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Test and characterization of the final readout ASIC for the CBM Silicon Tracking System experiment

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The Compressed Baryonic Matter (CBM) experiment is a fixed-target heavy-ion physics experiment at the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. The CBM physics program aims at exploring the QCD phase diagram at very high baryon densities, where a first-order phase transition from hadronic to partonic matter and a chiral phase transition is expected to occur. For high-statistics measurements of rare probes, CBM is designed to cope with very high interaction rates up to 10 MHz. Therefore, the experiment will be equipped with fast and radiation hard detectors employing free-streaming readout electronics.
The Silicon Tracking System (STS) is the essential component for tracking up to 1000 charged particles per event in nucleus-nucleus collisions. The experimental conditions pose demanding requirements in terms of channel density and read-out bandwidth to be met by the front-end electronics. An essential component is the STS-XYTER, a dedicated ASIC for the readout of the double-sided silicon micro-strip sensors. It is a low power, self-triggering ASIC with 128 channels, 5-bit ADC charge and 14-bit timing information. It needs to be fully integrated into a very confined space and it should perform in a high radiation environment. Several tests have been carried out to check the chips functionalities, the performance of modules as well as integration aspects. This contribution summarizes the characterization procedures of the final STS front-end electronics for different data taking scenarios.

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