Contribution ID: **502** Type: **Poster**

A new method to determine muon multiplicity at the GRAPES-3 experiment

Tuesday 13 December 2022 14:00 (1 hour)

Muons produced in extensive air showers (EAS) by the interaction of primary cosmic rays (PCR) in the Earth' s atmosphere provide an excellent tool to determine the PCR composition. This is based on the fact that a heavier mass PCR produced more muons as compared to lighter ones. An accurate determination of the muon multiplicity in an EAS is required. The GRAPES-3 experiment located at Ooty, Tamil Nadu contains a large area muon telescope to detect the muons above 1 GeV energy in the EAS by counting the hits in the proportional counters which have been used for the PCR composition studies so far. Here, we present a new method to calculate the number of muons in an EAS based on the pulse height information in the proportional counters which is a piece of additional information recorded besides the hit information. The pulse height is proportional to the energy deposited by muons. The preliminary results of the analysis show that the dynamic range of detecting muons has increased by more than a factor of two. This is important to determine the mass composition of PCRs accurately beyond the Knee region ($\sim$ 3 PeV) of the cosmic ray spectrum.

Session

Astroparticle Physics and Cosmology

Author: SCARIA, Ronald

Co-authors: OSHIMA, Akitoshi (Chubu University); JAIN, Atul (Tata Institute of Fundamental Research); HARIHARAN, B (Tata Insitute of Fundamental Research); PATTANAIK, Diptiranjan (Tata institute of fundamental research); VARSI, Fahim (Indian Institute of Technology, Kanpur, India); Mr PRADHAN, Girija Sankar (Indian Institute of Technology Indore); KOJIMA, H (College of Engineering, Chubu University); RAMESH, K (Tata Institute of Fundamental Research); REDDY, LV (Tata Institute of Fundamental Research); CHAKRABORTY, Medha; ZUBERI, Meeran; RAMEEZ, Mohamed (Tata Institute of Fundamental Research); JAGADEESAN, P (Tata Institute of Fundamental Research); MOHANTY, PRAVATA (Tata Institute of Fundamental Research, Mumbai, India); JAIN, Pankaj (I.I.T. Kanpur); Dr NAYAK, Pranaba (Tata Institute of Fundamental Research); SAHOO, Raghunath (Indian Institute of Technology Indore (IN)); KAWAKAMI, S (Graduate School of Science, Osaka City University); SHIBATA, S (College of Engineering, Chubu University); DUGAD, Shashi (Tata Institute of Fundamental Research); GUPTA, Sunil; Prof. MAHAPATRA, Swapna (Utkal University); Dr NONAKA, Toshiyuki (Institute for Cosmic Ray Research University of Tokyo); HAYASHI, Y (Graduate School of Science, Osaka City University); MURAKI, Y (Institute for Space-Earth Environmental Research, Nagoya University)

Presenter: SCARIA, Ronald

Session Classification: Poster - 2