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Silicon sensor technologies for vertex and tracking detectors at future e+e- colliders

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Several proposals for future e+e- colliders are currently under study, such as CLIC, ILC, FCC-ee or CEPC. The physics goals and experimental conditions at these 'Higgs Factories' pose challenging demands on the performance of the detector systems. For the silicon-based vertex and tracking layers, a single-plane spatial resolution of a few microns is needed, combined with very thin sensors (<100 microns). Moreover, hit-time tagging with a few nanosecond resolution is required to reject beam-induced background events for some of the collider options. An even better track-timing precision well below 100 ps opens up the possibility of particle identification by time-of-flight measurements.

To address these stringent detector requirements, a broad R&D program on new silicon-sensor technologies is being pursued within various collaborative frameworks. Different hybrid technologies with innovative sensor concepts, as well as advanced monolithic depleted CMOS sensors are under study.

This lecture introduces the Higgs-Factory detector requirements and gives an overview of the R&D programme for silicon-based vertex and tracking detectors.

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