A Day With a Yesterday

Universal domains, a gentle merger, and inherited structure

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Abstract

Fundamental Density Theory (FDT) has one substance, the omnium, and one central invariant. Its existence floor, force ceiling and open curvature ratio with a regular core exclude a singularity everywhere. A merger creates nothing from nothing; it inherits: pre-existing universal domains meet gently — gentle by the low-density omnium between galaxies, whatever the speed[2] — carrying galaxies, compact objects, stars and nuclei into the merged configuration. Their unwinding releases stored compression into the spacetime phase; at a black hole the release is the conversion of the matter accreting onto it to spacetime and energy, and the hole loses no mass and grows only through mergers[2]. Black-hole jets and the bubbles above and below the Galactic centre are that conversion at work: compression stored over an unimaginable time is let go at the fold in an instant, which powers the jets, and the freed spacetime decompresses through the radii $2^n R_s$, the inverse square law run in reverse[2]. Dark matter is the mass shadow, the compression of the substrate around matter; dark energy is the stored potential of compressed omnium, released as bodies lose mass, and its amount increases and decreases differently in different regions, an expansion here requiring a contraction elsewhere, so the Hubble number differs from region to region[2]. The cosmic web is the merged domain's nodal architecture and the microwave sky the cosmological reading of the substrate's cumulative standing-wave state. A merger gives that sky's mottling its boundaries, inherited phases, route and drive: its gas raises fronts where flows meet, and the chorus carries the linear pattern, blackbody by construction. This analysis reads the seed's sixteen sources[3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18] and the derivation notes S16 and S17[19, 20] through the locked core[1]. S17 derives the cone law and the junction data from core clauses and containment and narrows seven further register items and three of the source's debts; their states stand in the status ledger. FDT canon's fixed-volume reading[2] and a proper-volume release history give different amplitude bounds and different positivity limits. The published flow, expansion and power-asymmetry axes lie on one great circle, and its pole is the axis of the sky's quadrupole and octopole within the published errors: in-sample, the geometry of two rotating domains whose merger is in progress. Five prospective predictions distinguish a released level that rises where a region expands and falls where it contracts, a vanishing chemical-potential distortion, returning lensing weight at re-stacked gas, a constant-ratio clustering comb, and a persistent handedness dipole. Each has a declared comparator and a quantitative decision rule. Three exploratory observables are separate from that count.

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1 Framework

Authority and verbs. FDT is a true extension of general relativity and quantum mechanics (Use item 5). The locked core governs wherever a source disagrees with it[1, 2] (SC-001, L5–L6). The statements recorded with the source table are FDT canon[2]. The four FDT canon texts and their appendix[3, 4, 5, 6], the domain-merger and microwave papers[7, 8], the web and density notes[9, 10, 11, 12, 13], the stellar papers[14, 15, 16, 17, 18] and the derivation notes[19, 20] are attributed separately. Reports, states, computes and proposes describe those sources. An external measurement is an assumed input, identified as the published value and by its U-row. Derived, estimated, reconstructed and in-sample identify this analysis's calculations.

One substance and one stroke. Energy is E, rest mass m, kept duration t and physical length d; c is the strand rate. The omnium's response coefficients are ε_0, μ_0; h and $\hbar = h/(2\pi)$ are its Planck bridges. A mode indexed by q has energy E_q, mass m_q, angular frequency ω_q, period T_q and thread length ℓ_q. SI units are metres m, seconds s, kilograms kg, kelvins K, joules J and newtons N. The chain and its bridges are (0.1, 0.1a; U-01):

$$\begin{aligned} &\frac{E}{m} = c^2 = \frac{1}{\varepsilon_0\mu_0} = \left(\frac{d}{t}\right)^2, \\ &E_q = m_q c^2 = \hbar\omega_q, \qquad T_q = \frac{2\pi}{\omega_q} = \frac{h}{E_q}, \\ &\ell_q = cT_q = \frac{h}{m_q c}, \qquad \frac{d}{t} = c = 299792458\ \mathrm{m\,s^{-1}}. \end{aligned} \tag{1}$$

The length ℓ_q is the Compton length, never the support radius R_{box}. Quantisation steps the rest energies of closed patterns and the periods and paths of open strokes at their locked ratio; the curvature chart remains continuous. There are only patterns of omnium and their own supports, never a separate occupant and container (0.1b).

Pressure is P. The gravitational constant is G; the force ceiling is $F_{\max}$. The Planck extents are ℓ_P, t_P and Planck energy E_P; the floor extents are $d_{\min}, t_{\min}$ and its energy E_{floor}. Combining the ceiling with Planck's quantum gives (0.1a, 0.2):

$$\begin{aligned} &F_{\max} = \frac{c^4}{4G}, \qquad F_{\max} d_{\min} t_{\min} = \hbar, \qquad d_{\min} = c t_{\min}, \\ &d_{\min}^2 = \frac{\hbar c}{F_{\max}} = \frac{4\hbar G}{c^3} = 4\ell_P^2, \\ &d_{\min} = 2\ell_P, \qquad t_{\min} = 2t_P, \qquad E_{\mathrm{floor}} = F_{\max} d_{\min} = E_P/2. \end{aligned} \tag{2}$$

The floor is an infimum, occupied by no stroke; it fixes no spacing above it. The appendix's rounded floor length is an arithmetic instance, not a lattice[6] (L1929).

Strand geometry. Translation speed is v, circulation speed u, proper time τ, position x and wave number k. The two responses give $c^2 = 1/(\varepsilon_0\mu_0)$; time is circulated strand and space translated strand (0.1d). A closed pattern obeys $v^2 + u^2 = c^2$ and $c\,d\tau = u\,dt$; its inertia E/c^2 includes the closure stress, whose integrated spatial stress vanishes in the rest frame (von Laue). Its translation share $\mathfrak{s} = v^2/c^2$ equals exterior compactness only for a pattern held on the exterior branch. The

open stroke runs straight at c, keeps no time, and its grades turn at radius $\bar{\lambda} = c/\omega$ on a helix standing at $\pi/4$ (I-2). Its energy travels along the straight run. For a closed pattern, $\omega^2 = c^2k^2 + (mc^2/\hbar)^2$ and $(\omega/k)(d\omega/dk) = c^2$; the phase rate exceeds the run, with equality for the open stroke alone.

The wavefunction is ψ, its amplitude A and helical phase ϕ_h with initial phase ϕ_0. Cylindrical projection gives $\psi = Ae^{i\phi_h}$ with $\phi_h(t) = \phi_0 - \omega t$ (I-4). In an orthonormal strand plane with basis $\mathbf{e}_1, \mathbf{e}_2$, the unit bivector $\mathbf{B} = \mathbf{e}_1\mathbf{e}_2$ replaces i: $e^{\mathbf{B}\phi_h}$ is a single-angle phase rotor with a dimensionless exponent, distinct from a half-angle spinor rotor. Superposition is ignorance of ϕ_0 at observation. The universe is deterministic; there are no probability amplitudes (I-4).

The Alpha Lock. Total gravitating energy in mass units is $\mathcal{M}$; R_s is its gravitational radius, r_f the field radius, R_b the configuration's support radius, and r_c the core cutoff. The branch tag is σ, curvature ratio α_σ (exterior α_{ext}, interior α_{int}), and gap odds X_σ (exterior X_{ext}, interior X_{int}). The Einstein coupling is κ. The relations $\leq, \geq$ include their endpoint; ∞ denotes an unbounded limit. Circular curvature is the reciprocal of the radius, so two fixed lengths give (0.2–0.4):

$$\begin{aligned}
R_s &= \frac{2G\mathcal{M}}{c^2} = \frac{\mathcal{M}c^2}{2F_{\max}}, & \kappa &= \frac{8\pi G}{c^4}, \quad \kappa F_{\max} = 2\pi, \\
\alpha_{\text{ext}}(r_f) &= \frac{R_s}{r_f}, \quad R_s < r_f < \infty, & \sigma &= +1, \\
\alpha_{\text{int}}(r_f) &= \frac{r_f}{R_s}, \quad r_c \leq r_f < R_s, & \sigma &= -1, \\
\alpha_\sigma(r_f) &= \left(\frac{R_s}{r_f}\right)^\sigma, & \frac{d\alpha_\sigma}{dr_f} &= -\frac{\sigma\alpha_\sigma}{r_f}, \\
X_{\text{ext}} &= \frac{R_s}{r_f - R_s}, & X_{\text{int}} &= \frac{r_f}{R_s - r_f}.
\end{aligned} \tag{3}$$

No numerical core cutoff is supplied (O-1). Both branches satisfy $0 < \alpha_\sigma < 1$ by their evaluation domains; no coefficient is fitted and no second compactification is applied to a force input. The odds are the algebra $X_\sigma = \alpha_\sigma/(1 - \alpha_\sigma)$, without a probabilistic reading.

For the A-1 application let $\mathfrak{x} \geq 0$ denote an odds enhancement and $X_{\sigma,0}, \alpha_{\sigma,0}$ its baseline values. I-6 gives the finite update:

$$X_\sigma = X_{\sigma,0}(1 + \mathfrak{x}), \qquad \alpha_\sigma(\mathfrak{x}) = \frac{\alpha_{\sigma,0}(1 + \mathfrak{x})}{1 + \alpha_{\sigma,0}\mathfrak{x}}. \tag{4}$$

Actual comparison density orders by $q_\sigma = \alpha_\sigma^{3\sigma}$, not raw α_σ: an interior odds enhancement reduces that comparison density. This update changes no field equation.

Chart inventory. The computational coordinate is β_σ. The tokens $\alpha_{\text{ovl}}, X_{\text{ovl}}$ name overlap contrast, $\alpha_{\text{conf}}, X_{\text{conf}}$ confinement, and α_{mode} mode manifestation. The schematic saturation diagnostic is $\alpha_{\text{core}} \to 1^-$. The table declares each application once.

application	coordinate and warrant	use
A-1 compactness	α_σ; two fixed lengths, geometric	field r_f, support R_b, source R_s evaluations; no domain radius inferred
A-2 computational	$\beta_\sigma = \alpha_\sigma/(1+\alpha_\sigma)$; geometric	no force, optical or density slot
A-3 overlap	$X_{\mathrm{ovl}}, \alpha_{\mathrm{ovl}}$; no geometric warrant	token and range only (O-2); the I-1a instance is quoted separately
A-4 confinement	$X_{\mathrm{conf}}, \alpha_{\mathrm{conf}}$; no geometric warrant	token and range only (O-3)
A-5 modes	α_{mode}; no odds or geometric warrant	names regimes; ranks and spaces nothing
saturation	$\alpha_{\mathrm{core}} \to 1^-$	schematic skin diagnostic; P-3 names nuclear clamps

The two charts of a bound configuration are the source's exterior atlas and the configuration's interior chart, its skin at the fold with radius R_{room} taken from data (I-3). No transfer map joins them. A datum about an interior is a profile-weighted mean with its probe weight named; no point value follows from that mean. The low-n closures sit toward the dilute centre; binding is transacted at the high-α_{int} skin. A nuclear density quoted below is such a mean.

On the A-1 exterior branch $\alpha_{\mathrm{ext}} < 1/2$, $\alpha_{\mathrm{ext}} = 1/2$ and $\alpha_{\mathrm{ext}} > 1/2$ name the general-relativistic regime, the seam and the quantum-mechanical regime; the interior branch has the same division in α_{int} (0.3a). The seams stand at $2R_s$ outside and $R_s/2$ inside. The Clifford torus is the seam of the three-sphere support, not the fold; its two solid tori carry the matter phase and spacetime phase. The support, seam and phases repeat at every size, bounded below by the floor. Their limiting circles are approached and never occupied.

Force, curvature and mass. The force magnitude is F; pair members have masses $\mathcal{M}_1, \mathcal{M}_2$, supports $R_{\mathrm{b},1}, R_{\mathrm{b},2}$ and cross-centre inputs $\alpha_{1,\mathrm{ext}}, \alpha_{2,\mathrm{ext}}$. For two nonoverlapping spherical supports at monopole order, evaluate d at their separation and $\alpha_{i,\mathrm{ext}}(d) = R_{s,i}/d$ each exterior cross-centre input. I-1 holds at every scale; its pair domain qualifies the inverse-square reduction alone:

$$\begin{aligned} F &= \frac{c^4}{4G}\alpha_{1,\mathrm{ext}}\alpha_{2,\mathrm{ext}}, \quad 0 < \alpha_{i,\mathrm{ext}} < 1 \implies F < F_{\max}, \\ F &= \frac{G\mathcal{M}_1\mathcal{M}_2}{d^2}, \qquad\qquad\qquad\qquad d \geq R_{\mathrm{b},1} + R_{\mathrm{b},2}. \end{aligned} \tag{5}$$

The stronger ceiling $F \leq F_{\max}/4$ belongs to this pair construction; equality requires contact of saturated equal supports as a limit. Neither the universal interval nor $F < F_{\max}$ is a pair-domain restriction. At layer L2 two hollow supports, each taken as a skin carrying its endowment, attract through their whole overlap, $|R_{\mathrm{b},1} - R_{\mathrm{b},2}| \leq d \leq R_{\mathrm{b},1} + R_{\mathrm{b},2}$, with[20]

$$F = \frac{F_{\max}}{4}\,\alpha_{1,\mathrm{ext}}(R_{\mathrm{b},1})\,\alpha_{2,\mathrm{ext}}(R_{\mathrm{b},2})\left[1 - \left(\frac{R_{\mathrm{b},1} - R_{\mathrm{b},2}}{d}\right)^2\right], \tag{6}$$

each compactness that of a source at its own support. This joins the inverse square at contact, is constant for equal supports and vanishes when one support lies inside the other, so the stronger

ceiling holds through the overlap. S17 also gives the rotation remainders and shows that the width of the band outside a rotating source's fold is the gravitational radius of the rotational share of its endowment[20]. Overlap beyond L2 and the pairs a settlement joins enter no number here (O-5).

