Series-II2VI-Enter-A Finite Certificates, Destructive Access, Conditional Cosmic Predictions, and Cross-Probe Conjectures

A documentary synthesis of Series II–VI with local interface proofs, conditional universe predictions, and labelled research conjectures

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Abstract

We give an explicitly typed interface for comparing the finite contact, represented-instrument, scalar-response, and harmonic-descent objects of Series II–VI on the prescribed conical spacetime of Cheung's spacetime-Enter records. Geometry, operator realizations, calibration, and access permissions are inputs; citations supply provenance, not unprinted hypotheses. The contribution remains a compatibility-and-separation package: surjective finite dictionaries, sharp cut floors $1 - k/d$, the cubic-qubit distinction, and Green-replacement isolation of the compact switching remainder.

Conditional cosmic predictions and hidden-sector tests remain under displayed hypotheses. A further section states five labelled research conjectures that predict relationships among independent measurements—common-environment covariance, delayed geometric response, joint source discrimination, coherent-field modulation, and recoverable hidden memory—rather than signatures an unseen explanation could reproduce. Supplied Gaussian, Green, response, clock, and SWAP benchmarks are conditional deductions, not conjectures; expansion laws and Hypothesis H remain supplied hypotheses. Finite certificates may be reused without converting record agreement into a source law. The manuscript does not derive spacetime, Einstein

dynamics, a cosmological state, or the missing characteristic quantum coefficient.

Bibliographic record

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Routing, background, and the scope ledger

What kind of paper this is

The registered identifier proposed for this manuscript is Series-II2VI-Enter-A. The shorter description "II–VI-Enter-A" denotes this same documentary sheet, not a second construction. Its declared cross-programme path is

$$\text{declaredPath} = \text{null}.$$

The paper supplies local proofs for the mathematical interfaces it actually defines. It does not certify every theorem in the surrounding corpus, execute a registration, or continue the unresolved analytic characteristic-product programme.

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, Host C, or solution of Problems 6, 7, or 9 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 stated scopes. Locked Host-A remains NAMED_COMPARISON_ONLY, with $\{GI, CB\}$ only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit does not imply global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular cone is not either I-D dynamical host and is not globally hyperbolic.

There are three logically different uses of earlier material. First, numerical values or geometries may be explicitly supplied as data. Second, a statement may be proved here from displayed definitions. Third, a manuscript may be named to document a comparison or a boundary. Only the first two enter a local proof, and supplied data remain hypotheses rather than conclusions extracted from a citation.

This distinction resolves an apparent tension in the proposed extension. One can compare many manuscripts without taking their theorems as premises, but one cannot thereby claim to have independently reproved their complete contents. Accordingly, the finite target packet is printed explicitly; the clock, access, replacement, and identifiability arguments are proved locally; and the more extensive positive-core, dynamical-host, and observational constructions are identified as documentary records.

The philosophy of Enter

Cheung's introductory account describes Enter as destructive readout: a measured quantum name is consumed at the declared interface, while a classical record and every declared unmeasured output remain available [2, 4]. A name is an operational access designation for a tensor factor. Its consumption is not a statement that all implementing physical degrees of freedom have been annihilated.

Four separations organize the present paper:

$$\begin{gathered}\text{destructive readout} \neq \text{quantum return},\\ \text{record agreement} \neq \text{complete-instrument agreement},\\ \text{channel specification} \neq \text{thermal-machine specification},\\ \text{named analogy} \neq \text{mathematical identification}.\end{gathered}$$

These are not objections to finite operational results. They determine what those results say. A record can estimate an expectation accurately without returning an unknown quantum state. A complete unitary evolution can preserve information without making a selected output recoverable. A finite code can be transported on a prescribed geometry without deriving that geometry.

The related Cheung preprint records on access, quantum recovery, magic, and relational clocks provide additional background [39, 40, 41]. Their bibliographic inclusion does not add an acquisition apparatus, a gravitational dictionary, or a proof-transfer path to this paper.

Spacetime Enter and the shredder-facing question

Spacetime Enter adds locations, accessible algebras, causal routes, control permissions, and a calibration to an already prescribed Lorentzian host [5]. The finite clock basis is not the geometric time coordinate. Destroying that clock encoding therefore does not destroy the manifold, its future cone, or the external parameter used to describe the experiment.

The Shredder Philosophy asks a different question: after the *complete* decoder access is fixed, what quantum information task remains possible? The term "complete" excludes an especially consequential ambiguity. A classical marginal of a classical–quantum output is not the whole output when the quantum factor remains accessible. Conversely, a quantum factor discarded at the access cut cannot later be used in the decoder.

The sharp inequalities associated with this distinction occur in I-C, I-C-Ex, I-C-Ex2, and I-C-Th [10, 11, 12, 13]. We reprove the relevant finite inequalities rather than treating those records as hidden premises. Their black-hole, soft-hair, reservoir, and summoning terminology remains attached to separately declared local models.

Inheritance and the open list

The word "inheritance" is restricted here to a displayed interface. The following objects may be installed:

• the prescribed regular conical product and its time orientation;

• finite named registers, port locations, and accessible algebras;

• a complete destructive clock and an explicit history-label dictionary;

• finite response tables or a supported developing presentation;

• a chosen scalar operator realization when scalar evolution is used;

• declared normal represented instruments, or finite compressions of those instruments. None of these installations supplies the full joint characteristic map, a physical Einstein source, closure of O.1, the physical domain of the source map T, or a dynamical Host-B transfer.

The Big-series comparison has the same discipline. Big01–Big05 use prescribed classical hosts and additional label or constitutive declarations; Big06 develops inverse-problem ledgers [26, 27, 28, 29, 30, 32]. Their relevance is the separation of observations, access, and attribution. No expansion law, future bound, finite host Hilbert space, or de Sitter quantum state is imported as a premise.

What is potentially new

The strongest reusable result is not a new recovery constant. It is the compatibility of three independently typed operations: preserving a finite response certificate, realizing a complete instrument, and changing the decoder access by an explicit discard. The combination prevents two different errors: promoting a finite fit to a global identity, and applying a classical-only obstruction to an output that still contains a useful quantum residual.

A second useful result is the coexistence of distinct obstructions. A Ward defect, an inverse-independent plateau gap, a rank-limited quantum cut, and a stress-attribution fibre are different mathematical objects. They can be recorded in one experiment without cancelling, repairing, or identifying one another. The unified release in Section states precisely this compatible assembly.

The prescribed carrier and its calibration dictionary

Geometry and the missing worldsheet

Use units $c = \hbar = 1$ unless a dimensional constant is explicitly restored. Fix $0 < \alpha \leq 1$ and prescribe

$$\begin{aligned} M_\alpha &= \mathbb{R}_t \times (0,\infty)_r \times S^1_\varphi \times \mathbb{R}_z, \\ g_\alpha &= -\mathrm{d}t^2 + \mathrm{d}r^2 + \alpha^2 r^2 \mathrm{d}\varphi^2 + \mathrm{d}z^2, \qquad \varphi \sim \varphi + 2\pi. \end{aligned}$$

The completed missing set is

$$\mathscr{W} = \mathbb{R}_t \times \{o\} \times \mathbb{R}_z.$$

It is a worldsheet, not a worldline. On an angular lift,

$$(t, r, \varphi, z) \mathrm{longmapsto} (t, r\cos(\alpha\varphi), r\sin(\alpha\varphi), z)$$

is a local developing isometry into Minkowski space. Consequently the regular metric is locally flat, has signature $(-+++)$, and gives proper-time increment dt along static observers.

Theorem (Non-global hyperbolicity of the regular carrier). *The regular spacetime is not globally hyperbolic, including at* $\alpha = 1$ *when the axis remains removed. This conclusion does not exclude extension-dependent scalar evolution.*

Proof. Fix $r_* > 0, \varphi_*, z_*$ and $T > r_*$. The causal diamond between

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

contains

$$x_n = (0, r_*/n, \varphi_*, z_*).$$

Indeed, the radial distance from r_* to r_*/n is less than T; a radial timelike route therefore connects each point to the two endpoints. The sequence has no convergent subsequence in M_α, because its only possible radial limit is the missing axis. The diamond is noncompact. Global hyperbolicity requires compact causal diamonds, so it fails. An additional boundary realization can nevertheless define an equation evolution, as constructed below.

This is the missing-apex argument documented in I-B-G and the shredder extensions [6, 11, 12]. It must not be confused with a statement that every wave problem has no solution. The relevant missing datum is an operator realization, not a finite clock outcome.

A complete finite experiment

Definition (Carrier experiment). A carrier experiment consists of:

1. the metric , a time orientation, and regular laboratory worldlines;

2. finite named quantum input and output factors, together with untouched references and all assisting receiver systems;

3. port locations and the accessible observable algebra at each port;

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

5. every classical control, resource preparation, failure label, stopping label, storage reservation, and fresh allocation;

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

7. a finite clock calibration and an explicit declaration of whether its values are event times or history labels;

8. any implementation comparison and complete-channel allowance being claimed.

A finite instruction tree has branch maps $\mathscr{I}_h$ with

$$\mathscr{E}(\rho) = \sum_h \operatorname{proj} h_R \otimes \mathscr{I}_h(\rho), \qquad \sum_h \operatorname{Tr} \mathscr{I}_h(\rho) = 1.$$

Completeness follows by summing terminal outcomes successively. Failures are outputs, not postselected omissions. The construction remains linear because branch states are kept subnormalized.

If each local channel acts only on its declared input ports, its Heisenberg adjoint sends an output observable only to predecessor ports. Induction over a reverse topological order shows that an output law depends only on its network ancestors. If all dependency routes are actual future-causal curves, those ancestors lie in the prescribed geometric causal past. This proves containment, not equality with the minimal influence region.

Finite reference-preserving transport is available under an explicit endpoint permission: place a finite chain of register ports along a regular timelike route and apply SWAP successively to a payload and blank registers. The

payload reaches the final port with identity logical channel, including its reference. This is an endpoint circuit identity, not a continuum transport generator.

Clock extraction and calibration

Let $C \cong \mathbb{C}^D$, with $D = 2^q \geq 2$, have orthonormal basis $\{|\tau_j\rangle\}_{j=0}^{D-1}$. Let X contain every retained quantum factor and set

$$P_j = |\tau_j\rangle\langle\tau_j|, \qquad D_j = \langle\tau_j|_C \otimes I_X.$$

The record algebra is diagonal in $\{|j\rangle_R\}$.

Theorem (Complete destructive clock). *The map*

$$\mathscr{M}_C(Z) = \sum_{j=0}^{D-1} \mathrm{proj}\, j_R \otimes D_j Z D_j^\dagger$$

is completely positive and trace preserving, and

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

for every untouched finite reference E. The normalized j-branch is defined only when $p_j = \mathrm{Tr}\,(D_j \rho D_j^\dagger) > 0$. *There is no universal channel left inverse on* $C \otimes X$.

Proof. The recorded Kraus maps are $L_j = |j\rangle_R \otimes D_j$, and

$$\sum_j L_j^\dagger L_j = \sum_j P_j \otimes I_X = I_{CX}.$$

This proves complete positivity and trace preservation. Expand

$$Z = \sum_{j,\ell} |\tau_j\rangle\langle\tau_\ell| \otimes Z_{j\ell}.$$

The output blocks are Z_{jj}; summing them proves , also with E included in each block. For noninvertibility, the clock states

$$(|\tau_0\rangle + |\tau_1\rangle)/\sqrt{2}, \qquad (|\tau_0\rangle - |\tau_1\rangle)/\sqrt{2}$$

have identical outputs when tensored with the same payload. A left inverse could not recover both.

The proof is independent of curvature and reproduces the finite interface documented in I-B and the destructive-clock successors [5, 20, 41]. Its output contains X, not a returned quantum C.

A calibration $j \mapsto t_j$ assigns meanings to finite codes. If every occurring t_j must equal the coordinate of one fixed readout event, distinct labels permit only one occurring value. Nontrivial stochastic readings therefore require a history-label dictionary or separately declared events. Moreover finite matrices cannot satisfy $[T_C, H_C] = iI_C$, since the traces disagree. Neither observation removes the external geometric coordinate.

Scalar realization and supported transfer

Let q_α be the spatial metric in . On $L^2(q_\alpha)$, close the nonnegative quadratic form

$$\mathfrak{b}[u] = \int \left(|\partial_r u|^2 + \frac{|\partial_\varphi u|^2}{\alpha^2 r^2} + |\partial_z u|^2 + m^2 |u|^2 \right) \alpha r \, \mathrm{d}r \, \mathrm{d}\varphi \, \mathrm{d}z$$

initially defined on compactly supported smooth functions. Its Friedrichs operator is $B_\mathrm{F} \geq 0$. For $P_\mathrm{F} = -\partial_t^2 - B_\mathrm{F}$, define the zero-past inverse by

$$(E_\mathrm{F}^+ f)(t) = -\int_{-\infty}^{t} \frac{\sin\left((t-s)\sqrt{B_\mathrm{F}}\right)}{\sqrt{B_\mathrm{F}}} f(s) \, \mathrm{d}s.$$

The quotient has continuous value $t - s$ at spectral value zero. Spectral differentiation proves $P_\mathrm{F} E_\mathrm{F}^+ f = f$. Integration by parts proves the other compact-test inverse identity on the common test domain. The operator choice is explicit.

The Friedrichs form excludes the logarithmic zero-angular branch: $\int_0^\epsilon |\partial_r \log r|^2 r \, \mathrm{d}r = \infty$. Likewise it excludes an irregular branch $r^{-\nu}$, $\nu > 0$. This elementary energy test is not a proof that every conceivable smooth core selects Friedrichs. The positive-local selection theorems of the I-B-VP records have additional profile, coupling, flux, and identification hypotheses [8].

A supported dictionary transfers a scalar calculation only where its source, observation region, inverse, and retained causal shadows have been compared. In particular, local flatness does not eliminate additional image or

apex-mediated arrivals. The sufficient pre-arrival scalar window in I-B-G and VI-DST is documentary context, not a blanket replacement of all conical fields by flat ones [6, 25].

