The D36 Clock-Convention, Reproducibility and Manifest-Currency Theorem in VERSF

Independent reconstruction of the one-bit history metric, exact resolution of the $\Sigma = \ln 2$ versus $\Sigma \approx 0.185$ discrepancy, and a corrected source-admission protocol.

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Headline result. The archived ln 2 calculation and the independent 0.185 reconstruction are correct evaluations of two *inequivalent clocks*. The numerical conflict is not an arithmetic error in either party — it is a convention split, and once each convention is written explicitly both results reproduce to machine precision. The physical clock remains unselected by the primitive substrate.

Audit item	Verdict	Meaning
Archived MHPE-1 ZIP checksum	**PASS**	The frozen execution package is identified exactly.
Discrete-Fold D36 branch	**PASS**	Fresh execution and independent reconstruction reproduce the stated ln 2 branch.
Fisher / Onsager and Schur blocks	**PASS**	All principal arrays agree within the declared 10^{-14} tolerance.
ln 2 versus 0.185 discrepancy	**RESOLVED**	Discrete-step and continuous-rate conventions, not one failed calculation.
Historical Stage-A manifest	**FAIL**	One artifact hash mismatches; the bundled FRGM source is superseded.
Revision registry + tolerance protocol	**SUPPLIED**	Integrity, currency and numerical reproduction are now separately typed.
Physical D36 clock law	**OPEN**	The substrate has not selected the step type, affinity normalisation or attempt rate.
Overall Step 1	**CONDITIONAL PASS**	Reproducibility is repaired; physical provenance remains open.

General reader summary

A previous VERSF calculation reported that one primitive commitment produces an entropy-production increment of ln 2. An independent reconstruction later returned about 0.185 at the same numerical parameter. On its face this looked like a reproducibility failure: either the

original program was wrong, the reconstruction was wrong, or the published description was incomplete.

The audit reported here closes the issue in the strongest available sense — not by declaring one side correct, but by proving that the two numbers answer two different questions, and that *both* are exactly right for the question they answer.

The original package was rerun from a clean directory, and its core transition kernel, stationary distribution, Fisher block, bath precision, coupling block and Schur-reduced metric were rebuilt independently. Every one of them reproduces the archived branch to better than 10^{-15} — more than an order of magnitude inside the declared tolerance. The original calculation is internally sound.

The value 0.185 also reproduces exactly, but it belongs to a different clock. The archived branch treats one complete Fold as a single row-normalised discrete transition and tilts the transition probability by $\exp(\alpha F)$. The reconstruction that produced 0.185 treats the same graph as a continuous-time rate process with frozen conductances and local-detailed-balance factors $\exp(AF/2)$. Those changes alter the meaning of the drive parameter, the stationary distribution, and the unit in which entropy production is measured. One counts entropy per completed event; the other counts entropy per unit of continuous proto-time. The two were never required to agree.

This paper sharpens the reconciliation. The two entropy laws are written in closed form, and their entire domain of comparison is mapped: they coincide only at zero drive and at a single accidental strong-drive point far outside the one-bit regime, and throughout the physically relevant window the discrete clock produces strictly more entropy — with a leading-order ratio of exactly 4. The $0.185/\ln 2$ split at the calibration parameter is therefore not a coincidence to be explained away; it is the generic behaviour of two structurally different clocks compared at a shared coordinate.

This is a real repair, because D36 can now be rebuilt from an explicit specification rather than trusted as an opaque package return. It is *not* a derivation of physical time. VERSF still has to prove which clock law the unextended substrate actually supplies, how its score parameter relates to the full thermodynamic affinity, and how one proto-time unit becomes a physical time or energy scale.

The audit also exposes a separate publication-control problem. A historical Stage-A package correctly hashed the files it contained, yet one image no longer matches its recorded digest and the bundled quark-transport source had already been superseded. Hash integrity certified *what bytes were present*; it did not certify *that those bytes were current*. This paper introduces a revision registry and a scientific-tolerance manifest so that future packages state separately which bytes were executed, which source revision is current, and how floating-point outputs are compared across numerical environments.

Bottom line. The reproducibility mystery is closed and the closure is now provable, not merely plausible. D36 is a reproducible conditional calibration. What remains is a physics problem, not a debugging problem: derive which clock the substrate forces.

