

VERSF Standard Model Derivation Ledger

October 2026

September to October advances and the remaining physical derivation

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October assessment

The programme has advanced from the September audit's 68–72% planning range to approximately 75%, with a provisional range of 72–77%. The increase reflects identifiable results: a conditional neutrino mass-spacing ratio, a relative gauge-strength relation that removes two unknown comparison coordinates at one loop, stronger finite and static quantum consistency, and a completed baryon/lepton charge-selection calculation under explicit inherited premises.

A complete physical Standard Model derivation is not yet established. Absolute gauge coefficients, a physically selected neutral mass and current construction, the charged-flavour and Higgs observable bridges, confinement, and a common global quantum and continuum completion remain open. The new results narrow these obligations and close several calculations without assigning the missing physical coefficients.

What the update means in plain terms

The programme now says more than how a plausible particle framework could be organised. It produces a definite conditional neutrino ratio, predicts one force-related quantity from two measured strengths on a declared branch, and calculates which baryon and lepton changes are permitted by a specified combination of interactions. Each result has a precise range of application. The ledger records those advances without presenting their remaining physical identifications as already proved.

The approximately 75% figure describes research-programme maturity. It is not the fraction of measured Standard Model parameters derived, a probability that VERSF is correct, or a forecast that the remaining work will agree with experiment. The unfinished work includes some of the programme's most consequential steps.

This audit supersedes the September programme ledger [B0]. Primary theorem papers retain authority over the objects and assumptions they establish. All thirty SM identifiers are preserved. The October source register contains twelve files in eleven paper families, including two successive CLSN-1 editions.

1 Assessment and evidence grades

The overall estimate is a broad planning judgement constrained by the gate ledger. The layer ranges below continue September's convention; they are not measured completion statistics. The overall range is assessed separately and is not an arithmetic average of the five layers. Retired routes and repeated integrations receive no separate completion credit.

Layer	Sept.	Oct.	Basis of the October judgement
Mathematical and representation structure	91–94%	94–96%	New quotient, response, applicability and all-charge selection theorems; inherited carrier premises remain explicit.
Conditional same-action construction	81–85%	85–89%	Full specified tensor descent, assembled neutral candidates and more complete transfer and response calculations.
Numerical reproduction	50–55%	55–61%	Frozen conditional neutrino ratio and relative gauge prediction; residuals and failed branches retained.
Primitive physical admission	44–48%	46–51%	Some convention and carrier questions closed; physical amplitudes, records and coupled responses still unresolved.
Continuum and scheme or pole completion	40–45%	45–50%	Free/static positivity and conditional decoupling advance; global measure, dynamical positivity and common pole scheme open.
Overall planning assessment	68–72%	72–77%	Approximately 75%; modest increase reflecting shared dependencies and remaining physical gates.

Reading the grades

Grade	Meaning retained in this audit
Exact	Mathematical statement proved under its displayed hypotheses; this alone does not admit those hypotheses as physical.
Exact on frozen ledger	Evaluation on an inherited carrier, census or convention. Primitive origin remains separately graded.
Conditional action-level	Calculation on a specified action or source construction whose physical selection is not fully established.
Structural Stage 3 or retained theorem	Mechanism or protected result survives the stated reductions; full physical or observable promotion remains separate.
Physical microscopic or observable closure	Requires source admission and, for an observable, the appropriate physical normalization, matching and readout. No whole-SM certificate is issued here.
Refused or superseded	An invalid inference or failed branch is retained as a restriction; a replaced route is not counted as an additional result.

Verification claims retain their primary-paper scope; archive checks are not automatically independent checks by this audit. The September and October registers are supplemented by earlier website sources in Section 10. Declared foundational rules, empirical inputs, inherited theorems and unresolved physical identifications are graded separately. An accepted input is not an unfinished proof. Recovered earlier credit is not a fresh October advance.

2 Substantive advances since September

A numerical neutral construction now exists

The September description of the neutral sector as having no numerical certificate needs qualification. The bath-selection and source-fixed papers assemble explicit conditional constructions, reject specified depth and unprojected alternatives, select discrete Fold angles at sixth order on the tested branch, and return $R_v = 0.02822142937$ for a frozen projected parent. Its projection, physical amplitude, kinetic normalization and charged-current identification remain distinct obligations. The older failed parent is not retrospectively repaired by this newer construction. [003–005]

A relative gauge prediction survives unknown scales

SGRI-1 turns the earlier matching condition into an explicit one-loop relation among the three inverse gauge strengths. It eliminates the common boundary conversion and matching scale from one relative test. Gauge-only two-loop transport raises the weak-angle prediction to 0.22733305; the later leading-top calculation raises it to 0.22736738, against the frozen comparator 0.23122. This is a two-input conditional prediction with an evaluated residual. It does not derive the absolute gauge strengths or select a physical D41 reading. [008–009; 011, §43]

The full specified tensor descent and transfer tests advance

The bath paper closes the full mixed-tensor descent for the displayed $cH \otimes B_f$ structure, rather than only its primitive leg. CLSN-1 supplies a gauged sequential construction, changing-field vertices, finite Ward checks and an explicit chiral completion. Free positivity and fixed-static link-reflection positivity hold in the stated settings. A negative one-step component survives in an explicit non-Abelian example, with conditional decoupling under physical refinement. These are substantial restricted results, not a dynamical continuum completion. [004, §6.2; 007, §§17.13–17.50]

Generation structure has a precise physical test

The conditional three-generation census and canonical equal-layer quotient are existing results, strengthened by the exact S3 family map. HMGB-1 also provides canonical three-level geometry and holonomy descent. Their upstream rank-three premise remains explicit; QN-3 §5.3 inherits it as AD-3. The further B1 physical identification is separate. EX2E fails one proposed same-event family-to-key implementation, not all possible physical bridges. [010, §§52–62; F6–F7; F20]

A charge-selection derivation closes

O12 evaluates the faithful-bundle index map in VERSF's characteristic-class coordinates and explicitly cancels fractional covering-factor contributions. The $\mathbb{Z}_3$ selection rule, dimension-fifteen $\Delta B = 3$ operator and dimension-eighteen sphaleron minimum have established Standard Model antecedents; they are not claimed as new discoveries. The programme advance is the evaluated map and cancellation, its connection to the local interaction rules, and the complete five-generator minimum-index classification. No stiffness remains unevaluated within these results; census, chiral-measure and full-action premises retain their grades. [012, §§1, 3–10 and Appendix B]

3 Corrections and source precedence

A later statement replaces an earlier one only for the same carrier, branch, preparation, observation and approximation order. The following changes control the October ledger.

