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Probing perturbative QCD using electroweak bosons at the ATLAS detector

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The production of prompt isolated photons, W-bosons and Z-bosons in proton-proton collisions provides a stringent test of perturbative QCD and yields important information about the parton distribution functions (PDFs) for quarks within the proton. In this talk, we present precision measurements of these final states across four different proton-proton centre-of-mass energies using data collected by the ATLAS experiment. The measurements are compared with (next-to-)next-to-leading-order QCD cross-section calculations and different parton distribution functions. Measurements of the isolated-photon plus two jets and the inclusive isolated-photons cross sections at $\sqrt{s}=13$ TeV are presented, along with the ratio of photon cross sections at $\sqrt{s}=8$ and $\sqrt{s}=13$ TeV. The results are compared with state-of-the-art theory predictions, indicating several interesting discrepancies. We report measurements of fiducial integrated and differential cross sections for inclusive W^+ , W^- and Z boson production at $\sqrt{s}=2.76$ and $\sqrt{s}=5.02$ TeV. Measurements of the W^+ and W^- cross sections at $\sqrt{s} = 8$ TeV, in bins of the absolute lepton rapidity, and the associated charge asymmetry are also presented. Finally, a measurement of Z+jet production at $\sqrt{s} = 8$ TeV is also presented.

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