Scoped-GUT — Per-Gate Honest Status Ledger (SG-1..SG-10)

This ledger records the ten scoped-GUT gates in order, each as a single entry holding the gate, its technical witness, its honest caveats, and a status label drawn from the binding vocabulary: **DERIVED-GIVEN-E / PARTIAL / FORCED / DECLARED-FROZEN / DISCLOSED / OPEN / CANDIDATE**. The binding discipline: PROMOTIONS:0; the frozen branch `dcc66f1b2685` is READ-ONLY; "given-E" means computed with the Standard-Model chiral content E supplied as input, not a derivation of E; and selection != derivation. Status labels are assigned conservatively — a gate that passes its certificate only under declared assumptions is never elevated to an unconditional claim.

> The per-gate Battle-vs-rivals dossiers (string / M / F-theory / NCG / lattice comparisons, win / tie / shared-open verdicts) live in `BATTLE_GATES/`.

SG-1 — Geometry specification: the frozen 13D active branch (GUT Gate 1; §6.1)

SG-1 — Geometry specification: the frozen 13D active branch (GUT Gate 1; §6.1). The gate establishes that the submitted active branch $\mathfrak{B}$_active is a fully specified, layer-complete three-layer object (base ×, finite $\oplus$, tensor $\otimes$) — K6=SU(3)/T², S², S_Y¹/Z₂, the F^+ chamber and projectors — committed before any downstream gate is evaluated; the technical witness is a freeze-and-reproduce certificate, not a derivation: content hash dcc66f1b2685 and manifest meta-hash a5b1e6f9d951 pin every primitive/derived object (A0/A1/A2/A3/B2, dossiers C1–C10), and the R0 reproducer regenerates each hash so the only certified claims are specificity, no-layer-smuggling, and reproducibility (failure modes: missing layer/primitive, hash mismatch, smuggling). The honest caveats are that this is DECLARED-FROZEN and category-relative, not a uniqueness theorem: minimality is selector-minimal INSIDE the pre-declared search category (SHAPE is selected-not-forced absolutely — Kolmogorov/MDL-shortest only over the declared grammar + dimensional ladder + named rivals, with ~9–10 injected reals beyond the 4 anchors), so per the §6.12 falsification map the gate is *Claimed certificate pass under declared search category* and downgrades to *Open / not claimed* (under-defined branch) or *Category-relative diagnostic* (search-category attack); the carrier-uniqueness leg is mixed — K6=SU(3)/T² is the unique purely-abelian clean SU(3) carrier (abelian-isotropy uniqueness; CP²=SU(3)/U(2) was built and BREAKS at Gate 2 by over-producing gauge), and S² (F1) / S_Y¹/Z₂ (F2) are forced WITHIN the grammar, but rivals (string/M/F/NCG/lattice) TIE on the gauge-group outcome and the geometry/search-category choice itself stays SHARED-OPEN across frameworks. Frozen and reproducible, not proven unique; PROMOTIONS:0; frozen branch READ-ONLY. **DECLARED-FROZEN**

SG-2 — Gauge recovery: SU(3)c×SU(2)L×U(1)Y from internal isometries (GUT Gate 2; §6.2)

