The Fermionic Matter Sub-Programme

Presentation Note 6

Jérôme Beau

Independent Researcher

jerome.beau@cosmochrony.org

2026

Version 3.3

Abstract

The fermionic matter sub-programme asks where fermions, chirality, hypercharge and three generations could enter the Cosmochrony framework. Its answer is layered and each layer names its assumptions. A supplied dictionary $F_n \simeq \mathcal{H}_c$ concerns the Heisenberg carrier; the associated Weil block $V_c \simeq \mathbb{C}^q$ and supplied spinor doublet $V_\rho \simeq \mathbb{C}^2$ are distinct, with no selection map constructed. Given a real metaplectic model and the doublet, the algebra is proved without a metric: $\mathfrak{mp}(2,\mathbb{R})_{\mathbb{C}} \simeq \mathfrak{sl}_2(\mathbb{C})$, the symmetric square is the adjoint and the exterior square the determinant line. [H-Spin] identifies the doublet action with the spin group of a four-dimensional Lorentzian co-metric; [H-Weak] supplies a distinct rank-two weak factor with structure group $U(2)$. Neither identification is supplied by a source or excluded by a theorem. Connection-dependent admissible readings retain Q6a's two unproved continuum hypotheses: a smooth effective fibre bundle and a differentiable spatial continuum, the latter open in Q5a. Lorentz chirality and weak chiral selection are different statements. Left-admissibility is an input orientation branch given the Born–Infeld datum; weak $V-A$ is the representation content of [H-Weak], not derived from that branch. Hypercharge constraints need both spin and weak hypotheses; rigidity also uses a supplied colour module and matter decomposition, and the Standard Model pattern needs minimal determinant-line normalisation. A supplied rank-three rule gives a conditional gauge-singlet generation factor. Generation operators are models on a distinct doublet; their reading as restrictions of E^2_Π requires [H-Res], the level-to-generation map is open, and the split value is matching data. The Schur remainder equals the projective endomorphism only under an unsupplied symbol identity; a non-zero split, its Schur transport and Born–Infeld genus remain hypotheses. O31 supplies no colour derivation. NSR excludes its two deposited candidates for an independent weak multiplicity by exact obstructions; this does not exclude every extension, and the weak factor remains an architectural input. *Interpretive outlook (a reading, not a result).* The programme locates the missing connection between internal algebra, Lorentz frames and weak multiplicity, rather than deriving the observed fermionic content.

Keywords. fermionic matter; admissible spinor bundle; metaplectic lift; Lorentzian spin structure; weak factor; chirality; V-A structure; hypercharge constraints; anomaly cancellation; three generations; projected Dirac operator; Weil representation; non-injective projection; presentation note.

Contents

1 Motivation and Central Question **3**

2 Position in the Cosmochrony Programme **4**

3 Logical Chain of the Sub-Programme **5**

4 Constituent Papers **6**

4.1 Q14: Toward fermionic matter from projective Dirac admissibility 7

4.2 Angular Amplitude Reduction: the oriented shear product of the $\mathfrak{sl}_2$ step and the central-phase observable of the Weil cascade [6] 11

4.3 Q11 Oriented Frontier: recursive diagnostic of the angular generation split [17] . 11

4.4 Projective Residue as a Schur Complement 12

4.5 Spin-stratum type-rigidity: an obstruction to the Galois action on the binary icosahedral stratum, with conditional consequences for the chiral lift [12] 12

4.6 Chiral orientation of the directed frontier: σ_L as a representation type [7] 14

4.7 Eliminated block jet: the Lorentzian projector deformation [16] 15

4.8 Born–Infeld saturation margin of the chiral modulus [14] 15

4.9 Conditional weak determinant line and generation-level ordering [23] 15

4.10 Projected Yukawa operator and chiral polar factor [11] 16

4.11 Charged-lepton Koide relation as a unit-dispersion constraint [15] 17

4.12 Ternary phase carrier: colour, generations, and Koide as one carrier [13] 17

5 Inputs from Upstream Results **17**

6 Outputs to Downstream Branches **19**

7 Status of Results **20**

7.1 Structural results 20

7.2 Further structural results 21

7.3 Open problems 22

8 Open Deliverables **24**

9 Conclusion **27**

1 Motivation and Central Question

Convention for J_Π. The notation J_Π is interpreted on the carrier specified in each statement. On the generation carrier C^3_{gen}, it denotes the internal antilinear parity of Q14 Section 6. In the spinorial statements, including the EBJ subsection and the relation $R_b = \varphi \circ J_\Pi^{-1}$, it denotes the chirality-reversing spinorial parity: $J_\Pi \gamma_5 = -\gamma_5 J_\Pi$, under the hypotheses of the spinorial lift. This is the convention used in Q11-OF and CHO [17, 7]. The internal parity on C^3_{gen} alone does not supply a spinorial lift or this chirality relation.

The fermionic matter sub-programme answers the following question.

Central question. The bosonic spectral stratification — gravity at a_2, Yang–Mills at a_4 — derives the bosonic sector of the Standard Model from the same admissible spectral functional. Fermions, chirality, hypercharge assignments, and the three-generation structure are not covered by the bosonic synthesis. *Do these fermionic structures also arise as forced consequences of the admissible Weil fibre, or must they be introduced as additional postulates?*

The answer given in Q14 [21] is stratified, not uniform. It is stated throughout relative to a *supplied* Heisenberg carrier and a fixed non-trivial central character. Foundation distinguishes the Heisenberg carrier $\mathcal{H}_c$, the associated Weil block $V_c \simeq \mathbb{C}^q$, and the supplied spinor doublet $V_\rho \simeq \mathbb{C}^2$. No map selecting the doublet from that block is constructed. The identification $F_n \overset{\text{model}}{\simeq} \mathcal{H}_c$ is not selected by the admissibility axioms, which give irreducibility and non-commutation only under a representation-theoretic dictionary and an additional sector reading of A3, not derived, and neither make the commutator central nor single out a finite Heisenberg group, an explicit $\mathfrak{S}_3$ countermodel satisfying the extracted carrier contract [2, 1]. On that carrier the finite Weil module acts through $\mathrm{SL}(2, \mathbb{Z}/q\mathbb{Z})$, so a real metaplectic model and a doublet carrying its Lie algebra are supplied model data. Given them, the algebra is proved and needs no metric: $\mathrm{mp}(2, \mathbb{R})_{\mathbb{C}} \simeq \mathfrak{sl}_2(\mathbb{C})$, the symmetric square of the doublet is the adjoint and its exterior square the determinant line. Two physical readings of this algebra are separate hypotheses, each a missing identification and neither excluded by any result. [H-Spin] (Hypothesis 2.2 of Q14) identifies the $\mathrm{SL}(2, \mathbb{C})$ acting on the doublet with the spin group of a four-dimensional Lorentzian co-metric on the effective base, and no source supplies it: the geometric branch supplies only a rank-three degenerate co-metric, under its hypotheses, and nothing relates the metaplectic action to its frames. [H-Weak] (Hypothesis 2.3 of Q14) supplies a distinct rank-two weak factor E_{weak} with structure group $\mathrm{U}(2)$, which Q14 does not construct: by Schur's lemma a weak action commuting with Lorentz transformations cannot live on the doublet that carries the spin reading. Under [H-Spin], spinoriality is a statement about spacetime spinors, $\mathrm{Sym}^2(S_L)$ is the Lorentz sector, and $\wedge^2(S_L)$ is a trivial line carrying no hypercharge. Under [H-Weak], the same tensor functors applied to E_{weak} give the weak adjoint, whose compact real form is $\mathfrak{su}(2)_L$, and the determinant line $L_Y := \wedge^2(E_{\text{weak}})$, which carries $\mathrm{U}(1)_Y$ non-trivially only because the structure group of E_{weak} is $\mathrm{U}(2)$. Chirality splits in two. Lorentz chirality is the statement that the projective endomorphism E_Π of the projected Dirac operator is left-admissible, $P_R E_\Pi P_R = 0$: under [H-Spin], the Born–Infeld datum (H1)–(H2) of O30 and the orientation-compatible branch, which is an input. The weak chiral selection, the $V - A$ structure, is the representation content of [H-Weak], and Q14 does not derive it from left-admissibility. Hypercharge does not stand on the same footing, and it separates into two steps. The anomaly-cancellation constraints, which require both hypotheses, are weighted by the representation dimension, so the rigidity of the hypercharge weights carries a supplied three-dimensional colour module as a hypothesis; Q14 neither analyses the constraint system at general multiplicity nor claims that the constraints force three. Selecting the Standard Model pattern from those constraints needs a further premise: that the determinant line $L_Y = \wedge^2(E_{\text{weak}})$ carries the minimal integral normalisation compatible with the $\mathrm{U}(1)_Y$ action on the projected spinorial sectors. Under that premise, and on the Standard Model content without a right-handed neutrino and with $Y_e \neq 0$, the pattern is selected only up to an overall sign, rescaling and the exchange of the labels u_R and d_R, the cubic constraint

vanishing on it precisely at colour multiplicity three. The constraints are the gauge-curvature ones only: the E_Π-dependent traces are not analysed in Q14. Q14 records the explicit connection of that normalisation to the pattern as an open direction: the anomaly constraints restrict the allowed weights, while the determinant-line normalisation fixes their scale. Three generations arise conditionally from the spinorial multiplicity reading of the invariant $\sigma_c(n_3) = 3$, a supplied selection rule (O23 proves the three-dimensionality of the neutral sector of a supplied spinor carrier, Theorem 3.1; the carrier selection and the identification of Σ_c with that dimension are open). The resulting factor C^3_{gen} is distinct from the Lorentz sector and from any spatial triplet: no source identifies the invariant with spatial directions. What is NOT supplied is the independent fermionic weak doublet: the tensor functors of the spinor bundle give Lorentz-typed adjoint and determinant data, and under [H-Spin] the Lorentz commutant of the irreducible Weyl factor is scalar, so no internal non-abelian factor acts on the same spinor factor. The two deposited candidates for the missing multiplicity carrier $M_L \simeq \mathbb{C}^2$ — the internal Hecke operator doublets and the erased history fibres — are excluded by exact obstructions in the companion no-go note (NSR) [10], whose central result is the no-sequential-re-entry theorem: information erased by the projective channel cannot be recovered by any tower of subsequent projections. NSR's finite-stratum obstructions are unconditional (not conditional on [H-Spin]); its Lorentz-lock input is imported from Q14, where the spinor reading of the carrier is under [H-Spin]. The matter-sector weak doublet, the role that this note reads the factor E_{weak} of [H-Weak] as playing (a reading of this note, stated by neither Q14 nor the no-go note), is therefore an explicitly open frontier, realisable through an architectural extension, such as a parallel substrate channel with an oriented central/Weyl datum or an independent new multiplicity carrier, which the no-go note does not exclude, and not a consequence of the deposited corpus.

This sub-programme is the first paper of the Q-series that depends simultaneously on all four layers of the programme: the admissible Weil fibre structure on the supplied carrier (Notes 1 and 5), the conditional Lorentzian geometry (Note 2), the gauge bundle for a supplied compact structure group (Note 3), and the conditional gauge–gravity system (Q13 [8], summarised in Presentation Note 8).

Remark 1 (Scope: identification only, not mass spectrum)**.** This sub-programme addresses the *identification* of the fermionic sector: spinor bundle, chirality, hypercharge quantum numbers, and generation factor. The algebra of the spinor doublet is proved on the supplied model data; its Lorentz reading rests on [H-Spin] and the weak chiral selection on [H-Weak], neither of which is supplied. The generation factor remains conditional on a supplied rank-three carrier. The hypercharge quantum numbers split in two: the rigidity of the weights is conditional on a supplied three-dimensional colour module, while the identification of the Standard Model pattern among them carries, beyond that module, the minimal integral normalisation of $L_Y = \wedge^2(E_{\text{weak}})$, holds only up to an overall sign, rescaling and the exchange of u_R and d_R, and rests on a connection Q14 leaves open. It does not derive the mass spectrum, the Yukawa couplings, or the CKM/PMNS mixing matrices. Those require the explicit construction of E_Π as an operator on the spectral space, and the integration of the projected Yukawa Lagrangian $\mathcal{L}_{\text{Yuk}}$, both of which are listed as open deliverables.

Remark 2 (Vocabulary note)**.** Throughout this note, the vocabulary is *admissibility constraint*, not "relaxation". The substrate χ is static; fermions are not excitations of χ but, under [H-Spin], the spinorial interpretation of the admissible fibre.

2 Position in the Cosmochrony Programme

The fermionic matter sub-programme sits at the apex of Branch III. It depends on all five preceding sub-programmes and provides the fermionic matter content consumed by any downstream phenomenological application.

Inputs from upstream:

- $F_n \overset{\text{model}}{\simeq} \mathcal{H}_c \simeq L^2(\mathbb{Z}/q\mathbb{Z})$ on a supplied Heisenberg carrier at a fixed non-trivial central character, the symplectic form on the quotient by the centre, and the parity involution $c \leftrightarrow q - c$ (Notes 1 and 5). Stone–von Neumann is a conditional endpoint here, supplying uniqueness once that carrier is given [2, 1].
- A four-dimensional Lorentzian co-metric on the effective base M_{eff}, of which the geometric branch supplies only a rank-three degenerate part (Note 2; under its hypotheses Q5b [22]), the full-rank extension being supplied, and, for it, Q11 [20] leaves the temporal coefficient free and derives no coefficient value; it enters the fermionic sector only through [H-Spin].
- Admissible principal bundle $P_{G_\Pi}(M_{\text{eff}}, G_\Pi)$ and gauge connection A for a supplied compact structure group G_Π (Note 3, Q6a). The admissible-transport reading inherits Q6a's two unproved continuum hypotheses: an effective smooth fibre bundle and a differentiable spatial continuum, the latter open in Q5a. All connection-dependent statements of this note and Q14 retain those hypotheses. The group is supplied, not identified: Note 3 singles out no particular group, and the derivation of $\mathrm{SU}(3) \times \mathrm{SU}(2) \times \mathrm{U}(1)$ as a composite is withdrawn [25].
- Spectral entropy functional $S_\Pi[g, A]$ and the a_4 variation (Note 4 [19]/Q12, Q13 [8]), conditional: the conditional gauge–gravity system of Q13 is used here only in the gauge-curvature part of a_4.
- The projection space $H_{\text{eff}} = \mathbb{C}^3$, a supplied parameter, whose identification with the spin-one module $\mathrm{Sym}^2(V_\rho)$ is supplied, not derived (Note 2, Q7 [24]); and $\sigma_c(n_3) = 3$, a supplied selection rule (Note 1, O23).

3 Logical Chain of the Sub-Programme

The sub-programme is organised around the following structural chain, whose first arrow is read on the supplied Heisenberg carrier of Section 1 rather than derived from the admissibility axioms, and whose second arrow is a modelling step.

$$\Pi \rightsquigarrow F_n \overset{\text{model}}{\simeq} \mathcal{H}_c \overset{\text{model}}{\rightsquigarrow} \mathrm{Mp}(2,\mathbb{R}) \;\Rightarrow\; \mathrm{mp}(2,\mathbb{R})_{\mathbb{C}} \simeq \mathfrak{sl}_2(\mathbb{C}) \overset{\text{[H-Spin]}}{\rightsquigarrow} \mathrm{Spin}(3,1) \simeq \mathrm{SL}(2,\mathbb{C}) \;\Rightarrow\; \mathcal{S}_\Pi \tag{1}$$

The arrow marked [H-Spin] is not an implication: it is Hypothesis 2.2 of Q14, supplied by no source. Given [H-Spin] and the distinct weak factor of [H-Weak] (Hypothesis 2.3 of Q14), the readings of the tensor sectors, of chirality and of generation multiplicity are:

$$\underbrace{\mathrm{Sym}^2(S_L) \simeq \mathrm{ad}(P_\Pi),\ \wedge^2(S_L) \text{ trivial}}_{\text{[H-Spin]: Lorentz sector}}, \quad \underbrace{\mathrm{Sym}^2(E_{\text{weak}}) \Rightarrow \mathrm{ad}_{\mathbb{C}}(\mathfrak{su}(2)_L)}_{\text{[H-Weak]: SU}(2)_L}, \quad \underbrace{\wedge^2(E_{\text{weak}}) = L_Y}_{\text{[H-Weak]: U}(1)_Y},$$

$$\underbrace{E_\Pi \text{ left-admissible}}_{\text{Lorentz chirality, [H-Spin]}}, \quad \underbrace{\text{left-handed doublet assignment}}_{V-A,\ \text{[H-Weak]}}, \quad \underbrace{\sigma_c(n_3) = 3 \to C^3_{\text{gen}}}_{\text{3 generations (supplied rule)}}.$$

Three distinct mechanisms contribute.

