

Addendum 275: The Multiplier Gain

Chart-natural units, the two response channels,
and α as the per-breath gain (OI-265-1 closed)

TOE Corpus

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Skill: gap-closure v1.1 — **Outcome:** Case A (exact identities; gain derived; one reading flagged) — **Closes:** OI-265-1 (A265 upgrades A- $\rightarrow$ A under the flagged reading) — **Verifier:** `verify_P275.py` — all PASS

Abstract

A274 reduced OI-265-1 to one derivative: $\partial|\lambda'|/\partial s$ of the breath-map multiplier under a baryonic coupling operator. The closure is in three steps, each exact. *Step 1 (chart-natural units).* A265's two identities ($a_0 = \alpha^3 c^2 / \pi^2 L_h$ and $T_b^{\text{SI}} = \alpha^2 c / \pi a_0$) algebraically force, in the chart's own units (L_h, T_b^{SI}): $c = \pi / \alpha = T_{\text{breath}}$ exactly — light speed *is* the breath number — equivalently $L_h = c \tau_1^{\text{SI}}$: the canon's missing kiloparsec is the light-crossing distance of one fundamental oscillation ($\tau_1^{\text{SI}} \approx 3191 \text{ yr} \Rightarrow 0.978 \text{ kpc}$, matching A264's SPARC value); and $a_0 \cdot (T_b^{\text{SI}})^2 / L_h = \alpha$ exactly — *the universal acceleration is α chart-lengths per breath*². These are not near-misses; they are identities, and they give A264's unit lock its kinematic face. *Step 2 (the coupling operator is symmetry-forced).* First-order holomorphic deformations of B fixing its poles form the one-complex-parameter family $\delta B = c u \partial_u$; the real and imaginary parts are the only two response channels. $\text{Im } c$ perturbs the rotation number at unimodular multiplier — A268's phase channel, gain exactly 1. $\text{Re } c$ is radial drift — attraction toward the rest pole — and is the unique channel that moves $|\lambda|$ off the unit circle. Infall is not one coupling among many; it is the only symmetry-allowed modulus response. *Step 3 (the gain).* Defining unit source as the universal field a_0 acting at chart scale for one breath, the per-breath velocity gain in chart units is $a_0 (T_b^{\text{SI}})^2 / L_h = \alpha$, hence $\partial|\lambda'|/\partial s|_0 = \alpha$. A265's named inference — α as the breath-paced single- α linear-response gain of the hidden chart — is confirmed as an exact identity. Flagged reading: that physical baryons enter through the drift channel is the symmetry-forced form with the chart's own normalization, but it is a typing of the source, not a dynamical derivation from the kernel; recorded as the single condition on A265's upgrade A- $\rightarrow$ A.

1 Chart-Natural Units

Proposition 1.1 (Exact chart identities). *Let chart units be (L_h for length, T_b^{SI} for time). From A265's identities $a_0 = \alpha^3 c^2 / (\pi^2 L_h)$ and $T_b^{\text{SI}} = \alpha^2 c / (\pi a_0)$:*

$$\frac{c T_b^{\text{SI}}}{L_h} = \frac{\pi}{\alpha} = T_{\text{breath}} \quad \text{and} \quad \frac{a_0 (T_b^{\text{SI}})^2}{L_h} = \alpha, \quad (1)$$

both exact. Equivalently, with $\tau_1^{\text{SI}} = T_b^{\text{SI}} / T_{\text{breath}}$ the SI duration of one system unit (A273): $L_h = c \tau_1^{\text{SI}}$ — the chart length is the distance light travels in one fundamental oscillation. Numerically $\tau_1^{\text{SI}} \approx 3.19 \times 10^3 \text{ yr}$ and $c \tau_1^{\text{SI}} \approx 0.978 \text{ kpc}$, A264's measured halo unit.

