

VERSF Standard Model Derivation Audit - September 2026

*Post-RCHS-24 Master Ledger, Supersession Registry, Physical-Admission Boundary and
Revised Critical Path*

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Designation: SMA-3 / Interim SM-30 Audit

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**STATUS: UPDATED PROGRAMME AUDIT / STRUCTURAL, ACTION-LEVEL AND CONTINUUM READINESS
MATERIALLY ADVANCED / PHYSICAL STANDARD MODEL CERTIFICATE NOT ISSUED**

**Balanced planning estimate: 68-72% (midpoint approximately 70%; work-programme maturity only, not
probability of truth or success)**

Current highest-value route: independently normalised physical source response -> complete covariant quadratic
parent -> curvature readout and physical gauge weights; in parallel close Higgs-line bridge, neutral blocks,
confinement and global chiral/scheme completion

This paper supersedes SMA-2 (3 August 2026) as the current programme-level audit. It does not supersede the
primary theorem papers it grades.

Abstract

This audit updates the 3 August 2026 VERSF Standard Model Derivation Audit after the complete post-audit paper sequence through RCHS-24 and the Fold-to-K7 physical-stitching synthesis. The earlier balanced planning estimate of 60-65% is revised upward to 68-72%. The increase is not obtained by counting papers. It reflects specific changes of grade: event preparation and first-record composition are substantially sharper; primitive fact-order, retention and renewal have been decomposed into explicit theorems and non-identifiability boundaries; the charged-flavour axle has advanced to a strong structural-3S position; the gauge/current programme now contains a strictly positive source-generated rank-six current action and exact current-link Schur reciprocity; sequential opportunities have a unique local homogeneous attachment to emergent Lorentzian commitment time; the Higgs spatial kinetic mechanism has a source-derived unit geometric residue and exact protection against the presently identified defect-mediated renormalisations; the finite fermion kinetic operator and its normalised infrared Dirac/Weyl principal symbol have been reconstructed from the Master Action; and the one-loop Standard Model gauge beta coefficients now have a conditional source-matched regulator route.

The same corpus also forces several corrections. A positive current action is not yet a physical gauge coupling. RCHS-24 explicitly refuses to identify diagnostic or conditional response metrics with Z_3 , Z_2 or Z_q , and it does not establish that all remaining gauge freedom is one common scalar. The neutral sector still has no source-complete Y_{ν} , MR or ML return. The controlling CKM matrix remains the target-blind RRHF return and remains empirically poor; the more attractive curvature branch is quarantined until its physical coefficient, phase, retention and readout are source-selected. QCD confinement strength is still not derived. The strong-phase-zero result remains retained rather than fully continuum-admitted. The Fold/K7 topology has advanced from an open search to a sharply selected conditional construction, but physical source installation remains open and the genus-one statement concerns the supporting one-skeleton, not a toroidal vacuum complex.

The resulting programme is mature enough that the central risk is no longer whether useful finite constructions can be written. It is whether one physical source law selects the required carriers, amplitudes, branches, backgrounds and continuum readouts without target rescue. The revised critical path therefore prioritises physical source response and same-action admission over further unit-metric benchmarks, phase scans or inverse reconstructions.

General reader summary

VERSF is trying to do something much harder than reproduce familiar particle-physics numbers: it is trying to explain why the Standard Model has the structure and strengths it has without feeding those answers into the calculation. The August audit concluded that the programme was roughly 60-65% mature as a research programme, while warning that this was not the percentage of the Standard Model physically derived.

The work since August has moved several large blocks from 'missing mechanism' to 'mechanism largely understood, physical selection still missing'. The theory now has a positive six-direction current action generated by the source machinery itself, and that same source block ties the current response to the gauge-link response. The Higgs has a much cleaner space-time propagation story. The fermion kinetic operator is no longer an unspecified placeholder. The microscopic opportunity sequence can be attached to emergent Lorentzian time on a unique homogeneous local branch. Several old shortcuts have also been killed cleanly.

That is enough to raise the balanced planning estimate to about 68-72%, with a midpoint near 70%. The rise is real, but it should not be confused with saying that 70% of the measured Standard Model numbers have been predicted. The weakest parts remain precisely the parts that make a theory physical rather than merely elegant: unique gauge strengths, a source-complete neutrino sector, confinement strength, a common renormalisation and pole scheme, and one final same-branch boundary containing all sectors together.

The strongest improvement is the change in the shape of the remaining problem. In August, 'complete H_{CMR} ' was one huge blocker. It is now too coarse a description. Parts of preparation, record formation, source provenance, current geometry, time attachment and fermion transport have separated into exact passes, conditional passes and exact no-goes. RCHS-24 then shows that the leading gauge calculation does not have to wait for every all-order provenance question: it needs the complete physical quadratic source response on the current-link connected component, with the physical weights and curvature readout independently supplied.

The programme therefore looks materially closer than it did a month ago, but the next papers have to be more selective, not more numerous. The highest-value success would be one source-derived physical response that actually produces Z_3 , Z_2 and Z_q without inserting the missing weights. A comparable success in the neutral sector or in the whole-boundary integration would move the ledger much more than another conditional benchmark.

Executive verdict

Layer	August 2026	September 2026	Reason for change
Mathematical / representation structure	85-90%	91-94%	Topology, current geometry, source-jet typing, fermion IR geometry, Higgs spatial geometry and multiple exact no-goes have advanced.
Conditional same-action construction	70-75%	81-85%	Positive source current action, current-link reciprocity, stronger event/renewal chains, Higgs local 3+1 kernel and finite fermion reconstruction materially raise this layer.
Numerical Standard Model reproduction	45-50%	50-55%	Several conditional contacts remain close, one-loop running is stronger and quark-flavour structure has advanced, but no new controlling physical CKM or PMNS result exists.
Primitive physical admission	35-40%	44-48%	Many vague source debts are now exact gates, but physical gauge weights, background selection, post-commitment operation, neutral blocks and several carrier/readout identifications remain open.
Continuum / scheme / poles	25-30%	40-45%	Sequential time attachment, source-derived fermion IR normalisation and conditional one-loop beta coefficients are substantial advances; the global chiral measure and common scheme/pole bridge remain open.
Balanced planning estimate	60-65%	68-72%	A work-planning blend only. The range is not a theorem grade, a probability of correctness or a forecast of empirical success.

The September figure is deliberately not computed by adding points for papers. Several papers supersede one another, several close a route negatively, and several advances affect the same dependency chain. The range is a programme-maturity judgement constrained by the gate ledger below.