Earlier wording or inference	October replacement
No neutral numerical result	Explicit conditional blocks and a frozen ratio exist. Physical neutral admission and PMNS closure remain open. [003–005]
Only the primitive completion leg descends	The complete $\text{cH} \otimes \text{Bf}$ tensor descends on the displayed single-leg structure. Its physical coefficients are not thereby fixed. [004, §6.2]
The Fold angle is continuously free	Quartic angular flatness remains true; sixth-order anisotropy selects discrete angles at fixed nonzero radius on the tested branch. [005, §§4–5]
7/960 is a derived electromagnetic coupling	Retype it as the admission probability or structural comparator in this construction. The saturated trace does not supply Maxwell stiffness. [003, Part VII]
The gauge problem is one missing common scalar	That is a conditional factorization. Full factor-dependent source response can remain. One relative SGRI test eliminates the common scalar without deriving it. [008–009]
D41 eigenvalues are three force coefficients	Clamped stiffness, relaxed compliance and generalized eigenvalues are different objects. None is promoted by numerical proximity. [008, §§10, 18A]
Gauge derivatives and defect definitions are absent	Conditional derivatives, defects and transfer constructions exist. Their complete physical attachment and evaluation on one carrier remain the task. [007; 011, §44]
Current relaxation is universally gauge blind	The isolated shifted-current block is blind at tree and Gaussian order. Conservation, completion and interacting response have additional terms. [011, §42]
Substrate adjustment must correct quadratic force strengths	The tested classical stress-energy channel begins at fourth order about zero curvature. Other specified channels need their own evaluation. [011, §43]
A matching representation proves family identity	C9 and B1 remain explicit premises; the tested terminal-key realization fails the physical second-jet test. [010, §§55, 60–61]

Version and counting rules

The 6 October CLSN-1 edition [007] controls the overlapping 2 October edition [006]. From Fold to Three Generations [010] integrates much of [001]; inherited topology and record results count once. 011 is the 17 October rebuild incorporating the editorial pass, identified by the five-step order in §44 and the 161-check inventory in Appendix B. 012 is the current uploaded baryon/lepton edition, not a second advance.

Fact-Lock is an explicit foundational admissibility premise, not a dynamically derived infinite restoring force. Fixed complete MASD/HMGBC inputs exclude the tested extra Wilson-potential freedom. Conditional counterfamilies with the same limited data are not proofs that the complete VERSF rules admit inequivalent physical laws. [007, §§17.67, 17.85; 011, §41]

4 Gates SM 1 to SM 5

SM 1 Weak orientation admissibility

SM-1 | September: Partial; physical open. October: CONDITIONAL ORIENTATION SELECTION; PHYSICAL INSTALLATION OPEN.

The earlier single-Weyl restriction and later $P_W = P_U$ selection are conditional results already in the corpus. $P_W = P_L$ follows under the inherited naming. The later theorem retains a chiral-locking provenance audit and completion/mirror conditions; its physical common-action installation remains open. [F3, §5; F5, Theorem 7, §§13–14]

Remaining return. Install the source-selected weak orientation and branch in one admitted gauge, completion and matter action. [B0, SM-1; O10, Parts II and VIII]

SM 2 Full weak doublet Hessian

SM-2 | September: Strong conditional; structural Stage 3. October: STRONG CONDITIONAL; SPECIFIED TENSOR DESCENT CLOSED.

The full $ch \otimes Bf$ mixed tensor, not merely its primitive leg, passes the stated full-action descent. This is a real upgrade on that source structure. It does not determine Bf or complete physical axle selection.

Remaining return. Return the physical axle coefficient, normalization, branch and retained readout on the same action. [004, §6.2; O10, §§61–62]

SM 3 Leakage support trace

SM-3 | September: Open; physical neutral block absent. October: CONDITIONAL NEUTRAL RETURN; PHYSICAL TRACE OPEN.

Explicit neutral parents and active-state diagnostics now exist, including the projected mass-ratio candidate. The older active-completeness failure remains attached to its own parent; it is not a universal neutral no-go.

Remaining return. Admit the selected neutral parent and compute its physical weak-current leakage and support projector with the correct kinetic form. [003, Part XV; 004, §12; 005, §§10–15]

SM 4 Ordered chi readout

SM-4 | September: Retyped; substantial conditional pass. October: EXACT RECORD RESULTS; PHYSICAL FRAME OPEN.

Marked instruments recover seven history addresses, sharp-marginal preservation controls joint records, and ordered-history readouts have specified ranks. The $m=3$ information-loss theorem identifies a precise missing record channel on the tested attachment.

Remaining return. Identify the physical marked preparation, event grain and Fact-bearing record before using the constrained local response. [001, §§23–23G; 002; 007, §§17.83–17.85]

SM 5 Gauge census closure

SM-5 | September: Exact on frozen ledger; origin open. October: CONDITIONAL GAUGE ORIGIN AND CENSUS CLOSURE.

BCB and Closing the Interfaces select the three factors from the declared geometry and empirical anchors. Connection necessity and single- $U(1)$ results supply earlier links; Gauge-Census Closure proves completeness on the stated minimal matter/completion census. These derivations already exist. Product-sector, carrier, mixing and minimality conditions retain their source scope. [F1–F4]

Remaining return. Establish the still-unresolved substrate identifications if claiming a reduced-input origin; keep accepted empirical anchors explicit. Numerical gauge response is the distinct SM-26 task. [008, §18A; O10, §§52–56; F3–F4]

4 (continued) Gates SM 6 to SM 10

SM 6 Weak octant sign

SM-6 | September: Open. October: CONDITIONAL DIAGNOSTICS; PHYSICAL OCTANT OPEN.

A closure-kernel diagnostic produces mixing angles, and the sextic Fold calculation selects discrete source angles on its branch. No complete physical PMNS construction links those diagnostics to the frozen mass-ratio parent.

