

Addendum 358a: The Galactic-to-Cosmological Time-Bridge

$H_0 = 2\alpha^2/T_{\text{breath}}$, a parameter-free Hubble prediction, and
the lifting of the fold-rate floor

(Addendum to Papers 35 and 32; lifts the floor of Addendum 357a)

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Abstract

Addendum 357a recorded the fold-rate $\nu = \frac{1}{4}H_0$ as a named floor: the corpus unit system (Paper 35) is calibrated at the *galactic* scale — the universal/MOND acceleration $a_0 = \alpha$ in chart units, with $L_h = 0.978$ kpc the SPARC/Paper 39 scale — and its clock, the breath $T_{\text{breath}} = 1.374$ Myr, is $\sim 10^4$ too fast to clock a cosmological fold, with no bridge to span the gap. This addendum supplies a *candidate* bridge from corpus machinery plus one standard relation, and finds that it makes a parameter-free Hubble prediction. The two ingredients: (1) the corpus a_0 -chain (Paper 35, A264/A265), in chart units $a_0 = \alpha$, $c = \pi/\alpha$, $T_{\text{breath}} = \alpha^2 c/(\pi a_0)$, with a_0 the per-breath velocity gain; and (2) the de Sitter/MOND horizon relation $a_0 = cH_0/(2\pi)$. Combining,

$$H_0 = \frac{2\pi a_0}{c} = 2\alpha^2 \quad (\text{chart units}), \quad H_0 = \frac{2\alpha^2}{T_{\text{breath}}}, \quad \frac{1}{H_0} = \frac{\alpha^{-2}}{2} \text{ breaths.}$$

With $T_{\text{breath}}^{\text{SI}} = 1.374$ Myr this predicts $H_0 \approx 75.8$ km/s/Mpc with *no cosmological input*, landing in and just above the H_0 -tension window (+3.8% vs SH0ES 73.0, +12.4% vs Planck 67.4). The 357a obstruction — “ $\sim 10^4$ breaths per fold” — becomes $\alpha^{-2}/2 \approx 9389$ breaths, a *corpus number*. **Verdict: candidate bridge, not closure.** The residual is the exact horizon factor: the data prefer $cH_0/a_0 \approx 5.6$ against the clean $2\pi = 6.28$ ($\sim 12\%$, within the H_0 tension and a_0 uncertainty), and a corpus *derivation* of that 2π — mapping the de Sitter Gibbons–Hawking 2π to the breath’s own full-turn 2π (the Hopf fibre period) — is not delivered here. The 2π is de Sitter-motivated, not fit to the data; the 12% is reported, not hidden. All claims pinned by `verify_P358a.py` (12/12).

1 The floor, and the foothold

Addendum 357a showed that the corpus has no cosmological clock: its absolute clock is the breath ($T_{\text{breath}} = 1.374$ Myr), $\sim 10^4$ too fast to clock a fold, and its unit system is anchored galactically. The anchor is precise, though, and it is the foothold. Paper 35 fixes the dimensionful scale through the universal acceleration a_0 , with the chart identities

$$a_0 = \alpha, \quad c = \frac{\pi}{\alpha}, \quad T_{\text{breath}} = \frac{\alpha^2 c}{\pi a_0} \tag{1}$$

(Paper 35, A264/A265), where a_0 is the per-breath velocity gain ($a_0 T_{\text{breath}}^2/L_h = \alpha$ exactly). The same a_0 that sets the galactic scale is, in standard cosmology, tied to the cosmological expansion rate — and that tie is the bridge.

2 The bridge

Proposition 2.1 (The de Sitter horizon relation). *In a de Sitter background the horizon acceleration is $c^2/R_H = cH_0$ (horizon radius $R_H = c/H_0$), and the MOND acceleration scale is the horizon acceleration divided by the Gibbons–Hawking factor 2π :*

$$a_0 = \frac{cH_0}{2\pi}. \quad (2)$$

This is the standard MOND–cosmology coincidence. It is taken here as an external input; its corpus derivation is the residual (§3).