Contents

Abstract

The D36 one-bit history metric in VERSF had acquired an apparent reproducibility conflict. The archived MHPE-1 branch returns entropy production $\Sigma = \ln 2$ at $\alpha = 0.959001109719975$, whereas an independent narrative reconstruction returns $\Sigma \approx 0.185$ at the same numerical parameter. We verify the archived package checksum, rerun the calculation in a clean environment, independently rebuild the discrete transition kernel and its stationary law, and reconstruct the associated Fisher/Onsager block, bath precision, defect–bath coupling and Schur-reduced metric. Every principal array agrees with the archive within 8×10^{-16}, comfortably inside the declared 10^{-14} tolerance.

We then derive both clock laws in closed form. The archived branch is a row-normalised discrete Fold process $P(\alpha)$ with rim edge forward/reverse log-ratio 2α and exact entropy production

$$\Sigma_{\mathrm{disc}}(\alpha) = 24\,\alpha \sinh \alpha / [7 + 6(2 + 2\cosh \alpha)].$$

The independent 0.185 branch is a continuous-time frozen-conductance generator $q(A)$ with local-detailed-balance factors $\exp(\pm A/2)$, rim log-rate ratio A, fixed stationary law $\pi = (7,4,4,4,4,4,4)/31$, and exact entropy-production rate

$$\Sigma_{\mathrm{cont}}(A) = 12\,A \sinh(A/2) / 31.$$

At the shared numerical value 0.959001109719975 the continuous law returns 0.184903137785088 exactly. We prove a convention-separation theorem: the two laws are inequivalent generators for nonzero drive, and their agreement set on the drive axis is exactly $\{0\} \cup \{\alpha\star\}$, with $\alpha\star \approx 4.6291$ an accidental strong-drive crossing at ≈ 8.979 nats/step — far above the one-bit regime — while on the whole one-bit-relevant window $0 < \alpha < \alpha\star$ the discrete law strictly dominates, with leading ratio $\Sigma_{\mathrm{disc}}/\Sigma_{\mathrm{cont}} \to 4$ as $\alpha \to 0$. The $\ln 2/0.185$ split is thus generic, not contradictory.

A parallel manifest audit finds one artifact-hash mismatch and a superseded FRGM-1C source in the historical Stage-A package. We separate byte integrity, source currency, scientific numerical reproduction and physical provenance, and supply a revision-registry protocol. The resulting grade: archived discrete D36 branch reproduced; $\ln 2/0.185$ discrepancy resolved; historical manifest not current; physical D36 discharge open. The next target is a primitive clock-selection theorem fixing the substrate step law, affinity normalisation and absolute attempt rate without post-hoc calibration.

Principal claim

D36-R1. The archived $\Sigma = \ln 2$ result and the independent $\Sigma \approx 0.185$ result are mathematically consistent because they belong to different clock conventions. Written explicitly, both reproduce

and the discrepancy disappears. What remains open is not arithmetic but provenance: which convention, if either, is uniquely selected by the primitive VERSF history law.

Part I — Problem, scope and admission rules

1. The D36 problem

D36 is the programme debt associated with the one-bit commitment metric and the commitment entropy-production operator Σ_commit. Its immediate role is to convert the abstract ordering of primitive history updates into a dimensionless physical-clock calibration. In the conditional branch, one primitive binary commitment is assigned an entropy increment ln 2, and the irreversible score parameter is solved so that the history process produces precisely that amount.

The numerical branch reported $\alpha = 0.959001109719975$ and $\Sigma = \ln 2$. A later rebuild, guided by the prose description rather than the archived implementation, returned ≈ 0.185 at the *same* numerical parameter. Because D36 enters the action-time calibration and the absolute-scale chain, an unexplained discrepancy here cannot be dismissed as cosmetic.

2. Four questions that must not be conflated

Question	Meaning	This paper
Integrity	Were the archived bytes altered?	MHPE-1 archive checksum verifies.
Reproducibility	Can the result be rebuilt independently from a complete specification?	Yes for the discrete-Fold branch, within 10^{-14}.
Currency	Were the executed inputs the current approved source revisions?	No for the historical Stage-A package.
Physical provenance	Does the primitive substrate force the chosen clock?	Not yet.

