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Using LHC real-time information for ALICE FT0 Operation during Run 3

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The LHC Run 3 concluded in June 2026. Over nearly four years of operation, the ALICE experiment [1] collected $\sim$150 pb^{-1} of pp and $\sim$6.9 nb^{-1} of the first Pb−Pb collisions data, exceeding the cumulative dataset from previous Run 1 and Run 2. This period was also remarkable for the new light-ion program, featuring the first Ne−Ne and O−O collisions at the LHC.

Two of the new ALICE detectors, Inner Tracking System (ITS) and FT0 – a Cherenkov detector within the Fast Interaction Trigger (FIT) [2] system – have become essential for data taking. Both are widely used for event selection, particularly based on the vertex position in recent Run 3 analysis. Moreover, the FT0 data is a source for multiplicity classification in pp collisions and centrality classification in various ion collision systems. In addition, the FT0 serves as the primary ALICE luminometer in pp collisions and the machine background intensity estimator for the ALICE experiment. These capabilities of the FT0 detector are enabled by the high performance of the front-end electronics and its integration with the FIT Detector Control System (DCS) [3], which allows for the correction of trigger counts based on the LHC filling scheme.

This talk is devoted to the integration of the LHC interface signals with FT0 DCS. This connection enabled the Run 3 instantaneous luminosity measurement, online background estimator and other automated algorithms, ultimately contributing to the excellent performance of the FT0.

References

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