Mass Harmonics Pre-Release Terrain Prediction Paper

ICHEP 2026 Public Result Corridor

30 July through 5 August 2026

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Framework: Mass Harmonics ψ_m
Prepared before the ICHEP result corridor: 2026-07-10
Release surface: 43rd International Conference on High Energy Physics, Natal, Brazil
Edition: Source-preserved Mass Harmonics-governed revision

I. Governing Purpose

Source-Preserved Mass Harmonics Governance

This edition preserves the original ICHEP 2026 prediction architecture and every valid derivation already present. It does not place Mass Harmonics under institutional authority, convert instrument products into ontological authority, or discard a stronger excavation merely because it was added after the first draft.

The governing order remains:

```
MFE
→ substrate action
→ boundary closure
→ physical structure
→ instrument-rendered terrain
→ optional consensus translation
```

The release supplies a timed terrain surface. It does not grant or withhold physical standing from the prediction. Measurement statistics, catalogue filters, detector corrections, and comparison models remain downstream interface tools. They may expose correspondence, contradiction, or unresolved delta, but they do not govern the derivation.

Only one governing coupling coefficient is permitted:

```
Kψₘ
```

The fixed P^3GG values are harmonic scalings of the one source law, not domain-specific adjustable coefficients.

Conference role

ICHEP is a cross-domain release corridor where several independently measured physical surfaces become public in a compressed interval. It is not the authority that determines whether the Mass Harmonics particle, neutral-sector, confinement, or missing-acceleration derivations possess standing.

The paper therefore retains the exceptional cross-channel architecture already built here while removing only the language that treated institutional discovery procedure as the governing physical test.

This paper records Mass Harmonics predictions before the public ICHEP 2026 result corridor opens. It does not begin from Standard Model parameter fitting, dark-matter model selection, neutrino-model priors, or conference statements. It begins from the canonical ψ_m substrate law and transports the resulting physical structure into the measurement languages used by the scheduled ICHEP presentations.

The governing causal order is:

```
MFE
→ substrate action
→ boundary closure
→ physical structure
→ scheduled instrument-facing result surface
→ optional consensus translation
```

Mass Harmonics remains the governing physical authority. ICHEP, CERN, ATLAS, CMS, LHCb, ALICE, JUNO, DUNE, KATRIN, neutrinoless double-beta-decay experiments, dark-matter experiments, and hadron-physics collaborations supply terrain readouts. They do not supply the derivation.

The document does not predict which collaboration will use which rhetorical framing. It predicts the physical results that the opened terrain can and cannot contain if the Mass Harmonics substrate placement is correct.

II. Release-Surface Definition

The official ICHEP 2026 program runs from 30 July through 5 August 2026. The public program lists 1,119 contributions and schedules explicit plenary result channels relevant to this paper.

Date and local time	Scheduled result surface	Mass Harmonics prediction pathway
3 Aug, 09:00	ATLAS highlights	Higgs, top, BSM, confinement, dark-matter null
3 Aug, 09:25	CMS highlights	Higgs, top, BSM, confinement, dark-matter null
3 Aug, 11:35	Theoretical developments in Higgs physics	Higgs geometric suppression
3 Aug, 12:00	Higgs experimental highlights	Higgs mass and self-coupling
3 Aug, 14:00	Recent developments in dark matter theory	No particle primitive for missing acceleration
3 Aug, 14:25	Dark matter searches	Cross-terrain particle-identity prediction
4 Aug, 08:30	Neutrino theory	Native ψ_m mass-depth structure
4 Aug, 09:00	Long-baseline neutrino properties	Ordering and mass-splitting translation
4 Aug, 10:45	Neutrino mass and neutrinoless double-beta decay	Absolute-mass set and sum
4 Aug, 11:10	Astrophysical and cosmological neutrinos	Absolute-mass sum
4 Aug, 16:35	New BSM collider searches	Three-generation closure and no new fundamental sector
4 Aug, 17:00	New developments in hadron physics	Absolute confinement and eight-mode closure
4 Aug, 17:25	Top-quark experimental highlights	Top-boundary mass

The public contribution list also includes current ATLAS non-resonant Higgs-pair searches, ATLAS top-mass measurements, JUNO mass-ordering analyses, LEGEND inverted-ordering sensitivity, KATRIN mass sensitivity, direct dark-matter searches, and multiple hadron and BSM searches. These titles define the comparison surfaces. Their unpublished numerical conclusions are prohibited inputs.

