

Signals from fluorescent materials on the surface of silicon micro-strip sensors

Sunday, 10 December 2017 21:14 (1 minute)

For the High-Luminosity Upgrade of the Large Hadron Collider at CERN, the ATLAS Inner Detector will be replaced with a new, all-silicon tracker. In order to minimise the amount of material in the detector, circuit boards with readout electronics will be glued on to the active area of the sensor. Several adhesives investigated to be used for the construction of detector modules were found to become fluorescent when exposed to UV light. These adhesives could become a light source in the high-radiation environment of the ATLAS detector.

The effect of fluorescent material covering the sensor surface in a high-radiation environment has been studied for a silicon micro-strip sensor using a micro-focused X-ray beam. By pointing the beam both inside the sensor and parallel to the sensor surface, the sensor responses from direct hits and fluorescence can be compared with high precision.

This contribution presents a setup to study the susceptibility of silicon strip sensors to light contamination from fluorescent materials and shows their impact on the noise and fake signal rate of a sensor operated in a high-radiation environment.

Primary authors: POLEY, Luise (Deutsches Elektronen-Synchrotron (DE)); SPERLICH, Dennis (Humboldt University of Berlin (DE))

Co-authors: REHNISCH, Laura (Humboldt University of Berlin (DE)); STEGLER, Martin (Deutsches Elektronen-Synchrotron (DE)); BLUE, Andrew (University of Glasgow (GB))

Presenter: SPERLICH, Dennis (Humboldt University of Berlin (DE))

Session Classification: POSTER

Track Classification: New ideas and future applications