The metric is $g_{\mu\nu}$, Einstein tensor $G_{\mu\nu}$ and stress tensor $T_{\mu\nu}$; $d\Omega^2$ is the unit-sphere element and $\ell_{\rm opt}$ optical arclength. I-3's exact exterior optical face and unchanged tensor face are:

$$d\ell_{\rm opt}^2 = \frac{dr_f^2}{(1-\alpha_{\rm ext})^2} + \frac{r_f^2 d\Omega^2}{1-\alpha_{\rm ext}}, \qquad G_{\mu\nu} = \kappa T_{\mu\nu}. \tag{7}$$

Generalised Snell is the Fermat jump law of this exact metric: the exact optical index times the sine of incidence is continuous. A slow pattern reads the lapse; a stroke reads both ruler and clock adjustments, giving the factor of two in leading deflection. A standalone square-root factor is not the lensing geometry. The atlas in Eq. (3) is downstream of this tensor solution.

I-3 states: "Given the same stress tensor, cosmological terms, initial and boundary data and gauge, FDT and GR solve the same equation and return the same curvature." I-4 distinguishes L1, the exact pair algebra, from L2, GR's weak-field slow-motion reduction, and L3, the FDT source programme and each claimed divergence. No strong-field two-body continuation follows from L1. I-2 reads photon, graviton, gluon, phonon and magnon as the same spin-one stroke: the chain has one rate and one substance. Braided matter closures are outside this carrier identity.

The confinement operator is D, its confining domain Ω, its boundary data B, strand count n, orientation χ, and chart position $\mathfrak{p}$ in the eigenproblem; u_q is a mode shape. This renames I-5's chart-position argument. No chart-position trajectory is used. I-5 gives:

$$D(\Omega, B; n, \chi, \mathfrak{p})u_q = \omega_q u_q, \qquad m_q c^2 = \hbar\omega_q. \tag{8}$$

No form of D, its domains, boundary data or spectrum is written here (O-9). Support $R_{\rm box}$ is fixed independently of the mass; equating it to a Compton length would empty the eigenproblem. At fixed n a mass change is a confinement change; changing n requires re-braiding. The lepton-generation route remains the open fork named by I-5. Stability is I-5b's ledger condition: every final state preserving the exact books at or below threshold has zero transition amplitude; the rates and kernels enter no number here (O-12). Decay is loop unwinding through the one channel left open, and beta is one invariant-preserving many-to-many reclosure, so n is a per-closure label and never an additive charge (I-5b).

One energy ledger. Rest content is M, non-rest energy $E_{\rm nr}$, pressure P, volume V and temperature T. The radiation constant is a, with $\sigma_{\rm SB}$ the flux constant. Every channel enters once (0.5, I-7):

$$\mathcal{M} = M + \frac{E_{\rm nr}}{c^2} + \frac{PV}{c^2} + \frac{aT^4V}{c^2} + \cdots, \qquad a = \frac{4\sigma_{\rm SB}}{c}. \tag{9}$$

The chorus enters through the radiation term; stored compression through the work term. Binding is read from the solved geometry and never added as an independent local term.

The two readings. The clock factor is $\mathfrak{m} > 0$; $\mathcal{U}$ is a pattern's four-velocity in its kept time $t_{\rm own}$ and $\mathfrak{P}^{\mu\nu}$ its transverse projector. Core 0.1c gives:

$$\begin{aligned} (d,t) &\mapsto (\mathfrak{m}d, \mathfrak{m}t), \qquad & g_{\mu\nu} &\mapsto \mathfrak{m}^2 g_{\mu\nu}, \\ \nabla_{\mathcal{U}}\mathcal{U}^\mu &= -\mathfrak{P}^{\mu\nu}\partial_\nu \ln\mathfrak{m}, & \mathfrak{P}^{\mu\nu} &= c^2 g^{\mu\nu} + \mathcal{U}^\mu\mathcal{U}^\nu. \end{aligned} \tag{10}$$

Moving at constant speed on the pattern's own clocks and rulers through a density gradient is gravity. For a stress tensor of perfect form the medium's flow clock factor is its temperature at zero net conserved count, or enthalpy per count at fixed entropy per count. This is not a carried clock's thermal shift, which is time dilation from its own thermal motion. A conformal factor never bends a stroke and is never an α. For a static chart with lapse $\mathfrak{l}$, spatial metric γ_{ij} and its determinant γ, S17 derives the aperture's constitutive law from 0.1c and 0.1d[20]: the bookkeeper reads the stroke's two responses as $\varepsilon_0 \mathsf{Z}^{ij}$ and $\mu_0 \mathsf{Z}^{ij}$, with

$$\mathsf{Z}^{ij} = \frac{\sqrt{\gamma}\,\gamma^{ij}}{\mathfrak{l}}, \qquad \mathsf{Z}_{\parallel} = 1, \quad \mathsf{Z}_{\perp} = \frac{1}{1-\alpha_{\text{ext}}} \quad \text{in the exterior's areal chart,} \tag{11}$$

the principal values along and across the density gradient[45]. A stroke running across the gradient has index $(\mathsf{Z}_{\parallel}\mathsf{Z}_{\perp})^{1/2} = (1-\alpha_{\text{ext}})^{-1/2}$, P-4's aperture index; one running along it has the square; the pair is the optical metric of Eq. (7), and the common factor of a rescaling drops out of Z^{ij}. The interior instance needs the interior lapse, which no clause writes (O-4).

Curvature, a tide and a density gradient are read between neighbours or against a reference path (I-3a). An extended pattern's skin and centre path are such neighbours; its quadrupole reads the tide and the trace reads density. The gravitational window $\alpha_{\text{ext}} = \mathcal{M}c^2/(2F_{\max}r_f)$ is small for a laboratory pattern and correct. Along free fall from rest far away, $v = c\sqrt{\alpha_{\text{ext}}}$ and the inward acceleration is exactly $G\mathcal{M}/r_f^2$ (0.1c). A rotating source adds a swirl; frame drag is half its curl, the local rotation of the bookkeeper's three-velocity on constant-t_{own} slices, flat at leading Lense–Thirring order. The gravitational flow is irrotational; frame drag is not medium vorticity, and flow runs at every size.

For the helical window let E_0 be rest energy outside a twist, E_{ind} the induced-moment energy including its induction work, $\mathbf{m}$ held moments, and $\mathfrak{B}$ the magnetic field of the twist. Core 0.1c gives $E = E_0 + E_{\text{ind}} - \sum \mathbf{m}\cdot\mathfrak{B}$, $\mathfrak{m} = E/E_0$, $\mathcal{M} = E/c^2$ and the slow gradient force as minus the spatial derivative of E. Here the clock factor belongs to the pattern. Different held and induced moments per energy give different falls in the twist; universality of gravitational free fall stands. A uniform twist turns a held moment and pushes nothing. The twist compares different rest-energy responses or a reference path; identical equally turned copies see no gradient.

Notation guard. Each source collision has one destination below. Font-distinct symbols carry distinct meanings: $\mathbf{B}$ is the unit phase bivector, $\mathfrak{B}$ the twist field, and plain B the boundary data. Greek tensor indices are indices, not new scalar quantities.

token	source uses	notation here
α	compactness, effective and ignition readings	chart-tagged curvature; effective tag only in the I-1a quotation; ignition named in words
σ	branch, flux, significance, fluctuation amplitudes	branch or σ_{SB}; standard deviation is s.d.; other quantities in words
κ	Einstein coupling, section curvature, rates	Einstein coupling; curvature reciprocal radius; source rates in words
γ	shares, slopes, paths, exponents	spatial metric γ_{ij} and its determinant; source uses in words
ϕ	helical phase, acoustic phase shift	helical phase only; acoustic shift in words
Ω	domain, density fractions	domain, and $d\Omega^2$ as I-3 writes it; fractions $\mathcal{F}_{\mathrm{m}}, \mathcal{F}_{\Lambda}, \mathcal{F}_{\mathrm{b}}$
n	strands, tilt, optical index, occupation	strands; tilt $\mathfrak{n}_{\mathrm{s}}$; occupation $\bar{\mathcal{N}}_{\omega}$; densities and optical indices in words
R	gravitational, support, horizon, Hubble and phase radii	$R_s, R_b, R_{\mathrm{box}}, R_{\mathrm{room}}$; Hubble radius c/H_0; other uses in words
X	odds, density labels, elemental abundance	chart-tagged odds; exploratory labels are labels
D	operator, distances, diffusion scale	confinement operator; distances in words; deuterium ^{2}H
B	boundary, Planck function, named domains	boundary and k_B; Planck function in words
a	radiation, scale factor, shares, separation	radiation constant; scale factor $1/(1+z)$; shares in words
T	temperature, period, stress	temperature, T_q, and the core's stress tensor
S	action, entropy, three-sphere	action and entropy in words; S^3 the support
L	lengths, luminosities, coordinates	L1–L3 the I-4 layers; luminosity and Galactic coordinates in words
τ	stroke, exposure, proper time	stroke and proper time; Kendall coefficient $\mathfrak{k}$
η	count ratio, epochs, efficiencies, mean density	count ratio only; other uses in words
χ	orientation, statistic	I-5 orientation; statistic written chi-squared
w	state, probe weight, work, web label	effective state; other quantities in words
f	fission heat fraction (S16), release-history shape, unwound fraction	f_{fis}; $\mathfrak{f}(z)$; f_{unwound}
b	^{8}B branch per fusion cycle (S16), baryon fraction	b_{B}; $\mathcal{F}_{\mathrm{b}}$
W	count per unit ^{8}B flux, reservoir work (S16)	named in words

The density fractions $\mathcal{F}_{\mathrm{i}}$ are each density divided by critical density. The closing speed of a pair is

$\mathfrak{v}$, the fluid speed of a wave $\mathfrak{u}$ and a medium's wave speed c_{w}, leaving v and u to the strand; Mach numbers, adiabatic indices and vorticity are written in words. Redshift is z; H_0 is today's expansion rate and $H(z)$ its containment background; by core 0.7 the Hubble number is not a constant and differs from region to region[2] (SQ-23, L11025), so a fitted H_0 is the fitted background's and a measured one the sampled volume's. Reduced Hubble rate is h_{H}, leaving h to Planck's bridge. The chemical-potential distortion is ϖ, Compton distortion y, and acoustic angle Θ_*. A hat denotes an estimator; s. d. always denotes its standard deviation.

2 System chart

system and input	chart supplied	numerical standing
galaxy pair (U-07)	A-1 exterior, source endowment and support radius	compactness and contact work evaluated below
compact objects (U-06)	comparison density at R_s	whole-object separator, never local interior density
universal domains	the same atlas; support radius absent	no domain compactness, contact-work fraction or closing speed
stellar and nuclear interiors	interior chart with data-defined skin	profile-weighted means; local profile excluded (O-4)
web sheets and filaments	A-3 instance quoted from I-1a	no density-ratio construction of the odds
inherited matter	A-4 confinement eigenproblem	no absolute address, operator or mass ratio (O-3, O-9)
chorus modes	A-5 naming token	no rank, spacing or transfer of a comb ratio

The seven invariants operate here as follows: I-1 supplies pair work and closing speed; I-2 identifies the chorus's carrier; I-3 supplies the optical and cosmological containment; I-4 separates the pair calculation from that containment and the source programme; I-5 reads inherited matter and mass loss as confinement and reclosure; I-6 controls every chart input; I-7 accounts for radiation and released compression once.

3 The measured record

The published helium mass fraction is Y_p; isotope ratios count nuclei. The published values below are accepted in full. Each external input is assumed with its provenance; each source interpretation is assessed separately. The errors retain their source conventions.

observable	published value	provenance
monopole	$T = 2.72548 \pm 0.00057$ K; $\lvert\varpi\rvert < 9 \times 10^{-5}$, $\lvert y\rvert < 1.5 \times 10^{-5}$ at 95 percent confidence	U-08, U-09[21, 22]
acoustic angle	$100\Theta_* = 1.04109 \pm 0.00030$	U-10[23]
anisotropy	rms 30 ± 5 μK at 10° smoothing, dipole removed; dipole 3362.08 ± 0.99 μK, 369.82 ± 0.11 km s^{-1}, toward $(264.02^\circ, 48.25^\circ)$	U-52, U-53[52, 53]
low multipoles	quadrupole axis $(224.2^\circ, 69.2^\circ)$, $(228.3^\circ, 68.3^\circ)$, $(225.6^\circ, 69.7^\circ)$ after the kinematic-quadrupole correction, $(238.5^\circ, 76.6^\circ)$, $(242.4^\circ, 73.8^\circ)$, $(241.3^\circ, 77.3^\circ)$ before it; octopole axis $(239.0^\circ, 64.3^\circ)$, $(245.6^\circ, 64.8^\circ)$, $(241.7^\circ, 64.2^\circ)$	U-54[54]
rotation template	vorticity below 7.6×10^{-10} of the expansion rate at 95 percent confidence, homogeneous Bianchi VII$_h$	U-55[55]
tilt; running	$\mathfrak{n}_\mathrm{s} = 0.9743 \pm 0.0034$; 0.0062 ± 0.0052	U-11[25, 26]
constant state	$w = -0.986 \pm 0.025$; P-ACT-LBS	U-12[26]
expansion rate	67.4 ± 0.5; 73.49 ± 0.93; $70.39 \pm 1.22 \pm 1.33 \pm 0.70$ km s^{-1} Mpc^{-1}	U-04, U-18, U-19[23, 29, 30]
early structures	massive-galaxy candidates at $z \simeq 7$–9; black-hole/host mass about 10 percent at $z \simeq 4$–5, masses taken at face value	U-24, U-25[34, 35]
jets	M87 at 3.5 mm: jet joined to a ring $8.4^{+0.5}_{-1.1}\,R_s$ across; 217 blazars: jet power above the disk luminosity and above $\dot{M}c^2$ at efficiency 0.3	U-48, U-49[61, 62]
Galactic-centre bubbles	γ-ray lobes to 55°, $4.4^{+2.4}_{-0.9} \times 10^{37}$ erg s^{-1}; X-ray bubbles about 14 kpc, near 10^{56} erg	U-50, U-51[65, 66]
iron-poor star	SMSS J0313−6708, [Fe/H] < -7.1	U-26[37]
light elements	$Y_p = 0.2453 \pm 0.0034$; ^{2}H/H $= (2.527 \pm 0.030) \times 10^{-5}$; ^{7}Li/H $= (1.58^{+0.35}_{-0.28}) \times 10^{-10}$	U-27–U-29[38, 39, 40]
cluster front	1E 0657−56: Mach number 3.0 ± 0.4, front speed 4.7×10^3 km s^{-1}; gas behind the subcluster's galaxies and lensing mass	U-56[57, 56]

P-ACT-LBS combines P-ACT, lensing, first-year DESI distances and Pantheon+. Sky directions are Galactic longitude and latitude; the low-multipole axes are those of the SMICA, SEVEM and NILC maps, in that order. CPL denotes the Chevallier–Polarski–Linder state family, whose present state and slope are w_0, w_a. Its preference depends on the supernova sample[27, 28] (U-17); its fitted history is evaluated below rather than treated as an independent measurement at each epoch. The later little-red-dot analysis lowers the face-value black-hole masses by two orders of magnitude[36] (U-25). These are data and inference conventions, not inherited ages. I-3 returns the same curvature

on the same content; this containment map is exact, while a new source calculation is tested at the quoted errors. The two distance-ladder rates (U-18, U-19) are measured in the local volume and Planck's (U-04) is fitted to the microwave sky; no regional value is derived here (O-14).

