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**Preliminary Results from the second Balloon Flight of BESS-Polar Experiment** THOMAS HAMS, NASA/GSFC/CRESST/UMBC, Greenbelt, MD 20771, USA, BESS-POLAR II COLLABORATION — The BESS (Balloon-borne Experiment with a Superconducting Spectrometer) program uses elementary particle measurements on a balloon-borne instrument to search for antimatter in the cosmic radiation. The search for cosmic-ray antimatter allows studying the early Universe. The BESS instrument measures the energy spectra of cosmic-ray antiprotons to investigate signatures of possible exotic sources, and searches for heavier antinuclei. Previous BESS flights have confirmed that the majority of cosmic-ray antiprotons are secondary products of the interactions of primary cosmic-ray nuclei. However, flights near the Solar minimum in 1995 and 1997 showed a slightly higher low-energy antiproton flux in excess of the expected secondary production, suggesting a possible primary antiproton component. To improve the measurement at low-energies, the BESS-Polar instrument was optimized for a long-duration balloon flight in Antarctica. In this paper we report preliminary results from the second and main science flight conducted 2007-2008 from Antarctica at solar minimum yielding an observation time of 24.5 days.

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