



Erratum to: Measurements of W and Z boson production in pp collisions at $\sqrt{s} = 5.02$ TeV with the ATLAS detector

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It has been found that the theoretical predictions for W and Z boson cross sections, and for the W boson charge asymmetry, which are labelled as NNPDF3.1 [1] have in fact been calculated using the NNPDF3.0 PDF set [2] instead. The reported experimental results are not affected.

The corrected versions of Figs. 11, 12 and 13 of the paper are presented below.

The corrected text discussing the comparison of predicted cross sections to data in Sect. 9.2 of the paper should read:

A comparison of the differential cross sections shows that the predictions obtained with the NNPDF3.1 PDF set are in good agreement with the measured values, mainly because the NNPDF3.1 global fit includes high precision LHC measurements of W/Z boson production [3,4]. On the other hand, the predictions obtained with other recent PDF sets systematically deviate from the measured values.

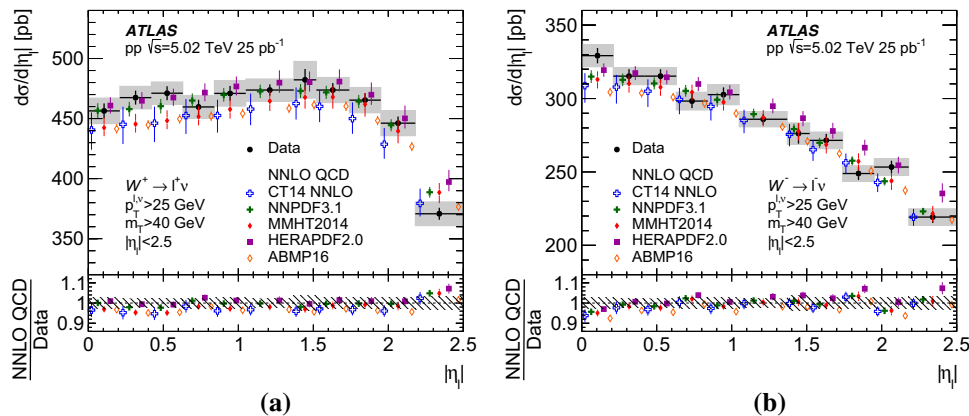


Fig. 11 Differential cross sections for **a** W^+ and **b** W^- boson production as a function of absolute decay lepton pseudorapidity compared with theoretical predictions. Statistical and systematic errors are shown as corresponding bars and shaded bands on the data points. The luminosity uncertainty is not included. Only the dominant uncertainty (PDF)

is displayed for the theory. The lower panel shows the ratio of predictions to the measured differential cross section in each bin, and the shaded band shows the sum in quadrature of statistical and systematic uncertainties of the data

The original article can be found online at <https://doi.org/10.1140/epjc/s10052-019-6622-x>.

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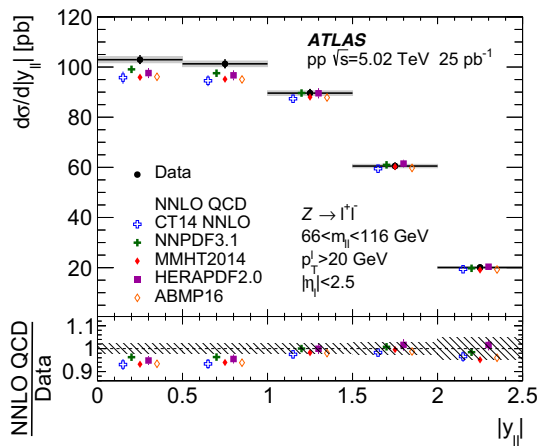


Fig. 12 Differential cross section for Z boson production as a function of absolute lepton-pair rapidity compared with theoretical predictions. Statistical and systematic errors are shown as corresponding bars and shaded bands on the data points. The luminosity uncertainty is not included. Only the dominant uncertainty (PDF) is displayed for the theory. The lower panel shows the ratio of predictions to the measured differential cross section in each bin, and the shaded band shows the sum in quadrature of statistical and systematic uncertainties of the data

