



Contribution ID: 20

Type: not specified

The total and differential cross sections for the production of a Z boson decaying to two charged leptons in association with N-jets

Wednesday 21 November 2018 10:50 (25 minutes)

The total and differential cross sections for the production of a Z boson decaying to two charged leptons in association with N jets in proton-proton collisions at a center-of-mass energy of 13 TeV are measured for different jet multiplicities. The differential cross sections are obtained as functions of the transverse momentum of the Z boson, of the jet multiplicity, of the jet kinematic variables, transverse momentum and rapidity, the scalar sum of the jet momenta, which quantifies the hadronic activity, and of the balance in transverse momentum between the reconstructed jet recoil and the Z boson. The measurements are compared with predictions from four different calculations: a multileg leading-order and a multileg next-to-leading-order calculations including parton showering, a fixed order calculation with next-to-next-to-leading-order accuracy for the process with one parton in the final state and a combination of the fully-differential next-to-next-leading-order calculation with next-to-next-leading-log resummation. We discuss the low transverse momentum of the Z boson where the models with different treatment of soft gluon resummation can be studied.

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Session Classification: Wednesday