1. *The complexified metaplectic algebra is* $\mathfrak{sl}_2(\mathbb{C})$*; its spin reading is* [H-Spin]. The associated symplectic action on the finite Weil block V_c factors through the finite group $\mathrm{SL}(2, \mathbb{Z}/q\mathbb{Z})$, which has no Lie algebra. A real metaplectic model $\mathrm{Mp}(2,\mathbb{R})$ and the action of its Lie algebra on a two-dimensional doublet are therefore supplied model data. Given them, the complexification $\mathrm{mp}(2,\mathbb{R})_{\mathbb{C}} \simeq \mathfrak{sl}_2(\mathbb{C})$ is a statement about Lie algebras: it is algebraic and

independent of any metric, and its simply connected integration is $\mathrm{SL}(2,\mathbb{C}) \simeq \mathrm{Spin}(3,1)$. An abstract isomorphism does not make this group the spin group of the effective spacetime. That requires a Lorentzian co-metric on the effective base and an identification of the $\mathrm{SL}(2,\mathbb{C})$ acting on the doublet with the group covering the Lorentz frames of that co-metric, which is [H-Spin]. The spinor bundle $\mathcal{S}_\Pi = S_L \oplus S_R$ is the associated bundle under [H-Spin].

2. *The tensor functors are algebra on the supplied doublet; their readings are two distinct hypotheses.* $\mathrm{Sym}^2(\mathbb{C}^2) \simeq \mathfrak{sl}_2(\mathbb{C})$ is the complex adjoint and $\wedge^2(\mathbb{C}^2) \simeq \det(\mathbb{C}^2)$ the determinant line, trivial on $\mathrm{SL}(2,\mathbb{C})$. On the spinor factor under [H-Spin], $\mathrm{Sym}^2(S_L)$ is the Lorentz sector and $\wedge^2(S_L)$ a trivial line that carries no hypercharge: neither is electroweak data. The electroweak reading applies the same functors to a distinct rank-two factor E_{weak} with structure group U(2) ([H-Weak]): $\mathrm{Sym}^2(E_{\mathrm{weak}})$ contains the complex weak adjoint, as an SU(2)-module (as a U(2)-bundle it is that adjoint twisted by L_Y), from which the compact real form selects $\mathfrak{su}(2)_L$, and $L_Y := \wedge^2(E_{\mathrm{weak}})$ supports $\mathrm{U}(1)_Y$, non-trivially only because the structure group is U(2). By the calibration of [10], no such factor is produced by the functors on $\mathcal{S}_\Pi$: a fermionic weak doublet requires a multiplicity factor $M_L \simeq \mathbb{C}^2$ commuting with the Lorentz action, the Lorentz commutant of the irreducible Weyl factor being scalar under [H-Spin]. In the reading of this note E_{weak} is the role such a factor would play: it is posited by [H-Weak] and not constructed.

3. *The projective endomorphism E_Π gives Lorentz chirality; the weak chiral selection and the hypercharge constraints need* [H-Weak] *as well.* The projected Dirac operator, under [H-Spin], satisfies the Lichnerowicz-type identity

$$D^2_{\Pi,g,A} = -(\nabla^{S,A})^2 + \frac{R}{4} + \frac{1}{2}\gamma^\mu\gamma^\nu F^a_{\mu\nu}T^a_R + E_\Pi.$$

Under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30, Q14 [21] derives a unique antilinear lift of the parity that reverses chirality. Left-admissibility ($P_R E_\Pi P_R = 0$) is the definition of the orientation-compatible branch of Q14 (Proposition 3.8), an input that the lift does not select. On that branch a non-zero residue must break the J_Π parity for $E_\Pi \preceq 0$, an explicit hypothesis of Q14 (Q14, Proposition 3.8): for the Schur residue of a J_Π-commuting locking operator, under the chiral splitting and [H-Gen](i) of [18], left-admissibility forces the residue to vanish. This is a statement about the projective residue and the Lorentz chirality γ_5. The $V - A$ structure is a different statement: the weak gauge action is carried by the left-handed factor alone, which is the representation content of [H-Weak], and Q14 does not derive it from left-admissibility (Remark 3.9 of Q14). Under [H-Spin], [H-Weak] and symbol compatibility, $\mathrm{U}(1)_Y$ invariance of $S_\Pi[g, A, D_{\Pi,g,A}]$ imposes the anomaly-cancellation trace constraint $\mathrm{Tr}_{\mathcal{S}_\Pi}(\gamma_5 Y A_\Pi(x)) = 0$ on the hypercharge weights, in its gauge-curvature part; the E_Π-dependent traces are not analysed in Q14. That constraint carries no colour hypothesis. The supplied three-dimensional colour module enters at the next level, that of the rigidity of the weights: the anomaly sums are weighted by the representation dimension, so the colour multiplicity enters them. Selecting the Standard Model pattern from those constraints is a further step, under the additional premise that $L_Y = \wedge^2(E_{\mathrm{weak}})$ carries the minimal integral normalisation compatible with the $\mathrm{U}(1)_Y$ action, on the Standard Model content without a right-handed neutrino and with $Y_e \neq 0$, and then only up to an overall sign, rescaling and the exchange of the labels u_R and d_R; the cubic constraint vanishes on that pattern precisely at colour multiplicity three.

4 Constituent Papers

The sub-programme has a single primary paper.

4.1 Q14: Toward fermionic matter from projective Dirac admissibility

Q14 [21] is the sole constituent paper. It is organised around three independent but mutually compatible results, whose hypotheses differ.

Theorem A: Spinorial electroweak bundle (algebra proved on supplied model data; two conditional readings). (a) On the supplied Heisenberg carrier, given a real metaplectic model and a supplied doublet V, the complexified metaplectic algebra is $\mathfrak{sl}_2(\mathbb{C})$, with

$$\mathrm{Sym}^2(V) \simeq \mathfrak{sl}_2(\mathbb{C}), \qquad \wedge^2(V) \simeq \mathbb{C}_{\det},$$

the adjoint and the trivial line; this is algebraic, proved without either hypothesis, and independent of any metric. (b) Under [H-Spin], $\mathcal{S}_\Pi = S_L \oplus S_R$ is a Dirac spinor bundle of the effective Lorentzian co-metric, $\mathrm{Sym}^2(S_L) \simeq \mathrm{ad}_{\mathbb{C}}(P_\Pi)$ is its Lorentz sector, and $\wedge^2(S_L)$ is trivial. (c) Under [H-Weak], the same identities applied to E_{weak} give the complex weak adjoint, with compact real form $\mathfrak{su}(2)_L$, and $L_Y = \wedge^2(E_{\mathrm{weak}})$ carrying $\mathrm{U}(1)_Y$:

$$\mathrm{Sym}^2(E_{\mathrm{weak}}) \Rightarrow \mathrm{ad}_{\mathbb{C}}(\mathfrak{su}(2)_L), \qquad \wedge^2(E_{\mathrm{weak}}) = L_Y.$$

This is Q14's own application of the tensor sectors to the weak factor; it does not import a gauge-group identification from the gauge structure sub-programme, which supplies none. Calibration: on the spinor factor these are Lorentz-typed adjoint and determinant data, and E_{weak} is not constructed. In the reading of this note, E_{weak} is the role of the independent fermionic weak doublet $M_L \simeq \mathbb{C}^2$, whose two deposited candidates are excluded by the exact obstructions of [10]. NSR's finite-stratum obstructions are unconditional (not conditional on [H-Spin]); its Lorentz-lock input is imported from Q14, where the spinor reading of the carrier is under [H-Spin].

Theorem B: Chiral selection and hypercharge constraints (conditional; the parts carry different hypotheses). Under [H-Spin], the projected Dirac operator $D_{\Pi,g,A}$ has the Lichnerowicz-type square above. Under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30, the spinorial BI lift J_Π^{spin}, whose internal part is HK, is, up to a phase, the unique covariant antilinear lift of the parity and reverses chirality. On the orientation-compatible branch, which is an input, E_Π is left-admissible: $P_R E_\Pi P_R = 0$. This is Lorentz chirality, a statement about the projective residue and γ_5. The weak chiral selection, the $V-A$ structure, is the representation content of [H-Weak], with fermions (the sectors need [H-Spin] as well, for P_L and P_R) in $P_L\mathcal{S}_\Pi \otimes E_{\mathrm{weak}}$ and right-handed components $P_R\mathcal{S}_\Pi \otimes L_Y^m$ that carry no factor E_{weak} and on which U(2) acts through the character $\det^m$ (weak singlets carrying the hypercharge twist L_Y^m). Q14 does not derive it from left-admissibility, which is compatible with it but does not select it. Under [H-Spin], [H-Weak] and symbol compatibility, $\mathrm{U}(1)_Y$ invariance of the projected spectral functional then imposes, at the a_4 level:

$$\mathrm{Tr}_{\mathcal{S}_\Pi}(\gamma_5 Y A_\Pi(x)) = 0 \quad \forall x \in M_{\mathrm{eff}},$$

where $A_\Pi(x)$ is the γ_5-weighted a_4 Seeley–DeWitt density of $D^2_{\Pi,g,A}$, not the projection A_Π^{odd} of [11]. This constraint is not postulated: it is the chiral consistency condition of the same a_4 level that yields Yang–Mills dynamics in the bosonic variation. The constraints are those of the gauge-curvature part of a_4 only: Q14 does not analyse the E_Π-dependent traces, and whether they add independent constraints is open. The hypercharge half carries further hypotheses, in two steps. First, the constraints are weighted by the representation dimension, so the colour multiplicity enters the sums: the rigidity of the weights Y_R holds on a supplied three-dimensional colour module, with the premise that the projected spinorial sectors are those of the admissible matter decomposition (Q14, Proposition 4.4). Q14 does not analyse the constraint system at general multiplicity and does not claim that the constraints force three. Second, selecting the *Standard Model pattern* from those constraints is a separate proposition with an additional premise: that the determinant line $L_Y = \wedge^2(E_{\mathrm{weak}})$ carries the minimal integral normalisation compatible with the $\mathrm{U}(1)_Y$ action on the projected spinorial sectors. Under that premise, on the Standard Model representation content without a right-handed neutrino and with $Y_e \neq 0$, the pattern is selected

only up to an overall sign, rescaling and the exchange of the labels u_R and d_R, and the cubic constraint vanishes on it precisely at colour multiplicity three. That premise is not discharged: Q14 lists the explicit connection between the determinant-line normalisation and the Standard Model pattern among its open directions, the anomaly constraints restricting the allowed weights while the normalisation fixes their scale.

Theorem C: Generation multiplicity (conditional on the supplied rank-three selection rule, and, through the bundle it multiplies, on [H-Spin] and [H-Weak]). The saturation invariant $\sigma_c(n_3) = 3$, a supplied selection rule (O23 proves the three-dimensionality of the neutral sector of a supplied spinor carrier, Theorem 3.1), admits a spinorial multiplicity reading, which maps it to a gauge-singlet generation space:

$$C^3_{\mathrm{gen}} \subset \ker(\mathrm{ad}_{\mathrm{SU}(2)} \oplus Y).$$

The generation space is identified neither with the weak adjoint $\mathrm{Sym}^2(E_{\mathrm{weak}})$ nor with the Lorentz sector $\mathrm{Sym}^2(S_L)$. The equality of dimensions $\dim \mathbb{R}^3_{\mathrm{space}} = \dim C^3_{\mathrm{gen}} = 3$ does not identify the two spaces (Q14 §5, Remark 5.3): no source supplies a geometric image of the rank-three sector, and the generation factor is a multiplicity space carrying no tangent structure. Three generations follow as a gauge-singlet factor, on that supplied rank-three carrier. A qualitative mechanism for their splitting is identified in Q14 §6 (summarised below) on model operators; the explicit E_Π and the amplitude of the splitting remain open.

Dynamic generation lifting (model operators; localisation and A4 matching). The internal structure of C^3_{gen} is probed in Q14 §6 by model operators standing for E^2_Π on $C^3_{\mathrm{gen}} = \mathrm{Sym}^2(V_{\mathrm{gen}})$, where V_{gen} is a supplied doublet distinct from the doublet soldered by [H-Spin] and carries its own copy of the Born–Infeld datum. Q14 does not supply the reading of these operators as restrictions of E^2_Π. The identification [H-Res] names that reading for the model operator $\mathrm{diag}(1, \frac{1}{2} + u, \frac{1}{2} - u)$, the real-split case with no R_{mix} component: it is the restriction of E^2_Π to C^3_{gen}. [H-Res] is not supplied. A static J_Π-real, weight-preserving model operator has a degenerate outer pair: the two light generations cannot be split statically (static obstruction). The lifts that remove this degeneracy, required to be real in the weight basis, to annihilate e_0 and to preserve the outer doublet (Q14, Proposition 6.3(i)–(ii)), and to be J_Π-odd, form a two-dimensional sector, the real-split direction being the weight generator J_3 and the mixing direction a doublet rotation. The generation split is not a finite-front observable in the symmetric sense: under an equivariant construction of the finite locking operator, a finite reading of the Schur expression and an identification of the parity $c \leftrightarrow q - c$ with J_Π (open), the raw finite front is J_Π-equivariant and gives $u_{\mathrm{fin}} = 0$ [18]. The residual automorphism of the oriented-frontier diagnostic is the central Weil lift $R_b = W(-I) = \mathrm{FT}^2$. Reading R_b as acting on the chiral carrier $S_L \oplus S_R$ as the scalar -1 (part (i): commutation $[\gamma_5, R_b] = 0$; part (ii): the value -1, used only in AOG) is the hypothesis [H-WS] of Q11OF [17], supplied by no source: a group-level map from the finite Weil group to the $\mathrm{SL}(2, \mathbb{C})$ of [H-Spin] sending $W(-I)$ to $-I$ is not available for a prime $q > 5$ (e.g. $q = 61, 101, 151$), and whether the chirality grading removes the residual obstruction without a spacetime parity is open [21]. The remaining amplitude would be fixed by a matching at A4 between the discrete chiral-frontier normalisation $\mathcal{N}_A$ [6] and the Born–Infeld curvature $\mu^2_\chi = \partial^2_s \mathcal{B}(0)$ of a supplied chiral two-form, whose genus is not determined [14], neither ingredient reducing to the other. Within the metaplectic step model of Q14, a complex metaplectic phase is excluded as a source of R_{mix}, which connects the outer weights: R_{mix} is not reached by the image of $\mathfrak{sl}_2(\mathbb{C})$ and would need a generator outside it, which is not supplied (Q14, Remark 6.4, whose argument concerns R_{mix} only). The projection A^{odd}_Π, the anti-Hermitian part of the J_Π-odd part of the $\mathfrak{sl}_2$ lift of the step generator to C^3_{gen}, vanishes identically for all complex coefficients, because, for the internal antilinear parity J_Π of the generation copy (Q14, Section 6; not the spinor-level lift of Q14, Theorem 3.7), the J_Π-odd part of the lift is its Hermitian part; this is a statement about A^{odd}_Π as defined in [11], a generator that is not the anomaly density $A_\Pi(x)$ of Q14. It does not determine the polar factor: the polar generator of a family of morphisms

$Y(\gamma) = U(\gamma)P(\gamma)$ between fixed orthonormal frames, with $P > 0$ and a real parameter, is $\Omega = U^\dagger\, dU/d\gamma$, defined by the Sylvester equation $\Omega P + P\Omega = U^\dagger\, dY - dY^\dagger U$, which is not a projection of the lift. Singular supports (P not invertible) and moving frames are not covered. At the identity, for dY the lift $L(M)$ of $M \in \mathfrak{sl}_2(\mathbb{C})$, $\Omega(0)$ is the anti-Hermitian part of $L(M)$, which is J_Π-even and generally non-zero; its internal entry for $pE + qF + rH$ is $\frac{\sqrt{2}}{2}(q - \bar{p})$, non-zero for real $p \neq q$. An exact real counterexample ($g = e^{tE}e^{sF}$ with $t = 2$, $s = 1$) has a finite polar factor of $\mathrm{Sym}^2 g$ with a non-zero external entry, $1/17$, so a vanishing infinitesimal generator does not exclude a non-zero external entry of the finite polar factor; with real data the Jarlskog invariant is zero, so non-zero mixing moduli do not establish CP violation. The external block R_{mix} of the Hermitian square is not reached by the image of $\mathfrak{sl}_2$ (Q14, Remark 6.4; Q14 excludes the internal block by hypothesis only, Proposition 6.3(i)–(ii)), a different object. Whether a physical family of Yukawa morphisms exists, and which polar class it has, is open: the corpus supplies no such family (a metaplectic step is not a Yukawa morphism, and its square is not the prescribed H_Π). No physical exclusion of mixing is claimed; that A_Π^{odd} is the right object is a modelling choice of [11] that no source justifies, and it is not the polar generator.

