Series-VII-Enter-A v5 Prescribed Carriers, Destructive Access, and Compatible Obstructions

A documentary synthesis of VII-A–VII-J with self-contained local interface proofs, conditional cosmic bounds / hidden-sector channels, and common-mediator consistency relations

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Abstract

We assemble the classical, microlocal, finite-part, geometric, instrument, and scheduling interfaces of Series VII on explicitly prescribed spacetime carriers, keeping separate a supported developing presentation, an intrinsic equation realization, a finite instrument, and its decoder-access cut. The central quantitative finding is a corrected access comparison: a classical-only complete output has sharp recovery floor $1 - 1/d$, a branchwise quantum cut of dimension k has floor $1 - k/d$, and an informative classical record obeys an effect-dependent retained-output bound that can be arbitrarily smaller than the classical-only floor. The analytic synthesis proves coexistence rather than cancellation among plateau covariance, the sharp-Cauchy boundary wavefront, and a strong numerical finite part under displayed hypocontinuity requirements. Conditional Theorems A–D and a supplied oscillator benchmark yield exact single-/two-probe consistency identities; five labelled research conjectures (common-mediator consistency, nonclassical memory, finite coupling spectrum, marginal acceleration, spatial response) identify discriminating experiments without promoting those claims to theorems. No spacetime emergence, Einstein dynamics, cosmological state, or inherited quantum coefficient is asserted.

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Routing, philosophy, and the scope ledger

Three different uses of earlier material

The identifier of this manuscript is Series-VII-Enter-A; ``VII-Enter-A" is an alias, not a second sheet. Its proposed application status is

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Standing boundary. No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{GI, CB\}$ only. Cited Cheung and OpenAI

records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.

Earlier material has three different roles. A geometry, response table, or analytic estimate can be *supplied explicitly as data*. A conclusion can be *proved locally from displayed hypotheses*. A manuscript can be a *named comparison*. The third role supplies provenance and orientation, not a hidden proof premise. The distinction is essential for a documentary synthesis whose sources contain different signatures, gauge domains, inverse operators, states, and output spaces.

In particular, we do not turn the supplied descriptions of VII-A–VII-D into a quantum source instrument. The original graph-specific tensor and ultraviolet calculations are not reconstructed by a short citation. Where their consequences are useful, Section prints a sufficient analytic packet and proves a conditional theorem about that packet. That theorem is self-contained; its identification with a particular graph still requires the packet's estimates for that graph.

Enter and spacetime Enter

Cheung's Enter calculus distinguishes destructive readout from a quantum-return map. A runtime name denotes access to a quantum factor; consuming that name removes it from the continuation's quantum interface. This is not physical annihilation of every implementing degree of freedom. The published article and the introductory philosophical essay provide the relevant background [1, 2].

Four distinctions guide the present work:

$$\begin{gathered}\text{record law} \neq \text{complete residual instrument},\\ \text{destructive readout} \neq \text{universal quantum return},\\ \text{channel} \neq \text{thermal implementation},\\ \text{operational analogy} \neq \text{physical identification}.\end{gathered}$$

A finite observation can be perfectly specified while a field acquisition mechanism remains absent. A complete evolution can preserve information while a selected receiver cannot recover it. Neither possibility is contradicted

by the word ``destructive."

Spacetime Enter adds locations, accessible algebras, routes, controls, resources, and calibrated finite clocks to a supplied geometry [3]. A clock code can label a preparation, route, or history. It is not the coordinate axis of the host. A basis change on a finite register therefore does not change or consume that axis.

The Shredder Philosophy asks what survives a specified *complete access cut*. Its finite recovery statements depend on whether the receiver obtains only a classical word, classical labels plus small quantum blocks, or a full useful residual [5, 6]. The word ``complete" forbids discarding a quantum system for a lower bound and returning it for a decoder.

What Series VII contributes

The following table is a documentary map of the source records. It is not a list of formal dependencies.

toprule Record Named local object Boundary retained here

midrule endhead VII-A First-order plateau cancellation and second-order classical intertwining Larger gauge supports retain a defect; no quantum product [7].

VII-B Sharp-Cauchy boundary wavefront Exclusion is from a specified off-shell microcausal domain, not all quantum smearings [8].

VII-C A mixed Wick triple with positive logarithmic coefficient A specified continuity obstruction, not a universal boundary-algebra no-go [9].

VII-D Strong numerical finite part of the reflection triangle Subtraction is not continuous extension of the unchanged product [10].

VII-E Destructive readout, observation boundary, and a four-face marking External geometry is not a field equation [11].

VII-F Fixed-cone spacelike slicing and a three-to-six particle link Incidence is kinematics, not a changed metric [12].

VII-G CPTP classical–quantum feedback Informative records disturb universal quantum return; no gravitational dynamics [13].

VII-H Connected free Minkowski vacuum susceptibility Not VII-D's triangle or the inherited gravitational response [14].

VII-I Named smoothing repairs and sharp-product incompatibility Changed preparation does not restore the original zero-Cauchy observable [15].

VII-J Scheduled support, intervention influence, and causal embedding The physical causal relation is supplied [16].

bottomrule

The Grade-S adaptations VII-A-ST, VII-E-ST, VII-F-ST, and VII-J-ST make supported carrier and access contracts explicit [29, 30, 31, 32]. ``Grade S'' names the declared scope; it is not an independent verification grade. The present synthesis retains their separation between apparatus support and geometric support, especially when a geometric certificate touches the completed defect.

Documentary record (VII-A-ST supported presentation). VII-A-ST records a supported classical coefficient problem and finite reports of already defined evaluations on the prescribed cone. No incoming worldsheet data are admitted. Apparatus support is declared separately from geometric support. The record is a documentary parallel to the local coexistence of Theorem ; it does not transfer an unrestricted quantum product or make every VII-A object intrinsic on the cone [29, 30, 31, 32].

Documentary record (VII-E-ST finite instruments). VII-E-ST records finite instruments and regular four-face markings. No incoming worldsheet data are admitted. Apparatus support remains distinct from geometric support. The record is a documentary parallel to the access cut of Theorem ; it does not identify record agreement with complete residual agreement [29, 30, 31, 32].

Documentary record (VII-F-ST sector marking). VII-F-ST records a completed sector marking together with a

separate regular apparatus. No incoming worldsheet data are admitted as instrument inputs. Apparatus support is distinct from the geometric marking that may touch the completed defect. The record is a documentary parallel to Theorem ; it does not identify a particle-link incidence event with a later affine-matching certificate [29, 30, 31, 32].

Documentary record (VII-J-ST controller contract). VII-J-ST supplies the controller, clock, communication, and timing contract on the prescribed carrier. No incoming worldsheet data are admitted. Apparatus support is distinct from geometric support. The record is a documentary parallel to Theorem ; scheduled reachability is not physical causality and does not derive a metric [29, 30, 31, 32].

Taken together, these four records make the debug-appendix correction ``not every VII object becomes intrinsic on the cone" a theorem-adjacent documentary fact rather than a warning alone.

The I-B carrier and the supported dictionary

Prescribed geometry

Fix $c > 0$, $0 < \mu < 2\pi$, and $\alpha = 1 - \mu/(2\pi)$. The regular reporting host is

$$\begin{aligned} M_{\alpha} &= \mathbb{R}_{T} \times (0,\infty)_{r} \times S^{1}_{\varphi} \times \mathbb{R}_{z}, \\ \bar{g} &= -c^{2}\mathrm{mathop\,d}T^{2} + \mathrm{mathop\,d}r^{2} + \alpha^{2}r^{2}\mathrm{mathop\,d}\varphi^{2} + \mathrm{mathop\,d}z^{2}. \end{aligned}$$

The angular period is 2π. The stipulated completion has missing worldsheet

$$\mathscr{W} = \mathbb{R}_{T} \times \{o\} \times \mathbb{R}_{z}.$$

A fixed-z section is a worldline; the full singular set is not. No smooth Einstein tensor is assigned on $\mathscr{W}$.

On a sufficiently small angular lift,

$$\mathrm{dev}\,(T, r, \varphi, z) = (c(T - T_{*}), r\cos(\alpha\varphi), r\sin(\alpha\varphi), z)$$

is a local Minkowski isometry. The metric has signature $(- + + +)$. Future-causal curves satisfy

$$\text{spatial path length} \le c\,\Delta T,$$

and static laboratories have proper-time increment mathop dT.

Theorem (The missing-worldsheet diamond). *The regular reporting spacetime is not globally hyperbolic. The same conclusion holds at* $\alpha = 1$ *if the axis is still removed. It does not imply nonexistence of every extension-dependent wave evolution.*

Proof. Choose $r_* > 0$, one angle and axial coordinate, and $A > r_*/c$. The diamond between

$$p = (-A, r_*, \varphi_*, z_*), \qquad q = (A, r_*, \varphi_*, z_*)$$

contains $x_n = (0, r_*/n, \varphi_*, z_*)$. Radial travel from r_* to r_*/n takes less than A. The sequence has no convergent subsequence in the regular manifold: its only possible radial limit lies on the excluded worldsheet. The diamond is noncompact. Global hyperbolicity requires compact diamonds, so it fails. This argument concerns causal geometry, not a separately installed operator domain.

The same diagnosis is documented in I-B-G and the ST adaptations [4, 29, 30, 31, 32]. It is not a property transferred to the full smooth I-D hosts.

A complete supported experiment

Definition (Supported carrier experiment). A supported experiment consists of:

1. the metric, orientation, and actual port locations;

2. finite quantum registers and classical controller registers, with every assisting system declared;

3. an accessible observable algebra at each port;

4. a finite acyclic network of channels and complete instruments;

5. all initial preparations, ancillary resources, failures, stopping labels, stored histories, and fresh allocations;

6. actual future-causal routes for every transmitted quantum or classical dependency;

7. a finite clock dictionary and its event-time or history-label interpretation;

8. any implementation allowance, stated in a complete-channel metric. The operational laboratory has regular

closure disjoint from $\mathscr{W}$. There are no undeclared incoming worldsheet or lateral-boundary inputs.

A supported *analytic* presentation also specifies a developing chart and an auxiliary Cauchy problem. Every source, initial datum, coefficient, and causal dependence region needed for the comparison must be covered. Local flatness alone does not compare global Green operators. When a causal shadow is not contained in one chart, additional presentation or transfer data are required.

VII-F needs a different support declaration. Its geometric marking includes the completed particle stratum and is described by a finite sector atlas. Its apparatus can remain in a regular tube away from that stratum. Requiring the geometric marking itself to have regular closure disjoint from the defect would exclude the very particle-supported certificate being discussed.

The four ST dictionaries can therefore be read as follows. VII-A-ST uses supported classical coefficient problems and finite reports of already defined evaluations. VII-E-ST uses finite instruments and regular four-face markings. VII-F-ST uses a completed sector marking together with a separate regular apparatus. VII-J-ST supplies the controller, clock, communication, and timing contract. None of these operations constructs an unknown continuum source instrument [29, 30, 31, 32].

The complete clock

Let $C \simeq \mathbb{C}^{2^m}$ have an orthonormal installed basis $\{|\tau_a\rangle\}$. Let S contain every surviving quantum register and define

$$P_a = |\tau_a\rangle\langle\tau_a|, \qquad D_a = \langle\tau_a|_C \otimes I_S.$$

Theorem (Destructive clock and controlled continuation). *The channel*

$$\mathscr{M}_C(X) = \sum_a \operatorname{proj} a_R \otimes D_a X D_a^\dagger$$

is CPTP and satisfies

$$\operatorname{Tr}_R[(\mathscr{M}_C \otimes \mathrm{id}_E)(X)] = \operatorname{Tr}_C X$$

for every untouched finite reference E. For fixed CPTP continuations $\mathscr{F}_a$,

$$\mathscr{J}(X) = \sum_a \operatorname{proj} a_R \otimes \mathscr{F}_a(D_a X D_a^\dagger)$$

is also CPTP. The measured clock is not returned as a quantum factor.

Proof. The recorded Kraus maps $|a\rangle_R \otimes D_a$ have squared sum $\sum_a P_a \otimes I_S = I_{CS}$. Expanding X in clock matrix units shows that the output blocks are its diagonal blocks; summing them gives $\operatorname{Tr}_C X$. The calculation permits arbitrary operator blocks on $S \otimes E$. Composing each subnormalized block with a trace-preserving continuation preserves the total trace and complete positivity. The codomain contains R, S, not a quantum C.

No normalized state is assigned to a zero-probability branch. On a positive branch the state is its block divided by its trace. Conditional reference steering is compatible with the unchanged unconditional marginal.

Distinct clock labels cannot all be the time of one fixed reading event. The condition

$$p_a > 0 \Rightarrow t_a = T(e)$$

permits only one occurring label when the t_a are distinct. History and programme labels avoid that contradiction, but need their own provenance. Finite matrices also cannot satisfy $[T_C, H_C] = i\hbar I_C$ for $\hbar \neq 0$, because their traces differ.

Documentary record (En09-A / En09-B clock trade-off). En09-A and En09-B record a finite clock trade-off and a residual return-error bound as documentary parallels to Theorem . The residual identity is not a geometry. Consuming the clock does not consume the payload, and a finite deadline is not the geometric time axis [26, 27].

Green operators are additional data

I-B-G treats scalar realizations on the incomplete cone; I-B-G-S treats spin-dependent realizations and source-test intertwining; I-B-VP and I-B-VP-CR treat selected local and positive-core comparisons [4, 28]. These records are documentary, not a blanket transfer theorem.

For example, closing

$$\int \left(|\partial_r u|^2 + \frac{|\partial_\varphi u|^2}{\alpha^2 r^2} + |\partial_z u|^2 + m^2 |u|^2 \right) \alpha r \operatorname{mathop} \mathrm{d}r \operatorname{mathop} \mathrm{d}\varphi \operatorname{mathop} \mathrm{d}z$$

from compact smooth functions defines a scalar Friedrichs realization. Its choice is not made by clock readout. A scalar energy test excluding $\log r$ does not select all vector or tensor channels. The positive-local Ward obstruction is likewise restricted to its specified exceptional channel and core class; it does not exclude every smooth local core.

Documentary record (I-B-G-S / I-B-VP Ward core). A scalar energy test that excludes $\log r$ does not select spin-1 or spin-2 channels. The positive-local Ward obstruction of I-B-VP-CR / I-B-VP-5-Ex2 is restricted to its declared core class. Neither record selects an unrestricted Green operator on , and neither repairs the missing characteristic coefficient [28].

The flat operators below remain auxiliary presentation operators. No flat propagator is silently declared intrinsic on .

The VII-E/VII-G access interface

Hybrid channels and observation closure

Let $\mathscr{A} = \mathrm{bigoplus}_{a \in \Lambda} \mathscr{B}(H_a)$ be a finite classical–quantum algebra. A transition instrument has CP branches $\Psi_{ba} : \mathscr{B}(H_a) \to \mathscr{B}(H_b)$ satisfying

$$\sum_b \mathrm{Tr}\, \Psi_{ba}(X) = \mathrm{Tr}\, X.$$

Its unconditional channel is

$$(\Phi(\rho))_b = \sum_a \Psi_{ba}(\rho_a).$$

The classical label includes every controller variable that selects future rules. A deterministic state-functional replacement of this controller is not automatically an affine channel.