Visual completion summary

The pies below show the midpoint of each September planning range as the completed share of that layer. *They are work-programme maturity estimates, not probabilities of correctness, empirical success or theorem grades.*

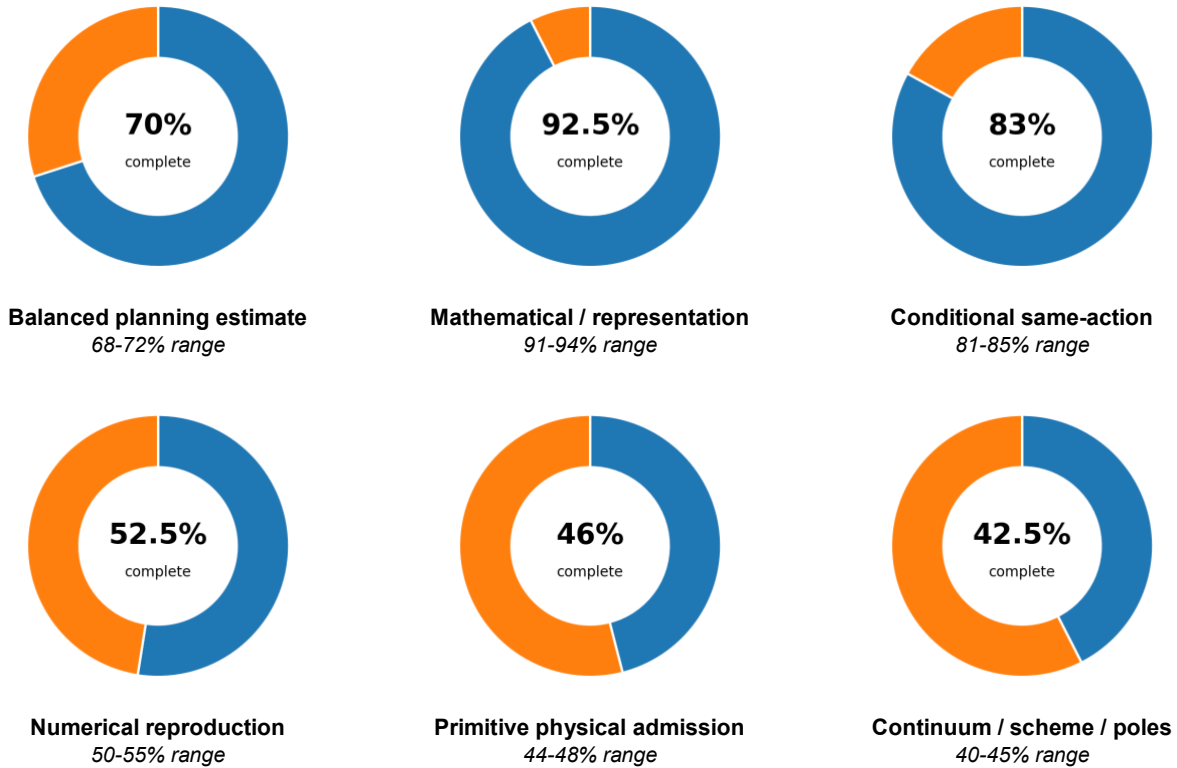


Figure 1. September 2026 completion overview. Midpoint values shown: 70%, 92.5%, 83%, 52.5%, 46% and 42.5%.

1. Source corpus, precedence and audit method

1.1 Controlling baseline and post-August source set

SMA-2, dated 3 August 2026, is the frozen baseline. It supplied the SM-1 to SM-30 gate vocabulary and the 60-65% balanced planning estimate. The present paper applies the same supersession discipline to the subsequent source corpus. The controlling post-August sources are listed in the source registry at the end of this paper. [S0-S15]

1.2 Supersession rules

- Latest controlling result wins only when it evaluates the same typed object on the same relevant carrier and readout.
- Different typed objects do not erase one another. A current-action Hessian is not a terminal Fisher matrix; a supporting-graph genus is not a completed two-complex topology; a record of commitment is not structural Fold presence.
- Positive construction is not physical selection. Rank, positivity, covariance, convergence and a good empirical residual do not by themselves promote a branch.
- Negative theorems count as scientific progress but do not populate a missing physical Standard Model row.
- No target rescue. Measured masses, couplings, mixings, phases or confinement scales may enter only after the VERSF object is frozen.
- No double counting. A sequence of audits that progressively isolates one missing physical gauge-response law is one programme advance, not five independent closures.

1.3 Audit grades

Grade	Meaning
EXACT	All operands declared; no missing object of the same mathematical type.
EXACT ON FROZEN LEDGER	Exact once a named representation/carrier/source ledger is granted.
CONDITIONAL ACTION-LEVEL	Returned from a frozen action or source law under named premises; not yet physically admitted.
3S / STRUCTURAL STAGE 3	Physical object and mechanism are strongly identified, but a final physical normalisation, branch or same-action source return remains.
RETAINED PHYSICAL THEOREM	Complete finite retained statement that still lacks the full continuum/global object.
PHYSICAL MICROSCOPIC	Same action returns carrier, branch, normalisation and microscopic number.
OBSERVABLE CLOSURE	Microscopic return transported through RG/scheme/threshold/pole or observable bridge.
REFUSED / NON-IDENTIFIABLE	Current source data cannot license the physical claim; inverse reconstruction or fitting is forbidden.
SUPERSEDED / RETIRED	No longer the controlling route; retained only for history, cross-checks or provenance.

