Contribution ID: **53** Type: **not specified**

From oscillation dip to oscillation valley in atmospheric neutrino experiments

Tuesday, 22 September 2020 14:00 (10 minutes)

Atmospheric neutrino experiments can show the "oscillation dip" feature in data, due to their sensitivity over a large L/E range. In experiments that can distinguish between neutrinos and antineutrinos, like INO, oscillation dips can be observed in both these channels separately. We present a data-driven approach — that uses the asymmetry in the up and down events, binned in the reconstructed L/E of muons — to demonstrate the dip, thereby confirming the oscillation hypothesis. We further propose, for the first time, the identification of an "oscillation valley" in the $(E_\mu - \cos\theta_\mu)$ plane, feasible for detectors like INO having excellent muon energy and direction resolutions. We illustrate how this two-dimensional valley offers a clear visual representation and test of the L/E dependence, the alignment of the valley quantifying the atmospheric mass-squared difference.

Primary author: Mr KUMAR, Anil (Insitute of Physics, Bhubaneswar. Homi Bhabha National Institute, Mumbai)

Co-authors: Dr KHATUN, Amina (Comenius University, Bratislava, Slovakia); Prof. AGARWALLA, Sanjib Kumar (Institute of Physics, Bhubaneswar, Homi Bhabha National Institute, and International Centre for Theoretical Physics); Prof. DIGHE, Amol (Tata Institute of Fundamental Research, Mumbai)

Presenter: Mr KUMAR, Anil (Insitute of Physics, Bhubaneswar. Homi Bhabha National Institute, Mumbai)

Session Classification: Contributed 08