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Upgrade of the ALICE ITS in LS3

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ALICE is planning to replace its inner-most three tracking layers with a fully cylindrical, bent silicon tracker during LHC Long Shutdown 3 (LS3, targeting 2024-25). The new detector is to reach an unprecedented low material budget of below 0.05% X_0 per layer, combined with an intrinsic spatial resolution of around $2\ \mu\text{m}$ in z - and $r\phi$ -directions. Its main building part is an ultra-thin (20-40 μm), wafer-scale (300 mm) CMOS Monolithic Active Pixel Sensor, that will be developed in 65 nm technology for this purpose. The sensor dimensions reach up to 280 by 94 mm, and, owing to the flexible nature of silicon chips at these thicknesses, is bent into half-cylinders of radii of 18, 24, and 30 mm, respectively, to form the new detector barrels.

This contribution addresses the detector R&D roadmap as well as projected improvements in performance and related physics yields. The combination of reduced material budget, closer proximity to the interaction point, and higher intrinsic resolution translate into a significant advancement in the measurement of short-lived particles and low-mass di-electrons, which are amongst the main physics goals of ALICE.

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