3.1 No first frame

Three boundaries together exclude the singularity: nonvanishing chain variables and their floor, the force ceiling, and the open chart with a regular core (0.8, I-6). A compact object is a hollow, double-sided density boundary, dilute at its centre and densest at its skin (0.6). The open interval alone supplies no regular centre (O-1). Three results of the unchanged equation bear on the fold[20]. For a static spherical configuration let $m(r_f)$ be the mass inside areal radius r_f, $\mathfrak{a} = 2Gm/(c^2 r_f)$ the compactness of that content, ρ_{loc} the local density and p_r the radial stress; then

$$\kappa\left(\rho_{\mathrm{loc}}c^2 + p_r\right) = \frac{1-\mathfrak{a}}{r_f}\,\frac{d}{dr_f}\ln\!\left(\frac{-g_{tt}g_{rr}}{c^2}\right), \tag{12}$$

so a regular static approach to the fold, $\mathfrak{a} \to 1^-$, carries $p_r \to -\rho_{\mathrm{loc}}c^2$, the radial stress of the spacetime phase. A static configuration with $p_r \geq 0$ and every stress below its energy density has $\mathfrak{a} \leq 48/49$, and a hollow skin over a flat interior $24/25$[46]; a saturated skin whose stresses stay below its energy density therefore stands on radial tension. The jump of extrinsic curvature across a layer is the field equation's own integral over the layer, and 0.8 leaves no layer of zero thickness: the junction data hold no datum of their own (O-13), and the stress in the layer is O-4's.

S01 reads the singularity as "the lower edge of the model's reach, not a physical event"[3] (L128–L129). Its backward look through even compression makes a vanishing point that travels with the viewer[3] (SC-015, SC-016, L198–L205). S04 and S10 apply the same perspective to the skin and the thin heart[6, 12] (SC-125, L1862–L1863; SC-469, L6086–L6090; SC-481, L6095–L6096; SC-485, L6103–L6104). S10 names two consensus moves that manufacture the central infinity: the exterior chart carried through the fold "as if the rails crossed and continued", and the comparison scale read as a local density[12] (SC-478, SC-479, SC-480, L6090–L6094). S10 limits the perspective: it "explains the appearance of the infinities and settles nothing about the interior"[12] (L6117), whose core chart and profile are O-1's and O-4's. The ordering is the core's, the perspective is the sources', and neither an exterior clock factor nor a vanishing point determines an interior.

The settlement is 0.1a's: "Events do not commute, and a process run backward is never the mirror of the forward event." S01's arrow is "the direction in which the universe's ordered solutions accumulate their history"[3] (SC-580, L175). Appendix A.16 requires a record functional that no allowed forward settlement lowers; an allowed cycle containing a strict record-forming increase kills that proposed functional[6] (L2706–L2707; SC-191, SC-188, L2717–L2719). This source-owned record law enters no numerical result. The exclusion of a singular origin is 0.8's statement; a state violating any of its three boundaries ends that reading, while the perspective contributes no additional precision claim.

3.2 One shape, and the domains it makes

Let ρ_s denote comparison density over the gravitational-radius volume, ρ_{loc} the local profile, and ζ the volume shape factor. For $\zeta = 1$ at this use, 0.6 gives (U-47):

$$\rho_s = \frac{\mathcal{M}}{(4\pi/3)R_s^3} = \frac{3c^6}{32\pi G^3\mathcal{M}^2}. \tag{13}$$

Using the assumed solar-mass conversion (U-02) and the assumed endowments $4.30 \times 10^6 M_\odot$ and $6.5 \times 10^9 M_\odot$, the second the appendix's M87* value[6] (U-06), the comparison densities are 1.8×10^{19} kg m^{-3} at one solar mass, 1.0×10^6 for the Sgr A* benchmark, and 0.44 for M87*. Against S10b's mean nuclear density 2.3×10^{17} kg m^{-3}[13] (SC-494, L6347), the solar-mass scaling crosses at about 9 solar masses: the ordering does not hold for every stellar hole. Double the endowment, quarter this density; it is a whole-object separator and reads no local interior.

The universe is a population of universal domains (0.8), each read on the same atlas as a nucleus or compact object. S01 supplies the image: "A black hole is a universe that has not finished widening. A universe is a black hole that has"[3] (L251–L252). The appendix marks the seat of the top conversion an author's ruling (SC-581, L2413) and states "The program claims that a black hole does not gain mass by swallowing", with its test, "sustained mass increase tracked with accretion would refute it"[6] (SC-184, L2595–L2597).

Domains meet gently and slowly, and a merger is the trigger of what is observed as expansion: the ongoing flow of omnium from the matter phase to the spacetime phase, the release of 0.7 (0.8). The slowness is the merger's duration, several dynamical times of the pair. Its speeds are another matter: in FDT canon a gentle merger "does not necessarily imply slow speeds"; it is "gentle because of all the low density omnium in between galaxies"[2] (14 Nov). The sky rehearses the image: S01 states that "when two galaxies merge, and the sky is full of mergers, no two stars collide", a galaxy being "almost entirely room"[3] (SC-032, L348–L349), and places the hot margins in the domain merger, "Only here and there, where flows met head-on" (SC-033, L351–L352). By core 0.8, the kinematics of a merger of universal domains are the same as those of galactic mergers, but on grander scales[2] (SQ-21, L11020). I-1 gives an exact pair calculation at layer L1. For equal spherical supports let $U(d)$ be their potential, with a convergent force integral at infinity:

$$\begin{aligned} U(d) &= -\int_d^\infty F_{\max} \frac{R_s^2}{s^2}\, ds = -\frac{G\mathcal{M}^2}{d}, \\ \frac{-U(2R_b)}{\mathcal{M}c^2} &= \frac{\alpha_{\text{ext}}(R_b)}{4}, \qquad \frac{-U(2R_b)}{2\mathcal{M}c^2} = \frac{\alpha_{\text{ext}}(R_b)}{8}. \end{aligned} \tag{14}$$

The galaxy benchmark $10^{12} M_\odot$ at 100 kpc (U-07) gives $\alpha_{\text{ext}}(R_b) = 9.6 \times 10^{-7}$ and work 2.4×10^{-7} of one endowment. A quarter is the saturated-support limit, not a domain result. The appendix fixes the gravitational radius "by the solved effective mass and nothing else" and lists a domain's support radius among "separate data"[6] (L2235; SC-152, L2236–L2237), so no domain support compactness and no domain work fraction follow. At strong field the same stress tensor and data return GR's curvature, not a universal coordinate-independent two-body force (I-3, I-4).

The same pair algebra gives the closing speed, $\mathfrak{v}$. Two supports falling from rest far away exchange the work of Eq. (5)'s inverse square, $G\mathcal{M}_1\mathcal{M}_2/d$, for the kinetic energy of their reduced mass $\mathcal{M}_1\mathcal{M}_2/(\mathcal{M}_1 + \mathcal{M}_2)$ at layer L2:

$$\frac{\mathfrak{v}^2}{c^2} = \frac{R_{s,1} + R_{s,2}}{d}, \qquad \frac{\mathfrak{v}}{c} = \sqrt{\alpha_{\text{ext}}(R_b)} \quad \text{for equal supports at contact, } d = 2R_b. \tag{15}$$

The galaxy benchmark (U-07) closes at $9.8 \times 10^{-4} c$, 293 km s^{-1}. Compactness sets the speed and dilution the gentleness. The benchmark's configuration mean density, 1.6×10^{-23} kg m^{-3}, is 6.0×10^3 times the fitted mean matter density (U-04), so supports of that kind holding all the matter fill 1.7×10^{-4} of the volume: what meets in a merger is, by volume, the low-density omnium between them. The cluster 1E 0657−56 is the measured instance. A subcluster has crossed a main

cluster; the subcluster's gas carries a front at Mach number 3.0 ± 0.4, 4.7×10^3 km s^{-1}, and that gas lags the subcluster's galaxies, where the lensing weight lies[57, 56] (U-56). No domain support radius is supplied, so no domain closing speed follows.

FDT canon states[2]: "Spacetime is conserved: the chain equates matter, energy and spacetime. A universal domain's volume changes only by a merger with another domain" (L48–49); and "Everything is inherited; stars are seeded by planets; almost everything survives a merger, which brings in raw material that refreshes existing galaxies" (L55–56). What a merger conserves beyond these statements is excluded from this calculation (O-15). The core names galaxies, compact objects, stars and nuclei as inherited dense seeds. S05 re-reads "the proposal that the visible universe is the relaxation region of a merger between two pre-existing universal domains"[7] (SC-235, L3051–L3052); neither their number nor their masses is fixed here. FDT canon names three cases the sky must separate: "the merger of several universal domains; two domains of different sizes; or a merger still in progress"[2] (14 Nov). For two supports of different sizes the bracket of Eq. (6) falls from $4R_{\mathrm{b},1}R_{\mathrm{b},2}/(R_{\mathrm{b},1}+R_{\mathrm{b},2})^2$ at contact to zero when the smaller lies inside the larger, where for equal supports it is one throughout: an unequal pair's attraction varies through the overlap, and the cluster above is such a pair. The axes of the sky and its mottling are read against the three cases below.

The canon also states[2]: "Compressing a sphere of spacetime into a galaxy took an unimaginable time, and decompressing it takes as long; no time can be worked out for either" (SQ-10, L54–L55). At a hole's fold the decompression is instant (Sec. 6.1): each parcel that reaches a fold decompresses at once, while a galaxy as a whole decompresses over as long as its compression took, its matter reaching the folds and unwinding gradually. S01 states that "The thirteen-odd billion years the standard chronology counts belong, on this reading, to the confluence"[3] (L368–L369); that age is the standard chronology's, not this analysis's date (SC-039, L370). S01 states that "a closed braid gives way only to the violence of a re-braiding, and a gentle interleaving offers none"[3] (SC-051, L407). I-5b supplies the exact-book condition, not that merger conclusion. The pair-work identity checks I-1 at its declared pair domain and the printed precision; a wrong inverse-square reduction there falsifies that construction.

3.3 Expansion as release

S02 attributes most of a proton's weight to its winding[4] (SC-069, L589–L592); I-5 reads that weight as confinement cost. When mass is lost by fission, decay, annihilation, radiation or gravitational-wave emission, stored compression relaxes (0.7); the matter accreting onto a black hole is converted to spacetime and energy and feeds the same release (0.7, 0.8), in the canon's words "converted to spacetime and energy, not falling" into the hole[2] (SQ-13, L9486). The density excess is $\Delta\rho$ above reference density $\bar{\rho}$. Let $\dot{m}$ be mass-loss rate density, $\delta = \Delta\rho/\bar{\rho} \geq 0$ the compression contrast it relaxes, V_Ω the averaging volume, Λ_{eff} the effective term, ρ_{rel} released density and $u_{\mathrm{rel}} = \rho_{\mathrm{rel}}c^2$ its energy density. The core's release law is:

$$\begin{aligned} \frac{d\Lambda_{\mathrm{eff}}}{dt} &= \frac{8\pi G}{c^2}\frac{1}{V_\Omega}\int_\Omega \delta(x)\dot{m}(x)\,dV, \\ \Lambda_{\mathrm{eff}}(t) &= \frac{8\pi G}{c^2}\rho_{\mathrm{rel}}(t) = \frac{8\pi G}{c^4}u_{\mathrm{rel}}(t). \end{aligned} \tag{16}$$

The released potential accumulates; it is not a new energy channel and enters $\mathcal{M}$ once (0.7, I-7). A contrast above one releases more stored potential than the rest energy of the mass lost. No

contrast of an unwinding body or mass-loss function is derived here (O-14). This is the stored PV/c^2 channel, not a second account of the emitted radiation.

With the constant-level Planck fit (U-04), critical density $\rho_{\rm crit} = 3H_0^2/(8\pi G)$ gives today's fitted $\rho_{\rm rel}(0) = 5.8 \times 10^{-27}$ kg m^{-3}. S10b prints the bill as $5.84/2.69 = 2.17$, the released-to-matter density ratio[13] (SC-493, L6336–L6337). S02 states that a straight conversion of everything that gravitates, "all of it let go at the famous exchange rate", "supplies under half of it"[4] (SC-078, L634–L635). S10b's mean nuclear-to-released density ratio is 3.9×10^{43} and a proton's mass corresponds to 0.29 m^3, a cube 0.66 m on a side[13] (SC-498, SC-499, L6353–L6354). These are in-sample inventory ratios, not a conversion law. S02's smooth tide reading[4] (SC-073, SC-074, L613–L616) adds no spatial transport solution. The mass shadow is held compression of the substrate, with no particle content, and gravitates through the total endowment (0.7). Its onset, profile, boundary and response remain outside this calculation (O-14). S03 states the adverse datum: in the published apertures, gas and starlight together are heavier at the plasma than at the galaxies, ruling out any version in which the response simply tracks the compactness or amount of ordinary matter inside the aperture[5] (SC-084, L1053–L1055).

