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SCT Commissioning

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The Barrel and EndCap SCT detectors are installed in the ATLAS cavern. This talk will focus on the installation and first tests of the SCT in-situ. The thermal, electrical and optical services will be reviewed and some of the problems that were encountered during installation will be discussed. The first tests of the SCT in-situ will be described using the calibration scans.. The performance of the SCT will be described, with particular emphasis on the fraction of working channels and the noise performance. The effects of different grounding options have been studied. The noise occupancy has been studied in calibration and "physics"runs and the effects of the operation of the TRT have been evaluated.

Summary

The barrel and EndCap SCT detectors have been installed in the ATLAS cavern. The electrical, optical and cooling services have been connected and an extensive programme of detector commissioning is underway. The first tests to be performed were the checks of the continuity of the electrical and optical connections as well as the reliability of the cooling system. The module cooling is based on an evaporative system using C3F8 to remove up to 40 kW of heat. Any liquid in the exhaust pipes must be evaporated and raised above the cavern due point to avoid condensation, therefore heaters are installed in these exhaust lines. A vulnerability to moisture ingress was identified in these heaters during the first commissioning tests and the heaters have all been modified to fix this. The performance of the cooling system will be reviewed.

The access to the electrical and optical patch panels will become increasingly difficult during the course of the final stages of ATLAS assembly, so it was vital to make full tests and repairs while access was straightforward. A simple electrical test system was used to check the continuity of all electrical connections from the patch panels to the modules. A few cases of broken tracks on the Al Low Mass Tapes (LMTs) were discovered and all the critical faults were successfully repaired in-situ. All cases of connector problems and shorted wires were also fixed. The optical connections at the patch panels near the detector, were also fully tested. The continuity for the fibreTTC links were tested by measuring the currents in the p-i-n diodes in the on-detector opto-packages. The continuity of the fibre data links was verified by performing digital scans of the receiver threshold in the Back of Carte (BOC). A few non-functional links were recovered by cleaning the MT-12 connectors to remove dust. Many TTC links were operating at very low p-i-n currents which is not satisfactory for long-term operation, so a programme to produce better coupled VCSEL arrays is underway.

After the functionality of the services had been verified, the performance of the modules was studied. Firstly the parameters for the optical services were optimised to ensure reliable communication to the modules. Then simple digital tests were carried out to verify the functionality of the modules. Finally more detailed analogue scans were performed to measure the noise performance of the system. Threshold scans of the front-end discriminator were performed for different values of the injected charge. These could then be used to determine the gain of the front-end amplifier and the input noise. After setting the threshold DACs to values corresponding to 1 fC threshold, the noise occupancy in calibration mode and physics mode was measured. These results will be compared with similar data taken during macro assembly at Oxford, NIKHEF and CERN SR1. Various tests of the grounding system and effects of the simultaneous operation of the TRT will also be discussed.

The first results from cosmic ray tests of the SCT in the ATLAS cavern will be discussed. This work will be used to give a summary of the in-situ performance of the SCT.

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