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Exploring non-unitary mixing of active neutrinos at T2K, T2HK, and T2HKK

This work presents the capability of long-baseline experiments in establishing the unitarity of active-neutrino mixing by ruling out the non-unitary mixing scheme as a function of true values of Dirac CP-violating phase . It is found that T2HK can establish unitarity of active neutrino mixing above 2σ C.L. irrespective of neutrino mass hierarchy and true value of Dirac CP-violating phase . Moreover, this work also discuss the bound on non-unitary mixing parameter in 21 sector and sensitivity limit of these experiments in determining NU parameter. The bounds on (α 21 /2) are obtained as 0.028, 0.0026, 0.005 at 2σ C.L. respectively for T2K, T2HK, and T2HKK. And the sensitivity limit of T2HK for NU parameter is much better than that of both T2K and T2HKK.

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