

1st cosmic ray antideuteron workshop

Contribution ID: 11

Type: **not specified**

Antihelium from Dark Matter

Thursday, June 5, 2014 5:00 PM (30 minutes)

Cosmic-ray anti-nuclei provide a promising discovery channel for the indirect detection of particle dark matter. Hadron showers produced by the pair-annihilation or decay of Galactic dark matter generate anti-nucleons which can in turn form light anti-nuclei. Previous studies have only focused on the spectrum and flux of low energy antideuterons which, although very rarely, are occasionally also produced by cosmic-ray spallation. Heavier elements ($A \geq 3$) have instead an entirely negligible astrophysical background for plausible detection scenarios, with a primary yield from dark matter which could be detectable by future experiments. In this talk, I will discuss our recent computation of antihelium production due to annihilating or decaying dark matter using an event-by-event Monte Carlo analysis. We will then employ semianalytic models for interstellar and heliospheric transport in order to obtain the local flux. Finally, we will discuss scaling relations which relate antihelium to antideuteron fluxes and briefly mention prospects for detection at current and future experiments, including GAPS and AMS-02.

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