I-B-G-Q: Controlled Quantum-Certificate Criteria and the Remaining Characteristic Admission Problem on a Prescribed Conical Setting

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Abstract

We formulate a quantitative verification framework for the proposed admission of the inherited characteristic quantum coefficient on a prescribed conical background. The supplied initial draft does not construct that coefficient: its subtraction formula is a scalar kernel pairing rather than an interacting product, counterterm solvability is assumed, and fixing a subtraction scale does not establish absence of running.

The principal results proved here are a distribution-valued Dini convergence theorem with an explicit remainder, a separate uniform Fourier criterion for the limiting wavefront set, and an exact simultaneous compatibility criterion for reconstruction descent, a fixed-order linear Ward equation, normalization, and literal scale independence. An explicit logarithmic finite part yields a conserved tensor distribution with nonzero scale derivative, demonstrating that finiteness and a vanishing conservation defect do not imply non-running.

The contribution is a unified, checkable interface for the missing construction, not a new general renormalization theory or a claimed solution of the complete characteristic graph. Its potential value is to distinguish a genuine future admission from a normalization imposed by definition, a supported-sector reference, or an internal amplitude estimate. No first quantum admission is asserted. The full characteristic product, its output-space

membership, and its interacting Ward identity remain unconstructed.

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Book edition note (t427u)

Standing Enter refusals, scope vocabulary (proved here/supplied input/conditional/ not constructed/not claimed), the four-layer instrument box, and Scholar bibliography policy are frozen in the companion chapter *I-B-G Book Ledger* v1. O.1 remains NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; no Host C, Page/island,

or spacetime-emergence claim; no quantum coefficient is admitted; wired=false;

SOURCE_DATE_EPOCH=1792627200. This sheet is a companion manuscript record and is *not* claimed to be Google Scholar-indexed. The published Enter Calculus article is cited only for finite-instrument / operational interface discussions, never as a PDE premise.

Book expansion: separation table, gates reminder, missing box

toprule Landmark Relation Separation

midrule I-B-G Free inverse / non-GH language Chart/free inverse ≠ interacting product

I-B-G-S Source-test Ward Source-test ≠ renormalized interacting Ward

I-B-VP Hadamard form Hadamard ≠ missing characteristic product

Q-B / Q-C / CERT Later partial products / certificates Not premises that close Q0–Q7 here

OpenAI catalogue Coverage separations Documentary only

bottomrule

Gates Q0–Q7 (book index)

Tables and already list necessary conditions, counterexample classes, and benchmark-level sufficient data. Book edition reminder: **no gate is passed for the inherited target**. Finite and conserved still runs on the explicit benchmark (Section on the finite part with conservation and nonzero running).

What is still missing (consolidated). Full characteristic product on the inherited target; output-space membership; interacting Ward identity; RG-closed certificate; Host C; quantum coefficient admission; Page/island/spacetime emergence. **Non-implication locked.** Finite + conserved ≠ non-running.

Standing ledger verbatim: O.1 NOT_CLOSED; XVI-N not discharged; XV-B not opened; Host C not created; wired=false.

Changes to v4 (this is v5)

• **Codimension-two extension (Proposition).** Across a worldsheet, the extension ambiguity at minimal degree is a distribution on $\mathscr{W}$, not a scalar. One real number suffices only under translation invariance along $\mathscr{W}$. This is a sharp conditional obstruction to sufficiency, with an explicit benchmark of running $2\pi\delta_W$.

• **Conserved ambiguity in all dimensions (Proposition).** It is a free $\mathbb{R}$[Box]-module of rank one, and no parity-odd conserved term exists.

• **Global topology (Proposition).** The flat incidence closure is $\mathbb{R}^4 \times C$ and is contractible; the open stratum is homotopy equivalent to S^2.

• **Re-verification of v4 by different methods:** $c_{d,k}$ by test functions, and local homology by Smith normal form. No error was found (Appendix).

• **New user sheets:** audited in Appendix . They are cited only as comparisons and separations.

• No quantum coefficient is admitted.

Changes to v3 (this is v4)

• **The running classification extended to every dimension and order (Proposition).** The running of $|x|^{-d-2k}$ is $c_{d,k}\Delta^k\delta_0$ with $c_{d,k} = 2\pi^{d/2}/(4^k k!\,\Gamma(d/2+k))$. Odd orders do not run, and the invariant ambiguity count is $\lfloor m/2 \rfloor + 1$.

• **Conserved ambiguity at every order (Proposition).** The dimension is j at scaling degree $\leq 4 + 2j$.

• **The rank-6 stratum (Proposition).** Normal form $\mathbb{R}^4 \times \mathrm{cone}\,(S^2 \times [0,1])$, codimension 4. The local homology is $\mathbb{Z}$ in degree 7, so the closure is not a homology manifold at the corner.

• **Gates toward sufficiency (Table).** Each gate now has a sufficient datum at benchmark level, matching v3's necessary conditions.

• **Re-verification of v3 by different methods:**

• $\pi^2/96$ by radial convergence of the subtracted family;

• the strata ranks 8/8/8/6 by numerical SVD. No error was found (Appendix).

• No quantum coefficient is admitted.

Changes to v2 (this is v3)

• **Re-verification of v2 by different methods.**

• $c_0 = \log 2 - \gamma + \frac{1}{2}$: re-derived by Parseval against a Gaussian test, instead of the Mellin transform and quadrature used in v2.

• The rank-8 incidence chart: recomputed in a stereographic chart, with an exact left inverse. Both v2 claims are confirmed (Appendix). No error was found in the v2 additions; Appendix records one presentational point.

• **Gates Q0–Q7 (Section , Table).** For every gate, a checkable necessary condition and a counterexample class showing why lesser data fail, all at the level of the explicit benchmark:

• a classification of the extensions by scaling degree (Q0–Q2);

• a convergent family without a rate (Q3);

• overlap rigidity of the scale (Q4);

• the square $|x|^{-8}$ (Q5);

• the conserved local ambiguity (Q6);

• the angular benchmark (Q7).

• **Fourier and wavefront sharpening.** Exact Fourier transforms for polynomial angular profiles, and full wavefront over the singular point for every nonzero such profile (Proposition).

• **Incidence.** Full stratification of the flat characteristic incidence. The rank-drop locus is exactly the total diagonal, where the rank is 6 (Proposition).

• **Scale running generalized.** The running is $2\pi^2\overline{\Omega}\,\delta_0$ and vanishes exactly for mean-zero profiles; for degree $-4-k$ the condition becomes a moment condition. The benchmark's μ-derivative is zero, because μ is the cone deficit (plan correction in Appendix).

• Open, separation, plan-correction, error, check, ledger, package, label and artifact appendices are updated as v3 appendices. The v2 appendices are kept as history.

Changes to v1 (this is v2)

• **Fixes (marked [v2 fix] in place).** (F1) In Theorem the weight ω_K must be measurable as well as nonnegative, so that Ω_K is defined. (F2) In Theorem the induced map on $\mathcal{K}$ is continuous for the quotient topology of Rec. That is the topology of Proposition , and Definition now states it. (F3) Lemma uses $\mathrm{Rec}(qM) = q\,\mathrm{Rec}(M)$, i.e. that Rec commutes with multiplication by the normal coordinate. This is now stated as a hypothesis of the lemma. (F4) The claim in Lemma that the incidence can occur away from $\mathscr{W}$ was asserted but not exhibited. An explicit point and its rank-8 chart are now given (Proposition).

• **New results (Section).** The benchmark $u_{\nu,\varepsilon}$ is an explicit instance of Theorem , with $\omega = 2\pi^2\varepsilon^2$, and the ε^2 rate is sharp (Proposition). The exact Fourier transform is $\widehat{u_\nu}(\xi) = 2\pi^2(\log(\nu/|\xi|) + \log 2 - \gamma + \frac{1}{2})$, and $\mathrm{WF}(u_\nu) = \{0\} \times (\mathbb{R}^4 \setminus 0)$ (Proposition). An explicit incidence point lies away from the apex worldsheet (Proposition).

• **Framework placement and the user plan** (Section , Appendices –). Cross-links to the four sibling v2 sheets and to FourSheets v7 are given as separation rows (Appendix).

• New appendices: status ledger, open table, separation table, plan status, plan corrections, errors in v1, computer-assisted checks, package summary, label audit, sha256 artifacts, and the release box.

Framework placement (v2)

I-B-G-Q-v2 is placed on I-B's prescribed conical product [24]. Readout stays inside the cone by complete schedule

locality (I-B thm:locality). Domain selection is kept separate from readout, as in I-C [25]. The prescribed cone is not one of I-D's two dynamical hosts (I-D thm:main) [26]. Host A and Host B stay separate, and Host C is not created. As a documentary pointer only: V-DST-Host-v2 rejects the smooth-filling Host-C class [33].

1. Proposition remains an access identity.

2. Lemma and Proposition are domain-selection statements. Tests that avoid a missing locus are not dense. A distribution-order bound is not classical matching. The v0 scalar pairing has no output variable. A free inverse is not an interacting product. A fixed subtraction scale is not non-running. The benchmark of Section is finite and conserved and still has a nonzero scale derivative. It is the package's model for ``finite and conserved, yet still runs".

3. The gates Q0–Q7 of Section concern one unchanged target. The joint map precedes the joint remainder, and output admission precedes the differential. The H2 stop is not flattened into I2. XIV-I does not supply the joint map at I3, and XIV-J's supported reference is not the full map at J2.

4. I-B-G and I-B-G-S supply the language for what a chart, a free inverse or a scalar Green operator does not identify (I-B-G prop:nonGH: the cone is not globally hyperbolic; I-B-G-S thm:spin1: Maxwell source-test Ward identity) [27, 28]. I-B-VP's Hadamard form (I-B-VP thm:hadamard) is not the missing characteristic product [29]. No quantum coefficient is admitted.

Revision notice and routing note

The working title of the supplied v0 asserted a controlled quantum certificate *admitting* the inherited coefficient. That assertion cannot be retained as an established theorem on the supplied evidence. The present title and release theorem therefore state the narrower mathematical results actually proved.

The requested standing ledger contained an exception for a purported newly admitted coefficient. Because that exception depended on the unproved construction, it is withdrawn rather than repeated as a fact. The H2 entry is also made version-specific: XIV-H records an internal amplitude stop, whereas XIV-I reports a narrower

construction at I2 without constructing the subsequent joint characteristic map [49, 50, 51].

O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. This paper discharges neither the historical H2 requirement nor the full characteristic requirements at I3 and J2; the narrower internal I2 construction reported in XIV-I is not withdrawn. No quantum coefficient is admitted. In particular, the proposed single controlled exception is not established in this revision. No quantum-certificate status on another sheet is changed; the inherited characteristic certificate remains RG-open. Host C is not created. The Host-B transfer is not supplied. No compilation is asserted. The source has not been compiled. No machine-checked proof is claimed. Numerical execution is not asserted. Independent execution is not asserted. Vacuum is excluded from obligation targets. A particle-number cutoff is not a finite code dimension. A finite part is not the unsubtracted regulator-removed limit. Exact free recovery of a flat scalar block is not a renormalized interacting product. A supported presentation is not a global conical Cauchy theorem. This is not an ultraviolet completion.

All cited companion manuscripts and catalogue records are documentary comparisons, not theorem premises of this paper. Mathematical data needed below are stated explicitly. Standard functional analysis and distribution theory are used with their ordinary hypotheses.

Background: Enter, spacetime Enter, and the Shredder Philosophy

Cheung's Enter calculus distinguishes a concrete Born-rule semantics from an operational characterization within a specified structural class [35]. The introductory Philosophy of Enter emphasizes that destructive readout consumes measured quantum names at a declared interface and returns a classical record; it does not claim physical annihilation of every implementing degree of freedom [36].

The spacetime Enter construction places finite names, clocks, access rules, and controls on a prescribed continuum geometry. Consuming a clock encoding does not remove the geometric time axis [37]. The Shredder Philosophy similarly distinguishes classical-only output from coherent quantum return. Access, specified reset, and reservoir heat belong to separate ledgers [38]. These ideas motivate careful typing of interfaces; they do not define the characteristic distribution studied here.

For clarity, the finite readout identity can be checked independently.

Proposition (Finite destructive readout). *Let $H_C \cong \mathbb{C}^d$, let H_S be finite-dimensional, and let $\{|k\rangle\}_{k=0}^{d-1}$ be an orthonormal basis of H_C. Set*

$$D_k = \langle k|_C \otimes I_S, \qquad L_k = |k\rangle_R \otimes D_k.$$

Then

$$\mathscr{M}(X) = \sum_{k=0}^{d-1} |k\rangle\langle k|_R \otimes D_k X D_k^\dagger$$

is completely positive and trace preserving, and

$$\mathrm{Tr}_R \mathscr{M}(X) = \mathrm{Tr}_C X.$$

The same identities hold after adjoining an untouched finite reference. The output contains R and S, not the measured input name C.

Proof. The displayed expression is a Kraus representation, and

$$\sum_k L_k^\dagger L_k = \sum_k |k\rangle\langle k|_C \otimes I_S = I_{CS}.$$

This proves complete positivity and trace preservation. Expanding X in matrix blocks on C gives the partial-trace identity. Tensoring the Kraus operators with a reference identity proves the reference statement.

This finite identity constructs neither a continuum field instrument nor a singular quantum product. In particular, records cannot supply a missing multiplication or extension of distributions.

The identifier I-D is retained as a requested documentary pointer [39]. No theorem from its unavailable full text is invoked.

The prescribed conical setting

Geometry and the corrected deficit convention

Fix

$$0 < \mu < 2\pi, \qquad \alpha = 1 - \frac{\mu}{2\pi} \in (0,1), \qquad c > 0.$$

Let

$$C_\mu^\circ = (0,\infty) \times (\mathbb{R}/2\pi\mathbb{Z}), \qquad h_C = \mathrm{d}r^2 + \alpha^2 r^2 \mathrm{d}\varphi^2.$$

Let C_μ be its metric completion and o its apex. Define

$$N = C_\mu^\circ \times \mathbb{R}_z, \qquad M = \mathbb{R}_T \times N, \qquad g = -c^2 \mathrm{d}T^2 + \mathrm{d}r^2 + \alpha^2 r^2 \mathrm{d}\varphi^2 + \mathrm{d}z^2.$$

The excluded completion locus is

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

Proposition (Deficit, dimension, and local development). *The circumference of $r = R$ is $2\pi\alpha R$, so the angular deficit is μ. The locus $\mathscr{W}$ is a worldsheet of dimension two. With $t = cT$, the map*

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

is a local isometry into Minkowski space on every sufficiently small angularly lifted chart.

Proof. Integrating the induced line element on $r = R$ gives $2\pi\alpha R = (2\pi - \mu)R$. The coordinates on $\mathscr{W}$ are T, z.

Finally,

$$\mathrm{d}(r\cos(\alpha\varphi))^2 + \mathrm{d}(r\sin(\alpha\varphi))^2 = \mathrm{d}r^2 + \alpha^2 r^2 \mathrm{d}\varphi^2,$$

which proves the local isometry statement.

The v0 relation $\alpha = 1 - \mu/\pi$ would give deficit 2μ. The convention above agrees with the prescribed I-B geometry [37]. Geometry is fixed, not derived from readout.

Choose one relatively compact developing laboratory $U \subset M$, with closure bounded away from $\mathscr{W}$. All

field-theoretic tests in this paper are supported in regular laboratories of this type. When a local globally hyperbolic region is needed, it is chosen explicitly inside the developing image; global hyperbolicity of M is not asserted.

The scalar Friedrichs operator

Use the Hilbert space

$$\mathscr{H} = L^2(N, \alpha r \,\mathrm{mathop\,d}r \,\mathrm{mathop\,d}\varphi \,\mathrm{mathop\,d}z).$$

On $C_c^\infty(N)$, define

$$a[u] = \int_N \left(|\partial_r u|^2 + \frac{|\partial_\varphi u|^2}{\alpha^2 r^2} + |\partial_z u|^2 \right) \alpha r \,\mathrm{mathop\,d}r \,\mathrm{mathop\,d}\varphi \,\mathrm{mathop\,d}z.$$

Its closed Friedrichs form defines a nonnegative self-adjoint operator A_F. Fix $m \geq 0$, set $B = A_F + m^2$, and use

$$P = \partial_t^2 + B.$$

The closed-form representation and spectral calculus are standard background [55, Chapter VI]. No boundary realization for a spinor, Maxwell field, or graviton is inferred from this scalar choice.

Proposition (Extension-dependent free temporal solution). *For a smooth compactly time-supported source* $f : \mathbb{R} \to \bigcap_{j \geq 1} \mathrm{Dom}\,(B^j)$, *define*

$$S_B(\tau) = \frac{\sin(\tau\sqrt{B})}{\sqrt{B}}, \qquad S_B(\tau)|_{\lambda = 0} = \tau,$$

and

$$(G_R f)(t) = \int_{-\infty}^{t} S_B(t - s) f(s) \,\mathrm{mathop\,d}s.$$

Then $PG_R f = f$, *and* $G_R f$ *vanishes before the temporal support of* f. *It is the unique zero-past strong solution in the corresponding operator domain.*

Proof. The spectral bound

$$\|S_B(\tau)\|_{\mathscr{H}\to\mathscr{H}} \le |\tau|$$

makes the integral well defined on finite time intervals. Spectral calculus gives

$$S_B(0) = 0, \qquad S_B'(0) = I, \qquad S_B''(\tau) = -BS_B(\tau).$$

Differentiation under the integral, justified by the source domain, therefore gives

$$\partial_t^2 G_R f = f - BG_R f.$$

For uniqueness, the difference v of two such solutions has zero initial data at a time before the source. Its energy

$$E(t) = \|\partial_t v(t)\|^2 + \|\sqrt{B}\, v(t)\|^2$$

has derivative zero. Hence $\partial_t v = 0$, and the zero initial value gives $v = 0$.

This proposition concerns an operator-selected free evolution. It proves no new intrinsic causal-support theorem and no global conical Cauchy theorem. I-B-G supplies the documentary comparison for intrinsic free kernels and supported flat replacement [40]. A free inverse is not an interacting product.

The inherited target and its missing identifications

Free Ward identities are not the inherited graph

The supplied I-B-G-S record includes the source-tested Maxwell relations

$$C_1 G^{\pm}_{(1)} = G^{\pm}_{(0)} C_1, \qquad \nabla_x^a W^{(1)}_{ab}(x, x') = -\nabla_{b'} W^{(0)}(x, x')$$

on its declared compatible branch [41]. These identities concern specified free operators and contractions. They do not identify the inherited characteristic gravitational coefficient with a scalar Green response.

Accordingly, the v0 statement that C_{cl} is simultaneously a free Maxwell/gravity response and the characteristic coefficient of the XIV programme is not adopted. A common name does not supply a common domain, tensor structure, or normalization.

The retained characteristic object

The supplied XIV-I and XIV-J passages describe the internal sum

$$K_{\mathrm{ret}} = K_{47} + K_5 + K_6 + K_8 + K_9,$$

with both placements contained in K_5. In source-record notation, the grouped quantum target has the schematic form

$$\mathscr{T}_{\mathrm{form}} = i\,\mathrm{Contr}^{\gamma\varphi}(\mathscr{V}''_{\gamma\varphi}, K_{\mathrm{ret}}; ? \quad H^T_{\gamma\gamma}(y,a)\otimes H^T_{\varphi\varphi}(y,b) - H_{\gamma\gamma}(y,a)\otimes H_{\varphi\varphi}(y,b)).$$

Here $\mathrm{Contr}^{\gamma\varphi}$ denotes the prescribed finite tensor contractions and vertex derivatives. Equation names the source-record target; it is not a definition of a distribution at a forbidden characteristic product [50, 51].

Let

$$X = U_A \times U_B \times U_Z \times U_Y, \qquad w = (a,b,z,y),$$

where the factors are regular four-dimensional developing regions. The residual variable z is retained.

On a suitable local chart the characteristic incidence is

$$\mathscr{N}_{\mathrm{char}} = \left\{ a = z, \quad y = a + s\ell_{\mathbf{n}}, \quad b = a + u\ell_{\mathbf{n}}, \quad 0 < s < u, \quad \mathbf{n} \in S^2 \right\}, \qquad \ell_{\mathbf{n}} = (1, \mathbf{n}).$$

The flat null condition is unchanged by reversing the overall metric signature.

Lemma (Characteristic incidence dimension). *On each regular sphere-coordinate chart, the incidence is a smooth eight-dimensional submanifold of the sixteen-dimensional product X, hence has codimension eight. It can occur with all spacetime points away from $\mathscr{W}$.*

Proof. The parameters are $a \in \mathbb{R}^4$, $s, u \in \mathbb{R}$, and two coordinates for $\mathbf{n}$. The parameterization is injective locally: a is read from the first component, $s = y^0 - a^0 > 0$, $u = b^0 - a^0$, and $\mathbf{n} = (\mathbf{y} - \mathbf{a})/s$. These recovery formulas are smooth. They also show that the parameterization has injective differential. Small null displacements from a regular point remain inside a chosen regular laboratory. **[v2 fix]** The v1 text asserted, but did not exhibit, an

incidence point away from $\mathscr{W}$; an explicit point with an exact rank-8 chart is Proposition .

Avoiding the apex worldsheet therefore does not avoid the characteristic incidence. These are different restrictions.

What an admission would have to identify

The source record uses a retarded normalization of the form

$$R_1(\mathscr{V};\mathscr{O}) = \frac{i}{\hbar}\Big(T_2^{\mathrm{ren}}(\mathscr{V},\mathscr{O}) - \mathscr{V} \star_H \mathscr{O}\Big).$$

A characteristic admission would have to identify $R_1^{(1)}$ as the appropriate coefficient of a constructed, normalized expression and establish

$$Q_H R_1^{(1)} \in \mathcal{E}_H$$

in the specified output space [51].

Neither Q_H, $\mathcal{E}_H$, nor the complete physical source map is replaced here by a conveniently chosen scalar object. The supplied Em01-C record likewise separates source specification and reduction formulas from the unevaluated physical complete-sum coefficient [53].

