

In Search of Cosmic-Ray Antinuclei from Dark Matter with the GAPS Experiment

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The General Antiparticle Spectrometer (GAPS) is the first experiment optimized to identify low-energy (<0.25 GeV/n) cosmic antinuclei, in particular antideuterons from dark matter annihilation or decay. The GAPS program will deliver unprecedented sensitivity to cosmic antideuterons, an essentially background-free signature of various dark matter models, as well as a high-statistics antiproton spectrum in an unexplored energy range and leading sensitivity to cosmic antihelium. GAPS is currently under construction. The first Antarctic balloon flight of GAPS is scheduled for late 2022, and two additional flights are planned for the coming years. Based on measurements of our custom-developed instrument technology, including large-area silicon detectors and a large-acceptance time-of-flight system, as well as detailed instrument simulation and reconstruction studies, we present here the anticipated impact of the GAPS program on cosmic-ray searches for dark matter. This contribution will discuss the current status of cosmic antinuclei studies while focusing on the science potential of GAPS.

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Collaboration

GAPS

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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