

VERSF Standard Model

Derivation Master Ledger July 22nd 2026

Latest proof state, gate-by-gate assessment, and ordered completion plan

Ledger version: July 2026 update — supersedes the original 62.4% Master Ledger and all intermediate planning updates.

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Primary update source: SMC-1U (updated), including Parts XII-octies through XII-decies and the revised final certificate.

≈ 87%	97–98%	NOT ADMITTED	PROVED
OVERALL PLANNING ESTIMATE	THEOREM / AUDIT ARCHITECTURE	HFB PHYSICAL BOUNDARY	CURRENT-CORPUS NON-CLOSURE

Current programme verdict. The derivational architecture is nearly complete, and the structural existence of the neutral terminal sector is now closed at retained quadratic order. The programme still lacks three things, and until they are supplied the Standard Model is not derived: a uniquely substrate-forced physical boundary, a first-principles absolute scale, and a complete admitted neutral/global package.

How to read this ledger.

1. The ≈ 87% figure is a weighted planning estimate across four programme dimensions (see §1) — not a proof grade, and not a claim that 87% of the Standard Model has been derived. The strict physical verdict is unchanged: HFB and the RPC numerical certificate are **not admitted**.
2. Compound grades of the form **A / B** read as (structural or mathematical layer) / (physical-admission layer). The physical layer always governs the programme verdict, so “structural existence closed / physical open” counts as **open** for admission.
3. Grades are preserved exactly as their source papers state them and are never silently promoted. Where a paper writes “closed” for a conditional theorem, this ledger keeps the condition attached.

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1. Executive position and evidence hierarchy

Bottom line. VERSF has progressed from a connected Standard Model architecture to a highly developed, executable and falsifiable closure programme. The strongest current result is not a completed derivation. It is the

combination of major conditional sector closures, an explicit full-carrier neutral construction, and a theorem proving that the present corpus does not yet determine one unique physical HFB boundary — together with a precise, ordered account of exactly what new upstream information would close it.

Completion profile — the primary reading

The single percentage is a summary of the four dimensions below; the dimensions, not the number, are the real state of the programme.

Programme dimension	Estimate	What it means
Theorem & audit architecture	97–98%	Type system, dependency chain, non-insertion rules, transport map and final-admission logic are almost fully specified.
Structural microscopic construction	88–92%	Common actions, history metrics, representation-resolved kernels and a full-carrier retained instrument all exist.
Unique primitive boundary selection	75–80%	A working instrument is supplied and sufficient, but is not yet proved to be uniquely forced by the unextended substrate.
Numerical physical closure	66–70%	No complete same-branch package of couplings, scalar parameters, Yukawas, neutral block and strong phase has been admitted.
Overall (weighted heuristic)	≈ 87%	A weighted planning estimate only, defensible range 85–89%. Not a statement that 87% of the Standard Model has been proved.

Official verdict. HFB NOT ADMITTED; RPC numerical certificate NOT ADMITTED; genuine conditional Standard Model derivation NOT ESTABLISHED.

Evidence hierarchy

Every result below sits in exactly one of three tiers, and the tier — not the residual size — decides how much weight it carries.

Tier 1 — Independently checkable, load-bearing. Theorem 4 (current-corpus non-closure), Lemma 3 (η -readback non-identifiability), and Appendix A (the self-consistent quark-threshold contraction theorem). These do not depend on accepting any off-document VERSF definition; a reader outside the framework can check them. They are what the ledger stands on.

Tier 2 — Conditional forward construction. RRHF-1, PRLU-1, PTSD-1, SGPL-1 and FCHI-1 materially narrow the remaining debt, but they rest on off-document VERSF definitions and supplied candidate structures. They are real progress at their declared grade — not the headline proof of a Standard Model derivation, and they are not independently verifiable without the primitive definitions.

Tier 3 — Non-promotable diagnostics. Transported conditional couplings, readback responses, benchmark PMNS frames and candidate boundary values remain quarantined. Exact arithmetic or regulator stability does not convert them into physical outputs — a residual of 10^{-16} can certify arithmetic and still carry no physical content.

