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Search for Dark Matter with the GAPS balloon-borne experiment

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The search for Dark Matter (DM) in cosmic rays focuses on the particles generated in potential DM annihilation or decay. GAPS (General Antiparticle Spectrometer) is a balloon-borne experiment whose goal is to detect low-energy ($E < 0.25$ GeV/n) cosmic anti-nuclei for a deeper understanding of the physics beyond the Standard Model (e.g., dark matter annihilation or decay). In particular, anti-deuteron production from standard astrophysical processes is significantly suppressed in the low-energy range, allowing for an essentially background-free DM search. Moreover, GAPS will provide new precise measurements of cosmic antiprotons and search for cosmic antihelium-3. GAPS consists of 1000 lithium-drifted silicon wafers, forming the tracker, surrounded by a plastic scintillator time-of-flight system and its detection approach of antinuclei is based on the annihilation products and the uniquely characterized atomic X-rays from the decay of exotic atoms. Currently, GAPS is being integrated and calibrated in preparation for its first flight from Antarctica in late 2024. This talk will provide an overview of the GAPS mission and its scientific goals and a report on the current activities and status of the experiment.

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