9	**"Decision-grade is not certificate-grade."** Calling Gap-04's closure "decision-grade" is admitting it is not nailed down — a euphemism for incomplete.	Concession: correct, and **intended** — decision-grade is explicitly *below* certificate-grade in the claim ladder, and the document never conflates them. Boundary: decision-grade is a defined rung, not a softened certificate: it requires a countersigned ruling citing the operative bound and the margin (here 35× / 2.4×10^3). It is **not** promoted to certificate-grade anywhere, and the one residue (c_loop)	§4; §7.5; §7.2 (state definitions); H04 (v8); v10 Amendment	The objection "wins" only as a category confusion: it is answered by *keeping* the grades distinct. It would genuinely win if any decision-grade row were ever cited as a certificate, or if c_loop were shown to threaten the well after the Amendment proved it cannot.	Gap 04 stays Closed-at-decision-grade; never promoted to Closed-by-computation/certificate.

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		separating the grades is named and shown non-threatening (the v10 Amendment).			
10	**"External artifacts make the document unverifiable."** Half the authorities (Tier-1 certificate, CERT_OF_TOE20_REPRODUCIBILITY, the prediction registry, the QC corpus) live outside the document; you can't check what you can't see.	Concession: yes, several governing cites are **EXTERNAL** (the Gap-16 Tier-1 certificate, Gap-17 reproducibility certificate, the Gap-18 prediction registry, the DM forecast record, the QC corpus). Boundary: EXTERNAL artifacts are **cited by id, never silently copied or mutated** (ST3 registry rule R4), and the in-document falsifiers do not depend on them — the calendar of kill-conditions (LiteBIRD r, nEDM θ̄, τ_p, η_B, DM null) is published-bound and date-stamped in §IV, checkable independently. Reproducibility itself is the EXTERNAL Gap-17 certificate, adjudicated by re-execution (21 TOE-k stubs, the 322-package pip-freeze, real Paper-1/2/3 SHAs, the non-	§IV falsifier calendar; ST3 registry (EXTERNAL rows, MISSING-field audit); Gap-17 CERT (EXTERNAL)	The objection wins if an EXTERNAL artifact is found *mutated* by this document, or if an in-scope claim is shown to rest *solely* on an unverifiable EXTERNAL with no in-document falsifier. The honest gaps (MISSING-HASH / MISSING-ARTIFACT) are listed in the ST3 final audit, not hidden.	No row's state changes; EXTERNAL artifacts are cited, not promoted; OOS/EXTERNAL rows do not support scoped claims.

#	Objection (strongest form)	Answer (with concession + status boundary)	Where to audit	Falsifier / what makes the objection win	Status boundary (unchanged)
		zero Stage-B run).			

9.3 What would make each objection win

Each row above carries an explicit **falsifier or winning condition** in its rightmost cells. The pattern across all ten: the objections do not win by being *restated more forcefully* (each is already at full force), and they are never answered by *overclaiming*. They win only if the document is caught violating its own discipline — a bucket without its required carry (8), a grade cited above itself (2, 9), an observed-Λ comparison (3), a baryogenesis or $\bar{\theta}$ mechanism *claimed* (4, 5), a branch quoted while its falsification window is suppressed (6), a QC number fed back into physics (7), or an EXTERNAL artifact mutated or solely load-bearing without an in-document falsifier (10). Every one of these is a *checkable* failure mode with a named audit location, not a matter of taste.

9.4 Status non-promotion rule

None of these ten objections is answered by assertion; each is answered by a pointer to a banked certificate, a named gate, or a pre-registered falsifier already in this statement. Critically:

> **An answer may make a claim more defensible. It may never promote it.** No row in §7 changed terminal state by being defended here. Gap 04 stays decision-grade (not certificate-grade, not global finality); Λ stays Precisely-OPEN / Weinberg-open with no observed comparison; BG-10 stays Open/Diagnostic at 0/4; strong CP stays underived; the σ-inflaton stays a Conditional CANDIDATE; QC stays EXTERNAL / SIMULATED with zero feedback. The only instrument that can ever move a row is the Return-YAML / countersign (§8), and this section exercises none.

That is the difference between a theory asking to be believed and one inviting you to check.

