

The AMS-02 Silicon Tracker - The detector after 500 days in space

The Alpha Magnetic Spectrometer (AMS-02) is a high-energy physics experiment operating in space on the International Space Station since the 16th of May.

Thanks to a large acceptance and a data taking period of, at least, 10 years, AMS-02 will measure over 10^{10} charged particles in the rigidity range 500MV - 2TV. AMS-02 is able to measure the energy spectrum of the cosmic ray components (antideuterons, antiprotons, electrons, positrons,) allowing the searching of primordial antimatter and dark matter annihilation products. 7 planes of Silicon sensors in the permanent magnet (0.15T) bore and 2 planes at the ends of the detector act as tracking device. The measurement of the curvature radius of the charged particles bent trajectories allows the computation of the particle rigidity and charge sign.

With an effective sensible area of 6.2m^2 the AMS-02 Silicon Tracker is the largest tracker never built for a spaceborne spectrometer. It is composed by 2264 double-sided Silicon sensors ($72\times 41\text{mm}^2$, $300\mu\text{m}$ thick) assembled in 192 read-out units, for a total of 200.000 read-out channels.

Si Tracker performances, observed after almost 500 days in space, and after more than 20 billions of triggers, will be presented and discussed.