MATTER AND TECHNOLOGIES

Contribution ID: **140** Type: **Poster DTS**

The Assembly and Integration of a Half-unit of the Silicon Tracking System (STS) Detector

Monday 3 November 2025 18:35 (3 minutes)

The Compressed Baryonic Matter (CBM) experiment at the Facility for Antiproton and Ion Research (FAIR) is designed to investigate the properties of strongly interacting matter at high net-baryon densities. A key component of the CBM experiment is the Silicon Tracking System (STS), which provides high-precision tracking of charged particles produced in heavy-ion collisions. Ensuring the proper assembly and integration of STS units is critical for the overall performance of the experiment. High tracking efficiency and vertex resolution of the STS are essential for rare probe measurements such as open charm and di-leptons, directly linking detector performance to the core physics goals of CBM.

This presentation focuses on the STS half-unit, aiming to develop, implement, and verify a reliable assembly and integration protocol. Prototype components were employed to simulate the mechanical assembly, ensuring safe handling before working with actual sensor modules and electronics. The protocol was designed for precise placement of all mechanical and electronic components, including ladders with mounted Front-End Board (FEB) boxes containing the front-end electronics (FEEs). The key phase of the study was verification of the cable routing, which involved configuring data and power connections between FEBs and the readout chain and ensuring proper alignment with the assembly layout. Special attention was given to the mechanical constraints of the half-unit, verifying that cable bends and routing paths did not interfere with module assembly or with future integration into the full STS system. This work represents the first verification of a half-unit assembly protocol, with validation of functional tests of the FEB boxes.

While the preliminary tests indicate that the assembly and routing procedures are effective, additional studies are planned to test the system under extended operational conditions and to verify long-term reliability. The outcomes of this work contribute to the overall preparation of the STS half-units for integration into the CBM experiment, ensuring that the modules meet the required standards for performance and stability.

Speed talk:

Normal speed talk selection

Author: SUBRAMANYA, Gnana Sindhu (Eberhard Karls Universität Tübingen(UT-PIT))

Presenter: SUBRAMANYA, Gnana Sindhu (Eberhard Karls Universität Tübingen(UT-PIT))

Session Classification: Poster