

Addendum 327: The $G1$ Audit

The selection half of $G1$ is corpus-faithful; the magnitude half is the withdrawn overlap-diagonal, an irreducible posit

TOE Corpus

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Skill: gap-closure v1.1 — **Outcome:** NO-FAN-OUT (framing audit, probe 1; the magnitude half of $G1$ is the withdrawn overlap-diagonal, an irreducible flagged posit) — **Addresses:** OI-287-1 (corrected); A326; A323; A312; A296; A287 — **Verifier:** `verify_P327.py` — all PASS

Abstract

A326 reduced the why-question of OI-287-1 to one irreducible premise $G1$: the mass-law coefficient a charged-lepton family draws is the character-resonant layer of its T_{cycle} eigenspace. The eigenspaces are $\mathbb{Z}_3$ Fourier combinations spread equally over the three layers, so $G1$ is a projection choice, not forced by $\mathbb{Z}_3$ -equivariance. This addendum opens a new thread, to derive $G1$ from the master-operator $\hat{O}$ dynamics, and per the binding process rule it runs the mandatory framing audit *first*. The danger is acute: the obvious operationalization of $G1$, the first-order perturbative shift of the density sector $\lambda\rho$ on an eigenstate, is the overlap-diagonal that A296 excluded and A321 withdrew. We decompose $G1$ into a *selection* half (which coefficient's block a family couples to) and a *magnitude* half (that the correction strength equals the coefficient's value), and audit four candidate derivation objects against the exclusion boundary. The first-order density-sector shift, **O-PT-diagonal**, is gated out: it is $\alpha \sum_k c_k \pi^k \langle \psi_n | x^k | \psi_n \rangle$, an affine image of the very $\langle \psi_n | x^k | \psi_n \rangle$ magnitudes A296 excluded on scale and shape, with the withdrawn diagonal as its $k = n$ term. We prove this numerically by building both. The $\mathbb{Z}_3$ Schur block, **O-equivariant-block**, and the renormalization scaling weight, **O-scaling-weight**, are gated in for the selection half only: both are corpus-faithful and form no overlap, but the scaling dimension of the degree- k density term is $p = k$, the degree $(1, 2, 3)$, the selection index, not the coefficient value $(2, 3, 16)$. No corpus identity expresses $(2, 3, 16)$ as a scaling dimension, an index, or a heat-kernel multiplicity; the c_n are the Taylor integers $\rho^{(n)}(0)/(\pi^n n!)$, set by ρ 's definition. The selection half of $G1$ is therefore derived, corpus-faithful, by two independent objects; the magnitude half is intrinsically the coefficient value, whose only readout off an eigenstate is the withdrawn overlap-diagonal. The verdict is NO-FAN-OUT: nothing tempting gates in for the magnitude that is distinct from the withdrawn functional, so $G1$'s magnitude is an irreducible flagged posit, matching A287's PSLQ-honesty, and OI-287-1 is as closed as honesty allows. The overlap-diagonal stays withdrawn; no published number changes.

1 The Audit Frame and the Exclusion Boundary

Remark 1.1 (Probe 1 runs the framing audit first). *This is the opening probe of a new thread on OI-287-1, so the binding process rule applies: re-ground the candidate objects against the corpus and gate out anything that revives a withdrawn functional, before proposing any derivation. The withdrawn object is the overlap-diagonal $B[n] = \langle \psi_n | c_k \pi^k x^k | \psi_n \rangle / \lambda_n$, which A296 introduced as the “bare Taylor probe” and excluded in the same addendum (its third proposition: the diagonal shift is short of the required log-eigenvalue shifts by factors 32 and 42 at $n = 2, 3$, the two factors*

disagreeing by about 28%, so “Excluded both on scale and on shape”), and which A321 withdrew as the object of the problem after the A299–A320 arc chased its artifact gap across seven arenas. The verifier rebuilds the production operator $H = -\partial_x^2 + \rho'(x)^2/(2\Omega^2) + E_{\text{self}}x^2(1-x)^2$ on Dirichlet $[0, 1]$, recovers the eigenvalues (16.51, 51.24, 102.02), and reproduces the withdrawn diagonal (1, 1.12, 7.50) at $L_2 = 0.63$ to the target (1, 1.5, 8), matching A299 and A321. This is the boundary; the candidates are tested against it, not built from it.

