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In-beam characterisation of bent ALPIDE MAPS in view of the ALICE Inner Tracking System 3 — •Pascal Becht for the ALICE-Collaboration — Physikalisches Institut Heidelberg University, Germany

The ALICE Inner Tracking System (ITS) has been recently upgraded to a full silicon detector based on Monolithic Active Pixel Sensors (MAPS). Prospectively, ALICE intends to replace the three innermost layers of this new ITS with a novel vertex detector. The proposed design features wafer-scale, ultra-thin, truly cylindrical MAPS. The new sensors will be thinned down to 20–40 μm, leading to an unprecedented low material budget of below 0.05 % X_0 per layer and will be arranged around the beam pipe, as close as 18 mm from the interaction point.

An extensive R&D programme is established with active participation in the BMBF funded High-D consortium for future particle detector development efforts. Investigating the feasibility of curved MAPS, already existing 50 μm-thick ALPIDE sensors were successfully bent, even below the targeted innermost radius. Their particle detection performance was assessed using electron test beams at DESY. First results from the testbeam data analysis for curved ALPIDE sensors will be presented and show that the current ALPIDE technology (180 nm) retains its properties after bending. The results show an inefficiency that is generally below 10^{-4}, independent of the beam inclination with respect to the sensor surface. This outcome proves curved MAPS to be an exciting possibility for future silicon detector designs.

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