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Upgrade of the ALICE experiment for LHC Run 3 and beyond

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The ALICE experiment is upgraded for LHC Run 3 in order to profit from the increase in luminosity in particular for the heavy ion data taking with an expected interaction and readout rate of 50 kHz, and to improve on the tracking resolution. The upgrades comprise replacing the Inner Tracking System with a new silicon tracker using MAPS technology, including a new tracking system in the forward direction for the reconstruction of trajectories of charged particles from the primary vertex to the muon spectrometer. The readout of the upgraded TPC is based on GEM foils, to reduce ion backflow and allow for continuous data taking. A new fast interaction trigger will provide the collision trigger and serve as luminometer. In addition, several detectors have been equipped with faster readout. In order to fully exploit the potential of the new detectors, also the software framework has been adapted to the new conditions, providing a first pass reconstruction during the data taking process to compress the data. The upgrades will provide new opportunities e.g. for measurement of heavy-flavour hadrons, low-mass dileptons, quarkonia and jets with unpreceded precision, particularly in heavy-ion collisions. We present an overview of the status of the detector and software upgrades of the ALICE experiment in preparation for Run 3 and provide an outlook of the future of the ALICE experiments in later LHC runs, including a high-granularity electromagnetic and hadronic calorimeter in the forward direction (FOCAL) and further upgrades of the inner tracking system with new silicon sensor technology (ITS3).

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