The programme is built to reach a verdict

The central discipline is that this programme can fail cleanly. Theorem 4 already proves the current corpus does not determine a unique boundary, so the remaining work is posed as one decidable question a level up: does the unextended primitive substrate uniquely force the working full-carrier instrument and the absolute scale, or does it provably admit inequivalent choices with no substrate-internal selector?

Either answer resolves the programme. The first completes the derivation; the second falsifies it as a derivation and fixes its standing as a conditional model. The apparatus is thus constructed to terminate in a

verdict rather than to accumulate indefinitely — a property most solo closure attempts lack, and the strongest structural claim this ledger makes.

Status vocabulary

Grade	Meaning	Evidence	Weight in completion score
CLOSED	Passes its declared gate without a same-type unresolved input.	Strong	Full credit at gate level.
CONDITIONAL	Closes once named premises are granted.	Bounded	Credit for the architecture / theorem layer, not unconditional physical closure.
PARTIAL	Important sub-gates close; the original pass condition remains open.	Mixed	Partial credit only.
SUPERSEDED	Original gate absorbed into a stronger common-object programme.	Mixed	Credit only for what the successor calculation actually returns.
OPEN / BLOCKING	Original pass condition remains unmet.	Open	No physical-closure credit.
FAILED CANDIDATE	A specific candidate route was falsified.	Strong negative	Scientific progress, but not completion credit.

Compound-grade convention. Several gates below carry two grades separated by a slash — for example STRUCTURAL EXISTENCE CLOSED / PHYSICAL OPEN, or CLOSED MATHEMATICALLY / PHYSICAL OPEN. The left term grades the structural or mathematical layer; the right term grades physical admission. The right term governs the programme verdict.

2. What has changed since the original Master Ledger

From a 62.4% architecture to an executable closure programme. The original ledger correctly identified a strong structural spine and weak numerical closure. The current stack adds master-action, history-measure, full-carrier and renormalised-transport machinery while preserving — throughout — the distinction between architecture and derivation.

Higgs sector. SM-16 now has a conditional numerical Route-A pass: a vacuum, quartic, quadratic coefficient and Higgs radial mass are returned on the frozen upstream stack, without inserting v or m_H . One-master-action provenance and full pole corrections remain open.

Charged flavour and gauge sector. RRHF-1 derives the functorial lift by blind differentiation and returns the charged tensor, the gauge Schur response and independent CY3' agreement at two regulators — conditional on the discrete representation ledger.

Ledger provenance. PRLU-1 proves the published primitive transfer does not itself select the neutral-extended ledger, then localises the debt to neutral terminal completeness and score normalisation.

Neutral terminal structure. PTSD-1 and SGPL-1 turn the two ledger premises into operator theorems. FCHI-1 then supplies the full 102-dimensional retained parent and complete Kraus instrument, passes the positive-support checks, and proves an exact, regulator-uniform terminal-route gap of $1 - e^{-1}$.

Quark transport. The threshold / mass transport problem is now a proved contraction with a unique fixed point and a common one-loop VBF matching operator, removing a previous scalar-stability obstruction.

Non-closure. Theorem 4 / RPC-1 Theorem 72.1 proves the current corpus permits continuously many inequivalent boundaries; the missing physical information cannot be recovered by downstream inversion or higher numerical precision.

Remaining frontier. The open question is no longer whether a working instrument can exist. It is whether the unextended primitive substrate uniquely forces that instrument, its absolute scale, and the physical same-branch neutral/global boundary.

Latest SMC-1U additions and their exact grade

New result	Current grade	What remains
Theorems 9–10: terminal & score descent	Structural reduction	The killed-kernel radius and score law become explicit operator questions — not yet full physical closure.
Theorems 11–12: absorption & marked-martingale orthogonality	Structural theorem pass	Neutral absorption follows from full-rank support; quadratic-score additivity no longer needs independent counts.
FCHI-1 full-carrier parent	Construction / existence pass	The 102-dimensional retained parent and complete instrument are supplied — not yet uniquely substrate-forced.
Theorem 13 exact route gap	Closed for the supplied instrument	$1 - e^{-1}$, exact and regulator-uniform. This is a route-support / typing gap, not a mass or lifetime.
D36 rebuild discrepancy	Reproducibility failure	$\hat{\Sigma} = \ln 2$ remains conditional and is not settled until the independent-rebuild discrepancy ($\hat{\Sigma} = 0.185$) is resolved.

