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Vector boson production and associated vector boson production with heavy flavors in ATLAS

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Summary

Vector boson production in p-p collisions in LHC Run-1 has been extensively studied at the LHC. Charged and neutral current Drell-Yan cross sections are sensitive to the parton distribution functions of the proton and electroweak corrections. The measurements of the neutral current Drell-Yan process in three distinct kinematic regions, i.e. at the Z boson mass peak, below and above, are performed. The results are compared to NLO Monte Carlo simulations and to NNLO QCD predictions corrected for NLO EW effects calculated using various parameterizations of the parton distribution functions.
Measurement of the transverse momentum of the Z boson is sensitive to soft resummation effects for small momentum transfers and to multiple hard jet emissions for large momentum transfers, probing QCD in a unique way. The data are used to tune next-to-leading order plus parton shower Monte Carlo simulations. An overview of these results is given.

Measurement of W+c production cross section at ATLAS 7 TeV has a unique sensitivity to the strange-quark density, which is poorly known at low x. W or Z boson production in association with b-quark jets, on the other hand, probes the b-quark density in the proton and the b-quark production by high-order QCD processes. The experimental results are compared to leading-order and next-to-leading-order QCD calculations and various parton density predictions.

Primary author: ATLAS, TBA

Presenter: LEVTCHENKO, Mikhail (PNPI, St.-Petersburg)

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