The present loss rate is $\dot m_0$. The state $w(z)$ is pressure over energy density in the bookkeeper fluid. Let $\mathfrak{e} = |1 + w_0|$ be the present departure, and define the look-back history $\mathfrak{h}(z)$ using the containment background of U-41. For a constant contrast over the fitted history, differentiating the accumulated level and using the bookkeeper's continuity equation gives:

$$
\begin{aligned}
1 + w(z) &= -\frac{\delta \dot m(z)}{3H(z)\rho_{\rm rel}(z)}, \\
\mathfrak{h}(z) &= \frac{H_0}{\dot m_0}\int_{t(z)}^{t(0)} \dot m\, dt, \qquad\qquad \frac{\rho_{\rm rel}(z)}{\rho_{\rm rel}(0)} = 1 - 3\mathfrak{e}\mathfrak{h}(z), \\
\frac{1 + w(z)}{1 + w_0} &= \frac{\dot m(z)}{\dot m_0}\frac{H_0}{H(z)}\frac{1}{1 - 3\mathfrak{e}\mathfrak{h}(z)}.
\end{aligned}
\tag{17}
$$

The integral is over look-back time; no standard cosmological age enters it. The rate $\dot m_0 = 2.90 \times 10^{-50}$ kg m^{-3} s^{-1} is S06's luminosity-based estimate[8] (SC-312, L4556–L4557), whose luminosity-density provenance is not specified there; a rate read from light counts only the light, and the rate and contrast of the accreted matter's conversion are O-14's. The estimate gives $1 + w_0 = -7.6 \times 10^{-7}\delta$, so every contrast bound below scales inversely with this estimated rate. The sign is accumulation's sign, not a chart choice.

For the history, $H(z)/H_0 = [0.3153(1+z)^3 + 0.6847]^{1/2}$ (U-04, U-41). Let $\mathfrak{f}(z)$ be the U-05 star-formation fit divided by its present value: $\mathfrak{f}(z) = (1+z)^{2.7}[1 + (1/2.9)^{5.6}]/[1 + ((1+z)/2.9)^{5.6}]$[44]. The fit is assumed over $0 \le z \le 8$ (U-05); its normalisation cancels in this ratio. The canon's fixed-volume reading gives $\dot m(z)/\dot m_0 = \mathfrak{f}(z)$, a per-content loss[2]. Appendix A.8 instead writes loss per proper volume on a responding geometry[6] (SC-138, L2079–L2084): the alternative is $\mathfrak{f}(z)(1+z)^3$. Both identifications of star formation with loss are assumptions. The small-amplitude shape is the first two factors in the last line of Eq. (17); the exact shape retains its final factor.

The effective constant state is defined by matching densities at today and $z = 1$ (U-40); it is $-1 + \ln[1 - 3\mathfrak{e}\mathfrak{h}(1)]/(3\ln 2)$. The lower three-standard-deviation edge of U-12 gives the following estimated bounds. Changing the matching epoch from 0.5 to 2 (U-40) changes them; these are conventions of the in-sample comparison.

quantity	fixed volume	proper volume
amplitude bound at the match	0.028	0.0070
matching-epoch range	0.022–0.038	0.0023–0.018
contrast bound	3.7×10^4	9×10^3
strict positivity amplitude ceiling to $z = 8$	0.090	0.0034
$\mathfrak{h}(8)$	3.7	97
level at $z = 8$ at the matched bound	0.69	-1.0
radiative fraction of matter released since $z = 8$	1.8×10^{-5}	4.8×10^{-4}

The proper-volume bound inferred only from the density match is outside the positive-history range at the far end of the fitted range; positivity supplies the tighter ceiling. The contrast S06 reads back from its constant state is 4.0×10^4[8]; the error propagated here from that state's is 4×10^4, and the value is itself an in-sample fit (SC-311, L4561). At its lower edge, centre and upper edge the fixed-volume levels at $z = 8$ (U-40) are respectively $1, 0.7, 0.3$; the proper-volume levels are $1, -8, -2 \times 10^1$. The central and upper proper-volume histories fail positivity. The conversion channel has its own inventory[20]. The converted mass is the radiated energy over c^2 times the ratio of the unradiated to the radiated share of the arriving matter's rest energy, and its integral over the record is the density the standard account calls accreted black-hole mass, $4.81^{+1.24}_{-0.99} \times 10^5\ M_\odot\,\mathrm{Mpc}^{-3}$ at a radiated share of one tenth and an expansion rate of 70 $\mathrm{km\,s^{-1}\,Mpc^{-1}}$[48]. That is 3.3×10^{-32} kg $\mathrm{m^{-3}}$: 5.6×10^{-6} of today's fitted level and 0.67 of the fixed-volume radiative loss in the table. Both are in-sample inventories; the channel's contrast is O-14's.

z (U-40)	fixed, first order	fixed, exact	proper, first order	proper, exact
0.5	2.2	2.3	7.5	7.7
1	3.2	3.7	26	29
1.5	3.5	4.3	55	78
2	2.9	3.8	78	1.8×10^2

Exact columns use each branch's printed matched bound; the proper-volume entries here stay positive through this table's endpoint. The fixed-volume small-amplitude shape peaks near $z = 1.4$ at 3.5 times today's departure. Different loss histories and contrast functions remain degenerate in the present bill. These histories and bounds treat 0.7's domain average as one level in every region, as the fits do; by core 0.7 the amount increases and decreases differently in different regions[2] (SQ-22, L11023–L11024), so T-1 reads the level region by region, and both arms of the appendix's kill condition, "a push measured constant across the expansion's history, or shrinking"[6] (SC-213, L2980–L2981), read one global level. The sign follows 0.7, read region by region, while the numerical shapes test these named rate and volume premises. S17 gives the regional clause its form[20]: the appendix's projected balance leaves the released level undiluted by expansion, so the regional rule is a statement about the source, the local release less the divergence of a flux of released potential whose total through the domain's boundary vanishes; in a contracting region the web exports more than its bodies release. The flux law enters no number here (O-14).

For the CPL central values (U-13–U-16), the crossing redshift is $z_\times = -(1 + w_0)/(1 + w_0 + w_a)$

and the level there is $(1+z_\times)^{3(1+w_0+w_a)}\exp[-3w_a z_\times/(1+z_\times)]$. The table uses each published pair; absent their covariance, it assigns no crossing error.

DESI DR2 combination	crossing	level/today
microwave (U-13)	0.5	1.4
with Pantheon+ (U-14)	0.4	1.1
with Union3 (U-15)	0.4	1.2
with DESY5 (U-16)	0.4	1.1

The constant-state fit lies within one standard deviation of a constant level, while all four CPL central histories fall toward today after crossing[27]. Their preference depends on the supernova combination; a CPL quadrant alone decides neither reading, and both fits average the sky over expanding and contracting regions, which the regional test below separates.

4 Web, voids and circulation

The merged domain is a resonating Chladni volume; the cosmic web is its nodal structure, with voids as the complementary antinodal regions (0.8). P-2 supplies this language, without an eigenoperator for the web. S07's walls, filaments and clusters name morphology, not a derived sequence of modes[9] (SC-366, L4905–L4907). I-1a's named effective instance is "cosmic sheets and filaments at $\rho/\bar{\rho} \approx 2 \to \alpha_{\text{eff}} = 2/3$". The appendix's control stands beside it: "no odds built from those scalars — a density value, a volume mean, a reference-density ratio — classifies valley against ridge"[6] (SC-155, SC-166, L2273–L2274). Here the effective tag names the quoted core reading only. It constructs no A-3 odds, transfers no density threshold to a star, and supplies no cosmological profile. S17 exhibits one construction that passes the appendix's longitudinal-curvature test and both of its controls[20]: for two identical profiles, twice the flank, the distance from a profile's crest to the shoulder where its second derivative changes sign, divided by the distance from the crest to the midpoint. That ratio of two lengths equals two exactly where the midpoint's longitudinal curvature vanishes; for a two-parameter Fermi profile the shoulder is the half-density radius. The test leaves a one-function family of such odds, the choice of its linear member belongs to FDT canon, and the construction enters no number here (O-2).

FDT canon states: "For every contraction there is an equal expansion, and the two can stand in different regions of the universe: the void dilutes and expands, its boundary densifies and contracts, and cosmic expansion stops at the void boundary. Galaxies move to the attractors on the void boundaries, the web, as sand settles on the nodal lines of a Chladni volume"[2] (SC-002, L50–L52). S08 labels volume conservation and the identification of the core's three-sphere atlas with a physical spatial slice as added premises[10] (SC-421, SC-425, SC-426, SC-422, L5541–L5549; SC-435, SC-436, SC-433, L5573–L5581); for positive transfers content goes from void to web, volume from web to void. These are S08's premises, not consequences of I-7[10]. They do not rank arrangements by energy. A rigid rotation changes positions at unchanged volume and unchanged internal geometry; conserved volume alone determines no flow. S08 labels energetic void dominance, coupled density/ruler/clock changes and merger exclusivity as premises of FDT canon, and the web's persistence until the next merger as a statement of the canon[10]; persistence against intervening nonmerger evolution "remains a requirement on the coupled stress–geometry response and stability law", and merger exclusivity has no derived energy inequalities (L5519; SC-419, L5529–L5532;

SC-440, SC-443, SC-444, L5608–L5618; SC-447, L5656). S08 establishes no observational exclusion of cosmological expansion[10] (L5658–L5659). The canon's statement "The universe is fractal: the central invariant holds at every level" stands with the floor: the repetition is bounded below and not endless (0.3a; SQ-11, L56–L57)[2].

For S07's assumed uniform sphere of radius 220 Mpc, mass 3.5×10^{48} kg and speed 400 km s^{-1}, its kinetic energy over the binding energy of a uniform sphere is $[\mathcal{M}v^2/2]/[3G\mathcal{M}^2/(5 \times 220\ \mathrm{Mpc})] = 0.004$ (SC-398, SC-399, L5311–L5312)[9]. This is an estimated ratio on that sphere, not the measured flow's energy and no budget of a merger. S07's maturity ratio 0.019 uses its assumed clock and crossing convention; it is in-sample and supplies no domain age[9] (L4794).

The published bulk flow is 427 ± 37 km s^{-1} inside $200h_{\mathrm{H}}^{-1}$ Mpc, against the quoted 120 km s^{-1} comparator[31] (U-20); h_{H} is the Hubble number in units of 100 km s^{-1} Mpc^{-1} (U-46). The reported statistic 29.8 with three degrees of freedom has upper-tail probability 1.5×10^{-6}, equivalent to a two-sided Gaussian 4.8 standard deviations (U-20). S07 labels its use of the flow a retrodiction with the sign fixed in advance and the tension a live disagreement, not a settled result[9] (SC-350, L4823; SC-351, L4828). S07 also records that the flow rises with scale, where gravitational instability declines and pure coasting is flat: "Observation matches neither"[9] (SC-352, L4799–L4807). That statistic is not the difference of speeds divided by the speed error. The flow's Galactic longitude and latitude are $(298^\circ \pm 5^\circ, -7^\circ \pm 4^\circ)$ (U-20). The apparent expansion anisotropy is about 9% toward $(280^\circ \pm 35^\circ, -15^\circ \pm 20^\circ)$[32] (U-21); by core 0.7 the Hubble number differs from region to region[2] (SQ-23, L11025), and no regional value is derived here (O-14). Their central separation is 19°; the quoted directional errors of both preclude a precise alignment significance. S07 states that these directions "must agree" on its merger reading[9] (SC-357, SC-358, SC-359, SC-360, SC-361, L4830–L4838), not a requirement of the core.

S01 says "Not a push. A vacated room, whose occupants are still leaving"[3] (L383–L384); the velocity reconstruction[43] does not by itself fix that reading. The microwave power asymmetry, $0.070^{+0.032}_{-0.015}$ over multipoles 2–64, points toward $(221^\circ, -22^\circ)$ with a 31° directional uncertainty[24] (U-22). Its central separations from the flow and expansion directions are 75° and 56°, respectively; the first carries the quoted 31° uncertainty (U-22) and the flow's directional errors (U-20), and the second carries the same 31° and the expansion-direction errors. No common axis is inferred.

The one-field JADES count is 158 clockwise and 105 counterclockwise among 263 classified galaxies[33] (U-23), a clockwise fraction 60.1%. Under independent fair labels its one-sided binomial tail is 6.5×10^{-4}. A field 36° from the southern Galactic pole (U-23) measures no full-sky dipole; a brightness selection tied to our motion remains a competing reading. S01 states that "The counts are contested — different teams, different methods"[3] (SC-041, SC-042, L378–L379). T-5 supplies the separate sky test.

A merger of two has a plane. S17 reads a domain merger as one solution whose circulation is the pair's angular momentum[20], and in FDT canon "our visible universe must be rotating"[2] (14 Nov). With the parents' own spins along the orbit's normal, such a pair is mirror-symmetric about its orbital plane. Seen from near that plane, every polar axis of the configuration — a flow, an axis of faster expansion, a one-sided power — lies in it, and every axial quantity, a handedness among them, lies along its normal, the axis of the circulation. The three cases separate by this symmetry. Two parents give coplanar polar axes and one axial normal; several parents, or parental spins off that normal, give no common plane; a merger in progress carries flows that rise with scale and a one-sided power, where a finished one is steady.

