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## The Scintillating Fibre Tracker for the LHCb Upgrade

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LHCb is undergoing a major upgrade during LHC LS2 to be completed in February 2022 to cope with increased instantaneous luminosities and a trigger-less 40 MHz read-out to improve on many world-best physics measurements. A light and homogeneous detector based on plastic scintillating fibres will be installed downstream of the LHCb dipole magnet.

The Scintillating Fibre (SciFi) tracker covers an area of 340 m<sup>2</sup> by using more than 10,000 km of blue emitting scintillating fibre with 250  $\mu$ m diameter, enabling a spatial resolution of better than 80  $\mu$ m for charged particles and a hit efficiency better than 99%. Six-layer fibre mats of 2.4 m length are assembled to form individual detector modules (0.5 m x 4.8 m) consisting of eight fibre mats each. Linear arrays of Silicon Photomultipliers cooled to -40 °C are placed at the fibre ends. The readout of 524k channels occurs through custom-designed front-end electronics with fast 10 ns shaping, dual integrators, and a 3-comparator flash ADC to digitise the signals. An FPGA clusters the signals over threshold and outputs a barycentre to the 40 MHz DAQ farm with a total bandwidth of over 20 Tbits/sec.

At the time of the conference, the tracker assembly will have been completed and installed underground at LHCb. The talk will give a brief overview of the SciFi detector design, production, performance, the experience from the assembly and an early commissioning status.

### Primary experiment

LHCb

**Author:** SOARES LAVRA, Lais (Université Clermont Auvergne (FR))

**Co-author:** LEVERINGTON, Blake (Ruprecht Karls Universitaet Heidelberg (DE))

**Presenter:** SOARES LAVRA, Lais (Université Clermont Auvergne (FR))

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