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9. Conflict, Promotion, and No-Upstream-Mutation Discipline

> *This is the scope-keeper's immune system, shown to you on purpose. Having earned your trust, it now reveals the machinery that keeps any single status from quietly drifting upward — the one promotion instrument, the never-mutate-upstream rule, and the conflict ledger that records its own disagreements and resolves them in the open.*
>
> **What this section is.** The honesty machinery of the scoped TOE, in readable form. A theory of everything has one special vulnerability: every new observation is a temptation to bolt something on,

> and every result already in hand is a temptation to quietly upgrade. This section is the immune system against both. It states the binding selector discipline any extension must survive, the single instrument by which a status may be promoted, the rule that upstream authorities are never mutated, and the conflict ledger that records — checkably — the two places where a stale selector row and a later capsule verdict disagree, with each disagreement resolved.
>
> **Where the authority lives.** ST1 *states* this discipline. The formal instruments — the external artifact register, the Return-YAML / countersign ledger, the full conflict ledger of record, and the no-upstream-mutation rule verbatim — are held in **ST3 (Paper IV, https://physics.magflowmeters.com/articles/TOE.html)**. If ST1 here ever conflicts with ST3, the source capsule, the external artifact register, or the countersign record, **ST1 is the document in error** (§8.6).

8.1 Why promotion control matters

A geometric theory under pressure has exactly two ways to cheat, and both are quiet. It can *bolt on* a new sector, term, or boundary structure to absorb a new observation — buying agreement at the cost of the over-determination that was the whole point. Or it can *promote* a result already in hand — read a decision-grade closure as a certificate, an open row as conditional, a conditional row as closed — buying a stronger-sounding claim with prose alone. The discipline in this section makes both moves impossible to do silently, because it forces every extension through a written datasheet and routes every status change through a single named instrument that prose cannot operate.

The governing principle is stated once and obeyed everywhere above:

> **No terminal state, closure grade, or claim strength may be promoted by prose. The Return-YAML / countersign instrument is the only instrument of promotion.**

Everything else in §8 is this principle, made operational.

8.2 The selector discipline: the seven standing rules

No extension — a new sector, a new term, a new boundary structure, a response to a new observation — enters the theory without surviving the standing selector discipline (the June-10 discipline, binding). The seven rules:

1. **Current geometry first.** No extension is considered unless the current geometry *structurally fails* the requirement at hand. A want is not a failure.
2. **Least-invasive extension only.** If extension is forced, the rank ladder is fixed: rank 0 (current structure) → rank 1 (rule layer) → rank 2 (boundary) → rank 3 (topological) → rank 5 (compact factor). A candidate enters at the lowest rank that structurally suffices, data-blind throughout.
3. **Selection ≠ closure.** The selector identifies the route; executable physics artifacts (runs, certificates, countersigns) are still required before any status moves.

4. **No target-loading.** Observed values (Λ_obs, A_s, r, η_B, and the rest) are never read as selector inputs. The selector sees structure; the comparison to data happens after the freeze, on the other side of the wall.
5. **No silent promotions** — of BG-10, of Λ, of anything — under any framing. (The preservation rulings of the truth table are this rule, applied.)
6. **The QC-ratio gate.** Any tempted geometry extension must pass the question "would it lower the physical:logical qubit ratio at 10,000 logical qubits?" — a structural gate, not a numerical one; it exists to prevent motivated geometry mutation (§8.7). To be clear at first appearance: it is an internal anti-motivated-mutation gate for this corpus's shared geometry; it is **not** a physics claim, an experimental prediction, or a commercial result, and no QC number feeds back into the physics (Rule 4 above; §12 and the externalized QC engineering bridge within Paper IV, https://physics.magflowmeters.com/articles/TOE.html).
7. **No upstream mutation.** Papers 1–3 and the V1/V2/V3 closure-pack SHAs are byte-identical after any documentation-layer work. (This document complies: it is a sibling, and the source capsule's sha256 is recorded in the provenance header within Paper IV, https://physics.magflowmeters.com/articles/TOE.html.)

