PRECISE MEASUREMENTS OF COSMIC-RAY ANTIPROTON SPECTRUM FOLLOWING THE SOLAR FIELD REVERSAL

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The energy spectrum of cosmic-ray antiprotons ($\bar{p}$'s) has been measured by BESS in an energy range of 0.18 to 4.20 GeV successively in 1993, 1995, 1997, 1998, 1999 and 2000. An accelerator beam test was also performed at a low energy antiproton beam line at KEK, as discussed in a companion paper; thus the systematic error on the resultant spectrum has been remarkably reduced. The absolute calibration of the antiproton detection efficiency in the low energy region below 1 GeV is now less than $\pm$ 5 %. Based on these successive measurements of the $\bar{p}$ spectrum at various solar activity, the effect of the solar modulation and the origin of cosmic-ray $\bar{p}$'s are discussed. The $\bar{p}/p$ ratios showed no distinctive year-to-year variation during 1993 – 1999 as predicted by the charge dependent solar modulation during the positive Sun's polarity phase. Data from the August 2000 flight are expected to help us to clarify the situation. The analysis is now under way and results will be presented at the conference.