Contribution ID: **59** Type: **not specified**

Simulation and data analysis in astroparticle physics

Tuesday 26 April 2022 14:00 (20 minutes)

One of the main concerns of experimental astroparticle physics is to characterize and measure the fluxes of different particle species of cosmic origin that arrive at Earth. In the most energetic regimes (above 10^{15} eV for the charged component of cosmic rays and 10^{11} eV for gamma rays), only arrays of detectors deployed at the ground and with large collection areas (hundreds to thousands of km^2) reach the sensibility required to study these particles. In such facilities, the properties of the cosmic rays are inferred after the observation of the cascades of particles and radiation they induce in the atmosphere — the so-called extensive air showers. This process of deconvolution of shower observables into the characteristics of the primary particle depends on the description of how shower particles interact with and radiate into the atmosphere. In this scenario, the present contribution is a compilation of results obtained through Monte Carlo simulations of extensive air showers and the study of their observables. The results aim at the improvement of data-analysis techniques as well as the proposal of new ones. In particular, the simulations allowed for a study of the depth of shower maximum, an important quantity for the determination of the mass composition of the primary cosmic-ray spectrum. The Cherenkov-light emitted by shower electrons, an important source of signal for optical detectors, is also a subject of analysis. An ongoing study of extreme fluctuations of the longitudinal profiles of the extensive air showers is discussed as well.

Authors: ARBELETCHE, Luan (Instituto de Física de São Carlos); DE SOUZA, Vitor (Instituto de Fisica de Sao Carlos, Universidade de Sao Paulo); DOBRIGKEIT CHINELLATO, Carola

Presenter: ARBELETCHE, Luan (Instituto de Física de São Carlos)

Session Classification: Sessão 2

Track Classification: Sessão 2