2. What changed after the August audit

Programme area	Post-August advance	September status
Primitive preparation and fact/record chain	HCMR-P1, HCMR-M1 and the cumulative PMS work turn a broad preparation/maintenance deficit into a collection of explicit results: record-conditioned preparation, almost-sure first entry, record-defined semigroup structure, exact append-only persistence on its branch, and sharp non-identifiability of alternative post-commitment operations. Fact commitment is now explicitly treated as the primitive FC boundary rather than a coefficient that the pre-fact action must manufacture.	Preparation and record formation materially advanced; physical frame, post-commitment selector and some event-grain/carrier bridges remain open.
Primitive selection and marked attachment	PSAC and the later Fold/K7 synthesis convert orientation, topology, rank-one selection and mark attachment into finite operator tests. Boolean mark alphabets are too coarse for a rank-one hard cut, while the full effect algebra has capacity. The Fold/K7 paper further separates structure, event and record and gives a timeless stable-support theorem.	Major structural progress; physical source installation remains open.
Charged flavour / CKM	The full-carrier C3 curvature and family attachment now reach strong structural-3S grade. The R4-to-axle carrier bridge is tighter, a primitive axle mechanism exists, and the continuous phase freedom is narrowed to a small target-independent holonomy set. None of this yet makes the favourable curvature matrix controlling.	Architecture and mechanism advanced strongly; physical coefficient, phase, retention/readout and final matrix remain open.
Gauge/current source action	RCHS-1 derives a positive rank-six relaxed current action and an exact current-link Schur reciprocity identity. Relative C/W/Y overlap geometry H_{CWY} is multiply derived and robust. Native gauge/current source provenance passes at rank 144 and rank 72 after the Wilson quotient.	Existence and relative source-level current/link normalisation are now strong. Physical W_{prim} , factor branch and continuum coupling readout remain open.
Time and Higgs	HSPR fixes the spatial centred derivative and unit geometric residue and proves exact defect-mediated protection of the common Higgs line. The sequential-time paper constructs the unique local homogeneous opportunity-to-Lorentzian map $T(\delta) = \delta a_t/c^*$.	Local 3+1 Higgs kinetic structure greatly advanced; Higgs-line bridge, operational flow, physical potential/loops, calibration and pole remain open.
Fermions and perturbative running	CWGW/MFKR reconstruct the finite kinetic operator, provide exact/conditional chiral-regulator closure, and now obtain the normalised spatial Dirac/Weyl principal symbol at refinement-geometry grade. Route-M probability running is closed negatively; the one-loop gauge beta coefficients are instead carried by the quantum fluctuation determinant at conditional source-matched grade.	Large continuum-readiness advance; global chiral measure, record-to-fermion intertwiner, positivity and common scheme/poles remain.

Programme area	Post-August advance	September status
Gauge physical-admission audit	RGHS-24 is deliberately corrective. It fixes the gauge-generator and Wilson endcaps, executes covariant response benchmarks and explicit nonlinear link-record covectors, but refuses to promote an assumed residual metric or response law to physical Z3, Z2, Zq.	The immediate missing object is now precisely an independently normalised physical source response or equivalent microscopic law.
Gate-T topology and Fold identity	The complement-pair connector and $A^*=\pm(J-I-S)$ are jointly selected within P0-P5; order-seven torsion follows rather than being targeted. A separate timeless stable-presence theorem is supplied.	Strong conditional topology/stability theorem; source installation, physical minimality/readout and metric scale remain open.

3. Major supersessions and corrections

- The shorter Twelve-Sector Commitment-Hazard Selector paper is a precursor to the later RGHS-1 current-rigidity/current-stiffness paper and is not counted as an independent closure.
- The HSPR and earlier MFKR statements that the physical-time attachment was still missing are superseded, on the local homogeneous branch, by the Sequential Opportunity-to-Lorentzian Commitment-Time theorem. The remaining condition is source derivation of opportunity-duration homogeneity.
- PMS-EX126 correctly found global radial blindness of a normalised current ray, but CRTF narrows the broad conclusion: relative C/W/Y amplitude deformations can be visible to the existing ray instrument. A wholly new instrument is not automatically required for every factor-relative score.
- Route-M probability running is retired as the beta-function route: retained-record and fixed terminal probabilities have zero regulator running on the executed architecture. The one-loop coefficients must come from the fluctuation determinant/regulator calculation instead.
- The old factor-of-two clock inference from two endpoint incidences is no longer load-bearing. Incidence typing and opportunity-time typing are separate.
- The old inference from a commitment-history latch to Fold structural presence is withdrawn. Structural presence, commitment event and retained record remain differently typed unless the source provides a bridge.
- The genus-one result refers to the minimum orientable embedding genus of the refined supporting one-skeleton. It is not a theorem that the completed vacuum complex is a torus.
- RGHS-24 prevents an overclaim that the gauge problem has collapsed to one physical common scalar. Relative factor geometry is strong; the full physical response may still be nonfactorising.

4. Updated thirty-gate ledger

The July/August SM-1 to SM-30 labels are preserved for continuity. Several labels now point to retyped questions. "Release condition" means the smallest remaining source return that would materially upgrade the gate, not necessarily the only downstream work.

4.1 Gates SM-1 to SM-5

Gate	Target	September grade	Controlling result	Release condition
SM-1	Weak-orientation admissibility	PARTIAL / PHYSICAL OPEN	Orientation and marked-source structure are much sharper, but no source theorem yet uniquely installs the physical left-handed weak branch on the full boundary.	Source-selected weak orientation/branch in the admitted gauge-Higgs-matter action.
SM-2	Full weak-doublet Hessian	STRONG CONDITIONAL / 3S-LIKE	Full-carrier C3 axle geometry, family attachment and primitive axle activation are now substantial. Physical coefficient, current normalisation, visible readout, retention and phase remain open.	Same-action physical axle coefficient/normalisation, branch, retention/readout and installation.
SM-3	Leakage support trace	OPEN / NEUTRAL BLOCK ABSENT	The topology and stable-support machinery is stronger, but no complete physical weak-neutral operator supplies the required neutral leakage projector/trace.	Direct neutral block and exact physical leakage/support calculation.
SM-4	Ordered chi readout	RETYPED / SUBSTANTIAL CONDITIONAL PASS	HCMR-P1/PMS replace a standalone chi readback with record-conditioned preparation, realised-event state, first-entry and history	One source-selected preparation/readout package and physical record frame.

Gate	Target	September grade	Controlling result	Release condition
			architecture. Physical frame, event grain and post-commitment operation remain.	
SM-5	Gauge census closure	EXACT ON FROZEN LEDGER / PRIMITIVE ORIGIN OPEN	Faithful quotient/census, source-generator conventions and native gauge/current ranks are strong.	Primitive derivation of the physical census/carrier rather than recovery inside an inherited ledger.

4.2 Gates SM-6 to SM-10

Gate	Target	September grade	Controlling result	Release condition
SM-6	Weak octant sign	OPEN	No source-complete neutral operator or physical PMNS matrix exists.	Same-action neutral block and data-independent octant/CP branch.
SM-7	Adjoint removal, positivity, microcausality	STRONG PARTIAL	Finite retained positivity, Ginsparg-Wilson/local chiral regulator results, locality and a source-derived IR Dirac/Weyl principal symbol now exist. Full global chiral measure, determinant line and continuum microcausality remain.	Global chiral measure/positivity/locality theorem on the physical regulator and continuum.
SM-8	Kappa / localisation convention	MAJOR PASS / ABSOLUTE CALIBRATION OPEN	Sequential opportunity time is attached locally as $T(\delta) = \delta a_t/c^*$. The old serial-incidence factor is retired. The a_t -to- χ relation, laboratory calibration and Fold metric scale remain open.	Source proof of homogeneous duration plus common ruler calibration and scale bridge.
SM-9	Convention and normalisation audit	STRONG PARTIAL PASS	$q=6Y$, generator normalisation, Wilson $c_{\text{norm}}=1$, fermion IR normalisation and the local time map are explicit. A single common native-to-standard scheme/pole/covariance ledger is not.	One immutable cross-sector scheme, threshold, covariance and pole convention.
SM-10	Substrate anomaly descent	CONDITIONAL STRONG PASS	Local anomaly arithmetic and faithful topology remain strong. Global anomaly/bordism/determinant-line completion is still absent.	Full chiral determinant line and global anomaly/bordism audit.