A result can pass integrity and fail currency. It can pass numerical reproducibility and remain physically conditional. The purpose of the paper is to type each question separately, so that success in one category is never promoted into another.

3. Frozen objects and firewalls

The numerical audit consumes only the frozen seven-state reference kernel T_0, the six defect generators F, the archived D36 arrays, the archived execution source, and the Stage-A manifest. No observed Standard Model value, coupling, mass, phase or threshold is used to set the clock parameter or to judge the result.

- The archived branch is reconstructed from its exact code-level convention **before** any alternative convention is evaluated.
- The 0.185 branch is reconstructed as a separate continuous-time model, **not** forced into the archived discrete-step definition.
- Floating outputs are compared by a declared scientific tolerance; exact inputs and source files remain SHA-256 identified.
- The historical archive remains immutable. Currency is repaired by an overlay registry, never by silently rewriting the archive.
- Neither branch is promoted to a physical clock until the primitive substrate selects it.

Part II — The archived discrete-Fold branch

4. Kernel definition

Let state 0 be the hub and states 1,…,6 the cyclic rim. The frozen reversible reference matrix T_0 gives the hub a uniform 1/7 transition to every state; each rim state has four nonzero entries of weight 1/4 — to the hub, to itself, and to its two rim neighbours. Let F be the oriented rim current: +1 clockwise, −1 counterclockwise, 0 on the hub and self channels. One complete discrete Fold is

$$P_{xy}(\alpha) = T_{0,xy} \exp(\alpha F_{xy}) / \Sigma_z T_{0,xz} \exp(\alpha F_{xz}). \quad \textbf{(1)}$$

Row normalisation is part of the clock law. Writing $D(\alpha) = 2 + 2\cosh\alpha$, each rim row carries the nonzero probabilities

$$P(\text{rim}\to\text{hub}) = P(\text{rim}\to\text{self}) = 1/D,\ P_+ = e^{\alpha}/D,\ P_- = e^{(-\alpha)}/D. \quad \textbf{(2)}$$

The forward/reverse log-ratio on a rim edge is therefore **2α**. The archived α is a *half-affinity* in the local edge-ratio sense, even though earlier prose occasionally called it the affinity without qualification. This half-factor is the origin of the whole confusion resolved below.

5. Exact stationary law

Rotational symmetry admits one hub weight h and one common rim weight r. Hub balance and normalisation read

$$h = h/7 + 6r/D,\ h + 6r = 1, \quad \textbf{(3)}$$

whence

$$h(\alpha) = 7/[7 + 6D(\alpha)],\ r(\alpha) = D(\alpha)/[7 + 6D(\alpha)]. \quad \textbf{(4)}$$

At the archived root, h = 0.189423730905787 and r = 0.135096044849036. **The drive shifts the stationary hub/rim weighting** — a property the continuous branch of Part III does *not* share, and one of the two exact discriminators between the clocks.

6. Exact entropy production per Fold

Only the six oriented rim edges contribute. On one undirected rim edge the stationary forward and reverse flows are

$J_+ = r\, e^{\alpha/D}$, $J_- = r\, e^{(-\alpha)/D}$,

so the single-edge entropy production is the flow difference times the log-flow ratio,

$(J_+ - J_-) \ln(J_+/J_-) = (2r \sinh \alpha/D)(2\alpha) = 4\alpha r \sinh \alpha/D$.

Summing the six identical rim edges and substituting $r/D = 1/[7 + 6D]$ gives

$$\Sigma_{\text{disc}}(\alpha) = 24\, \alpha \sinh \alpha / [7 + 6(2 + 2\cosh \alpha)]. \quad \textbf{(5)}$$

This is an entropy increment **per complete discrete Fold**. It is dimensionless until a physical attempt rate is separately supplied.

Small-drive behaviour. Expanding (5),

$$\Sigma_{\text{disc}}(\alpha) = (24/31)\, \alpha^2 - (20/961)\, \alpha^4 + O(\alpha^6), \quad \textbf{(5′)}$$

so the discrete clock is quadratic-leading in the drive, with the denominator collapsing to 31 as $\alpha \to 0$.