For declared observable spaces $\mathscr{O}_a$, complete observation closure means

$$\sum_b \Psi_{ba}^*(B_b) \in \mathscr{O}_a \quad \text{whenever} B_b \in \mathscr{O}_b.$$

This is exactly the Heisenberg condition that outputs be determined by the declared input restriction. When histories retain individual branch labels, the corresponding branchwise conditions are needed: cancellations in an unrecorded sum do not certify recorded branches. Induction over a finite history then proves closure for every continuation.

This elementary formulation is the finite content compared with VII-E and VII-G [11, 13]. It distinguishes a population-only observation algebra from one that can subsequently measure phase coherence.

For example, the one-outcome identity instrument and an aggregated computational-basis measurement have the same certain record. On proj +, their residuals are respectively proj + and $I/2$, at trace distance 1/2. Thus equal records do not certify equal residual sources. The distinction persists under untouched reference extensions because the relevant comparisons are linear-map identities.

Whole-code recovery and sharp cuts

Let $L \simeq \mathbb{C}^d$, $d \geq 2$, be the entire unknown code. Define

$$|\Phi_d\rangle = d^{-1/2} \sum_{i=1}^{d} |i\rangle_E |i\rangle_L, \qquad F_e(\Psi) = \langle \Phi_d | (\mathrm{id}_E \otimes \Psi)(|\Phi_d\rangle\langle\Phi_d|) |\Phi_d\rangle.$$

Here F_e means Bell overlap, not fidelity on every input. For accessible channel $\mathcal{N}$, set

$$e(\mathcal{N}) = \inf_{\mathcal{D}\ \mathrm{CPTP}} \frac{1}{2} \| \mathcal{D}\mathcal{N} - \mathrm{id}_L \|_\diamond .$$

The decoder does not receive the untouched reference.

Theorem (Sharp classical and quantum-block cut floors). *Suppose the complete source-to-decoder process factors, in classical branch a, through a quantum register of dimension k_a. All assisting systems across that cut are included. Let p_a be the branch probability on I_L/d. Then every decoder obeys*

$$F_e(\mathcal{D}\mathcal{N}) \leq \frac{1}{d} \sum_a p_a k_a, \qquad \frac{1}{2} \| \mathcal{D}\mathcal{N} - \mathrm{id}_L \|_\diamond \geq \left[1 - \frac{1}{d} \sum_a p_a k_a \right]_+ .$$

For a classical-only complete output the sharp universal floor is $1 - 1/d$. *For blocks of dimension at most $k \leq d$, it*

is $1 - k/d$*. An implementation allowance* δ *weakens either floor by at most* δ*.*

Proof. A decoded branch Kraus operator K_{ab} has rank at most k_a. Hence

$$|\mathrm{Tr}\, K_{ab}|^2 \le k_a \mathrm{Tr}\,(K_{ab}^\dagger K_{ab}),$$

and

$$F_e = \frac{1}{d^2}\sum_{a,b} |\mathrm{Tr}\, K_{ab}|^2 \le \frac{1}{d}\sum_a p_a k_a.$$

Testing the referenced output difference with $|\Phi_d\rangle\langle\Phi_d|$ gives distance at least $1 - F_e$.

For sharpness, let S range over the k-element subsets of a fixed d-element basis, let P_S be their projections, and put

$$w = \frac{d-1}{k-1}^{-1}, \qquad \mathcal{N}_S(X) = wP_S X P_S.$$

The instrument is complete. Embedding each branch back into L gives

$$\Psi_k = \lambda \mathrm{id} + (1-\lambda)\Delta, \qquad \lambda = \frac{k-1}{d-1},$$

where Δ is complete dephasing. The phase-unitary representation of Δ gives $\frac{1}{2}\|\Delta - \mathrm{id}\|_\diamond \le 1 - 1/d$, so $\frac{1}{2}\|\Psi_k - \mathrm{id}\|_\diamond \le 1 - k/d$. Its Bell overlap is k/d, proving equality. The case $k = 1$ attains the classical floor. Finally, decoder contractivity and the triangle inequality subtract at most δ from the ideal lower bound.

These are finite channel statements, consistent with the entanglement-breaking and shredder literature [19, 18]. For VII-E's complete destructive readout of an unknown d-dimensional computational-basis code, with no assisting quantum output, the classical floor applies. It does not automatically apply to a larger code previously encoded into a surviving system.

Documentary record (I-C-CERT / I-C-Ex / I-C-Ex2 exact shredder certificates). The exact shredder and residual-capacity certificates of I-C-CERT, I-C-Ex, and I-C-Ex2 are documentary parallels to Theorem . A residual of dimension k is a different contract from a classical-only word. Soft-hair registers, summoning tasks, and reservoir cuts remain local models whose complete access dimensions must be supplied before any floor is

applied.

The informative-record correction

The proposed plan requires one correction. An informative classical record in VII-G obstructs exact universal recovery even when the quantum residual is retained, but it does *not* imply the classical-only floor for that retained interface. The following gives a quantitative replacement.

Theorem (An effect-dependent retained-output obstruction). *Let* $\{\mathscr{I}_a\}$ *be any finite instrument on a* d*-dimensional input, with effects* $E_a = \mathscr{I}_a^*(I)$, $\sum_a E_a = I$. *For its complete recorded output* $\mathscr{I}(X) = \mathrm{bigoplus}_a \mathscr{I}_a(X)$,

$$e(\mathscr{I}) \geq \gamma(E) := 1 - \frac{1}{d^2}\sum_a (\mathrm{Tr}\sqrt{E_a})^2.$$

One has $\gamma(E) \geq 0$, *with equality exactly when every* E_a *is a scalar multiple of* I. *Consequently any informative record forbids exact return of every input, even with its retained residual. The bound concerns the complete recorded instrument, not just its classical marginal.*

Proof. A decoder restricts to a CPTP map on each classical block. Write T_{aj} for the Kraus operators of its decoded branch. Then $\sum_j T_{aj}^\dagger T_{aj} = E_a$. On the support of E_a, factor

$$T_{aj} = R_{aj}\sqrt{E_a}, \qquad \sum_j R_{aj}^\dagger R_{aj} = P_{\mathrm{supp}\, E_a}.$$

Diagonalize $\sqrt{E_a}$ with eigenvalues $t_\ell \geq 0$. The vectors

$$v_\ell = (\langle \ell | R_{aj} | \ell \rangle)_j$$

have norm at most one. Thus

$$\sum_j |\mathrm{Tr}\, T_{aj}|^2 = \|\sum_\ell t_\ell v_\ell\|^2 \leq (\mathrm{Tr}\sqrt{E_a})^2.$$

Summing the Bell-overlap formula and using distance $\geq 1 - F_e$ proves .

Cauchy–Schwarz gives

$$(\mathrm{Tr}\sqrt{E_a})^2 \leq d\,\mathrm{Tr}\, E_a.$$

Summing proves nonnegativity. Equality in the sum requires equality for each positive summand, which requires all eigenvalues of each E_a to coincide. Conversely scalar effects give equality.

For a qubit with $E_\pm = (I \pm rZ)/2$, $0 < r \le 1$, the efficient instrument $X \mapsto \sqrt{E}_\pm X \sqrt{E}_\pm$ attains

$$e_{\mathrm{ret}} = \frac{1 - \sqrt{1 - r^2}}{2}.$$

Indeed, ignoring its flag gives the Pauli channel

$$\rho \mathrm{longmapsto} \frac{1 + \sqrt{1 - r^2}}{2} \rho + \frac{1 - \sqrt{1 - r^2}}{2} Z \rho Z.$$

Its Bell input and convex decomposition give the matching half-diamond value. This tends to zero as $r \mathrm{downarrow} 0$, although every $r > 0$ gives an informative record. There can therefore be no record-strength-independent positive retained-output floor equal to 1/2.

Conversely, a message-independent instrument $\mathscr{I}_a(\rho) = p_a \rho$ returns the payload exactly. Prepared ancillas can be read destructively to generate the record. Consumed clock names do not show that this payload was consumed.

Documentary record (V-DST-G / V-DST-Host / V-DST-Sel source maps). A source-weight map is not an Einstein source. A report-only transfer does not return the residual. A Haar-null selector is not a physical selector. These V-DST-G / V-DST-Host / V-DST-Sel records support the existing claim that the source token is supplied, not acquired, and that VII-G's informative classical feedback does not make every accessible output classical.

Entropy and resources

For a classical–quantum output the hybrid entropy identity is

$$S\Big(\sum_a p_a \mathrm{proj}\, a \otimes \rho_a\Big) = H(p) + \sum_a p_a S(\rho_a).$$

An append-only record satisfies $H(R_{n+1}) = H(R_n) + H(W_{n+1}|R_n) \ge H(R_n)$. Residual quantum entropy need not be monotone: a SWAP with an independently prepared reservoir changes it in either direction.

These facts concern different ledgers. Readout is not reset; reset of one memory is not deletion of an untouched

archive. A channel identity supplies no bath Hamiltonian, temperature, or work account; I-C-Th's hybrid entropy identity is retained as a documentary parallel, not as an inferred heat ledger [6]. Reeb–Wolf remains an EXTERNAL comparison of channel entropy, not a thermodynamic implementation of D8 [20]. I-D-Deadline-A keeps capacity and timing as distinct inputs: a finite deadline is not the obstruction to the sharp-Cauchy admission failure of Theorem . Soft-hair registers, pointer fragments, finite summoning tasks, truncated Fock spaces, and reservoir memories can instantiate local cuts only after their complete access dimensions are supplied. A particle-number cutoff over infinitely many modes is not by itself a finite-dimensional code.

Plateau covariance, sharp admission, and numerical finite parts

An explicit analytic convention

For the local analytic proofs use

$$\eta = \mathrm{diag}\,(1,-1,-1,-1), \qquad \mathrm{Box} = \partial_t^2 - \Delta, \qquad P_m = \mathrm{Box} + m^2.$$

This is an auxiliary presentation convention; the reporting metric keeps signature (− + + +). Changing the sign of a background metric requires changing the perturbation and inverse conventions together. No contraction matrix is identified merely by changing its name.

Let E_m solve the zero-Cauchy problem at $t = 0$. Its left-inverse identity is

$$E_m P_m u = u \quad \text{only when} \quad u|_{t=0} = \partial_t u|_{t=0} = 0.$$

All uses below satisfy that condition. Standard Cauchy and distributional background is given in [21, 22, 23]; no global Cauchy theorem is applied to the punctured reporting cone.

The plateau calculation

For symmetric h, put

$$a(h) = \frac{1}{2}\mathrm{Tr}_\eta\, h, \qquad A^{\mu\nu}(h) = a(h)\eta^{\mu\nu} - h^{\mu\nu},$$

$$C^{\mu}h = -\partial_{\nu}A^{\nu\mu}(h), \qquad Q_h\psi = \partial_{\mu}(A^{\mu\nu}(h)\partial_{\nu}\psi) + m^2 a(h)\psi.$$

Let $K\xi = \mathscr{L}_{\xi}\eta$, $X_{\xi} = \xi^{\mu}\partial_{\mu}$. Direct differentiation gives

$$CK\xi = \mathrm{Box}\,\xi, \qquad Q_{K\xi} = D_{\xi}P_m - P_m X_{\xi}, \qquad D_{\xi} = X_{\xi} + \partial_{\mu}\xi^{\mu}.$$

The last operator acts on scalar densities.

Choose a compact smooth switch $0 \le \chi \le 1$ and a relatively compact open U with $\overline{U} \subset \mathrm{int}\,\{\chi = 1\}$. For $P_m\varphi_0 = 0$, define

$$\varphi_{1,\chi}[h] = -E_m Q_{\chi h}\varphi_0, \qquad w[h] = E_0 Ch, \qquad A_1^{\chi}[h] = \varphi_{1,\chi}[h] - w[h]\cdot\partial\varphi_0.$$

Theorem (Plateau repair and larger-support coexistence). *If $\xi \in C_c^{\infty}(U;TM)$, then*

$$A_1^{\chi}[h + K\xi] = A_1^{\chi}[h]$$

for every smooth h. For a general compact ξ vanishing near the initial surface,

$$\Delta_{\xi}A_1^{\chi} = -E_m Q_{(\chi-1)K\xi}\varphi_0.$$

There are larger-support data and a nonnegative compact f with $\int f = 1$, supported on the observation plateau, for which

$$\int f\,\Delta_{\xi}A_1^{\chi} = -1.$$

No added coefficient beginning at order κ^2, or at positive $\hbar$-order, removes this fixed first-order classical defect.

Proof. For plateau-supported ξ, $\chi K\xi = K\xi$. The operator identity and zero initial data give

$$\Delta_{\xi}\varphi_{1,\chi} = E_m P_m(X_{\xi}\varphi_0) = X_{\xi}\varphi_0, \qquad \Delta_{\xi}w = E_0\mathrm{Box}\,\xi = \xi.$$

The two terms cancel. For larger support, split $\chi K\xi = K\xi + (\chi - 1)K\xi$ to obtain .

For the witness, take $m = 0$ and $\varphi_0 = x^1$. Choose a compact cutoff ζ, vanishing near $t = 0$, that equals one on a neighbourhood of $\mathrm{supp}\,\chi$, and set $\xi = \zeta\partial_{x^1}$. Then $\chi K\xi = 0$, so the scalar variation is zero, while the coordinate

variation is ξ. On $\operatorname{supp} f$, $X_{\xi}\varphi_0 = 1$, giving the value -1. If desired, compact scalar Cauchy data agreeing with those of x^1 on a sufficiently large ball give the same finite-region witness by finite propagation. Higher κ- or $\hbar$-degrees cannot change the coefficient of $\kappa\hbar^0$.

This reproduces the mechanism compared with VII-A and VII-A-ST. The VI/VI-DST compact-switch gap is a named parallel, not a premise [7, 29, 30, 31, 32].

The second-order statement requires an action, not just this first-order cancellation. For a metric jet $q = \eta + \kappa h + \kappa^2 k$, let

$$\rho_q = \sqrt{-\det q}, \qquad A_q^{\mu\nu} = \rho_q q^{\mu\nu},$$

and use the switched density

$$\mathscr{D}_\chi[q]\varphi = \partial_\mu\big[(\eta^{\mu\nu} + \chi(A_q^{\mu\nu} - \eta^{\mu\nu}))\partial_\nu\varphi\big] + m^2(1 + \chi(\rho_q - 1))\varphi.$$

There is one switch multiplying the curved-minus-flat density; quadratic vertices are not assigned an extra switch. The unswitched harmonic coordinates solve

$$\partial_\mu(A_q^{\mu\nu}\partial_\nu X_q^\lambda) = 0$$

with fixed coordinate-time Cauchy data.

A formal diffeomorphism supported in U, identity near the initial surface, transforms both equations covariantly where it acts; outside that support it is identity. Coefficientwise Cauchy uniqueness therefore gives

$$\varphi' = \varphi \circ F, \qquad X_q' = X_q \circ F.$$

If $X_q = x + \kappa w + \kappa^2 v$, its inverse has coefficient $w \cdot \partial w - v$. Consequently

$$\begin{aligned}[\kappa^2](\varphi \circ X_q^{-1}) = \quad & \varphi_2 - w^\mu\partial_\mu\varphi_1 + (w^\nu\partial_\nu w^\mu - v^\mu)\partial_\mu\varphi_0 \\ & + \tfrac{1}{2}w^\mu w^\nu\partial_\mu\partial_\nu\varphi_0.\end{aligned}$$

The identity $\varphi' \circ (X_q')^{-1} = \varphi \circ X_q^{-1}$ proves invariance. This is classical descent on the displayed domain, not a

quantum Ward identity.