3. Updated 30-gate ledger

Reading rule. A conditional theorem or a successful construction does not automatically close the original physical pass condition. The “remaining debt” column controls the gate grade.

Gate	Original target	Current grade	What is established now	Remaining debt to close the original gate
SM-1	Weak-orientation admissibility	CONDITIONAL	Admissible weak orientation reduced to the left-chiral branch; vector-like, right-handed and mixed attachment excluded.	Upstream chiral-locking, mirror-census and completion-carrier provenance remain conditional.
SM-2	Full su(8) weak-doublet Hessian	SUPERSEDED / PARTIAL	The symbolic block work is strengthened by the common master-Hessian and later full-carrier construction.	The full su(8) numerical block return and direct background-matching certificate are not separately closed on an admitted branch.
SM-3	Projected leakage support trace	CONDITIONAL	Leading denominator 20 reduced to the 5×4 support count; double counting excluded.	Closure-orientation involution and per-slot allocation remain inherited premises.
SM-4	Ordered-commitment χ readout	PARTIAL	The readout domain is fixed to reversal-odd ordered history rather than the final record.	A primitive, nonzero physical quark-class χ current remains an open witness.
SM-5	Gauge census $k = 3 / k = 2$	CONDITIONAL	Minimal connected internal census closes on $SU(3) \times SU(2) \times U(1)$, given inherited triplicity and doublethood.	Primitive derivation of those inherited support facts and of minimality remains upstream.

Gate	Original target	Current grade	What is established now	Remaining debt to close the original gate
SM-6	Weak-attachment octant sign	PARTIAL	Conditional neutral branch selects $e-\tau$ attachment, upper atmospheric octant and negative leptonic CP orientation.	The direct Hilbert–Schmidt attachment-norm calculation and a blind physical sign return remain open.
SM-7	Adjoint removal, positivity, microcausality	PARTIAL	Null-ideal quotient, positivity and no-ghost structure substantially close; determinant-sign audit clarified.	Full physical microcausality, chiral Osterwalder–Schrader positivity and continuum reconstruction remain open.
SM-8	κ convention and numerical origin	CONDITIONAL	Convention drift, the amplitude/probability factor of two, and the conditional numerical origin of 8/3 are reconciled.	Depends on the anomaly / localisation descent premise stack.
SM-9	Convention and normalisation audit	CLOSED	Gauge, hypercharge, Higgs, Yukawa, flavour, phase, scale and scheme conventions are frozen.	Only later physical values and finite bridges remain; the audit gate itself is closed.
SM-10	Substrate-native gauge-anomaly descent	PARTIAL	Local perturbative anomaly arithmetic and quantum-gauge anomaly closure are established conditionally.	Faithful-group global bordism / η audit and primitive substrate provenance remain open.
SM-11	Generation and species census	CONDITIONAL	One-generation chiral package and three-generation support-return census fixed conditionally.	The neutral extension and some terminal-role provenance remain tied to the full-carrier / provenance theorem.
SM-12	World-to-framework occupancy map	CONDITIONAL / PARTIAL	All minimal matter fields have internal addresses; generation-quotient arithmetic is exact.	Physical terminal pushforward, nonzero-occupancy orientation and unique branch provenance remain open.
SM-13	CKM phase anti-circularity	PARTIAL	Blind charged tensors, steep hierarchy and relative frames produced conditionally by RRHF-1.	Physical CKM CP magnitude, orientation and one admitted branch are not yet returned from the primitive substrate.
SM-14	Strange-sector confinement selection	OPEN / PRECURSOR	Address and admissibility firewalls are built; strange threshold transport is typed.	Balanced-shell selection, complement breaking, down-sector exemption and physical nonperturbative dynamics remain open.
SM-15	Physical half-lazy χ gate	PARTIAL	Required involution, projection-derived halving and non-degeneracy conditions are formalised.	The exact physical quark-sector lazy involution and generation-halving law are not derived from the primitive action.
SM-16	Higgs potential and radial vacuum	CONDITIONAL NUMERICAL PASS	Route-A returns a stable scalar potential, vacuum, quartic, quadratic coefficient and Higgs radial mass without inserting v or m_H .	Microscopic Z_H , one-master-action provenance, full gauge/top/threshold pole shifts and unconditional branch selection remain open.
SM-17	First χ increment and charm hinge	PARTIAL	First occupied gap and charm-hinge architecture conditionally selected.	Primitive calibration and numerical magnitude remain