Remaining return. Return the neutral mass, kinetic and charged-current matrices together and select the octant and CP branch without target feedback. [004; 005, §§4–5, 14–15]

SM 7 Adjoint removal positivity and microcausality

SM-7 | September: Strong partial. October: CONDITIONAL QUOTIENT THEOREM; FREE AND STATIC TESTS; PHYSICAL GATE OPEN.

The earlier quotient theorem proves positive physical extraction and microcausality descent, conditional on terminal positivity and QC-7's kinematic causal antecedent. CLSN adds explicit free/static transfer tests and conditional decoupling, while retaining its non-Abelian one-step counterexample. These statements have different scopes; neither silently settles the other. [F10; 007]

Remaining return. Establish dynamical gauge positivity, the physical refinement limit and the required continuum locality and microcausality. [007, §§17.33–17.50]

SM 8 Kappa and localisation convention

SM-8 | September: Local time pass; absolute calibration open. October: CONVENTIONS STRONGER; PHYSICAL SCALE OPEN.

The inherited local homogeneous time attachment is retained. Common compact-link normalization and loop-work reconstruction remove specific coordinate ambiguities. Conditional metric and coherence scales do not establish a physical Fold ruler.

Remaining return. Supply the independently normalized kinetic or event-work response and the physical spatial and temporal calibration on the chosen branch. [B0, SM-8; 001; 007, §§17.80–17.81; 008, §§17–20]

SM 9 Convention and normalisation audit

SM-9 | September: Strong partial. October: EXACT INTERFACES; COMMON PHYSICAL MATCHING OPEN.

Generator traces, $q=6Y$ and the declared plaquette conversion are fixed. No extra quadratic half or E2 trace may be inserted. Statistical covariance, static stiffness, inertia and inverse propagator remain distinct.

Remaining return. Complete event counting, grain, temporal/spatial conversion and common scheme, threshold and pole conventions. [003; 008, §§16–18A; 009, §§2–7]

SM 10 Substrate anomaly descent

SM-10 | September: Conditional strong pass. October: EXACT GLOBAL CHARGE MAP; MEASURE COMPLETION OPEN.

The conditional anomaly-descent and quantum-gauge papers already supply local consistency machinery. The faithful bundle/index calculation closes further global charge-selection arithmetic. A retained global positive measure is executed, but its promotion to the full chiral determinant line and global anomaly certificate remains open. [F17–F18; F20; 012]

Remaining return. Derive the microscopic chiral measure and complete the determinant-line and global anomaly or bordism obligations; charge selection does not replace them. [012, §§1–5, 8–10 and Appendix B]

4 (continued) Gates SM 11 to SM 15

SM 11 Generation and species census

SM-11 | September: Strong structural pass. October: CONDITIONAL CENSUS; REPRESENTATION BRIDGE CLOSED.

SC-1's complete three-package census, HMGB-1's canonical antipodal selection and three-level geometry, and O10's representation bridge are retained. C9 traces to the explicitly inherited AD-3 rank premise in QN-3. B1 is a further physical identification; EX2E fails its tested second-order realisation, not the census or every possible bridge. [F6-F7; F20; O10]

Remaining return. Derive or explicitly retain C9 and establish the separate physical B1 family-to-terminal identification; the tested EX2E jet fails. [O10, §§52-62]

SM 12 World to framework occupancy

SM-12 | September: Strong conditional pass. October: EXACT SUPPORT RESULTS; PHYSICAL LAW OPEN.

Stable-support, marked-readout and full-configuration reconstruction results sharpen occupancy. D41, event-indexed Fact-Lock and compatible stochastic lifts are explicit at their own grades. They do not select the entire physical background or amplitude law.

Remaining return. Return the admitted source law, background, occupied support and physical record map, with required changing-field derivatives. [001-003; 007, §§17.70-17.85]

SM 13 Hermitian lift and frame firewall

SM-13 | September: Local no-go retained; alternate route open. October: LOCAL RESTRICTIONS RETAINED.

Discrete family-angle selection at sixth order is a result about its specified neutral construction. It does not derive the physical charged-sector phase, orientation-odd readout or a universal frame identification.

Remaining return. Provide the same-action phase and current-frame attachment, or prove physical output equivalence for all admitted alternatives. [B0, SM-13; 005, §§4-5, 14-15; O10, §61]

SM 14 Strange confinement dynamics

SM-14 | September: Non-identifiable; open. October: OPEN; NO NEW CONFINEMENT COEFFICIENT.

The corpus contains a nonperturbative triality/wall framework and executed conditional or reference models, not only perturbative colour running. GQSC-1R shows that its retained data leave the physical gap and string-breaking spectrum unidentifiable. The physical colour response and wall/flux dynamics remain required. [F16-F17]

Remaining return. Evaluate the physical colour action and wall or flux coefficient, then establish the longitudinal and confinement observable bridge. [B0, SM-14 and §5.7; 009; O12]

SM 15 Physical half lazy gate

SM-15 | September: Retired as primary route. October: RETIRED AS PRIMARY CLOSURE GATE.

Half-lazy restrictions still occur inside particular neutral source constructions. That use does not restore the historical scalar gate as an independent Standard Model derivation or permit it to choose a physical source.

Remaining return. Retain only a derived, branch-labelled consequence where it is actually used; advance the complete action and response calculation. [B0, SM-15; 005, §§4-5]

4 (continued) Gates SM 16 to SM 20

SM 16 Higgs potential and radial mode

SM-16 | September: Strong structural Stage 3; local kinetics. October: STRONG STRUCTURE; PHYSICAL POLE OPEN.

The completion representation, broken-phase W/Z/photon mass pattern, potential and radial construction already exist. Route A gives conditional $v_{cl} \approx 243.723$ GeV and leading $m_H \approx 123.796$ GeV on frozen premises. October's full tensor descent advances this baseline; it does not yet select that benchmark as the physical Higgs pole result. [F12–F14; 004; 011]

Remaining return. Derive the physical Higgs-line metric and potential response, then the gauge/Yukawa, threshold and pole completion on that branch. [B0, §5.3; 004, §6.2; 011, §§18–19, 34–41]

SM 17 Charm hinge magnitude

SM-17 | September: Superseded; charged sector open. October: SUPERSEDED; PHYSICAL CHARGED RETURN OPEN.

