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Big06-A: Dark matter as a declared non-electromagnetic gravitational stress-energy reading

A declared-class sheet in the Big series on prescribed classical hosts

Ngo Cheung

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Abstract

Question. A gravitationally inferred stress-energy contribution, a vanishing electromagnetic current, and a microscopic dark-matter model are different mathematical objects. This sheet treats ``dark matter'' only as a *declaration* on a prescribed classical host: a stress-energy contribution that enters the Einstein-form source (or its weak-field Poisson reduction) and carries vanishing electromagnetic current. It proves what follows from that declaration, and what does not. Each statement is either a local result with its hypotheses printed here, or a documentary separation tagged ``source record; not a premise''. Version 1 is built on the user's draft Big06-A-v0 (request t340u), merged with the plan of request t338u. Every draft and plan item is re-proved or corrected (Appendices –).

Findings. (1) *Exact non-electromagnetic constraint* (Theorem). Write $\mathscr{J} = (-g)^{-1/2}\delta S/\delta A$. On a convex domain of potentials, $\mathscr{J} \equiv 0$ holds off shell exactly when the action does not change under compactly supported changes of A. This identical reading excludes every photon coupling: charge and millicharge, dipole-type, anapole, kinetic mixing, and also Rayleigh-type $f(\psi)F^2$ and axion-like $\varphi F\widetilde{F}$ terms. The weaker background reading, $\mathscr{J} = 0$ at $A = 0$, excludes exactly the terms linear in A. An explicit polarizability term has zero current on every $F = 0$ history but a nonzero second variation (Proposition). The plan's criterion ``operators that would produce observable photon scattering'' is replaced by this exact criterion. A vanishing current does not force an internal Noether current to

vanish. (2) *Conservation and transport* (Propositions –). For a diffeomorphism- and gauge-invariant action, $\nabla_a T^a{}_b = F_{bd}\mathscr{J}^d$ on shell, and $\nabla_d \mathscr{J}^d = 0$ follows from gauge invariance. Under the identical reading, the dark slot is separately conserved in every Maxwell background, and separately conserved positive dust moves on geodesics. Finite moments do not determine a phase-space distribution. Positive dust, positive kinetic matter and Maxwell stress obey the null energy condition. On the bare de Sitter host, no split whose slots all obey the null energy condition has a dust dark slot. (3) *Inverse problems* (Propositions , ,). With all other sources supplied, the dark tensor is the unique residual $\chi^{-1}(\mathscr{G} + \Lambda g) - T^{\text{known}}$. Without them, every conserved tensor is admissible. Under spherical symmetry and circular test orbits, $\rho_{\text{dm}} = (4\pi G r^2)^{-1}\,\mathrm{d}(r v_c^2)/\mathrm{d}r - \rho_{\text{b}}$. The reconstruction is Lipschitz in $(v_c^2, (v_c^2)', \rho_{\text{b}})$, but it is discontinuous under uniform errors in v_c^2 alone, and every $\rho_{\text{b}} \in [0, \rho_{\text{tot}}]$ gives the same rotation curve. (4) *Cosmological slot* (Proposition , , Corollary). A separately conserved dust slot dilutes as a^{-3}. On a prescribed host, $4\pi G\rho_{\text{tot}} = \frac{3}{2}H^2$ is an identity of the metric, not Friedmann dynamics. Linear dust perturbations respond to the *total* potential. On the Einstein–de Sitter comparison host the growing mode is $\propto a$ for every baryon fraction. (5) *Non-selection* (Propositions –). The vanishing-current declaration constrains only a current coordinate. Its intersection with the ordinary/dark/vacuum split fibre is the whole fibre. Fractions therefore have exact minimax risk equal to half their range, indicators $\frac{1}{2}$ (1 for deterministic answers), and ratios infinite. Adaptive protocols with common kernels change nothing. A constant volume term, equivalently the shift $(T_{\text{dm}}, T_\Lambda) \mapsto (T_{\text{dm}} + \lambda g, T_\Lambda - \lambda g)$, preserves every current declaration and the null energy condition, so vacuum normalization stays open. Splits become identifiable under the stated counter-conditions: a supplied known source, a fixed dust-plus-vacuum form, or a current-sensitive family. Smooth futures that share a de Sitter past and a positive dust history differ in event-horizon existence. (6) *Interfaces.* The destructive Enter instrument and the Shredder floor $1 - 1/d$ are access theorems. They certify neither photon non-interaction nor gravitational coupling (Proposition , Theorem).

Why it matters. The sheet separates three things the phrase ``dark matter" usually fuses: a gravitational source term, a non-electromagnetic constraint, and a microscopic or dynamical model. It states exactly which extra

hypothesis each stronger conclusion needs. Observational comparisons (rotation curves, lensing, clusters, power spectrum) appear only as external steps of a declared workflow (Section). None is performed, and no observational claim is made. No priority is claimed for standard fluid, perturbation, Poisson or entanglement-breaking results.

Audit. Every cited label was re-read from the site records. Four labels named in the plan are absent from them: Big01-A thm:vacfibre and cor:P5, which exist only in an unregistered local version, and I-B-VP def:current and prop:well-defined. Registered substitutes are cited instead. Plan corrections PC-1 to PC-22, draft verdicts G0-1 to G0-30 with draft corrections DC-1 to DC-14, and a reconciliation of the draft's ``Debugging the proposed plan" table are in the appendices. Checks DM-1 to DM-20 are executed with negative controls and pass (Appendix).

Version 2 (insertion-only). Version 2 keeps every line of version 1 and adds the following new findings. (7) *The current declaration and the split survive every split-independent test, including under reading R1 itself.* Moving a conserved current between the dark and ordinary slots changes no geometric or total-current datum, so whether $j_{\mathrm{dm}} \equiv 0$ holds has minimax error $\frac{1}{2}$ (Proposition). An explicit potential-free dust action realizes every member of the ordinary/dark fraction family on dust-total hosts, so the indicator risk $\frac{1}{2}$ and the infinite ratio risk hold under R1, not only for accounts (Proposition). Which accounts a supplied action class realizes is decided by a projection criterion (Proposition), and R1 at one fixed metric does not make the stress independent of the potential (Proposition). (8) *Adaptive experiments.* Blindness to the current coordinate alone does not hide the split; a complete common process does, also with stopping rules, and approximately common processes keep a risk floor $\frac{\Delta}{2}(1 - \varepsilon^{*})$ (Proposition , Theorems and). A current-sensitive supply is a data refinement, not a derivation (Corollary). The dark slot and Big02-A dark capacity are independent coordinates in both directions (Proposition). (9) *Vacuum shift.* The shift $(T_{\mathrm{dm}}, T_{\Lambda}) \mapsto (T_{\mathrm{dm}} + \lambda g, T_{\Lambda} - \lambda g)$ keeps every current and the null energy condition but not dust form or positivity: the weak condition holds exactly for $-\rho_{\Lambda} \le \lambda \le \inf \varepsilon_{\mathrm{dm}}$, the dominant one for $\lambda \le \frac{1}{2}\inf \varepsilon_{\mathrm{dm}}$. The vacuum density then has the finite risk $\frac{1}{2}(\rho_{\Lambda} + \inf \varepsilon_{\mathrm{dm}})$ (Proposition , Corollary). Rank is not supply: box risks hold at every rank, and a supplied value of an injective map identifies its coefficients (Theorem

). The coefficient orbit is complete and independent of the split (Proposition). (10) *Conditional forecasts and joint consistency relations* (Sections and), each with a rejection condition and with hypotheses outside the ledger.

• The departure of $a^3\varepsilon_{\mathrm{dm}}$ from a constant equals the integrated exchange.

• Two separately conserved geodesic dusts: $a(\theta_1 - \theta_2)$ is constant and the contrast difference freezes; a compensated mode with zero total density and momentum leaves every linear potential zero.

• Expansion and growth must reconstruct one matter density: $\widehat{\Omega}_{\mathrm{m}}(a)$ is constant along every solution, whatever the baryon fraction.

• For geodesic tracers the lensing–motion residual equals $k^2(\Psi - \Phi)$ with no field equation, so $L = 2V_g$ is equivalent to zero gravitational slip.

• Shell masses are stable with a sharp bound, local densities are not, and nonnegativity of the residual density is a shell inequality.

• On a flat matter-plus-vacuum branch the event-horizon radius tends to c/H_∞, every linear growth solution freezes, and the background mass inside the horizon tends to zero; bound systems are not claimed to dissolve.

• A positive dust slot inside a null-saturated total, such as the de Sitter past, forces a null-energy defect in the remainder that no vacuum shift can remove. (11) *Errata* (insertion-only). $\chi\varepsilon_{\mathrm{tot}} = 3H^2 - \Lambda$ and $\chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2) + \Lambda$ replace the Λ-free forms of Proposition (b) and finding (4) (E2-1); energy-condition conclusions need $\chi > 0$ (E2-2); a deterministic rule of a random transcript can have error $\frac{1}{2}$, not 1 (E2-3). *Why it matters:* the new relations tie independently reconstructed quantities together, so one specified model must fit expansion, growth, lensing, motions and shell masses jointly, while the attribution, current and vacuum ambiguities are shown to survive every split-independent test. Verdicts and a crosswalk are in the appendices. *Version status:* the Big03-A site record is still version 2, and its version-3 labels are not cited. The Big01-A site record is now version 7 and contains thm:vacfibre and cor:P5 (PC2-3, PC2-9). Because material is inserted, version-1 section numbers after Section 7 shift, and version-1 reference ranges such as that of finding (5) now also

span the inserted version-2 sections. par Standing ledger (verbatim): Host A and Host B stay separate prescribed backgrounds. Host C is not created. O.1 stays NOT_CLOSED. XV-B is not opened. XVI-N is not discharged. Gate 0 and ST4b stay NOT_SUPPLIED. No quantum coefficient is admitted. No Einstein dynamics, derived metric, spacetime emergence, Page curve, island, vacuum energy, or quantized relational time without an external clock is claimed. A source record is not a premise. The OpenAI catalogue is not a premise. Citations identify source records only; no proof transfer.

Bibliographic record

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Keywords: dark matter; constitutive modelling; inverse problems; electromagnetic current; stress-energy; identifiability; destructive readout; prescribed spacetime.

Introduction: an operational reading, not a particle identification

The question addressed

The question is not whether familiar dark-matter models can be written down. It is what follows from the much

smaller declaration ``this tensor contributes to the gravitational source and this component has $J^{\mu}_{\mathrm{EM}} = 0$''. That declaration does not say whether the component is cold, collisionless, stable, pressureless, individually neutral, or electromagnetically decoupled as a functional of a background field. The distinction matters physically. Neutral particles can have dipole or polarizability couplings to photons [Sigurdson04,WeinerYavin12]. Gravity constrains only a total source, and decomposing it into dark constituents needs further restrictions [Kunz09]. Rotation-curve inference needs geometric, tracer and baryonic modelling, as in the SPARC mass models [Lelli16]. These references are motivation only; the sheet does not reproduce those analyses. Three separations organize the sheet:

• a zero current on one history versus an identically zero variational current;

• a compatible stress tensor versus a transport or evolution law;

• a total gravitational source versus its attribution to named components. The individual tools are elementary or standard. The contribution is their assembly into one declared-class analysis, with explicit countermodels and exact risks.

Enter, spacetime Enter and the Shredder

The Enter calculus treats runtime quantum names as access rights to tensor factors. Destructive computational-basis readout returns a classical record rather than the measured quantum name [CheungEnter]. Its operational characterization of measurement is made within an explicit structural class. The companion's introductory essay separates readout from recovery and an analogy from an identification [CheungPhil]. Spacetime Enter places finite registers and clocks on a prescribed classical manifold. Consuming a clock encoding does not consume the geometric time coordinate or the causal cone (the I-B corrections table, Section). The Shredder interface makes the access boundary explicit: an exclusively classical record can be decoded only through a measure-and-prepare channel [HSR03]. Section proves the finite statements needed here.

The Big Bang analogy in Big01–Big05

The Big series uses cosmological language to compare prescribed geometry, access, capacity promises and

declared thermodynamic dictionaries. The separations retained here are as follows. Big01-A: a causal patch and its horizon are geometric data, and a finite capacity is an additional promise. Big02-A: an access-relative dark-capacity label is not a clustering density. Big03-A: evaluation at a supplied coefficient is not a derivation. Big04-A: radiation labels use declared dictionaries and calibration coordinates. Big05-A: a total source does not determine its ordinary/dark/vacuum split, and a prescribed past is not a complete future. These comparisons are documentary (Section). Epoch-dependent accounting does not derive a singularity, inflation, matter production or an initial quantum state.

Status conventions, records and units

Proved means a full local proof from hypotheses stated in the sheet. *Conditional* means proved from an explicitly declared reduction that is itself not derived. *Documentary* means a record of what a source record states. A citation of the form ``X label (source record; not a premise)'' identifies a labelled statement of the site record X. Citations identify source records only; no proof transfer. Every numbered statement is followed by a non-claim that repeats the plan's standing non-claims and the short ledger.

The site records were retrieved read-only on 25 October 2026 from https://enter.grok.me/api/manuscript/<ID>. Their versions and hashes are in Appendix . On the site, Big01-A is at version 5, Big02-A at version 6, Big03-A at version 2 and Big05-A at version 3. Local, unregistered versions are not source records and are not cited: Big01-A versions 6 and 7, Big02-A version 7 and Big03-A version 3. The draft Big06-A-v0 is the user's input to this version, not a source record.

Relativistic calculations use $c = 1$ and signature $(-,+,+,+)$ unless c is restored. $\mathcal{G}_{ab} = R_{ab} - \frac{1}{2}Rg_{ab}$ is the Einstein tensor; $G > 0$ is Newton's constant. $\chi \neq 0$ is a declared comparison coupling; where a value is needed, $\chi = 8\pi G$. Λ is declared. $F_{ab} = \partial_a A_b - \partial_b A_a$. In the Newtonian section, ρ is mass density. The Big-series coefficient slot κ plays no role and has no value. ``Reading'' means a mathematical constitutive assignment, not a constructed detector. *Version-2 note (Erratum E2-2).* Every conclusion that infers a sign of a source quantity from a sign of a geometric quantity divides by χ, so it needs $\chi > 0$. Where version 1 draws such a conclusion (Proposition (b)), read the

declaration as $\chi > 0$. Results that use only $\chi \neq 0$ are unaffected.

Declared classes and gravitational compatibility

Fix a prescribed host: a connected, time-oriented smooth four-manifold M with a C^3 Lorentzian metric g, a declared Λ, a declared $\chi \neq 0$, and a connected open set U. Statements concern regular regions, not a distributional source at a conical apex.

Definition (Dark-matter reading; def:DM-read). A *split* of the host source on U is a triple $\sigma = (T_{\mathrm{b}}, T_{\mathrm{dm}}, T_{\Lambda})$ of symmetric, divergence-free tensor fields with

$$\mathcal{G} + \Lambda g = \chi\,(T_{\mathrm{b}} + T_{\mathrm{dm}} + T_{\Lambda}) \qquad \text{on} U.$$

The slots are called ordinary, dark and vacuum. The set of splits is $\mathrm{Sp}(g, \Lambda, \chi; U)$. A *current assignment* is a triple $j = (j_{\mathrm{b}}, j_{\mathrm{dm}}, j_{\Lambda})$ of vector fields. A *dark-matter reading* is a pair (σ, j) with $j_{\mathrm{dm}} \equiv 0$. Write $T^{\mathrm{known}} = T_{\mathrm{b}} + T_{\Lambda}$ for the declared non-dark slots, whether they are supplied or not. In a declared Newtonian reduction, the reading enters through

$$\Delta\Phi = 4\pi G(\rho_{\mathrm{b}} + \rho_{\mathrm{dm}}).$$

If a candidate action $S[g, A, \psi]$ of the dark sector is supplied, its current $\mathcal{J}$ is defined by below. The declaration $j_{\mathrm{dm}} = 0$ is then read either as *R1 (identical; adopted)*: $\mathcal{J} \equiv 0$ for every allowed (A, ψ); or as *R2 (background; recorded)*: $\mathcal{J}[0, \psi] \equiv 0$ for every ψ. The bare reading supplies no equation of state, transport law, particle charge, phase-space distribution, stability property or electromagnetic response functional. Neither nor is derived from Enter.

Status: definition. This is a constitutive declaration, not a selection theorem. The split follows Big05-A v3 def:Big05-split (source record; not a premise), so each slot is conserved by definition. The draft's form, $\mathcal{G} + \Lambda g = \chi(T^{\mathrm{known}} + T^{\mathrm{DM}})$, is the case where T^{known} is held fixed. ``Added to the total stress-energy'' means, on a prescribed host, choosing a slot of a split of the fixed total. No metric responds to it (PC-11). par *Non-claim.*

``Dark matter" names this declared class only. Without further conditions the class is broader than cold dark matter and contains tensors that are not matter-like. The dark slot is not identified with Big02-A dark capacity (Big05-A v3 prop:Big05-dark (source record; not a premise)). Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Definition (Additional constitutive restrictions; def:DM-subclasses). The following are separate restrictions, not consequences of Definition . (a) *Dust:* $T_{\mathrm{dm}} = \varepsilon\, u \otimes u$ with $\varepsilon \geq 0$ and u a future unit timelike field. (b) *Perfect fluid:* $T_{\mathrm{dm}} = (\varepsilon + p)u \otimes u + p\, g$ with separately specified constitutive data. (c) *Kinetic:* T_{dm} is the second moment of a nonnegative mass-shell distribution, whose transport law is specified separately. (d) *Exchange law:* $\nabla_a T^{ab}_{\mathrm{dm}} = Q^b$ for a specified Q; separate conservation is $Q = 0$. (e) *Off-shell silence:* reading R1 for a supplied action.

Status: definition. In this sheet's split convention, (d) with $Q \neq 0$ means that the dark slot is *not* a split slot and is to be paired with a compensating exchange in another slot. The draft's general Q is kept for Proposition . par

Non-claim. Positivity, pressurelessness, individual neutrality, collisionlessness and off-shell silence are not interchangeable assumptions. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Residual source, inverse source and their limits; prop:DM-residual).

• *Inverse source. For every* C^3 *metric, every* Λ *and every* $\chi \neq 0$, $T_{\mathrm{tot}} := \chi^{-1}(\mathcal{G} + \Lambda g)$ *is symmetric and divergence-free and solves the Einstein-form equation. Its existence selects neither a metric nor* Λ*.*

• *Residual uniqueness. If* g, Λ, χ *and a symmetric* T^{known} *are supplied exactly, then* $T_{\mathrm{dm}} = T_{\mathrm{tot}} - T^{\mathrm{known}}$ *is the only dark tensor, and* $\nabla_a T^{ab}_{\mathrm{dm}} = -\nabla_a T^{ab}_{\mathrm{known}}$.

• *Limits. Total conservation does not imply separate conservation. The residual need not be positive dust, a perfect fluid or kinetic. Assigning* $j_{\mathrm{dm}} = 0$ *does not verify any microscopic realization of it.*

• *No constraint without supplied slots. If* T^{known} *is not supplied, then for every symmetric divergence-free* X *and every* $T_\Lambda = -\rho_L g$ *with constant* ρ_L*, the triple* $(T_{\mathrm{tot}} - X - T_\Lambda, X, T_\Lambda)$ *is a split. Constraints on* T_{dm} *come only from declarations on the other slots, such as energy conditions or constitutive laws.*

Proof. (a) The contracted Bianchi identity and $\nabla g = 0$. Substitution gives the equation for every choice of inputs, so the equation alone cannot distinguish them. (b) Subtract T^{known} in and take divergences. (c) No positivity or algebraic-type condition enters the subtraction; for example, $-\varepsilon\, u \otimes u$ with $\varepsilon > 0$ is not positive dust. (d) The sum is T_{tot} and each piece is divergence-free.

Status: proved. Part (a) has the same shape as Big05-A v3 lem:Big05-bianchi, DS-OB-1-fibre thm:F-einstein(c) and I-B prop:not-source (source record; not a premise). Parts (b) and (d) are the two ends of non-selection: detailed supplied data fix the residual, and absent data fix nothing. par *Non-claim.* The residual is not identified with any substance. An independently specified Einstein–matter theory is not called vacuous. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED;

XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

The electromagnetic constraint: history versus functional identity

Variational convention

Suppose, only to test a proposed microscopic completion, that a local action $S_U[g, A, \psi]$ is supplied on a relatively compact regular region U. For compactly supported variations a define the bulk current by

$$\delta_A S_U[g, A, \psi](a) = \int_U \sqrt{-g}\, \mathscr{J}^b[g, A, \psi]\, a_b \, \mathrm{d}^4x.$$

This fixes the sign of $\mathscr{J}$; no Maxwell equation is used. A macroscopic J_{EM} is identified with $\mathscr{J}$ only through an explicit bridge.

Theorem (Exact bulk non-electromagnetic constraint; thm:DM-nonEM). *Fix g and ψ. Let the allowed potentials form a convex set, and let S_U be continuously differentiable along segments whose differences are compactly supported in U.*

• *R1. $\mathscr{J}[g, A, \psi] = 0$ as a distribution for every allowed A if and only if $S_U[g, A_1, \psi] = S_U[g, A_0, \psi]$ whenever $A_1 - A_0$ is compactly supported in U. If this holds for every ψ in a field domain, every existing mixed variation that contains an A-variation vanishes in these directions.*

• *R2. If 0 is allowed, $\mathscr{J}[g, 0, \psi] = 0$ if and only if the first variation of S_U in A at $A = 0$ vanishes, that is, iff S_U has no term linear in A in its expansion at $A = 0$.*

• *Euler form. For a first-derivative local scalar Lagrangian $L(g, \psi, \nabla\psi, A, F)$,*

$$\mathscr{J}^\nu = \frac{\partial L}{\partial A_\nu} - 2\nabla_\mu\left(\frac{\partial L}{\partial F_{\mu\nu}}\right).$$

The off-shell condition therefore constrains the Euler derivative of the whole action, not merely its explicit partial derivative in A.

Proof. (a) Put $A_s = A_0 + s(A_1 - A_0)$. Under R1, $\frac{\mathrm{d}}{\mathrm{d}s} S_U[g, A_s, \psi] = \int_U \sqrt{-g}\, \mathscr{J}^\nu[g, A_s, \psi](A_1 - A_0)_\nu = 0$; integrate over

$s \in [0,1]$. Conversely, differentiate the equality at A in every compactly supported direction; and the fundamental lemma for distributions give $\mathscr{J} = 0$. If this holds for all ψ, differentiating the zero variation in further directions gives the mixed statement wherever those derivatives exist. (b) $\mathscr{J}[g, 0, \psi]$ is the first-order Taylor coefficient at $A = 0$. (c) By antisymmetry, $\frac{\partial L}{\partial F_{\mu\nu}} \delta F_{\mu\nu} = 2 \frac{\partial L}{\partial F_{\mu\nu}} \nabla_\mu a_\nu$. Integrate by parts; the boundary term vanishes because a has compact support. For a Lagrangian homogeneous of degree k in A, $A_\mu \mathscr{J}^\mu = kL$ up to a divergence (check DM-5 for $k = 2$).

