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The Silicon Tracking System of CBM getting ready for experiment

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The Compressed Baryonic Matter (CBM) experiment at the FAIR facility will explore the QCD phase diagram at very high baryon densities, where a first order phase transition from hadronic to partonic matter as well as a chiral phase transition is expected to occur.
The Silicon Tracking System is the central detector for charged-particle identification and momentum measurement. It is designed to measure up to 1000 particles in A+A collision rates between 0.1 and 10 MHz, to achieve a momentum resolution in a 1 Tm dipole magnetic field of better than 2%, and to be capable of identifying complex particle decays topologies, e.g., such with strangeness content. The STS employs high-granularity double-sided sensors matching the non-uniform track density and fast self-triggering electronics with a free streaming data acquisition system and online event selection. With the resulting 1.8 million readout channels, it poses the most demanding requirements regarding bandwidth and density of all CBM detectors. The STS functional building block is a module consisting of a sensor, micro-cables and two front-end electronics boards. The modules are mounted on carbon fiber support ladders. The silicon sensors provide double-sided segmentation at a strip pitch of 58 µm and 7.5-degree stereo angle. Ultra-thin micro-cables with up to 50 cm length transfer the sensor signals to the electronics located out of the detector acceptance. The custom-developed read-out ASIC "STS-XYTER"has a self-triggering architecture that delivers time and amplitude information per channel.
Towards the phase 0 of the CBM experiment, mini CBM (mCBM), a precursor of the full CBM with detector units from all subsystems, the STS will contribute with two tracking stations consisting of a total of 13 modules. The mCBM will allow to test and optimize the detector performance, including the data acquisition chain under realistic experimental conditions and its integration with the other subsystems.
This presentation aims to show an overview of the development status of the module components, readout chain, first test results and system integration in a framework of the mCBM campaign at SIS18 at GSI.

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