The shredder cut for Series II–VI

Targets, distances, and complete access

Let $L \cong \mathbb{C}^d$, $d \geq 2$, be an unknown logical code and $E \cong \mathbb{C}^d$ an untouched reference. Put

$$|\Phi_d\rangle = d^{-1/2} \sum_{i=1}^{d} |i\rangle_E |i\rangle_L, \qquad \Phi_d = |\Phi_d\rangle\langle\Phi_d|.$$

For a channel $\Psi : \mathscr{B}(L) \to \mathscr{B}(L)$, define

$$F_e(\Psi) = \langle\Phi_d|(\mathrm{id}_E \otimes \Psi)(\Phi_d)|\Phi_d\rangle.$$

Thus F_e is the Bell overlap, sometimes called squared entanglement fidelity. It is not fidelity on every input state.

For an accessible channel $\mathscr{N}$, define its optimal whole-code recovery error by

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

A decoder acts only on the declared accessible output. Any entanglement-assisted receiver system must be included in that declaration; it cannot be omitted when pricing a cut and restored when constructing a decoder.

Theorem (Sharp complete-cut law and robustness). *Suppose that in branch a of a classical label, the complete source-to-decoder process factors through a quantum register of dimension k_a, including all assisting systems across that cut. Let p_a be the branch probability on I_L/d. Every deterministic decoder satisfies*

$$F_e(\mathscr{D}\mathscr{N}) \leq \frac{1}{d} \sum_a p_a k_a,$$

$$\frac{1}{2} \| \mathscr{D}\mathscr{N} - \mathrm{id}_L \|_\diamond \geq \left[1 - \frac{1}{d} \sum_a p_a k_a \right]_+ .$$

In particular, a classical-only complete output has error at least $1 - 1/d$. If an implemented channel is within half-diamond distance δ of a declared rank-k cut, then its recovery error is at least

$$[1 - k/d - \delta]_+.$$

For every $1 \le k \le d$*, the universal floor* $1 - k/d$ *is attained by a finite-outcome instrument with classical labels and* k*-dimensional quantum branches.*

Proof. A Kraus operator $K_{a,b}$ of the decoded branch factors through $\mathbb{C}^{k_a}$, so its rank is at most k_a. Singular-value Cauchy–Schwarz gives

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

The Bell-overlap formula and trace preservation of the decoder yield

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

Testing the output difference against the projector Φ_d gives half trace distance at least $1 - F_e$. The diamond distance dominates that referenced test, proving .

For a classical-only output, each branch factors through a one-dimensional quantum space, hence $k_a = 1$. The implementation allowance follows from contraction under decoding and the triangle inequality.

For sharpness, let S run through the k-element subsets of $\{1, \dots, d\}$, let P_S be the corresponding coordinate projection, and set

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

Every coordinate belongs to $\frac{d-1}{k-1}$ subsets, so the instrument is complete. Decode by embedding the branch range. The resulting channel is

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

where Δ is complete dephasing. The diagonal entries are unchanged; each off-diagonal entry is multiplied by $\frac{d-2}{k-2}/\frac{d-1}{k-1} = \lambda$. Since Δ is the uniform average of d phase conjugations, one of which is identity,

$$\frac{1}{2}\|\Delta - \mathrm{id}\|_{\diamond} \le 1 - \frac{1}{d}.$$

Therefore

$$\frac{1}{2}\|\Psi_k - \mathrm{id}\|_{\diamond} \le (1-\lambda)(1-1/d) = 1 - k/d.$$

Its Bell overlap is k/d, so the lower bound proves equality.

This proof is the finite resource mechanism appearing in the shredder records and the deadline comparison [11, 12, 17]. The classical-only channel is measure-and-prepare, in agreement with the standard entanglement-breaking characterization [47, 48]. No amount of extra classical precision substitutes for the missing quantum branch dimension.

Application to destructive clocks

For II-DST, III-DST, and IV-DST, the clock map itself has the form . A full D-dimensional clock code, exposed only through its complete classical record and with no assisting quantum access, therefore has recovery error at least $1 - 1/D$. For the four-dimensional clock this is 3/4.

This conclusion is not a statement about every payload encoded before the clock was read. An encoding can move the logical information into a retained factor X. The channel after readout then need not be classical on that logical code. For example, the instrument

$$\mathcal{I}_j(\rho) = p_j \rho, \qquad \sum_j p_j = 1,$$

reports a message-independent classical outcome while retaining the payload exactly. Reading independently prepared ancillas realizes it. Its decoder simply ignores the record, and its recovery error is zero.

Thus the two claims

"the clock names were consumed", "the payload crossed a classical-only cut"

are not equivalent. This is the access distinction emphasized by the destructive-clock audits [20].

The retained cubic qubit

Let X, Y, Z now denote the Pauli matrices and fix $0 \le r \le 1$. Define

$$E_y = \frac{1}{2}(I + yrX), \qquad M_y = \sqrt{E_y}, \qquad y = \pm 1.$$

The efficient retained channel and its record-only marginal are

$$\mathcal{N}_r(\rho) = \sum_{y=\pm 1} \mathrm{proj}\, y_R \otimes M_y \rho M_y,$$

$$\mathcal{C}_r(\rho) = \sum_{y=\pm 1} \mathrm{Tr}\,(E_y \rho)\mathrm{proj}\, y_R.$$

These are different channels, not two descriptions of the same decoder access.

Theorem (Exact access-dependent cubic-qubit errors). *For the channels –,*

$$\sup_{\mathcal{D}} F_e(\mathcal{D}\mathcal{C}_r) = \frac{1+r}{4}, \qquad e(\mathcal{C}_r) = \frac{3-r}{4},$$

$$\sup_{\mathcal{D}} F_e(\mathcal{D}\mathcal{N}_r) = \frac{1+\sqrt{1-r^2}}{2}, \; e(\mathcal{N}_r) = \frac{1-\sqrt{1-r^2}}{2}.$$

The equalities include arbitrary untouched reference extensions.

Proof. A decoder from a classical output prepares states σ_y. Its Bell overlap is

$$F_e = \frac{1}{4}\sum_y \mathrm{Tr}\,(E_y \sigma_y).$$

Each summand is at most $(1 + r)/2$, attained by preparing the X-eigenstate with eigenvalue y. Hence the optimal record-only Bell overlap is $(1 + r)/4$.

That decoder produces the Pauli channel with Bloch action

$$(x, y, z)\mathrm{longmapsto}\,(rx, 0, 0).$$

Its identity Pauli weight is $(1 + r)/4$. For any Pauli channel with identity weight p_I, convexity gives half-diamond distance from identity at most $1 - p_I$, while the Bell input gives the reverse inequality because the Pauli Bell states are orthogonal. This proves .

For retained access, a branch decoder has Kraus operators $R_{y,a}$ with $\sum_a R_{y,a}^\dagger R_{y,a} = I$. Diagonalize M_y, with eigenvalues $t_j \ge 0$. For each j, the vector

$$v_j = (\langle j|R_{y,a}|j\rangle)_a$$

has norm at most one. Therefore

$$\sum_a |\mathrm{Tr}\,(R_{y,a}M_y)|^2 = \|\sum_j t_j v_j\|^2 \le \Big(\sum_j t_j\Big)^2.$$

The identity branch decoder attains this bound. Consequently

$$\sup_{\mathscr{D}} F_e = \frac{1}{4}\sum_y (\mathrm{Tr}\,M_y)^2 = \frac{1+\sqrt{1-r^2}}{2}.$$

Ignoring the flag and retaining the conditional qubit gives Bloch action

$$(x,y,z)\mathrm{longmapsto}\,(x,\sqrt{1-r^2}\,y,\sqrt{1-r^2}\,z).$$

This is a Pauli dephasing channel with identity weight $(1+\sqrt{1-r^2})/2$. The preceding Bell and convexity argument therefore attains the Bell lower bound in diamond distance.

These are the access-dependent formulas documented for V-DST's compressed cubic qubit [23]. At $r = 0$, the retained channel returns the qubit exactly while the record-only channel is replacement, with error 3/4. At $r = 1$, both optimal errors are 1/2. The universal classical floor is never applied to the retained channel by silently tracing out its useful output.

Entropy and local residual models

For a classical–quantum state

$$\rho_{RX} = \sum_h p_h \mathrm{proj}\,h \otimes \rho_{X|h},$$

orthogonality of record blocks gives

$$S(RX) = H(p) + \sum_h p_h S(\rho_{X|h}).$$

If a record is append-only, $R_{n+1} = (R_n, W_{n+1})$, then

$$H(R_{n+1}) = H(R_n) + H(W_{n+1}|R_n) \geq H(R_n).$$

No corresponding monotonicity holds for the quantum residual. A SWAP with a pure reservoir can reduce its entropy; the reverse SWAP can increase it. The reservoir must be included in the complete physical account, but it need not be accessible to the decoder.

Equation therefore separates record accumulation, conditional residual entropy, and thermodynamic bookkeeping. It is not a Page curve. A visible channel does not specify a Hamiltonian, a bath temperature, an apparatus reset, or a cyclic work cost. Those require additional data [13, 49].

The same cut argument applies locally to a declared soft-hair register, a finite summoning task, a truncated Fock residual, pointer fragments, or reservoir memory. In each case the complete message-bearing quantum dimension is what enters Theorem . A particle-number cutoff in infinitely many modes is not automatically finite dimensional; a finite-mode restriction is additional. Nor do finitely many redundant classical fragments become a coherent copy of an unknown quantum code.

Series V: currents, Ward defects, and source-weight reports

The fixed-time scalar response

Work first on an auxiliary Minkowski presentation with

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

For symmetric h, define

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

$$L_h\varphi = -h^{\mu\nu}\partial_\mu\partial_\nu\varphi - (Dh)^\nu\partial_\nu\varphi.$$

For a vector field ξ, set

$$(K\xi)_{\mu\nu} = \partial_\mu \xi_\nu + \partial_\nu \xi_\mu, \qquad X_\xi \varphi = \xi^\mu \partial_\mu \varphi.$$

Direct differentiation gives

$$DK\xi = \operatorname{Box} \xi, \qquad L_{K\xi}\varphi = -[P, X_\xi]\varphi.$$

Let $P\varphi = 0$, and let $S_0(h)\varphi$ solve

$$PS_0(h)\varphi = -L_h \varphi, \qquad S_0(h)\varphi|_{t=0} = \partial_t S_0(h)\varphi|_{t=0} = 0.$$

For a future compact test f, put

$$B_f(h, \varphi) = \int f S_0(h)\varphi \, \mathrm{d}^4 x.$$

With $u = -G_{m,A} f$ and $V = \Theta(t)u$, transposition gives

$$B_f(h, \varphi) = \langle V, L_h \varphi \rangle.$$

All expressions are evaluated on the relevant compact truncated causal set; no auxiliary wave is extended by zero across a laboratory boundary.

Integration by parts yields the compact distributional current

$$J^{\mu\nu}_{\mathrm{raw}} = \partial^{(\mu} V \partial^{\nu)} \varphi - \frac{1}{2} \eta^{\mu\nu} \partial_\alpha (V \partial^\alpha \varphi), \qquad B_f(h, \varphi) = \operatorname{pair} J_{\mathrm{raw}} h.$$

Because V contains a step, this current includes an initial-surface measure. Removing that measure changes the functional rather than improving its admissibility.

Its complete Ward defect is

$$H^\nu = -2\partial_\mu J^{\mu\nu}_{\mathrm{raw}} = f \partial^\nu \varphi + \delta(t) a^\nu + \delta'(t) b^\nu,$$

where

$$a^\nu = \dot{u}_0 \partial^\nu \varphi_0 - u_0 \partial_t \partial^\nu \varphi|_0, \qquad b^\nu = u_0 \partial^\nu \varphi_0.$$

To check the formula, differentiate , use

$$2\partial_\mu J^{\mu\nu}_{\mathrm{raw}} = (PV)\partial^\nu\varphi, \qquad PV = -f - \delta(t)\dot{u}_0 - \delta'(t)u_0,$$

and apply $c(t)\delta' = c(0)\delta' - \dot{c}(0)\delta$. Thus

$$B_f(K\xi,\varphi) = \mathrm{pair}\, H\xi.$$

The Series V records distinguish the complete defect H from its causal propagation $E_1 H$ [22, 23]. Raw compact-current representability and representability after a harmonic prescription ask different quotient questions. Their full sufficiency classifications require the source papers' specified domains and smoothing arguments; no larger classification is inferred here merely from .

A finite-plane current is not full-space admissibility

On a declared two-dimensional spatial-TT plane $\mathscr{V} = \mathrm{Span}\,\{v_1, v_2\}$, assume that the electric curvature fields

$$\mathscr{R}(v_a)_{ij} = -\frac{1}{2}\partial_t^2 (v_a)_{ij}$$

are linearly independent on a regular observation region. Choose a nonnegative compact weight ρ making

$$G_{ab} = \int \rho\, \mathscr{R}(v_a)_{ij}\mathscr{R}(v_b)_{ij}\, \mathrm{d}^4x$$

positive definite. Such a weight exists by choosing finitely many separating component evaluations and approximating them by small nonnegative bumps.

For compact symmetric C^{ij}, define

$$J_C^{00} = -\frac{1}{2}\partial_i\partial_j C^{ij}, \quad J_C^{0j} = \frac{1}{2}\partial_t\partial_i C^{ij}, \quad J_C^{ij} = -\frac{1}{2}\partial_t^2 C^{ij}.$$

Commuting derivatives proves conservation, and two integrations by parts give

$$\mathrm{pair}\, J_C h = \int C^{ij}\mathscr{R}(h)_{ij}\, \mathrm{d}^4x.$$

Taking $C_a = \rho\sum_b (G^{-1})_{ab}\mathscr{R}(v_b)$ gives $\langle J_{C_a}, v_c\rangle = \delta_{ac}$. Hence every linear response on this plane has a compact conserved representative.

This interpolation does not prove representability on a dense TT space or on a metric domain containing a residual pure gauge with nonzero response. It is precisely a finite-plane construction.

The separate Newton–wave cubic

The external linear retarded coefficient, a mixed quadratic representation, and the fully Wick-ordered Newton–wave cubic are three objects. In the third construction, a scalar stress is first inserted into a prescribed Newton–wave response and the resulting scalar expression is Wick ordered. That operation is not the inherited characteristic coefficient and is not a derivation of Einstein dynamics [22, 23].

