Performance of b-jet identification in the ATLAS experiment

Abstract

The identification of jets containing b hadrons is important for the physics programme of the ATLAS experiment at the Large Hadron Collider. Several algorithms to identify jets containing b hadrons are described, ranging from those based on the reconstruction of an inclusive secondary vertex or the presence of tracks with large impact parameters to combined tagging algorithms making use of multi-variate discriminants. An independent b-tagging algorithm based on the reconstruction of muons inside jets as well as the b-tagging algorithm used in the online trigger are also presented. The b-jet tagging efficiency, the c-jet tagging efficiency and the mistag rate for light flavour jets in data have been measured with a number of complementary methods. The calibration results are presented as scale factors defined as the ratio of the efficiency (or mistag rate) in data to that in simulation. In the case of b jets, where more than one calibration method exists, the results from the various analyses have been combined taking into account the statistical correlation as well as the correlation of the sources of systematic uncertainty..