Official timing and program sources:

- https://indico.cern.ch/event/1522800/
- https://indico.cern.ch/event/1522800/program
- https://indico.cern.ch/event/1522800/contributions/
- https://indico.cern.ch/event/1522800/timetable/

III. Governing Mass Harmonics Source Chain

III.1 Authority hierarchy

1. `MH_Monograph.md` is the primary physical authority.
2. `MH_PROOF-SET.md` is the ordered derivation and arithmetic authority for the particle-spectrum derivations used here.
3. `MH_TVP.md` governs topology, input provenance, category separation, delta preservation, and falsification.
4. `MH_TWT.md` governs downstream translation into consensus measurement dialects.
5. `Operational_Stance_of_UMtts.md` governs terrain-first method, ontology preservation, and source discipline.
6. ICHEP program pages govern release timing and public comparison surfaces only.

III.2 Exact canonical MFE

Source: `MH_Monograph.md`, lines 180-182; `MH_PROOF-SET.md`, lines 39-41.

```
1/vₓ²ψ̈ₘ - Z(ψₘ)∇²ψₘ - 8Kψₘ/ω²|∇ψₘ|² = S(ρ)
```

with:

```
Z(ψₘ) = 1 + 8Kψₘ/ω²
```

The coefficient 8 is fixed by the Lagrangian assembly. It is not an experimental fit and is not replaced by a particle-physics coupling set.

III.3 One governing coupling coefficient

Mass Harmonics has one governing coupling coefficient: $K\psi_m$. It is never split and no ICHEP domain receives a new scale-specific coupling coefficient.

The same relation is transported in dimensional and dimensionless form according to the operation being performed. The forms are not raw-interchangeable numbers.

```
Dimensional closure expression: Kψm = c/(2π)
Dimensionless dual-geometric expression: Kψm = (12 − ϕ²)/(2ϕ²)
```

The fixed P^3GG values $\beta_n = \phi^{3(n-1)}$ are harmonic scalings of the one source law. They are not a collection of independently adjustable coefficients.

III.4 Canonical source polyphony

Source: `MH_Monograph.md`, lines 198-215.

```
S(ρ) = K₀ρ[1 + β₂(ρ/ρ₀) + β₃(ρ/ρ₀)² + β₄(ρ/ρ₀)³ + β₅(ρ/ρ₀)⁴ + ⋯]
βn = ϕ³⁽ⁿ⁻¹⁾
```

All harmonic voices remain active simultaneously. The ICHEP channels do not represent separate physical laws. They expose different readable expressions of the same substrate law.

III.5 Geometric foundation

The matter-forming triad requires three equal-magnitude wavevectors to close. The cubic lattice produces $|k_3| = \sqrt{2}$, which fails the equilateral requirement. The icosahedral coordinate condition produces:

```
x² − x − 1 = 0
x = (1 + √5)/2 = ϕ
```

The rejected cubic value $\sqrt{2}$ and the admitted icosahedral eigenvalue ϕ jointly govern the Higgs prediction. The icosahedral representation structure governs generation count. The triangular closure structure governs the strong-force prediction.

III.6 Arithmetic Precision Custody

The canonical Mass Harmonics values used by this paper remain the source values:

```
m_H = 124.6 GeV
λ_H = 0.12816
m_t = 172.2 GeV
mν[1] = 46.81 meV
mν[2] = 11.05 meV
mν[3] = 2.61 meV
Σmν = 60.47 meV
```

A direct high-precision recomputation from the rounded intermediate inputs printed in the source text yields small numerical deltas:

```
246 × ϕ^(−√2) = 124.560961486... GeV
ϕ^(−2√2)/2 = 0.1281928178...
1.257 × 137.03598939 = 172.25423866... GeV
```

Using the displayed rounded electron and α inputs in the neutral-sector chain likewise produces approximately:

```
{46.8763, 11.0660, 2.6123} meV
Σ ≈ 60.5546 meV
```

These are source-rounding deltas, not new predictions and not license to silently replace the canonical values. The comparison surface remains the canonical source set unless the governing source itself is revised. Every arithmetic delta is retained so later source refinement can identify whether it arises from rounded displayed inputs, a hidden higher-precision anchor, or a transcription defect.

