

# Supplementary material for LHCb-PAPER-2021-053

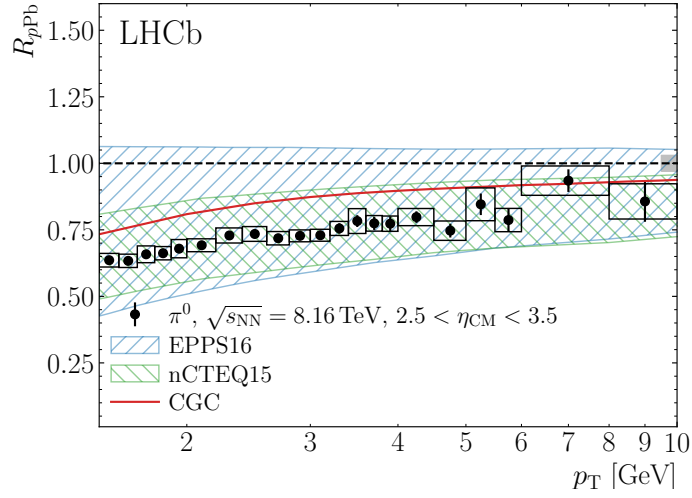


Figure A1: Forward results compared to pQCD predictions [1] using the EPPS16 [2] and nCTEQ15 [3] nPDF sets, as well as a CGC calculation [4]. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors.

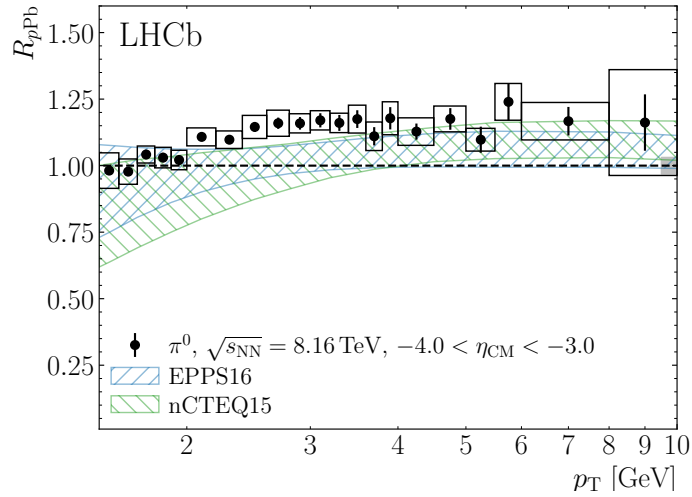


Figure A2: Backward results compared to pQCD predictions [1] using the EPPS16 [2] and nCTEQ15 [3] nPDF sets. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors.

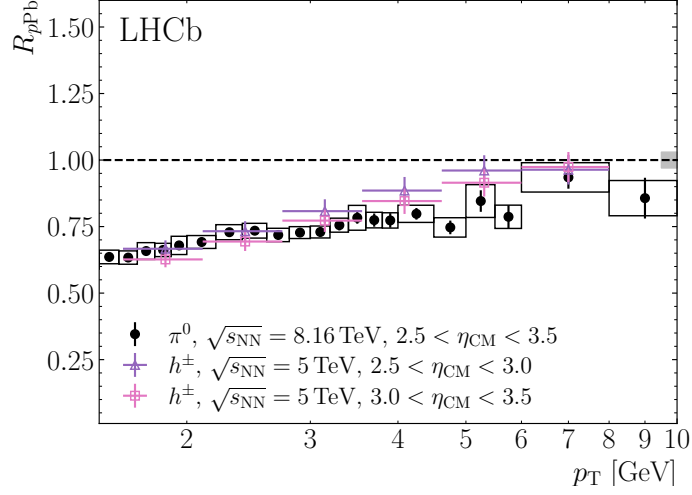


Figure A3: Forward results compared to charged-particle data from Ref. [5]. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors. The vertical error bars on the charged particle results show the combined systematic and statistical uncertainties.

