d14 1st cosmic ray antideuteron workshop

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Search for Cosmic-Ray Antideuterons with the BESS-Polar Spectrometer

Thursday, June 5, 2014 2:00 PM (30 minutes)

The BESS collaboration carried out 11 scientific balloon flights including two long-duration flights over Antarctica during 16 years from 1993 to 2008. Taking advantage of the quick turnaround between balloon flights, the instrument was improved and adapted to our specific scientific objectives flight by flight. The evolution of BESS antiproton measurements is a great example. These started with 6 antiprotons identified in the cosmic radiation using the data from the first flight in 1993, and ended with more than 8000 antiprotons identified using the data from BESS-Polar II flight in 2007/2008. These data enabled us to provide the definitive answer for the possibility of the existence of low energy primary antiprotons in the cosmic radiation. The data show no evidence of primary antiprotons from evaporation of primordial black holes. No antihelium candidates were found in the all flight data and set the most stringent upper limit reported of 6.9 x 10-8 for the abundance ratio of antihelium/helium in the rigidity range of 1-14 GV. The most sensitive antideuteron search reported used the data obtained by BESS97, BESS98, BESS99, and BESS00, which include the previous solar minimum period in 1997. By comparison, the BESS- Polar II flight accumulated cosmic-ray data in near solar minimum conditions with more than ten times the statistics of BESS97. We will report the status of a new search for antideuterons using BESS- Polar II data.

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