4.3 Gates SM-11 to SM-15

Gate	Target	September grade	Controlling result	Release condition
SM-11	Generation and species census	STRONG STRUCTURAL PASS	The 47/49-dimensional representation ledgers, twelve commitment sectors and factor overlaps are repeatedly reproduced. Primitive pre-representation origin and full dynamical generation selector remain open.	Primitive action derivation of census and generation dynamics.
SM-12	World-to-framework occupancy	STRONG CONDITIONAL PASS	Preparation, retained-event and stable-support structure are stronger, but a unique physical background/ensemble and event-level occupancy/readout remain unselected.	Source-selected physical background/ensemble and occupancy/readout.
SM-13	Hermitian lift / frame firewall	LOCAL NO-GO RETAINED / ALTERNATE ROUTE OPEN	Local phase/frame selection remains non-identifying. The quark programme narrows the target-independent holonomy set, but physical phase inheritance is not derived.	Orientation-odd same-action coupling or exact physical output-equivalence theorem.
SM-14	Strange confinement dynamics	NON-IDENTIFIABLE / OPEN	No post-August paper derives the physical triality gap, string tension or string-breaking spectrum.	Edge-resolved physical colour action, wall coefficient and longitudinal/confinement bridge.
SM-15	Physical half-lazy gate	RETIRED AS PRIMARY ROUTE	The old scalar gate is no longer controlling; full tensor/source-response methods supersede it.	Formal retirement or recovery only as a derived corollary of the common action.

4.4 Gates SM-16 to SM-20

Gate	Target	September grade	Controlling result	Release condition
SM-16	Higgs potential and radial mode	STRONG 3S / LOCAL KINETIC CLOSURE	Source-derived unit spatial geometric residue, exact defect protection, sequential-spatial metric equality and local Lorentzian attachment are now available. The Higgs-line bridge, physical potential curvature/loops, operational flow and pole remain.	Derive γ_H along the physical flow, physical K_H on the same branch, then gauge/Yukawa/threshold/scheme pole completion.

Gate	Target	September grade	Controlling result	Release condition
SM-17	Charm-hinge magnitude	SUPERSEDED / EMPIRICAL CHARGED SECTOR OPEN	The full charged tensor and axle geometry supersede isolated hinge formulas.	Physical charged spectrum and final same-action CKM/pole transport.
SM-18	Coloured participation fraction	RETIRED AS INDEPENDENT GATE	Representation-resolved participation is encoded in the exact H_{CWY} /factor-support geometry; the old scalar fraction is not a separate physical theorem.	No separate release unless claimed as provenance; use full current/action response instead.
SM-19	Tau suppression projection	SUPERSEDED / PHYSICAL LEPTON SCALE OPEN	Conditional charged-lepton ratios remain; the old suppression factor is not the controlling derivation.	Primitive activation/localisation law and common physical mass/pole scale.
SM-20	Variational suppression identity	RETIRED	The full tensor/current-response route makes the historical scalar identity non-controlling.	None as separate gate; retain only a provenance crosswalk if needed.

4.5 Gates SM-21 to SM-25

Gate	Target	September grade	Controlling result	Release condition
SM-21	Charged-lepton absolute scale	PARTIAL SCALE INFRASTRUCTURE / POLE OPEN	Time and kinetic normalisations are stronger, but no source-native absolute laboratory ruler and common pole scheme has closed the lepton masses.	Common ruler/scale plus native-to-pole transport on one admitted branch.
SM-22	Full Yukawa matrices	CHARGED STRONG CONDITIONAL / NEUTRAL OPEN	Y_u , Y_d and Y_e remain genuine conditional action-level returns; quark-mixing architecture has advanced. Y_{nu} , MR and ML remain absent.	Physical charged readout plus direct source-returned neutral blocks.
SM-23	Quark current-mass projection	STRONG CONDITIONAL RG/TRANSPORT	Fermion IR normalisation and one-loop regulator universality strengthen the transport side. Absolute source scale, common scheme, thresholds and pole masses remain.	Native-to-standard scheme bridge, thresholds, covariance and pole certificate.
SM-24	PMNS closure Hamiltonian	EXECUTION CONTRACT CLOSED / SOURCE BLOCKS OPEN	The Takagi/PMNS/nonunitarity execution contract remains valid, but direct source-complete neutral matrices are still absent.	Populate the contract from direct same-action Y_{nu} , MR, ML and a physical branch.
SM-25	Neutrino mass / charge conjugation	PHYSICAL CERTIFICATE REFUSED	Neutral mass blocks, branch/readout and scale remain undetermined; inverse construction is non-evidential.	Direct source blocks or an exact source theorem such as $ML=0$, plus branch and scale.

4.6 Gates SM-26 to SM-30

Gate	Target	September grade	Controlling result	Release condition
SM-26	Gauge action and coupling values	SOURCE-ACTION PASS / PHYSICAL COUPLINGS OPEN	RCHS-1 gives a positive rank-six source current action and current-link reciprocity; RCHS-24 fixes generator/Wilson endcaps and the physical response contract. W_{prim} , full matrix branch and continuum curvature readout remain unselected.	Independent physical source response -> complete covariant quadratic parent -> Z_3, Z_2, Z_q -> g_s, g_{prime} .
SM-27	QCD confinement and running	PERTURBATIVE RUNNING STRONG CONDITIONAL / CONFINEMENT OPEN	Route-M probability running is closed negatively; the one-loop beta coefficients (41/6, -19/6, -7) now have a source-matched regulator route. Physical Z_3 , Λ_{QCD} and confinement remain.	Physical colour boundary followed by common scheme/RG and a source-derived confinement coefficient.
SM-28	Strong CP and theta sector	STRONG RETAINED PASS / CONTINUUM OPEN	The retained positive completion still gives $\theta_{bar}=0$ without target input. Full chiral determinant/global measure and EDM bridge remain.	Continuum chiral global-measure theorem and observable strong-CP bridge.
SM-29	Quantum gauge completion	STRONG LOCAL/FINITE PARTIAL PASS	Finite positivity, local chiral regulator, exact/conditional Ginsparg-Wilson structure, finite kinetic reconstruction and one-loop universality are stronger. BRST/Ward/global chiral measure/all-order unitarity/scheme remain open.	Global quantum gauge completion plus common RG/scheme/S-matrix or pole bridge.
SM-30	Final derivation audit	SEPTEMBER INTERIM AUDIT PASS / FINAL GATE OPEN	This paper updates the ledger. A final certificate cannot issue while physical gauge, neutral, confinement, Higgs-pole and common-scheme rows remain open.	Final object-by-object table with no physical Owed rows and one complete same-branch boundary.

