

ATLAS SCT Real-Time Alignment & Initial Survey

R. B. Nickerson
Oxford University

The Semi Conductor Tracker in the ATLAS experiment at the LHC is one of the new generation of large-scale silicon based trackers. With an alignment goal of a few microns, the short-term stability of the support structures is not assured in the face of both environmental temperature and internal power consumption fluctuations. A geodetic grid of over 800 Frequency Scanned Interferometric (FSI) length measurements, each with sub-micron accuracy, has been installed and is capable of tracking low spatial-eigenmode changes in the support structure shape. The FSI will follow short time-scale alignment changes, complimenting the data which will be obtained in a more conventional fashion using tracks acquired over an extended period. The system is described and prototype results presented.

An x-ray survey system has been developed as part of the original overall SCT survey and alignment strategy. Schedule has precluded the use of the scanner in ATLAS, but results are presented demonstrating that the system is capable of providing a 3-D survey of a large silicon detector with a precision of a few microns.