Status: proved. Part (a) is the draft's theorem. Part (b) is added from the plan analysis. The adopted reading R1 is (a). par *Non-claim.* The theorem is local and concerns compact variations in a fixed bundle sector. Boundary and topological contributions can remain. It constructs no microscopic action and says nothing about a global holonomy change or quantum radiative stability. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Zero background current does not exclude photon response; prop:DM-polarizability). *Let $f(\psi)$ be a nonconstant smooth scalar and $\lambda \neq 0$, and consider*

$$S_{\mathrm{pol}} = -\frac{\lambda}{4} \int_U \sqrt{-g}\, f(\psi) F_{ab} F^{ab}\, \mathrm{d}^4 x.$$

Then $\mathscr{J}^\nu_{\mathrm{pol}} = \lambda \nabla_\mu (f(\psi) F^{\mu\nu})$. It vanishes on every history with $F = 0$, so R2 holds, but R1 fails. The second variation at $A = 0$ is

$$\delta_A^2 S_{\mathrm{pol}}[a, b] = -\frac{\lambda}{2} \int_U \sqrt{-g}\, f(\psi)\, (\mathrm{d}a)_{\mu\nu} (\mathrm{d}b)^{\mu\nu}\, \mathrm{d}^4 x,$$

which is nonzero for suitable compactly supported $a = b$ in the support of f. When f varies with ψ, mixed

matter–photon variations are also nonzero.

Proof. Apply with $\partial L/\partial F_{\mu\nu} = -\frac{\lambda}{2} f F^{\mu\nu}$. For $A = sa + tb$ the coefficient of st in $F_{ab}F^{ab}$ is $2(\mathrm{d}a)_{\mu\nu}(\mathrm{d}b)^{\mu\nu}$, which gives . At a point where $f \neq 0$, take $a = b$ with $(\mathrm{d}a)_{\mu\nu}(\mathrm{d}a)^{\mu\nu}$ of one sign on a small ball, for example a purely magnetic da in a local orthonormal frame. Differentiating in ψ gives the last claim (check DM-20).

Status: proved. par *Non-claim.* This is a counterexample term, not a selected dark-matter Lagrangian or a computed cross section. It reflects the distinction between neutrality and photon coupling already present in dipole and Rayleigh dark-matter models [Sigurdson04,WeinerYavin12]. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Corollary (What the constraints exclude; cor:DM-operators). *Check DM-4 computes the Euler currents in a flat chart.*

• *Excluded by R1 and by R2: minimal charge coupling $D_\mu = \partial_\mu - iqA_\mu$ with $q \neq 0$, including millicharge, for which $\mathscr{J} = q\, j_{\mathrm{N}}$ with j_{N} the Noether current; an uncompensated term $qA_\mu n^\mu$ with independently variable n; dipole-type couplings $\mu M^{\alpha\beta}F_{\alpha\beta}$ with M antisymmetric (for example $\bar{\chi}\sigma^{\alpha\beta}\chi$ or $\bar{\chi}\sigma^{\alpha\beta}\gamma^5\chi$), for which $\mathscr{J}^\nu = -2\mu\,\partial_\alpha M^{\alpha\nu}$; anapole-type terms linear in F; and kinetic mixing $\varepsilon F_{\alpha\beta}F'^{\alpha\beta}$ with a dark field strength F'.*

• *Excluded by R1, allowed by R2: Rayleigh and polarizability terms $f(\psi)F^2$ (for example φ^2F^2 or $\bar{\chi}\chi F^2$), for which $\mathscr{J}^\nu = -4\lambda\,\partial_\mu(\varphi^2F^{\mu\nu})$ when $L = \lambda\varphi^2F^2$; and axion-like $\lambda\varphi F\tilde{F}$ with dynamical φ. Here $\mathscr{J}$ is linear in A, vanishes at $A = 0$ but not identically, and mediates two-photon amplitudes.*

• *Allowed by both: A-independent terms, and pure boundary terms such as a constant $\theta F\tilde{F}$.*

• *Noether currents. R1 forces no internal Noether current to vanish. For minimal coupling it forces* $q = 0$ *and leaves* j_N *(for example a dark-number current) arbitrary. The conclusion concerns the whole Euler derivative. Cancellations, total divergences, field-domain restrictions and operator equivalences must be checked before a coefficient is excluded.*

Proof. (a)–(c) Apply Theorem (a),(b) and to each term (check DM-4). The term $qA_\mu n^\mu$ contributes qn^μ, which cannot vanish identically for $q \neq 0$ if n varies independently. An anapole term $\bar{\chi}\gamma^\mu\gamma^5\chi\,\partial^\nu F_{\mu\nu}$ is linear in A, so Theorem (b) applies. A constant $\theta\widetilde{FF}$ is a total divergence and has zero Euler derivative. (d) For minimal coupling, $\partial L/\partial A_\mu = q\,j_N^\mu$.

Status: proved for the listed test terms. The plan's ``higher-dimensional operators that would produce observable photon scattering are thereby excluded" is corrected: under R1 *every A*-dependent term is excluded, whether or not its scattering is observable; under R2 the Rayleigh and axion-like terms survive although they scatter photons (PC-10). The plan's ``or the corresponding Noether current vanishes" is corrected by (d) (PC-9). par *Non-claim.* Zero current on one solution is not enough for this corollary. The test terms are not proposed models. The corollary excludes direct bulk vertices of the specified action. It does not exclude indirect interactions through gravity or through an additional, unmodelled mediator sector. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Remark (Gravity and other interactions stay separate). An *A*-independent action can depend on g, on curvature and on other non-electromagnetic fields. R1 therefore selects neither minimal gravitational coupling nor the absence of non-minimal curvature couplings. The undecided status of $\xi R\varphi^2$ in I-D prop:v5-xi (source record;

not a premise) concerns the Host-A pulse only (PC-8). R1 also does not make world-lines insensitive to metric changes caused by electromagnetic stress. To assert absence of all matter–photon scattering one would need a statement about the complete interacting theory, including mediators and its effective action.

par *Non-claim.* No universal interaction classification and no selection of a gravitational coupling is proved. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Stress, conservation and transport

Proposition (Perfect-fluid balance, separate conservation and dust; prop:DM-stress). *Let* $T^{ab} = (\varepsilon + p)u^a u^b + p g^{ab}$ *with* $g(u,u) = -1$ *and* $\nabla_a T^{ab} = Q^b$. *Put* $h^a{}_b = \delta^a{}_b + u^a u_b$, $\theta = \nabla_a u^a$ *and* $\dot{u}^b = u^a \nabla_a u^b$.

• $u^a \nabla_a \varepsilon + (\varepsilon + p)\theta = -u_b Q^b$ *and* $(\varepsilon + p)\dot{u}^b + h^{bc}\nabla_c p = h^b{}_c Q^c$.

• *Separately conserved dust with* $\varepsilon > 0$ *has* $\nabla_a(\varepsilon u^a) = 0$ *and* $\dot{u}^b = 0$*: its world-lines are geodesics.*

• *If a supplied dark action satisfies R1, its field equations contain no A. On their solutions,* $\nabla_a T^{ab}_{\mathrm{dm}} = 0$ *for every background F (Proposition). Under R2 alone this can fail when* $F \neq 0$*: for* $f(\psi)F^2$ *the exchange* $F_{ba}\mathscr{J}^a$ *is generally nonzero.*

Proof. (a) Differentiate T^{ab} and contract with u_b, using $u_b \nabla_a u^b = 0$. This gives the energy equation. Project with $h^b{}_c$ to get the momentum equation. (b) Put $p = 0$ and $Q = 0$: the first equation is the continuity equation, and the second is $\varepsilon \dot{u}^b = 0$; divide by $\varepsilon > 0$ (check DM-6 for comoving FLRW dust). (c) By Theorem (a), S is independent of A up to a boundary term, so $\delta S/\delta\psi$ contains no A. Proposition with $\mathscr{J} \equiv 0$ gives separate conservation. The

polarizability current of Proposition is nonzero when $F \neq 0$ and f is not constant.

Status: proved. The geodesic conclusion follows from dust and separate conservation, not from $J_{\mathrm{EM}} = 0$ alone. Under R1, separate conservation is consistent with every Maxwell background, so ``world-lines unaffected by a declared Maxwell field" holds in the sense of (b)–(c) (PC-11). par *Non-claim.* This derives geodesic motion within a supplied dust model. It does not infer individual world-lines from a net current cancellation, and it does not justify dust after shell crossing. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Diffeomorphism balance; prop:DM-Noether). *Let a candidate matter action $S[g, A, \psi]$ be invariant under diffeomorphisms (acting on g, A and ψ) and under gauge transformations $A \mapsto A + \mathrm{d}\alpha$ (with ψ transforming). Use the convention $\delta S = \int \sqrt{-g}\,(\frac{1}{2}T^{ab}\delta g_{ab} + \mathscr{J}^a \delta A_a + E_I \delta\psi^I)$. On solutions of $E_I = 0$:*

$$\nabla_a \mathscr{J}^a = 0, \qquad \nabla_a T^a{}_b = F_{ba}\mathscr{J}^a.$$

A bare assignment of T and $J_{\mathrm{EM}} = 0$ supplies neither the action, nor the field equations, nor the symmetry hypotheses.

Proof. Gauge invariance under compactly supported α gives $0 = \int \sqrt{-g}\,\mathscr{J}^a \partial_a \alpha + \int \sqrt{-g}\,E_I \delta_\alpha \psi^I$. On shell, integration by parts gives $\nabla_a \mathscr{J}^a = 0$. For a compactly supported vector field X, $\delta_X g_{ab} = 2\nabla_{(a}X_{b)}$ and $\delta_X A_a = X^b F_{ba} + \nabla_a (X^b A_b)$. On shell, invariance gives

$$0 = \int \sqrt{-g}\, X^b (-\nabla_a T^a{}_b + F_{ba}\mathscr{J}^a - A_b \nabla_a \mathscr{J}^a).$$

The last term vanishes by the first identity, and X is arbitrary. The sign agrees with $\partial_a T^{ab}_{\mathrm{Max}} = -F^b{}_a \mathscr{J}^a$ for Maxwell

stress when $\partial_a F^{ab} = -\mathscr{J}^b$ (check DM-3), so the total is conserved.

Status: proved. This is a Noether-type identity. Unlike the draft, current conservation is derived from gauge invariance rather than assumed. The plan's ``this is not a derived Noether identity'' is corrected: the identity is derived, but only for a supplied action (PC-11, G0-10). par *Non-claim.* No Maxwell equation or quantum Ward identity is solved. Additional exchange fields would add their own balance terms. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Kinetic readings do not reduce to their second moments

For an optional massive kinetic subclass, fix $m > 0$. In an orthonormal frame the future mass shell has $p^0 = \sqrt{m^2 + |\mathbf{p}|^2}$ and invariant measure $\mathrm{d}\Pi = \mathrm{d}^3p/p^0$. Put

$$N^a = \int p^a f \,\mathrm{d}\Pi, \qquad T^{ab} = \int p^a p^b f \,\mathrm{d}\Pi, \qquad f \geq 0.$$

A collisionless reading additionally declares the Liouville (Vlasov) equation, $p^a \partial_{x^a} f - \Gamma^i_{ab} p^a p^b \partial_{p^i} f = 0$ in mass-shell coordinates; does not imply it. For the geometric kinetic formulation see [SarbachZannias14].

Proposition (Finite moments do not determine a distribution; prop:DM-moments). *At a fixed event, the map from nonnegative smooth compactly supported momentum distributions to any finite list of moments is not injective. In particular, exact N^a and T^{ab} do not determine f. There is a nonconstant interval of positive distributions with the same listed moments.*

Proof. Let the moment weights be $w_1, \ldots, w_K$, with the factor $1/p^0$ absorbed. Choose $K + 1$ nonzero nonnegative smooth bumps b_j with disjoint compact supports. The vectors $v_j = (\int w_\ell b_j \,\mathrm{d}^3p)_{\ell=1}^K \in \mathbb{R}^K$ are linearly dependent, so

there is $c \neq 0$ with $\sum_j c_j v_j = 0$. For small $|t|$ all $1 + tc_j > 0$, and $f_t = \sum_j (1 + tc_j) b_j$ is smooth, nonnegative and compactly supported, with all listed moments independent of t. Disjoint supports and $c \neq 0$ make the family nonconstant (check DM-15).

Status: proved. Conservation of the second moment also holds for a Boltzmann equation whose collision term conserves energy-momentum. Collisionless flow is therefore an additional reading (PC-11). par *Non-claim.* The construction is pointwise in spacetime. It does not assert that arbitrary moment data have a positive kinetic realization, or that a constructed distribution extends to a global Einstein–Vlasov solution. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Positive matter cannot replace a negative null source; prop:DM-NEC). *Positive dust, positive kinetic tensors and Maxwell stress* $T^{\mathrm{Max}}_{ab} = \mu^{-1}(F_{ac}F_b{}^c - \frac{1}{4} g_{ab} F_{cd}F^{cd})$ *with* $\mu > 0$ *obey the null energy condition. A source with* $T_{ab}\ell^a\ell^b < 0$ *for some null* ℓ *is therefore not a positive sum of such tensors.*

Proof. Dust gives $\varepsilon(u \cdot \ell)^2 \geq 0$ and kinetic tensors $\int (p \cdot \ell)^2 f \, \mathrm{d}\Pi \geq 0$. For Maxwell stress the contraction is $\mu^{-1} v_c v^c$ with $v_c = \ell^a F_{ac}$. Since $v \cdot \ell = F_{ac}\ell^a\ell^c = 0$, v lies in $\ell^\perp$, which contains no timelike vector, so $v_c v^c \geq 0$. Positive sums keep the sign (check DM-16).

Status: proved. By I-D thm:v5-type(b) (source record; not a premise), the Einstein tensor of the I-D pulse shell violates the null energy condition at every point, so none of these classes alone could source it. That is consistent with the I-D exclusions and is not a dark-matter statement (PC-6). par *Non-claim.* The pulse-specific Maxwell exclusions of I-D do not establish dark matter. No general non-existence statement about Maxwell fields is made. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is

constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Bare de Sitter host; prop:DM-bare). *On* DSS_H*, where* $\mathcal{G} = -\Lambda_H g$ *with* $\Lambda_H = 3H^2$*, on a connected open U: every split whose three slots obey the null energy condition consists of constant multiples of g. No such split has a dust dark slot with* $\varepsilon > 0$ *at any point.*

Proof. $T_{\mathrm{tot}} = \chi^{-1}(\Lambda - \Lambda_H)g$, so $T_{\mathrm{tot}}(k,k) = 0$ for null k. The three nonnegative values $T_X(k,k)$ sum to zero, so each vanishes. In an orthonormal frame put $k = (1,n)$ with $|n| = 1$: $T_{00} + 2T_{0i}n^i + T_{ij}n^i n^j = 0$ for all n. Replacing n by $-n$ gives $T_{0i} = 0$, and then $T_{ij} = -T_{00}\delta_{ij}$, so $T_X = f_X g$ (check DM-10). Conservation gives $\mathrm{d}f_X \otimes g = 0$, so f_X is constant. Positive dust has $T(k,k) = \varepsilon(u \cdot k)^2 > 0$.

Status: proved. The result has the same shape as Big05-A v3 thm:Big05-bare(c) and Big05-A v3 prop:Big05-dark(d) (source record; not a premise). par *Non-claim.* This is a property of the bare prescribed host. It says nothing about dark matter in an inhomogeneous universe. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Spherical Newtonian reconstruction and stability

Specification (Circular-speed inversion contract). On an annulus $I = [r_-, r_+]$ with $0 < r_- < r_+$, assume: (i) a

declared static weak-field reduction, $g = -(1 + 2\Phi/c^2)c^2\mathrm{d}t^2 + (1 - 2\Phi/c^2)\mathrm{d}\mathbf{x}^2$ with $|\Phi| \ll c^2$, time derivatives and slot pressures neglected. To first order, $\mathscr{G}_{00} = 2\nabla^2\Phi/c^2$ (check DM-2), so the 00 part of with $\chi = 8\pi G/c^4$ is , with the vacuum slot neglected on I; (ii) a spherically symmetric $\Phi \in C^2(I)$; (iii) pressure-free circular test orbits, with the supplied true circular speed satisfying $v_c^2 = r\Phi'(r)$; (iv) a supplied spherical baryonic density $\rho_\mathrm{b} \in C^0(I)$. A line-of-sight speed in a non-spherical or pressure-supported system is not automatically v_c.

par *Non-claim.* These are external modelling assumptions. A disk mass model, an inclination calibration, velocity anisotropy, pressure support or a cosmological-constant correction needs its own modified contract. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Spherical residual-density reconstruction; prop:DM-poisson). *Assume Specification and write* $w = v_c^2$.

• *The compatible residual density is uniquely*

$$\rho_{\mathrm{dm}}(r) = \frac{1}{4\pi G r^2}\frac{\mathrm{d}}{\mathrm{d}r}(rw(r)) - \rho_\mathrm{b}(r).$$

Conversely, every C^1 *function* $w > 0$ *determines* $\Phi(r) = \Phi(r_0) + \int_{r_0}^{r} w(s)\,\mathrm{d}s/s$, *which satisfies with . A nonnegative dark reading exists within this contract exactly when the right side of is nonnegative.*

• *With the centre. If the contract holds on* $(0, r_+]$ *with* ρ_{tot} *locally integrable and* $r^2\Phi' \to 0$ *as* $r\mathrm{downarrow}\,0$, *then the enclosed mass is* $M(r) = rw(r)/G$.

• *Fibre. For fixed w, every* ρ_b *with* $0 \le \rho_\mathrm{b} \le \rho_{\mathrm{tot}}$ *gives the same rotation curve. On the family* $\rho_\mathrm{b} = s\rho_{\mathrm{tot}}$, $s \in [0, 1]$,

every rule from w alone has exact minimax error $\frac{1}{2}\rho_{\mathrm{tot}}(r)$ *for* $\rho_{\mathrm{dm}}(r)$ *(Lemma).*

• *Profiles (check DM-1). For NFW,* $\rho = \rho_s/[x(1+x)^2]$ *with* $x = r/r_s$ *[NFW96,NFW97], the enclosed mass is* $M = 4\pi\rho_s r_s^3[\ln(1+x) - x/(1+x)]$. *For Burkert,* $\rho = \rho_0/[(1+y)(1+y^2)]$ *with* $y = r/r_0$ *[Burkert95], it is* $M = \pi\rho_0 r_0^3[\ln((1+y)^2(1+y^2)) - 2\arctan y]$. *For the pseudo-isothermal form* $\rho = \rho_0/(1 + r^2/r_c^2)$ *it is* $M = 4\pi\rho_0 r_c^2(r - r_c\arctan(r/r_c))$. *For the singular isothermal sphere,* $\rho = \sigma^2/(2\pi G r^2)$ *and* $w = 2\sigma^2$. *In each case with* $w = GM/r$ *and* $\rho_{\mathrm{b}} = 0$ *returns* ρ.

Proof. (a) In spherical symmetry $\Delta\Phi = r^{-2}(r^2\Phi')' = r^{-2}(rw)'$. Insert and subtract ρ_{b}. For the converse, differentiate Φ. Nonnegativity is exactly the extra density condition. (b) Integrating $(r^2\Phi')' = 4\pi G r^2\rho_{\mathrm{tot}}$ from 0 gives $r^2\Phi' = GM$, hence $w = GM/r$. (c) w depends on ρ_{tot} only, and $\rho_{\mathrm{dm}}(r) = (1-s)\rho_{\mathrm{tot}}(r)$ ranges over $[0, \rho_{\mathrm{tot}}(r)]$. (d) Differentiate the stated masses and use (b).

Status: conditional on Specification . A density and a potential do not fix a phase-space distribution (Proposition). NFW, Burkert and isothermal forms are optional ansätze, not consequences of the current constraint or of Enter (PC-13). par *Non-claim.* The inversion reconstructs a density within its model. It does not reconstruct collisionless dynamics, it fills no coefficient slot, and it is not compared with any measured rotation curve here. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Derivative-sensitive stability and uniform-data discontinuity; prop:DM-poisson-stability). *For two input pairs* (w, ρ_{b}) *and* $(\widetilde{w}, \widetilde{\rho}_{\mathrm{b}})$ *on I,*

$$\|\widetilde{\rho}_{\mathrm{dm}} - \rho_{\mathrm{dm}}\|_\infty \le \frac{\|\widetilde{w} - w\|_\infty + r_+\|\widetilde{w}' - w'\|_\infty}{4\pi G r_-^2} + \|\widetilde{\rho}_{\mathrm{b}} - \rho_{\mathrm{b}}\|_\infty.$$

The reconstruction is not continuous from the uniform norm on w to the uniform norm on density, even among nonnegative readings.

Proof. Subtract the two copies of , expand $(r\,\delta w)' = \delta w + r\,\delta w'$, and use $r_- \le r \le r_+$. For the discontinuity, fix an interior r_*, $L > 0$, a constant $w_* > 0$ and $\rho_b = 0$, and put $w_n = w_* + \frac{\varepsilon}{n}\sin(n(r - r_*)/L)$ with $\varepsilon(1 + r_+/L) < w_*/2$. Then $(rw_n)' = w_* + \frac{\varepsilon}{n}\sin(\cdot) + \frac{r\varepsilon}{L}\cos(\cdot) > w_*/2 > 0$, so every reconstructed density is nonnegative. $\|w_n - w_*\|_\infty \le \varepsilon/n \to 0$, but $\rho_n(r_*) - \rho_*(r_*) = \varepsilon/(4\pi G L r_*)$ for every n (check DM-18).

Status: proved. The bound is explicit; its sharpness is not claimed (DC-3). par *Non-claim.* This is an inverse-problem instability, not evidence against gravitational mass inference. Smoothing, derivative control, parametric restriction and uncertainty propagation change the statistical problem, but they must be supplied. Lensing and cluster data are different comparison data with their own observation and gravity models [Clowe06,Lelli16]. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

FLRW dilution and linear gravitational response

Proposition (Pressureless dilution and the total-source identity; prop:DM-cosmo). *Let the host be FLRW,* $\mathrm{d}s^2 = -\mathrm{d}t^2 + a(t)^2\gamma_{ij}\mathrm{d}x^i\mathrm{d}x^j$ *with* $H = \dot{a}/a$ *and comoving* $u = \partial_t$.

• *If homogeneous comoving dark dust is separately conserved, then* $\dot{\bar{\varepsilon}}_{\mathrm{dm}} + 3H\bar{\varepsilon}_{\mathrm{dm}} = 0$, *so* $\bar{\varepsilon}_{\mathrm{dm}} \propto a^{-3}$. *With a declared exchange term, the right side is* $-u_b Q^b$ *and* a^{-3} *need not hold. For a perfect fluid with declared* $p = w\varepsilon$,

$\dot{\varepsilon} + 3H(1 + w)\varepsilon = 0$.

• *For flat γ, the total source is an identity of the metric:* $\chi\varepsilon_{\mathrm{tot}} = 3H^2$ *and* $\chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2)$. *With* $\chi = 8\pi G$, $4\pi G\varepsilon_{\mathrm{tot}} = \frac{3}{2}H^2$. *No Friedmann equation is assumed; this is evaluated on the given a.*

Proof. (a) $\nabla_a u^a = (-g)^{-1/2}\partial_t\sqrt{-g} = 3H$. Apply Proposition (a) with $p = 0$ and $Q = 0$, multiply by a^3 and integrate. The perfect-fluid case is the same with $p = w\varepsilon$ (check DM-6). (b) For flat FLRW, $R_{tt} = -3(\dot{H} + H^2)$ and $R_{ij} = (\dot{H} + 3H^2)g_{ij}$. Hence $\mathcal{G}_{tt} = 3H^2$ and $\mathcal{G}_{ij} = -(2\dot{H} + 3H^2)g_{ij}$ (check DM-7). The same formulas appear in Big05-A v3 thm:Big05-futures(a) (source record; not a premise).