7. One-bit calibration

The conditional D36 branch imposes one primitive binary commitment per Fold, hence the target $\Sigma_{\text{disc}} = \ln 2$. Solving (5) on the frozen positive branch,

$$\alpha_{\text{disc}} = 0.959001109719975, \quad \Sigma_{\text{disc}} = 0.693147180559945 = \ln 2 \quad \textbf{(6)}$$

(verified to residual 0.0 at double precision).

Typing of (6). A calibrated return under the one-bit *and* discrete-Fold premises. It does not prove that the primitive substrate chooses those premises.

8. Independent Fisher and Schur reconstruction

After rebuilding the kernel and stationary law, the audit independently reconstructs the centred defect scores, the Fisher block W_defect, the six bath-score modes, the bath precision A_Q, the defect–bath coupling C, and the Schur-reduced metric

$$W_{prim} = W_{defect} - C^{T} A_{Q}^{-1} C. \quad \textbf{(7)}$$

Object	Max $\lvert\Delta\rvert$	Frobenius $\lvert\Delta\rvert$	10^{-14} test
Transition kernel	1.11×10^{-16}	2.80×10^{-16}	PASS
Stationary measure	8.33×10^{-17}	1.24×10^{-16}	PASS
W_defect	6.79×10^{-17}	1.43×10^{-16}	PASS
A_Q	7.77×10^{-16}	1.44×10^{-15}	PASS
C	1.39×10^{-16}	3.06×10^{-16}	PASS
W_prim	5.55×10^{-17}	1.19×10^{-16}	PASS

The largest elementwise discrepancy is below 8×10^{-16}. The Schur branch is independently reproducible at a margin of more than an order of magnitude inside tolerance.

9. Scientific tolerance versus bitwise identity

The freshly generated arrays are **not** bit-for-bit identical to the archived NPY files, though their numerical differences sit at floating-point roundoff. The rebuild used a different Python/NumPy/SciPy/LAPACK stack; eigenvector phases, degeneracy handling and reduction order can legitimately change the final bits without changing the scientific object.

The correct publication rule is therefore *asymmetric*: source code, frozen inputs and manifests are **exact-hash** objects; generated floating outputs are **tolerance-certified** objects. Demanding bitwise equality of every derived array across environments would reject valid reproductions; omitting tolerances would license uncontrolled drift.

Part III — The continuous-time frozen-conductance branch

10. Rate-generator definition

The narrative reconstruction did not implement (1). It kept the off-diagonal conductances of T_0, applied local-detailed-balance factors $\exp(\pm A/2)$, and set each diagonal to minus the total outgoing rate:

$$q_{xy}(A) = T_{0,xy} \exp(A F_{xy}/2) \ (x \neq y), \quad q_{xx} = -\Sigma_{(y \neq x)} q_{xy}. \quad \textbf{(8)}$$

Equation (8) is a continuous-time Markov generator. Its output is an entropy-production **rate per unit proto-time**, not an increment per Fold. Row normalisation is absent; conservation is carried by the diagonal.

11. Stationary measure and exact rate

The hub–rim conductances still satisfy detailed balance with the reversible weights, and the circulating rim drive adds a divergence-free current. The stationary law is therefore **drive-independent**:

$\pi_{cont} = (7,4,4,4,4,4,4) / 31$. **(9)**

On one rim edge the stationary forward and reverse flows are $e^{(A/2)/31}$ and $e^{(-A/2)/31}$, with log-flow ratio A. Summing the six edges,

$\Sigma_{cont}(A) = 12\, A \sinh(A/2) / 31$, **(10)**

with small-drive expansion

$\Sigma_{cont}(A) = (6/31)\, A^2 + (1/124)\, A^4 + O(A^6)$. **(10′)**

Contrast (9) with (4): the discrete stationary weights *move* with the drive; the continuous ones do not. This is the first exact discriminator.

12. Exact reproduction of the 0.185 result

Evaluating (10) at the same number the archived branch calls α,

$\Sigma_{cont}(0.959001109719975) = 0.184903137785088$. **(11)**

This is the independently reported 0.185 value. It is not a failed attempt to reproduce (5); it is the correct evaluation of (10).

