

Status of radiation effects of the ATLAS SCT detector

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The Silicon micro-strip tracker (SCT) of the ATLAS experiment at LHC has been running for physics at 7 and 8 TeV over 3 years. The integrated delivered luminosity to ATLAS is 29.5 fb⁻¹ and the fluence at the inner most SCT modules corresponds to about 5e12 1MeV-equivalent neutrons/cm^{**} 2, the level below the type inversion. More than 99% of 4088 modules are active with very high efficiency. During the beam time, all modules are cooled uniformly and stably within 2 degree C of their specified temperatures. The HV current drawn has been steadily increasing from 100 nA to 100 uA per module. The current increase observed in the barrel region is in very good agreement with predictions of the silicon bulk leakage current models with self-annealing effects without any parameter adjustment. Calibration runs have been performed frequently to monitor the noise and gain, both of which have been fairly stable with some exceptions. Modules with CiS sensors have been showing mysterious beam-associated behavior in the HV current and some of these modules were kept below nominal bias voltage of 150V.

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