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Testing of the extruded plastic scintillators on a large-scale for the CMVD

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The construction of a cosmic muon veto detector (CMVD) is in progress to shield the mini-Iron Calorimeter detector at IICHEP, Madurai. The goal of the CMVD is to study the feasibility of a shallow depth (100 m) neutrino experiment. The estimated reduction in cosmic muon flux will be 10^6 at a depth of 1 km. The same order of reduction in cosmic muon flux at a shallow depth (100 m) will be possible, only if the cosmic muon veto detector will have veto efficiency of more than 99.99% and fake rate of less than 10^{-5} .

The CMVD will consist of ~ 4.5 m long extruded plastic scintillators (EPSes), WLS fibre to collect the scintillation photons and the silicon-photomultipliers (SiPMs) for the readout. A total of 760 EPSes will be required in making of the CMVD. Two EPSes will be glued together to make one unit called di-counter. It is essential to test all the components (i.e. di-counters, SiPMs and the readout electronics) of the CMVD before installation to achieve the required veto efficiency goal. To test the di-counters, a cosmic muon coincidence setup is made using additional three di-counters to generate a trigger of cosmic muon trajectory. DRS modules are used to collect muon signals of the test di-counters. This paper will cover the details of the experimental setup and the test results for all the tested di-counters.

Session

Future Experiments and Detector Development

Primary author: JANGRA, Mamta (Tata Institute of Fundamental Research, Homi Bhabha National Institute)

Co-authors: Mr DEODHAR, Aditya (Tata Institute of Fundamental Research); MAJUMDER, Gobinda (Tata Inst. of Fundamental Research (IN)); Mr J. KRISHNAMOORTHY, J (Tata Institute of Fundamental Research); Ms PADMAVATHY, Veera (Tata Institute of Fundamental Research); Mr RAVINDRAN, K.C. (Tata Institute of Fundamental Research); SARAF, Mandar (Tata Institute of Fundamental Research); Mr SHAH, raj (Tata Institute of Fundamental Research); BHEESETTE, Satyanarayana

Presenter: JANGRA, Mamta (Tata Institute of Fundamental Research, Homi Bhabha National Institute)

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