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Performance of the ALICE upgraded Inner Tracking System

Major upgrades of the ALICE experiment are under way and will be completed during the LHC Long Shutdown 2 to start operation in 2022 for LHC Run 3. One key part of this upgrade is the new Inner Tracking System (ITS2), a full silicon-pixel detector constructed entirely with CMOS monolithic active pixel sensors. The upgraded ITS2 detector consists of three inner layers (50 μm thick sensors) and four outer layers (100 μm thick sensors) covering 10 m^2 and containing 12.5 billion pixels with a pixel pitch of 27 μm x 29 μm . Compared with the silicon tracking system used during the LHC Run 1 and Run 2, the increased granularity, the very low material budget (0.35% X_0 /layer in the inner barrel) as well as a smaller beam pipe radius, will result in a significant improvement of impact-parameter resolution and tracking efficiency.

The assembly of the full detector and services finished in December 2019. A comprehensive commissioning phase (on surface) was completed in December 2020, including fake-hit rate and cosmic-ray data taking, detector calibration, etc. The detector is currently being installed in the ALICE experiment, which will be followed by on-site commissioning. In this talk, the performance of the upgraded ALICE ITS2 detector, as well as the experience gained from its commissioning at the surface will be discussed in detail. Further plans for the commissioning following the detector installation at the ALICE experiment will also be outlined.

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