SG-2 — Gauge recovery: SU(3)c×SU(2)L×U(1)Y from internal isometries (GUT Gate 2; GUT.md §6.2). The surviving 4D isometry algebra of the frozen compact factors equals su(3)c⊕su(2)L⊕u(1)Y exactly — equality, not containment, after quotients/parities/bundle data act — with the simple-summand multiset {su(3),su(2),u(1)}, 8+3+1=12 generators, rank 4, and NO extra unbroken factor and no missing SM factor (the gate's failure mode), read architecturally with no coupling value consulted; the technical witness is K_gauge = K6×S2×S1_Y/Z2 with color carried by K6=SU(3)/T2, weak by S2, hypercharge by S1/Z2, and the session adds three architecture-neutral forcedness results — K6 is the UNIQUE clean SU(3) carrier by abelian-isotropy uniqueness (T2 is the unique purely-abelian SU(3) isotropy, so the CSDR centralizer survives no extra gauge; the explicitly-built CP2=SU(3)/U(2) route passes here but its non-abelian U(2) isotropy over-produces gauge and is killed downstream at chirality), S2 is FORCED by fact F1 (no abelian/torus carries non-abelian SU(2)), and S1/Z2 is FORCED by F2 (closed odd-dim → mirror fermions → LEP Z-width) — but the honest caveats are sharp: the gauge-group OUTCOME itself is a TIE shared by string/M/F/NCG/lattice rivals (this is a filter every framework passes, not a Fable-discriminating determiner), the recovery is computed GIVEN the selected geometry E (the isometry route does not prove this gauge group is unique across all geometries, only that this frozen branch yields it), and the carrier-forcedness — not the outcome — is the Fable-internal contribution; representation-level recovery (Appendix D) and the centers/Z6 global structure are deferred to Gates 3–5, and no coupling-unification numerics are claimed here. **DERIVED-GIVEN-E**

SG-3 — Three generations as topological index χ(K6,E) = −3 (GUT Gate 3)

SG-3 — Three generations as topological index χ(K6,E) = −3 (GUT Gate 3). The family count is the spin-C Borel-Weil-Bott index equalling −3 (magnitude 3 = generations, sign = chirality) — a rigid integer, no dial (Atiyah-Singer) — but computed WITH E as input: it certifies this geometry+bundle yields three families, not that three is unique across all geometries. **DERIVED-GIVEN-E**

SG-4 — Hypercharge table + hand-checkable anomaly witness (GUT Gate 4)

SG-4 — Hypercharge table + hand-checkable anomaly witness (GUT Gate 4). Full per-generation Y/Y³ ledger with by-hand witnesses 3·(1/6)−1/2=0 (mixed) and the six perturbative ledgers vanishing; but anomaly cancellation is a FILTER on E not a determiner (infinitely many solutions), only ~10/16 quantum classes close, the BV-BRST descent (UQF-4) and the R4 mixed t Hooft anomaly stay AUDIT/OPEN. **PARTIAL**

SG-5 — Electroweak embedding Q=T3+Y / EWSB to U(1)em (GUT Gate 5)

SG-5 — Electroweak embedding Q=T3+Y / EWSB to U(1)em (GUT Gate 5). A single Wilson-line/Hosotani doublet (nH=1, integer-winding protected) breaks SU(2)L×U(1)Y→U(1)em with Q=T3+Y on every multiplet and near-hits v=246.02, mh=123.82; but gauge-hierarchy lightness and custodial ρ=1 are undelivered, outputs GIVEN the selected geometry + frozen anchors. **PARTIAL**

SG-6 — Moduli stabilization: structural witnesses, no tuned dials (GUT Gate 6; §6.6 / Appendix F)

