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Study of cosmic-ray solar modulation with the PAMELA experiment

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The data collected by the satellite-borne PAMELA experiment, launched in June 2006, opened a new era of high-precision studies of cosmic rays. The PAMELA low detection energy threshold and long operativity enabled accurate measurements of the fluxes of several cosmic-ray species over a large energy range and the study of their time variation below a few tens of GeVs. In particular, these measurements covered a time that included the minimum phase of the 23rd solar cycle and the 24th solar maximum including the polarity reversal of the solar magnetic field. These measurements have allowed to significantly improve the understanding of the charged-particle propagation through the Heliosphere, the charge-sign effect due to the drift motions of these particles and to calibrate state-of-the-art models of cosmic-ray transport in the Heliosphere. In this presentation we will review PAMELA results on the time-dependent proton, helium and electron fluxes measured between a few tens of MeV/n and few tens of GeV/n from 2006 to 2014. Moreover, preliminary results of yearly energy spectra of deuterons, helium-3 and helium-4 nuclei below 1 GeV/n will be discussed.

Summary

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