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The Fast Simulation Chain in the ATLAS experiment

The ATLAS experiment at the Large Hadron Collider (LHC) relies heavily on simulated data, requiring the production of billions of Monte Carlo (MC)-based proton-proton collisions for every run period. As such, the simulation of collisions (events) is the single biggest CPU resource consumer for the experiment. ATLAS's finite computing resources are at odds with the expected conditions during the High Luminosity LHC era, where the increase in the instantaneous luminosity will result in higher particle multiplicities and a roughly five-fold increase in the number of interactions per bunch-crossing with respect to LHC Run-2. This talk will discuss the significant effort within the collaboration to increase the rate at which MC events can be produced by designing and developing fast alternatives to the algorithms used in the standard MC production chain.

Significance

The talk will cover novel fast pile-up simulation techniques, which rely on overlay of digitized events or on overlay of reconstructed tracks. It will also discuss new hadronic interaction model of the parametric simulation of the tracking detector, and performance improvement of the parametric silicon digitization, both expected to enter use for ATLAS physics within the next year.

References

vCHEP2021 contribution:
https://indico.cern.ch/event/948465/contributions/4324132/

Speaker time zone

Compatible with Europe

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