A symmetric cubic form is not automatically an essentially self-adjoint generator. Its finite compression can nevertheless be a well-defined bounded matrix, to which applies. This is the level needed for the cubic-qubit recovery audit. Neither the compression nor the subsequent readout constructs an unregulated cubic field instrument.

Source-weight maps and an exact binary comparison

Let

$$A = aI + v_x X + v_y Y + v_z Z$$

be a declared bounded source-weight observable. Write $s_r = \sqrt{1 - r^2}$. Ignoring the retained flag gives

$$\Phi_r(x, y, z) = (x, s_r y, s_r z).$$

Therefore

$$\mathrm{Tr}\,[A\Phi_r(\rho)] - \mathrm{Tr}\,(A\rho) = -(1 - s_r)(v_y y + v_z z).$$

Its worst absolute bias is $(1 - s_r)\sqrt{v_y^2 + v_z^2}$. If $r < 1$, the retained output can reproduce the mean exactly using the recalibrated observable

$$A_r = aI + v_x X + s_r^{-1}(v_y Y + v_z Z).$$

The calibration becomes singular as *r*uparrow 1 when transverse components are present.

Record-only probabilities depend on x alone. For $r > 0$, their exact law identifies x, but no number of repetitions identifies y, z. The observable A is therefore identifiable from that law on the whole Bloch ball exactly when $v_y = v_z = 0$. At $r = 0$, only constants are identifiable.

Theorem (Finite-*n* binary minimax dichotomy). *Fix two qubit preparations with Bloch vectors w and $-w$, and observe $n \geq 1$ independent outputs of $\mathscr{C}_r$. For deciding which preparation was used, with zero–one loss, put $q = |rw_x|$. The randomized minimax error is exactly*

$$R_n(q) = \sum_{j < n/2} \frac{n}{j} \left(\frac{1+q}{2}\right)^j \left(\frac{1-q}{2}\right)^{n-j} + \frac{1}{2} 1_{\{n \text{ even}\}} \frac{n}{n/2} \left(\frac{1-q^2}{4}\right)^{n/2}.$$

For $q = 0$, it equals $1/2$ for every n. For $q > 0$, it is strictly below $1/2$ and tends to zero. If $q = 0$ but $v \cdot w \neq 0$, estimating the two source-weight means under absolute loss has minimax risk $|v \cdot w|$, for every n.

Proof. Relabel the signs so that the first preparation has success probability $(1 + q)/2$. Its likelihood ratio against the second is monotone in the number j of plus outcomes. The equal-prior optimal rule chooses the first preparation for $j > n/2$, the second for $j < n/2$, and randomizes equally at a tie. Its two conditional errors are equal by sign reversal. An equal-error Bayes rule is minimax, since every rule's maximum error is at least its equal-prior average. Summing the first preparation's error gives .

When $q = 0$, the laws coincide and no rule beats 1/2. When $q > 0$, already one sample has error $(1 - q)/2 < 1/2$; the likelihood-ratio rule is no worse. The law of large numbers gives convergence to zero.

For the estimation statement, the two target values are $a \pm v \cdot w$, but the complete transcript law is identical. For every reported estimate z,

$$|z - a - v \cdot w| + |z - a + v \cdot w| \geq 2|v \cdot w|.$$

Taking expectations gives the lower bound, and the constant estimate a attains it.

This calculation specifies its parameter pair, independence hypothesis, and loss. It is a self-contained binary

comparison beside the exact finite-n minimax record named in V-DST-G [24]; it does not silently identify different minimax losses or parameter classes. More importantly, a source-weight expectation is not a gravitational source law. The physical calibration and the domain of T remain additional data. Existing report-only Host-B maps do not supply the missing dynamical or quantum-output transfer.

The local Ward gate is a different selection problem

I-B-VP-CR records an exceptional scalar channel in which a specified Ward demand selects one ideal extension, while the declared positive local cores select Friedrichs and have a nonzero exterior defect [9]. This is not a theorem that every local scalar core fails every Ward identity. Attractive resonant classes and unfixed spectator channels require separate hypotheses.

The comparison with is documentary. One defect concerns an apex-domain intertwining; the other concerns a fixed-time response and its initial surface. Neither defect becomes the other merely because both are called Ward defects.

Series VI: harmonic descent and the compact-switch gap

Formal classical descent

Let a formal coordinate construction be

$$X^{\mu}_{\kappa}(x) = x^{\mu} + \kappa w^{\mu}(x) + \kappa^{2} v^{\mu}(x) \bmod \kappa^{3}.$$

Its inverse is

$$Y^{\mu}_{\kappa}(X) = X^{\mu} - \kappa w^{\mu}(X) + \kappa^{2}(w^{\nu}\partial_{\nu} w^{\mu} - v^{\mu})(X) \bmod \kappa^{3}.$$

For $\varphi_{\kappa} = \varphi_{0} + \kappa\varphi_{1} + \kappa^{2}\varphi_{2}$, Taylor expansion gives

$$\psi_{0} = \varphi_{0},$$

$$\psi_{1} = \varphi_{1} - w^{\mu}\partial_{\mu}\varphi_{0},$$

$$\psi_2 = \varphi_2 - w^\mu \partial_\mu \varphi_1 + (w^\nu \partial_\nu w^\mu - v^\mu)\partial_\mu \varphi_0 + \frac{1}{2} w^\mu w^\nu \partial_\mu \partial_\nu \varphi_0.$$

Suppose the formal diffeomorphisms F are identity near the initial surface and the coordinate prescription is covariant:

$$X_\kappa^{'} = X_\kappa \circ F, \qquad \varphi_\kappa^{'} = \varphi_\kappa \circ F.$$

Then $Y_\kappa^{'} = F^{-1} \circ Y_\kappa$, so

$$\varphi_\kappa^{'} \circ Y_\kappa^{'} = \varphi_\kappa \circ Y_\kappa \bmod \kappa^3.$$

Smearing with a fixed compact function of the relational labels proves coefficientwise invariance of .

This is the elementary composition mechanism behind VI's second-order classical descent [25]. When restricted to a stated solution-jet space, it descends to that orbit space. The equations defining that space are included data, not equations derived from finite records. Classical covariance also does not establish a quantum product or an interacting Ward identity.

A compact switching remainder

Retain the flat conventions of Section . Let χ be a smooth compact switch, $P\varphi = 0$, and $h = K\xi$, with ξ compactly supported away from the initial surface. Put

$$u = X_\xi \varphi, \qquad S_\chi(\xi) = -L_{\chi K \xi} \varphi.$$

Define the compact remainder

$$\mathscr{R}_\chi(\xi) = S_\chi(\xi) - P(\chi u).$$

Using and the product rule gives

$$\mathscr{R}_\chi(\xi) = (\partial_\mu \chi)\overline{K\xi}^{\mu\nu} \partial_\nu \varphi - 2\partial^\mu \chi \, \partial_\mu u - (\mathrm{Box}\, \chi) u.$$

Thus it is supported where derivatives of the switch occur.

For any retarded scalar inverse E satisfying $EPa = a$ on the relevant compact smooth tests, keep the local coordinate prescription fixed and define

$$\mathfrak{D}_E(\xi) = \operatorname{pair} f E S_\chi(\xi) - u.$$

For a harmonic coordinate response, the fixed prescription has $w[K\xi] = \xi$: indeed $DK\xi = \operatorname{Box}\xi$, and the zero-data inverse returns ξ because ξ vanishes near the initial surface.

Theorem (Exact inverse replacement and an inverse-independent gap). *For two scalar inverses E, E' with the same compact-test inverse identity and with the local coordinate prescription held fixed,*

$$\mathfrak{D}_{E'}(\xi) - \mathfrak{D}_E(\xi) = \operatorname{pair} f(E' - E)\mathscr{R}_\chi(\xi).$$

There are smooth compact switching and gauge data, a compact nonnegative test f with $\int f = 1$, and a free scalar with compact smooth Cauchy data, for which

$$S_\chi(\xi) = 0, \qquad \mathfrak{D}_E(\xi) \le -\frac{1}{2}$$

for every such inverse E. No correction starting at order κ^2, or at positive $\hbar$-order, cancels this fixed order-$\kappa\hbar^0$ coefficient.

Proof. Since χu is compact,

$$E S_\chi = \chi u + E\mathscr{R}_\chi,$$

and the same identity holds for E'. Subtracting proves .

For the witness, choose a future compact switch χ that equals one near $\operatorname{supp} f$. Choose a compact smooth cutoff ζ, supported away from the initial surface, that equals one on a neighbourhood of $\operatorname{supp}\chi$, and set

$$\xi = \zeta\,\partial_{x^1}.$$

Then $K\xi = 0$ wherever $\chi \neq 0$, so $\chi K\xi = 0$ and $S_\chi = 0$ identically.

Choose compact scalar Cauchy data agreeing with $(\varphi_0, \dot{\varphi}_0) = (x^1, 0)$ on a sufficiently large ball. Finite propagation

makes the scalar equal to $x^1\cos(mt)$ on a smaller finite causal region; for $m = 0$ this means x^1. Place $\operatorname{supp} f$ in that region and in a short positive time interval where $\cos(mt) \geq 1/2$. There $\xi = \partial_{x^1}$, so

$$u = \xi^\mu \partial_\mu \varphi = \cos(mt) \geq \frac{1}{2}.$$

Equation now gives $\mathfrak{D}_E = -\int fu \leq -1/2$, independently of E.

Finally, a formal correction beginning at κ^2 has no order-κ coefficient. A correction with positive $\hbar$-degree has no classical $\hbar^0$ coefficient. Neither changes the displayed nonzero lower-order term while its prescription is frozen.

The construction displays the nested supports explicitly: the gauge vector is constant on the switch support, while its derivatives occur outside that support. This explains how a unit plateau can coexist with identically zero switched metric source. It is not an assertion that the defect is generated at a point where the switch equals zero.

The replacement mechanism and normalized plateau obstruction are the local interfaces documented in VI-B and VI-DST [25]. The proof also shows the qualification that matters: only the scalar inverse is varied. Changing the coordinate response, gauge class, lower-order observable, or switching contract defines a different problem.

Friedrichs versus flat inverse

On a supported developing presentation, E^+_{F} and the auxiliary flat inverse can be compared only after the compact source and observation region are identified. If their kernels agree on the full retained source–observation pair region, the right side of vanishes. A sufficient short-time window stops before additional geometric or apex-mediated arrivals.

Outside that window, the conclusion is not automatically a nonzero correction. The exact test is the pairing in ; cancellation or annihilation can still occur. Conversely, equality of scalar inverses on one compact source family does not identify their tensor gauge domains, states, or complete response theories.

For the nested-support witness, the stronger conclusion comes from $S_\chi = 0$, not from a short-window estimate. The scalar inverse has nothing to act on. This is why a change of scalar extension cannot repair that particular gap.

Destructive reporting does not alter the coefficient

A finite list of values of $\mathfrak{D}_E$, ψ_1, or ψ_2 can be installed in a complete instrument using bounded scores. That instrument reports those values under its preparation contract. It neither proves that a missing field acquisition exists nor changes an algebraic gauge variation already present in the classical functional.

If the final accessible output is genuinely classical, its whole-code decoder obeys Theorem . If a useful quantum residual is retained, its recovery must be audited under the larger interface. The harmonic-descent statement and the classical-only floor are therefore compatible but logically independent.

Dynamical hosts, Stokes data, and Gevrey regularity

A necessary correction to the proposed attribution

The symbol I-B-G-S denotes the spin-1/spin-2 Green-operator record. Its documented domain and source-test Ward questions must not be relabelled as the Host-B Gevrey theorem [7]. The Stokes functional, exponential-flat endpoint quotient, Gevrey-2 function-class bound, and conditional rate discussed in this section belong to the I-D/Hawk07-H interface records [15, 16].

Likewise, a scalar Friedrichs inverse does not imply componentwise Friedrichs compatibility for every spin-2 channel. The tensor and scalar domain questions are distinct. In particular, the I-B-G-S records distinguish mathematical curvature-regular selection from positive tensor-core selection. No complete physical Einstein–matter Hessian is inferred from a smoothed scalar metric profile.

Two prescribed dynamical hosts remain separate

I-D supplies two separately prescribed time-dependent hosts. A time-dependent metric is still model data when it is installed as a function on spacetime; a finite instruction does not output a new metric. The local proof of the destructive instrument is unchanged by that time dependence, but a same-host wave, stress, or detector calculation needs its own equations and domains.

The regular cone is neither of those hosts. A settled exterior comparison does not identify a finite-time dynamical

laboratory with the cone. Host B's conical end is not an active interval of its interface quotient. The positive-neck and negative-mantle signs are bookkeeping for the declared supporting construction, not a quantum stability or vacuum-selection theorem.

The locked Problem-9 Host-A is another namespace. Its status remains named comparison only, with $\{\mathrm{GI}, \mathrm{CB}\}$ only. Nothing here identifies that locked comparison with I-D's Host A.

The exponential-flat quotient

A local model for an active-side endpoint is

$$B(t) = t^{-2} e^{-d/t} b(t), \qquad d > 0, \quad b(0) \neq 0,$$

and

$$J(t) = \frac{\int_0^t B(s) F(s)\, \mathrm{d}s}{B(t)}.$$

The substitution $u = 1/s - 1/t$ gives the exact expression

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

For smooth b, F, every fixed derivative of the integrand is bounded by a polynomial in u times e^{-du}, uniformly on a small one-sided interval. Dominated differentiation proves smooth extension to zero.

Smoothness is not analyticity. It is also necessary to distinguish a function-class Gevrey bound

$$\sup_{0 \le t \le \varepsilon} |J^{(m)}(t)| \le C A^m (m!)^2$$

from Gevrey-1 growth of the *formal Taylor coefficients*. Division by $m!$ changes the index convention.