SG-6 — Moduli stabilization: structural witnesses, no tuned dials (GUT Gate 6; §6.6 / Appendix F). Every modulus an output reads (M_used) must carry a witness of declared TYPE — Weyl-rigid chamber for K6's three Cartan shape moduli (chamber-center u=(1,1,1)), modular fixed point τ=ω for the F+ Cartan-torus, integer winding n_H=1 for the Wilson-line Higgs, discrete Z2/Z6 topology for the orbifold/identification, plus boundary-condition pins for the S^2/S^1_Y radii and threshold spectrum — not a scalar potential whose minimum was placed at the answer, and the predicate tests the witness type so "a potential we minimized at R0" fails by construction; this is genuinely strong discipline (12-row witness ledger F.3, no tachyon, witness-coverage lint) and is the $y=R^2$ curve-not-a-number argument made operational. But it is scoped and given-E: the branch claims only admissibility-restriction + LOCAL stability at the chamber-center witness + phenomenological sufficiency for Gates 1–10 — global stabilization is an explicit NON-claim (F.9.4/F.10.1), the positive-definite moduli-mass Hessian is DIAGNOSTIC-ONLY (F.9.5, the named most-natural attack surface), and witnesses fix the moduli WITHIN the already-selected chamber, so the gate certifies the selected geometry is internally controlled, not that the witnesses determine the geometry; the acute soft spot is θ_H⋆ (Hosotani phase ~2.46e-14), READ from the chamber's one-loop V_Hos minimum, carrying ~85% of the electroweak hierarchy via v_EW=θ_H⋆/(2πR_γ) — a value extracted from a minimum rather than independently derived, leaving the lightness-of-v leg leaning on a read modulus; and stabilization is a SHARED-OPEN hard problem on which rivals (string/M/F/NCG/lattice) also struggle (Battle-of-the-Geometries: stabilization = TIE/SHARED-OPEN, not a Fable win), with the broader four-term V(σ) discharge living only in downstream Paper IV (EXTERNAL, its own caveats) and changing nothing here. PROMOTIONS:0; frozen branch READ-ONLY. **PARTIAL**

SG-7 — Threshold unification: heat-kernel delta triple to M_U (GUT Gate 7; §6.7 / Appendix G)

SG-7 — Threshold unification: heat-kernel delta triple to M_U (GUT Gate 7; §6.7 / Appendix G). The gate's job is the "not quite" — the three measured couplings alpha_1,alpha_2,alpha_3 run up from M_Z almost meet, and the survivor's own heavy KK spectrum must supply exactly the corrections that close the

gap with nothing adjustable; the witness is the 8-row G.3.2 heat-kernel ledger (matter packets, gauge+ghost net, hypercharge zero-mode + packet, Higgs Wilson-line at n_H=1, orbifold-boundary term at theta in {0,pi}) whose three column sums are the frozen threshold vector (delta_1,delta_2,delta_3)= (+4.8424,-3.1112,-1.7313) +/- 1.6e-3, driving inverse-coupling equality at M_U~1e16 GeV with a residual at the numerical-pipeline floor (~9.6e-11, inside the ~1e-3 PDG band), each row asserted as a deterministic function of named topological invariants/Dynkin indices (G.3.2a) under the "no row is a free parameter" / No-Hidden-Knob discipline (G.10); but the certificate is given-the-selected-survivor (this is a consistency/pruning pass evaluated on the frozen branch, not a determination that this spectrum is unique), the SM beta coefficients and M_U are inputs/declared-target conventions rather than predictions, and on audit it stands honest-but-undelivered: the three delta are injected reals (quoted at five sig figs, not regenerated), the G.3.2a row formulas do NOT reproduce the delta decimals (off ~2x-18x), and the load-bearing executable proof — reproduce_all.py plus appendix_F_heat_kernel_ledger.csv / appendix_F_threshold_outputs.csv with their VERIFY row — is referenced throughout but ABSENT, so "no row is a free parameter" is a declared-not-proven assertion; by the manuscript's own falsification map (§6.12 row 7) an unreproduced ledger or a hidden knob downgrades the gate from claimed-pass to Diagnostic only, leaving the reproduction-harness status AUDIT/OPEN pending the ledger-CSV mount; rival frameworks tie here (SHARED-OPEN on threshold). **PARTIAL**

SG-8 — Flavor closure: Yukawas from the F+ chamber (GUT Gate 9; §6.9)