5. Sector-by-sector physical audit

5.1 Primitive history, preparation, record and source selection

The August phrase “complete physical H_CM” is now too coarse to function as a single scientific blocker. The post-August papers have decomposed it into several differently graded objects. Event preparation and record-conditioned state construction have advanced; first record entry and record-defined sequential composition are much sharper; append-only persistence is exact on its branch; and general post-commitment persistence remains genuinely non-identifiable from the current data. PSAC and PMS further separate source direction, physical readout, matter selection and topology/attachment. [S1-S4]

RCHS-24 then makes a second retyping. Whole-action all-order primitive uniqueness remains important, but it is not a prerequisite to calculating the leading dimension-four gauge coefficient if the complete physical quadratic current-link connected parent is independently supplied. The physical provenance of every coefficient already entering that quadratic parent remains mandatory. [S14]

$$K0A(\text{all-order provenance}) \parallel K1*: \text{complete physical quadratic parent on } C(J, \theta)$$

This is an important efficiency gain: it removes higher-order source sectors that are provably Hessian-disconnected from the leading gauge calculation without allowing any same-order unknown weight to be ignored.

5.2 Gauge/current sector

The gauge/current sector has advanced the most conceptually. RCHS-1 derives a positive current stiffness on all six physical current directions after complete relaxation of the displayed auxiliary source block. On the unit diagnostic branch, $H_{JJ}^{\text{relaxed}} = (48/53)I_6$. More generally the stiffness remains strictly positive for every positive weighting in that source family. The same parent also yields a link stiffness and the exact reciprocity identity [S11]:

$$(K_{J^{\text{relaxed}}}^{-1}) = W_{J^{-1}} + (1/2) Kappa K_{\theta}^{-1} Kappa^{\dagger}$$

The relative C/W/Y geometry is equally strong. The exact factor Gram is

$$H_{CWY} = (1/49) [[36, 18, 36], [18, 26, 26], [36, 26, 47]]$$

and is reached through representation/current geometry, the quadratic terminal-Born continuation and the primitive commitment-mark score law. The factor-blind refinement theorem further protects this shape. [S4, S7, S11]

The remaining physical problem is nevertheless substantial. Distinct wheel modes give distinct current stiffnesses under one common separable metric, so scalar factor democracy is a compatibility branch rather than a theorem. RCHS-24 also shows that fixing the generator insertion and Wilson conversion does not fix the middle physical response. The correct direct handoff is now [S14]:

$$\text{physical source response} \rightarrow G_{\text{red}} \rightarrow K3, K2, Kq \rightarrow Z3, Z2, Zq \rightarrow gs, g, gprime$$

No physical values of Z3, Z2, Zq, gs, g or gprime are issued in the present corpus.

5.3 Higgs and electroweak scalar sector

HSPR-1 closes the spatial geometric part of the Higgs propagation problem on the declared D=3 refinement branch. The physical centred derivative is $(S-S^{-1})/(2 \text{ ell})$, the Laplace-Beltrami principal symbol has unit geometric coefficient, and every presently identified defect/history/bath/commitment correction that factors through the defect differential annihilates the common Higgs line. The remaining raw-field norm is therefore one direct operational scalar. [S12]

The Higgs-line metric comparison is reduced exactly to one state-wise scalar $\gamma_H(\tau)$. One-dimensionality makes both norms quadratic but does not force $\gamma_H=1$. The operational fixed-point value $Z_H > 1$ remains conditional on the distance-functional bridge and the physical selection/derivation of the operational-flattening dynamics. [S12]

The later sequential-time theorem then attaches the fact/opportunity phase to emergent Lorentzian time on the unique homogeneous local branch, giving [S13]:

$$T(\delta t) = \delta t \, a_{t/c^*}; \quad Z_{H^{\text{time}}} = Z_{H^{\text{space}}} \text{ (local attachment grade)}$$

This materially upgrades the Higgs programme from a spatial mechanism plus a missing clock to a local 3+1 kinetic structure with a sharply isolated field-norm/potential/loop/pole frontier. The scale-free ratio $m_H/v=32/63$ remains a Stage-2 numerical return rather than a formal Stage-3 microscopic prediction. [S6]

5.4 Charged flavour and CKM

The charged-flavour sector is scientifically stronger but still awkward. RRHF remains a genuine target-blind conditional action-level matrix and remains empirically poor. PCAC and the cumulative PMS work derive much more of the axle structure: the lowest-order C3 curvature, the full-carrier attachment, a source-side axle mechanism, a sharply reduced phase landscape and structural retention candidates. These advances make the old “free axle” picture obsolete. [S4,S5,S6]

They do not yet license the attractive curvature-corrected CKM matrix. The physical coefficient, current normalisation, comparison-loop inheritance, retention/readout and phase are still unselected. The final paper must therefore keep RRHF as the controlling CKM return until a same-action physical axle is installed and frozen before comparison.

5.5 Neutral sector

The neutral sector remains the least numerically mature major Standard Model sector. The architecture and exact Takagi/PMNS/nonunitarity execution contract exist, but direct source-side Ynu, MR and ML are absent. The earlier inverse-construction theorem continues to make any PMNS comparison based on supplied matrices non-evidential. No post-August paper changes that fundamental boundary. [S0,S6]

This gate is now relatively more important because several neighbouring sectors have advanced. A direct neutral block would therefore have unusually high programme leverage.

5.6 Fermion regulator and quantum/continuum sector

The fermion programme has moved from “source-explicit but not fully reconstructed” to a much stronger position. MFKR reconstructs the finite kinetic matrix as an exact source functional of the finite edge manifest and shared physical links, proves the matter-link normalisation firewall, and closes the normalised spatial Dirac/Weyl principal symbol at refinement-geometry grade on the declared D=3 branch. [S10]

The chiral-regulator programme adds exact/conditional Ginsparg-Wilson structure, locality and one-loop fermion universality. Route-M then closes the probability-running route negatively and redirects beta-function running to the fluctuation determinant. The conditional Standard Model one-loop coefficients are

$$(b_Y, b_2, b_3) = (41/6, -19/6, -7)$$

The remaining debts are global rather than local: the microscopic finite edge manifest for finite-level constants, record-to-fermion one-particle intertwining, physical post-commitment operation, fermionic positivity, the complete chiral/global measure, BRST/Ward/global-anomaly structure and one common scheme/pole pipeline. [S8-S10]

5.7 Strong sector and strong CP

Strong CP remains one of the stronger retained results: the retained positive full-support completion gives $\theta_{\text{bar}}=0$ without consulting the experimental bound. This remains short of a complete physical prediction because the full chiral determinant line, continuum global measure and observable EDM bridge are open. [S6]

Perturbative running has improved, but confinement has not. A nontrivial colour-response precursor exists and conditional unit-branch Λ_{QCD} calculations can be performed, but starting Z3 is not physical and the wall/triality/string-tension/string-breaking coefficient remains source-unselected. The ledger therefore grades perturbative running and confinement separately.

