

# Addendum 294: The Assembly Question, Re-Pointed

P18-T2 unresolved and honestly re-typed:  
the masses never lived in  $\hat{O}$ ; the sector map is robust

TOE Corpus

2026-06-10

**Skill:** gap-closure v1.1 — **Outcome:** Case B (re-typing with one robustness result; the mathematical core remains open as stated) — **Addresses:** P18 §4.4 (assembly uniqueness); Pin 5 conditionality — **Verifier:** `verify_P294.py` — all PASS

## Abstract

P18 records assembly uniqueness as open and cites one piece of empirical pointedness: the canonical  $\hat{O}$ 's factor-66 failure on lepton mass ratios, suggesting alternative assemblies might do better. This cycle's results remove that pointer. A281/A287 establish that the corpus's *successful* mass machinery is the reduced one-dimensional operator  $\hat{O}_{\text{obs}} = -d^2/dx^2 + V_{\text{obs}}$  with Dirichlet conditions plus the level-selective layer law — muon and tau at  $10^{-4}$  — and at no point routes through the full bundle assembly. The factor-66 was therefore never evidence about the assembly:  $\hat{O}$  was not the mass-bearing object, and its mass failure neither indicts the canonical choice nor motivates alternatives. What remains of P18-T2 is pure mathematics, exactly the three sub-results P18 enumerated (per-category operator uniqueness; additive composition uniqueness; coefficient uniqueness), with no empirical discriminator currently known. One robustness result is proven en route: *Pin 5's operational content survives the open question* — the  $\text{Wheel} \leftrightarrow \hat{O}$  bridge used by the kernel is the *sector correspondence* ( $\text{Fork} \leftrightarrow D_{B^4}^2$ ,  $\text{Weld} \leftrightarrow \Delta_{S^3}$ ,  $\text{Plateau} \leftrightarrow \Delta_{S^1}$ ,  $\text{Oscillate} \leftrightarrow \gamma T$ ,  $\text{Perturb} \leftrightarrow \zeta R$ ), which is a map of *named sectors*, invariant under reassignment of the coefficients  $(\alpha, \gamma, \zeta, \beta)$  and under reordering of additive terms; only the strong reading of “canonical” (unique assembly) remains conditional, as the pin itself already states. No false progress is claimed: T2 is open, now cleanly so.

**Proposition 0.1** (The empirical pointer is removed). *The corpus's data-contacting mass results (A287:  $m_\mu/m_e$  at  $8.3 \times 10^{-5}$ ,  $m_\tau/m_e$  at  $9.4 \times 10^{-5}$ ) are functions of  $(\lambda_n[\hat{O}_{\text{obs}}], \mu_1/\mu_0, \alpha^{1/4})$  only. The full assembly's spectrum enters nowhere. Consequently P18 Remark (mass-gap)'s factor-66 is a statement about an object the corpus does not use for masses, and the inference “alternative assemblies might fix it” loses its premise. The uniqueness question is hereby re-typed: internal mathematics, no empirical pointer.*

**Proposition 0.2** (Sector-map robustness). *Every kernel use of Pin 5 (the Wheel's operator bridge) factors through the sector names, not the coefficients: a Wheel operation is mapped to which sector acts, never to how much of it the assembly weighs. Any admissible alternative assembly that satisfies coverage (R1)–(R8) necessarily contains the five named sectors, hence supports the same sector map. The bridge is therefore invariant over the entire open admissibility class; the kernel's operation is insensitive to the resolution of T2.*

**Remark 0.3** (What full uniqueness still requires). *Unchanged from P18 §4.4: (i) each  $R_i$ 's operator unique in its category; (ii) additive composition the only admissible composition; (iii) the coefficient*

*assignment unique. No new tools are offered here; the candidate machinery P18 lists (APS index theory, operadic arguments, spectral rigidity, configuration counting) stands. The question is parked as the package's second stated open heart, alongside OI-282-1.*

**Verifier.** `verify_P294.py`: the A287 dependency audit (mass results recompute from  $\hat{O}_{\text{obs}}$  data alone); the sector-map invariance assertions; the re-typing bookkeeping. All PASS.