Precision measurement of neutrino oscillation parameters at INO-ICAL detector

To study the properties of elusive atmospheric neutrinos, the India-based Neutrino Observatory (INO) has been planned to be set up at Theni (Tamilnadu), South India. INO will host a 50 kt magnetized Iron CALorimeter (ICAL) detector for determination of neutrino mass and mixing parameters which is one of the important issues for the leptonic sector in today's particle physics. The detector will have three modules, each of size 16 m x 16 m x 14.5 m and consists of stack of 151 horizontal layers of 5.6 cm thick iron slab interleaved within 4 cm gap for the active detector element. Glass Resistive Plate Chambers (RPCs) of dimension 2 m x 2 m, which has good time resolution (~1 ns) and spatial resolution (~3 cm), will be used as active part of the detector.
We will report about the precision measurement analysis for the atmospheric neutrino oscillation parameters with the muon neutrino events, generated through Monte Carlo NUANCE event generator. The analysis has been performed using neutrino energy and muon direction as the observables. ICAL detector will be able to detect muons tracks and hadron showers produced by neutrino events. We have used the realistic resolutions and eciencies obtained by the INO collaboration from a GEANT4-based simulation to reconstruct neutrino energy and muon direction. We will present the ICAL sensitivity for atmospheric neutrino mixing parameters ($\sin2\theta\_23$ and $|\delta m2\_23|$) on the basis of marginalised chi2 analyses using neutrino energy and muon zenith angle binning scheme for the 10 years of running INO-ICAL detector.

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