Colour sector (conditional on a supplied colour module). The colour-coupled quark sector $\mathcal{S}_\Pi \otimes V_{\mathrm{color}}$ is obtained by tensoring the admissible spinor bundle with a colour module V_{color} of dimension three, carried as a hypothesis rather than derived. No admissible colour sector is available to supply one. O31 [25] is a withdrawal notice, and among the results it withdraws are the co-admissibility of the individual profiles σ_{c_1}, σ_{c_2}, σ_{c_3} — which Q14 identifies with the content of $[\text{H-color}]_{\text{pointwise}}$ — the uniqueness of SU(3) among connected compact subgroups acting irreducibly on $\mathbb{C}^3$, the arithmetic criterion $q \equiv 1 \pmod 3$ for the existence of colour triplets, and every derivation of a gauge factor. Counterexamples are given there: $\mathrm{SO}(3) \subset \mathrm{SU}(3)$, the diagonal torus T^2, and the triplet $\{1, 2, q-3\}$ for every prime $q \geq 7$. Nothing withdrawn there is replaced by a weaker positive statement, and the remaining scalar, arithmetic and discrete-group material is under re-audit and is not asserted. The quark bundle is therefore a conditional output of the sub-programme.

Status of the spinorial BI lift. Under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30, Q14 derives the spinorial lift of BI parity to the spinor bundle $\mathcal{S}_\Pi$: the conjugation identity $c \leftrightarrow q - c$, proved at the scalar Weil level (O17; recalled in O18 Theorem 3.1), lifts to the antilinear spinorial BI lift J_Π^{spin}, whose internal part is HK, satisfying ${J_\Pi^{\mathrm{spin}}}^2 = -1$ and $J_\Pi^{\mathrm{spin}}\gamma_5 = -\gamma_5 J_\Pi^{\mathrm{spin}}$, dressing the parity by the weight grading $H = 2J_3$. The relation $(HK)^2 = -1$ holds without any metric; the covariance, the uniqueness up to a phase and the chirality reversal use [H-Spin]. The reading of the pair $\{c, q - c\}$ as a physical fibre of Π is a structurally motivated hypothesis: O18 establishes Born–Infeld parity as a covariance of the response family and states the fibre identification as an open problem. Lorentz chirality, that is left-admissibility, rests on the supplied Heisenberg carrier, the axiomatic chain A1–A4 [2], [H-Spin], the Born–Infeld datum (H1)–(H2) of O30 with that fibre reading, and the orientation-compatible branch, which is an input. The $V - A$ structure rests on [H-Weak] and is not derived from left-admissibility.

Table 1: Summary of Q14 results by theorem. Status: P = proved on the supplied model data; C = conditional on the hypotheses named in the last column; no-go = ruled out by an exact obstruction proved in the cited note, for the candidates it names; an open item is a missing element, not a refutation. Every row is stated relative to the supplied Heisenberg carrier, which the whole construction inherits; the last column names any further hypothesis.

Result	Central output	Status and further hypothesis
Theorem A(a)	$\mathrm{Sym}^2 = \mathfrak{sl}_2(\mathbb{C})$ adjoint, $\wedge^2 =$ determinant line, on the supplied doublet	P; supplied real metaplectic model and doublet
Theorem A(b)	Lorentz reading: $\mathcal{S}_\Pi$ a spinor bundle, $\mathrm{Sym}^2(S_L) \simeq \mathrm{ad}_{\mathbb{C}}(P_\Pi)$, $\wedge^2(S_L)$ trivial	C; [H-Spin]
Theorem A(c)	$\mathfrak{su}(2)_L \subset \mathrm{Sym}^2(E_{\mathrm{weak}})$, $L_Y = \wedge^2(E_{\mathrm{weak}})$ carrying $\mathrm{U}(1)_Y$	C; [H-Weak], E_{weak} not constructed
Calibration [10]	no fermionic weak doublet M_L from these functors on $\mathcal{S}_\Pi$	C; finite-stratum obstructions not conditional on [H-Spin], Lorentz-lock input (scalar commutant of the irreducible Weyl factor, Q14 §2) under [H-Spin]; the no-go proofs of the cited note concern the two deposited candidates (Table 2)
Theorem B (Lorentz chirality)	$P_R E_\Pi P_R = 0$	C; [H-Spin], the BI datum (H1)–(H2) of O30; definition of the orientation-compatible branch (an input)
Theorem B ($V - A$)	weak chiral selection, left-handed doublet assignment	C; [H-Weak], not derived from left-admissibility
Theorem B (weight rigidity)	Y_R constrained by the anomaly-cancellation trace	C; [H-Spin], [H-Weak], supplied colour module of dimension three, admissible matter decomposition
Theorem B (SM pattern)	that pattern selected among the allowed weights, up to overall sign, rescaling and the exchange of u_R and d_R	C; the same, *and* the minimal integral normalisation of $L_Y = \wedge^2(E_{\mathrm{weak}})$, whose connection to the pattern Q14 leaves open
Theorem C	C^3_{gen}; three generations as gauge-singlet factor	C; supplied rank-three carrier (O23); [H-Spin], [H-Weak] through the bundle it multiplies
Colour sector	$\mathcal{S}_\Pi \otimes V_{\mathrm{color}}$; quark bundle	C; supplied colour module of dimension three; [H-Spin], [H-Weak]

4.2 Angular Amplitude Reduction: the oriented shear product of the $\mathfrak{sl}_2$ step and the central-phase observable of the Weil cascade [6]

This note fixes the numerical observable for the absolute normalisation of the angular generation split and reports the Weil–BFS computations of it. A Baker–Campbell–Hausdorff reduction in $\mathfrak{sl}_2$ identifies the per-step J_Π-odd J_3 component of the metaplectic cascade generator to leading order with the oriented product ts of the two shear parameters, produced by the $\mathfrak{sl}_2$ commutator $[E, F] = H$ (Q14, Proposition 6.5), and not with a free shear parameter; the computation in the SL(2)-on-V model of Q14 uses no Heisenberg bracket. The observable proposed for the Weil–BFS cascade is the accumulated oriented central-phase increment A_c of the Heisenberg lift, normalised by the projected capacity; that A_c carries the J_3 signal is an input of that note, its resemblance to the shear product being an analogy and not an identification. A direct evaluation on symmetric BFS shells returns $\Theta_{\mathrm{raw}} = 0$ identically: the symmetric capacity data fix the radial sector but cannot select an oriented angular branch, so the orientation prescription is an irreducible input prior to the normalisation $\mathcal{N}_A$. The capacity audit on the exact Heisenberg–BFS frontier fixes the onset central-phase coefficient: the directed outgoing-frontier mean $\langle|\Delta A_c|\rangle_{\partial^+}$ is an exact rational sequence $(\frac{1}{3}, \frac{5}{9}, \frac{2}{3}, \dots$ per shell, identical across $q \in \{61, 101, 151, 211, 307\}$ over the first six shells, by integer arithmetic, no fit), whose first-shell (onset) value is $\frac{1}{3}$, so the maximal-locking central-phase bound at the onset shell is $\theta^{(1)}_{\max} = 2\pi/(3q)$. The $\widehat{I}$-normalised bound at $n_3^{\mathrm{obs}} = 2$ is $2.114/q$, $2.122/q$, $2.118/q$ for $q = 61, 101, 151$, 0.9–1.3 % above $2\pi/(3q)$, so $\frac{1}{3}$ is an onset coefficient and not the value of the normalised bound at n_3^{obs}. The onset rational is exact for the standard $\{\pm X, \pm Y\}$ campaign but generator-set dependent, and is not a generation-count or Sym^2 dimension invariant, so only ε and the level ratio $R = \frac{3}{2}$ are generator-independent. This fixes the onset coefficient, not the dictionary value: since $\theta^{(1)}_{\max} \to 0$ with q, the comparison with $\varepsilon = 1/10$ is a required-normalisation diagnostic, whose algebra at the onset shell is $\mathcal{N}_A^{\mathrm{geom}} = 3q/(20\pi)$, which neither the capacity nor the Sym^2 data supply, leaving ε gated by the ADE datum [12]; and, within the input that A_c carries the J_3 signal, no value of $\mathcal{N}_A$ turns $\Theta_{\mathrm{raw}} = 0$ into a split. The per-shell rationals are recomputed from the AAR repository alone (standard library only).

4.3 Q11 Oriented Frontier: recursive diagnostic of the angular generation split [17]

The symmetric-shell observable vanishes ($\Theta_{\mathrm{raw}} = 0$) because the involution $g \mapsto g^{-1}$ pairs opposite central phases; this note defines the honest replacement, a frontier transfer observable on the directed edges $g \to gs$ whose central increment is the Heisenberg cocycle $a(g)\, s_b$, the discrete oriented increment of the cascade. It is a counterpart of the orientation datum and not the J_3 coefficient of the metaplectic step, which comes from the $\mathfrak{sl}_2$ commutator $[E, F] = H$. Its operator-level statement is that the residual reflection $R_b = \varphi \circ J_\Pi^{-1} = W(-I) = \mathrm{FT}^2$ is the central Weil lift. The chiral lift of that reflection is reduced there to one named hypothesis, [H-WS]: R_b acts on the chiral carrier $S_L \oplus S_R$ as the scalar -1 (part (i): $[\gamma_5, R_b] = 0$, all that Q11OF and CHO use; part (ii): the value -1, used only in AOG). No source supplies it: a group-level map from the finite Weil group to the $\mathrm{SL}(2, \mathbb{C})$ of [H-Spin] is not available for a prime $q > 5$ (e.g. $q = 61, 101, 151$), and whether the chirality grading removes the φ-paired obstruction without a spacetime parity is open [21]. The amplitude normalisation $\mathcal{N}_A$ is a separate question. The chiral weight σ_L entering this signal is identified, under [H-WS], in CHO-Note [7] as the Weyl representation type $\mathbf{2}$ versus $\bar{\mathbf{2}}$, not a function of the cascade generator $T(e)$ (arrow inversion and φ both send $T \mapsto -T$, fixing equal parities, while the admissible weight is arrow-even and φ-odd); in the inherited Heisenberg central-phase lift the outgoing-frontier overlap is maximal, $\rho_\chi = 1$, so $\mathcal{N}_A = \theta_{\max} \neq 0$ in that lift, under [H-WS]. In the model of Q14, the generation carrier V_{gen} is a doublet distinct from the soldered Weyl doublet, so the reading of that weight on the generation frontier is an identification not supplied by Q14.

4.4 Projective Residue as a Schur Complement: localisation and conditional finite/Lorentzian separation [18]

This note fixes the structural status of the split u before the explicit E_Π. Under contraction of Π_S, the compression remainder of the projected Dirac square, $D^2_{\Pi,g,A} - \Pi_S D^2 \Pi_S^*$, has the Schur form $-N^\dagger N \preceq 0$ with $N = (1-P)^{1/2} D\, \Pi_S^*$, the Schur complement of the eliminated spinorial block, as a quadratic form; it is zero-order under a separate symbol condition, which forces it to vanish on irreducible Clifford fibres; for a general locking operator only the Schur expression and its sign are unconditional, and [H-Spin] plays no role in them. That remainder is the projective endomorphism E_Π of Q14 only when $\Pi_S D^2 \Pi_S^*$ is the Lichnerowicz operator, an identity that no source states; without it nothing is stated about the endomorphism of Q14, whose sign is an explicit hypothesis of Q14 [21]. The localisation of u rests on the generation-reading hypothesis [H-Gen] of that note, supplied by no source: J_Π is antiunitary and compatible with D and Π_S, and a real-linear, $*$-preserving, J_Π-covariant reading map Φ carries the zero-order endomorphisms to the generation space. Under [H-Gen], u is read in the J_Π-odd part of $\Phi(E^2_\Pi)$, and a non-zero u requires a locking operator that breaks J_Π-equivariance, $J_\Pi P J_\Pi^{-1} \neq P$; the reference locking $\Pi_S^* \Pi_S$ gives $u = 0$. The antiunitary equivariance defect $\Delta_\chi(P) = \pi_{LL} - \tau\, \overline{\pi_{RR}}\, \tau^{-1}$ of the eliminated block is related to u only as a structural reading. With the chiral splitting and [H-Gen](i), a J_Π-commuting locking operator has zero residue on the left-admissible branch of Q14, so that a non-zero left-admissible residue breaks J_Π compatibility and is not the reference residue. These are necessary conditions only, and no mechanism for a non-zero split is derived. The multiplicative reading of $\frac{1}{2} \pm u$ as eigenvalues is a separate hypothesis [H-Mult], which with a non-singular even sector gives $u \equiv 0$ or admits no reading map in the chiral rank-two left-admissible frame. The finite locking operator has $u_{\mathrm{fin}} = 0$ only under an equivariant construction, a finite reading of the Schur expression and an identification of the parity $c \leftrightarrow q - c$ with J_Π (open); a non-zero split would then be a J_Π-odd datum outside that construction, located in the Lorentzian completion as a hypothesis, whose existence and stability would be read from the Born–Infeld saturation curvature $\mu_\chi^2 = \partial_s^2 \mathcal{B}(0)$ of a supplied two-form [14], its magnitude $|u|$ being dictionary-bound through the chiral-frontier normalisation. The note defines the Schur-null and Schur-transverse loci of the transported J_Π-odd tilt of the locking operator and proves a dichotomy under explicit hypotheses; which locus holds is open. The oriented metaplectic step has the exact $\mathfrak{sl}_2$ opening $\alpha(x,y) = xy\, r/\sinh r$, $\cosh r = 1 + \frac{xy}{2}$, produced by $[E,F] = H$ (Q14, Proposition 6.5); that the transported tilt equals it, up to a non-zero factor, is the transport hypothesis [H-Tr], supplied by no source. Neither the sign of the Born–Infeld genus nor the non-vanishing of u follows. The normal form of $\Phi(E^2_\Pi)$ on C^3_{gen} is stated there through the reading map of [H-Gen], a hypothesis; the tag [H-Res], used in [23, 11], is its instance in which Φ is the restriction to the triplet, supplied by no source. The determinantal Born–Infeld margin $\mathcal{B}(s)$ of a supplied antisymmetric chiral two-form, and the reduction of μ_χ^2 to the Lorentzian genus of its polarisation, are developed in the companion note [14], where the genus is not determined and no amplitude mechanism is selected (below). The statements on u read through $E^2_\Pi|_{C^3_{\mathrm{gen}}}$ use [H-Res], which is not supplied.

