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Milestones of the ALICE ITS3 vertex detector development: Advances in MAPS technology and detector performance

Thursday 19 September 2024 12:06 (18 minutes)

Using the example of the future ALICE vertex detector (ITS3), this talk aims at providing an overview on cutting-edge developments at the front of Monolithic Active Pixel Sensors (MAPS). These CMOS pixel sensors offer mechanical flexibility and a low power consumption, while maintaining excellent hit detection efficiency and spatial resolution. Featuring wafer-scale, stitched sensors, which are bent to form a truly cylindrical detection layers, the ITS3 concept pushes the limits in terms of detection performance, while dramatically reducing the material budget.

Introducing the novel detector concept, via the characterisation of small-scale pixel sensor prototypes produced in the 65 nm CMOS technology node, to first results of large-area, stitched sensors, milestones of the ITS3 development are presented. Here, the focus will be on the detection performance and power consumption of the prototypes as well as in-beam characterisation of large-scale sensors. Furthermore, the technique of material budget imaging is used to investigate the scattering properties of a light-weight tracking detector mock-up.

Speed talk:

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