Contribution ID: **128** Type: **Oral**

Development and performance of track reconstruction algorithms at the energy frontier with the ATLAS detector

Wednesday, October 12, 2016 12:15 PM (15 minutes)

ATLAS track reconstruction code is continuously evolving to match the demands from the increasing instantaneous luminosity of LHC, as well as the increased centre-of-mass energy. With the increase in energy, events with dense environments, e.g. the cores of jets or boosted tau leptons, become much more abundant. These environments are characterised by charged particle separations on the order of ATLAS inner detector sensor dimensions and are created by the decay of boosted objects. Significant upgrades were made to the track reconstruction code to cope with the expected conditions during LHC Run 2. In particular, new algorithms targeting dense environments were developed. These changes lead to a substantial reduction of reconstruction time while at the same time improving physics performance. The employed methods are presented and the prospects for future applications are discussed. In addition, physics performance studies are shown, e.g. a measurement of the fraction of lost tracks in jets with high transverse momentum.

Secondary Keyword (Optional)

Algorithms

Primary Keyword (Mandatory)

Reconstruction

Tertiary Keyword (Optional)

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Session Classification: Track 2: Offline Computing

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