Contribution ID: **47** Type: **Talk**

Performance Studies of an HV-MAPS for the LHCb Mighty Tracker

Friday 23 May 2025 10:40 (20 minutes)

In the LHC Run 5, the instantaneous luminosity of LHCb will increase by more than a factor of 5. This necessitates an upgrade of the main tracking systems to cope with the increased occupancy and radiation damage. As a part of the proposed Upgrade II, the current scintillating fibre (SciFi) tracker will be replaced by the so-called Mighty Tracker, featuring a scintillating fibre part in the outer regions, whereas the innermost part will be instrumented with silicon pixel sensors.

For this upgrade it is foreseen to utilize a High-Voltage Monolithic Active Pixel Sensor (HV-MAPS), the MightyPix. It allows for the amplifier and comparator to be embedded in the pixel's deep n-well.
Due to a foundry change, future MightyPix designs are expected to transition from CMOS to NMOS comparators. To ensure the performance of the NMOS comparator with regard to the LHCb specifications, the Run2020v1 chip is evaluated.
Specifically, the time resolution and efficiency are studied, utilizing a 4 GeV electron beam provided by the DESY II Testbeam facility. The results are compared to the TelePix1, which features a comparable pixel design but a CMOS comparator.

Authors: MAISANO, Benedict (Heidelberg University (DE)); KOLB, Ruben (Heidelberg University (DE))

Co-authors: IMMIG, David Maximilian (Heidelberg University (DE)); AUGUSTIN, Heiko Christian (Heidelberg University (DE)); DITTMANN, Lucas Marvin (Heidelberg University (DE)); BACHMANN, Sebastian (Heidelberg University (DE))

Presenter: KOLB, Ruben (Heidelberg University (DE))

Session Classification: Testing and evaluation