SG-8 — Flavor closure: Yukawas from the F+ chamber (GUT Gate 9; §6.9). The frozen F+ chamber (modulus τ=ω, sector projectors Π_{u,d,e,ν}, action ladders a_u=(2,1,0), a_d=(4/3,2/3,0), order-three holonomy → δ_CKM) maps two declared anchors (y_t(M_Z), |V_us|) through frozen operators O_{u,d,e,ν} to Yukawa matrices Y_{u,d,e,ν}, with CKM = U_u†U_d as the misalignment of two frozen diagonalizations and the CP phase read off holonomy — the program's hardest and most attackable gate, generating the quark/lepton/neutrino mass-mixing pattern by diagonalization not per-entry insertion (family-level normalizations forbidden, I.4); but the headline "2-in / 19+-out (~5.5x)" overstates the honest economy, which is ~4x (3.7–4.4x): the per-sector scales N_d/N_e/N_ν are themselves CALIBRATION INPUTS fitted to m_b/m_τ/Δm² (NOT derived from N_u — no such relation), the absolute sector mass-scales are anchor-consistency checks (diagnostic per I.0a.2, like the already-excluded m_t row) rather than independent outputs, and the seesaw Majorana scale M_R is UNKNOWN/open (no value, formula, or hash) — so the GENUINE frozen outputs are the within-sector mass RATIOS plus all CKM/PMNS magnitudes, Jarlskog, and CP phases, given the selected geometry and frozen chamber; the m_u row sits at ~4.4σ (disclosed weakest link), the numerical-comparison harness is AUDIT pending the J.6/K.5 table mount, and any neutrino quantity not certificate-complete is Pending/not-used — F+ remains the weakest link in the program and downgrades to Diagnostic-only if any Flavor-Lock row is violated. **PARTIAL**

SG-9 — Proton safety: product structure, no GUT mediator (GUT Gate 10; §6.10 / Appendix L)

SG-9 — Proton safety: product structure, no GUT mediator (GUT Gate 10; §6.10 / Appendix L). The product (non-simple-group) compactification K_gauge = K6×S2×S1_Y embeds the SM with no embedding into a single simple GUT group and therefore no heavy X/Y boson, sidestepping the failure mode that executed minimal SU(5) (~10^30 yr vs Super-K's ~10^34 yr); the technical witness is the tenth load-bearing term E_proton with frozen sector projectors Π_q=diag(1,0), Π_ℓ=diag(0,1) on E_matter giving the exact off-block-killing identity Π_q M Π_ℓ = 0 (certificate G10_proton_safety, 25 randomized class members + the X-like off-block FAIL confirmation), backed by the FCNC/mediator no-go theorem (R1.6 `fff4b433b7b3`, operator-class `551488d06011`) under which every dangerous mediator contribution to every FCNC and proton-decay Wilson coefficient vanishes by BRST decoupling on the spectator sector plus empty SM-charged physical cohomology of the chamber projectors — but this is a CANDIDATE-grade safety argument, not a theorem: the gate is two-part by design (L.2a declares O_danger^declared BEFORE the identity acts, the "narrowed subclass" attack being the named failure mode) so the certificate's own falsifier is precisely whether the projector identity kills the PHYSICALLY relevant operator class or only the declared one; dim-6 B/L-violating proton decay is a pressure SHARED by all GUT-class geometries (Battle-of-the-Geometries verdict: SHARED-OPEN, no Fable win, rivals neither cleared nor killed here) and in the SM proton longevity is partly an accidental symmetry, so the result is an operator-level selection-rule pass evaluated GIVEN the selected product geometry + frozen labeling, NOT a delivered absolute bound; the numerical lifetime is deliberately not forced and stays Diagnostic only (L.4, excluded from the closure claim), and the gate is a filter that prunes mediator-bearing variants rather than a determiner that proves longevity unique to this branch. **PARTIAL**

SG-10 — Claim boundary: explicit excluded sectors + scope walls (GUT Gate 11; §6.11/§9)

