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## The Silicon Tracking System of the CBM experiment at FAIR

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In the CBM experiment at FAIR, the Silicon Tracking System is the central detector for charged-particle identification and momentum measurement. Its key performance requirements are (a) pile-up free track measurement in collision rates between 0.1 and 10 MHz, (b) momentum resolution in a 1 Tm dipole magnetic field of better than 2%, and (c) capabilities for the identification of particle decays, e.g. such with strangeness content.

The STS comprises 8 tracking stations equipped with double-sided silicon microstrip sensors. Two million channels are read out with self-triggering electronics, matching the data streaming and on-line event analysis concept applied throughout the experiment. The detector's functional building block is a module consisting of a sensor, microcables and two front-end electronics boards. The modules are mounted on carbon fiber support ladders and further to mechanical frames. The microstrip sensors provide double-sided segmentation at a strip pitch of 58  $\mu\text{m}$  and 7.5 degree stereo angle, have integrated AC signal coupling and second-metal routing lines. Ultra-thin microcables with up to 60 cm length transfer the sensor signals to the electronics located at the periphery of the detector. The custom-developed 128-channel read-out ASIC "STS-XYTER" has a self-triggering architecture that delivers time and amplitude information per channel. The detector will be operated at below  $-5^\circ\text{C}$  within a thermal enclosure of about 2  $\text{m}^3$  volume so that the sensors' leakage currents are kept low and the detector remains operational up to an integrated particle fluence of  $10^{14}$   $\text{n}/\text{cm}^2$  (1 MeV equivalent). The front-end, data aggregation and powering electronics will dissipate about 40 kW which is planned to be taken out of the system with a bi-phase  $\text{CO}_2$  evaporative cooling.

The presentation will discuss the development status of the STS components and system integration and will give an outlook on the beginning detector construction.

### Collaboration

CBM

### Content type

Experiment

### Centralised submission by Collaboration

Presenter name already specified

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