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Fast Interaction Trigger for ALICE Upgrade

ALICE has entered Global Commissioning –the final phase of a three-year upgrade period before the April 2022 start of the LHC Run 3. One of the challenges is two orders of magnitude higher data rate than in the LHC Run 2. To cope with it, all ALICE sub-detectors and systems, especially the readout, have been upgraded. While many upgraded ALICE detectors operate in a continuous readout mode (ITS, MFT, ZDC, TOF, MCH, MID, TPC), some of them (TRD, CPV, HMPID, EMCAL, DCAL, PHOS) require a fast trigger provided by the new Fast Interaction Trigger (FIT) system. FIT triggers are delivered to the Central Trigger Processor less than 425 ns after the collision. Since half of that time comes from cable delay, the trigger hardware and firmware complete signal digitisation and evaluation in just over 200 ns. FIT incorporates three different detector technologies: FT0 (two Cherenkov arrays), FV0 (large, segmented scintillator ring with a novel light collection system), and FDD (two double-layered scintillator plates with fast wavelength shifting bars). All the FIT detectors are at high rapidity to sample unbiased collision multiplicity. In addition to the required triggers, FIT will deliver instantaneous luminosity feedback to the LHC, provide a start for Time-Of-Flight particle identification, reconstruct forward particle multiplicity, centrality, reaction plane, and provide essential data for diffractive physics measurements.

Primary experiment

ALICE

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