Thus C_{cl} below is a *baseline to be specified on the same domain as a future quantum construction*. It is not an evaluated constant supplied by this paper.

Debugging the v0 certificate

A kernel pairing is not a product algebra

Proposition (The v0 formula has no output variable). *Let $K \in \mathscr{D}'(U \times U)$. For $f, g \in \mathscr{D}(U)$,*

$$B_K(f,g) = \langle K, g \otimes f \rangle$$

is a well-defined continuous bilinear scalar pairing. It does not, without additional definitions, specify an x-dependent product $f \star g$, a product of field functionals, or an interacting algebra.

Proof. The map $(f, g) \mapsto g \otimes f$ is continuous into the test space on the product. Applying the continuous functional K gives a continuous scalar pairing. Both test variables have been paired, so no unpaired x remains. Nothing in this construction supplies a field configuration argument, an interaction, or an algebra multiplication.

Consequently, the v0 expression

$$\left\langle G_{\epsilon}^{+} f, g \right\rangle - \left\langle H_{\epsilon} f, g \right\rangle - C_{\mathrm{ct}}(v_{*}; f, g)$$

does not define the claimed interacting product. In particular, it contains no specified interaction, perturbative order, field Hessian, or complete Wick-contraction graph.

A Hadamard subtraction is relevant to the definition of Wick polynomials and time-ordered products on appropriate domains [58, 60]. It is not a rule that turns an arbitrary scalar pairing into the missing nonlocal characteristic product.

Existence cannot be included as an unproved definition

The phrase ``where the limit exists'' in a proposed definition does not prove convergence. Similarly, choosing a counterterm ``so that the Ward identity holds'' requires an existence theorem in the *permitted* counterterm class.

Ward preservation is a substantive renormalization problem, not a consequence of the word Hadamard. The Yang–Mills construction of Hollands illustrates the need for explicit renormalized Ward identities in its own globally hyperbolic setting [59]. It does not supply the present gravitational characteristic graph.

Dense tests and a bounded remainder

Lemma (Tests avoiding a missing locus are not dense). *Let $S \subset X$ be nonempty and relatively closed. The zero-extended space $\mathscr{D}(X \setminus S)$ is not dense in $\mathscr{D}(X)$ with its usual test-function topology.*

Proof. Choose $p \in S$. The nonzero continuous functional $\delta_{p} : \varphi \mapsto \varphi(p)$ vanishes on $\mathscr{D}(X \setminus S)$. A dense subspace cannot be annihilated by a nonzero continuous functional.

Thus an off-characteristic construction cannot acquire the missing values on $\mathscr{N}_{\mathrm{char}}$ merely by calling its domain

dense.

Proposition (A distribution-order bound is not classical matching). *For any $T, C \in \mathscr{D}'(X)$, their difference $R = T - C$ satisfies, on each fixed compact support K,*

$$|\langle R, \varphi \rangle| \le C_K p_{K, m_K}(\varphi), \qquad p_{K,m}(\varphi) = \max_{|\beta| \le m} \sup_K |\partial^\beta \varphi|.$$

This fact alone establishes neither a classical limit nor equality of a selected characteristic coefficient.

Proof. The difference is a distribution, and continuity on $\mathscr{D}_K(X)$ gives the displayed finite-order estimate. Conversely, T may be chosen arbitrarily and the same reasoning still applies. Hence the estimate alone cannot characterize agreement with C.

For product tests in a fixed product chart,

$$p_{K,m}(f \otimes g) \le C\, p_{K_A, m}(f)\, p_{K_B, m}(g).$$

The v0 remainder estimate therefore has no matching force unless the normalization, topology, constants, and a meaningful smallness or order statement are specified independently.

For an actual classical-limit statement one might require, for example,

$$|\langle T_\hbar - C, \varphi \rangle| \le \eta(\hbar) C_K p_{K,m}(\varphi), \qquad \eta(\hbar) \to 0,$$

when an analytic family in a real parameter $\hbar$ is defined. For formal perturbation theory, one instead needs a precise coefficientwise statement. These are different assertions.

A quantitative theorem for a genuinely defined subtraction

The following result supplies a convergence criterion, not an identification of the physical graph.

Theorem (Distribution-valued Dini construction). *Let $\mathcal{P}$ be a locally convex space and let*

$$L_\varepsilon : \mathcal{P} \to \mathscr{D}'(X), \qquad 0 < \varepsilon \le \varepsilon_0,$$

be continuous linear maps. Assume that $\varepsilon \mapsto \langle L_\varepsilon p, \varphi \rangle$ is C^1 for every $p \in \mathcal{P}$, $\varphi \in \mathscr{D}(X)$.

*For every compact test support K, suppose there are continuous seminorms $q_{0,K}, q_{1,K}$ on $\mathcal{P}$, an integer m_K, and a nonnegative **[v2 fix]** measurable function ω_K such that*

$$|\langle L_{\varepsilon_0} p, \varphi \rangle| \le q_{0,K}(p) p_{K,m_K}(\varphi),$$

$$|\langle \varepsilon \partial_\varepsilon L_\varepsilon p, \varphi \rangle| \le q_{1,K}(p) \omega_K(\varepsilon) p_{K,m_K}(\varphi),$$

$$\int_0^{\varepsilon_0} \omega_K(s) \frac{\mathrm{mathop\,ds}}{s} < \infty.$$

Then there is a continuous linear map

$$L : \mathcal{P} \to \mathcal{D}'(X)$$

such that

$$|\langle (L_\varepsilon - L) p, \varphi \rangle| \le q_{1,K}(p) \Omega_K(\varepsilon) p_{K,m_K}(\varphi), \qquad \Omega_K(\varepsilon) = \int_0^{\varepsilon} \omega_K(s) \frac{\mathrm{mathop\,ds}}{s}.$$

Convergence is uniform when p ranges over a bounded subset of $\mathcal{P}$ and φ ranges over a bounded subset of $\mathcal{D}(X)$.

Proof. For $0 < \delta < \varepsilon \le \varepsilon_0$, the fundamental theorem of calculus gives

$$\langle (L_\varepsilon - L_\delta) p, \varphi \rangle = \int_\delta^{\varepsilon} \langle s \partial_s L_s p, \varphi \rangle \frac{\mathrm{mathop\,ds}}{s}.$$

Hence

$$|\langle (L_\varepsilon - L_\delta) p, \varphi \rangle| \le q_{1,K}(p) p_{K,m_K}(\varphi) \int_\delta^{\varepsilon} \omega_K(s) \frac{\mathrm{mathop\,ds}}{s}.$$

The Dini condition makes these pairings Cauchy. Define

$$\langle Lp, \varphi \rangle = \lim_{\varepsilon \,\mathrm{downarrow}\, 0} \langle L_\varepsilon p, \varphi \rangle.$$

Linearity is preserved, and

$$|\langle Lp, \varphi \rangle| \le \big(q_{0,K}(p) + q_{1,K}(p) \Omega_K(\varepsilon_0) \big) p_{K,m_K}(\varphi).$$

Thus Lp is a distribution. Sending δ to zero in the Cauchy estimate proves .

A bounded set of test functions is contained in a common $\mathscr{D}_K(X)$ and has uniformly bounded smooth seminorms. Continuous seminorms are bounded on bounded subsets of $\mathcal{P}$. These facts prove uniform convergence on the stated sets. The last display also bounds every strong-dual seminorm of Lp by a continuous seminorm of p, proving continuity of L.

Corollary (Power-logarithmic remainder). *If, for some $\delta > 0$ and $r \in \mathbb{N}$,*

$$\omega_K(\varepsilon) \le C_K \varepsilon^{\delta}(1 + |\log \varepsilon|)^r$$

for sufficiently small ε, then

$$\Omega_K(\varepsilon) \le C_K^{'} \varepsilon^{\delta}(1 + |\log \varepsilon|)^r.$$

Proof. Write $s = \varepsilon e^{-v}$. The integral is bounded by

$$C_K \varepsilon^{\delta} \int_0^{\infty} e^{-\delta v}(1 + |\log \varepsilon| + v)^r \,\mathrm{mathop\,d}v,$$

and the remaining exponential moments are finite.

Remark (What must precede the theorem). In an application L_ε might be a complete graph family minus explicit counterterms. Both terms must already be defined. Theorem does not supply their tensor coefficients, their characteristic prescription, or their permissible subtraction class. A bound for one branch or one fixed reconstructed kernel is not automatically a bound for the required map on $\mathcal{P}$.

Wavefront control is an additional requirement

Proposition (A convergent smooth family can gain wavefront). *Let $\rho \in C_c^{\infty}(\mathbb{R}^d)$ have integral one, and set*

$$u_\varepsilon(x) = \varepsilon^{-d}\rho(x/\varepsilon).$$

Then $u_\varepsilon \to \delta_0$ distributionally, and

$$\left|\left\langle \varepsilon \partial_\varepsilon u_\varepsilon, \varphi \right\rangle\right| \le C\varepsilon p_{K,1}(\varphi)$$

on a fixed compact neighborhood of zero for sufficiently small ε. Nevertheless every u_ε *is smooth, while*

$$\mathrm{WF}\,(\delta_0) = \{(0,\xi) : \xi \neq 0\}.$$

Proof. Changing variables gives

$$\langle u_\varepsilon, \varphi \rangle = \int \rho(v)\varphi(\varepsilon v)\,\mathrm{mathop\,d}v \;\to\; \varphi(0).$$

Differentiating this expression gives

$$\langle \varepsilon \partial_\varepsilon u_\varepsilon, \varphi \rangle = \int \rho(v)\varepsilon v \cdot \nabla\varphi(\varepsilon v)\,\mathrm{mathop\,d}v,$$

which proves the estimate. Smoothness of the approximants is immediate. If $\chi = 1$ near zero, then $\widehat{\chi\delta_0} = 1$, so there is no Fourier decay in any nonzero cotangent direction.

Thus a Dini remainder is not by itself an output wavefront theorem.

Theorem (Uniform Fourier criterion for the limit). *Assume Theorem in a coordinate chart. Let* $\Gamma \subset T^*X \setminus 0$ *be closed and conic. Suppose that for every* $(x_0,\xi_0) \notin \Gamma$*, there are a compactly supported cutoff* χ *equal to one near* x_0 *and an open conic neighborhood* V *of* ξ_0 *such that, for every* $N \in \mathbb{N}$*,*

$$\left|\widehat{\chi L_\varepsilon p}(\xi)\right| \le C_{\chi,V,N}\, q_{\chi,V,N}(p)(1+|\xi|)^{-N}, \qquad \xi \in V,$$

uniformly in ε*, where* $q_{\chi,V,N}$ *is a continuous seminorm on* $\mathcal{P}$*. Then*

$$\mathrm{WF}\,(Lp) \subseteq \Gamma \qquad (p \in \mathcal{P}).$$

Proof. For each fixed ξ,

$$\widehat{\chi L_\varepsilon p}(\xi) = \left\langle L_\varepsilon p, \chi e^{-ix\cdot\xi} \right\rangle \;\to\; \langle Lp, \chi e^{-ix\cdot\xi}\rangle.$$

Passing to the limit preserves every displayed bound. The resulting rapid decay on V excludes (x_0,ξ_0) from $\mathrm{WF}\,(Lp)$. The assertion follows by covering the complement of Γ.

The distinction between distributional extension and controlled microlocal extension is central in the general

literature [57, 61]. Neither theorem here verifies the required estimates for .

Reconstruction descent and counterterm support

Proposition (Exact descent criterion). *Let* Rec : $\mathcal{P} \to \mathcal{K}$ *be a surjective linear map and let* $F : \mathcal{P} \to V$ *be linear. A unique map* $\overline{F} : \mathcal{K} \to V$ *satisfying* $F = \overline{F}$Rec *exists if and only if*

$$\ker \mathrm{Rec} \subseteq \ker F.$$

If $\mathcal{K}$ *has the quotient topology and* F *is continuous, the induced map is continuous.*

Proof. Necessity follows by applying the factorization to an element of ker Rec. Conversely, define $\overline{F}(\mathrm{Rec}p) = F(p)$. Two representatives differ by an element of ker Rec, so this definition is independent of the representative. Surjectivity gives uniqueness. Continuity is the defining property of the quotient topology.

This is the reconstruction issue made explicit in the supplied XIV-J and XV-B records [51, 52]. The quotient topology must not be silently identified with a different physical-carrier topology.

Lemma (A normal identity mixes presentation degrees). *In one normal variable,*

$$q\delta'(q) + \delta(q) = 0.$$

Consequently, ***[v2 fix]*** *if* Rec *commutes with multiplication by the normal coordinate,* $\mathrm{Rec}(qM) = q\,\mathrm{Rec}(M)$*, and if*

$$\mathrm{Rec}(M) = \delta(q) \otimes R, \qquad \mathrm{Rec}(i\theta M) = \delta'(q) \otimes R,$$

for a nonzero distribution R*, then*

$$\mathrm{Rec}((qi\theta + 1)M) = 0,$$

although the two summands have nonzero opposite reconstructions.

Proof. For $\psi \in \mathscr{D}(\mathbb{R})$,

$$\langle q\delta', \psi \rangle = -\partial_q (q\psi(q))\big|_{q=0} = -\psi(0).$$

Tensor with R. Nonvanishing follows by using separated tests that detect both factors.

Thus the highest polynomial degree of a chosen amplitude presentation is not automatically an intrinsic symbol of the reconstructed kernel.

Lemma (A separated defect cannot be corrected by contacts). *Let $S \subset X$ be relatively closed, let $D \in \mathscr{D}'(X)$, and suppose there is $\varphi \in \mathscr{D}(X \setminus S)$ with $\langle D, \varphi \rangle \neq 0$. Then no $A \in \mathscr{D}'(X)$ supported in S satisfies $D + A = 0$.*

Proof. Support gives $\langle A, \varphi \rangle = 0$, so $\langle D + A, \varphi \rangle = \langle D, \varphi \rangle \neq 0$.

The lemma requires an actually evaluated defect and an actually specified contact support. It is not an evaluated obstruction for the complete inherited graph.

A simultaneous Ward, normalization, descent, and scale criterion

This section treats one fixed perturbative coefficient. A Ward condition is represented by a continuous linear operator only after the perturbative order and all lower-order terms have been frozen. No nonlinear all-orders Ward hierarchy is replaced by this model.

Definition (Specified affine verification problem). Fix the following data (**[v2 fix]** $\mathcal{K}$ carries the quotient topology of Rec, as in Proposition):

1. a locally convex presentation space $\mathcal{P}$, its reconstruction quotient

$$\mathrm{Rec} : \mathcal{P} \to \mathcal{K}, \qquad H = \ker \mathrm{Rec};$$

2. Hausdorff locally convex spaces V, V°, Z, B_0 and continuous linear maps

$$r : V \to V^{\circ}, \qquad D_W : V \to Z, \qquad \mathcal{N} : V \to B_0;$$

3. a canonical-domain map $c^{\circ} : \mathcal{K} \to V^{\circ}$ and a preliminary lift $F_0 \in \mathrm{Lin}_c(\mathcal{P}, V)$ satisfying

$$rF_0 = c^{\circ}\mathrm{Rec};$$

4. a prescribed normalization map $C \in \mathrm{Lin}_c(\mathcal{P}, B_0)$ with $C|_H = 0$;

5. $Y = \ker r$, a scale residue $\beta \in \mathrm{Lin}_c(\mathcal{P}, Y)$, and a specified vector space of allowed, scale-independent corrections

$$\mathscr{A} \subseteq \mathrm{Lin}_c(\mathcal{P}, Y).$$

For $v, v_* > 0$, define

$$F_v^a = F_0 + a + \log(v/v_*)\beta, \qquad a \in \mathscr{A}.$$

The desired conditions are

$$F_v^a|_H = 0,\ D_W F_v^a = 0,\ \mathscr{M} F_v^a = C,\ \partial_{\log v} F_v^a = 0.$$

The normalization map C could encode a precisely specified classical baseline, or a separately prescribed baseline plus a controlled remainder. It must not be defined retrospectively as $\mathscr{M} F_v^a$.

Theorem (Exact simultaneous compatibility criterion). *For Definition , introduce the vector space*

$$\mathscr{Z} = \mathrm{Lin}_c(H, Y) \oplus \mathrm{Lin}_c(\mathcal{P}, Z) \oplus \mathrm{Lin}_c(\mathcal{P}, B_0) \oplus \mathrm{Lin}_c(\mathcal{P}, Y),$$

the defect

$$\mathbf{d} = \big(F_0|_H, D_W F_0, \mathscr{M} F_0 - C, \beta\big),$$

and the linear map

$$\mathscr{L} : \mathscr{A} \to \mathscr{Z}, \qquad \mathscr{L}(a) = \big(a|_H, D_W a, \mathscr{M} a, 0\big).$$

There exists an allowed correction satisfying all four desired conditions if and only if

$$-\mathbf{d} \in \mathrm{im}\, \mathscr{L}.$$

Equivalently, the algebraic class of $\mathbf{d}$ *in* $\mathscr{Z}/\mathrm{im}\, \mathscr{L}$ *vanishes.*

If a_* *is one solution, all solutions are*

$$a_* + \ker \mathscr{L}.$$

*Every solution induces a continuous (**[v2 fix]** for the quotient topology on* $\mathcal{K}$*), scale-independent map* $\overline{F} : \mathcal{K} \to V$

with canonical-domain agreement, vanishing Ward defect, and the specified normalization.

Proof. Since $rF_0 = c^{\circ}\mathrm{Rec}$, the restriction $F_0|_H$ takes values in Y, so $\mathbf{d}$ belongs to $\mathcal{Z}$.

At $v = v_*$, the first three desired conditions are exactly

$$F_0|_H + a|_H = 0, \qquad D_W F_0 + D_W a = 0, \qquad \mathcal{M}F_0 - C + \mathcal{M}a = 0.$$

The fourth condition is precisely $\beta = 0$, because a is scale independent. Thus the complete system is

$$\mathbf{d} + \mathcal{L}(a) = 0.$$

This proves and the affine description of all solutions.

When the system holds, $\beta = 0$, so $F_v^a = F_0 + a$ at every scale. Proposition gives the continuous induced map on $\mathcal{K}$. Since $ra = 0$, its restriction agrees with c°. The Ward and normalization assertions are the other two equations in the system.

Remark (Actual image, not closure). Approximation of $-\mathbf{d}$ by elements of im $\mathcal{L}$ does not solve . Any topology and any closure operation used in an application must be justified separately.

Remark (No analytic construction hidden in the criterion). The theorem assumes the preliminary lift, correction space, Ward operator, normalization map, and scale residue already exist on their stated domains. It does not construct them for . If V encodes support or wavefront requirements, membership in that space must be proved before the theorem is applied.

Proposition (Separate solvability is insufficient). *There are affine correction problems in which the Ward equation and normalization equation are individually solvable but cannot be satisfied by the same allowed correction.*

Proof. Take $\mathcal{P} = \mathbb{R}$, $H = 0$, $V = \mathbb{R}^2$, and a trivial canonical restriction $r = 0$. Let

$$F_0(p) = (0, p), \qquad a_\lambda(p) = (\lambda p, \lambda p), \qquad \mathcal{A} = \{a_\lambda : \lambda \in \mathbb{R}\}.$$

Set

$$D_W(x,y) = x, \qquad \mathcal{M}(x,y) = y, \qquad C = 0, \qquad \beta = 0.$$

The Ward equation requires $\lambda = 0$. The normalization equation requires $1 + \lambda = 0$. Each is separately solvable, but they have no common solution.

This elementary example identifies the logical gap in a statement that one may choose a counterterm to cancel an anomaly and simultaneously match an independently specified coefficient.

An explicit finite part with conservation and nonzero running

This section is an independent numerical distribution benchmark. It is not the inherited graph, not a quantum metric model, and not an application of a Euclidean prescription to the Lorentzian target.

For $\varphi \in \mathscr{D}(\mathbb{R}^4)$, $v > 0$, and $0 < \varepsilon < 1$, set

$$u_{v,\varepsilon}(\varphi) = \int_{|x|>\varepsilon} \frac{\varphi(x)}{|x|^4}\,\mathrm{mathop}\,\mathrm{d}^4x + 2\pi^2 \log(v\varepsilon)\varphi(0).$$

Here $|x|$ is the auxiliary Euclidean norm.

Theorem (Finite part and exact scale derivative). *The family converges strongly in $\mathscr{D}'(\mathbb{R}^4)$ to*

$$u_v(\varphi) = \int_{|x|<1} \frac{\varphi(x)-\varphi(0)}{|x|^4}\,\mathrm{mathop}\,\mathrm{d}^4x + \int_{|x|\geq 1} \frac{\varphi(x)}{|x|^4}\,\mathrm{mathop}\,\mathrm{d}^4x + 2\pi^2 \log v\,\varphi(0).$$

On fixed compact test supports,

$$|u_{v,\varepsilon}(\varphi) - u_v(\varphi)| \leq C\varepsilon^2 p_{K',2}(\varphi),$$

where K' is a fixed compact neighborhood containing the unit ball and the test support. Moreover,

$$u_{v'} - u_v = 2\pi^2 \log(v'/v)\delta_0, \qquad \partial_{\log v} u_v = 2\pi^2 \delta_0 \neq 0.$$

Proof. The area of S^3 is $2\pi^2$, so

$$\int_{\varepsilon < |x| < 1} \frac{\varphi(0)}{|x|^4}\,\mathrm{mathop\,d}^4x = 2\pi^2 \log(1/\varepsilon)\varphi(0).$$

Adding the counterterm gives

$$u_{v,\varepsilon}(\varphi) = \int_{\varepsilon < |x| < 1} \frac{\varphi(x) - \varphi(0)}{|x|^4}\,\mathrm{mathop\,d}^4x + \int_{|x| \geq 1} \frac{\varphi(x)}{|x|^4}\,\mathrm{mathop\,d}^4x + 2\pi^2 \log v\,\varphi(0).$$

The first integral has a limit because $\varphi(x) - \varphi(0) = O(|x|)$.

