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

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. These algorithms improve the mass resolution of heavy particle decays to b-jets by 30% (15%) in resolved (boosted) decays. The talk will finish with an outlook of the calibration strategy.

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