

Addendum 293: Registry Burn-down IV

The severe items: one repair, one refutation,
two structural diagnoses

TOE Corpus

2026-06-10

Skill: gap-closure v1.1 — **Outcome:** Mixed by design (1 retired, 1 refuted, 4 confirmed load-bearing with diagnoses) — **Verifier:** `verify P293.py` — all PASS

Abstract

The four severest standing registry items, each settled by computation. *P015_1 retired (re-pair).* The claimed $\langle |\cos \theta| \rangle = 1/4$ is indeed wrong — the spherical average is exactly $1/2$ — but P15's *result* $\bar{A}_{\text{shadow}} = S/4$ is nevertheless correct: it is Cauchy's projection formula, with the missing factor 2 being the front-back double count ($\bar{A} = S\langle |\cos \theta| \rangle/2$). Intermediate misstatement corrected; downstream intact. *P020_1 refuted as stated.* The Higgs-VEV conjecture $v = M_{\text{P1}}/\sqrt{\mu_0\mu_1}$ evaluates to 1.00×10^{17} GeV — off by 4.1×10^{14} . The conjecture is dead in its printed form. Two flags recorded, neither promoted: $\ln(v/m_e) = 13.085$ vs $E_{\text{self}} = 13.177$ (0.70%), and $\ln(M_{\text{P1}}/v)/\ln(M_{\text{P1}}/m_e) = 0.7461$ vs $3/4$ (0.53%, the P10 correction) — either would be a route to a corrected conjecture; neither is one yet. *P017_3_c confirmed, with the diagnosis the remark lacked.* The printed radial Dirac system has indicial exponents $-3/2 \pm \frac{3}{2}i$ at the origin — a complex pair: *no regular branch exists*, the boundary-value problem is ill-posed as printed, and the quoted spectrum (0.891, 6.923, 7.763) is unreproducible *in principle*, not merely in practice. A sign convention is missing from the canon. P017_2 (the factor-of-7 gap) inherits: unsupported pending the corrected system. *P013_1/2/3_c confirmed: the quintic is a schema.* The three consistency conditions contain unspecified constants (C_1, C_2, C_3), an unspecified functional (F), and an unproven rationality premise (P013_3_c: $\lambda_1(\alpha)$ is generically transcendental in α); the coefficients $a_5, \dots, a_0$ are not merely uncomputed but *uncomputable as stated*. P13's irreducible-quintic headline is a conjecture-schema until the construction is supplied. (The corpus's $5/4$ exponent and five-fold structure stand independently of P13.) Registry: open debt $44 \rightarrow 38$; the load-bearing class now carries six items, all with quantified diagnoses.

Proposition 0.1 (P015_1: the Cauchy repair). $\frac{1}{4\pi} \int_{S^2} |\cos \theta| d\Omega = \frac{1}{2} \int_0^\pi |\cos \theta| \sin \theta d\theta = \frac{1}{2}$, *not* $\frac{1}{4}$. The shadow average over orientations of a convex body is $\bar{A} = \frac{1}{2} \langle |\cos \theta| \rangle S = S/4$ (Cauchy), the $\frac{1}{2}$ correcting for the two-sided projection count. P15's formula stands; its stated integral is corrected. Retired.

Proposition 0.2 (P020_1: refutation and flags). $M_{\text{P1}}/\sqrt{\mu_0\mu_1} = 1.0003 \times 10^{17}$ GeV ($\sqrt{\mu_0\mu_1} = 122.06$); ratio to $v = 246.22$ GeV: 4.06×10^{14} . Refuted as stated. Flags (recorded per A245/A180, unpromoted, look-elsewhere acknowledged): (i) $\ln(v/m_e) = 13.0854$ sits 0.70% from E_{self} ; (ii) the exponent fraction $\ln(M_{\text{P1}}/v)/\ln(M_{\text{P1}}/m_e) = 0.74605$ sits 0.53% from $3/4$. A corrected conjecture would have to derive one of these and the residual; none is attempted here.

Proposition 0.3 (P017_3_c: ill-posedness diagnosis). Near $r = 0$ the printed system reduces to $(f, g)' = r^{-1}M(f, g)$ with $M = \begin{pmatrix} -3/2 & -3/2 \\ 3/2 & -3/2 \end{pmatrix}$ ($\kappa = 3/2$), whose eigenvalues are $-\frac{3}{2} \pm \frac{3}{2}i$. Both indicial branches are singular and oscillatory; no regular solution exists; “regularity at $r = 0$ ”

cannot be imposed. The printed equations therefore define no spectrum, and the quoted eigenvalues cannot be checked against them. The repair requires the intended sign/convention (standard radial Dirac places κ/r on the diagonal); until the canon supplies it, P017_2's factor-of-7 is unsupported. Confirmed load-bearing, diagnosis filed.

Proposition 0.4 (P013: the quintic is a schema). *Condition 1 invokes $\kappa_{\text{geom}} = C_1\mu_2/\mu_0^2 + C_2\mu_1/\mu_0 + C_3$ with C_i never fixed; Condition 2 invokes $F(\lambda_1, \beta) = 0$ with F never given; the rationality of $\lambda_1(\alpha)$ is unproven and generically false for Sturm–Liouville eigenvalues (P013_3_c stands). Hence $a_5, \dots, a_0$ are uncomputable as stated and the degree bound (P013_2) is unverifiable. P13's headline is reclassified conjecture-schema; its repair requires supplying (C_i, F) from the corpus and proving (or replacing) the rationality premise.*

Registry. P015_1 retired (A293); P020_1 refuted (A293); P017_3_c, P013_1, P013_2, P013_3_c confirmed-load-bearing with diagnoses. Totals: 14 retired, 1 superseded, 1 scope, 2 refuted, 6 confirmed-load-bearing, 38 unreviewed-or-open.

Verifier. `verify_P293.py`: the spherical average; the Cauchy factor; the VEV evaluation and both flags; the indicial eigenvalues; the schema assertions; registry regeneration and counts. All PASS.