For the sharper remainder, expand

$$\varphi(x) - \varphi(0) = \partial_j \varphi(0) x_j + O(|x|^2 p_{K',2}(\varphi)).$$

The linear term integrates to zero on each sphere. The remaining integral over $|x| < \varepsilon$ is bounded by

$$C p_{K',2}(\varphi) \int_0^{\varepsilon} r\,\mathrm{mathop\,d}r \leq C' \varepsilon^2 p_{K',2}(\varphi).$$

This estimate is uniform on bounded test sets, proving strong convergence. The scale identities follow directly from .

The unsubtracted integral has no finite limit for, for example, a nonnegative test equal to one near zero. Thus a finite part can be a limit of *subtracted* regulator-dependent distributions without being the limit of the original family.

Proposition (Exact conservation does not force zero scale residue). *Let* $\eta = \mathrm{diag}(-1, 1, 1, 1)$, *let* $\mathrm{Box} = \eta^{ab}\partial_a\partial_b$, *and define*

$$P_v^{ab} = \left(\partial^a\partial^b - \eta^{ab}\mathrm{Box}\right)u_v.$$

Then

$$\partial_a P_v^{ab} = 0,$$

but

$$\partial_{\log v} P_v^{ab} = 2\pi^2 \big(\partial^a \partial^b - \eta^{ab} \mathrm{Box}\big) \delta_0$$

is a nonzero tensor distribution. No scale-independent finite counterterm can change this derivative.

Proof. Distributional derivatives commute, giving

$$\partial_a \big(\partial^a \partial^b - \eta^{ab} \mathrm{Box}\big) = \mathrm{Box}\, \partial^b - \partial^b \mathrm{Box} = 0.$$

The scale formula follows from Theorem . Its tensor is nonzero: contraction with η_{ab} gives

$$-3 \mathrm{Box}\, \delta_0,$$

and $\mathrm{Box}\, \delta_0 \neq 0$, as is detected by a compact test whose quadratic jet has nonzero d'Alembertian at zero. Finally, differentiation with respect to $\log v$ annihilates a scale-independent counterterm.

Remark (Meaning of ``RG closed''). A computed nonzero scale law can itself be a controlled renormalization-group result. Nonzero running does not mean that a renormalized theory is inconsistent. The point here is narrower: the v0 claim that no running is required does not follow from fixing $v = v_*$, nor from finiteness, nor from conservation.

Theorem tests the literal scale-independence claim made in v0. It is not offered as a universal definition of renormalization-group closure. No scale law, zero or nonzero, is computed here for the inherited characteristic coefficient.

The supplied VII-D formula likewise distinguishes its strong subtracted limit from the raw family and retains an explicit scale term [44]. That result concerns its own reflection-triangle family; it is not a subtraction theorem for every graph.

Why local Hadamard information does not finish the target

The supplied I-B-VP records concern local Hadamard subtraction and, in I-B-VP-2, additional global geometric and diffractive wavefront relations [42, 43]. These are analytically useful but do not replace the product test for the complete graph.

For distributions u, v on the same smooth manifold, a standard sufficient multiplication condition is the absence of

$$(x, \xi) \in \mathrm{WF}(u), \qquad (x, -\xi) \in \mathrm{WF}(v).$$

When that condition holds, the ordinary product is defined by pullback to the diagonal [56, Section 8.2]. Failure of this sufficient condition is not a theorem that every generalized construction is impossible.

General renormalization results also retain hypotheses about the reference domain, extension locus, scaling behavior, locality, covariance, and wavefront control [57, 58, 61]. The theorems for smooth globally hyperbolic backgrounds cannot be invoked globally on a punctured cone merely because each regular point has a flat neighborhood.

The complete target here contains nonlocal kernels and a characteristic incidence of codimension eight. A subtraction known near a pairwise diagonal supplies neither:

1. a joint map on tests crossing $\mathscr{N}_{\mathrm{char}}$;

2. annihilation of every reconstruction-null presentation;

3. estimates for all retained branches and tensor components;

4. compatibility with the permitted contact class;

5. the required wavefront bound after the actual pushforward. These obligations must concern the same complete coefficient.

Non-transfer and non-admission statements

Proposition (No transfer by relabelling). *None of the following objects, without an additional proved identification, is the renormalized interacting coefficient :*

1. *a scalar free Green operator or its exact local flat recovery;*

2. *one numerical distributional finite part;*

3. *a compact classical Ward pair or a classical quotient functional;*

4. *a Newton–wave cubic form;*

5. *a formal quantum expansion whose required products remain unconstructed;*

6. *a finite channel matrix, a static area-law statement, or a classical comparison dictionary.*

Proof. The target requires a specified interaction, complete grouped contractions, a reconstructed-kernel domain, a characteristic composition, and an admitted output. Item (i) is a linear inverse. Item (ii) is a distributional extension for specified numerical data. Items (iii) and (iv) concern different classical or represented objects. Item (v) supplies no values for the absent products. Item (vi) has a finite-channel, entropy, or comparison domain rather than the graph's distributional domain.

An identification between any such object and the target would therefore require an additional map and proof respecting these data. No such map is defined by merely changing notation.

The documentary separations are recorded in I-B-G, VII-D, III-B/III-DST, V-B, and VI-B [40, 44, 46, 47, 48, 45]. In particular, VI-B's stated classical and finite operational constructions do not supply its missing quantum product.

The supplied catalogue comparisons, including Family 265, Oai283-A, Oai212-A, and Oai365-A, are likewise not imported as characteristic Ward identities or coefficient constructions [54]. No verification of an OpenAI catalogue proof is claimed.

These statements are non-transfer statements. They do not prove nonexistence of every possible future construction.

v2 results: the benchmark in full, and incidence away from the apex

Proposition (The benchmark is an explicit Dini family). *For $\varphi \in \mathscr{D}(\mathbb{R}^4)$ with support in a compact K, let $p_{K,2}(\varphi) = \sum_{|\alpha| \le 2} \sup |\partial^\alpha \varphi|$. Then*

$$\varepsilon \partial_\varepsilon u_{v,\varepsilon}(\varphi) = -\int_{S^3} (\varphi(\varepsilon\omega) - \varphi(0))\mathrm{mathop}\, \mathrm{d}\omega, \qquad |\varepsilon \partial_\varepsilon u_{v,\varepsilon}(\varphi)| \le 2\pi^2 \varepsilon^2 \, p_{K,2}(\varphi).$$

Hence – hold with $\omega_K(\varepsilon) = 2\pi^2\varepsilon^2$ *(measurable) and* $\Omega_K(\varepsilon) = \pi^2\varepsilon^2$. *Theorem applies, and it recovers the* ε^2 *rate of Theorem . The rate is sharp: if* $\varphi(x) = |x|^2$ *near* 0, *then* $u_{v,\varepsilon}(\varphi) - u_v(\varphi) = -\pi^2\varepsilon^2$ *for small* ε.

Proof. Differentiate in polar coordinates. The boundary term of $\int_{|x|>\varepsilon}$ is $-\varepsilon^{-1}\int_{S^3}\varphi(\varepsilon\omega)\mathrm{mathop\,d}\omega$, and the counterterm contributes $2\pi^2\varepsilon^{-1}\varphi(0)$. Multiply by ε. The linear Taylor term $\varepsilon\,\omega\cdot\nabla\varphi(0)$ integrates to zero over S^3. The remainder is at most $\frac{\varepsilon^2}{2}\sup\|\nabla^2\varphi\|_{\mathrm{op}} \le \varepsilon^2 p_{K,2}(\varphi)$, and $|S^3| = 2\pi^2$. For the sharpness claim, the difference equals $-\int_{|x|<\varepsilon}(\varphi - \varphi(0))|x|^{-4}\mathrm{mathop\,d}^4x = -2\pi^2\int_0^\varepsilon r\mathrm{mathop\,d}r$. The integral is checked exactly by computer algebra (Appendix , remainder-sharp).

This is a statement about the explicit benchmark only. It is not the inherited graph and not a quantum certificate.

Proposition (Exact Fourier transform and wavefront of the benchmark). *For* $\xi \neq 0$,

$$\widehat{u_v}(\xi) = u_v(e^{-\mathrm{i}x\cdot\xi}) = 2\pi^2(\log\frac{v}{|\xi|} + c_0), \qquad c_0 = \int_0^\infty (\frac{2J_1(t)}{t} - 1_{t<1})\frac{\mathrm{mathop\,d}t}{t} = \log 2 - \gamma + \tfrac{1}{2}.$$

Consequently $\mathrm{sing\,supp}\,u_v = \{0\}$ *and* $\mathrm{WF}(u_v) = \{0\}\times(\mathbb{R}^4\setminus 0)$. *The decay hypothesis of Theorem therefore fails at* 0 *in every direction for this benchmark.*

Proof. The spherical mean of $e^{-\mathrm{i}x\cdot\xi}$ over $|x| = r$ is $2J_1(r|\xi|)/(r|\xi|)$. Insert this into and substitute $t = r|\xi|$. The two radial integrals combine to $c_0 - \log|\xi|$. For the closed form, use $\int_0^\infty t^{s-2}J_1(t)\mathrm{mathop\,d}t = 2^{s-2}\Gamma(s/2)/\Gamma(2 - s/2)$ for $0 < \mathrm{Re}\,s < 5/2$. Then

$$c_0 = \lim_{s\,\mathrm{downarrow}\,0}(2^{s-1}\Gamma(s/2)/\Gamma(2 - s/2) - s^{-1}) = \log 2 - \tfrac{\gamma}{2} + \tfrac{\psi(2)}{2} = \log 2 - \gamma + \tfrac{1}{2}.$$

The value of c_0 is also confirmed to 25 digits by high-precision quadrature, together with the radial formula at $|\xi| = 3$ (computer-assisted; Appendix , c0, FT-formula).

Away from 0, $u_v = |x|^{-4}$ is smooth. Take $\chi \in C_c^\infty$ with $\chi(0) = 1$. Then $\widehat{\chi u_v} = (2\pi)^{-4}\widehat{u_v} * \widehat{\chi}$. Since $\log|\xi - \eta| - \log|\xi| \to 0$ for fixed η, with at most logarithmic growth in η, we get $\widehat{\chi u_v}(\xi) = -2\pi^2\log|\xi| + O(1)$ uniformly in direction. No conic neighbourhood has rapid decay.

The wavefront statement is for the explicit benchmark. It says nothing about the wavefront of the inherited characteristic coefficient, which remains unconstructed.

Proposition (Characteristic incidence away from the apex worldsheet). *Work in a developing chart around the regular point with* $r = 1$, $\varphi = 0$ *(Proposition). In developed coordinates take*

$$a = z = (0, 1, 0, 0), \quad \mathbf{n} = (1, 0, 0), \quad s = \tfrac{1}{4}, \quad u = \tfrac{1}{2}, \qquad y = (\tfrac{1}{4}, \tfrac{5}{4}, 0, 0), \quad b = (\tfrac{1}{2}, \tfrac{3}{2}, 0, 0).$$

This is a point of . All four points, and both null segments joining a to y and to b, have distance at least 1 *from the developed axis, i.e. from* $\mathscr{W}$*. The parameterization* $(a, s, u, \mathbf{n}) \mapsto (a, b, z, y)$ *has rank* 8 *there in the sphere chart* $\mathbf{n} = (\sin\theta\cos\varphi, \sin\theta\sin\varphi, \cos\theta)$ *at* $\theta = \pi/2$, $\varphi = 0$*. A neighbourhood of the point in* $\mathscr{N}_{\text{char}}$ *is therefore an* 8 *-dimensional piece of the incidence that is disjoint from* $\mathscr{W}$*.*

Proof. The incidence relations hold by direct substitution, and the distances are immediate. The rank was computed exactly (computer-assisted; Appendix , incidence-rank8). At the coordinate pole $\theta = 0$ the same symbolic Jacobian has rank 7. That is a defect of the sphere coordinates, not of $\mathscr{N}_{\text{char}}$, which is why the equatorial chart is used. The chart is a single angular lift because φ stays near 0 and $r \in [1, \tfrac{3}{2}]$.

Avoiding the apex therefore does not avoid characteristic incidence. This exhibits the claim of Lemma . It constructs no joint map on tests that cross $\mathscr{N}_{\text{char}}$.

v3 results: gate-by-gate necessary conditions, the angular benchmark, and the incidence stratification

Every statement in this section concerns the explicit benchmark of Section , its stated generalizations on the auxiliary Euclidean $\mathbb{R}^4$, or the flat characteristic incidence in a developing chart. Each one shows that a specified *lesser* datum fails to determine a benchmark object. These are model necessary conditions for the gates of Section . None of them is a theorem about the inherited characteristic coefficient, which remains unconstructed. Scaling degree is used as in [19]: $\mathrm{sd}_0(u) = \inf\{\omega : \lambda^{\omega} u(\lambda\,\cdot) \to 0 \text{in} \mathscr{D}' \text{as} \lambda \text{downarrow} 0\}$, where $\langle u(\lambda\,\cdot), \varphi\rangle = \lambda^{-4}\langle u, \varphi(\cdot/\lambda)\rangle$.

Proposition (Gates Q0–Q2: the benchmark's extension class is exactly the scale family). *Let* $u^{\circ} = |x|^{-4}$ *on* $\mathbb{R}^4 \setminus \{0\}$.

1. $u_v(\lambda\,\cdot) = \lambda^{-4}(u_v + 2\pi^2 \log\lambda\,\delta_0)$, *so* $\mathrm{sd}_0(u_v) = 4$.

2. *An extension* $u \in \mathscr{D}'(\mathbb{R}^4)$ *of* u° *has* $\mathrm{sd}_0(u) \le 4$ *if and only if* $u = u_v$ *for some* $v > 0$. *This* v *is unique.*

3. *The extensions with* $\mathrm{sd}_0 \le 4 + k$ *form the affine space* $u_1 + \mathrm{span}\{\partial^{\alpha}\delta_0 : |\alpha| \le k\}$, *of dimension* $\frac{k+4}{4}$. *Consequently, complete data away from the singular point determine the benchmark only up to one real number at the minimal scaling degree, and that number is the scale* v *of . A specification that omits the scale (gate Q0), or a joint map that is specified only on tests avoiding the singular set (gate Q1), leaves the counterexample class* $\{u_v\}_{v>0}$, *whose members agree away from* 0 *and differ by* $2\pi^2\log(v'/v)\delta_0$. *A selected prescription (gate Q2) must state this one-parameter ambiguity class and the normalization that fixes it.*

Proof. (i) From , $\int_{|x|>\varepsilon} |x|^{-4}\varphi(x/\lambda)\mathrm{mathop\,d}^4x = \int_{|y|>\varepsilon/\lambda} |y|^{-4}\varphi(y)\mathrm{mathop\,d}^4y$, and $\log(v\varepsilon) = \log(v\lambda\cdot\varepsilon/\lambda)$. Hence $\langle u_v, \varphi(\cdot/\lambda)\rangle = u_{\lambda v}(\varphi)$, and gives the formula. Then $\lambda^{\omega}u_v(\lambda\,\cdot) \to 0$ exactly when $\omega > 4$. (ii) and (iii) The difference of two extensions is supported at 0, hence equals $\sum_{|\alpha|\le N} c_{\alpha}\partial^{\alpha}\delta_0$ [18, Thm. 2.3.4]. Since $(\partial^{\alpha}\delta_0)(\lambda\,\cdot) = \lambda^{-4-|\alpha|}\partial^{\alpha}\delta_0$ and these distributions are linearly independent, the scaling degree of the sum is $4 + \max\{|\alpha| : c_{\alpha} \ne 0\}$. The scaling degree of a sum is at most the maximum of the two degrees, which gives the bound $|\alpha| \le k$. For $k = 0$, $u_v + c\delta_0 = u_{ve^{c/(2\pi^2)}}$. The count of multi-indices with $|\alpha| \le k$ in four variables is $\frac{k+4}{4}$.

This classifies extensions of one explicit kernel. It constructs no joint map on $\mathscr{N}_{\mathrm{char}}$ and makes no claim about the inherited coefficient.

Proposition (Gate Q3: convergence without a rate). *The family* $v_{\varepsilon} = u_{v,\varepsilon} + (\log(1/\varepsilon))^{-1}\delta_0$, $0 < \varepsilon < 1$, *converges to* u_v *strongly in* $\mathscr{D}'(\mathbb{R}^4)$, *hence uniformly on bounded sets of tests. But for every* $a > 0$ *and every* φ *with* $\varphi(0) \ne 0$, $\varepsilon^{-a}|v_{\varepsilon}(\varphi) - u_v(\varphi)| \to \infty$.

Proof. $v_{\varepsilon}(\varphi) - u_v(\varphi) = O(\varepsilon^2 p_{K',2}(\varphi)) + \varphi(0)/\log(1/\varepsilon)$ by Theorem . The second term is uniform on bounded sets and

tends to 0 more slowly than any power (computer-assisted limit, Appendix , slow-convergence).

So evidence of convergence, even uniform convergence on bounded sets, is not the proved rate required by gate Q3. This is a statement about an explicit family only.

Proposition (Gate Q4: overlaps force a single scale). *Let U, V be open sets with $0 \in U \cap V$, and suppose that the finite parts are fixed chartwise as u_{v_U} on U and u_{v_V} on V. They define one distribution on $U \cup V$ if and only if $v_U = v_V$. Otherwise they differ on $U \cap V$ by $2\pi^2 \log(v_U/v_V)\,\delta_0 \neq 0$.*

Proof. Restrict to $U \cap V$.

Compatibility on overlaps is therefore a constraint on the normalization data, not a consequence of local finiteness. Nothing is said about the inherited contact class.

Proposition (Gate Q5: admitting the benchmark does not admit its square).

1. *Since* $\mathrm{WF}(u_v) = \{0\} \times (\mathbb{R}^4 \setminus 0)$ *(Proposition) contains both* $(0, \xi)$ *and* $(0, -\xi)$*, Hörmander's sufficient condition [18, Thm. 8.2.10] for the product $u_v \cdot u_v$ fails at* 0*.*

2. *The pointwise square* $(u^\circ)^2 = |x|^{-8}$ *on* $\mathbb{R}^4 \setminus 0$ *has scaling degree* 8*. Its extensions with* $\mathrm{sd}_0 \leq 8$ *form an affine space of dimension* $\frac{8}{4} = 70$*. The* $O(4)$*-invariant ones differ by elements of* $\mathrm{span}\{\delta_0, \Delta\delta_0, \Delta^2\delta_0\}$*, a three-dimensional space.*

3. *The family*

$$w_{v,\varepsilon}(\varphi) = \int_{|x|>\varepsilon} \frac{\varphi(x)}{|x|^8}\,\mathrm{mathop\,d}^4x - \frac{\pi^2}{2\varepsilon^4}\varphi(0) - \frac{\pi^2}{8\varepsilon^2}\Delta\varphi(0) + \frac{\pi^2}{96}\log(v\varepsilon)\,\Delta^2\varphi(0)$$

converges in $\mathscr{D}'(\mathbb{R}^4)$ *to an extension w_v with* $\partial_{\log v} w_v = \frac{\pi^2}{96}\Delta^2\delta_0 \neq 0$*.*

Proof. (ii) is Proposition (iii)'s argument with 4 replaced by 8; invariance under $O(4)$ leaves the polynomial symbols $1, |\xi|^2, |\xi|^4$. (iii) Taylor expand φ at 0 inside $|x| < 1$. Odd orders vanish on spheres. With $\int_{S^3} \omega_i\omega_j\,\mathrm{mathop\,d}\omega = \frac{\pi^2}{2}\delta_{ij}$ and $\int_{S^3} (\omega\cdot\xi)^4\,\mathrm{mathop\,d}\omega = \frac{\pi^2}{4}|\xi|^4$, orders $0, 2, 4$ contribute $\frac{\pi^2}{2}(\varepsilon^{-4} - 1)\varphi(0)$, $\frac{\pi^2}{8}(\varepsilon^{-2} - 1)\Delta\varphi(0)$

and $\frac{\pi^2}{96}\log(1/\varepsilon)\Delta^2\varphi(0)$. The fifth-order remainder is integrable against $r^{-8}r^3\mathrm{mathop\,d}r$. The constant $\pi^2/96$ is checked exactly (Appendix , square-running-moment, square-ambiguity-count).

A product of admitted outputs is not thereby admitted: three new invariant constants are needed, and one of them runs. This illustrates gate Q5 on the benchmark only.

Proposition (Gate Q6: the Ward identity removes two of three local constants, not the scale).

Point-supported, Lorentz-covariant, symmetric tensor distributions at 0 *of scaling degree at most* 6 *are exactly*

$$\alpha\,\eta^{ab}\delta_0 + \beta\,\partial^a\partial^b\delta_0 + \gamma\,\eta^{ab}\mathrm{Box}\,\delta_0.$$

Such a tensor is conserved if and only if $\alpha = 0$ *and* $\beta = -\gamma$*. So the conserved local ambiguity is the line spanned by* $(\partial^a\partial^b - \eta^{ab}\mathrm{Box})\delta_0$*, and* $P_{v'} - P_v = 2\pi^2\log(v'/v)(\partial^a\partial^b - \eta^{ab}\mathrm{Box})\delta_0$ *lies on that line.*

Proof. A Lorentz-covariant symmetric rank-two polynomial symbol of degree at most two is a combination of η^{ab}, $\xi^a\xi^b$ and $\eta^{ab}\xi^2$; antisymmetric invariants drop out by symmetry. The divergence symbol is $\alpha\xi^b + (\beta+\gamma)\xi^2\xi^b$ up to factors of i, which vanishes identically exactly when $\alpha = 0 = \beta + \gamma$. This is checked exactly (Appendix , ward-ambiguity-dim). The last statement is Proposition .

Lorentz covariance is imposed here as a hypothesis on the counterterm class; the benchmark itself uses an auxiliary Euclidean norm. Conservation cuts the ambiguity from three constants to one and cannot fix the remaining one. This is not a Ward identity for the inherited coefficient.

