Contribution ID: **36** Type: **not specified**

Temperature calibration and thermal stress tests of the Front-End Electronics of the CBM Silicon Tracking System

Thursday 1 June 2023 10:30 (20 minutes)

Silicon Tracking System of the future heavy-ion CBM experiment has several distinctive features to manage the unprecedented beam-target interaction rate of up to 10 MHz. In order to maintain a material budget within 2 – 8%X0, while achieving sufficient granularity, spatial and timing precision, a novel integration approach was employed where the read-out electronics are placed outside of the sensitive volume, being connected to the double-sided double-metal silicon sensors
through the ultra-thin micro cables. Each detector module can dissipate up to 15W of power which is extracted through the limited surface of the cooling shelf. Thus, it is crucial to design and test appropriate thermal interfaces and develop monitoring routines during the detector
operation.

With this purpose, we calibrated internal thermometers of the custom-made SMX ASICs of the STS: this way, the temperature of the electronics can be monitored on-line during detector tests and operation. Calibration procedure involved series of measurements with a thermal imaging camera as a reference.

Due to the temperature changes, the front-end boards (FEBs) will experience a significant mechanical stress. By subjecting the FEBs to thermal stress, the results can help identify potential weaknesses and develop improvements to enhance the performance and reliability of FEBs in the detector conditions. During the tests, many SMX parameters were monitored, what helped to evaluate the robustness of the electronics at lower temperatures.

Authors: COLLAZO SANCHEZ, Lady Maryann (Universitaet Frankfurt); TEKLISHYN, Maksym; BAJDEL, Marcel

Presenter: COLLAZO SANCHEZ, Lady Maryann (Universitaet Frankfurt)

Session Classification: Coffee Break and Poster Session