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The GRAMS Project: Gamma-Ray and AntiMatter Survey

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GRAMS (Gamma-Ray and AntiMatter Survey) is a next-generation balloon/satellite mission that will be the first to target both MeV gamma-ray observations and antimatter-based indirect dark matter searches with a LArTPC detector. Astrophysical observations at MeV energies have not yet been well-explored due to the complexity and difficulties of the event reconstruction of Compton scatterings. With a cost-effective, large-scale LArTPC, the GRAMS single LDB (Long-Duration Balloon) flight could provide an order of magnitude improved sensitivity compared to previous experiments. Additionally, GRAMS can uniquely explore dark matter parameter space via antimatter measurements. In particular, low-energy antideuterons can be background-free dark matter signatures. In this talk, I will discuss the overview of the GRAMS project and the detection concepts for MeV gamma rays and antiparticles.

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