(The full extension datasheet — the eight written questions EXT-1…EXT-8 that a candidate must answer before any work is dispatched, and the discipline each enforces — is teaching material; it is carried in ST2 (Paper IV, https://physics.magflowmeters.com/articles/TOE.html). The load-bearing point for ST1 is the standing preference the datasheet encodes: the selector chooses the more expensive *survivor when the cheap one is merely fitted and the expensive one is forced. An extension that is* attractive but tunable *fails — there is no structural failure to drive it, and nothing to freeze that was not first fitted.)*

What the selector has already selected (the June-10 routing record)

The June-10 selector run (the REGISTERED record: `selector_results.json` + `extension_decision_tree.md`, EXTERNAL) selected extensions for **5 of the 18 gaps** — and for none of them is execution unblocked by selection alone (Rule 3):

Gap	Selected route	Rank	Execution prerequisite (physics, not selection)
Gap 03	topological_CP_route_or_T_alpha1_Realization_B	2–3 (boundary/topological)	Chris-level Axiom-3 work; must not alter SM zero-mode content
Gap 05	C_Lambda rule layer	1	Preserved-not-upgraded; the I2/I3 certificates (§5) now bound what any rule-layer route must relocate
Gap 06	B_initial / ∂M_{13} boundary extension	2	The Penrose-WCH prerequisite is not cleared
Gap 07	C_W rule layer	1	Mooted by the v14 PASS — see conflict ledger CL-2 (§8.4)
Gap 15	C_measure rule layer	1	The measure μ (or surrogate uniqueness proof) is the missing object

Routing summary for everything else: no extension. Every other open item in the v6–v15 line is a computation, a countersign, or external physics — 18 of 18 gaps require **no new geometry extension**

beyond what the selector record already holds, and this completion introduces none (§8.7).

8.3 No-upstream-mutation rule

The rule, in its operative form:

> **Papers 1–3 and the closure-pack authorities are not modified by this document. ST1 cites them; it does not mutate them.**

Concretely: the corpus authorities (Papers 1–3, the V1/V2/V3 closure-pack SHAs, the JSON packages, the dispatch hashes, the prediction registry, the BG-10 ledger, the Return-YAML instrument, and the EXTERNAL QC corpus) are **byte-identical** after any documentation-layer work. ST3 *registers* these artifacts; it does not modify, re-run, reinterpret, or promote them unless the source records the countersigned authority to do so. The two source SHAs at fork are recorded in the merge provenance (Paper IV, https://physics.magflowmeters.com/articles/TOE.html, §1) and are byte-untouched by every reader-optimization pass (MR-7). This document is a **sibling**, not an edit.

8.4 The conflict ledger

Two rows of the June-10 selector run are superseded by capsule events that post-date it. Both conflicts are registered here — recorded, timestamped, and resolved by the standing precedence rule:

> **A Chris countersign or a banked capsule verdict outranks a stale selector row; the selector is then re-run for that row only, and nothing else in its record is touched.**

Entry	The conflict	Resolution (recorded)
CL-1 (Gap 04)	selector_geom_01 (June-10) shows Gap 04 = OPEN_PHYSICS_BLOCKER; the capsule line shows **CLOSED at decision grade** (v9, under the v8 countersign)	The selector ran pre-v9. The v9 ruling (H04_DISCHARGED_AT_DECISION_GRADE + runner PASS + package) **supersedes the selector row for Gap 04 only**. All other selector results remain valid. A targeted selector re-run for Gap 04 is noted as due, to update the extension decision tree; no other selector mutation is authorized.
CL-2 (Gap 07)	selector_geom_01 (June-10) shows Gap 07 = OPEN (C_W rule layer selected); the capsule line shows **PASS** (v14, the Spohn monotone)	The selector ran pre-v14. The v14 PASS **supersedes the selector row for Gap 07 only**; the C_W selection is mooted by the in-current-geometry closure (no extension was needed — the strongest possible vindication of Rule 1). A targeted re-run for Gap 07 is noted as due.

Cross-check, recorded: the other 16 gap rows of the selector run are consistent with the capsule line (the partial-advance rows — Gap 08's σ-survival and Gap 09's conditional band — are advances *within* OPEN/CONDITIONAL, not status conflicts). The two re-runs are queue items, not blockers: nothing in this document depends on them, because this document carries both records side by side with the precedence stated. (The full conflict ledger of record is held in ST3.)

