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The AMS-02 3D Imaging calorimeter : a tool for cosmic ray physics in space

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Summary

AMS-02 is an astroparticle experiment that will operate on board of the ISS for a period of about three years. The main scientific goals of the experiment are the search for antimatter and dark matter, the high precision measurement of charged cosmic ray spectra and fluxes and the study of gamma rays, in the GeV to TeV energy range. In AMS-02 the Electromagnetic Calorimeter (ECAL) is required to measure e^+ , e^- and gamma spectra and to discriminate electromagnetic showers from hadronic cascades.

To fulfill these requirements ECAL is based on a lead/scintillating fiber sandwich, providing a 3D imaging reconstruction of the showers. The electronics equipping the detector, with low noise and challenging dynamic range readout, was designed following stringent requirements on mechanical and thermal stability, power consumption, radiation hardness and double redundancy. The full system had successfully gone through the space qualification tests. The ECAL Flight Model has been calibrated during Summer 2007 in a test beam at CERN, using 6 to 250 GeV electron and proton beams. Results on the measurements of ECAL parameters and performance are reported.

Primary authors: CERVELLI ET AL., Franco (INFN Pisa); Dr ROSIER LEES, Sylvie (LAPP)

Presenter: Dr GOY, Corinne (LAPP)

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