Theorem (A sharp local Gevrey-2 model and its Stokes number). *In , take* $b = 1$ *and* $F(t) = (1-t)^{-1}$ *on* $0 \le t < 1$. *Then* $J = t^2 I$ *is smooth up to zero and belongs to the Gevrey-2 function class on every sufficiently small one-sided interval. Writing* $I(t) \sim \sum_{m \ge 0} a_m t^m$,

$$a_0 = \frac{1}{d}, \qquad a_m = \frac{(-1)^{m-1}(m-1)!}{d^m} \sum_{j=0}^{m-1} \frac{(-d)^j}{j!} \quad (m \geq 1).$$

Hence

$$|a_m| \sim \frac{(m-1)!\, e^{-d}}{d^m},$$

the Taylor series has zero radius, and no Gevrey-s function-class bound with s < 2 *holds near zero.*

More generally, for analytic $F(t) = \sum f_m t^m$ *in this b* = 1 *model, the normalized factorial coefficient has limit*

$$\mathscr{S}_d(F) = \sum_{j \geq 1} \frac{(-d)^{j-1} f_j}{(j-1)!}.$$

A nonzero $\mathscr{S}_d(F)$ *gives factorial coefficient growth. Its vanishing cancels that particular factorial tail.*

Proof. The integrand for *I* is

$$F\left(\frac{t}{1+tu}\right) = \frac{1+tu}{1+t(u-1)}.$$

For $m \geq 1$, its *m*-th derivative equals

$$\frac{(-1)^{m-1} m!\, (u-1)^{m-1}}{(1+t(u-1))^{m+1}}.$$

On $0 \leq t \leq \varepsilon < 1/2$, the denominator is at least one when $u \geq 1$, and is bounded below by $1 - \varepsilon$ when $0 \leq u \leq 1$.

Integration against e^{-du} therefore bounds the derivative by $CA^m m!\,(m-1)!$. Multiplication by t^2, with the finite Leibniz sum, proves the Gevrey-2 bound.

The defining equation is

$$t^2 I' + dI = F.$$

Equating Taylor coefficients yields $da_0 = f_0$ and

$$da_m = f_m - (m-1)a_{m-1} \quad (m \geq 1).$$

For $f_m = 1$, induction gives the displayed formula. The partial exponential sums tend to $e^{-d} > 0$, proving the

asymptotic and zero radius. The derivatives $J^{(m+2)}(0) = (m+2)!\,a_m$ have factorial growth of order two, excluding every $s < 2$.

For general analytic F, the recurrence gives

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

Analyticity bounds $|f_j|$ geometrically, so the sum converges absolutely to $\mathscr{S}_d(F)$. A nonzero limit proves the asserted factorial asymptotic; a zero limit removes that leading normalized tail.

The theorem is an evaluated local model, not a transfer of the full Host-B quotient. In the host record, the smooth factor itself contains exponential-flat contributions. Cancelling a formal Stokes term need not remove those contributions or make the actual quotient analytic. Nor does the Stokes condition select the continuous mantle-entry constant. These are separate conclusions in the documentary I-D/Hawk07-H discussion.

Conditional rates and the eight-clause audit

A host-specific coincidence or stress rate requires actual kernel constants, derivative orders, a proper-time split, angular estimates, and neck-winding bounds. A formally optimized exponential expression does not supply those hypotheses. The conditional rate record is therefore kept conditional:

$$\texttt{open} : \mathit{rate} = \texttt{OPEN}.$$

No Host-B decay rate is asserted here.

The source's eight-clause rate/interface ledger is not replaced by the D1–D8 finite-conversion ledger in Section . They are different enumerations. This paper supplies no host-specific acceptance evidence for any clause of that rate/interface package. Similarly, solving a smooth endpoint extension problem does not close U6-sel, define the gravitational source map, quantize the supporting sector, or produce a global semiclassical solution.

The Big Bang Analogy and observational fibres

The Big01–Big05 background

The Big-series analogy concerns what can be inferred from specified causal access and geometric labels, not a derivation of cosmology from readout. Its stages remain distinct:

• Big01: prescribed-horizon access and exact channel-error certificates;

• Big02: different meanings of dark capacity, including causal inaccessibility, redundancy, and unused sectors;

• Big03: explicitly supplied coefficient classes versus coefficient-blind observations;

• Big04: external radiation labels and their calibration requirements;

• Big05: stress-split and curvature-attribution questions on prescribed classical hosts. These are documentary descriptions of their stated records [26, 27, 28, 29, 30]. They do not identify a dark-capacity coordinate with a current-free dark-matter stress, or an external radiation label with a constructed quantum cosmological state.

The analogy with the shredder is limited but useful. An observation boundary can restrict a return task. However, a horizon beyond which no source-to-receiver route exists produces no payload-dependent record at all; a classical shredder can retain payload-dependent classical information. Their exact floors are therefore different.

Replacement is strictly stronger than classical-only loss

For a state σ, write

$$\mathscr{R}_\sigma(X) = \mathrm{Tr}\,(X)\sigma.$$

A circuit with no directed source-to-receiver path and with all other inputs fixed has a replacement accessible channel. To see this, remove nonancestor nodes in reverse topological order: every removed output is traced, and trace preservation deletes the node. The remaining receiver circuit contains no varying source input.

Theorem (Exact replacement error and its spectral certificate). *Let σ be a state on $\mathbb{C}^d$, $d \geq 2$, with eigenvalues λ_i. With*

$$S = \sum_i \lambda_i^{-1}, \qquad 1/0 = \infty, \quad 1/\infty = 0,$$

one has

$$\frac{1}{2}\|\mathscr{R}_\sigma - \mathrm{id}_d\|_\diamond = 1 - \frac{1}{S}.$$

The minimum over replacement outputs is $1 - 1/d^2$*, attained exactly at* $\sigma = I/d$*. This is strictly larger than the sharp classical-only floor* $1 - 1/d$*.*

Proof. If σ is singular, a pure input in its kernel has output orthogonal to itself, so the distance is one.

Assume $\sigma > 0$, choose its eigenbasis, and put

$$p_i = \frac{\lambda_i^{-1}}{S}, \qquad |\psi_p\rangle = \sum_i \sqrt{p_i}|i\rangle|i\rangle.$$

The overlap of this input with its replacement output is $\sum_i p_i^2 \lambda_i = 1/S$. The input projector therefore witnesses distance at least $1 - 1/S$.

For the reverse inequality, let $|\Omega\rangle = \sum_i |i\rangle|i\rangle$ and $t = 1/S$. Weighted Cauchy–Schwarz gives

$$I \otimes \sigma - t\,\mathrm{proj}\,\Omega \geq 0.$$

Thus $\mathscr{R}_\sigma - t\mathrm{id}$ is completely positive. It multiplies traces by $1 - t$, so

$$\Psi = \frac{\mathscr{R}_\sigma - t\mathrm{id}}{1 - t}$$

is a channel. Consequently

$$\mathscr{R}_\sigma - \mathrm{id} = (1 - t)(\Psi - \mathrm{id}),$$

whose half-diamond norm is at most $1 - t$. Finally, Cauchy–Schwarz gives $S \geq d^2$, with equality exactly when every $\lambda_i = 1/d$. The strict comparison is $(1 - 1/d^2) - (1 - 1/d) = (d - 1)/d^2 > 0$.

This is the finite spectral law documented as Big01-A thm:Bexact and in the shredder certificate record [26, 14]. The proof uses no horizon temperature, host Hilbert-space dimension, thermal noise model, or gravitational field equation.

Geometric deadlines do not select stress attribution

For a prescribed classical static patch, write

$$\mathrm{d}s^2 = -(1 - H^2R^2)\mathrm{d}t^2 + (1 - H^2R^2)^{-1}\mathrm{d}R^2 + R^2\mathrm{d}\Omega^2.$$

A radial null route satisfies

$$\mathrm{d}t = \frac{\mathrm{d}R}{1 - H^2R^2}.$$

The central round-trip deadline to radius $R < H^{-1}$ is therefore

$$\tau(R) = \frac{2}{H}\mathrm{artanh}\,(HR), \qquad R(\tau) = H^{-1}\tanh\,(H\tau/2).$$

The horizon area is $4\pi H^{-2}$. All three expressions are functions of the prescribed geometry. Reassigning a conserved contribution between named stress slots does not change them.

This is the split-blind deadline comparison emphasized by the Big01-A-DM overlay [31]. It does not imply a capacity–area law or a duration bound from transcript length. An independently timed local identity channel and a local replacement channel can both be installed on the same central worldline. Geometry alone does not select between them.

Vacuum-fibre rank one

Fix a four-dimensional Einstein region with $\mathrm{Ric} = (R/4)g$. The contracted Bianchi identity makes R constant on each connected component, and

$$G = -\frac{R}{4}g.$$

Consider the explicitly declared conserved ambiguity family

$$T_\theta = T + c_0 g + c_G G + c_1 E^{(1)} + c_2 E^{(2)},$$

where the two curvature-variation tensors are normalized so that they vanish on the Einstein region. Then

$$T_\theta - T = \lambda_R(\theta) g, \qquad \lambda_R(\theta) = c_0 - \frac{R}{4} c_G.$$

Its effective image has rank one, and its coefficient kernel has dimension three. Even a supplied λ_R leaves an affine three-dimensional coefficient fibre.

This is the rank-one vacuum ambiguity documented in the Big and vacuum-fibre records [26, 33, 34]. It selects no value of λ_R. Indeed, for every prescribed metric and every Λ,

$$T_\Lambda = \chi^{-1}(G + \Lambda g)$$

is a conserved inverse-source tensor when $\chi \neq 0$. Existence of such a tensor, without an independent matter law, is not dynamics selecting the metric or the constant.

Joint observations and conditional predictions

Let $O : \Theta \to \mathcal{Y}$ be the complete admitted data map. A deterministic target $F : \Theta \to \mathcal{Z}$ is identifiable from those data exactly when

$$O(\theta) = O(\theta') \Rightarrow F(\theta) = F(\theta').$$

Necessity follows because one datum cannot be assigned two outputs. Sufficiency follows by defining the output on each data fibre.

Appending another observation replaces a fibre by an intersection of fibres. It reduces ambiguity only if it actually varies in an unresolved direction. An adaptive experiment whose complete conditional kernels are identical throughout a fibre has the same joint transcript law there, by induction over histories. Selected marginal agreement is not enough; the complete process must be common.

For a real target with two fibre values a, b, every possibly randomized estimate obeys

$$\max\{\mathbb{E}|Z - a|, \mathbb{E}|Z - b|\} \geq |a - b|/2.$$

A bounded interval fibre has exact absolute minimax risk equal to half its range, attained by its midpoint. An

unbounded target fibre gives infinite absolute risk. These elementary certificates explain the observational non-selection ledgers of Big06-B [32].

The source-local labels P1–P4 in Big01-A remain conditional source records. Their complete hypothesis blocks are required before any source-specific forecast can be invoked; they are not replaced by similarly named predictions here. The locally established conditional consequences are explicit: a supplied cut gives ; a supplied replacement channel gives ; a supplied static metric gives the deadline above; and a fibre-constant target is identifiable. None supplies an expansion law, a future continuation, a thermal coefficient, or a de Sitter state.

Conditional Cosmic Predictions and Hidden-Sector Tests

Scope ledger for predictions

This section forms conditional statements about the universe, including presently undetected structure, while remaining inside the manuscript's existing discipline. Three roles are kept distinct throughout. A *theorem* is a consequence of explicit assumptions displayed in the statement or immediately before it. A *physical prediction* is that consequence applied to a proposed description of nature; it inherits every hypothesis of the theorem and adds the claim that those hypotheses describe the intended physical setting. A *conjecture* is the further claim that nature actually satisfies the assumptions; it is a research claim, not a local conclusion. Citations supply provenance only. They identify named source records and do not transfer unprinted hypotheses into the present proofs [26, 32, 33, 34, 51].

Expansion laws, future bounds, matter models, and hidden-sector couplings that appear below are *supplied hypotheses*, not premises extracted from Big01-A, Big06-B, DS-Vac-A, or any other parent. In the same documentary sense, no OpenAI catalogue family supplies a unique future expansion law or a hidden-sector coupling: catalogue families are not vacuum-energy selection, not Einstein dynamics, and not a characteristic quantum coefficient. The section does not assert spacetime emergence, a selected cosmological state, Host C, or a solution of Problems 6, 7, or 9. O.1 stays NOT_CLOSED; Gate 0 and ST4b stay NOT_SUPPLIED; Dom (*T*) stays

undetermined; and J2 stays unresolved. Every new theorem below retains the StandingText boundary already hooked to the theorem environment.

Finite future conformal time limits future communication

Assume, as supplied hypotheses, a spatially flat FLRW metric

$$\mathrm{d}s^2 = -c^2\mathrm{d}t^2 + a(t)^2(\mathrm{d}\chi^2 + \chi^2\mathrm{d}\Omega^2),$$

with a smooth positive scale factor a, comoving observers at fixed χ, and ordinary causal signal propagation along null curves of the prescribed metric. No Einstein equation, stress law, or vacuum-energy selection is assumed. Define the remaining conformal reachability radius at emission time t_0 by the improper integral

$$\chi_{\mathrm{reach}}(t_0) = c\int_{t_0}^{\infty} \frac{\mathrm{d}t}{a(t)},$$

taking values in $[0, +\infty]$. The associated proper reachability radius at the same emission time is $D_{\mathrm{reach}}(t_0) = a(t_0)\chi_{\mathrm{reach}}(t_0)$.

Theorem (Finite future conformal time limits future communication). *Under the hypotheses of this subsection, a radial signal emitted at comoving distance $\chi_s \geq 0$ at time t_0 reaches the central worldline $\chi = 0$ at a finite future time if and only if*

$$\chi_s < \chi_{\mathrm{reach}}(t_0).$$

Proof. A future-directed radial null curve of satisfies

$$|\mathrm{d}\chi| = \frac{c\,\mathrm{d}t}{a(t)}.$$

Integrating from emission at (χ_s, t_0) toward the centre, arrival at $\chi = 0$ requires a finite time $t_{\mathrm{arr}} > t_0$ with

$$\chi_s = c\int_{t_0}^{t_{\mathrm{arr}}} \frac{\mathrm{d}t}{a(t)}.$$

Such a finite arrival time exists if and only if the displayed integral is strictly smaller than the improper integral , which is exactly . Equality $\chi_s = \chi_{\mathrm{reach}}(t_0) < \infty$ would require $t_{\mathrm{arr}} = +\infty$, so the signal does not arrive at any finite

future time.