The three published polar axes fit one great circle. Its pole is $(227.4^\circ, +67.6^\circ)$, with antipode

(47.4°, −67.6°), and the flow, expansion and asymmetry axes lie 0.8°, 0.9° and 0.3° from the circle. Planck orients a multipole by the normal to the plane that holds most of its power[54]. After the kinematic-quadrupole correction the quadrupole's axis lies 2.0°, 0.8° and 2.2° from that pole in the three maps, against 9.6°, 7.9° and 10.5° before it, and the octopole's lies 5.7°, 7.8° and 6.7° away (U-54). The sky's two largest patterns lie in the plane of the three polar axes, and their axis is its normal. S07 records that the flow rises with scale[9] (SC-352, L4799–L4807), and the power asymmetry is one-sided: read by the symmetry, the configuration is two parents, rotating, their merger in progress. This reading is in-sample, and the published directional errors set its precision. Drawing the asymmetry axis within its 31°, taken as a 68 percent radius, the expansion axis within its 35° and 20° and the flow within its 5° and 4° places the pole within 23° of its central value at 68 percent and within 41° at 95 percent, in a simulation with 2000000 draws and seed 20261114 (U-57). A random axis lies within 23° of a given one with probability $1-\cos 23^\circ = 0.08$; an axis 19° from the flow lies within 1.6° of the flow–asymmetry circle with probability 0.05. Our own motion against the chorus, the dipole of U-53, is one observer's velocity, not an axis of the configuration; it points 27° from the pole. The standard account sets the same low-multipole planes against the ecliptic, to which they stand nearly perpendicular[58]. That reading fixes nothing about the flow, the expansion axis or a handedness. The amplitude of the one-sidedness, which carries the parents' size ratio, is not derived here (O-15).

The rotation has a published bound. A homogeneous rotating space is held by Planck's template fit to a vorticity below 7.6×10^{-10} of the expansion rate at 95 percent confidence[55] (U-55); by I-3 that is the curvature of that stress tensor and data. A domain is a bounded configuration, densest at its skin (0.6), and inside a rotating skin the compass of inertia turns with it: by the fraction $4G\mathcal{M}/(3c^2R_b) = \frac{2}{3}\alpha_{\rm ext}(R_b)$ of the skin's rate at leading order[59], and wholly as the skin nears its gravitational radius[60]. This is the frame drag of 0.1c, and the bound reads the undragged remainder. No domain support compactness is supplied, so no remainder is printed.

5 The microwave chorus

The cosmic microwave background is the cosmological reading of the substrate's cumulative standing-wave state (0.8). I-2 supplies one carrier and I-4 its phase, not a second photon medium. S01 sums "the density waves of every domain the omnium holds and has ever held"[3] (SC-053, L426); S06 calls the background "the interference pattern of every density wave the domain has carried, past and present"[8] (SQ-12, L4044–L4045). Neither construction supplies what S01 says the mottling needs, "the room's boundaries, its inherited phases and the route to the telescope"[3] (L446–L447); the derivation that must return the measured anisotropies is O-15's. The bench-fluctuation identification belongs to those sources, not to I-4[3, 8] (L429–L431; SC-240, L4046–L4048).

The appendix states that the one carrier's equilibrium radiation has the Planck form when its radiative modes have "bosonic occupation, two transverse states, linear local dispersion and a number-changing equilibration that removes any chemical potential"[6] (SC-218, SC-216, L2992–L2994); these are the four named premises. Let ω be angular frequency, T temperature, k_B Boltzmann's constant and $\mathcal{E}_\omega$ the energy per volume per angular-frequency interval. The occupation is $\bar{\mathcal{N}}_\omega$ and integrated radiation energy density $u_{\rm rad}$. On those premises:

$$\bar{\mathcal{N}}_\omega = \frac{1}{\exp(\hbar\omega/k_BT)-1}, \qquad \mathcal{E}_\omega = \frac{\hbar\omega^3}{\pi^2c^3}\bar{\mathcal{N}}_\omega, \qquad u_{\rm rad} = \int_0^\infty \mathcal{E}_\omega\, d\omega = \frac{\pi^2k_B^4}{15\hbar^3c^3}T^4. \tag{18}$$

The exponent is dimensionless and the integrated result is energy per volume. The published value $T = 2.72548 \pm 0.00057$ K[21] (U-08) is inserted, not obtained from the floor. S06's spectral fit is in-sample; its coefficient equality evaluated to 1.9×10^{-9} is numerical identity accuracy, not an independent test[8] (L4231; SC-552, L4223). The bound on chemical-potential distortion is 9×10^{-5} and on Compton distortion 1.5×10^{-5}, both at 95% confidence[22] (U-09). With the latter assigned wholly to blackbody mixing, the small-spread relation $y = \mathrm{Var}(T)/(2\langle T\rangle^2)$ allows an rms fractional spread 0.55%, after removal of the dipole. Other contributions only tighten that allocation.

S06's nodal lock sets the velocity to zero at one common time, then lets the density and velocity run a quarter period apart[8] (SC-282, L4401–L4411). P-2 anchors the standing-wave vocabulary; it supplies neither this synchronisation nor its transfer equations. S06 reports a zero-lag correlation -0.463 and maximum $+0.774$ at lag 161, beside half an acoustic period 150.5[8] (SC-285, SC-286, L4427–L4429). These are reconstructed comparisons on the same spectra, not prospective predictions. Its anisotropy fit with one amplitude and its acoustic-angle agreement reuse the containment inputs[8] (SC-295, SC-293, SC-296, SQ-08, SC-297, SC-294, L4476–L4483; SC-301, SC-302, SC-303, SC-298, L4502–L4509). In the unchanged-field-equation route, the same stress tensor, data and gauge give the same curvature and the published acoustic angle (U-10); an independently solved chorus that returns those anisotropies is O-15's derivation, which enters no number here.

The scalar tilt is $\mathfrak{n}_\mathrm{s}$. S06's count $N(k)$ is defined by the logarithm of wavelength over the floor, not by a derived finite hierarchy[8] (L4454–L4457). With pivot $k_* = 0.05$ Mpc^{-1} (U-39), its count and proposed tilt law read

$$N(k) = \ln\!\left(\frac{2\pi/k}{2\ell_P}\right), \qquad N(k_*) = 136.0, \qquad \frac{d\mathfrak{n}_\mathrm{s}}{d\ln k} = \frac{\mathfrak{n}_\mathrm{s} - 1}{N(k)}. \tag{19}$$

The count and inverse-count law are S06's premises[8] (SC-281, L4373–L4374; SC-288, SC-290, SC-291, L4459–L4462). The floor licenses a lower bound alone. S06's fitted tilt coefficient is in-sample, and S06 writes no closed form for it[8] (L4636). Inserting the distinct published tilt $\mathfrak{n}_\mathrm{s} = 0.9743 \pm 0.0034$[25] (U-11) yields a running -1.9×10^{-4}; the published running is 0.0062 ± 0.0052[26]. The running therefore discriminates nothing at that precision.

The appendix calls the count ratio η "a census of two inventories, closed patterns against standing quanta"[6] (SC-193, L2743–L2744); S06 calls it a deposit ledger of unwinding[8] (SC-277, L4309–L4310). S06's 1.0372 MeV inventory divided by its uranium leg 1.2202 MeV gives 0.8500, while its thorium leg 1.1753 MeV gives 0.8825[8] (SC-271, SQ-05, SC-272, SC-269, SC-270, L4293–L4299). These are in-sample inventory ratios, not a decay kernel, retention calculation or yield. S06 states that the apportionment between the carrier grade and the decompression, Λ_eff, is set by the release function of 0.7[8] (SC-274, SC-273, SC-275, L4302–L4304), which is O-14's. The ratios do not determine the helium, deuterium and lithium abundances in the record. The numerical resemblance cannot close O-7 or O-12.

A merger supplies what S01 says the mottling needs. The parents' supports and the surface where they meet are the room's boundaries, each parent's standing-wave state its inherited phases, and the merged density field the route to the telescope. The merger is also a drive, and with it a start for S06's lock; the transfer from that drive to the sky is not written here (O-15). FDT canon adds the gas: gas from the parent domains "would interact, like wakes from a boat, creating differences in temperature"[2] (14 Nov). Two facts of the record fix how a wake reaches the sky.

The first is the channel. Hot gas marks the chorus by Compton scattering, which moves strokes in frequency at fixed number and leaves no Planck form; its measure is the Compton distortion,

below 1.5×10^{-5} over the sky (U-09), and a state predicting a non-blackbody sky is falsified on arrival (O-15). The gas's heat is the channel of the hot margins. The mottling runs through the clock factor and through motion. The occupation of Eq. (18) depends on ω and T through their ratio alone, so a common rescaling of clocks and rulers (0.1c) carries a Planck form to a Planck form at the rescaled temperature, and a Doppler shift does the same. For a medium of perfect form at zero net count the temperature is the clock factor of its flow (0.1c): a density wave in the chorus writes temperature differences that are blackbody by construction. Between two directions the fractional difference is the difference of $\ln \mathfrak{m}$ between the patches read plus the difference of their line-of-sight speeds over c, a comparison between neighbours (I-3a).

The second is the size. The published rms anisotropy at 10° smoothing is 30 ± 5 μK[52] (U-52), 1.1×10^{-5} of the monopole. At Mach number 3 the jump conditions of a gas of adiabatic index 5/3 multiply its temperature by $(5 \cdot 3^2 - 1)(3^2 + 3)/(16 \cdot 3^2) = 3.67$. A front stands five orders of magnitude above the mottling; fronts are S01's hot margins, met "Only here and there"[3] (SC-033, L351–L352). The mottling is a wake's linear regime. Let c_{w} be a medium's wave speed and $\mathfrak{u}$ the fluid speed of a plane wave in it. For pressure a third of an energy density that goes as T^4, as in Eq. (18),

$$c_{\mathrm{w}} = \frac{c}{\sqrt{3}}, \qquad \frac{\Delta T}{T} = \frac{\mathfrak{u}}{3c_{\mathrm{w}}}, \qquad \mathfrak{u} = \sqrt{3}\, c\, \frac{\Delta T}{T} = 5.7 \text{ km s}^{-1} \text{ at } 1.1 \times 10^{-5}. \tag{20}$$

A front forms only where a mover outruns the medium's waves; the sine of its half-angle is the wave speed over the mover's speed. The cluster's gas meets that condition at Mach number 3.0 (U-56). Against $c/\sqrt{3}$ no closing speed below $0.58c$ meets it, so the chorus carries no front and its share of a merger is the linear pattern. The fluid speed and the $0.58c$ stand on the perfect-form premise for the chorus; matter moving with it lowers c_{w}, and the wave speed that sets the measured comb is not derived here (O-15).

The record bounds the three cases. One acoustic angle, $100\Theta_* = 1.04109 \pm 0.00030$ (U-10), fits the whole sky. On that fit several parents share one ruler, or one parent fills the shell that is read. A drive that began at different times across that shell gives the comb a dependence on direction; the single number carries none, and no directional limit is quoted here. The single merger's geometry belongs to the largest angles, where the power asymmetry is quoted over multipoles 2–64 (U-22) and the axes of the previous section lie. At smaller angles the chorus sums "the density waves of every domain the omnium holds and has ever held"[3] (SC-053, L426), and a sum of many independent wakes tends to a Gaussian field. An acoustic length is a wave speed times an elapsed time, so the comb dates the drive once its wave speed is derived: the date of the confluence, S01's own debt (SC-039, L370), as one integral.

6 Inherited stars and holes

I-1a says "stars are fission reactors, and cosmic H/He is terminal exhaust". Beside it FDT canon states "Stars are powered by fission; hydrogen and helium are the final byproducts of the cascade"[2] (SQ-01, L58). The canon adds that "it is naive to assume that there is no fusion of lighter elements on a fission reaction", that the universe "solves an optimisation problem at every step", and that "there is no neutrino anomaly unexplained by fdt"[2] (SQ-16, SQ-17, L9491–L9492): as in the atom, whose "n-strand patterns reconfigure globally (many to many settlement) to keep the atom stable", in fission "the optimal solution sometimes calls for the fusion of lighter elements", and

"the universe's response is always many to many, never pairwise, as consensus physics requires" (SQ-18, SQ-19, SQ-20, L9495–L9497). Read with 0.1a and I-5b, the fission reaction and the fusion of its lighter elements, where the optimal solution calls for it, are one system-wide, many-to-many settlement solved at every step, and that fusion is no fusion-driven build-up of the elements (I-1a). The neutral-current record stands beside all three: SNO's flux is $5.25 \pm 0.16\,^{+0.11}_{-0.13} \times 10^6$ cm^{-2} s^{-1}, reported as the total found "where the fusion model had put it"[6] (SC-107, L1397–L1398; SC-179, L2300); by I-1a it is data and no neutrino anomaly unexplained by FDT, and its computation on FDT's terms is O-7's. The appendix's ordinary-reactor comparison also bounds its luminosity fraction below 1.58×10^{-3} at 90 percent confidence[6] (SC-176, SC-169, L2294–L2295), on its stated fission energy, antineutrino yield, energy window and survival-probability assumptions. It tests a spectrum of "independent actinide fissions", a branch the appendix excludes, not the direction, whose mechanism "is a whole-configuration transaction with transport, recombination and escape between the event and the detector, and reactor inputs do not transfer to it"[6] (SC-173, L2291; SC-169, SC-177, SC-170, L2295–L2297): the system-wide settlement of 0.1a, never independent pairwise events; replacing that spectrum requires the missing kernel and rates, not removal of the observation.

