

Understanding the temperature and humidity dependence of the SiPM characteristics

Thursday 18 July 2024 18:10 (17 minutes)

The commissioning work of a Cosmic Muon Veto detector (CMVD) on top of the mini-ICAL detector at Madurai, India is continued using extruded plastic scintillators, embedded WLS fibers and the SiPM as a photo-transducer. The CMVD is being built to study the feasibility of a cosmic muon veto for a shallow-depth neutrino experiment. An experimental setup was designed to characterise all those SiPMs in a temperature and humidity controlled environment. The readout electronics involves trans-impedance amplifiers followed by an opamp buffer stage of combined gain $1.245 \text{ mV}/\mu\text{A}$ and a digital storage oscilloscope for storing the data with a minimal distortion of SiPM signal. Various characteristics of the Hamamatsu SiPM (S13360-2050VE), e.g. signal shape, optically correlated and uncorrelated noise, recovery time etc were studied as a function of V_{ov} , number of photoelectrons, the ambient temperature and the humidity. This paper will cover the details of those results.

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Session Classification: Detectors for Future Facilities, R&D, Novel Techniques

Track Classification: 13. Detectors for Future Facilities, R&D, Novel Techniques