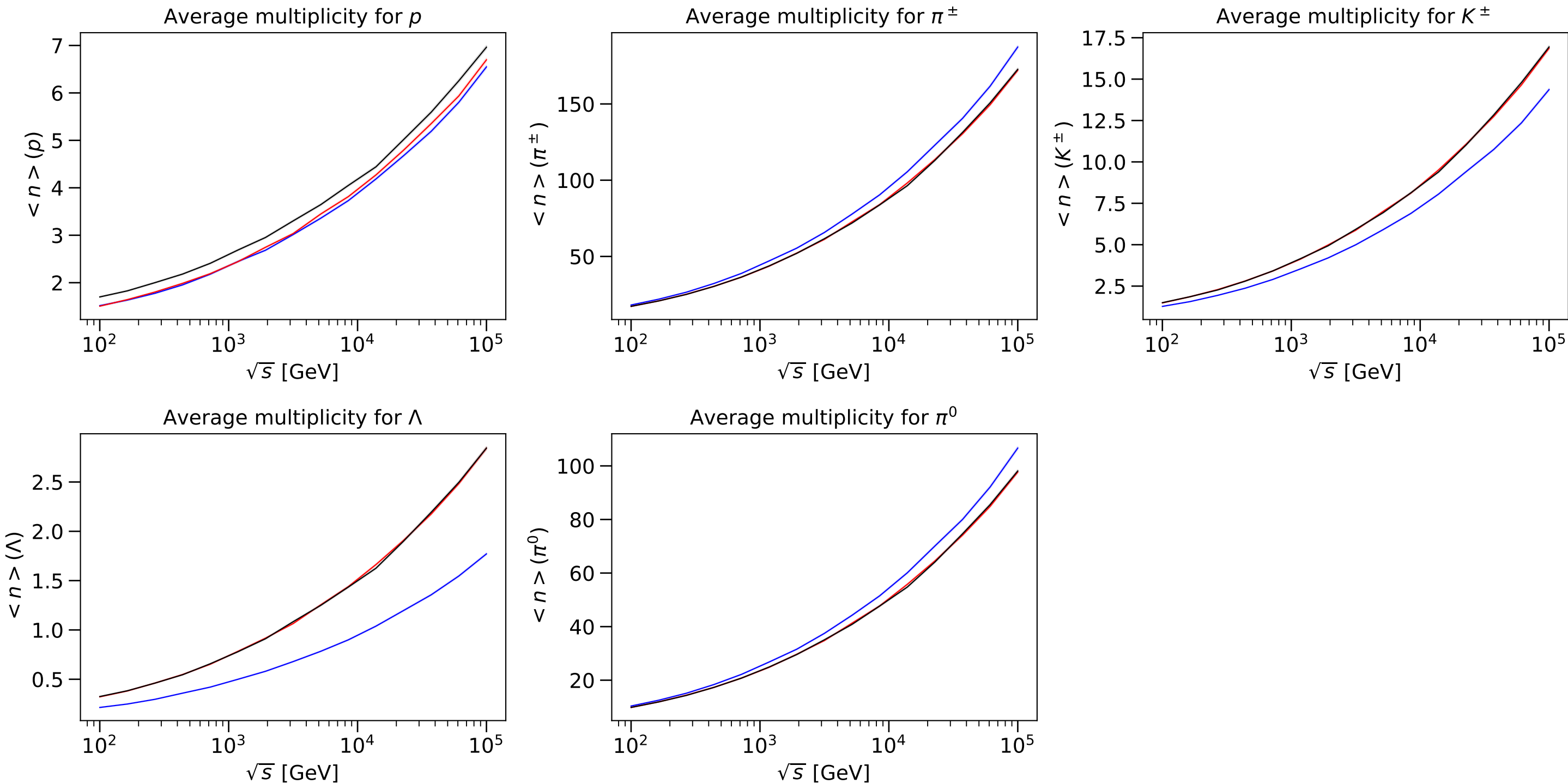
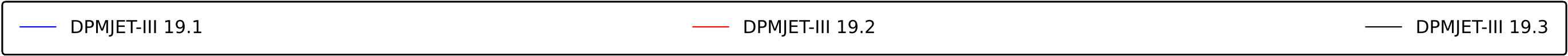
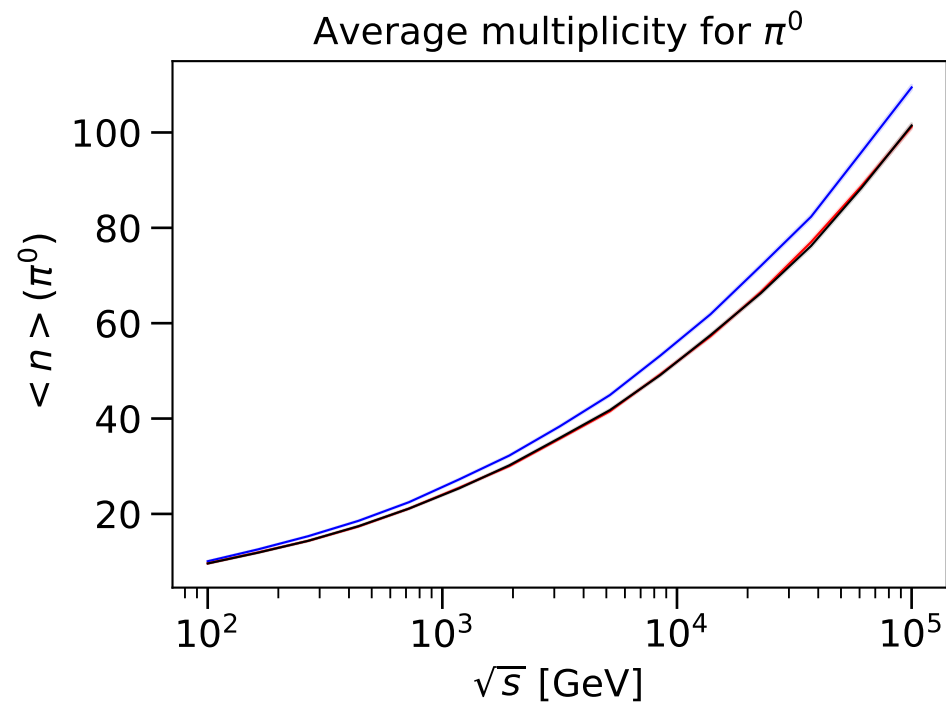
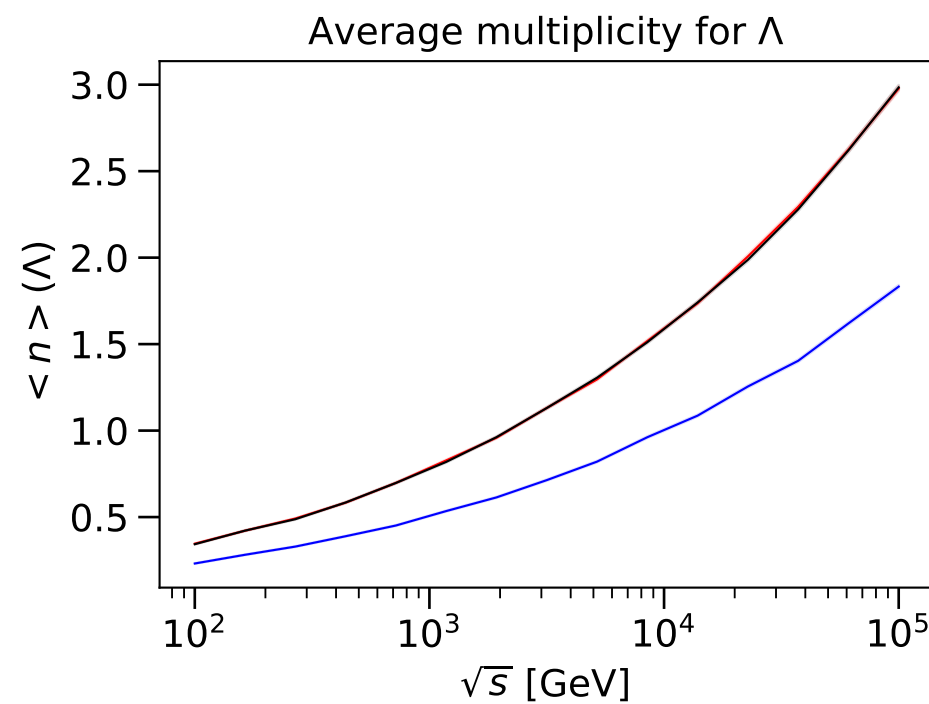
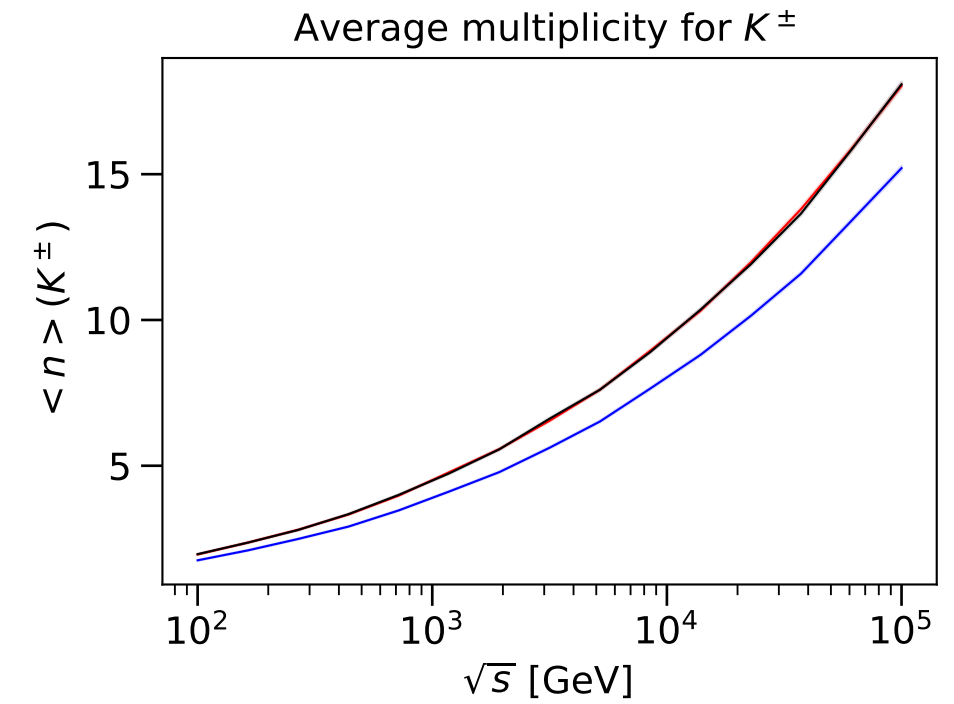
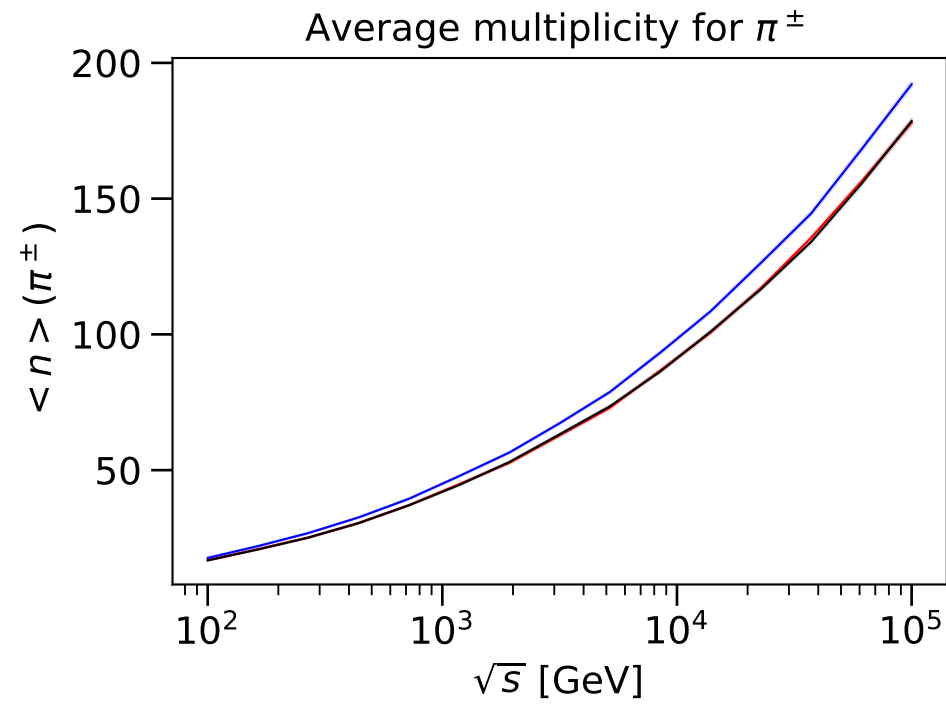
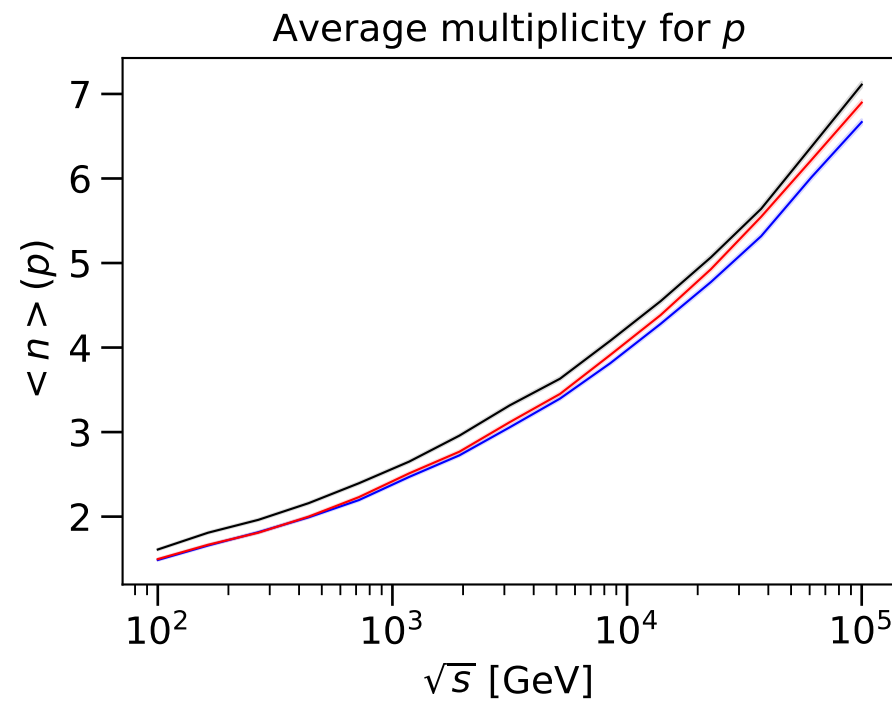
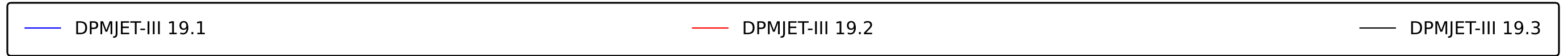


Atmospheric cascade related

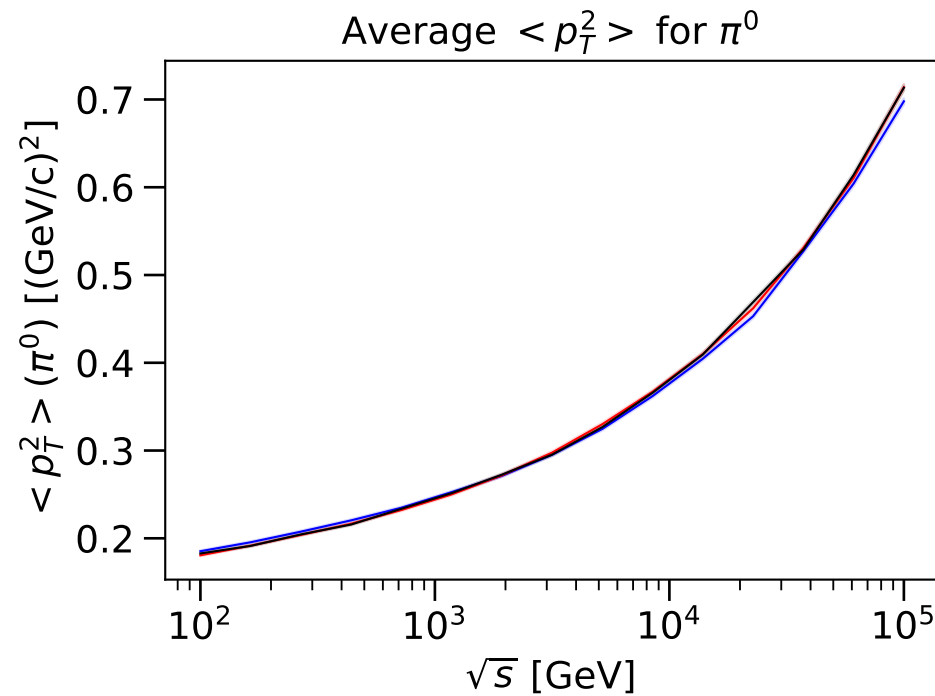
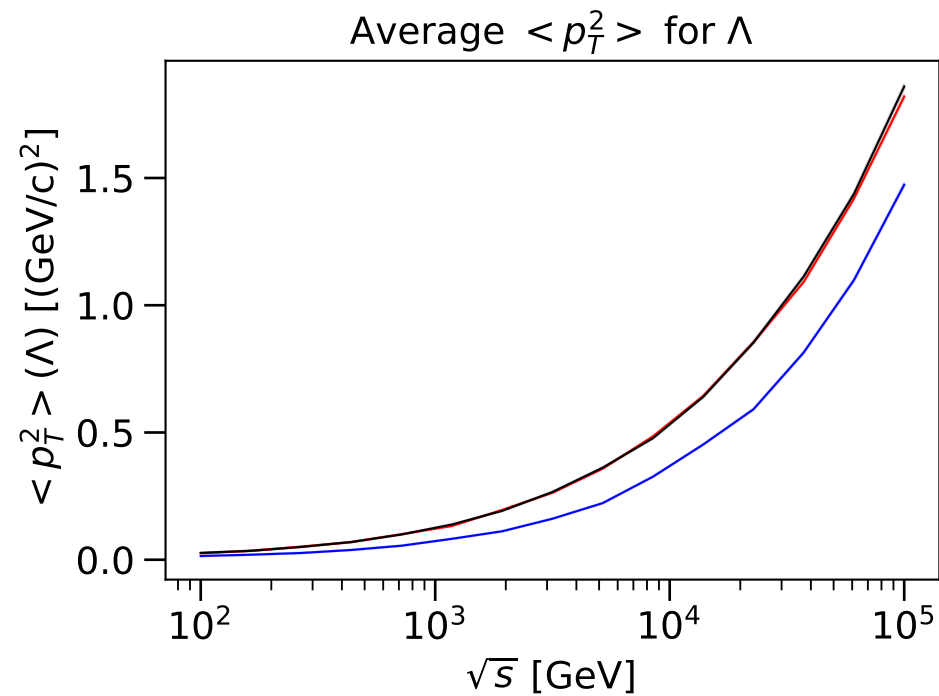
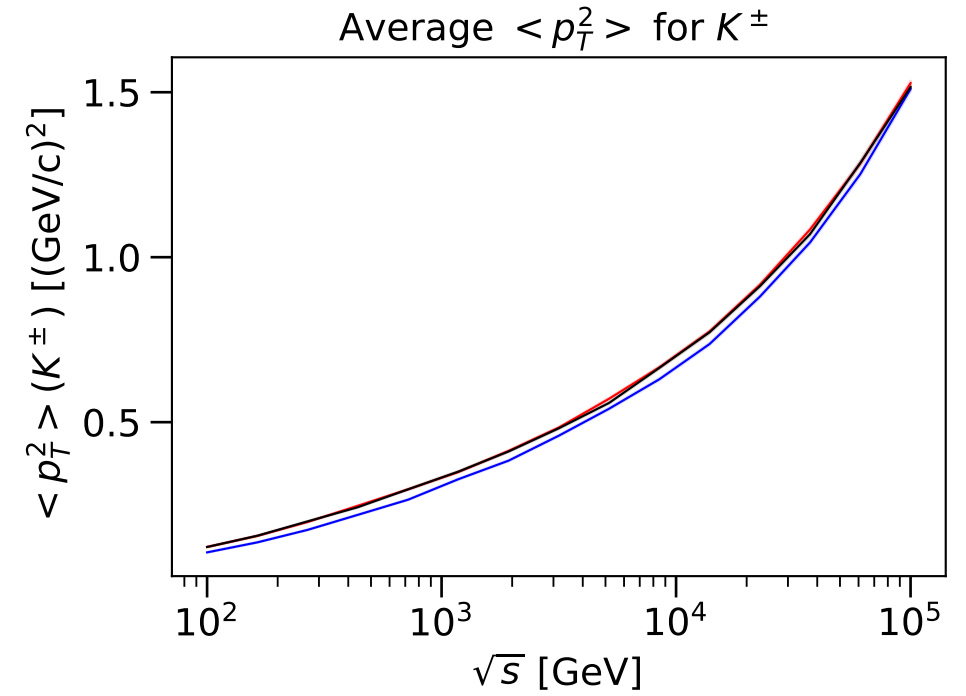
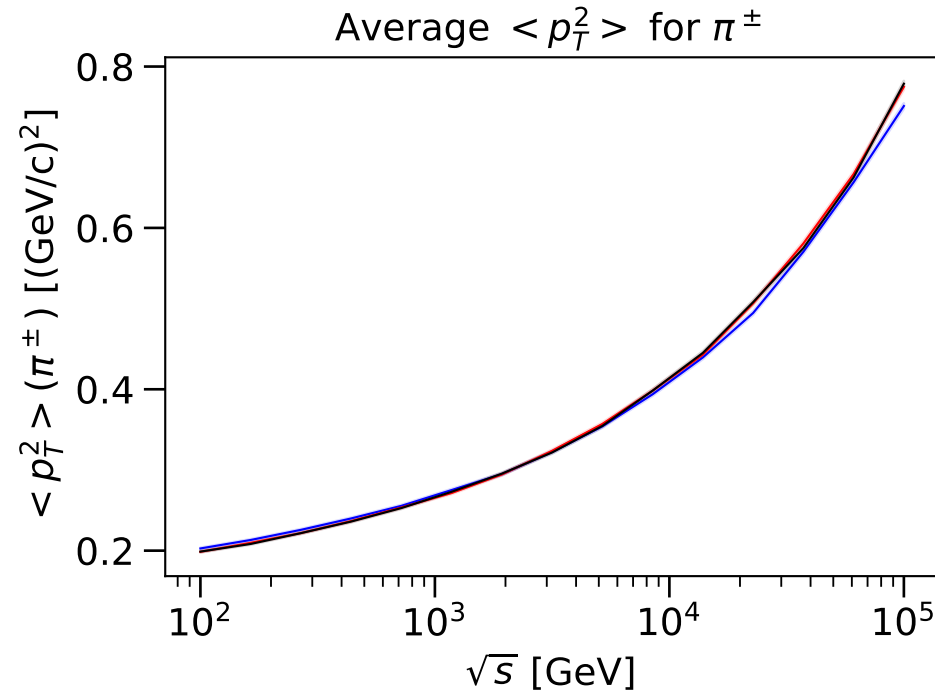
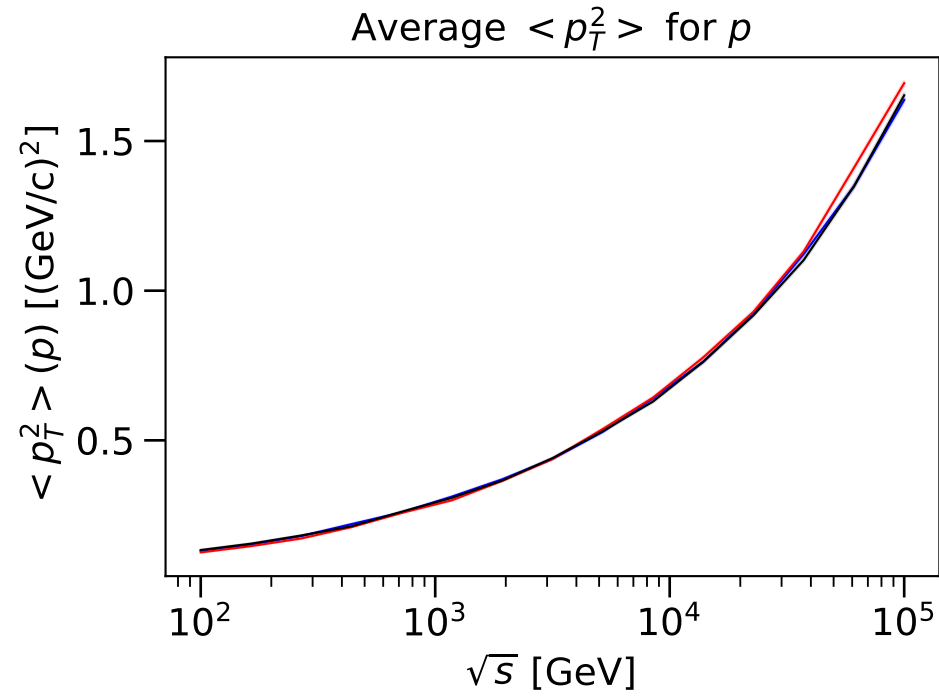
Average Multiplicity in piAir collisions



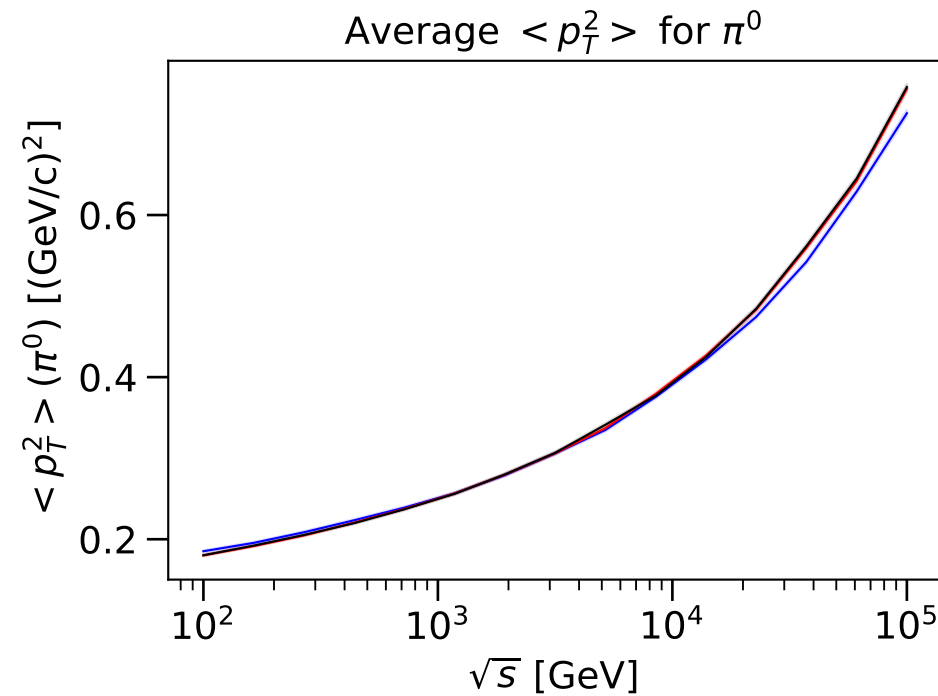
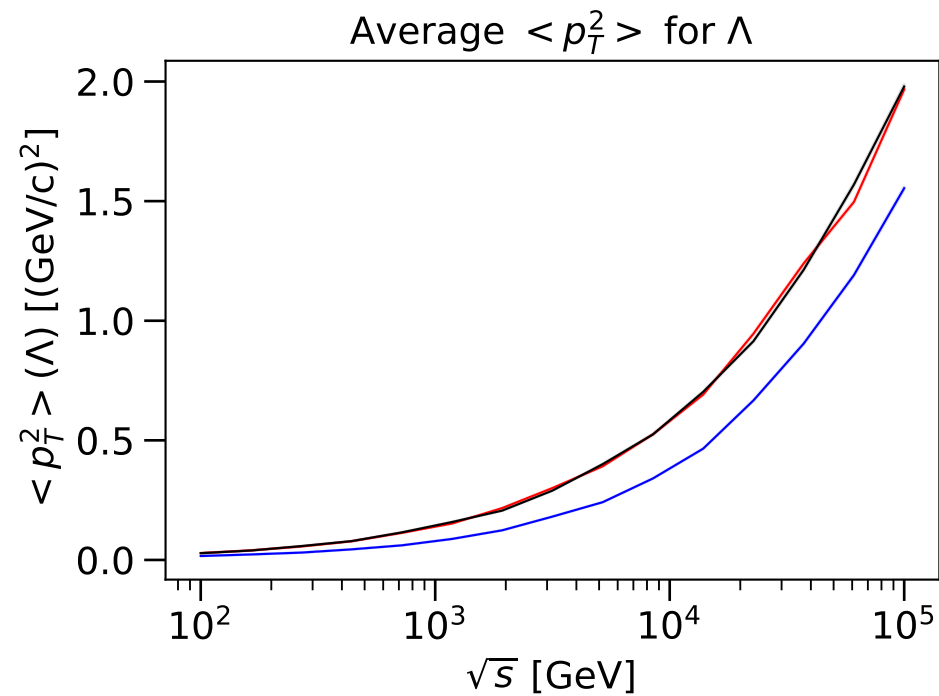
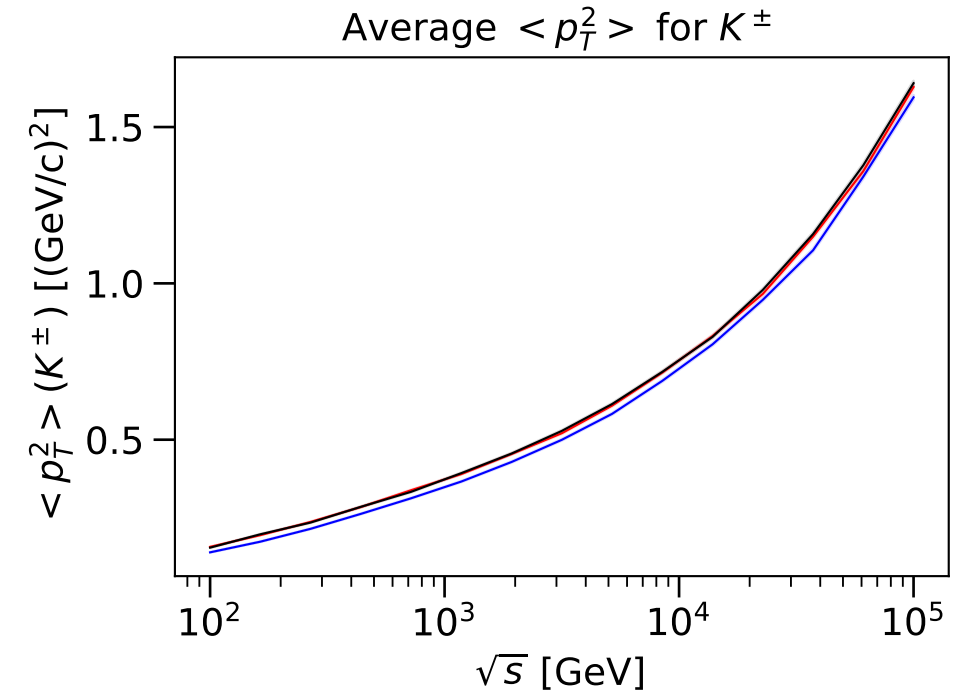
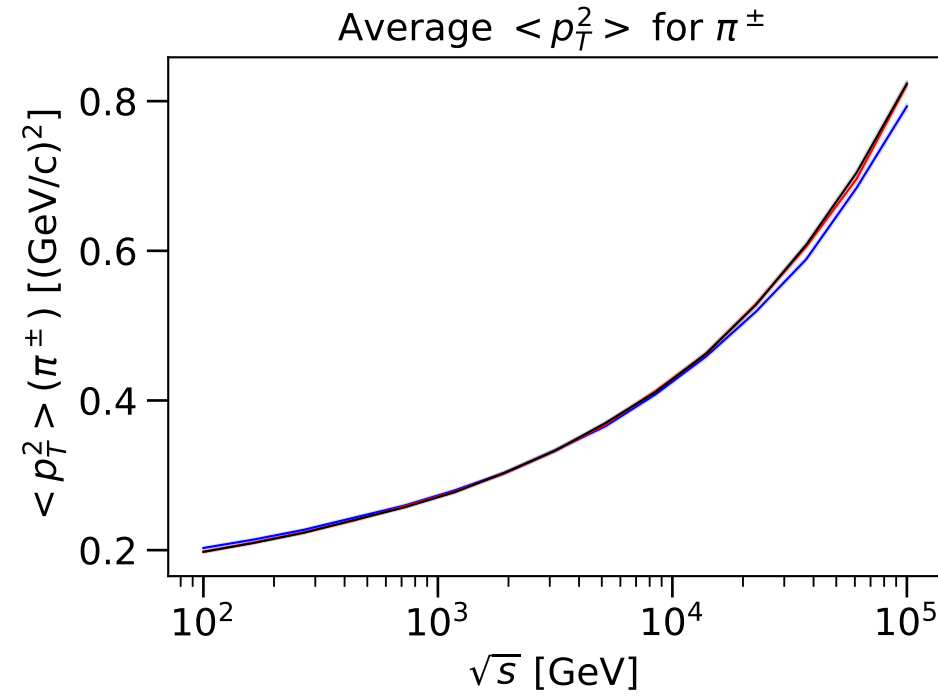
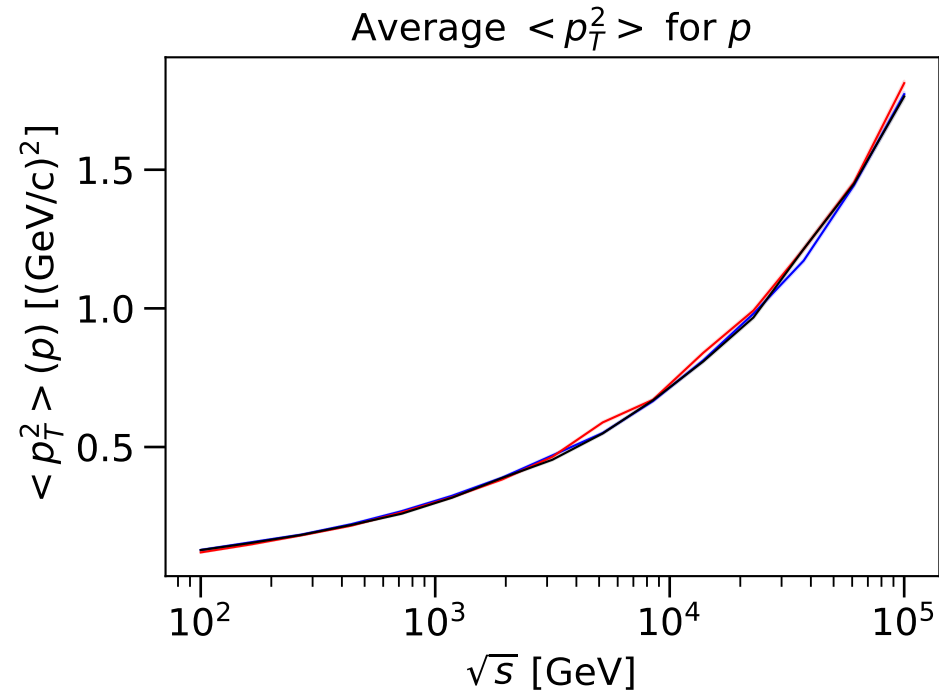
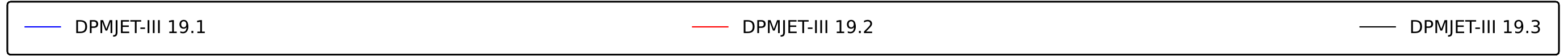
Average Multiplicity in kAir collisions



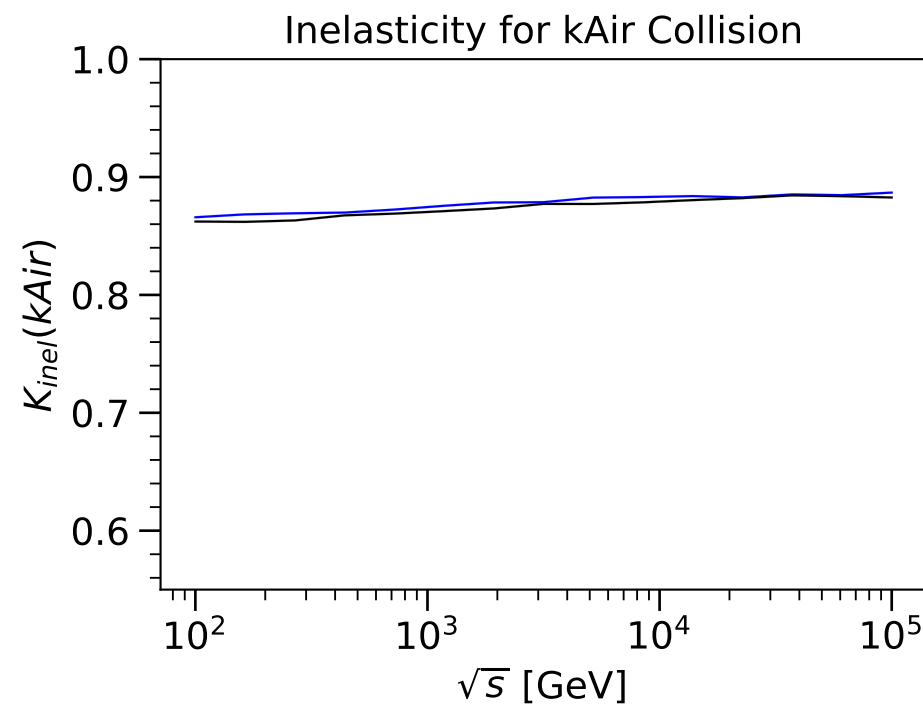
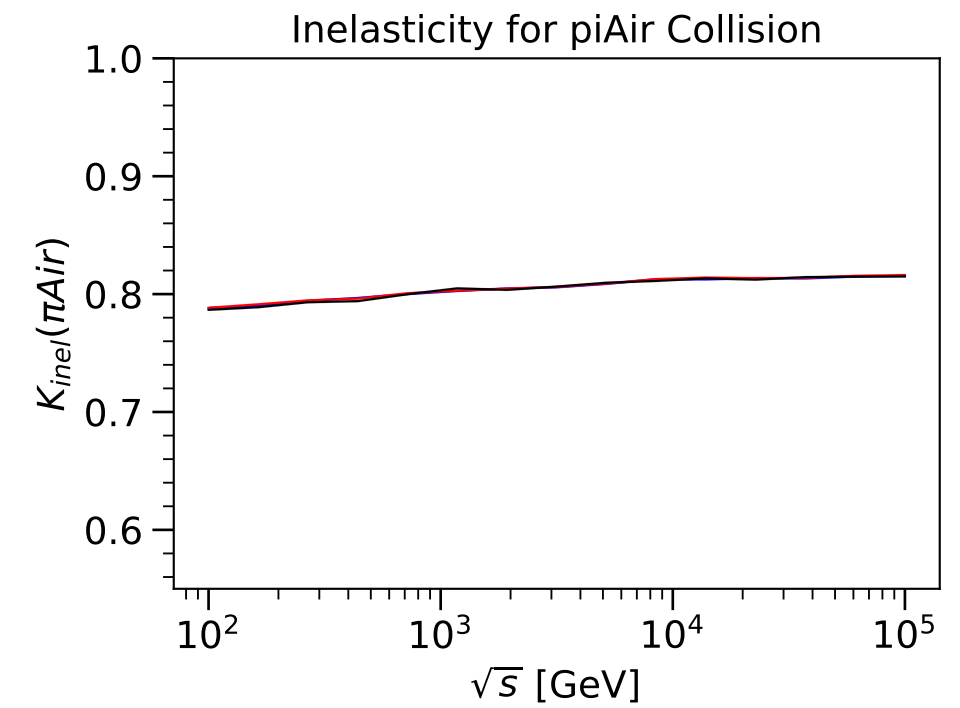
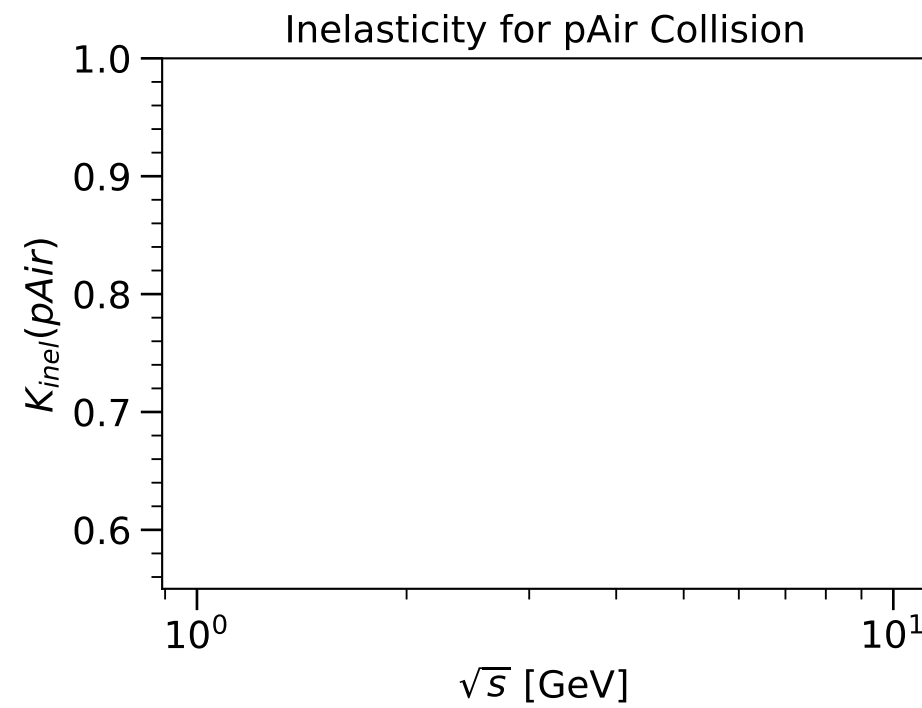
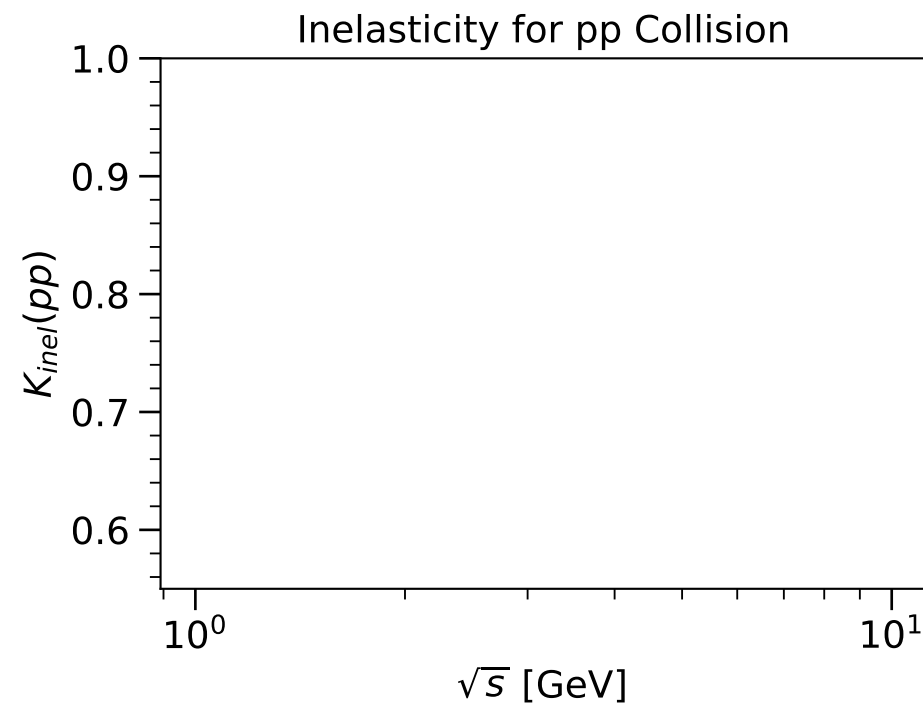
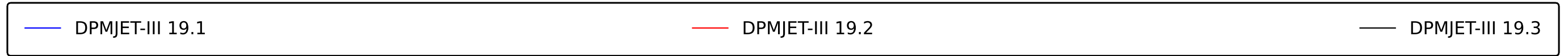
Average p_T^2 in piAir collisions



Average p_T^2 in kAir collisions



Inelasticity in pp, pAir, π Air, and kAir Collisions



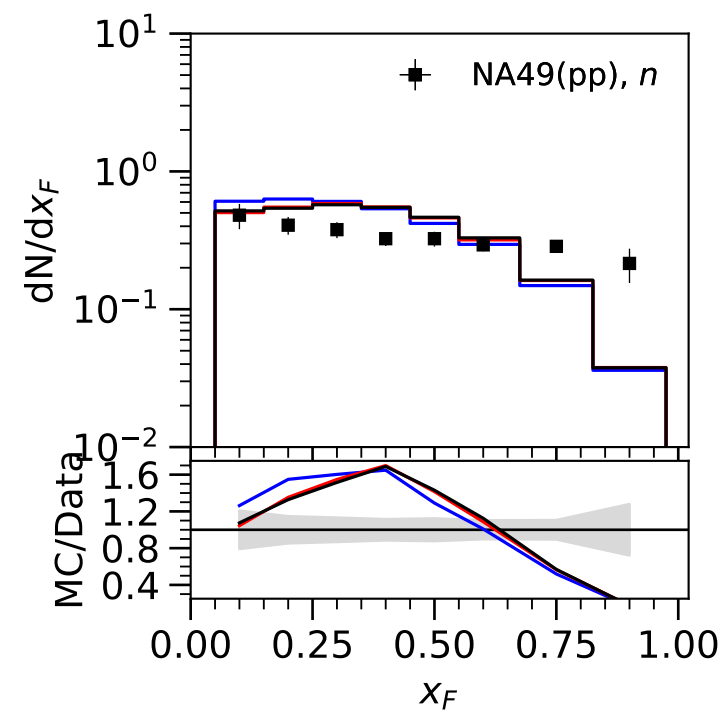
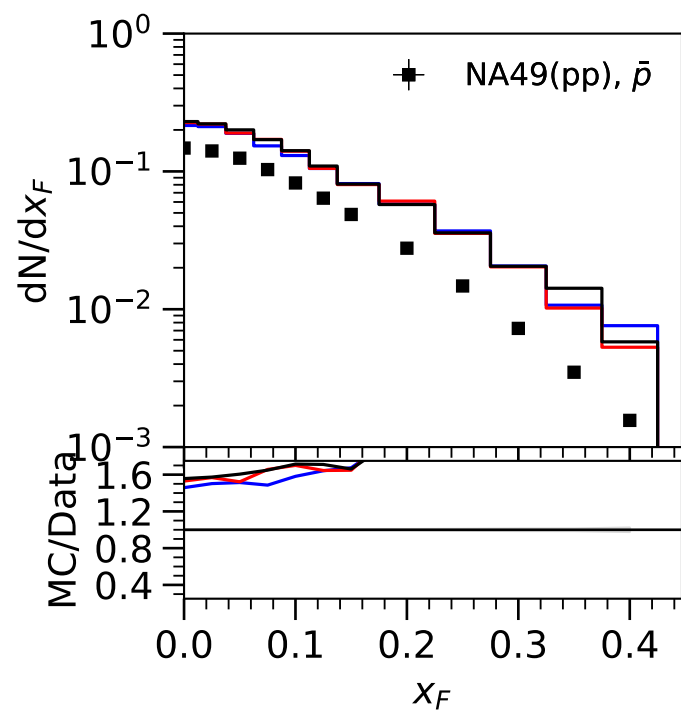
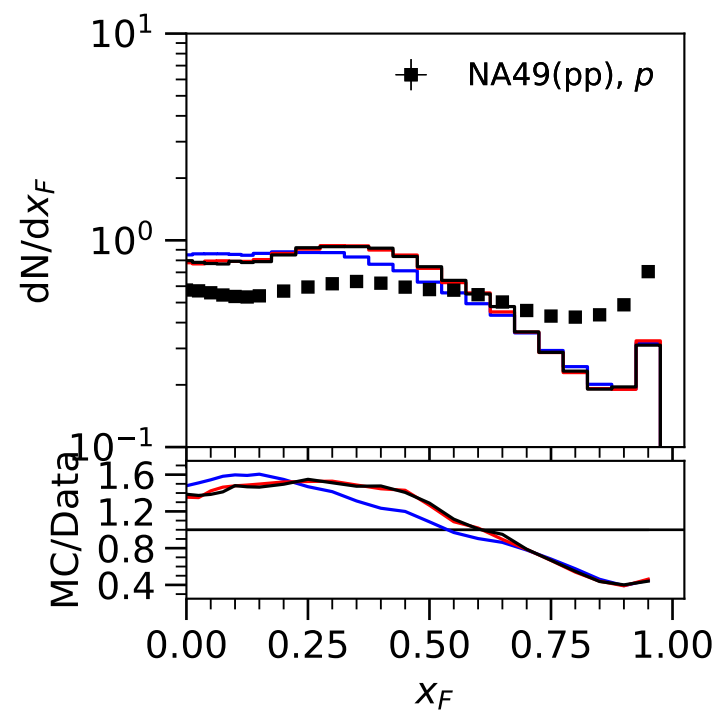
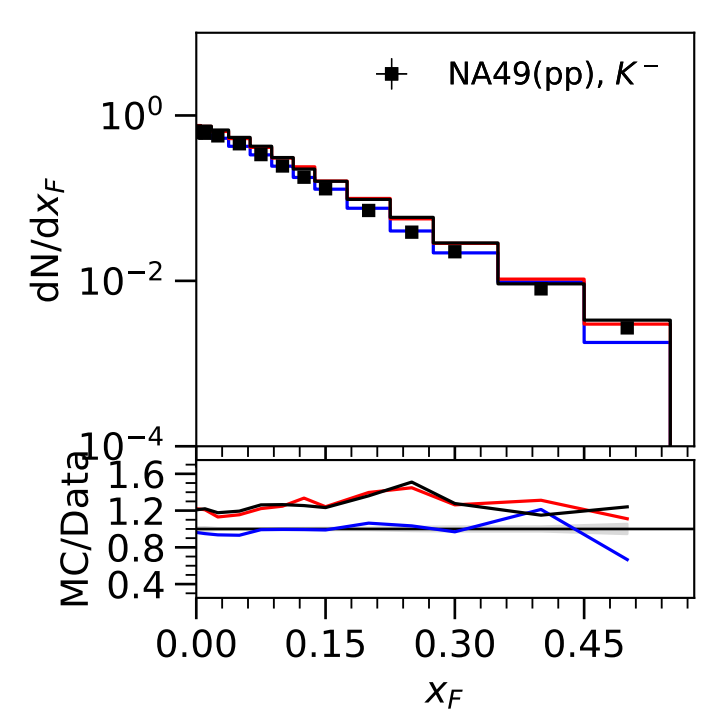
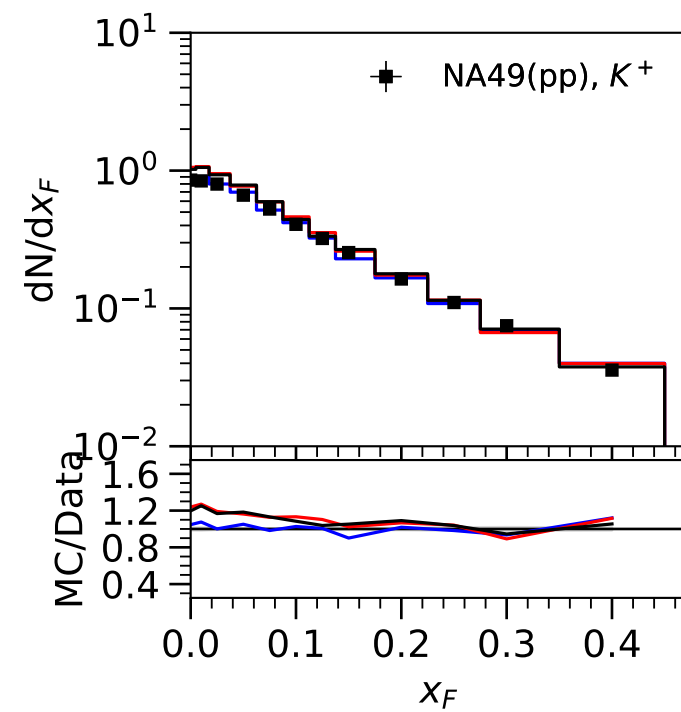
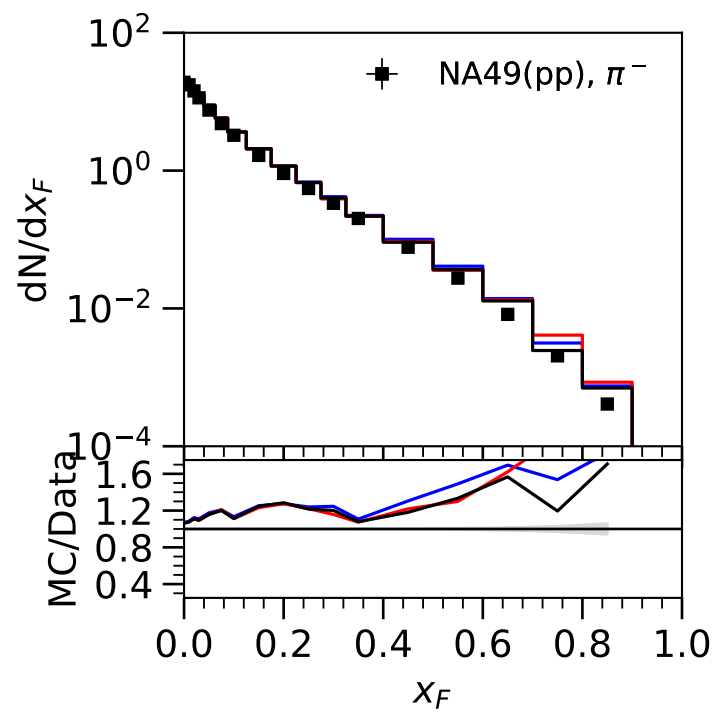
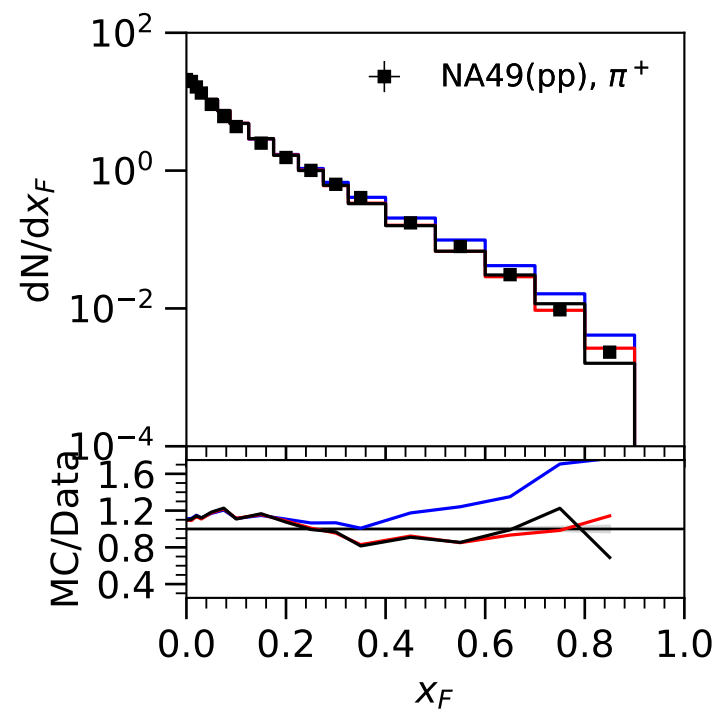
NA49: proton-proton

x_F - NA49 pp collisions at 158 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

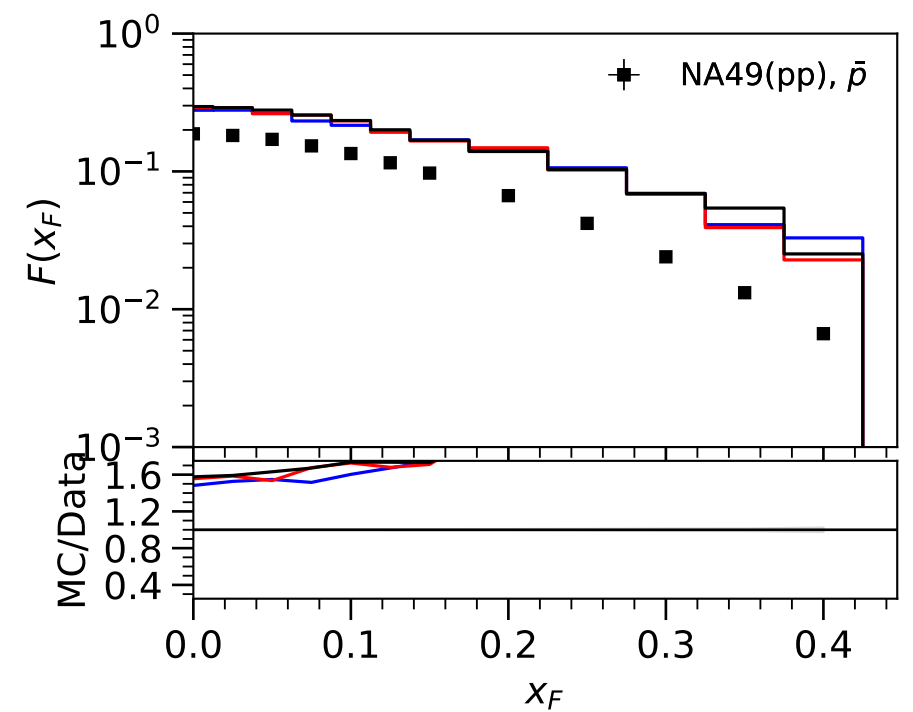
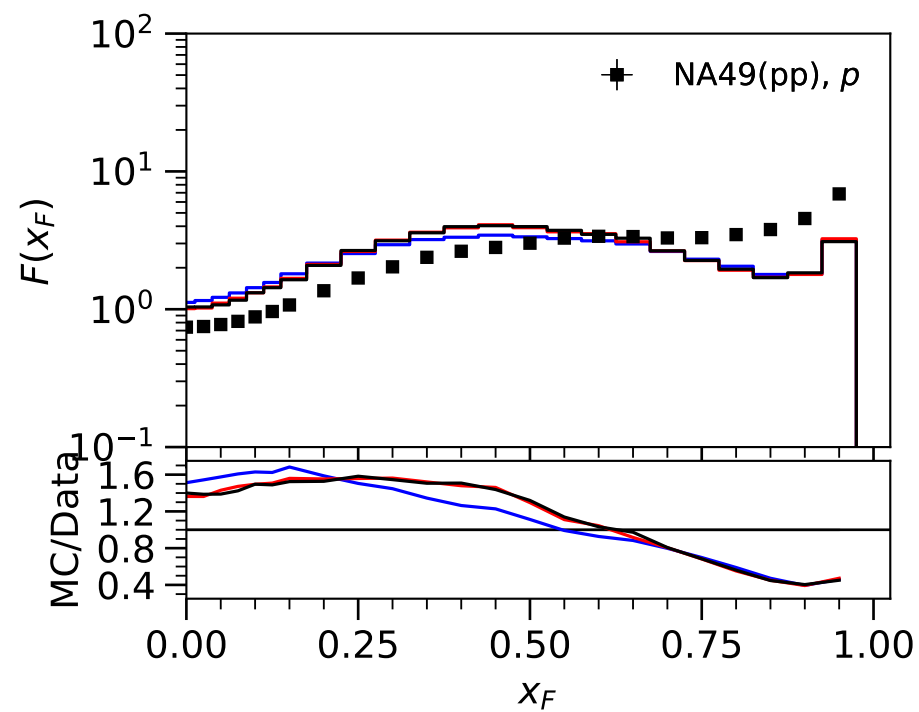
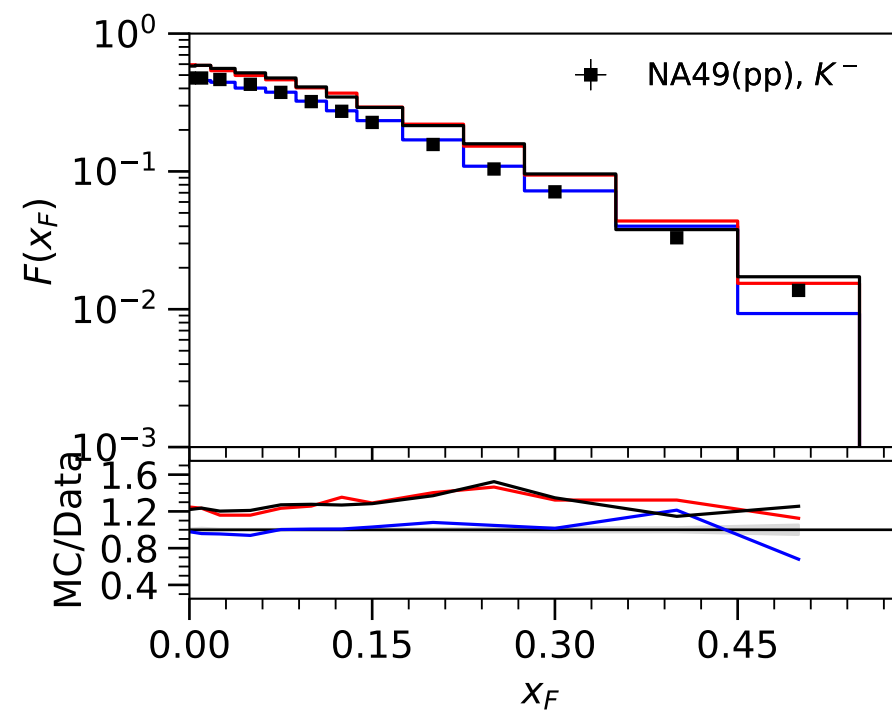
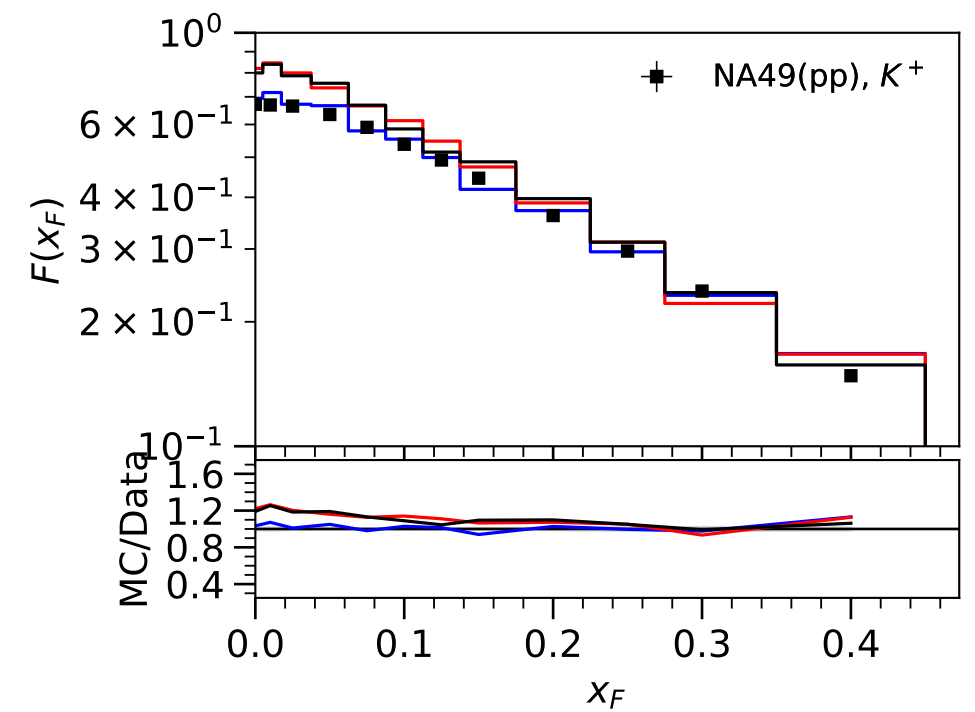
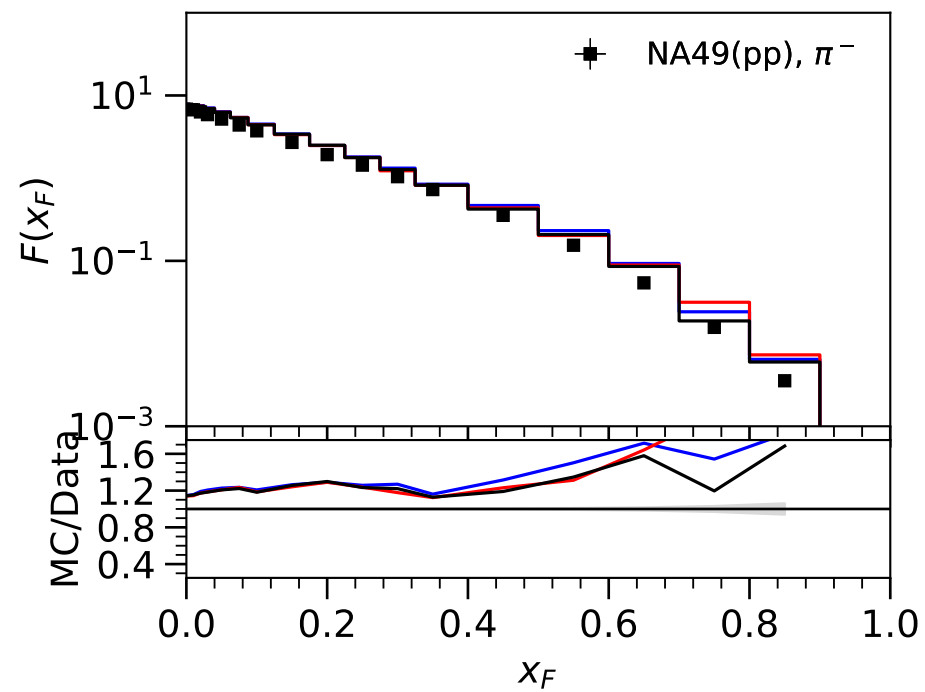
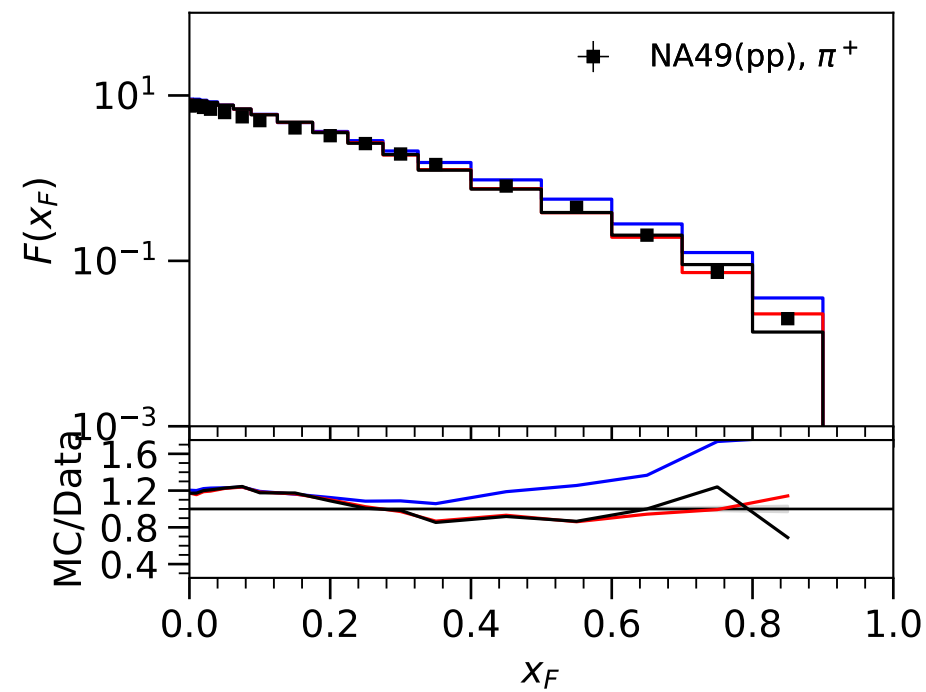