S16, the derivation note[19], writes the Sun's photon luminosity as one account, "with every contribution counted once" (SC-553, L9602–L9609; L9611–L9613): the net heat of the network's fission and fusion parts, escaping neutrino energy already removed, which "partition one complete network", plus any separately accounted supply, less the rate of change of stored energy and any non-photonic outward power not already removed. In S16, assigning the complete cascade heat to fission and adding its "internal fusion heat a second time" violates that account (SC-554, L9619–L9620), and a proposed release from stored compression "enters through its own finite energy account once, not through a second nuclear yield"[19] (SC-555, L9622–L9623), as a released stored potential enters $\mathcal{M}$ once in the core (0.7, I-7). In S16's stationary two-component illustration, with the fission heat fraction of the photon luminosity written f_{fis}, its all-flavour fusion-neutrino flux at one astronomical unit, with unit escape and active-flavour retention, is $6.51 \times 10^{10}(1 - f_{\mathrm{fis}})$ cm^{-2} s^{-1} on its illustrative heat of 26.1 MeV per completed cycle (NG-20, L9615–L9617; L9636–L9639; SC-556, L9652–L9658), a count S16 calls "the measured-network input to the luminosity constraint, not a reaction kernel derived from the proposed fission cascade" (SC-557, L9633–L9634), and S16 states that SNO's quoted ^{8}B normalization "is a different, energy-selected observable"[19] (SC-558, L9659–L9660). Calibrated to a fixed-response neutral-current normalization equal to SNO's central value, the ^{8}B branch per completed cycle that this normalization requires in S16's algebra, b_{B}, is $(1.61 \pm 0.06) \times 10^{-4}$ at $f_{\mathrm{fis}} = 0$ with no other component and rises as $1/(1 - f_{\mathrm{fis}})$ with the fission share, on the same heat (NG-21, L9730–L9731; L9738–L9739; SC-559, L9745–L9755), and S16 calls its family "reconstructions calibrated to one normalization, not independent predictions or simultaneous fits to SNO"[19] (SC-560, L9772–L9773). On the appendix's inputs S16 returns the appendix's ordinary-reactor bound, $f_{\mathrm{fis}} < 1.58 \times 10^{-3}$, its precision and confidence "conditional on the fixed heat, yield, spectrum and propagation assumptions"[19] (L9787–L9790; SC-561, L9801–L9805), and the note adds that fusion and inherited neutrinos "add nonnegative detector rates" and cannot cancel the antineutrino excess of a high-fission ordinary actinide reactor (SC-562, L9806–L9808). S17 adds a bound free of those premises[20]: the measured fluxes of the proton–proton chain give the fusion part's power as 1.011 of the photon output, with quoted errors 0.09 and 0.11[51], so in S16's stationary account $f_{\mathrm{fis}} < 0.17$ at 95 per cent confidence for any heat source without that chain's neutrinos. By I-1a it is data: there the fusion that the settlement calls for carries at least 0.83

of the photon luminosity. S16's extension "carries neutrinos through domain mergers as additional initial and boundary data"[19] (SC-563, L9595–L9596), its own premise beside I-1a's fusion within fission; in its merger count weak interaction alone "fixes neither a density enhancement nor the surviving MeV tail" (SC-564, L9856–L9857); for stable sources with fixed or corrected flavour transfer and detector response its count rates separate solar counts, which follow the inverse square of the Sun's distance, from a stationary isotropic inherited contribution, which is constant (SC-565, L9863–L9866), and no general confidence limit on that contribution follows without S16's response calculation and refit (SC-566, L9874–L9875).

The core orders a closed configuration's density from its dilute centre toward its densest skin (0.6). S12 and S13 instead describe heavy-element sorting toward stellar centres[15, 16] (SC-526, L7453–L7457; SC-545, L8864); those descriptions do not derive the core's profile or a new composition profile. S13's abundance comparison is in-sample[16] (SC-541, SC-542, SC-543, SC-544, L8634–L8638); S12's and S14's ignition thresholds[15, 17] are source proposals, not the overlap instance of I-1a (SC-531, L7501; SC-550, L9083). S11's uphill reading of fusion[14] (SC-516, SC-514, L6543–L6545), with its own concession that moving hydrogen and helium back toward Fe-56 "is energetically paid for" (L6550–L6551; SC-515, L6552), does not supply nuclear reaction rates. S14 proposes that "pre-existing planets serve as nucleation sites for rapid star formation during both galactic mergers and universal domain mergers", where planets "encountering disturbed gas and dust clouds would rapidly accrete material"[17] (SC-549, L9008–L9013), and S15 states that during the merger "existing planets would" be disrupted from stable orbits, encounter dense gas and dust clouds and "Rapidly accrete material and ignite as new stars"[18] (SC-551, L9307–L9310); those modals remain proposals. By core 0.8, in the canon's words, matter accreting onto a black hole is "converted to spacetime and energy, not falling into the black hole", "the black hole is not losing mass", and holes "only grow through mergers"[2] (SQ-13, SQ-14, L9486–L9487); the appendix's claim that a hole "does not gain mass by swallowing" (SC-184, L2595) carries its test, "sustained mass increase tracked with accretion would refute it"[6] (L2597). Read with 0.7 and 0.8, the conversion is a release: the accreted matter's omnium passes from the matter phase to the spacetime phase, and by 0.8 the hole's own endowment changes only through mergers. The record's equality stands beside 0.8: the mass density of the holes found in galaxies today, about $4 \times 10^5\ M_\odot\,\mathrm{Mpc}^{-3}$ within a factor 1.5[49], equals the converted density above at a radiated share near one tenth[50]. The standard account reads that equality as growth by accretion. In FDT it measures the matter converted at the holes, about one endowment for each over the record, and the appendix's test applies to each hole singly. The canon adds that "black holes have quantum masses"[2] (SQ-15, L9488): the universe is quantum, so black holes have quantum masses (0.8), while a hole's exterior reading α_{ext} keeps its open interval. No mechanism, mass formula, address or ladder is written, and the spectrum of black-hole masses is O-15's. One closed mode carries less than π Planck masses, 6.8×10^{-8} kg, since its period T_q is no shorter than $t_{\min}$, so a hole's mass is not one eigenvalue of Eq. (8)[20]. By 0.8 the masses are the closure of the inherited seeds' masses under mergers, in each of which the child's fold area is at least the sum of the parents'[47]; summed over a domain's holes, that area in floor units is a record no allowed settlement lowers[20].

6.1 Jets and bubbles

FDT canon reads black-hole jets and the Fermi bubbles as evidence of the conversion[2] (12 Nov): matter that reaches a hole's fold, where the standard account places the event horizon, is converted

there to spacetime and energy (0.7, 0.8). The record joins the jet to the hole: images of M87 at 3.5 mm show a ring-like structure $8.4^{+0.5}_{-1.1}$ Schwarzschild radii in diameter, and the edge-brightened jet joins the accretion flow of the black hole[61] (U-48). Across 217 blazars the jet's radiated power tracks the disk luminosity and the jet power exceeds it; with the accretion rate $\dot{M}$ inferred at an efficiency of 0.3, the fitted jet power lies above $\dot{M}c^2$, the rest energy the accreting matter brings per unit time[62] (U-49). The standard account supplies the excess from the hole's rotation, tapped by a magnetic field threading the horizon[63, 62]. In FDT the hole loses no mass (0.8), and a magnetic field is a helical density gradient of the omnium, no entity of its own (P-5); a contrast above one releases more stored potential than the rest energy of the matter converted (0.7, Eq. (16)), so a jet above $\dot{M}c^2$ draws on no store of the hole's, and the contrast at the fold enters no number here (O-14).

FDT canon places the power in the timescales[2] (12 Nov): the universe took an unimaginable time to compress spacetime into matter, and the matter is decompressed in an instant. Each parcel that reaches a fold decompresses at once, no instant being shorter than the floor's $t_{\min}$ (0.1a), while a galaxy as a whole decompresses over as long as its compression took, its matter reaching the folds and unwinding gradually. The power is the stored work let go over that instant, counted once in $\mathcal{M}$ (I-7).

FDT canon gives the decompression its rule[2] (12 Nov): when matter converts to spacetime, spacetime decompresses following a $(2^n)R$ rule, the inverse square law in reverse. On A-1's exterior branch the radii

$$r_n = 2^n R_s, \qquad \alpha_{\text{ext}}(r_n) = 2^{-n} \quad (n \geq 1), \qquad \frac{G\mathcal{M}/r_{n+1}^2}{G\mathcal{M}/r_n^2} = \frac{1}{4} \tag{21}$$

run from the fold, where $\alpha_{\text{ext}} \to 1^-$ (I-6), through the seam at $n = 1$, where the matter phase passes into the spacetime phase (0.3a), and on into the spacetime phase: each doubling of radius halves α_{ext} and quarters a slow pattern's pull (0.1c), the inverse square law read outward from the fold. For a rotating hole the fold sits at the horizon's areal radius $R_H \leq R_s$ and the band outside it is read through O-5; the jet's launch and collimation enter no number here (O-5, O-14).

FDT canon reads the Fermi bubbles as evidence of the same conversion[2] (12 Nov). Two gamma-ray lobes extend to 55° above and below the Galactic centre, about 40° wide, with a hard spectrum, sharp edges and no significant variation of the spectrum across them[64, 65]; their luminosity between 100 MeV and 500 GeV is $4.4^{+2.4}_{-0.9} \times 10^{37}$ erg s^{-1}[65] (U-50). X-ray bubbles extend about 14 kpc above and below the centre, with sharp boundaries and an estimated energy near 10^{56} erg[66] (U-51), the rest energy of about $56\,M_\odot$ at that value. The standard account forms both in an episode of energy injection at the Galactic centre, past accretion onto the central black hole or a nuclear starburst within the last 10 Myr[64, 66]. Read with 0.7 and 0.8, the lobes, symmetric about the hole at the centre and perpendicular to the disc, are the spacetime and energy released at that hole's fold; the hole gained no mass from the matter it converted, and the epoch and share of the release enter no number here (O-14).

7 Translations at fixed evidence

record language	FDT reading	extent of the map
mass and lensing	total $\mathcal{M}$, including the mass shadow	A-1 after the field solution; no fitted compactification
optical distance and redshift	cone fields and bookkeeper comparison	I-3 containment; the cone's response tensor from 0.1c and 0.1d[20]
quantum state and spectrum	closed braid, phase and confinement cost	A-4 token only; no collapse or mass spectrum derived
web modes and microwave sky	standing-wave structure	A-5 regimes only; no rank or spacing from the floor

8 Prospective predictions

T-1. The released level rises where the region expands. DC-1 discriminates SA-112: a fitted equation-of-state family measures neither an independently free level in every epoch nor its difference between regions. The additional source is 0.7's released potential, whose effective term "grows with cumulative unwinding and conversion rather than standing as a constant" (0.7); by 0.7 its amount increases and decreases differently in different regions, an expansion here requiring a contraction elsewhere[2] (SQ-22, L11023–L11024), and with decompression "away from regions of mass loss" (0.7) and expansion as decompression (0.8) the level rises where a region expands and falls where it contracts. Define $\mathfrak{d}_i^{\mathrm{void}}$ and $\mathfrak{d}_i^{\mathrm{web}}$ as later-minus-earlier level in bin i, divided by today's level, in void-dominated and web-dominated volumes classified from the galaxy density field before the reconstruction, with $\mathfrak{N}_{\mathrm{bin}}$ bins and covariance C of their difference. DESI distances and Rubin and Roman supernovae in each class, anchored by the microwave distance priors, reconstruct both over $0 < z < 2.5$ (U-34), free in each bin and without imposing a CPL crossing, with each class's matter contrast, from the density field and lensing, held in its containment background (I-3). FDT gives $\mathfrak{d}_i^{\mathrm{void}} - \mathfrak{d}_i^{\mathrm{web}} \geq 0$ for either named release-volume premise, since in FDT canon the void dilutes and expands and its boundary, the web, densifies and contracts[2] (SC-002, L50–L52); the comparator, one constant level in every region, gives zero. Correlated calibration, distance-prior, classification and reconstruction errors enter C, not independent bin errors invented afterwards; holding each class's matter in its background keeps the faster expansion of an underdense volume at one level out of the difference.

Let $\mathfrak{q}$ be the lower-tail family threshold and Φ the standard normal cumulative distribution. Simulations of one constant level in every region, with the covariance of the difference, set the probability of a minimum below $-\mathfrak{q}$ to 0.00135 (U-34, U-45). For independent bins (U-34, U-45),

$$\mathfrak{q} = \Phi^{-1}\Big((1-0.00135)^{1/\mathfrak{N}_{\mathrm{bin}}}\Big), \qquad \begin{array}{c|ccc} \mathfrak{N}_{\mathrm{bin}} & 4 & 6 & 8 \\ \mathfrak{q} & 3.40 & 3.51 & 3.58 \end{array}. \tag{22}$$

A minimum standardised difference below $-\mathfrak{q}$ ends the FDT sign. A generalised-least-squares fit of the release shape to the difference ends the uniform comparator above three standard deviations for one selected volume premise, or 3.2 for each when both are fitted (U-34); otherwise neither ends. A

null bounds the regional amplitude, the web's present state minus the void's, under each premise, and a finite null excludes only its stated amplitude. Both arms of the appendix's kill condition, "a push measured constant across the expansion's history, or shrinking"[6] (SC-213, L2980–L2981), read one global level: a sky-averaged level that stands constant or falls mixes both classes in the proportions its tracers sample and does not end the FDT sign. At the declared design point, a regional amplitude of 0.020 with standard error 0.004 in fixed volume, or 0.0020 with error 0.0004 in proper volume (U-44), both positive histories give standardised amplitude 5 against threshold 3.2 (U-34). Setting the release input to one constant level in every region gives zero. The amplitude test rests on declared inputs: one release shape serves both classes, its single channel is the released level's regional difference, and each class's matter stays at its measured contrast on the fitted flat matter-plus-constant-level background (U-04, U-41); the regional law of release is O-14's.

