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Estimating the performance of the GAPS detector with muon ground testing data from Antarctica

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The General Anti Particle Spectrometer (GAPS) is a balloon-borne cosmic-ray experiment which prepared to launch in the past Antarctic summer season 24/25.
Its primary science goal is the search for light antinuclei in cosmic rays at kinetic energies below 0.25 GeV/n. This energy region is especially of interest for dark matter searches and is still mostly uncharted.
GAPS promises to yield unprecedented sensitivity for the search of antideuterons and will measure the low-energy antiproton spectrum with high precision. To reach the required sensitivity, the GAPS detector incorporates a new approach for antimatter detection, utilizing a tracker with custom-designed, lithium-drifted silicon detectors, designed to measure the X-ray cascade expected from antimatter capture, together with a fast time-of-flight system, allowing for a high precision beta measurement.
During the past Antarctic season, GAPS performed a pre-flight, ground calibration of the fully-integrated instrument. We present the results for track-like events obtained with muon data. This talk will highlight key results from the Antarctic ground testing campaign and present an outlook for the next Antarctic season of 25/26 for which GAPS is scheduled to launch.

Collaboration(s)

GAPS

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