$F(x_F)$ - NA49 pp collisions at 158 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

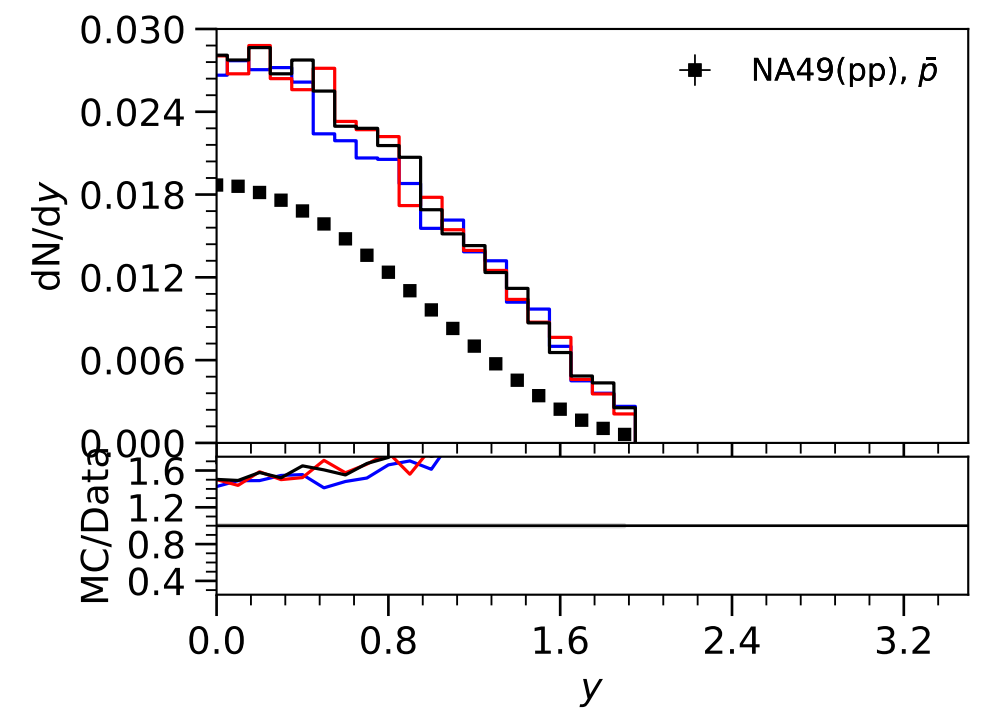
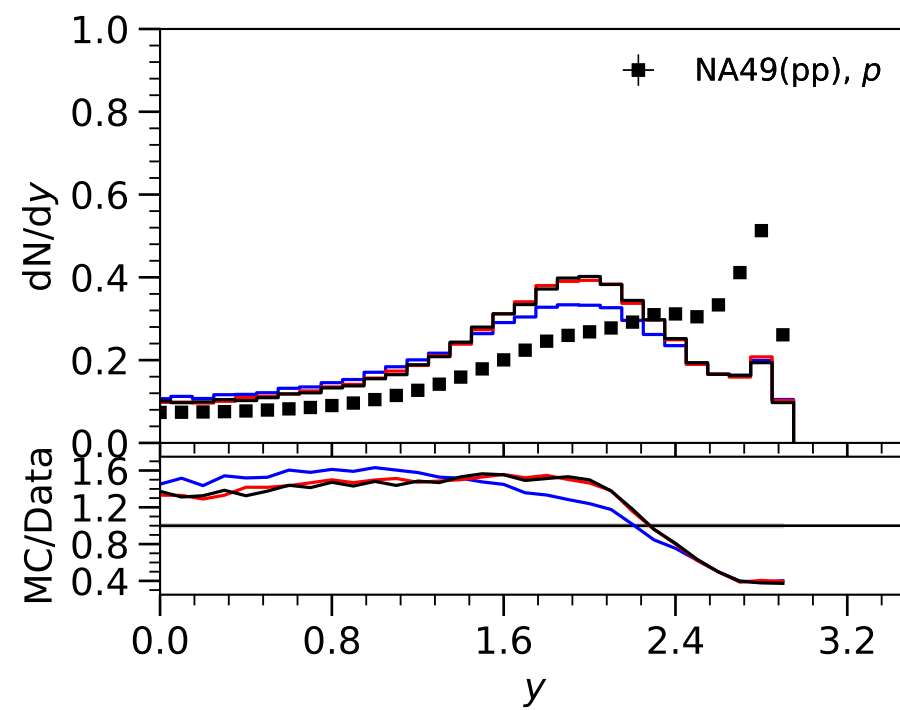
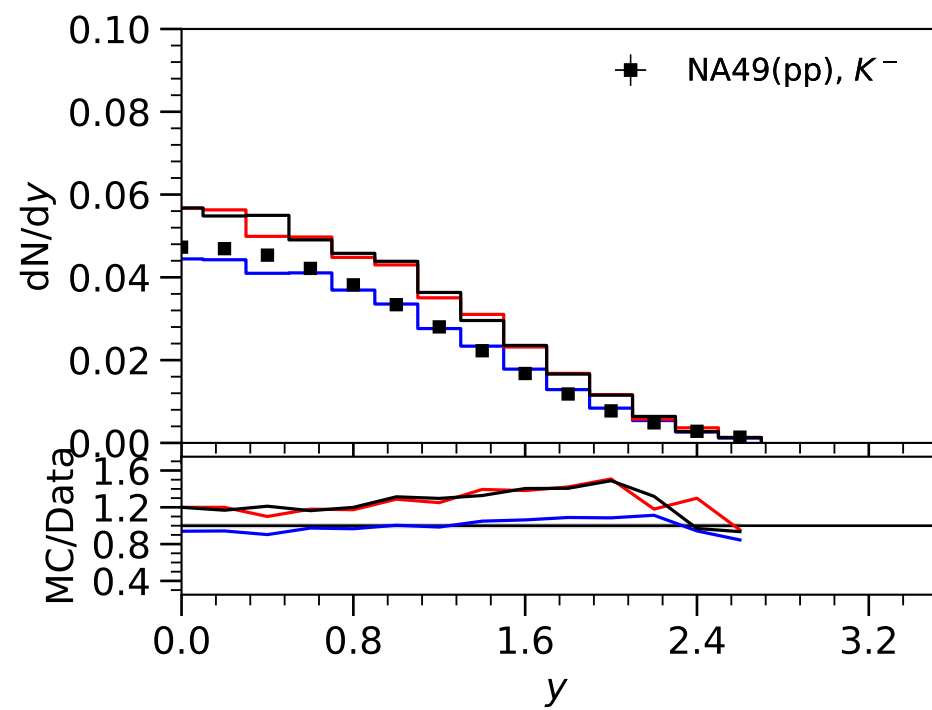
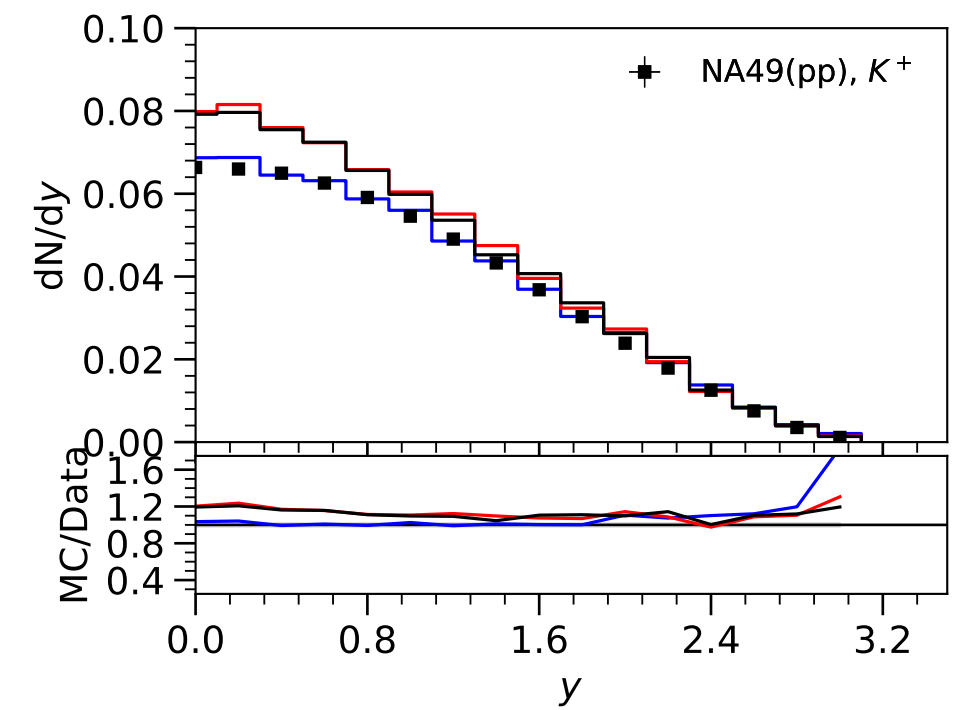
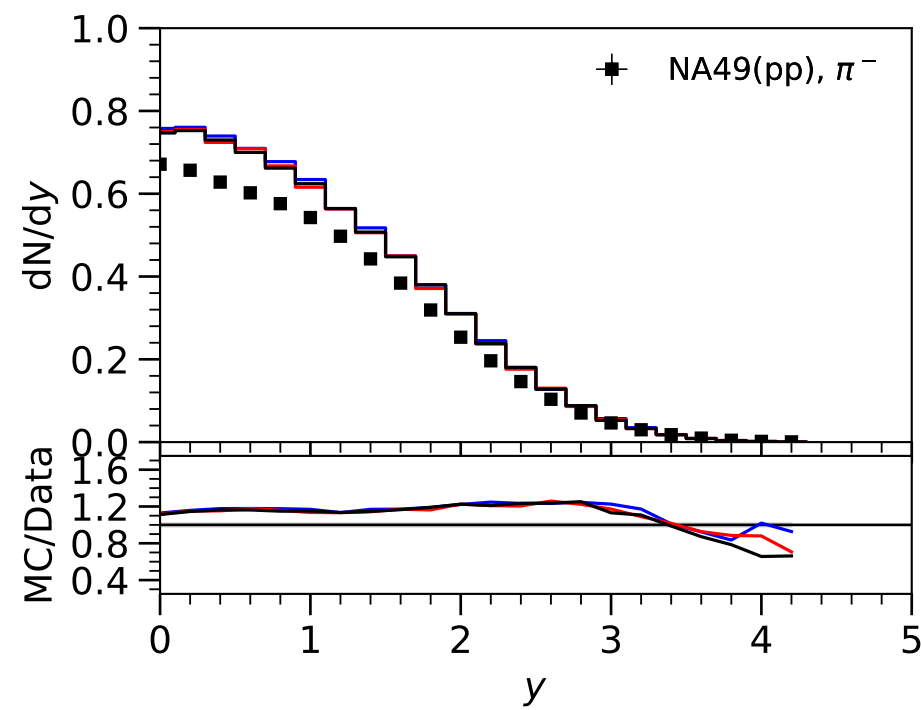
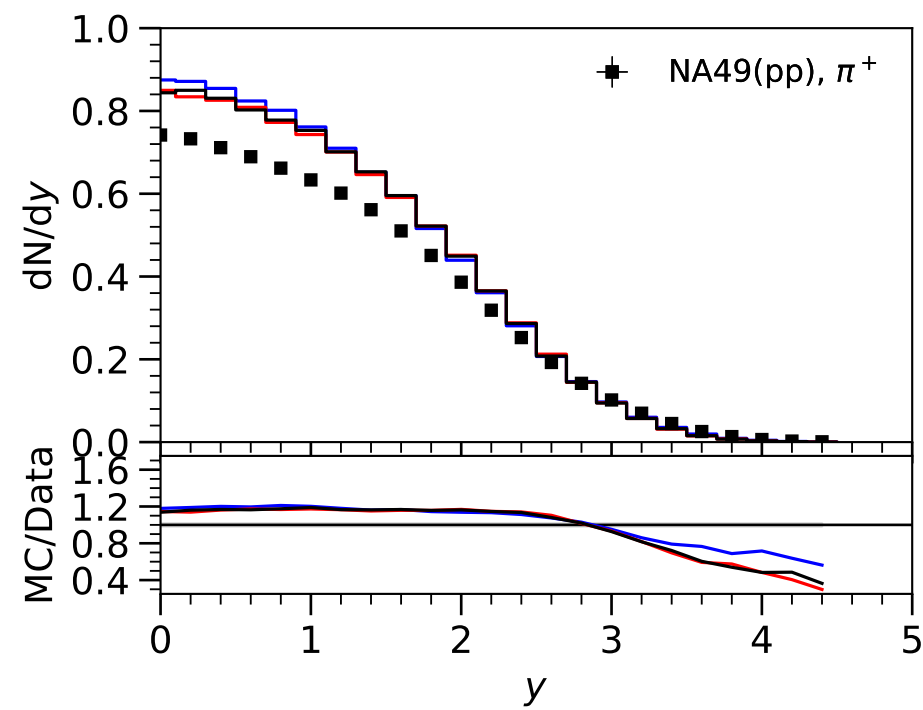


y - NA49 pp collisions at 158 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



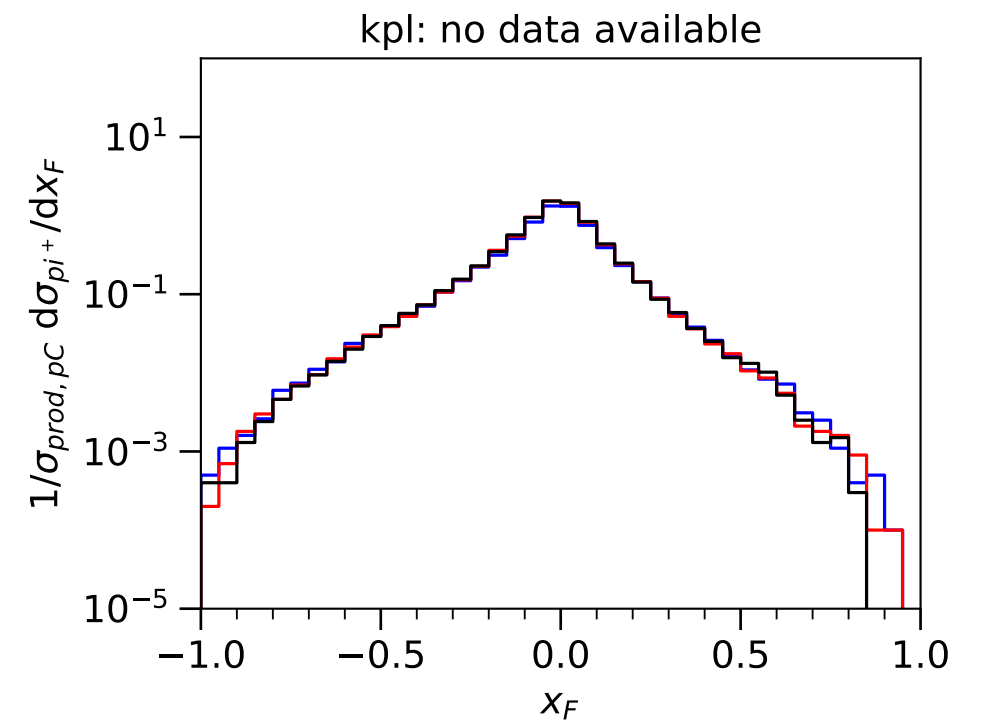
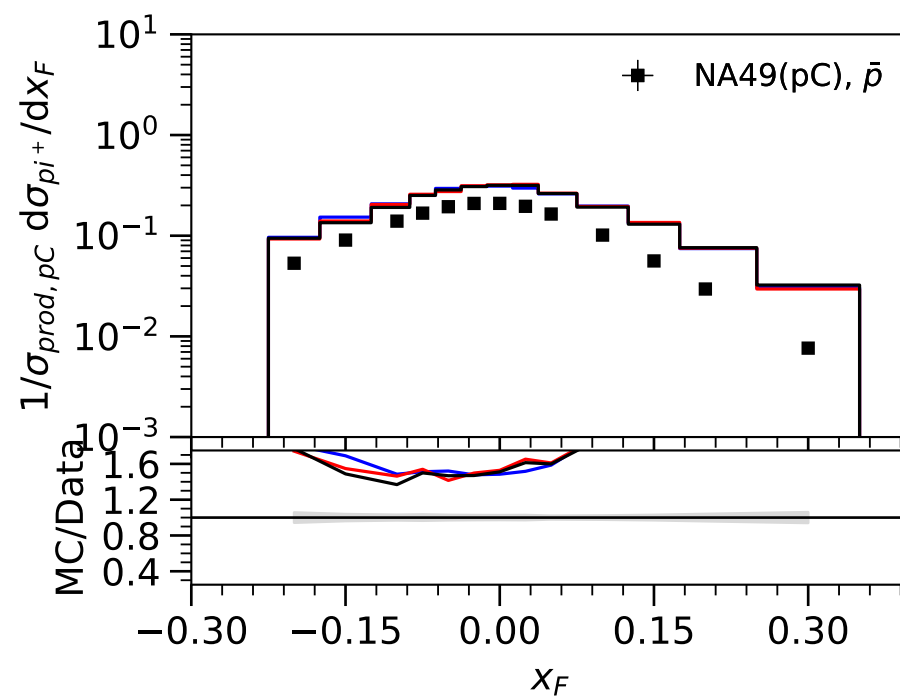
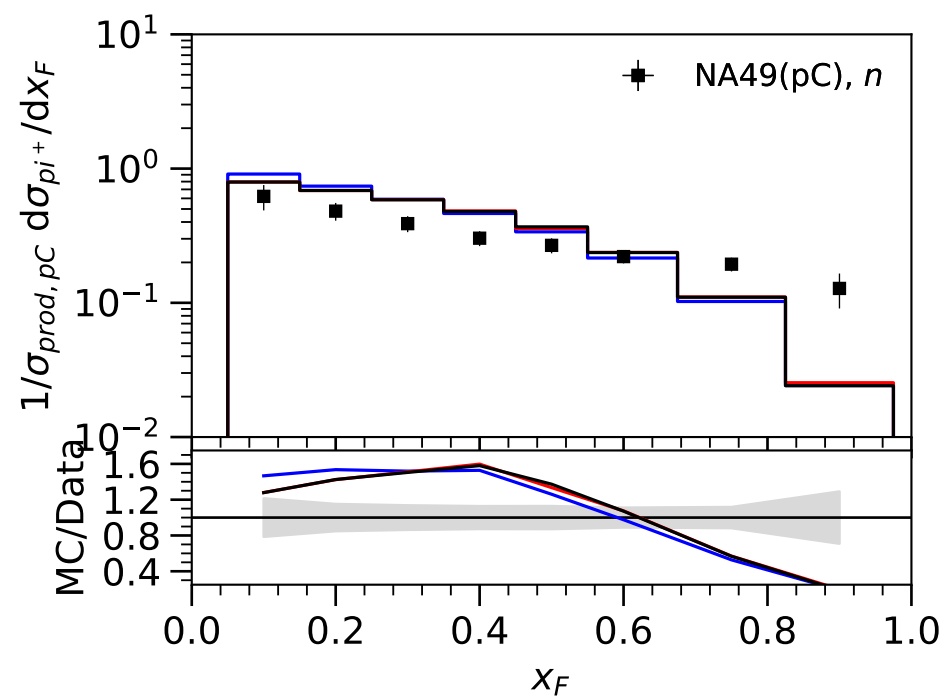
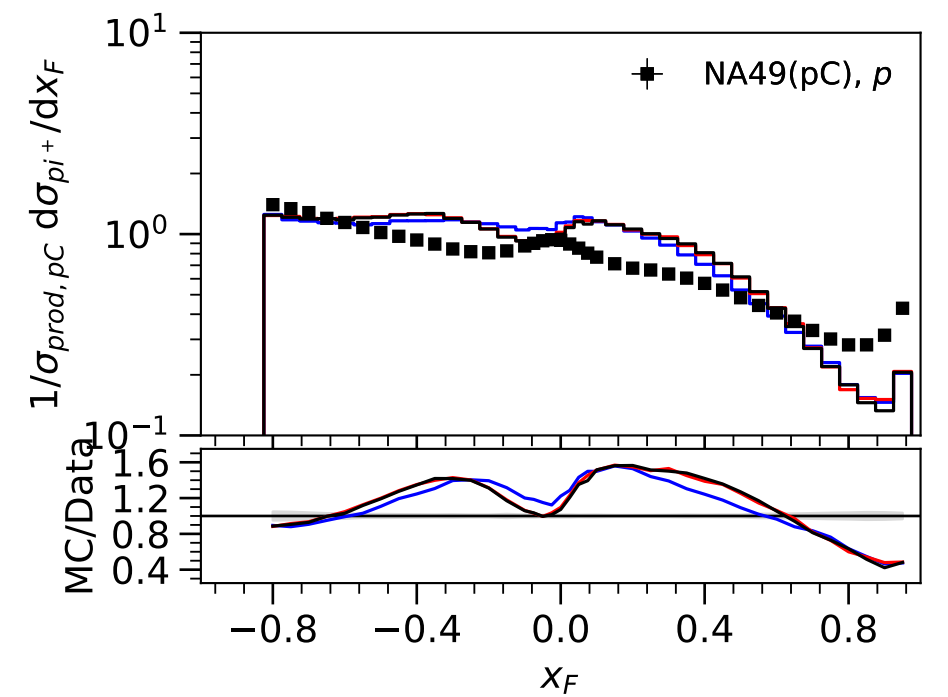
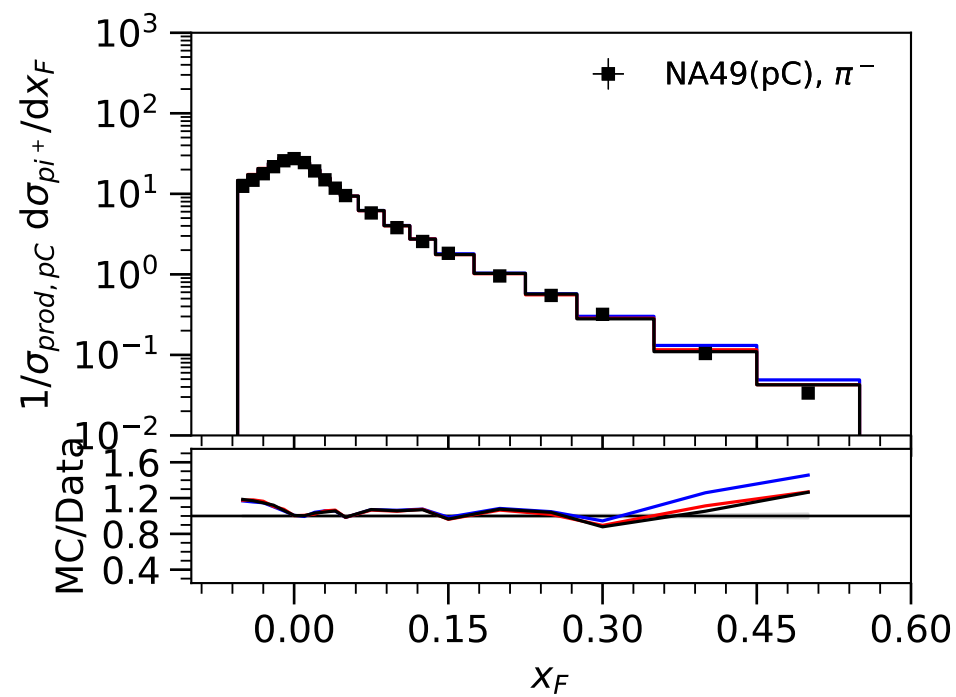
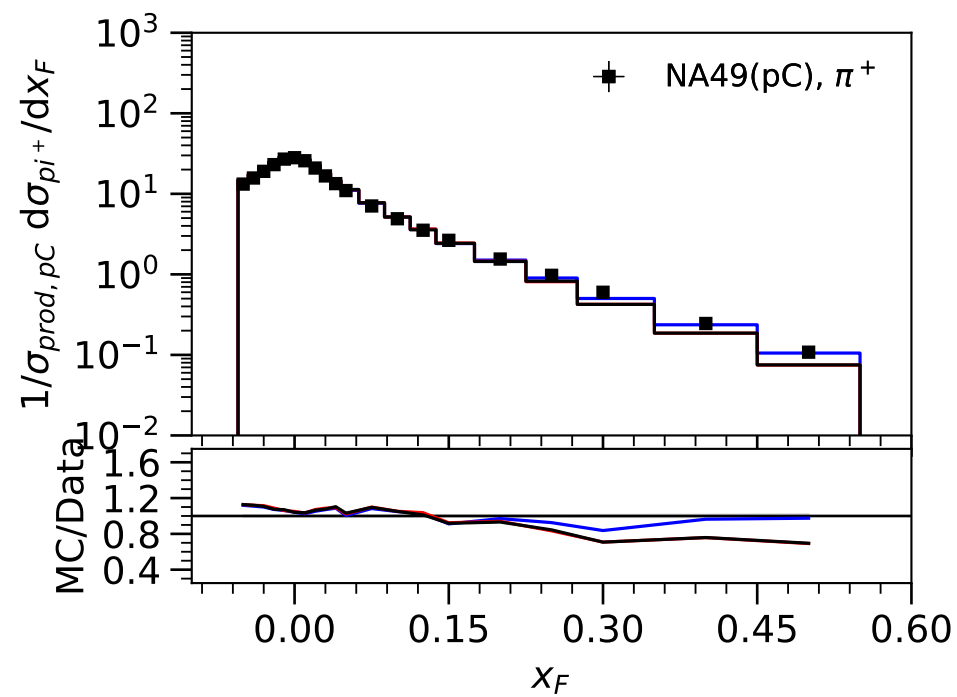
NA49: proton-carbon

x_F - NA49 pC collisions at 158 GeV

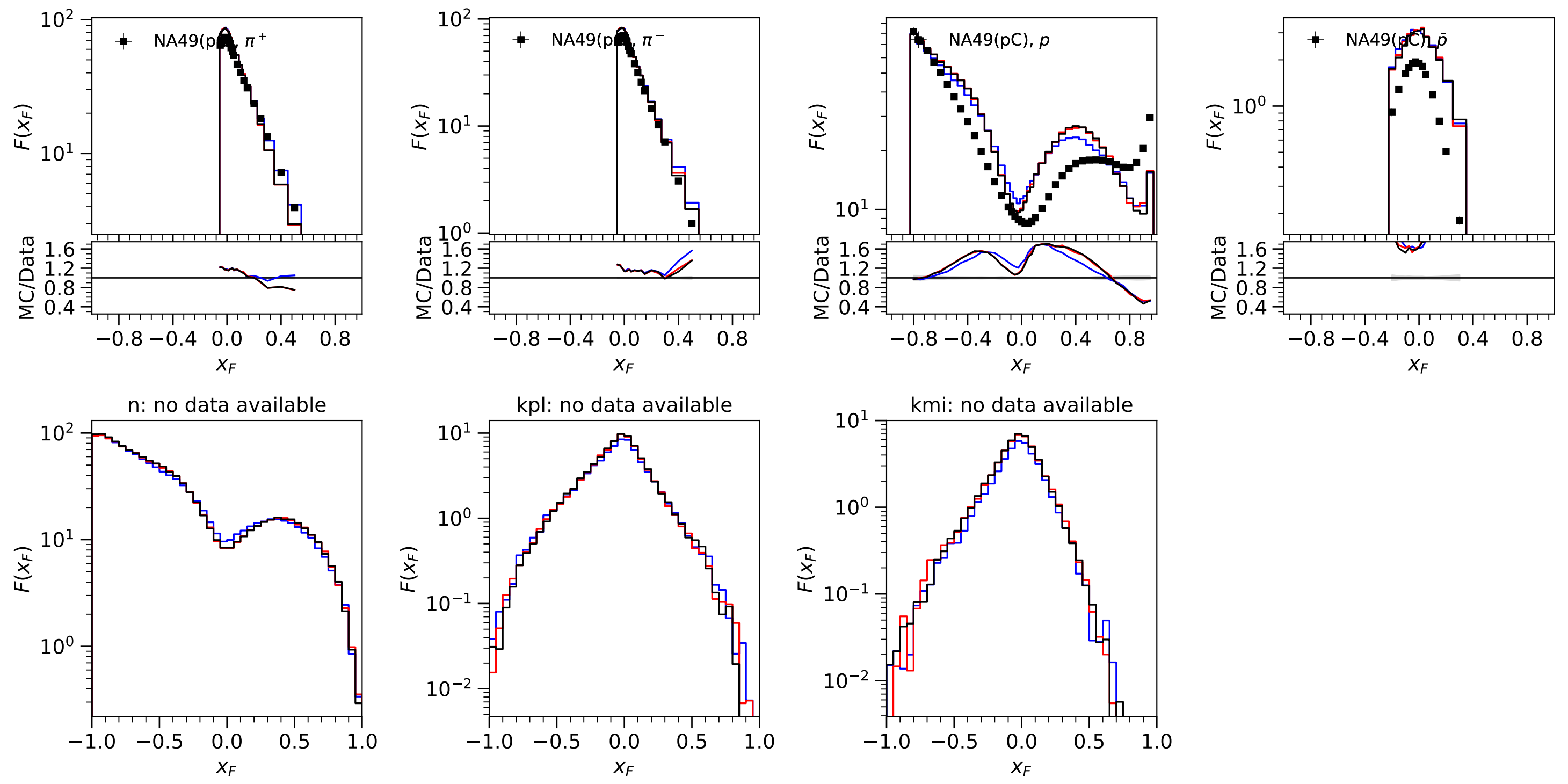
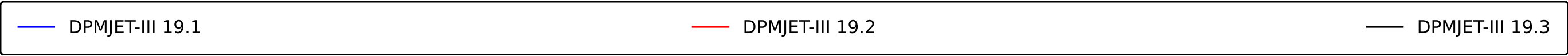
DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



$F(x_F)$ - NA49 pC collisions at 158 GeV

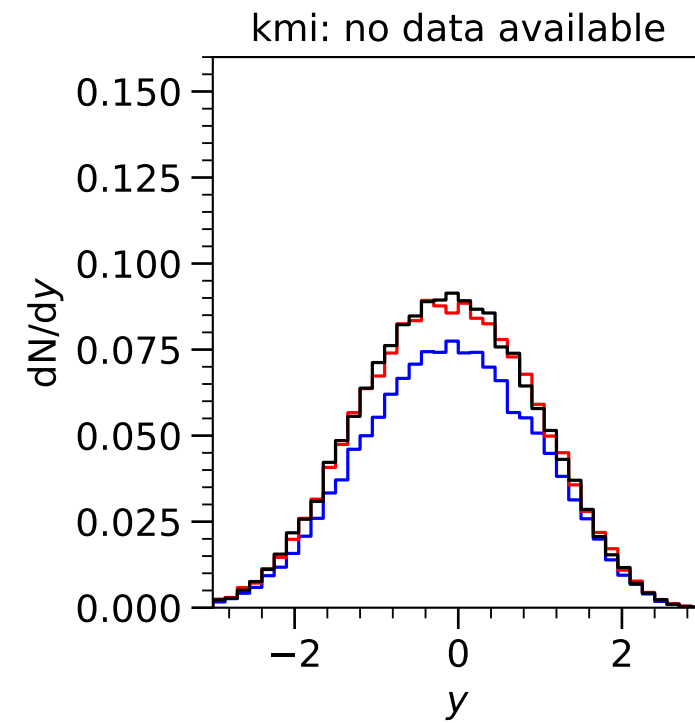
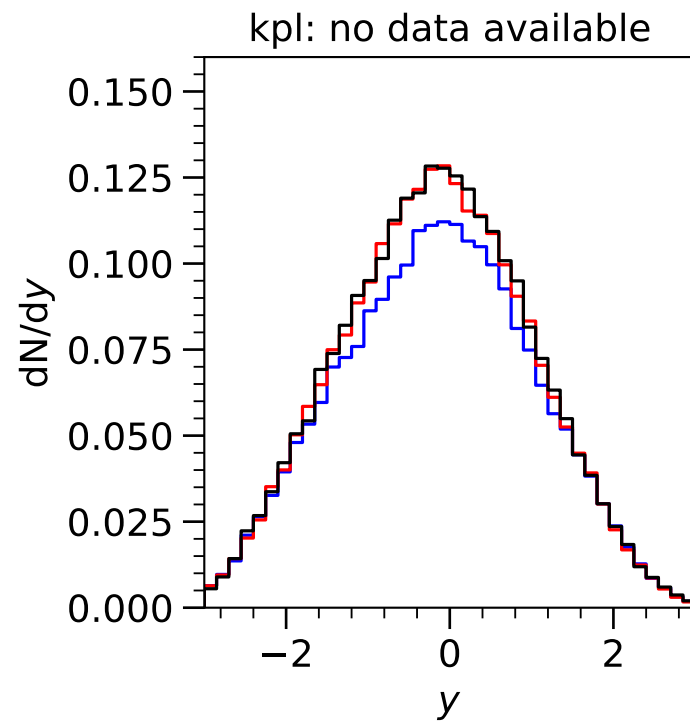
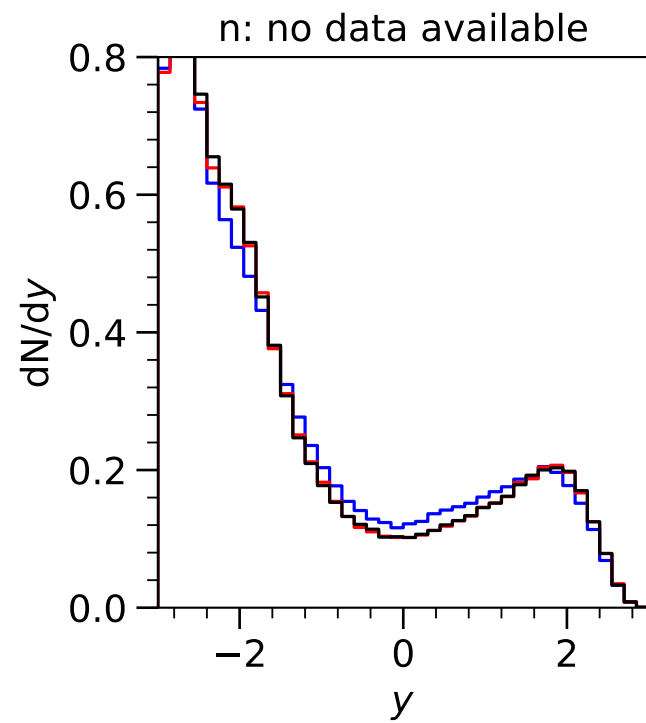
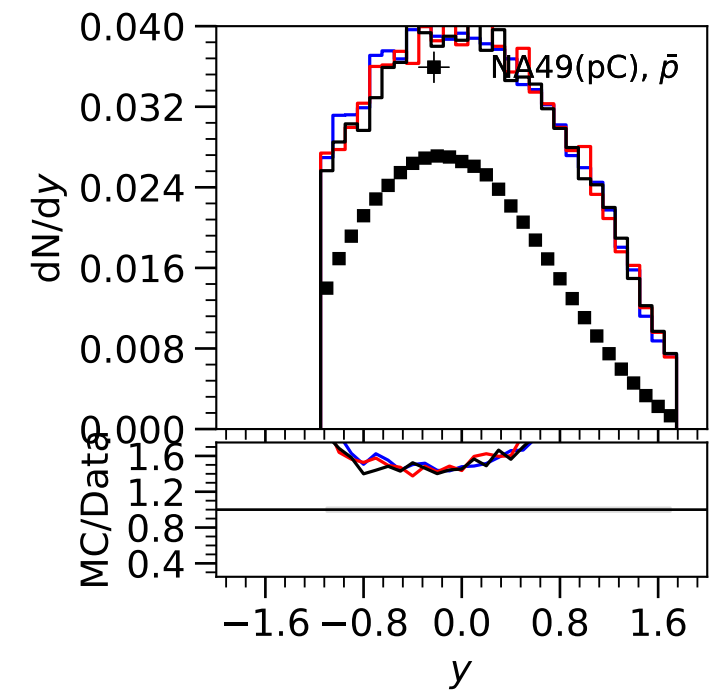
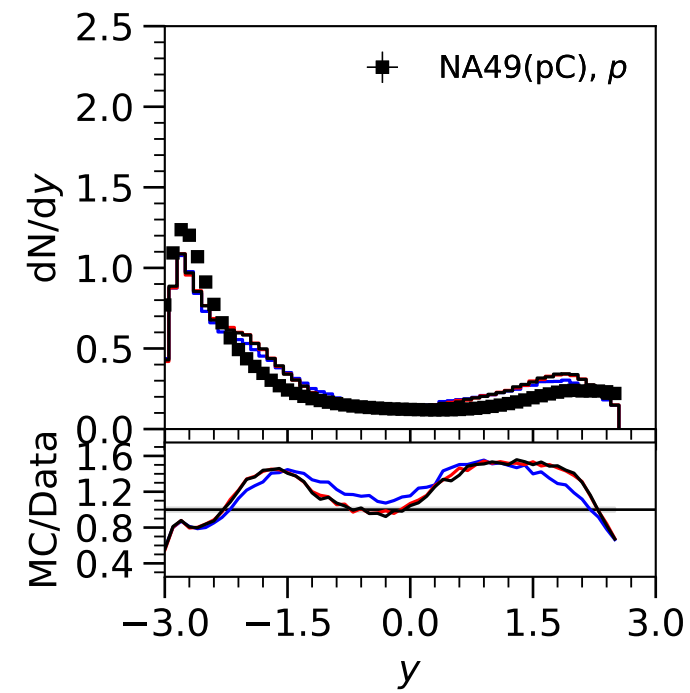
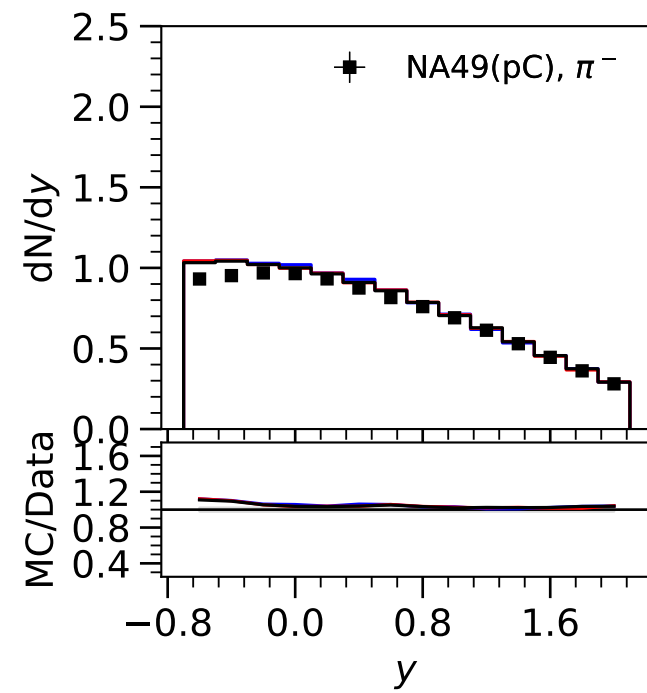
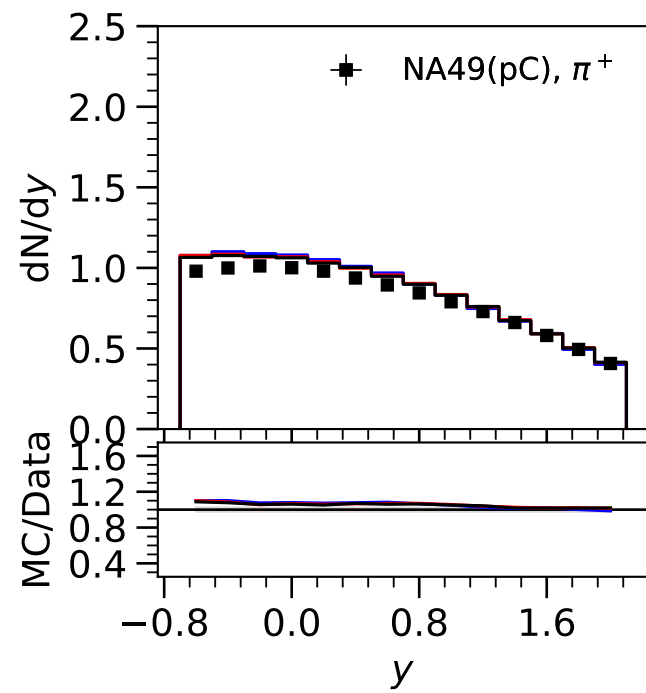


y - NA49 pC collisions at 158 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



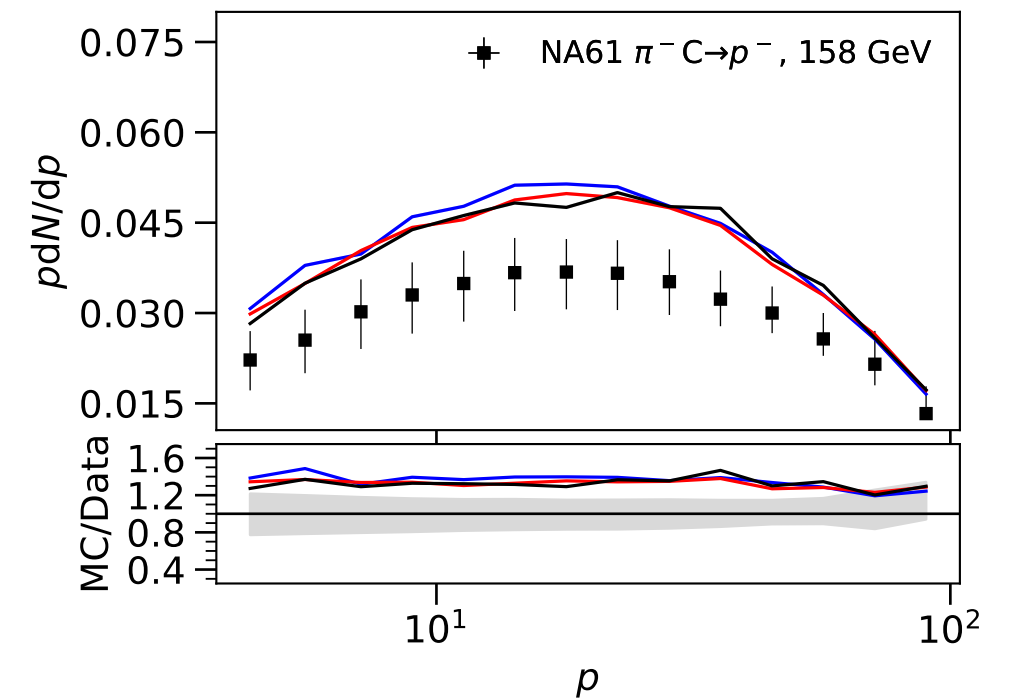
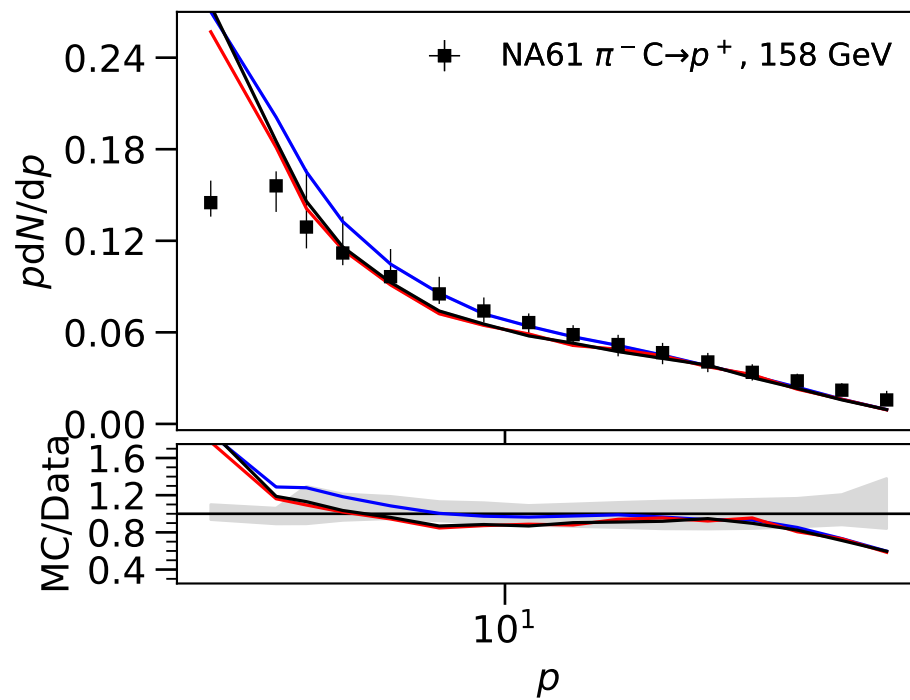
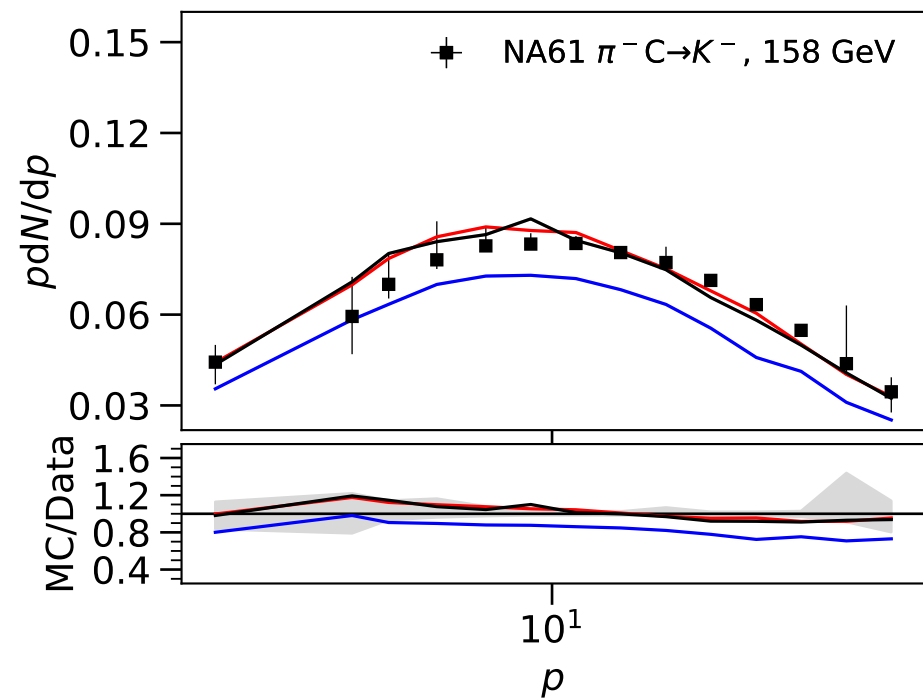
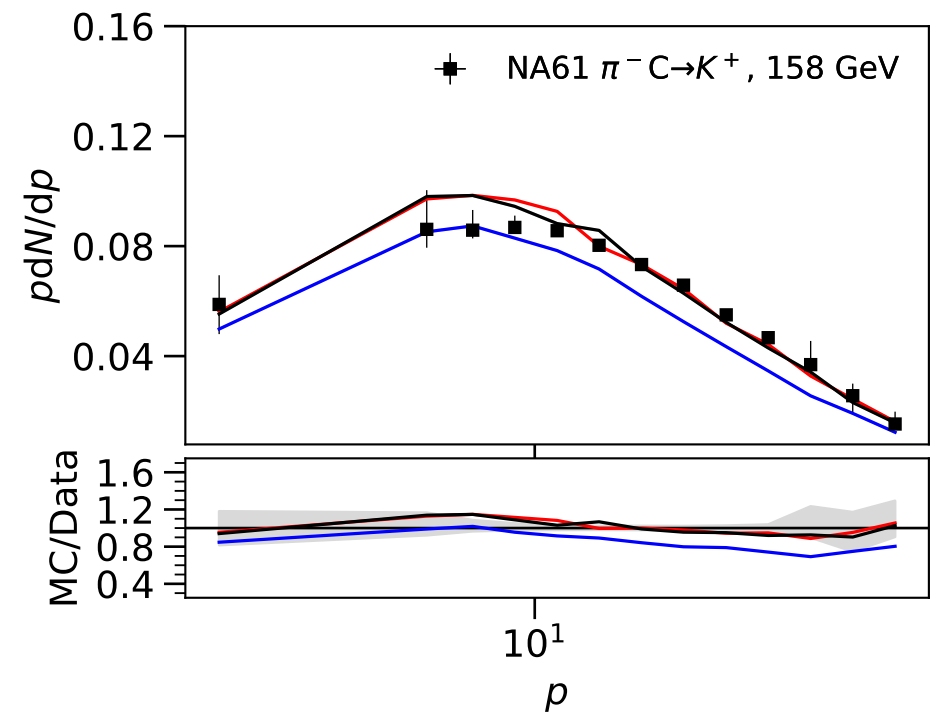
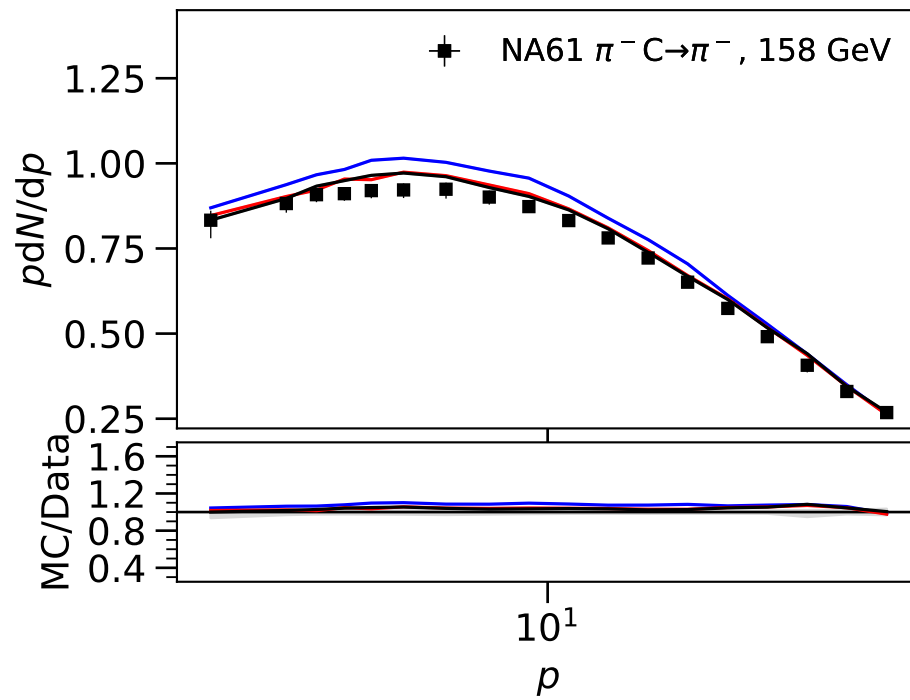
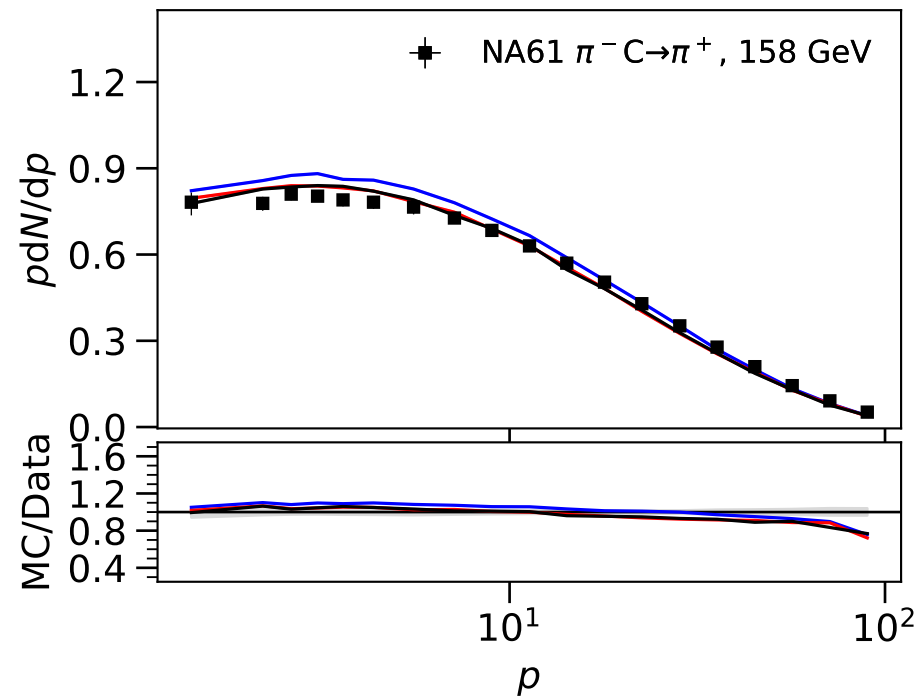
NA61: pion-Carbon

NA61 - momentum spectrum in $\pi^- + \text{C}$ at 158 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

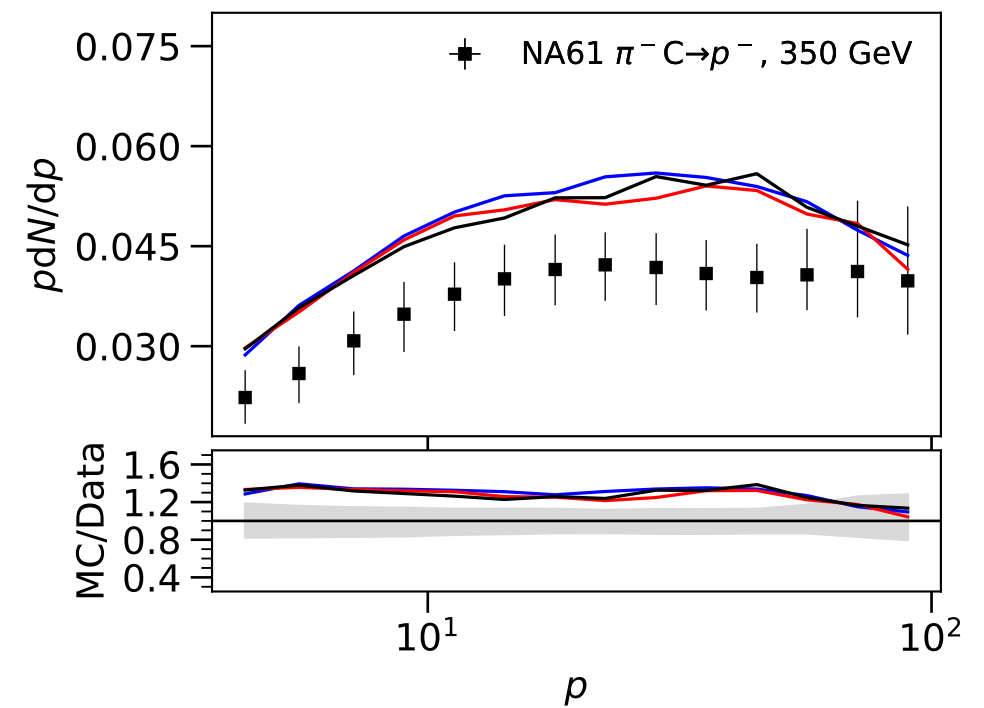
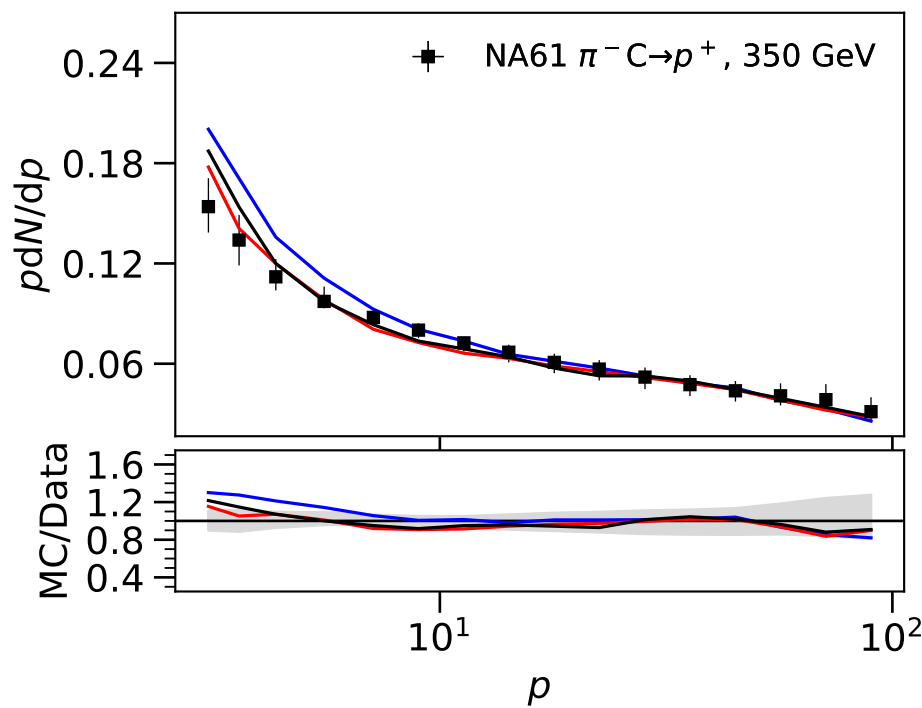
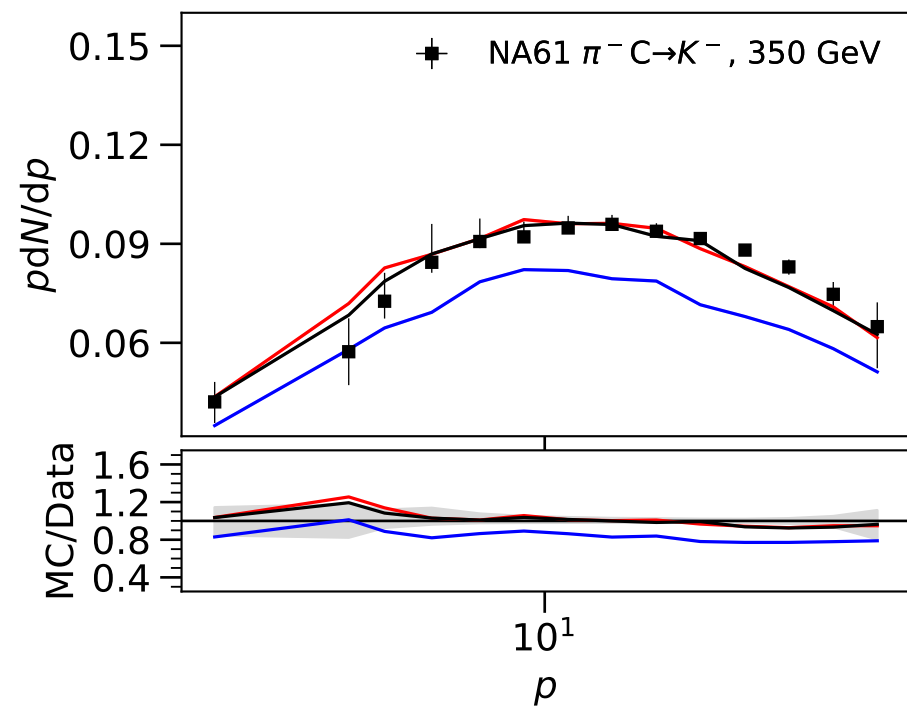
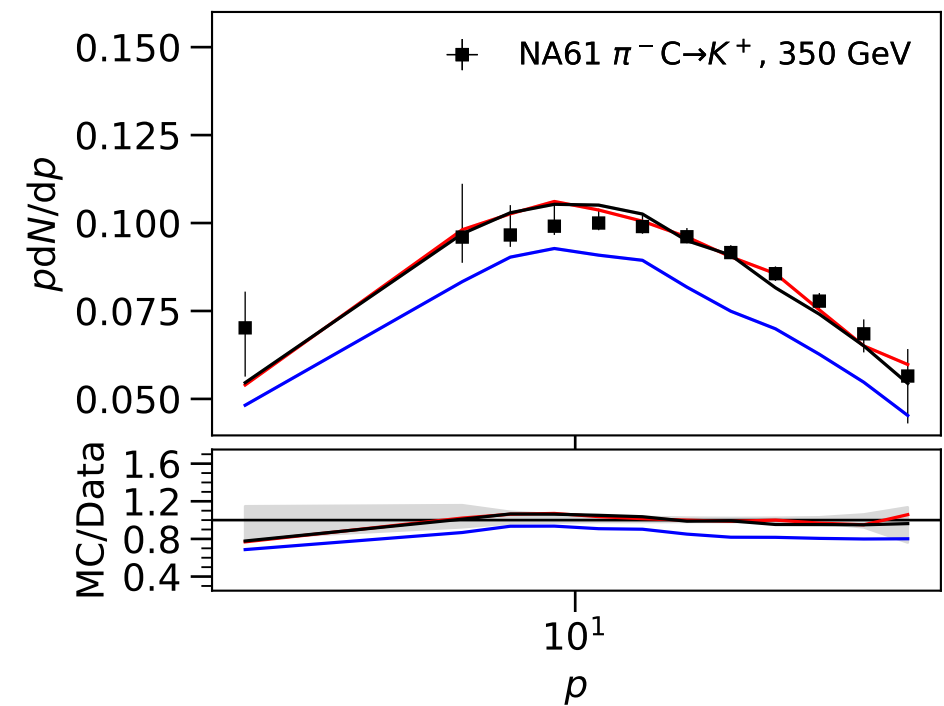
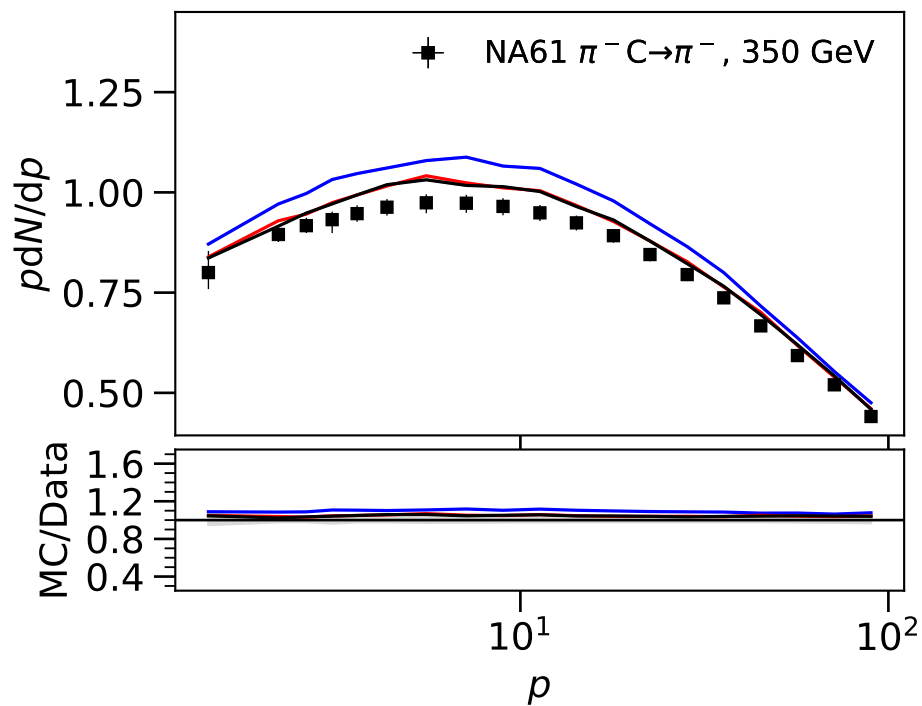
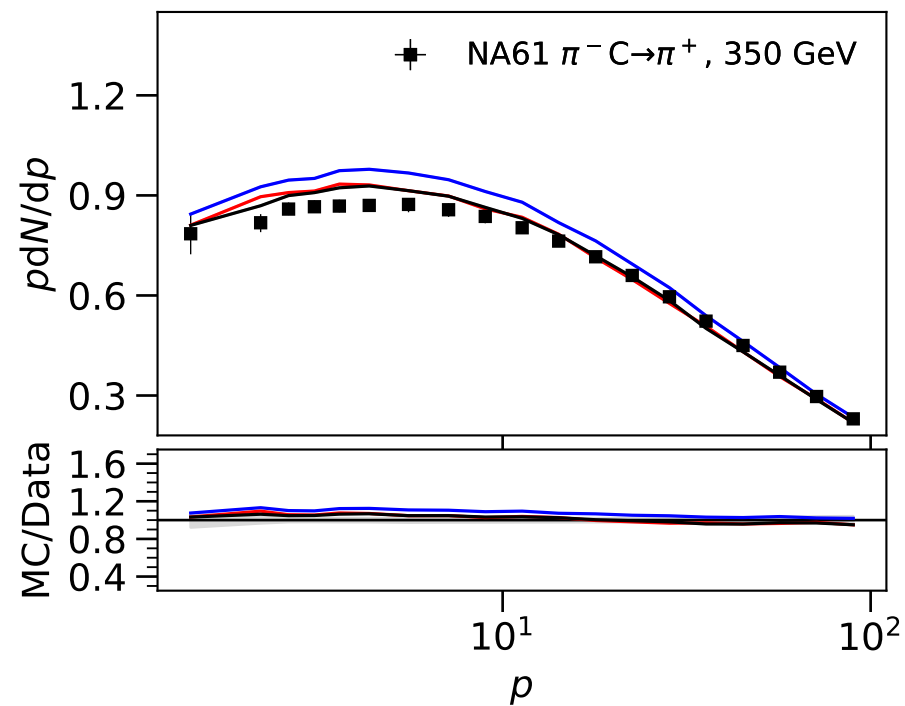


NA61 - momentum spectrum in $\pi^- + \text{C}$ at 350 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



