

Abstract

SciFi - A large Scintillating Fibre Tracker for LHCb

The LHCb detector will be upgraded during the Long Shutdown 2 (LS2) of the LHC in order to cope with higher instantaneous luminosities and to read out the data at 40MHz using a trigger-less read-out system. All front-end electronics will be replaced and several sub-detectors must be redesigned to cope with higher occupancy. The current tracking detectors downstream of the LHCb dipole magnet will be replaced by the Scintillating Fibre (SciFi) Tracker. Concept, design and operational parameters are driven by the challenging LHC environment including significant ionising and neutron radiation levels. Over a total active surface of 360 m² the SciFi Tracker will use scintillating fibres (\varnothing 0.25 mm) read out by Silicon Photomultipliers (SiPMs). State-of-the-art multi-channel SiPM arrays are being developed to read out the fibres and a custom ASIC will be used to digitise the signals from the SiPMs. The project is now at the transition from R&D to series production. We will present the evolution of the design and the latest lab and test beam results.