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Absolute neutrino mass as the missing link to the dark sector

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With the KATRIN experiment, the determination of the absolute neutrino mass scale down to cosmologically favored values has come into reach. We show that this measurement provides the missing link between the Standard Model and the dark sector in scotogenic models, where the suppression of the neutrino masses is economically explained by their only indirect coupling to the Higgs field. We determine the linear relation between the electron neutrino mass and the scalar coupling λ_5 associated with the dark neutral scalar mass splitting to be $\lambda_5 = 3.1 \times 10^{-9} m_{\nu_e}/\text{eV}$. This relation then induces correlations among the DM and new scalar masses and their Yukawa couplings. Together, KATRIN and future lepton flavor violation experiments can then probe the fermion DM parameter space, irrespective of the neutrino mass hierarchy and CP phase.

In-person participation

No

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