Contribution ID: **112** Type: **not specified**

Transformer networks for constituent-based b-jet calibration with the ATLAS detector

Tuesday 5 November 2024 09:20 (20 minutes)

The precise measurement of kinematic features of jets is key to the physics program of the LHC. The determination of the energy and mass of jets containing bottom quarks -jets is particularly difficult given their distinct radiation patterns and production of undetectable neutrinos via leptonic heavy flavor decays. This talk will describe a novel calibration technique for the b-jet kinematics using transformer-based neural networks trained on simulation samples. Separate simulation-based regression methods have been developed to estimate the transverse momentum of small-radius jets and the transverse momentum and mass of large-radius jets. In both cases, the medians of reconstructed jet properties are corrected to the true value across a range of jet features. A relative jet energy resolution improvement with respect to the nominal calibration between 18% and 31% is demonstrated for small-radius jets. Both the large-radius jet transverse momentum and mass resolution are shown to improve by 25–35%. These methods improve meaningfully upon simulation-based b-jet correction strategies previously used in ATLAS.

Track

Presenter: BULLARD, Brendon (SLAC National Accelerator Laboratory (US))

Session Classification: Reconstruction