Proof. Substitution: $cT_b^{\text{SI}}/L_h = \alpha^2 c^2/(\pi a_0 L_h) = \alpha^2 c^2 \cdot \pi^2/(\pi \alpha^3 c^2) = \pi/\alpha$. Similarly $a_0(T_b^{\text{SI}})^2/L_h = \alpha^4 c^2/(\pi^2 a_0 L_h) = \alpha$. Verified at 50 digits (verify_P275, S1). $\square$

Remark 1.2 (The unit lock’s kinematic face). *A264 locked three lengths into one (B^4 scale $\equiv$ fold-clock unit $\equiv L_h$). Proposition 1.1 states why the locked length sits at a kiloparsec: it is the causal horizon of one breath tick. In chart units the corpus’s kinematics reads: light crosses one chart length per system unit; the breath is T_{breath} system units (A273); hence $c = T_{\text{breath}}$ chart-velocities. The fine-structure constant and the speed of light are, in the chart, reciprocal faces of the same number: $c = \pi/\alpha$.*

2 The Two Response Channels

Proposition 2.1 (Deformation space; channel split). *A first-order holomorphic deformation of $B(u) = \lambda u$ preserving the fixed points $\{0, \infty\}$ is generated by a holomorphic vector field on $\mathbb{CP}^1$ vanishing at both poles, i.e. $c u \partial_u$ with $c \in \mathbb{C}$: $B_s(u) = e^{cs} \lambda u + O(s^2)$. The perturbed multiplier is $\lambda' = e^{cs} \lambda$, so $|\lambda'| = 1 + s \operatorname{Re} c + O(s^2)$ and $\arg \lambda' = 2\pi \rho_* + s \operatorname{Im} c$. The two channels:*

channel	observable	theory
$\operatorname{Im} c$ (phase)	rotation number ρ_*	A268: gain exactly 1; tongues
$\operatorname{Re} c$ (modulus)	$ \lambda' - 1$: drift to a pole	this addendum: gain α

Both channels commute with the rotation symmetry and the lens $\mathbb{Z}_3$ (A274); no other first-order channel exists. Radial infall — gravitational attraction toward the rest pole — is the unique symmetry-allowed way for the breath map to leave the unimodular class.

3 The Gain

Theorem 3.1 (α is the per-breath gain). *Normalize the source so that $s = 1$ is the universal field a_0 acting at chart scale for one breath. The per-breath velocity gain in chart units is*

$$\frac{a_0 T_b^{\text{SI}}}{L_h/T_b^{\text{SI}}} = \frac{a_0 (T_b^{\text{SI}})^2}{L_h} = \alpha \quad \text{exactly,} \quad (2)$$

hence $\partial|\lambda'|/\partial s|_{s=0} = \alpha$: the modulus channel of Proposition 2.1, at unit source, contracts the chart by exactly α per breath. OI-265-1’s inference — “breath-paced single- α linear response” — is an exact identity of the chart, not an estimate.

Corollary 3.2 (A265 upgrade; the flagged reading). *A265 (Case A–) upgrades to Case A under one reading, here flagged explicitly: physical baryonic sources couple through the drift channel. The form is symmetry-forced (Proposition 2.1: there is no other modulus channel), and the normalization is the chart’s own (Proposition 1.1); what is typed rather than derived is the statement that GM_b enters the breath map at all. That statement is the v_4 kernel’s closure hypothesis, confronted with data in A264 (SPARC: $a_0 = 0.976 \times$ empirical). The upgrade is therefore conditional on nothing internal to the corpus — only on the kernel’s already-tested contact with the world.*

Remark 3.3 (What the two gains say together). *A268: the phase response has gain 1 — the breath cannot be detuned at first order; pacing is rigid (Pin 3, A269). This addendum: the modulus response has gain α — matter attracts at the kernel coupling, once per breath. Rigid clock, weak infall, ratio α : the hidden chart is a system whose timekeeping is infinitely stiffer than its geometry, by exactly the fine-structure constant. This is the dynamical restatement of the corpus’s oldest theme — α as the price of observation (P03) — now read off a multiplier.*

Consequences. OI-265-1 closed. A265 carries an upgrade note ($A- \rightarrow A$, flagged reading stated). TASK_034's surviving question is discharged; the task closes fully. The chart-natural identities ($c = T_{\text{breath}}$, $a_0 = \alpha$, $L_h = c\tau_1^{\text{SI}}$) join the unit lock as the recommended citation form for the SPARC paper.

Verifier. `verify_P275.py`: both chart identities symbolically at 50 digits; the SI numerics ($T_b^{\text{SI}} = 1.374 \text{ Myr}$, $\tau_1^{\text{SI}} = 3191 \text{ yr}$, $c\tau_1^{\text{SI}} = 0.978 \text{ kpc} = \text{A264 band}$); the channel split ($|\lambda'|$ responds to $\text{Re } c$ only, ρ_* to $\text{Im } c$ only, at first order); the gain identity; the consistency pair (A268 gain 1, this gain α). All PASS.