

# Light sterile neutrinos and their implications on currently running long-baseline and neutrinoless double beta decay experiments.

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Recent  $\nu_e$  appearance data from the Mini Booster Neutrino Experiment (MiniBooNE) are in support of the excess of events reported by the Liquid Scintillator Neutrino Detector (LSND), which provides an indirect hint for the existence of eV-scale sterile neutrino. As these sterile neutrinos can mix with the standard active neutrinos, in this paper we explore the effect of such active-sterile mixing on the determination of various oscillation parameters by the currently running long-baseline neutrino experiments T2K and NO $\nu$ A. We find that the existence of sterile neutrino can lead to new kind of degeneracies among these parameters which would substantially deteriorate the mass hierarchy sensitivity of NO $\nu$ A experiment. We further notice that the inclusion of data from T2K experiment helps in resolving the degeneracies. The impact of new CP violating phases  $\delta_{14}$  and  $\delta_{34}$  on the maximal CP-violation exclusion sensitivity for NO $\nu$ A experiment has also been illustrated. Finally, we discuss the implication of such light sterile neutrinos on neutrinoless double beta decay processes in line with recent experimental results, as well as on the sensitivity reach of future experiments.

## Summary

Mass Hierarchy and Impact of new new CP violating phases have shown in details.

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