5.8 Gate-T topology, Fold stability and physical geometry

The Fold-to-K7 synthesis is a genuine mathematical advance. Within the explicit cyclic six-port, unit-coefficient attachment and acyclic-connector premises P0-P5, same-event anchoring, genuine inter-sector incidence, full rank and simple boundaries jointly select the complement-pair connector and

$$A^* = \pm(J - I - S), \quad \det A^* = 7, \quad \text{SNF}(A^*) = \text{diag}(1,1,1,1,1,7)$$

The order-seven homology therefore appears after the selection rather than being used to choose it. The selected supporting graph has minimum orientable embedding genus one. This is not a torus theorem. Physical promotion still requires the source to install the carrier, attachment family, connector, marked map and refinement. [S15]

The same paper introduces a timeless stable-presence theorem: given an independently specified absence support and a composition-closed family of admitted continuation channels, the largest common invariant support orthogonal to absence is calculable by finite adjoint-span closure. This is a clean structural theorem, but it does not yet identify the physical Fold, its minimality/readout or its metric size. The Fold-Planck identification therefore remains calibration grade, not an independent length prediction. [S15]

6. Numerical confrontation and evidential status

The numerical ledger is retained because VERSF now makes several nontrivial contacts with Standard Model numbers. The provenance grade controls the interpretation. Close numbers do not upgrade themselves.

Object	VERSF return	Comparison	Grade / limitation
Higgs ratio m_H/v	$32/63 = 0.507936508$	about -0.0528% vs 2026 inferred ratio	Stage 2 conditional numerical return; Higgs mechanism stronger at 3S
Higgs quartic comparator	$512/3969 = 0.128999748$	about -0.1055%	Correlated Stage-2 consequence; not independent
Electromagnetic structural candidate	$\alpha^{-1} = 960/7 = 137.142857$	about +0.0780%	Stage 2 structural/conditional; TPB/interface and continuum QED open
Charged lepton μ/e	$\exp(16/3) = 207.127249$	about +0.1736%	Conditional postdiction; primitive localisation and pole bridge open
Charged lepton τ/μ	$\exp(16/3)/12 = 17.260604$	about +2.63%	Conditional; physical 1/12 activation open
Weak-angle HCMR readback	$45/194 = 0.231958763$	about +0.32%	Candidate readback only; physical gauge certificate refused
RRHF CKM	target-blind returned matrix	empirically poor (August chi-squared_5 about 291)	Controlling conditional matrix; remains on ledger
Curvature-corrected CKM	favourable diagnostic branches incl. 150-degree holonomy	substantially better in selected diagnostics	Quarantined until physical axle coefficient/phase/retention/readout are derived
Strong CP	$\theta_{\text{bar}} = 0$	consistent with bound	Retained theorem; continuum chiral/EDM bridge open
One-loop gauge beta coefficients	41/6, -19/6, -7	Standard Model values	Conditional source-matched regulator/universality grade; physical boundary couplings still open
Neutrino/PMNS	no numerical certificate	not compared	Correctly refused: source-complete neutral blocks absent

The numerical reproduction range rises only modestly because the strongest post-August advances are mostly in provenance, mechanism and continuum readiness rather than new controlling physical numbers. This is scientifically preferable to inflating the score with unselected branches.

7. Revised critical path

The August critical path began with event preparation, copy-maintenance and score/frame selection converging into one complete H_CMR, followed by scale, branch, gauge/neutral/strong completion and a final common boundary. The September corpus allows a more selective path.

Immediate gauge route: physical source drift/forced response or microscopic law -> admitted covariant background + source units -> complete physical quadratic parent -> auxiliary reduction + curvature readout -> Z3,Z2,Zq

Parallel physics fronts: Higgs-line bridge/flow || physical CKM axle || direct neutral blocks || physical colour/confinement || Fold/K7 source installation || all-order primitive provenance

Downstream: physical microscopic boundaries -> common RG/scheme/threshold/pole bridge -> one HFB boundary -> final SM-30 certificate

7.1 Highest-leverage immediate calculations

Priority	Working paper / calculation	Mandatory return
P1	Primitive physical field-response and source-normalisation theorem	Return the actual field response that fixes the physical quadratic current/link/record weights without putting them into the starting metric. This is the shortest route to physical gauge weights and also a cross-check on the Higgs/current source architecture.

Priority	Working paper / calculation	Mandatory return
P2	Gauge continuum attachment and coupling theorem	Once P1 returns the response, execute the same-source curvature map, full matrix current-link reciprocity test, canonical normalisation, surviving Abelian portal and $Z_3, Z_2, Z_q \rightarrow g_s, g, g_{\text{prime}}$.
P3	Higgs-line distance-functional bridge and operational-flow physicalisation	Derive $\gamma_H(\tau)$ on the actual physical flow, return the same-branch K_H and then complete gauge/top/Goldstone/threshold/scheme contributions to the pole.
P4	Physical CKM axle completion	Use the source-selected current/metric and marked comparison loop to return the axle coefficient, phase, retention and readout before issuing a successor CKM matrix.
P5	Same-action neutral mass block	Return Y_{ν} , MR, ML or an exact source theorem restricting them, then execute the frozen Takagi/PMNS contract.
P6	Physical colour/confinement theorem	Return physical Z_3 , colour-typed wall/flux coefficient, longitudinal bridge, string tension and string breaking on one source-selected branch.
P7	Continuum chiral global measure	Construct the determinant line, global anomaly/bordism certificate, chiral positivity and strong-phase promotion.
P8	Common native-to-observable scheme/pole bridge	Transport all physically admitted microscopic returns through one immutable RG, threshold, covariance and pole scheme.
P9	Whole-action HFB boundary	Run one common admitted source at the required regulator sequence and return the gauge, Higgs, Yukawa, neutral and strong-phase boundary simultaneously.
P10	Final SM-30 empirical closure audit	Replace planning percentages with the final object-by-object physical table and explicit remaining failures.