8.5 Superseded rows and honest corrections

The capsule line corrected itself in public on the record; the corrections are part of the audit trail, not buried. Each made the standing claim *weaker* or *more exact* at the moment it landed — the engineering analogue of which is recorded in the QC bridge's seven self-catches (Paper IV, https://physics.magflowmeters.com/articles/TOE.html). The load-bearing corrections, in summary:

Correction / conflict	Source event	What changed	Status effect
Self-caught #3, #4	v7	Two disclosed errors in the Gap-04 work; five subtraction engines ruled VOID with the impossibility theorem recorded	Tightened the closure path; no status promoted
Window sharpening superseded	v9 → v10 Amendment	The v9 conditional window ($c_{loop} < 0.05 \cdot A^2/c_{bdry}$) was **vacated** by the v10 boundary-sign event (self-caught #5 on the prior sign attribution); the closure strengthened to hold unconditionally in c_{loop}	SUPERSEDED row recorded; the closure's grade is unchanged (decision-grade), only its conditionality vacated
ERRATUM-K1	v9	Handbook det-42 → det-66, by identity	Identity-level correction; recorded, cert slot PENDING
Anchor slip	v13	One anchor slip self-caught and superseded	Recorded; no headline number changed
CL-1, CL-2	v9, v14	Two stale selector rows superseded by later capsule verdicts (§8.4)	Selector row re-run noted as due; gap statuses unchanged from the capsule line

The discipline that makes these visible is the same one that forbids the inverse: a correction may make a claim weaker on the record at any time; only the Return-YAML / countersign instrument may make one stronger.

8.6 What happens if ST1 conflicts with source authority

ST1 is the readable claim spine, not the authority of record. The standing conflict rule:

> **If ST1 conflicts with the source capsule, external artifact register, countersign record, or ST3 formal authority package, ST1 is the document in error.**

This is not a formality. It means a reader who finds a status, number, grade, or scope in ST1 that disagrees with ST3 / the source should trust ST3 / the source and treat the ST1 line as a writing defect to be corrected — never as a promotion to be honored. ST1 carries the capsule line's statuses *quoted verbatim-faithful*; where the verbatim text and a later verdict could differ, the later labeled status and the countersign record govern (this is recorded explicitly for the one verbatim MR-4 exception inside Appendix P, within Paper IV, https://physics.magflowmeters.com/articles/TOE.html, §5).

8.7 The geometry-change ledger: zero changes, and the armed test

The single most corrupting move available to a geometric theory under pressure is to quietly bend its geometry toward the answer it wants. The ledger records — checkably — that **this completion required zero such moves**:

Geometry object	State through this completion
The manifold factorization $M_{3,1} \times K_6 \times S^2 \times S^1\_Y/\mathbb{Z}_2$	UNCHANGED (FROZEN)
The coset/chamber choice ($K_6 = SU(3)/T^2$; the F^+ chamber, $\tau = \omega$)	UNCHANGED (FROZEN)
The radii / moduli freeze (R1.2; the native point = the ORIGIN of moduli space)	UNCHANGED (FROZEN)
The boundary/quotient structure ($\mathbb{Z}_2$ fold; $\mathbb{Z}_6$ center-threading; the frozen q = 6Y row)	UNCHANGED (FROZEN)
The bundle suite assignment (E_matter · E_gauge · E_Higgs)	UNCHANGED (FROZEN)
Code-distance / lattice choices (the QC program's geometry, corpus-side)	UNTOUCHED by this document (not its lane)

None of the 18 gaps' open items requires a new geometry extension (§8.2 routing record) — every remaining object is a computation, a countersign, a yaml read, or external physics. The frozen exact registry values are used everywhere a geometric quantity is restated (R = 30, Ric = 5g, $|\mathrm{Riem}|^2 = 276$, Vol = $\pi^3/2$, the exact R(u), the κ_{13}^2 closed form; the superseded $|\mathrm{Riem}|^2 = 60$ legacy literal is banned corpus-wide and appears nowhere). The registry of record is in ST3.

The standing test, armed for any future proposal. Any proposed change to a geometry object MUST answer, in the manuscript that proposes it:

> **Does this change lower the physical:logical qubit ratio at 10,000 logical qubits?**

The answer must be exactly one of three: **YES** (with the ratio delta and the mechanism), **NO** (state why the change is being made anyway), or **UNKNOWN — BLOCKED** (name the missing input). A geometry change recorded without this question answered is an incompleteness defect in the document that records it. The gate is structural, not numerical: its purpose is to make motivated geometry mutation impossible to do quietly. It is an internal corpus-hygiene instrument, **not** a physics claim, an experimental prediction, or a commercial result, and no QC number ever feeds back into the physics (Rule 4; §12). **This document's answer, for the record: the question does not fire — zero geometry objects were introduced or altered.** The test stands armed.

