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A fast simulation to evaluate the impact of tracking performance on multi-(b)jet and multi-lepton triggers at HL-LHC

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The High Luminosity-Large Hadron Collider is expected to start in 2027 and to provide an integrated luminosity of 3000 fb⁻¹ in ten year, a factor 10 more than what will be collected by 2021. This high statistics will allow to perform precise measurements in the Higgs sector and improve searches of new physics at the TeV scale. The luminosity needed is $L \sim 7.5 \cdot 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$, corresponding to ~200 additional proton-proton pile-up interactions, which will increase the rates at each level of the trigger and degrade the reconstruction performances.

To face such harsh environment some sub-detectors of the ATLAS experiment will be upgraded or completely substituted and the DAQ system will be upgraded.

In this poster a fast-simulation framework developed to study the impact of the tracking resolution and acceptance on multi-(b)jet and multi-leptons triggers at the HL-LHC will be shown, as well as the resulting performance on the above triggers on the HH->4b channel.

Collaboration

The ATLAS Collaboration

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