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Neutrino Mass Ordering with Atmospheric, long baseline and reactor experiments

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In this work we study the synergy among the future accelerator (T2HK), future atmospheric (ICAL) and future reactor (JUNO) neutrino experiments to determine the neutrino mass ordering. T2HK can measure the mass ordering only for favorable values of δ_{CP} , whereas the mass ordering sensitivity of JUNO is dependent on the energy resolution. Our results show that with a combination of T2HK, ICAL and JUNO one can have a mass ordering sensitivity of 7.2σ even for the unfavorable value of $\delta_{CP} = 0^\circ$ for T2HK and most conservative value of JUNO energy resolution of $5\%/\sqrt{E(MeV)}$.

The synergy mainly comes because different oscillation channels prefer different values of $|\Delta m_{31}^2|$ in the fit when the mass-ordering χ^2 is minimized. In this context we also study: (i) effect of varying energy resolution of JUNO, (ii) the effect of longer run-time of ICAL, (iii) effect of different true values of θ_{23} and (iv) effect of octant degeneracy in the determination of neutrino mass ordering.

Session

Neutrino Physics

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