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Simulations of the Monolithic Active Pixel Sensors for the Octopus Project

Thursday 8 May 2025 14:50 (25 minutes)

The OCTOPUS (Optimized CMOS Technology for Precision in Ultra-thin Silicon) project, part of the DRD3 collaboration, aims to simulate, develop, and evaluate fine-pixel monolithic sensors using the 65 nm TPSCo process. The project targets a spatial resolution of 3 μm, a temporal resolution below 10 ns, a material budget of 50 μm silicon, and an average power consumption below 50 mW/cm² to meet the needs of vertex detectors in future lepton colliders.
The OCTOPUS project places significant emphasis on the extensive simulation effort under Work Package 1, which aims to improve sensor layouts and dimensions. This includes simulations of standard sensor designs with different readout options and n-gap designs with small pitch and binary readout. Building on past studies of n-blanket and n-gap designs, current research also explores ways to improve deep n-implant geometry. The simulation strategy combines TCAD static simulations and high-statistics Monte Carlo simulations, both essential for refining sensor designs and improving performance.
The contribution includes the simulation results for the different pitch standard layout designs and n-gap layout designs results with varying gap sizes, as well as the optimization of the n-gap shape.

Will the talk be given in person or remotely?

In person

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