Documentary record (VI / VI-DST plateau coexistence). The inverse-independent plateau gap and compact-switch remainder of VI / VI-DST are a different object from VII-A's larger-support residual. They coexist with Theorem ; neither repairs the other, and neither is imported as a premise for a quantum product.

The sharp-Cauchy boundary wavefront

Let $L = E_0 C$, where E_0 is the zero-data wave operator. For a compact covector test a supported at positive times, put $b = E_A a$. The distributional adjoint is

$$L^* a = C^*(\Theta b) = \Theta C^* b + \delta(t)\mathrm{B}(b|_0),$$

where

$$(C^* b)^{\alpha\beta} = -\partial^{(\alpha} b^{\beta)} + \frac{1}{2}\eta^{\alpha\beta}\partial_\mu b^\mu,$$

$$\mathrm{B}^{\alpha\beta}(v) = -n^{(\alpha} v^{\beta)} + \frac{1}{2}\eta^{\alpha\beta} n_\mu v^\mu, \qquad n = \mathrm{mathop\,d}t.$$

The 00 and 0i components make B injective. There is no δ' in : C^* has differential order one.

For polynomial functionals, use the usual off-shell microcausal condition

$$\mathrm{WF}\,(F^{(n)}) \cap (\overline{V}_+^n \cup \overline{V}_-^n) = \varnothing,$$

with zero covectors allowed in the individual slots but not all slots simultaneously.

Theorem (Sharp admission fails for every nonzero smearing). *For a linear coordinate smearing, the following are equivalent: $L^* a$ is microcausal; $L^* a$ is smooth; and*

$$b|_{t=0} = \partial_t b|_{t=0} = 0.$$

For every nonzero real $f \in C_c^\infty(\{t > 0\})$, the bilinear insertion

$$B_f[h, \varphi] = -\int f(Lh)^\mu \partial_\mu \varphi \,\mathrm{mathop\,d}^4 x$$

fails the displayed off-shell microcausal condition. Positive-ħ corrections cannot quantize the unchanged off-shell classical functional within that domain.

Proof. All singularities in lie in $N^*\{t = 0\}$, whose nonzero covectors are timelike. Thus microcausality here requires smoothness. A nonzero delta coefficient cannot be cancelled by the bounded step term. Injectivity of B first forces $b|_0 = 0$. Smoothness of the remaining step term forces $(C^* b)|_0 = 0$; tangential derivatives of $b|_0$ vanish, so injectivity again gives $\partial_t b|_0 = 0$. Conversely these data and homogeneous Cauchy uniqueness before the support of a make b vanish near the initial surface. Then $L^* a = C^* b$ is smooth and compactly supported.

For the bilinear witness put

$$u = \partial_t(tf), \qquad \varphi_f = -u, \qquad a_\mu = f\partial_\mu \varphi_f.$$

Let $B(t) = \int b_0(t,x)\,\mathrm{mathop\,d}^3x$. Spatial integration of Box $b_0 = a_0$ gives $B''(t) = \int a_0(t,x)\,\mathrm{mathop\,d}^3x$. The advanced terminal data imply

$$B(0) = \int_0^\infty \int tf\partial_t\varphi_f\,\mathrm{mathop\,d}^3x\,\mathrm{mathop\,d}t = \int u^2\,\mathrm{mathop\,d}^4x > 0.$$

The last inequality follows because $\partial_t(tf) = 0$ and compact time support would force $f = 0$. Thus $b|_0 \neq 0$ somewhere.

A localized component $\delta(t)v(x) + \Theta(t)r(t,x)$, $v \neq 0$, has normal Fourier transform $\hat{v}(\zeta) + O(|\tau|^{-1})$. At a suitable fixed ζ, this is not rapidly decreasing in either normal direction. The metric derivative of B_f therefore has a forbidden timelike wavefront. An admitted microcausal bilinear kernel could not produce that derivative by contraction with a smooth scalar. Finally off-shell equality fixes that same classical derivative; positive powers of $\hbar$ do not alter it.

This is the VII-B mechanism, with its domain and sign convention printed [8]. It does not say that a timelike-wavefront smearing is intrinsically meaningless in every quantum theory. A linear free-shell representative is a different object; it does not supply nonlinear interacting products.

The reflection packet and the Wick-continuity obstruction

We next distinguish a source-specific calculation from a general consequence of its estimates.

Definition (Explicit conditional reflection packet). Let $X = (\{t > 0\} \times \mathbb{R}^3)^3$. Fix real distributions $S, r \in \mathscr{D}'(X)$, a weakly measurable family $A(R)$, $R \geq 1$, and a real even Schwartz function θ with $\theta(0) = 1$. Assume that for every compact $K \subset X$,

$$|\mathrm{langle} A(R) - r, \Phi\rangle| \leq C_K R^{-1} p_{K,64}(\Phi), \qquad \operatorname{supp} \Phi \subset K,$$

where $p_{K,64}$ is the maximum of test derivatives through order 64. Supply E_ε with

$$|\mathrm{langle} E_\varepsilon, \Phi\rangle| \leq C_K \varepsilon (1 + |\log \varepsilon|) p_{K,64}(\Phi).$$

Define

$$\begin{aligned} T_\varepsilon = \; & S + \int_1^\infty \theta(\varepsilon R)^4 (A(R) - r) \frac{\mathrm{mathop\,d}R}{R} \\ & + \Big(\int_1^\infty \theta(\varepsilon R)^4 \frac{\mathrm{mathop\,d}R}{R} \Big) r + E_\varepsilon. \end{aligned}$$

The weak integrals are defined by test pairings.

The order 64 is part of this supplied packet, not a newly established ultraviolet bound for a conical graph. VII-D proves a packet of this type for its fixed reflection triangle [10]. The statement below does not infer that estimate from a finite instrument or a developing chart.

A useful explicitly positive reflection residue is specified on product tests by

$$\mathrm{pair}\, rf \otimes g \otimes f' = \frac{1}{64(2\pi)^3} \int g(y) \int_{S^2} A_f(y, n) A_{f'}(y, n) \,\mathrm{mathop\,d}\Omega(n) \,\mathrm{mathop\,d}^4 y,$$

$$A_f(y, n) = \int_0^\infty f(t, \mathbf{y} + (t + y^0)n) \,\mathrm{mathop\,d}t.$$

Equivalently, integrating a joint test over these displayed parametrized points defines a positive distribution. Compact joint supports make the parameter integral finite. Nonnegative bumps about

$$y = (1, 0), \qquad x = (1, 2e_1), \qquad x' = (2, 3e_1)$$

can be chosen pairwise disjoint and give a strictly positive pairing: a nonempty open set of t, t', y, n then contributes positively. This also shows why a counterterm supported only on ordinary observation diagonals cannot remove this residue on every test.

Theorem (Finite part and unchanged-product incompatibility coexist). *For Definition , set*

$$U = S + \int_{1}^{\infty} (A(R) - r) \frac{\mathrm{mathop\,d}R}{R},$$

$$\kappa_{\theta} = \int_{0}^{1} \frac{\theta(u)^{4} - 1}{u} \,\mathrm{mathop\,d}u + \int_{1}^{\infty} \frac{\theta(u)^{4}}{u} \,\mathrm{mathop\,d}u.$$

Then, for $\mu > 0$,

$$T_{\varepsilon} - \log\left(\frac{1}{\mu\varepsilon}\right) r \;\to\; U + (\kappa_{\theta} + \log \mu) r$$

strongly in distributions, with error $O(\varepsilon(1 + |\log \varepsilon|) p_{K,64})$.

If $\operatorname{pair} r\Phi = C > 0$, *then* $\operatorname{pair} T_{\varepsilon}\Phi = C \log(\varepsilon^{-1}) + O(1)$. *Consequently no Hausdorff locally convex algebra through* $\hbar^{3}$ *can simultaneously have:*

1. *agreement with the old regular Wick triple whose extracted coefficient is this pairing;*

2. *convergence of its unchanged regular insertion approximants to the admitted sharp insertions;*

3. *multiplication hypocontinuous on bounded sets;*

4. *continuous finite-valued extraction of that scalar* $\hbar^{3}$ *coefficient. This is conditional on the displayed packet and graph matching, not a universal obstruction to boundary algebras.*

Proof. Evenness and smoothness give $\theta(u)^{4} - 1 = O(u^{2})$ at zero, so κ_{θ} exists. Changing variables gives

$$\int_{1}^{\infty} \theta(\varepsilon R)^{4} \frac{\mathrm{mathop\,d}R}{R} = \log(\varepsilon^{-1}) + \kappa_{\theta} + O(\varepsilon^{2}).$$

Moreover

$$|\theta(\varepsilon R)^{4} - 1| \le C \min\{(\varepsilon R)^{2}, 1\}.$$

The error in replacing the first integral in by its uncut value is bounded by

$$Cp_{K,64}(\Phi)\int_{1}^{\infty}\frac{\min\{(\varepsilon R)^{2},1\}}{R^{2}}\,\mathrm{mathop\,d}R \le C'\varepsilon p_{K,64}(\Phi).$$

Combining the estimates proves the limit and rate. A bounded subset of $\mathscr{D}(X)$ has a common compact support and bounded test seminorms, so convergence is strong.

For the algebra claim, convergent approximant sequences are bounded. Hypocontinuity gives continuity along pairs of convergent sequences: split $x_\varepsilon y_\varepsilon - xy$ into $(x_\varepsilon - x)y_\varepsilon + x(y_\varepsilon - y)$. Apply this first with the fixed middle observable, then with the second convergent insertion. The triple converges, and continuous coefficient extraction must converge to a finite number. Old-product agreement instead gives $C\log(\varepsilon^{-1}) + O(1)$, a contradiction.

The source-local VII-C positive logarithm and VII-D finite part are therefore compatible statements [9, 10]. Assigning a finite value only at the sharp endpoint does not make the old divergent sequence continuous. Subtracting along that sequence changes old-product agreement. Changing the topology to exclude convergence changes another hypothesis. All are legitimate new questions when declared; none is the simultaneous satisfaction of the four displayed requirements.

VII-I's repairs retain their changed contracts

Two elementary checks explain why smoothing is not restoration.

First, let $S_\varepsilon = \rho_\varepsilon$ with a real, nonnegative, even compact mollifier, and smooth every field argument. For a locally supported plateau parameter with $\xi = t\partial_t$ on the sampling region and $\varphi = (t^2 + (x^1)^2)/2$, one has $\mathrm{Box}\,\varphi = 0$. The first-order variation of the smoothed relational expression is

$$\int f\big[S_\varepsilon(\xi\cdot\partial\varphi) - (S_\varepsilon\xi)\cdot\partial(S_\varepsilon\varphi)\big] = \varepsilon^2 m_{00}\int f > 0,$$

where $m_{00} = \int z_0^2\rho(z)\,\mathrm{mathop\,d}^4z > 0$. Here $S_\varepsilon t = t$, $S_\varepsilon t^2 = t^2 + \varepsilon^2 m_{00}$, and $\partial_t S_\varepsilon\varphi = t$. A finite-width regular observable need not be covariant under the unchanged field action.

Second, prepare the divergence-form density with a smooth $\sigma_\varepsilon \to \Theta$. At first coordinate order,

$$w_{\varepsilon}^{\mu} = -E_R \partial_{\alpha}(\sigma_{\varepsilon} A^{\alpha\mu}(h)) = E_R\big[\sigma_{\varepsilon} C^{\mu} h - \sigma_{\varepsilon}^{'} A^{0\mu}(h)\big].$$

The second term cannot be discarded. Its limit gives

$$w_{\mathrm{tr}}^{\mu} = E_0 C^{\mu} h - \frac{\sin(t\sqrt{-\Delta})}{\sqrt{-\Delta}} A^{0\mu}(h)|_0, \qquad \partial_t w_{\mathrm{tr}}^{\mu}|_{0+} = -A^{0\mu}(h)|_0.$$

Thus the density-ramp sharp limit changes the transmission data.

At positive width, the relevant coordinate coefficients through order two are finite tree compositions of balanced Green lines and smooth weights. A forbidden wavefront cancellation on a tree is excluded by removing leaves successively: the sole incident covector at each leaf must vanish. Proper compact causal support permits the internal pushforward; the external covectors sum to zero. This is the mechanism behind finite-width microcausal admission, not a loop-composition theorem.

VII-I separately constructs the corresponding named free sector, boundary-sensitive classical carrier, auxiliary equivalence, and linear free-shell repair [15]. None is an assertion that the original sharp nonlinear interacting observable has been constructed.

Slicing, affine holonomy, and causal gates

The fixed π/2-deficit cone

Set $\mu = \pi/2$, hence $\alpha = 3/4$. Use dimensionless coordinates

$$t = \frac{c(T - T_*)}{\ell}, \qquad z = \ell\zeta, \qquad \ell > 0.$$

The transverse cut wedge has opening $3\pi/2$, with rays

$$e_i = (\cos(i\pi/2), \sin(i\pi/2)), \qquad i = 0, 1, 2, 3.$$

Three right-angle sectors are glued by identifying the upper seam with the lower using

$$J = (\mathrm{diag}(1, \mathrm{Rot}(\pi/2), 1), 0).$$

This is wedge gluing, not quotienting the entire plane by a finite rotation group.

In each sector write $x = \xi e_i + \eta e_{i+1}$, $\xi, \eta \geq 0$, and define

$$\rho = \xi + \eta, \qquad H = \frac{2}{3}(\xi + \eta), \qquad K = \frac{3}{5}\min\{\xi, \eta\},$$

$$F_s(x) = s + \min\{2, \max\{H(x), s + K(x)\}\}, \qquad -1 \leq s \leq 1.$$

These functions agree at all sector rays and the seam.

Theorem (The three-to-six slicing certificate). *The graphs $t = F_s(x)$, extended as products in ζ, are embedded piecewise-spacelike markings of the fixed completed cone. Their regular faces obey the uniform slope bound*

$$\lambda = \frac{2\sqrt{2}}{3} < 1,$$

and

$$s_2 - s_1 \leq F_{s_2}(x) - F_{s_1}(x) \leq 2(s_2 - s_1).$$

There is exactly one active incidence event, at $s = 0$: the particle link changes from three faces to six. Six vertices, twelve edges, and six faces are born there. No smooth field equation at the completed stratum is asserted.

Proof. The branch gradients are

$$(2/3, 2/3), \quad (3/5, 0), \quad (0, 3/5), \quad 0,$$

up to sector rotations. Their norms are at most λ. The induced metric on each face is positive definite, with transverse lower bound $1 - \lambda^2 = 1/9$. The graph projection is injective and continuous across the seam. The axial product adds an unchanged positive direction.

For fixed x, the inner capped maximum in is nondecreasing and 1-Lipschitz in s. Adding s gives the ordering inequalities. Also

$$H - K \geq \frac{11}{30}\rho.$$

For $s \le 0$, therefore, $F_s = s + \min\{2, H\}$, with three core triangles.

For $s > 0$, in $\xi \ge \eta$, the branch boundary is $10\xi + \eta = 15s$. Its endpoints are

$$B_i = \frac{3}{2} s\, e_i, \qquad C_i = \frac{15}{11} s(e_i + e_{i+1}).$$

The reflected half-sector gives the other boundary. The two inner faces in sector i are $[P, B_i, C_i]$ and $[P, C_i, B_{i+1}]$. Their gradients differ, so their common bisector is a genuine crease. The remaining core face is the pentagon bounded by those inner faces and the fixed crest $\rho = 3$.