7.2 Work that should not be prioritised

- No further CKM phase scan before the physical comparison loop and axle coefficient are returned.
- No PMNS or neutrino fit using supplied matrices. The neutral inverse-construction boundary remains controlling.
- No further Route-M probability-running search for the beta function on the same architecture; that route has an executed zero.
- No identification of a unit-metric or convenient residual Hessian with physical gauge weights. RCHS-24 has already shown why this is circular.
- No promotion of the genus-one supporting graph to a toroidal vacuum complex.
- No attempt to recover a current magnitude from a normalised-ray instrument by extending it at $j=0$ by fiat.
- No more “one common scale remains” claims unless the physical source actually proves the nonfactorising response reduces to that scalar.
- No conversion of a Fold stability solver iteration count into physical pre-fact time or Planck length.

8. Disposition of the August sixteen-paper programme

August paper	September disposition	Comment
1 HCMR-P1	Completed / controlling	Record-conditioned preparation and realised-event state substantially advanced.
2 HCMR-M1	Completed then retyped	Retention and renewal sharpened; physical post-commitment selector remains open.
3 PFDMI-S1	Major partial	CRTF/RCHS clarify scores and current geometry; physical response metric/frame still open.
4 PFDMI-R1	Major partial	Graded source-jet/native gauge-current factorisation strong; one unified primitive instrument still open.
5 HCMR-2	Monolithic target superseded	RCHS-24 splits immediate quadratic physical parent from parallel all-order provenance.
6 OOC-1	Partial	Orientation/Fold source structure advanced; unique physical branch still open.

August paper	September disposition	Comment
7 HCFC-1	Strong partial / 3S	Full-carrier quark-mixing curvature and axle architecture advanced; physical CKM completion open.
8 ASCR-1	Major partial	Local physical time attachment closed; absolute ruler, a _t -xi and laboratory calibration open.
9 GRCE-1	Major partial	Positive gauge/current source action and fixed endcaps now exist; physical couplings open.
10 EWHR-1	Major partial / 3S	Higgs spatial and local temporal kinetic structure advanced; physical bridge/pole open.
11 NSTC-2	Open	Neutral source blocks still absent.
12 RWCT-1/GQSC-2	Open	Confinement strength still unselected; running advanced separately.
13 CGMA-1	Local/finite advance only	Chiral regulator and IR fermion physics stronger; global measure remains open.
14 NSPB-1	Partial	Conditional one-loop running improved; common scheme/threshold/pole bridge open.
15 WHFB-1	Open	No single same-branch physical Standard Model boundary yet.
16 SM-30/RPC-2	Interim update only	This SMA-3 paper updates the ledger; final certificate remains open by construction.

9. Largest remaining blocks

Rank	Block	Missing return	Downstream effect
1	Physical gauge-response selection and continuum attachment	Independently normalised full field response / W _{prim} equivalent, physical background, full matrix branch, curvature map, canonical Z3/Z2/Zq.	Blocks physical gauge couplings and strongly affects electroweak/Higgs and QCD starting boundary.
2	Neutral physical sector	Direct Ynu, MR, ML, branch/readout and scale.	Blocks PMNS, neutrino masses and neutral thresholds; remains the least numerically closed major sector.
3	Common continuum/global completion	Chiral determinant line/global anomalies, common RG/scheme/threshold/pole transport.	Blocks observable strong-CP promotion and a unified physical boundary.
4	Higgs same-source bridge and pole completion	gamma _H physical bridge/flow, K _H , gauge/Yukawa loops, thresholds and pole scheme.	Blocks formal Stage 3/4 Higgs prediction despite strong 3S mechanism.
5	Physical CKM axle	Coefficient/current normalisation, phase, retention/readout, physical loop inheritance.	Blocks successor physical CKM matrix.
6	Confinement coefficient	Physical colour response, wall/flux bridge, string tension and string breaking.	Blocks QCD confinement observables.
7	Whole-boundary integration	One source-selected same-branch gauge/Higgs/Yukawa/neutral/strong set.	Blocks any final Standard Model certificate even if individual sectors close.
8	Foundational physical Fold/K7 installation and post-commitment source law	Actual stable-presence package, event-grain/marked map, topology installation, post-commitment operation and metric scale.	Parallel foundational debt; some parts may become non-load-bearing for the leading SM boundary, but must be settled for complete theory provenance.

10. Completion assessment

10.1 Why the range rises from 60-65% to 68-72%

The increase is driven by four kinds of change. First, several former existence questions now have explicit positive source-side mechanisms: current stiffness, current-link reciprocity, Higgs spatial propagation and finite fermion transport. Second, several former missing bridges now have strong or local closures: opportunity time, source-jet provenance and multiple carrier identifications. Third, multiple open-ended searches have been replaced by exact no-goes or finite release tests. Fourth, the continuum layer is no longer almost entirely deferred: the fermion principal symbol, local chiral regulator and one-loop gauge-running architecture now have meaningful source-matched closure.

The estimate does not rise more because the hardest physical-admission rows remain open. A source-generated action is not yet the physical Standard Model boundary. The programme still lacks physical gauge couplings, a source-complete neutral sector, a physical confinement coefficient, a full global chiral/scheme/pole completion and a single same-branch boundary containing all sectors. The 68-72% range therefore reflects a programme that is much better specified and technically closer, but still missing several decisive integrations.

10.2 Stage-based cross-check

Object	Current stage	Reason
Higgs ratio 32/63	2	Exact target-independent numerical consequence; physical multi-cell normalisation not complete.
Higgs carrier/propagation	3S	Physical common line and local propagation structure strong; bridge/normalisation/pole incomplete.
Electromagnetic 7/960	2	Strong structural candidate; physical TPB/interface and QED matching open.
Charged leptons	2	Definite source-side ratios; primitive localisation and pole scale open.
Gauge current action	2/3S structural	Positive source action and reciprocity exist; physical W_{prim} /full matrix/continuum couplings open.
Physical strong coupling	1-2	Finite response precursors and running architecture; physical Z_3 absent.
Strong CP	2-3 retained	$\theta_{\text{bar}}=0$ retained; global chiral/EDM bridge open.
RRHF CKM	2	Genuine conditional action-level matrix; empirically poor.
Physical axle-corrected CKM	1 / diagnostic	Structure and diagnostics exist; coefficient/phase/retention/readout unselected.
Neutrino/PMNS	0-1	Architecture and execution contract exist; physical blocks absent.
Unified HFB boundary	1	Required boundary defined; no one admitted execution returns it.
Observable Standard Model	below 4 overall	No common admitted microscopic boundary plus common RG/scheme/pole pipeline yet.

