Contribution ID: **55**   Type: **Talk**

Impact of incidence angles on MuPix10 performance

Friday 19 April 2024 11:50 (20 minutes)

High Voltage Monolithic Active Pixel Sensors (HV-MAPS) have emerged as a promising technology for silicon tracking detectors in particle physics. HV-MAPS, selected as the technology for the Mu3e Pixel Tracker and under investigation for potential implementation in future detector applications, offers good efficiency, position, and time resolution while keeping the material budget minimal. In many of these applications, particles may enter the sensor at different incidence angles. This variability influences the cluster size and the collected charge, depending on the in-pixel incidence position, sensor thickness, and the depth of the depletion zone. Therefore, studying their performance at different incidence angles can help determine their limitations and capabilities.

This talk presents sub-pixel results from DESY test beam rotation studies using MuPix10 sensors, one of the HV-MAPS prototypes developed for the Mu3e experiment, with different sensor thicknesses and resistivities. The study aimed to gain insights into the relationship between cluster size and efficiency under different thresholds and voltage configurations. Additionally, the findings of this research contribute to enhancing the understanding of the impact of diffusion and drift on sensor efficiency for the HV-MAPS technology.

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Session Classification: Sensors