

Addendum 357a: The Fold-Rate is a Named Floor

Why $\nu = \frac{1}{4}H_0$ does not derive: the missing
galactic-to-cosmological time-bridge

(Addendum to Paper 32; sharpens the rate residual of Addendum 349a)

Léon Fernando Vlegels

2026-06-18

Abstract

Addendum 349a closed the fold-to-redshift map (Conjecture 32.2) in two halves: the *shape* derives (the Euler continuation $\chi(s) = 1 + \cos \pi s$ gives $C(\xi) = 4\xi + \sin(4\pi\xi)/\pi$, $\Lambda(\xi)/\Lambda_0 = 4/C(\xi)$), while the *rate* — the conversion from fold-progress to the scale factor — was supplied by “one fold per e-fold” ($dk/d\ln a = 1$, i.e. $\nu = \frac{1}{4}H_0$ for $\xi = k/4$) and honestly flagged as *reverse-engineered* to the DESI fit, not derived. This addendum asks whether the rate derives from corpus machinery. **It does not**, and the obstruction is quantified. The two candidate handles both fail to fix an absolute rate. (H1) Paper 32’s “time as fold-progress” remark gives $d\tau/dt = \sqrt{1 - v^2}$ — a dual-observer *ratio* (Paper 28), not the absolute fold-rate against cosmic expansion. (H2) The unit system (Paper 35) is calibrated at the *galactic* scale: the chart length is $L_h = 0.978$ kpc (the SPARC / Paper 39 hidden-branch halo scale, with $L_h/R_{\text{Hubble}} \sim 2 \times 10^{-7}$), and the only absolute clock, the breath $T_{\text{breath}} = 1.374$ Myr, is $\sim 10^4$ too *fast* to clock a cosmological fold (one fold per e-fold needs a fold period of $1/H_0 \approx 14.5$ Gyr $\approx 1.06 \times 10^4$ breaths). The corpus provides no galactic-to-cosmological time-bridge. **Verdict: the rate is a NAMED FLOOR**, not a derivation-in-waiting; “one fold per e-fold” remains the natural *dimensionless* posit (the seed-identity mode the corpus flags about α). This sharpens 349a — the rate’s open status is now an irreducible floor with a stated reason — and is fully consistent with 349a’s data verdict that the closed model is disfavoured by DESI. All claims pinned by `verify_P357a.py` (9/9).

1 The question

Addendum 349a left exactly one ingredient of the fold-to-redshift map non-derived: the rate ν in $d\xi/d\ln a = \nu/E(a)$. The value $\nu = \frac{1}{4}H_0$, equivalent to “one boundary fold completes per e-fold of expansion” ($dk/d\ln a = 1$ with $\xi = k/4$), reproduces $w_0 = -0.815$ against DESI’s -0.821 , but 349a flagged it as recognised from the fit and the principle reverse-engineered to it. The honest question is whether the corpus fixes the rate independently. There are two places it could come from: the proper-time identification of Paper 32, and the unit system of Paper 35.

2 H1: the proper-time remark fixes only a ratio

Proposition 2.1 (Dual-observer ratio, not absolute rate). *Paper 32’s “time as fold-progress” remark identifies the inside-observer completed-fold count with proper time τ and gives $d\tau/dt = \sqrt{1 - v^2}$, with v the interior/exterior fold-rate differential of the Paper 28 dual-observer geometry. This is a statement about the ratio of two fold-counters (inside versus outside); it carries no absolute scale relating the fold-count to the cosmic scale factor a . It therefore cannot fix ν .*

3 H2: the unit system is calibrated galactically

Proposition 3.1 (The breath is the wrong scale by $\sim 10^4$). *The corpus’s only absolute clock is the breath, $T_{\text{breath}}^{\text{SI}} = 1.374 \text{ Myr}$ ($\tau_1^{\text{SI}} = 3191 \text{ yr}$), and its natural length is the chart length $L_h = 0.978 \text{ kpc}$ (Paper 35). One fold per e-fold requires a fold period equal to $1/H_0 \approx 14.5 \text{ Gyr}$, which is $\approx 1.06 \times 10^4$ breaths. The breath is thus $\sim 10^4$ times too fast to serve as the fold clock. Moreover $L_h = 0.978 \text{ kpc}$ is a galactic length — it is the SPARC / Paper 39 hidden-branch halo scale — with $L_h/R_{\text{Hubble}} \sim 2 \times 10^{-7}$. The unit bridge of Paper 35 is fixed at the galactic scale and provides no cosmological time-bridge from which ν could be read.*

Remark 3.2 (Why this is the right diagnosis). The corpus is empirically anchored at the galactic scale: the one outside-facing data confrontation that succeeds is the hidden branch against SPARC (Paper 39), at $L_h \approx 1 \text{ kpc}$. The fold-cascade dark-energy dynamics live four orders of magnitude higher, at the Hubble scale. The rate ν is precisely the conversion across that gap, and nothing in the corpus spans it. This is not a failure of the fold model’s geometry (the shape is derived, 349a); it is a missing unit-bridge, of exactly the kind Paper 35 supplies at the galactic scale and does not at the cosmological one.

Status

The fold-rate $\nu = \frac{1}{4}H_0$ does **not** derive from current corpus machinery. The Paper 32 proper-time remark fixes only the dual-observer ratio $d\tau/dt = \sqrt{1-v^2}$ (Proposition 2.1); the Paper 35 unit system is calibrated at the galactic scale ($L_h = 0.978 \text{ kpc}$, the SPARC scale) and its absolute clock (the breath, 1.374 Myr) is $\sim 10^4$ too fast to clock a cosmological fold (Proposition 3.1). **Verdict: the rate is a NAMED FLOOR** — a missing galactic-to-cosmological time-bridge — not a derivation-in-waiting. “One fold per e-fold” ($dk/d \ln a = 1$) remains the natural *dimensionless* posit, the seed-identity mode the corpus flags about α^{-1} . This sharpens Addendum 349a: the rate’s open status is now an irreducible floor with a quantified reason, not an unfinished calculation. It is fully consistent with 349a’s verdict that the closed, fully-derived fold model is disfavoured by DESI DR2 at $3\text{--}4.5\sigma$. No new objects are introduced and no published number changes. Verifier: `verify_P357a.py`, 9/9 pass.

What would close it. A first-principles galactic-to-cosmological time-bridge — an extension of the Paper 35 unit system to the Hubble scale, fixing the fold-clock rate against H_0 without reference to the DESI fit — would convert the floor into a derivation. Absent that, the rate is posited, and the fold dark-energy model stands as a sharp, disfavoured, zero-parameter prediction.