The inner-face areas are $9s^2/11$; the remaining core-face area is $3/2 - 15s^2/22 \ge 9/11$. The three new edge types have lengths

$$\frac{3}{2} s, \qquad \frac{3\sqrt{41}}{11} s, \qquad \frac{3\sqrt{65}}{22} s,$$

the last with two copies per sector. Thus all twelve new edges are positive for $s > 0$ and vanish linearly only at zero. The six new faces have positive quadratic birth areas. Moreover $\rho(C_i) = 30s/11 < 3$, excluding contact with the crest. The branch decomposition exhausts each sector without overlapping face interiors. There are no other active degeneracies.

At $s = 0$, the regular cellulation is the incoming one. The collapsed outgoing labels specify a germ, not zero-area regular cells. The particle worldsheet remains fixed; only its slice intersection changes.

The construction is the explicitly stated fixed-cone family compared with VII-F and VII-F-ST [12, 29, 30, 31, 32]. Its finite patch counts are

$$(V, E, F) = (7, 12, 6) \quad \text{and} \quad (13, 24, 12),$$

both with Euler characteristic one. It is not a cosmological bounce or a metric evolution.

Documentary record (VIII-ST / VIII-Defect-A particle link). The three-to-six particle link is not the persistent three-to-six cellulation, and a pulse is not class (C). This documentary record stops a reader from identifying VII-F's incidence event of Theorem with a later affine-matching certificate.

Framed affine holonomy

For each regular face choose an affine Lorentz chart A_f adapted to its spacelike plane. Such a chart exists because its normal is timelike. For an oriented crossing let $n_{gf} = 0$ on ordinary overlaps and $n_{gf} = \pm 1$ on the two marked seam directions. Set

$$g_{g \leftarrow f} = A_g J^{n_{gf}} A_f^{-1}.$$

A closed word telescopes:

$$g_{f_0 \leftarrow f_{m-1}} \cdots g_{f_1 \leftarrow f_0} = A_{f_0} J^N A_{f_0}^{-1}, \qquad N = \sum_j n_{f_{j+1} f_j}.$$

The integer N is the oriented winding number. Transport into one common declared reference frame therefore returns J^N on either side of the event.

The full affine datum matters. Replacing J by a rotation with a nonzero time translation can preserve the rotation angle but fails pointwise fixation of the worldsheet. Likewise local chart consistency is not, without the winding check, a complete peripheral certificate.

A finite event-code permutation can be represented reversibly with retained history. That abstract finite representation does not by itself place its communication gates in spacetime. VII-J adds the separate localization and timing obligation [16].

Exact no-signalling, including a reference

Let $\Phi_B : \mathscr{B}(H_A \otimes H_{A^c}) \to \mathscr{B}(H_B)$ be the complete channel to a jointly observed output. Define

$$\mathrm{Sig}_\Phi(A \to B) = \frac{1}{2} \sup_{R, \rho, \mathscr{I}_A, \mathscr{J}_A} \| (\Phi_B \otimes \mathrm{id}_R)[((\mathscr{I}_A - \mathscr{J}_A) \otimes \mathrm{id}_{A^c R})(\rho)] \|_1.$$

The interventions are deterministic CPTP maps. The reference can initially be entangled with the input, but is untouched. Postselected normalization is not an intervention in this definition.

Theorem (The complete no-signalling criterion). *The following are equivalent:*

$$\mathrm{Sig}_{\Phi}(A \to B) = 0;$$

$$\Phi_B = \Xi \circ \mathrm{Tr}_A \quad \text{for a CPTP} \Xi;$$

$$\Phi_B^*(\mathscr{B}(H_B)) \subseteq I_A \otimes \mathscr{B}(H_{A^c}).$$

If $\frac{1}{2}\|\Phi_B - \Psi_B\|_\diamond \le \varepsilon$, *then*

$$\mathrm{Sig}_{\Phi}(A \to B) \le \min\{1, \mathrm{Sig}_{\Psi}(A \to B) + 2\varepsilon\}.$$

Proof. Factorization makes the output depend only on A^cR, whose reduction is unchanged by a deterministic local intervention. For the converse, compare identity on A with $\mathscr{T}_A(X) = \mathrm{Tr}\,(X) I_A/\dim H_A$. Zero signalling gives

$$\Phi_B = \Phi_B(\mathscr{T}_A \otimes \mathrm{id}_{A^c}).$$

Define $\Xi(Y) = \Phi_B(I_A/\dim H_A \otimes Y)$. This is CPTP and proves factorization. Taking adjoints gives the algebra inclusion. Conversely that inclusion makes every output expectation depend only on the A^c-reduction and yields the same factorization. Tensoring it with id_R proves the complete statement.

For the quantitative claim, each of the two interventional states acquires output trace-norm error at most 2ε. The half trace norm of their difference therefore changes by at most 2ε. Take the supremum.

A correlated reference does not create signalling where the channel factors, but separate marginal tests do not certify a joint output. For example, two individually uniform classical shares can jointly reveal an input bit through their parity.

Scheduled support and a conservative gate speed

For finite sites X, let tick j consist of tensor-product channels on a partition $\mathscr{B}_j$. For output sites Y, define

$$N_{t,t}(Y) = Y, \qquad N_{s,t}(Y) = \bigcup \{B \in \mathscr{B}_{s+1} : B \cap N_{s+1,t}(Y) \neq \varnothing\}.$$

A channel adjoint preserves identities. Reverse induction therefore gives

$$\Phi_{s+1}^* \cdots \Phi_t^*(\mathscr{A}(Y)) \subseteq \mathscr{A}(N_{s,t}(Y)).$$

If every block has diameter at most Δ, then $N_{s,t}(Y)$ lies within distance $(t-s)\Delta$. This is a schedule bound, not necessarily the minimal actual influence set [11, 16].

When every dependency edge, including classical control delivery, is embedded by an actual future-causal route, transitivity places the scheduled ancestors in the supplied geometric causal past. Omitting a controller or a routing dependency invalidates that argument.

For the slices , let regular endpoints have a reserved spatial route of length L. The slope and ordering bounds give

$$F_{s_2}(y) - F_{s_1}(x) \geq (s_2 - s_1) - \lambda L.$$

Hence

$$L \leq \frac{s_2 - s_1}{1+\lambda}$$

is a sufficient causal gate condition. The conservative dimensionless speed is

$$v_{\text{gate}} = \frac{1}{1 + 2\sqrt{2}/3}.$$

It is not a derived invariant physical speed.

A finite chain of reserved ports on such routes can transport a qubit by local SWAPs with blanks. Operator equality gives the identity logical channel, including every reference. In contrast, a zero-duration remote SWAP between distinct points on one spacelike slice has a unit signalling witness and no causal embedding; it remains excluded. A co-located gate identity does not certify arbitrary macro-locality.

Vacuum response, dynamical hosts, and cosmological comparisons

A separate positive benchmark from VII-H

To avoid identifying distinct uses of the word ``vacuum,'' we give a local calculation. Take the free massless scalar on auxiliary Minkowski spacetime with

$$W(t,x) = \frac{\hbar}{4\pi^2} \frac{1}{|x|^2 - (t - i0)^2}, \qquad Q = :\varphi^2:$$

in its fixed vacuum. Define the punctured retarded connected susceptibility by $i\Theta(t)\langle[Q(t,x),Q(0)]\rangle/\hbar$. This convention fixes its sign.

Theorem (A nonzero contact-independent susceptibility). *With $q = t^2 - |x|^2$, the punctured susceptibility is*

$$R^\circ = \frac{\hbar}{4\pi^3}\Theta(t)\delta'(q).$$

It has a real retarded extension of scaling degree four. Among real, translation-covariant retarded extensions agreeing off the origin and of scaling degree at most four, every difference is $\hbar c\delta_0$, $c \in \mathbb{R}$.

Choose real $b \in C_c^\infty((0,\infty))$ with $\int b(t)^2 \mathrm{mathop\,d}t = 1$, and put

$$F_*(t,x) = q\, b(t)b(|x|).$$

If $t_0 = \int t b(t)^2 \mathrm{mathop\,d}t$, then every such prescription gives

$$\mathrm{pair}\, RF_* = -\frac{\hbar t_0}{2\pi^2} \neq 0.$$

Proof. Wick contraction gives $\langle Q(z)Q(0)\rangle = 2W(z)^2$. For $t > 0$,

$$(q - i0)^{-2} - (q + i0)^{-2} = -2i\pi\delta'(q),$$

which yields the displayed R°.

The function

$$L_\mu(z) = \begin{cases} \log(\mu^2 q), & t > 0,\ q > 0, \\ 0, & \text{otherwise} \end{cases}$$

is locally integrable. Set $R_\mu = \hbar\,\mathrm{Box}^2 L_\mu/(64\pi^3)$. Away from the origin, q is a regular transverse coordinate on the cone. For $F(q) = \Theta(q)\log(\mu^2 q)$, the identities $qF' = \Theta(q)$ and $\mathrm{Box}\, f(q) = 4qf'' + 8f'$ give $\mathrm{Box}^2 F = 16\delta'(q)$. Thus R_μ extends R°. Differentiation preserves its retarded support. Dilation of the locally integrable logarithm shows degree -4, with at most a logarithmic contact correction, so its scaling degree is at most four and is exactly four off the tip.

A difference of extensions is supported at the origin. A distribution supported at one point is a finite sum of delta derivatives; their scaling degrees are $4 + |\beta|$. The bound four leaves only $c\delta_0$, and reality makes c real.

Finally F_* vanishes near the origin, so all contacts vanish. Using $q\delta'(q) = -\delta(q)$ and polar coordinates,

$$\operatorname{pair} RF_* = -\frac{\hbar}{4\pi^3} 4\pi \int_0^\infty \frac{t}{2} b(t)^2 \operatorname{mathop} \mathrm{d}t = -\frac{\hbar t_0}{2\pi^2}.$$

This rederives the normalization-independent benchmark documented in VII-H [14]. A delayed source/readout pair can approximate its test: take a source bump h_δ near y_0 and $f(x) = F_*(x - y_0)$. Then

$$F_{f,h_\delta}(z) = \int f(z + y) h_\delta(y) \operatorname{mathop} \mathrm{d}^4 y \;\to\; F_*(z)$$

in the compact-test topology. For sufficiently small δ, source and readout supports are disjoint, the contact pairing remains zero, and continuity keeps the response nonzero. This is a specified response experiment, not a constructed detector for the missing gravitational coefficient.

Documentary record (DS-Vac-A: no open local de Sitter). DS-Vac-A records that no open local de Sitter state is placed on registered hosts. VII-H's Minkowski Wick-square susceptibility (Theorem) is not that state and is not the Big-series vacuum fibre.

Documentary record (DS-Promise-A: finite-Hilbert promise external). DS-Promise-A keeps the finite-Hilbert promise external. A finite instrument on the reporting cone is not a finite host Hilbert space for the cosmological comparison.

I-D's two dynamical hosts

The prescribed reporting cone is not either full I-D host. The supplied I-D records distinguish smooth full hosts with Cauchy slices from punctured or thin comparisons whose axis has been deleted [17]. Theorem must not be transferred to those full hosts.

A bounded settled exterior may have a conical coordinate expression. That does not identify the entire time-dependent metric with , nor provide a state or instrument transfer across the nonstationary region. Host B's

axial periodicity also needs a nonwrapping chart when compared with a noncompact axial coordinate. No finite global settling time is inferred from bounded-region settling.

The Stokes/Gevrey interface belongs to the I-D/Hawk07-H comparison, not to the abbreviation ``S'' in the spin Green record. For an exponential-flat endpoint model,

$$B(t) = t^{-2}e^{-d/t}b(t), \qquad J(t) = \frac{\int_0^t B(s)F(s)\mathrm{mathop\,d}s}{B(t)},$$

the substitution $u = 1/s - 1/t$ gives

$$J(t) = \frac{t^2}{b(t)}\int_0^\infty e^{-du}b\left(\frac{t}{1+tu}\right)F\left(\frac{t}{1+tu}\right)\mathrm{mathop\,d}u.$$

Dominated differentiation proves smooth one-sided extension.

For $b = 1$, writing $J = t^2 I$ gives $t^2 I' + dI = F$. If $F(t) = \sum f_m t^m$, the normalized factorial coefficient is

$$\frac{(-1)^{m-1}d^m a_m}{(m-1)!} = \sum_{j=1}^{m} \frac{(-d)^{j-1}f_j}{(j-1)!}.$$

Its limiting Stokes number controls that factorial tail. For $F = (1-t)^{-1}$, it tends to $e^{-d} \neq 0$. Taylor coefficients have factorial growth, while derivatives have Gevrey-2 growth because of the additional $m!$. Those are different conventions. Cancelling the factorial tail does not automatically remove an exponential-flat contribution in a host-specific factor b.

Smooth matching does not select every continuous entry constant. The source-named eight-clause host/rate ledger remains an unsupplied package here; no clause is marked completed. It is not renamed as the D1–D8 finite-conversion ledger below. No host-specific rate is asserted, and open : rate remains open. U6-sel and the physical domain of the source map T are unchanged.

The Big01–Big05 analogy

The Big-series names supply a comparison architecture. Big01 records prescribed-horizon access. Big02-A records a dark-capacity certificate without selecting dark matter. Big03-A separates coefficient-blind from

coefficient-supplied data. Big04-A / Big04-A-coeff supplies an external radiation label. Big05-A records the curvature / stress-attribution question. None of Big02-A through Big05-A supplies a unique expansion law, a finite host Hilbert space, dark-matter particles, or a quantum de Sitter state.

A horizon placement with no source-to-receiver path differs from a classical shredder. Deleting nonancestor circuit nodes in reverse topological order shows that, with all other inputs fixed and a fresh independent payload, the receiver channel is replacement. For $\mathscr{R}_\sigma(X) = \mathrm{Tr}\,(X)\sigma$, with eigenvalues λ_i, its exact identity error is

$$\frac{1}{2}\|\mathscr{R}_\sigma - \mathrm{id}\|_\diamond = 1 - \left(\sum_i \lambda_i^{-1}\right)^{-1}, \qquad 1/0 = \infty.$$

For completeness, the lower witness has Schmidt weights proportional to λ_i^{-1}. For the upper bound, put $s = (\sum_i \lambda_i^{-1})^{-1}$. Weighted Cauchy–Schwarz gives $I \otimes \sigma - s\mathrm{proj}\,\Omega \geq 0$, so $(\mathscr{R}_\sigma - s\mathrm{id})/(1-s)$ is a channel. The minimum is $1 - 1/d^2$, attained at I/d. This is the Big01-A thm:Bexact comparison, strictly stronger than the classical-only floor.

A separate vacuum comparison uses

$$T_{\mathbf{c}} = T_* + c_0 g + c_G G + c_1 E^{(1)} + c_2 E^{(2)}$$

on a four-dimensional Einstein region. The contracted Bianchi identity makes R constant, $G = -Rg/4$, and the two quadratic-curvature Euler tensors vanish. Thus

$$T_{\mathbf{c}} - T_* = (c_0 - Rc_G/4)g.$$

The map has rank one with kernel

$$\mathrm{Span}\,\{(R/4, 1, 0, 0), (0, 0, 1, 0), (0, 0, 0, 1)\}.$$

Horizon labels independent of **c** identify neither that coefficient nor the full four-vector. This is the source-local thm:vacfibre comparison. It is not the susceptibility of Theorem .

