

Visible neutrino decay and matter effects at future long-base line experiments

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The consequences of introducing matter effects into the neutrino visible decay scheme are studied. To this end, we select two baselines for which matter effects have to be considered: 1300 km (DUNE) and 7650 km (considering an hypothetical beam aimed towards ANDES). The matter effects are almost unnoticeable for the visible decay contribution DUNE, being sizable at ANDES. We also carry out a realistic analysis taking DUNE as a context, considering ν_μ disappearance and ν_e appearance channels, for both FHC and RHC modes. The sensitivity to the decay constant α_3 can be as low as $2 \times 10^{-6} \text{ eV}^2$ at 90% C.L., depending on the neutrino masses and type of coupling (scalar, pseudo-scalar or both). Lastly, we assess the impact of neutrino decay in the determination of θ_{23} and δ_{CP} , and find that the best-fit value of θ_{23} can move from a true value at the lower octant towards the higher octant.

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