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Hight Granularity Timing Detector (HGTD)

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The large increase of pile-up interactions is one of the main experimental challenge for HL-LHC physics program. Covering the pseudo-rapidity region between 2.4 and 4.0, the Hight Granularity Timing Detector (HGTD) is therefore proposed for the ATLAS Phase-II upgrade. Using the ability to distinguish between interactions within an event at different ⬚ positions or time by high-precision timing information, HGTD is powerful to mitigate the effect of pile-up. One crucial element for this mitigation is to know the t0 of each of the 3.6 million channels, where t0 is the time of particles created at ⬚ =0. This is important to achieve the expected time resolution which expected to be around 15 ps, coming mainly from electronic jitters and geometrical effects, e.g. time of flight. These effects must be moderated and calibrated to minimised their contributions to time resolution. A calibration framework for time calibration is developed. In this presentation, we discuss in details the time calibration methodology and its performances using dedicated studies.

Language

English

Field

Experimental Physics, ATLAS detector, HGTD, HL-LHC

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