Theorem 2.2 (The time-bridge and the Hubble prediction). *Combining (1) and (2),*

$$H_0 = \frac{2\pi a_0}{c} = \frac{2\pi \alpha}{\pi/\alpha} = 2\alpha^2 \quad (\text{chart units}), \quad \text{i.e.} \quad H_0 = \frac{2\alpha^2}{T_{\text{breath}}}, \quad \frac{1}{H_0} = \frac{\alpha^{-2}}{2} \text{ breaths}. \quad (3)$$

With $T_{\text{breath}}^{\text{SI}} = 1.374 \text{ Myr}$ this is the parameter-free prediction $H_0 \approx 75.8 \text{ km/s/Mpc}$ (Hubble time $\approx 12.9 \text{ Gyr}$), using no cosmological data — only α , a_0 , c , and the de Sitter factor 2π . The prediction lands in and just above the measured window: +3.8% above SH0ES (73.0) and +12.4% above Planck (67.4).

Corollary 2.3 (The fold-rate floor is lifted to a corpus number). *Under Theorem 2.2 the fold-rate is $\nu = \frac{1}{4}H_0 = \alpha^2/(2T_{\text{breath}})$, and the fold period (one fold per e -fold) is $1/H_0 = \alpha^{-2}/2 \approx 9389$ breaths. The “ $\sim 10^4$ breaths per fold” obstruction of 357a is therefore not arbitrary: it is $\alpha^{-2}/2$, the square of the corpus fine-structure number. The observed value (≈ 10560 breaths) differs by the ratio 1.125 — the MOND-coincidence slack.*

3 The residual, and why this is not the seed-identity trap

Remark 3.1 (The exact horizon factor). What is not delivered is a corpus derivation of the factor 2π in (2). The data prefer $cH_0/a_0 \approx 5.6$ (using the corpus $a_0 = 1.172 \times 10^{-10}$) against the clean $2\pi = 6.28$, a $\sim 12\%$ gap that is within the present H_0 tension and the a_0 uncertainty. A corpus derivation would map the de Sitter Gibbons–Hawking 2π — a horizon-temperature factor — onto the corpus’s own fundamental 2π : the breath map’s full-turn multiplier $\lambda = e^{2\pi i \rho^*}$ and the Hopf fibre period. That mapping is the open residual; with it, $H_0 = 2\alpha^2/T_{\text{breath}}$ would be a closed prediction.

Remark 3.2 (Discipline). The corpus flags reverse-engineered constants as the seed-identity mode. This is not that: the factor 2π is fixed by the de Sitter horizon *before* comparison, and the data prefer 5.6, so the 12% is a reported miss, not a tuned hit. The bridge predicts H_0 high (toward the local/SH0ES value); a future tightening of H_0 and a_0 either confirms the clean 2π or measures the true factor and refutes it.

Status

The galactic-to-cosmological time-bridge of 357a’s floor is supplied as a **candidate**: the corpus a_0 -chain (Paper 35) together with the de Sitter horizon relation $a_0 = cH_0/(2\pi)$ give $H_0 = 2\alpha^2/T_{\text{breath}}$, a parameter-free prediction $H_0 \approx 75.8 \text{ km/s/Mpc}$ that lands in and just above the measured H_0 window, and lifts the fold-rate floor to the corpus number $1/H_0 = \alpha^{-2}/2$ breaths (Theorem 2.2,

Corollary 2.3). **Verdict: candidate bridge, not closure.** The residual is the exact horizon factor: the clean 2π exceeds the data factor $cH_0/a_0 \approx 5.6$ by $\sim 12\%$ (within the H_0 tension and a_0 uncertainty), and a corpus derivation of the 2π — identifying the de Sitter Gibbons–Hawking factor with the breath’s full-turn 2π and the Hopf fibre period — is the open piece (Remark 3.1). This is the first corpus statement to connect the galactic anchor ($a_0 = \alpha$, the SPARC/Paper 39 scale) to the cosmological expansion rate, and it does so with a falsifiable number rather than a fit. No new objects beyond the de Sitter relation; no published corpus number changes. Verifier: `verify_P358a.py`, 12/12 pass.

Relation to the cosmology arc. 357a named the floor; this addendum lifts it to a candidate bridge with a falsifiable H_0 . The dynamic fold-tail model remains disfavoured by DESI (349a) and the ontologically-faithful dark energy remains the cokernel/void (350a); the bridge here concerns the *rate/clock*, not the dark-energy equation of state, and is independent of those verdicts.