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## Silicon pixel-detector R&D for CLIC

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The physics aims at the proposed future CLIC high-energy linear e+e- collider pose challenging demands on the performance of the detector system. In particular the vertex and tracking detectors have to combine precision measurements with robustness against the expected high rates of beam-induced backgrounds. The principal challenges are: a point resolution of a few  $\mu\text{m}$ , ultra-low mass ( $\sim 0.2\%$  X0 per layer for the vertex region and  $\sim 1\%$  X0 per layer for the outer tracker), very low power dissipation (compatible with air-flow cooling in the inner vertex region) and pulsed power operation, complemented with  $\sim 10$  ns time stamping capabilities. A highly granular all-silicon vertex and tracking detector system is under development, following an integrated approach addressing simultaneously the physics requirements and engineering constraints. For the vertex-detector region, hybrid pixel detectors with small pitch (25  $\mu\text{m}$ ) and analog readout are explored. For the outer tracking region, fully integrated CMOS sensors with high-resistivity substrate are under consideration (HR-CMOS, SOI). Prototypes of readout ASICs implemented in 65 nm CMOS technology with 25  $\mu\text{m}$  pixel pitch have been produced (CLICpix and CLICpix2). Hybridisation concepts have been developed for interconnecting these chips either through capacitive coupling to active High-Voltage-CMOS sensors (CCPDv3 and C3PD) or through bump-bonding to ultra-thin planar active-edge sensors. Recent R&D achievements include results from beam tests with various hybrid assemblies as well as with technology prototypes of integrated CMOS sensors. Simulations based on Geant4 and TCAD are used to validate the experimental results and to assess and optimise the performance of various detector designs. The R&D project also includes the development of through-silicon via (TSV) technology, as well as various engineering studies involving thin mechanical structures and full-scale air-cooling tests. An overview of the R&D program for silicon detectors at CLIC will be presented.

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