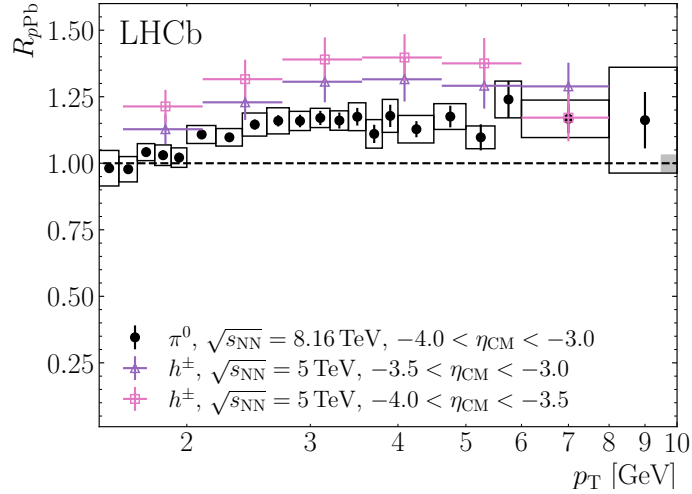


Figure A4: Backward results compared to charged-particle data from Ref. [5]. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors. The vertical error bars on the charged particle results show the combined systematic and statistical uncertainties.

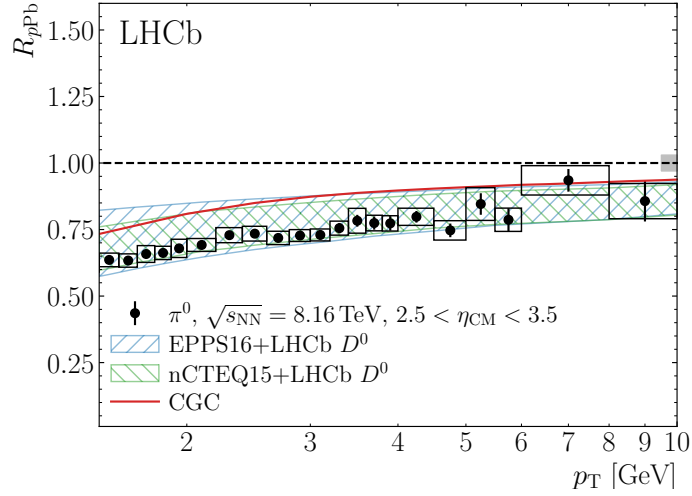


Figure A5: Forward results compared to pQCD predictions [1] using versions of the EPPS16 [2] and nCTEQ15 [3] nPDF sets that are reweighted to incorporate LHCb  $D^0$  production data [6,7], as well as a CGC calculation [4]. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors.

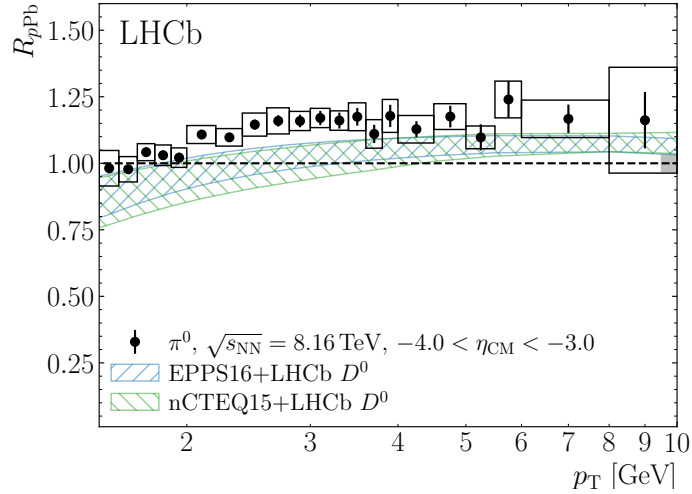


Figure A6: Backward results compared to pQCD predictions [1] using versions of the EPPS16 [2] and nCTEQ15 [3] nPDF sets that are reweighted to incorporate LHCb  $D^0$  production data [6,7]. The data error bars show the statistical uncertainties, while the open boxes show the  $p_T$ -dependent systematic uncertainties. The solid gray boxes show the overall normalization uncertainties from the luminosity estimate and efficiency correction factors.

## References

- [1] I. Helenius, K. J. Eskola, and H. Paukkunen, *Probing the small- $x$  nuclear gluon distributions with isolated photons at forward rapidities in  $p+Pb$  collisions at the LHC*, JHEP **09** (2014) 138, [arXiv:1406.1689](#).
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- [5] LHCb collaboration, R. Aaij *et al.*, *Measurement of the nuclear modification factor and prompt charged particle production in  $pPb$  and  $pp$  collisions at  $\sqrt{s_{NN}} = 5$  TeV*, [arXiv:2108.13115](#), submitted to PRL.
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- [7] LHCb collaboration, R. Aaij *et al.*, *Study of prompt  $D^0$  meson production in  $pPb$  collisions at  $\sqrt{s_{NN}} = 5$  TeV*, JHEP **10** (2017) 090, [arXiv:1707.02750](#).