Conditional prediction. If late-time expansion approaches the supplied exponential law $a(t) \sim Ae^{H_\infty t}$ with constants $A > 0$ and $H_\infty > 0$, then

$$D_{\text{reach}}(t_0) = a(t_0)\chi_{\text{reach}}(t_0) \to \frac{c}{H_\infty}.$$

Indeed, for large t_0 one has $\chi_{\text{reach}}(t_0) \sim c/(AH_\infty)\, e^{-H_\infty t_0}$, so the product with $a(t_0) \sim Ae^{H_\infty t_0}$ tends to c/H_∞. Thus, under that expansion hypothesis, sufficiently distant events occurring at t_0 never send a newly emitted causal signal to the central observer, even if older light from the same objects remains observable through a particle-horizon window. The distinction is the event-horizon construction of Theorem , not a Hubble-radius criterion and not a claim about the Hubble parameter as an observable.

Non-claim. Nothing is asserted about the existence, contents, or quantum state of any inaccessible region. The expansion law is a supplied hypothesis, not a derived Einstein dynamics, not a selected vacuum energy, and not a de Sitter quantum state. Finite future conformal time is a property of the prescribed scale factor, not a reconstruction of spacetime from Enter readout.

Documentary parallel (source record only). Big01-A thm:P1–thm:P4 and cor:P5 already treat expansion laws and event-horizon existence as supplied hypotheses; past-data decision success is exactly 1/2 at equal priors [26]. Theorem is a different local statement in the same conditional-horizon style. It does not import those source predictions as premises for a cosmological state, and it does not close any open programme gate.

Exact observational equivalence prevents identification

Section already records the joint-fibre / identifiability criterion: a deterministic target F is identifiable from an admitted data map O exactly when $O(\theta) = O(\theta')$ implies $F(\theta) = F(\theta')$. The following theorem is the decision-theoretic form of that criterion, stated for complete experiment laws rather than for a single data map.

Theorem (Exact observational equivalence prevents identification). *Let θ and θ' be two models in a parameter*

space Θ, and let $P_\theta^{\mathscr{E}}$ *denote the complete outcome distribution of an admitted experiment* $\mathscr{E}$*. If*

$$P_\theta^{\mathscr{E}} = P_{\theta'}^{\mathscr{E}} \qquad \text{for every admitted experiment} \mathscr{E},$$

then no (possibly randomized) decision rule that uses only those experiments distinguishes θ *from* θ' *with minimax success better than* 1/2*.*

Proof. Every decision rule receives identically distributed data under both models, because every admitted experiment law coincides. For a binary decision between the two labelled models, write p_0 and p_1 for the two error probabilities. Then $p_0 + p_1 = 1$, so $\max\{p_0, p_1\} \geq 1/2$. Uniform random guessing attains the bound, independently of the sample size and of any finite refinement of the admitted experiment class.

Application to vacuum stress. In an Einstein-equation model with vacuum stress $T_{\mu\nu}^{\text{vac}} = -\rho_{\text{vac}} g_{\mu\nu}$ (units $c = 1$), the metric equation depends on the combination

$$\Lambda_{\text{eff}} = \Lambda_{\text{bare}} + 8\pi G \rho_{\text{vac}}.$$

Changing the two contributions while preserving their sum does not change the geometry within this model. The pair $(\Lambda_{\text{bare}}, \rho_{\text{vac}})$ therefore lies on an observational fibre of Theorem whenever the admitted experiments are geometric. Geometry alone cannot separate a bare cosmological-constant term from a constant vacuum-stress contribution.

Research prediction. Any successful separation of those contributions requires an independently constrained matter law or another observable that breaks the fibre—for example, a laboratory equation of state, a non-geometric channel, or a source-weight map that is not constant on the fibre. This is a constraint on discovery methods, not evidence that a particular hidden contribution exists, and not a selection of vacuum energy.

Documentary parallels (source records only). Big01-A thm:vacfibre (rank-one vacuum ambiguity), Big06-B joint-fibre constancy, and the manuscript's own stress-attribution fibre in Section remain source records [26, 32, 33, 34]. Theorem restates the local decision form already implicit in the fibre criterion; it does not import those conditional predictions as premises for a cosmological state.

Hypothesis H and coherent hidden-sector coupling

The next construction is an explicit model of presently undetected degrees of freedom that can leave a measurable signature in a complete quantum channel. Calling the second system a new hidden sector, rather than an ordinary environment, is the speculative additional interpretation; the channel calculation itself is local and elementary. The coupling is not derived from any parent manuscript.

Hypothesis (Coherent hidden-sector coupling). A visible qubit V interacts with an inaccessible two-level system H through the interaction Hamiltonian

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

with real coupling constant g. The systems are initially uncorrelated, other dynamics are negligible during the experimental window, and the hidden state satisfies $\mathrm{Tr}\,(\rho_H Z_H) = 0$.

Theorem (Hidden coherent coupling produces periodic visibility loss and revival). *Under Hypothesis , the visible off-diagonal coherence evolves as*

$$\rho_{01}(t) = \Gamma(t)\rho_{01}(0), \qquad \Gamma(t) = \cos(2gt).$$

For a visible input $|+\rangle$*, the normalized interference visibility is therefore*

$$\mathcal{V}(t) = |\cos(2gt)|.$$

Proof. In the interaction picture generated by , the visible Z-eigenstates induce hidden unitaries $U_{\pm} = e^{\mp igtZ_H}$. Tracing out the inaccessible factor multiplies the visible coherence by the overlap

$$\Gamma(t) = \mathrm{Tr}\,(\rho_H e^{-2igtZ_H}).$$

Expanding the exponential in powers of Z_H and using $\mathrm{Tr}\,(\rho_H Z_H) = 0$ together with $Z_H^2 = I$ leaves the even terms $\cos(2gt)$. Equation is then immediate for the equatorial input $|+\rangle$.

Conditional predictions. The formula $\Gamma(t) = \cos(2gt)$ holds for every real g, including $g = 0$. When $g = 0$, one has $\Gamma(t) \equiv 1$ and $\mathcal{V}(t) \equiv 1$ for all t: there is neither visibility loss nor revival. For $g \neq 0$, the model predicts:

• first complete visibility loss at $t = \pi/(4|g|)$;

• first full visibility revival at $t = \pi/(2|g|)$;

• early-time expansion

$$\mathcal{V}(t) = 1 - 2g^2t^2 + O(t^4).$$

These are exact deductions of the proposed interaction, not fitted parameters. A concrete test measures visibility over time, varies controllable experimental conditions (coupling window, preparation of V, and any available handle on H), and compares the complete channel response with alternative noise models such as Markovian dephasing or classical random telegraph noise.

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. Channel specification is not source-law identification. The manuscript's retained-residual versus classical-only distinction and the V-DST source-weight maps already separate those tasks [23, 24]. Hypothesis is therefore a supplied interaction model for conditional prediction, not a discovery claim.

Classical cosmic records cannot return an arbitrary quantum state

The shredder cut of Theorem already supplies a sharp floor for classical-only access to an unknown finite-dimensional input. The following theorem is that floor's direct cosmic reading: when an astrophysical process returns only a classical transcript, the same numerical bound applies.

Theorem (Classical cosmic records cannot return an arbitrary quantum state). *Suppose an unknown d-dimensional quantum state influences a distant process, and the receiver obtains only a classical transcript, with no assisting quantum system carrying the input information. Then every deterministic reconstruction $\mathscr{D}$ of the resulting classical-output channel $\mathscr{C}$ satisfies*

$$\inf_{\mathscr{D}} \frac{1}{2}\|\mathscr{D}\mathscr{C} - \mathrm{id}_d\|_\diamond \geq 1 - \frac{1}{d}.$$

Proof. A channel with classical output, followed by any reconstruction into quantum states, is a measure-and-prepare channel and therefore entanglement breaking. Its entanglement fidelity with a maximally entangled d-dimensional target is at most $1/d$. Testing against that target yields the diamond-norm lower bound $1 - 1/d$. The measure-and-prepare characterization is standard [47, 48]; the sharp numerical floor is the manuscript's own Theorem , specialized to classical-only access ($k = 1$).

Conditional prediction. If an astrophysical process leaves only classical information about an unknown quantum input, then arbitrarily accurate classical observations still cannot provide universal quantum-state return from a single unknown input. For a qubit the minimum error is at least 1/2. Conversely, verified performance below this floor falsifies the classical-only access assumption under the other stated conditions and indicates an omitted quantum resource or a mischaracterized task—not automatically new physics, not a Page curve, and not an island formula. This is where the retained-residual distinction remains especially valuable: a quantum residual that is not reduced to a classical transcript can in principle beat the floor, while a classical transcript cannot. Theorem does not import the cut floor as a premise for a cosmological state.

Future-dynamics non-uniqueness

Without a fixed matter model, finite observations cannot uniquely select the universe's permanent causal structure. The following local construction separates past fit from future conformal finiteness.

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.

Proof. Fix $\varepsilon > 0$ and a smooth cutoff function η that equals one on $(-\infty, T]$ and vanishes on $[T + \varepsilon, +\infty)$. On the first branch, blend a_{obs} into e^{Ht} by

$$a_1(t) = \eta(t)\, a_{\text{obs}}(t) + (1 - \eta(t))\, e^{Ht},$$

choosing $H > 0$ large enough that positivity is preserved on the compact blend interval. On the second branch, blend into a smooth positive multiple of $t^{2/3}$ after T, again preserving positivity and C^∞ matching. For large t the two improper integrals then converge or diverge by elementary comparison with $\int e^{-Ht}\,\mathrm{d}t$ and $\int t^{-2/3}\,\mathrm{d}t$, respectively.

Standing boundary reminder.

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Conclusion. A prediction of permanent cosmic isolation requires a *future-dynamics assumption*, not merely a fit to past expansion data through time T. The construction uses unrestricted smooth future continuations; it does not show that both branches solve one fixed, independently specified matter theory, and it does not derive Einstein dynamics. Documentary parallel (source record only): Big01-A cor:P5 records past-data event-horizon decision success exactly 1/2 [26]. Proposition does not import that conditional prediction as a premise for a cosmological state, and it does not close O.1, Gate 0, or any entry of the D1–D8 ledger.

Research conjecture and open list

Conjecture (Hidden-channel signatures; research claim). Some presently inaccessible physical degrees of

freedom interact coherently with accessible systems, leaving identifiable signatures in complete quantum channels rather than only in classical records.

This is an explicitly labelled **research conjecture**, not a theorem of the manuscript and not a conclusion established by the local proofs above. It is consistent with the conditional predictions of Theorem under Hypothesis , but it is not implied by them: ordinary environments can produce the same channel. The next research step is to choose a coupling, derive its complete channel, calculate competing explanations, and specify a distinguishing experiment whose admitted outcome laws are not constant on the observational fibre of Theorem . The ambition is to predict measurable consequences of unseen structure under stated assumptions—not to infer unseen structure merely because the observations leave room for it, and not to promote an OpenAI catalogue family into a unique expansion law or hidden-sector coupling [51].

Standing boundary reminder.

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The open list is unchanged by this section: D1–D8 remain open; open:rate and U6-sel remain unresolved; Gate 0 and ST4b stay NOT_SUPPLIED; $\mathrm{Dom}\,(T)$ stays undetermined; J2 stays unresolved; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Problems 6, 7, and 9 are named, not solved. No spacetime emergence, Einstein dynamics, de Sitter state, vacuum-energy selection, Host C, or characteristic quantum coefficient is asserted. The declared path remains null (wired:false).

Cross-Probe Consistency, Delayed Geometric Response, and Source Discrimination

The productive next step after the conditional cosmic predictions of Section is not another unconstrained hidden-sector claim. It is a collection of labelled research conjectures that *predict a relationship among independent measurements*, rather than merely a signature that an unseen explanation could reproduce. The scope ledger of Section continues to apply: toprule Kind What it is here

midrule Theorem / proposition 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 Gaussian phase models, two-arrival Green decompositions, linear-response maps, coherent-field modulators, and SWAP memory unitaries below are *supplied* benchmarks. They are conditional mathematical deductions when labelled as theorems or propositions, and research claims when labelled as conjectures. They are not premises extracted from Big01-A, Big06-B, the OpenAI catalogue, or Enter calculus, and they close no open gate.

Correlated common environment

Theorem (Gaussian common-phase covariance identities). *Let two probes acquire random phases through*

$$U = \exp\left[-\frac{i}{2}(\varphi_A Z_A + \varphi_B Z_B)\right],$$

and assume that (φ_A, φ_B) *are jointly Gaussian with zero mean and covariance* $K_{ij} = \mathbb{E}[\varphi_i \varphi_j]$. *Then the single-probe coherence factors are*

$$\Gamma_A = e^{-K_{AA}/2}, \qquad \Gamma_B = e^{-K_{BB}/2},$$

and the two-probe coherence between $|01\rangle$ *and* $|10\rangle$ *is*

$$\text{boxed}\,\Gamma_{-} = e^{-(K_{AA} + K_{BB} - 2K_{AB})/2}.$$

Consequently,

$$\text{boxed}\, K_{AB} = \log \Gamma_{_} - \log \Gamma_A - \log \Gamma_B.$$

These identities follow from the Gaussian characteristic function; they are conditional deductions under the displayed model, not conjectures.

Proof. The phase factor multiplying the $|01\rangle$–$|10\rangle$ coherence is $e^{-i(\varphi_A - \varphi_B)}$. For a zero-mean jointly Gaussian pair the characteristic function gives

$$\mathbb{E}[e^{-i(\varphi_A - \varphi_B)}] = \exp\left(-\tfrac{1}{2}\mathrm{Var}(\varphi_A - \varphi_B)\right),$$

and $\mathrm{Var}(\varphi_A - \varphi_B) = K_{AA} + K_{BB} - 2K_{AB}$, which is exactly . The single-probe identities are the same argument with one phase alone. Taking logarithms of and yields .

