



Contribution ID: 930

Type: Poster

The Silicon Tracking System of the CBM experiment at FAIR

Tuesday 15 May 2018 19:10 (30 minutes)

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 μm 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°C within a thermal enclosure of about 2 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} n/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 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

Presenter: HEUSER, Johann (GSI - Helmholtzzentrum für Schwerionenforschung GmbH (DE))

Session Classification: Poster Session

Track Classification: Future facilities, upgrades and instrumentation