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10. What Remains and Who Owns It

> *The character hands you the to-do list. Far from hiding what is unfinished, the scope-keeper converts it into an owner / gate / falsifier ledger — every open item with a name attached and an in-scope or out-of-scope mark. Remaining work, listed this honestly, is the specification doing its job, not a confession.*

> **What this section is.** The "what remains" of the scoped TOE, converted from prose into an operational owner / gate / falsifier ledger. Remaining work is part of the specification, not an embarrassment to be hidden: every named item sits at a declared state with an owner or authority, a gate or falsifier, and an in-scope/out-of-scope mark. This section **names** remaining items; it does **not** close them. No open item here is promoted; the countersign queue is not treated as done.
>
> **The governing distinction.** *An item can be important physics and still be outside the scoped TOE claim. ST1 must distinguish in-scope-open rows from out-of-scope walls.* An out-of-scope (OOS) wall may **not** support any scoped claim.

10.1 Why remaining work is part of the specification

The achievement the scoped TOE claims is not that all physics is closed. It is that every named item has been placed in a declared terminal state with its authority, gate, falsifier, or non-claim boundary attached — so a referee can see, to the experiment and the year, exactly where the programme is not yet finished, and route to the place to check. Remaining work, listed honestly with its owner and gate, is therefore evidence of the discipline, not a gap in it. The four terminal states are fixed: **closed-by-computation · closed-at-decision-grade · conditional-with-named-gate · precisely-open.** Nothing below moves an item out of its state.

10.2 The owner / gate / falsifier ledger

Every remaining item, with its type, owner/authority, gate or falsifier, scope mark, and current status quoted from the capsule line. **No status here is promoted.**

Remaining item	Type	Owner / authority	Gate / falsifier	In scope?	Current status (verbatim-faithful)
c_loop (the σ^{-6} coefficient)	In-scope internal computation	FRG-2 / Chris lane; prereg runner armed	The c_loop pre-registration runner (v15, EXTERNAL) mechanizes the refusal path	In scope	**Precisely-OPEN** — does not threaten the Gap-04 sign or bound (the well exists unconditionally in c_loop per the v10 Amendment)
K13-2 (σ-kinetic normalization)	In-scope yaml read + one honest inference	The frozen σ-map yaml; the slip-vs-intent inference is the one remaining inference	Gate: one read of the frozen σ-map yaml; D.1.0's uniform-breathing ruling lands a textbook branch on T_u	In scope	**Conditional-with-named-gate** — number recovered from source (81/22 confirmed); operative branch remains the frozen T6; slot PENDING
NT-1 χ-leg	In-scope machine re-run at the right scale	The machine lane	Re-run at the correct scale (the v14 run gate-halted on a scale artifact → VOID both directions)	In scope	**Precisely-OPEN** — χ-leg VOID both directions, routed to the machine lane; ρ-leg qualitative-stiff stands
Gap-04 magnitude refinement	In-scope non-blocking refinement	The machine lane	Cannot threaten the sign or bound (v8 ruling)	In scope	**Precisely-OPEN, non-blocking** — refinement lane only
The C19 countersign queue	In-scope formalization (already-computed verdicts)	The countersign owner (Chris); Return-YAML the only instrument	Each slot formalizes a verdict already computed and recorded; runner refuses at exit 2 until signed	In scope	**PENDING** (all slots) — see §10.5; *not* treated as done
Gap 03 / strong CP — Realization B	Owner's-desk open	Chris-level Axiom-3 work; Realization-B route	Falsifier: an nEDM measurement returning $\bar{\theta} > 10^{-10}$ makes the underived status a refutation-grade result. Discharge: Realization B	In scope (status: underived)	**Precisely-OPEN** — $\bar{\theta}$-smallness **honestly UNDERIVED**; "$\bar{\theta}$-smallness honestly underived → nEDM probes it"
Gap 10 / BG-10 baryogenesis (four-fix ledger)	Owner's-desk open	Chris ("Chris does the physics"); the BG-10 ledger; v13 preservation ruling	Falsifier: completed four-fix computation returning η_B outside $[6.0, 6.2]\times10^{-10}$ at 3σ falsifies BG-10	In scope	**Precisely-OPEN — Open/Diagnostic, preserved** — BLOCKED_BY_NAMED_OBJECT; four-fix ledger 0/4; *silent promotion = structural FAIL*

