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New ALICE detectors for Run 3 and 4 at the CERN LHC

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During Run 3 and 4 ALICE (A Large Ion Collider Experiment) will gain two orders of magnitude in the statistics over the combined data collected during Run 1 and Run 2 at the LHC. ALICE will also conduct high-precision measurements of rare probes over a broad range of transverse momenta with particular focus on low signal-to-background probes at low pT values. To achieve that goal a sustained Pb-Pb readout rate of up to 50 kHz must be maintained while operating either continuously or with a minimum bias trigger. To cope with that challenge, ALICE is implementing new hardware and software solutions. In particular, 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 trackers are based on ALIPIDE (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 pT values. The use of ALIPIDE 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 pT˜0 from displaced J/Psi 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.

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