Contribution ID : **170** Type : **Oral talk**

NNLO QCD predictions of charge asymmetry distributions for inclusive W-boson hadroproduction

Wednesday, 30 November 2022 11:00 (15)

Higher-order QCD predictions of charge asymmetry distributions are presented for inclusive W±+X⟶l±ν+X production in proton-proton (pp) collisions at 8, 13, and 14 TeV center-of-mass energies. The W boson or the decay lepton charge asymmetries constitute a direct probe of the relative u and d quark distributions in the proton as functions of the initial-state parton momentum fractions. The predictions for the charge asymmetry distributions are acquired at next-to-next-to-leading order (NNLO) accuracy in the perturbative QCD domain, exploiting several parton distribution function (PDF) models. The predicted lepton charge asymmetry distributions are justified with the 8 TeV measurements by the LHC experiments in both central and forward acceptance regions of the lepton pseudorapidities 0≤η|≤2.4 and 2.0≤η|≤4.25, and are provided thoroughly for both the regions at 13 and 14 TeV pp collisions energies. Additionally, the impact of various lepton transverse momentum plT thresholds on the lepton (or the W boson) charge asymmetry predictions at NNLO accuracy are presented in the fiducial region encompassing both central and forward detector acceptances of the lepton pseudorapidity 0≤η|≤4.5. The lepton and W boson charge asymmetry distributions are assessed to be in close correlation with the plT threshold, where the distributions are particularly observed to be more correlated at a higher-plT threshold. The W boson asymmetry distribution as a function of the W boson transverse momentum pWT is also presented with improved accuracy by matching the NNLO predictions to resummed logarithmic corrections. Overall, the predicted results represent a substantial contribution in the context of the high-precision phenomenological studies.

Primary author(s) : OCALAN, Kadir (Necmettin Erbakan University, Konya, Turkey)

Presenter(s) : OCALAN, Kadir (Necmettin Erbakan University, Konya, Turkey)

Session Classification : High Energy Physics: Theory

Track Classification : High energy physics: theory