38th INTERNATIONAL CONFERENCE ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **799** Type: **Poster**

The design and performance of the ATLAS Inner Detector trigger for Run 2 LHC Collisions at 13 TeV

Saturday 6 August 2016 18:00 (2 hours)

LHC Run 2 presents challenging high rate conditions for data analysis and processing within the ATLAS trigger systems. The ATLAS Inner Detector (ID) trigger implements the algorithms used for identification of tracks in nearly all physics signatures within the ATLAS trigger. The ID trigger was updated and redesigned during the 2013-2015 long shutdown to meet the challenging conditions of Run 2. As well, for Run 2 a new pixel detector layer was added in very close proximity to the beam pipe, which enhances the ID Trigger performance. The redesigned ID trigger algorithms for Run 2 are described, illustrating the significant improvements gained by the new tracking strategies adopted to deal with the increased rate. Performance of the ID trigger in Run 2 is shown in terms of algorithm timing, efficiency and resolution, using data collected by ATLAS in Run 2. The ID trigger continues to show excellent performance, with efficiencies greater than 99%, and track reconstruction times well within the required latency budget.

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Session Classification: Poster Session

Track Classification: Detector: R&D and Performance