Gate	Original target	Current grade	What is established now	Remaining debt to close the original gate
				tied to the physical H_CM $\bar{R}$ and scale.
SM-18	Coloured participation fraction	PARTIAL	The fraction is reduced to a relative sector-response ratio; naive counting is ruled out.	The canonical participation operator and the physical numerical ratio remain open.
SM-19	Tau suppression	PARTIAL	Threshold projection and tau-last suppression sign follow conditionally.	Demand spectrum, capacity, surviving-channel count and suppression magnitude remain open.
SM-20	Variational-closure suppression identity	CLOSED MATHEMATICALLY / PHYSICAL OPEN	Primal–dual and deficit-to-suppression identities are exact.	Physical identification of the variational and census objects, and their mass bridge, remain open.
SM-21	Charged-lepton absolute scale	MAJOR PARTIAL	Charged hierarchy and matrices reproduced blindly at conditional action level; common-scale no-go and scale-lock architecture established.	Absolute action unit, ξ , finite scheme bridge and physical pole masses remain open.
SM-22	Full Yukawa matrices	CHARGED CONDITIONAL / FULL OPEN	RRHF-1 returns the charged tensor and genuinely separate CY3' routes agreeing at two regulators; minimal action falsified; functorial lift derived from the discrete ledger.	Primitive provenance of the full-carrier instrument, admitted Y_v , same-action neutral block and a physical four-matrix HFB pass remain open.
SM-23	Quark current masses and QCD matching	CONDITIONAL PASS	Self-consistent thresholds form a proved contraction; $R_u = R_d = 0.580788... \cdot I$ and scalar stability hold at one-loop VBF order.	Finite VBF-to-standard bridge, higher loops, finite decoupling and charm-region control remain open.
SM-24	PMNS evaluation	PARTIAL	Conditional frame, attachment and orientation architecture exist; regulator-stable candidate frames are available.	Absolute neutral spectrum, physical charged-lepton / active-neutrino relative frame, nonunitarity and sealed provenance remain open.
SM-25	Neutral fermion completion	STRUCTURAL EXISTENCE CLOSED / PHYSICAL OPEN	FCHI-1 supplies a 102-dimensional full-carrier parent and complete Kraus instrument; rank-three support, self-completion, no-protector and the exact gap $1 - e^{-1}$ pass.	The primitive substrate must uniquely force the instrument; absolute Y_v , M_D , M_R , Takagi spectrum and thresholds remain open.
SM-26	Gauge couplings	CONDITIONAL ACTION-LEVEL CLOSURE	Representation-resolved history functional returns the gauge Schur census and charged/gauge response blindly; colour deficit repaired on the conditional ledger.	Unique physical normalisation and η values, primitive instrument provenance, finite scheme bridge and admitted boundary couplings remain open.
SM-27	QCD scale and confinement	MAJOR PARTIAL	Conditional QCD-scale branches and self-consistent running are executed; centre / triality architecture and string-breaking route are explicit.	Physical Z_3 , reflection-positive global measure, derived wall coefficient, uniform physical gap, string tension and a no-route are explicit.

Gate	Original target	Current grade	What is established now	Remaining debt to close the original gate
				free-colour theorem remain open.
SM-28	Strong CP	PARTIAL / CONDITIONAL NO-GO	Combined strong-phase line, weak/strong CP independence and the positive-pushforward no-go fork established conditionally.	Physical determinant phase, substrate topological character, global measure and one blind $\bar{\theta}$ return remain open.
SM-29	Quantum gauge completion	LOCAL CONDITIONAL CLOSURE / GLOBAL OPEN	Local FP/BRST/BV, anomaly, one-loop running, algebraic renormalisation and physical-state architecture substantially closed.	Global nonperturbative measure, faithful-bundle census, OS positivity, transfer matrix and full continuum completion remain open.
SM-30	Final consolidated audit	AUDIT CLOSED / DERIVATION OPEN	Nine-requirement execution, non-insertion audit and the exact current-corpus non-closure certificate are complete.	A passing HFB package and RPC numerical certificate have not been issued; the Standard Model derivation is not established.

