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The Cosmic Ray Nuclear Composition Measurement Performance of the Non-Imaging CHErenkov Array (NICHE)

Thursday 30 July 2015 15:30 (1 hour)

The Non-Imaging CHErenkov Array (NICHE) will eventually measure the flux and nuclear composition of cosmic rays from below 10^{15} eV to 10^{18} eV by using measurements of the amplitude and time-spread of the air-shower Cherenkov signal to achieve a robust event-by-event measurement of XMax and energy. NICHE will have sufficient area and angular acceptance to have significant overlap with TA/ TALE, within which NICHE is located, in both fluorescence and Cherenkov measurements allowing for energy cross-calibration. In order to quantify NICHE's ability to measure the cosmic ray nuclear composition, two different cosmic ray composition models, one based on the poly-gonato model of J. Hörandel (AstroPart 19, 2003) and the other based on the H4a model of T. Gaisser (Astropart 35, 2012), using simulated X_{Max} distributions of the composite composition as a function of energy. These composition distributions were then unfolded into individual components via an analysis technique that included NICHE's simulated X_{Max} and energy resolution performance as well as the effects of finite event statistics as a function of measured energy. In this talk, NICHE's ability to distinguish between these two CR composition evolution models and determine the individual components as a function of energy will be presented.

Collaboration

– not specified –

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