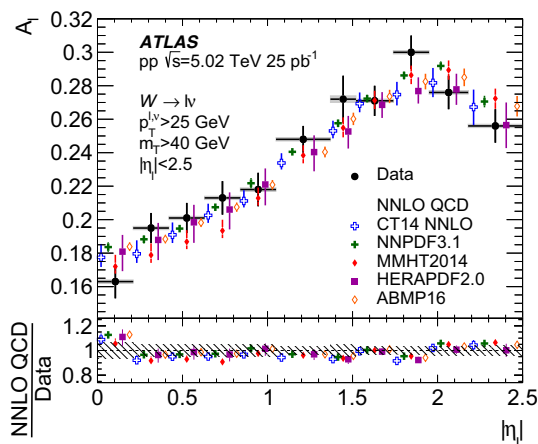


Fig. 13 Charge asymmetry for W bosons as a function of absolute decay lepton pseudorapidity compared with theoretical predictions. Statistical and systematic errors are shown as corresponding bars and shaded bands on the data points. Only the dominant uncertainty (PDF) is displayed for the theory. The lower panel shows the ratio of predictions to the measured differential cross section in each bin, and the shaded band shows the sum in quadrature of statistical and systematic uncertainties of the data

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References

1. R.D. Ball et al., Parton distributions from high-precision collider data. *Eur. Phys. J. C* **77**, 663 (2017). [arXiv:1706.00428](https://arxiv.org/abs/1706.00428) [hep-ph]
2. R.D. Ball et al., Parton distributions for the LHC Run II. *JHEP* **04**, 040 (2015). [arXiv:1410.8849](https://arxiv.org/abs/1410.8849) [hep-ph]
3. ATLAS Collaboration, Precision measurement and interpretation of inclusive W^+ , W^- and Z/γ^* production cross sections with the ATLAS detector. *Eur. Phys. J. C* **77**, 367 (2017). [arXiv:1612.03016](https://arxiv.org/abs/1612.03016) [hep-ex]
4. CMS Collaboration, Measurement of the differential cross section and charge asymmetry for inclusive $pp \rightarrow W^\pm + X$ production at $\sqrt{s} = 8$ TeV. *Eur. Phys. J. C* **76**, 469 (2016). [arXiv:1603.01803](https://arxiv.org/abs/1603.01803) [hep-ex]

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Bortoletto¹³², V. Bortolotto^{71a,71b}, D. Boscherini^{23b}, M. Bosman¹⁴, J. D. Bossio Sola³⁰, K. Bouaouda^{34a}, J. Boudreau¹³⁶, E. V. Bouhova-Thacker⁸⁷, D. Boumediene³⁷, C. Bourdarios¹²⁹, S. K. Boutle⁵⁵, A. Boveia¹²³, J. Boyd³⁵, D. Boye^{32b}, I. R. Boyko⁷⁷, A. J. Bozson⁹¹, J. Bracinik²¹, N. Brahimi⁹⁹, A. Brandt⁸, G. Brandt¹⁷⁹, O. Brandt^{59a}, F. Braren⁴⁴, U. Bratzler¹⁶¹, B. Brau¹⁰⁰, J. E. Brau¹²⁸, W. D. Breaden Madden⁵⁵, K. Brendlinger⁴⁴, L. Brenner⁴⁴, R. Brenner¹⁶⁹, S. Bressler¹⁷⁷, B. Brickwedde⁹⁷, D. L. Briglin²¹, D. Britton⁵⁵, D. Britzger^{59b}, I. Brock²⁴, R. Brock¹⁰⁴, G. Brooijmans³⁸, T. Brooks⁹¹, W. K. Brooks^{144b}, E. Brost¹¹⁹, J. H. Broughton²¹, P. A. Bruckman de Renstrom⁸², D. Bruncko^{28b}, A. Bruni^{23b}, G. Bruni^{23b}, L. S. Bruni¹¹⁸, S. Bruno^{71a,71b}, B. H. Brunt³¹, M. Bruschi^{23b}, N. Bruscinò¹³⁶, P. Bryant³⁶, L. Bryngemark⁴⁴, T. Buanes¹⁷, Q. Buat³⁵, P. Buchholz¹⁴⁸, A. G. Buckley⁵⁵, I. A. Budagov⁷⁷, M. K. Bugge¹³¹, F. Bühner⁵⁰, O. Bulekov¹¹⁰, D. Bullock⁸, T. J. 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