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B-tagging Calibration Bias Using Semileptonic Jets

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The ATLAS experiment has several algorithms which are used to identify b-jets. In this talk I concentrate on the so-called “MV1” b-tagging algorithm, which includes information on displaced secondary vertices and the impact parameters of tracks as inputs into a Neural Network. To calibrate this b-tagging algorithm we test how well it works on b-jets in simulation and then compare this with its performance on b-jets in data.

This calibration is performed on two types of b-jets, those that decay to a soft muon and neutrino, and those that do not. A ratio of performance in simulation and data is calculated to give a scale factor for each type of b-jet. A further comparison between the scale factors of the two types b-jet is provided in order to see if performing the calibration on b-jets that decay to a soft muon causes a bias. The calibration is performed on events with exactly two opposite sign leptons, two good jets, and large missing energy or large combined lepton plus jets transverse energy. This event selection provides a top pair enriched sample, which due to the large branching ratio of top quarks to b-quarks, also provides a sample enriched in b-jets.

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