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Design and Performance of the IDEA Vertex Detector at FCC-ee in Full Simulation and Related R&D on Monolithic Silicon Sensors

The FCC-ee is a proposed future e^+e^- collider capable of producing an unparalleled number of Higgs, Z, and W bosons, as well as of top quarks, in very clean experimental conditions. Up to four experiments can detect the collision products, with IDEA being one of the proposed detector concepts. A plethora of measurements at the FCC-ee rely on precise and accurate measurements of bottom and charm quarks and most of the heavy-flavour program crucially depends on efficient hadron and lepton identification and precise flight distance measurements.

This contribution presents the implementation of the IDEA vertex detector in full simulation using the Key4hep and DD4hep frameworks used by all future collider communities as well as the expected detector performance.

All future e^+e^- colliders foresee to use Depleted Monolithic Active Pixel Sensors (DMAPS) in their vertex detectors. This contribution will therefore also discuss the potential of using DMAPS developed in the 65 nm TPSCo process in the context of ALICE ITS3, which features similar requirements as FCC-ee vertex detectors.

Collaboration / Activity

FCC

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