Study of Angular Distribution of Cosmic Muons using INO-ICAL Prototype Detector at TIFR

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The India-based Neutrino Observatory (INO) collaboration is planning to set up a magnetized 50kton Iron-CALorimeter (ICAL) with Resistive Plate Chambers (RPC) as active detectors to study neutrino oscillations and precisely measures its parameters. A prototype detector stack (without magnet) comprising of 12 layers of RPCs of 1m x 1m in area has been set-up in TIFR to track cosmic ray muons.

Using the muon data, an attempt has been made to reproduce the cosmic muon intensity distribution on the earth's surface. The general form of this distribution is $I = I_0 \cos^n \theta$. Detector differential aperture, i.e., solid angular coverage of the detector is estimated and statistical minimization procedure is used to get the best fit value for 'I_0' and 'n'. Detector solid angle acceptance, efficiencies and minimization routine are presented here.

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