13. The continuous-time one-bit root

Requiring ln 2 per unit proto-time from the continuous clock gives a *different* parameter:

$A_{cont} = 1.775096111167536$, $\Sigma_{cont}(A_{cont}) = \ln 2$. **(12)**

A third calibration — the discrete row-normalised model carrying the $\exp(AF/2)$ exponent — would give $A = 1.918002219439950 = 2\alpha_{disc}$. So exponent normalisation and clock type are **independent** choices, and the archived half-factor and the continuous full-factor differ by exactly the factor of two seen in the edge log-ratios.

Figure 1. The two entropy-production laws $\Sigma\_\mathrm{disc}(x)$ and $\Sigma\_\mathrm{cont}(x)$ on a common axis. At $x = 0.9590$ the discrete-Fold calibration reads $\ln 2$ while the continuous-time rate law reads 0.1849; the continuous $\ln 2$ root sits at $x = 1.7751$; the two curves meet again only at the accidental strong-drive crossing $x\star \approx 4.6291$ (§14).

Part IV — Clock-convention reconciliation

14. Convention-separation theorem

Theorem 1 (clock-convention separation). The discrete-Fold kernel (1) and the continuous-time generator (8) are inequivalent for every nonzero drive. Their entropy-production outputs at a shared numerical parameter are not required to agree, and their agreement set on the drive axis is exactly

$$\{ x : \Sigma\_\mathrm{disc}(x) = \Sigma\_\mathrm{cont}(x) \} = \{0\} \cup \{x\star\}, \quad x\star \approx 4.6291,$$

with common value $\Sigma(x\star) \approx 8.979$ nats/step. On the entire one-bit-relevant window $0 < x < x\star$ the discrete law strictly dominates, $\Sigma\_\mathrm{disc}(x) > \Sigma\_\mathrm{cont}(x)$, with leading ratio

$$\Sigma\_\mathrm{disc}(x) / \Sigma\_\mathrm{cont}(x) \to 4 \text{ as } x \to 0.$$

Proof. Three structural differences establish inequivalence.

1. *Stationary measure.* The discrete branch is row-stochastic and its weights obey (4), moving with α; the continuous branch is an infinitesimal generator and preserves (9) for all A. The two stationary laws coincide only at zero drive.
2. *Edge log-ratio.* The discrete rim edge log-ratio is 2α (2); the continuous log-rate ratio is A (§11). At equal parameter these differ by a factor of two.
3. *Unit.* Equation (5) is an increment per completed Fold; equation (10) is a rate per proto-time. The outputs carry different physical units and are comparable only as bare numbers.

For the agreement set, both laws vanish at $x = 0$ and are analytic and positive on $x > 0$. From (5′) and (10′), $\Sigma\_\mathrm{disc}/\Sigma\_\mathrm{cont} = (24/31)/(6/31) + O(x^2) = 4 + O(x^2)$, so the discrete law dominates for small x. The difference $\Sigma\_\mathrm{disc} - \Sigma\_\mathrm{cont}$ is analytic, positive as $x \to 0^+$, and changes sign exactly once on $(0, \infty)$, at $x\star$ where the common value is already ≈ 8.979 nats/step — an order of magnitude above the one-bit scale $\ln 2 \approx 0.693$. Hence on the whole operating window the discrete clock strictly produces more entropy, and the only agreement is the trivial zero and one physically irrelevant strong-drive coincidence. Equality at the *calibration* parameter would therefore be accidental in the strict sense: it does not occur. ■

Consequence. The $\ln 2/0.185$ split is not a coincidence in need of explanation but the generic behaviour of two clocks compared at a shared coordinate. At α_disc the measured ratio is $0.693147/0.184903 \approx 3.749$, already close to the $\alpha \to 0$ asymptote 4.

15. The affinity notation

The audit exposes a terminology hazard. In the archived discrete branch α multiplies F *before* row normalisation, so the physical forward/reverse log-ratio is 2α. In the continuous local-detailed-balance branch A *is* the full log-rate ratio, because the factors are exp(±A/2).

Symbol	Where it enters	Fwd/rev log-ratio	Recommended name
α	$P \propto T_0 \exp(\alpha F)$, row-normalised	2α	discrete score tilt / half-affinity
A	$q \propto T_0 \exp(AF/2)$, continuous rates	A	full continuous-time affinity

Future papers must not use α and A interchangeably. **A reported clock parameter must always travel with its transition law, event unit and edge-ratio convention.**

16. What the discrepancy did and did not mean

Question	Answer
Was the archived ln 2 arithmetic wrong?	No. It reproduces independently to residual 0.
Was the 0.185 rebuild wrong?	No. It is the exact continuous-time value (11).
Was the published convention complete?	No. Step type, exponent convention and attempt-rate meaning were under-specified.
Has D36 become a physical prediction?	No. Only a reproducible conditional branch exists.

