

Addendum 286: The Tau Residual

Constant β excluded; the exponent run pinned;
one-parameter rescues refused

TOE Corpus

2026-06-10

Skill: gap-closure v1.1 — **Outcome:** Case B– (exclusion theorem + pinned targets; no rescue found, none invented) — **Files:** OI-286-1 — **Verifier:** verify_P286.py — all PASS

Abstract

A281 settled P07’s boundaries and left the tau as the operator’s open question. This audit determines what kind of question it is. *Exclusion:* with the settled spectrum ($\lambda_{1,2,3} = 16.507, 51.239, 102.020$, $N=2000$) and the derived exponent $\beta = 6\mu_1/\mu_0 = 4.7601$, the required per-level exponents are $\beta_2 = 4.7069$ (muon, -1.12%) and $\beta_3 = 4.4768$ (tau, -5.95%): **no constant exponent fits the three leptons**; the derived one overshoots both, increasingly with level. *The run is super-quadratic:* the drops $(0.053, 0.283)$ scale by $5.3\times$ from level 2 to 3, excluding corrections linear ($2\times$) or quadratic ($4\times$) in level index, and log-eigenvalue, $\sqrt{\lambda}$, and index-exponential forms fare no better — *no one-parameter corpus-natural extension fits muon and tau simultaneously* (eight families tested). *The trivial rescue, refused:* the offset family $m_n/m_e = ((\lambda_n - \lambda_0)/(\lambda_1 - \lambda_0))^{\beta'}$ has two parameters and two targets, so it fits exactly — at $\lambda_0 = 5.203$, $\beta' = 3.797$. Neither value lands on a corpus constant at bar precision (nearest: $\beta' \approx 6(\mu_1/\mu_0)^2 = 3.776$ at 0.5% ; $\lambda_0 \approx \lambda_1/\pi = 5.254$ at 1.0% — recorded as flags, worthless until one is derived, since a two-parameter fit to two numbers identifies nothing). *Verdict:* the tau residual is not noise and not a tuning error; it is **structure the mapping lacks** — either a derived running $\beta(n)$ or a V_{obs} correction that moves λ_3 by -12% while holding λ_2/λ_1 nearly fixed. Any future derivation now has pinned targets: $(\beta_2, \beta_3) = (4.7069, 4.4768)$, equivalently $(\lambda_0, \beta') = (5.203, 3.797)$. Filed as **OI-286-1**. The honest scorecard of P07 after this cycle: electron exact (anchor), muon 1.1% , tau 6.0% in exponent — a real partial success whose failure mode is now precisely characterized, which is more useful to a future derivation than the optimistic “ 94.8% ” ever was.

Proposition 0.1 (Exclusion and pinning). *With the A281 spectrum and derived β : the per-level required exponents $\beta_n = \ln(m_n/m_e)/\ln(\lambda_n/\lambda_1)$ are $\beta_2 = 4.7069$, $\beta_3 = 4.4768$, against derived 4.7601 . The drop ratio $(\beta - \beta_3)/(\beta - \beta_2) = 5.34$ excludes level-linear (2) and level-quadratic (4) corrections; tested and failing likewise: corrections proportional to $\ln(\lambda_n/\lambda_1)$ (1.61), $\sqrt{\lambda_n} - \sqrt{\lambda_1}$ (1.95), $\lambda_n - \lambda_1$ (2.46), e^{n-2} (2.72), and the multiplicative dressings $(1 \pm \mu_1 \alpha^2)^n$ ($\sim 10^{-3}$, two orders too small). Eight families, zero fits.*

Remark 0.2 (What a rescue must look like). *The pinned pair $(\lambda_0, \beta') = (5.203, 3.797)$ is a complete reparametrization of the residual: any proposal can be checked against it in one line. A proposal earns filing only by deriving one of the pinned values; matching them by construction is the trivial fit this addendum already performed and refused. The nearest-flag pair $(6(\mu_1/\mu_0)^2, \lambda_1/\pi)$ is recorded for the day a derivation produces either from the operator’s structure — at which point the other becomes a prediction, and the tau becomes a test instead of a residual.*

Verifier. `verify_P286.py`: the spectrum ($N=2000$); the required exponents; the exclusion table (eight families with their ratios against the required 5.34); the offset solve by bisection and the pinned pair; the nearest-flag distances. All PASS.