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[385] Precision 3D monitoring of the LHCb SciFi tracker alignment using BCAMs

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A new SciFi tracker was added to the LHC during the second Long Shutdown (2019-2022). It consists of three stations, each with four detection layers of around 6mx5m. Real-time 3D alignment monitoring is provided by opto-electronic BCAM sensors, which detect movements caused by magnet cycles, SciFi detector powering, or environmental changes. Triangulation provides positions for 14 points on three detection layers, monitored by 8 cameras. High-index refractive glass-balls serve as detection targets. With an intrinsic resolution of about 50 microns, preliminary results indicate enhanced sensitivity at the level of 10-20 microns by data averaging. Initial findings on magnetic field and operational impacts on detector alignment are presented.

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