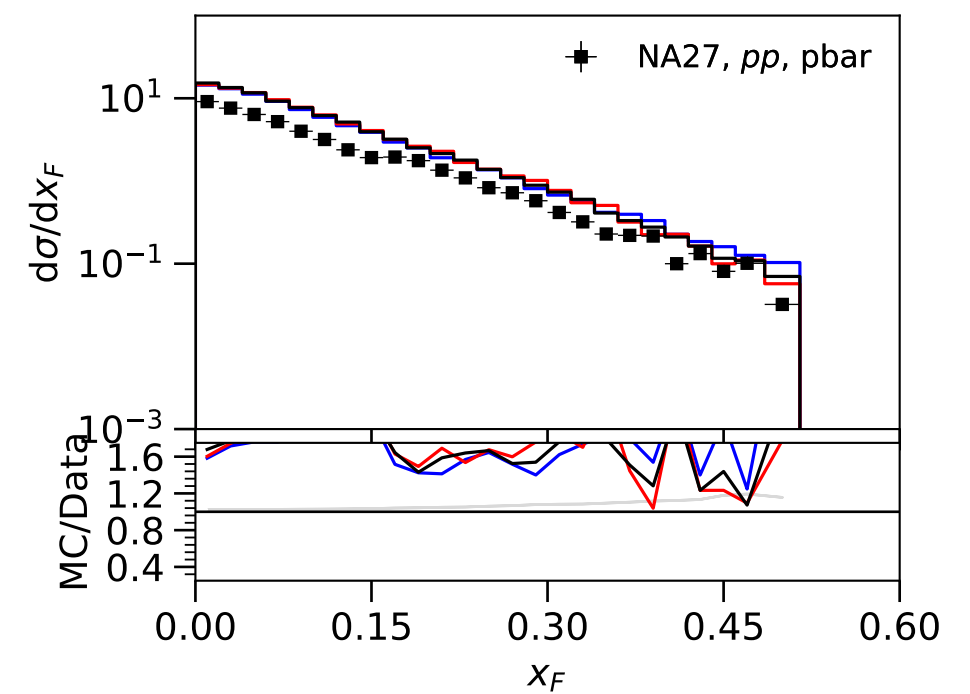
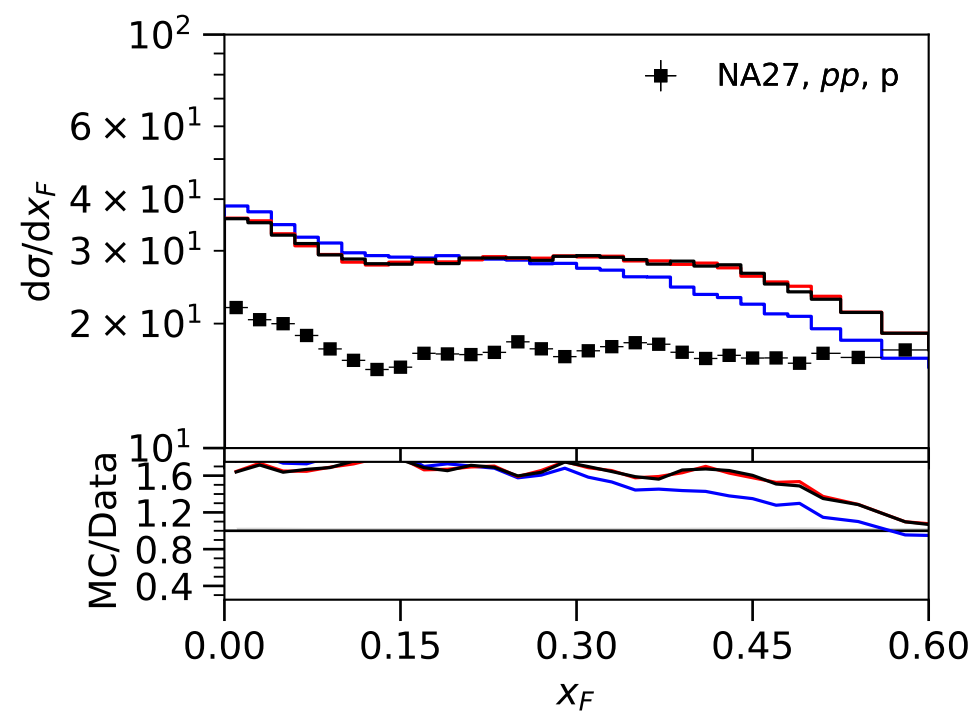
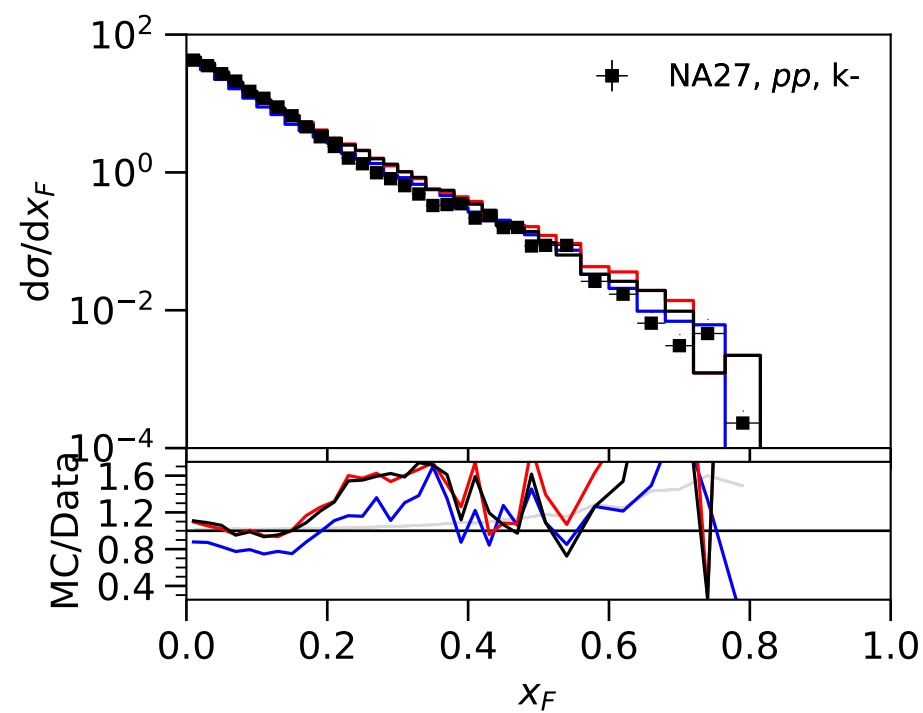
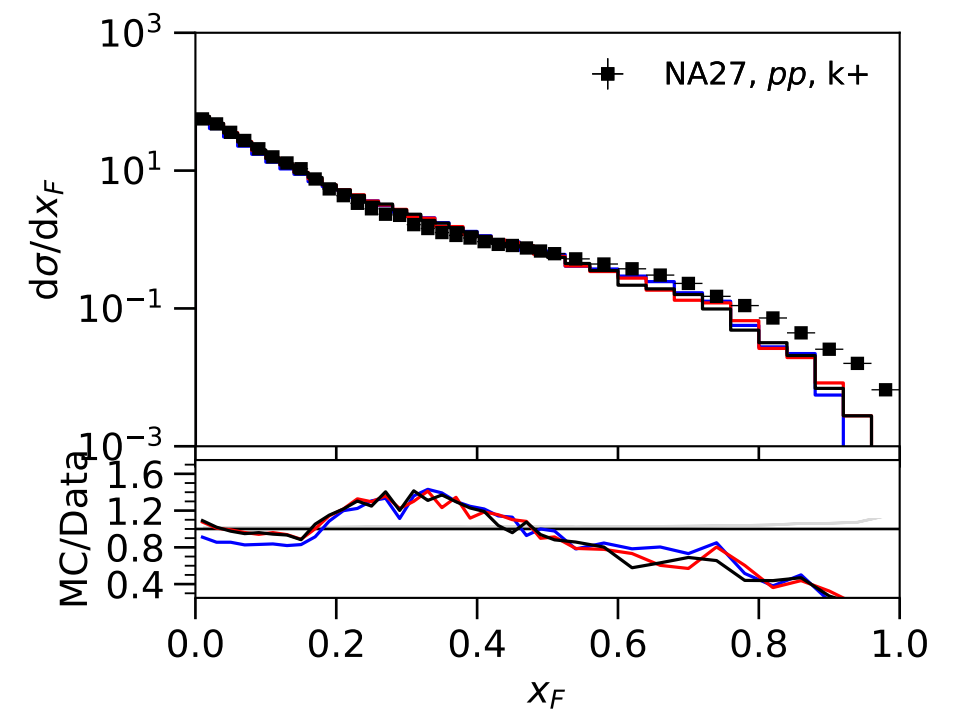
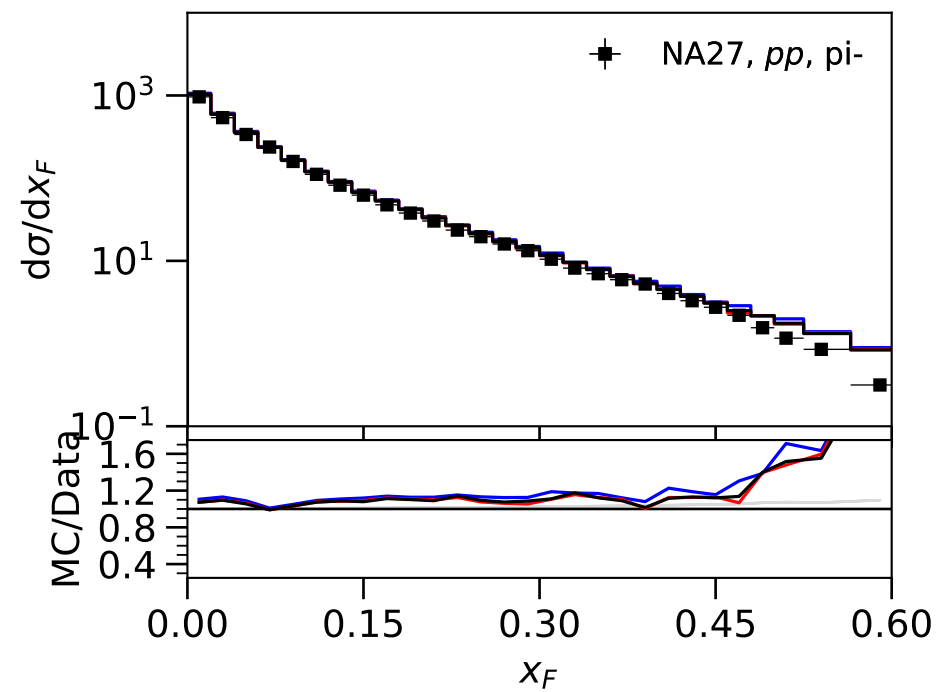
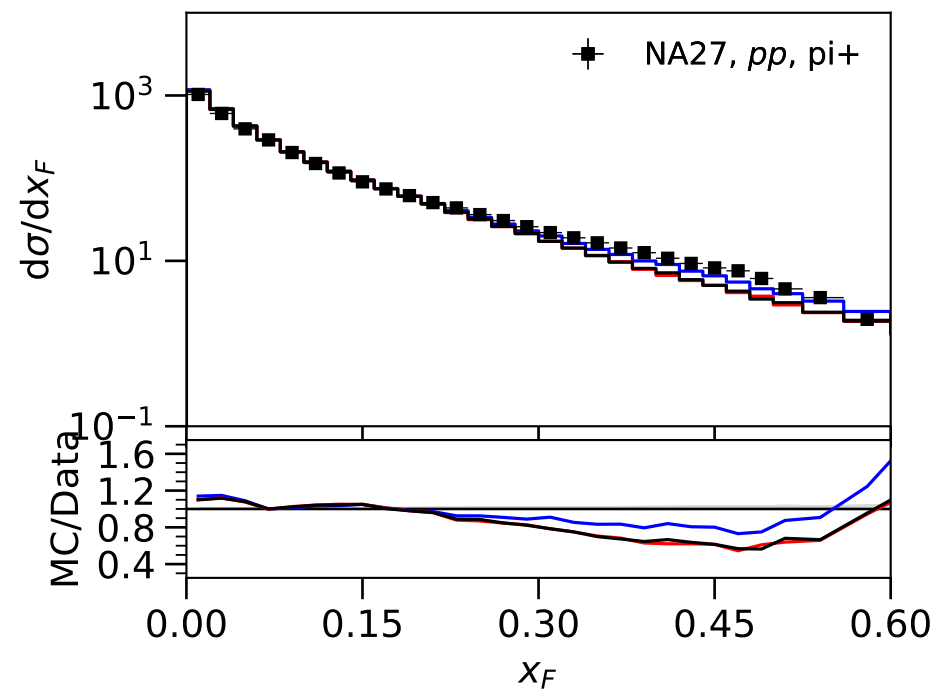
NA27: proton-proton

x_F - NA27 pp collisions at 400 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

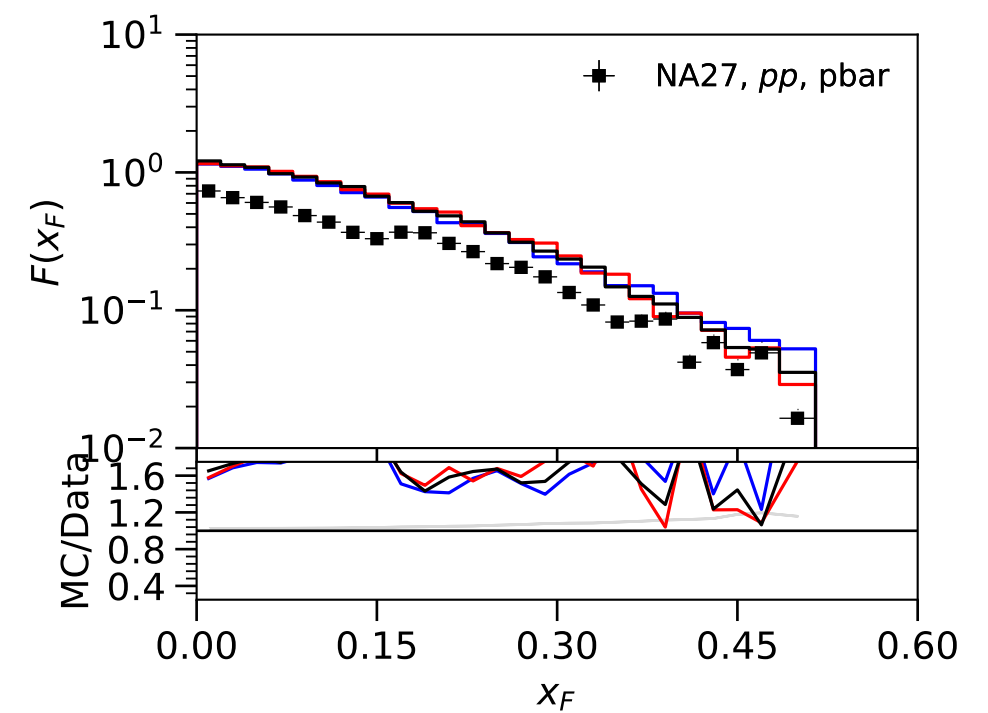
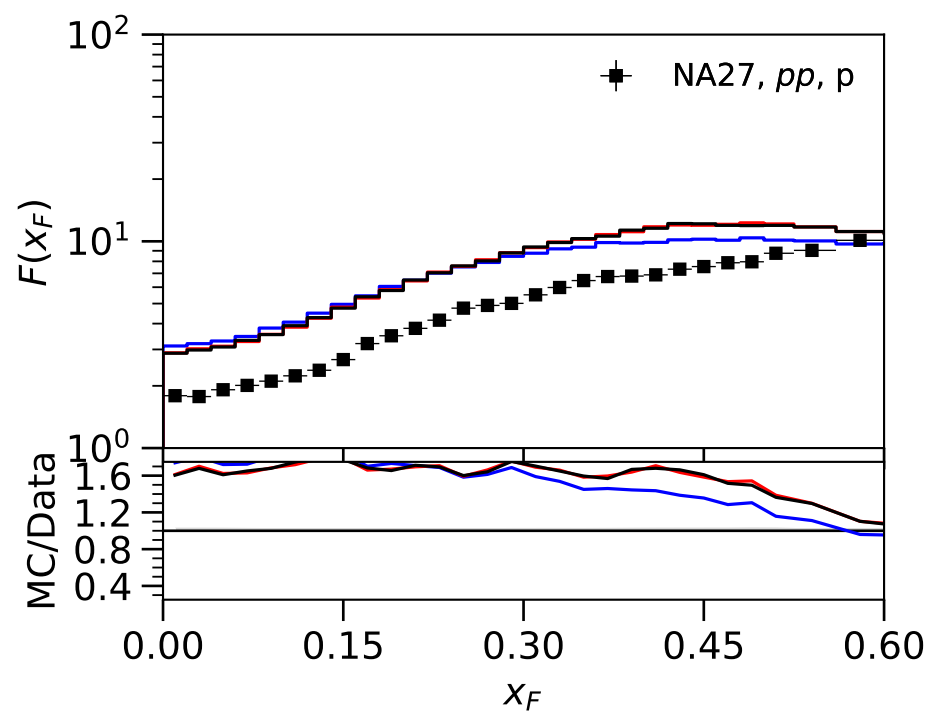
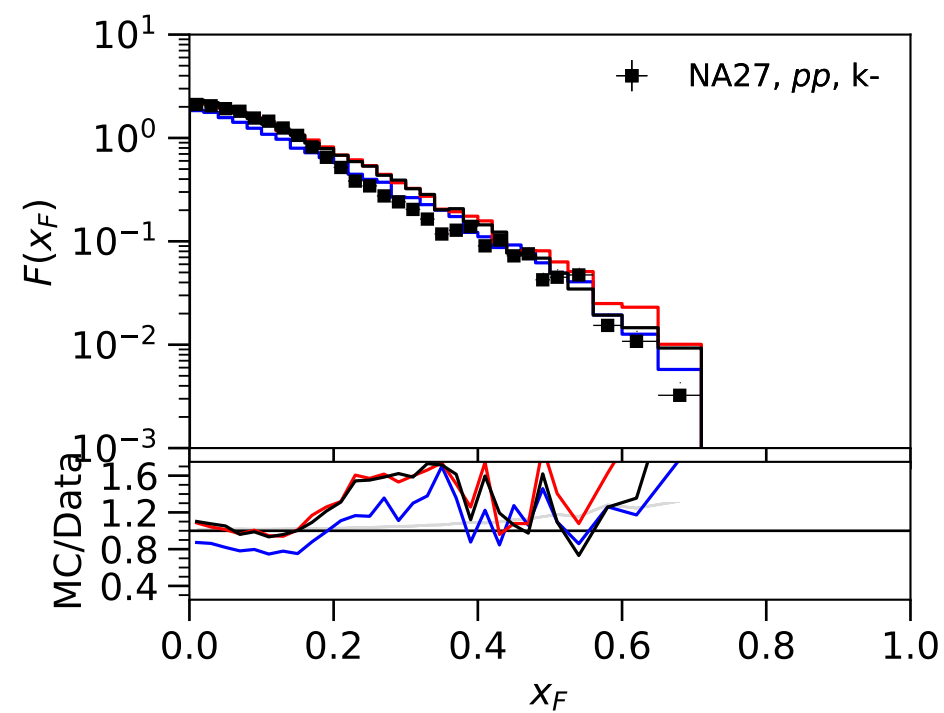
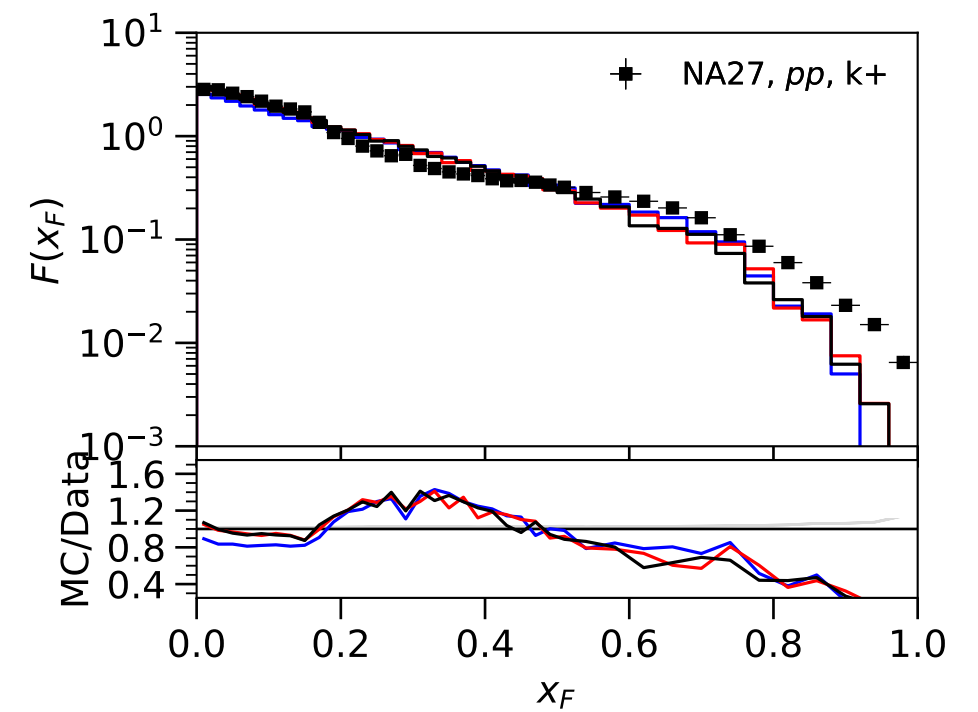
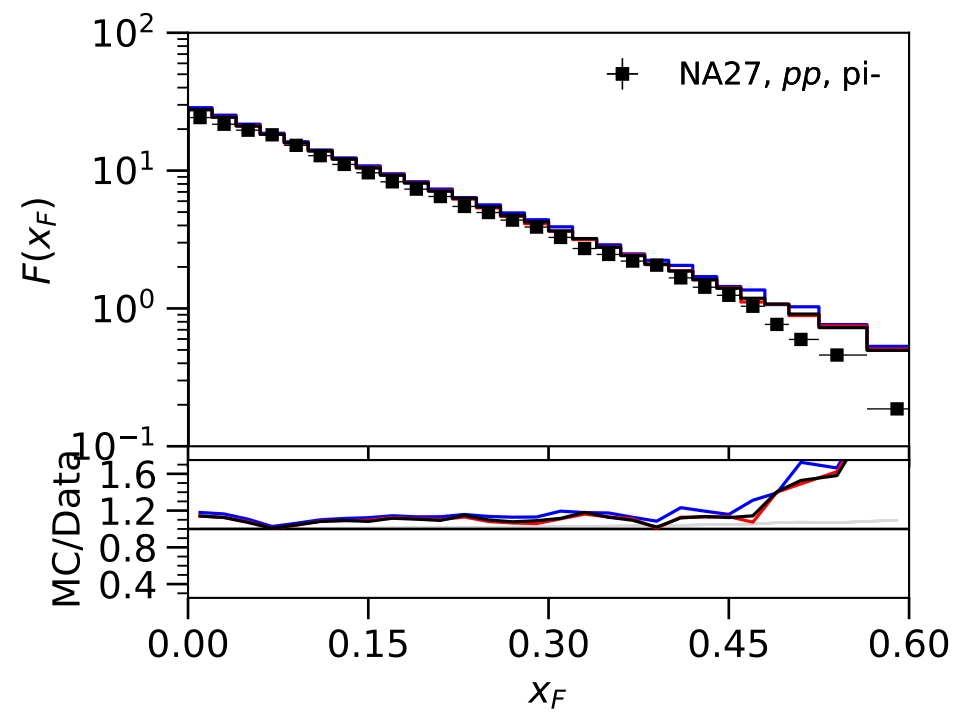
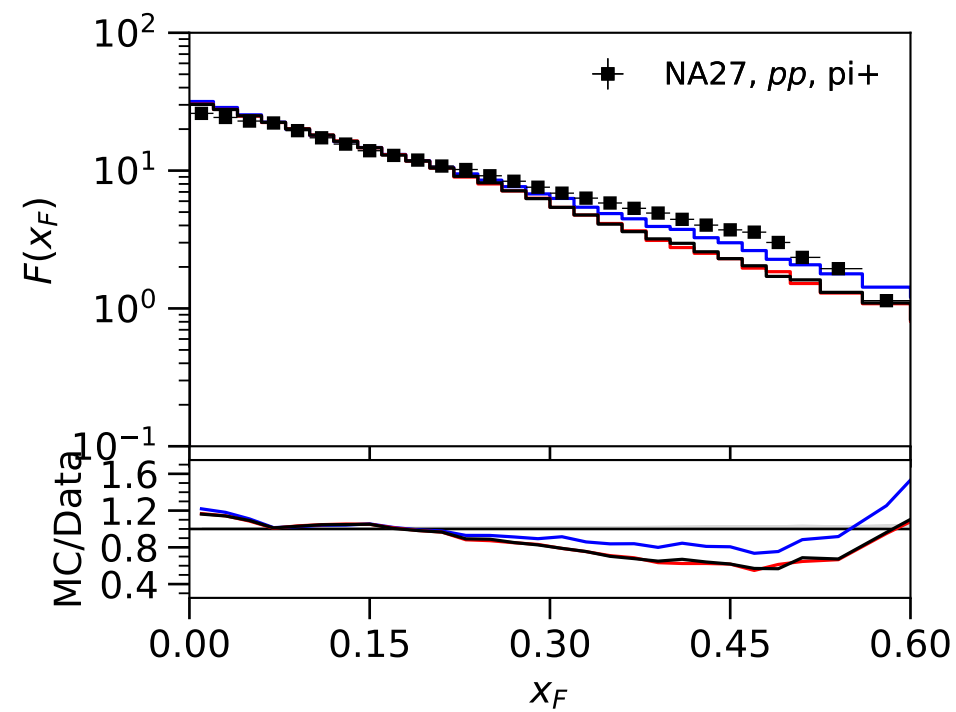


$F(x_F)$ - NA27 pp collisions at 400 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

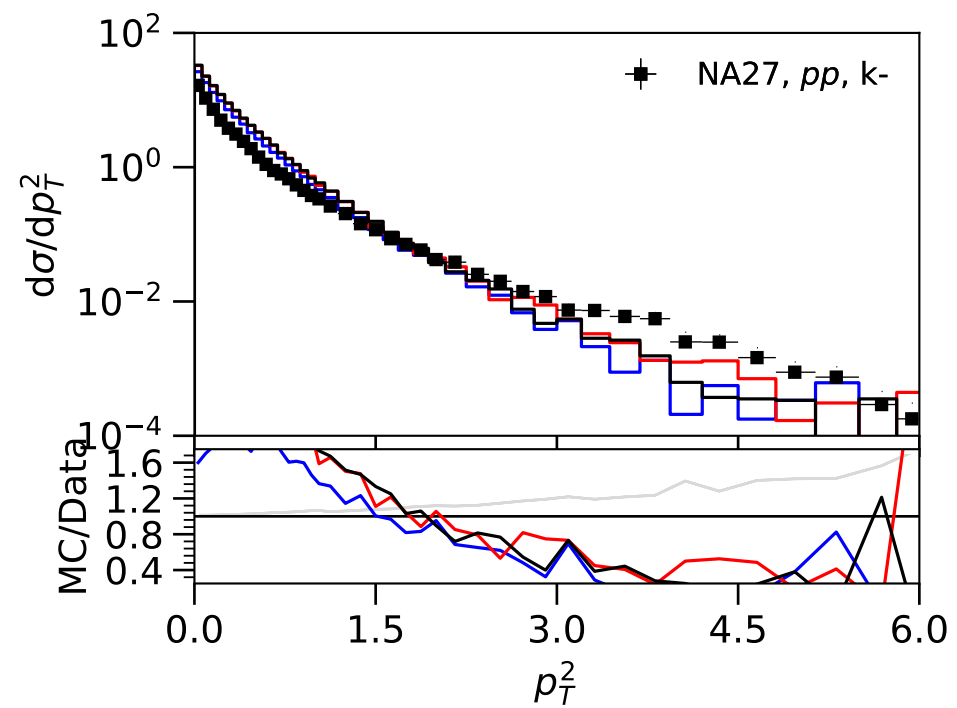
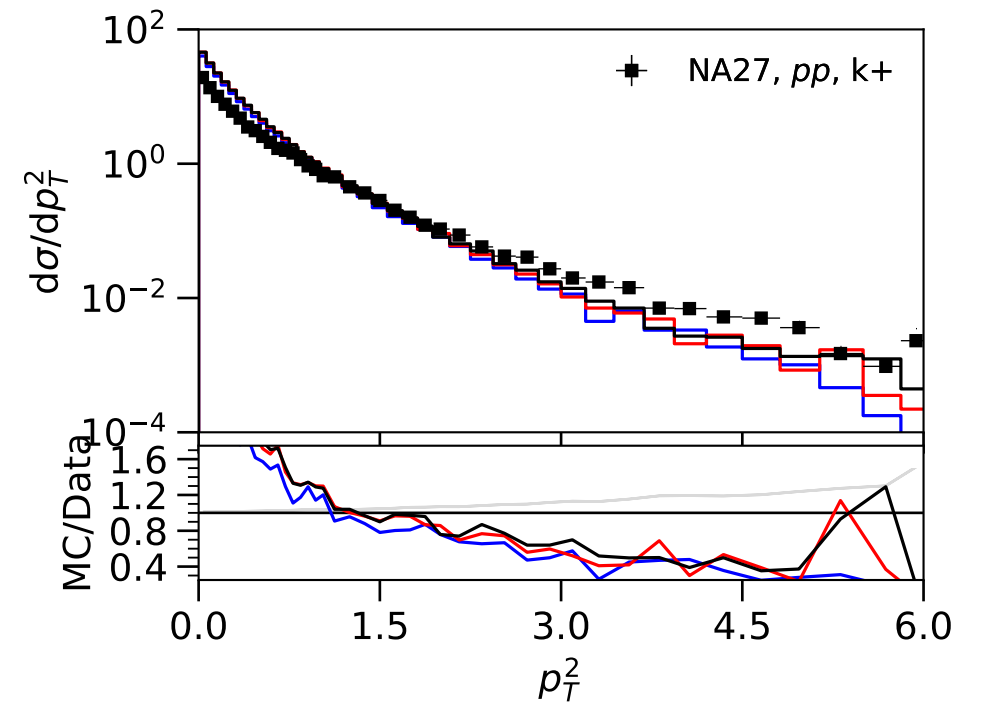
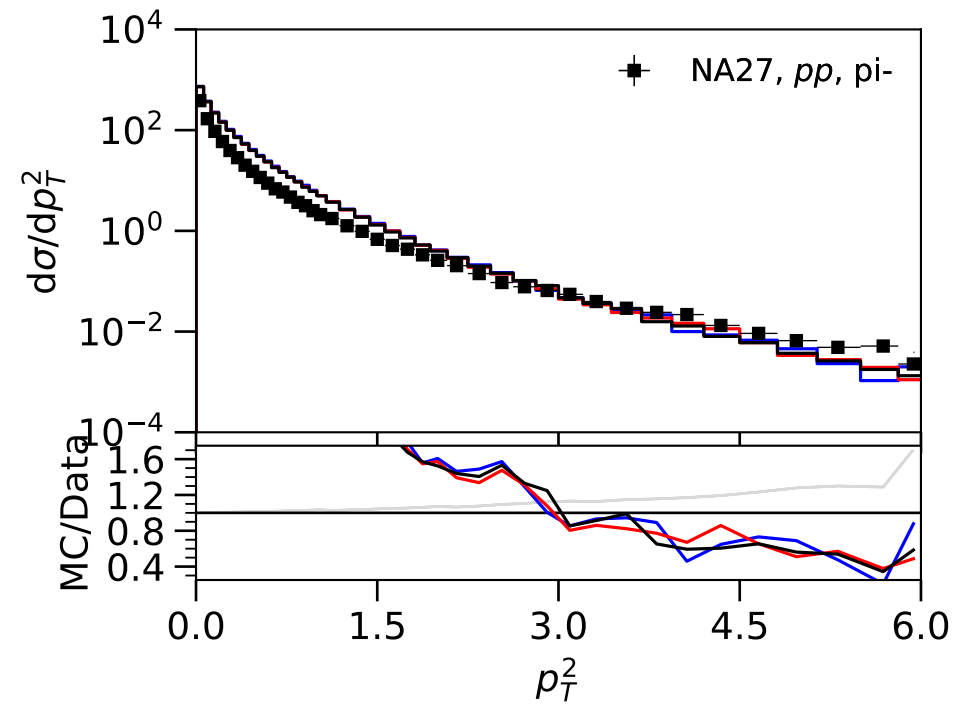
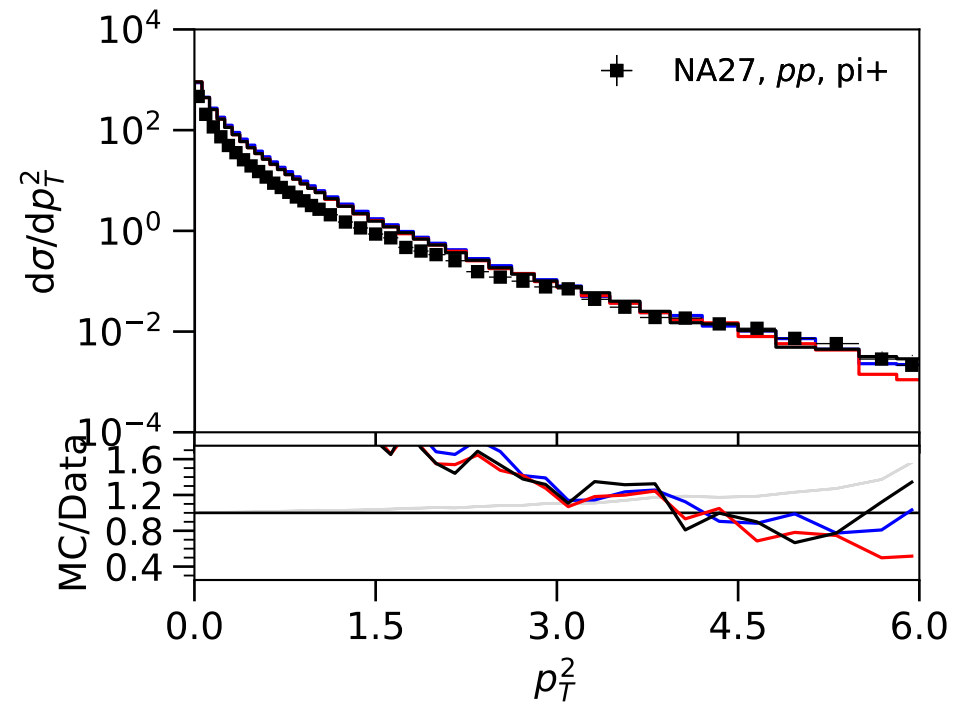


p_T^2 - NA27 pp collisions at 400 GeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

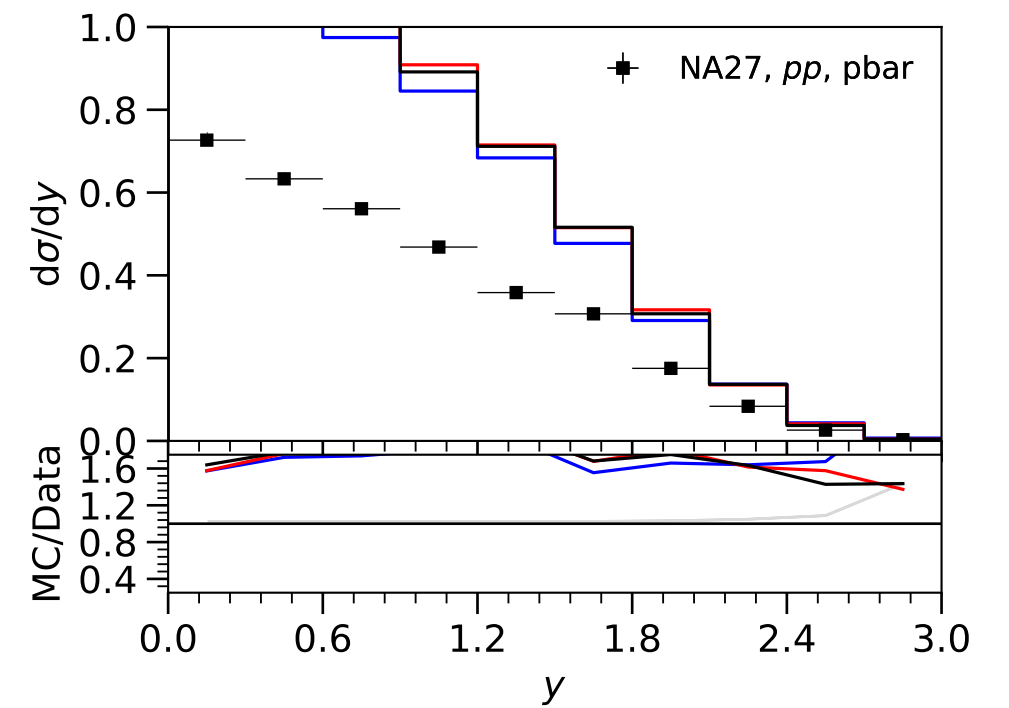
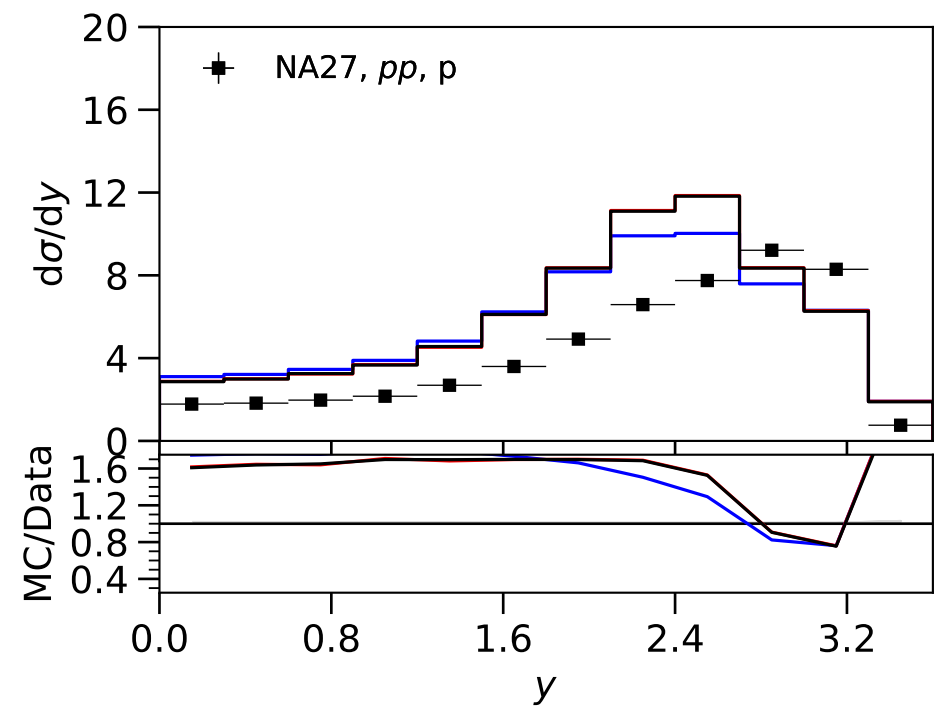
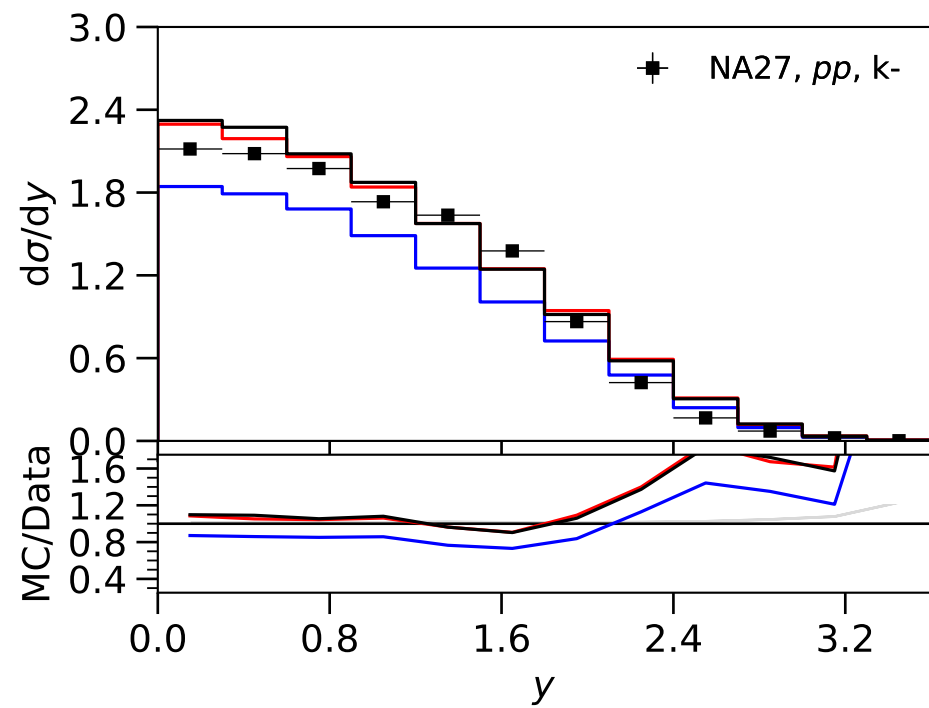
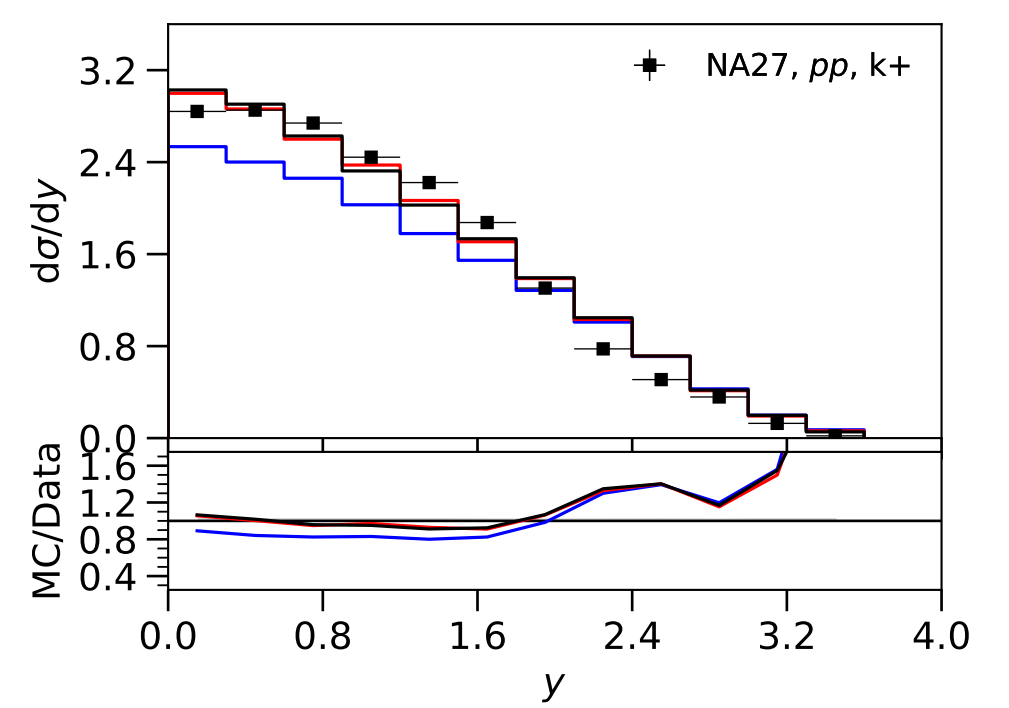
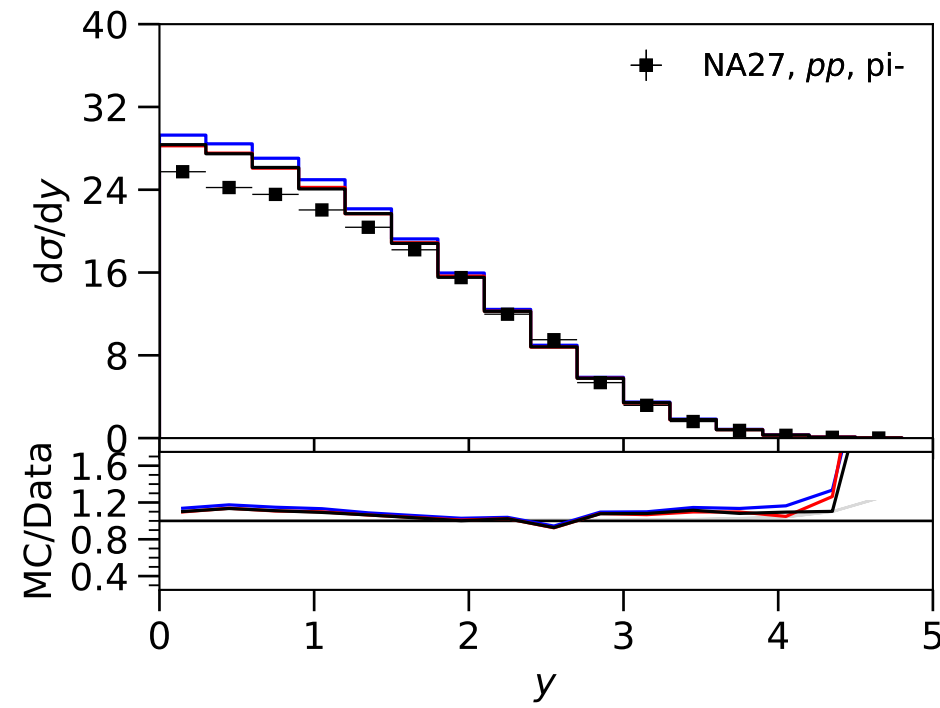
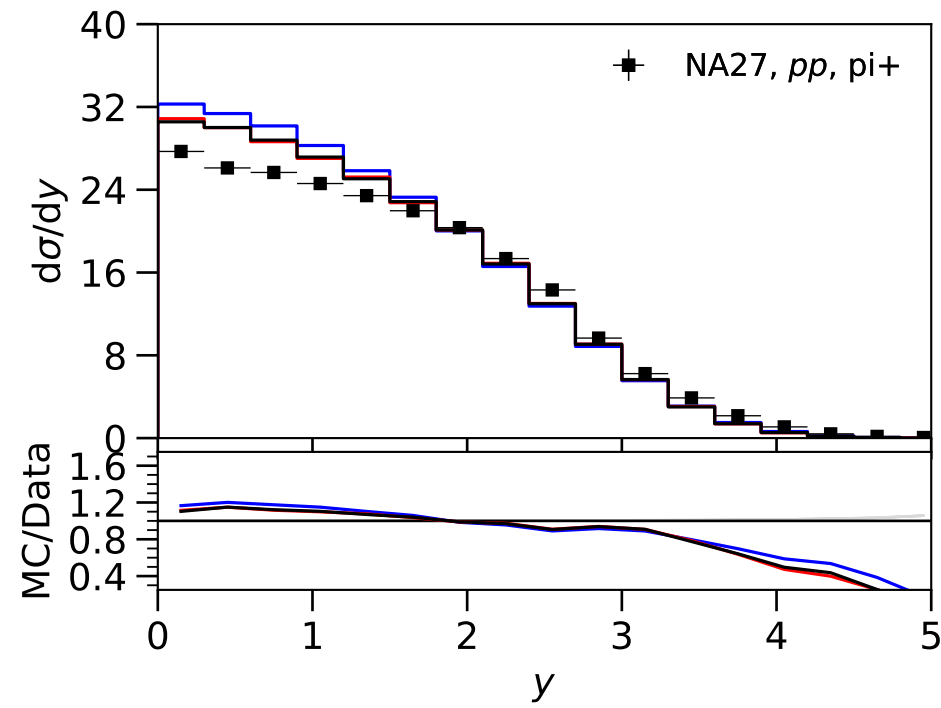


y - NA27 pp collisions at 158 GeV

DPMJET-III 19.1

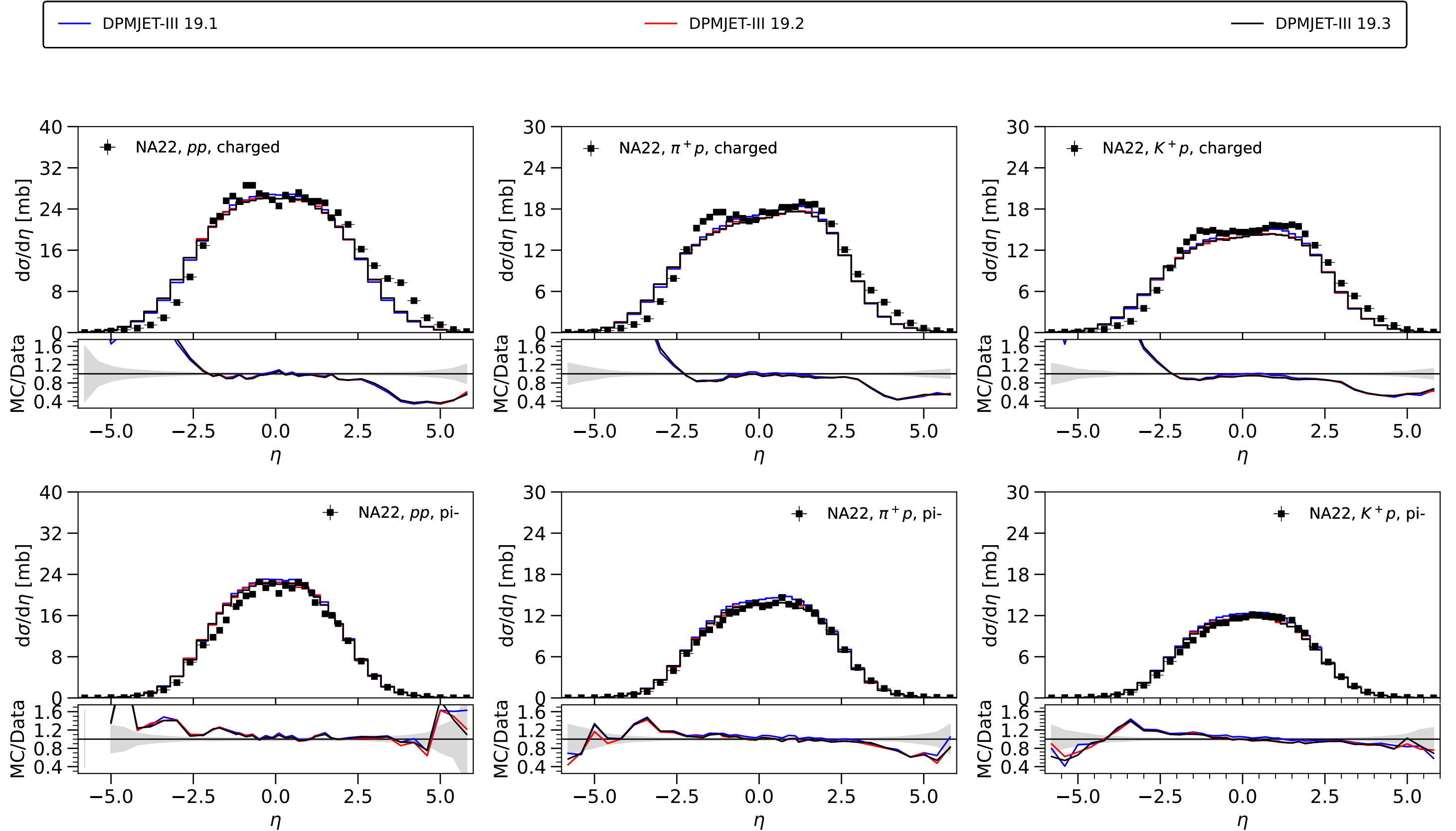
DPMJET-III 19.2

DPMJET-III 19.3

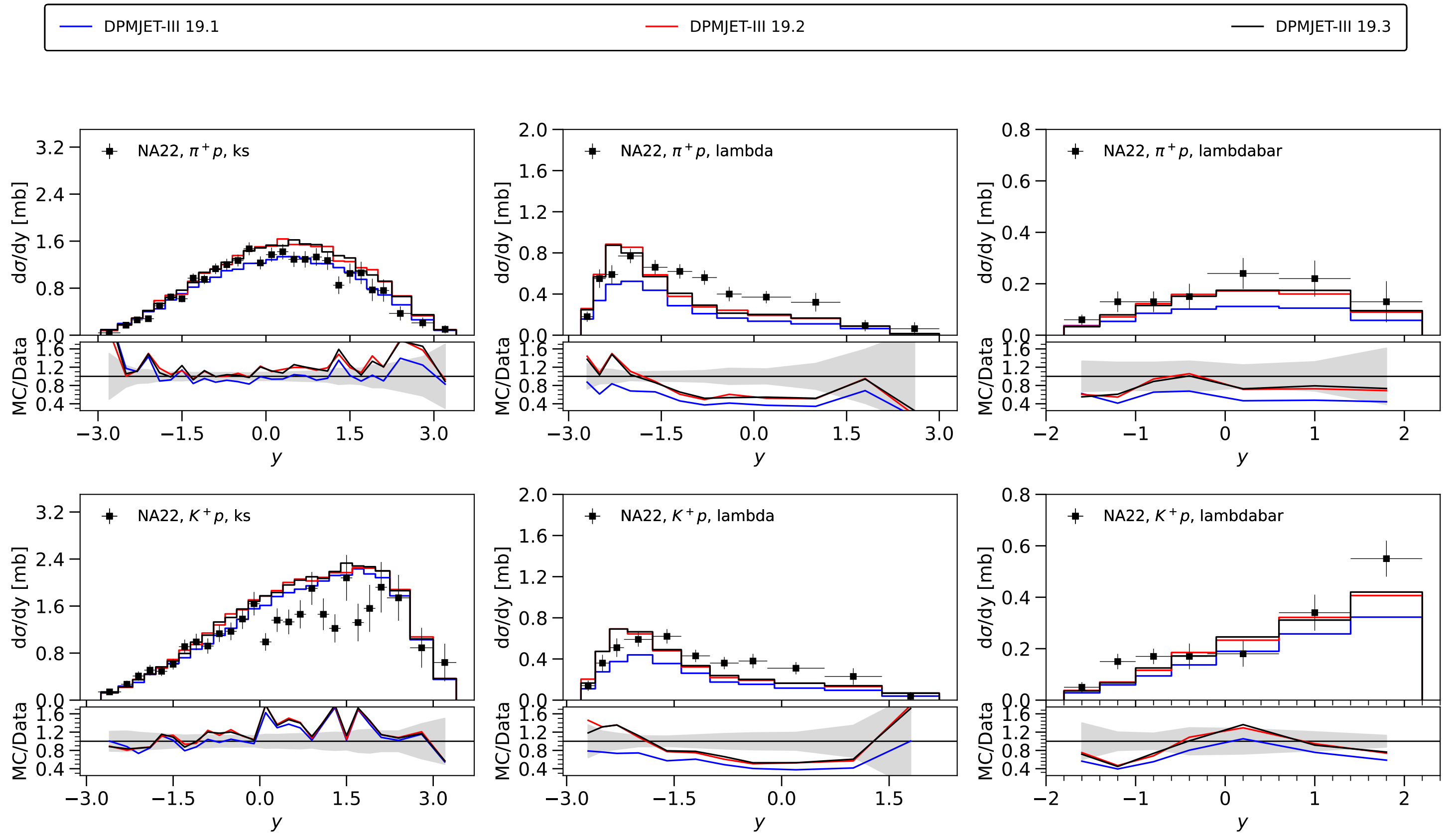


NA22: $p^-/\pi^-/K^-$ -proton

η - NA22 pp , $\pi^+ p$ and $K^+ p$ collisions at 250 GeV



y - NA22 $\pi^+ p$ and $K^+ p$ collisions at 250 GeV

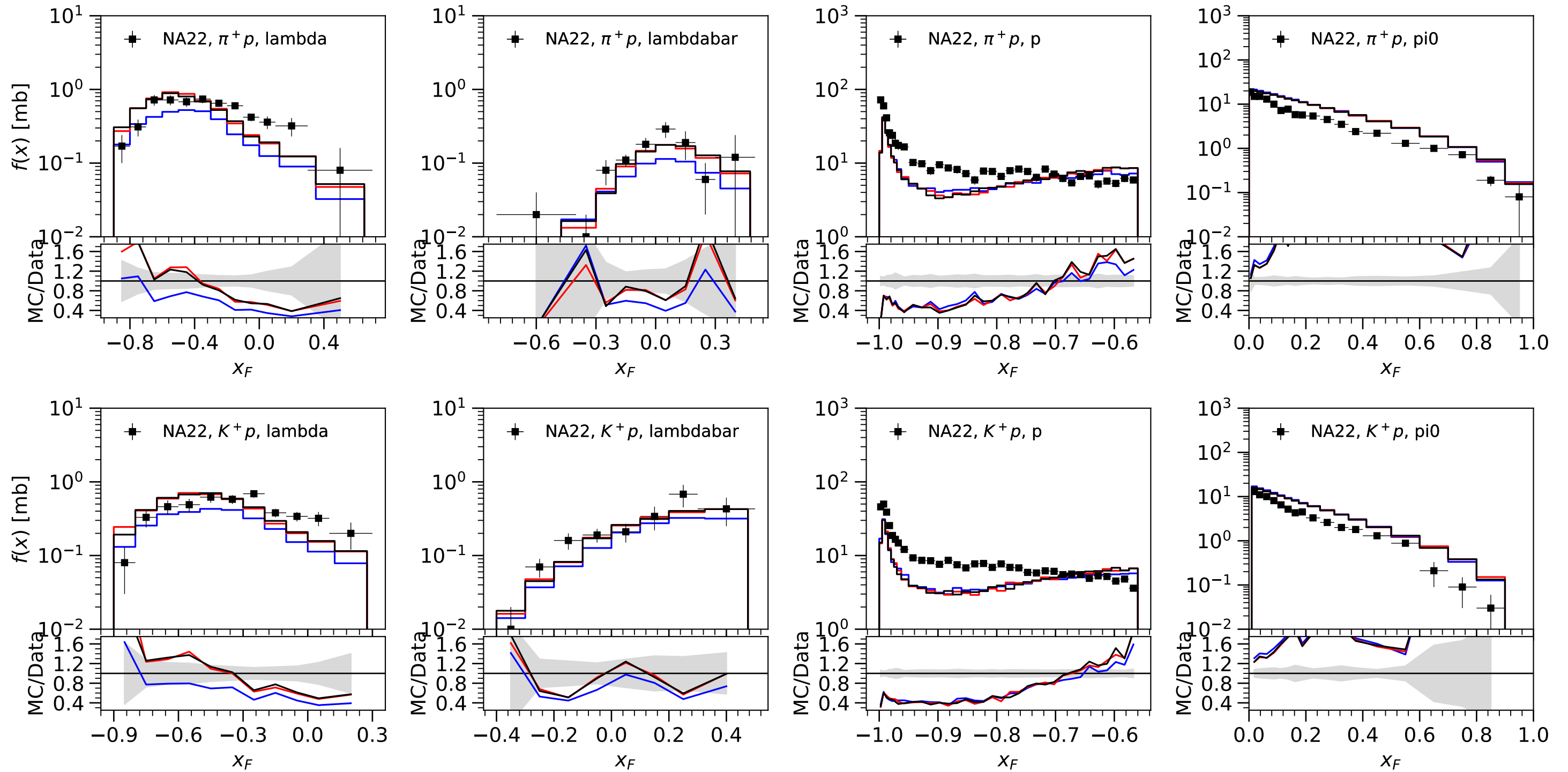


$f(x)$ - NA22 $\pi^+ p$ and $K^+ p$ collisions at 250 GeV

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

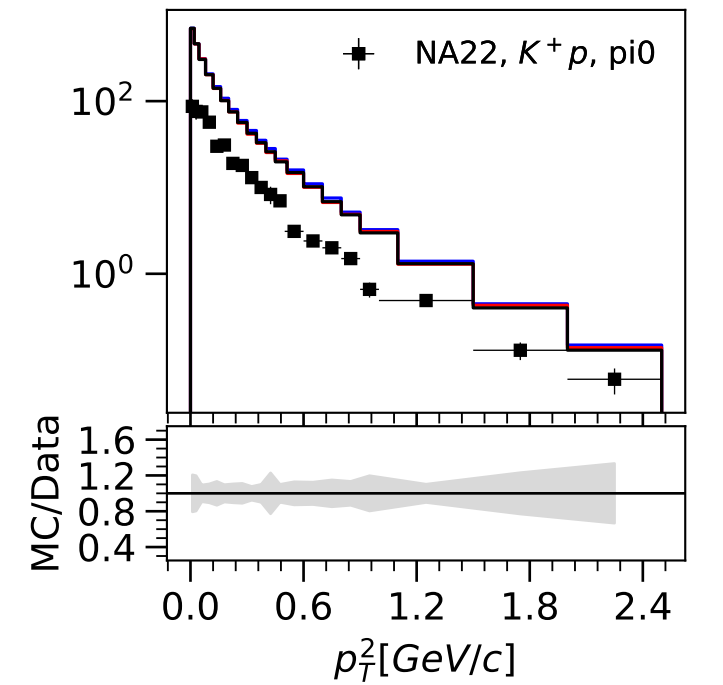
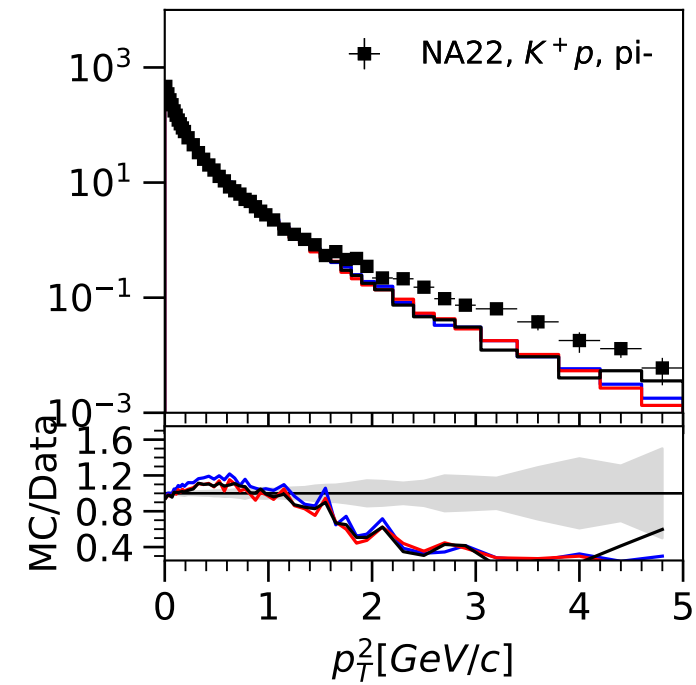
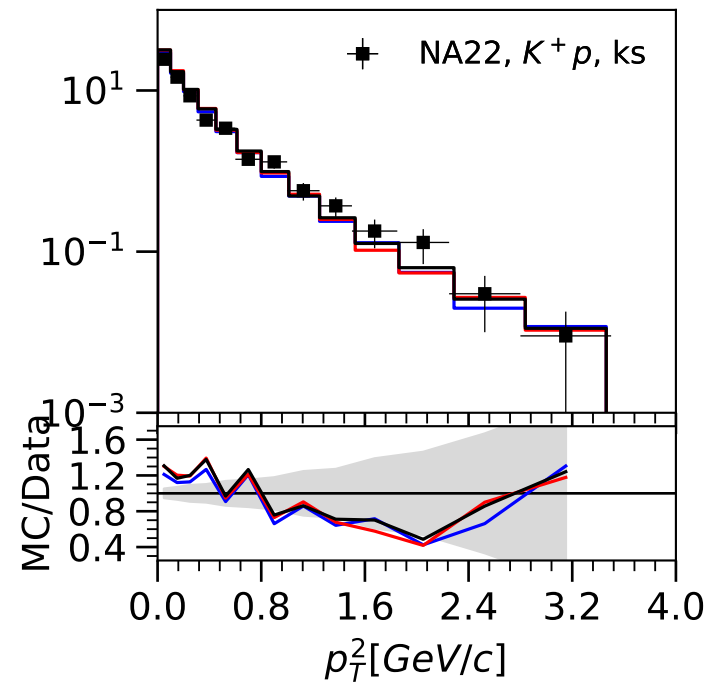
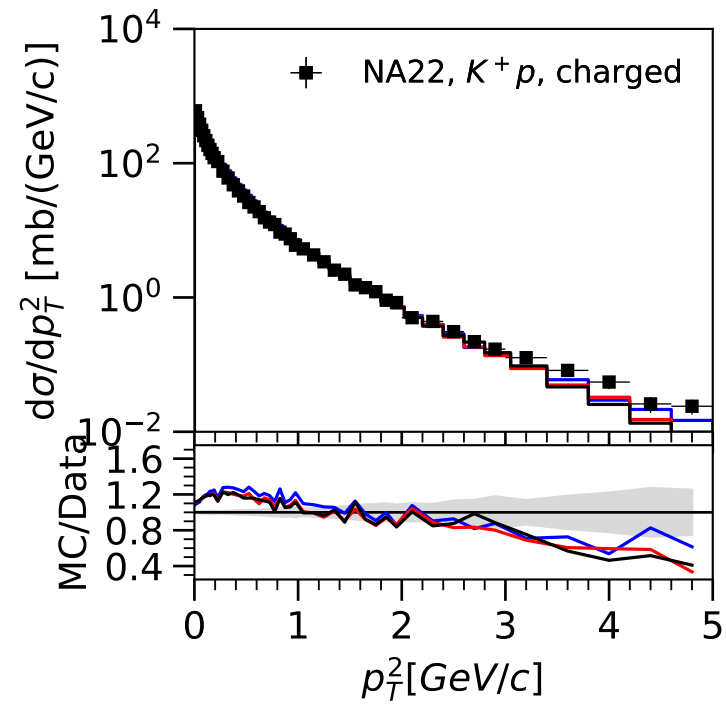
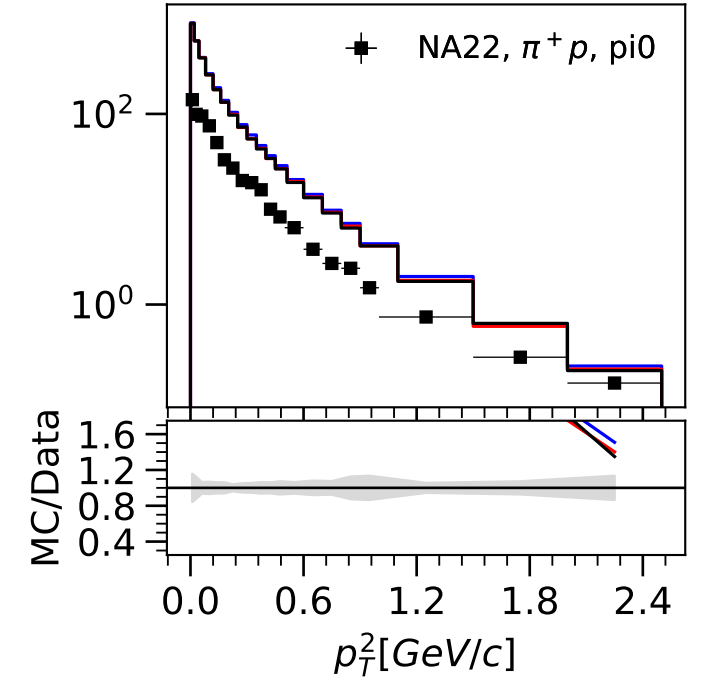
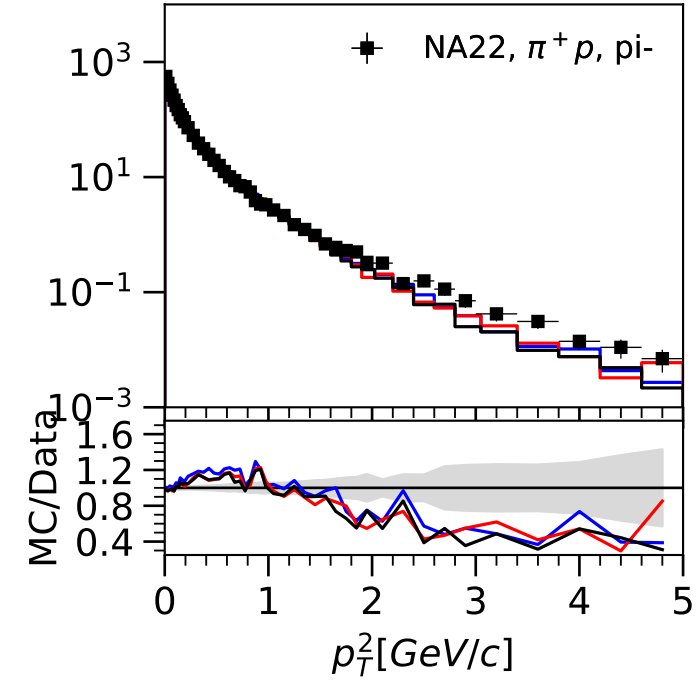
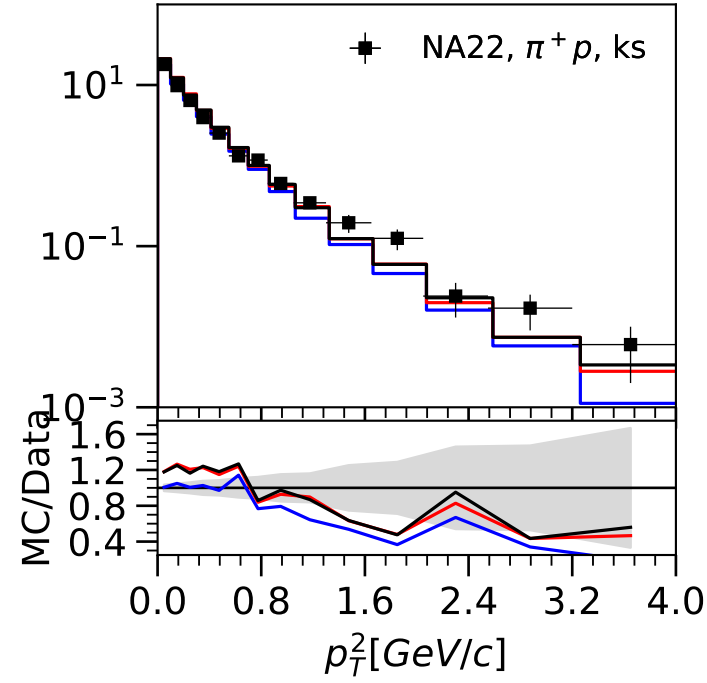
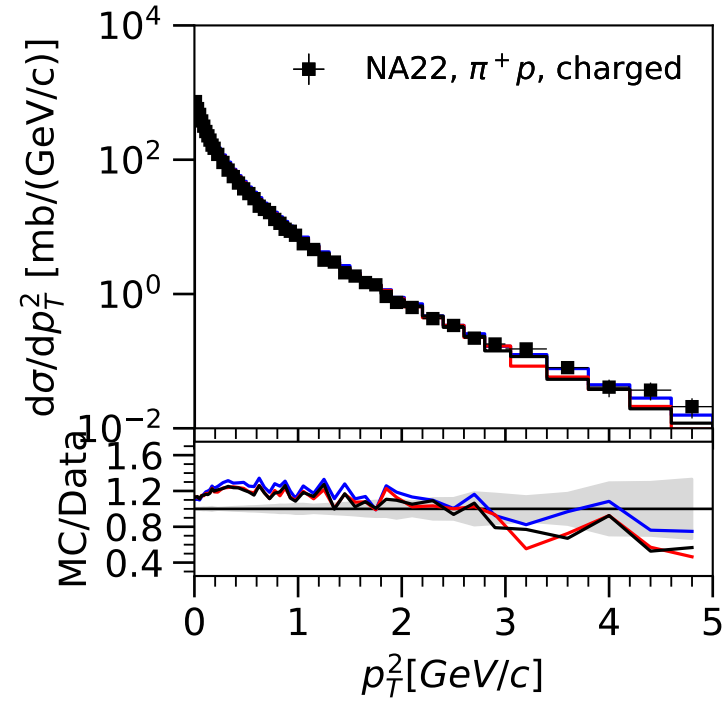