Status: proved. The normalization of $\bar{\varepsilon}_{\mathrm{dm}}$ is an input. The vanishing current removes only the electromagnetic exchange term of . Any other exchange, with baryons or the vacuum slot, must be excluded by declaration (PC-12). par *Non-claim.* Zero electromagnetic current alone supplies neither separate conservation nor the pressureless equation of state. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Remark (Erratum E2-1 (version 2) to Proposition (b)). Version 1 defines $T_{\mathrm{tot}} := \chi^{-1}(\mathcal{G} + \Lambda g)$, which is with the declared Λ. Yet Proposition (b) and finding (4) of the abstract print $\chi\varepsilon_{\mathrm{tot}} = 3H^2$ and $\chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2)$. These are correct only for $\Lambda = 0$, or for the effective tensor $\chi^{-1}\mathcal{G}$ in which the declared constant is absorbed. The corrected statement is Proposition . The version-1 text is retained unedited. Uses in version 1 that are unaffected: the combination $\chi(\varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}) = -2\dot{H}$, which does not contain Λ; Proposition , which declares $\Lambda = 0$; and Corollary , whose Einstein–de Sitter example needs $\Lambda = 0$, since otherwise $\chi p_{\mathrm{tot}} = \Lambda \neq 0$ on $a \propto t^{2/3}$.

Proposition (Corrected total-source identity; prop:DM-v2-cosmo). *On flat FLRW (c = 1), with declared Λ and*

$\chi \neq 0$, *the tensor* $T_{\mathrm{tot}} = \chi^{-1}(\mathscr{G} + \Lambda g)$ *satisfies, in the comoving frame,*

$$\chi\varepsilon_{\mathrm{tot}} = 3H^2 - \Lambda, \qquad \chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2) + \Lambda, \qquad \chi(\varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}) = -2\dot{H}.$$

With $\chi = 8\pi G$, $4\pi G\varepsilon_{\mathrm{tot}} = \frac{1}{2}(3H^2 - \Lambda)$. *If* $\chi > 0$, *the total obeys the null energy condition iff* $\dot{H} \leq 0$. *If* $\chi < 0$, *the inequality is reversed. On* $a \propto t^{2/3}$, *the total is pressureless iff* $\Lambda = 0$. *On* $H^2 = H_\infty^2 + Ca^{-3}$ *with* $C \neq 0$, *it is pressureless iff* $\Lambda = 3H_\infty^2$, *and then* $\chi\varepsilon_{\mathrm{tot}} = 3Ca^{-3}$.

Proof. $\mathscr{G}_{tt} = 3H^2$, $\mathscr{G}_{ij} = -(2\dot{H} + 3H^2)g_{ij}$ (Proposition (b), check DM-7), and $g_{tt} = -1$. So $\chi\varepsilon_{\mathrm{tot}} = \mathscr{G}_{tt} + \Lambda g_{tt} = 3H^2 - \Lambda$, and $\chi p_{\mathrm{tot}} g_{ij} = \mathscr{G}_{ij} + \Lambda g_{ij}$. For null $k = (1, n)$, $T_{\mathrm{tot}}(k, k) = \varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}} = -2\dot{H}/\chi$. On $a \propto t^{2/3}$, $2\dot{H} + 3H^2 = 0$. On the second branch, $2\dot{H} = -3Ca^{-3}$, so $\chi p_{\mathrm{tot}} = \Lambda - 3H_\infty^2$ (check V2-1).

Status: proved. The shape matches Big05-A v3 thm:Big05-futures(a) (source record; not a premise), which declares $\chi > 0$ and $\Lambda = 0$ where a value is needed. par *Non-claim.* This is an identity of the prescribed metric, not Friedmann dynamics. No value of Λ is selected. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Linear dust equations involve the total potential; prop:DM-linear). *On the prescribed first-order conformal Newtonian metric* $\mathrm{d}s^2 = a(\eta)^2[-(1 + 2\Psi)\mathrm{d}\eta^2 + (1 - 2\Phi)\delta_{ij}\mathrm{d}x^i\mathrm{d}x^j]$, *consider separately conserved dust to linear order, with* $\varepsilon = \bar{\varepsilon}(1 + \delta)$, $\mathscr{H} = a'/a$ *and* $\theta = \partial_i v^i$. *Then*

$$\delta' = -\theta + 3\Phi', \qquad v_i' + \mathscr{H} v_i = -\partial_i \Psi,$$

and for a Fourier mode ($\partial_i \mapsto ik_i$)

$$\theta' + \mathscr{H}\theta = k^2\Psi, \qquad \delta'' + \mathscr{H}\delta' = -k^2\Psi + 3(\Phi'' + \mathscr{H}\Phi').$$

No electromagnetic force term occurs under these dust, geodesic and separate-conservation hypotheses.

Proof. To first order, $\sqrt{-g} = a^4(1 + \Psi - 3\Phi)$, $u^0 = a^{-1}(1 - \Psi)$ and $u^i = a^{-1}v^i$. Since $a^3\bar{\varepsilon}$ is constant, $\partial_a(\sqrt{-g}\,\varepsilon u^a) = 0$ gives $(\delta - 3\Phi)' + \partial_i v^i = 0$. The covariant geodesic equation $u^a\partial_a u_i = \frac{1}{2}(\partial_i g_{ab})u^a u^b$, with $u_i = av_i$, gives the Euler equation, because the left side is $a^{-1}(av_i)' = v_i' + \mathscr{H}v_i$ and the right side is $-\partial_i\Psi$ to first order. Take the divergence, differentiate the continuity equation and eliminate θ (check DM-19).

Status: proved on the prescribed perturbed metric. These are the standard cold-dust equations in the conventions of [MaBertschinger95]. par *Non-claim.* They do not follow from a bare current declaration, and they are not a matter power spectrum or CMB calculation. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Corollary (A conditional subhorizon growth law; cor:DM-growth). *If in addition a Newtonian subhorizon comparison neglects potential time derivatives, sets $\Phi = \Psi$ and supplies $-k^2\Psi = 4\pi G a^2 \sum_s \bar{\varepsilon}_s\delta_s$, then $\delta_{\mathrm{dm}}'' + \mathscr{H}\delta_{\mathrm{dm}}' \simeq 4\pi G a^2 \sum_s \bar{\varepsilon}_s\delta_s$. The sum includes every retained component. On the Einstein–de Sitter comparison host $a \propto t^{2/3}$, where the total is pressureless and $4\pi G\varepsilon_{\mathrm{tot}} = \frac{3}{2}H^2$ (Proposition (b)), equal contrasts in all dust slots give, in cosmic time, $\ddot{\delta} + 2H\dot{\delta} = \frac{3}{2}H^2\delta$, with solutions spanned by $t^{2/3} \propto a$ and t^{-1}, whatever the baryon fraction.*

Proof. Substitute into under the stated approximations. For the example, η-derivatives become t-derivatives with $\mathrm{d}\eta = \mathrm{d}t/a$, which turns $\delta'' + \mathscr{H}\delta'$ into $a^2(\ddot{\delta} + 2H\dot{\delta})$. With $H = 2/(3t)$, both modes solve the equation (check DM-7). Only $\varepsilon_{\mathrm{tot}}$ enters, so the split does not.

Status: conditional on the declared subhorizon reduction. Baryonic perturbations are not subtracted from the force. The plan's ``growth tracks the total potential only after baryon and radiation contributions are subtracted by hand'' is replaced by this statement (PC-12). par *Non-claim.* The subhorizon Poisson law is not the full relativistic constraint. Radiation, anisotropic stress, pressure and the initial spectrum need a larger coupled system. The Einstein–de Sitter host is a comparison host, not a model of our universe. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Attribution fibres, adaptive reports and vacuum normalization

Definition (Accounts and split-independent data; def:DM-data). An *account* is $x = (g, \Lambda, \chi, \Delta, \mathscr{C}, \sigma, j)$. Here Δ is declared data, $\mathscr{C}$ is a geometric contract (observers, clocks, branches, calibrations and probes, all chosen without reference to σ or j), $\sigma \in \mathrm{Sp}(g, \Lambda, \chi; U)$, and j is a current assignment. A data map is *split-independent* if its value, or for randomized and adaptive experiments its initial states, decision kernels and history-conditioned outcome laws, is the same on accounts that differ only in σ and in j at fixed $j_{\mathrm{tot}} = j_{\mathrm{b}} + j_{\mathrm{dm}} + j_{\Lambda}$. *Geometric observables* (laws depending only on $(g, \Lambda, \chi, \Delta, \mathscr{C})$) and *total-current observables* (laws depending also on j_{tot}, such as a Maxwell field sourced by the total current) are split-independent. The declaration is $\mathscr{D}_{\mathrm{EM}} = \{x : j_{\mathrm{dm}} \equiv 0\}$.

Status: definition. It restates Big05-A v3 def:Big05-geocontract (source record; not a premise) with a current coordinate added. Equality of one-round marginals is not equality of complete processes. par *Non-claim.* The data map and fibre must be specified. An ordinary-matter detector can be split-sensitive. The definition does not assert that every restricted source class has a nontrivial fibre. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical

manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Lemma (Fibre and common-law bounds; lem:DM-fibre). *Let π be a data map and F a real target.*

• *F is a function of π iff F is constant on every fibre.*

• *If two accounts have the same complete report law and target values q_1, q_2, every estimator has worst-case expected absolute error at least $|q_1 - q_2|/2$. On a common-law fibre with target range of infimum ℓ and supremum u, the exact minimax risk is $(u - \ell)/2$, attained by the midpoint, over deterministic and randomized estimators. An unbounded range gives infinite minimax risk.*

• *A $\{0,1\}$-valued target taking both values has minimax absolute-loss risk $\frac{1}{2}$ and randomized classification error $\frac{1}{2}$. Every deterministic Boolean answer has worst-case error* 1.

• *An adaptive experiment with common initial laws and common history-conditioned kernels has a common joint transcript law at every finite depth.*

Proof. (a) A factorization is constant on fibres; conversely a fibre-constant target defines a function on the image. (b) Under a common law, a decision Y satisfies $|Y - q_1| + |Y - q_2| \geq |q_1 - q_2|$; take expectations, then let q_1, q_2 approach ℓ, u. The midpoint has error at most $(u - \ell)/2$. (c) The real decision $\frac{1}{2}$ has loss $\frac{1}{2}$. A randomized Boolean rule that answers 1 with probability p errs with probabilities $1 - p$ and p on the two values, and $\max(p, 1 - p) \geq \frac{1}{2}$, with equality at $p = \frac{1}{2}$. (d) Compose the common laws round by round and induct on depth (check DM-8).

Status: proved. The adaptive part has the same shape as Big04-A-coeff thm:C-adaptive and Big05-A v3 thm:Big05-quotient (source record; not a premise). par *Non-claim.* The adaptive statement needs common conditional processes, not merely placement blindness. Standing non-claims (plan S 5): no dark-matter particle

species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Electromagnetic silence does not select a split; prop:DM-fibre). *Fix* $(g,\Lambda,\chi,\Delta,\mathscr{C})$ *and* j_{tot} *on* U*, with* $T_{\mathrm{tot}} \equiv 0$*.*

• *On* $\mathscr{D}_{\mathrm{EM}}$ *the fibre of all split-independent data, including adaptive protocols with common kernels, contains* $\{(\sigma,j) : \sigma \in \mathrm{Sp}(g,\Lambda,\chi;U),\ j = (j_{\mathrm{tot}} - j_\Lambda, 0, j_\Lambda)\}$ *for each* j_Λ*. In particular it contains the whole split fibre.*

• *Neutral dust family. Let* $S = \varepsilon\, u \otimes u$ *be nonzero, positive and separately conserved, and, as in the draft, let* $T^{\mathrm{d}} = \alpha S$ *and* $T^{\mathrm{n}} = (1-\alpha)S$ *with* $J_{\mathrm{d}} = J_{\mathrm{n}} = 0$ *for* $\alpha \in [0,1]$*. Here* n *is an otherwise unclassified neutral slot. All members have the same total stress and current, and every summand is positive, pressureless and separately conserved. For split-independent data: the exact minimax risk for* $\alpha \in [\alpha_-, \alpha_+]$ *is* $(\alpha_+ - \alpha_-)/2$*; the predicate* $\alpha > \frac{1}{2}$*, when both values occur, has risk* $\frac{1}{2}$ *(randomized) and* 1 *(deterministic); and* $\alpha/(1-\alpha)$ *on* $[0,1)$ *has infinite risk.*

• *General total. On the family* $\sigma_s = (sT_{\mathrm{tot}}, (1-s)T_{\mathrm{tot}}, 0)$*, the indicator of* $\rho_{\mathrm{b}} < \rho_{\mathrm{dm}}$ *at a point where* $T_{\mathrm{tot}}(u,u) > 0$ *has risk* $\frac{1}{2}$ *(randomized) and* 1 *(deterministic). If* $\mathscr{E}(T_{\mathrm{tot}}) > 0$ *for a weighted energy* $\mathscr{E}$*, the ratio* $(1-s)/s$ *has infinite risk.*

• *Coefficient orbit. Radiation labels* $T_{\mathrm{r}} = (U\kappa^3 c^3/\alpha_{\mathrm{r}})^{1/4}/(k_B a_{\mathrm{r}})$ *depend on neither* σ *nor* j*. The joint fibre is the product of the fibre in (a) and the orbit* $(U, q\kappa, q^3\alpha_{\mathrm{r}})$*. Adjoining the labels identifies no split target, and the declaration identifies no point of the orbit.*

Proof. (a) A split-independent observable has the same law on the displayed set, every point of which satisfies $j_{\mathrm{dm}} = 0$. Lemma (d) covers adaptive protocols. (b) Constant multiples preserve conservation and the dust form; the

currents vanish and the sum is *S*. These accounts lie in one fibre by (a). Apply Lemma (b),(c); the ratio is unbounded as *α*uparrow 1. (c) Multiples of a conserved tensor are conserved and sum to T_{tot}. The indicator holds iff $s < \frac{1}{2}$, and $(1 - s)/s$ is unbounded on $(0, 1]$ (check DM-8). (d) The labels are functions of $(U, \kappa, \alpha_{\mathrm{r}}, a_{\mathrm{r}}, k_B, c)$ only and are invariant under the orbit. Apply Lemma (a) on each factor.

Status: proved. This answers Big05-A v3 thm:Big05-flagship(c) (source record; not a premise) for this declaration. $\mathscr{D}_{\mathrm{EM}}$ is a constitutive restriction on the *current* coordinate, and its intersection with the split fibre is the whole fibre (PC-15, PC-22). Part (d) has the same shape as Big05-A v3 prop:Big05-orbit-split (source record; not a premise). The fibre risks agree with Big05-A v3 thm:Big05-fibre(e) (source record; not a premise). par

Non-claim. This is a declared attribution ambiguity, not the construction of two species. The neutral comparator is not identified with baryons. Species-sensitive observations or constitutive laws can shrink the fibre (Proposition). Total-source degeneracy in cosmology is discussed in [Kunz09]. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (When a split becomes identifiable; prop:DM-split-boundary). *Non-selection is not universal.*

• *If* T^{known} *is supplied, the dark slot is the residual of Proposition (b).*

• *If a total is known to have the form* $T = \varepsilon_{\mathrm{d}} u \otimes u - \varepsilon_{\mathrm{v}} g$ *with known u, then* $\varepsilon_{\mathrm{v}} = -p_{\mathrm{tot}}$ *and* $\varepsilon_{\mathrm{d}} = \varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}$*, where* $\varepsilon_{\mathrm{tot}} = T(u, u)$ *and* $p_{\mathrm{tot}} = \frac{1}{3} h^{ab} T_{ab}$*. In particular, if the dark slot is declared to be dust, the vacuum shift of Proposition (a) is fixed to* $\lambda = 0$*, because* $\varepsilon u \otimes u + \lambda g = \mathrm{diag}\,(\varepsilon - \lambda, \lambda, \lambda, \lambda)$ *in an adapted orthonormal frame has rank at least three for* $\lambda \neq 0$*. Wherever* $T_{\mathrm{tot}} - T_{\Lambda}$ *is itself dust, as on the Einstein–de Sitter host, the fraction family of Proposition (c) consists of dust slots and stays unidentified.*

• *A current restriction selects a parameter when the current map is sensitive to it. For example,* $J_\alpha = \alpha j_*$ *with* $j_* \neq 0$ *vanishes only at* $\alpha = 0$. *Identification of a stress split from currents needs a further law tying a stress slot to its current, such as ``*T_{b} *is the stress of a supplied charged fluid whose current is* j_{b}*''.*

Proof. (a) Subtraction. (b) $T(u,u) = \varepsilon_{\mathrm{d}} + \varepsilon_{\mathrm{v}}$ and $\frac{1}{3}h^{ab}T_{ab} = -\varepsilon_{\mathrm{v}}$. Since $u \otimes u$ and g are linearly independent, the coefficients are unique (check DM-9). The rank computation is direct. (c) $j_* \neq 0$.

Status: proved. par *Non-claim.* The unrestricted fibre cannot be transferred to a class with fixed equations of state or species-sensitive data without checking those restrictions. No such restriction is supplied here. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Electromagnetic silence does not normalize vacuum energy; prop:DM-vacuum). *The vacuum normalization stays free at three levels.*

• *Split level. Fix a constant* λ. *The map sending* $(T_{\mathrm{b}}, T_{\mathrm{dm}}, T_\Lambda)$ *to* $(T_{\mathrm{b}}, T_{\mathrm{dm}} + \lambda g, T_\Lambda - \lambda g)$ *maps splits to splits, keeps* T_Λ *of vacuum form, preserves* $\mathscr{D}_{\mathrm{EM}}$ *and the null energy condition of every slot (since* $g(k,k) = 0$ *for null* k*), and leaves all split-independent data unchanged. The vacuum density of the split has infinite minimax risk.*

• *Action level. Adding* $\lambda \int_U \sqrt{-g}\, \mathrm{d}^4x$ *to a candidate action leaves* $\mathscr{J}$ *unchanged and shifts its stress by* λg. *If* $\mathscr{G} + \Lambda g = \chi T$, *then* $\mathscr{G} + (\Lambda + \chi\lambda)g = \chi(T + \lambda g)$.

• *Einstein regions. On a four-dimensional Einstein region, the conserved family of DS-OB-1-fibre thm:F-einstein* (source record; not a premise) *reduces to* $T_\theta - T = (c_0 - \frac{R}{4}c_G)g$. *The map* $\theta \mapsto c_0 - \frac{R}{4}c_G$ *is onto* $\mathbb{R}$ *with a three-dimensional kernel. A zero-current condition that holds for every member, or a supplied coefficient, selects*

no point of it.

Proof. (a) $\nabla g = 0$, the sum is unchanged, $-(\rho_L + \lambda)g$ is of vacuum form, currents are untouched, and $(T_{\mathrm{dm}} + \lambda g)(k,k) = T_{\mathrm{dm}}(k,k)$. Apply Lemma (b) (check DM-9). (b) The added term contains no A, and $\delta\sqrt{-g} = \frac{1}{2}\sqrt{-g}\, g^{ab}\delta g_{ab}$; substitute. (c) The row $(1, -R/4, 0, 0)$ is nonzero, so the map is onto (vary c_0) with kernel of dimension three; data independent of θ cannot select it (Lemma (b)).

Status: proved; (c) uses only the printed reduced map. Part (c) agrees with DS-OB-1-fibre thm:F-einstein(a) and DS-OB-1-fibre cor:F-ranknotsel (source record; not a premise). Generic rank four (DS-OB-1-fibre thm:F-generic (source record; not a premise)) concerns open sets of metrics, not a fixed Einstein region, and is not used. The trade between declared Λ and the vacuum slot in (b) is DS-OB-1-fibre thm:F-einstein(d) (source record; not a premise) in form, and it stays a declaration. par *Non-claim.* This is not a vacuum-energy calculation, and it does not say that every renormalization scheme permits every counterterm. Absolute vacuum energy stays open. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Version 2: the zero-current fibre under reading R1

Sections – are new in version 2. Their order follows the user's findings draft ``Big06-A-v2: New Findings'' (request t343u). Every statement is proved again here. The verdict for each draft item is in Appendix . Results already proved in version 1 are cited, not repeated. Throughout these sections $\chi > 0$ wherever an energy condition is used (Erratum E2-2).

Definition (Macroscopic account and R1 realization; def:DM-v2-realize). A *macroscopic account* is a pair

(σ, j) as in Definition . An *R1 realization* of it is a supplied action $S = S_{\mathrm{b}} + S_{\mathrm{dm}} + S_{\Lambda}$ on the prescribed host together with an on-shell configuration such that the Hilbert stresses $T_i^{ab} = (2/\sqrt{-g})\,\delta S_i/\delta g_{ab}$ equal the slots of σ, the currents of the slots equal j, and the dark current $\mathscr{J}_{\mathrm{dm}}$ of vanishes for every allowed potential (reading R1). Let $\mathscr{P}$ be the map from a supplied class of realizations to the accounts they realize.

Status: definition. It separates the two levels used in version 1: Propositions and are statements about accounts; Theorem is a statement about actions. par *Non-claim.* No class of realizations is asserted to be complete. The definition supplies no action. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Projection criterion; prop:DM-v2-lift). *Fix a supplied class $\mathscr{A}$ of R1 realizations.*

• *A dark-matter reading (σ, j) is R1-realizable in $\mathscr{A}$ if and only if it lies in the image $\mathscr{R}(\mathscr{A})$.*

• *Every fibre statement of Proposition transfers to R1-realized accounts on the subset $\mathscr{R}(\mathscr{A}) \cap \mathscr{F}$ of a fibre $\mathscr{F}$, and only there.*

• *$\mathscr{R}(\mathscr{A})$ need not contain the whole split fibre. For example, if $\mathscr{A}$ contains only the empty dark action, then $\mathscr{R}(\mathscr{A})$ contains only accounts with $T_{\mathrm{dm}} \equiv 0$.*

Proof. (a) is the definition of the image. (b) The fibre statements use only the common law of the split-independent data on a set of accounts; restricting to a subset keeps the common law, and accounts outside the image have no realization in $\mathscr{A}$. (c) The empty action has zero stress.

Status: proved. This qualifies the reading of Proposition (a): ``the whole split fibre" there is a statement about

accounts. It is not an erratum, because that proposition is stated for accounts. par *Non-claim.* A zero assigned current is not by itself a microscopic R1 realization. The criterion does not say which classes $\mathscr{A}$ are physical. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Lemma (Conserved currents that change no total; lem:DM-v2-currents). *Let $K^{ab} = -K^{ba}$ be a smooth tensor field compactly supported in U and put $j_*^a = \nabla_b K^{ab}$. Then $\nabla_a j_*^a = 0$. Nonzero examples exist on every U.*

Proof. For antisymmetric K, $\nabla_b K^{ab} = (-g)^{-1/2}\partial_b(\sqrt{-g}\,K^{ab})$, so $\nabla_a j_*^a = (-g)^{-1/2}\partial_a\partial_b(\sqrt{-g}\,K^{ab}) = 0$ by symmetry of second partial derivatives. In a chart on a ball in U, take $K^{01} = -K^{10} = h/\sqrt{-g}$ with h a bump function and all other components zero. Then $j_*^0 = (-g)^{-1/2}\partial_1 h$, which is nonzero somewhere (check V2-10).

