

# 1st cosmic ray antideuteron workshop

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## Prospects of antideuteron detection with AMS

*Friday, June 6, 2014 11:00 AM (30 minutes)*

AMS (Alpha Magnetic Spectrometer) is an experiment designed to perform a very precise measurement of the cosmic-ray spectrum at the top of the Earth's atmosphere, covering the energy range from hundreds of MeV to the TeV. The AMS-02 detector was installed aboard the International Space Station on 19 May 2011. The rate of event collection is approximately 500 Hz or  $1.6 \cdot 10^{10}$  events per year. An unprecedented statistics ( $\sim 5 \cdot 10^{10}$  events) has already been collected during the past three years and data acquisition is expected to continue for another decade.

Antideuterons have never been detected in cosmic rays. Dark matter annihilation is expected to produce an antideuteron flux in the energy region below 1 GeV which may be within the reach of AMS statistics. However, detecting an antideuteron signal requires a very effective rejection of background from a number of much more abundant particle species (protons, deuterons, electrons, positrons, antiprotons, ...) through a combination of reliable mass and charge measurements.

Particle identification with AMS-02 relies on a number of subdetectors aimed at providing independent measurements of particle velocity, rigidity and charge. The ongoing work to improve the quality of AMS-02 measurements to reach the level required for antideuteron detection will be presented. Implications for indirect dark matter detection will be discussed.

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