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Performance Measurements from Cosmic Muon Data using the Outer Barrel of the New ALICE Inner Tracking System

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The upgraded Inner Tracking System (ITS) of ALICE consists of 7 concentric layers of a custom monolithic active pixel sensor design known as ALPIDE. The ALPIDE-based detector design reduces the material budget to 0.35 % X_0 per layer for the innermost three layers (Inner Barrel), and to 1.0 % X_0 per layer for the outermost four layers (Outer Barrel), compared to 1.14 % X_0 per layer in the previous ITS. The readout rate has been improved to 100 kHz for Pb-Pb interactions, the radius of the first layer of the ITS reduced from 39 mm to 23 mm and the pixel pitch reduced to O(30 μm) $\times$ O(30 μm). These changes will improve the impact parameter resolution and tracking efficiency of heavy-flavour hadrons and dileptons at low transverse momenta, launching ALICE into the precision era of hot QCD physics.
The Outer Barrel was constructed at 10 sites around the world before being fully assembled into the intended barrel geometry and integrated into the readout electronics at CERN by the end of 2019. In the first half of 2020, the Outer Barrel underwent a series of verification tests to explore the performance of the finalised system. In the latter half of 2020, roughly 5 million cosmic muon events were measured by the Outer Barrel to further characterise the detector performance and provide a data set to be used for spatial alignment. This contribution will include a summary of the performance measurements made so far with the Outer Barrel, including a first measurement of the detector efficiency.

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