

Vector Boson Production in Pb-Pb collisions at the LHC

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Z Boson Rapidity

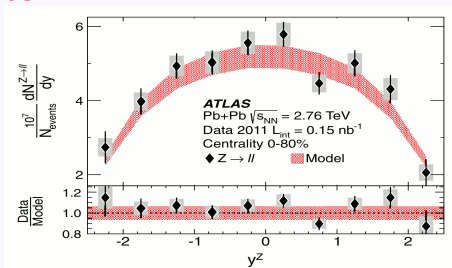
- In January of 2013 ATLAS published the results of their Z boson production study in Pb-Pb collisions at 2.76 TeV .
- 1995 candidate events were analyzed with proton PDFs and no deviation from the predictions for rapidity distributions was observed. We agree with this conclusion.

(arXiv:hep-ex:1210.6486v1)

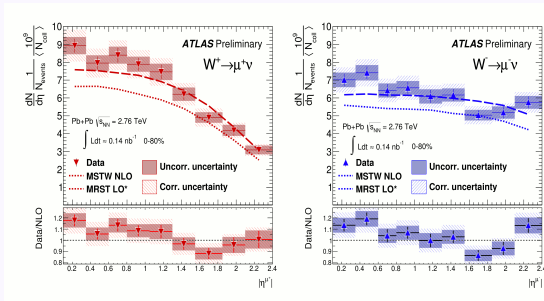
- Our analysis of vector bosons production using the nCTEQ nuclear PDFs shows significant shape changes to the rapidity distributions.
- We expect that with more data, deviations from the proton predictions due to nuclear corrections will be observed.



ATLAS Results

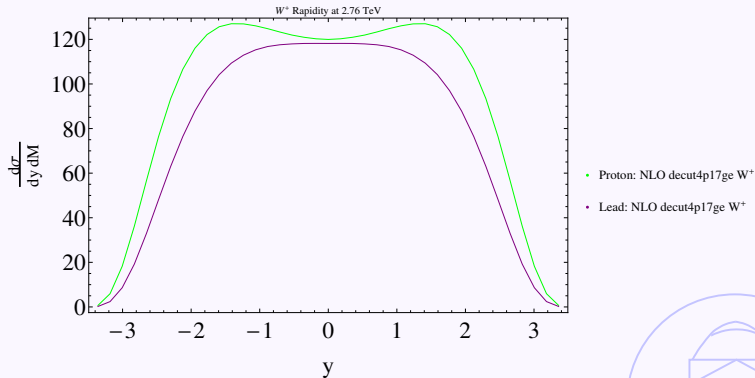


(arXiv:hep-ex:1210.6486v1)

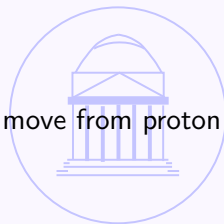


(ATLAS Col, ATLAS-CONF-20130106)

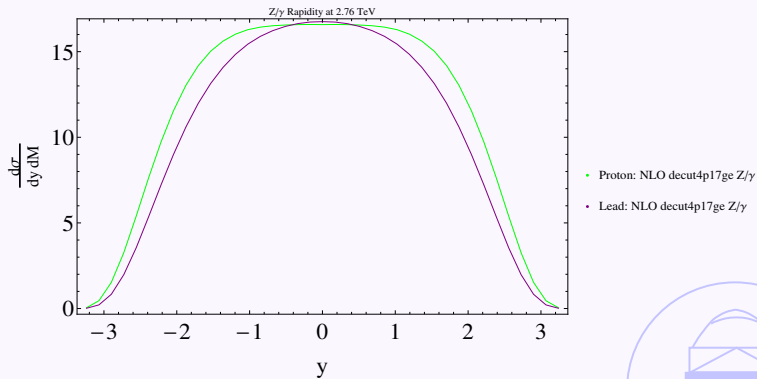
Rapidity Distributions



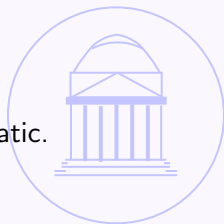
The W^+ rapidity shows a dramatic shape change as we move from proton to lead.