The full tensor and axle construction remains the controlling route. October's tensor descent is a genuine structural addition, but does not promote a favourable curvature-corrected CKM diagnostic into the physical matrix.

Remaining return. Return the selected charged spectrum, coefficient, phase, current frame and common CKM or pole transport. [B0, SM-17 and §5.4; 004, §6.2; 010, §62]

SM 18 Coloured participation fraction

SM-18 | September: Retired as independent gate. October: RETIRED; EXACT PARTICIPATION GEOMETRY RETAINED.

The D41 indicator ledger now supplies exact support nesting and aggregate class weights. These make the participation bookkeeping more explicit; they do not create another independent scalar force-strength theorem.

Remaining return. Use the full representation-resolved physical response. No separate scalar release is required unless a specific provenance claim depends on it. [008, §18A; 011, §§20–21]

SM 19 Tau suppression projection

SM-19 | September: Superseded; physical lepton scale open. October: SUPERSEDED; SCALE AND POLE OPEN.

The inherited conditional charged-lepton ratios remain on the numerical ledger. The failed common-depth neutrino/charged implementation is a different construction and neither replaces nor validates the earlier charged return.

Remaining return. Derive primitive activation and localization, the absolute scale and the physical mass or pole map on one admitted branch. [B0, SM-19; 004, §§12.3–12.8]

SM 20 Variational suppression identity

SM-20 | September: Retired. October: RETIRED.

The historical identity is non-controlling in the complete tensor and current-response route. New finite response identities are graded on their own assumptions and are not extra closure credit for this retired row.

Remaining return. No independent release. Preserve the provenance cross-reference without reviving a scalar shortcut. [B0, SM-20; 011, Parts D–E]

4 (continued) Gates SM 21 to SM 25

SM 21 Charged lepton absolute scale

SM-21 | September: Partial infrastructure; pole open. October: EVALUATED CONDITIONAL SCALE; PHYSICAL SCALE AND POLE OPEN.

The Charged-Lepton Absolute Scale theorem already gives an evaluated conditional scale relation, $m_e = \alpha^2 v / (8\pi)$, approximately 0.522 MeV with its imported electromagnetic and electroweak inputs. Later loop-work and geometric routes sharpen calibration. None yet supplies the independently admitted common physical ruler and full pole matching. [F15]

Remaining return. Return the common physical ruler and action normalization, then native-to-pole transport with thresholds and covariance on the same branch. [B0, SM-21; 001, §§23I–23S; 007, §§17.80–17.81]

SM 22 Full Yukawa matrices

SM-22 | September: Charged conditional; neutral open. October: CHARGED CONDITIONAL; NEUTRAL CANDIDATES EXPLICIT.

Full specified tensor descent closes. Conditional neutral matrices and a numerical candidate now exist, so the blanket statement that every neutral block is absent is superseded. Local operator selection also fixes allowed leading neutrino structure, not its coefficient.

Remaining return. Admit charged and neutral source blocks, addresses, kinetic forms and currents together; derive the remaining physical coefficients. [004, §6.2; 005; 012, §§6–9]

SM 23 Quark current mass projection

SM-23 | September: Strong conditional RG and transport. October: CONDITIONAL TRANSPORT; PHYSICAL SCHEME OPEN.

RPC-1 already issues a conditional structural certificate for coupled running, thresholds, flavour reconstruction and pole extraction, with audited executions; its full numerical certificate is withheld. The changing-link regulator and leading-top calculation add concrete transport tests, without providing the physical quark boundary. [F19]

Remaining return. Complete the native-to-standard scheme bridge, thresholds, absolute normalization and pole or stated current-mass certificate. [B0, SM-23; 007, §§17.13–17.20; 011, §§37–43]

SM 24 PMNS closure Hamiltonian

SM-24 | September: Execution contract closed; source open. October: EXECUTABLE CANDIDATES; PHYSICAL PMNS OPEN.

The PMNS execution contract and oscillation mechanism are inherited; October populates Takagi and active-state calculations on specified parents. Separate closure-kernel mixing angles cannot be assigned to the mass-ratio candidate. The remaining task is a unified physical mass, kinetic and current return, not a new explanation of interference between mass modes.

Remaining return. Evaluate masses, kinetic normalization and charged-current mixing from the same physically selected neutral construction, including nonunitarity and branch checks. [004; 005, §§10–15]

SM 25 Neutrino mass and charge conjugation

SM-25 | September: Physical certificate refused. October: CONDITIONAL NUMERICAL RESULT; PHYSICAL CERTIFICATE OPEN.

The frozen projected D-free parent gives $R_v = 0.02822142937$. Sextic angle selection advances the source calculation, while projection P and amplitude remain conditional. Majorana-compatible charge selection is independently closed on its declared local branch.

Remaining return. Derive the physical projection or replacement map, source amplitude, neutral kinetic and current frame and absolute scale; retain failed alternatives and comparator residuals. [005, §§4–5, 10–15; 012, §§6–9]

4 (continued) Gates SM 26 to SM 30

SM 26 Gauge action and coupling values

SM-26 | September: Source action pass; couplings open. October: RELATIVE RELATION CLOSED CONDITIONALLY; ABSOLUTE VALUES OPEN.

The earlier gauge-action theorem conditionally derives the curvature action and universal coupling identity. SGRI adds the relative relation and evaluated corrections. Physical J,T and absolute coefficients still require the coupled source response; current Schur costs do not supply it. [F11; O07–O09; O11]

Remaining return. Evaluate the admitted coupled source response and matching, or prove a specified contribution cancels; independently normalize absolute coefficients. [O07–O09; O11, §§20–21, 41–44]

SM 27 QCD confinement and running

SM-27 | September: Conditional perturbative running; confinement open. October: TRANSPORT ADVANCED; CONFINEMENT OPEN.