4. Programme completion profile and blocking logic

The completion profile is reproduced from §1 for reference; the blocking logic below explains why the overall estimate sits in the high-80s and not higher.

Why the programme is not yet above the high-80s

- The HFB package is still empty at the strict physical level: no single same-branch set of $g_s, g, g', \mu_{H^2}, \lambda, Y_u, Y_d, Y_e, B_v$ and $\bar{\theta}$ has been admitted.
- The strongest full-carrier neutral construction is a supplied retained-order candidate. Its existence, positivity and exact route gap are proved; its unique provenance from the unextended substrate is not.
- The absolute action-time / length calibration remains conditional. Without ξ and a settled D36 clock, physical GeV normalisation cannot be claimed from the history action.
- The global quantum measure, strong-phase character, QCD confinement pass, finite scheme bridge, poles and joint covariance remain open.
- The audit proves the missing information cannot be reconstructed from downstream observables — new upstream information is mandatory, not optional.

Current dependency chain

Primitive substrate provenance → H_CMR / full-carrier instrument → absolute scale ξ → unique branch → complete HFB boundary → scheme / RG / threshold / pole transport → final RPC certificate

The chain is strictly ordered: later transport cannot repair an incomplete microscopic boundary, so the first unmet link is the true blocker regardless of how much downstream machinery exists.

5. Ordered completion plan

The order matters. Each task has a stop/go pass condition; the next stage is not promoted until the preceding one is met.

Task 1 — Resolve the reproducibility and manifest-currency block

Why it blocks. The D36 one-bit metric is reported as conditionally discharged, but an independent rebuild gives $\hat{\Sigma} = 0.185$ rather than $\ln 2$. A result that cannot be rebuilt from its published specification is not yet a stable programme input — by the programme’s own D38/D40 standard.

Required work. Publish the complete score-kernel convention, all update amplitudes, clocks, normalisations and source hashes; rerun from a fresh directory; reconcile or formally retire the $\ln 2$ branch; add a revision registry that separates file integrity from source currency.

Pass condition. An independent rebuild from the paper and frozen manifest returns the same kernel, entropy-production rate, Fisher blocks and D36 verdict within declared tolerance.

Task 2 — Prove the full-carrier instrument provenance theorem

Why it blocks. FCHI-1 closes structural existence, positive support, self-completion and the exact route gap, but its 102-dimensional parent and Kraus instrument are supplied candidates. This is now the principal structural blocker.

Required work. Derive the support-strain instrument, representation ledger, neutral route maps, score normalisation and common proto-time clock directly from the unextended MASD/HMGBC substrate measure; exclude the charged-only alternative exposed by PRLU-1; prove uniqueness, or output-invariance over every admissible instrument.

Pass condition. The primitive transition law has one admissible instrument orbit, or all admissible instruments produce the same physical boundary operators. The FC1 supplied-instrument premise is retired.

Task 3 — Derive the absolute length, action unit and physical clock

Why it blocks. The candidate 84–88 μm routes are consistent but not uniquely selected. Without ξ and a settled action-time conversion, D35 normalisation and all GeV-scale claims remain conditional.

Required work. Close the D45” construction-order clause; prove which coherence / percolation branch the substrate selects; derive ξ , the proto-time attempt rate, Λ^* and the universal action unit from the same path measure used in Step 2.

Pass condition. One regulator-stable, data-independent ξ / action-time return is uniquely selected, with a two-route agreement certificate and no measured mass, coupling or vacuum scale used upstream.

Task 4 — Execute the uniquely selected physical H_CMR branch at multiple regulators

Why it blocks. Gauge normalisation, charged hierarchy, CY3’ and neutral route structure currently work on conditional or supplied branches. The physical branch must now return them from one uniquely selected history action.

Required work. Run the full non-factorising history action at two or more refinement levels; calculate W_{prim} , all D35 weights, physical G_{red} , scalar residue, P_Y , chiral embeddings, charged tensors and branch free energies; classify every null and auxiliary direction.