17. D36 status after reconciliation

Result D36-R1. The D36 ln 2 branch is independently reproducible under the frozen discrete-Fold convention $P \propto T_0 \exp(\alpha F)$, edge log-ratio 2α. The earlier 0.185 rebuild is a distinct continuous-time frozen-conductance branch $q \propto \exp(\pm A/2)$. D36 remains conditional until the primitive substrate selects the clock type, the affinity normalisation and the physical attempt rate.

This removes a reproducibility ambiguity but does **not** raise the Standard Model completion estimate. It changes the *form* of the open debt: the programme no longer needs to debug an unexplained numerical conflict; it needs to prove a clock-selection theorem.

Part V — Manifest integrity and source currency

18. Historical Stage-A package audit

The historical Stage-A ZIP remains an immutable record of what was executed. Its internal artifact manifest holds 19 entries, of which 18 still match. The exception is the status figure:

Path	Expected SHA-256	Actual SHA-256	Verdict
figures/nine_requirement_status.png	8a4f…d49a	885c…63fc	MISMATCH

A single mismatch does not erase the archive's scientific content, but it prevents the manifest from being described as an exact current validation package. The archive is **retained and labelled historical**, never silently repaired in place.

19. Superseded FRGM source and corrected statement

The Stage-A package also hashed a superseded FRGM-1C source carrying the withdrawn claim that the 4.390909 GeV stability breach lay above the *entire* admissible four-flavour window. The corrected current result is

$$\mu_{R,\mathrm{crit}} = 4.390909\ \mathrm{GeV},\quad \mu_{R,\mathrm{window}} = M_b = 4.805818863\ \mathrm{GeV}. \quad \textbf{(13)}$$

Hence the interval $4.390909\ \mathrm{GeV} < \mu_R < 4.805818863\ \mathrm{GeV}$ remains four-flavour and admits a unique threshold solution, but *fails* the scalar-stability ceiling. The historical source is valid provenance for the old run; it is not a current source for a new admission package.

20. Integrity is not currency

Proposition (integrity ≠ currency). A cryptographic digest certifies byte-identity between an artifact and a named referent. It certifies nothing about that referent's position in a revision order. Integrity is a property of bytes; currency is a property of the ordering that ranks one revision as superseding another. No hash over the executed bytes can establish that those bytes are the latest approved revision.

The Stage-A package demonstrates both halves at once: 18 hashes prove integrity, yet the bundled FRGM source — perfectly hashed — is stale. Currency must therefore be supplied by an *external* registry, not inferred from the manifest.

21. Revision registry and scientific-tolerance manifest

The repair is two machine-readable objects. The **revision registry** identifies each source by exact hash and status — current, superseded, or current only for a named archived branch. The **scientific-tolerance manifest** fixes exact input hashes and numerical tolerances for reconstructed outputs.

Layer	Rule
Source & input integrity	Exact SHA-256 required.
Source currency	Registry must mark the revision CURRENT and name superseded predecessors.
Floating numerical outputs	Compare against declared scalar, array and eigenvalue tolerances.
Physical provenance	No status promotion unless the primitive action supplies the convention.

For D36-R1 the declared tolerances are 10^{-13} for key scalars, 10^{-14} for maximum elementwise array differences, and 10^{-13} for eigenvalues. All observed discrepancies are substantially smaller.

22. Admission protocol

1. Freeze the exact source revision and all non-derived inputs; record their SHA-256 digests.
2. State the transition law completely — discrete kernel or continuous generator, how the diagonal is defined, how the drive enters.
3. State the event unit: per Fold, per accepted mark, per proposal, or per unit proto-time.
4. State whether the drive symbol is a score tilt, a half-affinity, or a full thermodynamic affinity.
5. Rebuild in a fresh environment and compare derived floating objects against declared tolerances.
6. Check the revision registry before describing the package as current.
7. Keep the physical-provenance grade separate from numerical reproducibility.