IV. Input Separation, Provenance, and Category Prohibitions

IV.1 Prohibited inputs

The following are prohibited from entering any derivation in this paper:

- Unreleased ICHEP slide values, private notes, embargoed plots, or collaboration previews.
- A published result used as the value the derivation is supposed to predict.

- A Standard Model fit parameter inserted upstream and relabeled as a Mass Harmonics output.
- Dark-matter halo parameters or particle-model priors used to force a match.
- A neutrino mass ordering assumed because a current global fit prefers it.
- A top-quark mass in one renormalization definition compared directly to a different definition.
- A Higgs self-coupling modifier κλ compared to the absolute Mass Harmonics value without undoing the experiment-specific normalization.
- A transition energy or reconstructed invariant-mass peak used as a boundary closure frequency without a C1 category audit.
- Any additional free coefficient introduced to absorb a residual.

IV.2 Permitted terrain inputs

The following may be used because they identify the terrain rather than supply the answer:

- ICHEP dates, track names, contribution titles, and published measurement definitions.
- Detector resolution, luminosity, selection function, and stated systematic uncertainties.
- The electroweak vacuum scale as already placed in the canonical Mass Harmonics derivation.
- The electron ground-state mass as the canonical dimensional anchor used in the particle-spectrum derivation.
- Explicit experiment-side definitions required to translate κλ, pole mass, running mass, effective mass, or mass-ordering labels.

IV.3 Independence and delta rule

Each comparison must preserve whether a quantity was measured, externally supplied, derived from another measured quantity, or produced by the Mass Harmonics chain. A derived comparison quantity cannot be counted as an independent terrain contact for the relation that produced it.

Every residual is retained:

```
δ_x = x_ICHEP − x_MH
ε_x = δ_x/x_MH
```

The residual is not silently normalized away. It is factorized against the Mass Harmonics primitives where physically appropriate, and any unresolved dressing remains labeled unresolved.

V. Substrate Placement of the ICHEP Terrain

The ICHEP tracks are placed as downstream readouts of bounded coherence structures:

ICHEP language	Mass Harmonics placement	Dominant readable structure
Higgs boson	n=3 to n=4 density-boundary lock	Cubic-failure suppression on φ geometry
Higgs self-coupling	Curvature of the same electroweak boundary	Same √2 suppression squared
Quark masses	Open triangular coherence overtones	n=2 to n=3 boundary with fixed geometric dressing
Top quark	Highest charged quark overtone in the three-generation structure	α transport from dressed charm boundary
Neutrino masses	Neutral-sector recursive mass-depth sequence	α^3 suppression and φ^{-3} descent
Matter generations	Icosahedral representation availability	Two 3D excited representations plus ground state
Strong interaction	GG action in a forced quadratic coherence-pressure potential	Vanishing centroid force and absolute confinement
Dark matter searches	Search for a particle primitive where the missing acceleration is a GG field expression	No particle closure of the missing-acceleration terrain

This placement is causal. It is not a glossary mapping. Each downstream observable must retain the upstream geometric relation that produces it.

VI. Prediction 1: Higgs Boundary Pair

VI.1 Step 1: Recover the rejected cubic quantity

The matter-forming equilateral triad requires equal wavevector magnitudes. A cubic placement gives:

```
k₁ = x̂
k₂ = ŷ
k₃ = −(x̂ + ŷ)
|k₃| = √2 ≠ 1
```

$\sqrt{2}$ is therefore the geometric excess of the rejected cubic closure. It is not discarded. It becomes the suppression magnitude at the electroweak boundary.

