

The Scintillating Fibre Tracker for the LHCb Upgrade: Experience from Production and Assembly

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During the Long Shutdown 2 of the LHC, the LHCb collaboration will replace the current Outer and Inner Tracker by a single tracking detector, based on 2.42 m long scintillating fibres with a diameter of 250 μm , readout by silicon photo-multipliers (SiPM). The fibres are arranged in mats of 6 fibre-layers with a width of 130.65 mm. Eight fibre mats will form a module and are sandwiched between honeycomb and carbon fibre composite panels to provide stability and support over the module length of 4.85 m. The modules are supported by a 4 m wide by 6 m high C-Frame structure that provides the proper stiffness to the full package. The C-Frames are also used to support electronic boards, cooling systems and services and must fit in the existing bridge/platform structure imposing tight space constraints. The production and assembly of the full C-Frames are currently underway with the foreseen installation date for the first six to be installed at the end of the year, and the following six in the spring of 2020. The experience in production and assembly of the various precision components of the C-Frame will be presented including the large extruded aluminium I-beams, carbon fibre support cables, and scintillating fibre modules with Nomex honeycomb and CFRP panels. Additionally, the integration of the Novec cooling circuit, chilled water, dry gas, and electrical services in the confined envelope of the tracker will be presented.