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ALICE FIT data processing and performance during LHC Run3

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During the upcoming Run 3 and Run 4 at the LHC the upgraded ALICE (A Large Ion Collider Experiment) will operate at a significantly increased luminosity and bunch crossing and will collect two orders of magnitude more events than in Run 1 and Run 2. A part of the ALICE upgrade is the new Fast Interaction Trigger (FIT) [1]. This thoroughly redesigned detector combines, in one system, the functionality of four forward detectors used by the ALICE experiment during the LHC Run 2: T0, V0, FMD and AD. As part of the online functionality, FIT will monitor luminosity and background, provide real-time feedback to the LHC, and generate minimum bias, vertex and centrality triggers. During the offline analysis FIT data will be used to extract the precise collision time needed for time-of-flight particle identification. During the heavy-ion collisions, FIT will also determine multiplicity, centrality and event plane. FIT electronics is designed to function both in the continuous and the triggered readout mode.

In this presentation I will describe the FIT simulation software and raw data processing. The focus will be on the detector performance, especially, triggers efficiencies, collision time and centrality resolution.

References

[1] W. H. Trzaska. New Fast Interaction Trigger for ALICE. Nucl. Instrum. Methods Phys. Res. A, 845:463–466, 2017. 10.1016/j.nima.2016.06.029.

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