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Experimental method to measure the positron and electron fluxes in AMS-02

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The Alpha Magnetic Spectrometer AMS-02 is a high energy particle physics detector, operational on the International Space Station since May 2011. The AMS-02 goal is the fundamental physics research in space with high energy cosmic rays, during its 20 year duration mission.
The latest published results, with 30 months of data, show an excess of high energy positrons whose origin is still highly uncertain. These positrons, in addition to being produced by spallation of cosmic rays on interstellar medium, may be produced in nearby pulsars, annihilation of Dark Matter particles, or still unknow processes. In this poster, I will review the analysis technique used for measuring positron flux and electron flux, as well as positron fraction. This analysis is based on three subdetectors: the Transition Radiation Detector (TRD), the silicium tracker, and the Electromagnetic Calorimeter (ECal). I will present a method which allows the combination of estimators constructed from these three subdetectors, in order to separate first leptons and protons, and secondly positrons and electrons. I will also detail the influence and the determination of the charge confusion between the positrons and electrons at high energy. The positron and electron flux, as well as the positron fraction, will be shown and discussed.

Collaboration

AMS

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