4.5 Spin-stratum type-rigidity: an obstruction to the Galois action on the binary icosahedral stratum, with conditional consequences for the chiral lift [12]

This transversal note isolates the logical status of the generation-split value $\varepsilon = 1/10$. It is a theorem modulo the ADE case-selection gate: the algebra $\frac{1/2+\varepsilon}{1/2-\varepsilon} = \frac{3}{2} \Rightarrow \varepsilon = 1/10$ is trivial and case-independent, so the first-principles status of ε is exactly that of the gate, which the note does not settle. The proved result of the note is an obstruction concerning the Galois automorphism $\sigma : \sqrt{5} \mapsto -\sqrt{5}$, not a result on the gate. In the compositum $\mathbb{Q}(\zeta_q, \sqrt{5})$ the Born–Infeld parity $c \mapsto q - c$ acts as complex conjugation ($\zeta_q \mapsto \zeta_q^{-1}$, $\sqrt{5} \mapsto \sqrt{5}$) and fixes $\sqrt{5}$ (proved), lying

in a distinct direct factor of the Galois group from $\sigma = (\zeta_q \mapsto \zeta_q,\ \sqrt{5} \mapsto -\sqrt{5})$; its status as the base-fibre involution is that of a candidate hypothesis of the foundations [2], taken by the note as a premise. A character-table audit of the binary icosahedral group $2I$ proves that inner conjugations, $-I$ and J_Π act trivially on $\mathrm{Irr}(2I)$, whereas σ induces the permutation $(2\,2')(3\,3')$. The other generators of the spin stratum enter as clauses of different status. The central reflection $R_b = W(-I)$ acts as $-I$ under [H-WS] of [17] (the scalar -1 on the chiral carrier, supplied by no source); the A4 locking contributes only a parity-odd sign under the A4 hypotheses ([H-Gen], J_Π-covariance, diagonal form, a locked pair, [H-F]/[H-Nd]); the tensor-functor and Schur-projection clauses are modelling assertions, not audited. Relative to these clauses and to the modelling premise [M] that the generator list is complete (which implies that every admissible operation is carrier-preserving), no listed operation realises σ, and a finite recursive tower of such operations preserves the arithmetic type [12]; the premise [M] is not proved. No link between the gate and σ is established: the outer automorphism fixes the order-four class and maps each of the order-five and order-ten loci to itself, so σ would be needed to tell the two order-five classes apart, not to choose between the order-four and the order-five locus. The gate therefore stays open, and no obstruction to the gate follows from that note. The gate has a concrete generator-set form inside $2I$. Once the order-five $\sqrt{5}$-locus is selected, the ratio $3:2$ is not a fit but a forced Cayley-spectral invariant, $R = |\lambda_3 - 1|/|\lambda_1 - 1| = (\frac{1}{4})/(\frac{1}{6}) = \frac{3}{2}$ with central level $\lambda_2 = 1$. The neutral order-four half-turn class — the programme's default admissibility convention — instead gives $\{|\lambda_1 - 1|, |\lambda_3 - 1|\} = \{\frac{1}{5}, \frac{1}{3}\}$, hence $R = \frac{5}{3}$ and $\varepsilon = \frac{1}{8}$, not $\frac{1}{10}$. The open problem is therefore the selection of the order-five locus over the neutral order-four locus, which is not a harmless convention change. A fermionic reading of the spinorial grading is not shown to supply it: the Lorentzian chiral lift, taken as input, induces no action on $\mathbb{Q}(\sqrt{5})$ under the boost premise [B] and the other conditions below, so it is no source of σ [12], and since no link between the gate and σ is established this does not bear on the selection itself. The Lorentzian chiral lift is an input that AOG does not construct: it is the spin-solder hypothesis [H-Spin] of Q14 [21], supplied by no source. The Weyl and boost lemmas and the chiral-rigidity corollary of AOG hold under [H-Spin] (as input), the modelling premise [M], the explicit boost premise [B] (the lift extends the spin stratum only by the central character and the complexification unit, acting by complex conjugation; asserted, not derived) and, for R_b, [H-WS]; its orientation corollary, hence $\mathcal{N}_A \neq 0$, holds under [H-Spin], [H-WS], [M], [B] and the inherited central-phase convention of [7], with $\rho_\chi = 1$ by definition of σ_L. Hence $\varepsilon = 1/10$ is conditional on the gate rather than an independent dictionary parameter, and the first-principles front for the value is the gate itself: upstream and structural. It is a matching value, fixed by imposing the external ADE ratio on the exit deficits of model operators on V_{gen}, and the level-to-generation map needed to read the three levels as three generations is not established (Q14 §6). The diagonal level-split parameter u is identified with the angular datum ε only through the downstream dictionary gate $R_\Pi = R_{\mathrm{ADE}} = 3/2$ [11]. The recursion of admissible operations, carrier-preserving relative to the modelling premise [M] of [12] (with [H-WS] for R_b), fixes the vertical parity type but does not generate the horizontal ADE/$\sqrt{5}$ transport selecting this value. Even granting the gate, and under [H-Res] and [H-Sq] for the squared Yukawa levels, this split is not the mass hierarchy: the levels $\lambda_Y^2\{1, \frac{3}{5}, \frac{2}{5}\}$ are order-one and the single-level cascade factor is order one [11, 3], so the observed charged-fermion hierarchy is carried, if at all, by generation-dependent cascade depths n_g in the amplification law $\Lambda_{\mathrm{proj}}(n)$, or by a later operator stratum not analysed there, λ_Y being kept there as a single downstream scale. The linear-growth route to these depths is ruled out in the model of that note: every depth read off the growth law $N(\lambda; n) \sim F_{\mathrm{KM}}(\lambda)\, n$ [3] — crossing depth, saturation rank, or any intermediate fraction — is a function of the same Kesten–McKay coefficients $c_g(p)$, so it inherits the band-edge divergence and the symmetry pin $c_2 = \frac{1}{2}$ and cannot be both cascade-stable and correctly ordered in those coefficients, for the inter-block and the inter-level partition alike [11]. The remaining positive route, a decaying capacity-controlled per-level profile $\sigma_{\lambda_g}(n)$ transported onto the cascade, is also ruled out as

a static route: quantising the per-level resolution density removes the band-edge denominator obstruction, the depth gap becoming independent of $c_g(p)$, but the Weil–Schur transport is scale-free, so the required stabilisation window is reached only by re-inserting the Laplacian valency $|S|$, the count normalisation, returning to the law $n_g = \Delta I_g / c_g(p)$ of the linear-growth route [11]. The static admissibility spectrum therefore carries the conditional three-generation factor and the order-one level split, but not the charged-fermion hierarchy. The remaining dynamical route — reading the depths off the relaxation trajectory rather than the static spectrum — is also tested at first order and reproduces the same obstruction [11]: the parallel-threshold reading makes the depth gap independent of the band-edge coefficient but stays on the order-one level-crossing scale, while the sequential Born–Infeld and renewed-floor readings reach the hierarchy scale only through the cascade amplification itself or an unpinned ceiling-to-floor ratio, both free normalisations. The hierarchy is thus carried by no forced static or first-order dynamical quantity of the cascade, which carries the conditional three-generation factor, an order-one splitting, and a band-edge-independent order-one depth gap, but not the charged-fermion hierarchy at this stratum.

4.6 Chiral orientation of the directed frontier: σ_L as a representation type [7]

This note resolves the chiral weight σ_L left open by Q11OF. A parity argument closes the false route $\sigma_L = f(T(e))$: edge inversion $U(e^{-1}) = U(e)^{-1}$ and the residual reflection both send the J_Π-odd cascade generator $T(e) \mapsto -T(e)$, so every function of T has equal arrow- and φ-parity, whereas the admissible weight must be arrow-even and φ-odd. The resolution, under [H-WS] of [17], is that σ_L is the Weyl representation type $\mathbf{2}$ versus $\bar{\mathbf{2}}$: group inversion preserves the representation (arrow-even) and complex conjugation exchanges it (φ-odd), the unique label distinguished by the conjugation that separates φ from arrow inversion; for a real lift the representation is self-conjugate and the contrast vanishes, matching the chiral symmetry of the real cascade. In the inherited Heisenberg central-phase lift the edge phase is the linear cyclotomic character $\zeta_q^{\Delta A_c}$, with no Gauss, Maslov, or $\sqrt{5}$ component; the natural outgoing branch gives $\sigma_L = \operatorname{sign} \Delta A_c$ on the cocycle support, hence, by this definition, $\rho_\chi = 1$ and $\mathcal{N}_A = \theta_{\max} \neq 0$; the bound is q-stable to 0.4 % ($\theta_{\max} q = 2.114, 2.122, 2.118$ at $n_3^{\mathrm{obs}} = 2$ for $q = 61, 101, 151$), not q-invariant, while its per-shell rationals are q-independent over the first six shells for $q \in \{61, 101, 151, 211, 307\}$ (verified domain). The result is therefore [H-orient] closed in the inherited central-phase lift and under [H-WS]; the residual open point of that note is an additional spin-Galois phase of the full Lorentzian chiral lift, in particular a $\sqrt{5}$ or ADE-spin factor orthogonal to ζ_q. AOG shows that, taking the Lorentzian chiral lift ($S_L \oplus S_R$, $\mathfrak{mp}(2,\mathbb{R})_{\mathbb{C}} = \mathfrak{sl}_2(\mathbb{C})$) as an input it does not construct, the chiral phase carries no Galois-spin factor orthogonal to ζ_q under its explicit boost premise [B], so that this residual does not arise there under [B] [12]. That input is the spin-solder hypothesis [H-Spin] of Q14 [21], supplied by no source; AOG states the conclusion under [H-Spin] (as input), [H-WS] of [17] (the reading of $R_b = W(-I)$ as the scalar -1 on the chiral carrier, supplied by no source), the modelling premise [M] that its generator list is complete, the boost premise [B] (the lift supplies only the central character and the complexification unit, by complex conjugation; no automorphism of $K_q(\mathrm{i})$ moving $\sqrt{5}$ is supplied, although the Galois group contains such elements; asserted, not derived), and the inherited central-phase convention of CHO, with $\rho_\chi = 1$ by definition of σ_L. This note records the conclusion as conditional on all of these, and does not extend it. It fixes the frontier amplitude datum conditionally and does not derive $u \neq 0$, which would further require a transport of the oriented signal to the J_Π-odd generation sector; the only transport stated in [18] is the hypothesis [H-Tr] for the $\mathfrak{sl}_2$ opening, supplied by no source.

4.7 Eliminated block jet: the Lorentzian projector deformation [16]

An operator-level lemma logically between the Schur reduction and the physical identification of the chiral generator. Writing the self-adjoint eliminated projector as a jet $1-P(s) = Q_0 + sQ_1 + s^2Q_2 + O(s^3)$ along the J_Π-odd modulus s, the projector constraints alone force $Q_1 = [A, Q_0]$ to be a purely off-diagonal Grassmann tangent for every smooth family; the parity grading of the jet holds under J_Π-equivariance, and with a covariant moving spinorial embedding and a Dirac operator invariant under the spinor-level BI parity of [16] the first-order J_Π-odd part of E_Π^2 is the anticommutator $\{E_0, E_1\}$. Antiunitary parity makes every odd-order generation-mixing coefficient vanish in every covariant family, with or without complex phases, even orders not being excluded, and an explicit covariant family realises $E_0^2 = \mathrm{diag}(1, \frac{1}{2}, \frac{1}{2})$, an initial condition of that family, with a non-zero split rate. That family is a finite witness with $J^2 = +1$, outside [H-Gen](i): it meets the clauses of [H-Mult] with the identity reading and conditions (ii)–(iii) of [H-Gen] (reading J_Π as J on its finite space), and illustrates a moving-embedding family without being an instance of [H-Gen]. In the chiral frame the left-handed block of the J_Π-odd tangent is half the transported defect rate, $[\Pi_{J_\Pi\text{-odd}}\dot{Q}(0)]_{LL} = \frac{1}{2}\partial_s\Delta_\chi(P)|_0$, one block of the split-sourcing tangent rather than a unique carrier; the selection of the family, the localisation of the odd tangent, and the normalisation of $|u|$ remain open. Neither the Schur transversality of the locking (a dichotomy under explicit hypotheses, the branch being open [18]) nor the Lorentzian genus (not determined [14]) is used there, while $|u|$, the Yukawa sector, and the mass spectrum are kept downstream.

4.8 Born–Infeld saturation margin of the chiral modulus [14]

The companion note on the Lorentzian genus of the chiral polarisation: it determines neither the genus nor the existence, the sign or the magnitude of the split u. An antisymmetry lemma shows the J_Π-odd generation modulus cannot be carried by the symmetric square $M = F_\chi F_\chi$ (J_Π-even), so the carrier is taken, by hypothesis, to be an antisymmetric chiral two-form $F_{\chi\mu\nu}(s)$; the Born–Infeld determinantal saturation margin $\mathcal{B}(s)$ of such a supplied two-form is defined with its overall sign fixed by the admissibility role of $\mathcal{B}$ (axiom A4 selects saturated minima), not by a Maxwell weak-field match. The chiral curvature reduces to $\mu_\chi^2 = \partial_s^2\mathcal{B}(0) = \frac{1}{2}\,P_{\chi,\mu\nu}P_\chi^{\mu\nu}$, the Lorentzian genus of the chiral polarisation in a Lorentzian co-metric that no source supplies, only its signature entering. The genus is not determined: the central commutator supplies no electric assignment, since the central direction is not temporal in the co-metrics of the corpus (the rank-three co-metric of Q5b has a zero central entry, the conditional completion of Q8 a positive one, and in Q11 the temporal direction is a separate factor with a free coefficient), and no map from the generation operator to a two-form is available. For $\mu_\chi^2 < 0$ a J_Π-conjugate locked pair $\pm s_*$ with a split $u \neq 0$ is the hypothesis [H-Nd], not a consequence; $\mu_\chi^2 > 0$ makes the symmetric point a stable minimum, and $\mu_\chi^2 = 0$ is marginal. The quartic coefficient of the radicand depends on the parametrisation of the modulus and selects no lock between a boundary contact and an interior stationary point; for an exactly collinear purely electric ray, under [H-F] (the construction of the chiral two-form), the bound is reached at $t_* = \beta/|\mathbf{E}_{F_0}|$ in the chart of that ray, when $|\varphi|$ attains it. The statements on u use [H-Res] for the reading of $E_\Pi^2|_{C^3_{\mathrm{gen}}}$, together with the hypotheses of [18]. The sign of u is a branch choice, an orientation-reversing chart exchanging the two branches. The magnitude $|u|$ remains dictionary-bound and is not predicted.

4.9 Conditional weak determinant line and generation-level ordering [23]

The first stage of the mass-sector frontier. Under [H-Weak], on the rank-two weak factor E_{weak} with structure group U(2), the determinant line $L_Y := \wedge^2(E_{\mathrm{weak}})$ is the one-dimensional functor among the symmetric and exterior powers, and it carries $\mathrm{U}(1)_Y$ non-trivially only because the structure group is U(2); on the spinor factor the same functor gives a trivial line, so the coupling

line is conditional on [H-Weak]. On the generation factor $C^3_{\rm gen}$, the model operator $\mathrm{diag}(1, \frac{1}{2}+u, \frac{1}{2}-u)$ has exit deficits $\{0, \frac{1}{2}-u, \frac{1}{2}+u\}$ that order three levels for $0 < u < \frac{1}{2}$ (degenerate at $u = 0$), with a scale-independent ratio. The ordering is algebra on that model operator, a pinned normal form taken by hypothesis (its even sector is the algebraic value of $(C_2 - J_3^2)/C_2$ at $C_2 = 2$, not a derived Born–Infeld sector). Reading it as the restriction of E^2_Π is [H-Res], which is not supplied, and the level-to-generation map is not established. The mass matrix is a distinct object: no mass value is claimed.

4.10 Projected Yukawa operator and chiral polar factor [11]

The second stage, a sharp partial no-go, stated on the generation block $Y^{\rm gen}_\Pi$ of the Yukawa morphism Y_Π. The model operator for the levels is read as in [H-Res]. The squared Yukawa observable adds the dictionary $H_\Pi = \lambda_Y^2\, E^2_\Pi|_{C^3_{\rm gen}}$, the premise [H-Sq], used together with [H-Res]; the two remain separate premises. Under them $H_\Pi := Y^{\rm gen\dagger}_\Pi Y^{\rm gen}_\Pi$ is positive hermitian with $\mathrm{Spec}(H_\Pi)|_{C^3_{\rm gen}} = \lambda_Y^2\{1, \frac{1}{2}+u, \frac{1}{2}-u\}$, so E^2_Π determines the squared Yukawa levels, not the morphism. By polar decomposition $Y^{\rm gen}_\Pi = U_\Pi\, H_\Pi^{1/2}$, which is linear algebra and uses no premise, the unitary chiral factor U_Π (chiral orientation and complex mixing phase) and the overall norm λ_Y are both invisible to E^2_Π. The projection $A^{\rm odd}_\Pi$, the anti-Hermitian part of the J_Π-odd part of the $\mathfrak{sl}_2$ lift of the step generator to $C^3_{\rm gen}$, vanishes identically for all complex coefficients, because, for the internal antilinear parity J_Π of the generation copy (Q14, Section 6; not the spinor-level lift of Q14, Theorem 3.7), the J_Π-odd part of the lift is its Hermitian part; this is a statement about $A^{\rm odd}_\Pi$ as defined in [11], a generator that is not the anomaly density $A_\Pi(x)$ of Q14. It does not determine the polar factor: the polar generator of a family of morphisms $Y(\gamma) = U(\gamma)P(\gamma)$ between fixed orthonormal frames, with $P > 0$ and a real parameter, is $\Omega = U^\dagger\, dU/d\gamma$, defined by the Sylvester equation $\Omega P + P\Omega = U^\dagger\, dY - dY^\dagger U$, which is not a projection of the lift. Singular supports (P not invertible) and moving frames are not covered. At the identity, for dY the lift $L(M)$ of $M \in \mathfrak{sl}_2(\mathbb{C})$, $\Omega(0)$ is the anti-Hermitian part of $L(M)$, which is J_Π-even and generally non-zero; its internal entry for $pE + qF + rH$ is $\frac{\sqrt{2}}{2}(q - \bar{p})$, non-zero for real $p \neq q$. An exact real counterexample ($g = e^{tE}e^{sF}$ with $t = 2$, $s = 1$) has a finite polar factor of $\mathrm{Sym}^2 g$ with a non-zero external entry, $1/17$, so a vanishing infinitesimal generator does not exclude a non-zero external entry of the finite polar factor; with real data the Jarlskog invariant is zero, so non-zero mixing moduli do not establish CP violation. The external block $R_{\rm mix}$ of the Hermitian square is not reached by the image of $\mathfrak{sl}_2$ (Q14, Remark 6.4; Q14 excludes the internal block by hypothesis only, Proposition 6.3(i)–(ii)), a different object. Whether a physical family of Yukawa morphisms exists, and which polar class it has, is open: the corpus supplies no such family (a metaplectic step is not a Yukawa morphism, and its square is not the prescribed H_Π). No physical exclusion of mixing is claimed; that $A^{\rm odd}_\Pi$ is the right object is a modelling choice of [11] that no source justifies, and it is not the polar generator. On the orientation-compatible branch of Q14, an input, a non-zero diagonal split requires, in the framework of [18] (under [H-Gen]), a locking operator that breaks J_Π-equivariance; no mechanism for it is derived, a J_Π-breaking locking alone building neither a split nor its spectral reading, and the reading of the split as an eliminated-block imbalance is a conditional lead of that note, not an established mechanism. The branch is not the $V - A$ structure. Hence the absolute masses, the generation mixing, and the CP structure remain downstream.