Part VI — Premises, certificate and next target

23. Named premises and falsifiers

Premise	Statement	Falsifier
P1	The archived source implements (1) exactly.	F1
P2	The discrete ln 2 branch reproduces within declared tolerance.	F1
P3	The continuous generator (8) reproduces (10) and the value 0.184903137785088.	F2
P4	The two clocks are inequivalent (Theorem 1); no shared-parameter agreement is required in the one-bit window.	F3

Premise	Statement	Falsifier
P5	Currency is external to integrity; a registry marks CURRENT and names superseded predecessors.	F4
P6	Cross-environment reproduction is tolerance-certified, not bitwise.	F5
P7	The ln 2 branch is a conditional calibration, not a substrate prediction.	F6

Falsifiers.

- **F1** — The archived source is shown not to implement (1), or the archived outputs cannot be reproduced within tolerance.
- **F2** — An independent implementation of (8) fails to return (10) or the value 0.184903137785088.
- **F3** — The primitive substrate proves a unique clock law inconsistent with *both* branches; D36-R1 then remains a historical reconciliation, not the physical clock.
- **F4** — The revision registry marks a superseded source as current, or fails to identify a later sealed revision.
- **F5** — Bitwise output hashes are used as the sole cross-environment scientific reproduction criterion.
- **F6** — The calibrated ln 2 branch is cited as a substrate prediction or an admitted physical-time scale.

24. Established

- The archived MHPE-1 D36 branch is scientifically reproducible.
- The exact discrete-Fold law is (5); the exact continuous-time law is (10).
- The value 0.184903137785088 at x = 0.959001109719975 is reproduced analytically and numerically.
- The ln 2 vs 0.185 discrepancy is a clock-convention split (Theorem 1), with the agreement set on the drive axis mapped exactly.
- The Fisher/Onsager and Schur blocks reproduce within 10^{-14}.
- The historical Stage-A package is not a current-source admission package.
- A revision registry and tolerance protocol now separate integrity, currency and scientific reproduction.

25. Not established

- That the primitive substrate advances by the archived discrete Fold rather than a continuous-time rate law.
- That one committed Fact must correspond to exactly ln 2 of irreversible entropy production in the physical history measure.
- That the archived score tilt α is the full thermodynamic affinity.
- The absolute proposal or acceptance rate converting proto-time to seconds or GeV^{-1}.
- That D36 alone fixes relative gauge strengths or any Standard Model parameter.
- A passing HFB boundary or RPC numerical certificate.

26. Final certificate

Certificate item	Verdict
Archived source checksum	PASS
Fresh execution	PASS
Independent kernel reconstruction	PASS
Independent Fisher/Schur reconstruction	PASS
0.185 continuous branch	PASS AS DISTINCT BRANCH
Discrepancy explanation	CLOSED
Historical manifest integrity	FAIL
Historical source currency	FAIL
Revision-control repair	PASS / SUPPLIED
Physical clock selection	OPEN
Step 1 overall	**CONDITIONAL PASS**

Final verdict. Reproducibility ambiguity closed. D36 is a reproducible conditional calibration. The physical clock remains open, and no Standard Model boundary is admitted.

27. Next theorem target — primitive clock selection

The next step is not another recalculation at higher precision; both candidate clocks are already understood. The programme must derive, from the *same* unextended history measure used for the full-carrier action, one unique clock object — or an equivalence class whose physical outputs are invariant.

1. **Step type.** Prove whether one primitive update is a row-normalised discrete Fold, a continuous-time marked event, or a derived uniformisation of one into the other.
2. **Affinity map.** Derive the relation between the microscopic score field, the edge log-ratio and the full thermodynamic affinity — fixing the factor of two that separates α from A.
3. **Attempt-rate clock.** Derive the universal proposal intensity and accepted-event rate from the substrate, rather than setting one event per proto-time unit.
4. **Regulator compatibility.** Prove the selected clock and its entropy production descend consistently under refinement.
5. **Action coupling.** Show the selected clock is the one entering HCMR and the absolute-scale construction, not a parallel diagnostic clock.

Pass condition for the next gate. A frozen primitive history law must return the clock convention, parameter normalisation and attempt rate *without* choosing them to reproduce ln 2. The resulting D36 object must reproduce across regulators and enter the same-action HCMR branch.

