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Highlights from Standard Model precision measurements in ATLAS

Thursday, July 20, 2023 10:00 AM (30 minutes)

Precision measurements using the leptonic decays of W and Z boson at the LHC are used to determine the fundamental parameters of the Standard Model. In this talk, extraordinarily precise double-differential measurement of the Z boson production in the full phase space of the decay leptons at a centre-of-mass energy of 8 TeV will be presented. The recoil of the Z-boson is sensitive to quark and gluon emissions and is used to determine the strong coupling constant in a novel approach. Moreover, the transverse momentum of the W and Z boson measured from the hadronic recoil at 5 and 13 TeV are discussed. The results are compared to state-of-the-art predictions at third-order accuracy in perturbative QCD, supplemented by resummation of logarithmically-enhanced contributions in the small transverse-momentum region of the lepton pairs (N3LO+N4LL). The measurements are a critical input for the measurement of electroweak parameters such as the W boson mass, of which an updated measurement at 7 TeV is discussed. Use of a profile-likelihood fit technique allows to improve the precision by fully exploiting the information present in data. Finally, a very precise measurement of diboson production is presented using WW->lvlv decays. The measurement is performed in a jet-inclusive phase space and compared to a variety of state-of-the art theoretical predictions. The measurement is very sensitive to the SU(2)xU(1) gauge structure of the electroweak theory and the consistency of theory and data are quantified in an Effective Field Theory interpretation.

Is this abstract from experiment?

Yes

Name of experiment and experimental site

ATLAS

Is the speaker for that presentation defined?

No

Details

N/A

Internet talk

Maybe

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