The statements of the companion concern the generation block. They transfer to the full coupling Y_Π only under the premise [H-Fac] of that note: (F1) a weak linking carrier K, supplied by no source, for which the space I_K of Lorentz-invariant sesquilinear couplings that are U(2)-invariant is non-zero; (F2) $\dim I_K \leq 1$, so that the coupling factorises through $C^3_{\rm gen}$. (F1) and (F2) are independent. The Lorentz part is not an obstruction: the sesquilinear pairing contains the Lorentz scalar once.

4.11 Charged-lepton Koide relation as a unit-dispersion constraint [15]

This source note fixes the phenomenological target of the charged-lepton mass sector, downstream of the projected Yukawa line and operator, as a single scale-free invariant. Writing $r_\ell = (\sqrt{m_e}, \sqrt{m_\mu}, \sqrt{m_\tau})$ with mean $\bar{r}$ and standard deviation σ_r, the Koide quotient is exactly $Q_\ell = (1 + \mathrm{CV}(r_\ell)^2)/3$ with $\mathrm{CV} = \sigma_r/\bar{r}$, so $Q_\ell = 2/3 \iff \mathrm{CV}(r_\ell) = 1$, i.e. the square-root masses have standard deviation equal to their mean (CV = 0.99999 on the pole masses). This separates the dispersion constraint (Koide) from the concrete hierarchy — the phase δ placing one generation near a node of the square-root profile, the harder and exponentially sensitive residue. The level ladder $\mathrm{diag}(1, \frac{1}{2} + u, \frac{1}{2} - u)$ of the model operator, taken by hypothesis as a pinned normal form, under-disperses, $\mathrm{CV} \leq 1/\sqrt{2}$; its square roots give $\mathrm{CV}(r_\ell) \in [0.09, 0.37]$ at the dictionary value $u = 1/10$ (with λ_Y cancelling). This bounds the static LEVELS, not the physical mass, which carries in addition the cascade depth amplification $A(n_g) = \exp(\beta^* n_g)$; the physical dispersion is set by the depths. So unit dispersion is reached by no presently *constructed* cascade mechanism — the obstruction being the unbuilt saturation arena on the resolved observable types (an A4 singlet–doublet coincidence), rather than the level-ladder cap. There is no general no-go for the equipartition mechanism, but KUD proves a scoped one for a concrete determinant realisation. Writing $r_\ell = r_S + r_D$, $s := \|r_S\|$, and $d := \|r_D\|$, no real-linear self-adjoint amplitude map in the inherited positive Hermitian structure can square to $(s^2 - d^2)P$ on a non-zero projected block. This closes the linear self-adjoint determinant route only. It leaves the discrete equipartition condition itself, the type-saturation arena, and non-linear, Krein, or enlarged-tower extensions open. A maximum-entropy reading (CV = 1 is the unit relative dispersion of the exponential) is recorded as an open test, whose crux is a first-moment constraint on $\sqrt{m}$; the discrete-to-continuous bridge it seems to require is a lock of the *continuous* route only, dissolved on the discrete cyclic / equipartition route [13]. In particular, the no-go does not constrain TPC's amplitude condition $A = \sqrt{2}\,S$, which is not presented as a linear self-adjoint determinant construction. The note fixes a target invariant, not a mass formula.

4.12 Ternary phase carrier: colour, generations, and Koide as one carrier [13]

A speculative bridge (explicitly not a derivation) relating three otherwise separate facts through one complex three-phase carrier $z_g = S + A\,e^{i(\delta + 2\pi g/3)}$, $g = 0, 1, 2$. Its pure-phase part sums to zero ($1 + \omega + \omega^2 = 0$), a centre-neutral, triality-zero class that is a shadow of colour neutrality rather than an SU(3) singlet; its real part $S + A\cos(\delta + 2\pi g/3)$ is the square-root mass profile of the unit-dispersion note [15]. The singlet amplitude S is the master dial: $S = 0$ is the pure-phase, sum-zero regime (colour); $S \neq 0$ opens the real-offset regime (masses); $A = \sqrt{2}\,S$ is singlet–doublet equipartition (Koide, CV = 1); and δ near a node gives the hierarchy. It proposes a candidate admissibility filter, a capacity balance $\|r_{\mathrm{dbl}}\| \leq \|r_{\mathrm{sing}}\|$ saturated at CV = 1, and lists a construction charge sheet any realisation must discharge (an exact colour singlet, three discernible generations after neutralisation, the electroweak quantum numbers, anomaly cancellation, and the quark/lepton selection rule). Reading the equipartition CV = 1 as a marginal-stability edge is a further hypothesis of that note, the saturation margin of [14] selecting no boundary contact over an interior stationary point. The carrier reorganises the open questions without closing them; in particular the colour-to-generation breaking it would require along the neutralisation route is the same one shown closed by the exact colour degeneracy and the forgetful colour projection.

5 Inputs from Upstream Results

1. $F_n \overset{\text{model}}{\simeq} \mathcal{H}_c$ **and symplectic structure, on a supplied Heisenberg carrier** (Notes 1, 5): the dictionary identifies F_n with a Heisenberg–Schrödinger carrier, not with the spinor doublet $V_\rho \simeq \mathbb{C}^2$. Its associated Weil block $V_c \simeq \mathbb{C}^q$ carries a distinct action. No map

from that block to the doublet is supplied; the real metaplectic model and the doublet are independent model inputs. This input is supplied, not derived: the admissibility axioms give irreducibility and non-commutation only under a representation-theoretic dictionary and an additional sector reading of A3, not derived, and neither make the commutator central nor select a finite Heisenberg group, and an explicit $\mathfrak{S}_3$ countermodel satisfies the extracted carrier contract [2, 1]. It is the condition that the whole chain inherits.

2. **Conditional Lorentzian co-metric** (Note 2, Q5b, Q11): reading the $\mathrm{SL}(2,\mathbb{C})$ of the complexified metaplectic algebra as a spin group needs a four-dimensional Lorentzian co-metric on the effective base. The geometric branch supplies only a rank-three degenerate co-metric under its hypotheses (Q5b [22]), the full-rank extension being supplied, and, for it, Q11 [20] leaves the temporal coefficient free and derives no coefficient value, so only a signature is available. The complexification itself is algebraic and uses no metric; the co-metric enters only through [H-Spin] (Hypothesis 2.2 of Q14), together with an identification of the spin structure with the metaplectic action that no source supplies.

3. **Gauge bundle for a supplied compact structure group** G_Π (Note 3, Q6a): the admissible principal bundle and gauge connection A enter the spin–gauge connection $\nabla^{S,A}$ of the projected Dirac operator. The admissible-transport reading is conditional on Q6a's two unproved continuum hypotheses: an effective smooth fibre bundle and a differentiable spatial continuum, the latter open in Q5a. The group is supplied, not identified. What is *not* available is the identification of a particular gauge group: Note 3 singles out none — it keeps a structural U(1) sector and an SU(2) sector conditional on the supplied spinor carrier, without assembling them — and the derivation of $\mathrm{SU}(3) \times \mathrm{SU}(2) \times \mathrm{U}(1)$ as a composite is withdrawn [25]. The electroweak data used here are Q14's own application of the tensor functors to the weak factor of [H-Weak], not an import.

4. **Supplied three-dimensional colour module** V_{color}: carried as a hypothesis for the quark bundle and for the hypercharge weight rigidity of Theorem B, since no admissible colour sector is derived [25]. The $V - A$ structure, the leptonic carrier and the generation factor do not use it.

5. **Minimal integral normalisation of the determinant line** $L_Y = \wedge^2(E_{\mathrm{weak}})$: an additional premise, used only for the selection of the Standard Model hypercharge pattern among the weights the anomaly constraints allow, and then only up to an overall sign, rescaling and the exchange of the labels u_R and d_R. Q14 keeps the explicit connection between this normalisation and that pattern among its open directions, so this input is neither derived here nor discharged upstream. No other result of the sub-programme uses it.

6. a_4 **Yang–Mills variation** (Q12 [26], Q13 [8]): the spectral anomaly cancellation of Theorem B uses the same a_4-level structure that yields Yang–Mills dynamics in the bosonic sector, for every supplied compact group, in its gauge-curvature part. The fermionic a_4 coefficient is a structural extension of the bosonic one. The conditional Einstein–Yang–Mills system of Q13 is the scientific dependency here; its presentation-level treatment is Presentation Note 8.

7. $\sigma_c(n_3) = 3$ (Note 1, O23): the rank-three threshold is a supplied selection rule (O23 proves the three-dimensionality of the neutral sector of a supplied spinor carrier, Theorem 3.1; the carrier selection and the identification of Σ_c with that dimension are open); it provides the spinorial multiplicity input for Theorem C.

8. **Parity involution** $c \leftrightarrow q - c$ (BornInfeld, O17–O18): the scalar conjugation identity is proved (O17; recalled in O18 Theorem 3.1) and is the input from which the spinorial

lift is derived under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30; its reading as the fibre structure of Π is a structurally motivated hypothesis (O18 states the fibre identification as an open problem).

9. **Lorentzian spin solder** [H-Spin] (not supplied; Hypothesis 2.2 of Q14): a Lorentzian cometric of dimension four on the effective base, and a principal $\mathrm{Spin}(3,1)$-bundle covering its oriented, time-oriented orthonormal frames with structure group identified with the $\mathrm{SL}(2,\mathbb{C})$ acting on the admissible doublet. Every Lorentz-covariant statement of the note uses it: the spinor bundle, the projected Dirac operator, γ_5, the uniqueness and chirality reversal of the spinorial lift, and left-admissibility. It is a missing identification, not a refutation.

10. **Distinct weak factor** [H-Weak] (not supplied; Hypothesis 2.3 of Q14): a Hermitian rank-two bundle E_{weak} with structure group $\mathrm{U}(2)$ and a connection, distinct from the factor soldered by [H-Spin], with fermion fields in $P_L\mathcal{S}_\Pi \otimes E_{\mathrm{weak}} \otimes L_Y^k$ and $P_R\mathcal{S}_\Pi \otimes L_Y^m$ (P_L, P_R exist under [H-Spin]). The $\mathrm{SU}(2)_L \times \mathrm{U}(1)_Y$ data, the $V-A$ structure and the anomaly constraints on the hypercharge weights use it. Q14 does not construct E_{weak}, and the two deposited candidates for the multiplicity factor M_L, which this note reads E_{weak} as replacing, are excluded by [10]. NSR's finite-stratum obstructions are unconditional (not conditional on [H-Spin]); its Lorentz-lock input is imported from Q14, where the spinor reading of the carrier is under [H-Spin].

6 Outputs to Downstream Branches

Table 2: Principal outputs and downstream consumers. Status: P = proved on the supplied model data; C = conditional on the hypotheses named in the last column; no-go = ruled out by an exact obstruction proved in the cited note, for the candidates it names; an open item is a missing element, not a refutation. Every row is stated relative to the supplied Heisenberg carrier; the last column names any further hypothesis.

Output	Consumer	Status and further hypothesis
$\mathfrak{sl}_2(\mathbb{C})$ tensor algebra on the supplied doublet	Q-series	P; supplied real metaplectic model and doublet
Admissible spinor bundle $\mathcal{S}_\Pi$, Lorentz sector $\mathrm{Sym}^2(S_L)$	Phenomenology, Q-series	C; [H-Spin]
$\mathfrak{su}(2)_L \subset \mathrm{Sym}^2(E_{\mathrm{weak}})$, $L_Y = \wedge^2(E_{\mathrm{weak}})$	SM phenomenology	C; [H-Weak], E_{weak} not constructed

Fermionic weak doublet M_L	— (open frontier)	exact obstruction (no-go) for the two deposited candidates [10]; finite-stratum obstructions not conditional on [H-Spin], Lorentz-lock input imported from Q14 under [H-Spin]
Lorentz chirality, $P_R E_\Pi P_R = 0$	Chiral structure of E_Π	C; [H-Spin], BI datum (H1)–(H2) of O30; definition of the orientation-compatible branch (an input)
$V - A$ chiral structure	Weak interaction pheno	C; [H-Weak], not derived from left-admissibility
Hypercharge weight rigidity from the anomaly trace	SM charge assignment	C; [H-Spin], [H-Weak], supplied colour module of dimension three
Standard Model hypercharge pattern	SM charge assignment	C; the same, *and* the minimal integral normalisation of $L_Y = \wedge^2(E_{\mathrm{weak}})$; up to sign, rescaling and the exchange of u_R and d_R
Three-generation factor C^3_{gen}	Mass/mixing notes	C; supplied rank-three carrier (O23); [H-Spin], [H-Weak] through the bundle it multiplies
Quark bundle $\mathcal{S}_\Pi \otimes V_{\mathrm{color}}$	QCD sector	C; supplied colour module of dimension three; [H-Spin], [H-Weak]
E_Π as projective endomorphism	Yukawa sector (open)	C; [H-Spin] (open)

7 Status of Results

7.1 Structural results

All of them are stated relative to the supplied Heisenberg carrier of Section 1, which the whole construction inherits. Each item names any further hypothesis it carries.

1. *Algebra and spinor bundle* (Theorem A(a),(b)): (a) on the supplied model data, the complexified metaplectic algebra is $\mathfrak{sl}_2(\mathbb{C})$, the symmetric square of the doublet is the adjoint and its exterior square the determinant line; this is proved, algebraic and independent of any metric. (b) The spinor bundle $\mathcal{S}_\Pi = S_L \oplus S_R$, with the Lorentz sector $\mathrm{Sym}^2(S_L) \simeq \mathrm{ad}_{\mathbb{C}}(P_\Pi)$ and the trivial line $\wedge^2(S_L)$, is conditional on [H-Spin]. It does not use the spinorial BI lift.

2. $\mathrm{SU}(2)_L$ *gauge sector from* $\mathrm{Sym}^2(E_{\mathrm{weak}})$ (Theorem A(c); conditional on [H-Weak]): the symmetric tensor sector of the weak factor gives the complex weak adjoint $\mathrm{Sym}^2(E_{\mathrm{weak}}) \supset \mathrm{ad}_{\mathbb{C}}(\mathfrak{su}(2)_L)$; after compact real-form selection, the $\mathrm{SU}(2)_L$ gauge sector is identified. This

identifies gauge-sector data only; E_{weak} is not constructed, and the fermionic weak multiplicity is a distinct object, not produced by the functors on $\mathcal{S}_\Pi$ [10].

3. $\mathrm{U}(1)_Y$ *from* $\wedge^2(E_{\text{weak}})$ (Theorem A(c); conditional on [H-Weak]): the determinant line $L_Y = \wedge^2(E_{\text{weak}})$ is the geometric support of the hypercharge factor, carrying $\mathrm{U}(1)_Y$ non-trivially only because the structure group of E_{weak} is $\mathrm{U}(2)$. On the spinor factor the exterior square is trivial and carries no hypercharge. This is the existence of the geometric support only. It must not be conflated with the two conditional statements it carries downstream (Section 7.2): the rigidity of the weights, and the selection of the Standard Model pattern, the latter resting on how L_Y is normalised rather than on the existence of the line.

