Contribution ID: **80** Type: **Contributed Talk**

PEBS - Positron Electron Balloon Spectrometer

Thursday 22 February 2007 16:45 (20 minutes)

The best measurement of the cosmic ray positron flux available today was performed by the HEAT balloon experiment more than 10 years ago. Given the limitations in weight and power consumption for balloon experiments, a novel approach was needed to design a detector which could increase the existing data by more than a factor of 100.
Using silicon photomultipliers for the readout of a scintillating fiber tracker and of an imaging electromagnetic calorimeter, the PEBS detector features a large geometrical acceptance of 4000 cmˆ2 sr, a total weight of 1500 kg and a power consumption of 900 W . The experiment is intended to measure cosmic ray particle spectra for a period of up to 20 days at an altitude of 40 km circulating the North or South Pole.
A full Geant 4 simulation of the detector concept has been developed and key elements have been verified in a testbeam in October 2006 at CERN.

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Session Classification: Session 8