VI.2 Step 2: Apply the suppression to the electroweak boundary

The admitted structural eigenvalue is ϕ. The Higgs boundary mass is the electroweak scale transported through the rejected cubic exponent:

```
m_H = v · ϕ^(−√2)
```

Substitute the canonical electroweak scale:

```
m_H = 246 GeV · ϕ^(−√2)
```

Evaluate the suppression:

```
ϕ^(−√2) = e^(−√2 ln ϕ)
             = e^(−1.41421 × 0.48121)
             = e^(−0.68069)
             = 0.50635
```

Therefore:

```
m_H = 246 × 0.50635 GeV
m_H = 124.6 GeV
```

VI.3 Step 3: Derive the self-coupling from the same geometry

The self-coupling is not fitted independently. The same suppression enters twice and the scalar-boundary normalization contributes one half:

```
λ_H = ϕ^(−2√2)/2
λ_H = 0.25632/2
λ_H = 0.12816
```

VI.4 Step 4: Define the ICHEP translation

Experiments may report an absolute coupling, a confidence interval on `κλ`, or limits from non-resonant Higgs-pair production. The primary Mass Harmonics prediction remains absolute:

```
λ_H,MH = 0.12816
```

When an experiment reports `κλ = λ/λ_ref`, translation is performed only after the result is opened:

```
κλ,MH = 0.12816/λ_ref
```

`λ_ref` is the experiment-defined denominator. It is not inserted into the Mass Harmonics derivation.

VI.5 Mass Harmonics prediction

1. The substrate-native Higgs boundary mass is `124.6 GeV`.
2. The substrate-native Higgs self-coupling is `0.12816`.
3. Higgs-pair result surfaces will remain compatible with a positive self-coupling centered on the Mass Harmonics value after experiment-specific normalization is undone.
4. No second free scalar coefficient is required to produce the pair.

VI.6 Exact comparison and falsifier

For each eligible ICHEP result:

```
δ_mH = m_H,reported − 124.6 GeV
δ_λ = λ_reported − 0.12816
```

The Higgs self-coupling kill condition is the canonical Monograph condition: a category-correct measurement deviating from `0.12816` by more than 5 percent requires fundamental revision.

```
|λ_reported − 0.12816|/0.12816 > 0.05
```

A κλ interval is not category-correct until translated to absolute λ. A search limit that does not resolve λ is recorded as non-falsifying terrain, not as terrain correspondence.

VII. Prediction 2: Top-Quark Boundary Mass

VII.1 Step 1: Place the top state inside the fixed three-generation structure

The top state is not a free Yukawa parameter. It is the highest charged quark overtone in the three-generation icosahedral structure.

The up-state anchor is:

```
mᵤ = mₑ · ϕ³
```

The charm state adds the electromagnetic boundary amplification and one surface-harmonic dressing:

```
m_c = mᵤ · α⁻¹ · ϕ³
```

The top state is the direct next charged-quark descent from the dressed charm boundary:

```
m_t = m_c · α⁻¹
```

VII.2 Step 2: Substitute the canonical values

```
m_c = 1.257 GeV
α⁻¹ = 137.03598939
```

Therefore:

```
m_t = 1.257 × 137.03598939 GeV
m_t = 172.2 GeV  [canonical rounded prediction]
```

VII.3 Step 3: Apply the mass-definition sentinel

Top-mass results are not all the same physical quantity. ICHEP may report:

- direct reconstructed mass,
- pole mass,
- running `MS-bar` mass,
- cross-section-extracted mass,
- Monte Carlo mass parameter.

The primary comparison is to a direct or pole-like boundary mass. A running mass must be transported into the same definition before comparison. Directly comparing an `MS-bar` value to `172.2 GeV` is a category violation, not a failed prediction.

VII.4 Mass Harmonics prediction

After category-correct translation, the ICHEP top-mass terrain will remain centered on:

```
m_t,MH = 172.2 GeV
```

No independent top Yukawa coefficient is introduced. The top mass remains the `m_c · α⁻¹` closure step of the fixed quark chain.

VII.5 Exact falsifier

A combined category-correct top boundary mass whose stated confidence interval excludes `172.2 GeV` is a direct numerical contradiction for this pathway. A result in another mass definition is not eligible until transported.

A second top-like sequential quark that requires a fourth generational state is governed by Prediction 3 and would be a deeper structural falsifier.