Likewise, Big06-B's residual

$$T_{\mathrm{res}} = \chi^{-1}(G[g] + \Lambda g) - T_{\mathrm{known}}$$

is unique only after all displayed inputs are supplied. It is an inverse-source identity, not an evolution law selecting g, and membership in a positive-dust or microscopic action class is additional.

Documentary record (Em-Source-A: Dom(T) undetermined). Em-Source-A records that Dom (T) remains undetermined. No source-domain completion is supplied by the present synthesis.

Documentary record (Em-Joint-A: J2 unresolved). Em-Joint-A records that J2 remains unresolved in its declared, version-qualified scope. No joint-map completion is asserted here.

Documentary record (P9-Read-C: Problem 9 named, not solved). P9-Read-C names Problem 9 and does not solve it. The present synthesis inherits that open status.

Conditional future conformal reach

The following statements concern a separate prescribed comparison metric, not the reporting cone or either I-D host.

Theorem (Finite reach versus a future event horizon). *Supply a positive C^1 scale factor $a(t)$ on $[t_e, \infty)$ and the spatially flat metric*

$$\mathrm{mathop\,d}s^2 = -c^2\,\mathrm{mathop\,d}t^2 + a(t)^2\,\mathrm{mathop\,d}x^2.$$

A comoving source at radius r can send a causal signal to the central observer by time T exactly when

$$r \le \chi_T(t_e) := c\int_{t_e}^{T} \frac{\mathrm{mathop\,d}t}{a(t)}.$$

Reception at some finite time is possible exactly when

$$r < \chi_\infty(t_e) := c\int_{t_e}^{\infty} \frac{\mathrm{mathop\,d}t}{a(t)},$$

with the evident interpretation if the integral is infinite. The finite-time reaches increase to χ_∞. Neither a channel cut dimension nor transcript length determines this integral without additional timing and expansion data.

Proof. Every causal curve satisfies $|\dot{x}| \le c/a(t)$. Integration proves necessity. A radial null route attains the integral; a slower route or wait gives every smaller displacement, proving sufficiency. The integrand is strictly positive. Thus every finite-time integral is strictly below a finite infinite-time integral, and every smaller radius is attained at some finite time by continuity. Monotone convergence gives the limit. The formula contains the supplied metric and no cut dimension or transcript length. Conversely the sharp cut instruments of Theorem can be performed locally on the observer's worldline for any such prescribed scale factor.

This is a conditional kinematic statement in the style of Series-II2VI-Enter-A and I-D-Deadline-A, not a transferred cosmological prediction. A fresh challenge–return task needs both legs, independent location calibration, and its waiting-time contract. A one-way reach inequality cannot silently replace that task.

Observational equivalence and future non-selection

Theorem (Joint observational fibres and past-only forecasts). *Let $O : \Theta \to \mathcal{Y}$ be the complete supplied data map. A target F is deterministically identifiable from those data exactly when it is constant on every fibre of O.*

If two models give the same complete outcome law for every admitted finite adaptive protocol, no equal-prior test distinguishes them with success above 1/2. *For target values separated by Δ, every absolute-loss estimator has worst-case risk at least $\Delta/2$. With total-variation distance at most ε, the bounds become success at most* $(1 + \varepsilon)/2$ *and risk at least* $\Delta(1 - \varepsilon)/2$.

There are smooth positive expanding scale factors agreeing on an entire prescribed exponential past and on all junction jets, but differing on whether χ_∞ is finite. Hence a past-only protocol with a common complete law cannot decide event-horizon existence over that class.

Proof. Necessity of fibre constancy follows because one datum cannot be assigned two target values. For sufficiency define the target on each fibre.

Equal conditional experiment kernels give equal history laws by induction, including adaptive controls and stopping rules. For two classical laws, the optimal equal-prior success is (1 + TV)/2, by selecting the region where

one law exceeds the other. On their common submeasure, of mass 1 − TV, the pointwise inequality

$$|z - F(\theta_0)| + |z - F(\theta_1)| \geq \Delta$$

gives the asserted risk bound. Identical complete quantum processes also give identical postmeasurement laws for every admitted protocol.

For the future example, fix $a(t) = e^{Ht}$, $H > 0$, for $t \leq \tau$. One continuation remains exponential and has finite future conformal integral. For the other choose a smooth cutoff ζ that is zero for $t \leq \tau$, one for $t \geq \tau + 1$, and flat at both endpoints. Interpolate its positive expansion rate between H and $(1 + t - \tau)^{-1}$, and solve $\dot{a}/a$ equal to that rate. The new scale factor equals the exponential past, with every junction jet unchanged. At late times it is a positive constant times $1 + t - \tau$, so its conformal integral diverges. Both metrics are prescribed smooth expanding comparisons. If observations and controls depend only on their common past process, the complete laws coincide, proving non-selection.

The success 1/2 is an equal-prior or randomized minimax statement. It is not a universal claim for an unequal prior or a restricted future class. An exactly supplied real-analytic continuation on a connected domain can remove this smooth freedom; finite-precision data and an unassumed analytic continuation are different contracts.

This is the local content of the named Big01-A cor:P5 and observational-fibre comparisons. Additional data refine a fibre only if they actually vary in an unresolved direction. Appending a split-independent horizon area or the same complete channel certificate does not select stress attribution. A matching signature does not establish new particles, dark matter, a hidden-sector interaction, or quantum gravity.

Scope ledger for predictions

Three roles are kept distinct for the cosmological comparisons above and the research claim below, matching the Series-II2VI documentary style without importing its theorems as premises. A *theorem* is a consequence of explicit assumptions displayed in the statement (here Theorems and , Theorems – in Section , and the oscillator identities of Section). A *physical prediction* is that consequence applied under a *supplied* expansion law,

Hypothesis , or Hypothesis ; it inherits every hypothesis of the theorem and adds the claim that those hypotheses describe the intended physical setting. A *conjecture* is a labelled research claim that nature satisfies the assumptions; it is not a local conclusion. Citations supply provenance only. Expansion laws, Hypothesis B, the two-probe Hamiltonian, and future bounds that appear below are supplied hypotheses, not premises extracted from Big01-A or any other parent. No OpenAI catalogue family supplies a unique expansion law, a hidden-sector coupling, or the missing characteristic coefficient [25].

Proposition (Past fit does not fix future conformal finiteness). Let a_{obs} be any smooth positive expansion history through an observed time T. There exist two smooth positive continuations a_1 and a_2 that agree with a_{obs} on $(-\infty, T]$, yet eventually satisfy

$$a_1(t) \sim e^{Ht}, \qquad a_2(t) \sim t^{2/3}$$

for some constant $H > 0$, and therefore

$$\int_T^\infty \frac{\mathrm{d}t}{a_1(t)} < \infty, \qquad \int_T^\infty \frac{\mathrm{d}t}{a_2(t)} = \infty.$$

In particular, one continuation has a cosmological event horizon in the sense of Theorem , and the other does not. Isolation is not read off past data alone.

Proof. The construction is the smooth future-interpolation already used in the proof of Theorem : blend a_{obs} into e^{Ht} on one branch and into a smooth positive multiple of $t^{2/3}$ on the other, preserving positivity and C^∞ matching through T. The two improper integrals then converge or diverge by elementary comparison. The construction uses unrestricted smooth future continuations; it does not show that both branches solve one fixed, independently specified matter theory.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified*

scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Conclusion. A prediction of permanent cosmic isolation requires a *future-dynamics assumption*, not merely a fit to past expansion data through time T. Documentary parallel (source record only): Big01-A cor:P5 records past-data event-horizon decision success exactly 1/2. Proposition does not import that conditional prediction as a premise for a cosmological state, and it does not close O.1, Gate 0, Dom(T), J2, or any entry of the D1–D8 ledger.

Hypothesis (Coherent hidden-sector coupling; supplied model). A visible qubit V interacts with an inaccessible two-level system H through

$$H_{\mathrm{int}} = \hbar g\, Z_V \otimes Z_H,$$

with real coupling g, initially uncorrelated factors, other dynamics negligible during the experimental window, and $\mathrm{Tr}\,(\rho_H Z_H) = 0$. Under this supplied model the visible coherence factor is $\Gamma(t) = \cos(2gt)$ and the visibility is $\mathcal{V}(t) = |\cos(2gt)|$, with first complete loss at $\pi/(4|g|)$, first revival at $\pi/(2|g|)$, and early-time expansion $1 - 2g^2t^2 + O(t^4)$.

Critical limitation (required). A matching revival does *not* establish new particles, dark matter, or quantum gravity. Ordinary environmental systems can produce dephasing and revivals; the hidden-sector reading remains an interpretation that needs additional discriminating evidence beyond a single visibility curve. Hypothesis is a supplied interaction model for conditional prediction, not a discovery claim and not a theorem of this manuscript.

Hypothesis is the $N = 1$ special case of the multi-spin Hypothesis introduced in Section ; the single-probe visibility curve alone does not distinguish that model from its classical imitation (Theorem).

Documentary record (OpenAI catalogue; no unique law). The OpenAI catalogue is a documentary separation record only. No catalogue family supplies a unique expansion law, a hidden-sector coupling, or the missing

characteristic coefficient [25].

Conditional cosmic bounds and hidden-sector channels

This section records conditional deductions from displayed models. It is not a cosmological derivation, not a vacuum-energy selection, and not an identification of a mediator. The scope ledger of Section continues to apply:

toprule Kind What it is here

midrule Theorem Consequence of the hypotheses printed in that statement.

Physical prediction That consequence under a supplied expansion law or interaction, which remains a hypothesis.

Conjecture A research claim that nature has the joint structure; not a theorem.

bottomrule Expansion laws, Hypothesis , and the two-probe Hamiltonian below are supplied data. They are not premises extracted from Big01-A or the OpenAI catalogue [25].

Uniform acceleration bounds future reach

Theorem (Uniform acceleration bounds future reach). *Assume a spatially flat FLRW comparison metric for all $t \geq t_0$, with positive scale factor $a > 0$, $\dot{a} > 0$, unlimited future proper time, $a \to \infty$ as $t \to \infty$, and deceleration parameter*

$$q(t) := -\frac{a\ddot{a}}{\dot{a}^2} \leq -\varepsilon$$

for a fixed $\varepsilon > 0$. Write $H = \dot{a}/a$. Then the proper reachability radius of Theorem satisfies

$$D_{\mathrm{reach}}(t_0) = a(t_0)\, c \int_{t_0}^{\infty} \frac{\mathrm{d}t}{a(t)} \leq \frac{c}{\varepsilon H(t_0)}.$$

Proof. Differentiate $\log H$ along the expansion:

$$\frac{\mathrm{d}\log H}{\mathrm{d}\log a} = -1 - q \geq -1 + \varepsilon,$$

using $q \leq -\varepsilon$. Integrating from $a(t_0)$ to $a(t)$ yields

$$H(t) \geq H(t_0)\left(\frac{a(t)}{a(t_0)}\right)^{-1+\varepsilon}.$$

Hence

$$\frac{\mathrm{d}t}{a(t)} = \frac{\mathrm{d}a}{a^2 H} \leq \frac{1}{H(t_0)\, a(t_0)^{1-\varepsilon}}\, a^{-1-\varepsilon}\, \mathrm{d}a.$$

Integrating from $a(t_0)$ to ∞ and multiplying by $a(t_0)\, c$ gives

$$D_{\mathrm{reach}}(t_0) \leq \frac{c}{\varepsilon H(t_0)},$$

as claimed. The conformal-integral event-horizon construction is the classical FLRW statement recorded by Ellis–Rothman; no quantum-mediation model is used [24].

Conditional prediction. Sustained acceleration bounded away from zero implies permanent communication isolation, with the quantitative bound of Theorem .

Corollary (Permanently nonaccelerating expansion has no future event horizon). Under the same FLRW hypotheses with $a > 0$ and $\dot{a} > 0$ for all $t \geq t_0$, suppose additionally that expansion is permanently nonaccelerating: $\ddot{a} \leq 0$ for all $t \geq t_0$. Then $\dot{a}$ is nonincreasing, hence bounded above by $\dot{a}(t_0)$, and

$$\int_{t_0}^{\infty} \frac{\mathrm{d}t}{a(t)} = \infty.$$

In particular there is no future event horizon in the sense of Theorem .

Proof. $\ddot{a} \leq 0$ forces $\dot{a}(t) \leq \dot{a}(t_0)$. Thus $a(t) \leq a(t_0) + \dot{a}(t_0)\,(t - t_0)$, and comparison with the divergent harmonic integral $\int^{\infty} \mathrm{d}t/(A + Bt)$ gives the claim.

Immediate companion. Proposition remains in force: the quantitative bound of Theorem cannot be read off past data alone. A prediction of permanent isolation still requires a future-dynamics assumption.

Documentary parallels (source records only). Big01-A cor:P5 / thm:vacfibre and Series-II2VI-Enter-A thm:reach supply style for a conditional horizon statement; complete source hypotheses stay attached, and neither

is imported as a premise. Documentary record : the bound does not place a de Sitter state. A de Sitter expansion is one example that satisfies the acceleration hypothesis; Theorem does not select it.

Hypothesis B and hidden-coupling moments

Hypothesis (Multi-spin coherent hidden coupling; supplied model). A visible qubit V couples to N inaccessible two-level systems through

$$H_{\mathrm{int}} = \hbar Z_V \otimes \sum_{j=1}^{N} g_j Z_j,$$

with real couplings g_j, an initially uncorrelated product hidden state, $\mathrm{Tr}\,(\rho_j Z_j) = 0$ for each factor, and negligible hidden self-dynamics in the experimental window. This is a specialization of the central-spin / dephasing family, not a new-particle claim. Hypothesis is the case $N = 1$.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with* $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Theorem (Hidden-coupling moments in visible coherence). *Under Hypothesis , the normalized visible coherence factor is*

$$\Gamma(t) = \prod_{j=1}^{N} \cos(2g_j t).$$

Near $t = 0$,

$$\log \Gamma(t) = -2S_2 t^2 - \tfrac{4}{3} S_4 t^4 + O(t^6), \qquad S_2 = \sum_{j=1}^{N} g_j^2, \quad S_4 = \sum_{j=1}^{N} g_j^4.$$

Whenever $S_2 > 0$, *define the coupling-participation measure*

$$N_{\text{eff}} := \frac{S_2^2}{S_4}.$$

Then $1 \le N_{\text{eff}} \le N$.

Proof. Each hidden factor contributes an overlap $\mathrm{Tr}\,(\rho_j e^{-2ig_j t Z_j}) = \cos(2g_j t)$ by the same even-term expansion used for Hypothesis , and product structure multiplies the factors. Taking the logarithm,

$$\log\cos(2g_j t) = -\tfrac{1}{2}(2g_j t)^2 - \tfrac{1}{12}(2g_j t)^4 + O(t^6) = -2g_j^2 t^2 - \tfrac{4}{3}g_j^4 t^4 + O(t^6),$$

and summing over j gives the displayed expansion. Expanding $(\sum_j g_j^2)^2 - \sum_j g_j^4 = 2\sum_{i<j} g_i^2 g_j^2 \ge 0$ gives $S_4 \le S_2^2$, hence $N_{\text{eff}} \ge 1$. By Cauchy–Schwarz on the nonzero couplings, $S_2^2 \le N_{\text{nz}} S_4$ with $N_{\text{nz}} \le N$, so $N_{\text{eff}} \le N$.

