

1st cosmic ray antideuteron workshop

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The PAMELA experiment and antimatter in the Universe

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Antiparticles are a natural component of the cosmic radiation being produced in the interaction between cosmic rays and the interstellar matter. They have been shown to be extremely interesting for understanding the propagation mechanisms of cosmic rays. Furthermore, positrons and antiprotons may also be created by dark matter particle annihilations in the galactic halo. Positrons can also be created in the magnetospheres of near-by pulsars.

Cosmic-ray positrons and antiprotons were first observed in pioneering experiments in the sixties and seventies, respectively. The relatively small flux of cosmic-ray antiparticles combined with the presence of huge backgrounds of particles make these searches extremely challenging. The PAMELA satellite-borne experiment has been measuring cosmic-ray antiparticle for nearly eight years. The combination of a permanent magnet silicon strip spectrometer and a silicon-tungsten imaging calorimeter allows precision studies of the antiparticle component to be conducted over a wide energy range with high statistics. In this talk we will review the PAMELA antiparticle results discussing the experimental uncertainties and challenges.

Primary author: Dr BOEZIO, Mirko (Istituto Nazionale di Fisica Nucleare - Sezione di Trieste)

Presenter: Dr BOEZIO, Mirko (Istituto Nazionale di Fisica Nucleare - Sezione di Trieste)