NQTC supplies nonperturbative architecture and a conditional 225.923 MeV MC-branch benchmark. GQSC-1R executes retained/reference models but leaves the physical gap and string-breaking spectrum unidentifiable from those inputs. October advances relative transport. [F16–F17]

Remaining return. Supply the physical colour boundary and common scheme or thresholds, followed by the source-derived nonperturbative confinement coefficient. [B0, SM-27; O09, §§10–11; O11, §43]

SM 28 Strong CP and theta sector

SM-28 | September: Retained pass; continuum open. October: RETAINED THETA ZERO; OBSERVABLE BRIDGE OPEN.

GQSC-1R proves $\bar{\theta} = 0$ in its executed retained positive completion, combining a trivial topological character with positive frozen quark determinants. Full physical chiral-measure and electric-dipole matching remain open. O12's charge selection is distinct. [F17, Theorems 9–11]

Remaining return. Complete the continuum chiral/global measure and the physical strong-CP observable matching. [B0, SM-28 and §5.7; O12, §1]

SM 29 Quantum gauge completion

SM-29 | September: Strong local and finite partial pass. October: STRONGER FINITE AND STATIC PASS; GLOBAL GATE OPEN.

Conditional local BRST/BV, anomaly, renormalisation and perturbative unitarity results already exist, alongside an executed retained global measure. CLSN adds chiral transfer, Ward and positivity tests. The full physical chiral continuum measure remains a separate requirement. [F17–F18; O07]

Remaining return. Establish the full dynamical and global quantum theory, physical continuum limit and common scheme or pole/S-matrix boundary. [O07, §§17.13–17.50; O11, §§40–44; O12]

SM 30 Final derivation audit

SM-30 | September: September interim pass; final open. October: OCTOBER INTERIM AUDIT COMPLETE; FINAL CERTIFICATE OPEN.

All thirty identifiers are reconciled with the dated October sources. Conditional predictions, exact selection results, failed branches and superseded descriptions are separated. The approximate 75% planning judgement does not constitute physical closure.

Remaining return. Return one consistent admitted gauge, completion, charged, neutral and strong-sector boundary with the necessary observable matching and no unresolved load-bearing physical entries. [B0; O01–O12]

5 Gauge prediction and physical response

The frozen PCN branch uses conventional hypercharge Y with $q = 6Y$. Its coefficient vector is $Z = (6, 13/2, 21/2)$; the inherited one-loop beta vector is $b = (-7, -19/6, 41/6)$, in colour, weak, hypercharge order. For $A = (g_s^{-2}, g^{-2}, g'^{-2})$, the one-loop family $A = sZ + \tau b$ has primitive normal $n = (466, -687, 159)$. [008, Theorem 9; 009, §§2–7]

$$466 g_s^{-2} - 687 g^{-2} + 159 g'^{-2} = 0$$

$$\sin^2 \theta_W = [159 + 466(\alpha/\alpha_s)] / 846$$

The relation is exact at fixed-census one-loop grade without thresholds or finite matching. Here n is exactly the SGW-3 contrast t , so $n \cdot \Delta = \Delta T$ when Δ is expressed in the same gauge-coefficient basis, units and at the same comparison point. Since $t \cdot Z = t \cdot b = 0$, rescaling or a one-loop scale shift cannot remove this transverse residual. By contrast, $j = (-2, -3, 3)$ satisfies $j \cdot Z = 0$ and $j \cdot b = 44$. An in-plane correction $\Delta = \delta sZ + \delta \tau b$ has $\Delta T = 0$ but $\Delta J = 44\delta\tau$: the relative test does not determine J . This identity does not evaluate the physical source correction. [009, §§2–7; 011, §43]

Calculation on the frozen branch	Weak angle	Interpretation
One loop	0.2244264903	Two inputs: $\alpha_s(\text{MZ}) = 0.1180$ and $\alpha^{-1}(\text{MZ}) = 127.95$.
Gauge-only two-loop transport	0.2273330516	Removes 42.784% of the original gap to the frozen comparator.
Gauge two loop plus leading top	0.2273673795	Uses diagnostic $yt(\text{MZ}) = 0.94$; added shift 0.0000343279.
Frozen comparison value	0.23122	Comparison only; not an input used to select the source or weak-angle solution.

The leading top effect closes 0.883% of the remaining gauge-only gap and leaves 0.003852621. These are declared transport calculations, not an evaluation of every substrate correction. The D41 clamped and relaxed controls are alternative readings of one statistical model; they are neither additive corrections nor physically selected by a better numerical match. [009, §§10–11; 011, §43]

What remains for J and T

Physical numerical J and T remain unevaluated. If K is the correctly attached normalized 47-state response, the exact contractions require only $C = \text{Tr}(PC K)$, $W = \text{Tr}(PW K)$, and $Bq = \text{Tr}(q^2 K)$: [011, §§20–21]

$$J = (B_q - 4C - 9W) / 12$$

$$T = (53B_q + 932C - 2061W) / 12$$

Thus $J = 0$ exactly when $Bq = 4C + 9W$, or $kQ = ku + 3ke$ in sector totals. This reduction becomes physical only after the response attachment and normalization are established. If the source directly returns the three gauge coefficients, their declared contractions can be used without an extra price conversion. The unknown coefficients cannot be supplied by symmetry or by requiring agreement with the comparison value.

6 Neutral and charged numerical status

The conditional neutrino result

The frozen projected D-free parent yields $R_v = 0.02822142937$ and mass ratios $1 : 1.0468248785 : 2.0966838931$. Its reported active weights are approximately 0.99715, 0.99713 and 0.99683. The source paper reports independent numerical reproduction. The physical weak-current identification is a separate requirement. [005, §§10–15]

Sixth-order angular anisotropy selects discrete orientations at fixed nonzero radius within the tested Fold construction. It does not fix the physical radius or source amplitude. Hypothesis P, projection before nonlinear response, is additional to orbit invariance and was introduced after the unprojected failure was known. The frozen calculation has no continuously fitted target parameter, but the hypothesis-design history is not blind. [005, §§4–5]

Quantity or comparison	Result	Evidential boundary
Archived source amplitude	$ q = 0.1663661412$	Declared source normalization; physical amplitude remains to be derived.
NuFIT 6.0 comparison	About 5.3% low; local residual about -2.0σ	Frozen comparator; common zero-covariance prescription below.
NuFIT 6.1 comparison in CLSN	Local residual about -3.9σ	Same candidate; tighter stated uncertainty. Underlying fit not independently verified.
Absolute mass illustration	About 27.2, 28.5, 57.0 meV; sum 112.7 meV	Uses an observed splitting to set scale; not an independent absolute mass prediction.

