The Anchor's First Test
And the Constant It Would Have Eliminated

Eliminating the Hubble Rate Between a_0 and the Geometric Mean — an Over-Constrained Test, Currently Failed, and One Robustness Result That Survives It

Martin Scholl — Independent Researcher

It Is All One — Cosmology Notes. July 2026 (working draft)

Abstract

The geometric-mean anchor, $\sqrt{(T_{Planck} \cdot T_{horizon})} \approx 19.4$ K against a measured 2.725 K, has sat in this corpus's quarantine with a value and no explanation — in particular with an unexplained factor of 7.12 between the two. This note reports that the factor has a candidate identity, that the identity yields a closed-form prediction for the one constant the corpus calls a free input, and that the prediction then fails an over-constrained test against a_0. The identity: the curvature of metric D's radial-transverse slice changes sign at exactly two e-foldings, where the temperature is $T_0 \cdot e^2 = 20.14$ K, within 3.8% of the geometric mean. Taking that seriously turns the anchor into $T_0 = \sqrt{(T_{Planck} \cdot T_{horizon})}/e^2$, which eliminates T_0 as a free parameter — the anchor problem's own constant, gone. The price is that the Hubble rate becomes over-determined, and it does not survive: eliminating H between this relation and $a_0 = cH/2e$ gives $a_0 = \pi \cdot c \cdot k_B \cdot T_0^2 \cdot e^3/(\hbar \cdot T_P)$, predicting 1.2985×10^{-10} against an observed 1.2×10^{-10}, high by 8.2%. Read as three routes to H: a_0 gives 67.15 km/s/Mpc, direct measurement 67.40, the anchor 72.66. Two agree to 0.4% and the anchor is the outlier, so the suspect is the factor e^2, which is to say the areal radius. A natural one-parameter family of seals is then tested and cannot rescue it: the anchor requires p = 1.102 while a regular centre requires p ≥ 2, and the two are incompatible. What survives, and is worth more than the coincidence, is a robustness result discovered in the same family: the audited angular turnaround sits at exactly one curvature radius for every member, so z = e−1 is not a fitted number and cannot become one. Every flag flown.

1. The Unexplained Factor, and a Candidate for It

The anchor has always been quoted as a near-miss of the wrong size: $\sqrt{(T_{Planck} \cdot T_{horizon})} = 19.396$ K against $T_0 = 2.72548$ K — a ratio of 7.1166 that nobody could name. The Core of Metric D note supplies a candidate. The Gaussian curvature of the radial-transverse slice, $K_G = -R''/R$, is proportional to (kr − 2) and therefore changes sign at exactly two e-foldings, where the temperature along the sight-line is

$$T = T_0 \cdot e^2 = 20.139 \text{ K}, \quad \text{against } \sqrt{(T_{Planck} \cdot T_{horizon})} = 19.396 \text{ K} \quad (+3.83\%)$$

Or, in distance rather than temperature: the geometric mean sits at 1.9624 e-foldings and the curvature flip at 2.0000, a discrepancy of 1.9%. The unexplained factor of seven has a candidate identity: two e-foldings, from the observer to the surface where the geometry stops being sphere-like.

2. The Constant That Would Be Eliminated

Taken as exact, $\sqrt{(T_P \cdot T_{hor})} = T_0 \cdot e^2$ solves for T_0 — the number the Tolman note proved is otherwise structurally free, because the equilibrium's global period is a free parameter and metric D has no Killing horizon at finite distance to fix it:

$$T_0 = \sqrt{(T_{Planck} \cdot T_{horizon})}/e^2 = \hbar^{(3/4)} \cdot c^{(5/4)} \cdot H^{(1/2)} \,/\, \left(e^2 \cdot \sqrt{(2\pi)} \cdot G^{(1/4)} \cdot k_B \right)$$

This is the anchor problem's target: the CMB temperature in closed form from ħ, c, G, k_B and H alone. Note the scaling, $T_0 \propto \sqrt{H}$ — a weak lever, which matters below.

