



ATLAS Silicon Microstrip Tracker Operation and Performance

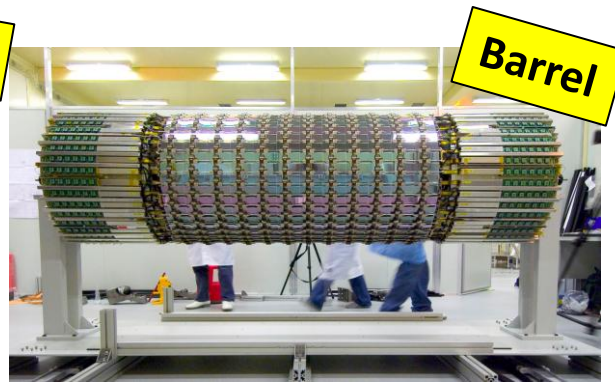
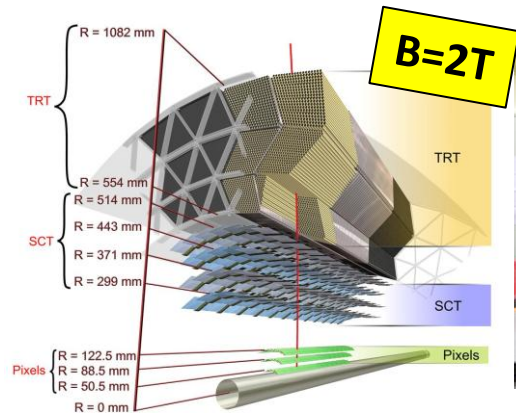


Miho Yamada(KEK), on behalf of the ATLAS Collaboration

SCT is a charged particle tracking device for momentum, collision point and secondary vertex measurement precisely with PIXEL and TRT in 2T magnetic field.

ATLAS Inner Detector

SemiConductor Tracker

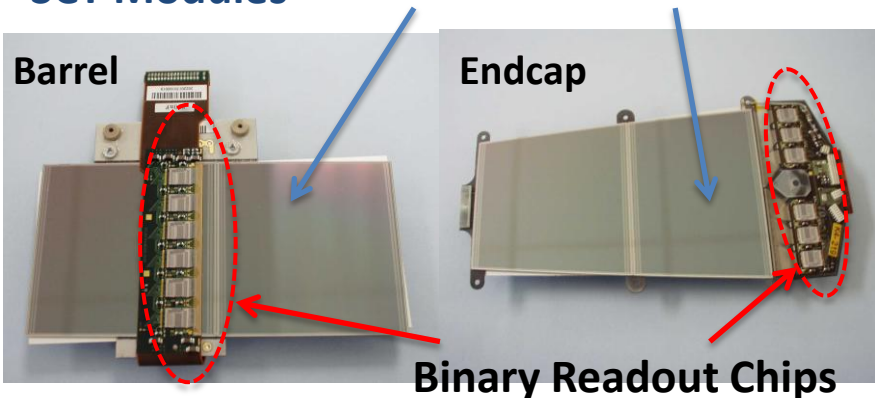


SCT Specifications

- 61m² silicon microstrip sensor
- 6.3 million readout channels
- 4088 modules arranged to form 4 Barrels and 18 disks(9 each end)
- $|\eta| < 2.5$
- resolution $r\phi \sim 16\mu\text{m}$, $Z \sim 580\mu\text{m}$
- **Front-End read out** : 128 channel ASIC(ABCD3TA) with binary architecture

SCT Modules

Silicon microstrip sensor



SCT Operation

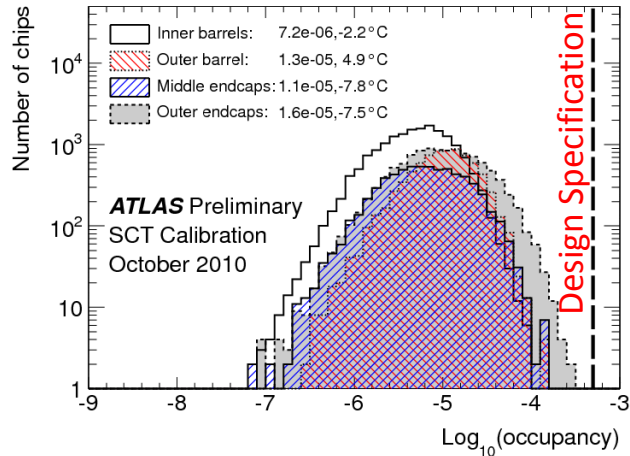
99.3% of SCT modules are operational and 99.7% for data taking efficiency.

Disabled Readout Components	Endcap A	Barrel	Endcap C	SCT	Fraction (%)
Disabled Modules	5	10	15	30	0.73
Disabled Chips	5	24	4	33	0.07
Masked Strips	3,364	3,681	3,628	10,673	0.17
Total Disabled Detector Region					0.97

SCT Performances

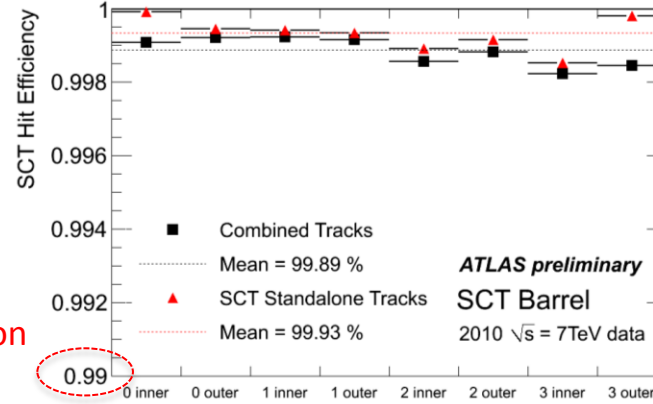
Noise Occupancy

5×10^{-4}



Design Specification $\geq 99\%$

Efficiency



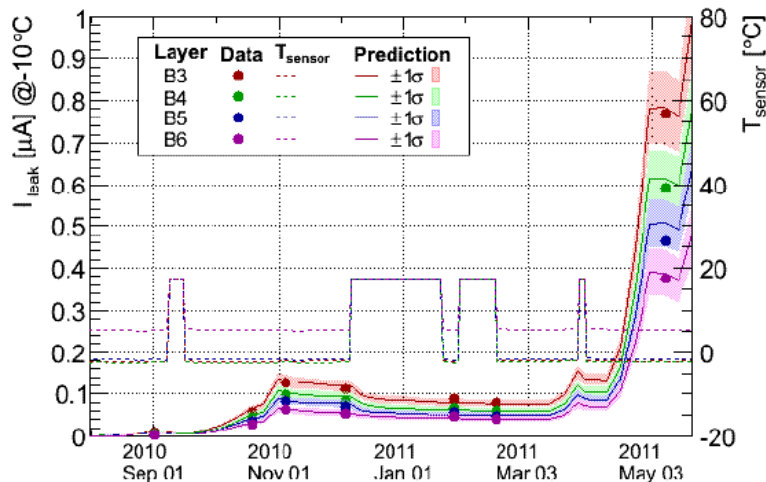
The number of hits required is at least 7 for SCT standalone tracks and at least 6 for ID combined tracks.

tracks with $p_T > 1 \text{ GeV}$

Noise Occupancy and Hit Efficiency exceed the design specifications.

Detector Irradiation

Linear relation between leakage current and fluence.



Lorentz Angle

It's depending on Electric, Magnetic Field and Temperature. Lorentz Angle is important to check the operating conditions of SCT.