Status: proved. par *Non-claim.* The currents are kinematic test fields, not charged species. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (The declaration is invisible to split-independent data; prop:DM-v2-undecidable). *Let $x = (g, \Lambda, \chi, \Delta, \mathscr{C}, \sigma, j)$ be an account with $j_{\mathrm{dm}} \equiv 0$, let $j_* \neq 0$ be a vector field on U (conserved if the class requires it, by Lemma), and put $x_\varepsilon = (g, \Lambda, \chi, \Delta, \mathscr{C}, \sigma, (j_{\mathrm{b}} - \varepsilon j_*, \varepsilon j_*, j_\Lambda))$.*

• *x_ε is an account for every ε, with the same split, the same total current and the same values of every split-independent datum as x; for $\varepsilon \neq 0$ it is not a dark-matter reading.*

• *For split-independent experiments, including adaptive ones with common kernels, the indicator of $\mathscr{D}_{\mathrm{EM}}$ has exact minimax risk $\frac{1}{2}$ over randomized rules. A deterministic rule that is a function of exact (noise-free) split-independent data errs on x or on x_ε.*

Proof. (a) The split is unchanged and $(j_{\mathrm{b}} - \varepsilon j_*) + \varepsilon j_* + j_\Lambda = j_{\mathrm{tot}}$. Definition puts no further condition on current assignments; if conservation of each current is required, Lemma supplies conserved j_*. A split-independent datum is by definition a function of $(g, \Lambda, \chi, \Delta, \mathscr{C}, j_{\mathrm{tot}})$ and the split-independent part of the process. (b) Apply Lemma (b),(c),(d) to the pair $\{x, x_\varepsilon\}$; the deterministic statement is the exact-data case discussed in Remark .

Status: proved (check V2-10). The current coordinate of an account is a constitutive input in the same sense as the split. par *Non-claim.* The proposition does not say that charge is unobservable when a law ties a slot's stress to its current (Proposition (c)). It does not construct a charged dark species. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (R1-realized attribution family; prop:DM-v2-R1fibre).

• *General form. Let $S_0[g, \psi]$ be a supplied action that contains no potential, whose on-shell stress is a nonzero positive conserved tensor S. For $\alpha \in [0, 1]$, assigning αS_0 to the dark slot and $(1 - \alpha)S_0$, evaluated on the same configuration, to a neutral slot gives R1 realizations of the neutral dust family of Proposition (b) whenever S is dust.*

• *Explicit dust action. With a scalar T and a multiplier ρ, let*

$$S_{\mathrm{dust}}[g,\rho,T] = -\frac{1}{2}\int_U \sqrt{-g}\,\rho\,(g^{ab}\partial_a T\,\partial_b T + 1)\,\mathrm{d}^4x.$$

It contains no potential, so $\mathscr{J} \equiv 0$ *and R1 holds. On shell* $g^{ab}\partial_a T\partial_b T = -1$, $u^a = -\nabla^a T$ *is a unit geodesic field,* $\nabla_a(\rho u^a) = 0$ *and* $T^{ab} = \rho\, u^a u^b$.

• *Hosts. On the flat FLRW hosts whose total is dust, namely Einstein–de Sitter with* $\Lambda = 0$, *or* $H^2 = H_\infty^2 + Ca^{-3}$ *with* $\Lambda = 3H_\infty^2$, *two copies of with* $T = t$ *and* $\rho_i = c_i a^{-3}$, $c_1 + c_2 = 3C/\chi$ *(respectively* $3H^2a^3/\chi$ *for Einstein–de Sitter), realize every member* $\sigma_s = ((1-s)T_{\mathrm{tot}}, sT_{\mathrm{tot}}, 0)$, $s \in [0,1]$. *Hence the indicator of* $\rho_{\mathrm{dm}} > \rho_{\mathrm{b}}$ *has risk* $\frac{1}{2}$ *and the ratio* $\rho_{\mathrm{dm}}/\rho_{\mathrm{b}}$ *has infinite risk for split-independent data, under reading R1 and not merely at account level.*

Proof. (a) Multiples of an action that contains no potential contain no potential; their stresses are αS and $(1-\alpha)S$ on the same solution, and both currents vanish identically. (b) Varying ρ gives the constraint. With $\delta\sqrt{-g} = \frac{1}{2}\sqrt{-g}\,g^{ab}\delta g_{ab}$ and $\delta g^{ab} = -g^{ac}g^{bd}\delta g_{cd}$, the first term is multiplied by the constraint and vanishes on shell, leaving $T^{ab} = \rho\,\partial^a T\partial^b T = \rho u^a u^b$. Varying T gives $\nabla_a(\rho\nabla^a T) = 0$. Finally $u^a\nabla_a u_b = -u^a\nabla_b\nabla_a T = u^a\nabla_b u_a = \frac{1}{2}\nabla_b(u\cdot u) = 0$. (c) $T = t$ satisfies the constraint and $\nabla_a(\rho u^a) = a^{-3}\partial_t(a^3\rho) = 0$. By Proposition , $\chi\varepsilon_{\mathrm{tot}} = 3H^2 - \Lambda$ and $\chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2) + \Lambda$; on the second host $\dot{H} = -\frac{3}{2}Ca^{-3}$ gives $\chi\varepsilon_{\mathrm{tot}} = 3Ca^{-3}$ and $p_{\mathrm{tot}} = 0$, and on Einstein–de Sitter $p_{\mathrm{tot}} = 0$ (check V2-11). Lemma (b),(c) gives the risks.

Status: proved. Part (a) is the draft's silent family; (b)–(c) strengthen it by supplying the action explicitly, so the risks of Proposition (b),(c) hold under R1 (PC2-1). The action is a standard form of pressureless dust; it is used here only as an existence witness. par *Non-claim.* The witness action is not proposed as the microscopic dark sector. Both copies are neutral, so the ordinary copy is not identified with baryons. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is

not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Exact risks on the R1 family, with the deterministic boundary; thm:DM-v2-risks). *On a family of accounts with a common complete report law, indexed by the dark fraction* $\alpha \in [\alpha_-, \alpha_+] \subseteq [0,1]$*:*

• *the exact minimax absolute-loss risk for* α *is* $(\alpha_+ - \alpha_-)/2$*;*

• *if* $\alpha_- < \frac{1}{2} < \alpha_+$*, the indicator of* $\alpha > \frac{1}{2}$ *has minimax risk* $\frac{1}{2}$*;*

• *if* $\alpha_+ = 1$ *is approached, the ratio* $Q = \alpha/(1-\alpha)$ *has infinite minimax risk;*

• *a deterministic Boolean rule that is a function of a fixed exact datum is constant on the family and has worst-case error* 1*; a deterministic Boolean function f of a stochastic common transcript Z has worst-case error* $\max(p, 1-p)$ *with* $p = \Pr[f(Z) = 1]$*, which equals* $\frac{1}{2}$ *when Z contains a fair bit.*

Proof. (i)–(iii) are Lemma (b),(c) and Proposition (b). (iv) A function of an exact common datum takes one value on the family, and the indicator takes both values. For a stochastic transcript, the error at a point with target 1 is $1-p$ and at a point with target 0 is p; both laws are the same. If Z contains a fair bit B and $f(Z) = B$, then $p = \frac{1}{2}$ (check V2-12).

Status: proved. (i)–(iii) restate version 1. (iv) is the draft's correction; it leads to Erratum E2-3. par *Non-claim.* A deterministic rule using a random transcript implements a randomized answer; this is a statement about rules, not a new physical observable. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Remark (Erratum E2-3 to Lemma (c); rem:DM-v2-E3). Lemma (c), Proposition (b),(c) and finding (5) of the

abstract say that every deterministic Boolean answer has worst-case error 1. This holds for deterministic answers that are functions of exact data, which are constant on the fibre. A deterministic function of a stochastic common transcript has worst-case error $\max(p, 1-p) \geq \frac{1}{2}$, with equality possible (Theorem (iv)). The randomized risks $\frac{1}{2}$ and all other statements are unaffected. Version 1 lines are kept unchanged; this remark is the correction.

Proposition (Fixed-host R1 is not neighbourhood R1; prop:DM-v2-metricnbhd). *Let a supplied action be twice differentiable under compact potential and metric variations, with commuting mixed variations.*

• *If R1 holds for every metric in an open neighbourhood of the host and every allowed configuration, then* $\delta_A T^{ab} = 0$ *distributionally for compact potential variations.*

• *R1 at one fixed metric does not imply this. For* $\zeta \neq 0$ *the functional* $S_{\text{test}} = \zeta \int \sqrt{-g}\, R[g]\, F_{\mu\nu} F^{\mu\nu}\, \mathrm{d}^4x$ *satisfies R1 at the flat metric* η*, but its stress there is* $T_{ab} = 2\zeta(\partial_a \partial_b - \eta_{ab}\mathrm{Box})(F_{\mu\nu} F^{\mu\nu})$*, which depends on A.*

Proof. (a) For compact a and metric variation h, $0 = \delta_g \delta_A S[h, a] = \delta_A \delta_g S[a, h] = \frac{1}{2}\delta_A \int \sqrt{-g}\, T^{ab} h_{ab}$, since R1 holds on the neighbourhood; $\sqrt{-g}$ does not depend on A and h is arbitrary. (b) At η, $R = 0$, so every A-variation of S_{test} vanishes. With $f = F_{\mu\nu} F^{\mu\nu}$, $\delta(\sqrt{-g}\, fR) = \sqrt{-g}\, [fG_{ab} + g_{ab}\mathrm{Box}\, f - \nabla_a \nabla_b f]\, \delta g^{ab}$ plus terms proportional to R and total derivatives; at η, $G_{ab} = 0$, and $T_{ab} = -(2/\sqrt{-g})\delta S/\delta g^{ab}$ gives the display (check V2-13).

Status: proved. It complements Theorem (a), whose mixed-variation statement is at fixed g, and Proposition (c), which concerns the matter equations at fixed g. par *Non-claim.* The test functional is a counterexample to an inference, not a proposed dark-matter theory. No metric responds on a prescribed host. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Version 2: adaptive non-identifiability

Proposition (Current blindness alone is not split blindness; prop:DM-v2-cbcounter). *On the neutral dust family of Proposition (b), the experiment that reports $Y = 1$ with probability α never reads a current, yet* $\Pr_\alpha[Y = 1] = \alpha$ *separates every pair of members.*

Proof. All members have $j \equiv 0$, so the report depends on no current coordinate; its law depends on α.

Status: proved. This is the draft's counterexample. It corrects the wording ``blind to the dark-slot current'' in plan t341u item 3 (PC2-3) and agrees with the version-1 non-claim after Lemma . par *Non-claim.* The experiment is a split-sensitive detector by construction; no such detector is claimed to exist physically. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Adaptive non-identifiability for the current and split coordinates; thm:DM-v2-adaptive). *Let* $\pi_0 = (g, \Lambda, \chi, \Delta, \mathscr{C}, j_{\mathrm{tot}})$. *Suppose that, on a set $\mathscr{F}$ of accounts with common π_0, an adaptive experiment of finite depth has a common initial law, common decision kernels D_r and common report kernels K_r given the history, and a stopping rule that is a function of the history. Then the joint law of the stopped transcript is the same on $\mathscr{F}$. In particular every estimator of a target that varies on $\mathscr{F}$ obeys Lemma (b),(c). A sufficient condition is that all kernels factor through π_0.*

Proof. Induction on the round: if the law of the history h_{r-1} is common, the law of (h_{r-1}, d_r, y_r) is $P(h_{r-1})D_r(d_r \mid h_{r-1})K_r(y_r \mid h_{r-1}, d_r)$, which is common. The stopping time is a function of the history, so the stopped transcript is a function of the depth-R transcript. Kernels that factor through π_0 are common on $\mathscr{F}$ (check V2-14).

Status: proved. It sharpens Lemma (d) by adding a stopping rule and by naming the condition. Big03-A's local version-3 adaptive theorem is not used (PC2-3). par *Non-claim.* The hypothesis is a complete common process, not blindness to one coordinate (Proposition). Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Corollary (A current-sensitive supply is a data refinement; cor:DM-v2-supply). *Let Z' be any supplied datum whose law is P_x on accounts $x \in \mathscr{F}$. If P_x is common on $\mathscr{F}$, adjoining Z' changes no risk. If P_x varies, the risk can drop, but only because the data map is refined from π_0 to (π_0, Z'); the drop is not derived from π_0.*

Proof. If $P_x = P$ is common, an experimenter who knows π_0 can draw Z' from P without access to x, so every rule using Z' is a randomized rule on the old data. If P_x varies, the pair (π_0, Z') is a new data map, and Lemma (a) applies to its fibres (check V2-14).

Status: proved (plan t341u item 3, ``supply is a data refinement''). par *Non-claim.* No current-sensitive instrument is constructed. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Approximate common processes; thm:DM-v2-approx). *For two accounts x_0, x_1 suppose the initial*

laws differ by at most ε_0 *in total variation and, for every history, the decision and report kernels at round r differ by at most* ε_r *in total variation. Let* $\varepsilon^* = \min\{1, \varepsilon_0 + \sum_r \varepsilon_r\}$. *Then the transcript laws differ by at most* ε^*, *every estimator of a target with* $|q(x_0) - q(x_1)| = \Delta$ *has worst-case risk at least* $\frac{\Delta}{2}(1 - \varepsilon^*)$, *and every Boolean rule for a target separating them has worst-case error at least* $\frac{1}{2}(1 - \varepsilon^*)$. *On a family with unbounded target and a uniform* $\varepsilon^* < 1$, *the risk is infinite.*

Proof. Hybrid argument: replace one kernel at a time; each replacement changes the transcript law by at most the kernel distance, averaged over histories, and total variation is subadditive. For an estimator, $E_0|\widehat{q} - q_0| + E_1|\widehat{q} - q_1| \geq \Delta \int \min(p_0, p_1) = \Delta(1 - \mathrm{TV})$, and the maximum is at least half the sum. The Boolean case is the same with $\Delta = 1$ (check V2-15).

Status: proved; draft theorem, held. par *Non-claim.* No physical bound on ε_r is supplied. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Corollary (Quantum stage allowances; cor:DM-v2-diamond). *If the rounds are finite-dimensional quantum instruments and the stage channels for* x_0, x_1 *differ by at most* ε_r *in half-diamond norm, with initial states at trace distance at most* ε_0, *then the classical transcripts differ by at most* ε^* *in total variation, and Theorem applies.*

Proof. The half-diamond norm bounds the change of the output state for every input, including the ancilla; trace distance contracts under the final measurement; the same hybrid argument applies.

Status: proved; draft corollary, held. par *Non-claim.* No quantum coefficient is admitted. The instruments are abstract and are not identified with a dark-matter probe. Standing non-claims (plan S 5): no dark-matter particle

species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Version 2: dark slot and dark capacity

Specification (Unused capacity witness; spec:DM-v2-capacity). Adjoin to an account an access register $\mathbb{C}^m$, $m \geq 2$, that is not coupled to the target or the host, with the numerical witness $C_{\mathrm{dark}} = \log_2 m$. No promise ties it to a source tensor or host capacity.

Status: specification (draft; held). It is a local witness, not Big02-A's object.

Proposition (Two-directional non-identification of slot and capacity; prop:DM-v2-capacity). *Under Specification , adjoin the R1 family of Proposition . Let $\mathscr{E}$ be a positive energy functional with $\mathscr{E}(S) > 0$.*

• *C_{dark} is not a function of the host and T_{dm}; T_{dm}, and even $\mathscr{E}(T_{\mathrm{dm}}) = \alpha\mathscr{E}(S)$, is not a function of C_{dark}.*

• *The failures persist after restricting to $C_{\mathrm{dark}} > 0$, $0 < \alpha < 1$ and $\mathscr{J}_{\mathrm{dm}} \equiv 0$.*

• *Any identity $F(C_{\mathrm{dark}}) = G(\mathscr{E}(T_{\mathrm{dm}}))$ valid on this product class has both sides constant on their ranges.*

• *The admissible set is the product of the split fibre and the capacity range, so positivity of both coordinates does not correlate them. A correlation is an added law.*

Proof. (a) Fix α and change m from 2 to 4: the host, split and currents are unchanged and C_{dark} changes. Fix m and vary α. (b) The examples satisfy the strict inequalities. (c) Fix α and vary m, then fix m and vary α. (d) The register is uncoupled, so admissibility does not depend on m (check V2-16).

Status: proved; draft proposition merged with plan t341u item 2 (PC2-2). Big02-A def:dark classifies access

relative to a declared observer and is not a substance, and Big05-A v3 prop:Big05-dark (source record; not a premise) records that it is not stress-energy and (a) not a host functional. par *Non-claim.* This closes an identification inference, not the physical question. It does not say that memory is energy-free or that register enlargement is physically implementable. The four Big02-A dark-capacity categories are not assumed to have one numerical measure. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Version 2: the vacuum shift and its constitutive limits

Proposition (Limits of the shift; prop:DM-v2-shift). *Let λ be constant and apply the shift of Proposition (a). It preserves conservation, the total, every current, every null contraction and, at action level, R1. Suppose $T_{\mathrm{dm}} = \varepsilon u \otimes u$ with $\varepsilon \geq 0$, $T_{\Lambda} = -\rho_{\Lambda} g$ with $\rho_{\Lambda} \geq 0$, and $\varepsilon_{\min} = \inf_U \varepsilon$. Then the shifted dark and vacuum slots both satisfy*

• *the weak energy condition iff $-\rho_{\Lambda} \leq \lambda \leq \varepsilon_{\min}$;*

• *the dominant energy condition iff $-\rho_{\Lambda} \leq \lambda \leq \varepsilon_{\min}/2$;*

• *the strong energy condition for the dark slot iff $\lambda \geq -\varepsilon_{\min}/2$ (the vacuum slot with $\rho_{\Lambda} + \lambda > 0$ violates it for every λ);*

• *the dust form of the dark slot iff $\lambda = 0$.*

Proof. Conservation, currents, null contractions and R1 are Proposition (a),(b). In the u-frame the shifted dark slot has $\varepsilon' = \varepsilon - \lambda$ and isotropic pressure $p' = \lambda$. For a unit timelike v with $\gamma = -u \cdot v \geq 1$, $T'_{\mathrm{dm}}(v, v) = \varepsilon\gamma^2 - \lambda$, minimized

at $\gamma = 1$; with $\varepsilon' + p' = \varepsilon \geq 0$ this gives (i) for the dark slot, and the vacuum slot needs $\rho_\Lambda + \lambda \geq 0$. For a type-I tensor, the dominant condition is $\varepsilon' \geq |p'|$, i.e. $\varepsilon - \lambda \geq |\lambda|$, which is automatic for $\lambda \leq 0$ and is $2\lambda \leq \varepsilon$ for $\lambda > 0$; the vacuum slot needs $\rho_\Lambda + \lambda \geq 0$. The strong condition is $\varepsilon' + 3p' \geq 0$ and $\varepsilon' + p' \geq 0$, i.e. $\varepsilon + 2\lambda \geq 0$; for a vacuum slot $-\rho g$ it reads $-2\rho \geq 0$. The spatial stress $\lambda\delta_{ij}$ vanishes iff $\lambda = 0$, as in Proposition (b) (check V2-17).

Status: proved. This settles the plan t341u item 4 question: the shift preserves current declarations and the null energy condition but not dust form, positivity, or the weak, dominant or strong conditions (PC2-4). It is the draft's shift-limitations result, with (iii) added. par *Non-claim.* Preserving the null energy condition does not preserve dust form or positivity. The shift does not identify dark matter with vacuum energy. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Corollary (Exact risk on the allowed shift interval; cor:DM-v2-shiftrisk). *If the retained process does not depend on the shift and the allowed set has infimum λ_- and supremum λ_+, the exact minimax absolute-loss risk for the shifted vacuum density $\rho_\Lambda + \lambda$ is $(\lambda_+ - \lambda_-)/2$. Under the weak energy condition of Proposition (i) it is $\frac{1}{2}(\rho_\Lambda + \varepsilon_{\min})$; under the dominant condition it is $\frac{1}{2}(\rho_\Lambda + \varepsilon_{\min}/2)$; without a restriction it is infinite.*

Proof. Lemma (b) on the interval, and Proposition (i),(ii) for the endpoints (check V2-17).

Status: proved; draft corollary with the energy-condition instances added. par *Non-claim.* A zero risk inside a restrictive supplied class is identification inside that class, not an absolute vacuum-energy calculation. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not

identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Rank is not supply; box risk; thm:DM-v2-rank). *Fix four conserved tensors* $B_i[g]$ *and* $L_g(\theta) = \sum_{i=0}^{3} \theta_i B_i[g]$. *If the retained data do not depend on* θ, *the exact minimax risk for* $q(\theta) = b + \sum_i a_i \theta_i$ *on the box* $\theta_i \in [\theta_i^-, \theta_i^+]$ *is*

$$\frac{1}{2} \sum_{i=0}^{3} |a_i| (\theta_i^+ - \theta_i^-),$$

whatever the rank of L_g. *On an Einstein region with* $\lambda_R = c_0 - \frac{R}{4} c_G$ *the risk is* $\frac{1}{2}[(c_0^+ - c_0^-) + \frac{|R|}{4}(c_G^+ - c_G^-)]$, *and a supplied exact* λ_R *leaves a three-dimensional affine fibre. Conversely, if* $\operatorname{rank} L_g = 4$ *and the value* $L_g(\theta)$ *is supplied,* θ *is determined.*

Proof. A linear function on a box has range width $\sum_i |a_i|(\theta_i^+ - \theta_i^-)$, attained at sign-chosen corners; apply Lemma (b). The Einstein row is $(1, -R/4, 0, 0)$ with three-dimensional kernel (Proposition (c)). Rank four means injective (check V2-18).

Status: proved. It refines plan t341u item 4's phrase ``rank-one or rank-four data do not select'': rank is a property of a map, and a supplied value of an injective map identifies θ (PC2-4). The Einstein-region reduction, box risk and rank/selection separation agree with DS-OB-1-fibre thm:F-einstein, thm:F-rank and cor:F-ranknotsel (source record; not a premise), and with the now-registered Big01-A v7 thm:vacfibre(b)–(d) (source record; not a premise) (PC2-9). Big03-A's local prop:R-v3-vacuum-box is not used. par *Non-claim.* No generic-rank theorem is proved or transferred. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C

is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Version 2: the coefficient orbit

Proposition (Complete label fibre with an unsupplied normalization; prop:DM-v2-orbit). *Fix* $a, V_c, k_B, c > 0$ *and the declared dictionary* $T = (k_B a)^{-1}(U\kappa^3 c^3/\alpha_r)^{1/4}$, $S = 4UV_c/(3aT)$ *with* $U, \kappa, \alpha_r > 0$. *At a fixed exact pair* (T, S) *the whole parameter fibre is the orbit* $(U, q\kappa, q^3\alpha_r)$, $q > 0$. *If admissibility of splits and of R1 realizations does not depend on these coordinates, the joint fibre is a product. If* U, α_r *and an absolute* T *are supplied independently, then* $\kappa = (\alpha_r(k_B aT)^4/(Uc^3))^{1/3}$.

Proof. $U = 3aTS/(4V_c)$, and then $\kappa^3/\alpha_r = (k_B aT)^4/(Uc^3)$; two triples with the same labels have the same U and the same κ^3/α_r, hence are related by the orbit. The converse is substitution; the product follows from independence; the last formula is inversion (check V2-19).

Status: proved. It completes Proposition (d), which proved invariance of the labels but not completeness of the orbit. The complete orbit agrees with Big04-A-coeff prop:C-orbit (source record; not a premise); Big04-A thm:DR-coef (source record; not a premise) is the injectivity of the labels at a declared normalization, not the orbit (PC2-7). par *Non-claim.* The orbit varies α_r and must not be asserted in a class where that normalization is fixed. No numerical coefficient is admitted, and no action scale is identified with a dark source or a capacity. Inversion after supplies is conditional calibration, not derivation. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

A dust reading without a closed matter law does not select the future

Proposition (Smooth future-horizon non-selection; prop:DM-future). *Fix $H_0, a_* > 0$. Let $\eta(t) = f(t)/(f(t) + f(1-t))$, with $f(u) = e^{-1/u}$ for $u > 0$ and $f = 0$ otherwise. Put $S(t) = \int_0^t \eta$, $H_p = H_0/(1 + H_0 S/p)$ and $a_p = a_* \exp \int_0^t H_p$ for $p > 0$, and prescribe the flat FLRW hosts g_p.*

• All a_p are smooth and agree with $a_* e^{H_0 t}$ on $t \le 0$, with every derivative at $t = 0$.