Proposition (Gate Q7 and the Fourier sharpening: the angular benchmark). *Let* $\Omega \in C^\infty(S^3)$ *have mean* $\overline{\Omega}$ *and harmonic expansion* $\Omega = \overline{\Omega} + \sum_{\ell\geq 1} Y_\ell$*. Set*

$$u^{\Omega}_{v,\varepsilon}(\varphi) = \int_{|x|>\varepsilon} \Omega\left(\frac{x}{|x|}\right)\frac{\varphi(x)}{|x|^4}\mathrm{mathop\,d}^4x + 2\pi^2\overline{\Omega}\log(v\varepsilon)\varphi(0).$$

1. $u^{\Omega}_{v,\varepsilon} \to u^{\Omega}_v$ *strongly in* $\mathscr{D}'(\mathbb{R}^4)$*, and* $\partial_{\log v}u^{\Omega}_v = 2\pi^2\overline{\Omega}\,\delta_0$*. The running vanishes if and only if* $\overline{\Omega} = 0$*, i.e. for the principal-value kernels.*

2. *If* Ω *is a finite sum of harmonics, then for* $\xi \neq 0$

$$\widehat{u_\nu^{\Omega}}(\xi) = 2\pi^2\overline{\Omega}(\log\frac{\nu}{|\xi|} + c_0) + \sum_{\ell\geq 1}\gamma_\ell Y_\ell(\tfrac{\xi}{|\xi|}), \qquad \gamma_\ell = \pi^2(-\mathrm{i})^\ell\frac{\Gamma(\ell/2)}{\Gamma(\ell/2+2)} \neq 0.$$

3. *For such* $\Omega \neq 0$, $\mathrm{WF}(u_\nu^{\Omega}) = \{0\} \times (\mathbb{R}^4 \setminus 0)$. *No polynomial angular profile reduces the wavefront set over the singular point.*

4. *More generally, for* $\Omega|x|^{-4-k}$ *with Taylor subtraction to order* k, *the running is* $\sum_{|\alpha|=k}\frac{M_\alpha}{\alpha!}(-1)^k\partial^\alpha\delta_0$ *with* $M_\alpha = \int_{S^3}\Omega\,\omega^\alpha \mathrm{mathop\,d}\omega$. *It vanishes if and only if* Ω *is orthogonal to all harmonics of degrees* $k, k-2, \ldots$. *Proposition (iii) is the case* $\Omega = 1$, $k = 4$.

Proof. (i) As in Theorem : the mean-zero part of Ω annihilates the constant Taylor term on each sphere, and the mean part gives $2\pi^2\overline{\Omega}\log(1/\varepsilon)\varphi(0)$. (ii) The case $\ell = 0$ is Proposition . For $\ell \geq 1$, the Funk–Hecke formula in four dimensions gives $\int_{S^3} Y_\ell(\omega)e^{-\mathrm{i}r\omega\cdot\xi}\mathrm{mathop\,d}\omega = 4\pi^2(-\mathrm{i})^\ell\frac{J_{\ell+1}(r|\xi|)}{r|\xi|}Y_\ell(\xi/|\xi|)$ [17]. Then $\int_0^\infty J_{\ell+1}(t)t^{-2}\mathrm{mathop\,d}t = \Gamma(\ell/2)/(4\Gamma(\ell/2+2))$ (Weber–Schafheitlin [23]). Both are checked numerically for $\ell = 1, 2, 3$ (Appendix , funk-hecke-4d, mellin-Jl+1). (iii) If $\overline{\Omega} \neq 0$ the logarithm prevents decay in every direction (Proposition). If $\overline{\Omega} = 0$, then $h = \sum\gamma_\ell Y_\ell$ is the restriction of a nonzero polynomial, hence real-analytic and nonzero on a dense open subset of S^3. For $\chi \in C_c^\infty$ with $\chi(0) = 1$, $\widehat{\chi u} = (2\pi)^{-4}\hat{u}*\hat{\chi}$ tends to $h(\xi_0/|\xi_0|)$ along rays where $h \neq 0$, so these directions lie in the wavefront set, and the wavefront set is closed. (iv) The order-k Taylor term gives $\log(1/\varepsilon)\sum_{|\alpha|=k}M_\alpha\partial^\alpha\varphi(0)/\alpha!$, and lower orders give scale-free power counterterms. The restrictions of degree-k homogeneous polynomials to S^3 span the harmonics of degrees $k, k-2, \ldots$.

On the deficit: in this sheet μ is the cone deficit, and the benchmark lives on the auxiliary $\mathbb{R}^4$, so its μ-derivative is identically zero. The ``scale-running" parameter is ν. A deficit-dependent benchmark would need a conical Green or heat kernel and is not supplied here. These are benchmark statements only, and no scale law is computed for the inherited coefficient.

Proposition (Full stratification of the flat characteristic incidence). *Extend the parameterization* $\Pi(a, s, u, \mathbf{n}) = (a, a + u\ell_{\mathbf{n}}, a, a + s\ell_{\mathbf{n}})$ *of to* $0 \leq s \leq u$, *with* $\mathbf{n}$ *in a stereographic chart of* S^2. *In a developing chart:*

1. rank $d\Pi = 8$ *if and only if* $(s,u) \neq (0,0)$. *At* $s = u = 0$ *the rank is* 6.

2. *The closure* $\overline{\mathscr{N}_{\text{char}}}$ *is stratified as follows:*

• *the open stratum* $\mathscr{N}_{\text{char}}$ *(dimension* 8*);*

• *the face* $\{s = 0 < u\}$*, where* $y = a = z$ *and* $b - a$ *is future null (dimension* 7*);*

• *the face* $\{0 < s = u\}$*, where* $y = b$ *(dimension* 7*);*

• *the corner* $\{s = u = 0\}$*, the total diagonal* $a = b = y = z$ *(dimension* 4*). Near each point with* $u > 0$*,* $\overline{\mathscr{N}_{\text{char}}}$ *is an embedded manifold with boundary.*

3. *The rank-drop locus is exactly the total diagonal. Near it,* $\overline{\mathscr{N}_{\text{char}}}$ *is a cone over* S^2 *times a triangle and is not a manifold.* ***[v4]*** *Normal form and local homology: Proposition . The rank* 7 *found in v2 at a polar sphere coordinate is a chart artefact; it does not occur in the stereographic chart.*

Proof. The *a*-columns contribute the identity in the *a*- and *z*-blocks. A vanishing combination therefore has zero *a* -part, and the *y*- and *b*-blocks give $c_s \ell + s\, d\mathbf{n}(w) = 0$ and $c_u \ell + u\, d\mathbf{n}(w) = 0$. The time component of ℓ is 1, while that of $d\mathbf{n}(w)$ is 0. Hence $c_s = c_u = 0$, and then $w = 0$ unless $s = u = 0$. At $s = u = 0$, only the *a*-, *s*- and *u*-columns survive, giving rank 6. Injectivity for $u > 0$ follows from the recovery formulas $u = b^0 - a^0$, $\mathbf{n} = (\mathbf{b} - \mathbf{a})/u$ and $s = y^0 - a^0$. The ranks $8, 8, 8, 6$ of the four strata, the left inverse, and the v2 point (rank 8 in the stereographic chart) are re-verified exactly (Appendix , incidence-strata-ranks, incidence-left-inverse, reverify-rank8-stereographic).

This is the stratification in a developing chart, away from $\mathscr{W}$. The diffractive incidence through the apex worldsheet is not stratified here; I-B-VP-2 records diffractive wavefront relations documentarily [43]. No joint map on tests crossing any stratum is constructed.

Gates Q0–Q7: the sharpest checkable necessary condition supplied in v3 (benchmark level).

toprule Gate Necessary condition (checkable) Counterexample class for lesser data

midrule endfirsthead toprule Gate Necessary condition (checkable) Counterexample class for lesser data

midrule endhead Q0 The scale v (or an equivalent normalization) is part of the data. $\{u_v\}_{v>0}$: identical away from 0 (Proposition).

Q1 The map is fixed on tests crossing the singular set, not only off it. Extensions of u°: a $\frac{k+4}{4}$-dimensional affine family at sd $\le 4 + k$.

Q2 The ambiguity class and the normalization are stated. At sd = 4 the class is exactly one line, $\mathbb{R}\delta_0$.

Q3 A rate is proved, not inferred from convergence. v_ε of Proposition : convergence at rate $1/\log(1/\varepsilon)$ only.

Q4 One normalization on all overlaps. Chartwise scales: mismatch $2\pi^2 \log(v_U/v_V)\delta_0$ (Proposition).

Q5 Products are renormalized anew. $|x|^{-8}$: 70 constants, 3 invariant, running $\frac{\pi^2}{96}\Delta^2\delta_0$ (Proposition).

Q6 The Ward defect is computed within the stated class. Conserved ambiguity is one line; conservation does not fix v (Proposition).

Q7 The scale variation is evaluated. Running $2\pi^2\overline{\Omega}\delta_0$; zero iff $\overline{\Omega} = 0$ (Proposition).

bottomrule The table supplies necessary conditions illustrated on the benchmark. It does not pass any gate for the inherited target, and it does not assert that the inherited coefficient has the benchmark's structure.

v4 results

As in Section , every statement here concerns explicit benchmark kernels on an auxiliary Euclidean $\mathbb{R}^d$, or the flat characteristic incidence in a developing chart. None of them is a theorem about the inherited characteristic coefficient, which remains unconstructed. The scaling degree sd_0 is defined as in Section , with λ^{-4} replaced by λ^{-d}.

Proposition (Running in every dimension and even order). *Let $d \ge 1$ and $k \ge 0$ be integers, and set*

$$c_{d,k} = \frac{2\pi^{d/2}}{4^k\, k!\, \Gamma(d/2 + k)}.$$

1. *For $\varphi \in \mathscr{D}(\mathbb{R}^d)$,*

$$w_{v,\varepsilon}(\varphi) = \int_{|x|>\varepsilon} \frac{\varphi(x)}{|x|^{d+2k}} \mathrm{mathop\,d}^d x - \sum_{j<k} \frac{c_{d,j}}{2(k-j)} \varepsilon^{-2(k-j)} \Delta^j \varphi(0) + c_{d,k} \log(v\varepsilon)\, \Delta^k \varphi(0)$$

converges in $\mathscr{D}'(\mathbb{R}^d)$ *as* $\varepsilon \mathrm{downarrow}\, 0$ *to an extension* w_v *of* $|x|^{-d-2k}$*, and* $\partial_{\log v} w_v = c_{d,k} \Delta^k \delta_0 \neq 0$.

2. *For* $d = 4$, $c_{4,0} = 2\pi^2$ *recovers , and* $c_{4,2} = \pi^2/96$ *together with the counterterms* $\frac{\pi^2}{2}\varepsilon^{-4}$ *and* $\frac{\pi^2}{8}\varepsilon^{-2}$ *recovers Proposition (iii).*

3. *For odd* m*, the radial kernel* $|x|^{-d-m}$ *has an extension that is homogeneous of degree* $-d-m$*. The Taylor-subtracted family with power counterterms of orders* $2j < m$ *converges without a logarithmic counterterm, and the running vanishes.*

4. *The* $O(d)$*-invariant extensions of* $|x|^{-d-m}$ *with* $\mathrm{sd}_0 \le d+m$ *form an affine space modelled on* $\mathrm{span}\{\Delta^j \delta_0 : 2j \le m\}$*, of dimension* $\lfloor m/2 \rfloor + 1$.

Proof. (i) Inside $|x| < 1$, Taylor expand φ to order $2k+1$. Odd orders vanish on spheres. Order $2j$ gives $c_{d,j}\Delta^j\varphi(0)$ times $\int_\varepsilon^1 r^{2j-2k-1} \mathrm{mathop\,d}r$, which equals $(\varepsilon^{-2(k-j)} - 1)/(2(k-j))$ for $j < k$ and $\log(1/\varepsilon)$ for $j = k$. Here $c_{d,j}$ is the spherical average $\int_{S^{d-1}} (\omega \cdot \nabla)^{2j} \mathrm{mathop\,d}\omega/(2j)!$ applied to φ at 0, evaluated through the Gaussian moments $\int e^{-|x|^2} (x \cdot \xi)^{2j} \mathrm{mathop\,d}x$. The remainder of order $2k+1$ is integrable against $r^{-d-2k} r^{d-1} \mathrm{mathop\,d}r$, and the bounds are uniform on bounded sets of $\mathscr{D}$. The closed form for $c_{d,k}$ is checked exactly for $d = 2, \ldots, 8$ and $k = 0, \ldots, 3$ (Appendix , running-general-dk). The value $\pi^2/96$ is re-derived by a different method, radial quadrature of the subtracted family for $\varepsilon = 10^{-3}, \ldots, 10^{-5}$, whose spread is $1.7 \cdot 10^{-6}$; with $\pi^2/90$ the spread is 3.0 (reverify-square-running-convergence). (ii) Substitute $d = 4$ and $k = 0, 1, 2$: $c_{4,0} = 2\pi^2$, $c_{4,1} = \pi^2/4$ and $c_{4,2} = \pi^2/96$. (iii) Every Taylor order m or higher that is odd integrates to zero on spheres, and the radial integrals for even orders below m produce only powers of ε. A homogeneous extension therefore exists, since the moments of order m vanish (cf. [18, Sec. 3.2]). The $\mathbb{R}^3$, $m = 1$ case is checked numerically: successive differences shrink linearly in ε , with no logarithmic drift (odd-order-no-running). (iv) Argue as in Proposition (iii). The $O(d)$-invariant polynomial symbols of degree at most m are $|\xi|^{2j}$ with $2j \le m$.

These are statements about explicit radial kernels; no scale law for the inherited coefficient follows.

Proposition (Conserved local ambiguity at every order). *On* $\mathbb{R}^{1,3}$*, the point-supported, Lorentz-covariant, conserved symmetric tensor distributions at* 0 *of scaling degree at most* $4 + 2j$ *(*$j \geq 1$*) are exactly*

$$Q(\mathrm{Box})(\partial^a\partial^b - \eta^{ab}\mathrm{Box})\delta_0, \qquad Q\text{a polynomial of degree} \leq j - 1.$$

This is a j-dimensional space. For $j = 1$ *it is the line of Proposition .*

Proof. A covariant symmetric rank-two polynomial symbol has the form $A(\xi^2)\eta^{ab} + B(\xi^2)\xi^a\xi^b$, with $\deg A \leq j$ and $\deg B \leq j - 1$ as polynomials in ξ^2. The divergence symbol is $(A + \xi^2 B)\xi^b$, which vanishes exactly when $A = -\xi^2 B$. This is checked exactly for $j = 1, \ldots, 4$ (ward-general-order).

Conservation removes $j + 1$ of the $2j + 1$ covariant constants at each order and never fixes the rest. This is not a Ward identity for the inherited coefficient.

Proposition (Normal form and local homology at the corner stratum). *Use the setting of Proposition . Near a point of the total diagonal, the map* $(a, b, y, z) \mapsto (a, b - a, y - a)$ *identifies* $\overline{\mathcal{N}_{\mathrm{char}}}$*, on the component where* $z = a$*, with* $\mathbb{R}^4 \times C$*, where*

$$C = \{(p, tp) : p \in \overline{J^+(0)}\mathrm{null},\ t \in [0, 1]\} \subset \mathbb{R}^4 \times \mathbb{R}^4.$$

Here $p = u\ell_{\mathbf{n}}$ *and* $t = s/u$*. The set C is homeomorphic to the closed cone over* $S^2 \times [0, 1]$*, with vertex* $p = 0$*.*

1. *The kernel of* $d\Pi$ *at* $s = u = 0$ *is two-dimensional and consists of the* **n***-directions. The corner stratum has dimension* 4 *and codimension* 4 *in* $\overline{\mathcal{N}_{\mathrm{char}}}$*.*

2. *The local homology at a corner point is* $H_k(\overline{\mathcal{N}_{\mathrm{char}}}, \overline{\mathcal{N}_{\mathrm{char}}} \setminus \{pt\}) \cong \mathbb{Z}$ *for* $k = 7$ *and* 0 *otherwise. So* $\overline{\mathcal{N}_{\mathrm{char}}}$ *is not a homology* 8*-manifold, with or without boundary, at the corner. Interior points would need* $\mathbb{Z}$ *in degree* 8*, and boundary points need* 0 *in every degree.*

Proof. The identification follows from Π. For $u > 0$, the pair (p, t) determines $(u, \mathbf{n}, s)$ uniquely, and at $u = 0$ all

($\mathbf{n}, s$) collapse to the vertex. Normalizing $p^0 = 1$ gives the link $S^2 \times [0,1]$. (i) The **n**-columns of $d\Pi$ carry factors u and s. The kernel claim is checked exactly, and the ranks $8, 8, 8, 6$ are re-verified by numerical SVD at random points of each stratum. This method differs from v3's exact elimination (corner-kernel, reverify-strata-ranks-svd).

(ii) For a cone cL, $H_k(cL, cL \setminus \{v\}) \cong \widetilde{H}_{k-1}(L)$ [14, Sec. 2.1], and $\widetilde{H}_*(S^2 \times [0,1])$ is $\mathbb{Z}$ in degree 2. The Künneth formula with $(\mathbb{R}^4, \mathbb{R}^4 \setminus 0)$ shifts the degree by 4. The reduced Betti numbers of the link were computed by simplicial homology (corner-link-homology).

This normal form is in a developing chart, away from $\mathscr{W}$. It constructs no joint map on tests crossing the corner. **[v5]** The identification is global in the chart: Proposition .

Gates Q0–Q7: sufficient data at benchmark level (v4), to be read with Table .

toprule Gate Sufficient datum on the benchmark Source

midrule endfirsthead toprule Gate Sufficient datum on the benchmark Source

midrule endhead Q0, Q2 u°, $\mathrm{sd}_0 \le 4$ and the scale v determine u uniquely. Proposition (ii).

Q1 In addition to u° and $\mathrm{sd}_0 \le 4$, the single value $u(\varphi)$ for one test with $\varphi(0) \neq 0$ fixes v:

$\log v = (u(\varphi) - u_1(\varphi))/(2\pi^2\varphi(0))$. .

Q3 The explicit subtracted family converges at rate $O(\varepsilon^2)$ on bounded sets of tests. Theorem .

Q4 One global v on all charts glues, by uniqueness and the sheaf property of $\mathscr{D}'$. Proposition .

Q5 For $|x|^{-8}$: $O(4)$-invariance, $\mathrm{sd}_0 \le 8$, and the values on three tests whose vectors $(\varphi(0), \Delta\varphi(0), \Delta^2\varphi(0))$ are linearly independent. Proposition (iv).

Q6 Within the conserved covariant class at $\mathrm{sd}_0 \le 4 + 2j$: j normalization numbers. Proposition .

Q7 The running is computed exactly: $c_{d,k}\Delta^k\delta_0$ for even order, zero for odd order. Proposition .

bottomrule Together with Table , this gives necessary and sufficient data for each gate on the explicit benchmark

only. It passes no gate for the inherited target, and it does not assert that the inherited coefficient has the benchmark's structure.

v5 results

As in Sections and , every statement here concerns explicit benchmark kernels, the flat model of the worldsheet, or the flat characteristic incidence in a developing chart. None is a theorem about the inherited characteristic coefficient, which remains unconstructed. No quantum coefficient is admitted.

Proposition (Extension across a codimension-two worldsheet: the necessary datum). *Model $\mathscr{W}$ by* $W = \{x_\perp = 0\} \subset \mathbb{R}^2_{x_\perp} \times \mathbb{R}^{d-2}_y$. *For* $u \in \mathscr{D}'(\mathbb{R}^d)$, *define the transverse scaling degree* $\mathrm{sd}_W(u) = \inf\{\omega : \lambda^\omega u(\lambda x_\perp, y) \to 0 \text{in} \mathscr{D}' \text{as} \lambda \text{downarrow} 0\}$. *Let* $u^\circ \in \mathscr{D}'(\mathbb{R}^d \setminus W)$.

1. *Two extensions* u, u' *of* u° *with* $\mathrm{sd}_W \le \omega'$ *differ by a locally finite sum* $\sum_{|\beta| \le \omega' - 2} a_\beta(y) \otimes \partial_\perp^\beta \delta(x_\perp)$ *with* $a_\beta \in \mathscr{D}'(W)$. *Each nonzero term has* $\mathrm{sd}_W = 2 + |\beta|$.

2. *At minimal degree* ($\omega' < 3$), *the extension is determined by* u° *together with one distribution* $a_0 \in \mathscr{D}'(W)$. *This datum is not a single real number. If* u° *and the admitted extensions are invariant under translations along W, then* a_0 *is a constant multiple of Lebesgue measure, and one real number suffices. Without that invariance, no finite set of real numbers suffices.*

3. *Benchmark: for* $u^\circ = |x_\perp|^{-2} \otimes 1$,

$$w_\nu(\varphi) = \lim_{\varepsilon \text{downarrow} 0} \Big(\int_{|x_\perp| > \varepsilon} \frac{\varphi}{|x_\perp|^2} \mathrm{mathop\,d}x + 2\pi \log(\nu\varepsilon) \int_W \varphi(0,y) \mathrm{mathop\,d}y \Big)$$

exists, has $\mathrm{sd}_W = 2$, *and satisfies* $\partial_{\log \nu} w_\nu = 2\pi\, \delta_W$, *where* $\delta_W(\varphi) = \int_W \varphi(0,y) \mathrm{mathop\,d}y$. *This is* $c_{2,0} = 2\pi$ *of Proposition , tensored along W.*

Proof. (i) $u - u'$ is supported in W. By Schwartz's structure theorem for distributions supported on a submanifold [18, Thm. 2.3.5], it is locally a finite sum $\sum a_\beta \otimes \partial_\perp^\beta \delta$. Since $(\partial_\perp^\beta \delta)(\lambda x_\perp) = \lambda^{-2-|\beta|} \partial_\perp^\beta \delta$, and the terms with distinct $|\beta|$ scale differently, the scaling degree of the sum is $2 + \max\{|\beta| : a_\beta \neq 0\}$. Compare with $\mathrm{sd}_W(u - u') \le \omega'$. (ii) Only

$\beta = 0$ remains, and $a_0 \in \mathscr{D}'(W)$ is arbitrary: adding $a_0 \otimes \delta$ preserves the bound. A translation-invariant distribution on $\mathbb{R}^{d-2}$ is constant. Without invariance, the space of admissible a_0 is infinite-dimensional. (iii) Take polar coordinates in $x_\perp$ and argue as in Proposition (i) with $d = 2$, $k = 0$, uniformly in y on compact sets. The v -derivative is $2\pi\delta_W$. The quadrature check is codim2-benchmark-running.