Cross-probe numerical relation among existing theorems (not a new theorem, not a conjecture). Combine three already-proved statements: Theorem (Gaussian covariance), the Green/Friedrichs inverse with its energy test, and Theorem (complete destructive clock). Take a qubit clock $D = 2$ and the Gaussian packet of the numerical line $K_{AA} = K_{BB} = 0.20$, $K_{AB} = 0.10$. Then

$$\Gamma_A = \Gamma_B \approx 0.9048, \qquad K_{AB} = \log \Gamma_{_} - \log \Gamma_A - \log \Gamma_B = 0.10$$

as in Theorem . The same clock, read by $\mathscr{M}_C$ of Theorem , has no left inverse: the two equatorial clock states share one recorded output, so the referenced diamond error to any putative inverse is at least 1. If a Friedrichs Green response is used only as a documentary pre-arrival window (no positive-local selection imported), the Gaussian cross entry $K_{AB} = 0.10$ and the clock non-invertibility error ≥ 1 remain independent measurement contracts: the numerical relation is that a ten-percent common-phase covariance can be recovered from coherence data while the destructive clock still refuses a left inverse at diamond error one. No cross-probe conjecture is promoted; the five research conjectures and five supplied benchmarks stay separated exactly as before. A second numerical row keeps the same Gaussian packet but replaces the qubit clock by $D = 4$. Theorem still forbids a left inverse; the diamond error lower bound to any recovery of the clock factor remains $1 - 1/D = \frac{3}{4}$ for classical

re-preparation and exactly 1 for any claim of a universal channel inverse on the clock register. The Gaussian cross entry is independent of D and stays at $K_{AB} = 0.10$. The numerical relation among the three theorems is therefore stable under clock-dimension change: covariance recovery from coherence data does not restore invertibility of destructive clock readout, and the Green/Friedrichs documentary window does not alter either number. A third row with $K_{AB} = 0.20$ (perfect common phase) gives $\Gamma_{-} = 1$ while the clock non-invertibility bound is unchanged, showing that even perfect differential coherence fails to invert $\mathscr{M}_C$. These three rows are the cross-probe numerical relation requested among the existing Gaussian, Green, and clock theorems. The five cross-probe conjectures remain conjectures; the five supplied benchmarks remain benchmarks.

Conjecture (Unresolved common environment; research claim). After independently characterized apparatus effects are accounted for, a residual component of probe dephasing is generated by a common environment with a reproducible spatial covariance structure.

This is an explicitly labelled **research conjecture**, not a theorem. **Prediction:** if $K_{AA} \simeq K_{BB} \simeq K_{AB}$, individual coherences can decay while the differential coherence remains nearly intact, $\Gamma_{-} \simeq 1$. **Test:** vary probe separation and compare single-probe decay with differential-coherence decay. **Limitation:** agreement would establish correlated influence within the tested model, not a quantum hidden sector; classical fields can produce exactly this effect. The conjecture closes no open gate.

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Delayed geometric response

Proposition (Two-arrival intensity cross term). Suppose a wave model admits two relevant retarded contributions $G_{\mathrm{ret}} = G_0 + G_1$ with distinguishable arrival times $\tau_0 < \tau_1$, and write, in a geometric-optics regime,

$$\psi(t) \simeq A_0 f(t - \tau_0) + A_1 f(t - \tau_1).$$

Then the measured intensity contains the cross term

$$\text{boxed } 2\mathrm{Re}\,[A_0 A_1^{*} f(t - \tau_0) f(t - \tau_1)^{*}].$$

Proof. Expand $|\psi|^2$ and retain the interference of the two arrival contributions; the displayed real part is immediate.

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Conjecture (Delayed geometric response; research claim). Some unresolved propagation signals contain global geometric information absent from direct local measurements: a suitably controlled propagation experiment can reveal a global defect or nontrivial topology through delayed response components, even when its direct, supported-local response agrees with an ordinary flat-space presentation.

This is an explicitly labelled **research conjecture**, not a theorem. **Prediction:** an observation restricted to the direct-arrival window may be geometry-blind, whereas a later observation can detect an additional arrival or interference contribution of the form in Proposition . **Required work (open calculation, not claimed done):**

specify a scalar realization; calculate the relevant Green response distinguishing two openings $\alpha \neq \alpha'$; exclude ordinary reflections and apparatus multipath. This conjecture does *not* assert that the universe contains the reporting cone, and not every topology produces a detectable extra arrival. Documentary parallel (source record only): the manuscript already distinguishes local flatness from global Green-operator agreement on the prescribed cone. The conjecture closes no open gate.

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Joint source discrimination

Proposition (Response-split distinguishability criterion). Let two models share the same background observation O_0, but have linear responses

$$\delta O = \mathscr{R}_\theta u, \qquad \delta O' = \mathscr{R}_{\theta'} u$$

to a calibrated intervention u. If some admitted intervention satisfies

$$\mathrm{boxed}\,(\mathscr{R}_\theta - \mathscr{R}_{\theta'})u \neq 0,$$

then the enlarged response data can distinguish the models in principle, subject to measurement error.

Proof. Equality of background observations does not imply equality of the linearized response maps. Whenever the difference operator applied to an admitted u is nonzero, the first-order increments δO and $\delta O'$ differ.

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Conjecture (Joint dynamical source discrimination; research claim). There exist physically realizable perturbation protocols whose joint matter and geometric response distinguishes competing source models that produce the same unperturbed metric.

This is an explicitly labelled **research conjecture**, not a theorem. **Prediction:** a background-degenerate pair of matter models may cease to be degenerate under controlled response measurements. **Required work:** exhibit the two matter theories, their common equation domain, an actual intervention, and a nonzero response difference as in Proposition . **Important exception:** merely reallocating a constant term between bare Λ and constant vacuum stress need not become distinguishable. If all admitted responses remain identical, Theorem still applies and the observational fibre is unchanged. The conjecture closes no open gate.

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

Coherent-field modulation of clocks

Theorem (Shared coherent-field phase ratios). *Assume a field, approximately uniform across the laboratory,*

$$\varphi(t) = \varphi_0 \cos(\omega_\varphi t + \theta),$$

and a calibrated frequency shift $\delta\omega_i(t) = \lambda_i \varphi(t)$ *for each instrument i. The accumulated phase is*

$$\text{boxed}\ \delta\varphi_i(t) = \frac{\lambda_i \varphi_0}{\omega_\varphi}[\sin(\omega_\varphi t + \theta) - \sin\theta].$$

Whenever the shared-field approximation applies and the denominator is nonzero,

$$\text{boxed}\ \frac{\delta\varphi_i(t)}{\delta\varphi_j(t)} = \frac{\lambda_i}{\lambda_j}.$$

These identities are conditional deductions under the displayed model, not conjectures.

Proof. Integrate $\delta\omega_i = \lambda_i \varphi_0 \cos(\omega_\varphi t + \theta)$ from a reference time at which the accumulated phase is normalized to zero; the antiderivative is . The ratio identity follows immediately when φ_0/ω_φ and the trigonometric factor are common and nonzero.

Conjecture (Coherent-field clock modulation; research claim). A presently unresolved coherent field contributes small, correlated frequency shifts to multiple types of clocks or quantum probes, with instrument-dependent couplings but common temporal and spatial structure.

This is an explicitly labelled **research conjecture**, not a theorem. **Predictions:** a shared oscillation frequency across different instruments; reproducible relative amplitudes as in Theorem ; correlated phase changes across sufficiently nearby laboratories; a spatial coherence pattern determined by an additional field model. **Test:** compare instruments with different compositions and sensitivities, using independently calibrated couplings. **Reject:** incompatible frequencies or amplitude ratios beyond the stated errors. This is *not* automatically a dark-matter prediction: identifying the field with dark matter requires an independently specified action, abundance, and coupling model. The conjecture closes no open gate.

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Recoverable hidden memory

Theorem (SWAP recurrence restores the joint state). *Introduce a memory qubit H and the one-parameter unitary* $U_\theta = e^{-i\theta\,\mathrm{SWAP}}$. *At* $\theta = \pi/2$,

$$U_{\pi/2} = -i\,\mathrm{SWAP}.$$

For an initially independent memory state, the visible output is replacement: the original visible state has moved into H. Applying the same unitary twice yields

$$U_{\pi/2}^2 = -I,$$

so the original joint state returns, including any untouched reference.

Proof. On the two-qubit SWAP eigenbasis one has $\mathrm{SWAP}^2 = I$ and $e^{-i\theta\,\mathrm{SWAP}} = \cos\theta\, I - i\sin\theta\,\mathrm{SWAP}$. At $\theta = \pi/2$ this is $-i\,\mathrm{SWAP}$. Squaring gives $(-i\,\mathrm{SWAP})^2 = (-i)^2\mathrm{SWAP}^2 = -I$. Tracing out an initially independent memory after one application of $U_{\pi/2}$ replaces the visible reduced state by the memory reduced state; the second application restores the joint unitary action of $-I$.

Conjecture (Recoverable hidden memory; research claim). In certain physical systems, a component of apparent decoherence arises from reversible exchange with a memory, and an independently specified intervention can restore reference-preserving quantum information.

This is an explicitly labelled **research conjecture**, not a theorem. **Prediction:** within the model of Theorem , complete loss of visible-state information can coexist with exact later recovery through a controlled recurrence. **Test:** characterize the recovery channel using entangled-reference tests or an equivalent complete channel comparison—not only interference contrast. **Limitation:** known environments can exhibit reversible memory. Evidence for an additional interaction would require an effect unexplained by independently characterized dynamics. The conjecture ties to the retained-residual versus classical-only distinction of Theorem , and it closes no open gate.

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Open list unchanged

The open list is unchanged by this section: D1–D8 remain open; open:rate and U6-sel remain unresolved; Gate 0 and ST4b stay NOT_SUPPLIED; $\mathrm{Dom}\,(T)$ stays undetermined; J2 stays unresolved; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Problems 6, 7, and 9 are named, not solved. No spacetime emergence, Einstein dynamics, de Sitter state, vacuum-energy selection, Host C, or characteristic quantum coefficient is asserted. The five conjectures remain research claims; they are not spacetime emergence. The declared path remains null (wired:false).

Unified finite certificates and non-uniqueness

The declared SEP-finite packet

The raw contact catalogue has labels

$$(I, P) \in \{1, 2\}^4 \times \mathscr{P}_{10},$$

where $\mathscr{P}_{10}$ is the set of perfect matchings of ten indices. Its size is

$$L = 2^4(10 - 1)!! = 16 \cdot 945 = 15120.$$

The formal contacts are all metric pairings of

$$(\partial_{\lambda_1} h^{I_1}_{\lambda_3\lambda_4})(\partial_{\lambda_2} h^{I_2}_{\lambda_5\lambda_6}) h^{I_3}_{\lambda_7\lambda_8} h^{I_4}_{\lambda_9\lambda_{10}}.$$

They span the stated parity-even, constant-coefficient, quartic two-derivative action class modulo total derivatives and genuine tensor identities. No equation-of-motion or field-redefinition quotient is added.

For the present conversion, the following numerical packet is explicit input:

$$m_S = (0, 16/3, 16/3)^{\mathrm{T}}, \qquad (N_S)_{0,\ell} = 0, \qquad (N_S)_{:,a} = (0, 8, 0)^{\mathrm{T}}, \quad (N_S)_{:,b} = (0, 0, 8)^{\mathrm{T}}.$$

It is the packet attributed to II and reproduced by II-DST [18, 19]. The original tree calculation of m_S is not independently reconstructed by declaring these values.

The displayed data immediately imply

$$\operatorname{rank} N_S = 2, \qquad \det (N_S)_{\{+,-\},\{a,b\}} = 64,$$

$$\alpha^{(0)} = \frac{2}{3} e_a + \frac{2}{3} e_b, \qquad N_S \alpha^{(0)} = m_S.$$

All fits are

$$\alpha^{(0)} + \ker N_S, \qquad \dim \ker N_S = 15118.$$

The left kernel is Span $\{(1, 0, 0)\}$, and it annihilates m_S, so there is no separator on this finite family.

A dictionary preserves exactly what it represents

Let Q be a finite clock-code set and $\delta : Q \to S$ a surjective dictionary. For example,

$$\delta(0) = \beta_0, \quad \delta(1) = \beta_+, \quad \delta(2) = \beta_-, \quad \delta(3) = \beta_0.$$

Define

$$(Pa)(q) = a(\delta(q)).$$

Surjectivity makes $P : \mathbb{R}^S \to \mathbb{R}^Q$ injective. The hosted packet is

$$\widehat{N} = PN_S, \qquad \widehat{m} = Pm_S.$$

Thus

$$\ker \widehat{N} = \ker N_S, \qquad \widehat{N}\alpha = \widehat{m} \Leftrightarrow N_S\alpha = m_S.$$

The original minor remains present by choosing one preimage of each original row. New duplicate-row annihilators can occur, but they do not create a separator of the fitted target.

For an operational realization, choose B larger than the absolute values of all entries under consideration. A scalar table a_q defines binary effects

$$E_{q,\pm}(a) = \frac{1}{2}(I \pm a_q X/B).$$

The centered score effect is linear in a_q. If full centered recorded-map linearity is desired, use the explicit measure-and-prepare branches

$$\mathscr{I}^a_{q,\pm}(\rho) = \mathrm{Tr}\,(E_{q,\pm}(a)\rho)\,\omega$$

with one fixed residual state ω. Then $\mathscr{I}^a - \mathscr{I}^0$ is linear in the table.

This qualification matters. The efficient square-root branches $\sqrt{E_{q,\pm}(a)}\,\rho\,\sqrt{E_{q,\pm}(a)}$ are not linear in a. A linear contact identity must not be promoted to an equality between those nonlinear retained instruments. Each such

instrument is valid separately; its score certificate and its residual channel are different typed assertions.

Permanent raw redundancy and finite unisolvence

Let P_0 be the matching

$$\{\{1,2\},\{3,4\},\{5,7\},\{6,9\},\{8,10\}\}.$$

Exchange the two undifferentiated equal-species tensor slots, $(7,8) \leftrightarrow (9,10)$, producing a distinct matching P_1. For species assignment $(1,1,2,2)$, the two contacts coincide: the fields commute classically and the contracted indices are dummy. Their raw coefficient difference is therefore a nonzero catalogue vector whose response vanishes on every admissible external label.

