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Faster simulated track reconstruction in the ATLAS Fast Chain

Monday 24 October 2022 16:10 (30 minutes)

The production of simulated datasets for use by physics analyses consumes a large fraction of ATLAS computing resources, a problem that will only get worse as increases in the instantaneous luminosity provided by the LHC lead to more collisions per bunch crossing (pile-up). One of the more resource-intensive steps in the Monte Carlo production is reconstructing the tracks in the ATLAS Inner Detector (ID), which takes up about 60% of the total detector reconstruction time [1]. This talk discusses a novel technique called track overlay, which substantially speeds up the ID reconstruction. In track overlay the pile-up ID tracks are reconstructed ahead of time and overlaid onto the ID tracks from the simulated hard-scatter event. We present our implementation of this track overlay approach as part of the ATLAS Fast Chain simulation, as well as a method for deciding in which cases it is possible to use track overlay in the reconstruction of simulated data without performance degradation.

[1] ATL-PHYS-PUB-2021-012 (60% refers to Run3, mu=50, including large-radius tracking, p11)

Experiment context, if any

ATLAS

References

Significance

This presentation covers a new method of speeding up the reconstruction of simulated data in ATLAS that will become necessary with the high luminosities of the HL-LHC.

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Session Classification: Poster session with coffee break