

Liquid Argon TPCs in space: The Gamma-Ray and AntiMatter Survey (GRAMS) Project

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Recent breakthroughs in neutrino astronomy indicate that the majority of cosmic-ray accelerators responsible for hadronic emission are not associated with Fermi-LAT's bright sources at GeV energies. Instead, they suggest that the solution to the century-old cosmic-ray mystery may lie at MeV energies. Additionally, precision anti-deuteron measurements provide a background-free indirect dark matter search. The GRAMS (Gamma Ray and AntiMatter Survey) experiment utilizes a cost-effective Liquid-Argon Time Projection Chamber deployed in the upper Earth atmosphere and eventually, space, to target both MeV gamma-rays and anti-matter. In this talk, we present the sensitivity of GRAMS to both MeV gamma-rays and anti-deuterons, and discuss the prospects of the final mission. We also report on the status of pGRAMS, a NASA-funded prototype balloon flight scheduled to deploy in 2025-2026.

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