p_T^2 - NA22 $\pi^+ p$ and $K^+ p$ collisions at 250 GeV

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

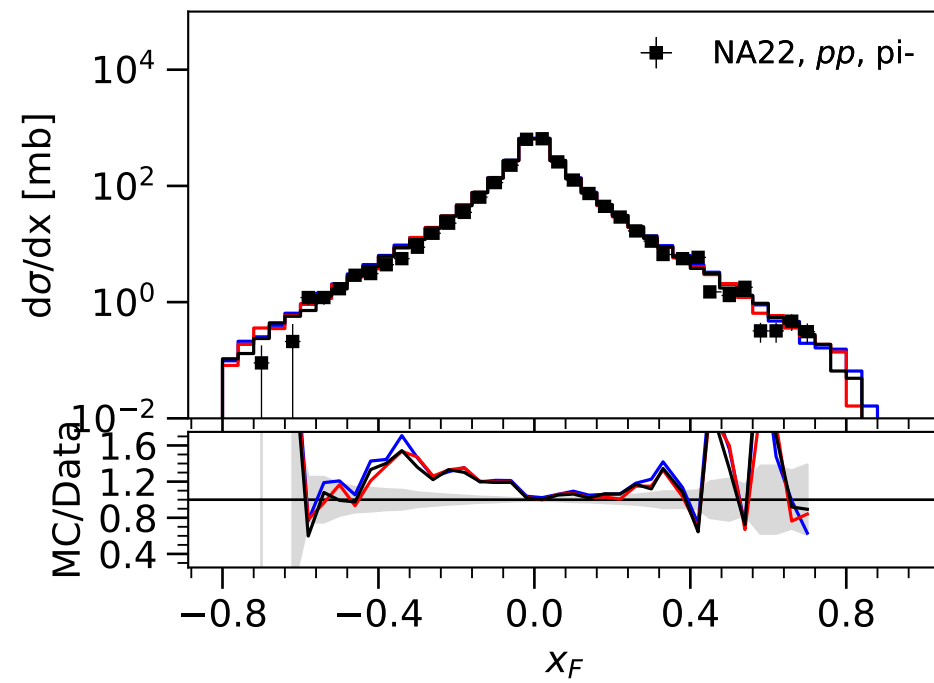
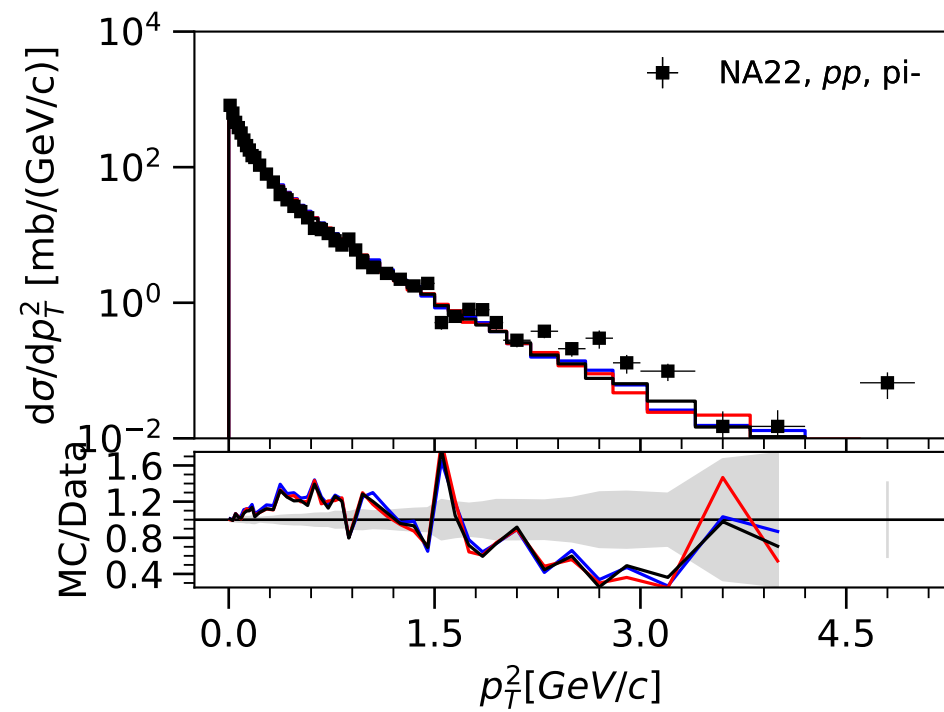
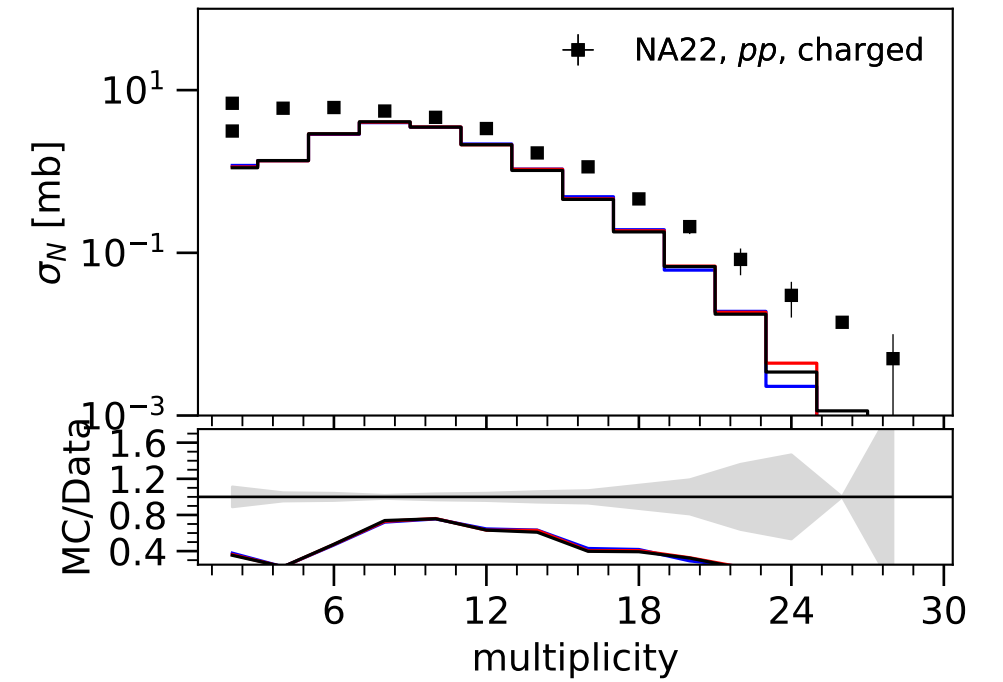
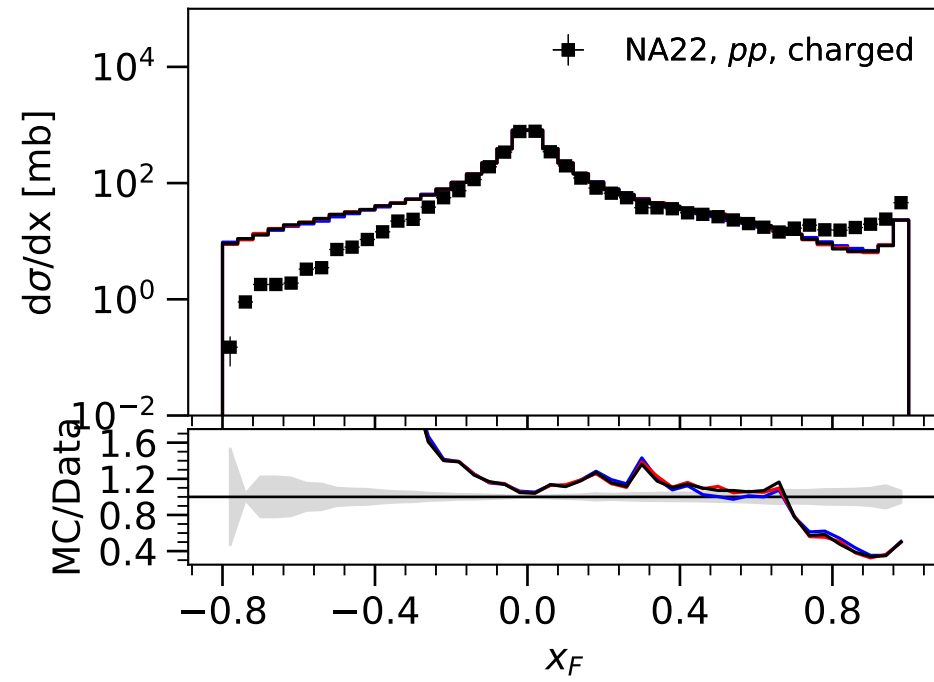
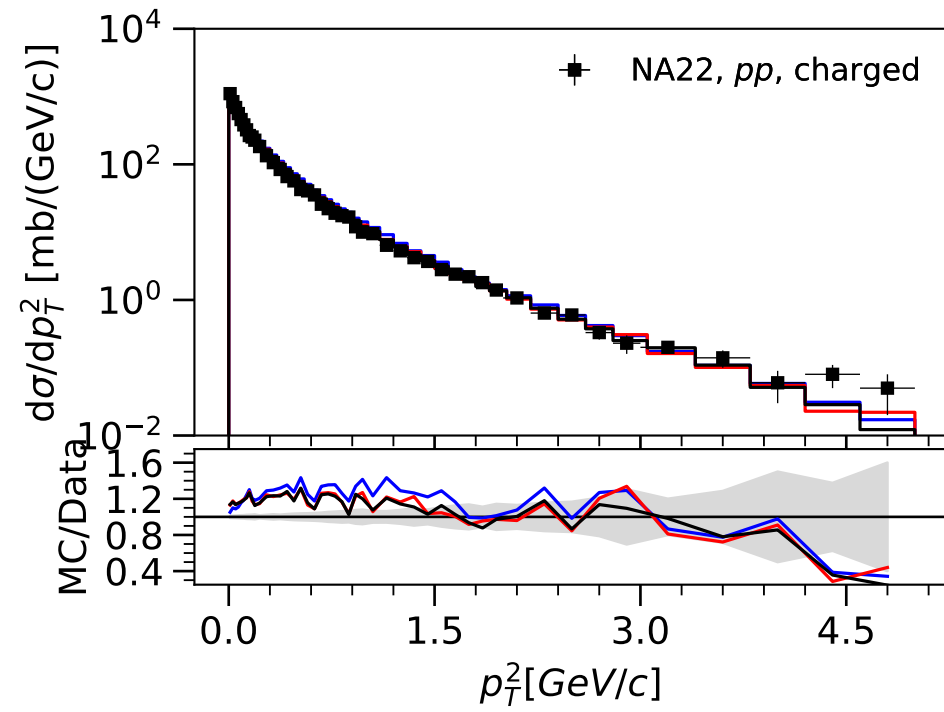


y - NA22 pp collisions at 250 GeV

DPMJET-III 19.1

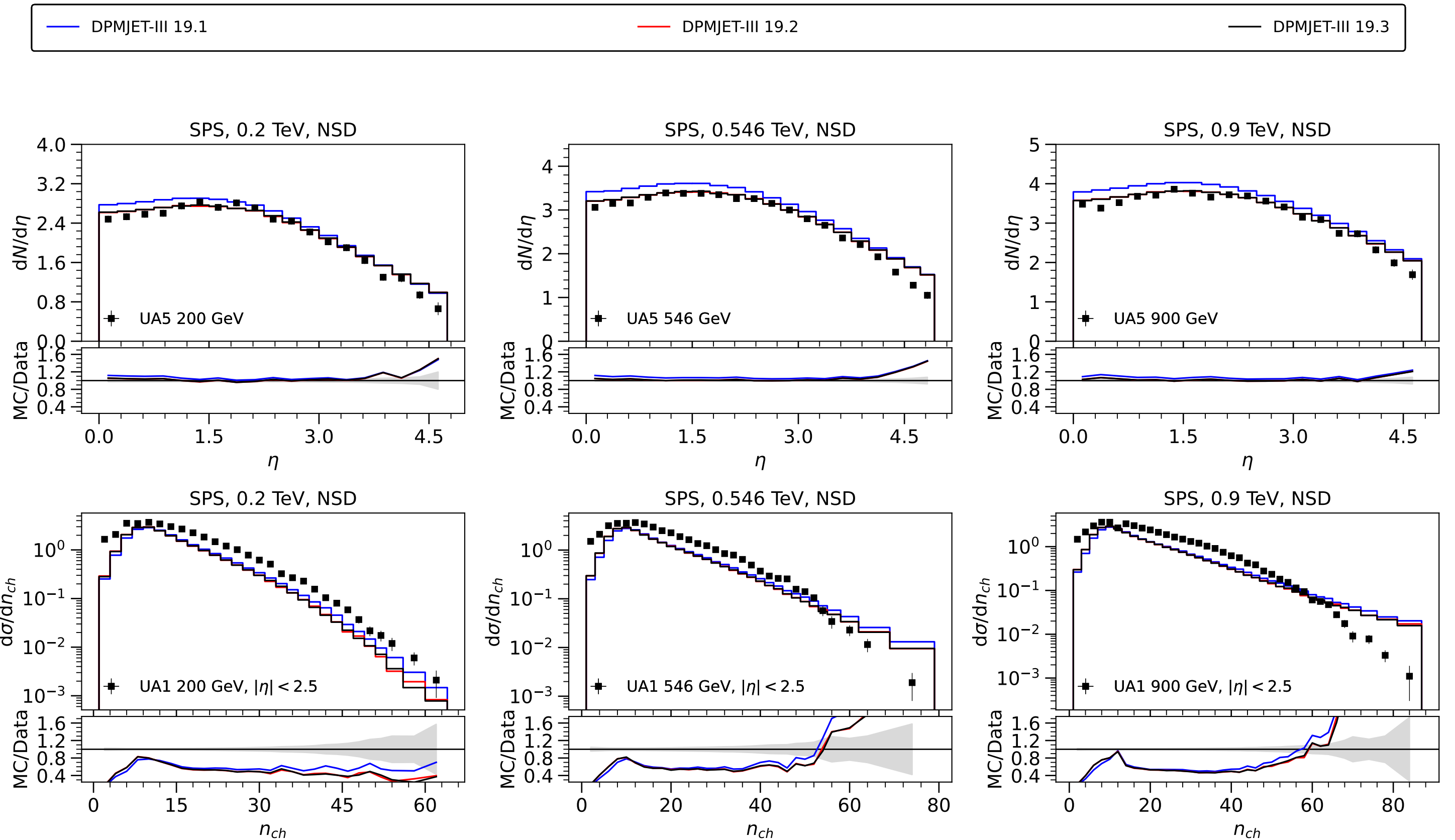
DPMJET-III 19.2

DPMJET-III 19.3



SPS: Minimum Bias

SPS - NSD multiplicity and η distributions.

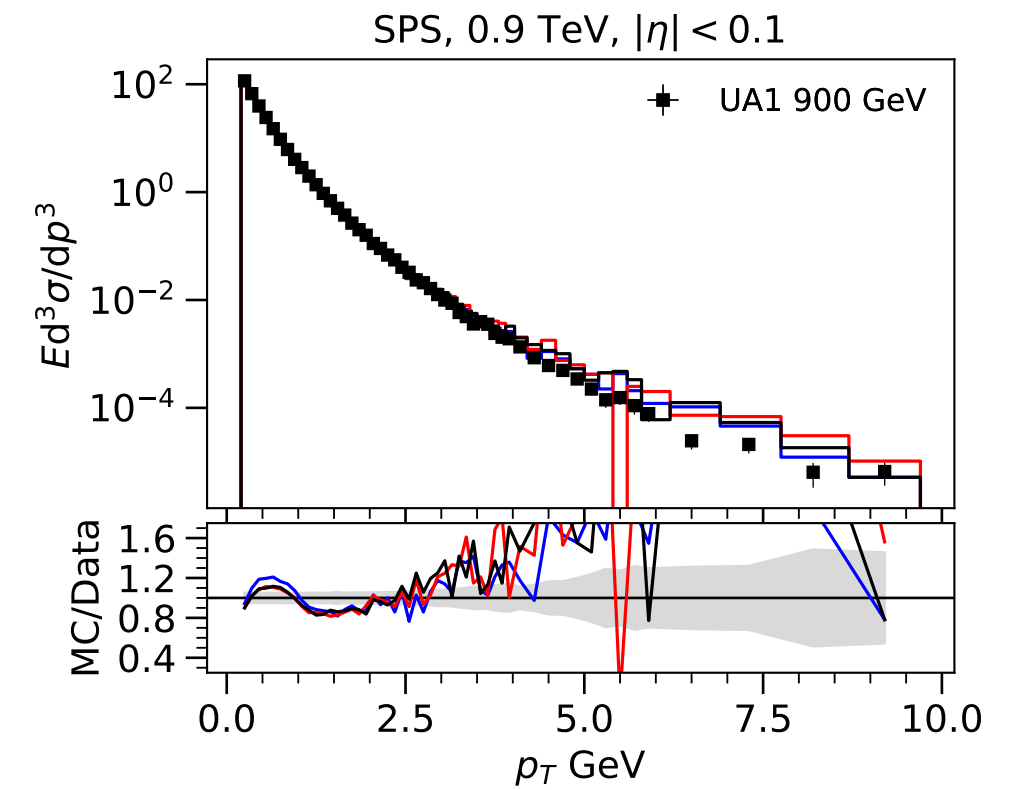
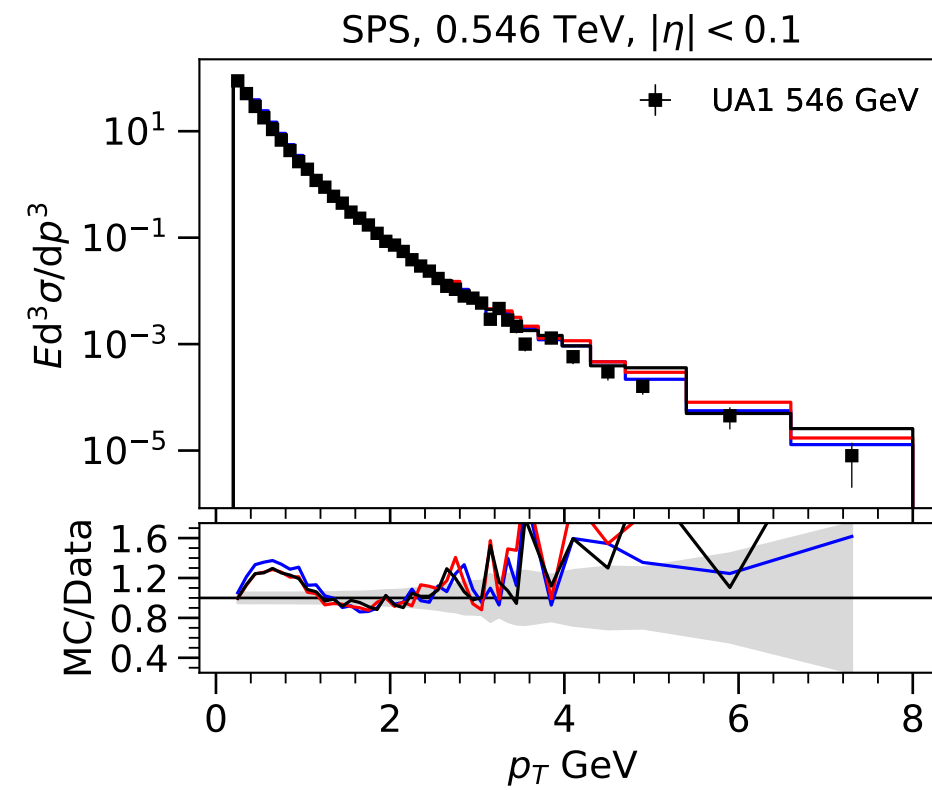
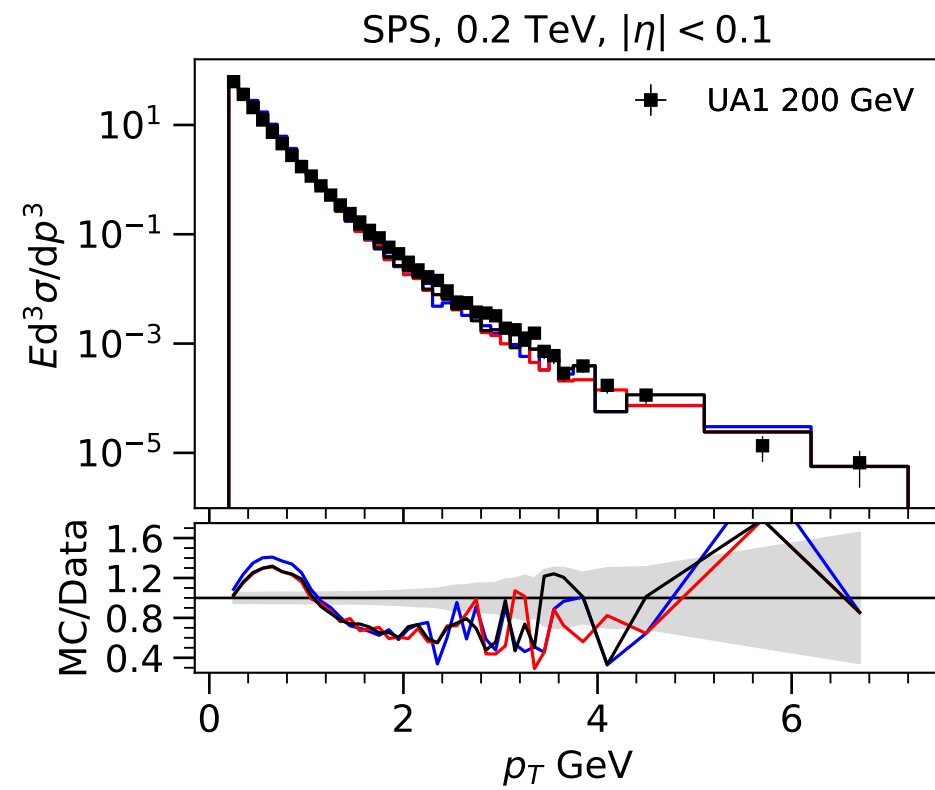


SPS - NSD Invariant crosssection in $|\eta| < 0.1$

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



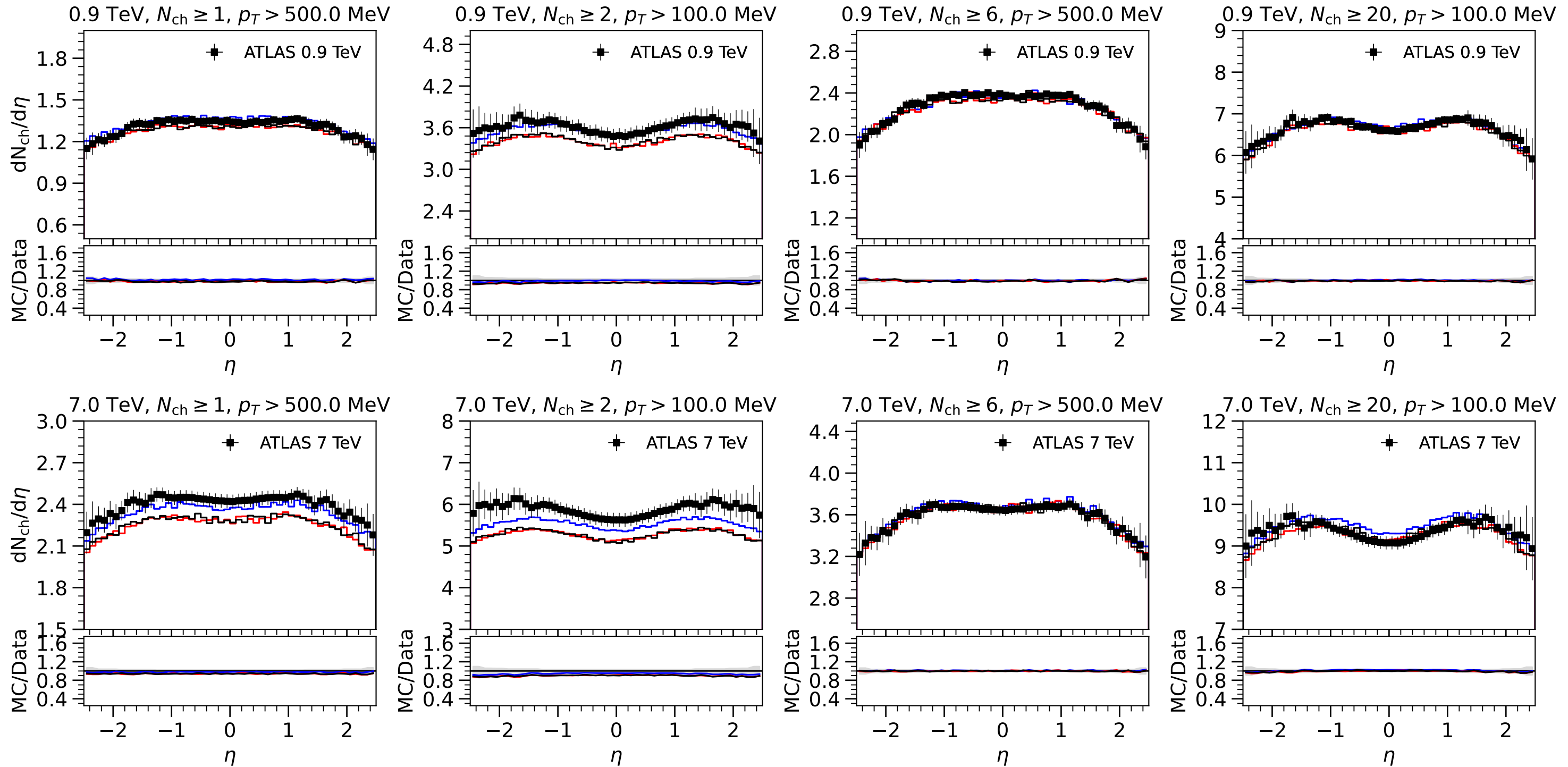
LHC: ATLAS Minimum Bias

ATLAS - Charged particle pseudorapidity density.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

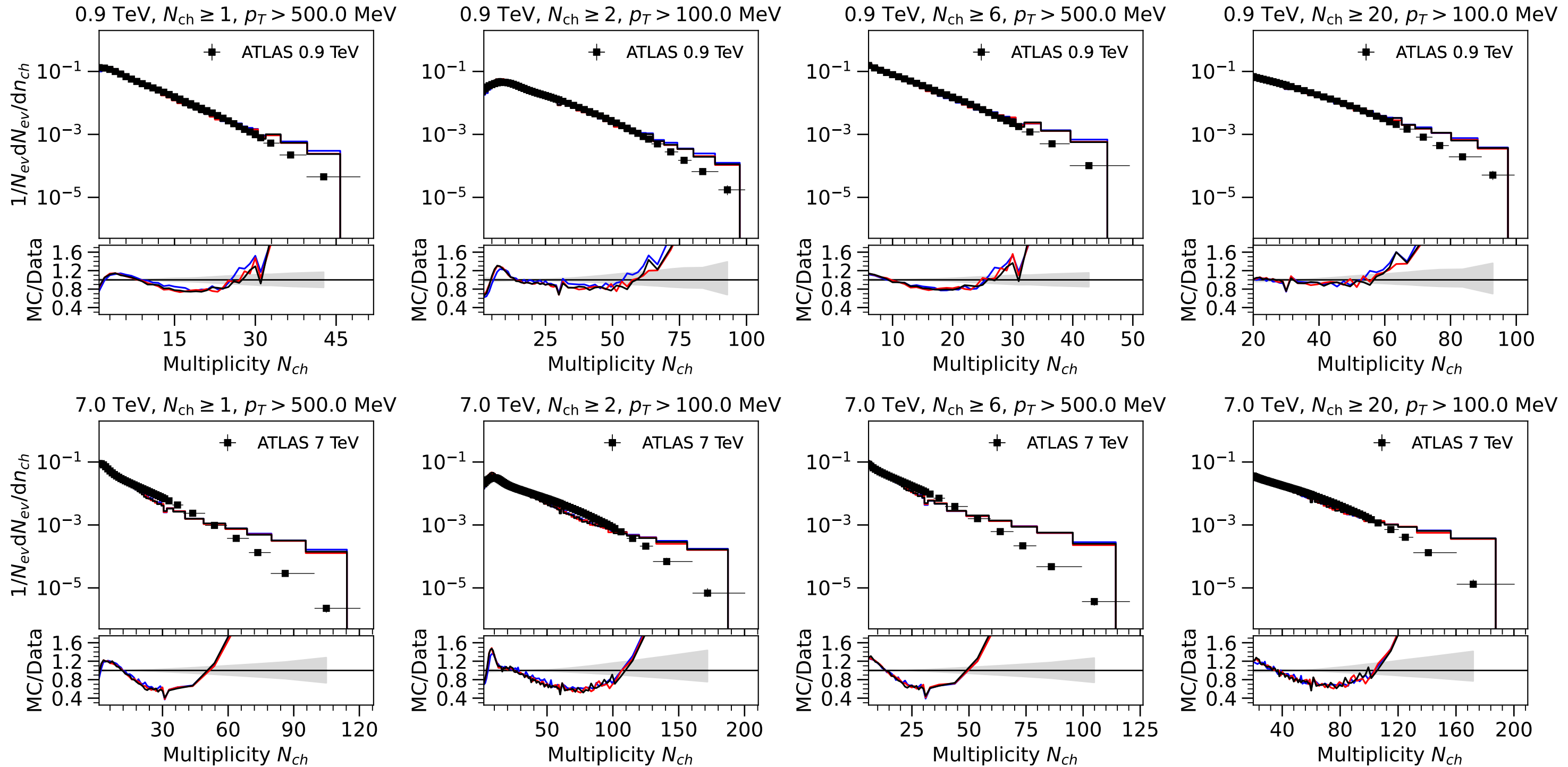


ATLAS - Charged particle multiplicity distributions.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

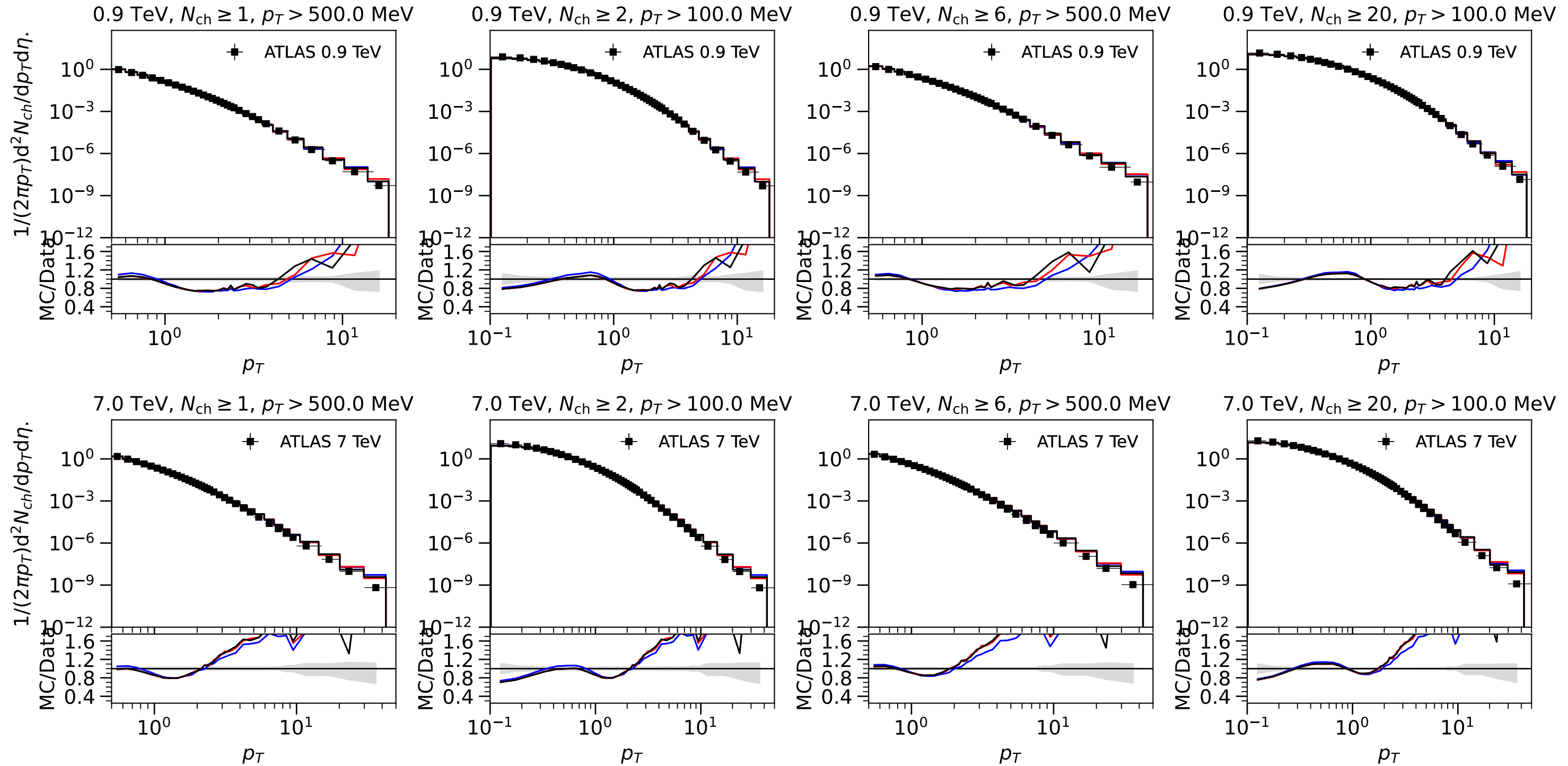


ATLAS - Transverse momentum distributions.

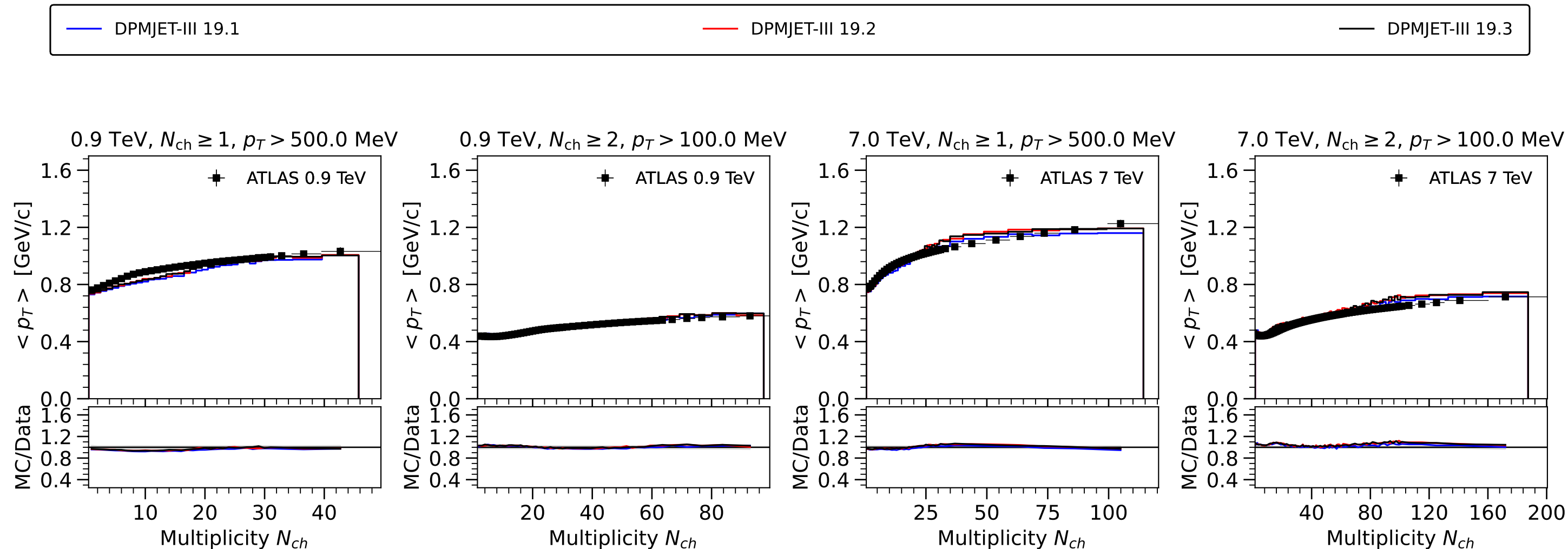
DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



ATLAS - average p_T for multiplicity bins.



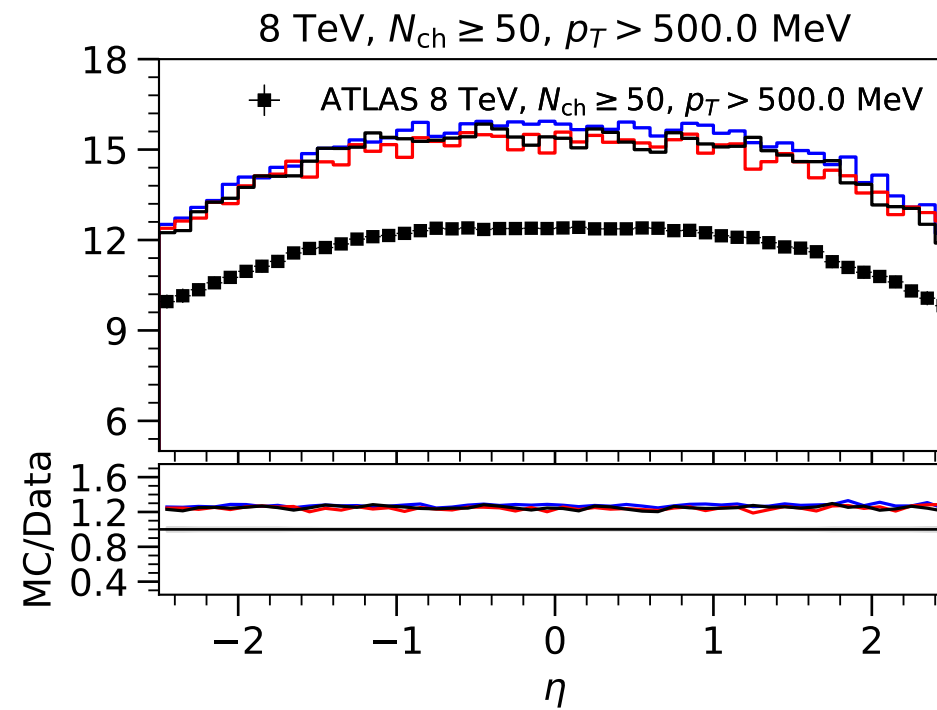
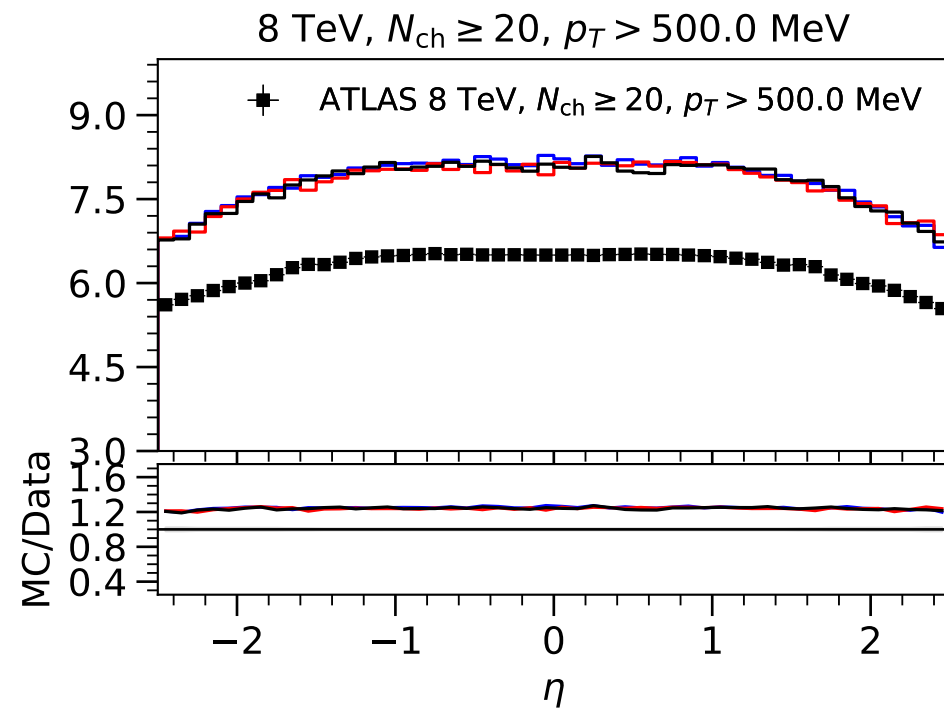
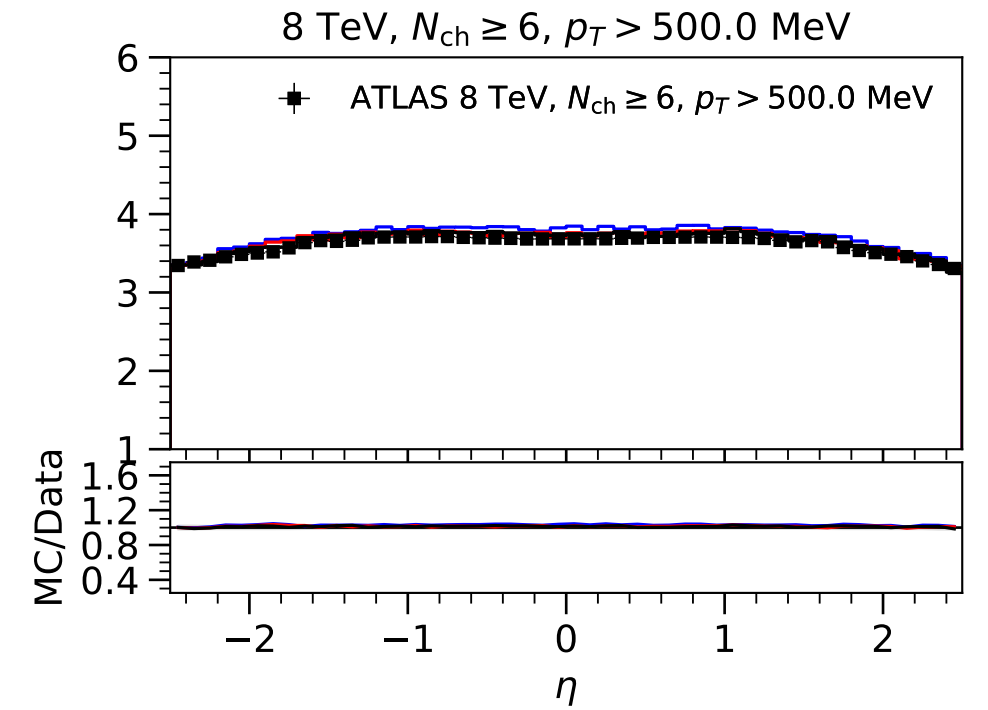
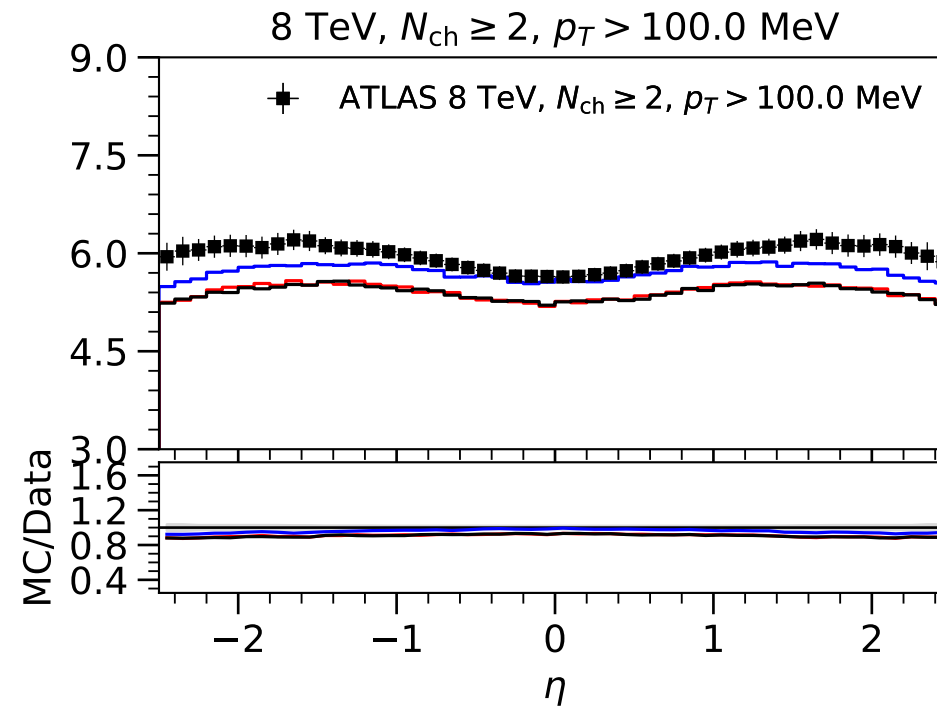
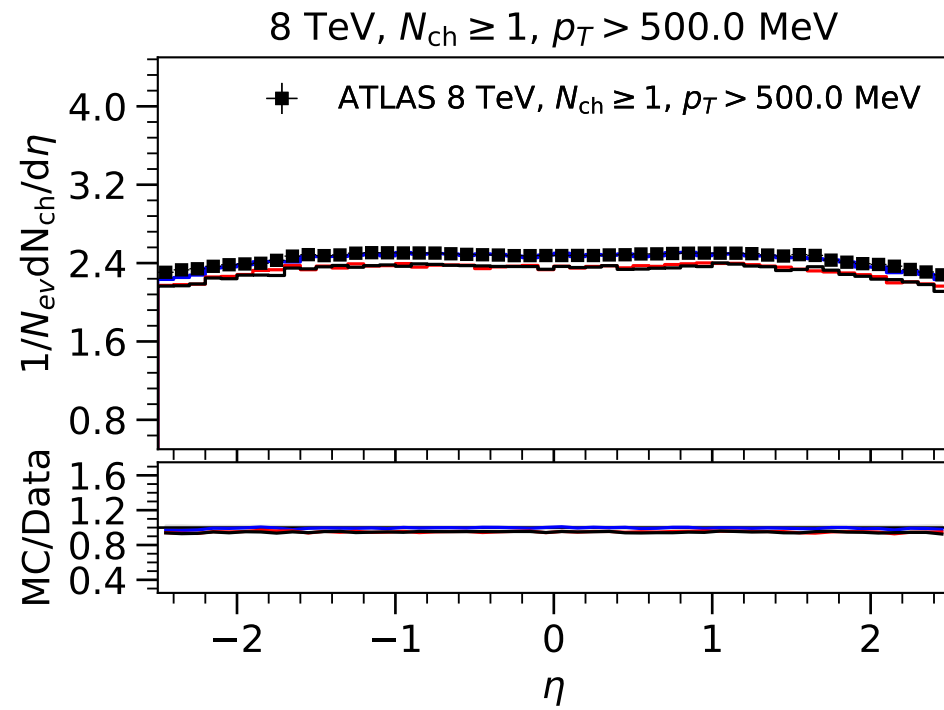
LHC: ATLAS Minimum Bias 8 TeV

ATLAS - Charged particle pseudorapidity density.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

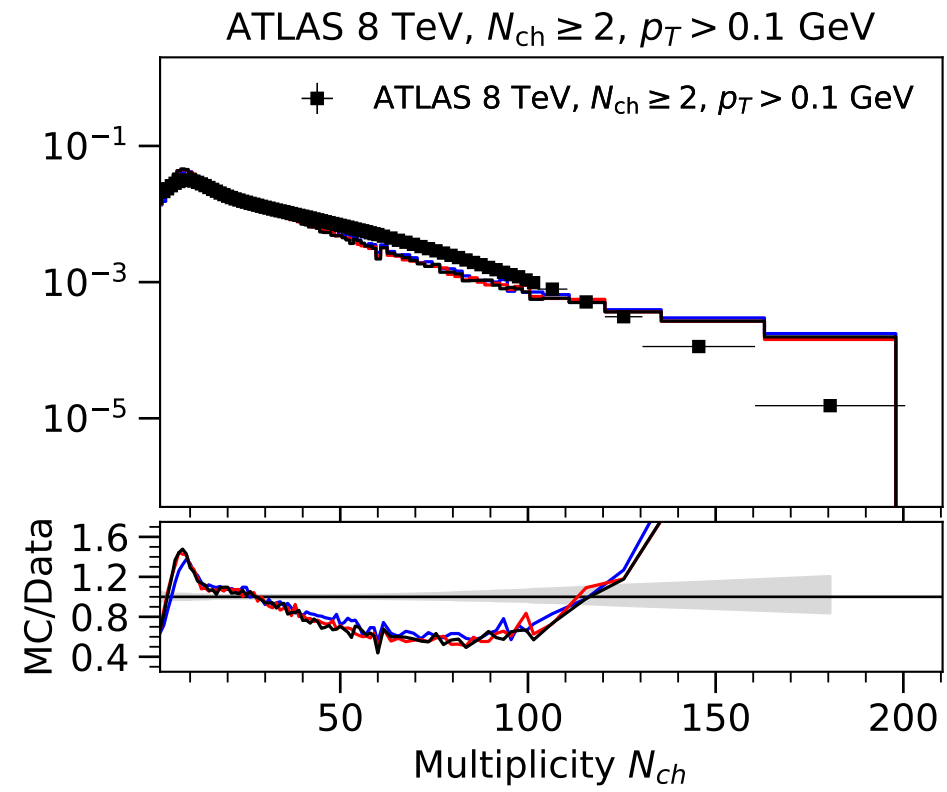
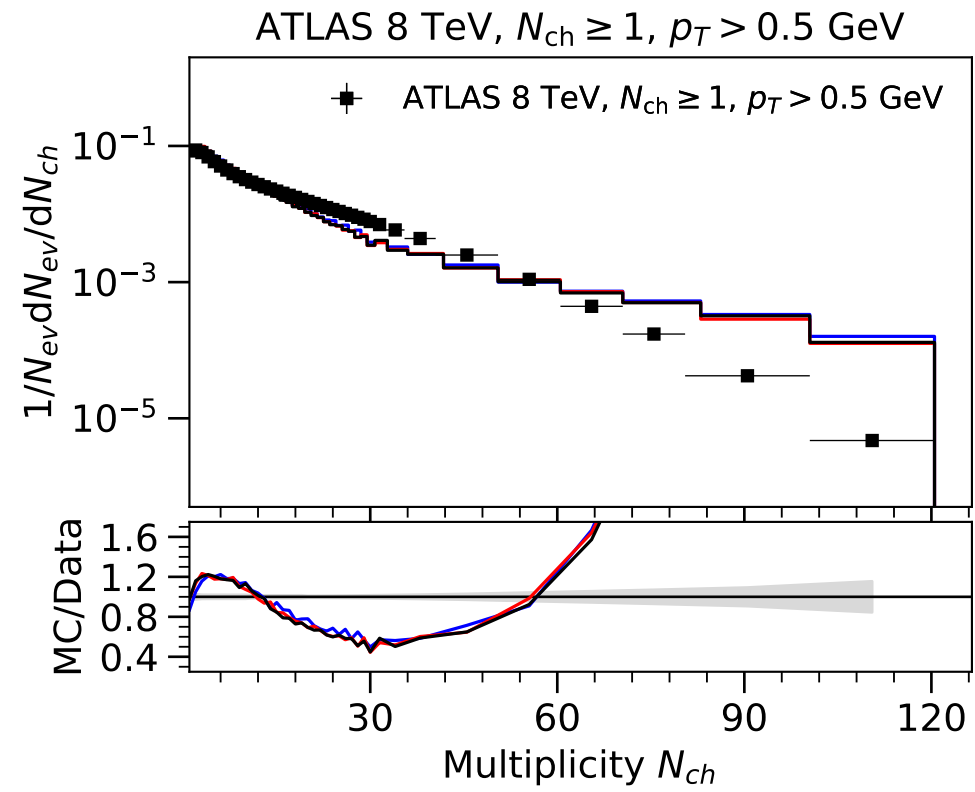


ATLAS - Charged particle multiplicity distributions.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

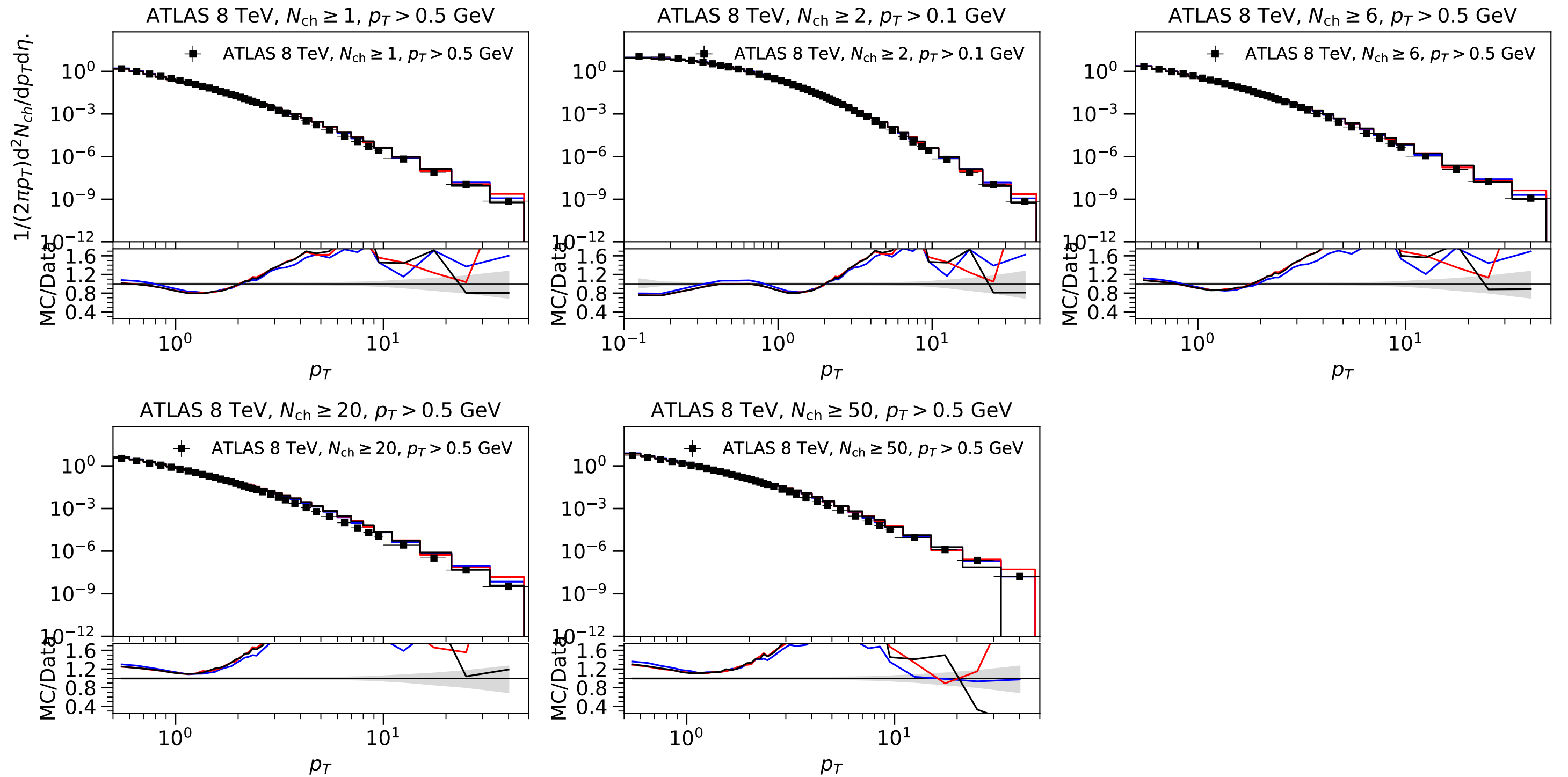


ATLAS - Transverse momentum distributions.

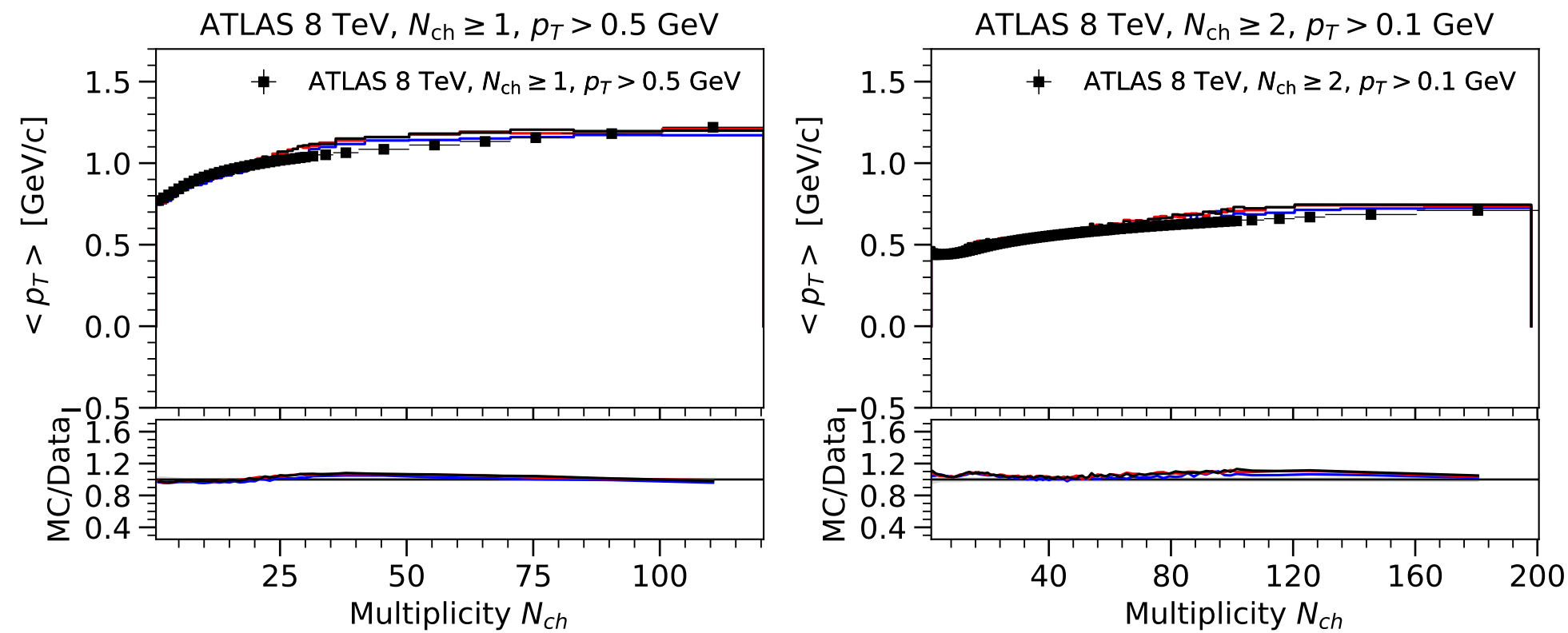
DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

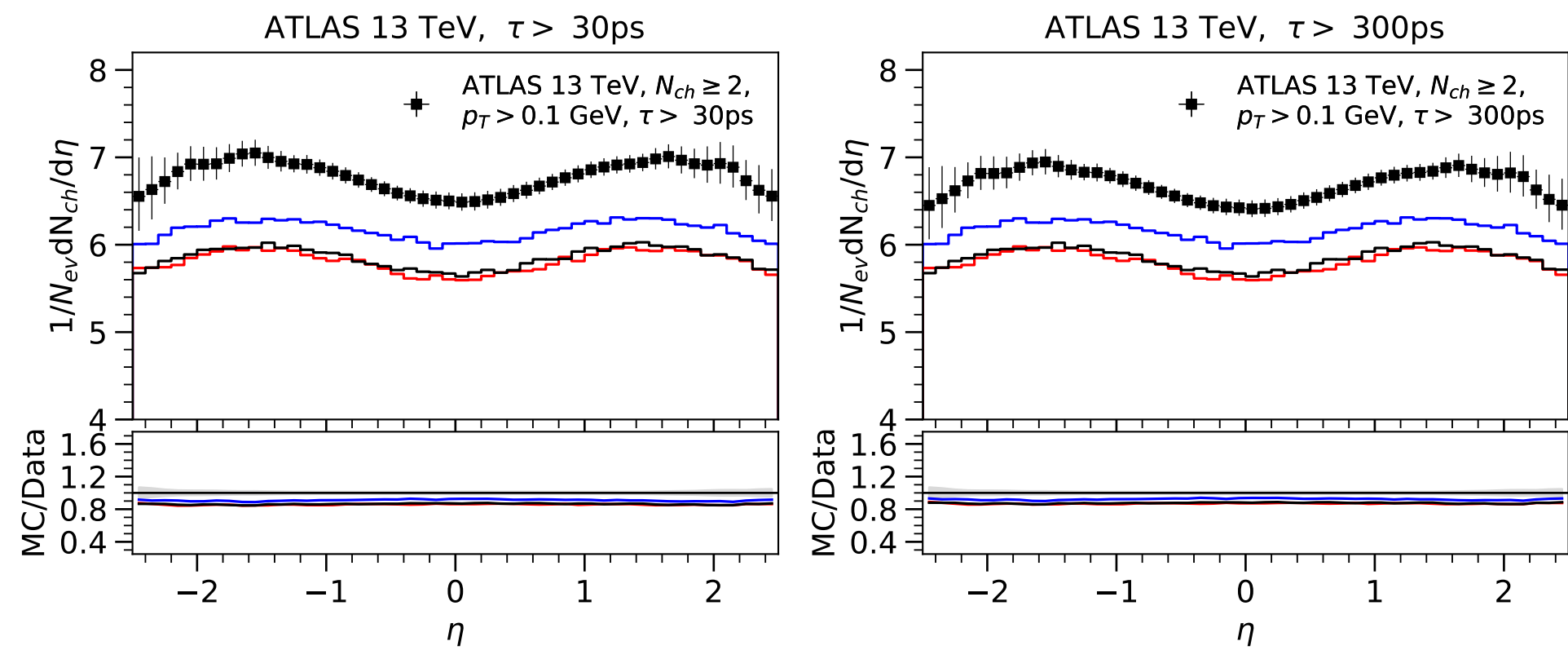
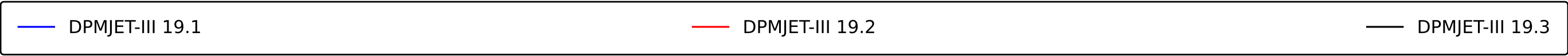


ATLAS - Average p_T for multiplicity bins.

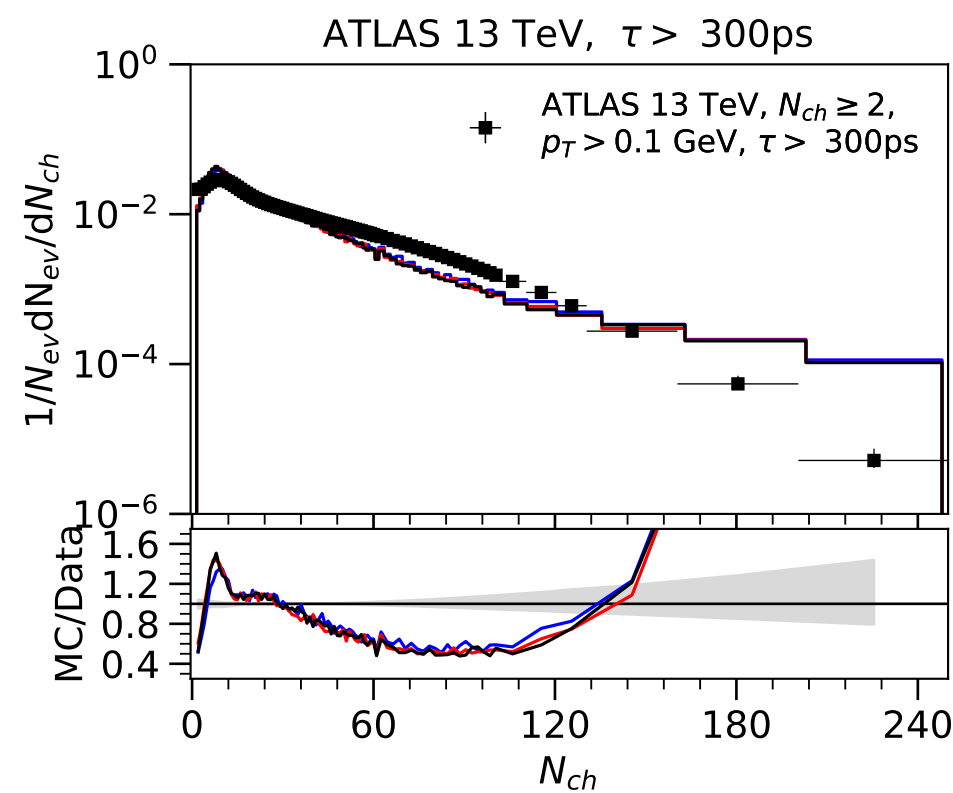
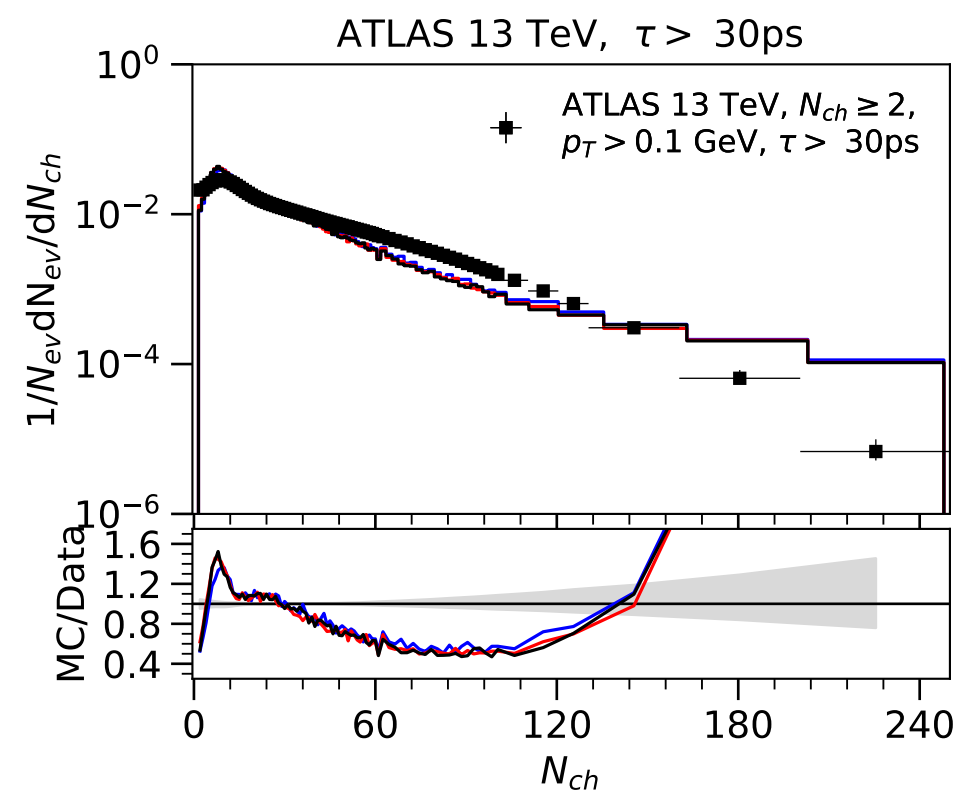


LHC: ATLAS Minimum Bias 13 TeV

ATLAS 13 TeV - Pseudorapidity distributions.