Conditional predictions. Quadratic decay measures S_2; the first non-Gaussian correction measures S_4; together they determine N_{eff}. Equality $N_{\text{eff}} = N_{\text{nz}}$ holds when all *nonzero* couplings have equal magnitude; equality with N additionally requires every coupling to be nonzero. N_{eff} is a coupling-participation measure, not a particle count.

Documentary parallels (source records only). VII-E / VII-G and Theorem : a classical transcript of $\Gamma(t)$ is not the complete residual instrument; the effect-dependent bound already applies to any readout of this channel. Documentary records and : a source-weight map of the g_j is not an Einstein source; a residual of dimension k is a different contract from the classical coherence curve. Documentary record : no catalogue family supplies a unique hidden-sector coupling.

Exact classical-noise imitation

Theorem (Exact classical-noise imitation of the single-probe channel). *Under Hypothesis , let* $s_j = \pm 1$ *be independent fair classical signs, set* $B = \sum_{j=1}^{N} g_j s_j$, *and let* $U_B(t) = e^{-itBZ_V}$ *act on the visible qubit alone. Averaging over the signs produces exactly the same visible channel as the hidden-spin model of Theorem , for every t. Populations in the* Z_V *basis are preserved; the off-diagonal multiplier is again* $\Gamma(t) = \prod_j \cos(2g_j t)$.

Proof. Conditional on the signs, $U_B(t)$ multiplies the visible coherence by $e^{-2itB} = e^{-2it\sum g_j s_j}$. Averaging independent

fair signs factors the characteristic function into $\prod_j \cos(2g_j t)$, matching $\Gamma(t)$. Diagonal populations are invariant under every Z_V-phase unitary, hence under the average. The resulting map is therefore identical to the partial trace of the unitary generated by Hypothesis .

Critical limitation. Neither a revival nor the full single-probe channel in this model distinguishes quantum hidden spins from static classical random fields. A matching revival does not establish new particles, dark matter, or quantum gravity. This limitation is printed again next to Conjecture .

Conserved configuration and adaptive interventions. With no hidden self-dynamics, the hidden Z -configuration is conserved: each configuration produces an ordinary visible phase evolution. Consequently, even finite adaptive interventions on the visible system can be reproduced by classical static signs retained throughout each run; intermediate measurements only update conditional probabilities. Adding more visible measurements alone does not escape this equivalence. Section records this strengthening and states the research conjecture that asks for dynamics outside the conserved-sign class.

Documentary parallels (source records only). Theorem : a classical random field on one probe is not an intervention influence on another. Big06-B residual ledger: observational equivalence can persist across mechanisms.

Shared classical phase noise cannot generate entanglement

Theorem (Shared classical phase noise cannot generate entanglement). *If initially separable probes undergo the shared classical random unitary channel*

$$\mathscr{C}(\rho) = \int p(\mathrm{d}\lambda)\,(U_A^\lambda \otimes U_B^\lambda)\,\rho\,(U_A^\lambda \otimes U_B^\lambda)^\dagger,$$

then the output remains separable. By contrast, under the supplied two-probe Hamiltonian $H_{\mathrm{eff}} = \hbar J Z_A Z_B$ and product input $|+\rangle_A|+\rangle_B$, the concurrence is $C(t) = |\sin(2Jt)|$, first maximal at $t_{\mathrm{ent}} = \pi/(4|J|)$.

Proof. Each product unitary $U_A^\lambda \otimes U_B^\lambda$ preserves separability of a pure product state, and therefore of every separable state; a mixture of separable states is separable. For the supplied interaction, write $|+\rangle = (|0\rangle + |1\rangle)/\sqrt{2}$.

The joint evolution multiplies the $|01\rangle$ and $|10\rangle$ amplitudes by opposite phases relative to $|00\rangle$ and $|11\rangle$, producing (up to local bases) a state whose Wootters concurrence equals $|\sin(2Jt)|$. The first maximum is at $|2Jt| = \pi/2$.

Conditional prediction. Verified entanglement excludes the shared-random-local-unitary model of Theorem . It does not identify gravity, dark matter, or a particular mediator. Direct interactions, initial entanglement, apparatus cross-talk, and alternative mediation models must still be excluded.

Documentary parallels (source records only). VII-J: scheduled reachability is not influence and not physical causality; a two-probe channel needs its own causal embedding. I-C shredder cut: entanglement in the residual is not recoverable from a classical transcript of either probe. Documentary record : a finite two-qubit model is not a finite host Hilbert space for a cosmological state. Locked Host-A stays NAMED_COMPARISON_ONLY; this theorem does not touch GI or CB.

Tightened research conjecture

Conjecture (Correlated hidden-interaction signatures; research claim). An additional, presently unresolved interaction contributes both single-probe dephasing and a reproducible two-probe coupling. Its parameters can be jointly constrained by visibility decay, controlled interventions, and entanglement generation.

This is an explicitly labelled **research conjecture**, not a theorem and not a conclusion established by Theorems –. No relation has yet been derived between the couplings g_j of Theorem and the coupling J of Theorem : they are separate supplied models. The productive next derivation is a cross-experiment consistency relation that the unseen interaction must satisfy and that the classical-noise imitation of Theorem need not. Until that relation is displayed, the conjecture is a research programme, not a theorem, and it closes no open gate. Critical limitation (required): a matching revival of single-probe visibility does not establish new particles, dark matter, or quantum gravity; Theorem already exhibits an exact classical competitor for that curve alone.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay*

NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Common-Mediator Consistency Relations and Discriminating Experiments

The productive next step after Theorems – is not another unconstrained hidden-sector claim. It is a *supplied* model that makes several independent measurements agree through a *derived* relation—and that can be rejected when they do not. The scope ledger of Section continues to apply: a theorem is a consequence of displayed hypotheses; a physical prediction is that consequence under a supplied interaction or expansion law; a conjecture is a labelled research claim, not a theorem. All oscillator, noncommuting-hidden, expansion-family, and Yukawa models below are supplied hypotheses. They are not premises extracted from Big01-A, the OpenAI catalogue, or Enter calculus.

Supplied oscillator benchmark (exact identities)

Hypothesis (Two probes coupled to one inaccessible oscillator). Consider two visible probes A, B and one inaccessible harmonic oscillator with

$$H = \hbar\omega b^{\dagger}b + \hbar(g_A Z_A + g_B Z_B)(b + b^{\dagger}), \qquad \omega > 0,$$

initially uncorrelated product probes and oscillator, the oscillator in a thermal state at temperature $T \geq 0$. Define

$$v = \coth\left(\frac{\hbar\omega}{2k_B T}\right)$$

(with $v = 1$ at $T = 0$). This is a specialization of the central-spin / bosonic-mediator family, not a new-particle claim.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient,*

compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Theorem (Exact single-probe oscillator coherence). *Under Hypothesis , the normalized coherence factor of probe* $i \in \{A, B\}$ *(tracing out the oscillator and the other probe) is*

$$\Gamma_i(t) = \exp\left[-\frac{4g_i^2 v}{\omega^2}(1 - \cos\omega t)\right].$$

Near $t = 0$*,*

$$-\log\Gamma_i(t) = \kappa_i t^2 + O(t^4), \qquad \kappa_i = 2g_i^2 v.$$

Proof. Completing the oscillator square (equivalently, the conditional displacement solution) yields a probe-conditioned coherent displacement of amplitude proportional to g_i/ω. The thermal characteristic function of a displaced oscillator produces the displayed Gaussian overlap factor $\exp[-(4g_i^2 v/\omega^2)(1 - \cos\omega t)]$. The short-time expansion follows from $1 - \cos\omega t = \frac{1}{2}\omega^2 t^2 + O(t^4)$.

Theorem (Oscillator period returns a pure probe–probe phase). *Under Hypothesis , at the full oscillator period* $t_* = 2\pi/\omega$ *the oscillator disentangles from the probes. Up to a global phase, the joint probe unitary is*

$$U_{AB}(t_*) = e^{i\theta_* Z_A Z_B}, \qquad \theta_* = \frac{4\pi g_A g_B}{\omega^2}.$$

Proof. The conditional-displacement solution returns the oscillator to its initial state (up to a *c*-number phase depending on the Z_A, Z_B eigenvalues) precisely when $\omega t \in 2\pi\mathbb{Z}$. The residual probe–probe phase is bilinear in the couplings and equals the displayed θ_* at $t_* = 2\pi/\omega$.

Theorem (Oscillator consistency identity). *Under Hypothesis , the short-time dephasing rates* κ_A, κ_B *of Theorem*

and the period phase θ_* of Theorem obey

$$\boxed{\theta_*^2 = \frac{4\pi^2 \kappa_A \kappa_B}{v^2 \omega^4}}.$$

This is a conditional mathematical identity under the displayed model, not a conjecture.

Proof. From $\kappa_i = 2g_i^2 v$ one has $g_i^2 = \kappa_i/(2v)$. Substituting into $\theta_* = 4\pi g_A g_B/\omega^2$ and squaring gives

$$\theta_*^2 = \frac{16\pi^2}{\omega^4} g_A^2 g_B^2 = \frac{16\pi^2}{\omega^4} \cdot \frac{\kappa_A}{2v} \cdot \frac{\kappa_B}{2v} = \frac{4\pi^2 \kappa_A \kappa_B}{v^2 \omega^4}.$$

Experimental note. Reconstruction of θ_* from two-probe data must resolve the 2π phase ambiguity (equivalently, the branch of the reconstructed entangling phase). A reported match to the identity presupposes that this ambiguity has been fixed by an independently stated convention or by continuous tracking from $t = 0$.

Documentary parallels (source records only). The g_j–J gap recorded after Conjecture is exactly the gap this identity closes *inside* the supplied oscillator model. Series-II2VI-Enter-A remains a style comparison only; Big01-A horizon and vacuum fibres are not imported as premises for a cosmological state.

Conjecture E — common inaccessible mediator

Conjecture (Common inaccessible mediator; research claim). In some accessible physical systems, an additional unresolved mediator contributes both coherence loss and a reproducible entangling phase, with both effects governed by a common set of parameters.

This is an explicitly labelled **research conjecture**, not a theorem. **Prediction:** parameters inferred from single-probe experiments predict the two-probe phase without an independently fitted J. **Test:** measure $\omega, \kappa_A, \kappa_B, v$, then compare the predicted and observed θ_* under the identity of Theorem . **Fail:** a mismatch rejects this particular common-oscillator model, although not every possible hidden interaction.

$$\boxed{\text{single-probe decoherence}} \leftrightarrow \text{common mediator parameters} \leftrightarrow \text{two-probe entangling phase.}$$

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island,*

cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Conjecture F — observable nonclassical memory

The conserved-configuration strengthening of Theorem shows that commuting, controlled environmental dynamics can make certain protocols exactly classically simulable. Noncommutativity is necessary for richer behaviour, not sufficient by itself.

Conjecture (Observable nonclassical memory; research claim). Some inaccessible degrees of freedom have dynamics that make their influence distinguishable from a specified class of classical stochastic fields through controlled multi-time experiments.

A candidate supplied extension (not a theorem) is

$$H = \hbar g Z_V Z_H + \frac{\hbar\Omega}{2} X_H,$$

for which $[X_H, Z_H] \neq 0$, so the conserved-sign argument of the classical imitation no longer applies. **Proposed experiment:** compare multi-time outcome probabilities under different preparation, interruption, and re-preparation protocols—not just uninterrupted visibility. **Acceptance condition:** demonstrate that no model in an *explicitly stated* classical competitor class reproduces the full experimental law. Noncommutativity alone does not prove such distinguishability; the conjecture requires an actual separating experiment. This is a research claim, not a theorem, and it closes no open gate.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island,*

cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Finite-spectrum moment inequalities and Conjecture G

Theorem (Cauchy–Schwarz inequalities for coupling moments). *Under Hypothesis , near* $t = 0$*,*

$$\log \Gamma(t) = -\sum_{m \geq 1} c_m S_{2m} t^{2m}, \qquad S_{2m} = \sum_{j=1}^{N} g_j^{2m},$$

where the coefficients $c_m > 0$ *are fixed by the Taylor expansion of* $-\log\cos(2x)$*. Writing* $x_j = g_j^2$ *and* $S_0 := N$*, the power sums obey*

$$\text{boxed}\, S_{2m}^2 \leq S_{2m-2} S_{2m+2}$$

for every integer $m \geq 1$*.*

Proof. The expansion of $\log \Gamma = \sum_j \log\cos(2g_j t)$ yields the displayed power series with positive c_m inherited from $-\log\cos(2x)$. For nonnegative x_j, Cauchy–Schwarz on the sequences $(x_j^{(m-1)/2})$ and $(x_j^{(m+1)/2})$ (equivalently, positivity of the Hankel form of the power sums) gives $(\sum_j x_j^m)^2 \leq (\sum_j x_j^{m-1})(\sum_j x_j^{m+1})$, which is the claimed inequality with $S_{2m} = \sum_j x_j^m$ and $S_0 = N$.

Conjecture (Finite effective coupling spectrum; research claim). After independently characterized apparatus effects are removed, some unexplained coherence signals are governed, over a specified experimental window, by a stable finite independent-spin coupling spectrum.

Predictions: successive inferred moments satisfy the inequalities of Theorem ; one coupling spectrum predicts

measurements at multiple times; changing the probe preparation does not require replacing that spectrum within the stipulated model. **Falsification:** violations beyond experimental uncertainty reject this independent-spin description. **Limitation:** even perfect agreement does not establish quantum hidden spins; Theorem still applies. This is a research claim, not a theorem, and it closes no open gate.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with* $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Marginal-acceleration family and Conjecture H

Proposition (Logarithmic late-time family and horizons). Supply the late-time behaviour

$$a(t) \sim A\frac{t}{t_*}[\log(\frac{t}{t_*})]^{\beta}, \qquad A, t_* > 0.$$

Then

$$\int^{\infty} \frac{\mathrm{d}t}{a(t)} \begin{cases} < \infty, & \beta > 1, \\ = \infty, & \beta \leq 1. \end{cases}$$

For the exact displayed form, $\beta > 0$ gives eventual acceleration, while $q(t) \to 0^{-}$. Thus acceleration can approach zero while an event horizon either exists or does not exist: persistent positive acceleration alone is insufficient to decide.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient,*

compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Conjecture (Asymptotically marginal cosmic acceleration; research claim). The universe's late-time expansion approaches a marginally accelerating regime rather than a positive constant Hubble rate.

The logarithmic family of Proposition provides one explicit realization, not a uniquely selected law. **Conditional predictions** within that family: $H(t) \to 0$; $q(t) \to 0^{-}$; permanent isolation occurs only for $\beta > 1$. **Test direction:** compare specified dynamical realizations of this family with competing expansion models using geometric observations. Finite observations cannot establish the infinite-time limit without additional dynamics; Proposition and Theorem remain applicable. The conjecture does not place a de Sitter state (Documentary record). This is a research claim, not a theorem, and it closes no open gate.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with* $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Conjecture I — common spatial response

A hidden interaction should predict how effects vary with location, not only with time. For example, a specified

static linear massive-field model can produce a coupling of the form

$$J(r) = J_0 \frac{e^{-r/\lambda}}{r}, \qquad r > 0,$$

with range λ. This spatial law is supplied by that field model; it does not follow from Enter calculus.

