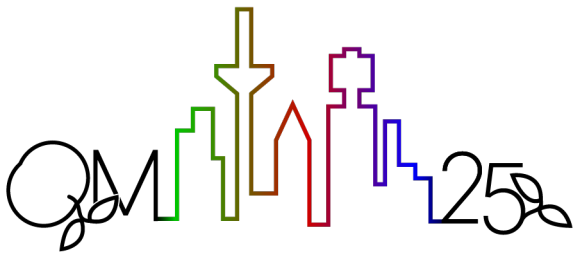

Contribution ID: **634** Type: **Poster**

Data Rates Performance Studies of the Silicon Tracking System Prototype in the miniCBM Experiment

Compressed Baryonic Matter (CBM) is a heavy-ion physics experiment designed to probe the QCD phase diagram at high densities. It is being installed at the Facility for Anti-Proton and Ion Research (FAIR) in Darmstadt, Germany, and will use a beam from the new SIS-100 accelerator. The Silicon Tracking System (STS) is the core tracking detector of CBM, tasked with achieving high-precision measurements of particle tracks and momentum. Currently, a prototype system, comprising several detector subsystems, including a scaled version of the STS called mSTS is undergoing extensive testing and data taking in the miniCBM (mCBM) experiment using the existing SIS-18 accelerator of the GSI, Helmholtzzentrum fur Schwerionenforschung, Darmstadt. This testing initiative is critical for validating hardware and software in realistic experimental conditions and ensures their performance in online data read-out, processing, and analysis of complex event topologies detected by the mCBM's subsystems.

We will present our comprehensive study of data rates achievable with the mSTS detector system, emphasizing results from simulations and experimental runs taken during the year 2024. Using UrQMD-based minimum bias events for Ni-Ni collisions at a beam momentum of 1.93 AGeV/c, we simulate the expected detector performance in a realistic free-streaming readout with an additional beam background simulated with GEANT4. We will present in a poster a comparative analysis of the simulations with data collected during the experimental campaign in 2024. The study will provide insights into the scaling and optimization required for full-scale implementation in CBM.

Category

Experiment

Collaboration (if applicable)

CBM Collaboration

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