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Production and characterization of ladders of the Silicon Tracking System for the CBM experiment

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The Silicon Tracking System (STS) for the CBM experiment is designed to handle an interaction rate of 10 MHz. A specialized integration approach, where the readout electronics are located outside the sensitive volume, minimizes the material budget to 2 - 8% λ_0 while ensuring high granularity, precision, and timing accuracy. Each detector module features a double-sided silicon strip sensor connected to two Front-End Boards (FEBs) with eight custom-designed STS-XYTER ASICs via microcables.

After assembly, rigorous quality control procedures are performed, including time and amplitude calibration of all module ASICs, as well as thermal stress tests, to ensure reliable operation and precise data analysis.

After testing, the modules are attached to low-mass carbon fiber ladders, each of which can accommodate up to 10 modules. The first-of-series ladders have undergone further evaluation to confirm consistent functionality, including IV measurements, functional tests, simultaneous noise (ENC) characterization, long-run stability, and radioactive source irradiation measurements.

This study presents the current status of ladder production during the construction of the STS detector series. It offers key insights into the detector's development and performance, with detailed studies on noise levels and signal response.

Speed talk:

Normal speed talk selection

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