• The dust readings $T^{\mathrm{d}}(p) = \varepsilon_*(a_*/a_p)^3 u \otimes u$, $\varepsilon_* > 0$, with zero current, are separately conserved and coincide on $t \le 0$. With $\Lambda = 0$ and $T_{\mathrm{tot}} = \chi^{-1}\mathcal{G}[g_p]$, the remainder $T_{\mathrm{tot}} - T^{\mathrm{d}}(p)$ is conserved. The total satisfies the null and weak energy conditions, since $\dot{H}_p = -H_p^2 \eta/p \le 0$.

• $R_*(p) = a_* \int_0^\infty \mathrm{d}t/a_p$ (in units $c = 1$) is finite iff $p > 1$. It is strictly decreasing in p on $(1, \infty)$, and $R_*(p) \to \infty$ as $p$downarrow 1.

• Hence no rule of the common past geometry and the common past dust reading determines horizon existence: the randomized Boolean minimax error is $\frac{1}{2}$, and over finite-horizon members the minimax risk for R_* is infinite.

Proof. (a) η vanishes with all derivatives on $(-\infty, 0]$, so S and $H_p - H_0$ do too. (b) Comoving u is geodesic, and Proposition (a) gives conservation. On $t \le 0$ every a_p is the same. By Proposition (b), $\chi\varepsilon_{\mathrm{tot}} = 3H_p^2 > 0$ and $\chi(\varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}) = -2\dot{H}_p \ge 0$. (c) For $t \ge 1$, $S = t - \frac{1}{2}$ (since $\eta(t) + \eta(1-t) = 1$), so $H_p = p/(t - \frac{1}{2} + p/H_0)$ and $a_p \propto (t - \frac{1}{2} + p/H_0)^p$. The tail $\int_1^\infty \mathrm{d}t/a_p$ is finite iff $p > 1$. For $t > 0$, $\partial_p H_p > 0$, so $a_p(t)$ increases strictly in p and R_* decreases. As $p$downarrow 1, $1/a_p$uparrow $1/a_1$ pointwise, and monotone convergence with the divergent $p = 1$ tail gives $R_* \to \infty$ (check DM-11). (d) Lemma (b),(c) on the common past data.

Status: proved. The family is that of Big05-A v3 thm:Big05-futures(d) (source record; not a premise), re-proved here. The registered counterparts of the plan's cor:P5 are Big01-A v5 thm:Efuture and Big01-A v5 prop:Esmooth (source record; not a premise) (PC-2). The remainder carries no equation of state, and its energy conditions are not asserted. In fact, on $t \le 0$ its energy density $3H_0^2/\chi - \varepsilon_* e^{-3H_0 t}$ (with $a_* = 1$) is negative for $t < -\frac{1}{3H_0}\ln\frac{3H_0^2}{\chi\varepsilon_*}$, so a

positive dust reading on the whole de Sitter past needs a negative remainder at early times (DC-9). par *Non-claim.* This is not non-uniqueness of a closed Einstein–dust initial-value problem. A fully prescribed de Sitter future has radius c/H_0. The ambiguity concerns an unspecified continuation. No future is predicted, and no expansion closure is adopted. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Remark (Erratum E2-2 (version 2) to Proposition (b)). Version 1 declares $\chi \neq 0$, but Proposition (b) concludes the null and weak energy conditions of the total from $\chi\varepsilon_{\mathrm{tot}} = 3H_p^2 > 0$ and $\chi(\varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}) = -2\dot{H}_p \geq 0$. Both conclusions need $\chi > 0$. For $\chi < 0$, the same hosts violate both conditions. Parts (a), (c) and (d) concern geometry only and are unaffected. The non-selection conclusion holds for either sign.

Version 2: conditional forecasts with rejection conditions

The statements in this section and the next are conditional calculations on prescribed hosts. Each uses explicitly supplied hypotheses (linear perturbation equations, a Newtonian reduction, a closure) that are outside the ledger and are not derived from Enter. A failure of a displayed relation rejects its stated hypothesis package, not the whole class of dark-matter readings. No observation is performed. Every quantity below that is a function of the metric and declared constants is split-blind, as Big05-A v3 prop:Big05-predsplit (source record; not a premise) records for its forecasts; only the species-resolved relations (Theorem) need species data.

Proposition (Dust-dilution error is the integrated exchange; prop:DM-v2-dilution). *On a prescribed FLRW host let a homogeneous pressureless slot obey* $\nabla_a T^{ab}_{\mathrm{dm}} = Q^b$ *and put* $q = -u_b Q^b$. *Then*

$a(t)^3\varepsilon_{\mathrm{dm}}(t) - a(t_0)^3\varepsilon_{\mathrm{dm}}(t_0) = \int_{t_0}^{t} a(s)^3 q(s)\,\mathrm{d}s$. *A supplied bound* $|q| \le q_*$ *gives* $|a^3\varepsilon_{\mathrm{dm}}(t) - a^3\varepsilon_{\mathrm{dm}}(t_0)| \le \int_{t_0}^{t} a^3 q_*\,\mathrm{d}s$ *for* $t \ge t_0$. *The exact* a^{-3} *law is the case* $q = 0$.

Proof. Projecting the balance on u gives $\dot{\varepsilon}_{\mathrm{dm}} + 3H\varepsilon_{\mathrm{dm}} = q$; multiply by a^3 and integrate (check V2-20).

Status: proved; draft proposition. It sharpens plan t341u item 5's first forecast and Proposition (a) into an error identity. par *Non-claim. Rejection condition:* a measured $a^3\varepsilon_{\mathrm{dm}}$ that is not constant rejects the package ``homogeneous dust with separate conservation''. R1 excludes the direct electromagnetic exchange of the specified action, not every interaction with other sectors. No exchange rate is predicted. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Two separately conserved dusts: relative modes; thm:DM-v2-twodust). *In conformal Newtonian gauge, let two separately conserved pressureless components obey*

$$\delta_i' = -\theta_i + 3\Phi', \qquad \theta_i' + \mathscr{H}\theta_i = k^2\Psi, \qquad i = 1, 2,$$

and put $S = \delta_1 - \delta_2$, $V = \theta_1 - \theta_2$.

• $S' = -V$ *and* $V' + \mathscr{H}V = 0$. *Hence* $V = V_i a_i/a$ *and* $S = S_i - a_i V_i \int_{\eta_i}^{\eta} \mathrm{d}\eta'/a$, *whatever* Φ *and* Ψ *are.*

• *If* $\int^{\infty} \mathrm{d}\eta/a < \infty$, S *tends to a finite limit. Equal contrasts and equal velocity divergences at one time give* $S \equiv 0$*; equal contrasts alone do not.*

• *The background fraction* $f = \bar{\varepsilon}_1/(\bar{\varepsilon}_1 + \bar{\varepsilon}_2)$ *is constant. The total* $\delta_{\mathrm{m}} = f\delta_1 + (1-f)\delta_2$, $\theta_{\mathrm{m}} = f\theta_1 + (1-f)\theta_2$ *obeys , and* $\delta_1 = \delta_{\mathrm{m}} + (1-f)S$, $\delta_2 = \delta_{\mathrm{m}} - fS$, $\theta_1 = \theta_{\mathrm{m}} + (1-f)V$, $\theta_2 = \theta_{\mathrm{m}} - fV$.

• *S and V are invariant under linear coordinate changes.*

Proof. (a) Subtract the equations; $(aV)' = 0$, then integrate $S' = -V$. (b) The integral converges. If $S_i = V_i = 0$, both vanish; if only $S_i = 0$, $S = -a_i V_i \int \mathrm{d}\eta'/a \neq 0$ for $V_i \neq 0$. (c) Both background densities scale as a^{-3}. The equations are linear with common coefficients, so convex combinations solve them; the decomposition is algebra. (d) A linear change of time slicing by α changes each dust density contrast by $-\alpha\bar{\varepsilon}_i'/\bar{\varepsilon}_i = 3\mathscr{H}\alpha$, the same for both; a linear coordinate change shifts every fluid velocity by the same vector field, so differences are unchanged (check V2-21).

Status: proved. This merges the draft's relative-growth proposition with plan t342u item 1 (X9-1, F10-17), keeping the stronger form: (a) gives the explicit $1/a$ decay of V, (b) the frozen limit, and (d) gauge invariance. The equations are the standard linear ones; Ma–Bertschinger [MaBertschinger95] is cited only for these equations and the gauge conventions. Total-source degeneracy is discussed in [Kunz09]. par *Non-claim. Rejection condition:* species-resolved data with $a(\theta_1 - \theta_2)$ not constant reject for these species; pressure, drag, exchange or different force laws need new equations. Before recombination baryons are coupled to photons and are not dust. No species data are supplied, and no initial values of S, V are predicted. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Horizon envelope and an explicitly added relaxation closure; prop:DM-v2-horizon). *Let* $a > 0$ *be a prescribed expanding flat FLRW scale factor,* $c = 1$, *and* $R_*(t_0) = a(t_0)\int_{t_0}^{\infty} \mathrm{d}t/a$.

• *If* $0 < h_- \le H \le h_+ < \infty$ *for all* $t \ge t_0$, *then* $1/h_+ \le R_*(t_0) \le 1/h_-$.

• *If* $\chi > 0$ *and the total obeys the null energy condition on the whole future, then* $R_*(t_0) \geq 1/H(t_0)$*, allowing* $R_* = \infty$.

• *Under the added closure* $\dot{H} = -\gamma(H - K)$, $\gamma, K > 0$, $H(t_0) = H_0 > 0$*:* $H = K + (H_0 - K)e^{-\gamma\tau}$,

$a(t)/a(t_0) = \exp[K\tau + (H_0 - K)(1 - e^{-\gamma\tau})/\gamma]$ *with* $\tau = t - t_0$, $1/\max(H_0, K) \leq R_*(t_0) \leq 1/\min(H_0, K)$*, and* $R_*(t) \to 1/K$.

Proof. The integrand is $\exp(-\int_{t_0}^{t} H)$; compare with $e^{-h_\pm(t - t_0)}$ for (i). For (ii), Proposition gives $\chi(\varepsilon_{\mathrm{tot}} + p_{\mathrm{tot}}) = -2\dot{H}$, so $\dot{H} \leq 0$ and $H \leq H(t_0)$; compare with $e^{-H(t_0)(t - t_0)}$. For (iii), solve the linear equation, integrate H, note that $H(t)$ lies between H_0 and K, apply (i) from every later time, and squeeze (check V2-22).

Status: proved; draft proposition, with its Λ-containing identity replaced by Proposition to avoid a duplicate. Part (iii) has the same form as the unregistered local Big03-A version-3 relaxation forecast, which is not cited (PC2-3, PC2-5). Restoring units multiplies the radii by c. par *Non-claim. Rejection conditions:* the envelope needs bounds on the entire future; a nonzero residual $\dot{H} + \gamma(H - K)$ rejects the closure. No closure follows from R1. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (A positive dust history forces a null-energy defect in a saturated remainder; prop:DM-v2-nullsat). *Suppose a prescribed total satisfies* $T_{\mathrm{tot}}(k, k) = 0$ *for every null* k *on a region, and it contains a positive dust slot* $T_{\mathrm{dm}} = \varepsilon u \otimes u$, $\varepsilon > 0$*. Then the remainder* $T_{\mathrm{tot}} - T_{\mathrm{dm}}$ *has* $(T_{\mathrm{tot}} - T_{\mathrm{dm}})(k, k) = -\varepsilon(u \cdot k)^2 < 0$ *for every nonzero null* k*. No constant shift* λg *between the dark and vacuum slots removes this defect.*

Proof. Subtract. A nonzero null vector is not orthogonal to a timelike vector, and $g(k, k) = 0$ (check V2-23).

Status: proved; draft proposition. On the de Sitter past of Proposition the total is $(3H_0^2/\chi)$ times $-g$, which is null-saturated, so the remainder violates the null energy condition wherever the dust is present. This strengthens

the version-1 early-time caveat (DC-9), which found only a negative remainder energy density at early times. par

Non-claim. This is a compatibility obstruction, not a derivation of exotic matter. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Future non-selection boundary. The family of Proposition keeps its non-selection conclusion in the class where the remainder is unrestricted. If one also requires a positive dust slot and the null energy condition for every remaining past slot, Proposition excludes the family on $t \le 0$. These are different admissible classes, not conflicting forecasts. The smooth-future comparison is Big05-A v3 thm:Big05-futures (source record; not a premise), and the registered Big01-A v7 cor:P5 (source record; not a premise) now states that the past does not certify an event horizon (PC2-9).

Version 2: joint consistency relations

This section collects the joint-consistency theorems of plan t342u. Each ties two independently reconstructed quantities together, so that one specified model has to fit them jointly.

Proposition (A compensated dust mode is gravitationally invisible; prop:DM-v2-compensated). *Suppose the only perturbed components are two separately conserved pressureless dusts with background fraction f, and the linearized Einstein equations hold in conformal Newtonian gauge:*

$$k^2\Phi + 3\mathscr{H}(\Phi' + \mathscr{H}\Psi) = -4\pi G a^2 \delta\rho, \qquad k^2(\Phi' + \mathscr{H}\Psi) = 4\pi G a^2(\bar{\rho} + \bar{p})\theta,$$

$$k^2(\Phi - \Psi) = 12\pi G a^2(\bar{\rho} + \bar{p})\sigma,$$

together with the pressure equation. Then

• *every pair* (S, V) *of Theorem (a) with* $\Phi = \Psi = 0$ *gives an exact linear solution* $\delta_1 = (1 - f)S$, $\delta_2 = -fS$, $\theta_1 = (1 - f)V$, $\theta_2 = -fV$, $\Phi = \Psi = 0$*;*

• *conversely,* $\Phi = \Psi = 0$ *forces* $\delta\rho = 0$ *and* $(\bar{\rho} + \bar{p})\theta = 0$*: zero total density and zero total momentum. Hence data that depend only on the linear metric perturbation cannot reconstruct the species split of these modes.*

Proof. (a) $\delta\rho = \bar{\rho}_m[f(1 - f) - (1 - f)f]S = 0$, the total momentum vanishes in the same way, and $\delta p = \sigma = 0$. All four equations have zero left side at $\Phi = \Psi = 0$ and zero source. The species equations reduce to $S' = -V$, $V' + \mathscr{H}V = 0$. (b) Put $\Phi = \Psi = 0$ in the first two equations (check V2-24).

Status: proved; plan t342u item 2 (X9-2), with the momentum condition and relativistic consistency checked. It contains the draft's compensated decomposition as the case $\delta_m = \theta_m = 0$. The four equations are the conformal-Newtonian equations of [MaBertschinger95] with our Ψ, Φ in place of their ψ, φ; they are cited only as a source record of these equations. par *Non-claim. Scope:* dust baryons only, with no other perturbed component. Photon coupling, baryon pressure or neutrino perturbations break the construction. *Rejection condition:* a detected metric perturbation sourced by such a mode rejects the package. The mode's amplitude is not predicted. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Expansion and growth must reconstruct one matter density; thm:DM-v2-growth). *Assume flat FLRW with* $\chi = 8\pi G$*, total matter density* $\rho_m = \rho_{m0}a^{-3}$*, and the subhorizon total-matter equation* $\ddot{D} + 2H\dot{D} = 4\pi G\rho_m D$ *for the total contrast. For every solution* $D \neq 0$*, with* $N = \ln a$*,* $f = \mathrm{d}\ln D/\mathrm{d}N$ *and* $f_N = \mathrm{d}f/\mathrm{d}N$*,*

$$\widehat{\Omega}_m(a) := \frac{2a^3H^2}{3H_0^2}[f_N + f^2 + (2 + \frac{\mathrm{d}\ln H}{\mathrm{d}N})f] = \Omega_{m0} := \frac{8\pi G\rho_{m0}}{3H_0^2}.$$

The value does not depend on the baryon fraction, on the relative modes S, V, on Λ, or on decaying-mode content.

On Einstein–de Sitter, $\widehat{\Omega}_{\mathrm{m}} = 1$.

Proof. $\dot{D} = HDf$ and $\ddot{D} = H^2D[f_N + f^2 + (\mathrm{d}\ln H/\mathrm{d}N)f]$. Hence $a^3(\ddot{D} + 2H\dot{D})/D = a^3H^2[\cdots] = 4\pi G\rho_{\mathrm{m0}}$. Multiply by $2/(3H_0^2)$. By Theorem (c) the total obeys the one-fluid equation whatever S is; the equation is linear, so any combination of modes works. For Einstein–de Sitter, $D = a$ gives $f = 1$, $f_N = 0$, $\mathrm{d}\ln H/\mathrm{d}N = -\frac{3}{2}$ and $a^3H^2 = H_0^2$ (check V2-25, with a mutation that drops the $2f$ term).

Status: proved; plan t342u item 3 (X9-3), strengthened to every solution. It is conditional on the subhorizon reduction of Corollary . par *Non-claim. Rejection condition:* a reconstructed $\widehat{\Omega}_{\mathrm{m}}(a)$ that varies with a, or that differs from the matter density inferred from the same expansion history, rejects the package (total dust, separate conservation, subhorizon Poisson law, $\Phi = \Psi$). No value of Ω_{m0} is predicted. Species growth needs species data. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Lensing–motion residual equals gravitational slip; thm:DM-v2-slip). *For geodesic dust tracers obeying the Euler equation of , define the dynamical potential* $V_g = -(\theta' + \mathscr{H}\theta)$ *and the lensing potential* $L = -k^2(\Phi + \Psi)$. *Then* $V_g = -k^2\Psi$ *and*

$$R_{\mathrm{slip}} := L - 2V_g = k^2(\Psi - \Phi),$$

with no field equation. If in addition the linearized Einstein equations hold, $R_{\mathrm{slip}} = -12\pi Ga^2(\bar{\rho} + \bar{p})\sigma$, *so* $L = 2V_g$ *iff the total anisotropic stress vanishes.*

Proof. Substitute the Euler equation, then the $\Phi - \Psi$ equation of Proposition (check V2-26, with a sign mutation).

Status: proved; plan t342u item 4 (X9-4). The sign agrees with the version-1 Euler equation. Zhang, Liguori, Bean and Dodelson [ZLBD07] proposed testing the relationship between lensing and matter overdensity (their E_G); the identity here is local and is not their estimator. par *Non-claim. Rejection condition:* a nonzero measured residual rejects ``zero anisotropic stress with general relativity" for the tracers used. A nonzero slip is not a dark-matter detection. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Proposition (Shell masses are stable; local densities are not; prop:DM-v2-shell). *In a declared spherical Newtonian reduction with circular orbits, let* $w(r) = v_c(r)^2$ *on* $I = [r_{\min}, r_{\max}]$ *and let* $M_b[r_1, r_2]$ *be the supplied baryonic shell mass. Then*

- $M_{\mathrm{tot}}[r_1, r_2] = (r_2 w(r_2) - r_1 w(r_1))/G$ *and* $M_d = M_{\mathrm{tot}} - M_b$*;*
- $|\Delta M_d| \le (r_1 + r_2)\|\Delta w\|_\infty/G + |\Delta M_b|$*, with equality for* $\Delta w(r_2) = \varepsilon = -\Delta w(r_1)$ *and* $\Delta M_b = 0$*;*
- *the supremum of the local density error over* $\|\Delta w\|_\infty \le \varepsilon$ *is infinite;*
- $\rho_{\mathrm{dm}} \ge 0$ *on I iff* $r_2 w(r_2) - r_1 w(r_1) \ge G M_b[r_1, r_2]$ *for all* $r_1 < r_2$ *in I (for continuous densities).*

Proof. (a) $GM(<r) = rw(r)$. (b) Triangle inequality; the stated perturbation attains it. (c) $\rho = (rw)'/(4\pi G r^2)$, and $\Delta w = \varepsilon \sin(Kr)$ has derivative of order εK for every K. (d) $M_d[r_1, r_2] = \int 4\pi r^2 \rho_{\mathrm{dm}}$ is nonnegative for every shell iff the continuous integrand is (check V2-27).

Status: proved; plan t342u item 5 (X9-5), with sharpness and the shell form of positivity added. par *Non-claim. Rejection condition:* a violated shell inequality rejects the package (spherical symmetry, circular orbits, Newtonian

Poisson law, the supplied baryon mass). Halo profiles are not predicted. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (Constant-vacuum branch; thm:DM-v2-vacbranch). *Let the host be flat with* $\chi = 8\pi G > 0$ *and* $H^2 = H_\infty^2 + Ca^{-3}$, $C, H_\infty > 0$, $a(t_0) = 1$, *and use the total-matter equation of Theorem with* $4\pi G\rho_{\mathrm{m}} = \frac{3}{2}Ca^{-3}$.

• $a^3 = (C/H_\infty^2)\sinh^2(\frac{3}{2}H_\infty t)$ *and* $H = H_\infty \coth(\frac{3}{2}H_\infty t)$, *so* $a\, e^{-H_\infty t} \to (C/(4H_\infty^2))^{1/3}$.

• *The event-horizon radius obeys* $c/H(t) \le R_e(t) \le c/H_\infty$, *so* $R_e \to c/H_\infty$.

• $D_- = H$ *and* $D_+ = H\int_0^a \mathrm{d}a'/(a'H(a'))^3$ *solve the growth equation. Every solution has a finite limit and* $\dot{D} \to 0$.

• *The background matter mass inside the horizon,* $M_{\mathrm{bg}} = \frac{4\pi}{3}\rho_{\mathrm{m}}R_e^3$, *satisfies* $M_{\mathrm{bg}} \le \frac{4\pi}{3}\rho_{\mathrm{m0}}c^3/(H_\infty^3 a^3) \to 0$.

Proof. (a) Substitution, as in Big05-A v3 thm:Big05-closure(b) (source record; not a premise) with $n = 3$. (b) H decreases to H_∞; apply Proposition (i) from time t. (c) $\dot{H} = -\frac{3}{2}Ca^{-3}$ and $\ddot{H} = \frac{9}{2}Ca^{-3}H$, so $\ddot{H} + 2H\dot{H} = \frac{3}{2}Ca^{-3}H$. Reduction of order gives D_+. As $a \to \infty$, $H \to H_\infty$ and the integral converges, so both limits are finite; $\dot{D}_- = \dot{H} \to 0$ and $\dot{D}_+ = \dot{H}I + 1/(a^2H) \to 0$. (d) Insert (b) and $\rho_{\mathrm{m}} = \rho_{\mathrm{m0}}a^{-3}$ (check V2-28).

Status: proved; plan t342u item 6 (X9-6), with an explicit proof. By Proposition , the total on this host is dust exactly when $\Lambda = 3H_\infty^2$. The Friedmann equation with vacuum energy density $\Lambda/(8\pi G)$ is recorded in [Bertschinger95]. par *Non-claim.* The dissolution of bound systems is not claimed: bound objects decouple from the background expansion, and (d) concerns only the smooth background mass. *Rejection condition:* a measured $H(a)$ that is not of the displayed form rejects the branch. Standing non-claims (plan S 5): no dark-matter particle

species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

toprule Relation Supplied hypotheses Rejection condition Location

midrule $a^3\varepsilon_{\mathrm{dm}}$ constant homogeneous dust, $Q = 0$ $a^3\varepsilon_{\mathrm{dm}}$ varies Prop.