Pass condition. A single branch, or a certified exact-degenerate set, returns regulator-convergent boundary operators and passes positivity, Ward, separability, CY3’, rank and non-insertion tests without readback or hand-selected susceptibilities.

Task 5 — Complete the physical neutral sector on the same branch

Why it blocks. Neutral terminal existence is now structurally closed, but the physical mass block, absolute sterile scale and observable PMNS package remain absent.

Required work. Return Y_v , M_D , direct M_R and any irreducible M_L from the same action and scale as the charged/gauge branch; perform Takagi reduction; derive ordering, light/heavy census, active nonunitarity, threshold operators and PMNS from the physical relative frames.

Pass condition. A full neutral block B_v with absolute spectrum, branch provenance, thresholds, covariance and regulator convergence is published; no neutrino datum selects the branch or scale.

Task 6 — Close the global quantum measure, strong phase and confinement

Why it blocks. Local perturbative quantum architecture is strong, but the global measure, determinant-line character, reflection positivity, physical triality gap and $\bar{\theta}$ remain open.

Required work. Construct the faithful-quotient history pushforward and chiral determinant section; prove OS / reflection positivity and the transfer matrix; evaluate the substrate topological character and physical quark determinant phase; derive the colour wall coefficient and the regulator-uniform physical triality gap.

Pass condition. One global Hilbert-space / measure certificate returns $\bar{\theta}$ (zero, nonzero or obstruction), a physical confinement verdict, and a consistent strong-sector handoff without inserted centre penalties or lattice inputs.

Task 7 — Complete the scheme bridge and production-precision transport

Why it blocks. The present quark transport theorem is a strong one-loop VBF result, but physical comparison requires a common continuum scheme, higher-order running, finite threshold matching and pole extraction.

Required work. Derive the finite VBF-to-standard-scheme bridge; implement production β -functions, finite decoupling, heavy-neutral Wilson coefficients and controlled charm treatment; calculate gauge/Higgs/lepton/neutral poles and short-distance quark observables; propagate joint covariance and truncation envelopes.

Pass condition. The full HFB boundary transports through one frozen scheme / RG / threshold / pole map with closed round-trip checks, stable observables and a complete uncertainty ledger.

Task 8 — Issue HFB-1 and run the final RPC certificate

Why it blocks. The programme is complete only when one immutable microscopic boundary is admitted and transported without rescue.

Required work. Seal the branch, scale, scheme, operators, covariance, thresholds, regulator evidence and provenance hashes; run RPC-1 from Stage 0 through physical observables; publish every pass, fail, unresolved or degenerate result before any experimental comparison.

Pass condition. HFB-1 reads PASS (or a formally accepted exact-degenerate set), the RPC numerical certificate is populated, the final non-insertion audit passes — and only then is the output compared with nature.

Critical-path summary

Order	Blocking object	Current position	Release condition
1	D36 reproducibility / manifest currency	Conflict remains	Fresh independent rebuild agrees
2	Instrument & H_CMR provenance	Existence closed; uniqueness open	Substrate uniquely forces the instrument, or an output-invariant class
3	ξ / action-time / D45''	Two candidate routes	Unique scale and clock selected
4	Physical branch & G_red	Conditional / supplied branches	One regulator-convergent same-action branch
5	Neutral physical mass block	Terminal structure exists	Absolute B_v and PMNS package returned
6	Global measure, $\bar{\theta}$, confinement	Architecture conditional	Global Hilbert / measure and strong-sector certificate
7	Scheme, precision, poles, covariance	Reference transport only	Production map and uncertainty ledger complete
8	HFB / RPC final run	Locked / not admitted	Numerical certificate issued

6. Final HFB / RPC pass conditions

The derivation is complete only when the following package exists as one immutable object. A value appearing somewhere in the corpus is not enough.

