

The novel, truly cylindrical, ultra-thin silicon detector for the ALICE Inner Tracker System

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ALICE is planning to replace its innermost tracking layers during LHC Long Shutdown 3 with a novel detector that will be as close as 18 mm to the interaction point and as thin as $<0.05\% X_0$ per layer. To achieve these figures, a wafer-scale Monolithic Active Pixel Sensor in 65 nm technology is being developed. This sensor, fabricated on 300 mm wafers, will reach dimensions of up to 280 by 94 mm. They are subsequently thinned down to values between 20-40 μm , where they become flexible and are bent into truly cylindrical half-barrels.

Following the publication of a Letter of Intent by ALICE in 2019, a very active R&D programme on bent silicon detectors has started.

This contribution will review the detector concept, the physics motivations, and lays out the R&D path. Mechanical integration tests with ultra-thin silicon wafers as well as electrical test of bent MAPS, including beam test results, will be shown and demonstrate the feasibility of this new class of tracking detectors.

TIPP2020 abstract resubmission?

Yes, this would have been presented at TIPP2020.

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