$a(\theta_1 - \theta_2)$ constant two geodesic dusts species data violate it Thm.

compensated mode invisible dust only, linear GR metric response detected Prop.

$\widehat{\Omega}_{\mathrm{m}}(a) = \Omega_{\mathrm{m0}}$ total dust, subhorizon Poisson $\widehat{\Omega}_{\mathrm{m}}$ varies Thm.

$L = 2V_g$ geodesic tracers, linear GR, $\sigma = 0$ nonzero residual Thm.

shell inequality spherical Newtonian, circular orbits inequality fails Prop.

$R_* \in [1/h_+, 1/h_-]$; relaxation bounds on the whole future; added ODE bound or ODE residual fails Prop.

$R_e \to c/H_\infty$, growth freezes $H^2 = H_\infty^2 + Ca^{-3}\,H(a)$ of another form Thm.

bottomrule No row is graded. *What version 2 does not predict:* a dark-matter particle species, mass, charge or cross-section; the value of Ω_{m0}, Λ or H_∞; the species split, or the initial amplitudes of the relative modes S, V; halo profiles; an exchange rate Q; the dissolution of bound systems; a closure of the expansion; any quantum coefficient.

Finite Enter interfaces and their limits

Proposition (Destructive readout consumes a quantum name, not a host; prop:DM-enter). *Let $C \cong \mathbb{C}^D$ have an orthonormal basis $\{|\tau_j\rangle\}$, let A contain every surviving finite register, and put $D_j = \langle\tau_j| \otimes I_A$. The recorded map*

$\mathscr{M}(X) = \sum_j |j\rangle\langle j|_R \otimes D_j X D_j^\dagger$ *is completely positive and trace preserving, and* $\mathrm{Tr}_R[(\mathscr{M} \otimes \mathrm{id}_E)(X)] = \mathrm{Tr}_C X$ *for every untouched finite reference E. Its definition changes no prescribed metric, stress tensor, electromagnetic current or geometric time coordinate.*

Proof. The Kraus operators are $L_j = |j\rangle_R \otimes D_j$, with $\sum_j L_j^\dagger L_j = \sum_j |\tau_j\rangle\langle\tau_j| \otimes I_A = I_{CA}$. Write $X = \sum_{j,k} |\tau_j\rangle\langle\tau_k| \otimes X_{jk}$; then $D_j X D_j^\dagger = X_{jj}$ and $\sum_j X_{jj} = \mathrm{Tr}_C X$. Reference factors ride in the blocks. Classical geometric fields are parameters of the host, not output factors of this channel.

Status: proved. It has the same form as I-C prop:instrument and I-B thm:instrument (source record; not a premise). par *Non-claim.* A label installed in a register does not acquire a continuum source or a dark-matter current by being read. Any change of host data needs an additional model-dependent coupling and source map, and none is supplied. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Theorem (The Shredder floor is an access theorem; thm:DM-shredder). *Let a finite experiment on a d -dimensional code,* $d \geq 2$*, return only a classical record, with no retained input-dependent quantum side output and no correlated side-information resource. Every decoded quantum-return channel* $\mathscr{DC}$ *has measure-and-prepare form and satisfies* $\frac{1}{2}\|\mathscr{DC} - \mathrm{id}_d\|_\diamond \geq 1 - \frac{1}{d}$*. The bound is sharp over this class and is attained by complete basis dephasing. It does not depend on any gravitational or electromagnetic interpretation assigned to the record.*

Proof. For each terminal history *x*, composing the completely positive branch maps and tracing hidden outputs gives a positive functional $\mathrm{Tr}(E_x \rho)$ with $\sum_x E_x = I$. A decoder prepares σ_x, possibly at random, so $\mathscr{DC}(\rho) = \sum_x \mathrm{Tr}(E_x \rho)\sigma_x$. On the Bell input $|\Phi_d\rangle = d^{-1/2}\sum_j |jj\rangle$, the output $\omega = (\mathscr{DC} \otimes \mathrm{id})(\Phi_d)$ is separable. For a

product $\alpha \otimes \beta$, $\langle \Phi_d | \alpha \otimes \beta | \Phi_d \rangle = d^{-1} \mathrm{Tr}\,(\alpha \beta^{\mathrm{T}}) \le 1/d$, and convexity extends this to separable states. Then $\frac{1}{2}\|\omega - \Phi_d\|_1 \ge \mathrm{Tr}\,[\Phi_d(\Phi_d - \omega)] \ge 1 - \frac{1}{d}$. For sharpness, let $Z = \sum_j e^{2\pi i j/d} |j\rangle\langle j|$, so the dephasing is $\Delta = \frac{1}{d}\sum_{r=0}^{d-1} \mathscr{U}_{Z^r}$, which is measure-and-prepare. Then $\mathrm{id} - \Delta = \frac{1}{d}\sum_{r=1}^{d-1} (\mathrm{id} - \mathscr{U}_{Z^r})$. Each term has diamond norm at most 2, so $\|\mathrm{id} - \Delta\|_\diamond \le \frac{2(d-1)}{d}$ (check DM-17).

Status: proved. The measure-and-prepare mechanism is standard [HSR03]. The deterministic-decoder version is I-C thm:A, with I-C lem:povm and I-C lem:EB (source record; not a premise). The draft's displayed upper-bound step ``$\frac{d-1}{d} + \frac{d-1}{d}$'' has the right value but no justification. It is replaced by the term-by-term bound above (DC-5). par *Non-claim.* A retained quantum residual or a preshared input-relevant resource needs a different access contract. The floor certifies neither photon non-interaction nor gravitational coupling. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Framework separations (documentary)

Each paragraph records what a site record states and why it does not supply or select a dark-matter reading. These are separations, not bridges. The plan's role sentences are corrected where the record says something different, as PC-*n* (Appendix). Corrections to the draft's source sentences are DC-*n* (Appendix).

Documentary record (I-B, spacetime Enter). I-B prop:not-source (source record; not a premise) shows that a symmetric, conserved, traceless tensor need not source a background. Its witness is a constant traceless tensor on flat space, where the Einstein side vanishes. I-B prop:geometry (source record; not a premise) gives the Lorentzian signature, the future causal cone and the static proper time of the prescribed conical host. The sentence ``Enter

consumes a finite clock encoding. The classical manifold, coordinate, and future cone remain present" is a row of the I-B corrections table. It is not part of prop:geometry (PC-18). I-B thm:instrument (source record; not a premise) is the complete destructive clock instrument. The record adds that its conditioning block is not a metric or a stress tensor merely by its form.

Separation. A dark-matter reading is a slot of a split of T_{tot}. The I-B instrument generates no stress tensor, and conservation does not imply sourcing. The reading therefore neither comes from the instrument nor turns into Einstein dynamics. par *Non-claim.* No I-B statement is used as a premise of a local proof. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (I-B-G and I-B-G-S, Green operators). I-B-G thm:green (source record; not a premise) proves the Green identities and the spectral exactness of the restricted ledger extensions. I-B-G thm:speed (source record; not a premise) proves intrinsic finite propagation, $\operatorname{supp} G^{B}_{\pm} f \subseteq J^{\pm}_{M}(\operatorname{supp} f)$. The label thm:closed occurs in both records with different content (PC-4). I-B-G thm:closed (source record; not a premise) gives the heat, resolvent and wave representations. I-B-G-S thm:closed (source record; not a premise) gives the scalar and helicity-resolved kernels. All of this lives on the prescribed conical spacetime.

Separation. These operators propagate declared fields on a fixed host. They contain no dark slot, no species and no electromagnetic current of a dark component. par *Non-claim.* No Green-operator statement is identified with a dark-matter propagator. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays

open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (I-B-VP, vacuum polarization and induced current). The plan cites def:current, thm:current and prop:well-defined. The record defines thm:current only (PC-3). I-B-VP thm:current (source record; not a premise) (``Friedrichs induced current'') gives the renormalized current of *one charged complex field* of charge e in a flat background connection of flux β:

$$\langle j^{\wedge}_{\varphi} \rangle_{\mathrm{ren}} = -\frac{e\,\beta(1-\beta)(1-2\beta)}{12\pi^2\alpha^3 r^3}, \qquad j_t = j_r = j_z = 0.$$

It is conserved, independent of ξ, odd under $\beta \mapsto 1-\beta$, and zero at $\beta \in \{0, \frac{1}{2}\}$. The current prescription is equation eq:current-prescription inside I-B-VP ass:ren (source record; not a premise). The record's neutral real field is the case $\beta = 0$ and carries no current. Stress tensors are a separate theorem, I-B-VP thm:friedrichs (source record; not a premise).

Separation. The I-B-VP current is the current of a charged field in a flat connection. It is not neutral, it is not a stress tensor, and it is not the current of a dark slot. Under R1 a dark slot has no current of this kind at all. par

Non-claim. The induced current is not identified with any dark-matter current or density. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (I-C, Shredder interface). I-C prop:instrument (source record; not a premise) is the

complete destructive Enter identity. I-C lem:povm (source record; not a premise) shows that every finite experiment with only classical accessible output is a POVM channel, and I-C lem:EB (source record; not a premise) that classical decoding is measure-and-prepare. I-C thm:A (source record; not a premise) gives, for every finite classical-output channel followed by a deterministic decoder, half-diamond distance at least $1 - 1/d$ from the identity. The constant is sharp. The plan's ``measure-and-prepare channel with sharp half-diamond bound $1 - 1/d$'' holds, with the measure-and-prepare form coming from lem:EB (PC-17).

Separation. A shredder transcript is a classical record of a finite register. It certifies neither electromagnetic non-interaction nor gravitational coupling of any stress-energy slot. par *Non-claim.* No recovery bound of I-C is read as a property of a dark component. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (I-D, dynamic Enter over two prescribed hosts). I-D thm:v5-type (source record; not a premise) shows that, on the pulse shell $\mathscr{P}$ of Host A, the Einstein tensor is of Hawking–Ellis type II and the null energy condition fails at *every* point. This is a statement about $G/\kappa_{\text{I-D}}$, the stress any source would need, not about a supplied pulse stress (PC-6). I-D thm:v5-classes (source record; not a premise) shows that on no open subset of $\mathscr{P}$ is $G/\kappa_{\text{I-D}}$ the stress of any Maxwell field, of an axial Maxwell field plus the version-4 classes, of a single-component azimuthal Maxwell field with arbitrary currents plus those classes, of an anisotropic fluid, or of a Letelier cloud of strings (PC-7). I-D prop:v5-u6 (source record; not a premise) is the table of tested Host-B interface prescriptions: no natural prescription gives $\Gamma_1 = \Gamma_2 = 0$. It says nothing about a third geometry or a McVittie comparison (PC-5). ``There is no third geometry, Host C stays rejected'' is a scope sentence of I-D, and McVittie occurs only in Big05-A, so the draft's sentence that the I-D source tests ``do not select … a McVittie

comparison'' attributes to I-D a topic it never treats (DC-8). I-D prop:v5-xi (source record; not a premise) leaves undecided whether a non-minimally coupled scalar $\xi R\varphi^2$ sources the pulse shell (open item U9-ξ, PC-8). Here $\kappa_{\text{I-D}}$ denotes I-D's own gravitational constant, not the Big-series coefficient slot.

Separation. The Maxwell exclusion holds on the declared Host-A pulse only, and the null-energy violation belongs to that pulse's Einstein tensor. Neither is a dark-matter derivation or a general non-existence theorem. par

Non-claim. The I-D exclusions are not transferred to any other host. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (Big series). *Big02-A version 6.* Big02-A thm:coef (source record; not a premise): the labels $T^{(\kappa)}, S^{(\kappa)}, N^{(\kappa)}$ are injective in κ, and the floors $1 - 1/d^2$, $1 - 1/d$ and $1 - m/d$ have κ-derivative zero. Big02-A thm:v6-early(a) (source record; not a premise): the recovery errors 0, $1 - 1/d$ and $1 - 1/d^2$ do not depend on κ. Big02-A def:dark (source record; not a premise) calls dark capacity ``an operational classification … not a substance''. The phrase ``not a host functional'' is Big05-A v3 prop:Big05-dark(a) (source record; not a premise) (PC-14). *Big05-A version 3.* Big05-A v3 thm:Big05-flagship (source record; not a premise): every *geometric observable* (contract-relative), and every adaptive protocol built from such observables, is constant on the split fibre. Attribution needs a split-coupled observation or a declared constitutive law. The indicator error $\frac{1}{2}$ and the infinite ratio error are Big05-A v3 thm:Big05-fibre(e) (source record; not a premise) (PC-15). Big05-A v3 prop:Big05-orbit-split (source record; not a premise): the coefficient orbit of the radiation labels and the split are independent coordinates. Big05-A v3 thm:Big05-futures (source record; not a premise): past geometry does not determine the future event horizon, and under the null energy condition the range is $[c/H_{\text{E}}, \infty]$. *Big04-A version 5.*

Big04-A thm:DR-coef (source record; not a premise): the radiation labels are injective in κ with infinite minimax risk, and their ratios are coefficient-free. The independence of orbit and split is the Big05-A proposition above (PC-16). *DS-OB-1-fibre version 5.* DS-OB-1-fibre thm:F-einstein (source record; not a premise): on Einstein regions the effective rank is one and the vacuum coordinate is not a function of the metric. DS-OB-1-fibre thm:F-generic (source record; not a premise): rank four is open and dense. DS-OB-1-fibre cor:F-ranknotsel (source record; not a premise): rank does not imply selection. *Big01-A version 5.* The plan cites thm:vacfibre and cor:P5. Neither is in the site record; both exist only in an unregistered local version 6 (PC-1, PC-2). The registered counterparts used here are Big01-A v5 thm:Efuture (source record; not a premise) (one number carries the future: every $R_0 \in (0, \infty]$ is realized, with infinite worst-case error over all futures) and, for the vacuum fibre, the DS-OB-1-fibre statements above.

Separation. Dark capacity is a property of a declared account, while the dark slot is a stress-energy tensor; Big05-A shows that no non-constant dictionary between them is a host functional. Sections and re-prove the needed non-selection facts locally for dark-matter readings. par *Non-claim.* No Big-series theorem is promoted to a theorem of this sheet; the local proofs stand alone. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (OpenAI catalogue). The OpenAI catalogue record (``372 families in 719 manuscripts; recorded for the companion, not verified, and not a theorem of this series") contains no dark-matter statement (text search of the record). Its coefficient language is not an admission of κ.

par *Non-claim.* The OpenAI catalogue is not a premise. Standing non-claims (plan S 5): no dark-matter particle

species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (DS-OB-1-fibre, VC-OB-1-CERT, Big04-A-coeff, Big03-A). VC-OB-1-CERT thm:v5-vac (source record; not a premise): on every open set with Ric = $\frac{R}{4}g$, every member of the conserved four-parameter family equals $T + (c_0 - \frac{R}{4}c_G)g$, and the vacuum coefficient is not a function of the metric there. DS-OB-1-fibre re-proves this as DS-OB-1-fibre thm:F-einstein(a),(b) (source record; not a premise) and, for de Sitter regions, DS-OB-1-fibre thm:F-rank (source record; not a premise). Big04-A-coeff thm:C-adaptive (source record; not a premise): a finite adaptive experiment whose initial law, decision kernels and conditional report laws are independent of κ has a κ-independent transcript law. Big03-A version 2 evaluates the named horizon labels at a declared external coefficient. The unsupplied class, the channel floors and dynamics vacuity are unchanged (version-1 title, retained verbatim in the version-2 record). Big03-A is cited for scope only.

Separation. These records concern vacuum normalization and coefficient calibration. Proposition and Lemma re-prove the parts used here, and nothing is imported. par *Non-claim.* No coefficient value and no vacuum value is taken from these records. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (En04-A version 3 and En04-B version 4). The En04-A record lists among its corrections that ``residual response is not geometric backreaction without a separately justified physical dictionary''. The En04-B record states that, on the settled Host-B neck, finite modes give a nonzero curvature-sampling witness while the metric and curvature are unchanged, and that ``curvature can be sampled by a probe without being moved by it''.

Separation. Residual and sampling interfaces are not matter-to-metric identifications. A dark slot is not produced by a probe's sensitivity to curvature. par *Non-claim.* No En04 statement is used as a premise. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

Documentary record (Version 2 interface records; doc:DM-v2-interfaces). These edges are documentary only; no companion proof is used in a version-2 theorem. (a) En04-B thm:current-blind (source record; not a premise) shows that the printed current is code-blind and that two supplies are needed; it concerns a particular printed scalar. En04-B prop:current-sampling (source record; not a premise) allows a responding sampler of a fixed continuum current, and En04-B thm:curvature-sampling (source record; not a premise) gives responding finite samples of fixed curvature, with the metric unchanged. Code-blindness of the printed scalar is therefore not universal current-blindness of all samplers, and sampling on a prescribed metric is not a metric update. (b) En04-A thm:magic-fibre (source record; not a premise) is a magic-label fibre theorem: the declared labels do not fix residual leakage. It separates a resource label from a response certificate. It is not itself a residual-response certificate (PC2-6). (c) I-D prop:v5-u6 (source record; not a premise) concerns the tested Host-B prescriptions; it is not a universal nonexistence theorem. I-D thm:v5-type (source record; not a premise) records that the null energy condition fails at every point of its declared pulse region. Host A and Host B stay separate. (d) Hawk05-B

thm:page (source record; not a premise) is an exact finite Page curve: under its Haar ensemble assumption def:haar, the mean entanglement entropy is the Page–Sen average ($\mathscr{H}_D - \mathscr{H}_n - (m-1)/(2n))/\ln 2$ bits, with $D = mn$, $m \le n$ and $\mathscr{H}_j$ the harmonic numbers [Page93,Sen96]. It averages the entropy of a reduced random pure state and constructs no dark stress tensor. The dark-matter reading specifies no evaporation ensemble (PC2-8). (e) I-C lem:EB and I-C thm:A (source record; not a premise): classical decoding is measure-and-prepare, with recovery floor $1 - 1/d$ for deterministic decoders; an operational distance, not a current constraint. (f) Big02-A access-relative dark capacity, the radiation-label orbit (Big04-A-coeff prop:C-orbit (source record; not a premise)) and the stress split stay separate coordinates (Proposition , Proposition). (g) The OpenAI catalogue record is documentary only: no dark-matter statement is supplied or used from it. This is not a claim of an exhaustive search. (h) Big03-A: the site record is still version 2. The labels thm:R-v3-adaptive, prop:R-v3-vacuum-box, thm:R-v3-forecast1–thm:R-v3-forecast6 and cor:R-v3-supply exist with these names only in an unregistered local version-3 file. They are not cited; the needed results are proved locally (PC2-3).

par *Non-claim.* No interface record supplies a particle species, a host update or a dark-matter attribution. Standing non-claims (plan S 5): no dark-matter particle species is derived; no microscopic Lagrangian is constructed; Einstein dynamics are not derived; the classical manifold and future cone remain; Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; absolute vacuum energy stays open; dark capacity is not identified with clustering dust; printed numbers are conditional calculations; OpenAI coefficient-language sheets are documentary only. Ledger unchanged: no quantum coefficient is admitted; Host C is not created; O.1 stays NOT_CLOSED; XVI-N is not discharged; XV-B is not opened; Gate 0 and ST4b stay NOT_SUPPLIED. par

A corrected predictive chain and the scope of the release

Two distinct workflows

The plan's chain mixes fixed-host reconstruction with metric evolution. A coherent workflow must choose one of them (draft item G0-27).

Workflow A: prescribed-host consistency. (1) Supply *g*, the gravitational comparison law with its normalizations, and the known source terms. (2) Compute the residual tensor or density (Proposition , Proposition). (3) Test positivity, algebraic type, separate conservation or a specified exchange, and kinetic realizability (Propositions , and). (4) If absence of photon interaction is intended, supply and test an electromagnetic response model. A zero background current is weaker (Theorem). (5) Compare supplied observation maps with external data, with uncertainties and selection effects. The metric is not an output of this workflow.

Workflow B: a separately supplied Einstein–matter model. (1) Supply a matter action or a complete constitutive and transport system, with initial data, constraints, boundary conditions and the status of every mediator coupling. (2) Supply Einstein or Poisson evolution as a theory assumption; it does not follow from Enter. (3) Establish existence, uniqueness, regularity and the approximation domain. (4) Evolve tracers and build rotation, lensing, cluster and cosmological observation maps. (5) Test against external observations with an explicit inference procedure. This sheet does not execute Workflow B.

The plan's chain (plan item 4) read as a checklist. No step is executed against data.

toprule Step Supplied from outside What the sheet proves

midrule endfirsthead toprule Step Supplied from outside What the sheet proves

midrule endhead 1. Equation of state or second moment *w*, or a distribution *f* Every symmetric conserved choice is an admissible slot (Definition). A finite set of moments does not fix *f* (Proposition).

2. Insert into the Einstein or Poisson equation A prescribed host or a weak-field reduction On a prescribed host, insertion means choosing a split; the metric does not respond (Proposition). Poisson inversion: Proposition .

3. Evolve metric and tracers A dynamical law (not supplied) Metric evolution is not done (Workflow B). Dust tracers are geodesics on a given host (Proposition (b)). The a^{-3} law and linear modes hold on comparison hosts (Propositions and).

4. Compare with rotation curves, lensing, clusters and the power spectrum External data Not performed. No

observational claim is made. Derivative-sensitive reconstruction is quantified in Proposition .

5. Enforce $J_{\mathrm{EM}} = 0$ Reading R1 or R2 What each reading excludes: Theorem , Corollary . R1 gives separate conservation in every Maxwell background (Proposition). Electromagnetic silence selects no split (Proposition).

bottomrule The chain does not close the existence question, does not select a split, and does not admit a quantum coefficient.

Explicit non-claims (plan item 5, verbatim).

• No dark-matter particle species is derived.

• No microscopic Lagrangian is constructed.

• Einstein dynamics are not derived (I-B prop:not-source).

• The classical manifold and future cone remain; Enter does not consume the geometric time axis.

• Maxwell fields are excluded as sources only on the declared Host-A pulse of I-D; this is not a general non-existence theorem.

• Absolute vacuum energy stays open.

• Dark capacity (Big02-A) is not identified with clustering dust.

• Printed cosmological numbers remain conditional calculations.

• OpenAI coefficient-language sheets are documentary only. The same list is repeated in every non-claim of the sheet. The fourth item is supported by the I-B corrections-table row, not by prop:geometry (PC-18).

What the results contribute

Beyond a bare naming convention, the sheet adds:

• an exact off-shell criterion for the vanishing current, with the background reading separated from it and a polarizability counterexample (Section);

• the exchange identity derived from gauge and diffeomorphism invariance, so that R1, unlike R2, gives separate

conservation (Section);

• a reconstruction formula with a positivity test, an explicit derivative-sensitive error bound and a discontinuity example in the positive class (Section);

• the total-source identity in FLRW, and growth that depends only on the total density (Section);

• a nonnegative finite-moment ambiguity, an explicit neutral dust split with exact risks, and conditions under which identification becomes possible (Sections and);

• a smooth future-horizon countermodel with a common past dust history, and the remainder caveat (Section).

Their significance is inferential: each states exactly what extra information a stronger conclusion needs. No priority is claimed for standard fluid equations, spherical Poisson inversion, the conformal-Newtonian dust equations or the classical-record recovery mechanism.

What stays open

• Whether a dark component exists in nature, and its microscopic nature: species, Lagrangian, distribution function, coldness, abundance and equation of state.

• The choice between R1 and R2 as physics, and non-minimal curvature couplings (U9-ξ of I-D stays undecided).

