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Search for Cosmic-Ray Antinuclei from Dark Matter with the GAPS Antarctic Balloon Mission

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The General Antiparticle Spectrometer (GAPS) is a balloon-borne experiment, firstly optimized to identify low-energy (⊠ 0.25 GeV/n) cosmic antinuclei from dark matter annihilation or decay. With a novel detection approach that uses the uniquely characterized atomic X-rays and charged particles from the decay of exotic atoms, the GAPS program will deliver an unprecedented sensitivity to low-energy cosmic antideuterons, an essentially background-free signature of dark matter. In addition, GAPS will deliver a precise antiproton spectrum with high statistics in an unexplored energy range as well as a high sensitivity to cosmic antihelium.

The GAPS detector instrument consists of a tracker of >1000 custom lithium-drifted silicon detectors, which is cooled by a novel oscillating heat pipe thermal system, and a precision-timing, large-area time-of-flight system. The GAPS project has completed the on-ground commissioning in Antarctica and anticipates its first of three Antarctic flights in late 2025. This talk will cover the overview of the GAPS mission while highlighting results from the Antarctic ground-testing campaign.

Collaboration you are representing

GAPS

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