TFPT Prediction: Majorana Neutrinoless-Double-Beta Row

Stefan Hamann Alessandro Rizzo

Standalone prediction note – April 27, 2026

Abstract

This note isolates the neutrinoless-double-beta row as a Majorana-branch comparison target.

Prediction scope and audit

Target. $m_{\beta\beta} = 1.516 \times 10^{-3}\,\mathrm{eV}$
Status. Comparison quantity; Majorana lattice on the closed neutrino branch.
Dependency class. neutrino readout N_u
Kill or pressure test. light-Majorana detection implying $m_{\beta\beta} \gtrsim 10^{-2}\,\mathrm{eV}$.

1 Standalone Minimal Kernel

Minimal TFPT kernel used in this prediction

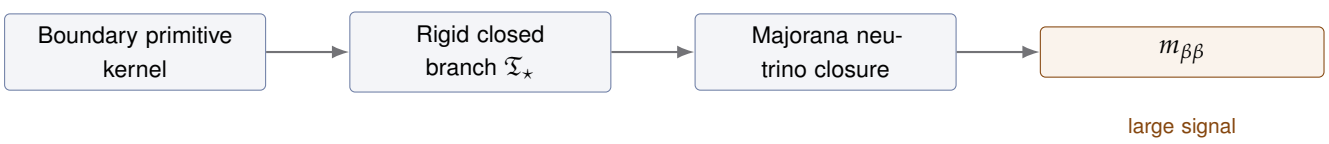
The standalone input package is the boundary-polarized closed branch

$$\mathfrak{S}_{\min} \Rightarrow \mathcal{B}_{\min} \Rightarrow \mathfrak{T}_{\partial}^{\min} \Rightarrow (\tau_{\mathrm{dbl}}, \iota_C, P_{\mathrm{prim}}, [u_\Sigma], c_3) \Rightarrow d^{\star}_{\mathrm{disc}} \Rightarrow P_{\mathrm{adm}} \Rightarrow \mathfrak{T}_{\star}.$$

The prediction uses only the sector map named in its audit box. Numerical comparison conventions are not theorem inputs; they enter only at the final interface row.

The paper is intentionally one-row: it does not reprove the full TFPT series. It states the minimal closed-branch input needed for this prediction, shows the sector map, and gives the direct failure mode. The source status follows the TFPT 4.5 split: boundary and carrier inputs are core, electromagnetic/flavor/metrology inputs are bridge readouts, QFT closure is conditional, and cosmology rows are downstream comparison targets when explicitly marked.

2 Dependency Graph



The row is a low-amplitude Majorana target, not a high-mass inverted-ordering signal.

3 Derivation

On the closed Majorana neutrino branch the effective mass row is recorded as

$$m_{\beta\beta} = 1.516 \times 10^{-3}\,\mathrm{eV}.$$

It is generated by the same neutrino closure package that fixes the PMNS matrix and the intrinsic normal-ordering mass sum. The row is therefore a low-amplitude light-Majorana target.

4 No-Knobs and Failure Surface

No-knobs audit

A detection that robustly implies $m_{\beta\beta} \gtrsim 10^{-2}\,\mathrm{eV}$ would be incompatible with the present closed Majorana branch.

5 Minimal Submission Claim

The standalone claim is limited to the displayed target and dependency class. It does not assert that every comparison row of the full TFPT ledger has the same proof status. Any update of the upstream boundary kernel, carrier theorem, or sector map must be propagated into this prediction before the numerical row is distributed.

References

[1] M. F. Atiyah, V. K. Patodi, and I. M. Singer, *Spectral asymmetry and Riemannian geometry. I*, Math. Proc. Cambridge Philos. Soc. **77** (1975), 43–69.

[2] A. H. Chamseddine and A. Connes, *The spectral action principle*, Commun. Math. Phys. **186** (1997), 731–750.

[3] P. J. Mohr, D. B. Newell, and B. N. Taylor, *CODATA recommended values of the fundamental physical constants: 2022 update*, NIST / CODATA reference set, accessed March 2026.

[4] S. Navas et al. (Particle Data Group), *Review of Particle Physics*, Phys. Rev. D **110** (2024), 030001; 2025 online update.

[5] NuFIT Collaboration, *NuFIT global analysis of neutrino oscillation data*, website snapshot based on data available through November 2025.

[6] Planck Collaboration, *Planck 2018 results. VI. Cosmological parameters*, Astron. Astrophys. **641** (2020), A6.

[7] Y. Minami and E. Komatsu, *New extraction of the cosmic birefringence from the Planck 2018 polarization data*, Phys. Rev. Lett. **125** (2020), 221301.

[8] X. Chang et al. (for the NA62 Collaboration), *New measurement of $K^+ \to \pi^+ \nu\bar{\nu}$ branching ratio at the NA62 experiment*, arXiv:2604.12649.

[9] KOTO Collaboration, *Search for the $K_L \to \pi^0 \nu\bar{\nu}$ decay at the J-PARC KOTO experiment*, arXiv:2411.11237.