T-2. The accumulated spectrum has zero chemical potential. DC-2 discriminates SA-096. The constitutive input is 0.8's cumulative standing-wave state, where the comparator has a dissipation history with a first moment; S06's field sits at its maximum-entropy fixed point because "The domain has no origin and no first moment"[8] (SC-261, SQ-02, SC-264, L4250–L4252). Resting on S06's entropy maximisation with no constraint on stroke count (L4193–L4194) and on its uncomputed residual lying below the test's reach (L4253–L4254), the 0.8 accumulated state has chemical-potential distortion $\varpi = 0$[8] (L4257). This tests number-changing equilibration together with the unbounded accumulation; it leaves the other three Planck-form premises untouched. The dissipation comparator is $1.57^{+0.11}_{-0.13} \times 10^{-8}$[41] (U-30), or $(2.3 \pm 0.14) \times 10^{-8}$ in the white paper's convention[42] (U-31), kept distinct.

Let s_ϖ denote instrument standard error and s_{cmp} the lower comparator error. A result $\widehat{\varpi} > 3s_\varpi$ ends the stated FDT value; a result below the comparator minus $3\sqrt{s_\varpi^2 + s_{\mathrm{cmp}}^2}$ ends that comparator; otherwise neither (U-33). Under Gaussian errors each rule has one-sided size 0.00135. Super-PIXIE's eight-year error is 7.7×10^{-9} (U-32); the white paper's 5×10^{-9} is the sensitivity it assumes in one forecast, never its goal. At zero distortion, the lower-comparator rejection probabilities are respectively 0.2 and 0.5, and reach 0.9 at error 3.5×10^{-9} (U-33). The test point is five times Super-PIXIE's sensitivity (U-33): error 1.54×10^{-9}, combined threshold 6.0×10^{-9}, and either truth decided with probability above 0.99. This is the configuration with which, the white paper states, a Voyage 2050 mission could target a measurement of the distortion to ten percent or better[42]. Removing the accumulated-state input replaces zero by the lower dissipation value. This single-channel test shares Compton distortion with the comparator; foreground and calibration errors enter s_ϖ.

T-3. Re-stacked gas regains lensing weight. DC-3 discriminates SA-047. The additional source is the mass shadow of 0.7, resting on S03's overlap reading[5] (SC-087, L1039), carrying its adverse aperture datum above (SC-084, L1053–L1055). S03 states that the overlap reading "removes a simple falsifier, so it incurs a stricter obligation": "A complete account must supply a rule that fixes overlap from an arrangement, freeze it before applying it to this cluster, evolve the measured matter through the collision, and predict the lensing map"[5] (SC-088, L1058–L1061). S03 adds the case of "three meeting at once: a shared patch has its own geometry, and the rule must keep those patches, count each part of the source once, and return the same bending whether the cluster is described whole or resolved into its stars and gas"[5] (L1063–L1064), the overlap complex

of O-5. Define $\mathfrak{w}_j$ as lensing mass over gas mass at the gas peak in the same aperture, $\mathfrak{t}_j$ as time since pericentre, and $\mathfrak{k}$ as their Kendall rank correlation across $\mathfrak{N}_{\text{pair}}$ dissociated pairs observed before their first apocentre. S03 says the weight "must come back to it" as gas "settles back down and re-stacks", and "the separation should shrink the longer ago the collision was"[5] (SC-091, SC-092, L1072–L1074). Reading this as a rising aperture ratio is this manuscript's operational premise: $\mathfrak{k} > 0$. A falling ratio before apocentre, $\mathfrak{k} < 0$, is this manuscript's comparator premise for collisionless halos leading stripped gas. A ratio that falls and then rises inside the sample lies outside both premises (U-35).

With independent pairs, continuous ranks and no ties (U-35), the null standard error $s_{\mathfrak{k}}$ and the positive decision edge are

$$s_{\mathfrak{k}} = \sqrt{\frac{2(2\mathfrak{N}_{\text{pair}}+5)}{9\mathfrak{N}_{\text{pair}}(\mathfrak{N}_{\text{pair}}-1)}}, \qquad \begin{array}{c|ccc} \mathfrak{N}_{\text{pair}} & 24 & 36 & 48 \\ 3s_{\mathfrak{k}} & 0.44 & 0.35 & 0.30 \\ \text{one-tail size} & 0.0010 & 0.0011 & 0.0012 \end{array} . \tag{23}$$

The sizes come from the exact permutation distribution. An estimate above the unrounded positive edge ends the comparator premise; below its negative ends the FDT reading; otherwise neither. S03's condition is "Should it turn out that undisturbed clusters do it too, then the arrangement was never what mattered, and neither was any of this"[5] (SC-092, L1074–L1075). This single-channel test fixes clocks, apertures, projection and lensing calibration across the sample. No re-stacking time or amplitude is supplied. The sign ablation encodes the two monotone readings as $+1$ and -1, with unit threshold (U-35).

T-4. A constant-ratio clustering comb. DC-4 discriminates SA-131. The constitutive input is 0.8's statement that "the merged domain is a resonating Chladni volume, the cosmic web its nodal structure", resting on S07's preferred-scale reading of that nodal web[9]. The fractional amplitude is Ξ, the fitted scale ratio $\mathfrak{r}$ and the free phase ϑ_{comb}. S07 proposes preferred scales in constant ratio from an operator it does not display[9] (SC-372, L4917–L4922); its 2.4766 and S09's 1.72 ± 0.07 are the sources' values, not imported predictions[11] (SC-370, L4927; L5891). The template multiplies the smooth power spectrum by $1 + \Xi \cos(2\pi \ln(k/k_*)/\ln \mathfrak{r} + \vartheta_{\text{comb}})$. FDT's reading, on the declared input, gives $\Xi > 0$ at some ratio; the smooth-plus-arithmetic-acoustic comparator sets $\Xi = 0$ (U-36).

For logarithmic band width $\Delta \ln k$, averaging attenuates the template by $\sin(\pi\Delta \ln k/\ln \mathfrak{r})/(\pi\Delta \ln k/\ln \mathfrak{r})$, and resolution requires $\Delta \ln k \le \ln \mathfrak{r}/2$[11] (SC-460, L5889–L5890). Profile a cubic in $\ln k$ and both sine and cosine of k times the assumed acoustic length out of the null and template. With $\mathfrak{N}_{\text{ratio}}$ tested ratios (U-36), the maximum improvement $\mathcal{Q}$ ends the comparator above the two-parameter union-bound threshold $-2\ln(0.0027/\mathfrak{N}_{\text{ratio}})$. No finite null ends FDT's reading, whose amplitude and ratio no clause derives, the web scale being S01's own debt[3] (SC-068, L509–L510); a null gives an upper bound on Ξ at each ratio. S07's condition, "If the web shows no constant-ratio structure, or shows one at a different ratio, the two are inconsistent and the theory has a genuine problem", belongs to that source, not to a new amplitude floor[9] (L4932–L4934).

The design (U-36, U-37) uses 60 independent equal-error bands tiling 0.01–0.30 Mpc^{-1}, at logarithmic midpoints, and 120 ratios evenly spaced from 1.3 to 3.0, including 2. The acoustic length is the assumed S06 value 144.416 Mpc (U-37), not an independently derived drag horizon[8]. The band width is $\ln 30/60 = 0.0567$ (U-36); its limiting resolvable ratio is 1.12, below the scan. At ratio 2 (U-36), attenuation is 0.989. For amplitude equal to one band's fractional error, at the

least favourable phase after projection, noncentrality is 25.49. The decision threshold is 21.40, or radial amplitude 4.63 in standard-error units; the test signal is 5.05 in those units. The noncentral chi-squared upper tail at this one ratio is 0.70, a lower bound on scan power. Under identity covariance, a simulation with 200000 draws and seed 20261109 (U-42) puts the diagnostic scan threshold near 2×10^{1}; its finite simulation uncertainty licenses only that figure. It decides nothing. Replacing the declared comb input by zero leaves the same projected null. This single-channel test replaces identity errors by survey covariance and window/selection mixing.

T-5. A persistent handedness dipole. DC-5 discriminates SA-027. The block rests on the operational circulation reading and its stated test amplitude. The constitutive input is inherited structure (0.8); the same axis in separate slices is this manuscript's operational reading of S01's inherited circulation[3] (SC-040, L375–L376), not an axis stated by S01 and not S12's preferred-axis proposal[15] (SC-535, L7902–L7904). The axis itself is read in-sample from the plane of the published polar axes: its pole, $(227.4^\circ, +67.6^\circ)$ or the antipode, within 23° at 68 percent (U-57). For $\mathfrak{N}_{\mathrm{gal}}$ galaxies let $\mathfrak{g}_j = \pm 1$ be handedness, $\mathfrak{o}_j$ unit sky direction and $\boldsymbol{\Upsilon}$ the dipole vector (U-38). The estimator is $\widehat{\boldsymbol{\Upsilon}}$, s_Υ its component standard error, and $\mathcal{C}_3$ the central chi-squared law with three degrees of freedom. Uniform full-sky coverage gives

$$\widehat{\boldsymbol{\Upsilon}} = \frac{3}{\mathfrak{N}_{\mathrm{gal}}} \sum_j \mathfrak{g}_j \mathfrak{o}_j, \qquad s_\Upsilon = \sqrt{\frac{3}{\mathfrak{N}_{\mathrm{gal}}}}, \qquad \frac{\mathfrak{N}_{\mathrm{gal}}}{3} |\widehat{\boldsymbol{\Upsilon}}|^2 \sim \mathcal{C}_3. \tag{24}$$

On a footprint a generalised-least-squares fit with its actual design matrix replaces this formula. Set aside the Galactic polar component, where a brightness bias from rotation can lie. The remaining two-component chi-squared threshold is 11.83 at tail 0.0027; the three-component value would be 14.16 (U-38). The FDT reading is a nonzero in-plane dipole stable in two disjoint redshift slices; isotropy is zero. The slice counts are $\mathfrak{N}_1, \mathfrak{N}_2$. The comparator ends only when both slices exceed the threshold and their squared vector difference, divided by $3/\mathfrak{N}_1 + 3/\mathfrak{N}_2$, is below 11.83. Both slices use the same classification and aperture conventions. Otherwise neither ends. The independent-slice false-positive size is at most 7.3×10^{-6}.

At 2630 galaxies per slice (U-38), the three-standard-error component reach is 0.10. Before the agreement condition the two-slice powers are 0.99, 0.6 and 0.1 at common in-plane amplitudes 0.20, 0.14 and 0.10 (U-38); agreement lowers each by at most 0.0027. The instantiated amplitude 0.20 (U-38) has radial decision threshold 0.116, against the ablated value zero. With the dipole along that pole, which stands 22.4° from the Galactic pole, its part in the Galactic plane, the in-plane part of this test, is $\cos 67.6^\circ = 0.38$ of its amplitude, toward longitude 227° or 47°, and the polar component set aside carries 0.92: the in-plane amplitudes 0.20, 0.14 and 0.10 are then full amplitudes 0.52, 0.37 and 0.26. Where mirror controls bound the brightness bias, the polar component enters and the three-component threshold 14.16 applies. This single-channel test requires mirror controls and shared selection errors in the footprint fit. A null prints each component's absolute estimate plus three standard errors. No clause derives the amplitude, and the axis above is an in-sample reading, not a derivation: the inherited circulation is S01's and the appendix's own debt[3, 6] (SC-068, L510; SC-228, L3034); a dipole along the excluded polar axis lies outside this test's reach, and a finite null cannot end the unspecified circulation reading.

Retired candidates. DC-6 (SA-108) is inert: S06's law at the published tilt gives a running -1.9×10^{-4}, which differs from the zero-running ablation by less than the published three-standard-error threshold 0.0156 (U-11); its count and inverse-count law are S06's[8], while 0.3a supplies the floor alone. DC-7 (SA-169) has no map: fusion isochrones supply the reported stellar ages, and no FDT age follows without O-7's fission-cosmology computation against the SNO neutral-current flux; the merger date is S01's own debt[3]. DC-8 (SA-167) is inert at the published directional precision: S12 reads the approximate alignment of its listed axes as supporting "a common origin: the axis of our spinning universe, inherited from domain merger"[15] (L8010–L8011), and S07 states of the "Dipole Repeller / Shapley" axis and the bulk-flow, low-multipole microwave and expansion-rate directions that "If the flow is debris from a domain merger, there is one axis, and these must agree"[9] (SC-357, SC-358, SC-359, SC-360, SC-361, L4830–L4838). With the kinematics of a galactic merger on a grander scale (0.8)[2] (SQ-21, L11020), a merger of two has one plane and its normal, not one axis: its polar axes need only be coplanar, as the published flow, expansion-rate and microwave directions are within their errors, the 75° flow–microwave separation included, and the low-multipole axis is the plane's normal, a quarter turn from the flow. The pole carries 23° at 68 percent (U-57), and an alignment test of size 0.0027 needs a tested axis within 4.2° of it, since $1-\cos 4.2^\circ = 0.0027$: the plane is an in-sample reading and decides nothing at that precision. What a merger conserves and its matter-phase to spacetime-phase flow law enter no number here (O-15).

9 Across scales

Under the scale change $(R_s, r_f) \mapsto (\lambda R_s, \lambda r_f)$, with positive scale factor λ, A-1's ratio stays fixed (0.3a). This repeats the support, seam and two phases above the floor. The branch exchange $\mathfrak{i} : r_f \mapsto R_s^2/r_f$ exchanges exterior and interior readings of one support and fixes the fold; the seam exchange $\mathfrak{J} : \alpha \mapsto 1-\alpha$ fixes the seam and is a different involution. Neither is an inter-domain transfer rule. The same pair law acts at each size, but the monopole work calculation requires nonoverlapping spherical supports. S17 reads a merger of bounded configurations in a common exterior as one solution of the unchanged equation[20]: its conserved content is the energy–momentum and angular momentum of the pair's far field with the exact books of I-5b, the child's endowment is the parents' sum less the energy that leaves the merged support, and its circulation is the pair's angular momentum, the inherited circulation of the source's list; its axis is the normal of the pair's orbital plane, read in-sample above at the pole of the published polar axes. With a galactic merger's kinematics (0.8) the merger lasts several dynamical times of the pair; the domains' mean density, which needs their support radius, sets that time, and at the fitted matter density of the visible patch the free-fall time is 41 Gyr, an in-sample scale that fixes no date; it is a duration, and the closing speed is Eq. (15)'s, which needs the same support radius. The matter-phase to spacetime-phase flow law, the merger's rates and the seeds' spectrum enter no number here (O-15). S07's proposed shear interface[9] (SC-415, L5470–L5479) is a source test of an interface's stress, not a boundary condition; by S17 an interface's junction data are the two sides' solutions and the layer's stress (O-13).