007, §12 uses the same symmetrised 1σ Gaussian, zero-covariance method for both rows. Central ratios 0.0298050 and 0.0300159, with stated errors 0.0007924 and 0.0004575, reproduce -2.00σ and -3.92σ . The latter error is 42% smaller. This checks 007's ratio-level arithmetic, not the underlying NuFIT 6.1 fit or a joint-likelihood exclusion.

The physical completion must return the source amplitude or its replacement, justified projection, active addresses, kinetic form and charged-current frame from one admitted construction. The separate closure-kernel angles (33.401601° , 8.593903° , 48.369145° , $\delta_{CP} = 227.235343^\circ$) are conditional diagnostics from another calculation and cannot be attached to this mass spectrum. The γT equivariance audit remains; its small effect in one sensitivity test is not a symmetry proof. [003–005; 007, §12]

Inherited numerical claims carried forward

Object	Retained return	October treatment
Higgs ratio and quartic	32/63; 512/3969	Correlated Stage-2 consequences; physical normalization, loops and pole remain open.
Charged lepton ratios	$\mu/e = \exp(16/3)$; $\tau/\mu = \exp(16/3)/12$	Conditional inherited ratios; localization, activation and pole scale remain open.
RRHF CKM	Target-blind conditional matrix, empirically poor	Retained controlling conditional return; attractive curvature variants remain unadmitted.
7/960 and weak readback	7/960; 45/194	Admission/structural probability and candidate readback respectively; neither is a physical gauge-coupling certificate.
Strong CP	$\bar{\theta} = 0$	Retained theorem; global chiral measure and observable EDM bridge remain open.

Inherited comparisons are carried from [B0, §6] rather than refreshed to new experimental inputs. The 7/960 interpretation is corrected by [003, Part VII]. No failed common-depth construction supersedes the earlier charged result merely because it uses related ingredients.

7 Completed selection and quantum consistency

Global baryon and lepton selection

For the faithful bundle coordinates $a = c_1(EW) = -c_1(EC)$, $b = c_2(EC)$, $c = c_2(EW)$, define $\gamma = \langle p_1(TX), X \rangle / 24$. Here c and b in the following numerical formulas denote integrated classes. The evaluated anomaly indices are [O12, §§2–4]

$$A_B = -N_g c, \quad A_L = -N_g c - (N_g - N_s)\gamma$$

N_g counts complete charged generations and N_s the stated left-handed singlet conjugate neutrinos. On the spin four-torus, $\gamma = 0$. Correlated Abelian and weak contributions preserve $\Delta B = \Delta L = -N_g c$ even when covering-factor winding numbers are fractional. The result does not require a gauge-strength value.

For three generations, composing the admitted gauge sectors with the Weinberg interaction and otherwise baryon/lepton-preserving interactions gives the exact charge lattice

$$\Lambda_M = \{(3n, 3n + 2m) : n, m \in \mathbb{Z}\}$$

Its quotient inside the Lorentz-scalar charge lattice is $\mathbb{Z}_3$. Baryon change one or two is excluded on this branch under symmetry-preserving quantum composition and matching. The first compatible local baryon-changing structure has dimension fifteen, with field content $(u^c)^4(d^c)^5 e^c$; the paper supplies a nonzero 3,960-monomial Grassmann witness. The gauge anomaly alone retains a different twelve-fermion, dimension-eighteen minimum. The $\mathbb{Z}_3$ rule and both dimension thresholds have established Standard Model antecedents; O12 evaluates their faithful-bundle connection and fractional-charge cancellation in the VERSF coordinates. [O12, §§7–9]

The all-charge minimum-index classification is also closed. At $c = -k$ the minimum norm is $4k$, with $(k + 1)^2 + \lfloor k^2/4 \rfloor$ minimum patterns. Four unit-charge generators and one indispensable charge-two generator produce every minimum. This is an arithmetic classification of signed indices, not a proof that each sector has an instanton saddle or nonzero rate. [O12, Appendix B]

These results inherit the census, chiral symbol and index-normalized measure. Additional baryon-breaking source vertices can remove the protection; their absence from the complete substrate action is not proved. No proton lifetime, neutrino mass coefficient or baryon asymmetry is assigned. The reported 136 grouped checks support the primary paper's execution; the general statements rest on its analytic arguments.

What the regulator results close

CLSN-1 supplies a conditional gauged sequential transfer, exact vertices and finite Ward checks, an explicit chiral completion and a free Weyl branch with unit residue. Free transfer positivity and fixed-static link-reflection positivity hold in their stated settings. An explicit small $SU(2)$ background prevents a general nonnegative one-step-transfer claim. A bound $|r| \leq 0.2583709137$ on the negative support gives conditional decoupling at fixed positive time under the prescribed refinement. [O07, §§17.13–17.50]

Time-dependent and dynamical gauge positivity, the positive-sector continuum limit, contact terms, global chiral measure and common observable matching remain separate. The global charge calculation above does not discharge these requirements.

8 Remaining derivations and release conditions

The next calculation should consume the definitions and intermediate constructions already established. A blanket request for the action, the fields or their derivatives is no longer an adequate description of the remaining work. The outstanding returns are specific physical instantiations or evaluations on one admitted branch. [007; 011, §44]

Priority	Concrete return	What would count as an advance
1 Physical gauge response	Complete coupled response on an admitted common carrier, or independently calibrated paired loop work.	Derive the required coefficients and derivatives with all same-order auxiliaries; test Ward/null, positivity, reciprocity and regulator transport. Evaluate physical J,T or prove a specified contribution cancels.
2 Physical neutral input	Source-derived projection or replacement, amplitude, active addresses, kinetic form and charged current.	Freeze one consistent mass/mixing calculation, then compare its ratio, PMNS and nonunitarity; identify any empirically calibrated absolute scale.
3 Fact and family attachment	Correctly typed Fact-bearing m=3 record, or the physical family-to-terminal second jet where that route is used.	Show a nonzero source map and its normalization or prove a no-go on the admitted law. Keep C9, B1 and Fact-Lock logically distinct.
4 Charged and Higgs observables	Physical axle/frame and Higgs-line metric, potential and kinetic response.	Return the selected charged matrices and Higgs boundary before common threshold and pole conversion; do not promote attractive diagnostic branches.
5 Quantum and continuum	Dynamical positivity, global chiral measure and physical refinement with common scheme.	Extend restricted finite/static results to the actual coupled theory and its observable boundary.
6 Confinement	Physical colour boundary plus nonperturbative wall/flux dynamics.	Derive a triality gap, string tension or string-breaking observable with declared units and matching.
7 Whole boundary	One admitted gauge, completion, charged, neutral and strong-sector set.	Demonstrate common source identity, scale and convention compatibility; no sector may borrow an unresolved coefficient from a different branch.

