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Dark Matter Indirect Detection with the GAPS Experiment

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The General Antiparticle Spectrometer (GAPS) is a balloon-borne experiment designed to identify cosmic antinuclei, in particular antideuterons from dark matter annihilation or decay, using the uniquely characterized atomic X-rays and charged particles from the decay of exotic atoms. With such a novel detection approach, benefitting from a custom-developed large-area silicon tracker and a large-acceptance time-of-flight system, GAPS is sensitive to antideuterons with kinetic energy <0.25 GeV/nucleon, which should offer an essentially background-free region to probe various dark matter models. Additionally, one long duration balloon flight allows GAPS to collect a high-statistics antiproton spectrum in an unexplored energy range. The first flight of GAPS is scheduled for 2021 from Antarctica. This talk will present the science impact of the GAPS experiment, while focusing on the detection principle, conceptual design, construction status and plan for initial flight.

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