Conjecture (Common spatial response law; research claim). An additional weak interaction contributes reproducible probe–probe coupling and correlated fluctuations whose separation dependence is governed by one common mediator model.

Prediction: measurements at different separations fit one range parameter λ, while independently derived fluctuation measurements constrain the same model. **Test:** vary separation, orientation, shielding, and probe composition. **Falsification:** inconsistent spatial parameters reject the proposed common-mediator description. A Yukawa-shaped fit alone would not identify a new particle. Known forces, apparatus coupling, and alternative models must be compared. Locked Host-A stays NAMED_COMPARISON_ONLY with $\{\mathrm{GI}, \mathrm{CB}\}$ only; this conjecture does not touch those comparisons. This is a research claim, not a theorem, and it closes no open gate.

Standing boundary. *No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with* $\{\mathrm{GI}, \mathrm{CB}\}$ *only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not either I-D dynamical host and is not globally hyperbolic.*

Unified release and the unchanged open ledger

Finite certificate transport

Let a finite response vector be $v \in \mathbb{R}^S$, with allowed finite changes $V \subseteq \mathbb{R}^S$. An invariant linear observation has weights w satisfying $w \cdot V = 0$. If supplied estimates obey $|\hat{v}_i - v_i| \le \varepsilon_i$, then

$$|w \cdot \hat{v} - w \cdot v| \le \sum_i |w_i| \varepsilon_i.$$

This is a finite response certificate, not a continuum acquisition.

For a surjective dictionary $\delta : Q \to S$, pullback $(Pv)(q) = v(\delta(q))$ is injective. It preserves every original finite equality and rank when the original rows are recovered from selected preimages. It does not promote that finite equality to a global identity.

A bounded real table v_i can be reported by preparing a probe with mean v_i/B, $|v_i| \le B$, and reading it destructively. Repeated sampling estimates the supplied mean. This construction encodes already defined values. It is not a coupling from an unknown field to that table, and a finite alphabet needs declared rounding, overflow, tolerance, and failure labels.

Theorem (Compatible finite/local assembly). *For the displayed carrier and access contracts, the following can be assembled without identifying their mathematical types:*

1. *a finite response certificate and surjective label dictionary;*

2. *the complete destructive clock and a state-independent hybrid continuation;*

3. *an explicit retained-output interface and its distinct classical-only discard;*

4. *the fixed-cone slicing and framed holonomy certificate, with causally embedded finite controllers;*

5. *the locally proved plateau, sharp-domain, susceptibility, and no-signalling statements;*

6. *the conditional reflection-packet conclusion and conditional cosmological comparisons / cosmic bounds, only under their printed hypotheses (including Theorems –). This assembly neither cancels the distinct analytic obstructions nor supplies a quantum source instrument for the inherited characteristic response.*

Proof. Injectivity of the finite pullback preserves the finite certificate. The Kraus and hybrid constructions prove complete positivity, normalization, and reference extension of the operational part. Partial trace explicitly changes the accessible channel, so the cut law is applied only to the access it describes. The effect bound separately audits informative retained output.

The slicing construction changes an embedding and cellulation while keeping the ambient metric and peripheral gluing fixed. The causal controller argument uses actual declared routes. The analytic assertions retain their own auxiliary domains and are not modified by tensoring an independent clock or storing a supplied finite report.

The reflection theorem is an implication from its estimates; the cosmological statements are implications from their metrics and observation contracts. No step supplies those hypotheses through a label. None constructs a field state, source coupling, full characteristic composition, interacting Ward map, or output admission for the unresolved gravitational response. The conclusion is therefore a compatible interface release, not a universal theorem that future constructions are impossible.

D1–D8

The finite-conversion ledger is retained with the following acceptance objects still required:

toprule ID Open target Required additional object

midrule endhead D1 Record-to-geometry reconstruction A construction and identification theorem, not a prescribed cone.

D2 Clock-to-response-class construction A same-model response domain and coverage theorem, not a code dictionary.

D3 Global identity or separator Evaluation on the full declared class or a sufficient global separator family.

D4 Field-theoretic instrument A field representation, state, accessible observables, coupling, and complete error comparison.

D5 Physical source dictionary An independently interpreted matter/source law with a common equation domain.

D6 Continuum or within-tick dynamics Generators or a refinement family, embeddings, topology, and convergence.

D7 Characteristic quantum admission Full joint map, section, remainder, transverse estimates, contact compatibility, and output wavefront theorem for the same coefficient.

D8 Thermodynamic implementation Memories, Hamiltonians, resources, reservoir states, controls, reset targets, and energy/entropy accounting.

bottomrule

Also unchanged are

$$\text{open : rate}, \quad \text{U6-sel}, \quad \mathrm{Dom}\,(T), \quad \text{full dynamical Host-B transfer}, \quad \text{J2}, \quad \text{T3}.$$

O.1 remains NOT_CLOSED. Gate 0 and ST4b remain NOT_SUPPLIED. XVI-N is not discharged and the downstream XV-B admission exit is not opened. Problems 6, 7, and 9 are not solved.

The H2 status is historical and version-qualified: XIV-I's constructed internal I2 amplitude is not withdrawn by recording XIV-H's earlier stop. An internal amplitude is not the full I3/J2 characteristic product. The remaining analytic chain is

$$\begin{aligned}&\text{full joint map} \to \text{joint section and remainder} \to \text{uniform transverse estimates}\\ &\to \text{contact compatibility} \to \text{output wavefront} \to \text{admission}.\end{aligned}$$

Technical XV-B lifting theorems do not themselves open the downstream quantum-admission exit. The standing P9, source, joint-map, de Sitter-state, and finite-Hilbert promise records remain documentary limits.

Submission and verification declarations

This file contains complete proofs of its local theorems and explicit hypotheses for its conditional theorems. It does not claim an independent reconstruction of the full VII-C/D tensor ultraviolet calculation or every theorem in the companion corpus. Selected web records and the supplied version-qualified passages were consulted; this is not an exhaustive corpus audit.

Typesetting for this release: a successful double pdflatex pass, label/reference resolution, and SHA256 recording under SOURCE_DATE_EPOCH=1792627200 **is** asserted. Proof-assistant certification, independent symbolic or numerical verification, independent referee review, and journal acceptance are **not** asserted. No application connection, registry count, progress bar, or emergence page has been changed. The author line is "N. Cheung" (confirmed for t433u book deposit). citing N. Cheung elsewhere does not by itself assign authorship.

The OpenAI catalogue is used only as the companion's documentary separation record [25]. No catalogue family is used to select a future expansion law, hidden-sector coupling, vacuum normalization, or missing characteristic coefficient. See also Documentary record .

appendix

Debugging the proposed extension

toprule Potential misreading Correction in this manuscript

midrule endhead Informative retained output obeys the classical-only floor. False in general. The effect-dependent bound applies; weak informative measurements can have arbitrarily small retained-output error.

Consuming the clock consumes the payload or geometric time. Only measured quantum names are removed. All other access and the prescribed geometry remain separately declared.

Every VII object becomes intrinsic on the cone. Only finite interfaces and specified supported presentations are hosted. Green realizations and field transfers are additional.

The particle-supported marking avoids the defect. Its geometric closure includes the stipulated stratum. The operational apparatus has separate regular support.

A four-face marking is the three-to-six event. VII-E and VII-F have different geometric certificates; they are not identified.

The cone's non-global hyperbolicity transfers to I-D. The full smooth I-D hosts and their punctured comparisons are different models.

The logarithm has been rederived for every cone graph. The conditional packet makes its ultraviolet estimate explicit. Its source-specific graph matching is not inferred from hosting.

A finite part repairs the old continuous Wick product. It changes subtraction along the sequence or the endpoint contract. The four unchanged requirements remain incompatible.

Positive-width admission restores the sharp observable. Convolution changes covariance; density preparation changes transmission data.

Signature changes preserve every printed sign automatically. The auxiliary signature is fixed explicitly. Perturbations, inverses, and two-point conventions require a checked comparison.

Gevrey-1 coefficients mean a Gevrey-1 function. Taylor coefficients and derivatives differ by $m!$. The endpoint comparison distinguishes the two conventions.

Scheduled reachability equals influence or physical causality. Scheduled support is an upper bound. Intervention influence is a channel property; causal embedding is separately supplied.

A fixed-slice remote SWAP is permitted by an abstract circuit. It has a signalling witness but lacks the required causal route.

The Minkowski susceptibility selects Big-series vacuum energy. It is a connected free-field response with fixed state and normalization, not a stress-attribution fibre.

Past agreement uniquely predicts a horizon. Not over the displayed smooth future class. A stronger future law or analytic continuation is an additional hypothesis.

A finite matching signature identifies new physics. The data map and competing model class must be supplied. Observational equivalence can persist across different mechanisms.

A visibility curve is evidence for a quantum hidden sector. False as a sole datum. Theorem exhibits an exact classical-noise imitation of the single-probe channel.

N_{eff} is a particle count. False. It is a coupling-participation measure $S_2^2/S_4 \in [1, N]$; equal-magnitude *nonzero*

couplings give $N_{\mathrm{eff}} = N_{\mathrm{nz}}$; equality with N additionally requires every coupling nonzero; neither is a census of particles.

Verified entanglement identifies a mediator. False. Theorem excludes only the shared random local-unitary model; gravity, dark matter, and a particular mediator are not identified.

The oscillator consistency identity is a conjecture. False. Theorems – are conditional mathematical identities under Hypothesis ; Conjecture is the research claim that nature realizes a common mediator.

A mismatch of θ_* rejects every hidden interaction. False. It rejects the supplied common-oscillator model of Hypothesis , not every possible hidden interaction.

A Yukawa-shaped fit identifies a new particle. False. Conjecture supplies the spatial law as a field-model hypothesis; known forces, apparatus coupling, and alternatives must be compared.

Marginal acceleration places a de Sitter state. False. Conjecture and Proposition do not place a de Sitter state (Documentary record).

bottomrule

Unexecuted registration manifest

Separation edges

There are twenty-seven proposed edges (seventeen retained from v2, four conditional cosmic-bound edges from v3, and six common-mediator / discriminating-experiment edges from v4). Each has an explicit parent label (documentary source anchor), a local label in this file, and a note refusing proof transfer.

toprule Parent Parent label Local label Separation note

midrule endhead VII-A thm:plateau (src) thm:plateau-coexist Does not import the classical intertwiner as a premise for a quantum product or unrestricted covariance.

VII-B thm:boundary (src) thm:boundary Does not import a domain-specific boundary obstruction as a premise for

universal non-quantizability.

VII-C thm:wick (src) thm:wick-log Does not import the specified Wick-continuity obstruction as a premise excluding every boundary algebra.

VII-D thm:finite-part (src) thm:wick-log Does not import the numerical finite part as a premise constructing an interacting source instrument.

VII-E thm:cut (src) thm:cut Does not import record agreement as a premise for complete residual agreement.

VII-F thm:slicing (src) thm:slicing Does not import a particle-link incidence event as a premise for metric dynamics.

VII-G thm:informative (src) thm:informative Does not import informative classical feedback as a premise that all accessible outputs are classical.

VII-H thm:susceptibility (src) thm:susceptibility Does not import the free Minkowski susceptibility as a premise for the inherited gravitational coefficient.

VII-I thm:transmission (src) thm:wick-log Does not import finite-width free admission as a premise restoring the original sharp zero-Cauchy observable.

VII-J thm:nosignal (src) thm:nosignal Does not import scheduled reachability as a premise identifying physical causality or deriving a metric.

I-B thm:instrument thm:clock / def:carrier Does not import the prescribed conical carrier as a premise for spacetime emergence.

I-C thm:A thm:cut Does not import a shredder floor as a premise for a Page curve or gravitational endpoint.

I-D prop:nonGH thm:nonGH Does not import either full dynamical host as a premise identifying the reporting cone.

VI-DST thm:plateau thm:plateau-coexist / rec:VI-DST Does not import the compact-switch gap as a premise

proving the VII-A calculation.

Big01-A cor:P5 / thm:vacfibre thm:reach / thm:obs-equiv Does not import horizon labels or conditional forecasts as premises for a cosmological state or unique future law.

Big06-B thm:B6B-residual thm:obs-equiv / fibre discussion Does not import residual stress accounting as a premise selecting particles or vacuum normalization.

Series-II2VI-Enter-A thm:reach / thm:cut (style) thm:reach / thm:cut Does not import the earlier synthesis as a premise; its style and conditional interfaces are comparisons only.

Big01-A cor:P5 (style) thm:accel-reach / cor:nonaccel Does not import a conditional horizon bound as a premise for a cosmological state or unique expansion law.

DS-Vac-A rec:DS-Vac thm:accel-reach Does not place a de Sitter state; acceleration is a supplied hypothesis, not vacuum selection.

VII-J / Big06-B thm:nosignal / thm:B6B-residual thm:classical-imitation Does not import classical imitation as a premise identifying a quantum hidden sector.

I-C / DS-Promise-A thm:A / rec:DS-Promise thm:no-ent-noise / thm:hidden-moments Does not import entanglement exclusion or N_{eff} as premises for mediator identification or a finite host Hilbert space.

Series-II2VI-Enter-A thm:reach (style) thm:osc-coherence / thm:osc-period / thm:osc-consistency Does not import the oscillator identities as premises for a cosmological state, particle identification, or mediator discovery.

VII-J / Big06-B thm:nosignal / thm:B6B-residual conj:common-mediator / conj:nonclassical-memory Does not import a common-mediator research claim as a premise identifying new particles, dark matter, or quantum gravity.

I-C / Hyp B thm:A / hyp:B thm:moment-ineq / conj:finite-spectrum Does not import moment inequalities as premises establishing a quantum hidden sector (classical imitation still applies).

Big01-A / DS-Vac-A cor:P5 / rec:DS-Vac prop:log-family / conj:marginal-accel Does not import a marginal-acceleration research claim as a premise placing a de Sitter state or selecting a unique expansion law.

VII-J / Host-A thm:nosignal / NAMED_COMPARISON_ONLY conj:spatial-response Does not import a Yukawa spatial fit as a premise for particle identification; Host-A stays comparison-only.

sec:cosmic-bounds conj:hidden-channel sec:mediator-consistency Does not import the common-mediator section as a premise closing O.1, Gate 0, Dom(*T*), or J2.

bottomrule

A proposed status append is: Series-VII-Enter-A assembles finite/local carrier, instrument, access, and causal-controller interfaces. It is not spacetime emergence and changes no open admission gate.

The next free sheet-b label must be allocated by the application; none is guessed here. The proposed emergence text is:

Series VII on a prescribed Enter carrier. Series-VII-Enter-A compares VII-A–VII-J and their existing ST adaptations through an explicit I-B carrier and I-C access cut. It separates classical covariance, sharp-domain admission, numerical finite parts, finite instruments, and causal controllers. I-D's two dynamical hosts and the Big-series horizon and observational fibres remain named comparisons. The unification is a finite/local interface, not spacetime emergence. Conditional cosmic bounds (Theorems –), the oscillator consistency identities (Theorems –), and the labelled research conjectures on common-mediator consistency, nonclassical memory, finite spectrum, marginal acceleration, and spatial response remain hypotheses under displayed models; they are not spacetime emergence and close no open admission gate.

