

ANALYSIS OF COSMIC RAY NEUTRONS IN THE SCICRT USING MACHINE LEARNING TOOLS

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Abstract

Machine learning is a powerful tool currently used in many different areas, from image processing to space navigation or high-energy physics. In this paper we present a configuration of different artificial intelligent tools for the classification of cosmic rays particles, as well as, the unfolding of neutron energy spectrum registered in the Scintillator Bar Cosmic Ray Telescope (SciCRT). The SciCRT is an array of detectors consisting of scintillator plastic bars that work nearly independent, The plastic emits photons when a particle cross telescope, the intensity of photons is directly proportional to energy deposited for it. Taking advantage of the construction of the telescope, it is possible to do particle tracking and analysis.

The main purpose of SciCRT is the detection of solar neutrons originated in violent phenomena taking place in the solar atmosphere solar. Nonetheless, the SciCRT is capable of detecting different kinds of secondary particles produced by the interactions of primary cosmic ray with atmospheric nuclei. For this reason, the task of signal classification according the incident particle is essential. In addition, our paper presents a Monte Carlo simulation of the SciCRT including all relevant physical processes for the training and evaluation of the method.

Presentation: POSTER