



Contribution ID: 32

Type: **Presentation**

Machine learning approach to identify cores of EAS observed by the GRAPES-3 experiment

Wednesday 6 July 2022 15:15 (15 minutes)

The GRAPES-3 experiment located in Ooty consists of a dense array of 400 plastic scintillator detectors spread over an area of $25,000 m^2$ and a large area ($560 m^2$) tracking muon telescope. Everyday, the array records about 3 million showers in the energy range of 1 TeV - 10 PeV induced by the interaction of primary cosmic rays in the atmosphere. These showers are reconstructed in order to find several shower parameters such as shower core, size, and age. High-energy showers landing far away from the array often trigger the array and are found to have their reconstructed cores within the array even though their true cores lie outside, due to reconstruction of partial information. These showers contaminate and lead to an inaccurate measurement of energy spectrum and composition. Such showers can be removed by applying quality cuts on various shower parameters, manually as well as with machine learning approach. The improvements achieved by the use of machine learning will be presented.

Agreement to place

Participants agree to post their abstracts and presentations online at the workshop website. All materials will be placed in the form in which they were provided by the authors

Authors: CHAKRABORTY, Medha (Tata Institute of Fundamental Research); AHMAD, S. (Aligarh Muslim University, Aligarh 202002, India); CHANDRA, A. (Aligarh Muslim University, Aligarh 202002, India); DUGAD, S.R. (TIFR, Mumbai); GOSWAMI, U.D. (Dibrugarh University, Dibrugarh 786004, India); GUPTA, S.K. (TIFR, Mumbai); BALAKRISHNAN, Hari Haran (Tata Institute of Fundamental Research); HAYASHI, Y. (Graduate School of Science, Osaka City University, Osaka 558-8585, Japan); JAGADEESAN, P. (TIFR, Mumbai); JAIN, A. (TIFR, Mumbai); JAIN, P. (IIT Kanpur); KAWAKAMI, S. (Graduate School of Science, Osaka City University, Osaka 558-8585, Japan); KOJIMA, H. (College of Engineering, Chubu University, Kasugai, Aichi 487-8501, Japan); MAHAPATRA, S. (Utkal University, Bhubaneswar 751004, India); MOHANTY, P.K. (TIFR, Mumbai); MOHARANA, R. (Indian Institute of Technology Jodhpur, Jodhpur 342037, India); MURAKI, Y. (Institute for Space-Earth Environmental Research, Nagoya University, Nagoya 464-8601, Japan); NAYAK, P.K. (TIFR, Mumbai); NONAKA, T. (Institute for Cosmic Ray Research, Tokyo University, Kashiwa, Chiba 277-8582, Japan); OSHIMA, A. (College of Engineering, Chubu University, Kasugai, Aichi 487-8501, Japan); PANT, B.P. (IIT Jodhpur, India); PAUL, S. (TIFR, Mumbai); PATTANAIK, Diptiranjan (Tata Institute of Fundamental Research, Mumbai); PRADHAN, G.S. (IIT Indore, India); RAMEEZ, M. (TIFR, Mumbai); RAMESH, K. (TIFR, Mumbai); REDDY, L.V. (TIFR, Mumbai); SAHOO, R. (IIT Indore, India); SCARIA, R. (IIT Indore, India); SHIBATA, S. (College of Engineering, Chubu University, Kasugai, Aichi 487-8501, Japan); TANAKA, K. (Graduate School of Information Sciences, Hiroshima City University, Hiroshima 731-3194, Japan); VARSII, F. (IIT Kanpur, India); ZUBERI, M. (TIFR, Mumbai)

Presenter: CHAKRABORTY, Medha (Tata Institute of Fundamental Research)

Session Classification: Session 1. ML in Particle Astrophysics and High Energy Physics

Track Classification: Track 1. Machine Learning in Particle Astrophysics and High Energy Physics