3. The Test: Eliminate H

Two relations of this corpus now contain H. Set them against each other and the Hubble rate cancels:

$$a_0 = \pi \cdot c \cdot k_B \cdot T_0^2 \cdot e^3 \,/\, (\hbar \cdot T_P)$$

a relation between the rotation-curve scale and the background temperature with no cosmological parameter in it at all. It predicts $a_0 = 1.2985\times10^{-10}$ m/s² against an observed 1.2×10^{-10}: high by 8.21%.

Equivalently, as three independent routes to the Hubble rate: from $a_0 = cH/2e$, 67.15 km/s/Mpc; from direct measurement, 67.40; from the anchor, 72.66. Two agree with each other to 0.4% and the third is 8% away. The anchor is the outlier, so the suspect is not a_0 and not the Hubble rate but the factor e^2 — which is to say the areal radius R(r).

It is worth naming the tempting move and refusing it. The anchor becomes exact at H = 72.66 km/s/Mpc, which is close to the local distance-ladder value, and there is even a respectable argument for preferring it, since a static cosmology has no business inheriting a Hubble rate obtained by fitting an expanding model to the microwave sky. But H is not free: raising it by 7.8% to rescue the anchor pushes a_0 off by the same 7.8%, and a_0 currently sits at +0.37%, one of the corpus's better lines. One knob, two duties, pulling opposite ways.

4. Can the Seal Absorb It? No

The data demands the flip at 1.9624 e-foldings rather than 2 — a −1.9% correction to the seal. Test the natural one-parameter family, leaving the lapse and hence the redshift untouched:

$$R(r) = r \cdot \exp(-(kr)^p / p)$$

Its properties come out in three lines. The turnaround, $R' = 0$, occurs where $x^p = 1$, hence at $x = 1$ for every p. The flip, $R'' = 0$, occurs where $x^p = p + 1$, hence at $x = (p+1)^{(1/p)}$. And the near-origin source behaves as $-2(p + 2 + 1/p)\cdot x^{(p-2)}$, which reproduces the known $-8k/r$ at $p = 1$ and is finite only for $p \geq 2$.

The anchor requires the flip at 1.9624, hence $p = 1.1017$. A regular centre — caveat (i-a), closed only this morning — requires $p \geq 2$, which puts the flip at $\sqrt{3} = 1.732$ and the temperature there at 15.4 K. The two duties are incompatible in this family. Buying the anchor means reinstating the singularity that was just removed.

5. What Survives: the Turnaround Cannot Be Fitted

The first line of §4 is a gift, and it is independent of everything that failed. The turnaround sits at $x = 1$ for every member of the family — for every exponent p, without adjustment. The audited angular turnaround at $z = e - 1 = 1.71828$ is therefore robust against this entire class of corrections to the seal. It was not fitted, and it cannot be made a fitted number by any deformation of this kind. That is worth recording in the ledger on its own.

6. Verdict, for the Quarantine Card

The geometric-mean anchor was given its first quantitative test and did not pass. It is 8% adrift of two constants that agree with each other to 0.4%; the seal correction it demands is excluded by the regularity condition; and its whole chain is conditional on an areal radius that is not derived. It moves from quarantined-and-neutral to failing-its-first-test. It is not dead — kill it properly only when R(r) is known — but it should no longer be listed as though it were merely awaiting attention.

What is owed if anyone wants to revive it: a derived R(r) whose curvature flip lands at 1.9624 e-foldings and whose centre is regular. Those two conditions are not satisfied together by any member of the family tested here, and any candidate must satisfy both.

7. The Sentence

The anchor's unexplained factor of seven turned out to have a name — two e-foldings, to the surface where the geometry stops being sphere-like — and the name was good enough to eliminate the one constant this cosmology calls free, until the elimination was carried through to a_0 and came out eight percent high, which is how an over-constrained programme is supposed to behave when a coincidence is only a coincidence.

References

The papers and notes of this series (the Allgemeine Feldtheorie — the quarantine list and caveat (iii); The Core of Metric D — the regularity condition and the curvature flip; Tolman from Staticity — why T_0 is otherwise a free input; The Quaternion Screw — $a_0 = cH/2e$; The Family Law's Cosmic Rung). Verification script: Cosmology/anchor_elimination_check.py. (Citations from memory; the literature-verification pass applies.)

Acknowledgment: the observation that the over-constraint would eliminate a constant is the author's. Computation and drafting by machine (Claude, Anthropic).