Abstract

In future neutrino long baseline experiments, such as T2HK and DUNE, it is anticipated that the mass ordering, the octant of $\theta_{23}$, and the CP phase $\Delta$ will be determined. In the first half of this presentation (based on arXiv:2210.09103), I will describe how the uncertainty in the Earth's density affects the precision of $\Delta$. In the second half (based on arXiv:2308.15071), I will explain that long baseline experiments, like T2HKK and ESS$\nu$SB, which primarily probe the second oscillation maximum, may not possess sufficient sensitivity to resolve the octant degeneracy of $\theta_{23}$ using the plot of appearance oscillation probabilities in the ($\sin^2 2\theta_{13}$, $1/\sin^2 \theta_{23}$)–plane.