

Calibration of atmospheric neutrino flux calculations using cosmic muon flux and charge ratio measurements

Authorship annotation

Session and Location

Monday Session, Poster Wall #155 (Hölderlin-Room)

Abstract content

Neutrinos produced by cosmic ray interactions in the Earth's atmosphere have proven to be an invaluable tool for particle physics research. While the general features of the flux are well characterized, the absolute precision of calculations is still insufficient for the ambitious atmospheric neutrino research program being currently pursued. A main source of uncertainty is the modeling of hadronic interactions in the very forward region, where measurements are scarce. In this work, we challenge the current generation hadronic models using high-precision atmospheric muon calculations from a few GeV to multiple TeV energies provided by the MCEq code. We derive corrections to hadronic models based on muon flux and ratio measurements, taking the experimental uncertainties into account. These corrections are then used to “calibrate” atmospheric neutrino flux predictions. We discuss the strength of the derived constraints and compare them to meson spectra from fixed target experiments.

Poster included in proceedings:

yes

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