

Addendum 322: The Grounding Audit

A framing audit of the corrected selection rule, and the one candidate object the corpus permits

TOE Corpus

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Skill: gap-closure v1.1 — **Outcome:** GROUNDED+STEP (grounding probe and framing audit; one gated object, a first structural step) — **Addresses:** OI-287-1 (corrected); A321; A287 — **Verifier:** `verify_P322.py` — all PASS

Abstract

A321 found that the eighteen-probe overlap-diagonal arc had been matching a functional the corpus excluded, and reverted OI-287-1 to its A287 and A296 form: derive why the lepton mass correction law assigns charged-lepton family n the degree- n Taylor coefficient c_n of the density ρ , with the coefficients read as the integers $(2, 3, 16)$. This addendum runs the mandatory framing audit at the start of that direction, before any further probing. Three candidate objects a derivation could use are each gated against the corpus text. The near-origin object, the reading that the n -th family's onset $\sim x^n$ samples $\rho^{(n)}(0)$ and so extracts c_n , is excluded: A297 already measured the onset and found leading power one for every family, forced by the Dirichlet condition $\psi(0) = 0$, so the eigenstate carries no n in its origin jet; and any readout of c_n from ψ_n is the position-moment overlap A296 and A297 set aside, the withdrawn functional in another form. The moment object is a distinct use of ρ that supplies the hierarchy scale, not the family-to-degree pairing, and carries no corpus identity on which to base a step. The $\mathbb{Z}_3$ -grading object, the three families as the ω^k eigenspaces of the layer-cycle operator of P20, is corpus-mandated and distinct from the overlap-diagonal; it gates a first structural step, the consistency that the degree of ρ , the number of nonzero coefficients, the number of $\mathbb{Z}_3$ eigenspaces, and the number of families are all three. The verdict is GROUNDED+STEP, with the scope stated plainly: the gated step is the count-and-grading consistency, not the derivation of why degree k of ρ attaches to eigenspace k , which remains the open core. The overlap-diagonal stays withdrawn and no new arena search is opened.

1 The Problem and the Audit

Proposition 1.1 (The integer assignment is the density's own jet; one candidate object is corpus-mandated and distinct from the withdrawn functional). *The coefficients of $\rho(x) = 16\pi^3 x^3 + 3\pi^2 x^2 + 2\pi x$ are its Taylor data at the center, $c_n = \rho^{(n)}(0)/(\pi^n n!) = (2, 3, 16)$, normalized $(1, \frac{3}{2}, 8)$, computed here from $\rho'(0) = 2\pi$, $\rho''(0) = 6\pi^2$, $\rho'''(0) = 96\pi^3$. The corrected OI-287-1 asks why the mass correction law of A287 assigns family n the integer c_n read directly. Three objects a derivation could use are gated against the corpus:*

- (i) The near-origin object. *The reading that the n -th family's onset $\sim x^n$ samples $\rho^{(n)}(0)$ and so extracts c_n . This is not corpus-mandated and is excluded. A297 measured the onset of the lowest three eigenstates of the production operator and found leading powers $(0.999, 0.997, 0.995)$, recomputed here, all one: the Dirichlet condition $\psi(0) = 0$ forces every family linear at the*

center, so the origin jet carries no n . Further, any readout of c_n from ψ_n is an overlap $\langle \psi_n | x^k | \psi_n \rangle$, the position-moment probe A296 and A297 excluded and A321 withdrew. The object is the withdrawn functional in another form.

- (ii) The moment object. The reading that an identity links the moments $\mu_n = \int_0^1 x^n \rho dx$ to c_n . The moments are $(\mu_0, \dots, \mu_3) = (137.04, 108.72, 90.18, 77.06)$ with $\mu_0 = \alpha^{-1}$, monotone decreasing, with ratios at $L_2 = 7.3$ from $(1, \frac{3}{2}, 8)$; the corpus uses them for the mass hierarchy, not for the family-to-degree pairing. The object is distinct from the overlap-diagonal but empty: no corpus identity derives the assignment from the moments.
- (iii) The $\mathbb{Z}_3$ -grading object. The three families as the ω^k eigenspaces of the layer-cycle operator, $T_{\text{cycle}}\psi^{(k)} = \omega^k \psi^{(k)}$, $k = 0, 1, 2$, enforced by $\pi_1(L(3, 1)) = \mathbb{Z}_3$ (P20). This is corpus-mandated and distinct from the overlap-diagonal: a representation-theoretic grading is not an expectation value of ψ_n against a monomial. It is the one object that passes the gate.

2 The Gated Step and Its Scope

Remark 2.1 (A structural first step, and what it does not yet reach). *On the gated object the first checkable step is the structural consistency already recorded in A301, restated here as the grading object's own statement: the degree of ρ , the number of nonzero coefficients c_n , the number of $\mathbb{Z}_3$ eigenspaces, and the number of families are all equal to three. The verifier confirms this. The scope is stated plainly. The step establishes that the coupling-side grading and the topological grading agree on the count; it does not derive why degree k of ρ attaches to eigenspace k , which is the open core of the corrected problem. A316 found that the real reduction of the layer-cycle phase, $\text{Re}(\omega^k)$, takes equal values on $k = 1$ and $k = 2$ and folds families two and three, so the genuine pairing requires the complex ω^k phase; the structural step does not supply that pairing. The fan-out, to be entered only after this grounding confirms the framing, is then: test whether the genuine complex ω^k eigenspace k pairs with the degree- k graded piece of ρ by representation theory, at the structural and grading level rather than as a magnitude functional; ask whether the identity $c_n = \rho^{(n)}(0)/(\pi^n n!)$ is itself a reading of the $\mathbb{Z}_3$ -graded structure of ρ on the lens space, independent of any wavefunction overlap; and only after a corpus-faithful pairing is confirmed, test whether it reproduces the mass-law assignment. The overlap-diagonal of A299 through A320 remains withdrawn and is not revived by any of these; no new arena search is opened.*

Status. OI-287-1 remains open in its corrected A287 and A296 form. The framing audit gates one corpus-faithful object, the $\mathbb{Z}_3$ grading of P20, and excludes the near-origin reading as the withdrawn functional in another form. The first step is structural and consistent; the derivation of why degree k attaches to eigenspace k is the standing open core. No published number changes; the A287 lepton law and its 10^{-4} accuracy are untouched.

Verifier. `verify_P322.py`: recomputes $c_n = \rho^{(n)}(0)/(\pi^n n!) = (2, 3, 16)$ and the direct readout $(1, \frac{3}{2}, 8)$ at $L_2 = 0$; the moments with $\mu_0 = \alpha^{-1}$, monotone decreasing and at $L_2 = 7.3$ from the target; the production eigenvalues $(16.51, 51.24, 102.02)$ with node counts $(0, 1, 2)$ and the near-origin onset powers $(0.999, 0.997, 0.995)$, all linear; the exclusion of the near-origin object as the withdrawn functional; and the GROUNDED+STEP verdict with the structural consistency $\deg \rho = 3$. Eight checks, all PASS.