4. *Generation multiplicity* (Theorem C; conditional): $C^3_{\text{gen}} \subset \ker(\mathrm{ad}_{\mathrm{SU}(2)} \oplus Y)$ is a gauge-singlet three-generation space arising from the spinorial multiplicity reading of $\sigma_c(n_3) = 3$, a supplied selection rule (conditional on the supplied rank-three carrier, and through the bundle it multiplies on [H-Spin] and [H-Weak]). The spatial and generation readings of the rank-three invariant are not identified ($\mathbb{R}^3_{\text{space}} \neq C^3_{\text{gen}}$; Q14 §5): no source supplies a geometric image of the rank-three sector.

7.2 Further structural results

Same convention: relative to the supplied Heisenberg carrier, with any further hypothesis named in the item.

1. *Left-admissibility of* E_Π (Theorem B; conditional on [H-Spin], the Born–Infeld datum (H1)–(H2) of O30, and the orientation-compatible branch, which is an input): on that branch $P_R E_\Pi P_R = 0$, a statement about the projective residue and the Lorentz chirality, which holds by the definition of the orientation-compatible branch, an input; for $E_\Pi \neq 0$ with $E_\Pi \preceq 0$ it is not J^{spin}_Π-invariant (Q14, Proposition 3.8, which assumes Theorem 3.7).

2. $V - A$ *chiral structure* (Theorem B; conditional on [H-Weak]): the weak chiral selection, with the weak gauge action carried by the left-handed factor alone and fermions in $P_L\mathcal{S}_\Pi \otimes E_{\text{weak}}$, is the representation content of [H-Weak], the sectors P_L, P_R needing [H-Spin] as well. Left-admissibility is compatible with it but does not select it, and Q14 does not derive the $V - A$ structure from $P_R E_\Pi P_R = 0$ (Remark 3.9). This part of Theorem B does not use the colour module.

3. *Hypercharge weight rigidity* (Theorem B; conditional on [H-Spin], [H-Weak], a supplied three-dimensional colour module, and the premise that the projected spinorial sectors are those of the admissible matter decomposition, Q14 Proposition 4.4): the trace condition of anomaly cancellation constrains Y_R:

$$\mathrm{Tr}_{\mathcal{S}_\Pi}(\gamma_5 Y A_\Pi(x)) = 0.$$

   The constraints are weighted by the representation dimension, so the colour multiplicity enters the sums. The constraint system at general multiplicity is not analysed, and the constraints are not claimed to force three. They are the gauge-curvature constraints only; the E_Π-dependent traces are not analysed in Q14.

4. *Standard Model hypercharge pattern* (Theorem B; conditional on the same hypotheses and module *and* on the minimal integral normalisation of L_Y): selecting the Standard Model pattern among the allowed weights is a separate proposition, holding under the further premise that the determinant line $L_Y = \wedge^2(E_{\text{weak}})$ carries the minimal integral normalisation compatible with the $\mathrm{U}(1)_Y$ action, on the Standard Model content without a right-handed neutrino and with $Y_e \neq 0$, and then only up to an overall sign, rescaling and the

exchange of the labels u_R and d_R. On that pattern the cubic constraint vanishes precisely at colour multiplicity three. The premise is not discharged: Q14 keeps the explicit connection between the determinant-line normalisation and the Standard Model pattern among its open directions. The anomaly constraints restrict the allowed weights; the normalisation fixes their scale.

5. *Quark bundle* (Q14 §7; conditional on the same supplied colour module): $\mathcal{S}_\Pi \otimes V_{\text{color}}$ is structural once V_{color} is supplied. The spinorial BI lift is derived under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30 (Q14), but no admissible colour sector is derived: O31 [25] withdraws the co-admissibility of the individual profiles, which Q14 identifies with $[\text{H-color}]_{\text{pointwise}}$, together with every derivation of a gauge factor.

6. *Schur-null and Schur-transverse loci* [18] (conditional): the transported J_Π-odd tilt of the locking operator defines the two loci, and a dichotomy is proved under explicit hypotheses; which locus holds is open. The exact $\mathfrak{sl}_2$ opening $\alpha(x,y) = xy\,r/\sinh r$, $\cosh r = 1 + \frac{xy}{2}$, produced by $[E,F] = H$ (Q14, Proposition 6.5), is not transported to the locking operator without the hypothesis [H-Tr], supplied by no source. Its normal form on C^3_{gen} is read here as a model operator, and reading it as $E^2_\Pi|_{C^3_{\text{gen}}}$ is [H-Res]. Neither the non-vanishing of u nor the sign of the Born–Infeld genus follows.

7.3 Open problems

1. *Explicit form of E_Π.* E_Π is identified as the zero-order endomorphism of the projected Dirac square, the "internal spectral residue of non-injective projection." For the compression remainder of the projected Dirac square the structural form is the Schur complement of the eliminated spinorial block, $-N^\dagger N \preceq 0$ with $N = (1-P)^{1/2} D\,\Pi_S^*$ [18]; that remainder is E_Π only under the identity $\Pi_S D^2 \Pi_S^* = \text{Lich}$, which no source states, and Q14 assumes $E_\Pi \preceq 0$ as a hypothesis [21]. What is not constructed is its explicit Lorentzian block $1-P(s)$ along the J_Π-odd modulus. The inter-generation splitting is localised, on the model operator read as $E^2_\Pi|_{C^3_{\text{gen}}}$ under [H-Res], in its J_Π-odd part; no amplitude mechanism is selected: the quartic coefficient of the radicand is chart dependent, and the saturation-margin note selects no lock between a boundary contact and an interior stationary point [14]. The split value $\varepsilon = 1/10$ is not an independent dictionary parameter: it is fixed by matching once the ADE case-selection gate supplies the external $3:2$ ratio. Its first-principles status is therefore exactly the status of that gate, which stays open: AOG-Note [12] proves only that the listed spin-stratum operations do not realise the Galois action $\sqrt{5} \mapsto -\sqrt{5}$ (under its stated clauses), and establishes no link between that action and the gate. Without the explicit Lorentzian E_Π, the three-generation mass spectrum and the Yukawa sector cannot be derived.

2. *Normalisation of $\mathcal{L}_{\text{Yuk}}$.* The Yukawa Lagrangian $\mathcal{L}_{\text{Yuk}}$ is identified as arising from the trace $\text{Tr}_{\mathcal{S}_\Pi}[E^2_\Pi]$ variation. Its integral normalisation and the derivation of the mass matrix from the spectral data of E_Π are open.

3. *An admissible colour sector.* No colour module is derived, so the quark bundle and the rigidity of the hypercharge weights both rest on a supplied one, as does the selection of the Standard Model pattern. O31 [25] withdraws the co-admissibility of the individual capacity profiles, the uniqueness of SU(3), the arithmetic criterion for the existence of colour triplets, and every derivation of a gauge factor, with counterexamples and with no weaker positive statement put in their place; its remaining scalar, arithmetic and discrete-group material is under re-audit. The gauge structure sub-programme supplies no particular group either: it keeps a structural U(1) sector and an SU(2) sector conditional on the supplied spinor carrier, without assembling them into a group. The open problem is therefore

the construction of an admissible colour sector itself, not the extension of an established one beyond the standard Cayley graph. Until such a sector exists, the quark bundle stays conditional.

4. *The fermionic weak multiplicity M_L and the parallel-channel frontier.* The independent weak doublet carrier $M_L \simeq \mathbb{C}^2$ commuting with the Lorentz action, the role that this note reads the weak factor E_{weak} of [H-Weak] as playing, is not derived by the corpus, and its two deposited candidates are excluded exactly [10]: the internal Hecke operator doublets have no fermionic lift (the Weil carrier commutant is spanned by the parity projectors), and the erased history fibres are structurally abelian, their alternating line reaching the protected odd operator sector only through a re-entry that the no-sequential-re-entry theorem ($\pi v = 0 \Rightarrow Q\pi v = 0$ for the canonical record quotient) forbids to every projection tower. The surviving formulation for that route is architectural: a parallel substrate channel, refining the observable record and carrying an orientation of the central and Weyl generators, would realise the history-derived odd operator and reopen the activation of the protected sector. These are two new ingredients — two new axioms, or one new axiom supplying both; the frontier is explicitly an extension question, not a derivation question, and an independent new multiplicity carrier outside the deposited corpus remains a distinct, unconstrained extension architecture.

5. *Neutrino identity as a projective test case.* Under [H-Weak], the weak flavour basis and the mass propagation basis are not aligned, and in the present framework there is no structural reason for the weak flavour basis to diagonalize the projected spectral mass residue: basis misalignment is the generic situation, and alignment requires an additional projective stabiliser. This reverses the usual reading of mixing: the large PMNS mixing is the unfixed default, in line with the anarchy hypothesis [27], while the near-diagonality of the CKM matrix becomes the non-trivial feature to be explained, requiring the charged projection channels to pin the up-type and down-type mass bases to a common projective frame. The full development — the neutral-meson comparison, the ontological status of elementary misalignment [28], the Dirac/Majorana reading, and the structural test relating mixing magnitude to the number of identity-stabilising projection channels — is carried by the companion note [9].

6. *The Lorentzian spin solder.* Constructing the principal $\mathrm{Spin}(3,1)$-bundle of [H-Spin] from the metaplectic action, with a four-dimensional Lorentzian co-metric on the effective base, is open: the geometric branch supplies only a rank-three degenerate co-metric, under its hypotheses, and no source relates the metaplectic action to its frames. Reading the central Weil lift $R_b = W(-I)$ as acting on the chiral carrier $S_L \oplus S_R$ as the scalar -1 is the hypothesis [H-WS] of [17], supplied by no source: a group-level map from the finite Weil group to the $\mathrm{SL}(2,\mathbb{C})$ of [H-Spin] is not available for a prime $q > 5$ (e.g. $q = 61, 101, 151$), and whether the chirality grading removes the residual obstruction without a spacetime parity is open. Equally open is whether the admissible fibre supplies either of the two factors of [H-Spin] and [H-Weak].

7. *The generation carrier and the level-to-generation map.* The operators of Q14 §6 are model operators on $C^3_{\text{gen}} = \mathrm{Sym}^2(V_{\text{gen}})$, with V_{gen} a supplied doublet distinct from the soldered one. Reading the model operator $\mathrm{diag}(1, \frac{1}{2} + u, \frac{1}{2} - u)$ as the restriction of E^2_{Π} is [H-Res], which is not supplied, and the level-to-generation map is not established; the split value $\varepsilon = 1/10$ is a matching value.

8 Open Deliverables

Under [H-Spin] and the Born–Infeld datum (H1)–(H2) of O30, the spinorial BI lift is derived in Q14 [21]: the spinorial BI lift J_Π^{spin} dresses the BI parity by the weight grading (HK on its internal part). This does not make Theorems B and C unconditional. Theorem B carries [H-Spin] for Lorentz chirality and [H-Weak] for the $V-A$ structure and the anomaly constraints; Theorem C carries the supplied rank-three carrier, the hypercharge weight rigidity of Theorem B carries the supplied colour module, and the selection of the Standard Model pattern carries in addition the minimal integral normalisation of L_Y, whose connection to that pattern Q14 keeps among its own open directions. Two open deliverables remain.

Open deliverable 1: Explicit E_Π and the Yukawa sector. The mass spectrum of charged leptons and quarks, and the CKM/PMNS mixing matrices, require the explicit spectral construction of E_Π as an operator on the admissible Hilbert space. This requires integrating the projected Yukawa Lagrangian $\mathcal{L}_{\mathrm{Yuk}}$ and extracting the mass matrix from the eigenvalues of E_Π^2. This is the primary open problem of the fermionic sector. The Schur form of the compression remainder, $-N^\dagger N \preceq 0$ [18], is that of E_Π only under the identity $\Pi_S D^2 \Pi_S^* = \mathrm{Lich}$; the open part is its explicit Lorentzian block $1-P(s)$ along the J_Π-odd modulus. Under an equivariant construction of the finite locking operator the symmetric finite front is J_Π-equivariant and gives $u_{\mathrm{fin}} = 0$, but the discrete chiral-frontier normalisation $\mathcal{N}_A$ is fixed maximally, $\mathcal{N}_A = \theta_{\max}$, in the inherited central-phase lift and under [H-WS] [7]. The residual reflection $R_b = \mathrm{FT}^2$ is the central Weil lift. Its commutation with γ_5 is the hypothesis [H-WS] of [17] (action on the chiral carrier as the scalar -1), supplied by no source; a group-level map from the finite Weil group to the $\mathrm{SL}(2,\mathbb{C})$ of [H-Spin] is not available for a prime $q > 5$ (e.g. $q = 61, 101, 151$), and Q14 states no commutation without it [21]. The split amplitude would therefore be fixed by a matching at A4 between this discrete normalisation and the Born–Infeld curvature $\mu_\chi^2 = \partial_s^2 \mathcal{B}(0)$ of a supplied two-form, neither ingredient reducing to the other; schematically,

$$|u| = \mathrm{A4Match}\big(\mathcal{N}_A,\, \mu_\chi^2\big)\,,$$

where μ_χ^2 is available only for a supplied two-form whose genus is not determined. The operator side of this matching is not closed. The Schur-null and Schur-transverse loci of the transported J_Π-odd tilt of the locking operator are defined in [18], where a dichotomy is proved under explicit hypotheses; which locus holds is open. The exact $\mathfrak{sl}_2$ opening of the oriented metaplectic step, $\alpha(x,y) = xy\, r/\sinh r$ with $\cosh r = 1 + \frac{xy}{2}$, is produced by $[E,F] = H$ (Q14, Proposition 6.5), but its transport to the locking operator is the hypothesis [H-Tr] of that note, supplied by no source; the normal form on C^3_{gen} is read here under [H-Res]. The A4 companion does not determine the genus: the central commutator supplies no electric assignment, the central direction not being temporal in the co-metrics of the corpus, and no map from the generation operator to a two-form is available; the existence of a locked pair is the hypothesis [H-Nd] [14]. Neither amplitude nor selection is settled there: the quartic coefficient of the radicand depends on the parametrisation of the modulus and selects no lock, and for an exactly collinear purely electric ray the bound is reached at $t_* = \beta/|\mathbf{E}_{F_0}|$ when $|\varphi|$ attains it; no choice between a boundary contact and an interior stationary point is established [14]. What remains open is the existence of a non-zero split, its value $|u|$ and the Yukawa sector downstream of u. The value $|u|$ itself is not a parameter-free prediction: it is dictionary-bound through the chiral-frontier normalisation $\mathcal{N}_A$, the angular analogue of the radial scale $\kappa = 5/12$ of the exit-deficit dictionary [6, 21], whose split value $\varepsilon = 1/10$ is fixed by matching the three-level exit-deficit structure of the model operators to the external ADE ratio of a selected case [5]. The genuine first-principles front for the value is therefore upstream and structural, not a numerical amplitude: the ADE case selection and the level-to-generation map, the derivation of the projective-resolution growth and the cascade exponent β, and the derivation of the transfer constant N_{casc} that fixes $\mathcal{N}_A$ [21]. No structural bound on β is available: the Born–Infeld flux constraint together with the Cheeger inequality for Ramanujan–LPS graphs does not yield one, and repairing that route needs structural choices

absent from the Born–Infeld axiom itself [4]. Deriving the projective-resolution growth $\Lambda_{\mathrm{proj}}(n)$ from first principles is the central open problem of that front [5]. What remains quantitative is therefore these upstream dictionary inputs, the integral normalisation of $\mathcal{L}_{\mathrm{Yuk}}$, and generation mixing, for which Q14 excludes a complex metaplectic phase as a source of R_{mix} within its step model, where R_{mix} is not reached by the image of $\mathfrak{sl}_2(\mathbb{C})$ [21]. The internal block is treated in [11], where the projection A_Π^{odd} of the lift vanishes. This is a statement about A_Π^{odd} as defined, which is neither the anomaly density of Q14 nor the polar generator (non-zero). Whether a physical morphism family exists is open.

Charged-lepton unit-dispersion target. The phenomenological target for the open charged-lepton masses is stated most sharply not as a mass ratio but as a scale-free shape invariant: the Koide relation is equivalent to unit relative dispersion of the square-root mass vector $r_\ell = (\sqrt{m_e}, \sqrt{m_\mu}, \sqrt{m_\tau})$, since $Q_\ell = (1 + \mathrm{CV}(r_\ell)^2)/3$, so that $Q_\ell = 2/3 \iff \mathrm{CV}(r_\ell) = 1$ (standard deviation equal to mean). The generation ladder $(1, \frac{1}{2} + u, \frac{1}{2} - u)$ of the model operator has bounded dispersion, $\mathrm{CV} \le 1/\sqrt{2}$ and $Q \le 1/2$, and therefore cannot by itself reach the Koide value; the dispersion constraint and the concrete hierarchy (the placement of one generation near a node of the square-root profile) separate. KUD records this target invariant, the open maximum-entropy test, and the scoped linear self-adjoint determinant no-go described above [15].

