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Review of θ_{13} measurements and latest results from Daya Bay

The neutrino oscillation is described by six independent parameters: three mixing angles θ_{23}, θ_{12}, and θ_{13}), two mass-squared splittings, and one CP-violating phase ($\delta_{\rm cp}$). As of 2010, only θ_{13} and $\delta_{\rm cp}$ remained unknown. However, a non-zero value of θ_{13} is crucial for exploring CP violation in the lepton sector. In 2011, the T2K and Double Chooz experiments provided evidence of a non-zero θ_{13}. From 2012 to the present, the Daya Bay reactor experiment has pushed the precision of θ_{13} down to 2.8%. Recently, Daya Bay achieved a 6.5% precision of θ_{13} in an independent measurement using the new capture-on-hydrogen sample. Although θ_{13} is currently the most precisely known mixing angle, it is expected to become the least precise with the next-generation experiments such as JUNO.

In this report, I will review the history and current status of θ_{13} measurements. The latest results from Daya Bay will be highlighted. The potential for further improving the precision of θ_{13} measurements will also be discussed. These high-precision measurements will constrain the PMNS neutrino mixing matrix to within 1% precision, opening the door to high-precision Unitarity tests in neutrino physics.

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