Stopping and comparison rules

A zero excludes only the evaluated contribution, background and order unless a general theorem is proved. A nonzero finite response becomes a physical prediction only after its source identity, units and observable attachment are established. The full law need not be uniquely reconstructed if all admitted alternatives are proved equivalent for the observable at issue. Same-order terms cannot be dropped merely because another sector is already reduced.

Measured couplings, masses and mixing angles are comparison inputs only after the relevant source result is frozen. Conditional controls that bracket a measurement do not select a physical branch. The classical zero-curvature relaxation test leaves quadratic gauge coefficients unchanged through its stated channel; it does not authorize either a fitted correction or a universal zero.

October's interim ledger is complete. The programme has more conditional predictive content and sharper physical tests than in September. Approximately 75%, with a 72–77% range, is a provisional planning description of that status, not a completion score established by these results. The final SM-30 certificate remains open until the physical requirements above are satisfied together.

9 Source register and controlling editions

Bracketed references identify the following dated editions. Earlier primary results remain carried through the September audit unless a later entry supersedes the same claim. Section references belong to the cited edition. Page counts are omitted because pagination varies by renderer; dates and identifying content determine precedence.

B0 VERSF Standard Model Derivation Audit September 2026

SMA-3 / Interim SM-30 Audit. 6 September 2026.

Controlling baseline for all thirty identifiers, inherited grades and prior numerical returns. Sections 4–6 contain the original gates and sector status; Appendix A records the earlier source chain. The October audit replaces its programme-level status, not the proofs it cites.

001 The Fold-to-K7 Physical Stitching and Marked-Anchor Reduction in VERSF

5 September 2026; scale/coherence revision 7 September 2026.

Additional marked-record, response, refinement, probability and scale results beyond the baseline's original Fold/K7 topology credit. Key locations: §§23–23S. Much of this material is integrated in O10 and is counted once.

002 Native Current Response, Hypercharge Visibility and Full-Configuration Source Reconstruction in VERSF

September 2026.

Native-current ranks, classical hypercharge blindness, coherent-comparison alternatives, endpoint-response distinctions and full-configuration reconstruction. Key locations: source-status ledger and §§19A–19E.

003 Configuration Dynamics, Refinement Geometry and Record-Conditioned Curvature Response in VERSF

22 September 2026.

Configuration dynamics, moving-projector correction, refinement split, electromagnetic-probability retyping and explicit current-to-neutral response. Key locations: Parts III, V, VII, XII–XV.

004 Physical Bath Selection and Neutrino Mixing in VERSF

25 September 2026.

Direct neutral route, full specified mixed-tensor descent, failed common-depth construction and faithful nonlinear history typing. Key locations: §6.2, §12.8 and §§13–14.

005 The First Source-Fixed Neutrino Mass-Ratio Prediction Attempt in VERSF

September 2026.

Sextic angular selection, projected D-free neutral candidate, numerical reproduction and physical-amplitude limitations. Key locations: §§4–5, 10–15; consistent-basis controls retained.

9 (continued) Source register

006 The Physical Changing Link Source Representation Resolved History Metric and Gauge Normalisation Closure Attempt in VERSF

Draft 13, 2 October 2026; through 17.75.

Earlier CLSN-1 edition, retained for version history only. 007 controls the overlapping construction. Its results are not counted as a separate paper advance.

007 The Physical Changing Link Source Representation Resolved History Metric and Gauge Normalisation Closure Attempt in VERSF

6 October 2026; through 17.85.

Controlling CLSN-1 edition in this register. Gauged transfer, positivity, source tests, compact-flux/work inversion and the Fact-Lock continuation through §17.85. Key locations: §§17.13–17.50, 17.67, 17.76–17.85 and §19.

008 The Universal Gauge Conversion Factor, D41 Representation Typing, and Source-Response Release in VERSF

CLSN-2; 9 October 2026.

CLSN-2. Gauge-equivariance restrictions, D41 operational readings, conversion audit and the antecedent one-loop determinant condition. Key locations: §§3–5, 9–18A and 19–22.

009 The Scale- and Common-Normalisation-Free Gauge Relation in VERSF

SGRI-1; 9 October 2026.

SGRI-1. Primitive integer gauge relation, reconstruction, one-dimensional correction quotient and gauge-only two-loop calculation. Key locations: §§2–11. Consumes 008's determinant theorem.

010 From Fold to Three Generations in VERSF

12 October 2026.

Cumulative Fold/K7 and corrected census synthesis with canonical antipodal bridge and the failed tested same-action family-key identification. Key locations: §§52–63. Earlier 001 results retain their original counting.

011 Physical Applicability and Irreversible Response in VERSF

SGW-3; 17 October 2026 rebuild incorporating the editorial pass.

Controlling edition: five-step calculation order in §44 and the 161-check inventory in Appendix B (57 plus 104; an inventory, not a claim that both supplements were run). Applicability and irreversible response, exact J,T moments, source-kernel reduction and top/classical-relaxation tests. Key locations: §§2–6, 20–21 and 40–46.

012 Global Baryon and Lepton Selection in VERSF

19 October 2026. Word edition.

Current uploaded Word edition. Exact faithful index map, charge lattice, local operator threshold and complete minimum-index classification. Key locations: §§1–10 and Appendix B. The earlier session copy is not a separate result.

