
(Poster)

Hybrid and module from LHC to Super LHC

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The module and service structure designs of the present ATLAS silicon tracker (SCT) have evolved as a result of a number of technical and performance considerations. Because of the overall technical and financial optimization of the detector elements and the service structures, a modular solution was chosen. The SCT of ATLAS required 4,088 modules in total in the barrel and the endcap sections. Using a robotic system, they were mounted onto their support structures during about one year. In considering an upgrade of the ATLAS inner tracking detector, it is imperative to carefully evaluate the technical performance of the current SCT, in the light of the experience gained and to understand how the current design might be modified for operation at SLHC.

The silicon microstrip sensor for the ATLAS tracker at the SLHC will probably be fabricated from 6-inch wafers. From a single 6-inch wafer, one rectangular sensor of maximum size of 12.47 x 6.37 cm² can be laid out. Four 3 cm strip elements can be embedded in a single sensor for short-strip modules and one 12 cm strip exists for long-strip modules relevant to outer radii. Two large sensors can be glued back-to-back on a thermo-mechanical baseboard.

A single wrap-around hybrid could service both the top and the bottom sides, very much like the present SCT barrel modules. Since there are four rows of strips in the short-strip design, the readout ASIC's of four rows can be carried on a single large area hybrid. The design of the hybrid with the four rows of ASIC's is one of the R&D areas, together with the engineering of the cooling contact, the module fixation points, the thermal management with the baseboard design, and the electrical connectivity.