Required certificate	Minimum content	Current status
One physical boundary	$g_s, g, g', \mu_{H^2}, \lambda, Y_u, Y_d, Y_e$, full B_v and $\tilde{\theta}$ — at one scale, in one branch	NOT SUPPLIED
Microscopic provenance	Common action / Hessian, P_Y , embeddings, full-carrier instrument, branch and regulator certificates	PARTIAL / CONDITIONAL
Absolute scale and clock	ξ, Λ^* , action unit, proto-time-to-physical-time conversion	OPEN
Global quantum certificate	Faithful-quotient measure, determinant line, OS positivity, transfer matrix, strong phase	OPEN
Strong-sector certificate	Physical Z_3 , QCD scale, triality gap / confinement or string-breaking verdict	PARTIAL
Common transport map	Finite scheme bridge, RG, thresholds, EWSB, poles, Wilson coefficients	STRUCTURAL / PARTIAL
Uncertainty and covariance	Joint input covariance; regulator, branch, scheme, truncation and numerical envelopes	OPEN
Non-insertion & reproducibility	Sealed hashes, revision registry, independent rerun, no target visibility	PARTIAL — D36 conflict
Final outcome	PASS, FAIL, DEGENERATE or UNRESOLVED, published before comparison	NOT ISSUED

Completion decision rule. Declare “Standard Model derived” only if: one uniquely selected — or formally exact-degenerate — primitive branch returns the complete HFB operator package; every boundary object has provenance and regulator certificates; the global quantum and strong-sector gates pass; the RPC map transports the package with no inserted data; and the observable comparison is performed only after the certificate is sealed.

7. Key risks, falsifiers, and source map

Highest-risk failure modes

R1 — Provenance failure. The primitive substrate permits the working full-carrier instrument but does not uniquely force it. Outcome: conditional model, not derivation.

R2 — Absolute-scale non-uniqueness. The 84–88 μm candidates remain branch-dependent, or the D45” construction-order clause fails.

R3 — D36 reproducibility failure. The one-bit kernel cannot be reconstructed from the published rules, invalidating its use in the physical H_{CMR} normalisation.

R4 — Neutral physical failure. A substrate-forced instrument exists but returns a non-viable neutral mass hierarchy, rank, ordering, nonunitarity or threshold structure.

R5 — Strong / global failure. No positive faithful-quotient measure or determinant-line trivialisation exists, or the physical triality gap collapses under regulator removal.

R6 — Precision-transport failure. The finite scheme bridge, higher-loop charm treatment or threshold corrections move the branch outside scalar stability or physical agreement.

R7 — Branch degeneracy. The $k = \pm 1$ pair remains physically distinct without a data-independent selector or an exact equivalence theorem.

R8 — Flexibility masquerades as prediction. A candidate boundary is promoted because it fits, despite being produced by selectable scores, susceptibilities or completion graphs. This is the failure the non-insertion discipline exists to prevent.

Primary source stack for this ledger

Source layer	Role in this ledger
Original baseline	The Standard Model Derivation Master Ledger in VERSF — the 30-gate architecture and the original 62.4% planning estimate.
Latest controlling audit	VERSF Conditional Standard Model Derivation and Parameter-Closure Audit (SMC-1U, updated) — including Theorems 9–13 and Parts XII-octies through XII-decies.
Assembly and transport	The Renormalised Standard Model Parameter-Closure Theorem in VERSF (RPC-1) — including the exact current-corpus non-closure theorem and the reduction to $\{H_CMR, \xi\}$.
Common microscopic parent	The VERSF Master Substrate Action and Constitutive-Descent Theorem (MASD-1).
History & branch architecture	The VERSF History-Measure, Generation-Geometry and Branch-Closure Theorem (HMGBC-1).
Sector completion papers	Higgs/vacuum, neutral branch, microscopic Yukawa, gauge response, nonperturbative QCD, global-measure/strong-phase and quantum-gauge completion papers assessed in the preceding batches.

Ledger discipline. Where a later paper uses “closed” for a construction or a conditional theorem, this ledger preserves that grade and does not silently promote it to unconditional physical closure. The overall $\approx 87\%$ estimate is therefore conservative relative to architecture progress and intentionally strict relative to physical numerical completion.

Current verdict. Approximately 87% complete as a programme, with theorem architecture nearly finished — but the Standard Model derivation remains unadmitted until the provenance, absolute-scale, neutral/global and final-transport certificates are all closed on one physical branch. The programme’s strength is that this is a decidable end-state, not an open horizon: the same substrate step that would close it is the one that would, if it fails, falsify it.