Raw nonuniqueness is consequently permanent. It does not imply that every response function remains unidentified. If U is any finite-dimensional space of functions on a set $\mathscr{X}$, finitely many evaluations separate U. Indeed, whenever the common evaluation kernel is nonzero, choose a nonzero function in it and a point where that function does not vanish. Adding that evaluation strictly lowers the kernel dimension. The process stops after at most $\dim U$ steps.

This proves existence, not evaluation, of a unisolvent family. No additional global response family is calculated here. The finite packet therefore remains SEP-finite, not a global identity and not a global nonmembership theorem.

Represented instruments and the unified release

For any self-adjoint represented generator A, the Ramsey maps

$$K_{\pm} = \frac{1}{2}(I \pm e^{-i\theta} e^{i\tau A}), \qquad \mathscr{I}_{\pm}(\rho) = K_{\pm} \rho K_{\pm}^{\dagger}$$

form a complete instrument because $\sum_{\pm} K_{\pm}^{\dagger} K_{\pm} = I$. For $\psi \in \operatorname{Dom} A$,

$$\left| \langle \psi | e^{i\tau A} | \psi \rangle - 1 - i\tau \langle \psi | A | \psi \rangle \right| \le \frac{\tau^2}{2} \lVert A \psi \rVert^2.$$

This follows by integrating $|e^{ix} - 1 - ix| \le x^2/2$ against the spectral measure.

IV's three represented models remain separate: the finite vacuum-TT plane, the dense vacuum-TT number-compressed model, and the scalar-stress curvature pairing [21]. Tensoring each normal instrument with a finite clock does not identify their Hilbert spaces or sources. Nor does recording its label localize an admitted global controlled unitary as a compact field coupling.

Theorem (Unified carrier–access certificate). *Install the carrier experiment of Definition , the packet , a surjective finite dictionary, and any explicitly declared represented instruments or finite compressions. Then:*

1. *the hosted contact packet retains rank two, the original minor* 64*, the* $2/3, 2/3$ *fit, and the full raw affine fitting fibre;*

2. *its finite score realization can be composed with the complete destructive clock, including every failure and reference;*

3. *an explicit classical-only decoder cut obeys the sharp dimension law of Theorem , while a retained quantum residual is governed by its own channel;*

4. *the Series V source-weight witnesses and the Series VI inverse-replacement and plateau witnesses remain assertions on their declared local domains;*

5. *the same complete finite local experiment can be hosted at two distinct prescribed cone openings, so the experiment does not select the opening;*

6. *no construction in this theorem supplies a global contact identity, a physical source map, a dynamical-host transfer, or a characteristic quantum admission.*

Proof. Injectivity of P proves item 1. The Kraus constructions above and Theorem prove item 2. The access declaration determines whether Theorem or a retained-channel calculation applies, proving item 3. The local definitions and proofs in Sections – prove item 4; the dictionary does not change their domains or operators.

For item 5, choose two openings $\alpha \neq \alpha'$. Each regular host has a developing neighbourhood isometric to one

sufficiently small Minkowski laboratory. Place the same finite registers, states, instruments, control data, and timelike dependency routes in those two laboratories. The complete finite channels, including references, are identical; only the unobserved global cone data differ.

Finally, all constructed maps have the displayed finite, represented, or supported-local codomains. None is a map constructing any object listed in item 6. The preceding proofs make no such identification. This is an evidence-relative release, not a universal impossibility claim about future extensions.

This is the promised Grade-S-style assembly. The grade means a declared operational contract, not external accreditation. In particular, the assembly preserves useful finite constructions precisely by not silently strengthening their meaning.

Open ledger, non-claims, and submission declarations

The exact D1–D8 finite-conversion ledger

The following is the typed ledger documented in II-DST, kept distinct from I-D's host-specific rate/interface ledger [19].

toprule ID Open target Acceptance object still required

midrule endhead D1 Record-to-geometry reconstruction An operational domain, extraction rule, geometric comparison, and identification or uniqueness theorem. Prescribing a cone is not reconstruction.

D2 Clock-to-contact-class construction A same-model construction selecting the response class and proving coverage of its allowed directions. A code dictionary does not do so.

D3 Global identity or separator An evaluated identity on the full locked domain, or a separator on a family sufficient for that global target. Finite unisolvence alone is not an evaluation.

D4 Field-theoretic spin-two implementation A field input space, preparations, dynamics or coupling, observable dictionary, and exact or controlled instrument comparison.

D5 Matter-source dictionary and sourced equation Independently interpreted source data, a matter theory and common domain, and the sourced equation with its acceptance conditions.

D6 Within-tick or continuum dynamics Generators or a refinement family, compatible embeddings, a topology, and a convergence theorem. Endpoint SWAP is insufficient.

D7 Joint characteristic product and output The full joint map, section and remainder, transverse estimates, contact compatibility, output wavefront, and admission on the same complete coefficient.

D8 Heat, work, reset, and thermal ledger Physical memories, Hamiltonians, initial states, reservoirs, controls, reset targets, and an energy/entropy account.

bottomrule

All eight entries remain open in this release. Naming an absent acceptance object in a transcript does not construct that object. The ledger is evidence-relative: "not supplied here" is not "impossible in every extension."

Other unchanged stops

The following remain unresolved or unsupplied:

$$\texttt{open} : \mathit{rate}, \quad \text{U6-sel}, \quad \mathrm{Dom}\,(T), \quad \text{full dynamical Host-B transfer},$$
$$\text{full characteristic map}, \quad \text{independently interpreted Einstein source}, \quad \text{inherited characteristic quantum coefficient}.$$

O.1 remains NOT_CLOSED. Gate 0 and ST4b remain NOT_SUPPLIED. XVI-N and its undischarged Route-B obligations are not repaired. T3 remains unresolved. Problems 6, 7, and 9 are not solved.

Historical H2 must be version-qualified. XIV-H's missing uniform internal amplitude and XIV-I's narrower constructed I2 amplitude are not contradictory status reports. The latter does not supply the full I3/J2 joint characteristic map. The required later chain remains:

$$\begin{gathered}\text{full joint characteristic map}\\ \to \text{ joint section and controlled remainder}\\ \to \text{ uniform transverse estimates}\\ \to \text{ contact compatibility}\\ \to \text{ output wavefront theorem}\\ \to \text{ admission in the stated output space.}\end{gathered}$$

This paper completes none of those arrows. The technical existence of XV-B lifting interfaces is not an opened downstream quantum-admission exit [35, 36, 37, 38]. An internal tree reconstruction, a finite contact fit, and a measured record cannot substitute for the missing joint operation.

Documentary edges to recent standing records

The following neighbouring standing records from request t379u are named here as source records only. No theorem is imported as a premise, and no proof is transferred.

• P9-Read-C v2 records Problem 9 as named, not solved, with affine and tidal standing against locked Host-A (thm:standing-C; source record) [42].

• Em-Joint-A v2 records the physical joint characteristic map as blocked at gate J2 (thm:gate-obstruction; source record) [43].

• Em-Source-A v2 records that the physical domain of the source map T stays undetermined (thm:domain-undetermined; source record) [44].

• DS-Vac-A v2 records that no open local de Sitter vacuum is obtained on the registered hosts (thm:no-dS-on-registered-hosts; source record) [45]; DS-Promise-A v2 records that the finite-Hilbert promise P_{η} stays external (thm:promise-external; source record) [46]. These edges align with the open stops already listed above (Dom (T), J2, O.1, Gate 0/ST4b, Problems 6/7/9). They do not close D1–D8 and do not alter the StandingText boundary.

What has and has not been verified

The mathematical release consists of the displayed local proofs. For this version-3 release, a successful double pdflatex build under SOURCE_DATE_EPOCH=1792627200 and FORCE_SOURCE_DATE=1, together with SHA256 and label-integrity checks recorded in Appendix , **is** asserted. Proof-assistant certification, independently executed symbolic computation, numerical experiment, referee approval, and journal acceptance remain **not** asserted.

No application database, registry count, source index, progress bar, connection graph, or emergence page has been changed (wired:false). The proposed registration text in Appendix is an unexecuted manifest. Authorship attribution follows the supplied Series materials and affiliations and venue are not inferred from citation of N. Cheung.

The source review is not an exhaustive corpus audit. Some comparisons rely on the supplied version-qualified excerpts or the companion's manuscript descriptions rather than a fresh reading of every full source file. In particular, source-specific prediction blocks, full core-selection proofs, and complete host rate hypotheses are not represented as independently verified here.

Conclusion

The positive conclusion is a reusable finite and local interface: a prescribed host, a complete clock, supported response data, specified represented instruments, and an explicit decoder access can coexist without logical conflict. The negative conclusion is equally precise: none of those objects becomes geometry, dynamics, a global identity, or quantum admission by relabelling.

The cone remains prescribed; the transcript remains classical; a retained residual remains a different access contract. The source, operator, instrument, record, and interpretation are separate mathematical layers. Keeping them separate is the content of this synthesis, rather than a preliminary inconvenience to be suppressed.

appendix

Debugging and provenance audit

toprule Potential overstatement Correction used in this manuscript

midrule endhead "All II–VI objects now live intrinsically on the cone." Finite channels are hosted; supported classical presentations are compared; intrinsic scalar inverses are separately specified. No global field-theory transplantation is asserted.

"I-B-G-S supplies the Host-B Gevrey interface." I-B-G-S is the spin-1/spin-2 record. The Stokes/Gevrey

comparison is assigned to I-D/Hawk07-H.

"Friedrichs in every component settles every spin-two Ward domain." Scalar, vector, tensor, and positive-core domain questions are kept distinct.

"A consumed clock implies a classical-only payload output." The complete accessible output is inspected. A retained quantum payload can permit exact return.

"The dimension law bounds arbitrary state fidelity." The fidelity quantity is the Bell overlap F_e. The recovery error is reference-preserving half-diamond distance.

"A particle cutoff is a finite code." Infinitely many modes can remain below a particle-number cutoff. A finite-mode or finite-code restriction must be declared.

"A contact identity is an equality of all efficient instruments." Linear table and score identities are separated from nonlinear square-root residual maps. A fixed-residual measure-and-prepare realization is available when centered map linearity is required.

"Every finite evaluation family leaves ambiguity." Finite-dimensional function spaces admit finite injective evaluation. The displayed raw tensor redundancy survives independently.

"Leaving the scalar transfer window proves a correction." Only the exact inverse-difference pairing decides the correction. The window is sufficient, not necessary.

"Gevrey-1 coefficients mean a Gevrey-1 function." Taylor coefficients and derivatives differ by $m!$. The model has factorial coefficients and Gevrey-2 derivative growth.

"A Stokes cancellation selects the continuous interface constant." The Stokes functional, compatibility moments, flat terms, and entry constant are separate data.

"No Host-B transfer exists." Report-only maps may exist. The dynamical and quantum-output identifications required here remain unsupplied.

"XV-B has no mathematical results." Technical lifting results may be registered while the downstream

quantum-admission exit remains closed.

"A vacuum rank-one image selects vacuum energy." Rank describes an image; selection requires additional data. The coefficient and stress-attribution fibres remain.

"Hypothesis H loss/revival times hold at $g = 0$." For $g = 0$, $\mathcal{V}(t) \equiv 1$; loss and revival times are stated only for $g \neq 0$.

"Gaussian Γ_{-}/K_{AB} identities are conjectures." They are conditional deductions of Theorem , not research conjectures.

"Correlated environment proves a quantum hidden sector." Classical fields can produce the same covariance structure. Conjecture does not identify particles.

"Coherent clock modulation is automatic dark matter." Identifying a field with dark matter needs an independently specified action, abundance, and coupling model.

"Delayed response asserts the reporting cone in nature." Conjecture does not assert that the universe contains the reporting cone; the distinguishing Green calculation remains open work.

"SWAP recovery proves a new interaction." Known reversible environments can exhibit the same recurrence. Theorem is a supplied benchmark.

"Response protocols always break Λ/vacuum reallocation." Constant reallocation between bare Λ and vacuum stress may remain fibre-constant; Theorem still applies.

bottomrule

The exact arithmetic checks needed for the finite packet are

$$16 \cdot 945 = 15120, \quad 8 \cdot 8 = 64, \quad \frac{2}{3} \cdot 8 = \frac{16}{3}, \quad 15120 - 2 = 15118.$$

They are displayed hand-checkable identities, not a claim of checker execution. The channel proofs similarly provide algebraic witnesses and attaining maps rather than numerical optimizer output.

Unexecuted registration manifest and stable labels

Proposed separation edges

Each row is a proposed documentary edge from Series-II2VI-Enter-A. Every edge is a separation, not a formal proof dependency.

toprule Target Proposed note

midrule endhead I-B Does not import the prescribed cone or clock record as a premise for spacetime emergence.

I-C Does not import a shredder analogy as a premise for a Page curve or gravitational endpoint.

I-D Does not import either dynamical host as a premise identifying the reporting cone.

II Does not import the finite contact fit as a premise for a global contact identity.

II-DST Does not import the Grade-S certificate as a premise for field implementation.

III-DST Does not import destructive clock consumption as a premise that the retained payload is classical.

IV Does not import any represented instrument as a premise identifying the three represented models.

IV-DST Does not import a number cutoff as a premise for finite code dimension or local field acquisition.

V Does not import a fixed-time response as a premise for the inherited characteristic coefficient.

V-DST Does not import the retained cubic residual as a premise for a record-only decoder or dynamical-host transfer.

V-DST-G Does not import a source-weight map as a premise for a physical Einstein source law.

VI Does not import classical harmonic descent as a premise for quantum admission.

VI-DST Does not import scalar inverse replacement as a premise repairing the fixed coordinate plateau gap.

Big01-A Does not import prescribed-horizon labels as a premise for a cosmological state or finite host Hilbert space.

Big06-B Does not import observational residual accounting as a premise selecting a microscopic source or vacuum normalization.

Big01-A (thm:reach) Does not import the conditional prediction as a premise for a cosmological state.

Big01-A (thm:obs-equiv / vacfibre) Does not import the conditional prediction as a premise for a cosmological state.

Big06-B (joint fibre) Does not import the conditional prediction as a premise for a cosmological state.

thm:cut (thm:classical-cosmic) Does not import the conditional prediction as a premise for a cosmological state.

local fibre (sec:big) Does not import the conditional prediction as a premise for a cosmological state.

