

Contribution ID: 4

Type: Oral

Improving jet substructure performance in ATLAS with unified tracking and calorimeter inputs

Wednesday 21 March 2018 10:00 (25 minutes)

Jet substructure techniques play a critical role in ATLAS in searches for new physics, and are being utilized in the trigger. They become increasingly important in detailed studies of the Standard Model, among them the inclusive search for the Higgs boson produced with high transverse momentum decaying to a bottomantibottom quark pair. To date, ATLAS has mostly focused on the use of calorimeter-based jet substructure, which works well for jets initiated by particles with low to moderate boost, but which lacks the angular resolution needed to resolve the desired substructure in the highly-boosted regime.

We will present a novel approach designed to mitigate the calorimeter angular resolution limitations, thus providing superior performance to prior methods. Similar to previous methods, the superior angular resolution of the tracker is combined with information from the calorimeters. However, the new method is fundamentally different, as it correlates low-level objects as tracks and individual energy deposits in the calorimeter, before running any jet finding algorithms. The resulting objects are used as inputs to jet reconstruction, and in turn result in improved resolution for both jet mass and substructure variables. It will be discussed how these jets could prove to be robust against pile-up due to the pile-up rejection capabilities of the tracker.

Author: JANSKY, Roland (Universite de Geneve (CH))

Co-authors: ATLAS; STYLES, Nicholas (Deutsches Elektronen-Synchrotron (DE)); DANNINGER, Matthias (University of British Columbia (CA)); CALACE, Noemi (Universite de Geneve (CH)); SCHRAMM, Steven (Universite de Geneve (CH))

Presenter: CALACE, Noemi (Universite de Geneve (CH))

Session Classification: Session3

Track Classification: 5: Advanced usage of tracks