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The LHCb Mighty-Tracker

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The LHCb experiment will undergo its high luminosity detector upgrade to operate at a maximal instantaneous luminosity of $1.5 \times 10^{34} \text{cm}^{-2}\text{s}^{-1}$. This increase poses a challenge to the tracking system to achieve proper track reconstruction with a tenfold higher occupancy. In Upgrade II, new tracking stations, called Mighty-Tracker, will replace the Scintillating Fibre (SciFi) Tracker. The Mighty-Tracker comprises of silicon pixels in the inner region and scintillating fibres in the outer region. The silicon pixels provide the necessary granularity and radiation tolerance to handle the high track density expected in the central region, while the scintillating fibres are well suited for the peripheral acceptance region.

To address the needs of LHCb, a new monolithic High Voltage CMOS sensor called MightyPix is currently being developed for the silicon region. The MightyPix sensor, based on the High Voltage CMOS series, is specifically designed to meet the anticipated requirements in terms of pixel size, timing resolution, radiation tolerance, power consumption and data transmission among other parameters, while being compatible with the LHCb 40 MHz readout system. Recent progress towards MightyPix have been achieved, including evaluation of fabricated prototypes and design towards the next chip iteration MightyPix2. Additionally, recent advancements in the mechanical and electronic design of the silicon modules, including cooling, will be presented

Primary experiment

LHCb

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