11. Final programme verdict

SCIENTIFIC VERDICT

- VERSF now contains a substantially more mature mathematical and conditional Standard Model construction than the August audit recorded. The balanced planning estimate rises from 60-65% to 68-72%, with a midpoint near 70%.
- The most important positive post-August result is not a new fitted number. It is that several mechanisms previously treated as missing now exist as explicit source-side structures: a positive rank-six current action, current-link reciprocity, local Higgs space-time propagation, finite fermion kinetic reconstruction and source-matched infrared/one-loop transport.

3. The most important restraint is RCHS-24. It shows that these advances do not yet equal physical gauge couplings. The physical field response, its metric/units, background, full nonfactorising reduction and curvature readout must be source-derived before Z3, Z2, Zq, gs, g or gprime can be issued.
4. The neutral sector remains the clearest major hole. No PMNS or neutrino number is counted until direct same-action neutral blocks exist.
5. The controlling CKM return remains RRHF and remains poor. The attractive C3/axle branch is scientifically interesting but remains quarantined until the action selects it.
6. The Higgs programme is now strong at 3S: its local kinetic mechanism and time attachment are much clearer, but the physical Higgs-line bridge, potential/loops and pole completion remain.
7. The strong sector has stronger perturbative running and a retained $\theta_{\text{bar}}=0$ theorem, but confinement strength and the global chiral/observable completion remain open.
8. The Fold/K7 topology is now a sharply selected conditional mathematical branch, not an open topology search. Its physical source installation and Fold metric scale are not yet derived, and the genus-one graph must not be called a torus.
9. A complete first-principles Standard Model derivation is therefore not established. The next decisive paper should return new physical source information, not another conditional benchmark.

The September programme claim should therefore be: “VERSF is approximately seventy percent mature as a Standard Model derivation programme, with several major mechanisms now structurally or conditionally closed, but the physical Standard Model boundary remains unissued because gauge normalisation, neutral masses, confinement and common continuum/pole admission are not yet jointly source-selected.”

Appendix A. Source registry and currency notes

Ref	Source	Controlling role
[S0]	VERSF Standard Model Derivation Audit - August 2026 (SMA-2, 3 August 2026).	Frozen baseline, gate names, prior grades and sixteen-paper programme.
[S1]	Ordered Records, Realised Event States (HCMR-P1).	Event-level preparation, first-entry and record-conditioned state architecture.
[S2]	The Post-Commitment Atomic-Operation, Retention and Renewal Theorem (HCMR-M1-R15).	Post-commitment retention/renewal, append-only persistence and physical-selection boundary.
[S3]	The Primitive Selection History-to-Curvature and Standard-Model Attaching-Map Closure Theorem in VERSF (PSAC-1-R19).	Primitive source/readout/matter/topology gate decomposition and rank-one selection audits.
[S4]	Primitive Matter Selection in VERSF: Cumulative Executed Theorems on Fact Commitment, Record Retention and Renewal.	Fact-order, FC boundary, renewal selection, history-to-probability geometry and quark-axle source developments.
[S5]	The Full-Carrier Quark-Mixing Curvature Closure in VERSF.	C3 curvature, full-carrier family attachment and strong 3S charged-flavour architecture.
[S6]	The Standard-Model Numerical Confrontation and Provenance Theorem in VERSF (SMNC-3).	Stage scale and source-locked numerical confrontation across Higgs, EM, leptons, gauge, quark flavour, neutral and strong sectors.
[S7]	The Physical C/W/Y Radial-Current Tangent Field and Existing-Instrument Score Descent in VERSF (CRTF).	Physical factor-relative current tangent, existing-instrument score capacity and correction of the broad radial-blindness interpretation.
[S8]	The Route-M Off-Shell Integrability and Current-Source Closure paper.	Physical six-direction Route-M carrier, integrability obstruction typing and probability-running zero.
[S9]	The VERSF Chiral-Regulator Universality Matching Theorem (CWGW).	Local chiral regulator, Ginsparg-Wilson/locality and one-loop fermion universality.
[S10]	The Finite Master-Action Fermion Kernel Reconstruction and Source-Identity Gate in VERSF (MFKR-1).	Exact finite K_U source functional, IR principal-symbol closure, sequential generator/Fock lift and remaining source-identity gates.
[S11]	RCHS-1: The Twelve-Sector Current-Rigidity, Source-Generated Rank-Six Current-Stiffness and Current-Link Schur Reciprocity Theorem in VERSF.	Hazard rigidity, H_{CWY} , positive current action, reciprocity, provenance and Gate-T conditional topology.

Ref	Source	Controlling role
[S12]	HSPR-1: The Refinement-Geometry Higgs Spatial-Propagation and Kinetic-Residue Reduction Theorem in VERSF.	Spatial Higgs unit geometric residue, defect protection, gamma_H bridge and sequential-spatial equality.
[S13]	The Sequential Opportunity-to-Lorentzian Commitment-Time Attaching Map in VERSF.	Unique local homogeneous time attachment and physicalisation of the sequential Higgs/record clock.
[S14]	RCHS-24: The Quadratic Gauge-Release Sufficiency and First-Fact Endpoint-Admission Reduction Theorem in VERSF.	Quadratic release retyping, gauge-normalisation endcaps, covariant response audit, explicit endpoint/link-record forces and physical source-response requirement.
[S15]	The Fold-to-K7 Physical Stitching and Marked-Anchor Reduction in VERSF.	Joint connector/sign selection, timeless stable-presence theorem, Fold/record typing and physical-source/metric boundary.

Currency note. The shorter Twelve-Sector Commitment-Hazard Selector manuscript is treated as a precursor to [S11] for the overlapping typed current/hazard results. Earlier statements in HSPR/MFKR that the physical-time attaching map was still open are superseded at the local homogeneous grade by [S13]. The latest RCHS-24 audit [S14] governs physical promotion of gauge-response claims but does not withdraw the source-action theorems of [S11].

Appendix B. August-to-September percentage comparison

These ranges are deliberately broad. They are planning measures of maturity and dependency closure. They are not probabilities, Bayesian credences, fractions of nature explained or measures of how close the remaining calculations will land to experiment.

Layer	August midpoint	September midpoint	Approximate movement
Mathematical / representation	87.5	92.5	+5 points
Conditional same-action	72.5	83.0	+10.5 points
Numerical reproduction	47.5	52.5	+5 points
Primitive physical admission	37.5	46.0	+8.5 points
Continuum / scheme / poles	27.5	42.5	+15 points
Balanced planning blend	62.5	70.0	+7.5 points

The largest movement is assigned to continuum readiness because the time attachment, fermion IR principal symbol and one-loop regulator/universality route materially change that layer. Primitive physical admission rises less, because the physical source still has not selected several of the most consequential amplitudes, branches and readouts.