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Absolute neutrino mass scale and dark matter stability from flavour symmetry

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We explore a simple but extremely predictive extension of the scotogenic model. We promote the scotogenic symmetry $\mathbb{Z}_2$ to the flavour non-Abelian symmetry $\Sigma(81)$, which can also automatically protect dark matter stability. In addition, $\Sigma(81)$ leads to striking predictions in the lepton sector: only Inverted Ordering is realised, the absolute neutrino mass scale is predicted to be $m_{\text{lightest}} \approx 7.5 \times 10^{-4}$ eV and the Majorana phases are correlated in such a way that $|m_{ee}| \approx 0.018$ eV. The model also leads to a strong correlation between the solar mixing angle θ_{12} and δ_{CP}, which may be falsified by the next generation of neutrino oscillation experiments. The setup is minimal in the sense that no additional symmetries or flavons are required.

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