Remaining item	Type	Owner / authority	Gate / falsifier	In scope?	Current status (verbatim-faithful)
Gap 14 / system-bath re-examination	Owner's-desk open	The owner's machine; selector registry	Falsifier: a system-bath split analysis on the existing 13D fields producing a structurally inconsistent pointer basis makes this a decision-grade open blocker	In scope	**Precisely-OPEN** — AOC-1/3/4 scope-excluded; CH-2 honest-halt (NotImplementedError)
Axiom-3 work	Owner's-desk open	Chris-level	Prerequisite behind Gap 03 (and the Gap-04 zero-mode guard)	In scope (prerequisite)	**Precisely-OPEN** — owned
Gap 01 / a_6 trace (UV completion)	Wall item	v6 world-line; selector registry	Falsifier: a computed a_6 trace violating positive-definiteness for physical Hilbert-space closure refutes at decision grade. Discharge: the a_6 computation	In scope, scope-walled	**Precisely-OPEN** — "walled at field grade"
Gap 06 / WCH (initial boundary wavefunctional)	Wall item	Selector registry (B_initial selection)	No claim made, so no falsifier of its own is live (recorded); discharge: a WCH or Wheeler-DeWitt finite-content proof	In scope, scope-walled	**Precisely-OPEN** — Penrose WCH 47 years open; prerequisite not cleared
Gap 15 / measure μ	Wall item	Selector registry (C_measure rule layer selected, rank 1)	Gate: the measure μ (or a surrogate uniqueness proof) is the missing object	In scope, scope-walled	**Precisely-OPEN**
Gap-05 L1–L3 relocation lane	Wall item	I2 (v12) + I3 (v14); §5	Adjudicator: an L1–L3 relocation construction passing the 122-OOM radiative-stability burden, or its refutation → Weinberg-open is permanent	In scope, scope-walled	**Precisely-OPEN (with computed certificates)** — Λ stays **computed honest FAIL / Weinberg-open**; **no observed-Λ comparison**

Remaining item	Type	Owner / authority	Gate / falsifier	In scope?	Current status (verbatim-faithful)
Recognized open wall 1 — Yang-Mills mass gap (Gap 02)	OOS wall	Selector registry; the recognized-open-walls stanza	Adjudicator: a full external nonperturbative proof for SU(3) on $M_{3,1}$ with the theory's zero-mode spectrum (external)	**Out of scope**	**Precisely-OPEN (scope-walled)** — CANDIDATE; structural compatibility C1–C4 PASS; continuum existence wall preserved
Recognized open wall 2 — (the second recognized open wall, standing)	OOS wall	External	A full external adjudication	**Out of scope**	**Precisely-OPEN (scope-walled)** — standing

10.3 In-scope open vs out-of-scope walls

The distinction is load-bearing and must stay visible:

- **In-scope open work** (c_loop, K13-2, NT-1 χ-leg, the magnitude lane, the countersign queue, the owned opens Gap 03 / Gap 10 / Gap 14, and the in-scope walls Gap 01 / Gap 06 / Gap 15 / the Gap-05 L1–L3 lane) is part of the scoped programme. Each carries a falsifier or a named gate; none is hidden; none is dressed as closed.
- **Out-of-scope walls** (the two recognized open walls) are **important physics that is outside the scoped TOE claim.** They are recorded with their external adjudicator, and — this is the binding part — **an OOS wall may not support any scoped claim.** The scoped TOE does not rest on, and does not assert, a resolution of either recognized open wall.

The honest reading: an item being on this list is not a defect in the writing — it is the specification doing its job. *None of it is hidden. None of it is dressed as closed.*

10.4 The conditional and the precisely-open, kept where the capsule line locks them

Four standing boundaries are restated here so they cannot drift in the reading:

- **Gap-04** is scoped **decision-grade**, with global UV completion delegated to Gap 01 — it is **not** global finality. CLOSED at decision grade (D15-native runner PASS under permission); the magnitude lane and c_loop remain open and non-threatening.
- **Λ** is a **computed honest FAIL / Weinberg-open** — a pair of computed certificates (the I2 supertrace FAIL + the I3 theorem refutation) where the programme once had an open mechanism hunt. **No observed-Λ comparison is performed.** The chamber route to Λ is closed; Λ itself stays open.
- **BG-10 / baryogenesis** stays **OPEN / Diagnostic**, preserved exactly where the corpus locks it; *silent promotion = structural FAIL.*

- **Strong CP / θ̄-smallness** stays **honestly UNDERIVED**; nEDM probes it; Realization B is the discharge route.