ATLAS 13 TeV - Multiplicity distributions.

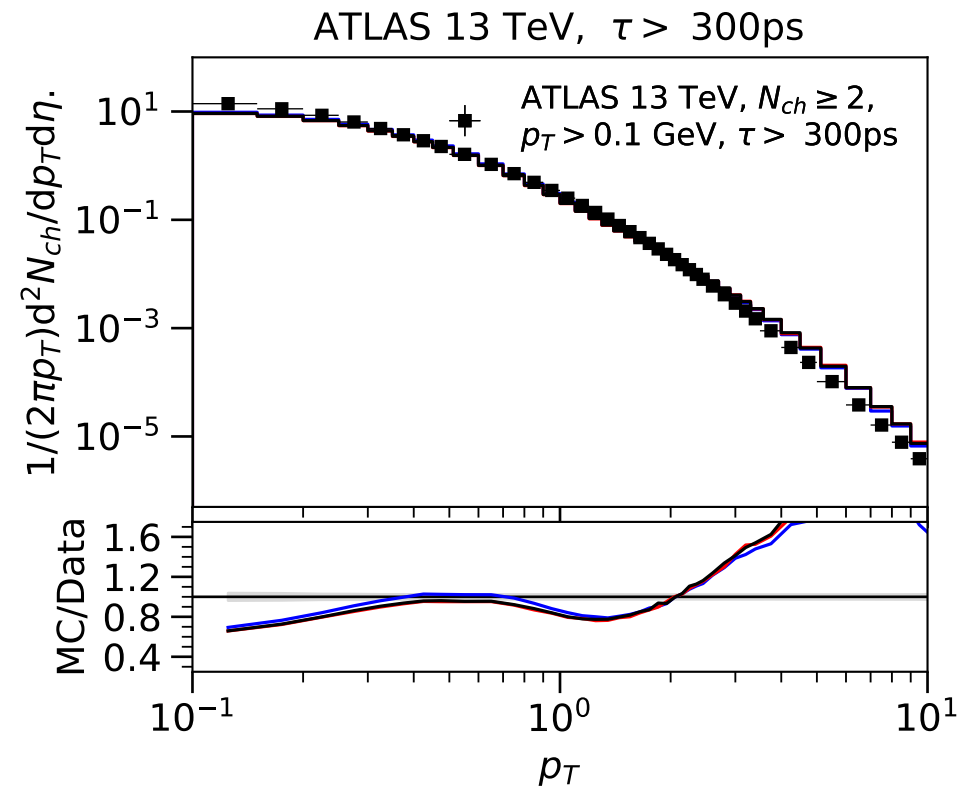
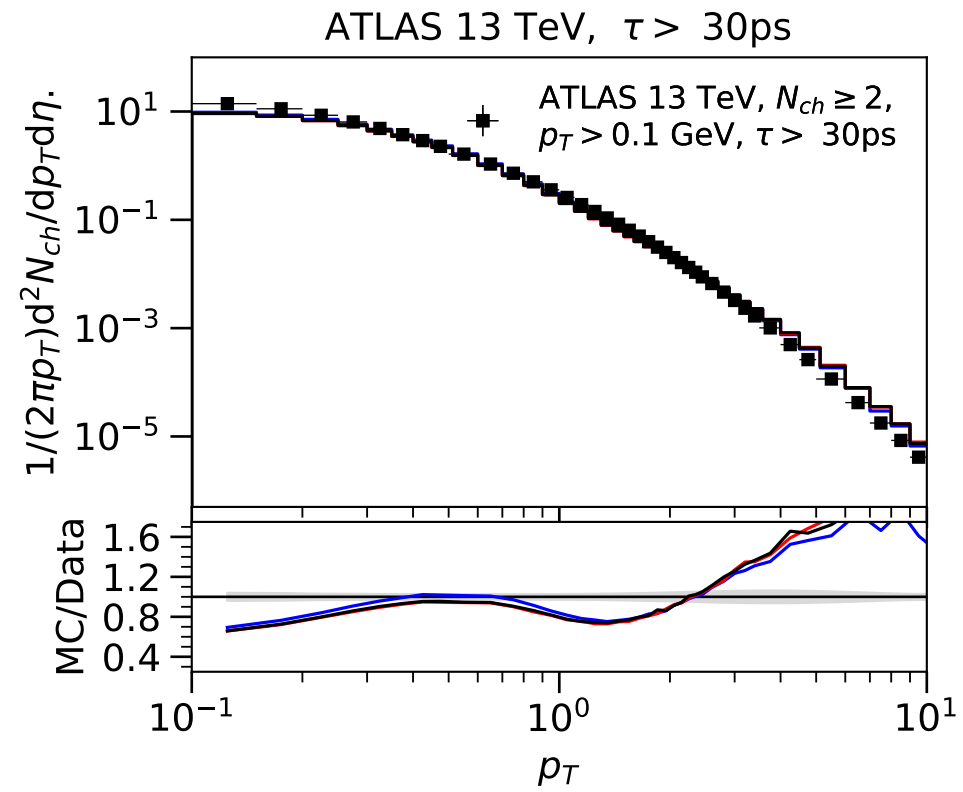


ATLAS 13 TeV - Transverse Momentum distributions.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

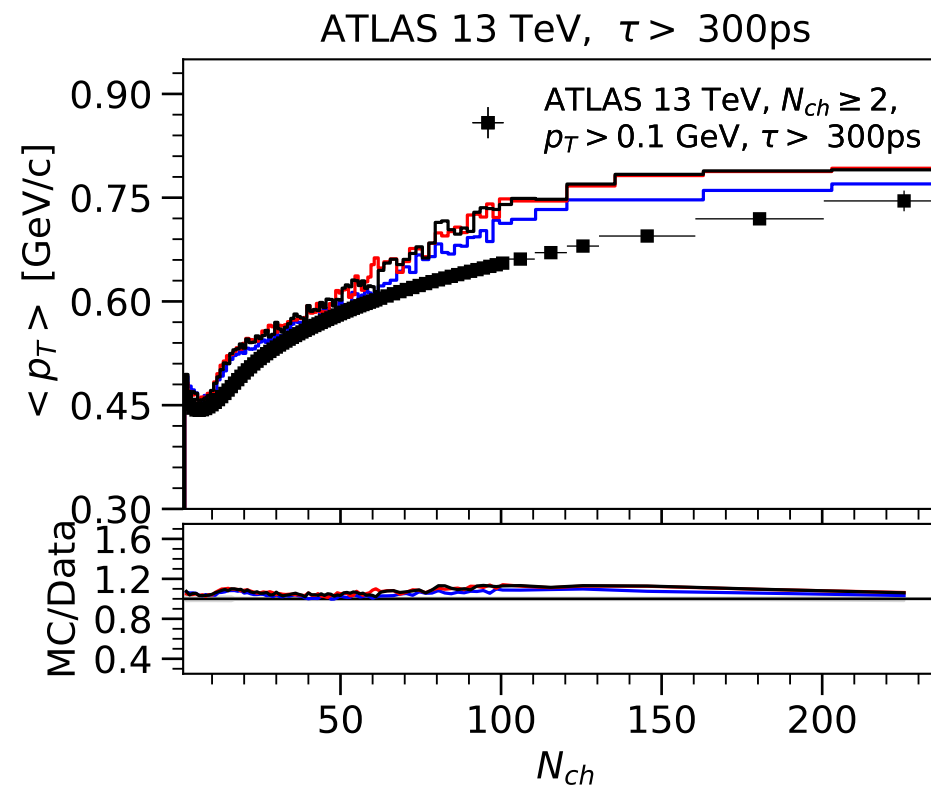
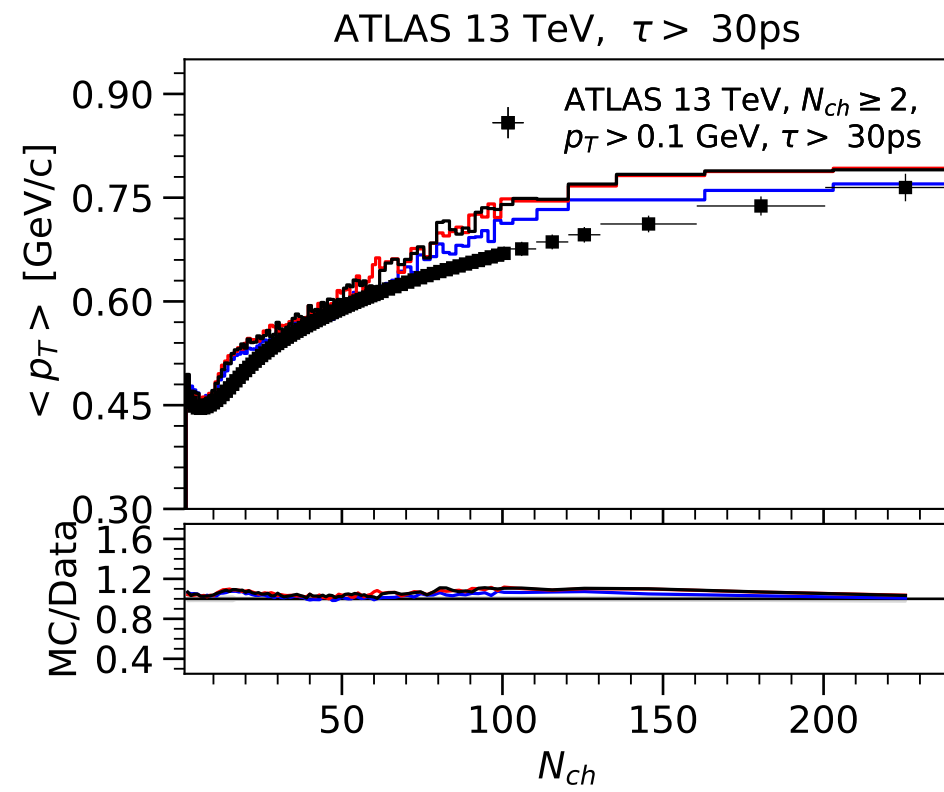


ATLAS 13 TeV - Average Transverse Momentum distributions.

DPMJET-III 19.1

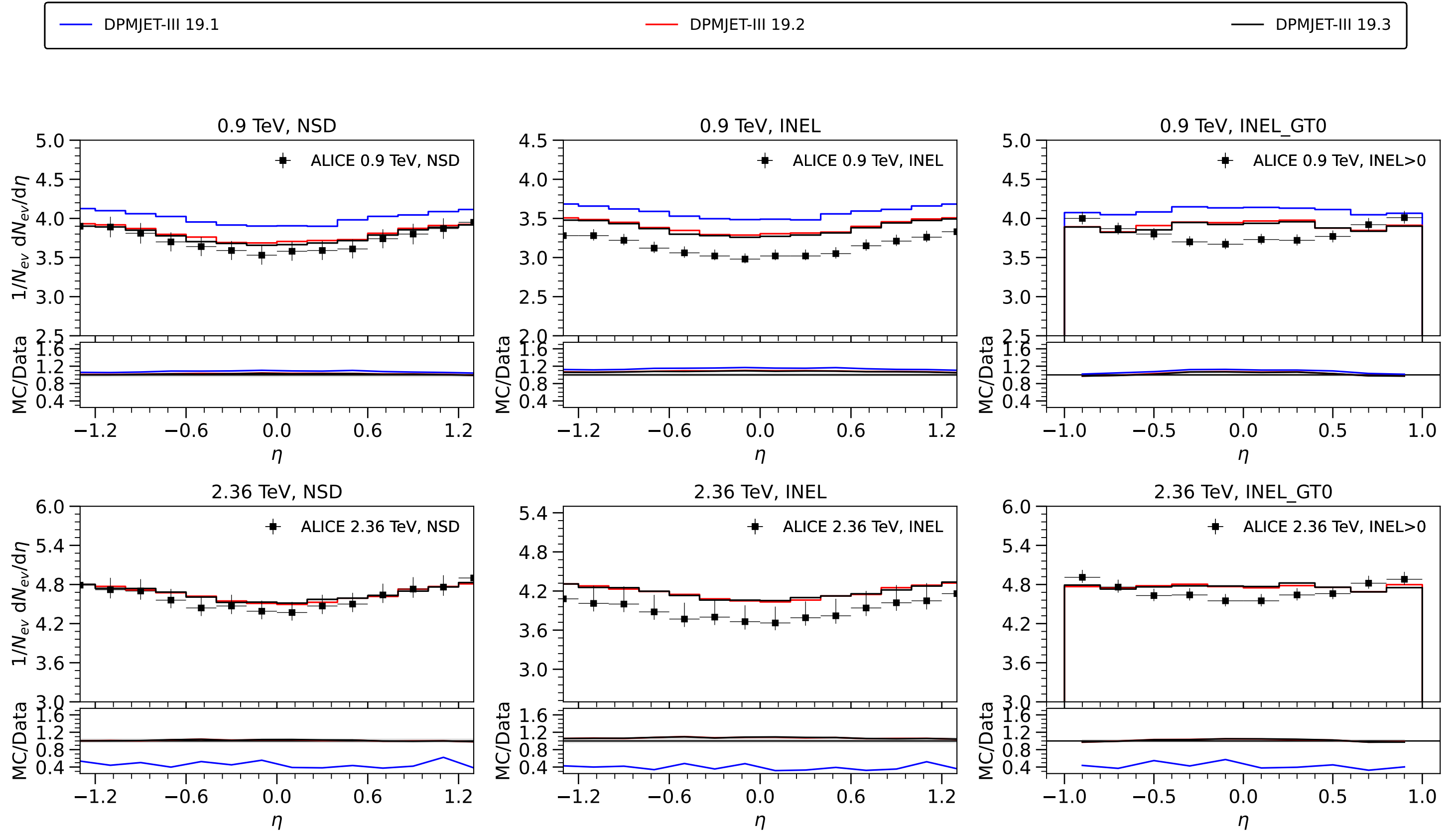
DPMJET-III 19.2

DPMJET-III 19.3

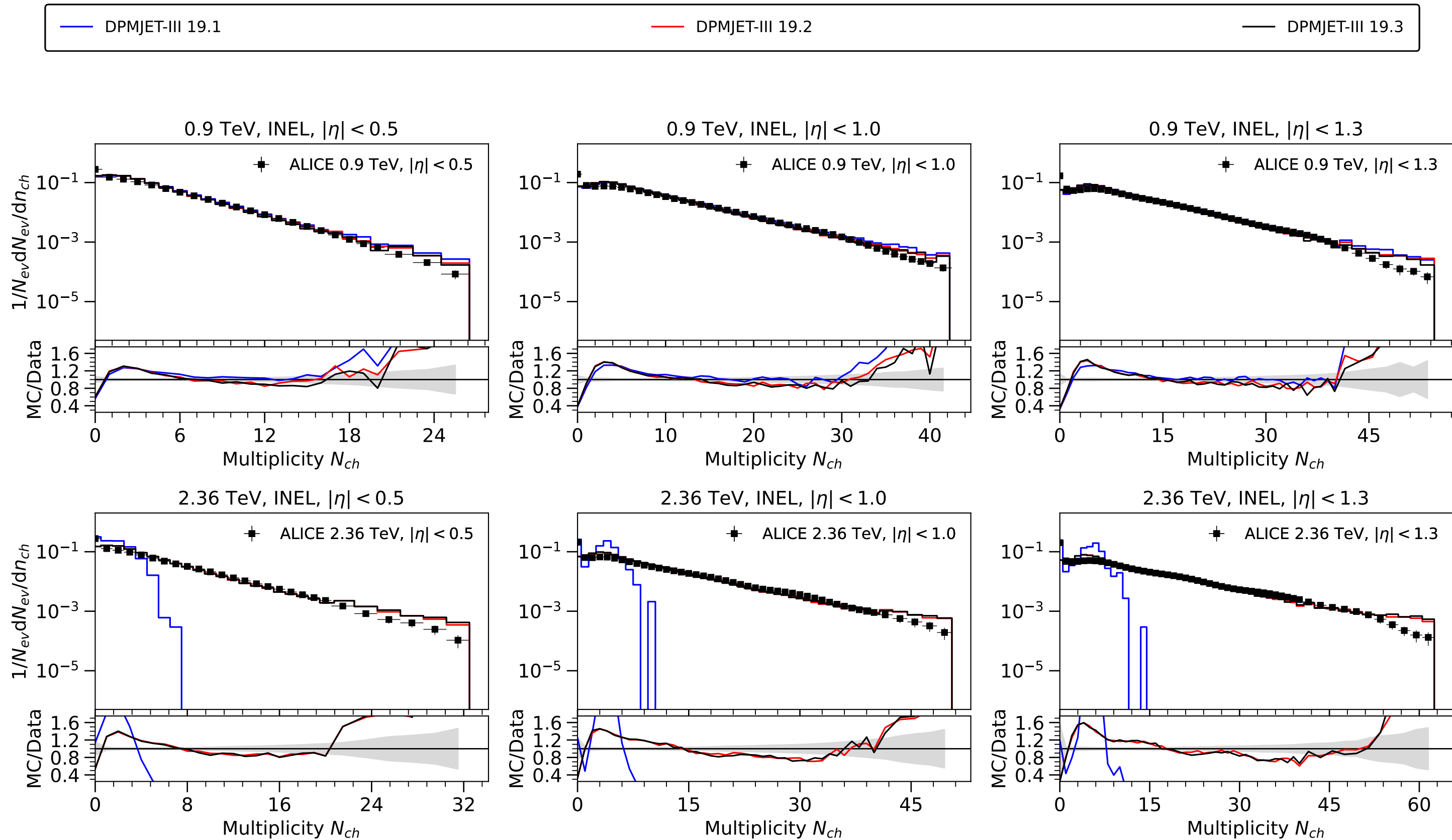


LHC: ALICE Minimum Bias

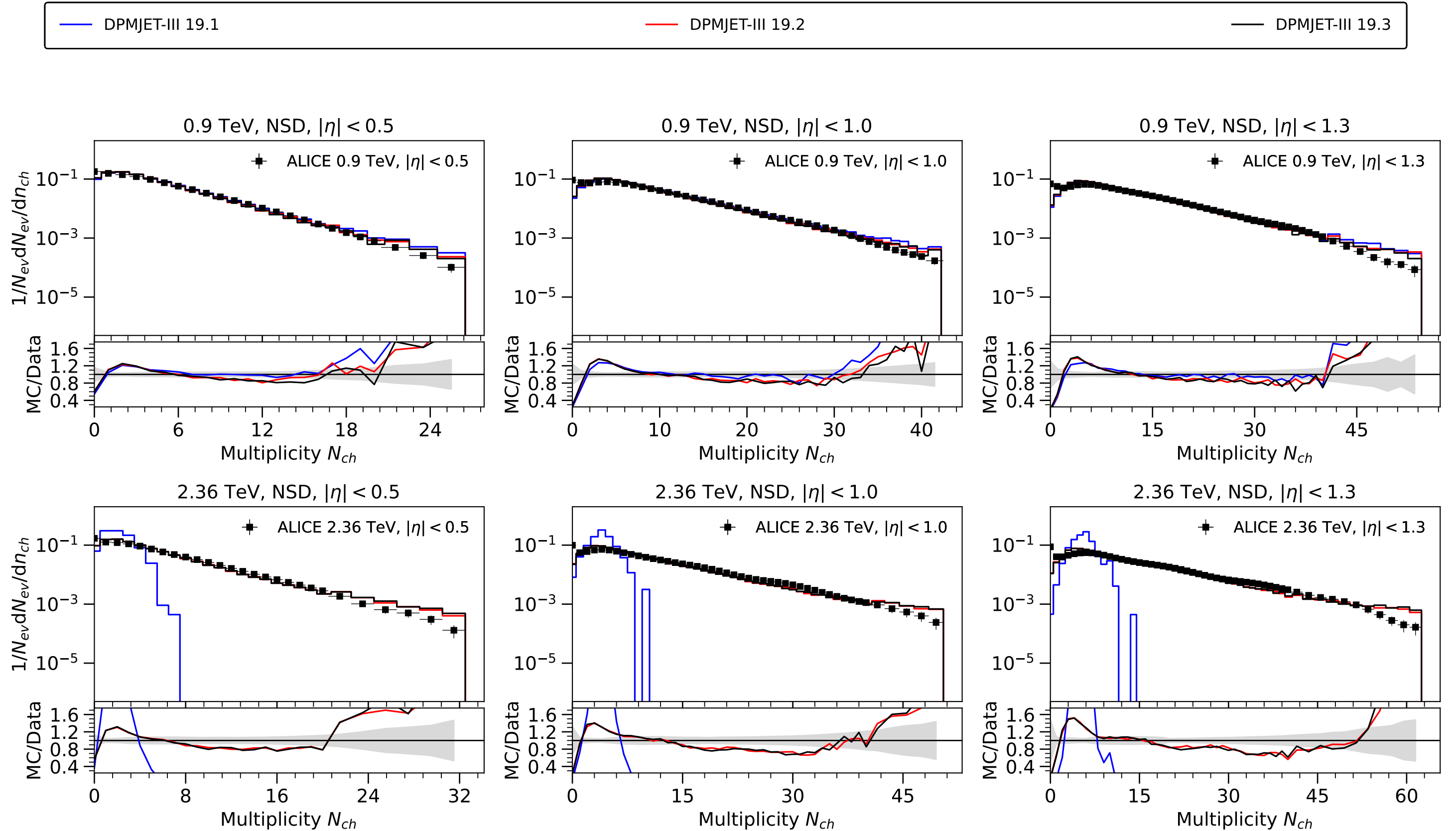
ALICE - NSD charged particle pseudorapidity density.



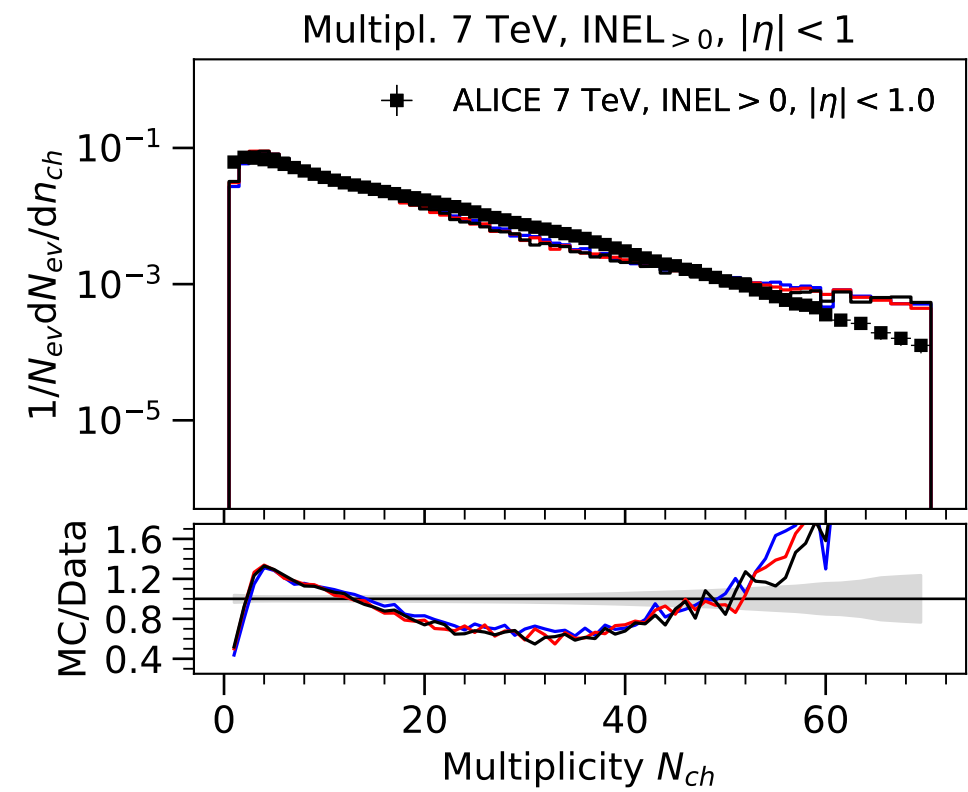
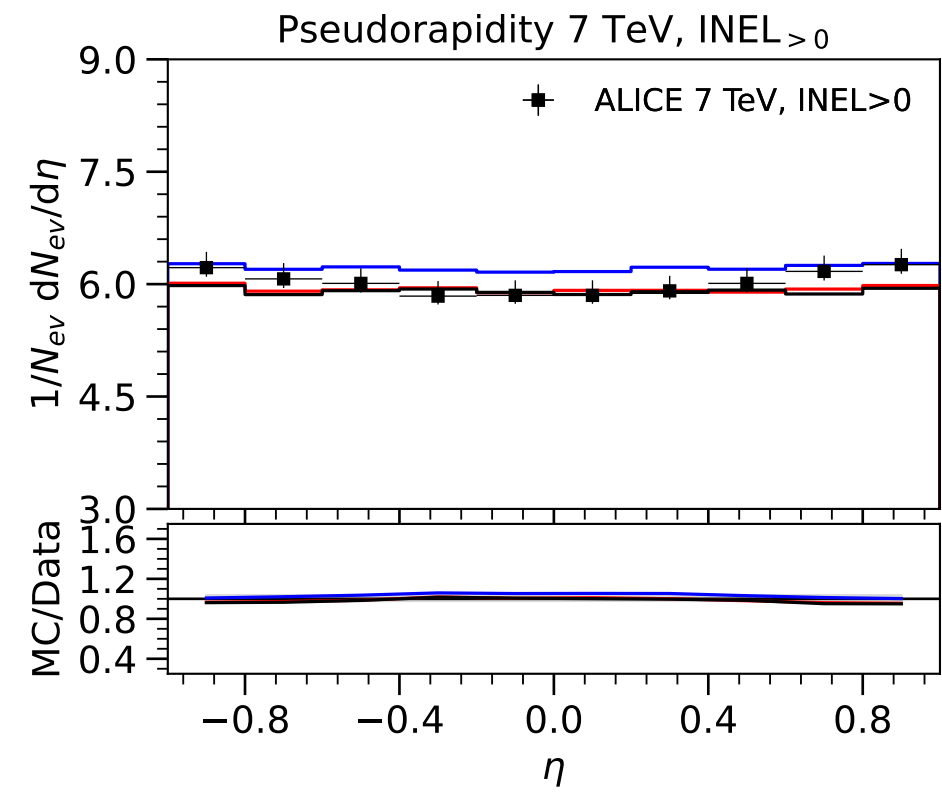
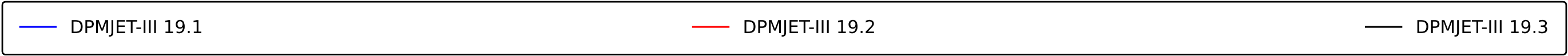
ALICE - INEL charged particle multiplicity.



ALICE - NSD charged particle multiplicity.



ALICE - 7 TeV.



LHC: ALICE Minimum Bias 2017

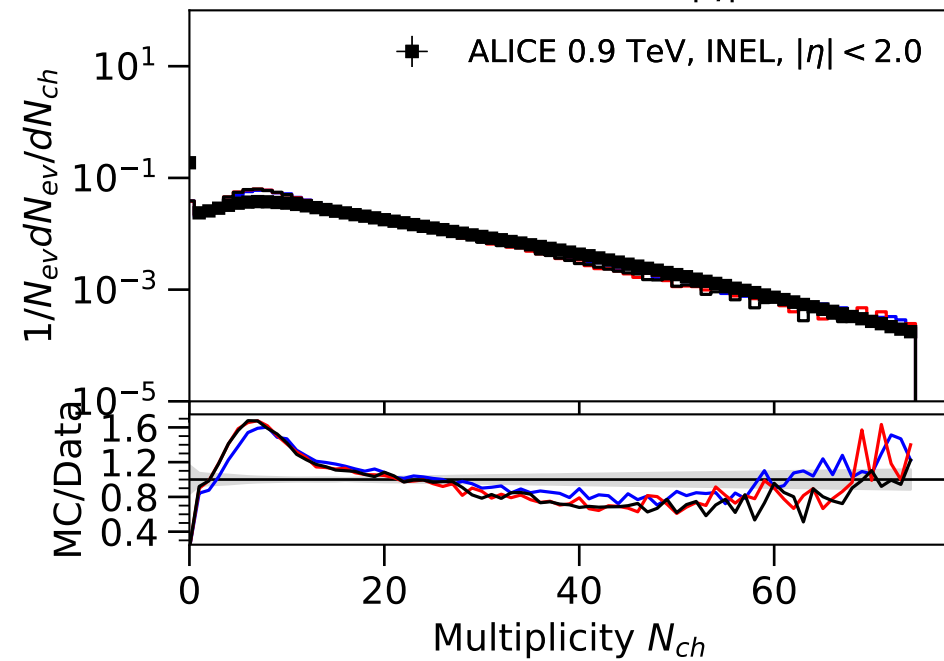
ALICE - 0.9TeV INEL Multiplicity distribution.

— DPMJET-III 19.1

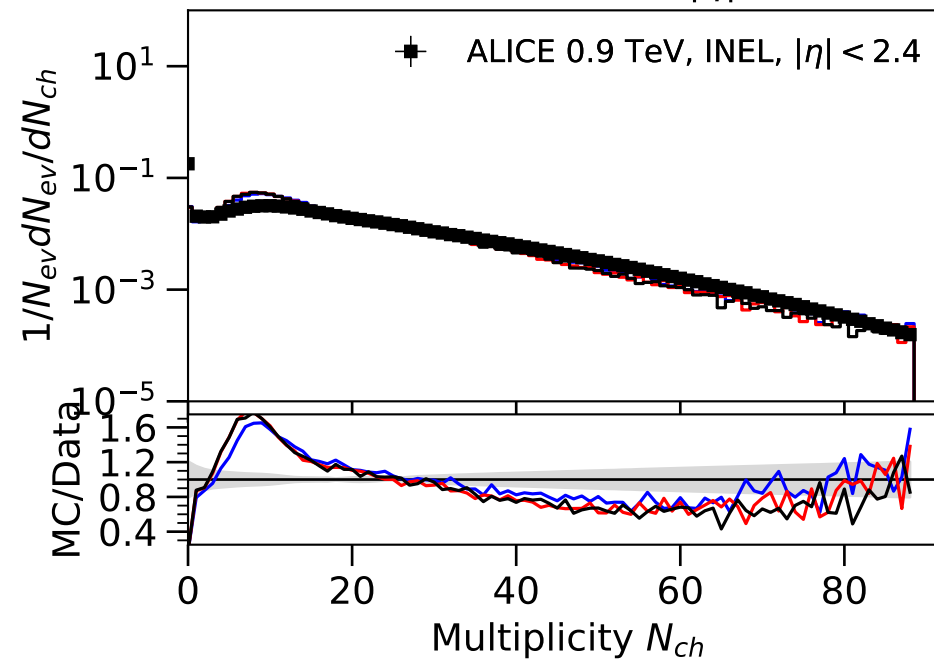
— DPMJET-III 19.2

— DPMJET-III 19.3

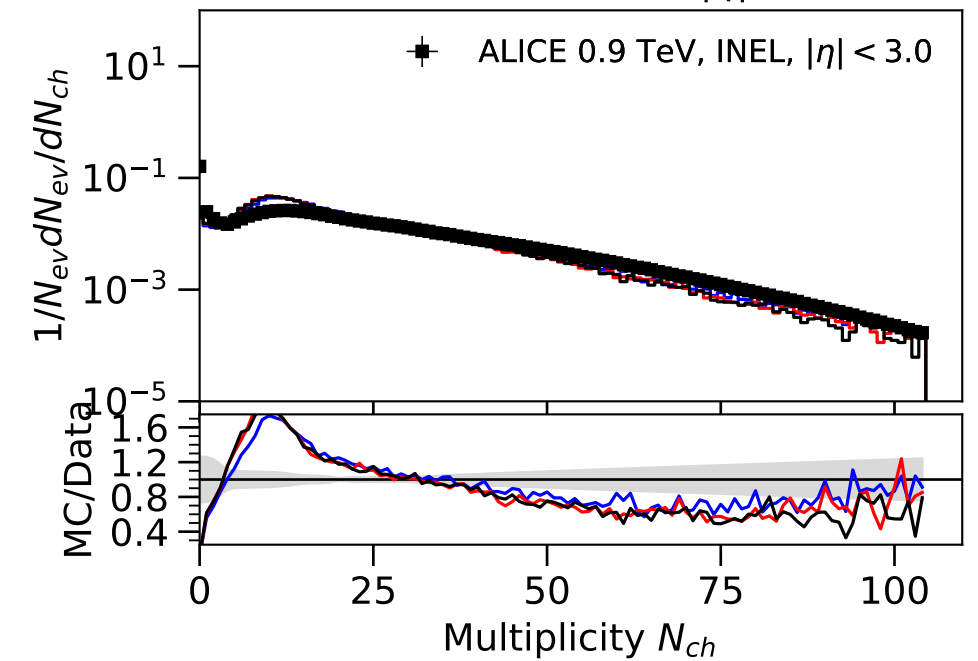
ALICE 0.9 TeV, INEL, $|\eta| < 2.0$



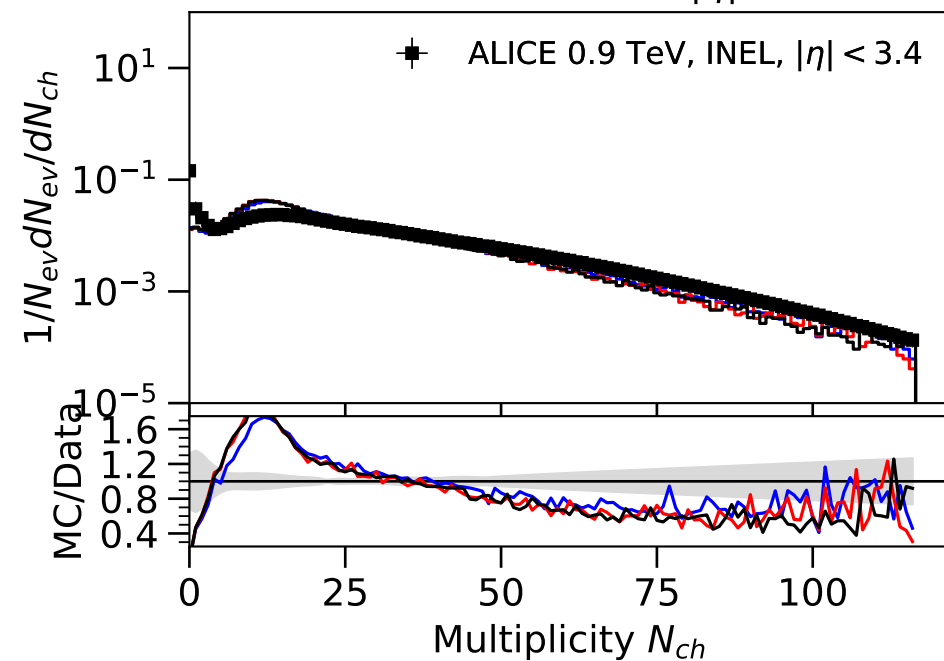
ALICE 0.9 TeV, INEL, $|\eta| < 2.4$



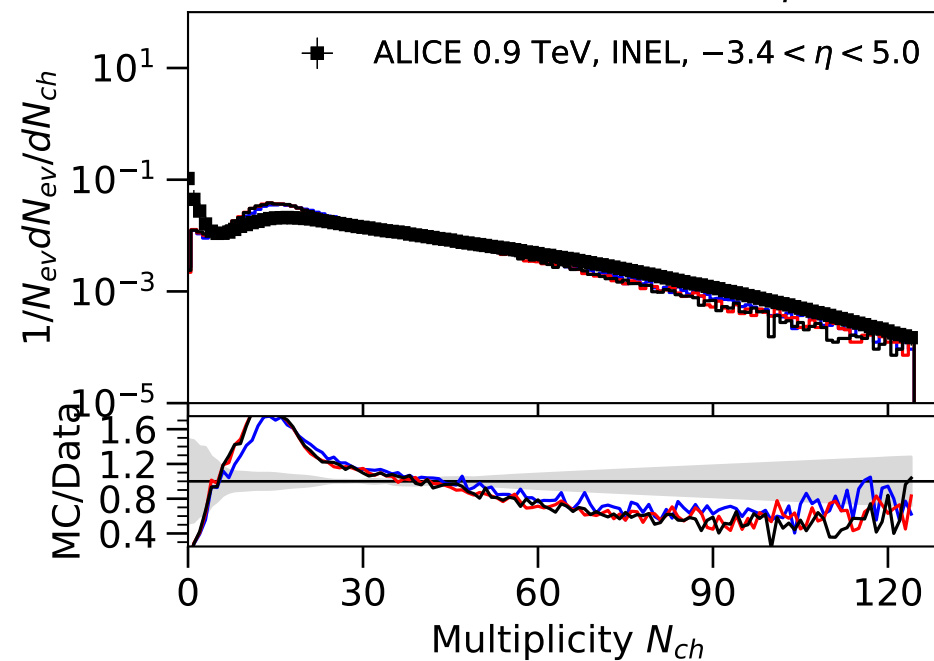
ALICE 0.9 TeV, INEL, $|\eta| < 3.0$



ALICE 0.9 TeV, INEL, $|\eta| < 3.4$



ALICE 0.9 TeV, INEL, $-3.4 < \eta < 5.0$

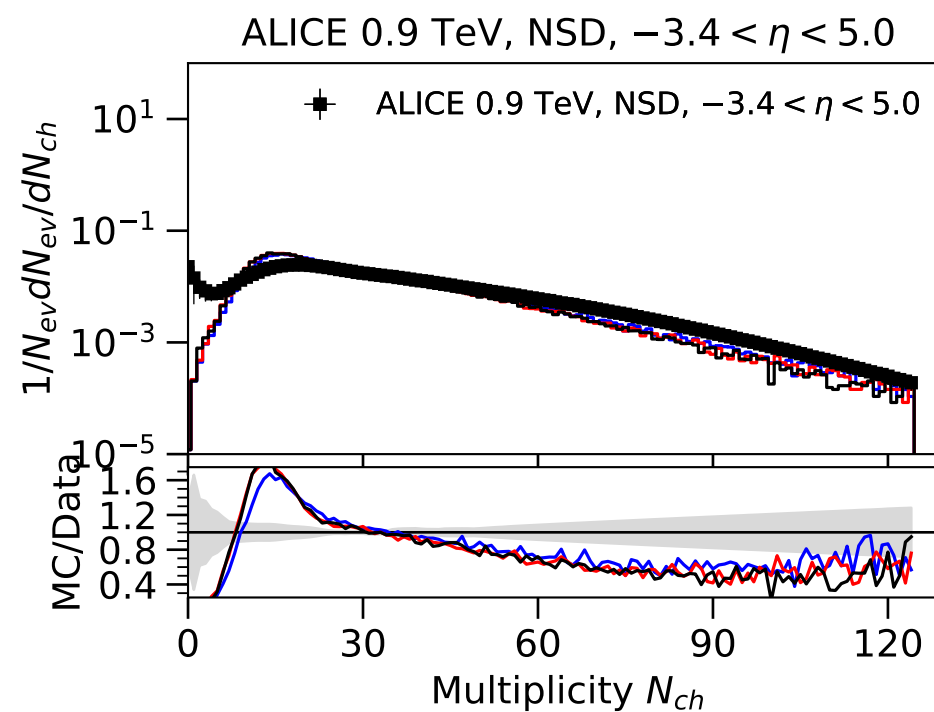
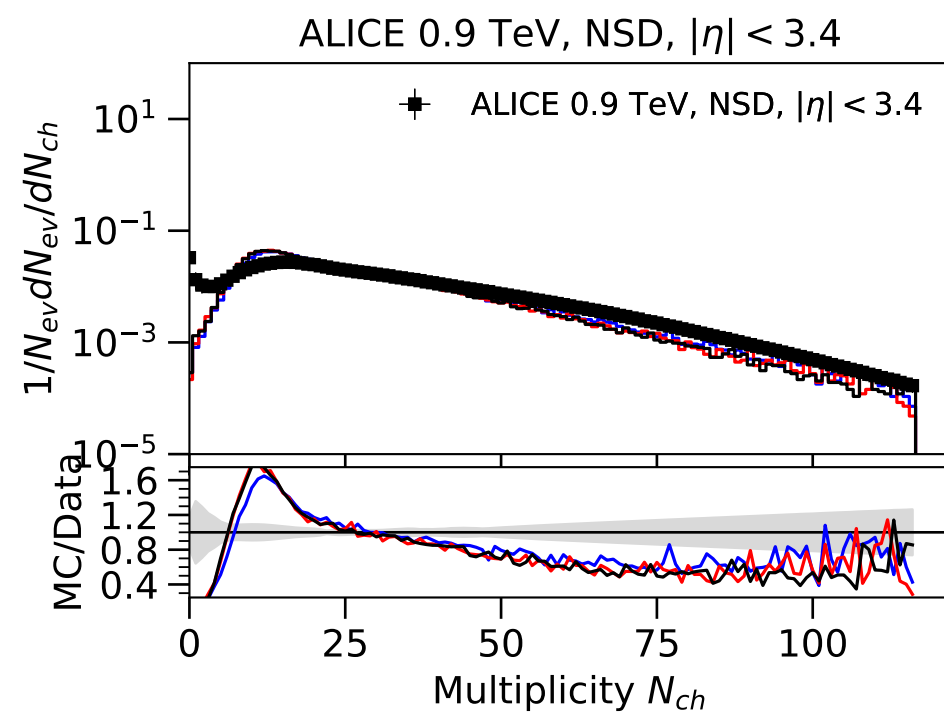
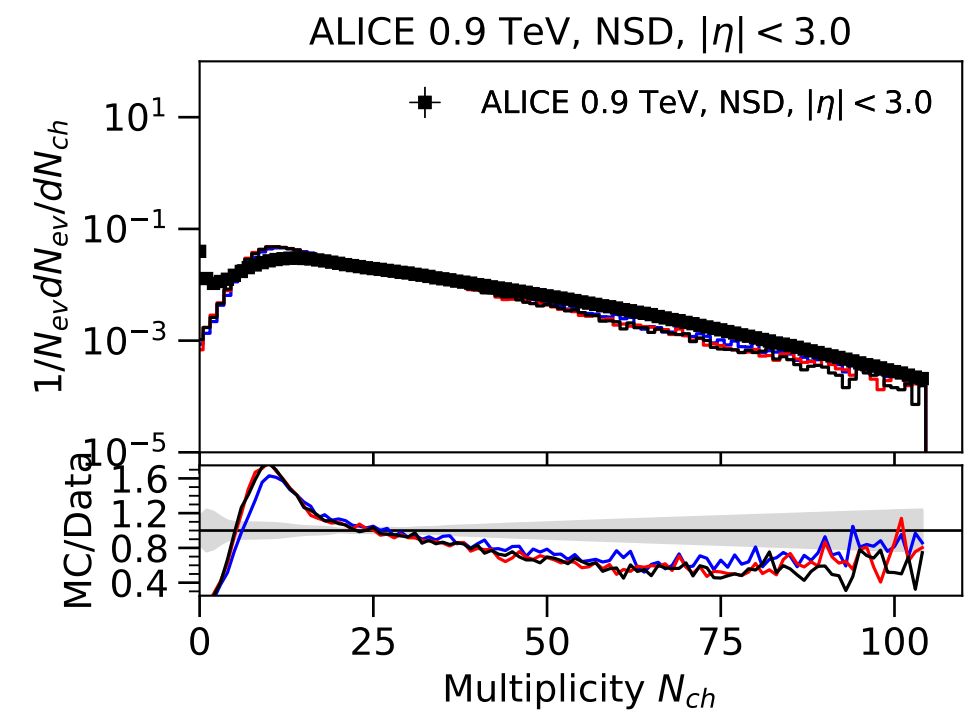
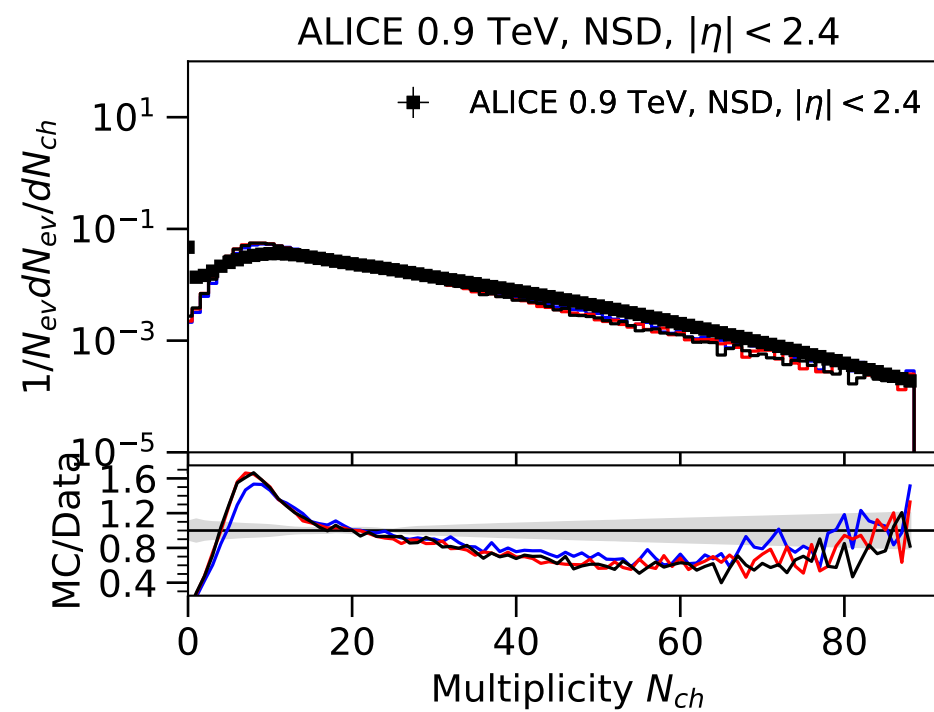
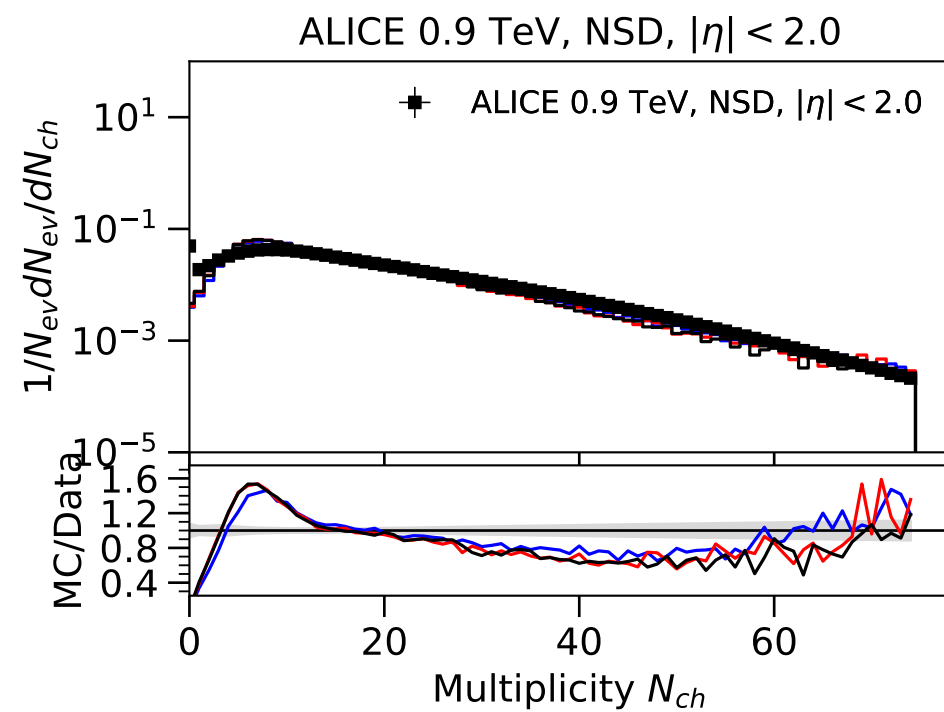


ALICE - 0.9TeV NSD Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

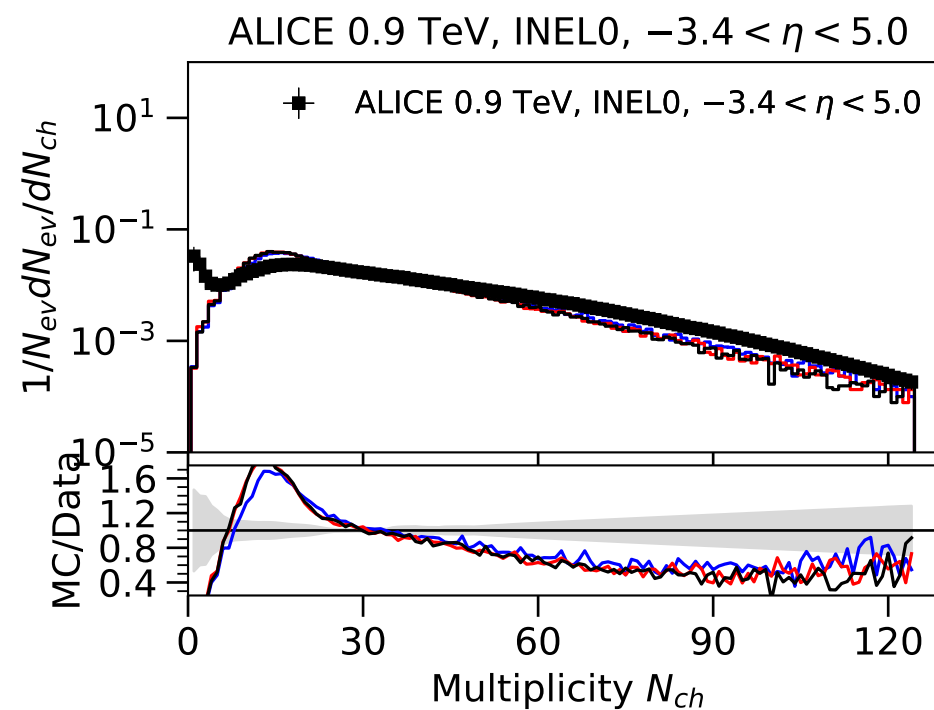
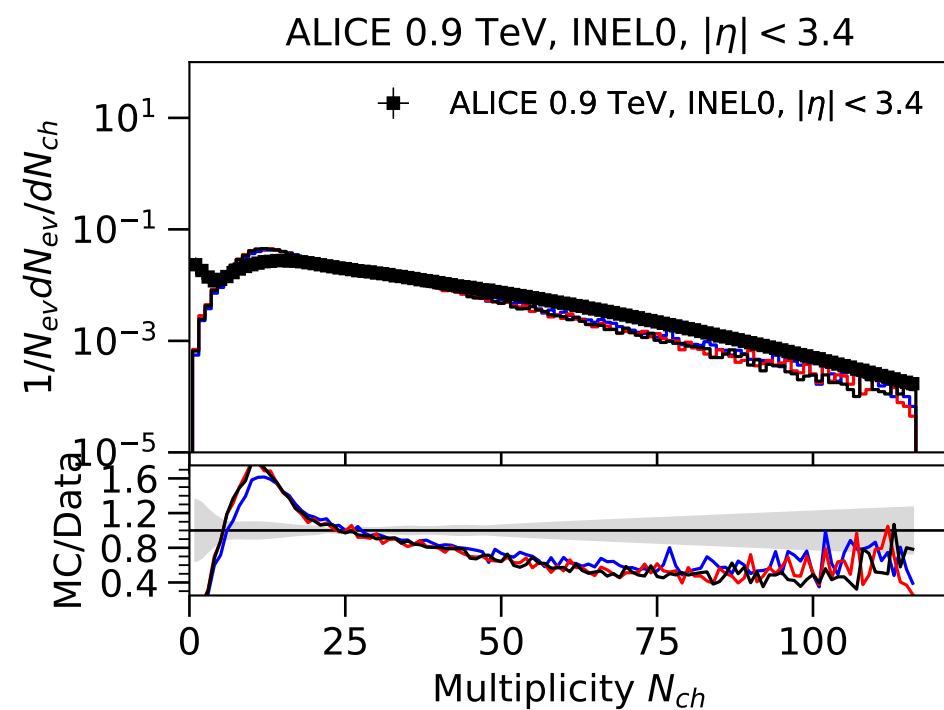
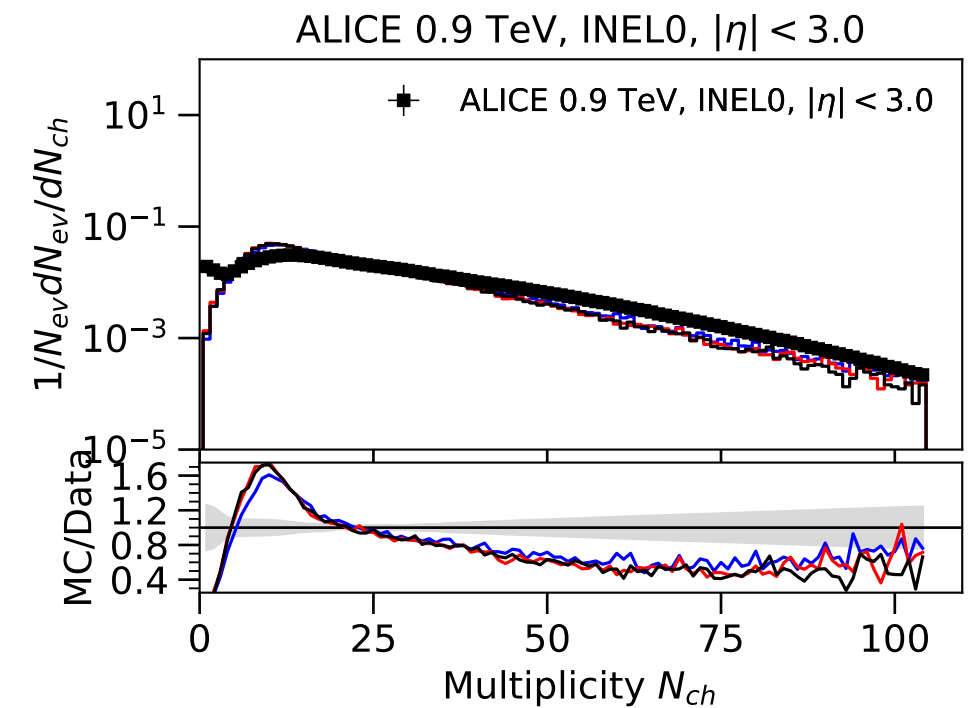
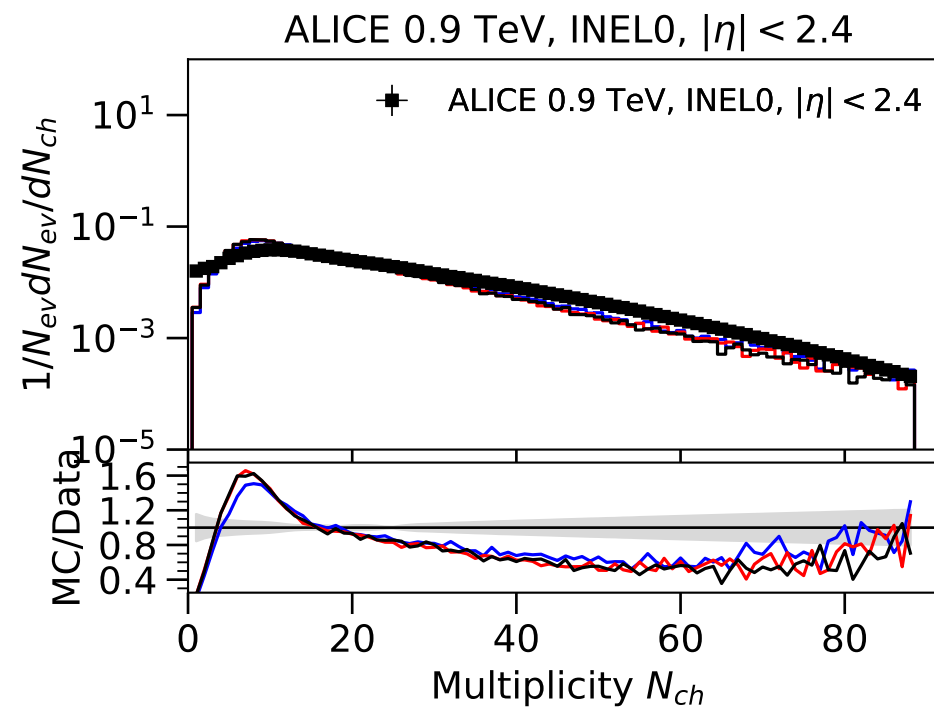
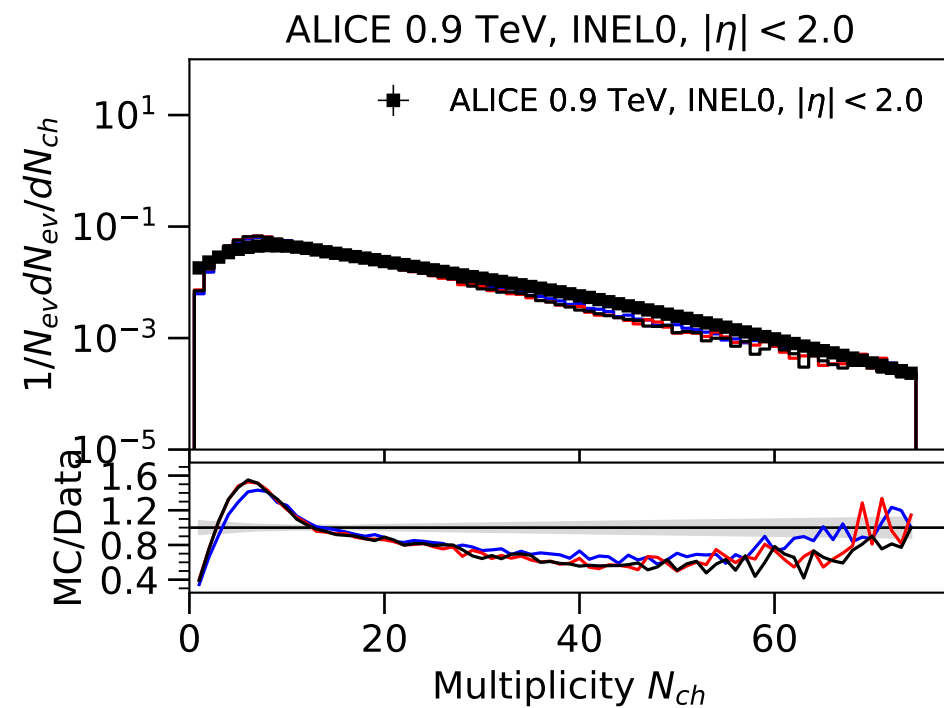


ALICE - 0.9TeV INEL > 0 Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

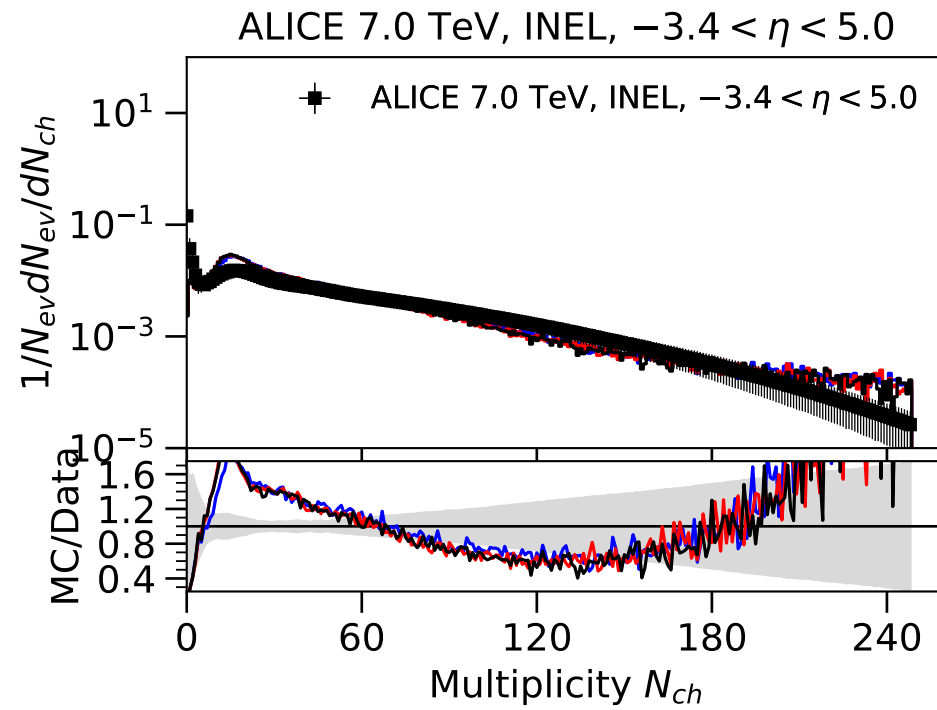
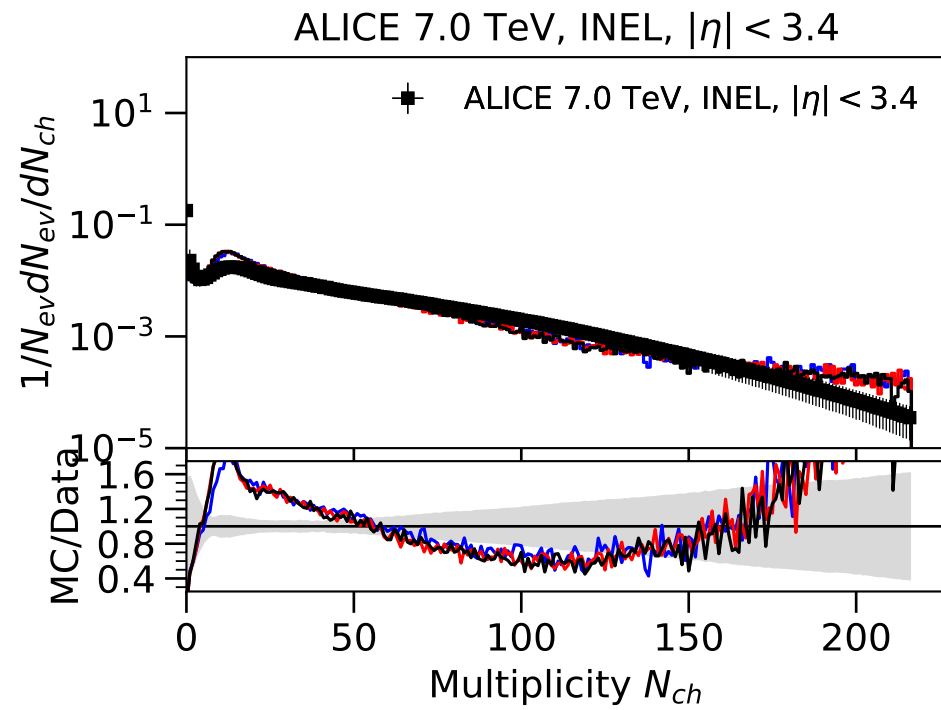
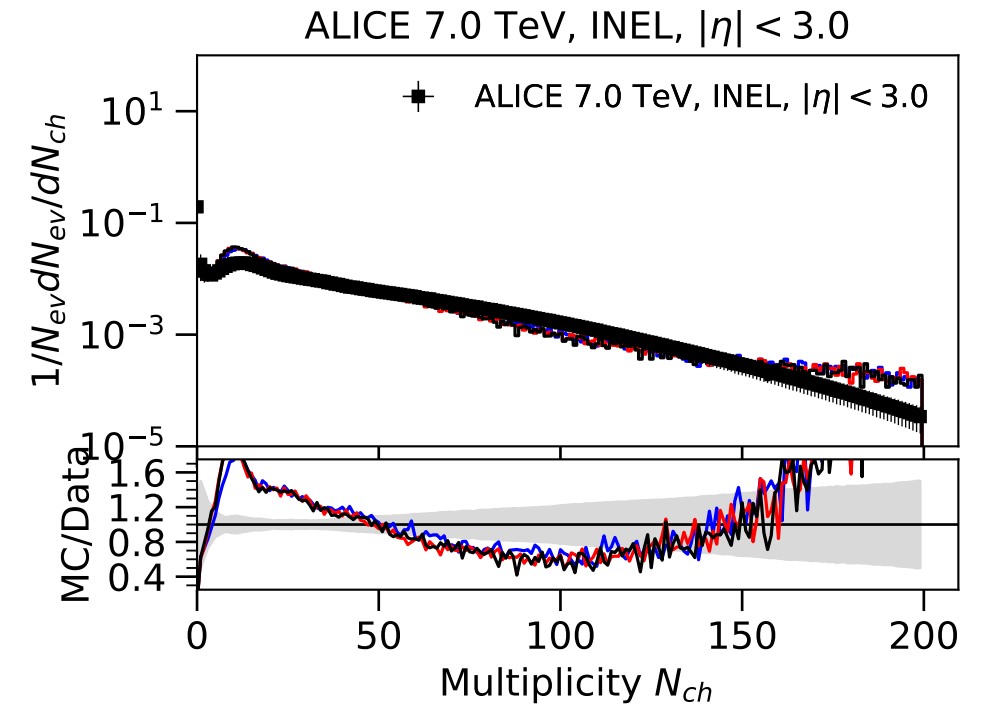
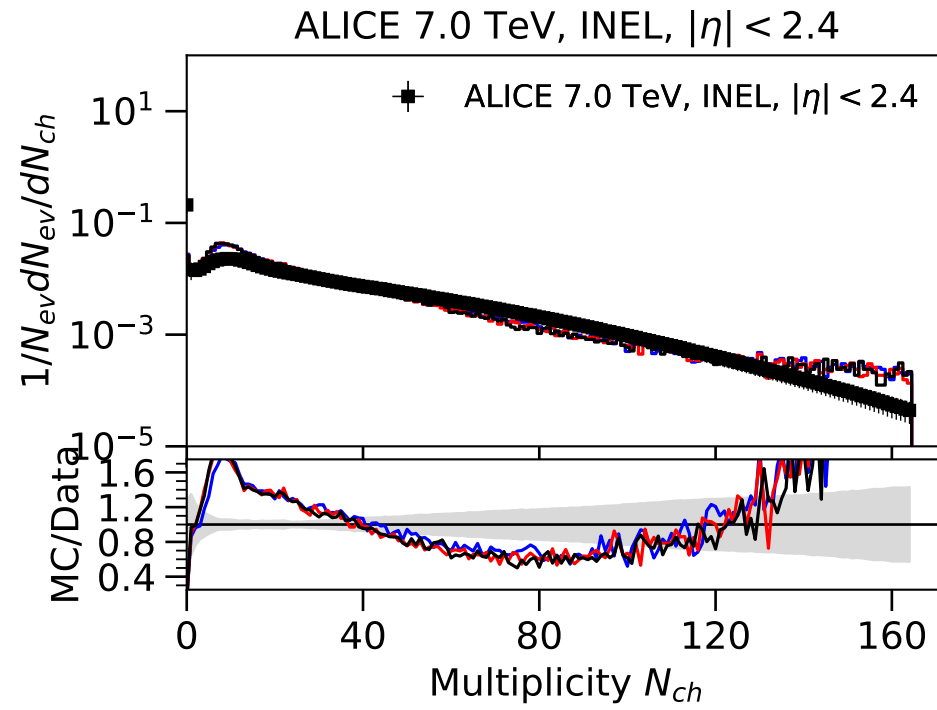
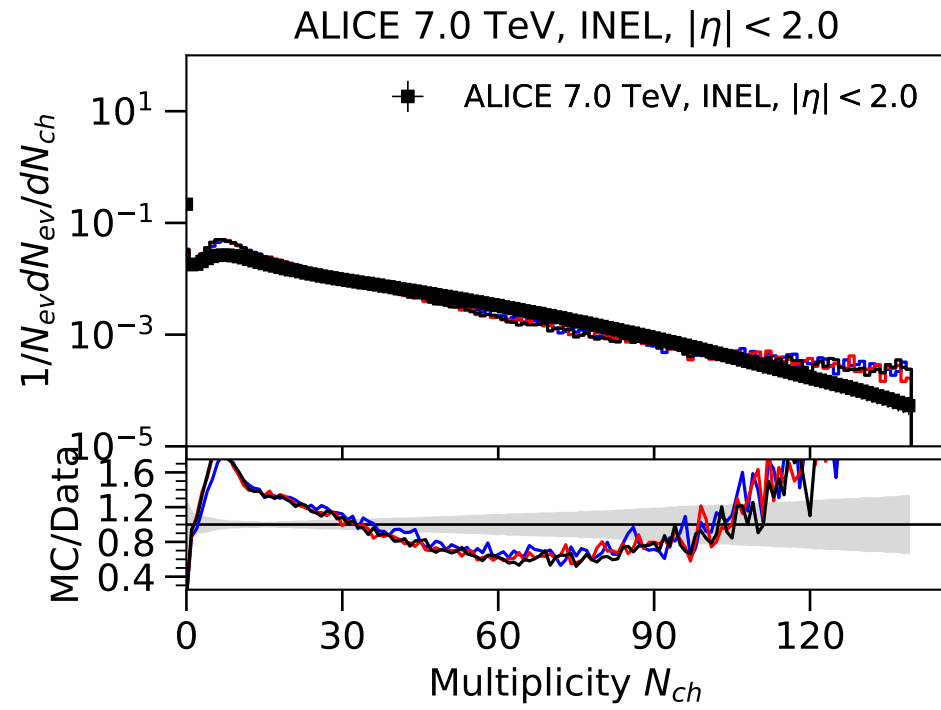


ALICE - 7TeV INEL Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3



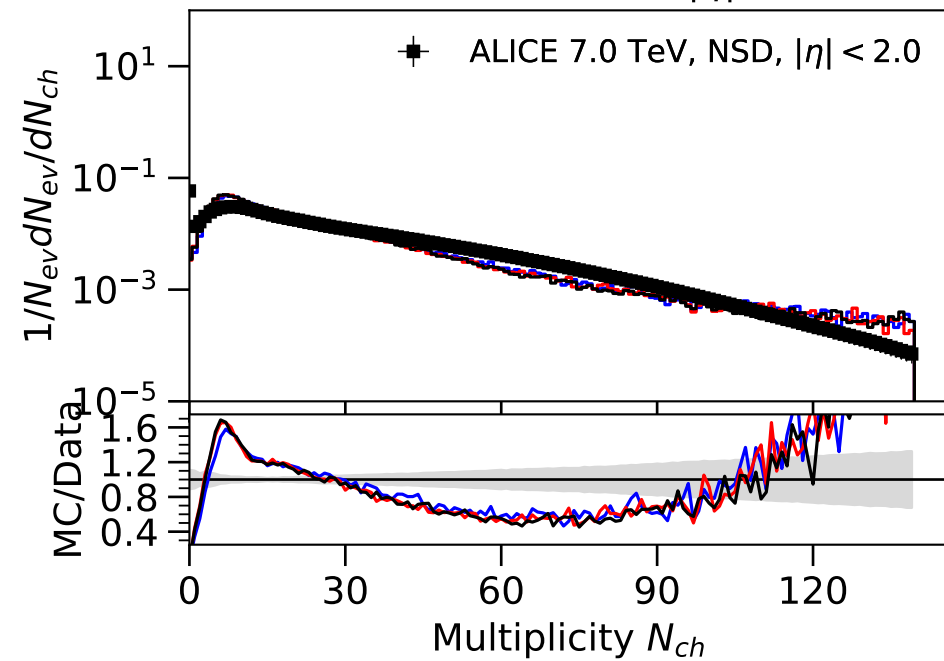
ALICE - 7TeV NSD Multiplicity distribution.

