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The first prototype Monolithic Active Pixel Sensor for The OCTOPUS Project

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The First Monolithic Active Pixel Sensor Prototype for The OCTOPUS Project

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Abstract

The next generation of lepton colliders will require extremely precise vertex detectors that cannot be implemented in technologies widely used at the moment. Hence it is essential to explore novel, small feature size monolithic approaches.

The **OCTOPUS** (Optimized CMOS Technology for Precision in Ultra-thin Silicon) project, part of the **DRD3 collaboration**, unites physicists and ASIC designers across Europe pushing the technology forward. In a first stage, the project aims to develop a MAPS chip that serves as vertex detector demonstrator developed in the TPSCo 65nm CIS process. The contribution sketches the development targets and discusses the functionality and layout of the first planned prototype and evaluates the potential expected performance of the chip.

For the first prototype, we aim at a spatial resolution of $3\text{ }\mu\text{m}$, about 100 ns of timing accuracy, and an average power consumption below 500 mW/cm^2 . For the final chip, we aim to meet the needs of vertex detectors in future lepton colliders by achieving a time resolution of 5 ns and an average power consumption below 50 mW/cm^2 while maintaining a spatial resolution of $3\text{ }\mu\text{m}$.

Type of presentation (in-person/online)

in-person presentation

Type of presentation (I. scientific results or II. project proposal)

II. Presentation on project proposal

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