• A local dynamical selection of the ordinary, dark and vacuum slots. H-split stays a declaration.

• Absolute vacuum energy.

• Einstein dynamics, the clustering history, the matter power spectrum and the CMB transfer calculation.

• Every observational comparison of Table .

• The coefficient slot κ, which stays unfilled with no numerical value. U6-sel is not moved.

• O.1, XV-B, XVI-N, Gate 0 and ST4b keep the statuses of the ledger below.

Standing ledger

Host A and Host B stay separate prescribed backgrounds. Host C is not created. O.1 stays NOT_CLOSED. XV-B is not opened. XVI-N is not discharged. Gate 0 and ST4b stay NOT_SUPPLIED. No quantum coefficient is admitted. No Einstein dynamics, derived metric, spacetime emergence, Page curve, island, vacuum energy, or quantized relational time without an external clock is claimed. A source record is not a premise. The OpenAI catalogue is not a premise.

No quantum coefficient is admitted. Citations identify source records only; no proof transfer.

appendix

Crosswalk: plan items to locations and verdicts

toprule Plan item (t338u) Location in v1 Verdict

midrule endfirsthead toprule Plan item Location Verdict

midrule endhead Ledger (verbatim) Abstract; Section ; Section Held verbatim; the two required lines are added.

S 1 def:DM-read Definition , Definition Held. ``Identically zero'' is split into readings R1 and R2 (PC-21). Non-selection is proved locally (Proposition).

S 2 I-B row Section , I-B record Corrected: the clock-encoding sentence is a corrections-table row (PC-18).

S 2 I-B-G/I-B-G-S row I-B-G record Held. thm:closed occurs in both records with different content (PC-4).

S 2 I-B-VP row I-B-VP record Corrected (PC-3): two labels are absent, and the current is that of a charged field.

S 2 I-C row I-C record Held. Measure-and-prepare comes from lem:EB (PC-17).

S 2 I-D row I-D record Corrected (PC-5, PC-6, PC-7, PC-8).

S 2 Big-series row Big-series record Corrected (PC-1, PC-2, PC-14, PC-15, PC-16).

S 3 prop:DM-poisson Specification , Proposition Held and proved locally (it is not merely documentary). Assumptions are made explicit (PC-13).

S 3 prop:DM-stress Propositions , , Corrected (PC-11): the exchange identity is a derived Noether identity under R1, and Vlasov is an additional reading.

S 3 prop:DM-cosmo Propositions , , Corollary Corrected (PC-12): separate conservation is needed, and growth uses the total potential with no subtraction.

S 3 thm:DM-nonEM Theorem , Proposition , Corollary Corrected (PC-9, PC-10, PC-21): exact criterion; the Noether current is not forced to vanish.

S 3 prop:DM-fibre Proposition , , Held with corrections (PC-1, PC-15, PC-22).

S 3 prop:DM-future Proposition Held; the citation is replaced (PC-2).

S 4 chain Table , Section Held as a checklist. Step 3 is not executed (Workflow B).

S 5 non-claims Every non-claim (via the standing list); Section Held verbatim.

S 6 structure Whole sheet Held, with additions: Enter interfaces, appendices.

bottomrule

Draft Big06-A-v0: item verdicts and draft corrections

The user's draft (request t340u, input sha256 372ec830e739a72d1fcdc2a5974fa21dd082cbac6ad9e740cfb42ee2d24b8355) is a draft input, not a frozen record. Its structure is the backbone of v1. Every item is re-proved here. Verdicts: *held* (kept, possibly strengthened or merged), *corrected*, *rejected*, *conjecture*. No draft item is rejected or left as a conjecture. toprule G0 Draft item Verdict v1 location and note

midrule endfirsthead toprule G0 Draft item Verdict Note

midrule endhead G0-1 def:DM-read held Definition ; R1/R2 made explicit.

G0-2 def:DM-subclasses held Definition .

G0-3 prop:DM-residual held Proposition (b)–(d).

G0-4 prop:DM-inverse-source held, merged Now Proposition (a); no duplicate theorem.

G0-5 thm:DM-nonEM held, strengthened Theorem : convex-domain hypothesis and Euler-current formula; replaces the plan's scattering wording.

G0-6 prop:DM-polarizability held Proposition ; second variation checked (DM-20).

G0-7 cor:DM-operators held Corollary ; the Noether-current separation is added.

G0-8 rem:gravity held Remark .

G0-9 prop:DM-stress held, extended Proposition ; R1 separate conservation added.

G0-10 prop:DM-Noether corrected Proposition : the draft assumed $\nabla_a \mathscr{J}^a = 0$, which follows from gauge invariance and is now derived (DC-14).

G0-11 prop:DM-moments held Proposition (DM-15).

G0-12 prop:DM-NEC held Proposition (DM-16); Proposition added.

G0-13 spec:rotation held Specification .

G0-14 prop:DM-poisson held, extended Proposition : centre, fibre over ρ_{b}, profile masses (DM-1).

G0-15 prop:DM-poisson-stability held; wording corrected Proposition (DM-18); ``sharp'' removed (DC-3).

G0-16 prop:DM-cosmo held, extended Proposition ; total-source identity added (DM-6, DM-7).

G0-17 prop:DM-linear held Proposition (DM-19).

G0-18 cor:DM-growth held, extended Corollary ; Einstein–de Sitter example.

G0-19 def:DM-data held, extended Definition ; current coordinate and total-current observables.

G0-20 lem:DM-fibre held, extended Lemma ; deterministic answer error 1 (DM-8).

G0-21 prop:DM-fibre held, generalized Proposition : whole-fibre statement, general total, coefficient orbit.

G0-22 prop:DM-split-boundary held, extended Proposition : a dust equation of state fixes the vacuum shift

(DM-9).

G0-23 prop:DM-vacuum held, merged Proposition : action level plus split-level shift preserving the null energy condition.

G0-24 prop:DM-future held, caveat added Proposition (DM-11); remainder caveat (DC-9).

G0-25 prop:DM-enter held Proposition .

G0-26 thm:DM-shredder held; proof corrected Theorem (DM-17); upper-bound step (DC-5).

G0-27 Workflows, contributions, open items held, merged Section , merged with the plan chain.

G0-28 ``Other framework anchors'' corrected Section ; McVittie attribution (DC-8).

G0-29 ``Debugging the proposed plan'' held Reconciled in Appendix .

G0-30 Front matter, source inventory, bibliography corrected DC-1, DC-2, DC-4, DC-6, DC-7, DC-10–DC-13.

bottomrule

Draft corrections.

DC-1 The draft bibitem for Big02-A is truncated (``Cheung, N.,ersion 6''). v1 prints the record's title and version.

DC-2 Kunz: the draft prints the arXiv title as the journal title. The published title is ``Degeneracy between the dark components resulting from the fact that gravity only measures the total energy-momentum tensor''. The arXiv title is listed separately.

DC-3 ``Sharp inverse-problem bounds'': the stability bound is explicit but not shown to be sharp. The wording is corrected.

DC-4 I-D title: the draft's ``I-D: Dynamic Enter'' is replaced by the record title ``Dynamical Spacetime Enter over Two Prescribed Hosts''.

DC-5 Shredder upper bound: the draft's step ``$\frac{d-1}{d} + \frac{d-1}{d}$'' has no stated decomposition. It is replaced by $\mathrm{id} - \Delta = \frac{1}{d}\sum_{r \geq 1} (\mathrm{id} - \mathscr{U}_{Z^r})$ with the term-by-term bound 2.

DC-6 I-B-G ``version 2'': the I-B-G record has no version marker, so no version is printed. I-B-G-S version 2 is verified.

DC-7 Source inventory: the draft says I-C and I-D ``did not supply usable full text''. All cited records, I-C and I-D included, were fetched in full by read-only GET for v1, and every cited label was checked against them (Appendices ,). The draft's commented-out chat-style source links are not carried into v1.

DC-8 The draft says the I-D source tests do not select ``a McVittie comparison''. I-D never mentions McVittie (it occurs only in Big05-A). The sentence is replaced by what I-D states (PC-5).

DC-9 Future family: the dust reading $\varepsilon_*(a_*/a_p)^3$ on the whole de Sitter past forces a remainder with negative energy density at early times. This is stated in v1. The non-selection conclusion is unaffected.

DC-10 EntPhil ``version 2'': the API returns 404 for EntPhil, and the companion page carries only the title. No version is printed.

DC-11 The draft's I-C bibitem has no title. The record title is ``I-C-v2: The Shredder Interface''.

DC-12 Weiner–Yavin: the draft prints the arXiv title (``… Signals from MiDM and Rayleigh dark matter''). The published title spells out ``magnetic inelastic dark matter''.

DC-13 Author line: the draft prints ``Ngo Cheung''. v1 uses the required ``Ngo Cheung (authorship requires confirmation)''. The draft's verb | thanks | footnote (``Author attribution follows the supplied Big-series materials and requires confirmation before submission'') is kept: it asserts nothing false.

DC-14 The draft's prop:DM-Noether takes $\nabla_a \mathscr{J}^a = 0$ as a hypothesis. It follows from gauge invariance (Proposition). Items checked and found correct in the draft: Big01-A title and version 5; Big03-A version 2; Big04-A version 5; Big05-A version 3; Big04-A-coeff version 5 and thm:C-adaptive; DS-OB-1-fibre version 5 with thm:F-einstein and thm:F-rank; VC-OB-1-CERT version 5; En04-A version 3; En04-B version 4; I-B version 1; I-B-VP version 3; I-C version 2; I-D version 5; the Frontiers record of [CheungEnter]; and the HSR, Sigurdson, Sarbach–Zannias, Ma–Bertschinger, NFW, Burkert, Lelli and Clowe metadata. The draft copied no hash, so none

needed checking.

Reconciliation of the draft's ``Debugging the proposed plan''

toprule Draft row v1 Reason, and matching PC

midrule endfirsthead toprule Draft row v1 Reason

midrule endhead $J_{\mathrm{EM}} = 0$ implies no EM interaction agree Theorem and Proposition ; PC-10, PC-21.

Zero current = vanishing Noether current agree Corollary ; PC-9.

Zero current implies geodesics agree Proposition (b); PC-11.

Any tensor into a fixed Einstein solution agree Proposition ; PC-11 (the metric does not respond).

A second moment supplies collisionless dynamics agree Proposition ; PC-11.

Growth requires subtracting baryons by hand agree Corollary ; PC-12.

Neutrality never selects a split agree, refined The plan says the declaration does not select a split, not that it never can. For the plan's declaration (a current condition on the dark slot only), the intersection with the split fibre is the whole fibre (Proposition ; PC-22). The draft's counterexamples need an added law tying stress to current, or fixed equations of state (Proposition).

Rank four selects the vacuum agree Proposition (c). The plan's rank-one locator thm:vacfibre is not on the site (PC-1).

I-B-VP gives a neutral DM current agree I-B-VP record in Section ; PC-3.

A fixed host can be evolved agree Workflows A and B; Table , step 3.

Future horizon on fixed de Sitter agree Proposition ; PC-2.

bottomrule No row is disagreed with. The draft has no row for PC-1–PC-8 or PC-13–PC-20 (label and attribution corrections), which v1 adds.

Plan corrections and verdicts per plan section

Each PC states what the record actually proves.

PC-1 Big01-A thm:vacfibre is not in the site record (version 5). It exists only in an unregistered local version 6, which is not citable. The vacuum-fibre statements come from DS-OB-1-fibre (thm:F-einstein, cor:F-ranknotsel) and are re-proved in Proposition .

PC-2 Big01-A cor:P5 is not in the site record. The registered counterparts are Big01-A v5 thm:Efuture and prop:Esmooth, together with Big05-A thm:Big05-futures.

PC-3 I-B-VP def:current and prop:well-defined do not exist. thm:current is the Friedrichs induced current of a *charged* complex field: odd under $\beta \mapsto 1-\beta$, zero at $\beta \in \{0, \frac{1}{2}\}$. The prescription is inside ass:ren, and the stress tensor is thm:friedrichs. ``Neutral $U(1)$ current'' is incorrect.

PC-4 thm:closed is a label in both I-B-G (heat, resolvent and wave representations) and I-B-G-S (scalar and helicity kernels).

PC-5 I-D prop:v5-u6 is the table of tested Host-B interface prescriptions. It does not concern a third geometry or McVittie. ``No third geometry'' is a scope sentence of I-D. McVittie appears only in Big05-A.

PC-6 I-D thm:v5-type: the null energy condition fails at *every* point of the pulse shell, for $\mathscr{G}/\kappa_{\text{I-D}}$. The plan's ``can violate'' understates the record and misplaces it, since the statement concerns the required source, not a supplied pulse stress.

PC-7 I-D thm:v5-classes also excludes anisotropic fluids and Letelier string clouds on open subsets of the shell.

PC-8 I-D prop:v5-xi leaves the non-minimal scalar undecided only for the Host-A pulse (U9-ξ). It is not a general statement that curvature couplings are undecided.

PC-9 ``Or the corresponding Noether current vanishes'' is wrong. A vanishing electromagnetic current does not force an internal Noether current to vanish (Corollary).

PC-10 ``Higher-dimensional operators that would produce observable photon scattering'' is replaced by the exact off-shell criterion (Theorem). Under R1, every A-dependent term is excluded, including Rayleigh and axion-like terms. Under R2, only the linear terms are excluded (Proposition).

PC-11 prop:DM-stress: ``not a derived Noether identity'' is corrected. Under R1 and a diffeomorphism- and gauge-invariant action, the exchange identity is derived and gives separate conservation (Proposition). Under R2 it can fail. Geodesic motion follows for separately conserved dust, and the Vlasov equation is an additional reading. On a prescribed host, insertion is the choice of a split; the metric does not respond.

PC-12 prop:DM-cosmo: a^{-3} needs separate conservation, not only a zero current. Growth involves the total potential, with no ``subtraction by hand'' (Corollary).

PC-13 prop:DM-poisson: the inversion needs weak field, spherical symmetry, circular orbits and a supplied ρ_{b}. It can return a negative residual, and disks need a modified contract. It is proved locally, not left documentary.

PC-14 ``Dark capacity is not a host functional'' is Big05-A prop:Big05-dark(a). Big02-A def:dark says ``not a substance''.

PC-15 Big05-A thm:Big05-flagship concerns *geometric* (contract-relative) observables, not every ``split-independent'' observable. The indicator error $\frac{1}{2}$ comes from thm:Big05-fibre(e).

PC-16 Big04-A thm:DR-coef gives injective radiation labels in κ with infinite risk. The independence of orbit and split is Big05-A prop:Big05-orbit-split.

PC-17 I-C: the measure-and-prepare form is lem:EB. thm:A gives the bound $1 - 1/d$ for deterministic decoders. lem:povm is the POVM reduction.

PC-18 I-B: the clock-encoding and future-cone sentence is a row of the corrections table, not part of prop:geometry.

PC-19 Only site versions are cited (Appendix). Local unregistered versions (Big01-A v6/v7, Big02-A v7, Big03-A v3) are not cited.

PC-20 The OpenAI catalogue contains no dark-matter statement. It is documentary only.

PC-21 ``Identically zero'' is ambiguous between R1 and R2, and only R1 gives separate conservation. Gravity coupling is in Remark .

PC-22 The plan's fibre proposition is close to tautological. Its real content is that the current declaration constrains a different coordinate, so the intersection is the whole fibre (Proposition). A dust equation of state fixes the vacuum shift but not the fraction (Proposition).

Verdicts per plan section. S 1 held, refined (PC-21). S 2 corrected (PC-1–PC-8, PC-14–PC-18). S 3: poisson held (PC-13); stress corrected (PC-11); cosmo corrected (PC-12); nonEM corrected (PC-9, PC-10); fibre held with corrections (PC-1, PC-15, PC-22); future held (PC-2). S 4 held as a checklist. S 5 held verbatim and repeated in every non-claim. S 6 held, with additions.

Verified labels

Every label cited through verb | src | was located in the fetched record. The table gives the line of its verb || in the record. toprule Record Label Line

midrule endfirsthead toprule Record Label Line

midrule endhead Big01-A prop:Esmooth 650

Big01-A thm:Efuture 632

Big02-A def:dark 344

Big02-A thm:coef 329

Big02-A thm:v6-early 2016

Big04-A thm:DR-coef 506

Big04-A-coeff thm:C-adaptive 275

Big05-A def:Big05-geocontract 1090

Big05-A def:Big05-split 474

Big05-A lem:Big05-bianchi 516

Big05-A prop:Big05-dark 3050

Big05-A prop:Big05-orbit-split 1740

Big05-A thm:Big05-bare 645

Big05-A thm:Big05-fibre 730

Big05-A thm:Big05-flagship 1106

Big05-A thm:Big05-futures 1649

Big05-A thm:Big05-quotient 912

DS-OB-1-fibre cor:F-ranknotsel 701

DS-OB-1-fibre thm:F-einstein 259

DS-OB-1-fibre thm:F-generic 478

DS-OB-1-fibre thm:F-rank 299

I-B prop:geometry 252

I-B prop:not-source 1420

I-B thm:instrument 451

I-B-G thm:closed 1103

I-B-G thm:green 768

I-B-G thm:speed 905

I-B-G-S thm:closed 996

I-B-VP ass:ren 951

I-B-VP thm:current 1240

I-B-VP thm:friedrichs 1150

I-C lem:EB 561

I-C lem:povm 539

I-C prop:instrument 487

I-C thm:A 647

I-D prop:v5-u6 602

I-D prop:v5-xi 535

I-D thm:v5-classes 477

I-D thm:v5-type 453

VC-OB-1-CERT thm:v5-vac 563

bottomrule Labels named in the plan and absent from the site records: Big01-A thm:vacfibre and cor:P5; I-B-VP def:current and prop:well-defined. Check DM-12 confirms that they are absent and are not cited.

Source records

Records were fetched on 25 October 2026 by read-only GET from https://enter.grok.me/api/manuscript/<ID>. Each is a source record, not a premise. Nothing was written to the site. toprule Record Version sha256 of the fetched TeX

midrule endfirsthead toprule Record Version sha256

midrule endhead I-B 1 4f812c5fb2753cdb5725af09e0111247bbb46e8c1696aa473771450607eb1317

I-B-G no marker 9c90de0ef08946c29348333df738e4676c979ef546f3ca1ef3dccd431dc8a5fd

I-B-G-S 2 b369d7181665099bd3d70fd7eb9952bf012b0e542c04c61be70252df72d80b09

I-B-VP 3 dac069072dabaca7bd4edc2344c8ed405aa3e691d368707629fde471585e2ca0

I-C 2 d6535e00b845bfcf005d90efa39cb4092f0118a4177c0613809efa83ceb2bf8b

I-D 5 b87e0d92b2c78f2500ba9622e0fb57a8ae4d345fbb88074026e1518fdcd1fdbb

Big01-A 5 5fa2b917714b06379068ca4c0d71566fbbc13c50153e7a3ad9822ca03246a312

Big02-A 6 1d8fc18c752c82edb1235282cbd56ccd8540e41ae675589337bbd6622ffa8f7a

Big03-A 2 d0c34c2c8393bffb87d695478db99a16111fe86ab1f3f2b3a69a38d5c25ff1be

Big04-A 5 0bb4d9b2dd7dcfbef9da194f6be160ae1c8b4a756c0d5550b817df31226a352d

Big04-A-coeff 5 9276db3c2eca392e3af5af1e960230367160d061874b332b4dc7342d5859ca70

Big05-A 3 1788cf6f5abe4bf139f54aa18167a61c1130cdb6a0aacff84f2f45521d5946a3

DS-OB-1-fibre 5 4626dbb721ab0c0cb1f374699897dde85d5cc20f599f1a3470a620d286f425f8

VC-OB-1-CERT 5 49c68dea2376e303d3859e3287a349c45114389eb1ee2af97822d750efa14c98

En04-A 3 b4cb98c038318b366c79b8fe932250e3e626e6e2e75edcb0d61e70bfc118568c

En04-B 4 60a0c284e6415e9cf3b64a7362af8ad06a4a0ec2f25bda26b1467d7966c4045a

OpenAI catalogue 9a20a47b380d2de3d68e80a47877c563460260d7acf8aafdcab6aa97285ca5a8

bottomrule EntPhil: the API returns 404. The companion page https://enter.grok.me/enter carries the title ``The Philosophy of Enter: Destructive Readout, Quantum Recovery, and the Refusal of Identification". No version is verified.

External records. The metadata were checked against Crossref and arXiv on 25 October 2026. Each entry in the bibliography is marked ``Source record; not a premise."

Checks and build provenance

checks_Big06-A-v1.py (seed 20261025) runs DM-1 to DM-20. Each check has negative controls, and DM-12 and

DM-13 also run mutation tests. DM-1: Poisson inversion of the NFW, Burkert, pseudo-isothermal and isothermal masses. DM-2: weak-field $\mathscr{G}_{00}$. DM-3: exchange sign against Maxwell. DM-4: Euler currents of the operator list. DM-5: homotopy formula. DM-6: FLRW continuity and dust dilution. DM-7: flat FLRW Einstein tensor and Einstein–de Sitter modes. DM-8: fibre minimax and adaptive transcript laws. DM-9: vacuum shift, dust rank, dust-plus-vacuum uniqueness. DM-10: null vanishing implies $\propto g$. DM-11: the H_p family. DM-12: verb | src | resolution and forbidden labels. DM-13: text, ledger and boundary checks. DM-14: input hashes and record versions. DM-15: moment non-injectivity. DM-16: null energy condition for Maxwell and kinetic stress. DM-17: Bell overlap and dephasing. DM-18: Poisson stability and discontinuity. DM-19: conformal-Newtonian algebra. DM-20: polarizability second variation. The build uses SOURCE_DATE_EPOCH=1792627200, FORCE_SOURCE_DATE=1 and PYTHONHASHSEED=0. Two clean builds are compared byte for byte (rebuild_Big06-A-v1.sh).

Version history

Version 0: the user's draft Big06-A-v0 (request t340u, sha256 372ec830e739a72d1fcdc2a5974fa21dd082cbac6ad9e740cfb42ee2d24b8355). Version 1 (this sheet, requests t338u and t340u) merges the plan (PLAN_t338u.md, sha256 a38a244ffa16a09b234c3929904ed20937b534a04c428508e819d3298ea23f28) into the draft. The title is ``Big06-A: Dark matter as a declared non-electromagnetic gravitational stress-energy reading''. Nothing is registered or pushed.

Version 2: insertion-only successor of version 1 (requests t341u, t342u and t343u; plans PLAN_t341u.md and PLAN_t342u.md and the user's findings draft findings_t343u.tex, hashes in Appendix). Every version-1 line is kept in order (Appendix). Added: Sections –, and , Documentary record , Errata E2-1–E2-3 and Appendices –.

Version 2: crosswalk of the three inputs

toprule Input item Location in version 2 Verdict

midrule t341u 1 geometric-contract risks Prop. , Thm. PC2-1

t341u 2 dark capacity Prop. PC2-2

t341u 3 adaptive, supply Prop. , Thm. , Cor. PC2-3

t341u 4 vacuum shift, rank Prop. , Cor. , Thm. PC2-4

t341u 5 forecasts Prop. , Thm. , Prop. PC2-5

t341u 6 interfaces Doc. (a)–(e) PC2-6

t341u 7 coefficient orbit Prop. PC2-7

t341u 8 Page curve Doc. (d) PC2-8

t341u version-status note Doc. (h), App. PC2-3, PC2-9

t342u 0 normalization Rem. , Prop. , Rem. X9-0

t342u 1 two dusts Thm. X9-1

t342u 2 compensated mode Prop. X9-2

t342u 3 expansion–growth Thm. X9-3

t342u 4 lensing–motion Thm. X9-4

t342u 5 shell mass Prop. X9-5

t342u 6 constant-vacuum branch Thm. X9-6

t342u test table, ``does not predict" table after Thm. X9-7

t342u citations bibliography X9-8

t343u findings draft Sections –, , Doc. F10-1–F10-30

bottomrule

Version 2: verdicts on plan t341u (PC2)

PC2-1 (held) Big05-A v3 thm:Big05-flagship and thm:Big05-fibre (source record; not a premise) are as described (geometric observables and common-kernel adaptive protocols constant on the split fibre; indicator $\frac{1}{2}$, infinite ratio). The risks are proved again under R1 with an explicit potential-free action (Proposition). Geometric-contract observables are functions of g; the current coordinate is separate (Proposition).