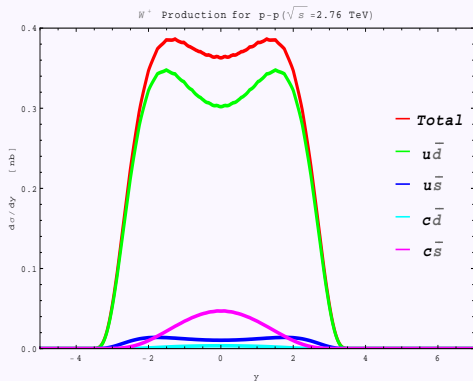
Rapidity Distributions



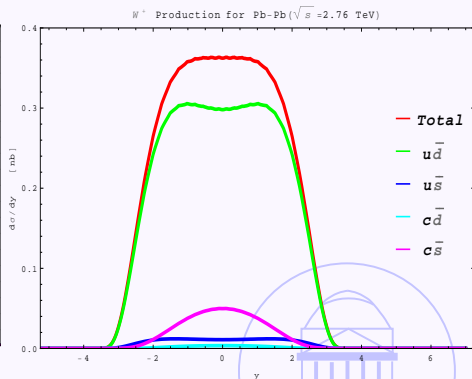
The change in the Z Rapidity is less dramatic.



Flavor Contributions for W^+



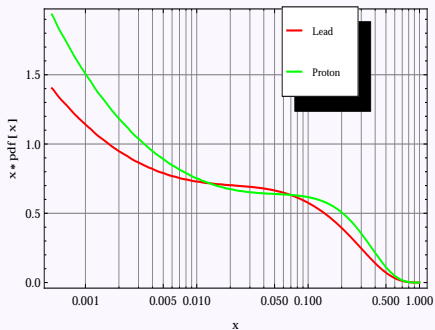
p-p Interaction



Pb-Pb Interaction

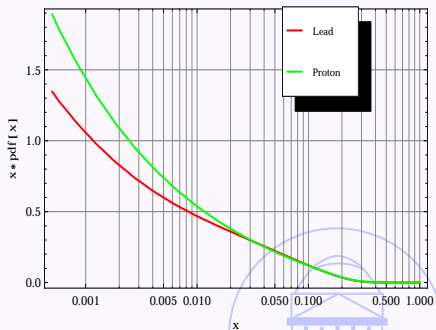
PDFs

up



$$x * u(x, Q)$$

d̄bar



$$x * \bar{d}(x, Q)$$

Conclusions

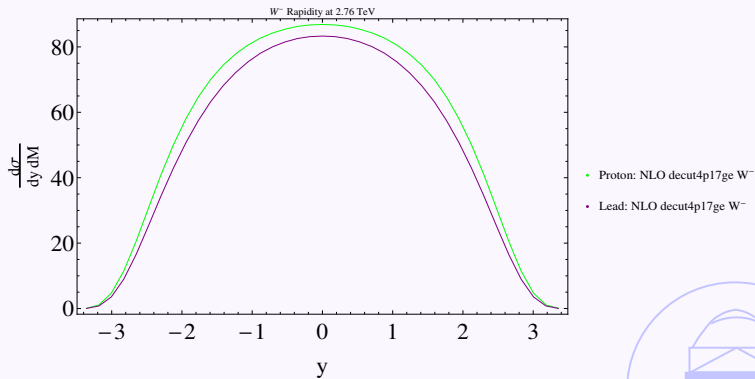
- Nuclear corrections to PDFs can significantly modify measurements of vector boson rapidities.
- We have removed the effect due to the approximate isospin symmetry of the lead nucleus.
- Error analysis for the Pb predictions is in progress.



Backup Slides



Rapidity Distributions

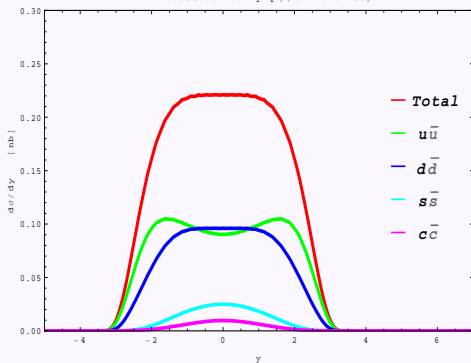


The W^- rapidity shows no shape change as we move from proton to lead.



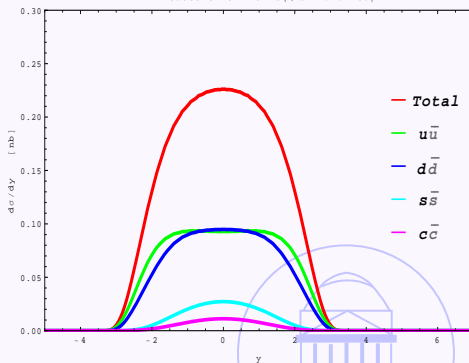
Flavor Contributions for Z

Z Production for p-p ($\sqrt{s}=2.76$ TeV)



p-p Interaction

Z Production for Pb-Pb ($\sqrt{s}=2.76$ TeV)



Pb-Pb Interaction