— DPMJET-III 19.1

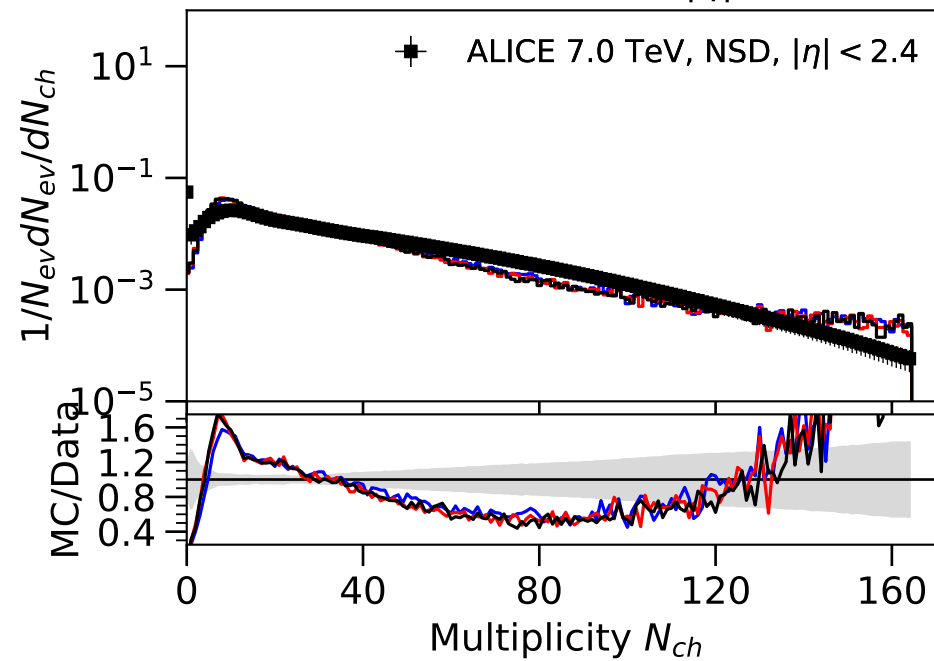
— DPMJET-III 19.2

— DPMJET-III 19.3

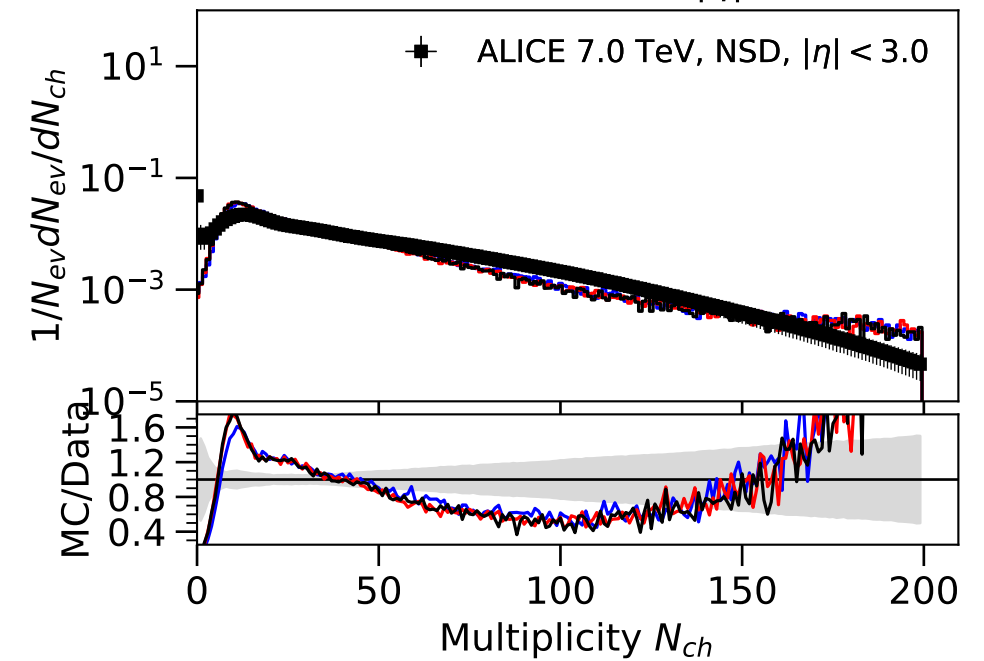
ALICE 7.0 TeV, NSD, $|\eta| < 2.0$



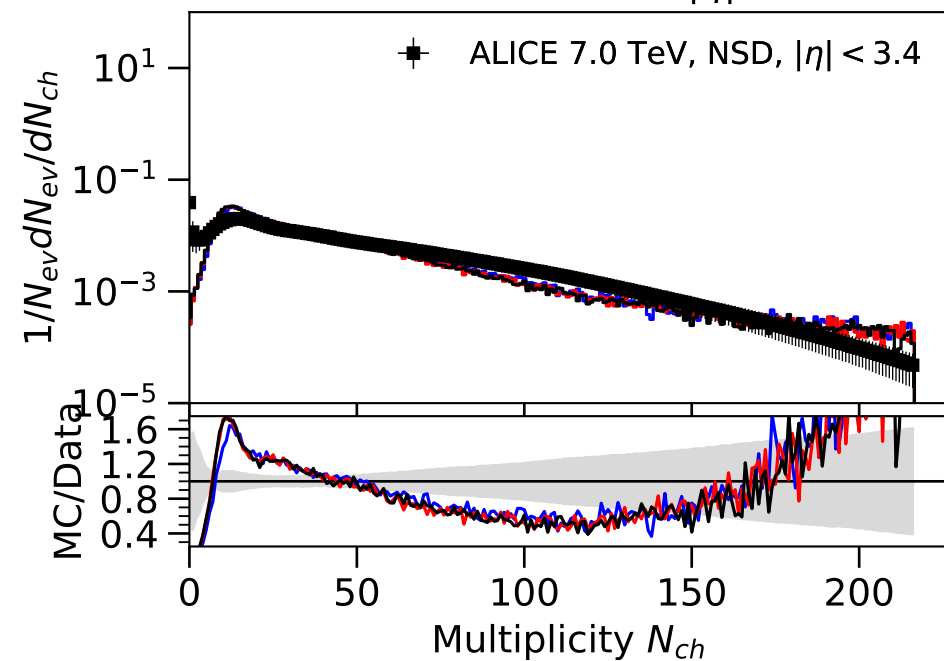
ALICE 7.0 TeV, NSD, $|\eta| < 2.4$



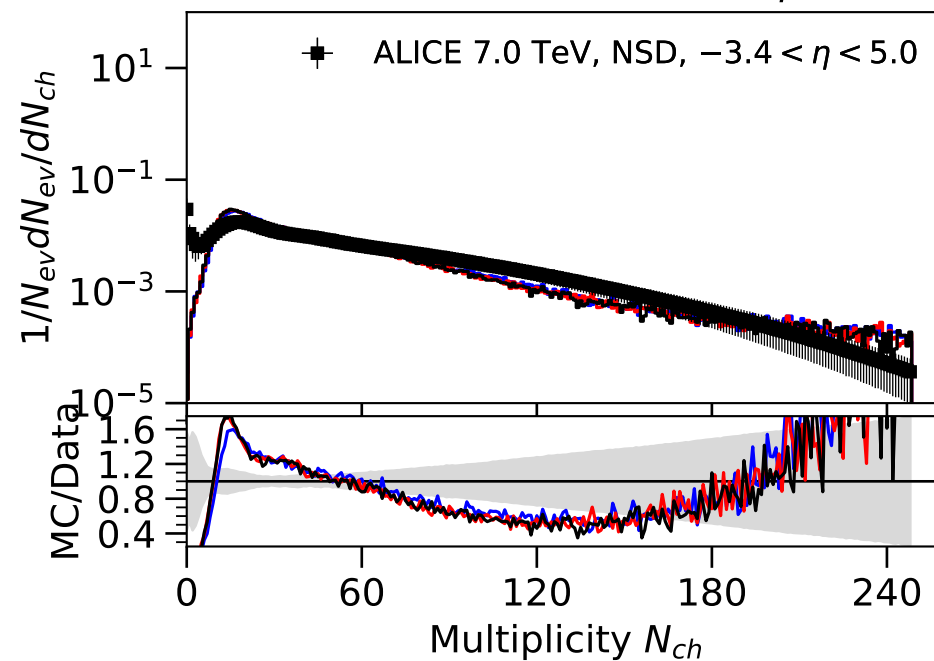
ALICE 7.0 TeV, NSD, $|\eta| < 3.0$



ALICE 7.0 TeV, NSD, $|\eta| < 3.4$



ALICE 7.0 TeV, NSD, $-3.4 < \eta < 5.0$

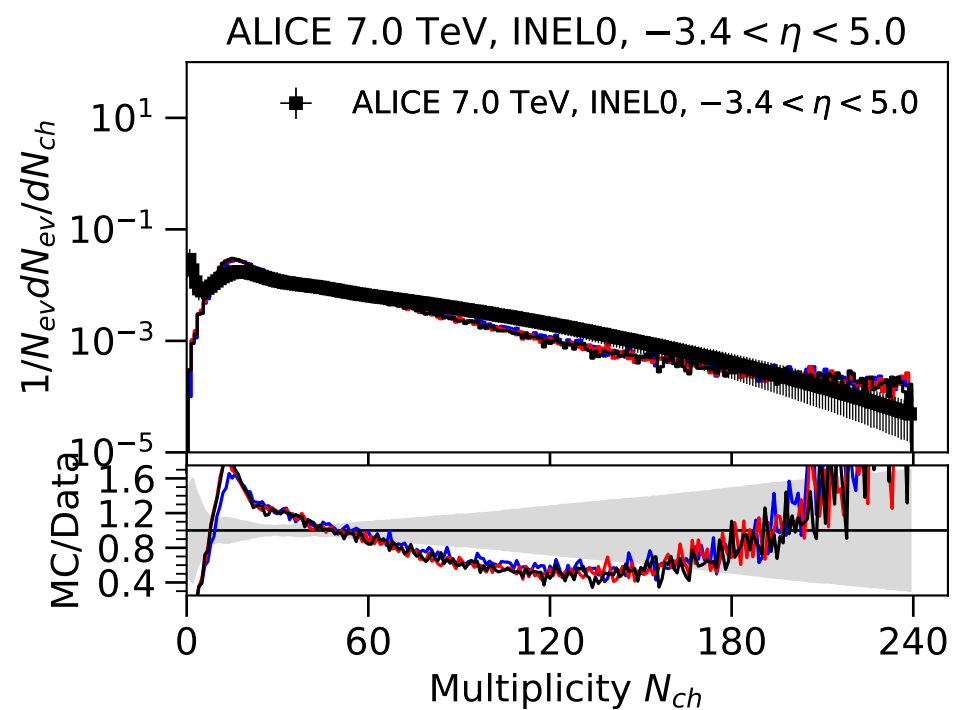
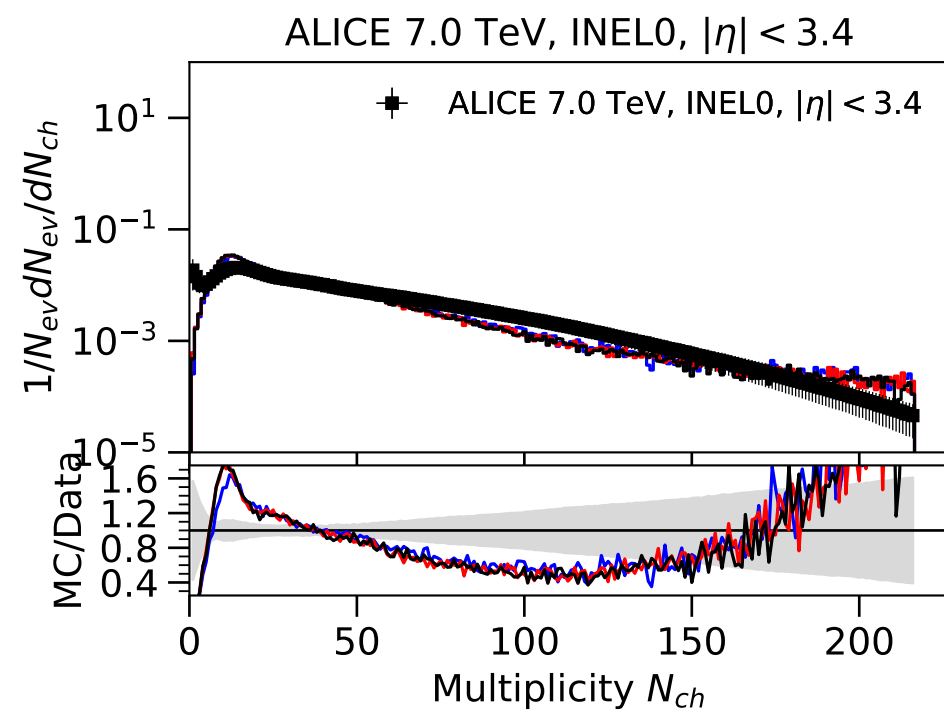
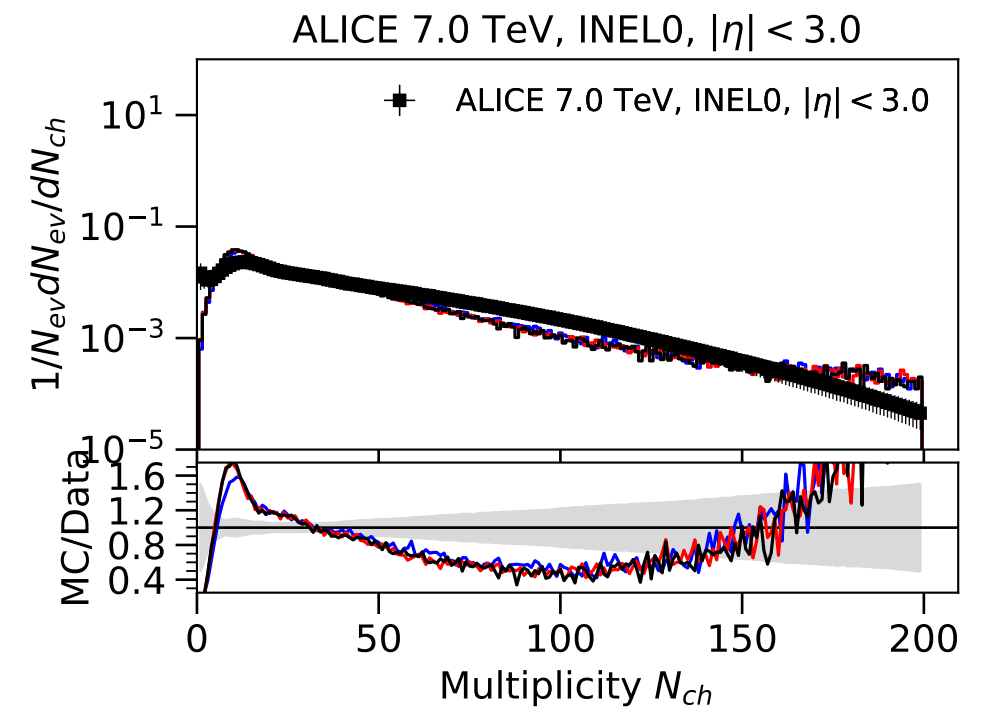
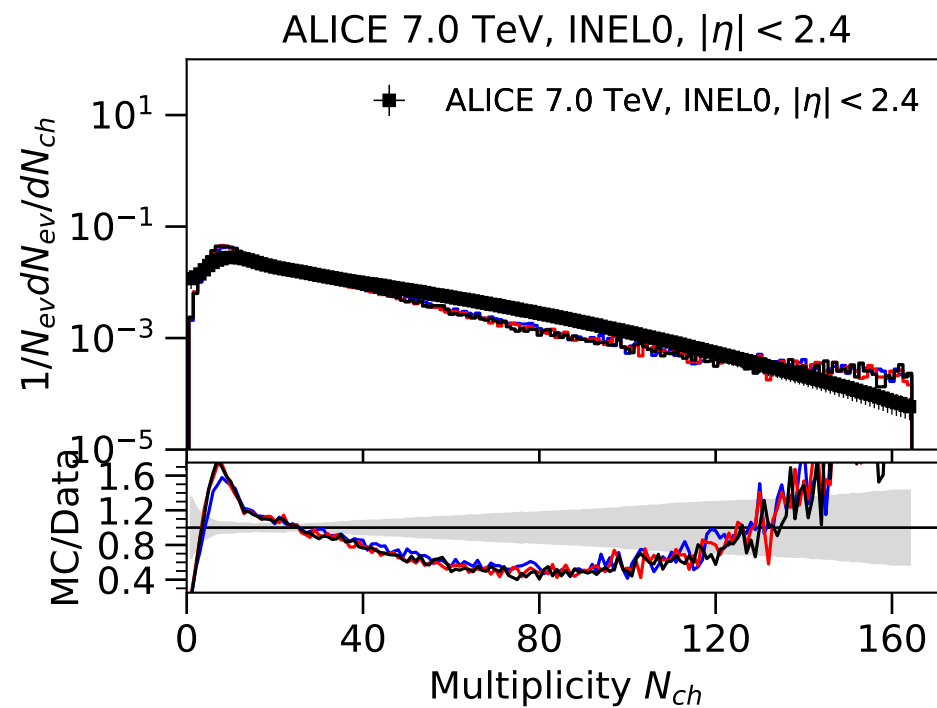
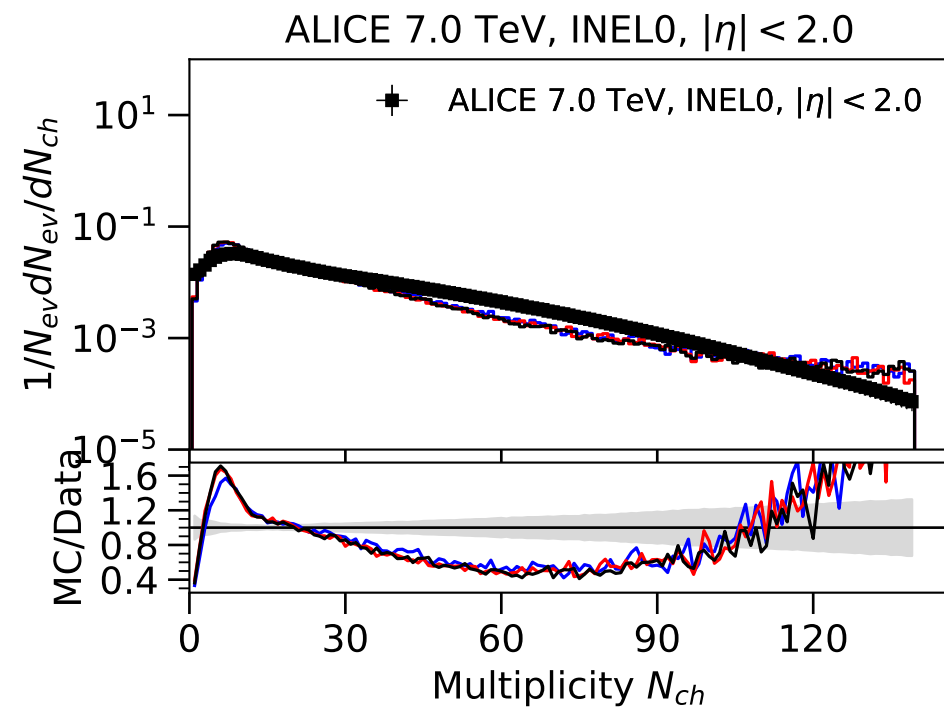


ALICE - 7TeV INEL > 0 Multiplicity distribution.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

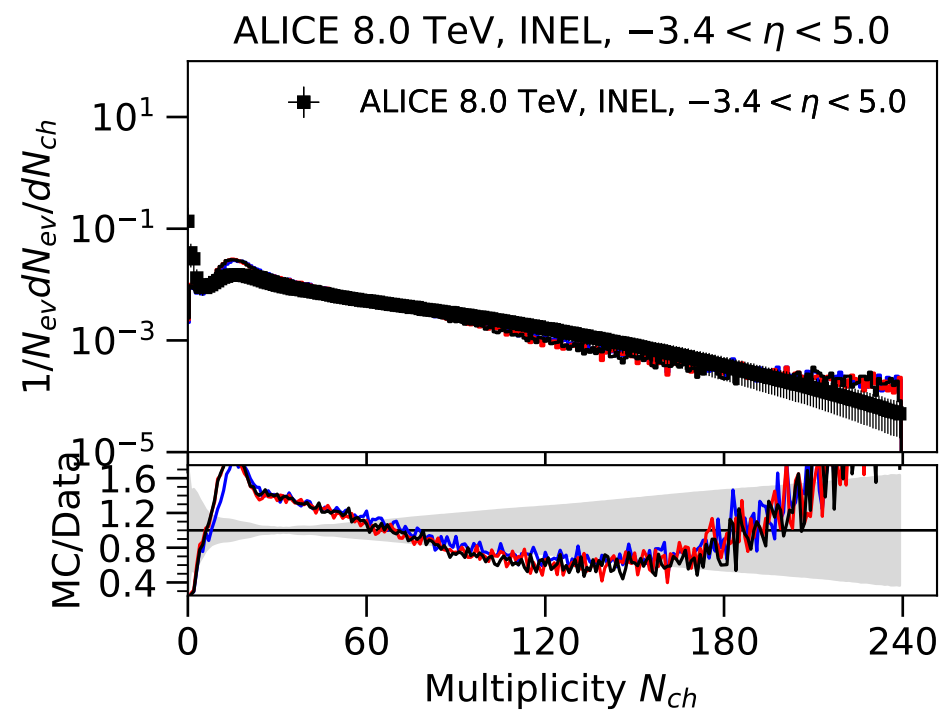
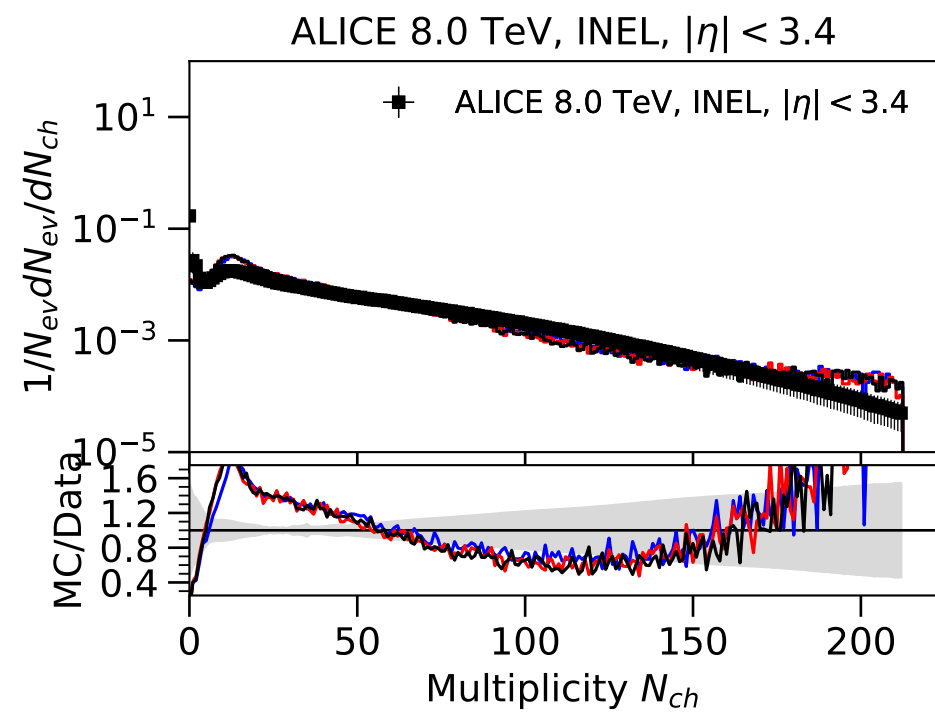
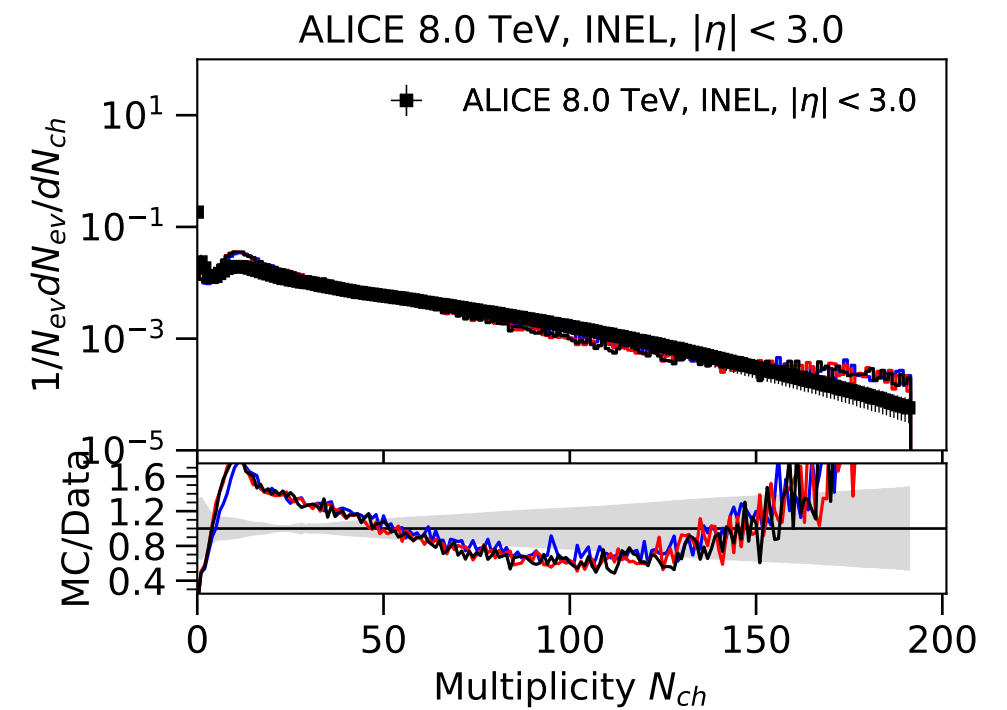
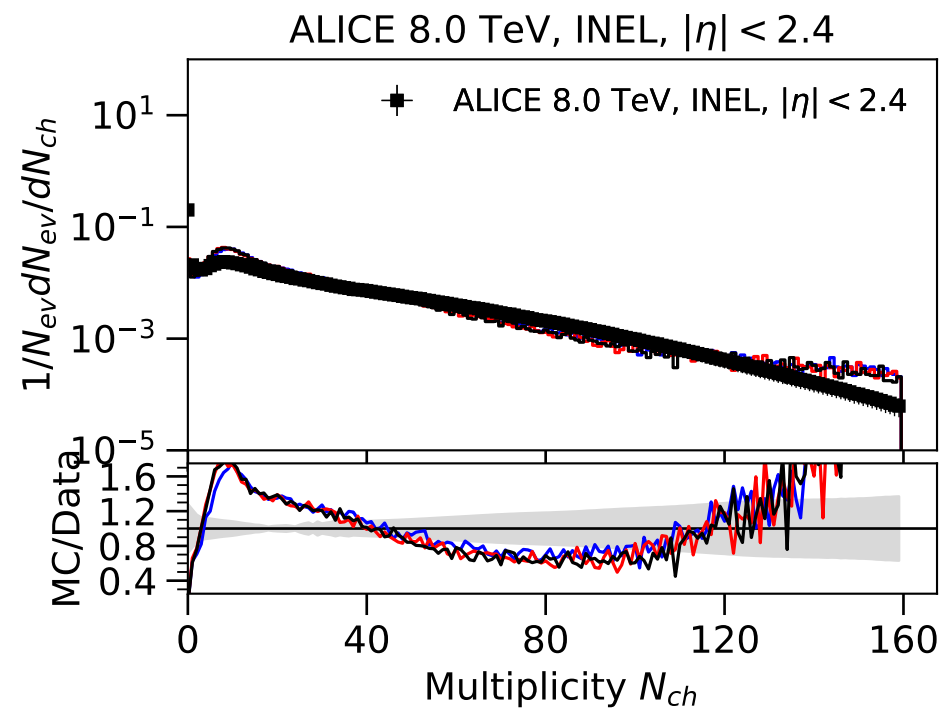
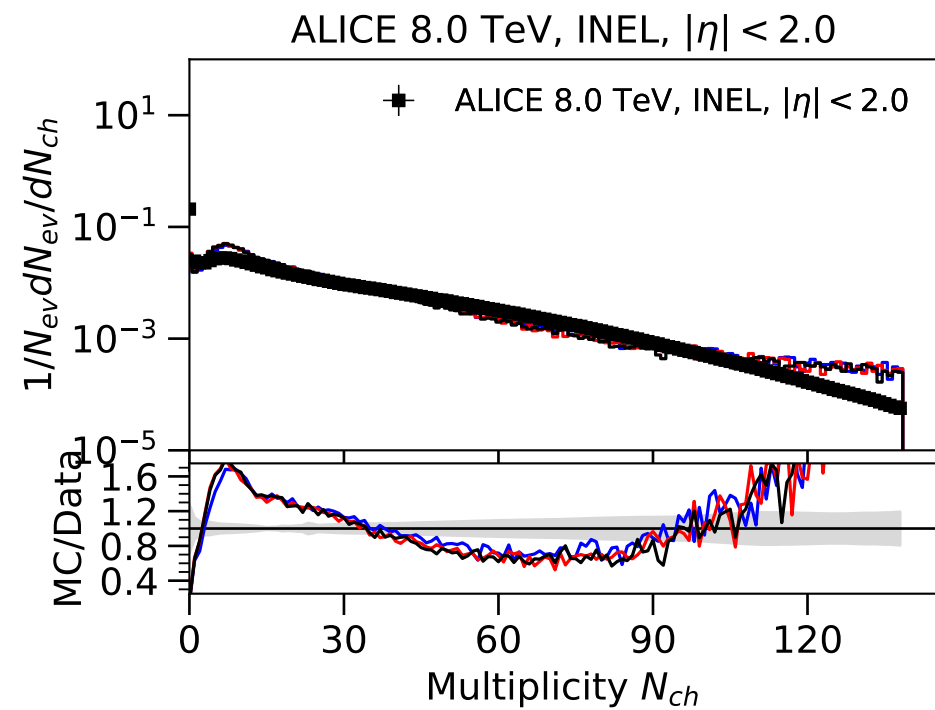


ALICE - 8TeV INEL Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

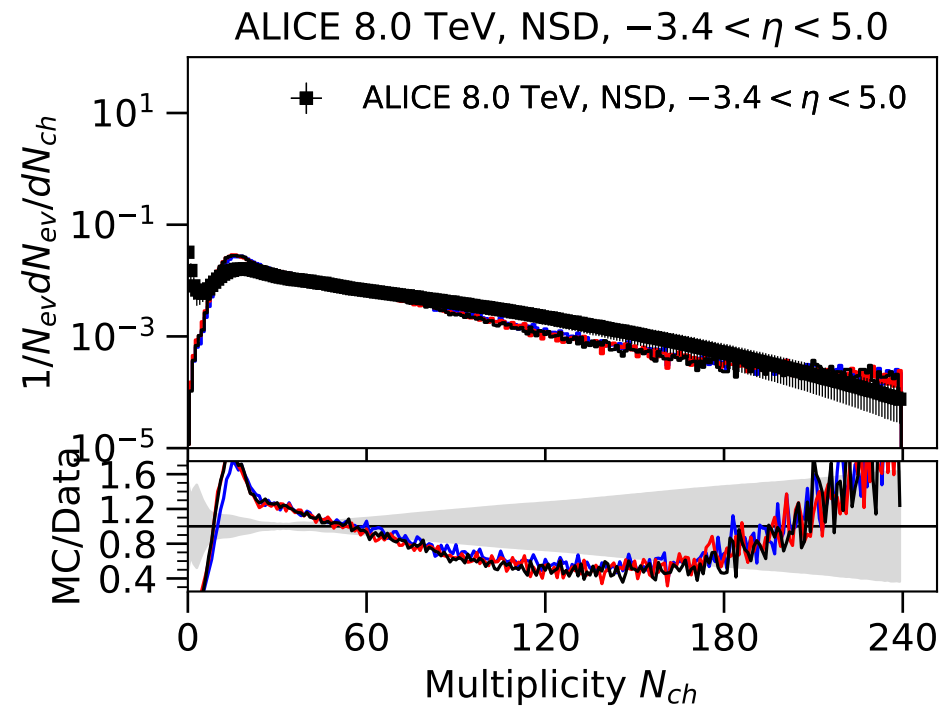
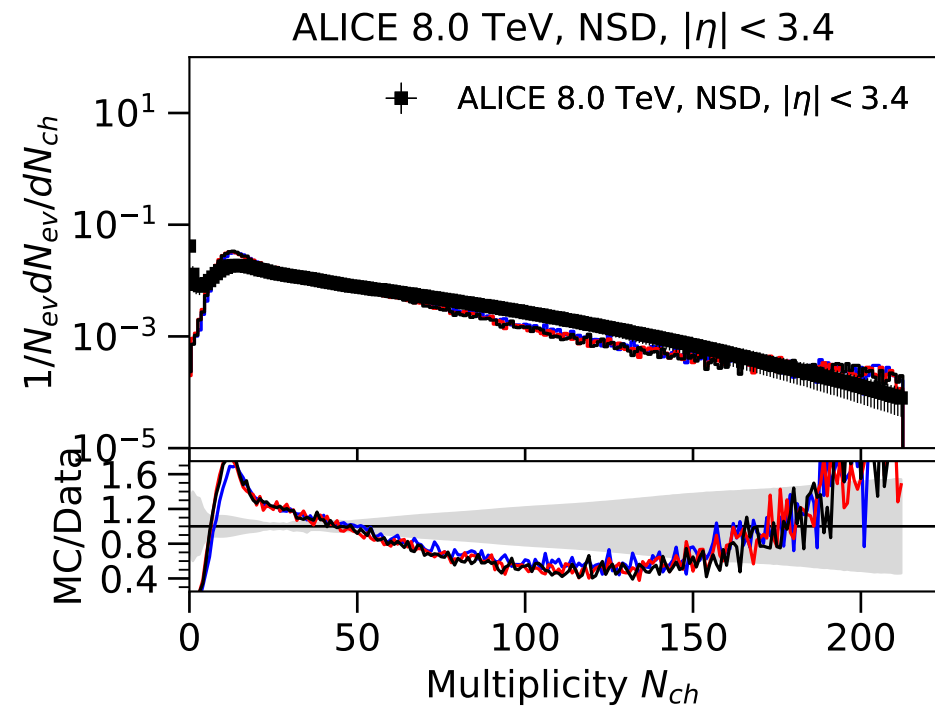
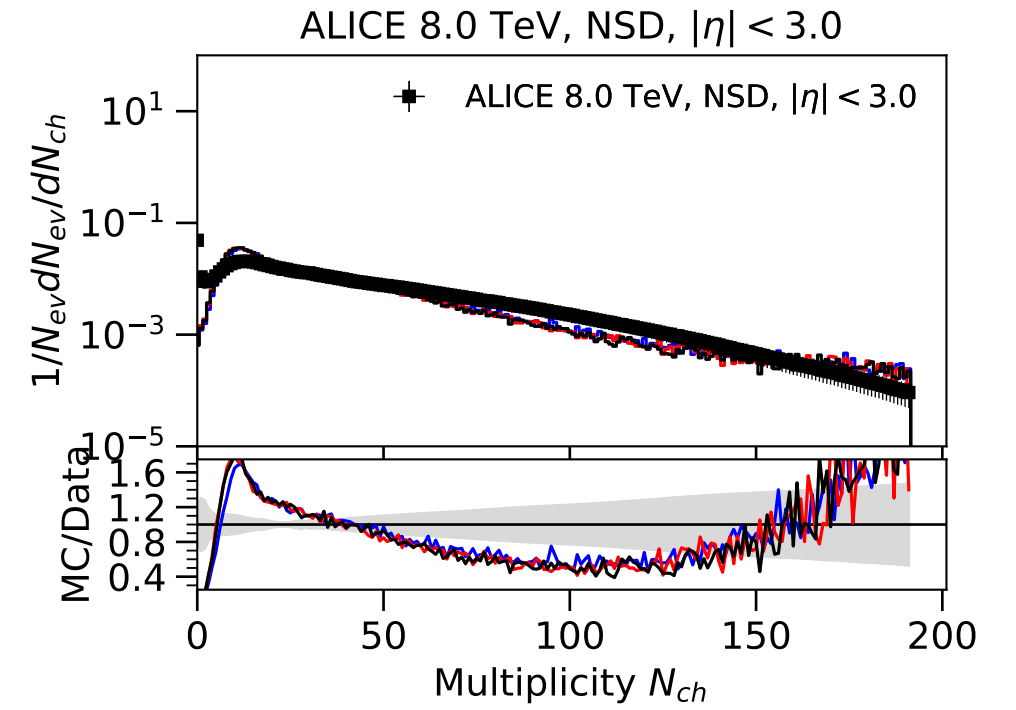
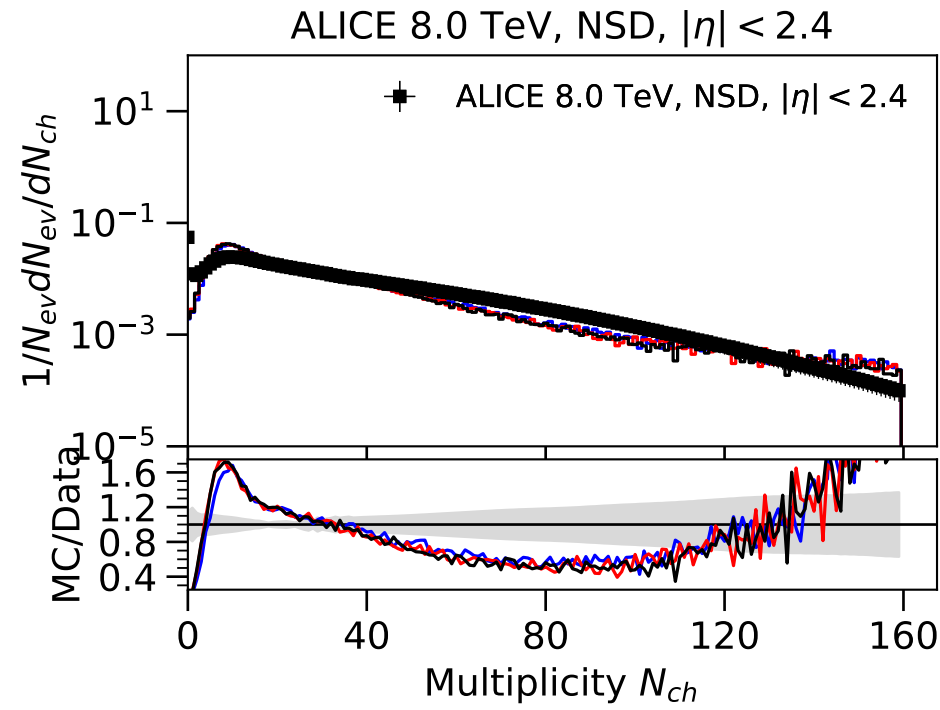
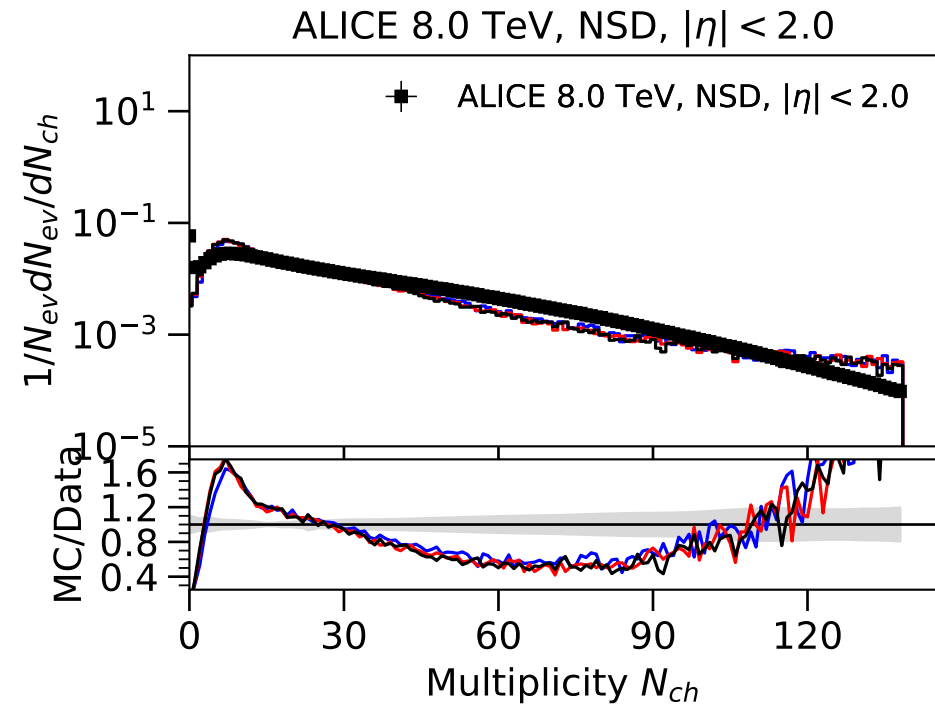


ALICE - 8TeV NSD Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

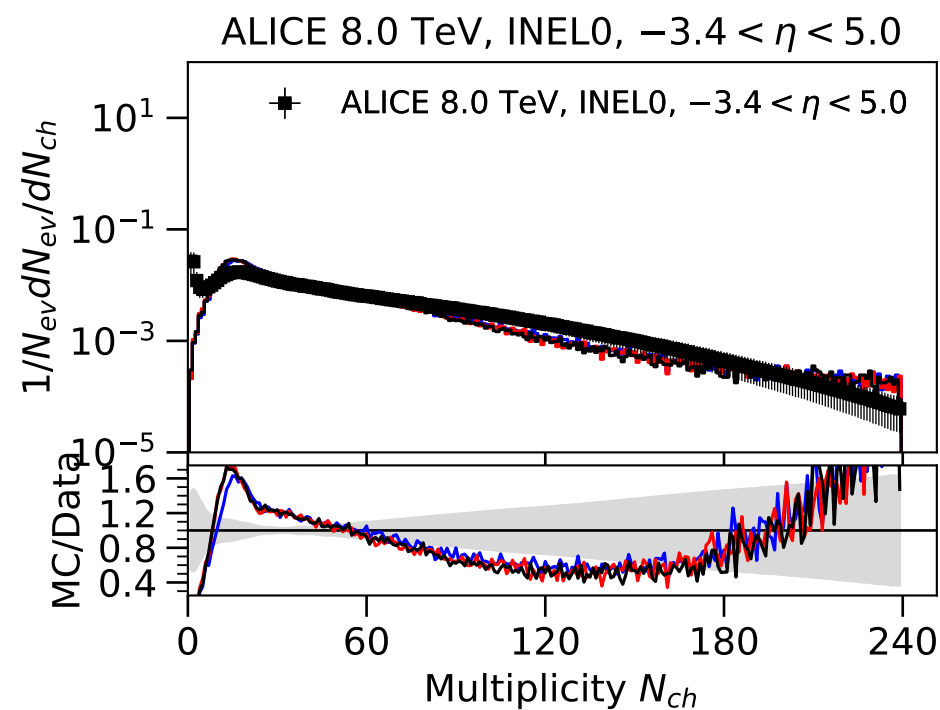
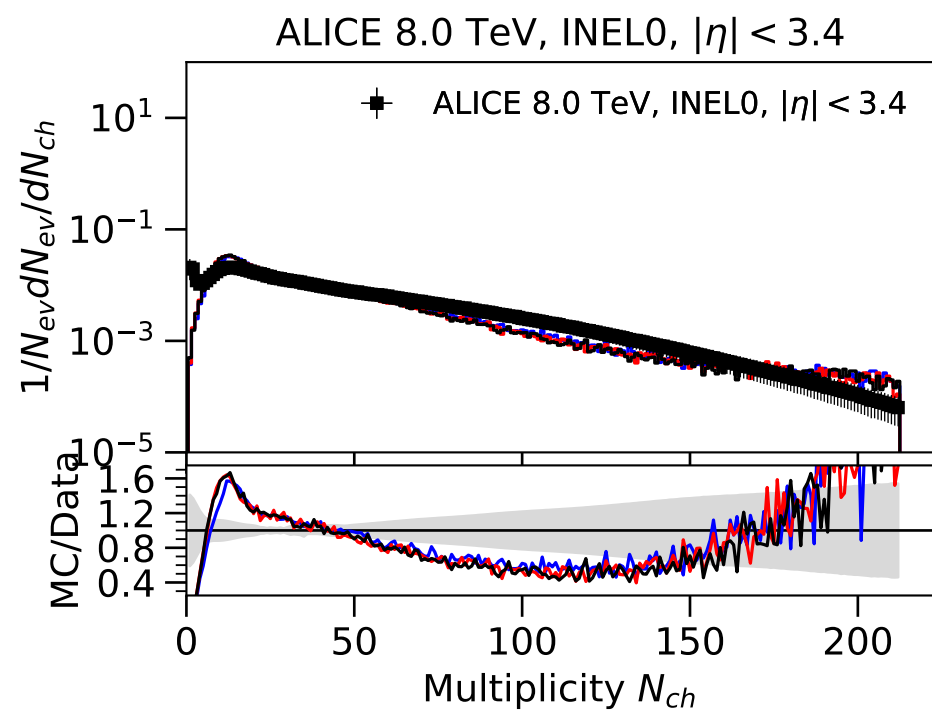
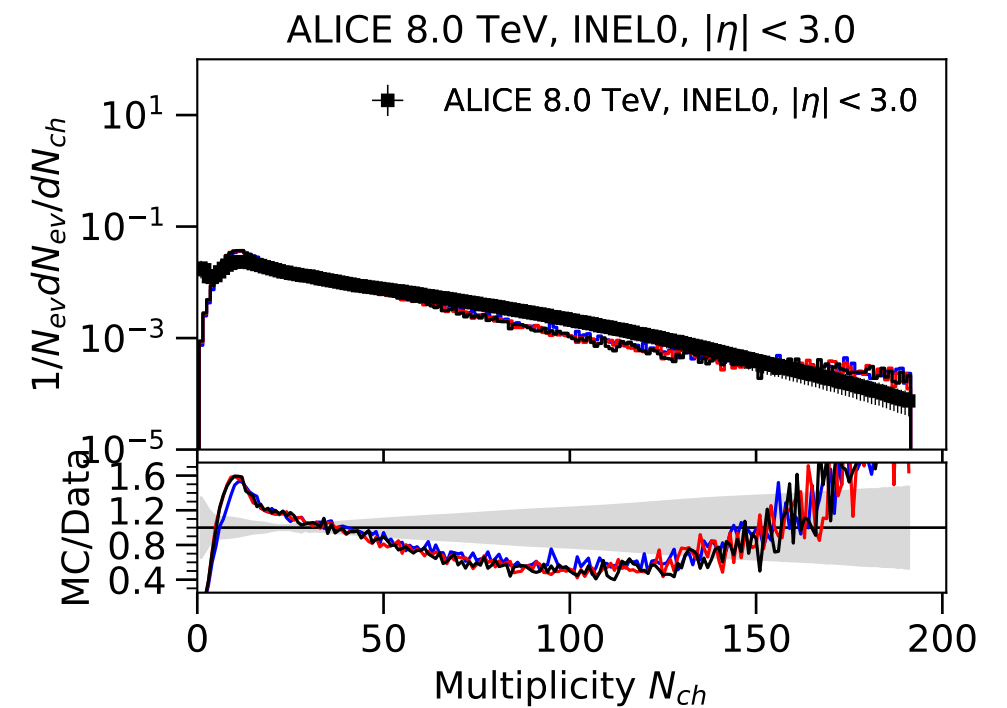
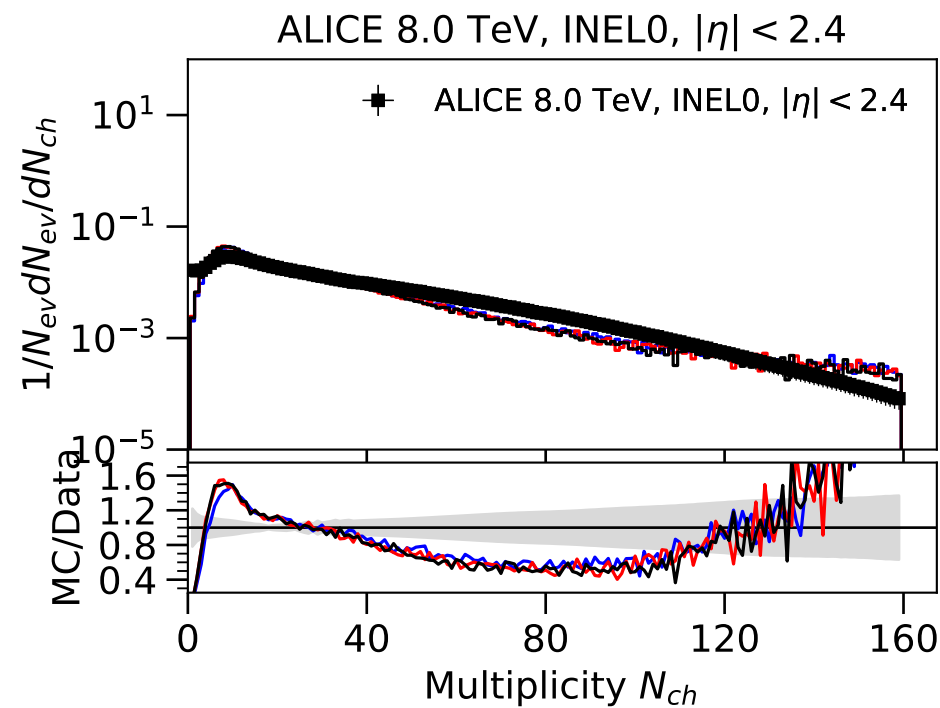
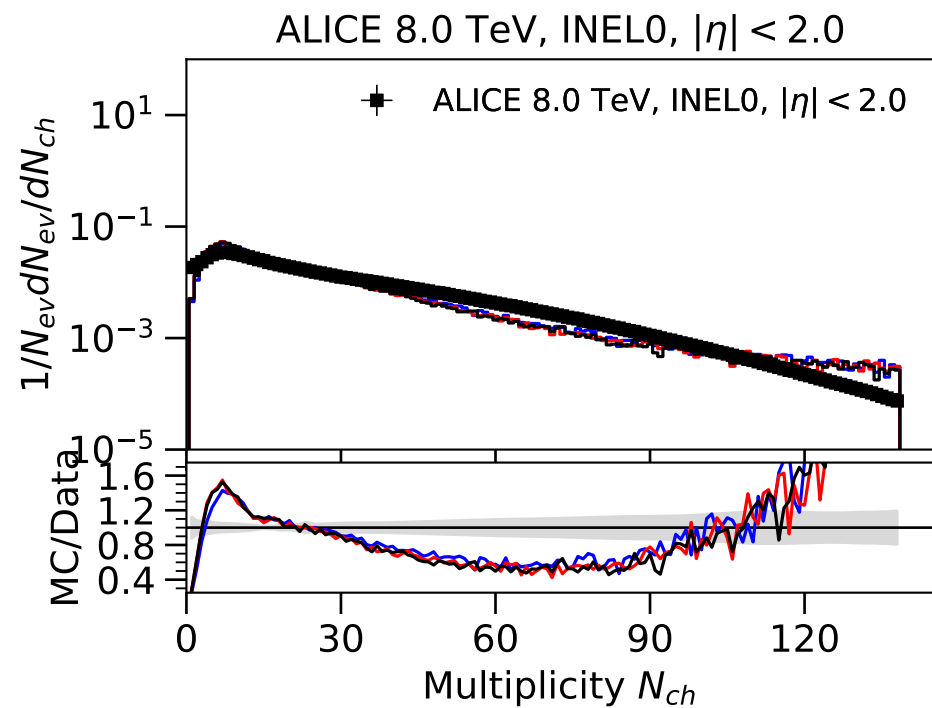


ALICE - 8TeV INEL > 0 Multiplicity distribution.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3



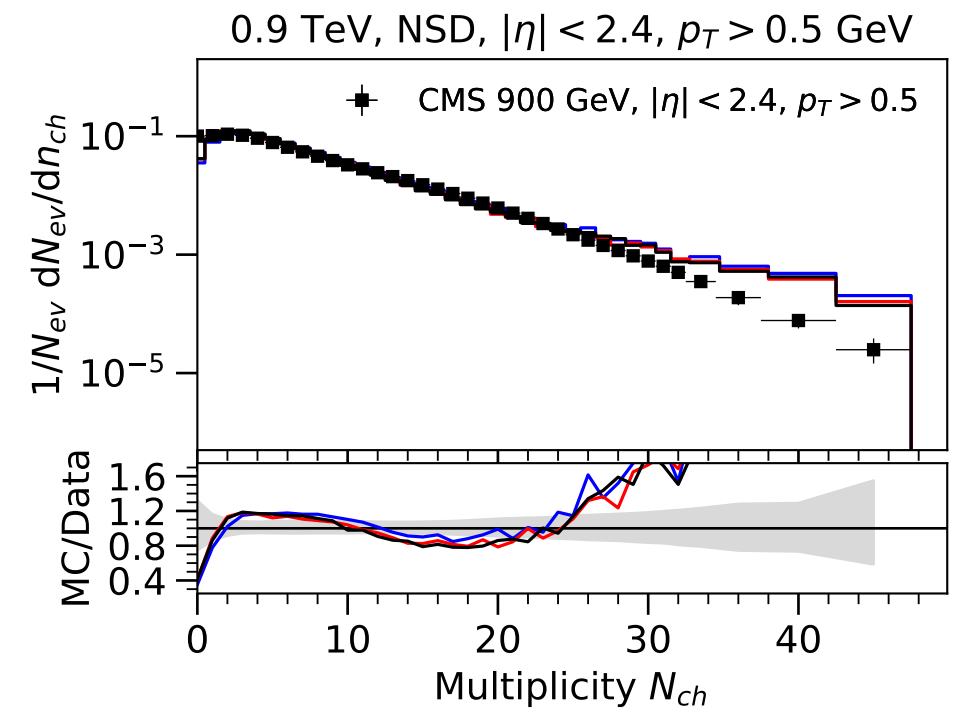
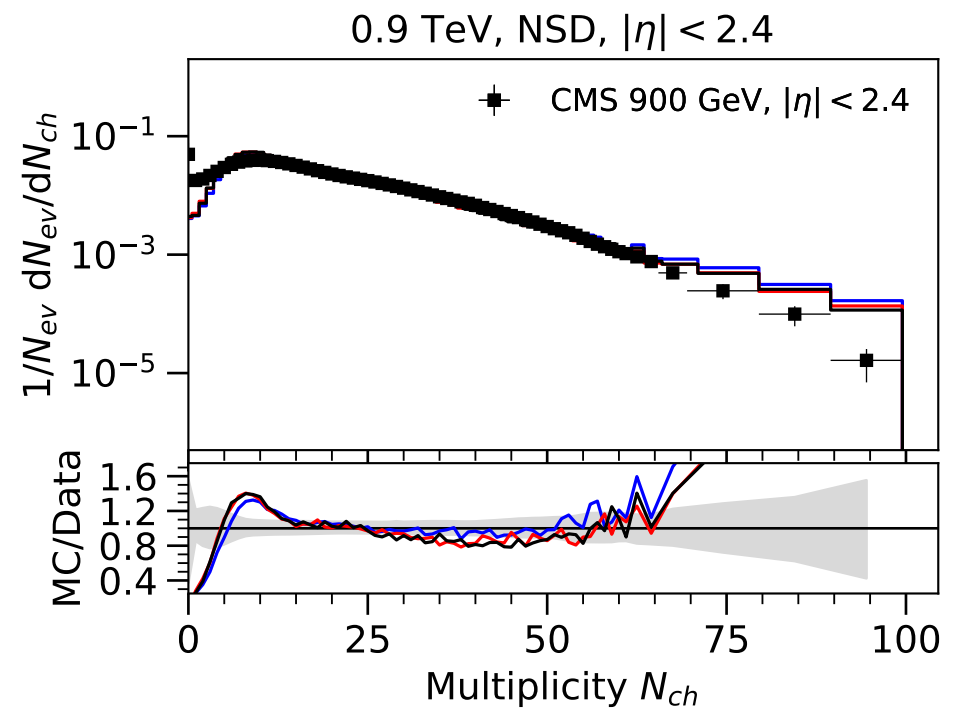
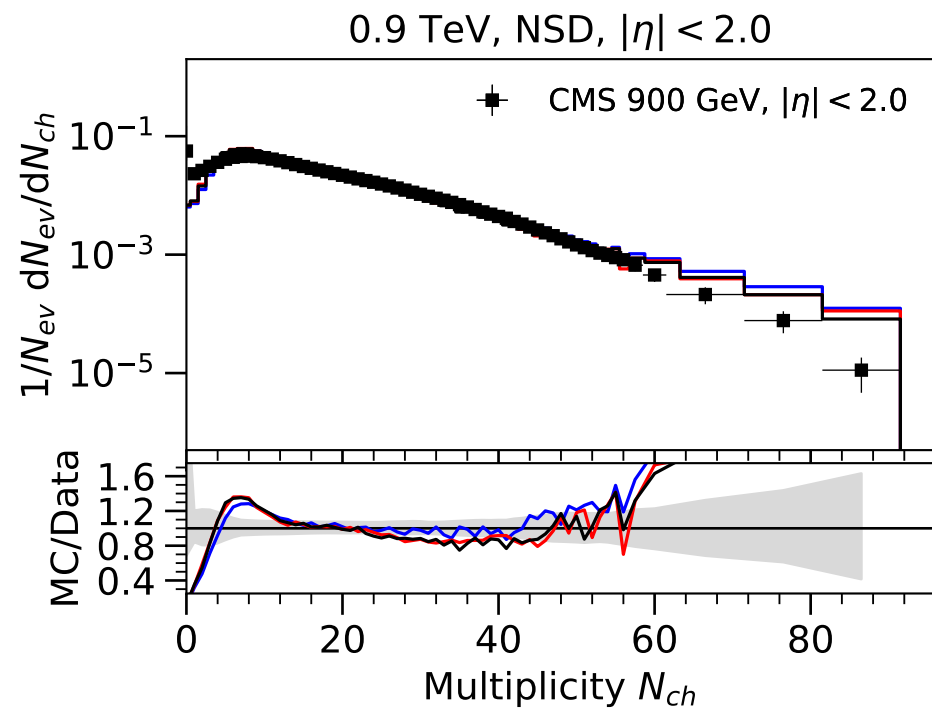
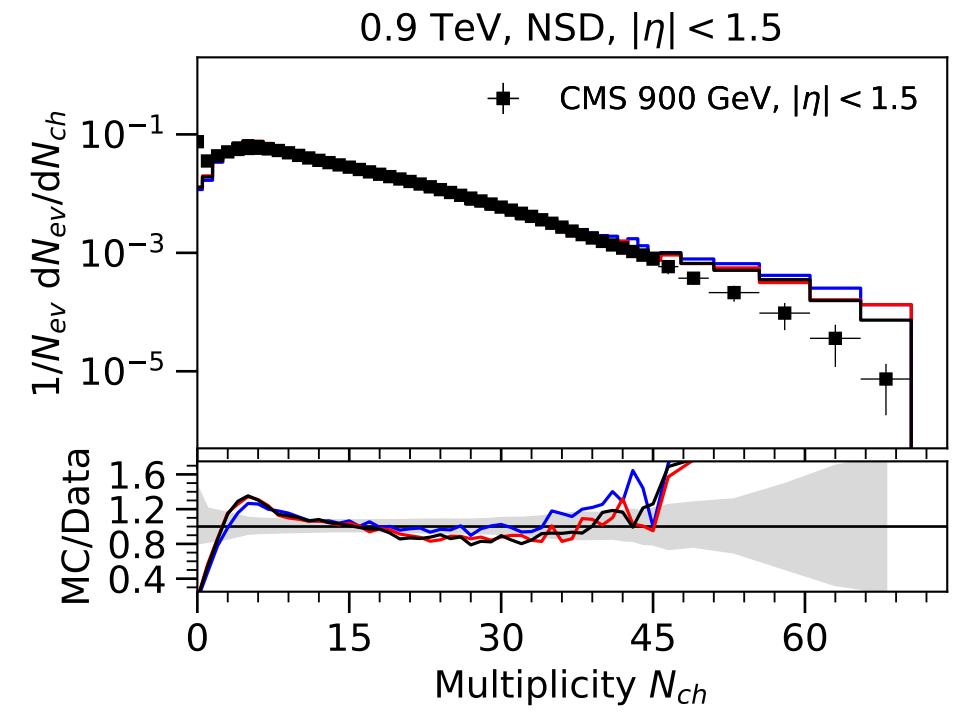
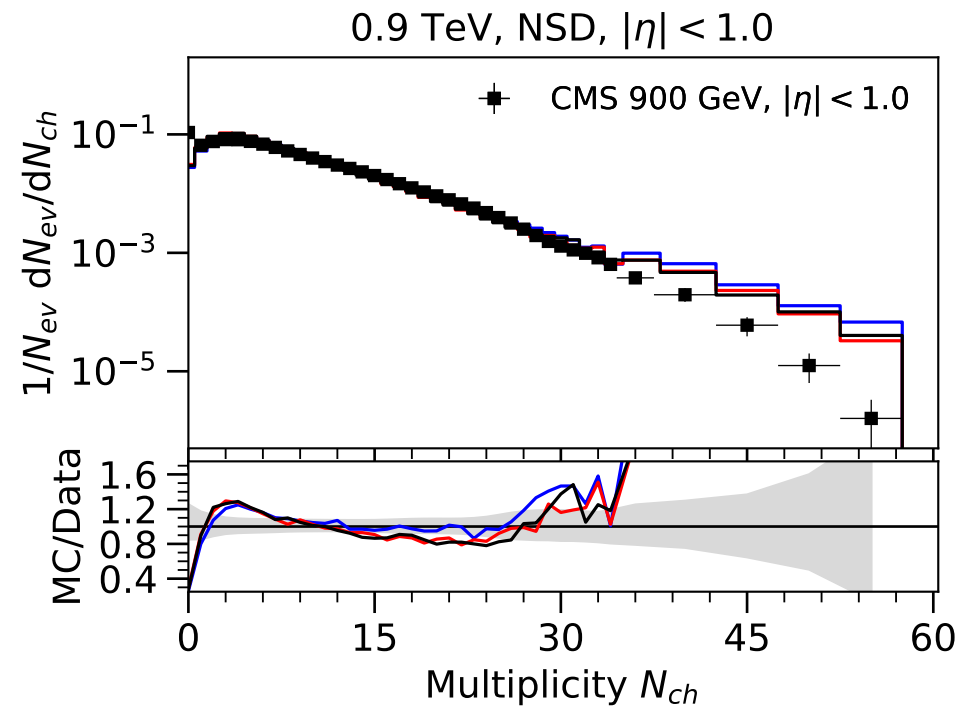
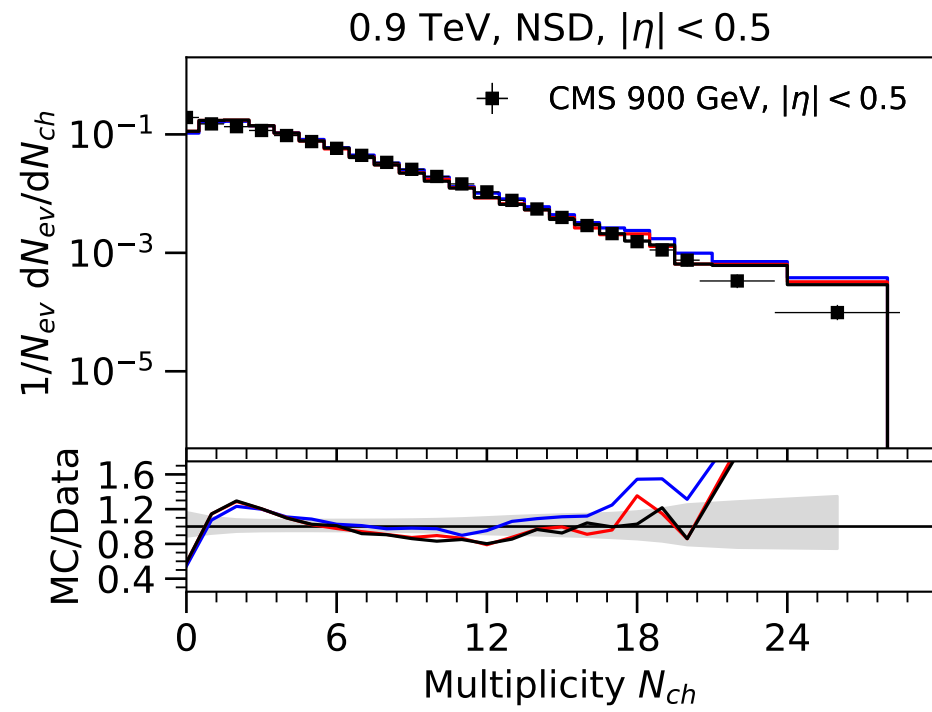
LHC: CMS Minimum Bias

