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Precision W and Z measurements at ATLAS

Monday 8 May 2023 15:00 (15 minutes)

Precision measurements of the production cross-sections of W/Z boson at LHC provide important tests of perturbative QCD, information about the parton distribution functions for quarks within the proton and fundamental parameters of the Standard Model. Extremely precise double-differential measurement of Z transverse momentum and rapidity at centre-of-mass energy of 8 TeV will be presented. This measurement is used to extract the coupling constant of the strong interactions using 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. In addition, the W mass is determined with a profile-likelihood fit technique which allows improvements in the precision of the mass determination by fully exploiting the information present in the 7 TeV proton-proton data. Finally, the measurement of the W, Z, ttbar cross section and their ratios at the centre-of-mass energy of 13.6 TeV using early Run3 data will be shown.

Author: BEAUCHEMIN, Pierre-Hugues (ATLAS)

Presenter: BEAUCHEMIN, Pierre-Hugues (ATLAS)

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