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High-energy Gamma Rays detection with the AMS-02 electromagnetic calorimeter

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The Alpha Magnetic Spectrometer (AMS-02) is a high-energy particle detector developed to operate on the International Space Station. It was installed and started taking data on May 2011, and is expected to operate for 10-20 years, collecting about 160-320 billion events. The main goals of the experiment are the detection of primordial antimatter and of dark matter, by studying spectra and fluxes of different cosmic ray components in the high energy range (1-2000 GeV).

Identification of electrons, positrons and photons is provided by the Electromagnetic Calorimeter (ECAL), a fine-grained lead-scintillating fibre sampling calorimeter that allows for a precise three-dimensional imaging of the longitudinal and lateral shower development. The ECAL provides an excellent reconstruction of the electromagnetic shower energy and a highly efficient rejection of the hadronic background.

Thanks to the 3D shower reconstruction capability, ECAL allows a stand-alone determination of the incoming particle direction, with unprecedented angular resolution. The AMS-02 subdetectors located above the ECAL provide rejection of charged background. As a result, ECAL is able to identify high energy photons coming from galactic and extragalactic sources. The up-to-date AMS-02 photon data will be discussed.

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