CMS 900 GeV - NSD charged particle multiplicity.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

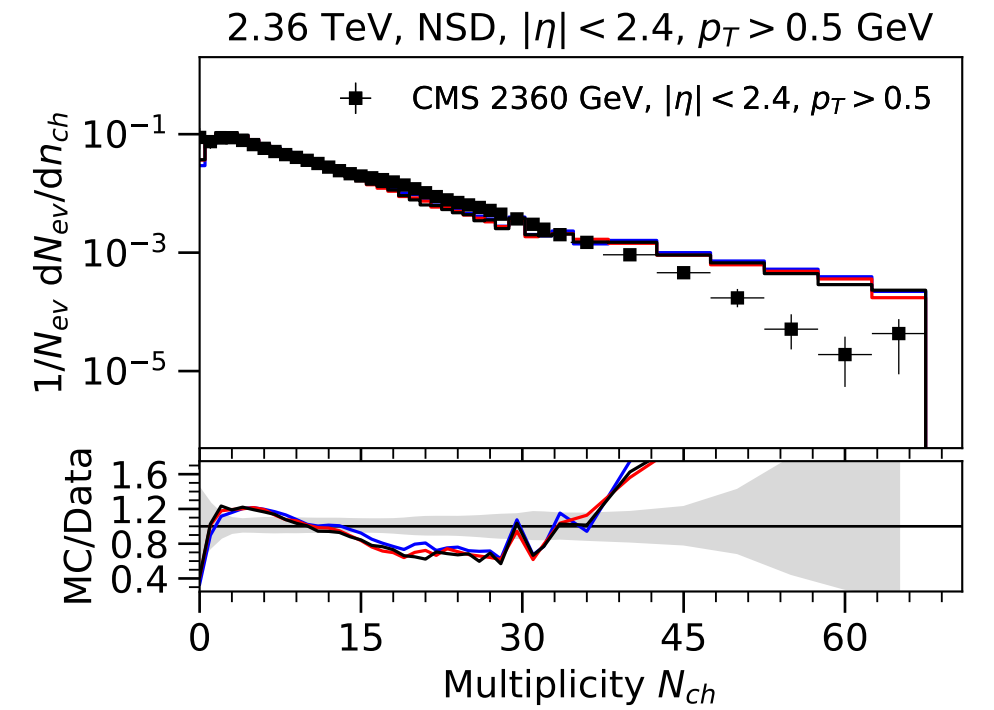
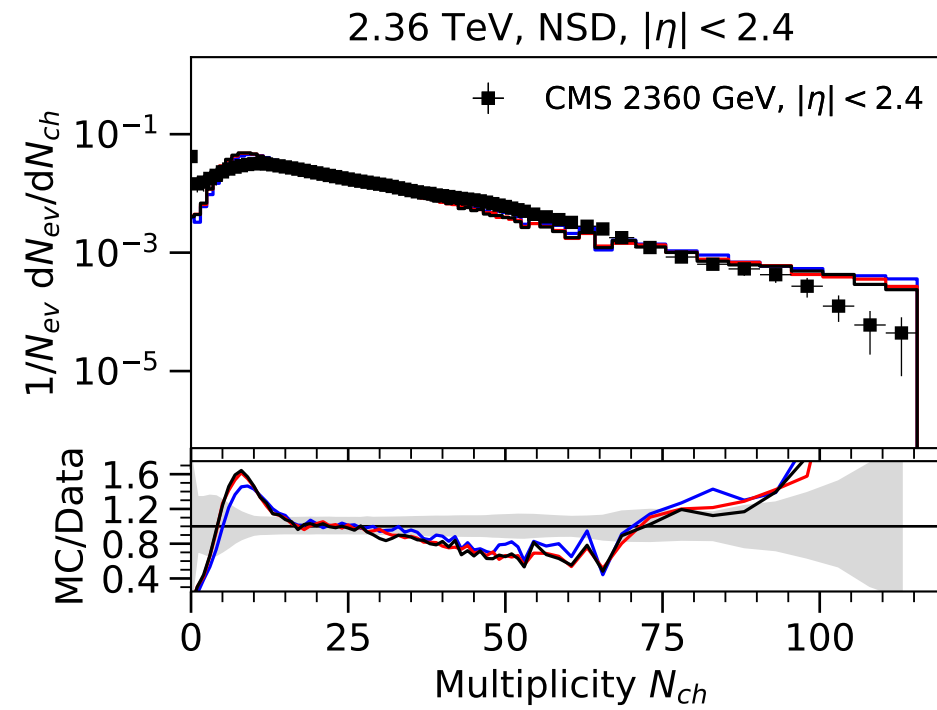
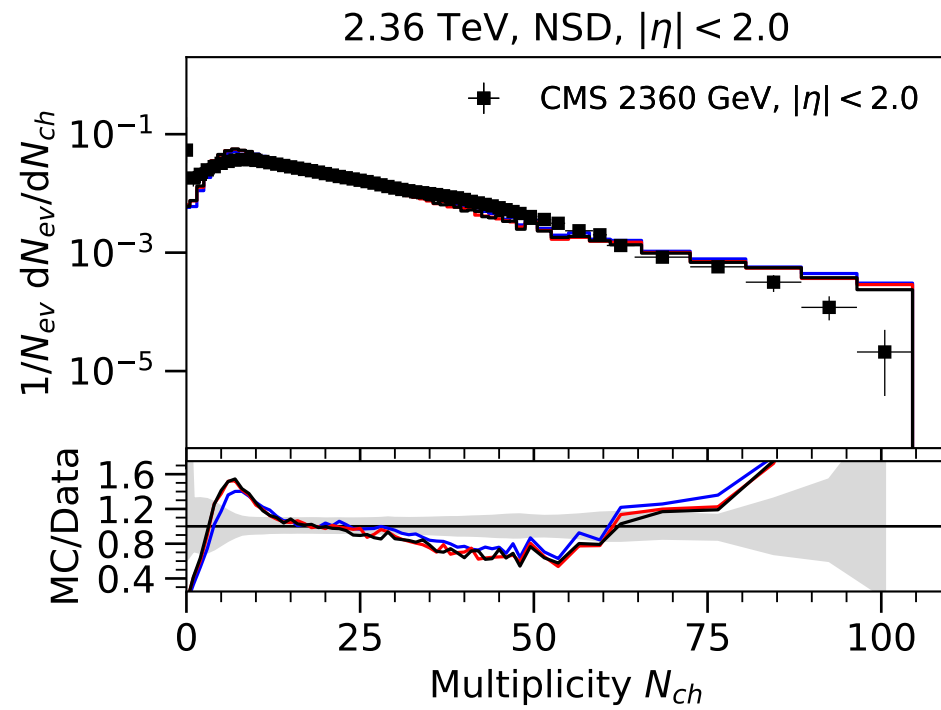
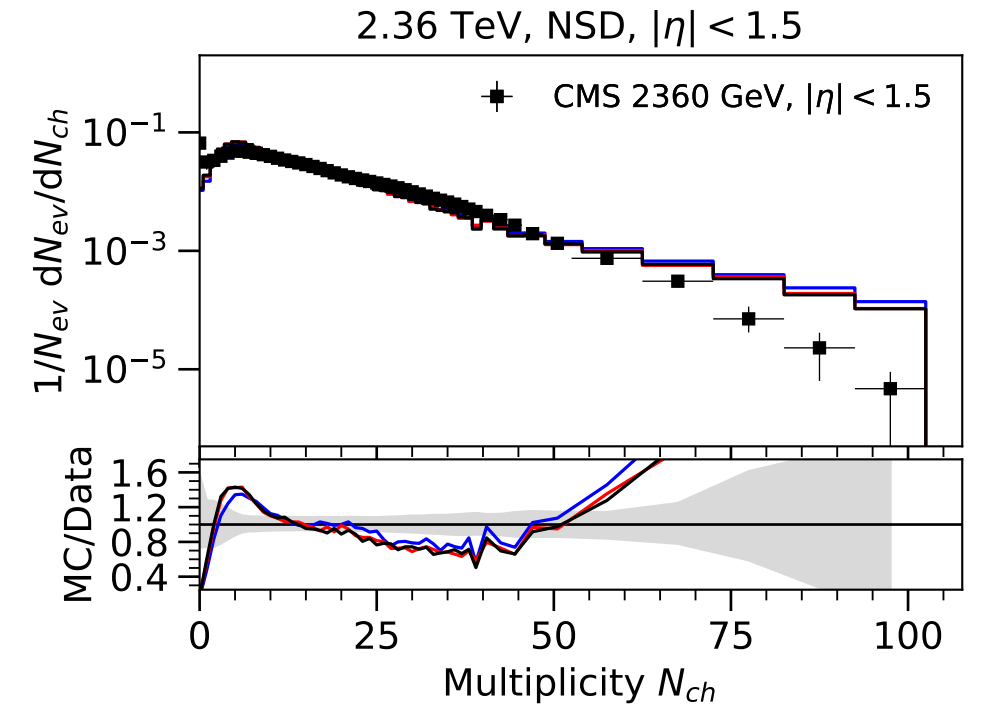
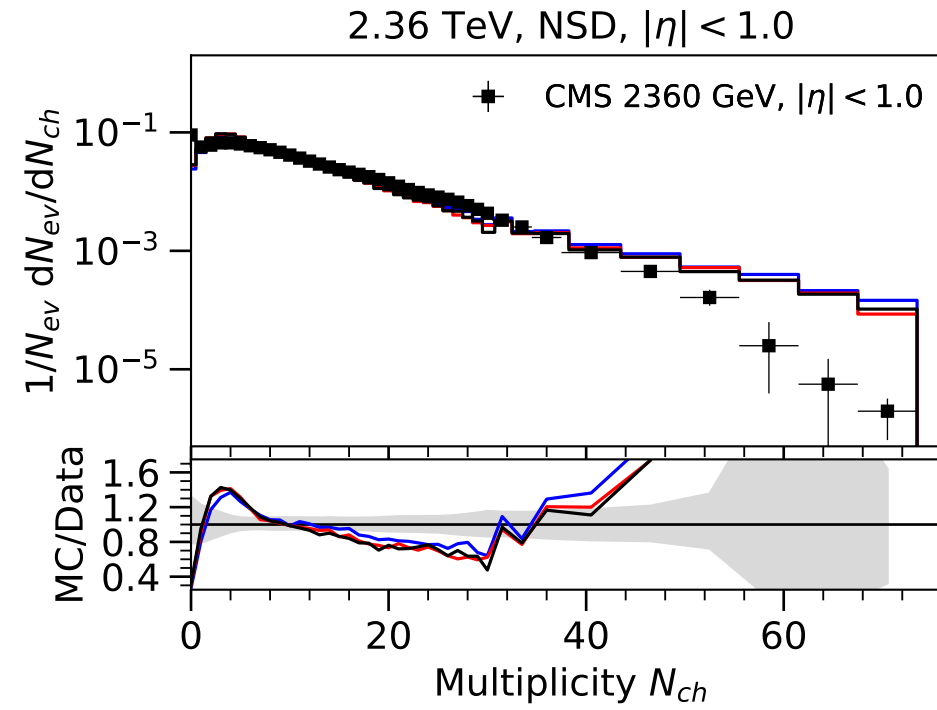
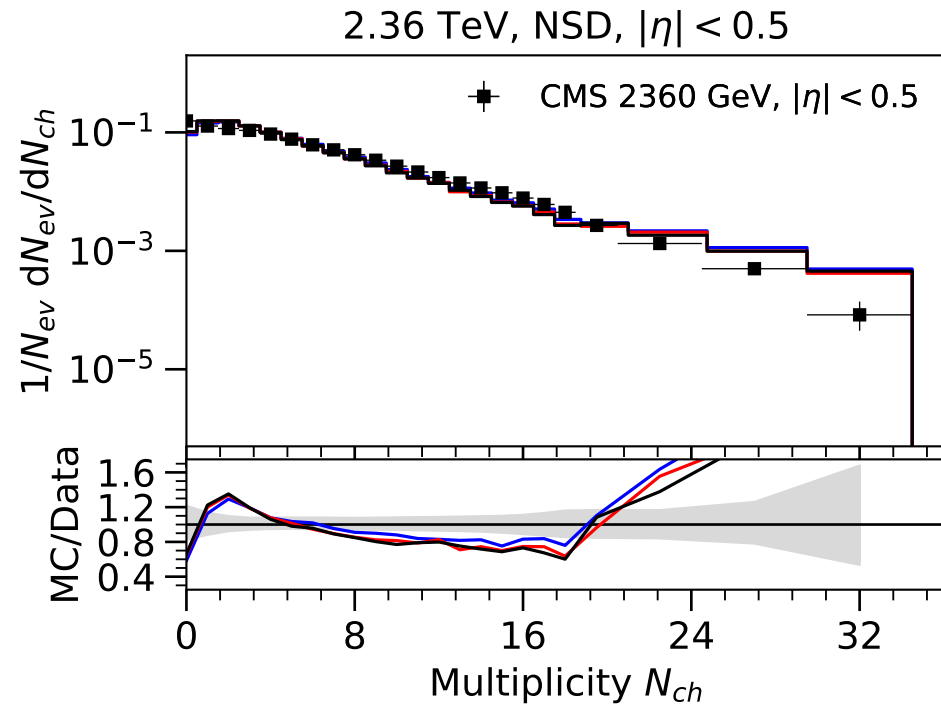


CMS 2360 GeV - NSD charged particle multiplicity.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

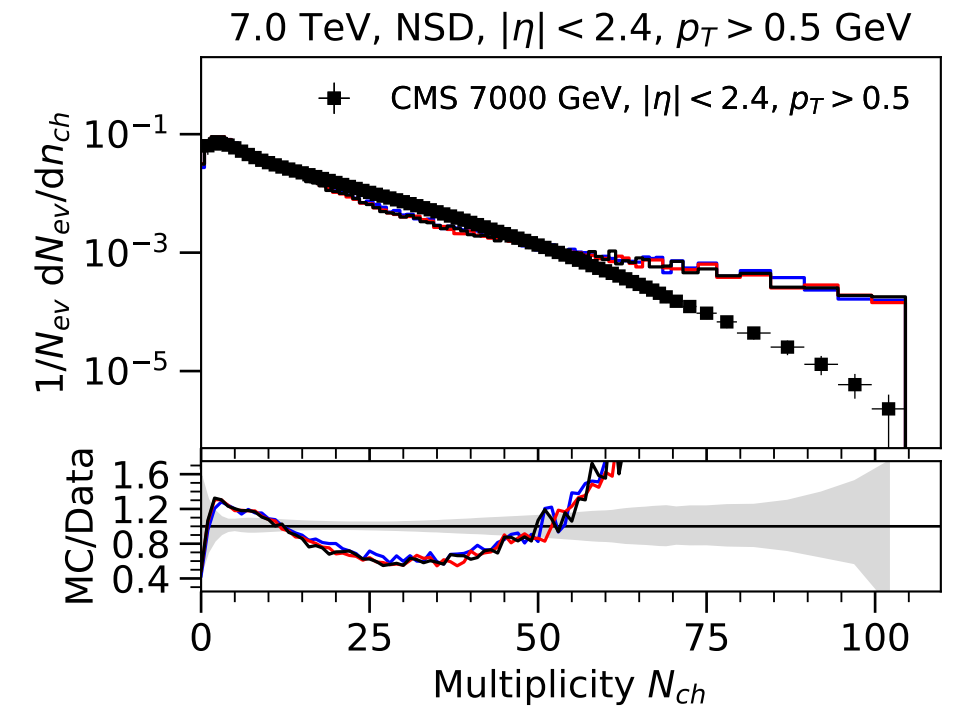
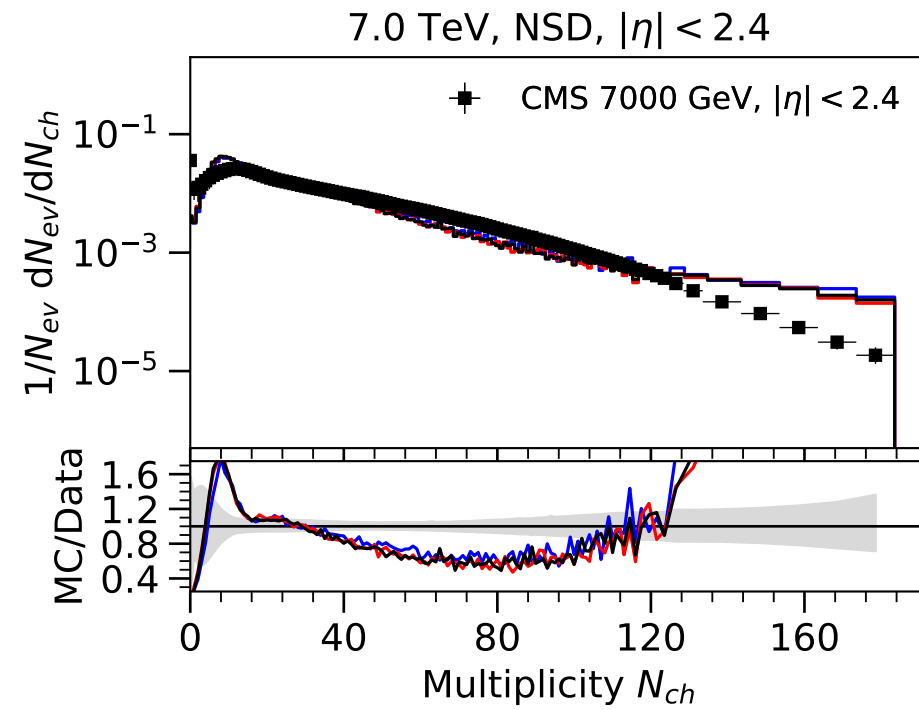
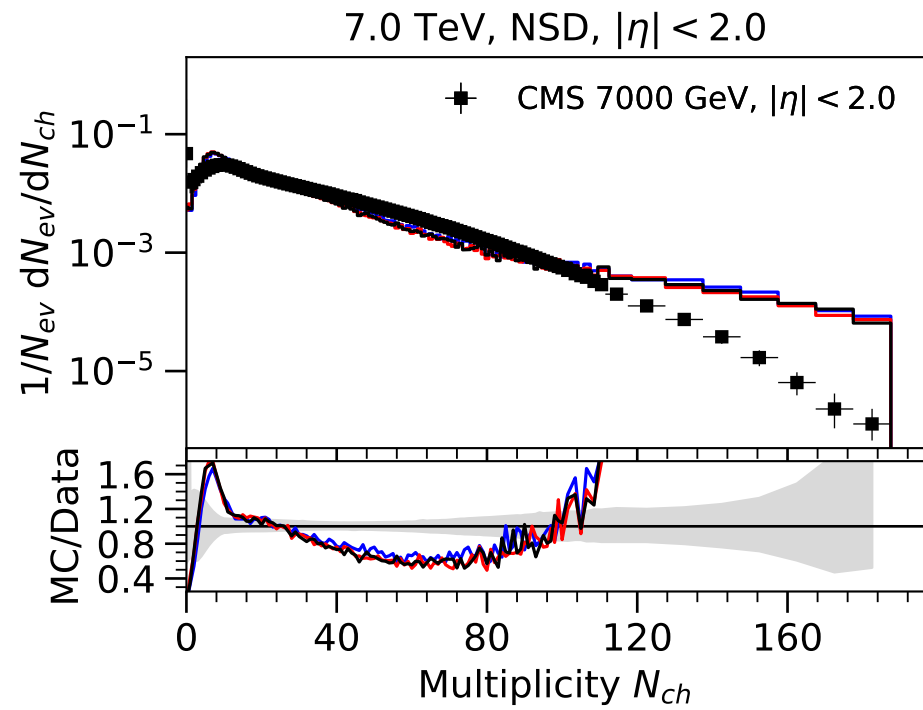
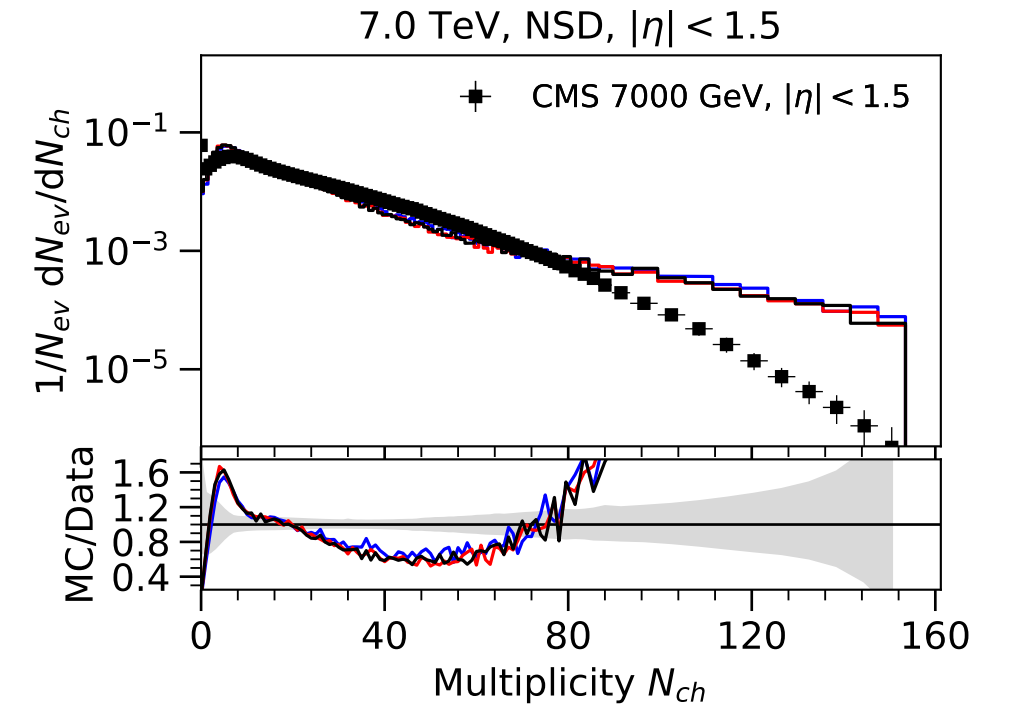
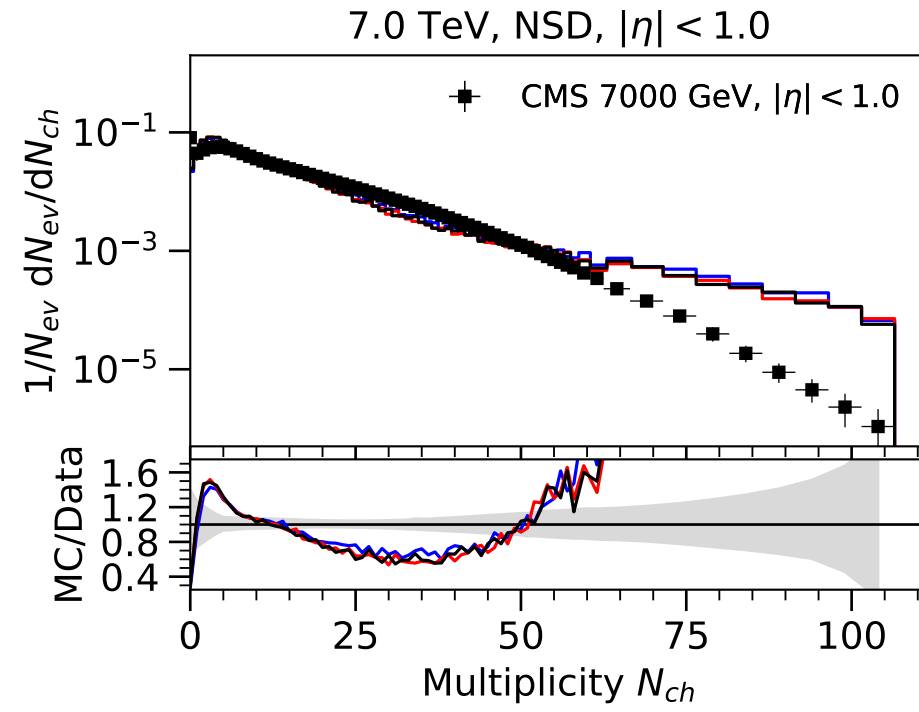
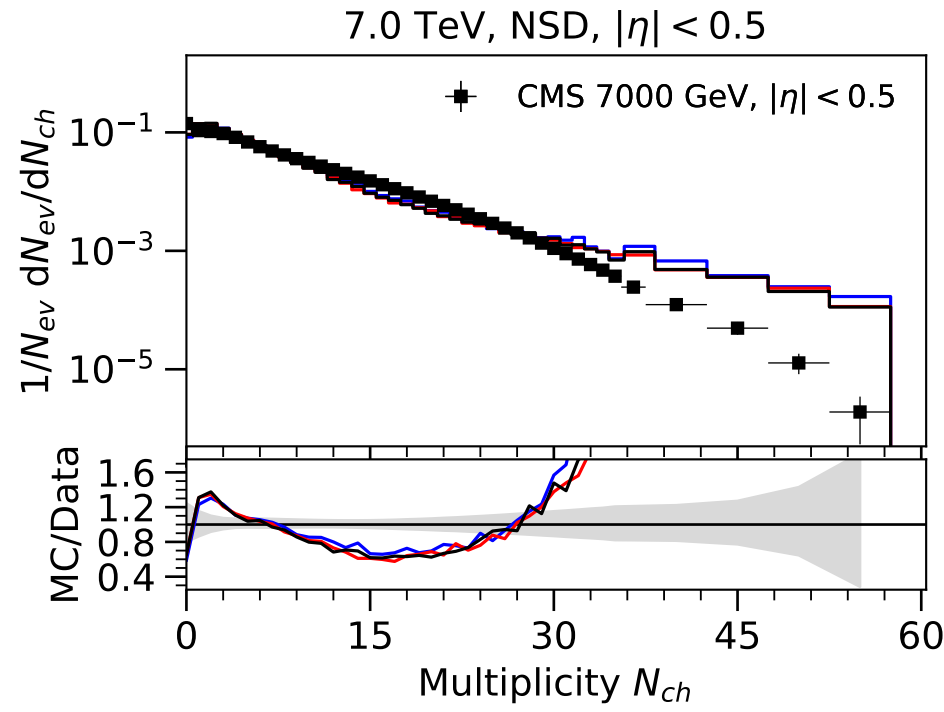


CMS 7000 GeV - NSD charged particle multiplicity.

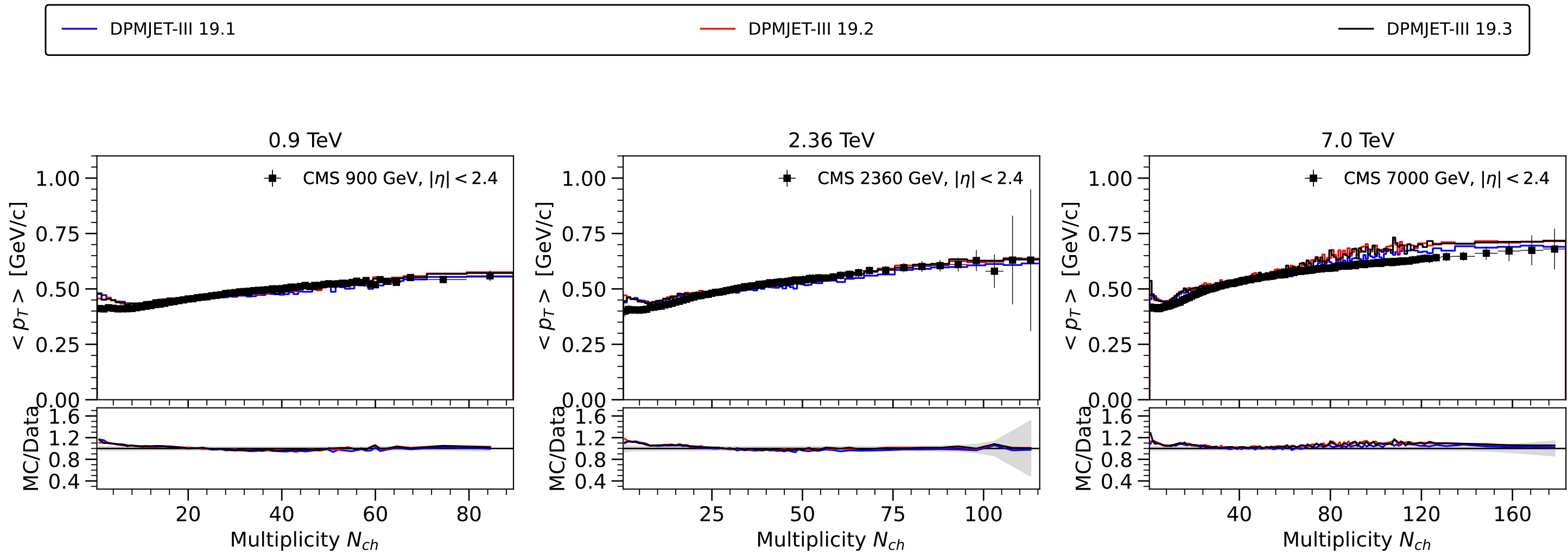
— DPMJET-III 19.1

— DPMJET-III 19.2

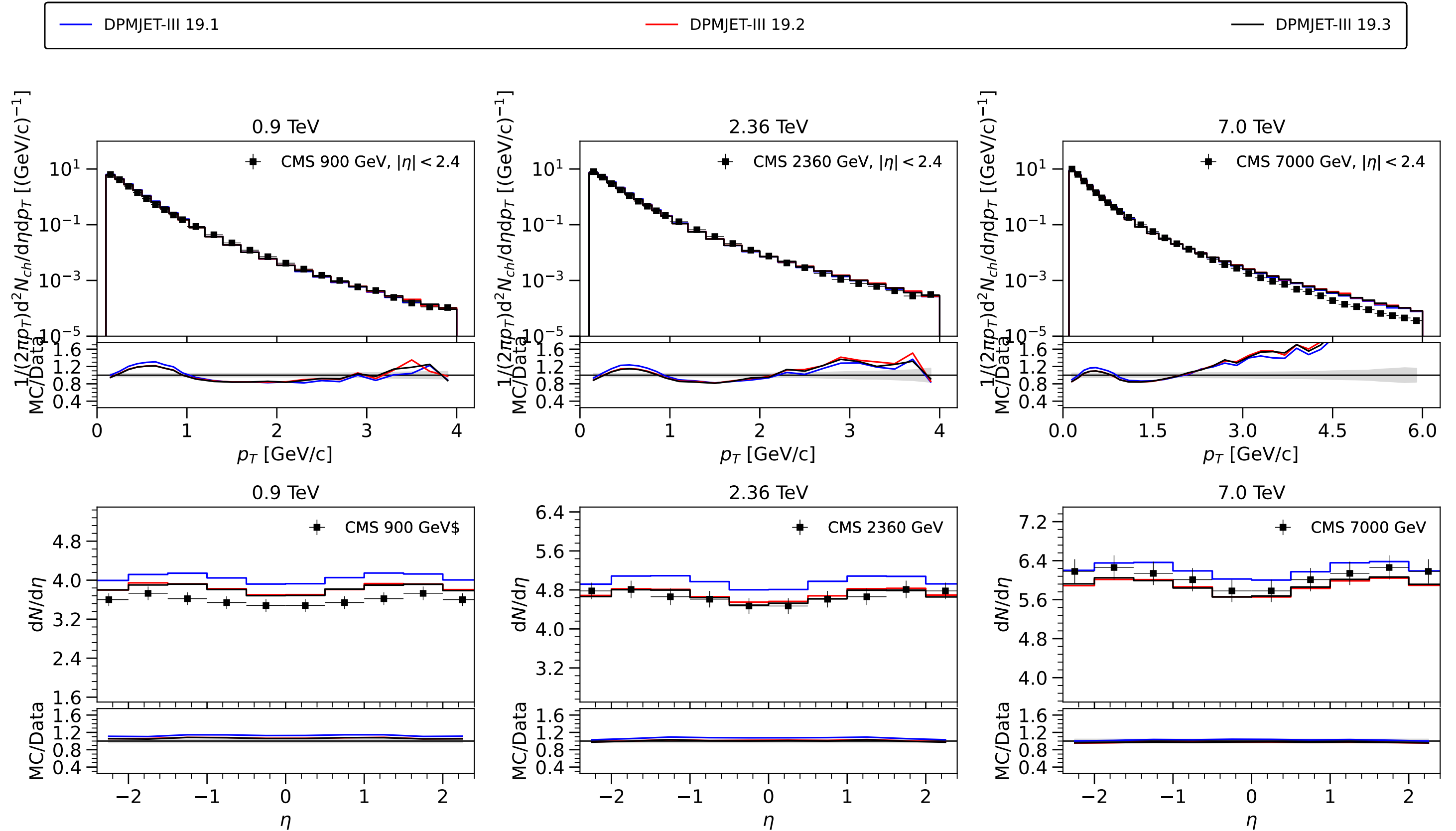
— DPMJET-III 19.3



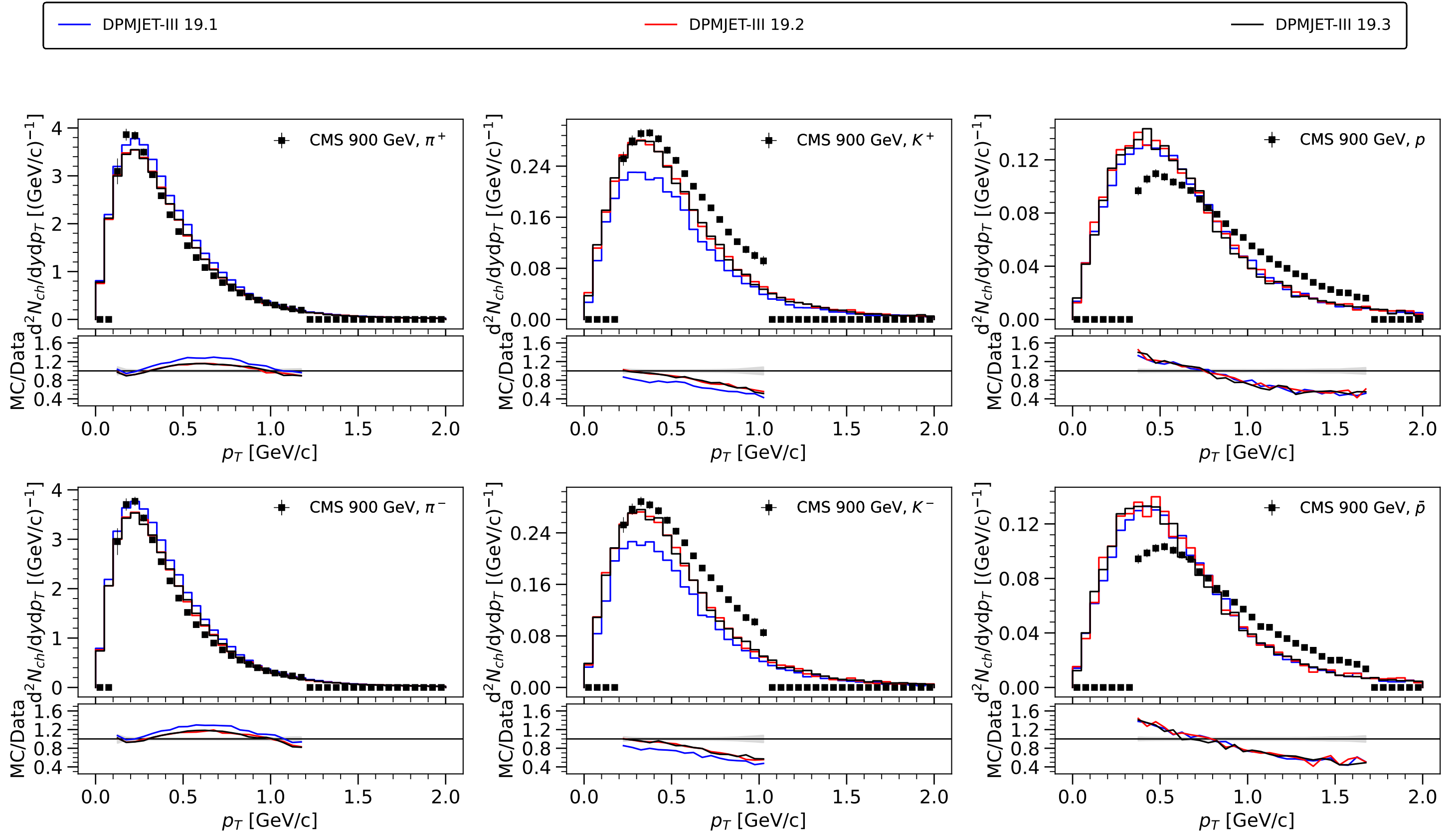
CMS - average p_T for multiplicity bins.



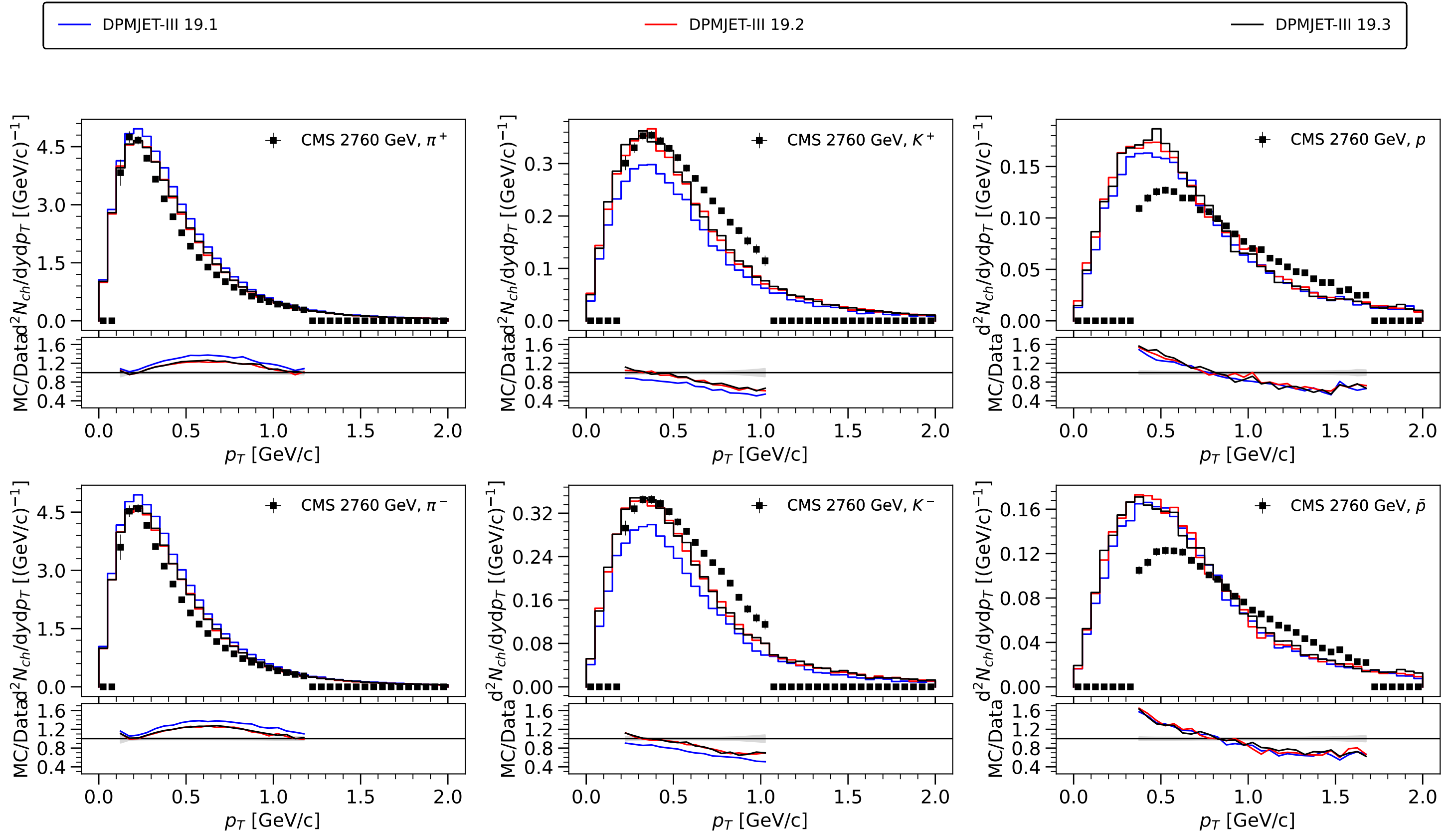
CMS - NSD p_T and η distributions.



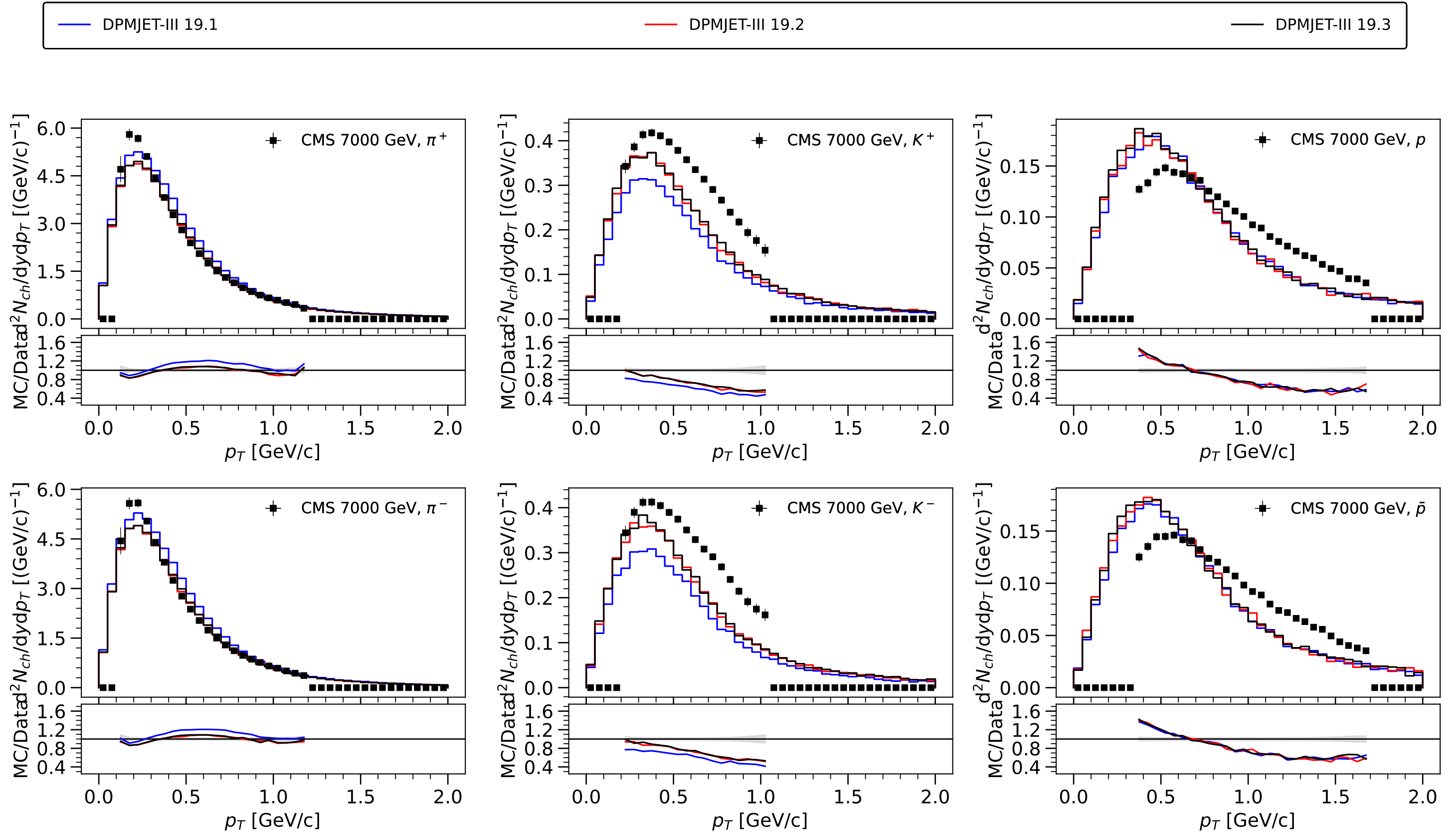
CMS - identified particle spectra in $|y| < 1$ for pp at 900 GeV.



CMS - identified particle spectra in $|y| < 1$ for pp at 2760 GeV.



CMS - identified particle spectra in $|y| < 1$ for pp at 7000 GeV.



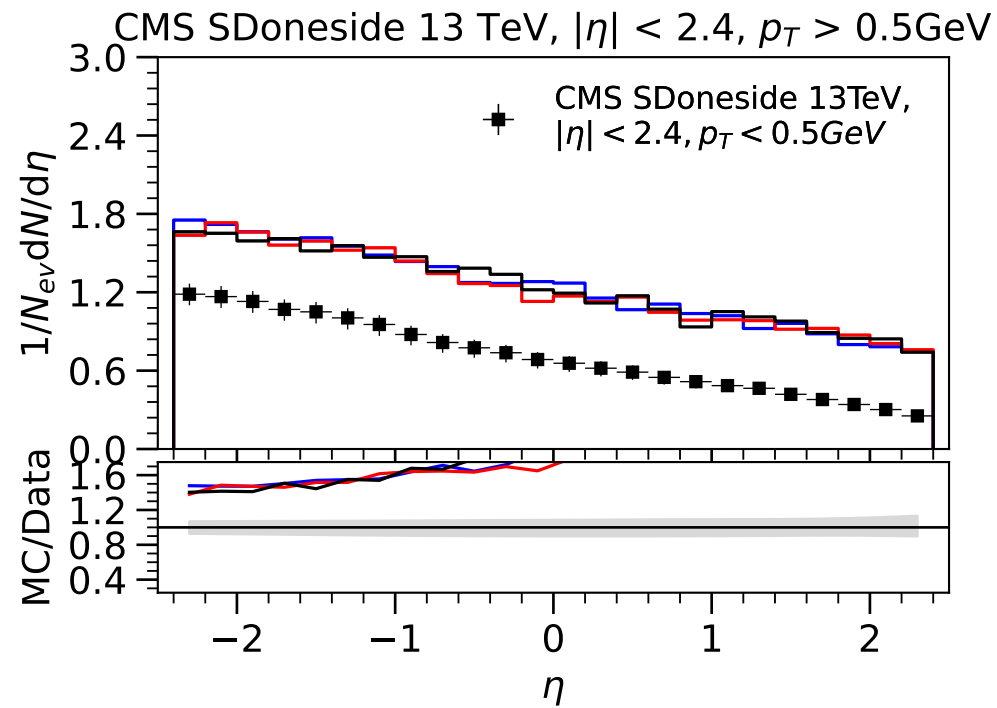
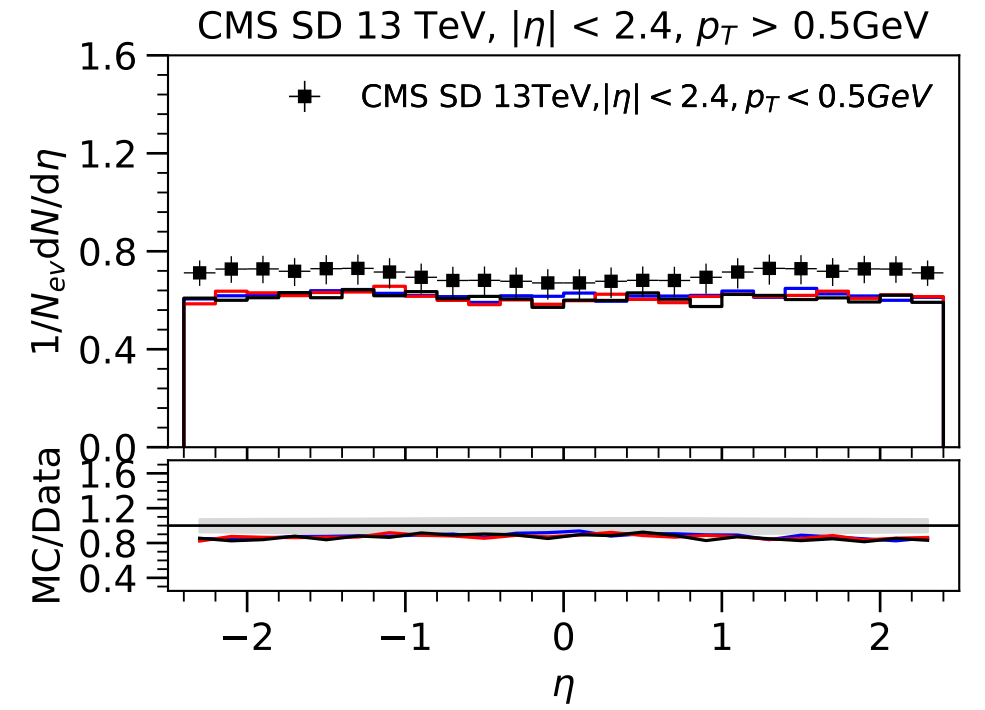
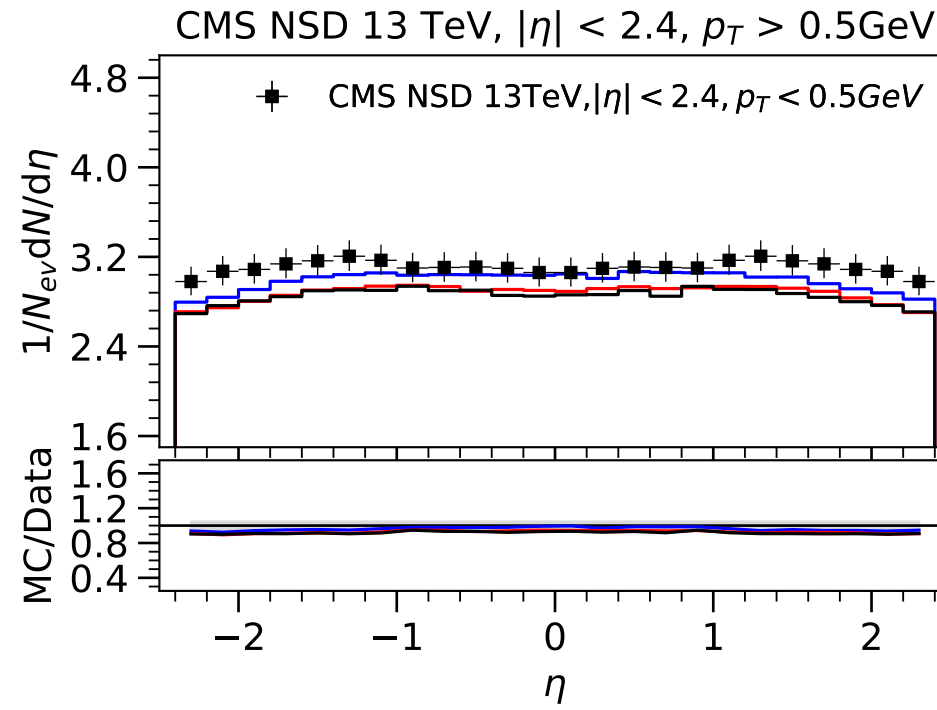
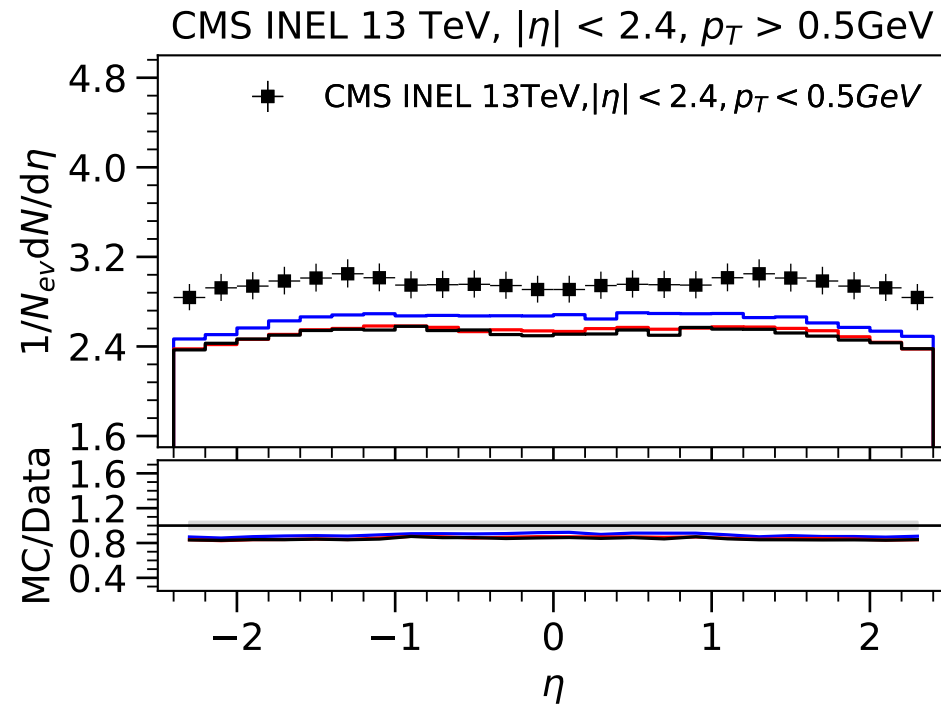
LHC: CMS Minimum Bias 13 TeV

CMS 13 TeV - Pseudorapidity Distribution

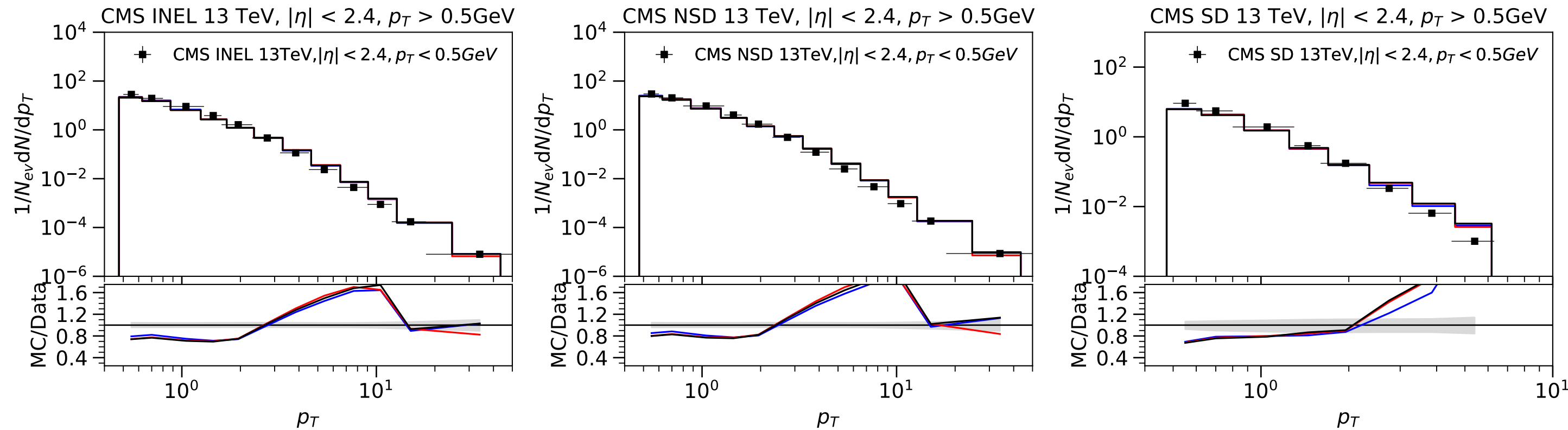
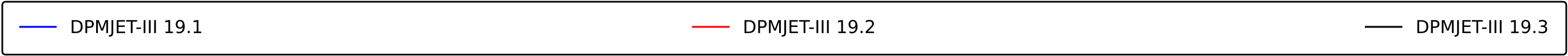
DPMJET-III 19.1

DPMJET-III 19.2

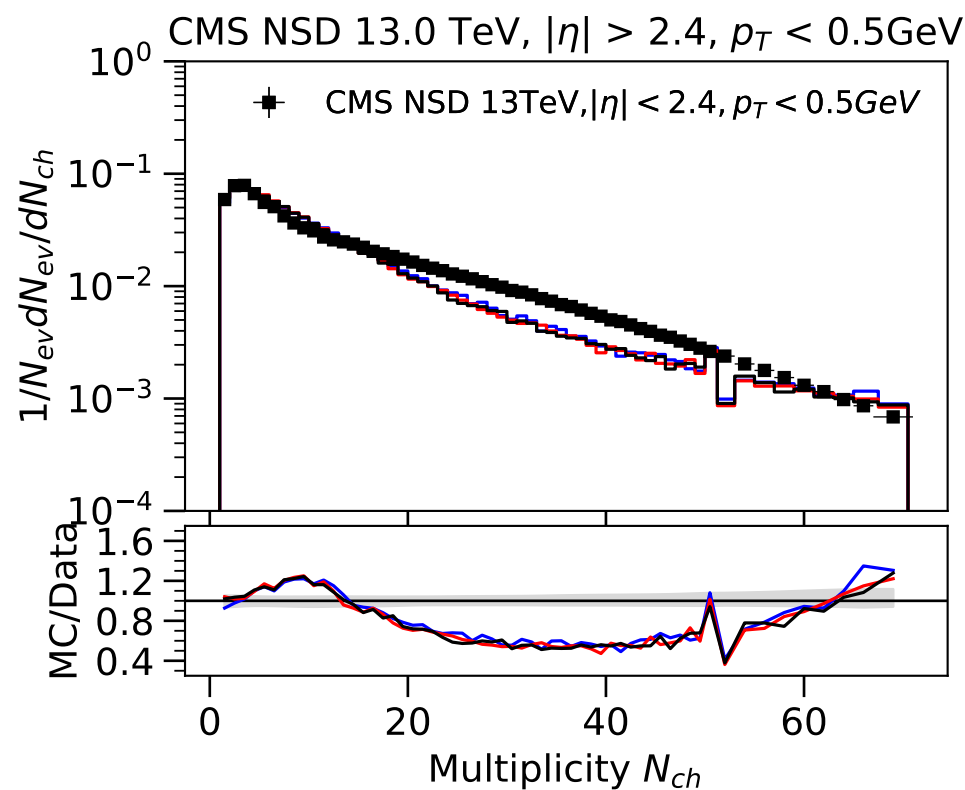
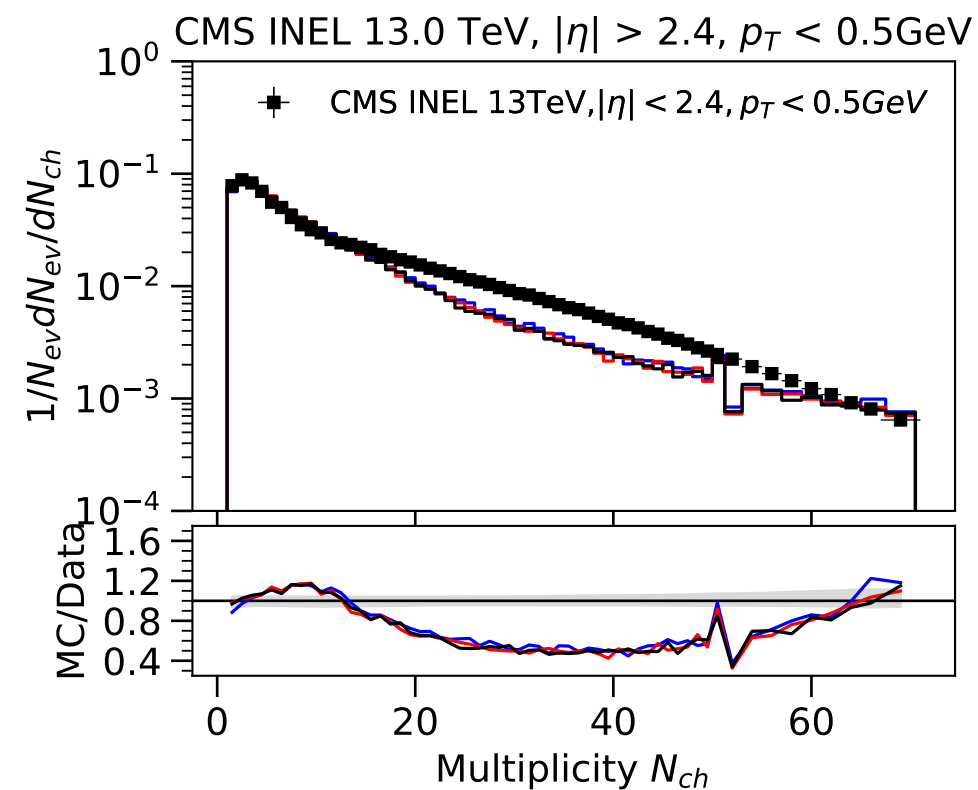
DPMJET-III 19.3



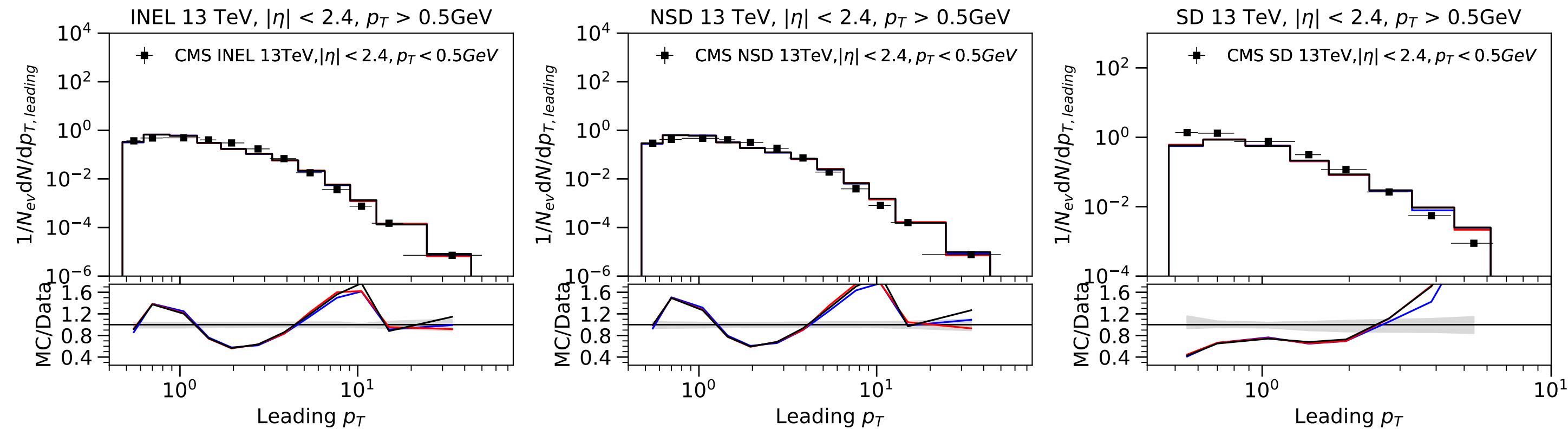
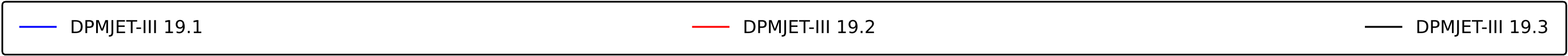
CMS 13 TeV - Transverse Momentum Distribution



