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Cosmic muon momentum spectrum at the earth surface

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As a part of its R&D, the ICAL collaboration has built a small prototype module called mini-ICAL to study the detector performance, and engineering challenges in the construction of large-scale magnet, and magnetic field measurement systems as well as to test the ICAL electronics in the presence of the magnetic field. This detector was also used to measure the charge-dependent muon flux and to study the feasibility of cosmic muon veto for a shallow depth neutrino experiment. The mini-ICAL consists of 11 layers of iron plates (dimension $4\text{ m} \times 4\text{ m} \times 0.056\text{ m}$) with an inter-layer gap of 45 mm . The RPC (area $\sim 2\text{ m} \times 2\text{ m}$) detectors are inserted between the iron layers. Kalman filter based track fitting algorithm is being used for reconstructing 4-vectors of muons

in the ICAL experiment. The same algorithm is also being used for the mini-ICAL with 10 layers of RPCs. The cosmic ray data collected by the detector is also used to measure the charge ratio (R) of the number of μ^+ to μ^- arriving at the Earth's surface.

This paper discusses the results obtained from the mini-ICAL detector and its comparison with the results of extensive air shower (EAS) simulation.

Session

Astroparticle Physics and Cosmology

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