The Silicon Tracking System of the CBM experiment at FAIR

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Silicon Tracking System

- Track point measurement in high-rate collision environment: \(10^3 - 10^4 \text{ A+Au, up to } 10^7 \text{ A+A}\)
- Physics aperture: \(2.5^\circ \leq \theta \leq 25^\circ, 0.3 \text{ m} \leq z \leq 1.0 \text{ m}\)
- 8 tracking stations
- Double-sided silicon microstrip sensors
- Hit spatial resolution = 25 µm
- Self-triggering front-end electronics
- Time-stamp resolution = 5 ns
- Material: \( \sim 0.3\% - 1.5\% \times \mu \text{ for station}\)
- \( \Delta p/p = 1.8\%\) \((p > 1 \text{ GeV/c, 1 Tm field})\)

Silicon Microstrip Sensors

- 285/320 ± 15 µm thick
- n-type silicon
- Double-sided segmentation
- 1024 strips of 58 µm pitch
- Strip length 2/4/6/12 cm
- Double-sided segmentation
- n-type silicon
- 285/320 ± 15 µm thick

Modules and Ladders

- Common GTBx Readout Board
- μTCA crate with AFCK boards
- FLES input node with FLIB boards

Read-out Electronics

- Copper link (~2 m)
- Optical link (~50 m)
- Optical link (~800 m)

Demonstrators

- miniSTS design
- miniSTS in demonstrator experiment miniCBM at GSI/SIS18
- minibeam 2018 - 2021
- 2 tracking stations
- 13 modules
- 5 half-ladders
- GBT read-out
- FLES DAQ node

STS Project Timeline

- Production Readiness: Nov. 2018
- Detector readout: 2019 - 2022
- Assembly Centers: GSI-FAIR, JINR-VBLHEP

Compressed Baryonic Matter experiment at FAIR