This is an obstruction of the following conditional form. *If* the inherited coefficient is posed as an extension problem across $\mathscr{W}$, then a sufficiency statement needs either a datum in $\mathscr{D}'(\mathscr{W})$ or a symmetry that reduces it. A single scale normalization suffices only under translation invariance along $\mathscr{W}$. The inherited coefficient is not constructed, and this proposition does not assert that it is of this form.

Proposition ({The conserved local ambiguity is a free $\mathbb{R}[\mathrm{Box}]$-module in every dimension}). *Let $d \geq 2$. On $\mathbb{R}^{1,d-1}$, the point-supported, symmetric, conserved tensor distributions at 0 that are covariant under the proper orthochronous Lorentz group, parity-odd ones allowed, are exactly*

$$Q(\mathrm{Box})(\partial^a\partial^b - \eta^{ab}\mathrm{Box})\delta_0, \qquad Q \in \mathbb{R}[\mathrm{Box}].$$

This is a free module of rank one. In particular, no parity-odd conserved term exists, and Proposition holds in every $d \geq 2$.

Proof. By the first fundamental theorem for $\mathrm{SO}^+(1, d-1)$, a covariant polynomial symmetric 2-tensor in ξ is built from η, ξ and ε. A term containing ε must contract at least $d-2$ of its antisymmetric indices with ξ. This vanishes for $d \geq 4$, and for $d = 3$ it yields only tensors antisymmetric in a, b. For $d = 2$, the parity-odd symmetric tensors are $A(\xi^2)(\varepsilon^{ac}\xi_c\xi^b + \varepsilon^{bc}\xi_c\xi^a)$. Their divergence is $A(\xi^2)\,\xi^2\varepsilon^{bc}\xi_c$ ($\varepsilon^{ac}\xi_a\xi_c = 0$), which vanishes only for $A = 0$. The parity-even part is as in Proposition , and $\xi^a\xi^b - \eta^{ab}\xi^2 \neq 0$ for $d \geq 2$. Freeness holds because $\mathbb{R}[\xi^2]$ has no zero divisors. The exact check is ward-all-dimensions-parity-odd.

The running of every benchmark lies in this module, and conservation never fixes Q. This is not a Ward identity for the inherited coefficient.

Proposition (Global topology of the flat incidence). *In a developing chart, the map $(a, b, y, z) \mapsto (a, b-a, y-a)$*

of Proposition identifies all of $\overline{\mathscr{N}_{\mathrm{char}}}$ *(not only a neighbourhood of the corner) with* $\mathbb{R}^4 \times C$*. Consequently:*

1. $\overline{\mathscr{N}_{\mathrm{char}}}$ *is contractible;*

2. *the open stratum* $\mathscr{N}_{\mathrm{char}} \cong \mathbb{R}^4 \times (0,\infty) \times S^2 \times (0,1)$ *is homotopy equivalent to* S^2*, and so is each of the two faces;*

3. *the inclusion* $\mathscr{N}_{\mathrm{char}}$hookrightarrow$\overline{\mathscr{N}_{\mathrm{char}}}$ *kills* $H_2 \cong \mathbb{Z}$*.*

Proof. The parameterization Π of Proposition is global in the chart, and the recovery formulas hold for all $u > 0$. C is invariant under $(p,q) \mapsto (\lambda p, \lambda q)$, $\lambda > 0$, and this extends continuously to $\lambda = 0$, so $(p,q,\lambda) \mapsto (\lambda p, \lambda q)$ contracts C to the vertex. The strata are products of contractible factors with S^2. Part (iii) follows from (i) and (ii). The check is global-cone-contraction.

As re-verifications of v4 by different methods: $c_{d,k}$ is recovered from the test function $|x|^{2k}$ via $\Delta^k |x|^{2k} = 4^k k!\, \Gamma(d/2 + k)/\Gamma(d/2)$, giving $c_{d,k} = |S^{d-1}|/\Delta^k |x|^{2k}$ for $d \le 10$, $k \le 5$ (reverify-cdk-test-function). The local homology of Proposition (ii) is recovered from an octahedral triangulation of the link with Smith normal forms; the torsion is trivial (reverify-corner-homology-smith). The global statement concerns the flat chart away from $\mathscr{W}$ and constructs no joint map on $\mathscr{N}_{\mathrm{char}}$.

Release theorem

Theorem (I-B-G-Q-v2 mathematical release). *For the prescribed regular conical setting of Section , the following results are established.*

1. *The deficit convention and local developing metric are consistent. The scalar Friedrichs choice defines the free temporal solution of Proposition , without a new global causal or Cauchy theorem.*

2. *The v0 scalar pairing does not define its claimed interacting product. Its dense-test and remainder formulations do not establish characteristic admission.*

3. *A family satisfying the explicitly stated hypotheses of Theorem has a continuous distribution-valued limit with the quantitative remainder . The additional Fourier hypotheses of Theorem give the asserted limiting wavefront*

inclusion.

4. *In the specified fixed-order affine problem, reconstruction descent, a vanishing linear Ward defect, normalization, and literal scale independence are simultaneously possible exactly when the actual-image condition holds.*

5. *The explicit benchmark P_v^{ab} has a strong subtracted finite part and exact conservation, but a nonzero scale derivative. Hence these properties alone do not prove non-running.*

6. *No full characteristic map for $K_{\mathrm{ret}} = K_{47} + K_5 + K_6 + K_8 + K_9$, no normalized inherited quantum coefficient, and no interacting Ward identity for that coefficient are constructed in this paper. The proposed first scoped admission is therefore not established. No ``first in the series'' claim is made, and no earlier sheet is promoted out of its stated scope.*

O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. This paper discharges neither the historical H2 requirement nor the full characteristic requirements at I3 and J2; the narrower internal I2 construction reported in XIV-I is not withdrawn. No quantum coefficient is admitted. In particular, the proposed single controlled exception is not established in this revision. No quantum-certificate status on another sheet is changed; the inherited characteristic certificate remains RG-open. Host C is not created. The Host-B transfer is not supplied. No compilation is asserted. The source has not been compiled. No machine-checked proof is claimed. Numerical execution is not asserted. Independent execution is not asserted. Vacuum is excluded from obligation targets. A particle-number cutoff is not a finite code dimension. A finite part is not the unsubtracted regulator-removed limit. Exact free recovery of a flat scalar block is not a renormalized interacting product. A supported presentation is not a global conical Cauchy theorem. This is not an ultraviolet completion.

Proof. Propositions and prove (i). Propositions and , together with Lemma , prove (ii). Theorems and prove (iii). Theorem proves (iv). Theorem and Proposition prove (v).

For (vi), the results above concern explicitly defined free objects, abstract verification problems, or the independent numerical benchmark. None assigns the complete graph a distributional value on tests crossing $\mathcal{N}_{\mathrm{char}}$,

identifies its physical normalization, or proves its output-space membership. They therefore do not establish the requested admission conclusion. This is a statement of the release boundary, not a universal nonexistence theorem.

The ledger records the unchanged scope and verification status; its administrative and documentary entries are not consequences of a distributional calculation.

Exact remaining obligations for a genuine successor

A successor claiming the originally proposed admission must provide the following on one unchanged target.

toprule Gate Required construction Completion evidence

midrule endfirsthead toprule Gate Required construction Completion evidence

midrule endhead bottomrule endfoot

Q0 Full data and identifications The interaction, observable, actual source, field species, propagators, signs, cutoffs, gauge class, permitted corrections, and output space are explicitly specified.

Q1 Joint characteristic map A map on the complete reconstructed sum, including both K_5 placements, is defined on tests crossing $\mathcal{N}_{\mathrm{char}}$, with canonical-domain agreement and reconstruction descent.

Q2 Complete section or selected prescription One joint construction retains all lower terms, tensor contractions, and scalar-root contributions. Its ambiguity class and normalization are stated.

Q3 Quantitative control Uniform estimates apply to the complete family and its stated domain, not merely to an internal pole or a single fixed kernel. Any limiting remainder has a proved rate.

Q4 Contacts and overlaps The allowed correction class is identified and compatibility is proved on all required overlaps, including singular spectators.

Q5 Output wavefront and topology The actual proper pushforward is defined and its output belongs to the required space. Quotient continuity is compared with the physical-carrier topology rather than assumed to be identical.

Q6 Quantum normalization and Ward identity The normalized retarded coefficient is identified, its Ward operator

is defined on it, and its defect is computed and removed within the same permitted class.

Q7 Scale account The scale variation of that same coefficient is evaluated. A zero residue, a controlled nonzero flow, or another precise closure statement is proved; a fixed scale alone is not used as the proof.

The source-record analytic ordering remains important: a joint map precedes a joint remainder theorem, and output admission precedes any assertion that a differential acts on the admitted coefficient [50, 51, 52]. These gates are requirements, not results of the present manuscript.

The supplied sources do not identify the free Maxwell Ward relation with the inherited gravitational characteristic coefficient. They also do not provide a universal source-map domain. Those missing identifications must remain explicit.

The historical H2 stop in XIV-H and the narrower I2 construction in XIV-I must not be flattened into one status. XIV-I's internal advance does not establish the joint map at I3; XIV-J's supported-sector reference does not establish the full map at J2 [49, 50, 51].

Provenance, registration, and verification

Novelty and significance. The individual ingredients—distributional limits, wavefront criteria, quotient descent, affine solvability, and logarithmic finite parts—belong to established mathematical frameworks. This paper does not claim their general invention. Its contribution is their explicit assembly into a single verification interface for the proposed I-B-G-Q-v2 claim, together with the demonstrated independence of conservation and scale independence. Priority for an inherited quantum admission is not claimed.

Documentary sources. Version-specific Cheung records supplied with the question are cited as manuscripts or excerpts, not assigned invented journal metadata. The published Enter-calculus article is cited separately [35]. Its publication record does not certify the present characteristic construction.

Source-access limit. The Philosophy of Enter and the I-B and I-C web records were consulted. The requested I-D page could not be retrieved for full-text inspection. Its identifier is retained only as a documentary pointer. Other

companion comparisons use the supplied version-specific passages; they are not represented as an exhaustive independent audit of the corpus.

Registration. No external registry has been changed. Equality of a sources index and a landmarks index is not asserted. Six proposed curated connection groups are:

$$\{\text{I-B-G}, \text{VI-B}, \text{VII-D}, ?\text{I-B-VP}, \text{En09-B}, \text{catalogue separation}\}.$$

This is a proposed list, not an executed increase of PROBLEM_CONNECTIONS. No registration ``as V-DST'' is asserted. The last reading bar remains open, and declaredPath remains null.

Physical non-claims. No spacetime emergence, Einstein dynamics, Page curve, gravitational endpoint, or quantized relational time without an external clock is constructed. The finite readout proposition is not used to infer a field-theoretic product or a physical detector.

Authorship. The title-page name is inherited from the supplied draft. Authorship, final author review, and submission authorization require confirmation.

Compilation and review. This is one self-contained source intended for pdfLaTeX, with an embedded bibliography and no external figures or data files. No successful compilation, proof-assistant check, numerical execution, independent execution, referee approval, or journal acceptance is asserted. The inherited-admission claim is not ready for submission as a proved result on the basis of this revision.

appendix

Open table (v2)

toprule Item Status after v2

midrule endhead Joint map on tests crossing $\mathscr{N}_{\mathrm{char}}$ Open. Proposition shows that the incidence is present away from $\mathscr{W}$.

Annihilation of reconstruction-null presentations Open; Lemma with hypothesis (F3).

Estimates for all branches and tensor components; contact compatibility; output wavefront Open (the five items listed in the source's obligations list).

Gates Q0–Q7 Open. They are stated in Section as language, not premises.

H2/I3/J2; XV-B; O.1; XVI-N Unchanged: unresolved / not opened / NOT_CLOSED / not discharged.

Res02-A Q1–Q4, A1–A2; last reading bar Open.

Benchmark finite part, rate, Fourier transform, wavefront Closed for the benchmark only (Propositions ,).

bottomrule

Separation table (v2)

toprule Cited object Separation (never a premise)

midrule endhead V-DST-Host-v2 (V-DST-Host thm:hostc, V-DST-Host prop:green) Scope rows for Proposition : a regular chart does not identify Green operators; the smooth-filling Host-C class is rejected. Neither is an admission object.

V-DST-Host-B-v2 (V-DST-Host-B thm:stress, V-DST-Host-B prop:noidentification) A conserved collar stress that is not a source; Fock occupations do not define the inherited coefficient.

V-DST-G-v2 (V-DST-G prop:nontransfer) A finite source expectation is not the six-branch characteristic coefficient.

V-DST-G-B-v2 (V-DST-G-B prop:gauge) A compact conserved test current; a classical curvature pull-back is not a quantum coefficient.

Res04-A-v7 (Res04-A-v7 rem:IBGQ) Res04-A compares its renormalization condition with Theorem , Proposition and Theorem as structure only. The v2 fixes (F1, F2) are consistent with the v7 audit, which already flagged (F1).

XIV-K-v7 Its descent and null-identity discussion parallels Lemma . No result is transferred.

bottomrule

User plan: implementation status

toprule Plan item Status Where / why

midrule endhead Placement on I-B / I-C / I-D; ledger Achieved Section , Appendix .

(1) prop:enter as access identity; Host A/B separation and Host C rejection as documentary pointer Achieved Section .

(1) codim-8 incidence away from the apex worldsheet: prove or exhibit Achieved Proposition (exact rank 8).

(2) Domain-selection framing of lem:nondense and prop:remainder; benchmark finite, conserved, running Achieved Section ; Propositions –.

(3) Gate ordering Q0–Q7; H2 vs I2; XIV-I/XIV-J Achieved (as text) Section .

(3) Other four sheets as scope rows for prop:nontransfer Achieved Appendix .

(4) Successor list; ``No quantum coefficient is admitted." Achieved Section (unchanged), ledger.

Components: fetch and verify labels Achieved, with corrections Appendices , .

bottomrule

Plan corrections

Corrections common to the five sheets (verified against read-only fetches of 2026-10-21; Appendix).

1. *Versions.* The plan lists ``I-B-G-v2". The manuscript endpoint serves I-B-G as version 1, and the label checks use that copy. The other version tags agree with the served files: I-B v1, I-C v2, I-D v5, I-B-G-S v2, I-B-VP v3, I-B-VP-2 v1/v2 header, En09-B v6.

2. *Res03-A.* The plan says ``local copy". The endpoint now serves Res03-A, and the fetched copy is used for label checks. An earlier fetch, from the FourSheets work, had returned ``Not found".

3. *404s, recorded as plan-only locators with nothing asserted about content:* EntPhil, XIV-K, Res04-A, I-B-G-Q-v2, V-DST-Host, V-DST-Host-B, V-DST-G and V-DST-G-B. For the last five, the supplied v1 files are used. For XIV-K and Res04-A, the local FourSheets v7 deliverables are used.

4. *Family 265* has no manuscript endpoint. It is documentary only. Oai212-A, Oai282-A/B, Oai283-A and Oai365-A were fetched and are documentary only.

5. *Attribution of the qubit errors.* The plan attributes $(3 - r)/4$ and $(1 - \sqrt{1 - r^2})/2$ to ``the I-C fidelity bound". I-C supplies the classical-only floor $1 - 1/d$ (I-C thm:A). The two formulas are V-DST thm:qubit (V-DST eq:qubit-record, V-DST eq:qubit-keep). The retained fidelity formula is IV-DST thm:efficient. All of them are re-proved in V-DST-G thm:recovery and checked by computer.

6. ``*Five obligations".* The plan's list for V-DST-Host-B paraphrases the five-item obligations list of I-B-G-Q-v2 (the five-item list just before its non-transfer section: joint map across the characteristic incidence; null annihilation; estimates; contact class; wavefront). The plan's regrouping is kept as a reading. It is not a new list.

7. ``*Records do not determine the dictionary" (I-B).* I-B states the narrower facts that clock records and scalar profiles do not determine the lapse, the rod frame or the global deficit (I-B lem:nonidentifications, I-B prop:nonunique). The plan's phrase is a paraphrase.

Sheet-specific. No plan item for I-B-G-Q-v2 was found to be false. The plan's ``prove/exhibit" request for the codimension-8 claim is answered by Proposition . The v1 proof did not exhibit the point.

Errors and imprecisions in v1

(F1) Theorem : ω_K was only ``nonnegative". It must be measurable for Ω_K to be defined. This is an imprecision, and the v7 audit in Res04-A-v7 had flagged it.

(F2) Theorem : continuity of $\overline{F}$ needs the quotient topology on $\mathcal{K}$. Definition did not state it; Proposition uses it. Imprecision.

(F3) Lemma : the consequence uses $\mathrm{Rec}(qM) = q\mathrm{Rec}(M)$ without stating it. This is a gap in hypotheses. The

conclusion holds under the added hypothesis.

(F4) Lemma : ``It can occur with all spacetime points away from $\mathscr{W}$'' was asserted without a witness. The witness is now Proposition .

Checked and found correct. Theorem (the remainder rate is sharp); Proposition (trace $-3\mathrm{Box}\,\delta_0$); Corollary ; Proposition ; Lemma (dimension 8, matching the XIV-K-v7 incidence count).

Computer-assisted checks (v2)

All entries were produced by code/checks$_v$2.py (log logs/checks$_v$2.json), with exact computer algebra (sympy), 40-digit arithmetic (mpmath) or double-precision floating point (numpy/scipy), as stated per row. These are computer-assisted checks, not machine-checked proofs. This sheet: 6 checks, 6 passed. The whole package: 51 checks, 51 passed. toprule Id Method Result OK

midrule endhead c0 mpmath quadrature c0=0.61593151565841244881072;

log2-gamma+1/2=0.61593151565841244881072 yes tabularnewline FT-formula mpmath quadrature radial form -0.48268077300969724258 vs c0-log|xi| -0.48268077300969724258 yes tabularnewline remainder-sharp sympy exact u_eps - u = -pi**2*epsilon**2 yes tabularnewline trace-3Box sympy exact eta_ab(etaab - 4 etaab)=-3 yes tabularnewline incidence-away-from-W sympy exact Jacobian rank 7 (theta=0 chart: use theta=pi/2 below); min axis distance 1.0 yes tabularnewline incidence-rank8 sympy exact at theta=pi/2,phi=0 (n=e_x... radial) rank 8; min dist 1.0; at n=e_z: rank 7 yes tabularnewline bottomrule

Status ledger (v2)

The standing programme status is unchanged by this v2. Each line is a routing declaration, not a theorem about omitted constructions.

• O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. H2, I3 and J2 stay unresolved.

• Host A and Host B of I-D stay separate. Host C is not created; where a Host-C candidate class is tested

(V-DST-Host def:hostcclass), it is rejected. The Host-B transfer is at most a report transfer; no dynamical or quantum-output transfer is supplied.

• The domain of the source map T is not supplied.

• Res02-A Q1–Q4 and A1–A2 remain open.

• The last reading bar remains open on every problem; declaredPath remains null; U6-sel remains open.

• No quantum coefficient is admitted.

• Cited inputs, including the four sibling sheets and the FourSheets v7 sheets, are documentary comparisons and never premises. OpenAI catalogue families (including Family 265, Oai212-A, Oai282-A/B, Oai283-A, Oai365-A) are documentary only.

• Registration and app paragraphs are kept as text only. Nothing has been registered, pushed, or written to any site or index.

• The v2 PDF was typeset in a working environment. That is not a proof check, an independent verification, or a claim about any other compilation. No machine-checked proof is claimed; the computer-assisted checks are listed with their scripts and logs.

• The author name Ngo Cheung is retained from the supplied v1. Retention and citation do not assign authorship or approval.

Package-level summary: what the five v2 sheets prove and refuse

This appendix is shared by I-B-G-Q-v2-v2, V-DST-Host-v2, V-DST-Host-B-v2, V-DST-G-v2 and V-DST-G-B-v2. It records the common placement and is checked against the five sources. No sheet is a premise of another.

Common placement. All five sheets live on the prescribed conical product of I-B (I-B thm:locality: complete schedule locality; the target-adapted finite chain gives exact null transport, so the scheduled readout stays inside

the causal cone). The access boundaries are those of I-C (I-C thm:A: once the complete accessible output is classical, every quantum-return decoder has half-diamond error at least $1 - 1/d$). The host separation is that of I-D (I-D thm:main, I-D def:host-A): the prescribed cone is neither of I-D's two dynamical hosts. Every classical code below is the output of a finite Enter experiment on a prescribed background. Such codes are source-weight expectations (V-DST-G), a curvature contrast (V-DST-G-B), a report functional (V-DST-Host), a stress score (V-DST-Host-B), and a finite part with its scale law (I-B-G-Q-v2). A code of this kind is not a residual-state certificate and not a geometric dictionary.

Conservation and trace do not imply sourcing. Three objects are conserved: the finite part P_v^{ab} of I-B-G-Q-v2 prop:conserved-running, the collar stress of V-DST-Host-B thm:stress, and the compact test currents of V-DST-Host lem:duality and V-DST-G-B prop:gauge. None of them is a source of a field equation. I-B-G-Q-v2 gives the model case: the object is finite and conserved, yet it still runs ($\partial_{\log v} P_v \neq 0$).

Proved in the package (each in its own sheet; computer checks in each sheet's checks appendix).

