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Tsuguo Aramaki (SLAC): GAPS - Hunting for Dark Matter with Cosmic-ray Antimatter

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GAPS (General Antiparticle Spectrometer) is a balloon-based indirect dark matter search experiment that focuses on low-energy antiprotons and antideuterons produced by dark matter annihilation and decay in the Galactic halo. The predicted antideuteron flux from well-motivated dark matter models can be more than two orders of magnitude larger than the one produced by the cosmic-ray interaction at low-energy. Therefore, the GAPS antideuteron measurement is considered as a background-free rare signal dark matter search experiment while solely and complementarily probing a broad number of dark matter models with direct detection, collider and other indirect searches. GAPS could also investigate the DM models put forward to explain the recent results from Fermi, AMS-02 and PAMELA observations. The detection concept and the detector performance have been validated through the accelerator beam test and the engineering flight. We are now moving forward with the first science flight scheduled by NASA from Antarctica in late 2020. In this talk, I will present the overview and the recent status of the GAPS mission.

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