Contribution ID: **236** Type: **Poster**

Advancements in the Silicon Tracking System of the CBM Experiment: Module series production, testing, and operational insights

Wednesday, 3 July 2024 15:02 (1 minute)

Designed to function as the primary tracking detector for the future CBM experiment at FAIR, the Silicon Tracking System (STS) is tailored to measure charged particles generated during heavy-ion collisions at unprecedented interaction rates of up to 10 MHz, using a triggerless free-streaming readout approach. The detector modules developed for STS integrate large-area double-sided silicon sensors, lightweight high-density interconnecting microcables, and a custom-designed self-triggered readout ASIC. This configuration results in modules with low material budget capable of providing 2D position information alongside timing and amplitude data.

Central to the STS project is the series production of detector modules and ladders, which also involves assembly and quality control measures for each component. A comprehensive functional and thermal stress testing of the finalized modules ensures their reliability before their integration onto carbon-fiber ladders. Beyond that, the operational capabilities of STS modules are evaluated in various application scenarios. High-intensity nucleus-nucleus collisions at GSI facilities and the E16 experiment at J-PARC serve as platforms for evaluating their performance.

This report provides a detailed overview of the production processes involved in STS module fabrication, along with results from functional module testing, and insights gained from their operational deployments across distinct experimental setups.

Primary author: Dr RODRÍGUEZ RODRÍGUEZ, Adrian (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Co-authors: Prof. TOIA, Alberica (Goethe University Frankfurt am Main); Dr SCHMIDT, Christian (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Mr RODRÍGUEZ GARCES, Dairon (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Mr RAMÍREZ ZALDIVAR, Dario Alberto (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Dr LEHNERT, Joerg (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Dr HEUSER, Johann (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Mrs COLLAZO SÁNCHEZ, Lady Maryann (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Dr TEKLISHYN, Maksym (GSI Helmholtzzentrum für Schwerionenforschung GmbH); Dr FRANKENFELD, Ulrich (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Presenter: Dr RODRÍGUEZ RODRÍGUEZ, Adrian (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Session Classification: Poster Session