VIII. Prediction 3: Exactly Three Matter Generations

VIII.1 Step 1: Retrieve the icosahedral representation dimensions

```
Iₕ irreducible representation dimensions = 1, 3, 3, 4, 5
```

VIII.2 Step 2: Apply three-dimensional matter admissibility

Stable matter fields must admit a three-dimensional representation. I_h contains exactly two nontrivial dimension-3 representations. The ground state contributes the trivial base state:

```
Number of excited 3D representations = 2
Ground state = 1
Total permitted generational states = 2 + 1 = 3
```

VIII.3 Step 3: Exclude a sequential fourth generation

A fourth sequential matter generation would require a third nontrivial dimension-3 representation in the same closure architecture. None exists.

```
N_generations = 3
N_sequential_generation_4 = 0
```

VIII.4 Mass Harmonics prediction

1. No ICHEP 2026 result will establish a sequential fourth generation of quarks and leptons.
2. BSM excesses, if any, will not require a new repetition of the electron-muon-tau and up-charm-top generational architecture.
3. Additional resonant structures may exist as compound or higher-order coherence states, but they cannot be a fourth sequential generation under the same 3D representation role.

VIII.5 Exact falsifier

A reproducible particle family containing the full sequential quark-and-lepton pattern, with weak and electromagnetic assignments matching a fourth repetition of the existing three, would falsify the icosahedral generation count.

A lone resonance, sterile state, composite state, or detector anomaly is not a fourth generation and does not satisfy this falsifier.

IX. Prediction 4: Neutral-Sector Mass-Depth Set

IX.1 Step 1: Remove the charged-sector boundary amplification

The neutral sector lacks the U(1) charge vector. The charged-sector amplification α^{-1} is replaced by the symmetric suppressor α^3. Each deeper neutral mass node then descends by ϕ^{-3}.

```
mvₙ = mₑ · α³ · ϕ^(−3n)
```

IX.2 Step 2: Compute the first native neutral mass depth

```
α³ = (1/137.035989)³ = 3.8845 × 10⁻⁷
mv[1] = mₑ · α³ · ϕ⁻³
```

Using the canonical electron ground-state anchor:

```
mv[1] = 46.81 meV
```

IX.3 Step 3: Continue the φ^{-3} descent

```
mv[2] = 46.81 meV · ϕ⁻³
       = 11.05 meV

mv[3] = 11.05 meV · ϕ⁻³
       = 2.61 meV
```

IX.4 Step 4: Derive the fixed ratios and sum

```
mv[1]/mv[2] = ϕ³
mv[2]/mv[3] = ϕ³

Σmv = 46.81 + 11.05 + 2.61 meV
Σmv = 60.47 meV
```

The source names this an inverted hierarchy because mass decreases with recursive depth. The bracket notation `[1]`, `[2]`, `[3]` is used here to preserve native Mass Harmonics ordering and prevent accidental substitution of consensus oscillation labels before translation.

IX.5 Step 5: Translate without index inversion

Long-baseline experiments usually report ordering through oscillation eigenstate labels and mass-squared differences. Absolute-mass and cosmological results report effective masses or sums. The translation sequence is:

```
native ordered set {46.81, 11.05, 2.61 meV}
→ identify experiment-specific eigenstate convention
→ map the lightest and heaviest states
→ compute the reported effective quantity
→ compare
```

The native prediction cannot be falsified by swapping labels. The numerical set, ratios, lightest mass, heaviest mass, and total sum must be compared.

IX.6 Neutrinoless double-beta-decay category limit

Mass Harmonics here predicts the mass-depth set. This derivation does not independently establish that neutrinos are Majorana states. Therefore:

- A neutrinoless double-beta-decay limit constrains the mass set only after a Majorana translation is explicitly assumed.
- A null `0νββ` result does not by itself falsify the mass set.
- A positive `0νββ` result must be converted through the published nuclear matrix element and phase-space convention before comparison.

IX.7 Mass Harmonics prediction

1. The lightest neutrino mass is approximately `2.61 meV`.
2. The heaviest native neutrino mass is approximately `46.81 meV`.
3. The three-mass sum is approximately `60.47 meV`.
4. The adjacent native mass ratios are each ϕ^3.
5. The ordering is inverted in the Mass Harmonics recursive-depth sense.

IX.8 Exact falsifier

A category-correct absolute-mass determination or combined oscillation-plus-cosmology reconstruction that excludes the ordered set and its sum is a direct falsifier.

