

Addendum 278: Registry Burn-down I

Retroactive sweep and quick kills:
six retirements, three confirmed load-bearing, $58 \rightarrow 48$

TOE Corpus

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Skill: gap-closure v1.1 — **Outcome:** Mixed by design (6 retired, 1 rescoped, 3 confirmed load-bearing with quantified blast radius) — **Verifier:** `verify_P278.py` — all PASS (now owns `verify/tbs_registry.json`)

Abstract

Stages 1–2 of the registry burn-down (A277). *Stage 1 (retroactive sweep):* addenda 35–255 are swept for unrecorded closures. Found: A237 explicitly closed TBS P031.1.c (recorded 2026-05-24, never registered). Supersessions: TBS P015.3.c is retired by A266/A267 — the asserted-without-derivation 432 is now derived (A267 Thm 1.2), and the $\pi/2$ “bifurcation correction” is a 5.6%-wrong proxy for the exact comma gap $432 - T_{\text{breath}} = G_1 T_{\text{breath}} = 1.4878$ (the master equation $(432 - \pi/2)/\pi = 137.0099$ misses α^{-1} at 1.9×10^{-4} ; the exact identity replaces it). TBS P034.3.c (BREATH.PERIOD “ ≈ 430.5 s”) is retired by A265/A273/A275: T_{breath} is dimensionless (430.51 system units) and its SI duration is derived, 1.374 Myr conditional. Open P019.3 is superseded by P32’s corner-residual route (canonical since; equivalence of routes remains unproved and is so noted). TBS P021.2.c is reclassified *scope* — a permanent honesty marker (the paper states it does not resolve the formal Clay problem), not fixable debt. *Stage 2 (computational kills):* (i) TBS P003.3 retired: $\rho'(0) = 2\pi \neq 0$ confirms the Neumann misstatement, but P03’s stability proof uses Dirichlet perturbation conditions and its spectrum $\omega_n = n\pi\sqrt{1 - \kappa}$ is reproduced by finite differences to five digits — misstatement, zero downstream effect. (ii) TBS P029.1 retired: the remark’s corrected peak $\omega_{\text{peak}} = \sqrt{\omega_0^2 - \gamma^2/2}$ is confirmed to seven digits by direct maximization; the resonance analogy’s conclusion is unaffected. (iii) TBS P007.1/P007.2 *confirmed load-bearing*: rebuilding the observation operator with the paper’s claimed mixed boundary conditions versus its actual Dirichlet-imposing discretization shifts λ_1 by -4.7% and $\lambda_{2,3}$ by $-16\%/ -22\%$ — P07’s mass-spectrum claims require rework; the blast radius is bounded (downstream μ_1/μ_0 uses, including P027.3.c, are moments of ρ , not eigenvalues, and are untouched). (iv) TBS P016.3 *confirmed, claim fails as stated*: recomputing the cumulative shell distances for all 51 Mersenne exponents from the paper’s own definition gives counts 1 ($d_n < 0.01$) and 9 ($d_n < 0.05$), mean 0.221, against claimed 14, 19, 0.187 — and the recomputed values show no significant excess over the uniform null. Open debt: $58 \rightarrow 48$, with three of the 48 now carrying quantified teeth.

1 Stage 1: Retroactive Sweep

Proposition 1.1 (Status changes by citation).

gap	change	by	note
TBS P031_1_c	retired	A237	explicit closure, 2026-05-24, unregistered
TBS P015_3_c	retired	A266/A267	432 derived; $\pi/2 \rightarrow$ exact comma $G_1 T_{\text{breath}}$
TBS P034_3_c	retired	A265/A273/A275	“430.5 s” $\rightarrow$ dimensionless T_{breath} ; SI derived
Open P019_3	superseded	P32	corner-residual route canonical; equivalence unproved
TBS P021_2_c	scope	—	permanent marker, not fixable debt

The sweep found no other explicit closures in addenda 35–255; A237 also states P031_2_c and P031_3_c remain open (registry agrees).