10 Earlier results restored by the website audit

The 19 October source audit catalogued 601 distinct PDF links across six public website pages and traced the relevant earlier results behind the twenty six question paper and this ledger. It was a source-coverage and attribution audit, not an independent verification of all 601 papers. The F register below records the primary sources used for corrections.

The principal correction is to credit completed derivations at their stated scope. The gauge selection and completeness chain, three-generation construction, weak-orientation theorem, Hilbert/Born and fermionic reconstruction, gauge action, electroweak mass pattern, retained global measure and observable-transport theorem already exist. A later paper's inheritance does not make them absent. Empirical anchors are accepted inputs, not automatically unresolved physical tasks.

For gauge origin, Closing the Interfaces Theorem 3.4 gives the selection argument; Distinguishability Conservation supplies connection necessity; Gauge-Census Closure supplies the later completeness result. Commuting sector actions and the minimal census remain part of the scope. The phase $U(1)$ must not be attributed to the trivial CP_0 base, nor the local product confused with the faithful global quotient. These are structural results independent of the unfinished numerical coupling calculation. [F1–F4; F23]

Other source limits remain specific: C9 retains an inherited rank premise; the weak-orientation paper retains its chiral-locking audit and mirror conditions; causal descent needs its kinematic antecedent; numerical benchmarks retain their inputs. Retained global positivity does not certify the full continuum chiral measure. These limits qualify the corresponding results without deleting them.

No new physical J,T value, unified flavour fit, physical confinement coefficient or whole-model certificate is issued by this correction. The thirty gate identifiers and overall approximately 75% planning description are unchanged. The recovered work was part of the earlier programme and is not counted as a second October advance.

[F1] Taylor K. The Three Gauge Symmetries from BCB. Minimal internal symmetry and the capacity and anchor premises; 143-page website edition. Website PDF

[F2] Taylor K. Distinguishability Conservation and Gauge Structure. Connection necessity and covariant transport; §6.3 states the dynamical limits. Website PDF

[F3] Taylor K. Closing the Interfaces. §§3–5: capacity, anchors, Abelian uniqueness and chiral-interface premises. Website PDF

[F4] Taylor K. The Gauge-Census Closure Theorem in VERSF. Conditional exclusion of additional connected internal gauge channels; inherited carrier, mixing and minimality assumptions. Website PDF

[F5] Taylor K. The Weak-Orientation Admissibility Theorem in VERSF. Theorem 7, §§13–14 and Appendix C: $P_W = P_U$; chiral-locking and mirror-sector conditions. Website PDF

[F6] Taylor K. The Generation and Species Census Theorem in VERSF. SC-1, C9–C15, §9 and Theorem 1: conditional three-generation census. Website PDF

[F7] Taylor K. The VERSF History-Measure, Generation-Geometry and Branch-Closure Theorem. HMGB-1, §§31–32A, especially 32A.0–32A.7: provenance, lumpability, spectra and canonical holonomy descent. Website PDF

[F8] Taylor K. Why Both Hilbert Structure and the Born Rule Are Structurally Forced in VERSF. Proposition 1 and Theorems 1–5: route-dependent reconstruction; the minimal kernel alone is insufficient. Website PDF

[F9] Taylor K. The Fermionic Fock-Space Reconstruction in VERSF. Full CAR and Fock reconstruction under FF-1, FF-2a/b and FF-4; leading vertex retains current matching. Website PDF

[F10] Taylor K. The Adjoint-Removal Positivity and Microcausality Theorem in VERSF. Theorem 1, §11.2: positive quotient and microcausality descent; QC-7 retains the kinematic antecedent. Website PDF

- [F11] Taylor K. The Gauge Action and Coupling Theorem in VERSF. Theorems 1–15: Schur reduction, local quadratic gauge action, universal coupling and matching conditions. Website PDF
- [F12] Taylor K. The Electroweak Completion-Interface Theorem in VERSF. Effective $(1,2,+1/2)$ completion carrier; §15 retains the completion-necessity premise. Website PDF
- [F13] Taylor K. The Broken Electroweak Phase in VERSF. Explicit weak-vector mass matrix and electromagnetic stabiliser on the declared completion background. Website PDF
- [F14] Taylor K. The Electroweak Vacuum and Higgs-Potential Completion Theorem in VERSF. Route-A conditional scale and Higgs benchmark; scope box and Theorems 2, 8 and 9. Website PDF
- [F15] Taylor K. The Charged-Lepton Absolute Scale Theorem in VERSF. Conditional scale-locking and numerical benchmarks; imported electromagnetic and electroweak inputs are explicit. Website PDF
- [F16] Taylor K. The Non-Perturbative QCD Scale and Triality-Gap Completion Theorem in VERSF. Principal claim, §20' and §§30–33: reference scale, penalty-free gap architecture and open physical coefficients. Website PDF
- [F17] Taylor K. GQSC-1R The Faithful-Quotient Retained Global Measure. Theorem A, Theorems 8–16 and §§34–37: executed retained positive transfer, strong-phase zero and confinement non-identifiability. Website PDF
- [F18] Taylor K. The Quantum Gauge Completion of the VERSF Standard Model. Theorems 1–28 and debt register: local BRST/BV, anomaly and renormalisation results; global and physical conditions. Website PDF
- [F19] Taylor K. The Renormalised Standard Model Parameter-Closure Theorem in VERSF. RPC-1: structural transport certificate, frozen boundary contract and audited executions; numerical certificate not issued. Website PDF
- [F20] Taylor K. The Substrate Anomaly-Descent Theorem in VERSF. QN-3, AD-3 and §5.3 explicitly inherit physical support rank three rather than prove it there. Website PDF
- [F21] Taylor K. The Replication Theorem. §§4–8 and status table: charge-blind replication; complete-family and spectral-index identifications remain conditional. Website PDF
- [F22] Taylor K. The Generation Theorem. §§7–9 and §8A: finite refinement census; REF-DIM, REF-BIN and the interface-dimension route retain stated conditions. Website PDF
- [F23] Taylor K. Why Nature Chose the Standard Model. General-reader companion to the BCB gauge papers. Technical scope and conventions are controlled by F1–F4; this guide uses $Q = T_3 + Y$ throughout. Website PDF