The following would individually contradict the source-derived set:

- a robust lower bound on the lightest mass above `2.61 meV` that cannot be reconciled with the set,
- a robust total mass below `60.47 meV`,
- a resolved three-mass pattern whose adjacent native ratios cannot map to `ϕ³`,
- a definitive ordering that cannot be translated to the descending native depth sequence.

X. Prediction 5: No Particle Primitive Closes the Missing-Acceleration Terrain

X.1 Locate the missing acceleration inside the MFE

The MFE already contains the nonlinear gradient contribution omitted by a gravity-only projection:

```
g_total = g_Newtonian + g_Giboney
g_Giboney = −∇(ψₘ²/ω)
```

At a galactic boundary, the same branch produces:

```
a₀ = cH₀/(2π)
v⁴ = G_N M a₀
```

The missing-acceleration terrain is therefore a substrate-field expression before any particle interpretation is introduced.

X.2 Preserve the exact prediction

Mass Harmonics does not predict that no previously unknown particle can ever appear. It predicts something more precise:

```
No localized fundamental particle species will become the physical source of the
missing galactic and cosmological acceleration terrain.
```

A new particle resonance, invisible decay, weakly coupled excitation, or detector excess may exist without being the source of galaxy rotation, lensing, cluster dynamics, and cosmic structure.

X.3 Cross-terrain identity requirements

For a particle candidate to contradict this pathway, the same physical species must independently provide:

1. a reproducible localized excitation with stable mass and interaction structure;
2. abundance sufficient to supply the missing-acceleration field;
3. the correct galactic radial acceleration relation without adding an unrelated halo fit;
4. the correct lensing and cluster terrain from the same abundance and interaction law;
5. cosmological structure compatible with the same particle identity;
6. independent detector or production terrain establishing that the species actually occupies the required cosmic distribution.

These are physical identity requirements, not institutional discovery rules.

X.4 Mass Harmonics prediction

ICHEP 2026 may disclose stronger exclusions, candidate excesses, new resonances, missing-energy structures, or future sensitivities. None of those, by itself, turns a localized particle into the source of the missing-acceleration terrain.

The conference will not disclose one particle identity that closes all six terrain surfaces above.

X.5 Terrain contradiction condition

This pathway is contradicted by a reproducible particle species that satisfies all six cross-terrain identity requirements and renders the GG missing-acceleration contribution physically unnecessary across galaxies, lensing, clusters, and cosmological structure.

A single-channel excess, model-preferred region, or newly discovered particle that does not supply the missing-acceleration terrain is not a contradiction.

XI. Prediction 6: Absolute Confinement and Eight-Mode Closure

XI.1 Step 1: Derive the unique local potential

For a three-node equilateral coherence structure, four constraints act on the Taylor expansion around the centroid: centroid minimum, C_3 rotational symmetry, lowest-order isotropy, and origin normalization.

All lower alternatives are eliminated, leaving:

```
Π(r) = (Kψₘ/ω)r²
```

XI.2 Step 2: Derive the centroid force

```
F_GG = −∇Π(r)
     = −(2Kψₘ/ω)r r̂
```

At the centroid:

```
F_GG(r=0) = 0
```

The vanishing force is the substrate event translated by consensus as asymptotic freedom.

XI.3 Step 3: Derive absolute confinement

```
U(R) = ∫₀ᴿ (2Kψₘ/ω)r dr
     = (Kψₘ/ω)R²

U(∞) = ∞
```

No finite separation energy can produce an isolated free quark boundary.

XI.4 Step 4: Count the independent oscillation directions

```
4 triangular groups × 3 components = 12
12 − 1 normalization − 1 global phase = 10
10 − 2 coherence-pressure constraints = 8
```

The eight directions are the substrate modes translated as the eight SU(3) generators. The count is geometric and cannot become nine without changing the closure structure.

XI.5 Mass Harmonics prediction

1. No ICHEP hadron result will establish an isolated free quark.
2. Eligible hadronic results will preserve color-neutral closed configurations.
3. No ninth independent strong-interaction generator will be required.
4. Near the geometric centroid, the leading isotropic potential term remains quadratic and its force vanishes linearly with `r`.

