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Calibration of the light jet mistag rate of the ATLAS b-tagger using Z + jets events

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Many analyses in ATLAS rely on the identification of jets containing b-hadrons (b-jets). The corresponding algorithms are referred to as b-taggers. A deep neural network based b-tagger, DL1r, has been widely used in ATLAS Run 2 physics analyses. Its performance needs to be measured in data to correct the simulation. In particular, the measurement of the mis-tag rate for light jets is extremely challenging given the very powerful light jet rejection of DL1r. Therefore, the so-called “negative tag method” was developed which relies on a modified tagger, designed to decrease the b-jet efficiency while retaining the same light jet response. This work presents the recently published light jet mis-tag rate measurement in Z + jets events using 139 fb^-1 of data from pp collisions at sqrt{s} = 13 TeV, collected with the ATLAS detector. The
precision is greatly improved compared to the previous iteration thanks to improved inner detector modeling and more sophisticated systematic uncertainty evaluations. This work has been widely applied in ATLAS Run 2 physics analyses.

In-person participation

Yes

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