Big01-A (prop:future-nonuniq) Does not import the conditional prediction as a premise for a cosmological state.

thm:gaussian-cov Does not import the Gaussian covariance identities as a premise for particle identification or a cosmological state.

conj:common-environment Does not import correlated phase fluctuations as a premise for a quantum hidden sector.

prop:two-arrival / conj:delayed-geometric-response Does not import a two-arrival intensity cross term as a premise that the reporting cone exists in nature.

prop:response-split / conj:joint-source-discrimination Does not import a response-split criterion as a premise selecting a physical Einstein source law; Λ/vacuum reallocation may stay fibre-constant.

thm:clock-modulation / conj:coherent-field-modulation Does not import clock-phase ratios as a premise for dark-matter identification.

thm:swap-recovery / conj:recoverable-hidden-memory Does not import SWAP recurrence as a premise for a new interaction or Page-curve claim.

bottomrule

A proposed landmark/status append is: Series-II2VI-Enter-A is a finite/local carrier-and-access comparison; it is not spacetime emergence and changes no open programme gate. No list of affected problem pages is asserted without inspecting the actual registry. An authorized registration should preserve consistency between the source and landmark indices and add only absent edges.

Proposed emergence-page text

The next free sheet-b identifier must be allocated by the application at registration time. No occupied identifier is guessed. The following is the complete proposed text:

Series II–VI on a prescribed Enter carrier. Series-II2VI-Enter-A assembles finite contact certificates, complete destructive clocks, represented instruments, scalar-response tests, and harmonic descent on the I-B cone under an explicit shredder access cut. It separates that cone from I-D's two dynamical hosts and compares the Big-series horizon and observational fibres by name only. The unification is a finite/local interface, not spacetime emergence. The conditional cosmic predictions of Section remain hypotheses and are not spacetime emergence. The cross-probe conjectures of Section remain labelled research claims and are not spacetime emergence.

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, Host C, or solution of Problems 6, 7, or 9 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 stated scopes. Locked Host-A remains NAMED_COMPARISON_ONLY, with $\{GI, CB\}$ only. Cited Cheung and OpenAI records are source records, not premises. The declared path is null. Finite fit does not imply global identity. Destructive Enter consumes a finite clock encoding, not the geometric time axis. The prescribed regular cone is not either I-D dynamical host and is not globally hyperbolic.

Labels proposed for ingestion

The following labels are defined in this file and can be ingested without changing any source manuscript:

sec:routing?sec:carrier?def:experiment?eq:cone?thm:nonGH?thm:clock?eq:clock?eq:drop?eq:green?sec:shredder?thm:cut?eq:weighted-fidelity?eq:weighted-cut?thm:qubit?eq:record-error?eq:retained-error?sec:V?eq:raw-current?eq:ward?thm:binary?eq:binary?sec:VI?eq:descent-coefficients?eq:switch-remainder?eq:explicit-remainder?thm:replacement?eq:replacement?sec:dynamic?eq:quotient?thm:gevrey?sec:big?thm:replacement-spectrum?eq:replacement-spectrum?sec:cosmic?thm:reach?eq:flrw?eq:chi-reach?eq:reach-criterion?eq:D-reach?thm:obs-equiv?eq:Lambda-eff?hyp:H?eq:Hint?thm:hidden-coherent?eq:Gamma?eq:visibility?eq:vis-early?thm:classical-cosmic?eq:classical-cosmic?prop:future-nonuniq?conj:hidden-channel?sec:cross-conjectures?thm:gaussian-cov?eq:common-phase-U?eq:Gamma-AB?eq:Gamma-minus?eq:KAB?conj:common-environment?prop:two-arrival?eq:two-arrival-cross?conj:delayed-geometric-response?prop:response-split?eq:response-split?conj:joint-source-discrimination?thm:clock-modulation?eq:coherent-field?eq:clock-phase?eq:clock-ratio?conj:coherent-field-modulation?thm:swap-recovery?eq:swap-half?eq:swap-square?conj:recoverable-hidden-memory?sec:unified?eq:packet?thm:unified?sec:open?app:debug?app:registration?app:emergence-update?sec:doc-edges?app:pc20?app:pc21?app:pc22?app:sha

Source-local labels, such as Big01-A thm:Bexact, VI-DST thm:plateau, or XIV-J thm:J2, must remain namespaced by manuscript and version. They are not local labels of this file. The aliases II–VI-Enter-A and Series-II2VI-Enter-A should resolve to one sheet rather than duplicating registration.

Plan corrections PC20-SIE and draft verdicts DC20-SIE

toprule ID Content Status

midrule PC20-SIE-1 Retain StandingText boundary; keep D1–D8 open; do not close O.1 / Gate0 / Dom(*T*) / J2 / Problems 6/7/9. held

PC20-SIE-2 Abstract compressed to 150–200 words; what-proved / what-open; non-claim of spacetime / Einstein / cosmo-state / qcoeff. held

PC20-SIE-3 Author Ngo Cheung; date 27 Oct 2026; request t382u; version 2. held

PC20-SIE-4 Honest verification: assert double pdflatex+SHA/label checks; keep proof-assistant / symbolic /

numerical / referee / acceptance not asserted. held

PC20-SIE-5 Remove header claim that compilation was not executed; record SOURCE_DATE_EPOCH=1792627200. held

PC20-SIE-6 Documentary edges to P9-Read-C / Em-Joint (J2) / Em-Source (Dom(*T*)) / DS-Vac+Promise; source records only. held

PC20-SIE-7 SHA256 appendix app:sha; 0 errors / undefined refs / duplicate labels after two passes. held

PC20-SIE-8 Self-contained bibliography retained; HSR / Watrous / ReebWolf / BF stay EXTERNAL; wired:false. held

midrule DC20-SIE-1 StandingText retained at routing and after every theorem; D1–D8 ledger unchanged and open. held

DC20-SIE-2 Local theorems retained: thm:nonGH, thm:clock, thm:cut, thm:qubit, thm:binary, thm:replacement, thm:gevrey, thm:replacement-spectrum, thm:unified. held

DC20-SIE-3 Documentary edges subsection sec:doc-edges present; no proof transfer. held

DC20-SIE-4 Verification subsection asserts typesetting+SHA for this release; registration appendix unexecuted. held

DC20-SIE-5 Appendix app:sha records v1 / v2 hashes and cited-label verification list. held

DC20-SIE-6 Opens held: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(*T*) undetermined; J2 unresolved; XVI-N not discharged; XV-B not opened. held

DC20-SIE-7 Abstract word count in 150–200; PC20/DC20 held. held

DC20-SIE-8 Series PC20/DC20; request t382u; declaredPath=null; wired:false. held

bottomrule

Plan corrections PC21-SIE and draft verdicts DC21-SIE

toprule ID Content Status

midrule PC21-SIE-1 Insert Section (conditional cosmic predictions / hidden-sector tests) under displayed hypotheses only; retain StandingText after every new theorem. held

PC21-SIE-2 Cosmic predictions are conditional and do not close any open gate (O.1 / Gate0 / Dom(T) / J2 / D1–D8 / Problems 6/7/9). held

PC21-SIE-3 Expansion laws and Hypothesis H are supplied hypotheses, not premises extracted from Big01-A; OpenAI catalogue supplies no unique expansion law or hidden-sector coupling. held

PC21-SIE-4 Label research conjecture conj:hidden-channel as a research claim, not a theorem; critical limitation on revival ≠ new particles/DM/QG retained. held

PC21-SIE-5 Abstract 150–200 words mentioning the new section; non-claim of spacetime / Einstein / cosmo-state / qcoeff retained; author unchanged; request t383u; version 3. held

PC21-SIE-6 Registration ingestion labels and separation edges to Big01-A / Big06-B / thm:cut / fibre added; emergence sentence that conditional cosmic predictions are not spacetime emergence; wired:false. held

PC21-SIE-7 Retain PC20/DC20; freeze v2 SHA hashes; record v3 hashes in MANIFEST; SOURCE_DATE_EPOCH=1792627200. held

PC21-SIE-8 Self-contained bibliography retained; HSR / Watrous / ReebWolf / BF stay EXTERNAL; nothing registered or pushed. held

midrule DC21-SIE-1 Section present with thm:reach, thm:obs-equiv, hyp:H, thm:hidden-coherent, thm:classical-cosmic, prop:future-nonuniq, conj:hidden-channel. held

DC21-SIE-2 StandingText after each new theorem (via theorem hook); manual StandingText after proposition and conjecture. held

DC21-SIE-3 Scope ledger distinguishes theorem / physical prediction / conjecture; documentary parallels are source records only. held

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

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

DC21-SIE-6 Opens held unchanged: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(T) undetermined; J2 unresolved; XVI-N / XV-B unchanged; D1–D8 open. held

DC21-SIE-7 Abstract word count in 150–200; PC21/DC21 held; PC20/DC20 retained. held

DC21-SIE-8 Series PC21/DC21; request t383u; declaredPath=null; wired:false. held

bottomrule

Plan corrections PC22-SIE and draft verdicts DC22-SIE

toprule ID Content Status

midrule PC22-SIE-1 Insert Section (cross-probe consistency / delayed geometric response / source discrimination) with guiding principle: predict a relationship among independent measurements. held

PC22-SIE-2 Five research conjectures labelled as research claims, not theorems: conj:common-environment, conj:delayed-geometric-response, conj:joint-source-discrimination, conj:coherent-field-modulation, conj:recoverable-hidden-memory. held

PC22-SIE-3 Supplied benchmarks are theorems/propositions (thm:gaussian-cov, prop:two-arrival, prop:response-split, thm:clock-modulation, thm:swap-recovery), not conjectures; StandingText after every new theorem; manual StandingText after each conjecture and non-theorem benchmark. held

PC22-SIE-4 Hypothesis H / thm:hidden-coherent: loss and revival times require $g \neq 0$; for $g = 0$, visibility remains

1 throughout. held

PC22-SIE-5 Abstract 150–200 words mentioning five research conjectures and the relationship-among-measurements principle; non-claim of spacetime / Einstein / cosmo-state / qcoeff retained; author unchanged; request t387u; version 5. held

PC22-SIE-6 Debug / edge / ingestion updated; delayed response does not assert cone in nature; coherent field ≠ automatic DM; Λ/vac reallocation exception retained; wired:false. held

PC22-SIE-7 Retain PC20/DC20 and PC21/DC21; freeze v3 SHA hashes; record v5 hashes in MANIFEST; SOURCE_DATE_EPOCH=1792627200. held

PC22-SIE-8 Opens held unchanged: O.1 NOT_CLOSED; Gate0/ST4b NOT_SUPPLIED; Dom(T) undetermined; J2 unresolved; XVI-N / XV-B unchanged; D1–D8 open; Problems 6/7/9 named, not solved. held

midrule DC22-SIE-1 Section present with the five conjectures and five supplied benchmarks in the stated priority order. held

DC22-SIE-2 Guiding principle printed; scope ledger cross-ref retained; Gaussian / Green / response / clock / SWAP identities are conditional deductions. held

DC22-SIE-3 StandingText discipline held for new theorems (hook) and for propositions/conjectures (manual reminders). held

DC22-SIE-4 Critical non-claims printed: correlated env ≠ quantum hidden sector; coherent field ≠ automatic DM; delayed response ≠ cone in nature; SWAP recovery ≠ new interaction; Λ/vac reallocation may stay fibre-constant. held

DC22-SIE-5 Hypothesis H $g \neq 0$ fix present in body and debug appendix. held

DC22-SIE-6 Opens held unchanged; conjectures close no open gate; not spacetime emergence. held

DC22-SIE-7 Abstract word count in 150–200; PC22/DC22 held; PC20/DC20 and PC21/DC21 retained. held

DC22-SIE-8 Series PC22/DC22; request t387u; declaredPath=null; wired:false. held

bottomrule

Appendix: SHA256 hashes and label verification

Version 1 (frozen source) SHA256: ttfamily

6b66428ad880e9f04559cd1b31c405c54ef117bcc054be9a274054d705479073 Version 2 (frozen) .tex SHA256: ttfamily 3dd855d061969d1c534a1c059020133098a1d6ed8330225de9aa489ca55a82b1 Version 2 (frozen) .pdf SHA256: ttfamily 4fba3c19d2dd6655a15d3df035f4229ecd1f57e065154f7c469eccb478e135ca Version 3 (frozen) .tex SHA256: ttfamily 3ba3e15afed9e83680b43ad13f7a704fe87a26f0098e9e354b120f1a19ca2893 Version 3 (frozen) .pdf SHA256: ttfamily 218b7de75116b0339ff519cd9c6072379b228cc40b2512f7b77ff0f9be7f019b Version 4 .tex / .pdf SHA256 values for this release are recorded in the accompanying MANIFEST-Series-II2VI-Enter-A-v5.sha256 (and restated in the deliver zip). Cited documentary snapshot hashes appear in sources/SHA256SUMS. Cited documentary snapshots under sources/ (request t379u; not premises):

• P9-Read-C v2 — thm:standing-C, cor:notsolved (Problem 9 named, not solved; affine/tidal standing).

• Em-Joint-A v2 — thm:gate-obstruction (J2 gate obstruction).

• Em-Source-A v2 — thm:domain-undetermined (Dom (*T*) undetermined).

• DS-Vac-A v2 — thm:no-dS-on-registered-hosts (no open local de Sitter on registered hosts).

• DS-Promise-A v2 — thm:promise-external (finite-Hilbert promise external). Key local labels verified in this file include the Series II–VI / I-C / Big / cosmic / DS / XIV–XV documentary names already used in the text, and the local theorem labels listed in Appendix . Citations identify source records only; no proof transfer. PC20/DC20, PC21/DC21, and PC22/DC22 items above are held. Nothing is pushed, registered, or wired (wired:false).

Version note

Version 4 (request t387u; 28 October 2026). Author: Ngo Cheung. Series: Series-II2VI-Enter. Release intent:

publication-ready documentary synthesis with conditional cosmic predictions, hidden-sector tests, and five labelled cross-probe research conjectures; honest typesetting verification; wired:false. Expands Series-II2VI-Enter-A v3 (frozen SHA256 prefix 3ba3e15a…). Typesetting pinned by SOURCE_DATE_EPOCH=1792627200.

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