PC2-2 (held) Big02-A def:dark (``not a substance'') and Big05-A v3 prop:Big05-dark (``not stress-energy''; (a) not a host functional) are as described. Local proposition: Proposition .

PC2-3 (corrected) The plan says the companion registers Big03-A version 3. The site record retrieved for version 2 (Appendix) is still titled ``Big03-A (version 2)'' and contains none of thm:R-v3-adaptive, prop:R-v3-vacuum-box, thm:R-v3-forecast1–thm:R-v3-forecast6. These labels exist with the same names in the unregistered local file Big03-A-v3.tex and are not cited. Also, ``blind to the dark-slot current'' is not a sufficient hypothesis (Proposition); the correct hypothesis is a complete common process (Theorem). Big04-A-coeff thm:C-adaptive (source record; not a premise) is as described.

PC2-4 (corrected) The shift preserves every current declaration and the null energy condition (held), but not dust form, positivity or the weak, dominant or strong conditions (Proposition). ``Rank-one or rank-four data do not select'' is refined: rank is a property of a map, and a supplied value of an injective map identifies the coefficients (Theorem). The DS-OB-1-fibre labels are as described.

PC2-5 (held with corrections) Forecast 1 holds only with zero exchange; the exact error is Proposition . Forecast 2 is corrected: the total potential fixes the common forcing but not the relative modes (Theorem). Forecast 3 holds when the remainder is unrestricted; if the remainder must obey the null energy condition, a positive dust history on the de Sitter past is excluded (Proposition). Big05-A v3 thm:Big05-futures and prop:Big05-predsplit (source record; not a premise) are as described.

PC2-6 (partly corrected) En04-A thm:magic-fibre is a magic-label fibre theorem (labels do not fix residual

leakage), not a residual-response certificate. I-D prop:v5-u6 concerns tested Host-B prescriptions; host separation is a scope statement of the sheet, not that proposition's content. En04-B thm:current-blind and thm:curvature-sampling, I-C thm:A and lem:EB, I-D thm:v5-type and version-1 thm:DM-shredder are as described.

PC2-7 (partly corrected) Big04-A thm:DR-coef is injectivity of the labels at a declared normalization, not an orbit statement; the orbit is Big04-A-coeff prop:C-orbit and Big05-A v3 prop:Big05-orbit-split (source record; not a premise). The κ-slot does not appear in Definition and is not selected by a vanishing current (Proposition).

PC2-8 (held) Hawk05-B thm:page is the exact finite Page curve, with the Page–Sen mean under def:haar. The record carries no version marker in its title.

PC2-9 (corrected; site status changed) The plan says Big01-A thm:vacfibre and cor:P5 remain absent. The Big01-A site record retrieved for version 2 is *version 7* and contains both; version 1 retrieved version 5, where both were absent, so PC-1 and PC-2 of version 1 were correct for that record. Version 2 cites the version-7 record (Theorem , the future non-selection boundary in Section).

Version 2: verdicts on plan t342u (X9)

X9-0 (held: erratum) Version 1's $\chi\varepsilon_{\mathrm{tot}} = 3H^2$ omits Λ (Erratum E2-1, Proposition); energy conditions need $\chi > 0$ (Erratum E2-2).

X9-1 (held, strengthened) $V' + \mathscr{H}V = 0$, $S' = -V$, $V \propto 1/a$; added: frozen limit, total-matter decoupling, gauge invariance (Theorem).

X9-2 (held, with scope) $\Phi = \Psi = 0$ needs zero total density and zero total momentum; consistent with all linearized Einstein equations; dust baryons only (Proposition).

X9-3 (held, strengthened) $\mathscr{A} = 4\pi G\rho_{\mathrm{m0}}$ and $\widehat{\Omega}_{\mathrm{m}}$, including the $2Hf$ (i.e. $2f$) term, are constant along every solution, not only the growing mode (Theorem).

X9-4 (held, strengthened) $L = 2V_g$ under linear GR with zero anisotropic stress; the residual equals $k^2(\Psi - \Phi)$ with no field equation; sign checked against the version-1 Euler equation (Theorem).

X9-5 (held, strengthened) Shell mass and bound, with sharpness, the density instability, and the shell form of positivity (Proposition).

X9-6 (held, strengthened) $R_e \to c/H_\infty$, every linear solution freezes with $\dot{D} \to 0$, background mass in the horizon $\to 0$; dissolution of bound systems not claimed (Theorem).

X9-7 (held) Test table with no grading and a ``does not predict'' list (Section).

X9-8 (held, with title notes) arXiv:astro-ph/9506072 (Ma–Bertschinger) is cited only for the linear equations and conventions; arXiv:astro-ph/0702615 (Kunz; published title differs) only for total-source degeneracy; arXiv:0704.1932 (Zhang et al.; published title differs) only for proposing a lensing–matter relationship test; the NED Bertschinger page only for the Friedmann equation including vacuum energy. Tracking parameters were removed from all URLs.

Version 2: verdicts on the findings draft (F10) and draft corrections (DC2)

F10-1 (held) Setting with two levels and $\chi > 0$: Definition .

F10-2 (held) Projection criterion: Proposition .

F10-3 (held, strengthened) Silent family: Proposition (a), with an explicit action (b)–(c).

F10-4 (held; corrects version~1) Risks (i)–(iii) restate Proposition (b); (iv) is new and gives Erratum E2-3 (Theorem).

F10-5 (held) Big05-A flagship and fibre comparison (PC2-1).

F10-6 (held) Current-blindness counterexample: Proposition .

F10-7 (held, merged) Adaptive theorem: Theorem , with the stopping rule and Corollary .

F10-8 (held) Approximate common processes: Theorem .

F10-9 (held) Stage allowances: Corollary .

F10-10 (held) Capacity witness: Specification .

F10-11 (held, merged) Two-directional non-identification: Proposition , with (d) added.

F10-12 (held, extended) Shift limitations: Proposition , with the strong condition added. It settles the dust-form and positivity question of t341u item 4.

F10-13 (held, extended) Shift risk: Corollary , with the energy-condition instances.

F10-14 (held) Rank is not supply: Theorem .

F10-15 (held) Label fibre: Proposition ; it completes Proposition (d).

F10-16 (held) Dilution error: Proposition .

F10-17 (held, merged) Relative growth: merged into Theorem with t342u item 1; its compensated decomposition is contained in Proposition .

F10-18 (held, merged) Horizon envelope and relaxation: Proposition ; its Λ-identity is Proposition (no duplicate).

F10-19 (held) Null-saturated defect: Proposition ; it strengthens version-1 DC-9.

F10-20 (held) Future non-selection boundary: paragraph after Proposition .

F10-21 (held) Metric-neighbourhood requirement: Proposition ; the counterexample stress was recomputed.

F10-22 (held) I-C and Hawk05-B: Documentary record (d),(e); the Page–Sen formula matches the record with $D = mn$.

F10-23 (held) En04-B current-blind and current-sampling: Documentary record (a); prop:current-sampling exists on the site record.

F10-24 (held) En04-A magic labels: Documentary record (b).

F10-25 (held) I-D hosts: Documentary record (c).

F10-26 (held) Capacity, coefficient, catalogue: Documentary record (f),(g).

F10-27 (corrected) Big03-A status note: the draft says retrieval failed; the site was retrieved and serves version 2 (DC2-3).

F10-28 (corrected) Big01-A locators: the draft carries the version-1 absence report; the site now serves version 7 with both locators (PC2-9).

F10-29 (corrected) Other locator limitations: prop:C-orbit, thm:curvature-sampling and prop:Big05-predsplit exist on the site records with complete statements (DC2-4). The nine applicability corrections are held and appear as Propositions , , Theorem (iv), Propositions , Theorem , Propositions , Theorem , Proposition and Proposition .

F10-30 (superseded) Verification boundary: the draft claims no executed checks; version 2 executes its checks and build (Appendix). The closing ledger is kept verbatim. Draft corrections:

DC2-1 The draft's Sen bibitem gives the arXiv title; the published title is ``Average Entropy of a Quantum Subsystem".

DC2-2 The draft calls Hawk05-B ``version 1"; the site record carries no version marker in its title.

DC2-3 The draft says companion retrieval gave no usable records; read-only retrieval succeeded (Appendix).

DC2-4 The draft says prop:C-orbit, thm:curvature-sampling and prop:Big05-predsplit were not available; all three exist on the site records.

DC2-5 The draft's author line is replaced by the required form ``Ngo Cheung (authorship requires confirmation)".

DC2-6 The draft's bibliography cites records ``as described in the supplied passages"; version 2 cites the retrieved records with hashes.

Version 2: errata to version 1

E2-1 Proposition (b) and abstract finding (4): $\chi\varepsilon_{\mathrm{tot}} = 3H^2 - \Lambda$ and $\chi p_{\mathrm{tot}} = -(2\dot{H} + 3H^2) + \Lambda$ (Remark , Proposition).

E2-2 Energy-condition conclusions need $\chi > 0$, not only $\chi \neq 0$ (Remark).

E2-3 ``Every deterministic Boolean answer has worst-case error 1" holds for functions of exact data; with a stochastic transcript the error is $\max(p, 1-p)$ (Remark). Strengthening (not an erratum): the version-1 early-time caveat DC-9 is strengthened by Proposition .

Version 2: new labels

toprule Label Type Title

midrule rem:DM-v2-E1 remark Erratum E2-1 (version 2) to Proposition (b)

prop:DM-v2-cosmo proposition Corrected total-source identity

eq:v2-cosmo equation

def:DM-v2-realize definition Macroscopic account and R1 realization

prop:DM-v2-lift proposition Projection criterion

lem:DM-v2-currents lemma Conserved currents that change no total

prop:DM-v2-undecidable proposition The declaration is invisible to split-independent data

prop:DM-v2-R1fibre proposition R1-realized attribution family

eq:v2-dust-action equation

thm:DM-v2-risks theorem Exact risks on the R1 family, with the deterministic boundary

rem:DM-v2-E3 remark Erratum E2-3 to Lemma (c)

prop:DM-v2-metricnbhd proposition Fixed-host R1 is not neighbourhood R1

prop:DM-v2-cbcounter proposition Current blindness alone is not split blindness

thm:DM-v2-adaptive theorem Adaptive non-identifiability for the current and split coordinates

cor:DM-v2-supply corollary A current-sensitive supply is a data refinement

thm:DM-v2-approx theorem Approximate common processes

cor:DM-v2-diamond corollary Quantum stage allowances

spec:DM-v2-capacity specification Unused capacity witness

prop:DM-v2-capacity proposition Two-directional non-identification of slot and capacity

prop:DM-v2-shift proposition Limits of the shift

cor:DM-v2-shiftrisk corollary Exact risk on the allowed shift interval

thm:DM-v2-rank theorem Rank is not supply; box risk

eq:v2-box-risk equation

prop:DM-v2-orbit proposition Complete label fibre with an unsupplied normalization

rem:DM-v2-E2 remark Erratum E2-2 (version 2) to Proposition (b)

prop:DM-v2-dilution proposition Dust-dilution error is the integrated exchange

thm:DM-v2-twodust theorem Two separately conserved dusts: relative modes

eq:v2-two-dust equation

prop:DM-v2-horizon proposition Horizon envelope and an explicitly added relaxation closure

prop:DM-v2-nullsat proposition A positive dust history forces a null-energy defect in a saturated remainder

prop:DM-v2-compensated proposition A compensated dust mode is gravitationally invisible

thm:DM-v2-growth theorem Expansion and growth must reconstruct one matter density

eq:v2-Omega-hat equation

thm:DM-v2-slip theorem Lensing–motion residual equals gravitational slip

prop:DM-v2-shell proposition Shell masses are stable; local densities are not

thm:DM-v2-vacbranch theorem Constant-vacuum branch

doc:DM-v2-interfaces documentary Version 2 interface records

sec:v2-fibre section Version 2: the zero-current fibre under reading R1

sec:v2-adaptive section Version 2: adaptive non-identifiability

sec:v2-capacity section Version 2: dark slot and dark capacity

sec:v2-vacuum section Version 2: the vacuum shift and its constitutive limits

sec:v2-orbit section Version 2: the coefficient orbit

sec:v2-forecast section Version 2: conditional forecasts with rejection conditions

sec:v2-joint section Version 2: joint consistency relations

app:v2-crosswalk section Version 2: crosswalk of the three inputs

app:v2-PC2 section Version 2: verdicts on plan t341u (PC2)

app:v2-X9 section Version 2: verdicts on plan t342u (X9)

app:v2-F10 section Version 2: verdicts on the findings draft (F10) and draft corrections (DC2)

app:v2-errata section Version 2: errata to version 1

app:v2-labels section Version 2: new labels

app:v2-sources section Version 2: sources and records

app:v2-checks section Version 2: checks, build and retention

bottomrule

Version 2: sources and records

Read-only GET requests to https://enter.grok.me/api/manuscript/<ID> only; nothing was pushed, registered or written. Citations identify source records only; no proof transfer. Hashes are SHA-256 of the retrieved bytes.

toprule File Role SHA-256

midrule Big01-A.raw site record (GET /api/manuscript/Big01-A) Big01-A (version 7)

7d3989b447c4a0dd282b1ffeb97eb38d1b303986b82be3130d8db7a5e952169a

Big02-A.raw site record (GET /api/manuscript/Big02-A) Big02-A (version 6)

1d8fc18c752c82edb1235282cbd56ccd8540e41ae675589337bbd6622ffa8f7a

Big03-A-v3.local.tex unregistered local file; label check only; not cited

f00b8dbfd827150b3fa8510fc4e896b21368f3ad5cc04a0120ef4ed5b4f89eb4

Big03-A.raw site record (GET /api/manuscript/Big03-A) Big03-A (version 1)

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Big04-A-coeff.raw site record (GET /api/manuscript/Big04-A-coeff) What the Admitted Data of the Big04-A Host Fix

about the Radiation-Label Coefficient

9276db3c2eca392e3af5af1e960230367160d061874b332b4dc7342d5859ca70

Big04-A.raw site record (GET /api/manuscript/Big04-A) Big04-A, Version 4

0bb4d9b2dd7dcfbef9da194f6be160ae1c8b4a756c0d5550b817df31226a352d

Big05-A.raw site record (GET /api/manuscript/Big05-A) Is Spacetime Curvature Mainly Caused by

Dark Matter and Cosmic Expansion? 1788cf6f5abe4bf139f54aa18167a61c1130cdb6a0aacff84f2f45521d5946a3

Big06-A-v1.tex frozen base (version 1)

eca341929d98422c3c6475d8175d1ec48d71b87e4fcc1057842000d658145e79

DS-OB-1-fibre.raw site record (GET /api/manuscript/DS-OB-1-fibre) Radiation and Horizon Labels Select No Point

of the Conserved Vacuum Fibre 4626dbb721ab0c0cb1f374699897dde85d5cc20f599f1a3470a620d286f425f8

En04-A.raw site record (GET /api/manuscript/En04-A) En04-A-v2.tex

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En04-B.raw site record (GET /api/manuscript/En04-B) En04-B

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Hawk05-B.raw site record (GET /api/manuscript/Hawk05-B) Hawk05-B

e8ae780e771c04d876d91505de79fb11e47c89925596cb67f50db641945470fd

I-C.raw site record (GET /api/manuscript/I-C) I-C-v2: The Shredder Interface

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I-D.raw site record (GET /api/manuscript/I-D) documentclass[11pt]article

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OpenAI.raw site record (GET /api/manuscript/OpenAI) OpenAI Research Catalogue

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findings_t343u.tex request input 91e5a9c50f7665d6a95f68cacfd38a280ee0e3eae04e71ddc70efd695d36f287

10.1086_176550.json bibliographic record (Crossref, arXiv or NED); source record, not a premise

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10.1103_PhysRevD.80.123001.json bibliographic record (Crossref, arXiv or NED); source record, not a premise

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10.1103_PhysRevLett.71.1291.json bibliographic record (Crossref, arXiv or NED); source record, not a premise

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10.1103_PhysRevLett.77.1.json bibliographic record (Crossref, arXiv or NED); source record, not a premise

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10.1103_PhysRevLett.99.141302.json bibliographic record (Crossref, arXiv or NED); source record, not a premise

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arxiv_0704.1932.html bibliographic record (Crossref, arXiv or NED); source record, not a premise

19719a37279d0ad45a1c13a06b12fef380ba192000c80c4757edfebfe9158bb4

ned_bert0.html bibliographic record (Crossref, arXiv or NED); source record, not a premise

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ned_bert1.html bibliographic record (Crossref, arXiv or NED); source record, not a premise

5bf11906399510bb76870a5c17aba573162cce5dd65fa55922c2a0f483e52f2f

bottomrule

Version 2: checks, build and retention

Checks are executed by checks_Big06-A-v2.py; results are in checks_Big06-A-v2.json (not embedded here, to avoid circularity). Each check has negative controls or mutations that must fail. toprule Check Content

midrule V2-1 Erratum E2-1: symbolic flat-FLRW Einstein tensor with Λ; $\chi\varepsilon = 3H^2 - \Lambda$, $\chi p = -(2\dot{H} + 3H^2) + \Lambda$; dust totals on both hosts. Mutations: Λ omitted; $\chi < 0$ reverses the null condition.

V2-2 Input hashes: plans, findings draft, frozen version-1 TeX and every retrieved record match the recorded SHA-256. Control: a one-byte change is detected.

V2-3 Frozen trees: hashes recomputed after the build equal the before-hashes (except the declared concurrent tree). Control: a perturbed hash list fails.

V2-4 Ledger verbatim in the abstract and at the end; the sentences on quantum coefficients and on citations present. Mutation: a dropped sentence is detected.

V2-5 Author line exactly ``Ngo Cheung (authorship requires confirmation)''. Mutation: the draft's form fails.

V2-6 Every inserted theorem, proposition, lemma, corollary and definition is followed by a non-claim. Mutation: a deleted non-claim is detected.

V2-7 No grading words and no tracking parameters in the inserted text. Mutation: an inserted grade is detected.

V2-8 Label resolution: every record locator in the inserted text exists in the cited site record; no Big03-A version-3 locator is cited; the version-3 names exist only in the local file. Mutation: a fake locator fails.

V2-9 Site-version facts: Big03-A record is version 2; Big01-A record is version 7 with thm:vacfibre and cor:P5; Hawk05-B has no version marker; the locators named in DC2-4 exist.

V2-10 Conserved antisymmetric-potential currents (symbolic, generic metric density); declaration indicator pair. Control: a symmetric K gives a nonzero divergence.

V2-11 Dust action: constraint, continuity and geodesic equations on FLRW; dust totals on the two hosts. Mutation: $\Lambda = 0$ on the vacuum host gives pressure.

V2-12 Deterministic boundary: a fair-bit rule has error $\frac{1}{2}$, a constant rule error 1. Mutation: claiming error 1 for the fair-bit rule fails.

V2-13 Metric-neighbourhood counterexample: linearized $\sqrt{-g}R$ equals $\partial_a \partial_b h^{ab} - \mathrm{Box}\, h$ symbolically; the stress is conserved and depends on A. Mutation: wrong sign of the trace term.

V2-14 Adaptive and supply simulations by exact enumeration: common kernels give identical transcript laws; a common supply changes nothing. Mutation: an α-dependent kernel separates.

V2-15 Approximate processes: exact transcript TV $\le \varepsilon_0 + \sum \varepsilon_r$ and the risk floor on random instances. Mutation: the bound $\max_r \varepsilon_r$ fails.

V2-16 Capacity product witness: both directions of non-identification. Control: a correlated class is detected.

V2-17 Shift energy conditions by boost sampling: weak, dominant, strong intervals and dust form; shift risks. Mutation: dominant interval $\lambda \le \varepsilon_{\min}$ fails.

V2-18 Box risk by corner enumeration, Einstein instance, rank-four inversion. Mutation: rank-one inversion fails.

V2-19 Coefficient orbit: invariance and completeness (symbolic), conditional calibration. Mutation: $(U, q\kappa, q^2\alpha_r)$ fails.

V2-20 Dilution identity by ODE integration with exchange. Mutation: q omitted.

V2-21 Two dusts: symbolic $V \propto 1/a$, numerical integration with arbitrary potentials, gauge invariance. Mutation: $V' + 2\mathcal{H}V = 0$ fails.

V2-22 Horizon envelope, null-condition lower bound and relaxation solution. Mutation: a wrong relaxation exponent.

V2-23 Null-saturated defect on random null vectors; shift leaves it. Control: timelike k is not covered.

V2-24 Compensated mode in the four Ma–Bertschinger equations (symbolic). Mutation: nonzero total momentum sources the potentials.

V2-25 $\widehat{\Omega}_m$ constant along growing, decaying and mixed solutions in ΛCDM; Einstein–de Sitter value 1. Mutation: dropping the $2f$ term.

V2-26 Lensing–motion residual and slip (symbolic). Mutation: sign flip of the Euler force.

V2-27 Shell mass bound, sharpness, density instability and positivity equivalence. Mutation: bound without r_1.

V2-28 Constant-vacuum branch: symbolic $a(t)$, $D_- = H$, numerical D_+, horizon and mass bounds. Mutation: $D = H^2$ fails.

V2-29 Errata E2-1–E2-3 present as insertions; the corrected version-1 lines are still present verbatim.

V2-30 Citations: new bibliography entries match the retrieved Crossref/arXiv/NED records, carry ``Source record; not a premise.", and have no tracking parameters.

V2-31 Retention: every version-1 line appears verbatim and in order. Mutation: an edited version-1 line fails.

V2-32 Verdict completeness: PC2-1–9, X9-0–8, F10-1–30 and DC2-1–6 each appear once as an item; abstract

states the version-2 findings.

bottomrule *Retention.* Version 1 has 868 lines; version 2 has 1570 lines, of which 702 are inserted. Every version-1 line appears verbatim and in its original order (checked by the assembler and by check V2-31). No version-1 line is edited or deleted; errata are recorded as insertions. *Build.* pdfLaTeX, two clean builds with SOURCE_DATE_EPOCH=1792627200, FORCE_SOURCE_DATE=1, PYTHONHASHSEED=0, TZ=UTC, LC_ALL=C; the PDFs are compared byte for byte; the build requires zero errors, undefined references, duplicate labels and multiply defined labels (rebuild_Big06-A-v2.sh). The version-1 checks are rerun from a private copy of the frozen delivery and compared with the version-1 reference JSON.

Closing standing ledger

Host A and Host B stay separate prescribed backgrounds. Host C is not created. O.1 stays NOT_CLOSED. XV-B is not opened. XVI-N is not discharged. Gate 0 and ST4b stay NOT_SUPPLIED. No quantum coefficient is admitted. No Einstein dynamics, derived metric, spacetime emergence, Page curve, island, vacuum energy, or quantized relational time without an external clock is claimed. A source record is not a premise. The OpenAI catalogue is not a premise.

No quantum coefficient is admitted. Citations identify source records only; no proof transfer.

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