

ALICE Upgrades for Run3 and Physics Projections

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The upcoming upgrade of the CERN LHC is a challenge and opportunity for ALICE (A Large Ion Collider Experiment). By sustaining a Pb–Pb readout rate of 50 kHz, ALICE will gain two orders of magnitude in statistics and conduct high-precision measurements of rare probes at low p_T values. ALICE is refitting the Time Projection Chamber with new, GEM-based readout chambers with electronics for continuous readout using the new SAMPA chip. The same chip will be utilized for the upgrade of electronics of the Muon Arm. To improve vertexing and tracking, especially at low p_T values, a new Inner Tracking System is being constructed based on ALIPIDE (ALICE Pixel Detector)—a custom designed sensor incorporating the specific requirements imposed by the physics program, including a high-granularity and low material budget of the non-active elements. ALIPIDE is also used by the Muon Forward Tracker intended to add vertexing capabilities to the Muon Spectrometer over a broad range of transverse momenta 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 the new Fast Interaction Trigger. The TOF and TRD will get new readout electronics while PHOS, EMCAL, CPV, and HMPID will improve the readout rates with the existing electronics. The O2 system will offer new computing facility with online tracking and data compression.

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