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# The Silicon Tracking System of the CBM experiment at FAIR

The Silicon Tracking System is the central detector in the CBM experiment at FAIR. Operating in the 1 Tm dipole magnetic field, the STS will enable pile-up free detection and momentum measurement of the charged-particles originating from beam-target nuclear interactions at rates between 100 kHz and 10 MHz. It will also allow identifying particle decays occurring within the aperture.

The STS consists of 8 tracking stations based on double-sided silicon microstrip sensors equipped with fast, self-triggering read-out electronics. With about two million read-out channels, the STS will deliver a high-rate stream of time-stamped data that is transferred to a computing farm for on-line event determination and analysis. The functional building block is a detector module consisting of a sensor, microcables and two front-end electronics boards. The double-sided microstrip sensors have a strip pitch of 58 $\mu$m, are AC-coupled and oriented under 7.5 degree stereo angle. Double metallization is employed for read-out routing. Ultra-thin microcables with up to 60 cm length and a line pitch matching that of the sensor strips transfer the analog signals to the readout electronics at the periphery of the stations where cooling and further infrastructure can be provided without compromising the material budget. The custom-developed read-out ASIC "STS-XYTER" has a self-triggering architecture that delivers time and amplitude information. The detector will be operating within a thermal enclosure of about 2 $m^3$ at below −5 °C so that the silicon sensors remain operational up to a particle fluence of $10^{14}$ 1-MeV $n_{eq}cm^{-2}$. The electronics, 16 thousand ASICs, data aggregation and power boards, will dissipate about 40 kW that will be removed with bi-phase $CO_2$ evaporative cooling.

In this contribution, the development status of the STS components and the system integration will be discussed and an outlook on the detector construction given.

## Preferred Track

Future Experimental Facilities, Upgrades, and Instrumentation

## Collaboration

Other

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