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First results of the newly installed, MAPS based, ALICE Inner Tracking System

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During the second long shutdown of the LHC, the ALICE Inner Tracking System (ITS) has been replaced with a full-pixel detector entirely built with CMOS monolithic active pixel sensors (ITS2).

The ITS2 consists of three inner layers with 50 μm thick sensors and four outer layers with 100 μm thick sensors. The entire tracker covers 10 m^2 and includes approximately 12.5 billion pixels with a single pixel size of $27 \mu\text{m} \times 29 \mu\text{m}$.

Its increased granularity, the very low material budget (0.35% X_0 for each of the three innermost layers) as well as the small radius of the innermost layer combined with a thin beam pipe, will result in a significant improvement of impact-parameter resolution and tracking efficiency at low p_T with respect to the previous tracker.

The assembly of the full detector and services, completed in December 2019, was followed by a comprehensive on-surface commissioning campaign. The detector has been installed in the experiment in the first half of 2021. After further in-situ commissioning, both standalone and integrated with the entire ALICE experiment, the detector has seen first collisions during LHC pilot beam tests.

In this talk, results from the ITS2 commissioning with and without beam will be presented. This includes results from full detector calibration measurements, like threshold and noise performance, and from cosmic tracks and collisions, which will give a first measurement of the detector efficiency and spatial resolution.

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