The Yukawa sector splits into two sub-fronts. The coupling line is conditional on [H-Weak]: the determinant line $L_Y = \wedge^2(E_{\mathrm{weak}})$ is the one-dimensional functor among the symmetric and exterior powers of the weak factor, invisible to the $\mathrm{SU}(2)_L$ adjoint sector and carrying the abelian weight because the structure group of E_{weak} is U(2) [23]. The generation levels are read on the model operator $\mathrm{diag}(1, \frac{1}{2} + u, \frac{1}{2} - u)$ on C^3_{gen}, which is $E^2_\Pi|_{C^3_{\mathrm{gen}}}$ only under [H-Res]: for $0 < u < \frac{1}{2}$ its exit deficits $\{0, \frac{1}{2} - u, \frac{1}{2} + u\}$ are smallest on the central direction e_0 and largest on e_-. That ordering is a statement about levels, attached to E_Π only through [H-Res]; reading it as an ordering of the three generations needs the level-to-generation map, which is not established. The Yukawa coupling Y_Π is, schematically, a coupling between the left-handed sector $P_L\mathcal{S}_\Pi \otimes E_{\mathrm{weak}} \otimes L_Y^k$ and the right-handed sector $P_R\mathcal{S}_\Pi \otimes L_Y^m$ of [H-Weak] (with [H-Spin] for P_L, P_R); as a sesquilinear Lorentz-invariant form it needs the weak linking carrier K of [H-Fac], and how the weak doublet index is absorbed is not constructed here. On the generation block Y_Π^{gen}, under [H-Res] and [H-Sq], the squared observable $H_\Pi := Y_\Pi^{\mathrm{gen}\dagger} Y_\Pi^{\mathrm{gen}}$ has $\mathrm{Spec}(H_\Pi)|_{C^3_{\mathrm{gen}}} = \lambda_Y^2\,\{1, \frac{1}{2} + u, \frac{1}{2} - u\}$, so $E^2_\Pi|_{C^3_{\mathrm{gen}}}$ determines the squared Yukawa levels, not the morphism [11]. What stays open is the chiral polar factor U_Π in $Y_\Pi^{\mathrm{gen}} = U_\Pi H_\Pi^{1/2}$ — a unitary chiral map on the support of H_Π — which carries the chiral orientation and the complex mixing phase, together with the separate positive Yukawa norm λ_Y that scales H_Π (a unitary cannot carry it), and hence the absolute masses and the generation mixing. E^2_Π is blind to U_Π: under [H-Res] and [H-Sq] it fixes $H_\Pi = Y_\Pi^{\mathrm{gen}\dagger} Y_\Pi^{\mathrm{gen}}$ but fixes Y_Π^{gen} only if U_Π is fixed. Under [H-Grad] of [11], which gives each generation carrier its own Cartan generator J_3 and is supplied by no source, the polar factor is not canonical but a rephasing class, $U_\Pi \sim V_R\, U_\Pi\, V_L^{-1}$ under the unitaries commuting with J_3 on each carrier, which are the diagonal rephasings; its rephasing-invariant content is therefore CKM/PMNS-type data, three mixing angles and one CP phase. At first order a non-trivial class $[U_\Pi] \neq [I]$ needs a transverse source, a block between e_0 and $e_\pm$ or between e_+ and e_- [11]; a vanishing tangent does not exclude exit from $[I]$ at higher order or at finite parameter, and the class is observable only relative to a second fermionic sector. The projection A_Π^{odd}, the anti-Hermitian part of the J_Π-odd part of the $\mathfrak{sl}_2$ lift of the step generator to C^3_{gen}, vanishes identically for all complex coefficients, because, for the internal antilinear parity J_Π of the generation copy (Q14, Section 6; not the spinor-level lift of Q14, Theorem 3.7), the J_Π-odd part of the lift is its Hermitian part; this is a statement about A_Π^{odd} as defined in [11], a generator that is not the anomaly density $A_\Pi(x)$ of Q14. It does not determine

the polar factor: the polar generator of a family of morphisms $Y(\gamma) = U(\gamma)P(\gamma)$ between fixed orthonormal frames, with $P > 0$ and a real parameter, is $\Omega = U^\dagger\, dU/d\gamma$, defined by the Sylvester equation $\Omega P + P\Omega = U^\dagger\, dY - dY^\dagger U$, which is not a projection of the lift. Singular supports (P not invertible) and moving frames are not covered. At the identity, for dY the lift $L(M)$ of $M \in \mathfrak{sl}_2(\mathbb{C})$, $\Omega(0)$ is the anti-Hermitian part of $L(M)$, which is J_Π-even and generally non-zero; its internal entry for $pE + qF + rH$ is $\frac{\sqrt{2}}{2}(q - \bar{p})$, non-zero for real $p \neq q$. An exact real counterexample ($g = e^{tE}e^{sF}$ with $t = 2$, $s = 1$) has a finite polar factor of $\mathrm{Sym}^2 g$ with a non-zero external entry, $1/17$, so a vanishing infinitesimal generator does not exclude a non-zero external entry of the finite polar factor; with real data the Jarlskog invariant is zero, so non-zero mixing moduli do not establish CP violation. The external block R_{mix} of the Hermitian square is not reached by the image of $\mathfrak{sl}_2$ (Q14, Remark 6.4; Q14 excludes the internal block by hypothesis only, Proposition 6.3(i)–(ii)), a different object. Whether a physical family of Yukawa morphisms exists, and which polar class it has, is open: the corpus supplies no such family (a metaplectic step is not a Yukawa morphism, and its square is not the prescribed H_Π). No physical exclusion of mixing is claimed; that A_Π^{odd} is the right object is a modelling choice of [11] that no source justifies, and it is not the polar generator. These statements concern the generation block; they transfer to the full coupling only under [H-Fac] of [11], that is (F1) a weak linking carrier K with a non-zero space of invariant couplings, supplied by no source, and (F2) $\dim I_K \leq 1$, two independent conditions.

Open deliverable 2: Full matter content in Lorentzian signature. The complete fermionic content $S_\Pi^{\mathrm{matter}} = (\mathcal{S}_\Pi \oplus (\mathcal{S}_\Pi \otimes V_{\mathrm{color}})) \otimes C^3_{\mathrm{gen}}$ in full Lorentzian signature, with explicit gauge couplings and three-generation Yukawa structure, is the downstream target. It requires the resolution of Deliverable 1 above, the hypotheses [H-Spin] and [H-Weak], and, for its coloured summand, an admissible colour sector, which is not available: the module V_{color} is supplied.

9 Conclusion

The fermionic matter sub-programme states what the fermionic sector requires when fermions are sought in the admissible Weil fibre rather than added to the Cosmochrony framework as external fields. On a supplied Heisenberg carrier, given a real metaplectic model and a supplied doublet, the algebra is proved and uses no metric: the complexified metaplectic algebra is $\mathfrak{sl}_2(\mathbb{C})$, the symmetric square of the doublet is the adjoint and its exterior square the determinant line. The dictionary $F_n \overset{\text{model}}{\simeq} \mathcal{H}_c$, the Weil action on V_c and the supplied doublet V_ρ are distinct inputs; no map selecting that doublet is constructed. Connection-dependent admissible interpretations retain both unproved continuum hypotheses of Q6a: a smooth effective fibre bundle and differentiable spatial continuum, the latter open in Q5a. The carrier is supplied rather than selected by the admissibility axioms, and everything below inherits that condition. Two physical readings of the algebra are distinct hypotheses, each a missing identification and neither excluded by any result: [H-Spin], which identifies the $\mathrm{SL}(2,\mathbb{C})$ of the doublet with the spin group of a four-dimensional Lorentzian co-metric on the effective base, and [H-Weak], which supplies a distinct rank-two weak factor E_{weak} with structure group $\mathrm{U}(2)$.

Under [H-Spin], $\mathcal{S}_\Pi = S_L \oplus S_R$ is a spinor bundle of the effective co-metric, $\mathrm{Sym}^2(S_L)$ is the Lorentz sector and $\wedge^2(S_L)$ a trivial line (Theorem A). Under [H-Weak], the electroweak data of $\mathrm{SU}(2)_L \times \mathrm{U}(1)_Y$ arise from the same tensor functors applied to E_{weak}: $\mathfrak{su}(2)_L \subset \mathrm{Sym}^2(E_{\mathrm{weak}})$ and $L_Y = \wedge^2(E_{\mathrm{weak}})$. The independent fermionic weak doublet, the role that this note reads E_{weak} as playing, is not produced by the functors on $\mathcal{S}_\Pi$ and not constructed, its two deposited candidates being excluded at the operator and history strata by the companion no-go note [10]. Lorentz chirality, the left-admissibility of the projective endomorphism E_Π, is the definition of the orientation-compatible branch of Q14, an input, under [H-Spin] and the Born–Infeld datum of O30 (Theorem B); on that branch a non-zero residue breaks the J_Π parity of the lift for $E_\Pi \preceq 0$, an explicit hypothesis of Q14. The $V - A$ structure is a different statement, the representation content of [H-Weak], and it is not derived from left-admissibility. Under both hypotheses, the anomaly-cancellation trace constrains the hypercharge weights with no colour hypothesis; their rigidity is what carries a supplied three-dimensional colour module. Selecting the Standard Model pattern among them takes a further premise, the minimal integral normalisation of the determinant line $L_Y = \wedge^2(E_{\mathrm{weak}})$, holds only up to an overall sign, rescaling and the exchange of u_R and d_R, and is where the cubic constraint vanishes at colour multiplicity three; Q14 leaves the explicit connection between that normalisation and the pattern open. The constraints are the gauge-curvature ones, the E_Π-dependent traces not being analysed. Three generations arise from the spinorial multiplicity reading of $\sigma_c(n_3) = 3$ (Theorem C, conditional on the supplied rank-three selection rule of O23). The colour-coupled quark sector follows by tensoring with V_{color}, and carries that same supplied module: no admissible colour sector is derived [25]. The matter-sector weak doublet stands as the explicitly architectural frontier of the sub-programme: its realisation through the deposited operator or history structures requires a parallel substrate channel with an oriented central/Weyl datum — two new ingredients, or one new axiom supplying both, that no deposited principle provides — while an independent new multiplicity carrier remains a distinct extension architecture (Section 7.3).

On the model operators of Q14 §6, the inter-generation splitting is localised: statically obstructed, living in a two-dimensional J_Π-odd lift sector, and vanishing on the symmetric finite front under an equivariant construction of the finite locking ($u_{\mathrm{fin}} = 0$, J_Π-equivariant). Reading the residual reflection $R_b = \mathrm{FT}^2$ as the scalar -1 on the chiral carrier, hence commuting with γ_5, is the hypothesis [H-WS] of Q11OF, supplied by no source. No amplitude mechanism of the splitting is selected: the saturation margin of [14] is defined for a supplied two-form, its genus is not determined, and it selects no lock. The generation sector is described by model operators on a distinct supplied doublet, the identification [H-Res] of which with restrictions of E_Π^2 is not supplied, and the level-to-generation map is not established. The remaining open components are

the explicit Lorentzian E_Π, whose eliminated-block jet $1 - P(s)$ is structurally constrained and whose J_Π-odd tangent has left-handed block equal to half the transported equivariance defect rate, $[\Pi_{J_\Pi\text{-odd}}\dot{Q}(0)]_{LL} = \frac{1}{2}\partial_s\Delta_\chi(P)|_0$, in the companion note [16] (one block of the split-sourcing tangent, not a unique generator); the split value, which is dictionary-bound and whose first-principles derivation is upstream and structural (the ADE case selection and level-to-generation map, the cascade exponent β, and the transfer constant N_{casc}); and the derivation of the Yukawa sector and mass spectrum.

The local operator chain is constrained but not closed in the eliminated-block and saturation companions [16, 14]: for a covariant family the split rate is sourced at first order by the odd tangent $[A_-, Q_0]$ together with the first-order motion of the spinorial embedding, and under the localisation hypothesis that this source is exhausted by the transported left-handed block $\frac{1}{2}\partial_s\Delta_\chi(P)|_0$, the embedding-motion terms and the chirally off-diagonal part of the tangent contributing nothing to the J_3 component, the saturation-margin note factorises the contact split formally, to first order in s_*, as

$$u_\partial = \eta\,\sqrt{2}\,s_*\,\frac{T_{J_3}(\partial_s\Delta_\chi(P)|_0)}{\langle J_3, J_3\rangle},$$

where $\sqrt{2}$ is the even-block factor of the criterion $u'(0) = -\sqrt{2}\,(E_1)_{++}$ of [16], valid in the normal form $E_0 = -\mathrm{diag}(1, 2^{-1/2}, 2^{-1/2})$, that is $E_0^2|_{C^3_{\text{gen}}} = \mathrm{diag}(1, \frac{1}{2}, \frac{1}{2})$ read under [H-Res], an initial condition of the family of that note; $\eta = \pm 1$ is the product of the sign of E_0 on the outer block, derived only under [H-Mult], and of a definitional sign of T_{J_3} ($\eta = +1$ on the finite witness of that note for the stated definition of T_{J_3}); s_* is the first contact $\Delta_\chi(s_*) = 0$ when it exists, a parameter value that transforms under reparametrisation of the modulus; and T_{J_3} is the oriented angular observable whose normalised evaluation is dictionary-bound through $\mathcal{N}_A$. The factorisation is formal: it is stated under [H-Gen], [H-Mult], [H-Tr], [H-F] (the construction of the chiral two-form) and [H-Nd], the J_Π-covariance and diagonal-form premises of the saturation-margin note and the localisation hypothesis, and no frame satisfying [H-Gen](i)–(iii), [H-Mult] and a chiral defect together is exhibited; it fixes no magnitude. The localisation hypothesis is open and fails in the explicit family of the eliminated-block note, whose auxiliary-compression rate differs from its split rate; with the selection of the covariant family and the normalisation of the defect rate also open, the remaining magnitude problem is upstream in its dictionary inputs and local in the localisation of the odd tangent.

The mass-sector frontier separates into three layers. On model operators, the angular onset coefficient is fixed in the standard campaign ($\theta^{(1)}_{\max} = 2\pi/(3q)$ at the onset shell) [6]; a non-zero u would need, beyond [H-Res], the transport hypothesis [H-Tr] of [18], a Lorentzian genus that [14] does not determine, and the existence hypothesis [H-Nd] of a locked pair, none of which is supplied. The external block R_{mix} is not reached by the image of $\mathfrak{sl}_2(\mathbb{C})$ (Q14, Remark 6.4), and A^{odd}_Π, the anti-Hermitian part of the J_Π-odd part of its lift, vanishes as defined in [11]; this projection is not the polar generator of a morphism family (which is non-zero, with an exact real counterexample), and no physical exclusion of the internal block or of mixing is claimed. Finally, the dictionary value $\varepsilon = 1/10$ is not a capacity fit and is not fixed by $\mathrm{Sym}^2(\mathbb{C}^2)$ alone; after the capacity and Sym^2 normalisations are separated, the remaining datum is the ADE ratio $R = 3/2$ — equivalently the prime 5, or the $\sqrt{5}$-gate — whose selection over the neutral order-four convention ($R = \frac{5}{3}$, $\varepsilon = \frac{1}{8}$) is the single residual lock, left open by [12].

The neutrino sector provides a particularly sharp interpretive test case: if particle identity is projective rather than primitive, then PMNS-like misalignment is the generic neutral case, while CKM near-alignment is the structure requiring explanation (Section 7.3).

Interpretive outlook. The following is a reading of the results, not a result. The Standard Model does not treat spin and weak isospin as one structure: a left-handed electron is a Lorentz spinor and, separately, a member of a weak doublet. The sub-programme reaches the same

separation from the other side. A supplied doublet on the admissible fibre carries one copy of the algebra, and that algebra is exactly the algebra of both spin and weak isospin, but one copy cannot carry both roles. Where the fermionic sector meets spacetime and where it meets the weak interaction are therefore two distinct questions, and the question of why weak interactions are left-handed becomes the question of how the two factors are joined. The remaining problems are specific: the two hypotheses on how the fibre is soldered, and the rigidity problems for E_Π and L_Y.

References

[1] J. Beau. A Finite Obstruction to Heisenberg Carrier Selection from Admissibility Constraints, 2026. spectral admissibility subprogram paper, doi:10.5281/zenodo.19635395.

[2] J. Beau. Admissible Non-Injective Transitions as the Primitive of Physical Description, 2026. Cosmochrony Foundation Paper "M", doi:10.5281/zenodo.19616329.