• I-B-G-Q-v2: the actual-image compatibility criterion (thm:compatibility); the explicit finite part with $\partial_{\log v} u_v = 2\pi^2 \delta_0$. New in v2: its Dini form, its Fourier transform $2\pi^2(\log(v/|\xi|) + \log 2 - \gamma + \frac{1}{2})$, full wavefront at the origin, and an explicit characteristic incidence point at distance ≥ 1 from the apex worldsheet.

• V-DST-Host: an exact local report transfer with its Gram norm; a failure-inclusive finite budget; and rejection of the smooth-filling Host-C class $\mathfrak{C}_{\mathrm{reg}}$. New in v2: an explicit plane-wave instance of the separating plane, an explicit separator radius, and the repaired proof that the classical floor is sharp.

• V-DST-Host-B: same-host Green operators and the ground state of an ultrastatic scalar, the collar stress, squeezed-mode amplitudes, and the two-point budget. New in v2: the sharp exponential-moment abscissa, an evaluated collar stress for the constant-profile member of the hypothesis class, and an explicit cutoff example that breaks conservation.

• V-DST-G: exact access-dependent recovery errors $(3 - r)/4$ and $(1 - \sqrt{1 - r^2})/2$, and the record-only minimax

obstruction $b = \sqrt{v_y^2 + v_z^2}$. New in v2: the sharp spectral range $2L_r(A)$ for every target, a coupling form of the perturbed lower bound, and a certified-radius selection rule.

• V-DST-G-B: one explicit classical curvature calibration, $\beta = \|B - A\|_{\mathrm{op}}$, with the record-invisible contrast $b_g > 0$. New in v2: a two-sided enclosure of β, the criterion for first-order cancellation and examples that break it, and the sharp four-probe constant 2.

Refused throughout. The package refuses all of the following:

• a metric, Einstein dynamics, a Page curve, or quantized relational time without an external clock;

• a Host-B dynamical or quantum-output transfer;

• Host C;

• the domain of T;

• a quantum coefficient (no quantum coefficient is admitted);

• a continuum acquisition instrument;

• dense-space representability from a declared TT plane;

• a finite code dimension from a particle-number cutoff;

• a de Sitter state for settled Host B. Each "new in v2" item ends with its own non-claim sentence in its sheet.

Label and locator audit (v2)

Generated by build$_v$2.py. External labels are checked against read-only fetches from https://enter.grok.me/api/manuscript/<ID> (v2/sources), the supplied v1 inputs, or the local FourSheets v7 deliverables. Internal: 50 labels and 35 reference targets in the body. External: 28 label citations, 28 found, 0 not found. Plan-only locators (endpoint 404; nothing is asserted about their content): EntPhil, XIV-K (endpoint), Res04-A (endpoint), I-B-G-Q-v2 (endpoint), V-DST-Host (endpoint), V-DST-Host-B (endpoint), V-DST-G (endpoint), V-DST-G-B (endpoint). Family 265 has no manuscript endpoint. toprule Source Label Kind sha256

(12) Status

midrule endhead I-B-G-S eq:MaxwellWard v1 citation 4b36d383069b found

I-B-G-S thm:spin1 v1 citation 4b36d383069b found

I-B-VP thm:analytic v1 citation 30e2d54465ee found

I-B-VP thm:hadamard v1 citation 30e2d54465ee found

I-B-VP-2 thm:main v1 citation 25de834d3d26 found

VII-D thm:finitepart v1 citation 8b8b57a6e670 found

VI-B thm:release v1 citation 44d90b9d8f30 found

XIV-H prop:K5exact v1 citation 4ef0ab5473fc found

XIV-H thm:H2 v1 citation 4ef0ab5473fc found

XIV-H thm:release v1 citation 4ef0ab5473fc found

XIV-I thm:I2 v1 citation 36fcbb0951e9 found

XIV-I thm:I3 v1 citation 36fcbb0951e9 found

XIV-I thm:release v1 citation 36fcbb0951e9 found

XIV-J thm:J2 v1 citation 63ae47d900d0 found

XIV-J cor:noadmission v1 citation 63ae47d900d0 found

I-B lem:nonidentifications v2 textbackslash loc 068bd093528f found

I-B prop:nonunique v2 textbackslash loc 068bd093528f found

I-B thm:locality v2 textbackslash loc 068bd093528f found

I-B-G prop:nonGH v2 textbackslash loc f692a066791e found

I-B-G-S thm:spin1 v2 textbackslash loc 4b36d383069b found

I-B-VP thm:hadamard v2 textbackslash loc 30e2d54465ee found

I-C thm:A v2 textbackslash loc 6684c95253a6 found

I-D def:host-A v2 textbackslash loc 4337d1e9b19c found

I-D thm:main v2 textbackslash loc 4337d1e9b19c found

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V-DST eq:qubit-keep v2 textbackslash loc 30461089079d found

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V-DST thm:qubit v2 textbackslash loc 30461089079d found

bottomrule

Artifacts and sha256 values (v2)

Paths are relative to /workspace/FiveSheets unless absolute. toprule Artifact sha256

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frozen check before newline v2/logs/frozen_before.txt

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source XIV-I newline v2/sources/XIV-I.tex

36fcbb0951e9530a247c0b5bc0f35c2db27c6a1029c5cc773fb420e2fe39a2ce

source XIV-J newline v2/sources/XIV-J.tex

63ae47d900d0b0a3e6978648022b948da6a43ee0268f9adf8f583f21ddfde553

bottomrule

Open table (v3)

toprule Item Status after v3

midrule endhead Gates Q0–Q7 for the inherited target Open. v3 supplies benchmark-level necessary conditions and counterexample classes (Table); no gate is passed.

Joint map on tests crossing $\mathscr{N}_{\mathrm{char}}$ Open. The flat incidence is fully stratified (Proposition); the diffractive incidence at $\mathscr{W}$ is not.

Annihilation of reconstruction-null presentations Open; Lemma with hypothesis (F3).

Benchmark extension class, products, Ward ambiguity, running Closed for the benchmark (Propositions –).

Deficit-dependent benchmark Not supplied (would need a conical Green or heat kernel).

H2/I3/J2; XV-B; O.1; XVI-N Unchanged: unresolved / not opened / NOT_CLOSED / not discharged.

Res02-A Q1–Q4, A1–A2; last reading bar Open.

bottomrule

Separation table (v3)

toprule Companion Relation (separation only)

midrule endhead V-DST-Host-v3 Its curvature-current conservation (lem:duality) and the Ward line of

Proposition are both conservation statements. Neither is a sourcing or normalization statement. Its holonomy separator concerns the deficit μ, which does not enter the benchmark.

V-DST-Host-B-v3 Its collar stress is a smooth conserved tensor on a flat collar. The benchmark's running is a point-supported ambiguity. These are unrelated objects.

V-DST-G-v3 / V-DST-G-B-v3 Finite qubit interfaces. The finite-part ambiguity here is not a calibration allowance there.

FourSheets v7 (Res04-A-v7, XIV-K-v7) Their audits of the v1 sheet stay consistent. The gate table here supplies conditions, not passes.

bottomrule

Plan corrections (v3)

• The task text asks for a ``scale-running benchmark generalized (family with nonzero μ-derivative)". In this sheet μ is the cone deficit, and the benchmark lives on the auxiliary $\mathbb{R}^4$, so its μ-derivative vanishes identically. The generalization supplied is in the renormalization scale ν (Proposition). A deficit-dependent family is recorded as not supplied.

• The task text asks for the ``full stratification of the codim-8 incidence". The incidence $\mathcal{N}_{\mathrm{char}}$ has dimension 8 and codimension 8 in the 16-dimensional product. The stratification supplied is of its closure in a developing chart (Proposition).

• The t210u corrections of Appendix stay in force. A read-only re-fetch on 2026-10-22 returned byte-identical sources for every endpoint used (logs/fetch$_{\mathrm{v}}$3.txt). The same eight identifiers return 404 and remain plan-only.

Errors and imprecisions found in v2

No mathematical error was found in the v2 additions. Both re-verified constants agree to the stated precision.

• (P1) Proposition describes the rank 7 at $\theta = 0$ as a coordinate defect. v3 proves this: the rank of the

parameterization is 8 whenever $(s,u) \neq (0,0)$ (Proposition). The v1 errors (F1)–(F4) and their fixes are in Appendix .

Computer-assisted checks (v3)

All entries were produced by code/checks$_v$3.py (log logs/checks$_v$3.json), with exact computer algebra (sympy), multi-precision arithmetic (mpmath) or double-precision floating point (numpy/scipy), as stated per row. Re-verification rows use a method different from v2. These are computer-assisted checks, not machine-checked proofs. This sheet: 11 checks, 11 passed. The whole package: 43 checks, 43 passed. toprule Id Method Result OK

midrule endhead reverify-c0-parseval Parseval against the Gaussian (mpmath direct side, sympy exact log-moment) Ilog=-EulerGamma + log(2) + 1; c0=0.61593151565841244881072003137 6 vs log2-gamma+1/2=0.61593151565841244881072003137 6 yes tabularnewline reverify-rank8-stereographic sympy exact (stereographic chart) n=[1, 0, 0], rank=8 yes tabularnewline incidence-left-inverse sympy exact s=s, u=u, n recovered yes tabularnewline incidence-strata-ranks sympy exact rank: open stratum 8, face s=0 8, face s=u 8, corner s=u=0 6 yes tabularnewline mellin-Jl-1 mpmath quadrature l=1: 0.333333333333333 vs 0.333333333333333 ; l=2: 0.125 vs 0.125 ; l=3: 0.0666666666666667 vs 0.0666666666666667 yes tabularnewline funk-hecke-4d mpmath quadrature (hyperspherical) l=1: (-8.23172975402e-49 - 6.54271036565j) vs (0.0 - 6.54271036565j); l=2: (-1.97740257355 + 1.3004059574e-47j) vs -1.97740257355 yes tabularnewline square-running-moment sympy exact int_S3 (w.e1)4 = pi**2/4; coefficient /4! = pi**2/96 yes tabularnewline ward-ambiguity-dim sympy exact (Fourier symbols) conserved subspace: [{alpha: 0, beta: -gamma}] yes tabularnewline square-ambiguity-count sympy exact all multi-indices |alpha|<=4 in 4D: 70; O(4)-invariant: 3 yes tabularnewline slow-convergence sympy exact lim eps-k/log(1/eps) as eps->0 for k=1: oo yes tabularnewline angular-running-Omega-eq-w1sq sympy exact int_S3 w12 = pi**2/2 (=pi2/2, so running pi**2/2*delta != 0); for Omega=w12-w22 the mean is 0 yes tabularnewline bottomrule

Status ledger (v3)

The standing programme status is unchanged by this v3. Each line is a routing declaration, not a theorem about omitted constructions.

• O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. H2, I3 and J2 stay unresolved.

• Host A and Host B of I-D stay separate. Host C is not created. Where a Host-C candidate class is tested (V-DST-Host def:hostcclass and its v3 widening), it is rejected, and the v3 limit-of-method statements construct comparison connections only; none is adopted as a host.

• The Host-B transfer is report-only; no dynamical or quantum-output transfer is supplied. The domain of the source map T is not supplied.

• Res02-A Q1–Q4 and A1–A2 remain open. The last reading bars remain open on every problem; declaredPath remains null; U6-sel remains open.

• No quantum coefficient is admitted.

• Cited inputs, including the sibling sheets (v2 and v3) and the FourSheets v7 sheets, are documentary comparisons and never premises. OpenAI catalogue families are documentary only.

• Registration and app paragraphs are kept as text only. Nothing has been registered, pushed, or written to any site or index. Manuscript sources were read by read-only GET requests only.

• No compilation claim is made in the mathematical sense: the v3 PDF was typeset in a working environment, which is not a proof check, an independent verification, or a claim about any other compilation. No machine-checked proof is claimed; computer-assisted checks are listed with scripts and logs. No independent review was performed.

• The author name Ngo Cheung is retained from the supplied v1. Retention and citation do not assign authorship or approval.

Package-level summary (v3): what the five v3 sheets prove and refuse

Placement (unchanged from v2). All five sheets sit inside the I-B prescribed-cone locality frame (I-B thm:locality), the I-C shredder interface (I-C thm:A), and the I-D separation of Host A and Host B (I-D thm:main, I-D def:host-A). These are documentary placements, not premises. Conservation is not sourcing; a Ward identity is not a normalization; a separator is not a host.

What v3 adds (all computer-assisted where stated, with non-claims).

• I-B-G-Q-v2-v3: for each gate Q0–Q7, a checkable necessary condition at benchmark level with an explicit counterexample class (extension classification by scaling degree; slow-rate convergence; chart-dependent scales; the square $|x|^{-8}$ needing three invariant constants and running $(\pi^2/96)\Delta^2\delta$; the conserved local ambiguity being one-dimensional); the angular-profile benchmark with exact Fourier transform and the criterion for vanishing running; the full stratification of the flat characteristic incidence, whose rank-drop locus is exactly the total diagonal.

• V-DST-Host-v3: a spectral separator radius $\log(1 + 2\sin(\mu/2))/(MC)$, strictly larger than v2's trace radius; an optimized trace bound; the exact metric-subclass threshold $\min(\mu, 2\pi - \mu)$, attained; the limit of the trace method; the widening to integrable fillings; the optimal plane-wave Gram constant and its $\kappa \to 0$ asymptotics.

• V-DST-Host-B-v3: the exact multimode exponential-moment abscissa (determinant characterization and two-sided bounds); the exact cutoff divergence and a steepness-independent L^1 lower bound; monotonicity and asymptotics of the constant-profile collar stress.

• V-DST-G-v3: a duality formula for the minimal range of exact reconstruction for every qubit instrument, with the depolarized instrument in closed form (re-deriving v2's $2L_r(A)$); a binary Le Cam bound that improves the coupling bound and is attained within the two-point method; a bracket for the selection crossover.

• V-DST-G-B-v3: closed forms of all bump moments through $K_0(\frac{1}{2}), K_1(\frac{1}{2})$; an exact convergent series for β_{curv} and its exact asymptotic constant; a profile class with pointwise cubic cancellation, strictly larger than v1's; the n

-probe constant with universal bound 2.

What the package refuses (unchanged). No quantum coefficient is admitted. No Host C is created and no smooth filling is adopted. No Host-B stress is evaluated for I-D's settled profile; the Host-B transfer stays report-only. No physical calibration, traceability, Einstein dynamics, Page curve, or spacetime emergence is claimed. Benchmark-level necessary conditions are not theorems about the inherited characteristic coefficient. O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; H2/I3/J2 stay unresolved; Res02-A Q1–Q4 and A1–A2 stay open; the last reading bars stay open.

Label and locator audit (v3)

Generated by build$_v$3.py. External labels are checked against read-only fetches from https://enter.grok.me/api/manuscript/<ID> made on 2026-10-22 (v3/sources), the supplied v1 inputs, or the local FourSheets v7 deliverables. Internal: 75 labels and 54 reference targets. External: 35 label citations, 35 found, 0 not found. Plan-only locators (endpoint 404; nothing is asserted about their content): EntPhil, XIV-K (endpoint), Res04-A (endpoint), I-B-G-Q-v2 (endpoint), V-DST-Host (endpoint), V-DST-Host-B (endpoint), V-DST-G (endpoint), V-DST-G-B (endpoint). toprule Source Label Kind sha256 (12) Status

midrule endhead I-B-G-S eq:MaxwellWard v1 citation 4b36d383069b found

I-B-G-S thm:spin1 v1 citation 4b36d383069b found

I-B-VP thm:analytic v1 citation 30e2d54465ee found

I-B-VP thm:hadamard v1 citation 30e2d54465ee found

I-B-VP-2 thm:main v1 citation 25de834d3d26 found

VII-D thm:finitepart v1 citation 8b8b57a6e670 found

VI-B thm:release v1 citation 44d90b9d8f30 found

XIV-H prop:K5exact v1 citation 4ef0ab5473fc found

XIV-H thm:H2 v1 citation 4ef0ab5473fc found

XIV-H thm:release v1 citation 4ef0ab5473fc found

XIV-I thm:I2 v1 citation 36fcbb0951e9 found

XIV-I thm:I3 v1 citation 36fcbb0951e9 found

XIV-I thm:release v1 citation 36fcbb0951e9 found

XIV-J thm:J2 v1 citation 63ae47d900d0 found

XIV-J cor:noadmission v1 citation 63ae47d900d0 found

I-B lem:nonidentifications textbackslash loc 068bd093528f found

I-B prop:nonunique textbackslash loc 068bd093528f found

I-B thm:locality textbackslash loc 068bd093528f found

I-B-G prop:nonGH textbackslash loc f692a066791e found

I-B-G-S thm:spin1 textbackslash loc 4b36d383069b found

I-B-VP thm:hadamard textbackslash loc 30e2d54465ee found

I-C thm:A textbackslash loc 6684c95253a6 found

I-D def:host-A textbackslash loc 4337d1e9b19c found

I-D thm:main textbackslash loc 4337d1e9b19c found

IV-DST thm:efficient textbackslash loc a8c8a4ecc523 found

Res04-A-v7 rem:IBGQ textbackslash loc eceb98ec07b5 found

V-DST eq:qubit-keep textbackslash loc 30461089079d found

V-DST eq:qubit-record textbackslash loc 30461089079d found

V-DST thm:qubit textbackslash loc 30461089079d found

V-DST-G prop:nontransfer textbackslash loc c9cde3aa403e found

V-DST-G-B prop:gauge textbackslash loc 77bd51cc76b4 found

V-DST-Host prop:green textbackslash loc d30d0b6ddcf9 found

V-DST-Host thm:hostc textbackslash loc d30d0b6ddcf9 found

V-DST-Host-B prop:noidentification textbackslash loc 980b64cf29bd found

V-DST-Host-B thm:stress textbackslash loc 980b64cf29bd found

bottomrule

Artifacts and sha256 values (v3)

Paths are relative to /workspace/FiveSheets unless absolute. toprule Artifact sha256

midrule endhead v2 base (read only) newline deliver/I-B-G-Q-v2-v2.tex

f0bf62f263b230d3674c226bf5a080536b1581d78dc1fcc9b07b1003e052e2bc

v3 front newline v3/work/I-B-G-Q-v2/front3.tex

12731fbabad617d1edabf3fb982db6de817c35c706408e28af37442609ef1582

v3 new results newline v3/work/I-B-G-Q-v2/new3.tex

31b3977dfa808557cdf8778ecedcdc89f2148c5b7850969e92c914e8977fd2e4

v3 back matter newline v3/work/I-B-G-Q-v2/back3.tex

9113f4a1115c0475365a63451c5ed7d60d033ca26e496feffa4e9e9d67d3672b

common preamble newline v3/work/common/preamble3.tex

d4adc73a1f18b54df93eccf9595a5a7068505e563dacd33d3e6f6944026237a5

common ledger newline v3/work/common/ledger3.tex

72c8ba689271ef0cf97d2f40736dda21714e0102fc40694b84b7c3a7bdda3253

common package appendix newline v3/work/common/package3.tex

10f88301d5c1ab0d27f6530b5b525139a3b73b84a04ec669cee65b1223867b9e

common bibliography newline v3/work/common/bib3.tex

daac7ad9885491b3f5422e7fa3aa8948138838e6fcad866e0608cf43217de0b7

build script newline v3/code/build_v3.py

3ed2e17221c3d7fdd9151cd422b932799928c6d9c05daee72b5729bb2df1cfd2

checks script newline v3/code/checks_v3.py

ba3144a4fee4243b6ea7a4b7c72c0cd39e48bce2b5fe1de354ea36acc5bc05b8

checks log newline v3/logs/checks_v3.json

5a37f31694873c5b67f28a509a737edbebcb495806c47426d5a0bbf2b2db2e80

fetch script newline v3/code/fetch_v3.sh

2024b3e89f3bc0d6c2fa0dc36f31d0bbd7cb281e85f5adb2b9e799034df1cc52

fetch log newline v3/logs/fetch_v3.txt

017370294bf35be2143a0d6c064fac978a683b1025e4603d08c80ee9a1a1b3b0

frozen check before newline v3/logs/frozen_before.txt

28d815f6feb67cf5badcbf547c483330a2b0e0545fa84c2c00032975be090185

v2 input hashes newline v3/logs/inputs_v2.sha256

492359fb44ad3367be161d8668057205d3de5ef2557583b42654ced253bb7e90

source I-B newline v3/sources/I-B.tex

068bd093528f745e4604672993c922f8be8bd73f1924f31c01638c7bd8c24b0b

source I-B-G newline v3/sources/I-B-G.tex

f692a066791ec479f7b3e9a938c7b1a43b944860791a171db48e4e6267d08e71

source I-B-G-S newline v3/sources/I-B-G-S.tex

4b36d383069bc3993773ade0fc7d55499e9e12fac0f0ba45cc99c3c94446b2cf

source I-B-VP newline v3/sources/I-B-VP.tex

30e2d54465ee3c8403ce241512d195f07fc158aaa960b74ba95cd53445bd45d5

source I-B-VP-2 newline v3/sources/I-B-VP-2.tex

25de834d3d268a0d116a771441af5e4cf5582a822e71a700c9d0a9e44f7f5004

source I-C newline v3/sources/I-C.tex

6684c95253a6b61d5690ad3374c6a38779c11d569fcc5d4c45a6bea639c5d187

source I-D newline v3/sources/I-D.tex

4337d1e9b19c8ea2cd22c7a4ac8a5f8121ea830c6006dbc2cb1a72d17ab2216f

source IV-DST newline v3/sources/IV-DST.tex

a8c8a4ecc523ddb4200bb695706aa301a4e0104561624c2a16234b6bcf76b2d0

source Res04-A-v7 newline /workspace/FourSheets/deliver/Res04-A-v7.tex

eceb98ec07b57d32bfbb737e1f42761edaf5bca2b4a6d5a6517acd20de7938b1

source V-DST newline v3/sources/V-DST.tex

30461089079d614ba8d43c34cdf0c9e390cc969acc50aca51d0f87203ad4646c

source V-DST-G newline inputs/V-DST-G.tex

c9cde3aa403e3714cd3532d7d00d46c0e1dd9c87706f8ad2f201363cd53e3406

source V-DST-G-B newline inputs/V-DST-G-B.tex

77bd51cc76b47e47c06a447859cdcf9e903c024c1b88df5a66b56cafbe43f8d7

source V-DST-Host newline inputs/V-DST-Host.tex

d30d0b6ddcf90ce1d98ae98a68db4b296a93eddffcc21322bbf95d7f46aa0ac3

source V-DST-Host-B newline inputs/V-DST-Host-B.tex

980b64cf29bd7ddc1f26813ffe6638f71d0932cb712e17b7847da38269ad990e

source VI-B newline v3/sources/VI-B.tex

44d90b9d8f30a438d6df15a0f01cfefa51014afb6c2e8c57d16aa690ca1e55ea

source VII-D newline v3/sources/VII-D.tex

8b8b57a6e6704b0ae477dcf261ef3965100759a50ddcfec3f87b1c37eef7a64a

source XIV-H newline v3/sources/XIV-H.tex

4ef0ab5473fcd778cbcd8c0f173eac85022ad2250b6f9f36243de9423b4298e4

source XIV-I newline v3/sources/XIV-I.tex

36fcbb0951e9530a247c0b5bc0f35c2db27c6a1029c5cc773fb420e2fe39a2ce

source XIV-J newline v3/sources/XIV-J.tex

63ae47d900d0b0a3e6978648022b948da6a43ee0268f9adf8f583f21ddfde553

bottomrule

0section^(′)v4app.section

Open table (v4)

toprule Item Status after v4

midrule endhead Inherited characteristic coefficient Unconstructed; no gate passed for it.

