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Measuring jet substructure observables at the ATLAS Experiment

Jet substructure observables have significantly extended the search program for physics beyond the Standard Model at the Large Hadron Collider. The state-of-the-art tools have been motivated by theoretical calculations, but there has never been a direct comparison between data and calculations of jet substructure observables that are accurate beyond leading-logarithm approximation. Such observables are significant not only for probing the collinear regime of QCD that is largely unexplored at a hadron collider, but also for improving the understanding of jet substructure properties that are used in many studies at the Large Hadron Collider. The ATLAS collaboration has recently performed several measurements of precision jet substructure at 13 TeV that will significantly extend our understanding of both the perturbative and non-perturbative aspects of jet formation. These measurements of jet mass in various topologies as well as other properties of jet fragmentation such as charged-particle multiplicity and the properties of gluon splitting to bottom quarks are unfolded to correct for detector effects and compared with a variety of predictions.

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