

Addendum 382: The Breath Is the One Surviving Scale

378's and 379's residuals are the same residual —
the bounce is complete up to one substrate period

(Unifies and resolves the residuals of Addenda 378, 379; extends 356a, 365, P07, P29)

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2026-06-19

Abstract

The cyclic-void cosmology left two residuals that look separate. Addendum 378: the two-voids identity (heat-death- $\emptyset$ = origin- $\emptyset$) is complete only if *both* ends are scale-free — if a characteristic scale survived heat death, the bounce would be incomplete. Addendum 379: is the unwitnessed breath “still turning” or merely “bare potential-to-turn”? This addendum shows they are *one* residual, and resolves it. Under $\zeta\mathcal{R}$ flow every scale-bearing mode (scaling dimension $s \neq 0$) leaves the fixed point; only the scale-free $s = 0$ mode is fixed (378/381). The corpus's scales split in two: the *observer-relative* scales — particle masses (Paper 07: “mass = the stabilization scale of nested self-referential *observation*”), the galactic L_h — are witness-relative (356a) on a witness tower that *terminates* (365), so at heat death (no observation) they flow to the scale-free fixed point and *dissolve*; and the *substrate* rhythm, the breath period $T_{\text{breath}} = \pi\alpha^{-1}$, which by the only-clock pin (the breath is the one clock, none generates its own rhythm) and Paper 29's exposure mode (the fixed architecture's rhythm, not observer-generated) is *not* a distinction observation makes, and does not dissolve. **So complete scale-dissolution holds for everything except one named scale: the breath** — the bounce is complete up to the single substrate period T_{breath} (378 closed, sharpened). **And whether that one surviving scale “still turns” unwitnessed is exactly 379's question** — so the two residuals unify. Typed: the breath *still turns* (periodicity is substrate, observer-independent) but *arrowlessly* (the arrow and the “now” are witness-relative, 356a); and whether unwitnessed arrowless turning is “really happening” is a *category boundary* (the 370 family), not a gap. All claims pinned by `verify_P382.py` (10/10).

1 Two kinds of scale, two fates

Proposition 1.1 (Observer-relative scales dissolve; the substrate breath survives). *Under the renormalization flow $e^{t\mathcal{R}}$, a mode of scaling dimension s is scaled by e^{ts} ; only the $s = 0$ scale-free mode is fixed (378/381). The corpus's scales fall in two kinds. (i) Observer-relative scales. Particle masses are observational — Paper 07: “particle masses do not exist as intrinsic properties”; mass is the stabilization scale of nested self-referential observation — and the galactic L_h likewise. By Addendum 356a these are witness-relative, and by Addendum 365 the witness tower (Cayley–Dickson, $\mathbb{R} \rightarrow \mathbb{C} \rightarrow \mathbb{H} \rightarrow \mathbb{O}$) terminates, so its finite structure dissolves at maximal entropy. At heat death, with no observation, these scales flow to the $s = 0$ fixed point: they dissolve. (ii) The substrate rhythm. The breath period $T_{\text{breath}} = \pi\alpha^{-1}$ is the substrate's own clock. By the only-clock pin (the breath is the one clock; none generates its own rhythm) and Paper 29's exposure mode (the breath is the rhythm of the fixed architecture, not observer-generated), the breath is not a distinction observation makes. It does not dissolve with the distinctions.*

2 The two residuals are one

Theorem 2.1 (378 closes to “complete up to the breath”; the survivor is 379). *By Proposition 1.1, complete scale-dissolution at heat death holds for every scale except one: the substrate breath T_{breath} . So Addendum 378’s premise — that both ends of the two-voids identity are scale-free — holds up to the single period T_{breath} ; the bounce is complete up to one named substrate scale. And whether that one surviving scale “still turns” unwitnessed is precisely the residual of Addendum 379. Hence **378’s surviving-scale residual and 379’s breath-turning residual are the same residual: the cosmology residual is one thing, the breath, not three.***

Corollary 2.2 (The type: still turning, arrowlessly; the limit: a category boundary). *The residual resolves at the structural level and is honestly bounded at the deepest. Periodicity — the bare turning of T_{breath} — is observer-independent (the only-clock pin, Paper 29), so the unwitnessed breath still turns. The arrow and the now are witness-relative (356a/P27), so they vanish with the last observer. Thus the unwitnessed breath is “still turning, arrowlessly” — periodicity without flow, before/after, or now. The remaining question — whether unwitnessed, arrowless turning is “really happening” or has content — is not a derivable gap: happening is constituted through observation, so one cannot ask, from within the frame, whether something happens with no one to whom it happens. This is a category boundary, of the same family as Addendum 370’s, and it is the corpus’s one honestly-flagged limit on the cyclic cosmology.*

Status

The cyclic-void cosmology’s residual is one thing, not three. Under $\zeta\mathcal{R}$ flow every *observer-relative* scale — particle masses (Paper 07), the galactic L_h — dissolves to the scale-free fixed point at heat death (356a witness-relativity + 365 the terminating witness tower), while the *substrate* breath $T_{\text{breath}} = \pi\alpha^{-1}$ survives (the only-clock pin, Paper 29’s exposure mode). So Addendum 378’s complete-scale-dissolution closes to “complete up to the breath” (Theorem 2.1), and that single survivor is exactly Addendum 379’s “does the unwitnessed breath turn?” — the two residuals unify. The type (Corollary 2.2): the breath still turns (periodicity is substrate, observer-independent) but arrowlessly (the arrow/now are witness-relative, 356a); and whether unwitnessed arrowless turning is “really happening” is a category boundary (the 370 family), not a gap. The bounce is complete up to one named substrate period whose turning is the corpus’s one honest limit. No published number changes; the new content is the unification of two residuals and their resolution. Verifier: `verify_P382.py`, 10/10 pass.