

ALICE Upgrade for Run 3 and 4 at the CERN LHC

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During the ongoing Long Shutdown of the LHC, ALICE is installing detector upgrades that will allow to collect the full 50 kHz interaction rate of the LHC, collecting 2 orders of magnitude more events than in run 1 and 2. This, together with the improved track-resolution will allow ALICE to significantly improve the precision of measurements of rare signals such as heavy flavour and di-lepton production at low p_T , where they probe the QGP at the scale of the temperature.

To cope with this challenge, ALICE is implementing new hardware and software solutions. The Time Projection Chamber (TPC) –the main ALICE tracking detector –has been refitted with the new GEM-based readout chambers and three new detectors are being installed: the Inner Tracking System (ITS), the Muon Forward Tracker (MFT) and the Fast Interaction Trigger (FIT) detector. The new silicon trackers are based on ALPIDE (ALICE Pixel Detector) –a custom designed sensor incorporating the requirements imposed by the physics program including a high-granularity and low material budget of the non-active elements. The new sensor will improve vertexing and tracking, especially at low p_T values. The use of ALPIDE by the Muon Forward Tracker will add vertexing capabilities to the Muon Spectrometer covering a broad range of transverse momenta and allowing ALICE to measure beauty down to $p_T \sim 0$ from displaced J/ψ vertices and to have an improved precision for the $\psi(2S)$ measurement. It will also add high-granularity data to the forward multiplicity information acquired by FIT. In addition to providing inputs for the new Central Trigger Processor, FIT will serve as the main luminometer, collision time, multiplicity, centrality, and reaction plane detector for the ALICE experiment.

In this presentation the main goals of the upgraded ALICE experiment and a brief status of the construction, installation and commissioning of the major ALICE detectors will be summarized. The talk will conclude with the outline of the future plans being discussed by the collaboration.

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