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The Silicon Tracker L0 Upgrade of the AMS-02 experiment on the ISS

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The Alpha Magnetic Spectrometer (AMS) is a particle physics experiment on board the International Space Station (ISS) designed to accurately measure the principal and the rarest Cosmic Rays components in the rigidity range from 1 GV to several TV.

Following a long period of construction and testing, AMS was launched to the ISS and installed on May 19, 2011, and since then collects data and it is supposed to take data for the whole life of the ISS, that currently extends to 2030.

AMS has the unique capability of distinguishing matter from anti-matter, thanks to its capability of measuring the charge sign from the track deflection within its magnetic field. In order to make the best possible use of the remaining data taking time the Collaboration has decided to upgrade the silicon tracker with the installation of an additional tracking layer of silicon micro strip detectors on the top of the existing instrument. The main advantages would be the increase of a factor 3 in the acceptance for many analysis channels and an improved charge measurement thanks to the low material budget in front of the new detector.

The detector is currently in the integration phase of the flight hardware, and will undergo the space qualification procedure in autumn 2025, to be ready for the launch in spring 2026. In the presentation will be described in detail the technological choices made to build the detector in about two years. We will report on the assembly and test strategy and the expected performance based on beam test measurement, as well as on the space qualification procedure and test already performed and planned before the launch.

Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

No

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