Remark 1.2 (The selection / magnitude split of G1). G1 asserts two things at once. The selection half: family- k (character k) draws the resonant character block of ρ , i.e. which of the three coefficients it couples to. The magnitude half: the resulting correction strength equals that coefficient’s value — A287’s $c_n \alpha^{1/4}/\lambda_1$ per unit coefficient. The two halves have different standing against the corpus, and the audit must judge them separately. The selection half is a which-block statement, representation-theoretic; the magnitude half is a value, and the only operator object that reads a coefficient’s value off an eigenstate is an expectation $\langle \psi | \cdot | \psi \rangle$ — the withdrawn functional.

2 The Gate, Object by Object

Proposition 2.1 (O-PT-diagonal is the withdrawn overlap-diagonal — gated out). The density-coupling sector of $\hat{O}$ is $\lambda\rho(x) = \alpha\rho(r)$, a multiplication operator (P18 §3.5). First-order perturbation theory of a multiplication operator V on a non-degenerate eigenstate ψ_n gives the energy shift $\langle \psi_n | V | \psi_n \rangle$. For $V = \alpha\rho = \alpha \sum_k c_k \pi^k x^k$ this is

$$E_n^{(1)} = \alpha \sum_{k=1}^3 c_k \pi^k \langle \psi_n | x^k | \psi_n \rangle,$$

an affine combination of the monomial expectations $\langle \psi_n | x^k | \psi_n \rangle$ — the same table the withdrawn overlap-diagonal is built from. The withdrawn diagonal is literally the $k = n$ term of this expansion, divided by λ_n : $\alpha c_{n+1} \pi^{n+1} \langle \psi_n | x^{n+1} | \psi_n \rangle = \alpha \lambda_n B_{\text{raw}}[n]$, verified to machine precision. O-PT-diagonal therefore reaches for exactly the $\langle \psi | \cdot | \psi \rangle$ magnitudes A296 excluded on scale and shape. It revives the withdrawn functional and is gated out, citing A296 and A321.

Proposition 2.2 (O-equivariant-block is the selection half — gated in for selection, silent on magnitude). A $\mathbb{Z}_3$ -equivariant density coupling commutes with T_{cycle} and is block-diagonal across the three characters; by Schur orthogonality $\frac{1}{3} \sum_j \omega^{(a-b)j} = \delta_{a=b}$, family- k couples only to the character- k block (A323). This is a which-block statement: it forms no overlap and reads no eigenstate. It fixes which degree each family couples to (the degree- k term carries character $k \bmod 3$, so the present degrees 1, 2, 3 carry characters 1, 2, 0 and each character selects one degree), but it says nothing about the coupling magnitude. The value $c_k = (2, 3, 16)$ is read off ρ ’s definition, not produced by the block. O-equivariant-block is gated in for the selection half, corpus-faithful and overlap-free, and is silent on magnitude.

Proposition 2.3 (O-scaling-weight reads the degree, not the value — gated in for selection, gated out for magnitude). The renormalization sector is $\mathcal{R} = r \partial_r + \Delta_\psi$ with eigenfunctions r^p and eigenvalue the scaling dimension p (A312, P18 §3.6). The degree- k density monomial x^k has scaling dimension $p = k$: the renormalization generator reads the degree (1, 2, 3), an index-like integer intrinsic to the operator, with no overlap. But the degree is the selection index — which layer, which character — not the coefficient value: the scaling weights are (1, 2, 3) while the coefficients are (2, 3, 16), distinct data. The mass formula’s exponential arises from $\mathcal{R}$ (P18 §4.5), and the

A287 law enters c_n as a subtraction in that exponent, $\beta_n = 6\mu_1/\mu_0 - c_n\alpha^{1/4}/\lambda_1$; so the scaling sector is the right home for the correction, and it supplies the selection weight $p = k$. It does not supply the magnitude. No corpus identity expresses $(2, 3, 16)$ as a scaling dimension, an index, or a heat-kernel multiplicity: $(2, 3, 16)$ is neither the scaling dimensions $(1, 2, 3)$, nor the $\text{SO}(4)$ -Casimir multiplicities $(1, 4, 9)$ of $A314$, nor any degree sequence; the c_n are the Taylor integers $c_n = \rho^{(n)}(0)/(\pi^n n!)$, set by ρ 's definition in P03. O-scaling-weight is gated in for the selection half and gated out for the magnitude half.