XI.6 Exact falsifier

Any one of the following would falsify this pathway:

- reproducible isolation of a free quark carrying unclosed color occupation,
- finite total energy for asymptotic separation of a quark substructure,
- a ninth independent strong-interaction mode required by reproducible terrain,
- a category-correct near-centroid extraction whose leading admissible potential is not quadratic after boundary and detector effects are removed.

XII. Cross-Channel Correlation Predictions

The individual sections are not independent stories. They are correlated outputs of the same geometry.

Shared geometric source	ICHEP channel 1	ICHEP channel 2	Source-derived relation
Cubic failure √2	Higgs mass	Higgs self-coupling	`m_H/v = ϕ^(−√2)` and `2λ_H = ϕ^(−2√2)`
Derived EM boundary α	Charm-to-top descent	Neutral-sector suppressor	`m_t/m_c = α⁻¹`; neutral base uses α^3
Icosahedral 3D representations	Charged generations	Neutral generations	Exactly three generational states
Equilateral three-node closure	Hadron confinement	Quark spectrum	Closed triads, no free quark
GG nonlinear term	Galactic missing acceleration	Particle-search terrain	Field effect without a particle primitive

A result that appears to support one channel but breaks the shared relation is not counted as full closure. The cross-channel structure is the prediction.

XIII. Instrument and Translation Controls

XIII.1 Higgs controls

- Separate observed Higgs-pair cross-section limits from an extracted self-coupling.
- Undo `κλ` normalization before comparing to `0.12816`.
- Preserve assumptions about other effective operators. A multi-parameter fit cannot be treated as a one-parameter measurement without disclosure.

XIII.2 Top controls

- Record the mass definition exactly.
- Record generator, hadronization, and calibration dependence.
- Do not compare a running mass directly to a pole-like boundary mass.
- Preserve the full covariance when combining ATLAS, CMS, or global determinations.

XIII.3 Neutrino controls

- Preserve native Mass Harmonics depth labels separately from consensus eigenstate labels.
- Distinguish oscillation ordering from absolute-mass measurement.
- Distinguish beta-decay effective mass, cosmological mass sum, and `0νββ` effective Majorana mass.
- Do not infer Majorana character from the mass-depth derivation alone.

XIII.4 Missing-acceleration particle-identity controls

- Separate exclusion, excess, evidence, and discovery.
- Require independent channel terrain identity for physical closure.
- Preserve astrophysical halo assumptions used to convert event rates into cross-sections.
- Do not let the assumed halo model become proof of the particle whose existence the model presumes.

XIII.5 Hadron controls

- Separate deconfined plasma behavior from isolation of a free quark.
- Separate a local potential expansion near the centroid from a different long-distance translation variable.
- Preserve whether an apparent extra mode is a new independent generator, a compound resonance, or an analysis basis artifact.

XIV. Unified Prediction Matrix

ID	Primary ICHEP surface	Mass Harmonics output	Status	Direct falsifier
ICHEP-P1	Higgs experimental highlights, HH searches	`m_H = 124.6 GeV`; `λ_H = 0.12816`	Forced numeric pair	Absolute λ differs by >5% after category-correct translation
ICHEP-P2	Top experimental highlights	`m_t = 172.2 GeV` in boundary-mass translation	Forced numeric	Category-correct measured range excludes `172.2 GeV`
ICHEP-P3	BSM collider searches	Exactly three sequential generations	Exact structural	A complete fourth sequential family is reproducibly present
ICHEP-P4	Long-baseline, absolute mass, cosmological neutrino results	`{46.81, 11.05, 2.61} meV`; sum `60.47 meV`; adjacent ratio ϕ^3	Forced numeric set	Category-correct reconstruction excludes set or sum
ICHEP-P5	Particle-search and missing-acceleration surfaces	No localized particle identity closes the missing-acceleration terrain	Source-forced field placement	One species satisfies all six physical identity requirements

ID	Primary ICHEP surface	Mass Harmonics output	Status	Direct falsifier
ICHEP-P6	Hadron and strong-interaction results	No free quark; eight modes; $\Pi \propto r^2$, $U(\infty)=\infty$	Exact structural	Free quark, finite asymptotic separation, ninth mode, or nonquadratic leading centroid potential

