

# Characterisation of HV-MAPS ATLASPix3 and its applications for future lepton colliders

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High voltage CMOS pixel sensors have been proposed in several future particle physics experiments for particle tracking. ATLASPix3 is the first full reticle size ( $2 \times 2 \text{ cm}^2$ ) Monolithic Active Pixel high voltage CMOS sensor, developed in context of the ATLAS upgrade for High Luminosity Large Hadron Collider (HL-LHC). It is designed to meet the specifications of outer layers of the ATLAS inner tracker (ITk) pixel subsystem. ATLASPix3 has been implemented in a standard 180nm HVCMOS process, containing  $132 \times 372$  pixels, each with an area of  $150 \times 50 \mu\text{m}^2$ . The readout electronics supports both triggered and triggerless readout with zero-suppression. The excellent position resolution, high readout rate (40 MHz), and high radiation tolerance make ATLASPix3 an ideal candidate for large-area tracking detector R&D of future collider experiments. It is under study for the Circular Electron Positron Collider (CEPC) silicon tracker. New versions tailored to different experiments are under development.

Results of electrical tests, sensor calibration and measurements with radioactive sources and lasers will be presented on individual chips and first multi-chip-modules. Multi-module readout architectures and large prototype demonstrator design concepts will be discussed.

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