SG-10 — Claim boundary: explicit excluded sectors + scope walls (GUT Gate 11; §6.11/§9). The outermost honesty layer names every non-GUT sector it does not claim — quantum-gravity UV completion (Gap-01 scope wall), full cosmology, dark matter, dark energy, baryogenesis, strong CP — with the Yang-Mills mass gap (Gap-02) and Λ left Weinberg-open, each recorded in the Section-9 boundary ledger as "Outside scoped-GUT claim"; the technical witness is a mechanical, scriptable two-clause scope-consistency lint (`certificates/G11_claim_boundary/`) enforcing, in BOTH directions, that no excluded sector is cited to close a required Gate 1–10 and no required gate is re-filed as an exclusion, so the binding rule (§1.2.1) "a required gate may never be closed by narrowing scope" is checked by program, not authorial restraint, with the falsifier downgrading the offending required gate rather than this one. The honest caveats: this gate closes no physics and translates to nothing geometric — it is a meta-constraint on the claim (a DISCLOSED non-claim, not a derivation), so it carries no certificate of correctness for the excluded sectors and adds no output; its strength is purely disclosure discipline (per the Battle-of-the-Geometries it is one of only two Fable-WIN gates, since most rivals silently omit the exclusion list), and it is load-

bearing only as the guardrail that keeps the scoped-GUT closure honest, leaving the excluded sectors themselves entirely OPEN. **DISCLOSED**

Honest roll-up

Across the ten scoped-GUT gates the status tally is: **2 DERIVED-GIVEN-E** (SG-2 gauge recovery, SG-3 three-generation index), **5 PARTIAL** (SG-4 hypercharge/anomaly, SG-5 electroweak embedding, SG-6 moduli stabilization, SG-7 threshold unification, SG-8 flavor closure, SG-9 proton safety) — six gates by count, since SG-4/5/6/7/8/9 all carry the PARTIAL label — **1 DECLARED-FROZEN** (SG-1 geometry specification), and **1 DISCLOSED** (SG-10 claim boundary); there are zero gates labeled FORCED, OPEN, or CANDIDATE as a top-line status (CANDIDATE-grade and OPEN-grade qualifiers appear inside SG-9 and SG-4 respectively but do not promote the gate). Corrected count: SG-4, SG-5, SG-6, SG-7, SG-8, SG-9 = 6 PARTIAL; SG-2, SG-3 = 2 DERIVED-GIVEN-E; SG-1 = 1 DECLARED-FROZEN; SG-10 = 1 DISCLOSED. The standing scoped-GUT posture is certificate-complete-under-declared-assumptions on the closeable gates: the geometry is frozen and reproducible (not proven unique), gauge recovery and the family index are rigid given the SM chiral content E, and the remaining gates pass their certificates as filters/consistency-passes evaluated on the selected geometry rather than as cross-geometry determinations. The named OPEN/AUDIT residuals are concentrated in SG-4 (BV-BRST descent UQF-4 and the R4 mixed 't Hooft anomaly stay AUDIT/OPEN; only ~10/16 quantum classes close), SG-6 ($\theta_{H^\star}$ read from a minimum; global stabilization an explicit non-claim; Hessian diagnostic-only), SG-7 (three δ are injected reals, G.3.2a formulas do not reproduce the decimals, the reproduce_all.py + ledger-CSV harness is ABSENT → AUDIT/OPEN), SG-8 (per-sector scales $N_d/N_e/N_\nu$ are calibration inputs, seesaw M_R unknown/open, m_u at ~4.4σ, comparison harness AUDIT), and SG-9 (projector identity is CANDIDATE-grade safety against the declared operator class, not a delivered absolute lifetime bound). The excluded scope walls — disclosed in SG-10 and left entirely OPEN — are quantum-gravity UV completion (Gap-01), the Yang-Mills mass gap (Gap-02), the cosmological constant Λ (Weinberg-open), full cosmology, dark matter, dark energy, baryogenesis, and strong CP. PROMOTIONS:0; frozen branch `dcc66f1b2685` READ-ONLY; selection != derivation; "given-E" denotes computation with E supplied as input, never a derivation of E.