XV. Terrain-Reading Sequence

For each public ICHEP result surface:

1. record the reported quantity, definition, uncertainty, and source measurement;
2. identify whether the result is a boundary mass, running parameter, normalized modifier, transition quantity, limit, or compound-state readout;
3. transport it into the corresponding Mass Harmonics category without changing the source-derived value;
4. preserve every residual and test the fixed topology, harmonic, or representation relation where applicable;
5. do not let a conference label, combined-fit prior, or search-model basis replace the physical identity of the terrain;
6. report correspondence, contradiction, or unresolved instrument reach separately for each pathway.

XVI. Derivation Placement

Forced numeric: The canonical chain produces a specific numerical value or set.

Exact structural: The canonical geometry excludes or requires a structure without a fitted numerical tolerance.

Directional exact event prediction: The document predicts the presence or absence of a cross-terrain identity event under declared before terrain opening criteria.

Translation-limited: The substrate output is fixed, but the public result may be reported in a different measurement definition and requires lossless translation before comparison.

Non-falsifying terrain: A limit or sensitivity projection that does not resolve the predicted quantity.

XVII. Source-Preserving Revision Rule

This paper may be strengthened when a correction restores source fidelity, fixes release metadata, repairs arithmetic or notation, or exposes a missing Mass Harmonics causal edge. It may not be weakened merely to fit institutional expectations.

No revision may silently change a numerical prediction after the result is known, introduce a domain-specific free coefficient, swap mass or frequency categories, erase a delta, or recast a conference label as substrate ontology.

XVIII. Final Mass Harmonics Prediction Statements

Before the ICHEP 2026 result corridor opens, Mass Harmonics predicts:

1. The Higgs boundary remains governed by `m_H = 124.6 GeV` and `λ_H = 0.12816`.
2. The category-correct top boundary mass remains centered on `172.2 GeV`.
3. Exactly three sequential matter generations exist. A fourth sequential family will not be established.
4. The neutral mass-depth set is `46.81 meV`, `11.05 meV`, and `2.61 meV`, with total `60.47 meV` and adjacent ratio ϕ^3.
5. No ICHEP 2026 result will supply one localized particle identity that closes the missing-acceleration terrain across galaxies, lensing, clusters, cosmological structure, abundance, and detector terrain.
6. Strong-interaction terrain will preserve absolute confinement, no isolated free quark, and eight independent oscillation directions.

These are not six unrelated predictions. They are six instrument-facing readouts of one ψ_m substrate law, one governing coupling coefficient $\kappa\psi_m$, one forced icosahedral geometry, and one continuous causal chain.

TRUTH > COMFORT. Always.

XIX. Source Ledger

Mass Harmonics sources

- `MH_Monograph.md`, canonical MFE and P^3GG: lines 180-215.
- `MH_Monograph.md`, α derivation: lines 333-445.
- `MH_Monograph.md`, Higgs derivation: Part 4.9.
- `MH_PROOF-SET.md`, MFE: lines 12-50.
- `MH_PROOF-SET.md`, $K\psi_m$: lines 94-124.
- `MH_PROOF-SET.md`, fine-structure constant: lines 128-199.
- `MH_PROOF-SET.md`, Higgs mass and self-coupling: lines 233-262.
- `MH_PROOF-SET.md`, strong force: lines 438-490.
- `MH_PROOF-SET.md`, Standard Model particle spectrum: lines 551-636.
- `MH_PROOF-SET.md`, dark matter and dark energy: lines 641-695.
- `MH_TVP.md`, topology, category, provenance, and delta rules.
- `MH_TWT.md`, downstream transport and translation rules.
- `Operational_Stance_of_UMtts.md`, authority and terrain-first method.

Release-surface sources

- ICHEP conference overview and dates: https://indico.cern.ch/event/1522800/
- ICHEP scientific tracks: https://indico.cern.ch/event/1522800/program
- ICHEP contribution list and scheduled talks: https://indico.cern.ch/event/1522800/contributions/
- ICHEP timetable: https://indico.cern.ch/event/1522800/timetable/

The release-surface sources establish only when and where the terrain will open. They do not govern the physical derivations above.