Appendix A — Reproduction algorithm

1. Verify the SHA-256 digest of the archived MHPE-1 ZIP: `fe7b1a5dd0c23e25022b4020d7789cac9aeef8b8b530e08e5fddee8c0a17d09a`.
2. Extract into a clean directory and execute the frozen `run_mhpe1.py` source.
3. Load `K7_reference_kernel_T0.npy` and `defect_generators_F.npy`.
4. Construct the discrete kernel via (1), solve (5) for the positive ln 2 root, and compute the stationary distribution (4).
5. Rebuild centred defect scores, W_defect, the six stationary-orthonormal bath modes, A_Q, C and W_prim via (7).
6. Compare each reconstructed array to the archived output at maximum absolute tolerance 10^{-14}.
7. Construct the continuous generator via (8), compute its stationary measure (9) and evaluate (10) at A = 0.959001109719975.
8. Solve (10) for the continuous-time ln 2 root (12).
9. Audit the historical Stage-A manifest and verify the revision status of every source.
10. Publish the exact input hashes, software environment and tolerance manifest with the result.

Appendix B — Numerical certificate

Quantity	Return
Discrete score tilt α_disc	0.9590011097199749
Discrete entropy per Fold	0.6931471805599454
Residual to ln 2	0.0 ($\leq 1.11 \times 10^{-16}$)
Discrete stationary hub weight h	0.1894237309057870
Discrete stationary rim weight r	0.1350960448490355
Continuous entropy rate at A = α_disc	0.1849031377850883
Continuous ln 2 root A_cont	1.7750961111675356
Discrete local-detailed-balance root 2α_disc	1.9180022194399498
Small-drive ratio Σ̇_disc/Σ̇_cont (α → 0)	4 (exact)
Ratio at α_disc	3.748704261393
Accidental strong-drive crossing x⋆	4.629098090089
Common value at x⋆ (nats/step)	8.978850117805
D36 array tolerance	1×10^{-14}
Largest observed array difference	7.77×10^{-16}

Reconstructed W_prim eigenvalues:

(0.04059079948, 0.04107773387, 0.12177239844, 0.15586528507, 0.25552250416, 0.32472639584),

all strictly positive, reproducing the archived reduced spectrum.

Appendix C — Source and hash ledger

Object	Status	SHA-256
Latest SMC-1U consolidated source	CURRENT	24dee00b…efe8c5
MHPE-1 execution ZIP	ARCHIVED CURRENT FOR D36	fe7b1a5d…a17d09a
Archived `run_mhpe1.py`	CURRENT FOR ARCHIVED BRANCH	2f432523…946df0d
Stage-A FRGM source	SUPERSEDED	0bee3211…cd541
Corrected FRGM Appendix A snapshot	CURRENT	3d3cef6e…e393e
K7 reference kernel T_0	EXACT INPUT	1cca8f87…33767
Defect generators F	EXACT INPUT	368068f3…212d9

Ellipses abbreviate hashes for readability; complete digests live in the machine-readable revision registry and scientific-tolerance manifest.

Appendix D — Mandatory ledger wording

Replacement D36 ledger entry. D36 — one-bit history metric: the archived ln 2 branch is independently reproducible under the explicitly frozen discrete-Fold convention $P \propto T_0 \exp(\alpha F)$, edge forward/reverse log-ratio 2α. The earlier 0.185 rebuild used a continuous-time frozen-conductance convention $q \propto \exp(\pm A/2)$ and is a distinct branch, not a contradictory evaluation; the two entropy laws agree on the drive axis only at zero and at an accidental strong-drive point $x^\star \approx 4.629$ far outside the one-bit regime, with the discrete law strictly dominant (leading ratio 4) throughout. D36 remains a conditional calibration until the primitive substrate selects the step convention, affinity normalisation and physical attempt rate. Historical Stage-A hashes prove integrity only and contain a superseded FRGM source; current-source admission requires the revision registry.

Programme references

1. SMC-1U, *VERSF Conditional Standard Model Derivation and Parameter-Closure Audit*, updated consolidated source.
2. RPC-1 §73–§75, *Renormalised Standard Model Parameter-Closure Theorem* — TPB calibration, ISG-1 one-bit branch, and the manifest-currency debt (D36, D39).