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The LHCb Mighty Tracker

Tuesday 22 August 2023 17:00 (20 minutes)

The LHCb detector is set to undergo a significant upgrade during the upcoming long shutdown 4 of the LHC. This upgrade will result in a nearly tenfold increase in instantaneous luminosity, reaching $1.5 \times 10^{34} cm^{-2} s^{-1}$, with an integrated luminosity expected to rise from $50 fb^{-1}$ to $300 fb^{-1}$. To effectively handle the elevated track densities, the downstream tracking stations will employ silicon pixel sensors in the inner region where particle fluences are highest. The MightyPix ASIC is a Monolithic HV-CMOS sensor based on the HV-MAPS families MuPix and ATLASPix, specifically designed to meet the requirements of LHCb. The Mighty Tracker silicon detector will covering an extensive active area of $18 m^2$ will comprise over 2×10^9 pixels. The first iteration of the chip, along with its features and design, will be presented. Notable recent advances in the mechanical and electronic design of the silicon modules will also be shown. Progress on prototyping developments, which focus on simulation, verification and FPGA emulation work will be outlined. The latest beam test campaigns have yielded valuable insights into the radiation performance of precursor chips of the MightyPix. Noteworthy highlights will be presented, accompanied by plans in place to maximise the chip's performance.

Collaboration / Activity

LHCb

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Session Classification: T12 Detector R&D and Data Handling

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