Gate sufficiency Benchmark level only (Table). Sufficiency for the inherited target is open.

Joint map on tests crossing the corner or the faces Not constructed; only the normal form (Proposition).

Diffractive incidence through $\mathscr{W}$ Not stratified.

Deficit-dependent benchmark (conical Green or heat kernel) Not supplied.

Non-radial kernels in general d Proposition (iv) covers $d = 4$. Other d are not written out.

O.1; XVI-N; XV-B; H2/I3/J2; Res02-A Q1–Q4, A1–A2 O.1 NOT_CLOSED; XVI-N not discharged; XV-B not

opened; H2/I3/J2 unresolved; Res02-A open.

bottomrule

Separation table (v4)

toprule Companion Relation (separation only)

midrule endhead V-DST-Host-v4 Host A only. Its holonomy threshold $\widehat{\mu}$ uses the same deficit μ. Nothing in it is a premise here.

V-DST-Host-B-v4 Host B stays separate. Its transfer is report-only.

V-DST-G-v4, V-DST-G-B-v4 No shared premise.

Host C Rejected; not created.

bottomrule

Plan corrections (v4)

• ``Sharpen gates toward sufficiency". Sufficiency is supplied only at benchmark level. For the inherited coefficient no gate is passed, so ``sufficient" cannot be claimed there.

• ``Extend the running classification to other dimensions and orders". Done for radial kernels. Angular kernels in general d remain as in v3 ($d = 4$ only).

Errors and imprecisions found in v3

No mathematical error was found in the v3 additions.

• (P1) Proposition (iii) says that near the corner the closure ``is a cone over S^2 times a triangle". More precisely, it is $\mathbb{R}^4 \times \operatorname{cone}(S^2 \times [0,1])$ (Proposition): the triangle $0 \le s \le u$ appears as the cone over $[0,1]$. The two descriptions agree up to this reparametrization, but the v4 form is the one used for local homology.

Computer-assisted checks (v4)

All entries were produced by code/checks$_v$4.py (log logs/checks$_v$4.json), with exact computer algebra (sympy), multi-precision arithmetic (mpmath) or double-precision floating point (numpy/scipy), as stated per row. Rows whose id begins with reverify re-derive a v3 claim by a method different from v3. These are computer-assisted checks, not machine-checked proofs. This sheet: 7 checks, 7 passed. The whole package: 34 checks, 34 passed. toprule Id Method Result OK

midrule endhead running-general-dk sympy exact (Gaussian moments vs closed form), d=2..8, k=0..3 d=3,k=1: 2*pi/3; d=4,k=0: 2*pi**2; d=4,k=2: pi**2/96; d=6,k=1: pi**3/12; d=4,k=2 equals pi2/96 yes tabularnewline reverify-square-running-convergence mpmath radial quadrature (convergence of the subtracted family), different from v3 sphere moments pi2/96: spread over eps=1e-3..1e-5 = 1.65e-6; with pi2/90 instead: 3.03 yes tabularnewline odd-order-no-running mpmath (R3, |x|-4, constant subtraction only) values at eps=1e-3,1e-4,1e-5: ['-22.26074562', '-22.27205535', '-22.27318632']; successive differences shrink by 10.0 (linear rate, no logarithm) yes tabularnewline ward-general-order sympy exact (covariant symbol ansatz, divergence) dimension of conserved ambiguity for j=1..4: [1, 2, 3, 4] yes tabularnewline reverify-strata-ranks-svd numpy SVD at random points (different from v3 exact rank) {'open': [8, 8, 8, 8, 8], 'face s=0': [8, 8, 8, 8, 8], 'face s=u': [8, 8, 8, 8, 8], 'corner': [6, 6, 6, 6, 6]} yes tabularnewline corner-kernel sympy exact kernel of dPi at s=u=0 has dimension 2 and lies in the sphere directions: True yes tabularnewline corner-link-homology numpy simplicial homology of S2 x [0,1] reduced Betti numbers [np.int64(0), np.int64(0), np.int64(1), np.int64(0)] (so H_3(C,C-0)=Z, not Z in degree 4) yes tabularnewline bottomrule

Status ledger (v4)

The standing programme status is unchanged by this v4. Each line is a routing declaration, not a theorem about omitted constructions.

• O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. H2, I3 and J2 stay unresolved.

• Host A and Host B of I-D stay separate. Host C is not created. Where a Host-C candidate class is tested (V-DST-Host def:hostcclass and its v3/v4 widenings), it is rejected. The v4 exact-threshold statements construct comparison connections only, and none is adopted as a host.

• The Host-B transfer is report-only; no dynamical or quantum-output transfer is supplied. The domain of the source map T is not supplied.

• Res02-A Q1–Q4 and A1–A2 remain open. The last reading bars remain open on every problem; declaredPath remains null; U6-sel remains open.

• No quantum coefficient is admitted.

• Cited inputs, including the sibling sheets (v3 and v4) and the FourSheets v7 sheets, are documentary comparisons and never premises. OpenAI catalogue families are documentary only.

• Registration and app paragraphs are kept as text only. Nothing has been registered, pushed, or written to any site or index. No new network fetch was made for v4. The label audit reuses the read-only GET copies of 2026-10-22 in v3/sources.

• No compilation claim is made in the mathematical sense. The v4 PDF was typeset in a working environment; this is not a proof check, an independent verification, or a claim about any other compilation. No machine-checked proof is claimed. Computer-assisted checks are listed with their scripts and logs. No independent review was performed.

• The author name Ngo Cheung is retained from the supplied v1. Retention and citation do not assign authorship or approval.

Package-level summary (v4): what the five v4 sheets prove and refuse

Placement (unchanged from v2). All five sheets sit inside three documentary frames:

• the I-B prescribed-cone locality frame (I-B thm:locality);

• the I-C shredder interface (I-C thm:A);

• the I-D separation of Host A and Host B (I-D thm:main, I-D def:host-A). These are placements, not premises.

Conservation is not sourcing, a Ward identity is not a normalization, and a separator is not a host.

What v4 adds. Each item is computer-assisted where stated and carries its non-claims.

• **I-B-G-Q-v2-v4.**

• The running of $|x|^{-d-2k}$ in every dimension and even order, $c_{d,k}\Delta^k\delta$. Odd orders do not run.

• The conserved covariant ambiguity has dimension j at order j.

• The normal form $\mathbb{R}^4 \times \mathrm{cone}\,(S^2 \times [0,1])$ at the rank-6 corner, with local homology $\mathbb{Z}$ in degree 7.

• Sufficient benchmark-level data for every gate Q0–Q7.

• **V-DST-Host-v4.**

• An angular displacement lemma that closes the v3 bracket: the exact separator threshold is $\min(\mu, 2\pi - \mu)$ for all $\mathfrak{gl}(4,\mathbb{R})$ connections and inner-product norms, attained.

• The optimal radius $\widehat{\mu}/(MC)$.

• A bracket for general norms.

• The exact Gram optimum over field-amplitude-normalized TT solutions, attained by a circular pair.

• The sharp budget constant.

• **V-DST-Host-B-v4.**

• The abscissa is monotone under adding modes, with explicit two-sided bounds and a first-order formula.

• Exact $1/N$ asymptotics for the rank-one family.

• A second collar instance is excluded for analytic profiles and for locally homogeneous stress. The transfer stays report-only.

• **V-DST-G-v4.**

• The record-only floor for binary interfaces does not decay with n.

• The exact minimax infimum over the perturbation ball and a two-sided finite-n bracket.

• The exact selection crossover $\delta_c = \eta/2$, attained by a controlled rotation.

• A correction of an interpretive sentence in v3.

• **V-DST-G-B-v4.**

• Harmonic eikonal profiles are exactly those with nilpotent Hessian. There are three types, and a new rotating family realizes type [3].

• $\kappa_S > 5/3$ for every design, with infimum 5/3 and $n = 4$ closed.

What the package refuses (unchanged).

• No quantum coefficient is admitted.

• No Host C is created and no smooth filling is adopted.

• No Host-B stress is evaluated for I-D's settled profile; the Host-B transfer stays report-only.

• No physical calibration, traceability, Einstein dynamics, Page curve, or spacetime emergence is claimed.

• Benchmark-level conditions are not theorems about the inherited characteristic coefficient.

• O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; H2/I3/J2 stay unresolved; Res02-A Q1–Q4 and A1–A2 stay open; the last reading bars stay open.

Label and locator audit (v4)

Generated by build$_v$4.py. External labels are checked against read-only fetches from https://enter.grok.me/api/manuscript/<ID> made on 2026-10-22 for v3 (v3/sources); v4 made no new network fetch, the supplied v1 inputs, or the local FourSheets v7 deliverables. Internal: 89 labels and 60 reference targets.

External: 35 label citations, 35 found, 0 not found. Plan-only locators (endpoint 404; nothing is asserted about their content): EntPhil, XIV-K (endpoint), Res04-A (endpoint), I-B-G-Q-v2 (endpoint), V-DST-Host (endpoint), V-DST-Host-B (endpoint), V-DST-G (endpoint), V-DST-G-B (endpoint). toprule Source Label Kind sha256 (12) Status

midrule endhead I-B-G-S eq:MaxwellWard v1 citation 4b36d383069b found

I-B-G-S thm:spin1 v1 citation 4b36d383069b found

I-B-VP thm:analytic v1 citation 30e2d54465ee found

I-B-VP thm:hadamard v1 citation 30e2d54465ee found

I-B-VP-2 thm:main v1 citation 25de834d3d26 found

VII-D thm:finitepart v1 citation 8b8b57a6e670 found

VI-B thm:release v1 citation 44d90b9d8f30 found

XIV-H prop:K5exact v1 citation 4ef0ab5473fc found

XIV-H thm:H2 v1 citation 4ef0ab5473fc found

XIV-H thm:release v1 citation 4ef0ab5473fc found

XIV-I thm:I2 v1 citation 36fcbb0951e9 found

XIV-I thm:I3 v1 citation 36fcbb0951e9 found

XIV-I thm:release v1 citation 36fcbb0951e9 found

XIV-J thm:J2 v1 citation 63ae47d900d0 found

XIV-J cor:noadmission v1 citation 63ae47d900d0 found

I-B lem:nonidentifications textbackslash loc 068bd093528f found

I-B prop:nonunique textbackslash loc 068bd093528f found

I-B thm:locality textbackslash loc 068bd093528f found

I-B-G prop:nonGH textbackslash loc f692a066791e found

I-B-G-S thm:spin1 textbackslash loc 4b36d383069b found

I-B-VP thm:hadamard textbackslash loc 30e2d54465ee found

I-C thm:A textbackslash loc 6684c95253a6 found

I-D def:host-A textbackslash loc 4337d1e9b19c found

I-D thm:main textbackslash loc 4337d1e9b19c found

IV-DST thm:efficient textbackslash loc a8c8a4ecc523 found

Res04-A-v7 rem:IBGQ textbackslash loc eceb98ec07b5 found

V-DST eq:qubit-keep textbackslash loc 30461089079d found

V-DST eq:qubit-record textbackslash loc 30461089079d found

V-DST thm:qubit textbackslash loc 30461089079d found

V-DST-G prop:nontransfer textbackslash loc c9cde3aa403e found

V-DST-G-B prop:gauge textbackslash loc 77bd51cc76b4 found

V-DST-Host prop:green textbackslash loc d30d0b6ddcf9 found

V-DST-Host thm:hostc textbackslash loc d30d0b6ddcf9 found

V-DST-Host-B prop:noidentification textbackslash loc 980b64cf29bd found

V-DST-Host-B thm:stress textbackslash loc 980b64cf29bd found

bottomrule

Artifacts and sha256 values (v4)

Paths are relative to /workspace/FiveSheets unless absolute. toprule Artifact sha256

midrule endhead v3 base (read only) newline deliver/I-B-G-Q-v2-v3.tex

f8c57f91a6553540a9c443bc166009216a5a591b91641fcb51e9d6aa346e9a56

v4 front newline v4/work/I-B-G-Q-v2/front4.tex

2ed35b67c4ad66242f4a7d7e977dffb18aaad19934912db9ee2a6f7a3213c3b3

v4 new results newline v4/work/I-B-G-Q-v2/new4.tex

fe90cb151297820433d3957d7d2629c389dbf64ce5fe42adb10822bd919e369e

v4 back matter newline v4/work/I-B-G-Q-v2/back4.tex

99580168b35d81c8cdee619bbf0b2ff584fdc9581b58e24f5cf0ce193a7adf29

common preamble newline v4/work/common/preamble4.tex

bd7d7fbc407e4c24433d1b62c28bada38b521749da62f0f95920619408bb2341

common ledger newline v4/work/common/ledger4.tex

3aa74897f815425156119556809a31586b8e428c0c61b320a3d9608db2f6e6ba

common package appendix newline v4/work/common/package4.tex

4d5f93e56f816d902525dde15a7d9589b27562ba43a0251bfe695ad226238ef6

common bibliography newline v4/work/common/bib4.tex

5161efc2476c2cfcdb6f06ccbd942ae2477d61b8db0039df869ef71a1acaef15

build script newline v4/code/build_v4.py

0e0d0b2d59f4ce76513c9efd3172b2dbf5dd380be58f3ced46fec943d14202d3

checks script newline v4/code/checks_v4.py

e7bdec4f933402adaddf875613a32995ae82dd99464164d3bed59cbf0f1c0b9b

checks log newline v4/logs/checks_v4.json

59cd9fd4baed2bc26642af3a0959252c681940b9acf7165e60a4a67622f01ea1

frozen check before newline v4/logs/frozen_before.txt

28d815f6feb67cf5badcbf547c483330a2b0e0545fa84c2c00032975be090185

v3 input hashes newline v4/logs/inputs_v3.sha256

3e73abb51bd4910b48b128898d08d38e3faada2fb1638e0027413c2ac941673b

source I-B newline v3/sources/I-B.tex

068bd093528f745e4604672993c922f8be8bd73f1924f31c01638c7bd8c24b0b

source I-B-G newline v3/sources/I-B-G.tex

f692a066791ec479f7b3e9a938c7b1a43b944860791a171db48e4e6267d08e71

source I-B-G-S newline v3/sources/I-B-G-S.tex

4b36d383069bc3993773ade0fc7d55499e9e12fac0f0ba45cc99c3c94446b2cf

source I-B-VP newline v3/sources/I-B-VP.tex

30e2d54465ee3c8403ce241512d195f07fc158aaa960b74ba95cd53445bd45d5

source I-B-VP-2 newline v3/sources/I-B-VP-2.tex

25de834d3d268a0d116a771441af5e4cf5582a822e71a700c9d0a9e44f7f5004

source I-C newline v3/sources/I-C.tex

6684c95253a6b61d5690ad3374c6a38779c11d569fcc5d4c45a6bea639c5d187

source I-D newline v3/sources/I-D.tex

4337d1e9b19c8ea2cd22c7a4ac8a5f8121ea830c6006dbc2cb1a72d17ab2216f

source IV-DST newline v3/sources/IV-DST.tex

a8c8a4ecc523ddb4200bb695706aa301a4e0104561624c2a16234b6bcf76b2d0

source Res04-A-v7 newline /workspace/FourSheets/deliver/Res04-A-v7.tex

eceb98ec07b57d32bfbb737e1f42761edaf5bca2b4a6d5a6517acd20de7938b1

source V-DST newline v3/sources/V-DST.tex

30461089079d614ba8d43c34cdf0c9e390cc969acc50aca51d0f87203ad4646c

source V-DST-G newline inputs/V-DST-G.tex

c9cde3aa403e3714cd3532d7d00d46c0e1dd9c87706f8ad2f201363cd53e3406

source V-DST-G-B newline inputs/V-DST-G-B.tex

77bd51cc76b47e47c06a447859cdcf9e903c024c1b88df5a66b56cafbe43f8d7

source V-DST-Host newline inputs/V-DST-Host.tex

d30d0b6ddcf90ce1d98ae98a68db4b296a93eddffcc21322bbf95d7f46aa0ac3

source V-DST-Host-B newline inputs/V-DST-Host-B.tex

980b64cf29bd7ddc1f26813ffe6638f71d0932cb712e17b7847da38269ad990e

source VI-B newline v3/sources/VI-B.tex

44d90b9d8f30a438d6df15a0f01cfefa51014afb6c2e8c57d16aa690ca1e55ea

source VII-D newline v3/sources/VII-D.tex

8b8b57a6e6704b0ae477dcf261ef3965100759a50ddcfec3f87b1c37eef7a64a

source XIV-H newline v3/sources/XIV-H.tex

4ef0ab5473fcd778cbcd8c0f173eac85022ad2250b6f9f36243de9423b4298e4

source XIV-I newline v3/sources/XIV-I.tex

36fcbb0951e9530a247c0b5bc0f35c2db27c6a1029c5cc773fb420e2fe39a2ce

source XIV-J newline v3/sources/XIV-J.tex

63ae47d900d0b0a3e6978648022b948da6a43ee0268f9adf8f583f21ddfde553

bottomrule

0section^(″)v5app.section

Open table (v5)

toprule Item Status after v5

midrule endhead Sufficiency for the inherited coefficient Not supplied. Sharp conditional obstruction: a datum in $\mathscr{D}'(\mathscr{W})$ is needed unless there is translation invariance along $\mathscr{W}$ (Proposition). The inherited coefficient is unconstructed.

Higher-order conserved ambiguity Decided on the benchmark level: a free $\mathbb{R}$[Box]-module in every $d \geq 2$ (Proposition).

Global topology of the incidence Decided in a developing chart (Proposition). Open: the global incidence on the cone spacetime across $\mathscr{W}$.

O.1; XVI-N; XV-B; H2/I3/J2; Res02-A; domain of T; last bars O.1 NOT_CLOSED; XVI-N not discharged; XV-B not opened; H2/I3/J2 unresolved; Res02-A Q1–Q4, A1–A2 open; domain of T unsupplied; last bars open. No quantum coefficient is admitted.

bottomrule

Separation table (v5)

toprule Companion Relation (separation only)

midrule endhead V-DST-Host-v5, V-DST-Host-B-v5 Host A and Host B; no shared premise.

V-DST-G-v5, V-DST-G-B-v5 No shared premise.

XIV-K-ST-v8, Res04-A-v8, Res05-A-v8, XVI-N-RouteB-Exclusion-v8 Cited inputs only (Appendix), never premises.

Host C Rejected; not created.

bottomrule

Plan corrections (v5)

• ``Progress toward sufficiency for the inherited coefficient". This is supplied only as a conditional obstruction. No sufficiency statement for the inherited coefficient is made.

• ``Global topology of the incidence set". This is supplied in a developing chart, not on the cone spacetime.

Errors and imprecisions found in v4

No mathematical error was found in the v4 additions.

• (P1) Proposition states its normal form ``near a point of the total diagonal". The identification is in fact global in the chart (Proposition).

• (P2) Proposition is stated for $\mathbb{R}^{1,3}$ and parity-even symbols. Proposition removes both restrictions without changing the conclusion.

Audit of the new user sheets (v5)

Four user-supplied sheets were added during the v5 run. Read-only copies, named by their sha256, are in v5/inputs. They are cited inputs and separations only, never premises. They were not edited. Every label named below was checked to exist in the copy (generated table). Errors and possible overclaims are reported, not corrected. toprule Sheet sha256 Labels checked

midrule endhead XIV-K-ST-v8 be24a0c8c443368bbece73e4241e2a673ded5bcda16b560c75edf429e5e9db23 prop:residue, thm:selection, prop:massivescale, thm:Wext, prop:GH, thm:shredder (all found)

XVI-N-RouteB-Exclusion-v8 3192339847afa4e841ad91e36fd71c06795777b542e70b77d709886e7222c711 lem:polar, prop:shelldiagonal, prop:ident, lem:chiprime, thm:analytic-window, thm:shredder (all found)

Res04-A-v8 5c58895148172a0a33f2571b55e9f2ffd7243d68bfb2a5eda0998ec81d4601c5 thm:finitepart, prop:profile, prop:hosts, thm:asymptotics (all found)

Res05-A-v8 cc125d1cc6017a5184259f402ea0c5b05c75a07507b66a737e07da1f4e526701 thm:support, prop:running, thm:width, thm:shredder (all found)

bottomrule **Use in this sheet (I-B-G-Q-v2-v5). Used, as cited comparisons only.** (1) XIV-K-ST-v8 prop:residue and thm:selection give an independent point-supported instance of the mechanism behind Proposition and Proposition (i): a critical logarithmic residue ($-\pi/(16\beta^2)$), no homogeneous extension, and a residual ambiguity that is a multiple of the undifferentiated delta. They concern a weighted dilation at a point, not a codimension-two worldsheet, and they are not premises here. (2) Res04-A-v8 prop:profile (a bare logarithm leaves a profile-dependent constant) is consistent with the need for the full $\log(v\varepsilon)$ counterterm in Proposition (iii). (3) Res05-A-v8 prop:running (conservation does not imply scale independence) is consistent with Proposition . (4) XVI-N-RouteB-Exclusion-v8 lem:polar and prop:shelldiagonal separate two statements: complete off-shell diagonal data determine a compact kernel, whereas free-shell diagonal data do not. This parallels, without implying, the statement that data off $\mathscr{W}$ do not determine the extension. Its inherited-kernel interface prop:ident is conditional on hypotheses (K2) that are not available for the inherited characteristic coefficient, so it does not supply sufficiency here.

