

Title: Cosmic Ray Showers with Anomalous Longitudinal Profile

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Abstract: The aim of this work was to study high-energy cosmic ray showers with anomalous longitudinal profiles generated by Monte-Carlo simulation and subsequently use the acquired analysis techniques on results from the Pierre Auger Observatory (PAO) in Argentina. Firstly, a short introduction of various descriptions of the extensive air showers was given. Then a systematic analysis was performed on approx. 7×10^5 simulated showers with three different techniques. A brief explanation of the functionality of the PAO was given, then the importance of monitoring the immediate state of the atmosphere using the Shoot-the-Shower program was elucidated and the FRAM telescope was described in detail. FRAM enabled an identification of showers with a clear atmospheric background, this sample of showers was then analyzed and several interesting events warranting a further study were chosen.

Keywords: Pierre Auger Observatory, Extensive Air Showers, Chemical Composition, Anomalous Longitudinal Profile, Gaisser-Hillas Function