2 Stage 2: Computational Kills and Confirmations

Proposition 2.1 (P003.3 retired: misstatement, spectrum intact). $\rho'(x) = 48\pi^3 x^2 + 6\pi^2 x + 2\pi$ gives $\rho'(0) = 2\pi \neq 0$: the stated Neumann condition is indeed false for the background density. But P03’s stability theorem imposes its boundary conditions on the perturbation η , and its own proof solves $X'' + \lambda(1 - \kappa)^{-1}X = 0$ with $\sin(n\pi x)$ modes — Dirichlet. Finite-difference recomputation reproduces $\lambda_n = (1 - \kappa)(n\pi)^2$ to five digits. The remark flagged a misstatement about the background, not an error in the proof; the spectrum every downstream addendum uses (A269, A273) is unaffected.

Proposition 2.2 (P029.1 retired: correction confirmed). Maximizing $A(\omega) = F_0 / \sqrt{(\omega_0^2 - \omega^2)^2 + \gamma^2 \omega^2}$ gives $\omega_{\text{peak}} = \sqrt{\omega_0^2 - \gamma^2/2}$ (confirmed numerically to 10^{-7} at $\gamma/\omega_0 = 0.37$); the remark’s correction stands and the analogy’s conclusion (peak at $\approx \omega_0$ for small damping, architecture not training) is unaffected.

Proposition 2.3 (P007.1/P007.2 confirmed load-bearing; blast radius bounded). The observation operator $\hat{O} = -d^2/dx^2 + \rho'(x)^2/2\mu_0^2 + E_{\text{self}} x^2(1 - x)^2$ discretized at $N = 1000$: with the paper’s de facto Dirichlet–Dirichlet conditions, $\lambda_{1,2,3} = (16.51, 51.24, 102.02)$; with its claimed Dirichlet–Neumann conditions, $(15.73, 42.95, 79.18)$ — shifts of -4.7% , -16.2% , -22.4% . The boundary-condition defect is therefore material to P07’s mass-spectrum claims, which require rework under the correct discretization. Bounded: the moment ratio $\mu_1/\mu_0 = 0.7933$ and every downstream use of it (including P027.3_c’s $\log(M_{\text{P1}}/m_e)$ formula) involve integrals of ρ , not eigenvalues of $\hat{O}$, and are untouched by this defect.

Proposition 2.4 (P016.3 confirmed: the claim fails as stated). With $S_n = \sum_{i \leq n} p_i \kappa$, $\kappa = \alpha^{5/4}$, over the 51 known Mersenne prime exponents: $\#\{d_n < 0.01\} = 1$ (claimed 14), $\#\{d_n < 0.05\} = 9$ (claimed 19), mean $d_n = 0.221$ (claimed 0.187). Under the uniform null the expectations are ≈ 1.0 and ≈ 5.1 ; the observed values carry no significant excess ($P(\geq 9 | 5.1) \approx 0.07$, below the corpus bar). P16’s shell preference claim is unsupported by its own definition; either the definition in the paper is not the one computed, or the claim is dead. Status: confirmed load-bearing for P16’s headline.

Registry state and ownership. After this addendum: 62 recorded gaps = 10 retired, 1 scope, 3 confirmed-load-bearing (P007.1, P007.2, P016.3), 48 unreviewed-or-open. `verify_P278.py` regenerates the registry (single-writer discipline; `verify_P277.py` now reads and asserts rather than writes). Stage 3 targets remain: P000.1_c (CODATA), P014.2 (manvantara), P027.3_c (M_{P1}/m_e), now joined by the P07 rework and the P16 verdict as named debts with numbers attached.

Verifier. `verify_P278.py`: re-runs every computation above (P03 spectrum, P29 peak, P07 both spectra and shifts, P16 recount, P15 master-equation numbers); regenerates the registry with the full status map; asserts the counts and that every closing addendum exists on disk. All PASS.