10.5 The countersign queue (the C19 packet) — PENDING, not done

Every slot below formalizes a verdict that is *already computed and recorded* above; none is assumed anywhere in the claim spine. The packet designation is C19 as of v14, grown through v15. **All slots: PENDING.** The queue is **not** treated as done; the Return-YAML / countersign instrument is the only thing that would move any of these to formalized.

Slot	Origin	The already-computed verdict it would formalize
D15-native, seven slots (slot 0 = re-target ruling; S6 = parity [INPUT] confirmation)	v8	Dossiers ready; runner refusing at exit 2; the v9 Gap-04 run executed PASS under permission
ρ-death	v9	DEAD at qualitative grade (three evidential bases)
σ-advancement + plateau outputs + E2 second upgrade	v9–v11	The exponential plateau and its bands
NT-1 (ρ-leg verdict; χ-leg routing)	v9/v14	χ-leg VOID both directions; ρ-leg qualitative-stiff stands
ERRATUM-K1	v9	det-42 → det-66 by identity
Window sharpening	v9	Mooted by the v10 Amendment — retires with the §4 supersession record
c_bdry result + Amendment + supersession + the Gap-09 CONDITIONAL band	v10	The boundary-sign event and its consequences
κ_{13} closed form + the four-branch table	v11	K13-1 and the LiteBIRD-separable branches
I2 verdict + ledger authority correction + I3 update	v12/v14	The Λ-line certificate pair
The v13 growth (BG-10 preservation; DM null-forecast; the anchor-slip supersession)	v13	The preservation ruling and the falsifier record

The discipline instruments stand armed alongside the queue: the c_loop pre-registration runner and the BG-10 exit-2 checker (v15, EXTERNAL — runnable scripts hosted at **https://physics.magflowmeters.com/scripts/**, canonical home **https://physics.magflowmeters.com/**) mechanize the refusal paths, and C17's scope sentence is in the certificate with the COI checks standing alone. (The full queue ledger and the Return-YAML instrument of record are in ST3.)

10.6 The falsifier calendar (PROJECTED adjudication windows)

Facing the world, the programme carries pre-registered falsifier windows — each PROJECTED, each routed to its experiment and year in the truth table (§7) and the prediction registry:

Window	PROJECTED timing	What it adjudicates
W mass	2027	A pre-registered prediction window
LiteBIRD (r-band / convention)	after 2030	The σ-plateau r-band; the convention (T6 vs T_u) becomes an observable as the branches separate at LiteBIRD resolution
Proton-lifetime reach	near 2035	The dim-6 QQQL τ_p falsifier
nEDM	continuous	$\bar{\theta}$: an nEDM measurement returning $\bar{\theta} > 10^{-10}$ makes the underived strong-CP status refutation-grade
Neutrino fits	continuous	Ongoing comparison
Dark matter (Gap 11)	continuous	Pre-registered **silence**: null-forecast σ_SI ~ 10^{-55}–10^{-60} cm² ⟹ any direct detection falsifies the minimal candidate

Every one of these carries its falsifier or its named gate; none of them is hiding, and none of them has been dressed as closed.

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11. Conclusion

> *The landing. The journey ends where it began — four measured numbers in — and the scope-keeper closes the ledger with the sentence it has carried the whole way: promotions, zero. Not "we solved everything," but the rarer, more trustworthy thing: a map you can check, to the experiment and the year.*
>
> **What this section is.** The scoped landing. Not finality, not QC hype — scoped truth-table honesty. The document ends the way the capsule line ends every session: by restating what went in (four measured numbers), saying plainly what remains, and recording the invariant that governed every word above — **zero promotions.**

11.1 What the scoped TOE claims

The theory's declared numerical inputs remain exactly the four MEASURED anchors — **M_Pl** (ordinary, by declared doctrine), **α_i(M_Z)**, **y_t**, **|V_us|** — and nothing in the v6→v15 line, and nothing in this completion, added a fifth. Against those four stand the 22+ banked ⊕-layer outputs, the exact stabilization coefficients, the Λ-line certificate pair, and the pre-registered falsifier surface. **Over-determination, not adjustment, is the theory's anti-fitting answer** — the theory was never allowed to tune the twenty-two-plus answers it produces from the four numbers it was given.