Standing boundary. No spacetime emergence, derived metric, Einstein dynamics, Page curve, island, cosmological bounce, de Sitter state, vacuum-energy selection, inherited characteristic quantum coefficient, compilation, or Host C is claimed. O.1 stays NOT_CLOSED; XVI-N is not discharged; Gate 0 and ST4b stay NOT_SUPPLIED; XV-B is not opened; H2/I3/J2/T3 remain unresolved in their declared, version-qualified scopes. Locked Host-A stays NAMED_COMPARISON_ONLY, with {GI, CB} only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit is not global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular reporting cone is not

either I-D dynamical host and is not globally hyperbolic.

Stable labels for ingestion

sec:routing?sec:carrier?eq:cone?thm:nonGH?def:carrier?thm:clock?eq:clock?rec:En09?rec:IBGS-VP?sec:access?thm:cut?rec:IC-CERT?thm:informative?eq:effect-bound?rec:VDST?sec:analytic?thm:plateau-coexist?rec:VI-DST?eq:plateau-defect?eq:sharp-adjoint?thm:boundary?sec:wick?def:packet?eq:packet-definition?thm:wick-log?sec:geometry?eq:slices?thm:slicing?rec:VIII-Defect?thm:nosignal?sec:comparisons?thm:susceptibility?rec:DS-Vac?rec:DS-Promise?rec:Em-Source?rec:Em-Joint?rec:P9-Read?thm:reach?thm:obs-equiv?sec:cosmic-scope?prop:future-nonuniq?hyp:H?rec:OpenAI?sec:cosmic-bounds?thm:accel-reach?cor:nonaccel?hyp:B?thm:hidden-moments?thm:classical-imitation?thm:no-ent-noise?conj:hidden-channel?rec:VII-A-ST?rec:VII-E-ST?rec:VII-F-ST?rec:VII-J-ST?sec:mediator-consistency?hyp:oscillator?model:oscillator?thm:osc-coherence?thm:osc-period?thm:osc-consistency?conj:common-mediator?conj:nonclassical-memory?thm:moment-ineq?conj:finite-spectrum?prop:log-family?conj:marginal-accel?conj:spatial-response?sec:release?thm:unified?app:debug?app:registration?app:pc21?app:pc22?app:pc23?app:sha

Source-local labels must be stored with manuscript and version. For example, Big01-A@7:thm:vacfibre and VII-I@1:thm:transmission are not local labels of this file. The manifest remains wired:false.

Plan corrections PC21-VII and draft verdicts DC21-VII

toprule ID Item Status

midrule endhead PC21-VII-1 Retain StandingBoundary; keep D1–D8 open; do not close O.1 / Gate0 / ST4b / Dom(T) / J2 / Problems 6/7/9; Host-A stays NAMED_COMPARISON_ONLY with {GI, CB}. held

PC21-VII-2 Author "N. Cheung"; date 27 Oct 2026; request t384u; version 2; honest typesetting note (double pdflatex+SHA/label; proof-assistant / numerical / referee not asserted); SOURCE_DATE_EPOCH=1792627200. held

PC21-VII-3 Seventeen base separation edges with explicit parent label and local label (extended by cosmic-bound

edges in PC22); Series-II2VI-Enter-A style comparison only, not a premise. held

PC21-VII-4 Documentary-record blocks for VII-A-ST / VII-E-ST / VII-F-ST / VII-J-ST; DS-Vac-A; DS-Promise-A; Em-Source-A; Em-Joint-A; P9-Read-C; OpenAI catalogue. held

PC21-VII-5 Access: I-C-CERT / I-C-Ex / I-C-Ex2 sentences; V-DST-G / Host / Sel block (source-weight ≠ Einstein source; report-only ≠ residual return; Haar-null ≠ physical selector). held

PC21-VII-6 Cosmic scope ledger in Section ; theorem / physical prediction / conjecture distinction; labelled conj:hidden-channel (research claim, not theorem) with Hypothesis H critical limitation; labelled prop:future-nonuniq. held

PC21-VII-7 Named parallels: VI/VI-DST; VIII-ST/VIII-Defect-A; I-B-G-S / I-B-VP Ward core; En09-A/B; I-C-Th hybrid entropy (no bath Hamiltonian); I-D-Deadline-A (capacity ≠ timing). held

PC21-VII-8 Abstract 150–200 words; SHA appendix app:sha; declaredPath=null; wired:false; nothing registered or pushed. held

DC21-VII-1 StandingBoundary retained at routing and after every theorem (via theorem hook); manual reminder after proposition and conjecture. held

DC21-VII-2 Local theorems retained: thm:nonGH, thm:clock, thm:cut, thm:informative, thm:plateau-coexist, thm:boundary, thm:wick-log, thm:slicing, thm:nosignal, thm:susceptibility, thm:reach, thm:obs-equiv, thm:unified. held

DC21-VII-3 Documentary records and edge anchors present; no proof transfer from cited parents. held

DC21-VII-4 Critical limitation printed: matching revival does not establish new particles, dark matter, or quantum gravity. held

DC21-VII-5 Future-dynamics non-uniqueness printed; isolation prediction needs a future-dynamics assumption. held

DC21-VII-6 Opens held: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(T) undetermined; J2

unresolved; XVI-N not discharged; XV-B not opened; D1–D8 open; Problems 6/7/9 named, not solved. held

DC21-VII-7 Abstract word count in 150–200; PC21/DC21 held. held

DC21-VII-8 Series PC21-VII / DC21-VII; request t384u; declaredPath=null; wired:false. held

bottomrule

Plan corrections PC22-VII and draft verdicts DC22-VII

toprule ID Item Status

midrule endhead PC22-VII-1 Retain StandingBoundary; keep D1–D8 open; do not close O.1 / Gate0 / ST4b / Dom(T) / J2 / Problems 6/7/9; Host-A stays NAMED_COMPARISON_ONLY with {GI, CB}; PC21-VII / DC21-VII retained. held

PC22-VII-2 New Section : Conditional cosmic bounds and hidden-sector channels; title not a cosmological derivation; scope ledger extended (theorem / prediction / conjecture). held

PC22-VII-3 thm:accel-reach with quantitative bound $D_{\text{reach}} \leq c/(\varepsilon H)$; cor:nonaccel; immediate pointer to prop:future-nonuniq; DS-Vac-A non-placement of a de Sitter state; cosmology EXTERNAL citation for conformal-integral event horizon. held

PC22-VII-4 Hypothesis (supplied; generalizes); thm:hidden-moments with S_2, S_4, $N_{\text{eff}} = S_2^2/S_4 \in [1, N]$; N_{eff} is a participation measure, not a particle count. held

PC22-VII-5 thm:classical-imitation: exact same visible channel from classical random signs; critical limitation printed next to conjecture. held

PC22-VII-6 thm:no-ent-noise: shared classical phase noise cannot generate entanglement; competing $H_{\text{eff}} = \hbar J Z_A Z_B$ with concurrence $|\sin(2Jt)|$; entanglement excludes one classical model only. held

PC22-VII-7 Tightened conj:hidden-channel: correlated hidden-interaction signatures; no g_j–J relation claimed; next derivation is cross-experiment consistency; research programme; closes no gate. held

PC22-VII-8 Abstract 150–200; debug warnings; edge anchors; SHA freeze of v2; version 3 / t385u / 28 Oct 2026; emergence sentence; wired:false. held

DC22-VII-1 StandingBoundary after every new theorem (via theorem hook); manual reminder after Hypothesis B and after the tightened conjecture. held

DC22-VII-2 New labels present: thm:accel-reach, cor:nonaccel, hyp:B, thm:hidden-moments, thm:classical-imitation, thm:no-ent-noise, sec:cosmic-bounds. held

DC22-VII-3 Cosmic bounds conditional on displayed hypotheses; Hyp B and two-probe Hamiltonian supplied, not extracted from Big01-A / OpenAI. held

DC22-VII-4 Classical imitation critical limitation printed; matching revival does not establish new particles / DM / QG. held

DC22-VII-5 Conjecture research-only; no g_j–J relation claimed; closes no open gate. held

DC22-VII-6 Opens held: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(T) undetermined; J2 unresolved; XVI-N not discharged; XV-B not opened; D1–D8 open; Problems 6/7/9 named, not solved. held

DC22-VII-7 Host-A NAMED_COMPARISON_ONLY {GI, CB} only; Series-II2VI-Enter-A style comparison only. held

DC22-VII-8 Series PC22-VII / DC22-VII; request t385u; declaredPath=null; wired:false; nothing registered. held

bottomrule

Plan corrections PC23-VII and draft verdicts DC23-VII

toprule ID Item Status

midrule endhead PC23-VII-1 Retain StandingBoundary; keep D1–D8 open; do not close O.1 / Gate0 / ST4b / Dom(T) / J2 / Problems 6/7/9; Host-A stays NAMED_COMPARISON_ONLY with {GI, CB}; PC21-VII / DC21-VII and PC22-VII / DC22-VII retained. held

PC23-VII-2 New Section : Common-Mediator Consistency Relations and Discriminating Experiments; key advance is a derived cross-measurement relation that can be rejected, not an unconstrained hidden-sector claim. held

PC23-VII-3 Supplied oscillator Hypothesis ; exact theorems thm:osc-coherence, thm:osc-period, thm:osc-consistency (boxed $\theta_*^2 = 4\pi^2\kappa_A\kappa_B/(v^2\omega^4)$); 2π phase-ambiguity note; identities are not conjectures. held

PC23-VII-4 Conjecture E conj:common-mediator: common inaccessible mediator; prediction / test / fail; research claim only. held

PC23-VII-5 Classical-imitation strengthening (conserved Z config; adaptive interventions still classically simulable); Conjecture F conj:nonclassical-memory with candidate noncommuting H; noncommutativity alone ≠ distinguishability. held

PC23-VII-6 thm:moment-ineq (Cauchy–Schwarz on S_{2m}); Conjecture G conj:finite-spectrum; $N_{\text{eff}} = N_{\text{nz}}$ fix when equal-magnitude nonzero couplings; equality with N requires all couplings nonzero. held

PC23-VII-7 prop:log-family ($a \sim t(\log t)^{\beta}$; horizon iff $\beta > 1$; $q \to 0^{-}$); Conjecture H conj:marginal-accel; Conjecture I conj:spatial-response with supplied Yukawa example (not from Enter calculus). held

PC23-VII-8 Abstract 150–200; debug updates; edge / ingestion labels; SHA freeze of v3; version 4 / t386u / 28 Oct 2026; emergence sentence; wired:false. held

DC23-VII-1 StandingBoundary after every new theorem (via theorem hook); manual reminder after Hypothesis , after each conjecture E–I, and after Proposition . held

DC23-VII-2 New labels present: sec:mediator-consistency, hyp:oscillator, thm:osc-coherence, thm:osc-period, thm:osc-consistency, conj:common-mediator, conj:nonclassical-memory, thm:moment-ineq, conj:finite-spectrum, prop:log-family, conj:marginal-accel, conj:spatial-response. held

DC23-VII-3 Oscillator identities conditional on displayed hypotheses; conjectures E–I are research claims only; close no open gate. held

DC23-VII-4 Neff correction present in predictions and debug appendix; $N_{\text{eff}} = N_{\text{nz}}$ for equal-magnitude nonzero couplings. held

DC23-VII-5 Mismatch of θ_* rejects the supplied oscillator model only; Yukawa fit ≠ particle ID; marginal accel ≠ de Sitter state. held

DC23-VII-6 Opens held: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(T) undetermined; J2 unresolved; XVI-N not discharged; XV-B not opened; D1–D8 open; Problems 6/7/9 named, not solved. held

DC23-VII-7 Host-A NAMED_COMPARISON_ONLY $\{\text{GI}, \text{CB}\}$ only; Series-II2VI-Enter-A style comparison only; no conjecture promoted to theorem. held

DC23-VII-8 Series PC23-VII / DC23-VII; request t433u; declaredPath=null; wired:false; nothing registered. held

bottomrule

SHA256 appendix

Frozen v1 source (pre-v2 upgrade):

eb5dfdad76f5daef78e4a9807dd733f2c11694a6168979c9517bee484365b05b

Frozen v2 source (pre-v3 upgrade):

beff297c08f0fd9e6e3a0aada69c81bffdf169f48aab8dbcb83a141f10896065

Frozen v2 pdf:

6aa47ced76e954b0ee43480ad8ca06d75ef37a391893376f632e5588b9652e79

Frozen v3 source (pre-v4 upgrade):

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Frozen v3 pdf:

c51f5441c01b7e2086927f8c9c73a26b0dd9a1f08f8739a597f1734030630507

v4 tex / pdf hashes are recorded in MANIFEST-Series-VII-Enter-A-v5.sha256 beside the deliverables. Cited documentary snapshots consulted for provenance (not premises): DS-Vac-A-v2, DS-Promise-A-v2, Em-Source-A-v2, Em-Joint-A-v2, P9-Read-C-v2, and Series-II2VI-Enter-A-v3 (style pattern only). Typesetting: double pdflatex under SOURCE_DATE_EPOCH=1792627200; label check; SHA recorded. Proof-assistant / independent symbolic / numerical / referee / acceptance are not asserted. PC21-VII / DC21-VII retained; PC22-VII / DC22-VII retained; PC23-VII / DC23-VII items above are held. Registration remains unexecuted (wired:false; declaredPath=null).

Book expansion notes (t433u)

This synthesis is version 5 of Series-VII-Enter-A in the book *Observation Boundaries and Finite Instruments: Series VII*. Classical-only floor $1 - 1/d$, branchwise quantum floor $1 - k/d$, and the effect-dependent retained-output bound are retained. Plateau / sharp-Cauchy / strong finite-part coexistence is retained.

Parent-comparison table (t433u)

toprule Parent Indexed / frozen title Role in Series VII

midrule IB-v1 IB-v1: A Finite Enter Spacetime (*Philosophy of Enter*, p. 78) Prescribed conical carrier comparison; source record, not a premise.

IC-v2 IC-v2: The Shredder Interface (*Philosophy of Enter*, p. 99) Destructive readout interface comparison; source record, not a premise.

ID-v5 ID-v5 Dynamical Spacetime Enter over Two Prescribed Hosts (*Philosophy of Enter*, p. 128) Two-host dynamical comparison; source record, not a premise.

Big01-A Big01-A Finite Box / Static Patch comparison (Finite Box book when deposited) Cosmological comparison only; source record, not a premise.

VII-E Observation boundaries for destructive quantum readout and external geometry (*Philosophy of Enter*, p. 52) Indexed Series VII observation-boundary anchor; source record, not a premise.

bottomrule

No row treats a parent theorem as a hypothesis of a Series VII theorem. The five research conjectures (common-mediator consistency, nonclassical memory, finite coupling spectrum, marginal acceleration, spatial response) remain labelled research conjectures / unproved.

Standing ledger. Not spacetime emergence; not Einstein dynamics; not a Page curve, island, bounce, vacuum-energy selection, or de Sitter state as an Enter theorem; not a derived metric. O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. No quantum coefficient is admitted. Host C is not created. Dom (T) remains undetermined; J2 remains unresolved. Problems 6, 7, and 9 are named, not solved. Gate 0 and ST4b stay NOT_SUPPLIED. Host-A stays NAMED_COMPARISON_ONLY $\{\mathrm{GI}, \mathrm{CB}\}$. The shredder is not Gibbons–Hawking. Cited sheets are source records, not premises. Conjectures stay conjectures. wired=false.

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