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Impact of non-unitary neutrino mixing on physics potential of long baseline experiments

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In this work, we investigate the effects of non-unitary neutrino mixing on the determination of current unknown parameters in neutrino oscillation physics. From our analysis, we found that non-unitarity parameters in the 21 sector are sensitive to the NOνA experiment. However, it is observed that the NOνA experiment is not expected to improve the current knowledge of those parameters. We also found that the sensitivities to current unknowns have deteriorated significantly in the presence of non-unitary lepton mixing and these sensitivities crucially depend upon the new CP-violating phase in the non-unitary mixing. Further, we find that the degeneracy resolution capability of the NOνA experiment is reduced in the presence of non-unitarity parameters. However, the synergy between the currently running experiments T2K and NOνA can improve the parameter degeneracy resolution, and hence there is an enhancement in the sensitivities of unknowns.

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