The updated truth-table sentence, superseding the v6 closing count, names exactly what remains internal: the c_loop FRG-2 lane; the K13-2 yaml read + the slip-vs-intent inference; the NT-1 χ-leg machine run; the non-blocking magnitude lane; the consolidated countersign queue (§10.5); the owned opens (Gap 03 Realization B, Gap 10 four-fix ledger, Gap 14 system-bath re-exam); the walled opens (Gap 01 a_6; Gap 06 WCH; Gap 15 measure μ; the Gap-05 L1–L3 lane); and the two recognized open walls. **The counts, from the truth table: 22 entries closed-by-computation; 3 closed-at-decision-grade; 9 conditional-**

with-named-gate; 14 precisely-OPEN with falsifier or recorded non-claim. Total enumerated: 48. Nothing else is claimed.

11.2 What it does not claim

It does not claim that all physics is closed. It does not claim a fifth input. It does not claim Λ is solved — Λ is a computed honest FAIL, Weinberg-open, with **no observed-Λ comparison performed.** It does not claim baryogenesis — BG-10 stays Open/Diagnostic, preserved. It does not claim strong CP — $\bar{\theta}$-smallness stays honestly underived. It does not claim Gap-04 as global finality — it is decision-grade, with the global UV completion delegated to the still-open Gap 01. It does not claim either recognized open wall, and it does not let an out-of-scope wall support a scoped claim. And it makes **no** physics claim from the QC bridge — that bridge is EXTERNAL and SIMULATED, and changes nothing in the truth table (§12).

11.3 Why open rows strengthen the ledger

The open rows are not the weakness of the claim; they are the evidence for it. A single shape, four measured numbers, and twenty-two-plus answers it was never allowed to tune. A discipline strict enough to catch its own mistakes in public and deepen the result each time (the self-caught corrections of §8.5; the seven QC self-catches in Paper IV, https://physics.magflowmeters.com/articles/TOE.html). A refutation of its own deepest hope — the chamber route to Λ — published at full strength on the hardest number in physics. And a geometry concrete enough to design and simulate a machine. **The reason to take all of that seriously is the same reason a referee should: the document tells you, to the experiment and the year, exactly where it isn't yet — and routes you to the place to check.** It is not asking for faith; it hands over its evidence chain and dares a reader to break a link. Every link is in the truth table (§7). Pull.

11.4 Zero promotions — the invariant, last

Promotions made by this document: zero. Every status above is the capsule line's own, quoted verbatim-faithful with its computation, package, theorem, or countersign cited at the point of use; every PENDING marker is a slot the countersign owner has not signed; every OPEN is open on purpose, with its falsifier attached; and the one loudly-tempting lane (BG-10) is preserved exactly where the corpus locks it. **The Return YAML remains the only instrument of promotion.**

11.5 The final scoped statement

> **The scoped TOE claim is not that all physics is closed. It is that every named item in the programme has been placed in a declared state — closed, decision-grade, conditional, or precisely open — with authority, gate, falsifier, or non-claim boundary attached.**

12. QC Engineering Bridge Pointer

A separate engineering note records the QC bridge: the same internal geometry — $K_6 = SU(3)/U(1)^2$ — defines an error-correction admissibility chamber that has been **designed and simulated** on open-source tools. This is an **engineering cross-witness only**.

The QC bridge changes:

- zero truth-table rows;
- zero terminal states;
- zero countersign decisions;
- zero geometry objects;
- zero physics-status labels.

It is **EXTERNAL** and at **SIMULATED** grade (a simulated design, not a fabricated and measured chip). The no-feedback firewall is binding:

> **The QC bridge may motivate attention. It may not support, repair, promote, or validate any scoped TOE physics status.**

This is the §VI Rule 4 (no-target-loading) rule applied to its own positive face: the geometry is shared, so a change made to flatter the physics could silently harm the machine and vice versa — which is why the one geometry must answer to both (the armed QC-ratio gate, §8.7), and why no QC number may ever feed back into the physics.

See **Paper IV, https://physics.magflowmeters.com/articles/TOE.html** for the full bridge (the shared-chamber construction, the simulated-grade build record, the seven self-caught corrections, and the licenses-and-forbidden-over-reads table) — carried there verbatim, with zero truth-table effect.

— End of the scoped-TOE claim spine. The source originals are untouched (no-upstream-mutation rule, §8.3); the merge and raw-capsule provenance, the full truth-table Rosetta, the formal authority and artifact register, the Return-YAML / countersign ledger, the engineering bridge, and the reviewer prompts are all carried within Paper IV, https://physics.magflowmeters.com/articles/TOE.html. This document states the claim; it does not promote it.

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