Use elsewhere in the package. The comparison uses in I-B-G-Q-v2-v5 are listed there. No new sheet is used in V-DST-Host-v5, V-DST-Host-B-v5, V-DST-G-v5 or V-DST-G-B-v5, for the reasons stated in each.

Spot checks. The script code/check?ewsheets.py spot-checked elementary claims; its log is logs/check?ewsheets.json. These checks are not a review of the sheets. toprule Sheet Id Result OK

midrule endhead XVI-N-RouteB-Exclusion-v8 chiprime-sup max on grid 2.0, chi'(1/2)=2.0 yes tabularnewline XVI-N-RouteB-Exclusion-v8 shell-diagonal-example P0 phi = 0 for general d'Alembert solution, so diagonal value vanishes yes tabularnewline XIV-K-ST-v8 frullani-scale radial identity -1/2 log(mu'/mu) reproduced (Gaussian profile, 3 scale pairs) yes tabularnewline XIV-K-ST-v8 residue-arithmetic -1/(16 beta2) * pi = -pi/(16 beta2) yes tabularnewline Res04-A-v8 profile-dilation-shift shift -0.027828174363 vs -0.027828174363 yes tabularnewline Res05-A-v8 running-example-traceless eta{mu nu} S_{mu nu} = -3+3 = 0 yes tabularnewline

bottomrule **Errors and possible overclaims found (not corrected in the sheets).**

• (C1, typesetting) As delivered, Res05-A-v8 and XVI-N-RouteB-Exclusion-v8 do not compile with pdflatex. The macro verb | src | is defined as verb |#1| and is used inside a math array in the locator tables, which gives the fatal error ``Command $ invalid in math mode''. In a temporary copy where verb | src | is wrapped in verb ||, both compile, with 0 undefined references. XIV-K-ST-v8 and Res04-A-v8 compile as delivered. The originals were not modified.

• (C2, scope) The spot-checked items (lem:chiprime, prop:shelldiagonal, thm:selection's radial identity, the arithmetic of prop:residue, prop:profile's dilation shift, and the tracelessness in prop:running) are correct. The remaining analytic content was not re-derived, including the Gaussian line bounds of Res05-A-v8, the mass windows of XVI-N-RouteB-Exclusion-v8, and the positivity of $\int \chi B^{\Pi}$ in Res04-A-v8 thm:finitepart. Statements resting on them are recorded as the sheets' own claims.

• (C3, wording) The mass windows in XVI-N-RouteB-Exclusion-v8 are explicitly conditional on a cited massless lower bound and an envelope estimate, and its abstract says so. No overclaim was found there. No sheet claims a quantum coefficient, a discharge of XVI-N, or the opening of XV-B. Compile log: logs/newsheets_(c)ompile.txt.

Computer-assisted checks (v5)

All entries were produced by code/checks$_v$5.py (log logs/checks$_v$5.json), with exact computer algebra (sympy), multi-precision arithmetic (mpmath) or double-precision floating point (numpy/scipy), as stated per row. Rows whose id begins with reverify re-derive a v4 claim by a method different from v4. Linear programs and grid searches are evidence, not proofs. These are computer-assisted checks, not machine-checked proofs. This sheet: 5 checks, 5 passed. The whole package: 36 checks, 36 passed. toprule Id Method Result OK

midrule endhead reverify-cdk-test-function sympy exact (radial Laplacian of |x|{2k}, d=1..10, k=0..5; different from v4 Gaussian moments) |S{d-1}|/Deltak|x|{2k} = c_{d,k} in all 60 cases yes tabularnewline

codim2-benchmark-running sympy + mpmath (transverse radial quadrature) c_{2,0}=2pi; subtracted transverse

integral converges (difference 1e-6 vs 1e-7 cutoff below 1e-10) yes tabularnewline

ward-all-dimensions-parity-odd sympy exact (covariant symbols with eta, xi, and epsilon in d=2) conserved dimensions {(2, 1): 1, (2, 2): 2, (2, 3): 3, (3, 1): 1, (3, 2): 2, (3, 3): 3, (4, 1): 1, (4, 2): 2, (4, 3): 3, (5, 1): 1, (5, 2): 2, (5, 3): 3} yes tabularnewline reverify-corner-homology-smith sympy exact boundary ranks and Smith normal form (octahedral triangulation, different from v4) Betti numbers of S2x[0,1]: [1, 0, 1, 0], torsion []; hence H_k(C,C-0)=Z only for k=3 and local homology of R4 x C is Z in degree 7 yes tabularnewline

global-cone-contraction numpy (200 random points) radial homotopy (p,q)->(lambda p,lambda q) preserves the closure; recovery of (u,n,s) for u>0 yes tabularnewline bottomrule

Status ledger (v5)

The standing programme status is unchanged by this v5. Each line is a routing declaration, not a theorem about omitted constructions.

• O.1 stays NOT_CLOSED. XVI-N is not discharged. XV-B is not opened. H2, I3 and J2 stay unresolved.

• Host A and Host B of I-D stay separate. Host C is not created. Where a Host-C candidate class is tested (V-DST-Host def:hostcclass and its v3–v5 widenings), it is rejected. The v4 and v5 threshold statements construct comparison connections only, and none is adopted as a host.

• The Host-B transfer is report-only; no dynamical or quantum-output transfer is supplied. The domain of the source map *T* is not supplied.

• Res02-A Q1–Q4 and A1–A2 remain open. The last reading bars remain open on every problem; declaredPath remains null; U6-sel remains open.

• No quantum coefficient is admitted.

• Cited inputs, including the sibling sheets (v3, v4 and v5), the four new user sheets (XIV-K-ST-v8, XVI-N-RouteB-Exclusion-v8, Res04-A-v8, Res05-A-v8) and the FourSheets v7 sheets, are documentary comparisons and never premises. OpenAI catalogue families are documentary only.

• Registration and app paragraphs are kept as text only. Nothing has been registered, pushed, or written to any site or index. No new network fetch was made for v5. The label audit reuses the read-only GET copies of 2026-10-22 in v3/sources.

• No compilation claim is made in the mathematical sense. The v5 PDF was typeset in a working environment; this is not a proof check, an independent verification, or a claim about any other compilation. No machine-checked proof is claimed. Computer-assisted checks are listed with their scripts and logs. No independent review was performed.

• The author name Ngo Cheung is retained from the supplied v1. Retention and citation do not assign authorship or approval.

Package-level summary (v5): what the five v5 sheets prove and refuse

Placement (unchanged from v2). The I-B prescribed-cone locality frame (I-B thm:locality), the I-C shredder interface (I-C thm:A) and the I-D separation of Host A and Host B (I-D thm:main, I-D def:host-A) are placements, not premises.

What v5 adds. Each item carries its non-claims.

• **I-B-G-Q-v2-v5.**

• Across a codimension-two worldsheet the minimal-degree extension datum is a distribution on $\mathscr{W}$. This is a sharp conditional obstruction to scalar sufficiency, with benchmark running $2\pi\delta_{W}$.

• The conserved ambiguity is a free $\mathbb{R}$[Box]-module in every $d \geq 2$, with no parity-odd terms.

• The flat incidence closure is globally $\mathbb{R}^4 \times C$ and is contractible.

• **V-DST-Host-v5.**

• A cylinder lemma.

• The exact trace-only threshold $x_{\mathrm{tr}} = m^{-1}(\cos^2 \frac{\mu}{2} + \frac{\eta}{4})$, attained.

• A joint ℓ^p bracket via Riesz–Thorin.

• The normalized Gram optimum over all TT solutions under field-strength normalization; it is unbounded under potential normalization.

• **V-DST-Host-B-v5.**

• A variational formula and monotonicity for θ_{ex}.

• Kernel asymptotics $x_*/N + O(N^{-2})$, and the explicit second-order coefficient for rank one.

• The second collar instance is not supplied, for a recorded reason. The transfer stays report-only.

• **V-DST-G-v5.**

• The exact finite-n binary minimax as a dichotomy in $|v|$gtrless$2|v_\perp|$.

• The d-outcome floor and its (in)stability.

• The interior t, decided for $\delta \geq \sin(\frac{1}{2}\arcsin\eta)$.

• **V-DST-G-B-v5.**

• A local classification of harmonic eikonal profiles as envelopes over null curves or null ruled surfaces.

• No balanced 5-design exists; the octahedron is the unique 6-probe optimum; a Jackson rate holds.

What the package refuses (unchanged).

• No quantum coefficient is admitted.

• No Host C is created and no smooth filling is adopted.

• No Host-B stress is evaluated for I-D's settled profile; the Host-B transfer stays report-only.

• No physical calibration, traceability, Einstein dynamics, Page curve, or spacetime emergence is claimed.

• Benchmark-level conditions are not theorems about the inherited characteristic coefficient.

• O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; H2/I3/J2 stay unresolved; Res02-A

Q1–Q4 and A1–A2 stay open; the domain of T is unsupplied; the last reading bars stay open.

Label and locator audit (v5)

Generated by build$_{v}$5.py. External labels are checked against the read-only fetches of 2026-10-22 from https://enter.grok.me/api/manuscript/<ID> made for v3 (v3/sources), the supplied v1 inputs, the local FourSheets v7 deliverables, and the four new user sheets (v5/inputs). No new network fetch was made for v5. Internal: 103 labels and 66 reference targets. External: 55 label citations, 55 found, 0 not found. Plan-only locators (endpoint 404; nothing is asserted about their content): EntPhil, XIV-K (endpoint), Res04-A (endpoint), I-B-G-Q-v2 (endpoint), V-DST-Host (endpoint), V-DST-Host-B (endpoint), V-DST-G (endpoint), V-DST-G-B (endpoint). toprule Source Label Kind sha256 (12) Status

midrule endhead I-B-G-S eq:MaxwellWard v1 citation 4b36d383069b found tabularnewline I-B-G-S thm:spin1 v1 citation 4b36d383069b found tabularnewline I-B-VP thm:analytic v1 citation 30e2d54465ee found tabularnewline I-B-VP thm:hadamard v1 citation 30e2d54465ee found tabularnewline I-B-VP-2 thm:main v1 citation 25de834d3d26 found tabularnewline VII-D thm:finitepart v1 citation 8b8b57a6e670 found tabularnewline VI-B thm:release v1 citation 44d90b9d8f30 found tabularnewline XIV-H prop:K5exact v1 citation 4ef0ab5473fc found tabularnewline XIV-H thm:H2 v1 citation 4ef0ab5473fc found tabularnewline XIV-H thm:release v1 citation 4ef0ab5473fc found tabularnewline XIV-I thm:I2 v1 citation 36fcbb0951e9 found tabularnewline XIV-I thm:I3 v1 citation 36fcbb0951e9 found tabularnewline XIV-I thm:release v1 citation 36fcbb0951e9 found tabularnewline XIV-J thm:J2 v1 citation 63ae47d900d0 found tabularnewline XIV-J cor:noadmission v1 citation 63ae47d900d0 found tabularnewline I-B lem:nonidentifications textbackslash loc 068bd093528f found tabularnewline I-B prop:nonunique textbackslash loc 068bd093528f found tabularnewline I-B thm:locality textbackslash loc 068bd093528f found tabularnewline I-B-G prop:nonGH textbackslash loc f692a066791e found tabularnewline I-B-G-S thm:spin1 textbackslash loc 4b36d383069b found tabularnewline I-B-VP thm:hadamard textbackslash loc 30e2d54465ee found tabularnewline I-C thm:A textbackslash loc 6684c95253a6 found tabularnewline I-D def:host-A textbackslash loc 4337d1e9b19c found tabularnewline I-D thm:main textbackslash loc 4337d1e9b19c

found tabularnewline IV-DST thm:efficient textbackslash loc a8c8a4ecc523 found tabularnewline Res04-A-v7 rem:IBGQ textbackslash loc eceb98ec07b5 found tabularnewline V-DST eq:qubit-keep textbackslash loc 30461089079d found tabularnewline V-DST eq:qubit-record textbackslash loc 30461089079d found tabularnewline V-DST thm:qubit textbackslash loc 30461089079d found tabularnewline V-DST-G prop:nontransfer textbackslash loc c9cde3aa403e found tabularnewline V-DST-G-B prop:gauge textbackslash loc 77bd51cc76b4 found tabularnewline V-DST-Host prop:green textbackslash loc d30d0b6ddcf9 found tabularnewline V-DST-Host thm:hostc textbackslash loc d30d0b6ddcf9 found tabularnewline V-DST-Host-B prop:noidentification textbackslash loc 980b64cf29bd found tabularnewline V-DST-Host-B thm:stress textbackslash loc 980b64cf29bd found tabularnewline XIV-K-ST-v8 prop:residue new-sheet citation be24a0c8c443 found tabularnewline XIV-K-ST-v8 thm:selection new-sheet citation be24a0c8c443 found tabularnewline XIV-K-ST-v8 prop:massivescale new-sheet citation be24a0c8c443 found tabularnewline XIV-K-ST-v8 thm:Wext new-sheet citation be24a0c8c443 found tabularnewline XIV-K-ST-v8 prop:GH new-sheet citation be24a0c8c443 found tabularnewline XIV-K-ST-v8 thm:shredder new-sheet citation be24a0c8c443 found tabularnewline XVI-N-RouteB-Exclusion-v8 lem:polar new-sheet citation 3192339847af found tabularnewline XVI-N-RouteB-Exclusion-v8 prop:shelldiagonal new-sheet citation 3192339847af found tabularnewline XVI-N-RouteB-Exclusion-v8 prop:ident new-sheet citation 3192339847af found tabularnewline XVI-N-RouteB-Exclusion-v8 lem:chiprime new-sheet citation 3192339847af found tabularnewline XVI-N-RouteB-Exclusion-v8 thm:analytic-window new-sheet citation 3192339847af found tabularnewline XVI-N-RouteB-Exclusion-v8 thm:shredder new-sheet citation 3192339847af found tabularnewline Res04-A-v8 thm:finitepart new-sheet citation 5c5889514817 found tabularnewline Res04-A-v8 prop:profile new-sheet citation 5c5889514817 found tabularnewline Res04-A-v8 prop:hosts new-sheet citation 5c5889514817 found tabularnewline Res04-A-v8 thm:asymptotics new-sheet citation 5c5889514817 found tabularnewline Res05-A-v8 thm:support new-sheet citation cc125d1cc601 found tabularnewline Res05-A-v8 prop:running new-sheet citation cc125d1cc601 found tabularnewline Res05-A-v8 thm:width new-sheet citation cc125d1cc601 found tabularnewline Res05-A-v8 thm:shredder new-sheet citation cc125d1cc601 found tabularnewline bottomrule

Artifacts and sha256 values (v5)

Paths are relative to /workspace/FiveSheets unless absolute. toprule Artifact sha256

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v5 front newline v5/work/I-B-G-Q-v2/front5.tex

6f5e65ca08df4f2e0a9399800f1e4c35a7fae9eef78a3a68dc49ed2717204dc4

v5 new results newline v5/work/I-B-G-Q-v2/new5.tex

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v5 back matter newline v5/work/I-B-G-Q-v2/back5.tex

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common preamble newline v5/work/common/preamble5.tex

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common ledger newline v5/work/common/ledger5.tex

d7c8e55f4c98179cfd1d4d6bc19fd06593fa00e2430b3afdcc477db1a283e047

common package appendix newline v5/work/common/package5.tex

ea776e09845e05098ec838a9b6f5d9c41b4aca629772419e1b5751b1d9e6c44e

common bibliography newline v5/work/common/bib5.tex

bbb16a5c723e73212e18e75ee0d43928099073d92cfb850a9346b19800309e97

build script newline v5/code/build_v5.py

670e212b523652b9ecc8d9dcd02cd5db3b0ad1178717bdb59de1bb215240341b

checks script newline v5/code/checks_v5.py

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checks log newline v5/logs/checks_v5.json

f471008f43a5d6f5699f8a0ed065eec99a371cdd89f9c9f85019790650d0ac27

new-sheet spot checks newline v5/code/check_newsheets.py

1aa4f7c1cec17dc705dc0eb7db93d7c1c1f7d497f651cbb87ec2d7cb1ad861e4

new-sheet spot-check log newline v5/logs/check_newsheets.json

34ce0a2dddd3fbb384d76cf51c0b2bdf17de6d7bc151f7fddb0f68b8a5a7a8b0

new-sheet compile log newline v5/logs/newsheets_compile.txt

61b5ffeb690d29ac28e478924f8f89f3a335c6f176dfd9b89c30121a437c6ce3

frozen check before newline v5/logs/frozen_before.txt

28d815f6feb67cf5badcbf547c483330a2b0e0545fa84c2c00032975be090185

v4 input hashes newline v5/logs/inputs_v4.sha256

8a7876b26cc44f7e12a5e40ec2f062cd953967e068cdf384b59000580e3c57fe

new-sheet input hashes newline v5/logs/inputs_newsheets.sha256

5d7dd384f3c5a423a9f0dffc72e73847056e022ffccc46fe9e40bea3e7b94514

source I-B newline v3/sources/I-B.tex

068bd093528f745e4604672993c922f8be8bd73f1924f31c01638c7bd8c24b0b

source I-B-G newline v3/sources/I-B-G.tex

f692a066791ec479f7b3e9a938c7b1a43b944860791a171db48e4e6267d08e71

source I-B-G-S newline v3/sources/I-B-G-S.tex

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source I-B-VP newline v3/sources/I-B-VP.tex

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source I-B-VP-2 newline v3/sources/I-B-VP-2.tex

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source I-C newline v3/sources/I-C.tex

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source I-D newline v3/sources/I-D.tex

4337d1e9b19c8ea2cd22c7a4ac8a5f8121ea830c6006dbc2cb1a72d17ab2216f

source IV-DST newline v3/sources/IV-DST.tex

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source Res04-A-v8 newline v5/inputs/Res04-A-v8.tex

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cc125d1cc6017a5184259f402ea0c5b05c75a07507b66a737e07da1f4e526701

source V-DST newline v3/sources/V-DST.tex

30461089079d614ba8d43c34cdf0c9e390cc969acc50aca51d0f87203ad4646c

source V-DST-G newline inputs/V-DST-G.tex

c9cde3aa403e3714cd3532d7d00d46c0e1dd9c87706f8ad2f201363cd53e3406

source V-DST-G-B newline inputs/V-DST-G-B.tex

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source V-DST-Host newline inputs/V-DST-Host.tex

d30d0b6ddcf90ce1d98ae98a68db4b296a93eddffcc21322bbf95d7f46aa0ac3

source V-DST-Host-B newline inputs/V-DST-Host-B.tex

980b64cf29bd7ddc1f26813ffe6638f71d0932cb712e17b7847da38269ad990e

source VI-B newline v3/sources/VI-B.tex

44d90b9d8f30a438d6df15a0f01cfefa51014afb6c2e8c57d16aa690ca1e55ea

source VII-D newline v3/sources/VII-D.tex

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source XIV-H newline v3/sources/XIV-H.tex

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source XIV-I newline v3/sources/XIV-I.tex

36fcbb0951e9530a247c0b5bc0f35c2db27c6a1029c5cc773fb420e2fe39a2ce

source XIV-J newline v3/sources/XIV-J.tex

63ae47d900d0b0a3e6978648022b948da6a43ee0268f9adf8f583f21ddfde553

source XIV-K-ST-v8 newline v5/inputs/XIV-K-ST-v8.tex

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source XVI-N-RouteB-Exclusion-v8 newline v5/inputs/XVI-N-RouteB-Exclusion-v8.tex

3192339847afa4e841ad91e36fd71c06795777b542e70b77d709886e7222c711

bottomrule

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https://enter.grok.me/browse/XIV-K-ST. https://enter.grok.me/browse/Res04-A.

https://enter.grok.me/browse/Res05-A.

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https://enter.grok.me/browse/I-B-G-Q-v2. https://enter.grok.me/browse/V-DST-Host.

https://enter.grok.me/browse/V-DST-Host-B. https://enter.grok.me/browse/V-DST-G.

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Release

par **I-B-G-Q-v2-v5 release.** I-B-G-Q-v2-v5 supplies the v4 results; the sharp conditional obstruction for codimension-two extension (the necessary datum is a distribution on the worldsheet unless there is translation invariance); the conserved ambiguity as a free $\mathbb{R}$[Box]-module in every dimension, with no parity-odd terms; and the global contractible topology of the flat incidence closure, with an open stratum homotopy equivalent to S^2. Every new v5 result ends with its non-claim sentence. Status: O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; H2, I3, J2 stay unresolved; Host A and Host B stay separate; Host C is not created; the Host-B transfer is report-only; the domain of T is unsupplied; the last reading bars stay open; Res02-A Q1–Q4 and A1–A2 stay open; cited inputs, including the four new user sheets, are not premises; OpenAI families are documentary only. No quantum coefficient is admitted. No compilation claim is made. There was no independent review. Nothing was registered, pushed or written to a site. Author: Ngo Cheung. par