Remark 2.4 (No fourth object yields the magnitude without an overlap). *A coefficient's value is, by construction, an integer datum of ρ . To read it off the state of family- k requires a functional of ψ_k that returns c_k , and the $\mathbb{Z}_3$ -equivariant such functionals that distinguish the three families are the overlap expectations $\langle \psi_k | \cdot | \psi_k \rangle$ — precisely the withdrawn class. The selection-half objects (Schur block, scaling weight) return the degree, never the value. We searched for a faithful non-overlap object that yields the value and found none; we decline to manufacture one to justify a fan-out.*

3 The Verdict

Object	Gate	Reason
O-PT-diagonal	OUT	affine image of the withdrawn overlap-diagonal (A296/A321)
O-equivariant-block	IN (selection only)	A323 Schur block; no overlap; silent on value
O-scaling-weight	IN (selection only)	A312 scaling dim $p = k$ is the degree, not the value
	OUT (magnitude)	no index identity for $(2, 3, 16)$; Taylor integers of ρ

Table 1: The gate ledger. The selection half of $G1$ is gated in, corpus-faithful, by two independent objects; the magnitude half is gated out as the withdrawn overlap-diagonal.

Proposition 3.1 (The selection half is derived; the magnitude half is an irreducible posit). *The selection half of $G1$ — family- k draws the resonant character block — is corpus-faithful and derived, supplied independently by the A323 Schur block and the A312 scaling-dimension degree, neither forming an overlap. The magnitude half of $G1$ — the correction strength equals the coefficient's value — is intrinsically the coefficient value c_n , whose only readout off an eigenstate is the withdrawn overlap-diagonal. No faithful non-overlap object yields it. The magnitude half is therefore an irreducible flagged posit, and it coincides with A287's own PSLQ-honesty, which already records the strength $c_n\alpha^{1/4}/\lambda_1$ as a flagged, underived identification. The audit does not weaken A287; it locates the residual exactly where A287 left it.*

No fan-out. The pre-registered question for this thread was whether any $\hat{O}$ -faithful object derives $G1$'s magnitude content without an eigenstate overlap. The audit answers no, decisively. The selection half is already derived; the magnitude half is the withdrawn functional. Nothing tempting gates in for the magnitude that is distinct from the overlap-diagonal, so no parallel fan-out is warranted. This is itself the result: $G1$'s magnitude is an irreducible flagged posit, and OI-287-1 is as closed as honesty allows — its selection mechanism derived (the $\mathbb{Z}_3$ character rule of A323/A324, the bridge forced to $G1$ by A326), its magnitude a posit matching A287. A clean negative is worth more than a manufactured object.

Status. OI-287-1 remains open in its corrected form, and its residual is now characterized precisely. The why-question splits into a selection half, which is derived and corpus-faithful, and a magnitude half, which is the withdrawn overlap-diagonal and hence an irreducible posit. To close the magnitude half one would have to revive the functional A321 withdrew, which the seven-arena exclusion (A299–A320) and A296’s scale-and-shape exclusion both forbid. The honest terminus is therefore: posit $G1$ ’s magnitude as a flagged corpus axiom, exactly as A287 already does for the strength. The overlap-diagonal stays withdrawn; no wavefunction overlap is formed as a derivation object; no published number changes; the A287 lepton law and its 10^{-4} accuracy are untouched.

Verifier. `verify_P327.py`: recomputes $\alpha^{-1} = 4\pi^3 + \pi^2 + \pi$ and $c_n = \rho^{(n)}(0)/(\pi^n n!) = (2, 3, 16)$; rebuilds the production operator and the withdrawn overlap-diagonal $(1, 1.12, 7.50)$ at $L_2 = 0.63$ and records A296’s scale-and-shape exclusion; builds the density-sector first-order PT shift and proves it is $\alpha \sum_k c_k \pi^k \langle \psi_n | x^k | \psi_n \rangle$ with the withdrawn diagonal as its $k = n$ term, gating O-PT-diagonal out; recomputes the Schur block and confirms it selects which degree but not the value, gating O-equivariant-block in for selection only; recomputes the renormalization scaling dimension $p = k$ and confirms it reads the degree $(1, 2, 3)$, not the value $(2, 3, 16)$, with no index identity for $(2, 3, 16)$ against the scaling dimensions, the $SO(4)$ -Casimir multiplicities, or the degrees, gating O-scaling-weight out for magnitude; resolves the selection / magnitude split; states the NO-FAN-OUT verdict; and guards that the overlap-diagonal is built only to demonstrate the gate-out, not revived as a derivation object. Twenty checks, all PASS.