10 System-level reading (exploratory)

This section reads three system-level quantities in house format and adds no prediction.

X-1. Critical-density Hubble content. Let $\mathcal{M}_{\rm Hubble}$ be the critical-density content of the sphere of radius c/H_0, not a support inferred from the sky. Its gravitational radius then equals that radius at every expansion rate:

$$\mathcal{M}_{\rm Hubble} = \frac{4\pi}{3}\rho_{\rm crit}\left(\frac{c}{H_0}\right)^3 = \frac{c^3}{2GH_0}, \qquad \frac{2G\mathcal{M}_{\rm Hubble}}{c^2} = \frac{c}{H_0}, \qquad \frac{c/H_0}{c/H_0} = 1. \tag{25}$$

The comparator returns the same identity, which corroborates nothing. It assigns no A-1 field evaluation, interior share, domain support or fold to the visible universe[6] (SC-152, L2236). A measured distance is not a gravitational radius.

X-2. A continuous logarithmic span. The observable $\ln[(c/H_0)/(2\ell_P)] = 139.6$ is a number this analysis chooses to print, and that choice is its defining condition; it compares the Hubble length with the floor (U-01, U-03, U-04). It is a continuous log range and counts nothing: no eigenmodes and no iterations. S06's pivot value 136.0 uses a different upper length[8]. The floor fixes no spacing above it (0.1a): it gives neither equal spacing nor a finite hierarchy, and the comparator has the same arithmetic on the assumed endpoints.

X-3. An isothermal compression premise. S10b declares one further law, $P = c^2\rho$ along compression, where ρ is the compressed material's density, typed as a new premise[13] (SC-505, L6366–L6367). At fixed compressed mass the work per rest energy is then $\int d\rho/\rho$, so the proposed contrast is $\delta_{\rm iso} = \ln(\rho_{\rm nuc}/\rho_{\rm rel}) \simeq 100$ from $\rho_{\rm nuc} = 2.3 \times 10^{17}\ \mathrm{kg\,m^{-3}}$[13] and today's fitted level (U-04; SC-494, L6347). The required unwound mass fraction would be $f_{\rm unwound} = 2.17/\delta_{\rm iso} \simeq 0.02$[13] (SC-507, L6372). This is S10b's extra compression law[13], not a prediction from I-7; no unwinding body's contrast is derived here (O-14). The comparator is the bill alone, which fixes the product of the contrast and the unwound fraction and neither factor separately. S10b's G5 says that its third section, the exploratory route (SC-503, L6363), "is not printed until the law is derived", and its item R40 queues the route's adoption, its "two percent unwound" "carried as an exploratory number, never printed"[13] (SC-501, SQ-06, L6394–L6395; L6400; SQ-07, SC-502, L6405–L6408). It appears here only as an in-sample re-description on S10b's declared premise[13] (SC-505, L6366–L6367), beside those limits.

The radiative channel integrated back to $z = 8$ releases fractions 1.8×10^{-5} and 4.8×10^{-4} of today's matter content under the fixed- and proper-volume premises, respectively (U-40). Both omit other channels and earlier history; neither measures a total unwound fraction or disproves the isothermal law. S10b's kill condition is "a released inventory far from two percent", or "a derived compression law (O-14) of another form"[13] (SC-501, SQ-06, L6391–L6394). S10b's G4 and G6 leave the decision to the inventory of released mass over the domain's history and to the compression law that O-14 must derive or refute[13] (SC-501, SQ-06, L6391–L6396).

Guards. Every number in this section is an in-sample re-description; none is a prediction, and X-1 to X-3 are not counted with T-1 to T-5. The appendix fixes a gravitational radius "by the

solved effective mass and nothing else" and keeps a domain's support radius, density profile and curvature radius as separate data[6] (L2235; SC-152, L2236–L2237), so no domain compactness, fold or contact-work fraction is printed.

11 Convergence statement

For the same stress tensor, data and gauge, I-3 returns the same curvature as general relativity. It thus preserves measured distances, redshifts, time dilation and acoustic scales on the containment route. At the stated temperature and on the four named premises, the Planck spectrum is recovered; the anisotropy fit is in-sample. A merger enters that route as initial and boundary data — the parents, their size ratio and their orbit — and the plane of the published axes is an in-sample reading of such data. The abundances, lensing maps, jet and bubble records and inherited-object observations remain the record, with their source tags and errors. Where the theories converge, FDT reproduces the results; the FDT source programme and each claimed divergence stand at I-4's third layer, L3. Where it declines an assumption, the additional conclusion is not an obligation.

The standard extrapolation reads a singular beginning (SA-010). FDT's three redundant boundaries—the floor, the force ceiling, and the open interval with a regular core—exclude a singularity everywhere, with no beginning of time (0.1a, 0.2, 0.3, I-6, 0.8).

The standard reading assigns the whole universe a hot dense phase (SA-024). FDT's merger is gentle and slow, with no impact and no singular event (0.8): slow in its duration and gentle by the low-density omnium between galaxies, whatever its speeds[2] (14 Nov). S01 reads the textbook's universal fire as "assembled from two ingredients", the margins that truly burned and the glare of a backward look[3] (SC-034, L355–L358); the margins are the gas's fronts, and the mottling is the chorus's linear pattern.

The standard reading drives late acceleration with a cosmological constant or vacuum energy (SA-121). In FDT there is no cosmological-constant term: the effective one is released stored potential per unit volume accumulated over the domain's history (0.7), the domain average of an amount that increases and decreases differently in different regions, so that the Hubble number differs by region (0.7)[2] (SQ-22, L11023–L11024; SQ-23, L11025).

The standard reading extends a runaway expansion to the whole universe (SA-004). In FDT, "Expansion and its late acceleration are decompression (0.7)" (0.8). FDT canon then states "The runaway expansion of consensus is a conjecture beyond the scales observation reaches"[2] (L53).

The standard reading assigns acoustic phase coherence to an initial condition laid down by inflation (SA-118). FDT reads the microwave sky as the substrate's cumulative standing-wave state (0.8); its derivation is O-15, and the particular lock is S06's proposal[8], for which a merger's drive supplies a start.

The standard reading takes the microwave sky as the afterglow of a hot origin (SA-117). FDT reads it as the cosmological standing-wave state, not an origin's afterglow (0.8).

The standard reading makes the light elements by primordial nucleosynthesis (SA-119). FDT calls them terminal fission exhaust (0.8, I-1a), with the SNO neutral-current agreement, which by I-1a is data and no neutrino anomaly unexplained by FDT[2] (SQ-17, L9492), beside O-7's computation, which enters no number here.

The standard reading fixes the baryon-to-photon ratio in the first moments (SA-102). FDT has no origin singularity and no beginning of time (0.8); S06's deposit ledger is that source's separate reconstruction[8].

The standard reading makes stars fusion engines building elements upward (SA-052). I-1a says "stars are fission reactors, and cosmic H/He is terminal exhaust", with the SNO record, whose computation is O-7's, the reactor-spectrum bound and the derivation note's one solar account, its SNO family a calibration[19], carried above; the canon adds that in fission "the optimal solution sometimes calls for the fusion of lighter elements"[2] (SQ-16, L9491; SQ-19, L9496), read above as no build-up of the elements. The standard account runs its reactions one-to-one, particle by particle. In FDT each step is the system-wide, many-to-many settlement of the state it starts from (0.1a, I-5b).

The standard reading makes the most iron-poor stars a first generation and the early black holes products of rapid growth (SA-030, SA-088). FDT reads the iron-poor stars as inherited seeds at an early stage of unwinding (0.8) and the early black holes as inherited dense seeds, grown, by core 0.8, only through mergers[2] (SQ-14, L9487), keeping every mass ratio's observational qualifier.

The standard reading powers jets with the hole's rotational energy, tapped by a magnetic field threading the horizon, so that a jet above $\dot{M}c^2$ spins the hole down[63, 62]. In FDT the hole loses no mass and the field is a helical density gradient (0.8, P-5); the jet is the conversion of arriving matter at the fold, its power the instant release of compression stored over an unimaginable time[2].

The standard reading forms the Fermi and X-ray bubbles in a past outburst of accretion onto the central black hole or a nuclear starburst[64, 66]. FDT reads them as the release at that hole's fold, the hole gaining no mass from the matter it converted (0.7, 0.8)[2].

The standard reading assigns dark matter to a new particle species (SA-048). FDT's mass shadow has no particle content (0.7); a confirmed detection ends that reading, while present silence proves neither.

The standard reading assigns residual mode energy to an empty vacuum (SA-120). FDT has no vacuum (0.1, 0.1d); the residual-mode reading is S06's[8] (SC-324, SC-325, L4597–L4598), and the floor is an unoccupied infimum (0.1a).

The standard reading makes interactions exchanges of virtual carriers (SA-059). FDT has one carrier and curvature plus geodesic motion (I-2).

12 Status ledger

item	scope and status
O-1	the finite-core cutoff r_c, the regular core chart, or the outward phase-transfer law: to be derived
O-2	a geometrically constructed odds for the overlap-contrast application (A-3): to be derived
O-3	a canonical odds for the confinement application (A-4): to be derived
O-4	the local profile $\rho_{\mathrm{loc}}(r_f)$ from the omnium constitutive law with boundary, surface and core data, reducing to the measured nuclear profile: to be derived
O-5	multipole and tidal remainders of the closed-form pair expression, and the reading they give of the band $R_H < r_f < R_s$ outside a rotating source's horizon; the overlap complex; how P-4's many-cone settlement signs a pair it does not join: to be derived. Here R_H is the outer horizon radius
O-7	the fission-cosmology computation against the SNO neutral-current flux, and the FDT computation of every other neutrino anomaly: to be derived
O-8	the constitutive derivation of the cone speed / cone index and its reconciliation with lensing: to be derived in the core's register; derived in S17 on every chart whose metric is in hand[20], the interior instance with O-4
O-9	the confinement operator D, its domains, boundary data and spectrum; every mass ratio, including the two held-out targets: to be derived
O-12	the phase-exchange rates Q_a^{ν} and the decay kernel, spectrum, chirality and rates: to be derived
O-13	full junction data $[K_{ab}]$ at any interface: to be derived in the core's register; by S17 the data hold no datum of their own, the layer's stress being O-4's[20]; K_{ab} is extrinsic curvature
O-14	the mass-shadow response function and its closure; the release function of 0.7—the mass-loss rate density $\dot{m}(x)$ and compression contrast $\delta(x)$ of the unwinding bodies and the converted accreting matter that feed Λ_{eff}; the regional law of the released amount and of the Hubble number: to be derived
O-15	what a domain merger conserves—each domain's conserved content and effective $\mathcal{M}$—and the matter-phase to spacetime-phase flow law, with the merger's rates (its kinematics are a galactic merger's on a grander scale, 0.8); the spectrum of black-hole masses; the derivation of the CMB as the substrate's standing-wave state, which must return the blackbody spectrum and the measured anisotropies—a state predicting a non-blackbody CMB is falsified on arrival: to be derived
source	S01's own debts[3], not additions to the core's list: the web scale, the inherited circulation, the census and the record law (SC-068, L509–L513), the second and fourth also the appendix's[6] (SC-228, L3034), and the date of the confluence (SC-039, L370)
T-1	prospective void-minus-web sign and declared regional release shape; both volume premises
T-2	prospective zero distortion, resting on number-changing equilibration and a residual below the test's reach
T-3	prospective opposite monotone signs under the two aperture-ratio premises
T-4	prospective comb against zero, instantiated amplitude; finite null gives bounds
T-5	prospective persistent in-plane dipole against isotropy; finite null gives bounds; its axis read in-sample at the pole of the axis plane
running	inert at the stated running precision
stellar ages	no map, O-7
one plane	the plane of the published polar axes and its normal: in-sample; inert at the published directional precision
X-1–X-3	exploratory identity, continuous log span and in-sample isothermal redescription
in-sample	density and release reconstructions, CPL central crossings, source spectral and phase fits, flow and handedness counts, the sphere's energy ratio, inventories, the conversion inventory, the free-fall scale, the benchmark's closing speed and filling fraction, the wake's fluid speed, the axis plane with its pole, and the derivation note's calibration to SNO's normalization
A-5	mode token and regimes only; no eigenoperator or spacing supplied

item	S17's state[20]
O-1	reduced
O-2	reduced
O-3	debt
O-4	reduced
O-5	reduced
O-7	reduced
O-9	debt
O-12	debt
O-14	reduced
O-15	reduced
source	reduced

S17 closes O-8 and O-13, each by displaying its own object with no premise added[20]; the table lists the items that remain, the source's entry standing for its circulation, record law and date.

13 Conclusion

The visible universe has a yesterday. The core gives universal domains, a gentle merger, inherited dense seeds, a nodal web and a cumulative microwave state; the sources add specific histories, locks, inventories and proposed tests. Black-hole jets and the bubbles at the Galactic centre record the conversion at the folds, its power the instant release of compression stored over an unimaginable time. Keeping those additions named makes the discriminants precise. A merger gives the sky's mottling its boundaries, phases, route and drive, and the published axes lie in one plane whose normal is the axis of the sky's largest patterns: the in-sample mark of two rotating domains still merging. Release can be tested region by region by its sign and amplitude, the spectrum by its chemical potential, the gas by returning lensing weight, and the sky by a clustering comb and a persistent circulation pattern. The missing operators and rates remain exactly where a quantitative account must supply them. The cone law and the junction data are derived; what remains is named row by row in the ledger.

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