[3] J. Beau. Asymptotic Saturation of Projective Resolution: Spectral Growth along the Projective Cascade, 2026. Spectral admissibility sub-program paper, doi:10.5281/zenodo.19056975.

[4] J. Beau. Bounded Relational Flux and Ramanujan Expansion Do Not Yet Yield a Cascade-Exponent Bound, 2026. Spectral admissibility sub-program "O4" paper, doi:10.5281/zenodo.19101472.

[5] J. Beau. Three Particle Generations and Mass Hierarchy from Spectral Stratigraphy, 2026. Spectral admissibility sub-program paper, doi:10.5281/zenodo.19040490.

[6] Jérôme Beau. Angular Amplitude Reduction: the Oriented Shear Product of the sl(2) Step and the Central-Phase Observable of the Weil Cascade, 2026. Fermionic matter subprogramme working note: fixes the numerical observable for the absolute normalisation of the angular generation split of Q14 §6 and reports the Weil–BFS computations of it. A Baker–Campbell–Hausdorff reduction in $\mathfrak{sl}_2$ identifies the per-step J_Π-odd J_3 component of the metaplectic cascade generator with the oriented product ts of the two shear parameters, produced by the $\mathfrak{sl}_2$ commutator $[E, F] = H$ (Q14 Proposition 6.5), not a free shear parameter. The computation uses only the $\mathfrak{sl}_2$ relations of the SL(2)-on-V model; no map from the Heisenberg bracket is supplied. The proposed observable is the accumulated oriented central-phase increment A_c of the Heisenberg lift, normalised by the projected capacity $\widehat{I}(n)$; that A_c carries the J_3 signal is an input of the note, not a consequence of the reduction. Under this input, at n_3^{obs} the normalised increment equals $\varepsilon_{\mathrm{Weil}}(n_3^{\mathrm{obs}})$, to be compared with the dictionary value $\varepsilon = 1/10$ without fitting. Direct evaluation on symmetric BFS shells returns $\Theta_{\mathrm{raw}} = 0$ identically; the orientation prescription is an irreducible input prior to $\mathcal{N}_A$. doi:10.5281/zenodo.20601228.

[7] Jérôme Beau. Chiral Orientation of the Directed Heisenberg Frontier, 2026. "CHO" note. doi:10.5281/zenodo.20735907.

[8] Jérôme Beau. Gauge–Gravity Spectral Synthesis: A Conditional Einstein–Yang–Mills System from Projective Spectral Entropy, 2026. "Q13" paper, doi:10.5281/zenodo.20209859.

[9] Jérôme Beau. Neutrino Mixing and Projective Particle Identity, 2026. Fermionic matter sub-programme companion note: basis misalignment as the generic situation, alignment as requiring an identity-stabilising projection channel; PMNS large mixing as the unfixed default and CKM near-diagonality as the explanandum, conditional on a common projective frame; Dirac–Majorana as projective conjugation resolution. Structural throughout, no mixing angles or masses derived, doi:10.5281/zenodo.21207750.

[10] Jérôme Beau. Operator Doublets, Erased History Fibres, and the No-Sequential-Re-entry Theorem, 2026. Fermionic-matter no-go note. Exact finite obstructions: abelian carrier commutant of the Weil module (no fermionic lift of the Hecke doublets); C_4 frame stabiliser and canonical $(\mathbb{Z}_2)^r$ erased-fibre torsor; semilinear RK exchange of the two odd Hermitian axes; the no-sequential-re-entry theorem ($\pi v = 0 \Rightarrow Q\pi v = 0$) and the O33/EBJ lever audit; corollary: realisation through the history-fibre route requires a parallel substrate channel with an oriented central/Weyl datum, doi:10.5281/zenodo.21381089.

[11] Jérôme Beau. Projected Yukawa Operator and Chiral Polar Factor, 2026. Fermionic matter sub-programme companion note, stated on the generation block Y_Π^{gen} of the projected Yukawa morphism Y_Π: under the premises [H-Res] and [H-Sq], the squared observable $H_\Pi = (Y_\Pi^{\mathrm{gen}})^\dagger Y_\Pi^{\mathrm{gen}}$ has $\mathrm{Spec}(H_\Pi)|_{\mathrm{gen}} = \lambda_Y^2\{1, \frac{1}{2}+u, \frac{1}{2}-u\}$, so E_Π^2 fixes the squared levels, not the block $Y_\Pi^{\mathrm{gen}} = U_\Pi H_\Pi^{1/2}$; transfer to the full coupling needs the premise [H-Fac], the existence of a weak linking carrier and multiplicity at most one of the invariant couplings, doi:10.5281/zenodo.20767498.

[12] Jérôme Beau. Spin-Stratum Type-Rigidity: An Obstruction to the Galois Action on the Binary Icosahedral Stratum, with Conditional Consequences for the Chiral Lift, 2026. Arithmetic orthogonality of the Galois action $\sqrt{5} \mapsto -\sqrt{5}$ and the spin-stratum operations: $\varepsilon = 1/10$ is a theorem modulo the ADE case-selection gate, whose first-principles status this note does not settle. A character-table audit of $2I$ proves that inner conjugations, $-I$ and J_Π act trivially on $\mathrm{Irr}(2I)$ whereas σ induces $(2\,2')(3\,3')$; the Born–Infeld parity $c \mapsto q-c$, acting as complex conjugation, fixes $\sqrt{5}$ (proved), but its status as the base-fibre involution is that of a candidate hypothesis of the foundations, taken here as a premise. Modulo [H-WS] for R_b, the A4 hypotheses for the locking, modelling assertions for the tensor functors and Schur projection, and the modelling premise [M] that the generator list is complete (which implies carrier-preservation of every admissible operation), no listed operation realises σ. No link between the gate and σ is established. The Lorentzian chiral lift is an input not constructed here ([H-Spin] of Q14). The chiral-lift conclusion (no action on $\mathbb{Q}(\sqrt{5})$) is conditional on [H-Spin], [H-WS], the modelling premise [M], an explicit boost premise [B] (the lift supplies only the central character and the complexification unit, by complex conjugation) and the inherited central-phase convention [C]. doi:10.5281/zenodo.20693084.

[13] Jérôme Beau. Ternary Phase Carrier: Colour Confinement, Generation Splitting, and Koide Dispersion, 2026. Fermionic matter sub-programme note (speculative bridge): one complex three-phase carrier $z_g = S + A\,e^{i(\delta+2\pi g/3)}$ read two ways – pure-phase part sums to zero ($1+\omega+\omega^2 = 0$, colour-neutral class), real part $S + A\cos(\delta + 2\pi g/3)$ is the square-root mass profile of the unit-dispersion note. The singlet amplitude S is the master dial: $S = 0$ pure-phase (colour, confined); $S \neq 0$ real offset (masses); $A = \sqrt{2}S$ singlet-doublet equipartition (Koide, CV=1); δ near a node gives the hierarchy. Candidate admissibility filter: capacity balance $\|r_{dbl}\| \leq \|r_{sing}\|$ saturated at CV=1. Not a derivation; states the construction charge sheet. doi:10.5281/zenodo.21115977.

[14] Jérôme Beau. The Born–Infeld Saturation Margin of the Chiral Modulus: Antisymmetric Structure and Lorentzian Genus of the Generation Split, 2026. Fermionic matter sub-programme companion note to PRS: the chiral modulus is J_Π-odd and the primary variable is an antisymmetric chiral two-form; the Born–Infeld determinantal saturation margin of a supplied such two-form has second variation $\mu_\chi^2 = \frac{1}{2}P_{\mu\nu}P^{\mu\nu}$, the Lorentzian genus of the chiral polarisation. The genus is not determined: the construction of the two-form, the coincidence of the Born–Infeld modulus with the Schur tilt, the transport of the metaplectic opening to the locking operator, and the non-degeneracy of the split are hypotheses; the amplitude analysis is stated for a supplied purely electric two-form. doi:10.5281/zenodo.20633931.

[15] Jérôme Beau. The Charged-Lepton Koide Relation as a Unit-Dispersion Constraint, 2026. Fermionic matter sub-programme source note: recasts the charged-lepton Koide relation as a unit coefficient-of-variation condition on the square-root mass vector, $Q_\ell = (1+\mathrm{CV}(r_\ell)^2)/3$, hence $Q_\ell = 2/3 \iff \mathrm{CV}(r_\ell) = 1$ ($\sigma_r = \bar{r}$); separates the dispersion constraint from the hierarchy phase (node placement); records the dispersion obstruction $\mathrm{CV} \le 1/\sqrt{2}$, $Q \le 1/2$ of the cascade ladder, taken by hypothesis as a pinned normal form; states the maximum-entropy reading as an open S_Π-variational test. Target invariant for the fermionic-mass sector, not a mass formula. doi:10.5281/zenodo.21109812.

[16] Jérôme Beau. The Constrained Jet of the Lorentzian Eliminated Block and the Chiral Defect-Rate Identity: A Moving-Schur Existence Theorem for the Generation Split, 2026. Fermionic matter sub-programme companion note, logically between the Schur reduction (PRS) and the physical identification of the chiral generator. For every smooth self-adjoint projector family $1 - P(s) = Q_0 + sQ_1 + s^2Q_2 + O(s^3)$ the projector constraints force $Q_1 = [A, Q_0]$ to be a purely off-diagonal Grassmann tangent and pin the diagonal blocks of Q_2 to Q_1^2 with opposite signs; the jet parities alternate under J_Π-equivariance. With a covariant moving spinorial embedding and a J_Π-even Dirac operator the first-order J_Π-odd part of E_Π^2 is $\{E_0, E_1\}$, and antiunitary parity makes every odd-order generation-mixing coefficient vanish, mixing at even orders not being excluded. An explicit covariant moving-Schur family realises $E_0^2 = \mathrm{diag}(1, \frac{1}{2}, \frac{1}{2})$ with a non-zero split rate $u'(0) = 11 \cdot 2^{1/4}/9$. In the chiral frame $[\Pi_{J_\Pi\text{-odd}} \dot{Q}(0)]_{LL} = \frac{1}{2}\partial_s \Delta_\chi(P)|_0$ determines one block of the odd tangent, not a unique generator; the selection of the family, the localisation, and the normalisation of $|u|$ remain open, doi:10.5281/zenodo.20763532.

[17] Jérôme Beau. The Oriented Frontier Observable: a Recursive Q11 Diagnostic for the Angular Generation Split, 2026. Fermionic matter sub-programme diagnostic note. The raw shell observable of the angular generation split vanishes identically on symmetric BFS shells ($\Theta_{\mathrm{raw}} = 0$); this note defines an oriented replacement, a frontier transfer observable on the directed outgoing edges $g \to gs$ whose central increment is the Heisenberg cocycle $a(g)\, s_b$. It is not the J_3 coefficient of the metaplectic step, which in the SL(2) model of Q14 is produced by the $\mathfrak{sl}_2$ commutator $[E, F] = H$ (Q14 Proposition 6.5). The first test is the existence of an oriented signal, with the symmetrised-frontier cancellation as anti-bias control. The chiral lift of the residual reflection $R_b = \mathrm{FT}^2$ is reduced to one named hypothesis [H-WS]: (i) R_b acts on the chiral carrier $S_L \oplus S_R$ as a scalar, so that $[\gamma_5, R_b] = 0$; (ii) the scalar is -1, used only in AOG; supplied by no source. No normalisation, no dictionary value, no ε enters. doi:10.5281/zenodo.20601245.

[18] Jérôme Beau. The Projective Residue as a Schur Complement: Reduction of the Generation Split to the Chiral Asymmetry of Projection Locking, 2026. Fermionic matter sub-programme note: under a contraction hypothesis the compression remainder of the projected Dirac square is, as a quadratic form, the Schur complement $-N^\dagger N$ of the eliminated spinorial directions; it is zero-order under a separate symbol condition, which forces $E_\Pi = 0$ on irreducible Clifford fibres; chiral block reduction, finite J_Π-equivariance under an equivariant construction, and the Schur-null and Schur-transverse loci of the locking defect, which locus holds being open and conditional on a transport hypothesis; no sign of the Born–Infeld genus and no non-vanishing of u is derived. doi:10.5281/zenodo.20601040.

[19] Jérôme Beau. The Spectral Gravity Sub-Programme, 2026. Presentation Note 4, doi:10.5281/zenodo.20533351.

[20] Jérôme Beau. Toward a Temporal Scale for Emergent Spacetime: Spatial SU(2) Invariance Leaves the Temporal Coefficient Free, 2026. "Q11" paper, version 2.0, doi:10.5281/zenodo.20098387.

[21] Jérôme Beau. Toward Fermionic Matter from Projective Dirac Admissibility: Chirality and Electroweak Structure Rest on a Lorentzian Spin Solder and a Distinct Weak Factor, 2026. Heisenberg carrier $\mathcal{H}_c$, Weil block V_c and spinor doublet V_ρ are distinct; connection-dependent admissible readings inherit both unproved Q6a continuum hypotheses, the spatial continuum open in Q5a. Fermionic-matter paper Q14: on a supplied Heisenberg carrier and supplied model data, the $\mathfrak{sl}_2(\mathbb{C})$ tensor algebra is proved; the Lorentz reading rests on a spin solder [H-Spin] and the electroweak reading on a distinct $U(2)$ weak factor [H-Weak], neither supplied; $V-A$ selection is the representation content of [H-Weak], hypercharge twists are selected by anomaly constraints under both hypotheses with a supplied colour module and minimal L_Y normalisation, and the three-generation factor uses a supplied rank-three selection rule; the sign $E_\Pi \preceq 0$ of the projective endomorphism, used for its chiral block structure on the left-admissible branch, is an explicit hypothesis. doi:10.5281/zenodo.20218409.

[22] Jérôme Beau. Toward Four-Dimensional Lorentzian Geometry from BFS Shell Stratification, 2026. Emergent-geometry paper Q5b (version 2.2.1): on balls of radius $n \ll \sqrt{q}$ the BFS shells of $\mathrm{Heis}_3(\mathbb{Z}/q\mathbb{Z})$ converge to a sub-Finsler Carnot–Carathéodory sphere foliation with $D_{\mathrm{hom}} = 4$; under the unestablished [H-L] and the open [H-lift] the effective co-metric has rank three, the full-rank extension and the coefficient values being open, doi:10.5281/zenodo.19686700.

[23] Jérôme Beau. Toward Projected Yukawa Couplings: A Conditional Weak Determinant Line and Generation-Level Ordering, 2026. Fermionic matter sub-programme companion note: under the distinct weak factor [H-Weak] of Q14, not supplied, the determinant line $L_Y = \wedge^2(E_{\mathrm{weak}})$ of a rank-two weak bundle with structure group $U(2)$; and, for the model operator $\mathrm{diag}(1, \frac{1}{2}+u, \frac{1}{2}-u)$ on C^3_{gen}, whose reading as $E^2_\Pi|_{\mathrm{gen}}$ is the named hypothesis [H-Res], the ordering of three exit-deficit levels for $0 < u < \frac{1}{2}$, without any mass value, doi:10.5281/zenodo.20767265.

[24] Jérôme Beau. Toward Three Spatial Directions from a Supplied Spinor Carrier: Requirements for an Equivariant Bridge, 2026. Q7 (version 2.0): states the requirements an equivariant bridge would have to meet and proves those that follow from representation theory on a supplied carrier; the identification of the measured space with the spin-one module is an explicit hypothesis supplied by no source. The stored basis rows are pure Fourier modes, so the flat-mode entry of the compression is the Rayleigh quotient $4 - 2 - 0 = 2$, A_z is an unevaluated parameter, and the gap between the two distinct entries is the identity $4\sin^2(\pi k/q)$. Verdict on the bridge: missing identification, neither derived nor ruled out, doi:10.5281/zenodo.19802123.

[25] Jérôme Beau. Withdrawal Notice for O31: Unsupported Colour-Triplet Co-admissibility and Gauge-Group Claims, 2026. "O31" paper, doi:10.5281/zenodo.20030491.

[26] Jérôme Beau. Yang–Mills Dynamics from Projective Spectral Entropy: Vertical Heat-Kernel Variation on the Admissible Fibre, 2026. "Q12" paper, doi:10.5281/zenodo.20189137.

[27] Lawrence J. Hall, Hitoshi Murayama, and Neal Weiner. Neutrino mass anarchy. *Physical Review Letters*, 84:2572–2575, 2000. arXiv:hep-ph/9911341.

[28] George Hobart. Ontic types in the standard model of particles. Conference abstract; PhD project "The Philosophy of the Standard Model of Particle Physics", University of Bristol, `https://research-information.bris.ac.uk/en/projects/the-philosophy-of-the-standard-model-of-particle-physics/`, 2026.