CMS 13 TeV - Multiplicity Distribution



CMS 13 TeV - Leading p_T Distribution



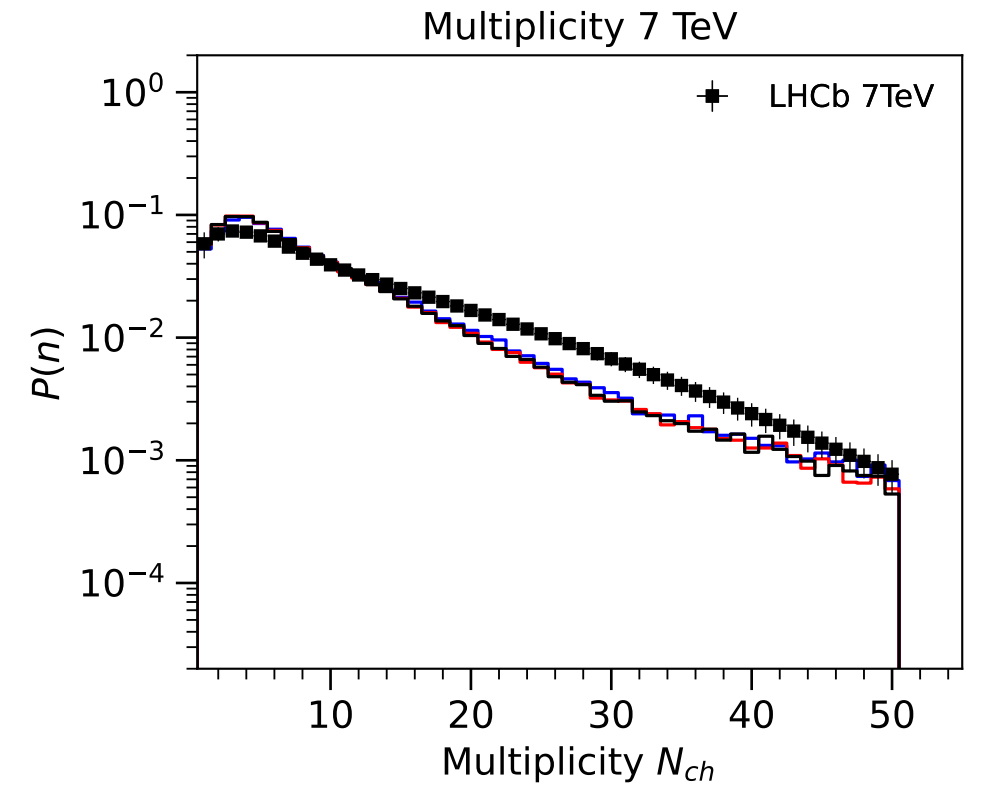
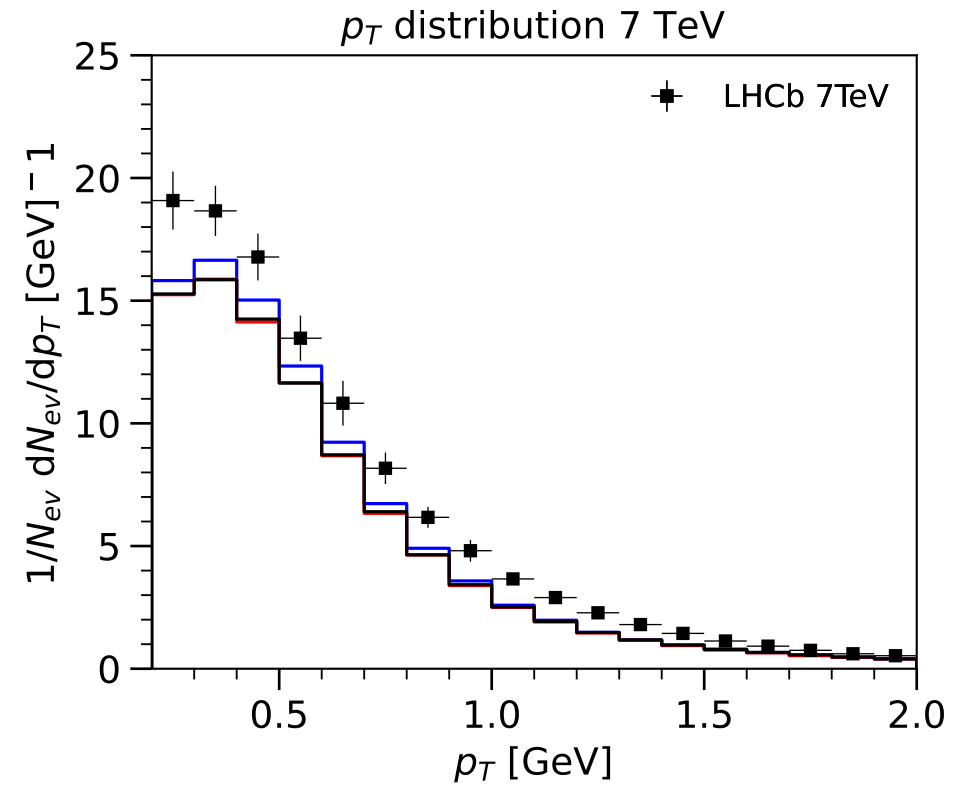
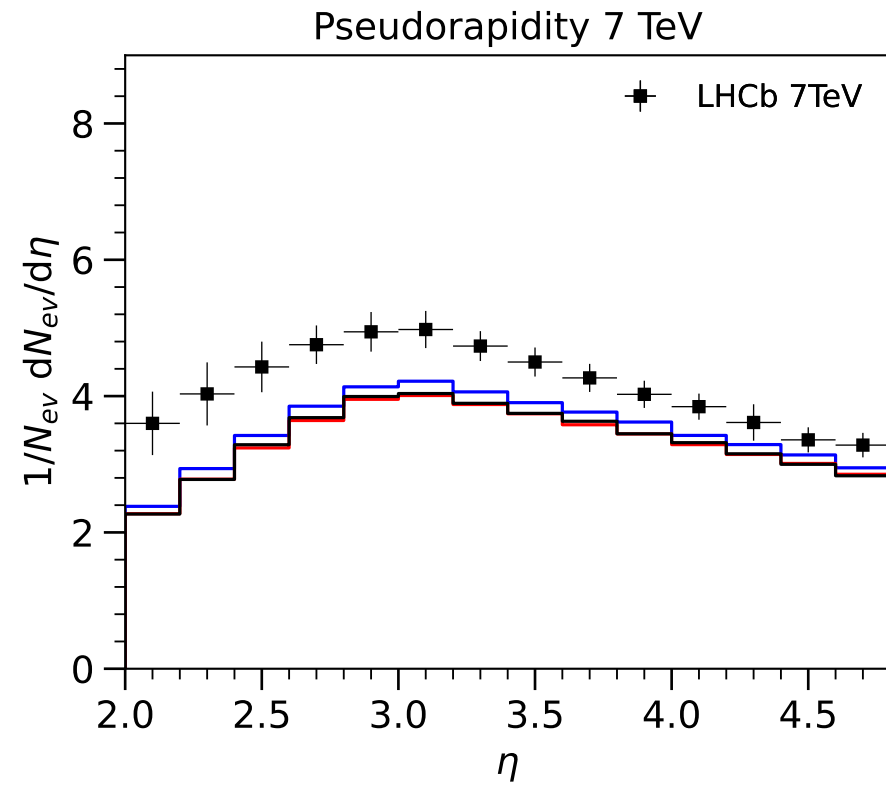
LHC: LHCb Minimum Bias

LHCb - inclusive charged particles in $2 < \eta < 4.8$ at 7 TeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

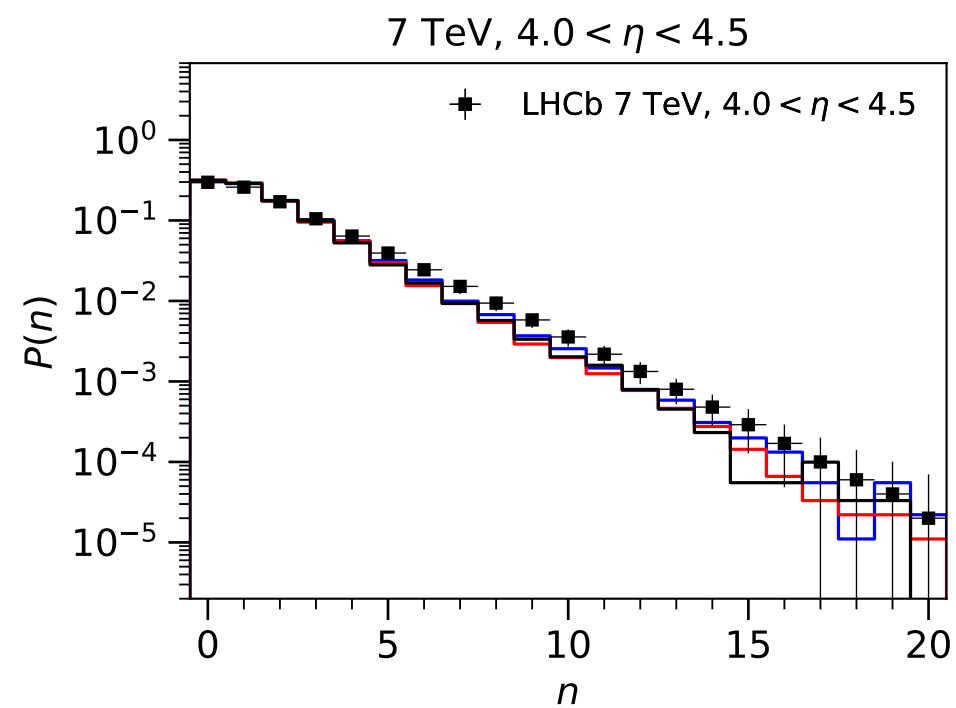
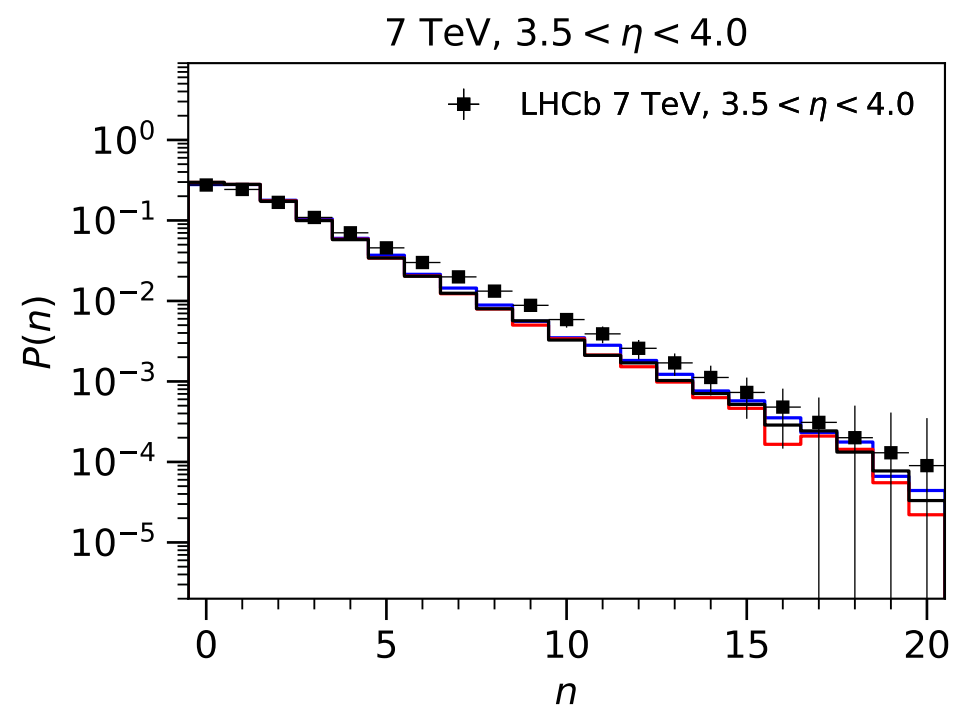
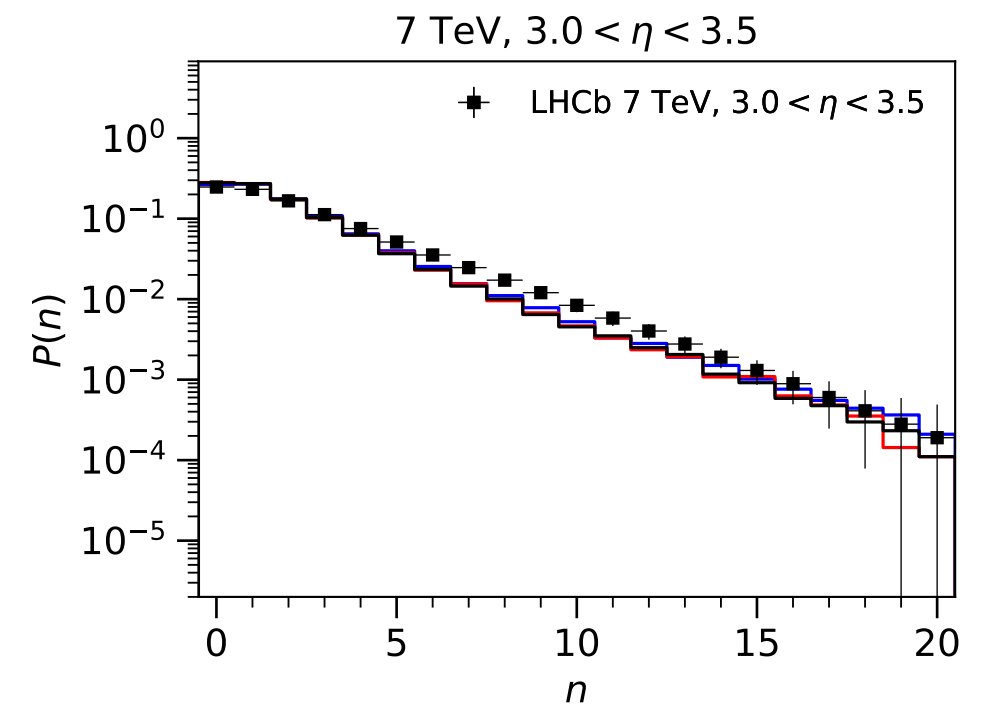
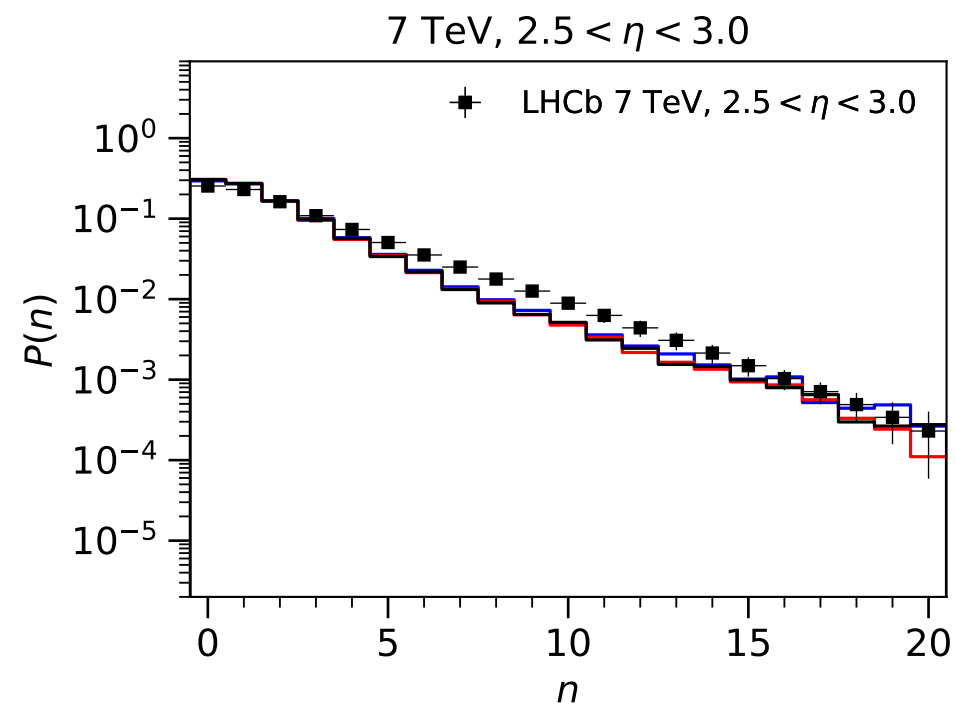
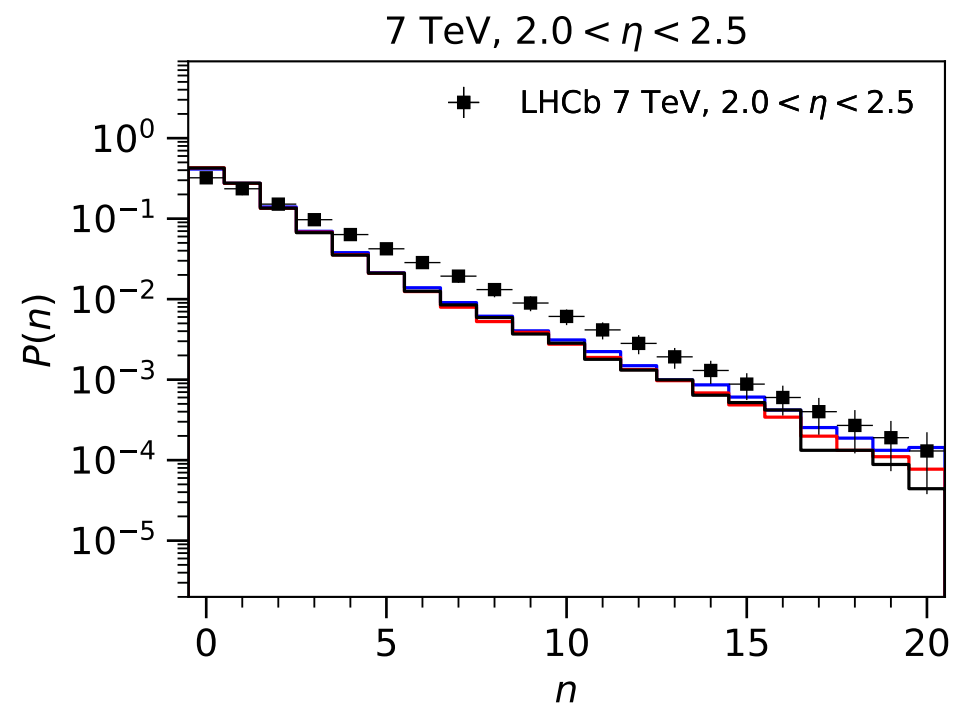


LHCb: Charged particle multiplicities in pp collisions at 7 TeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

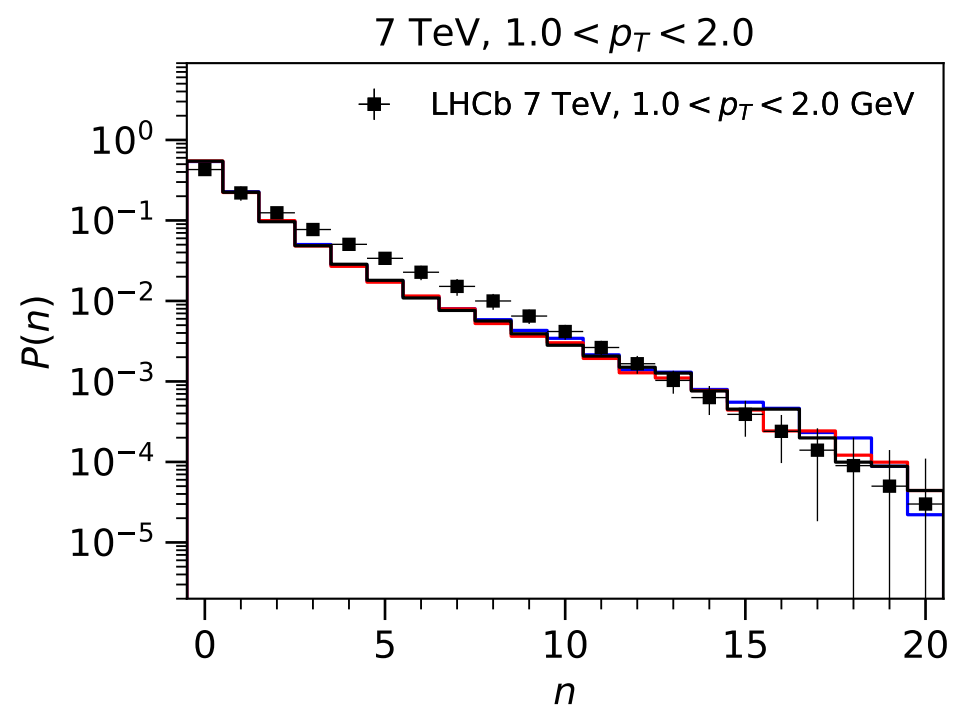
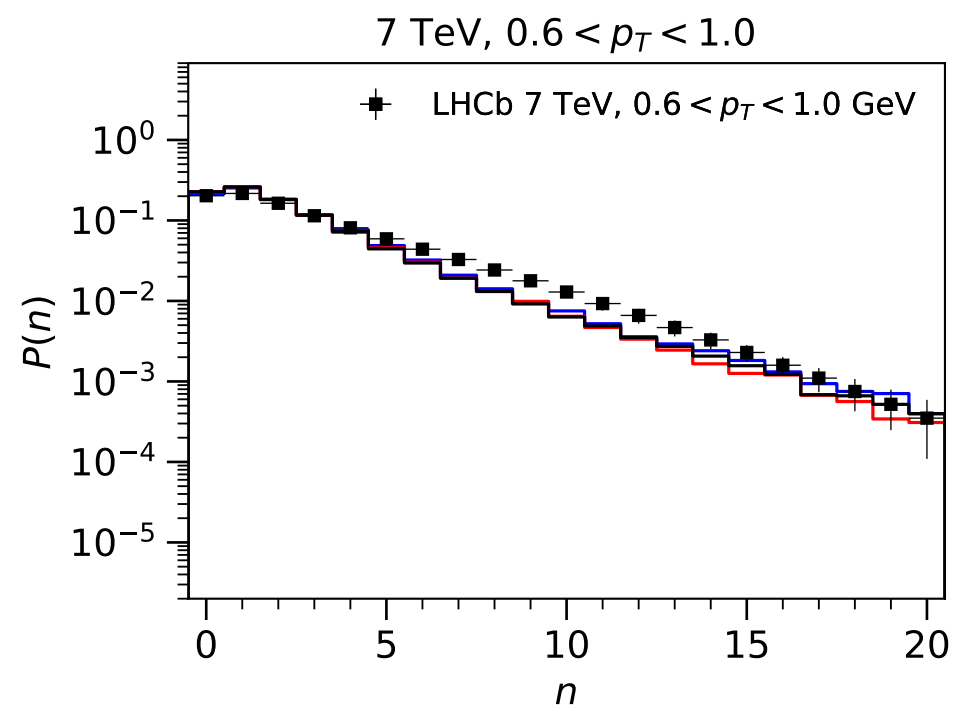
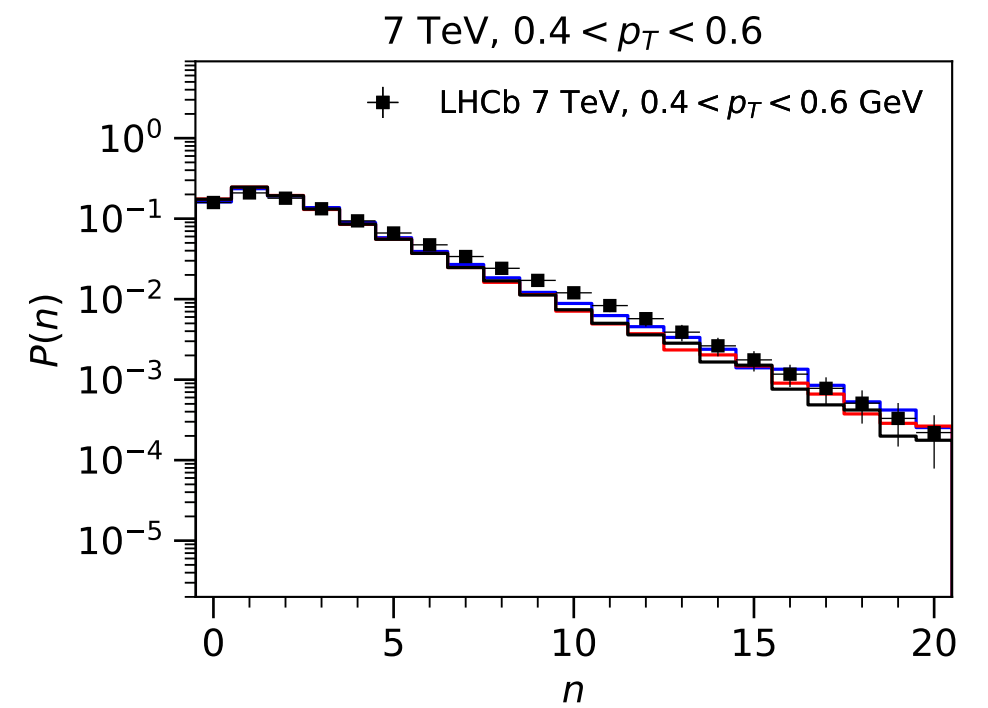
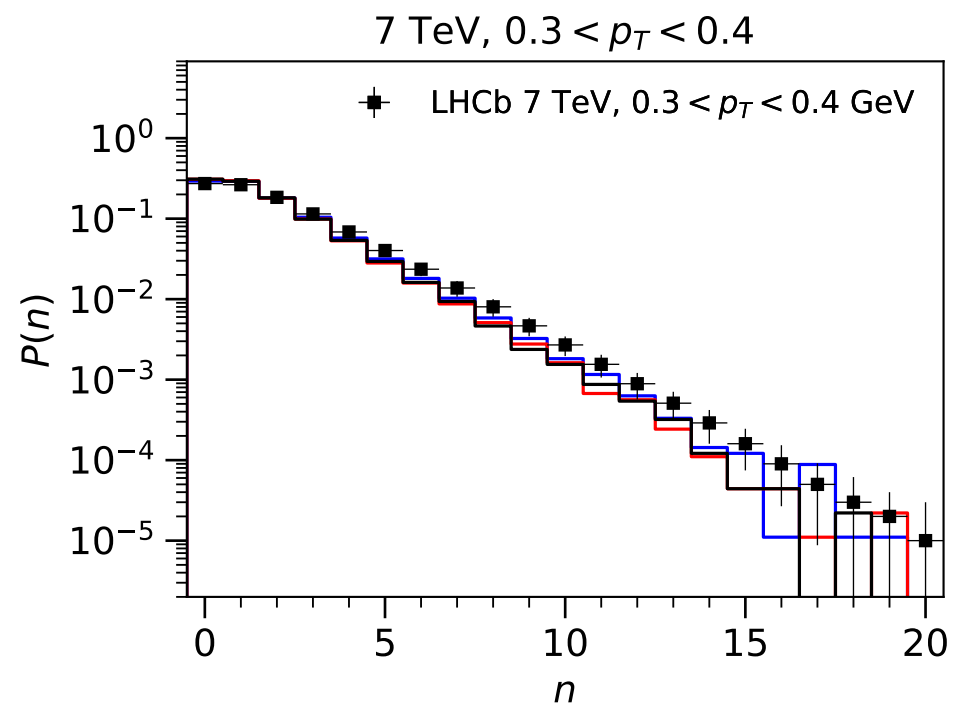
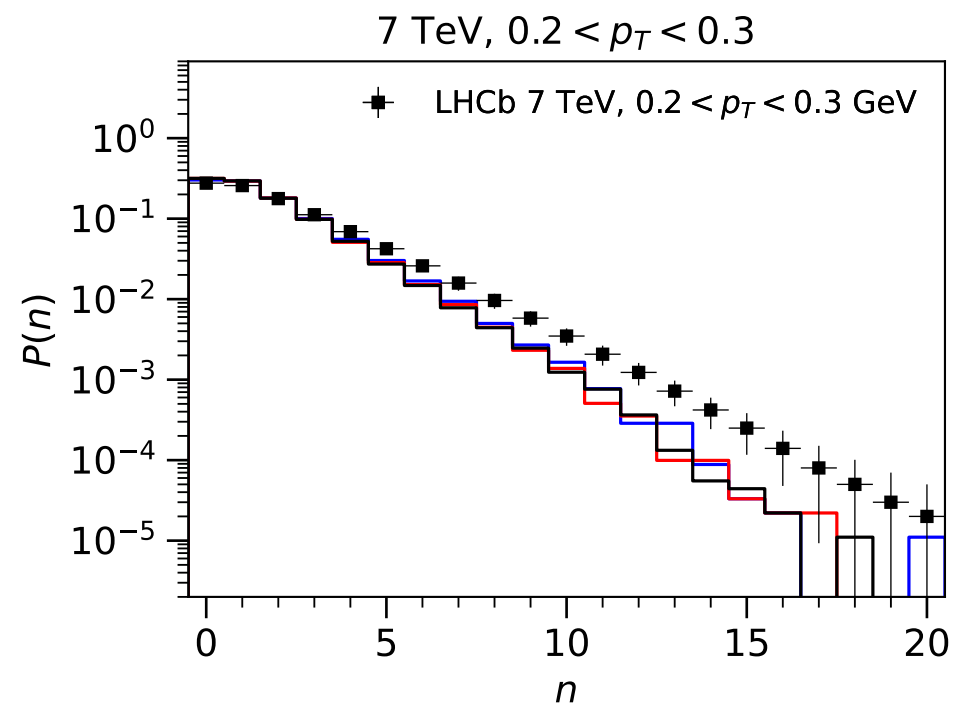


LHCb: Charged particle multiplicities in pp collisions at 7 TeV

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



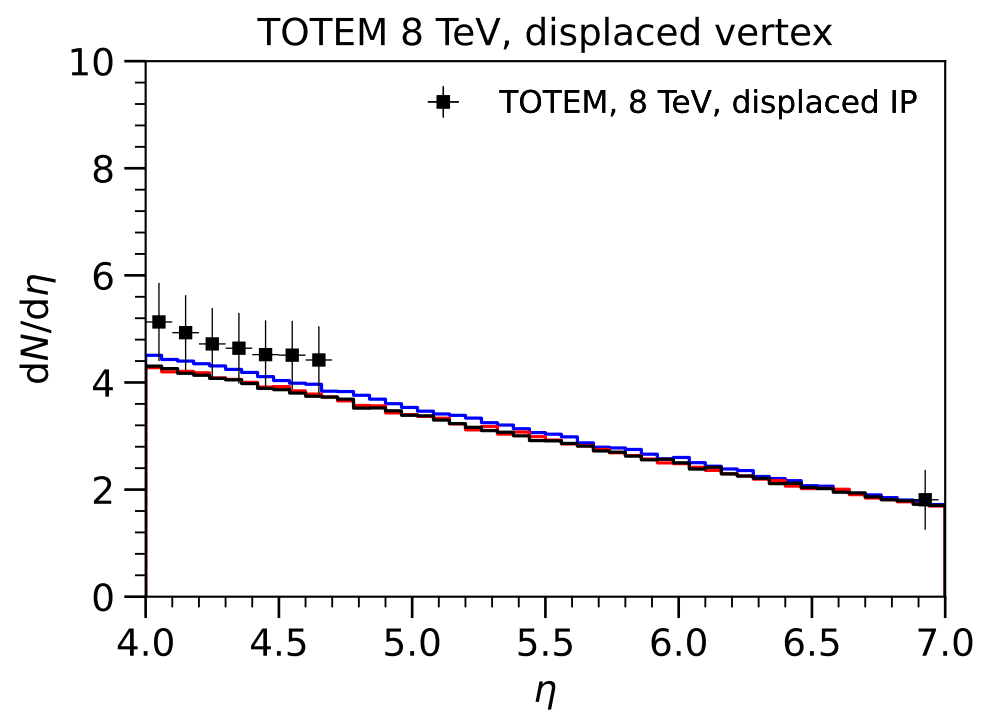
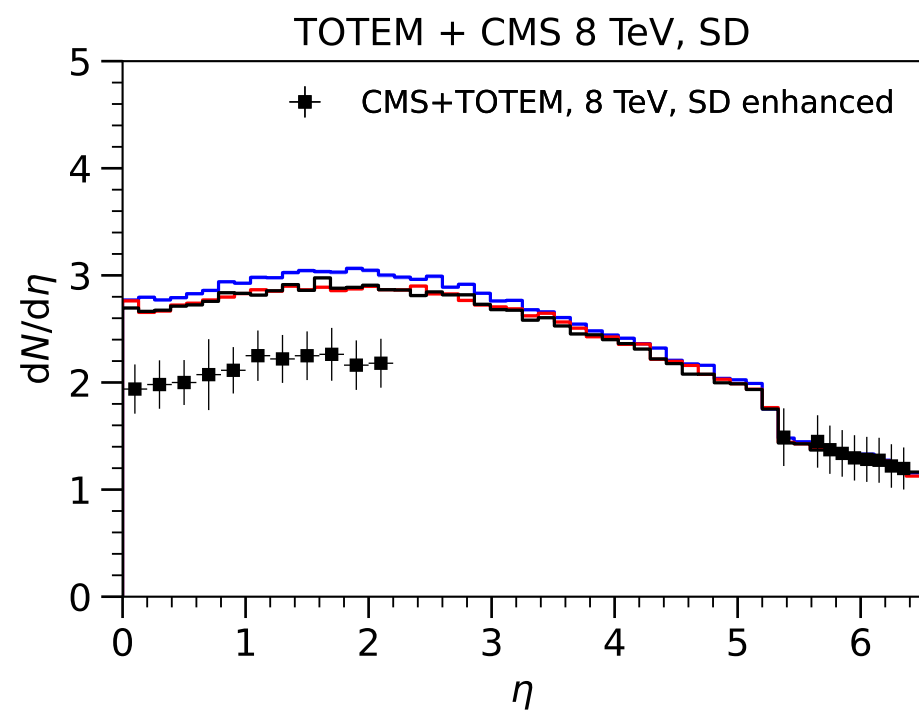
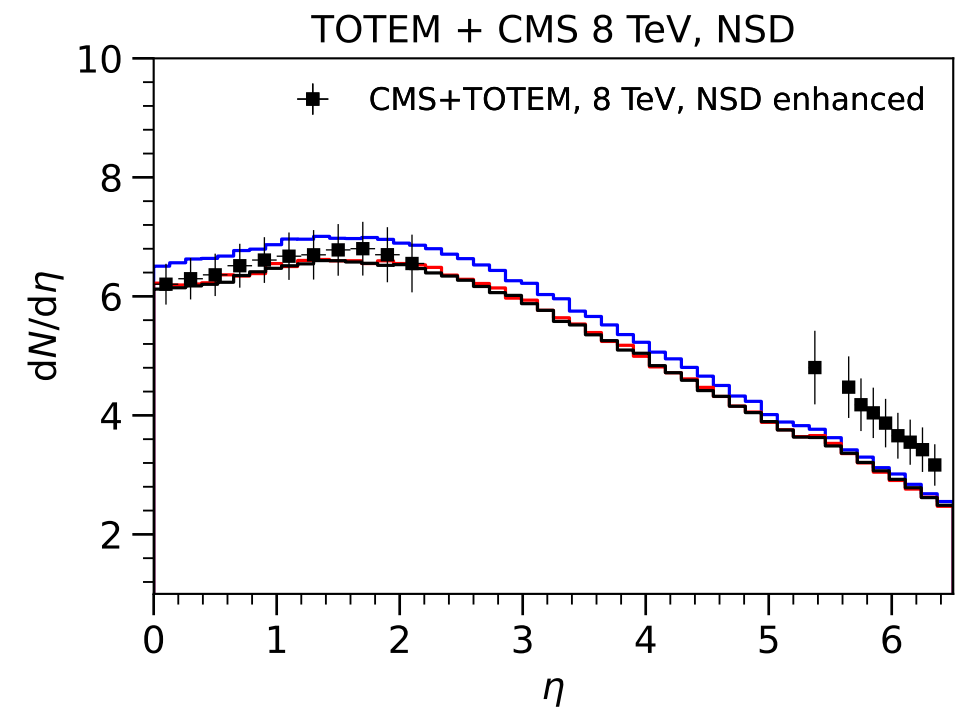
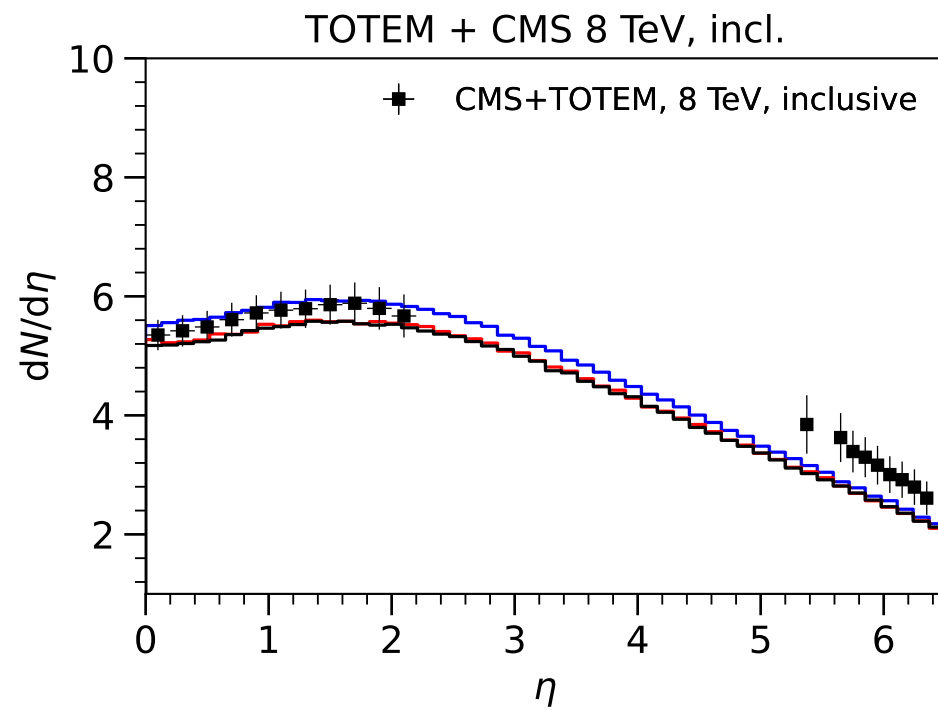
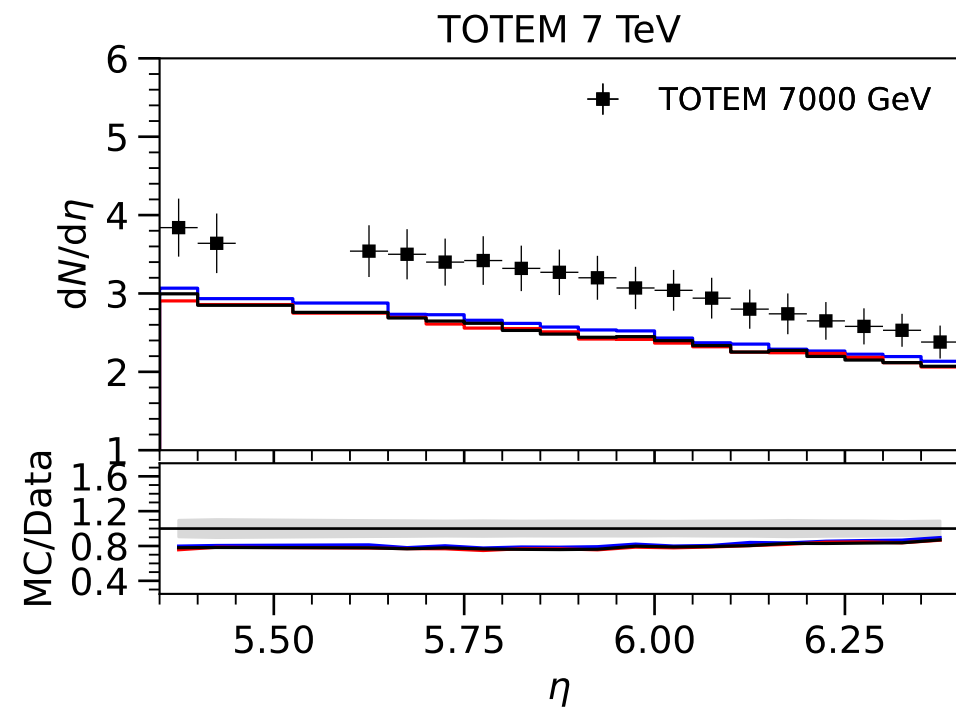
LHC: Forward physics

TOTEM - η distribution.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

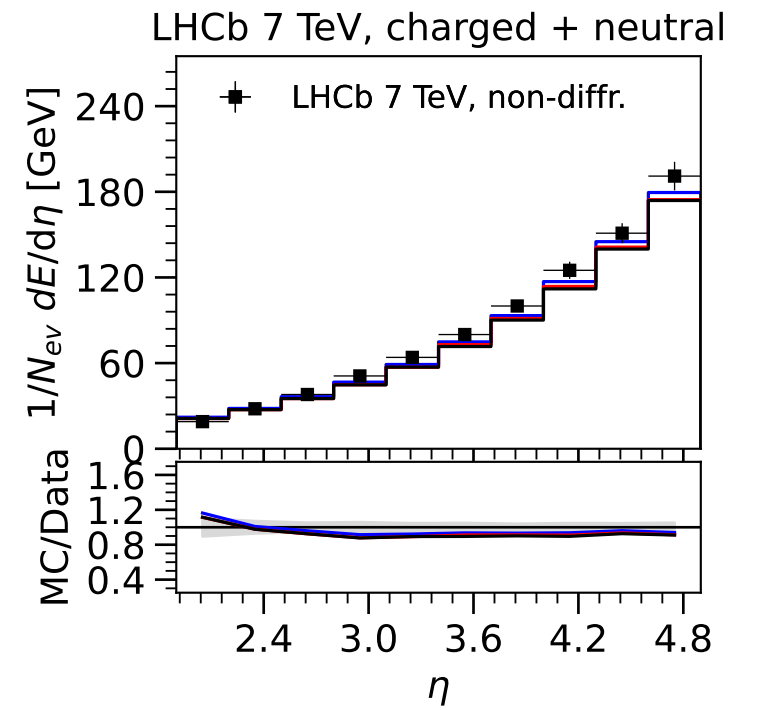
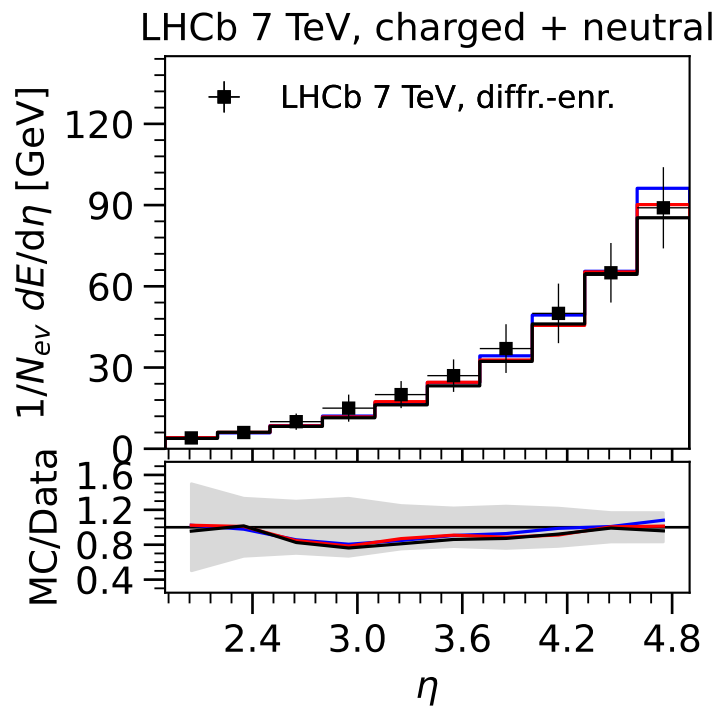
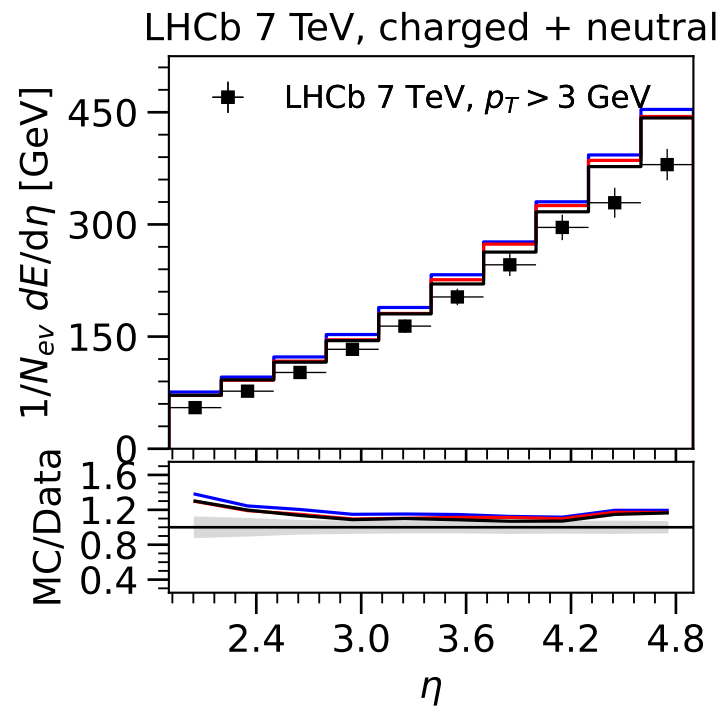
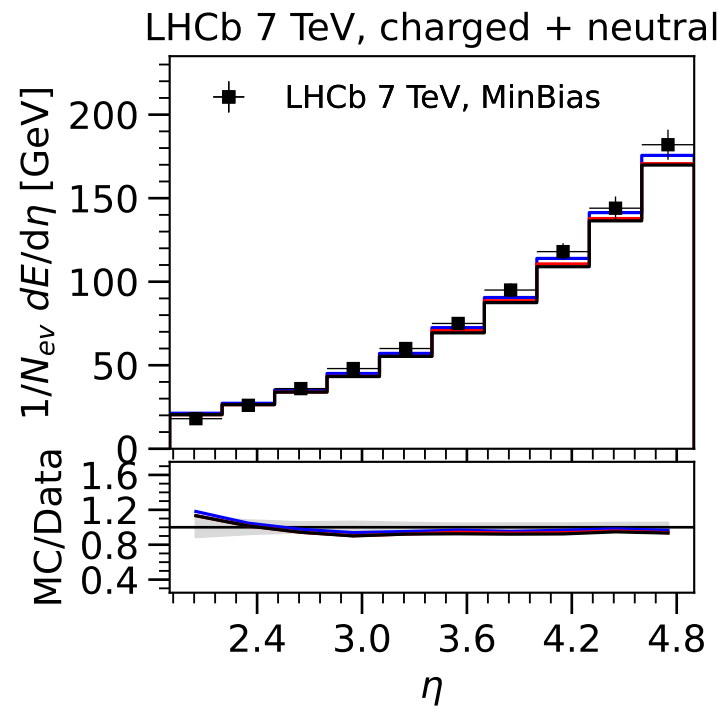
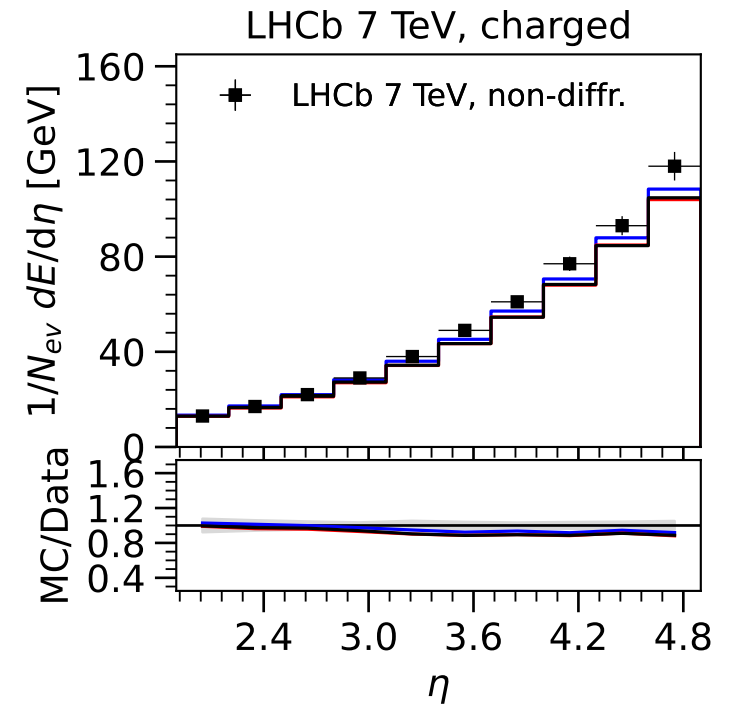
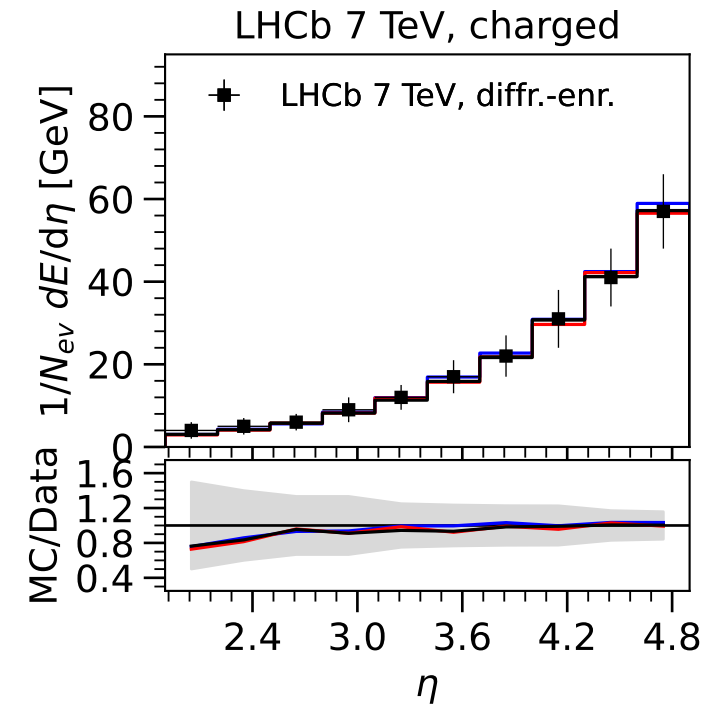
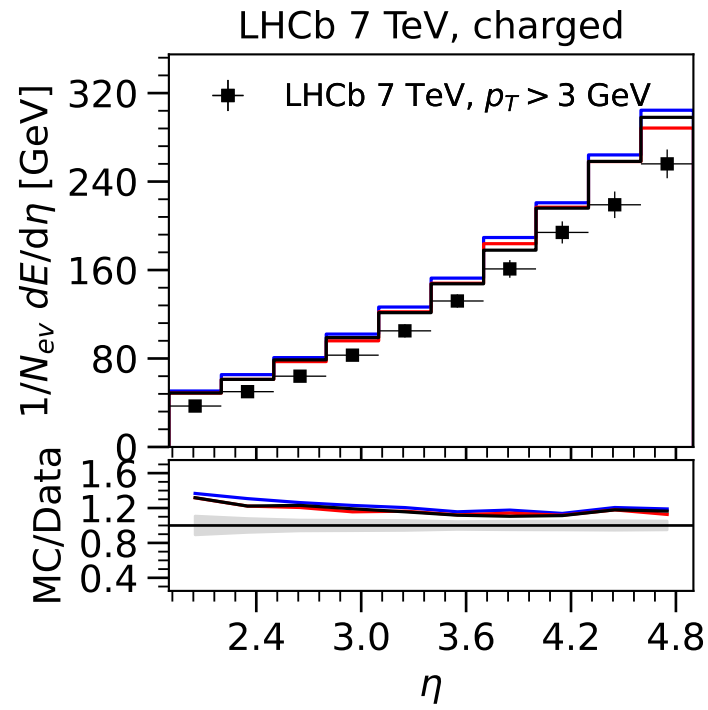
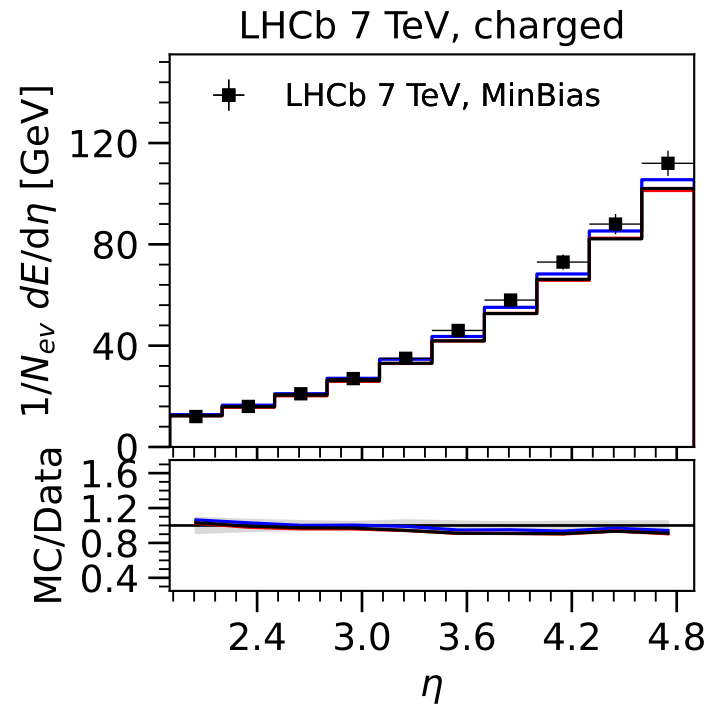


LHCb - Forward energy flow.

— DPMJET-III 19.1

— DPMJET-III 19.2

— DPMJET-III 19.3

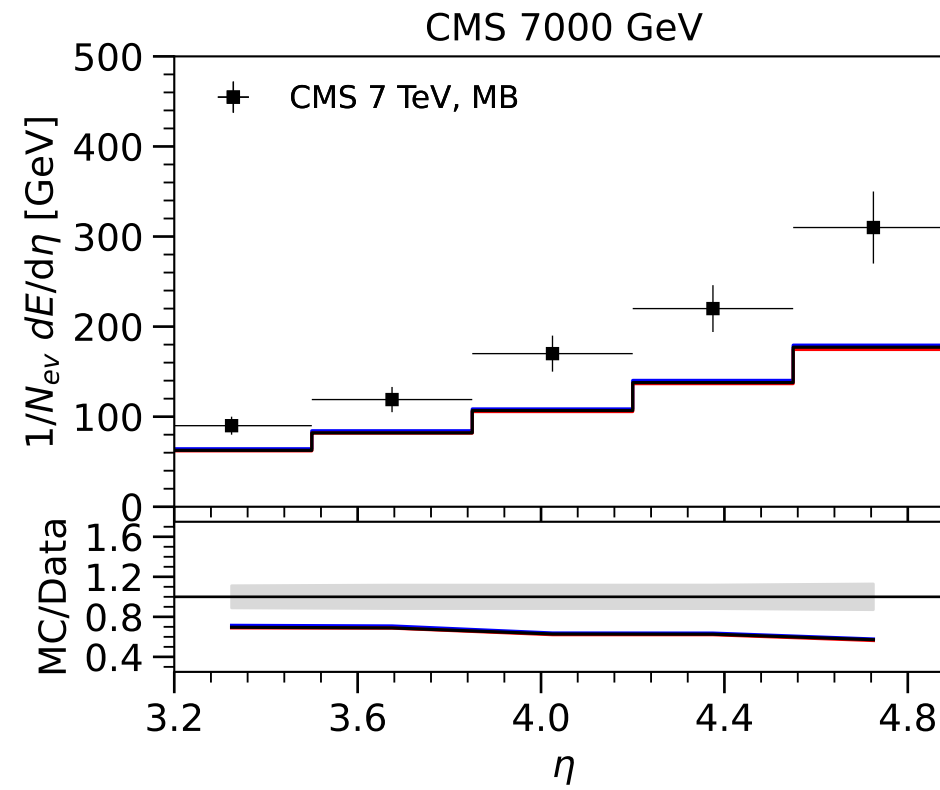
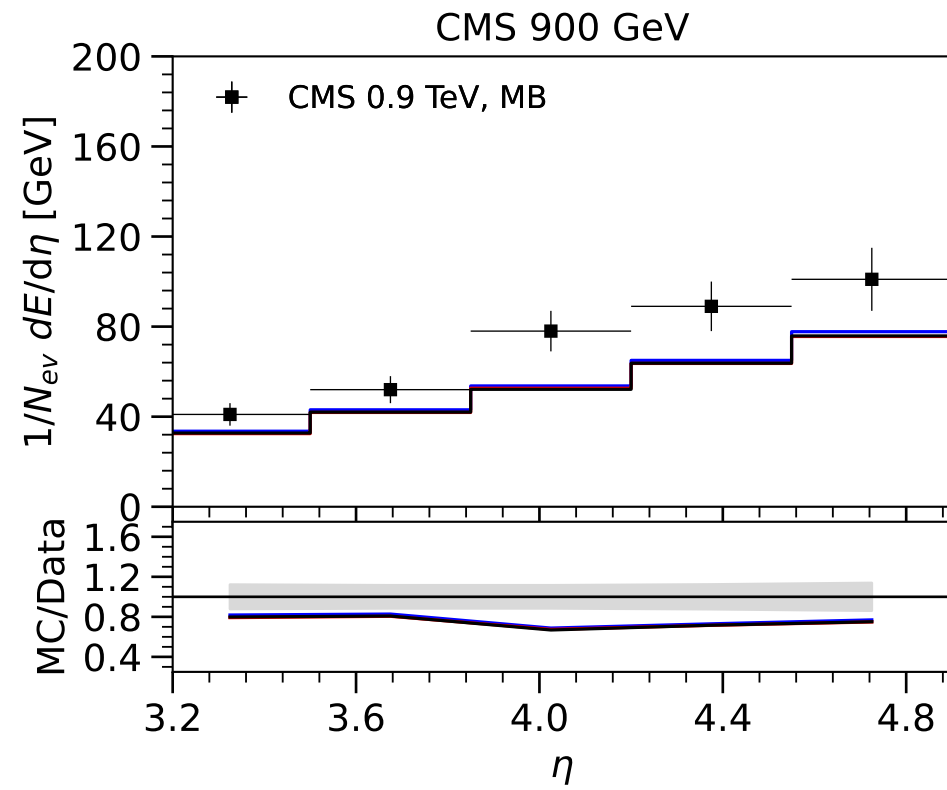


CMS - Forward energy flow.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

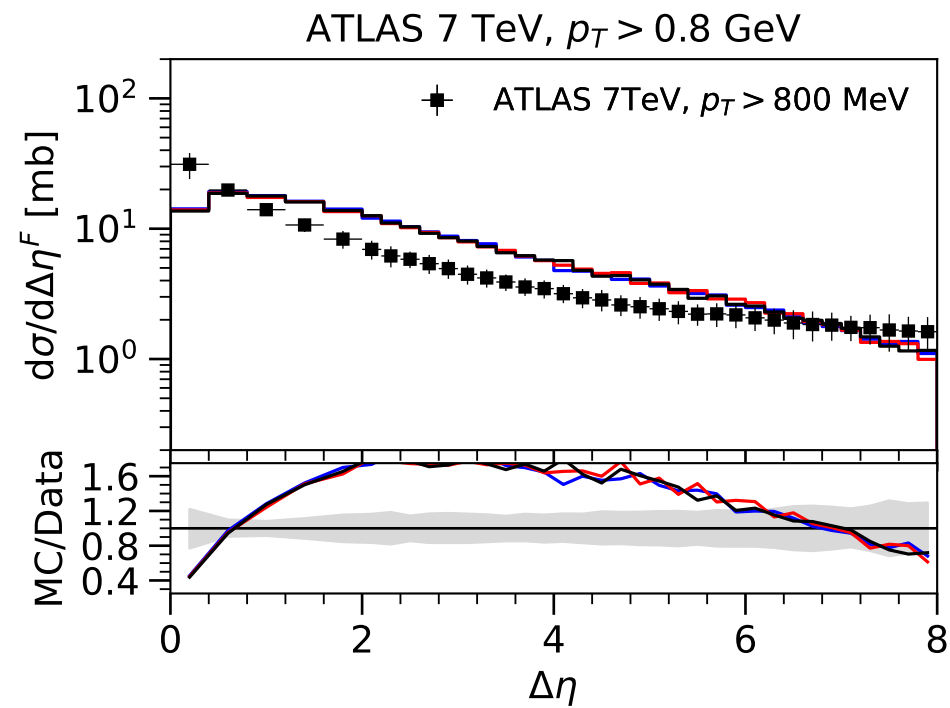
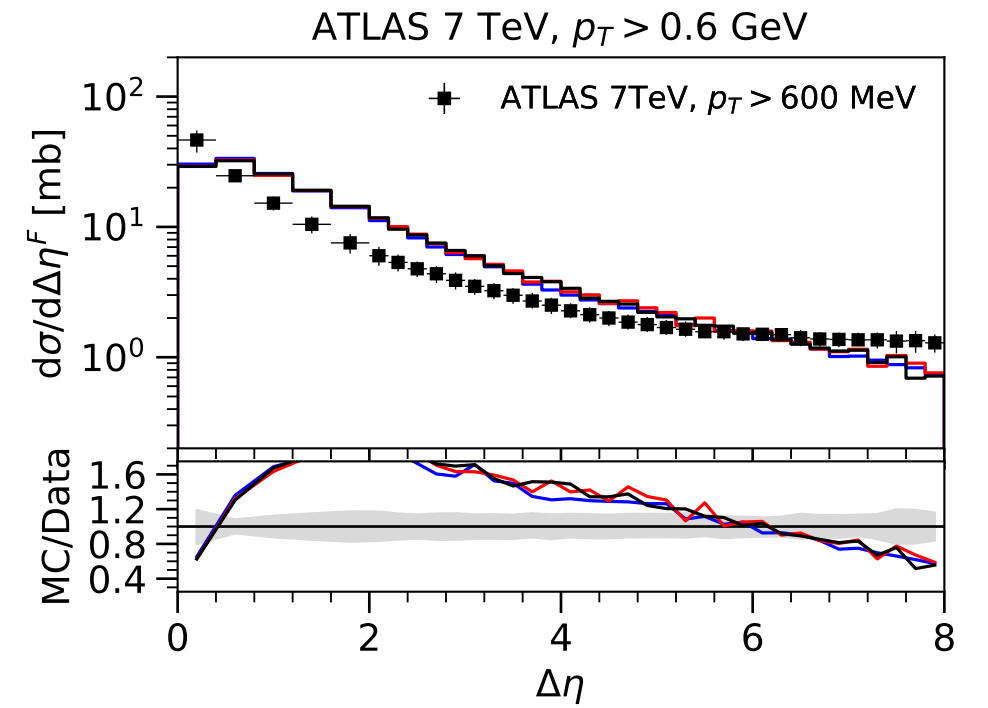
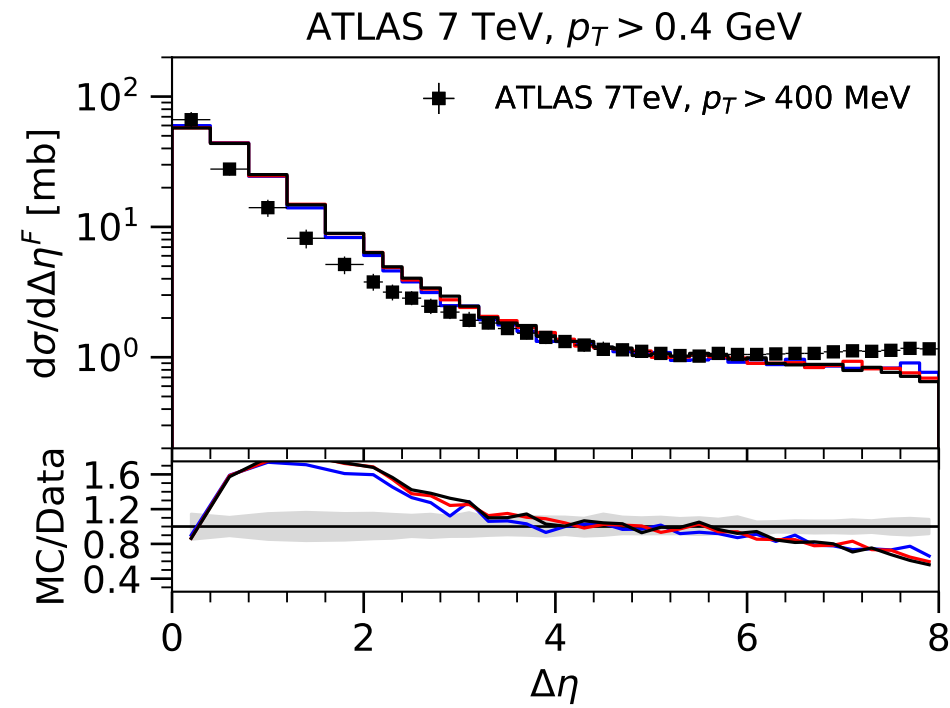
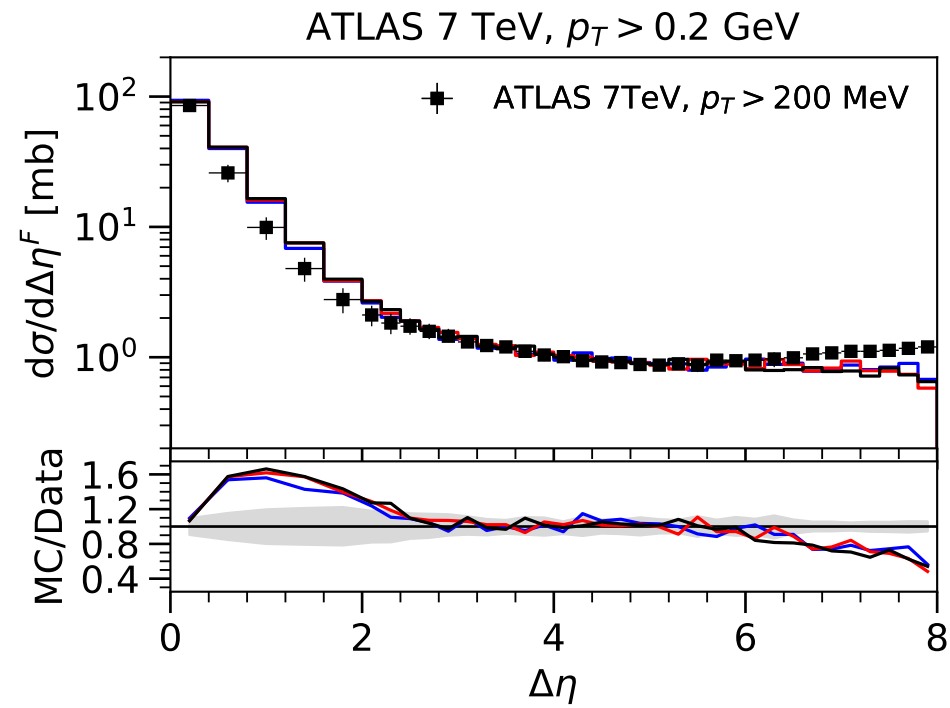


ATLAS - Rapidity gaps at 7 TeV

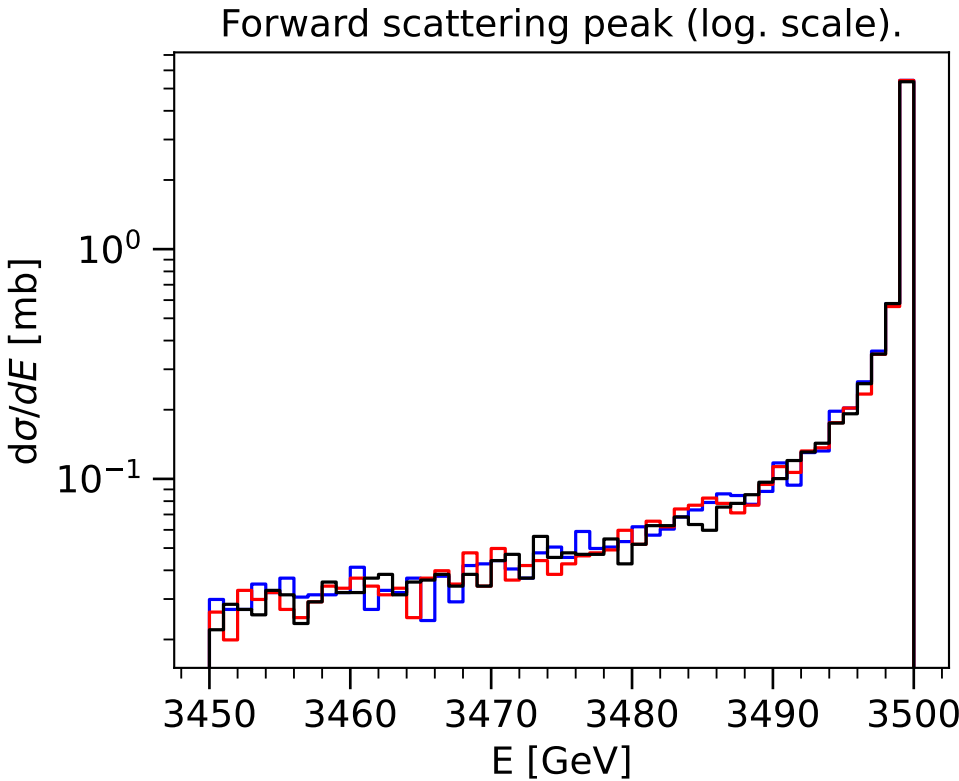
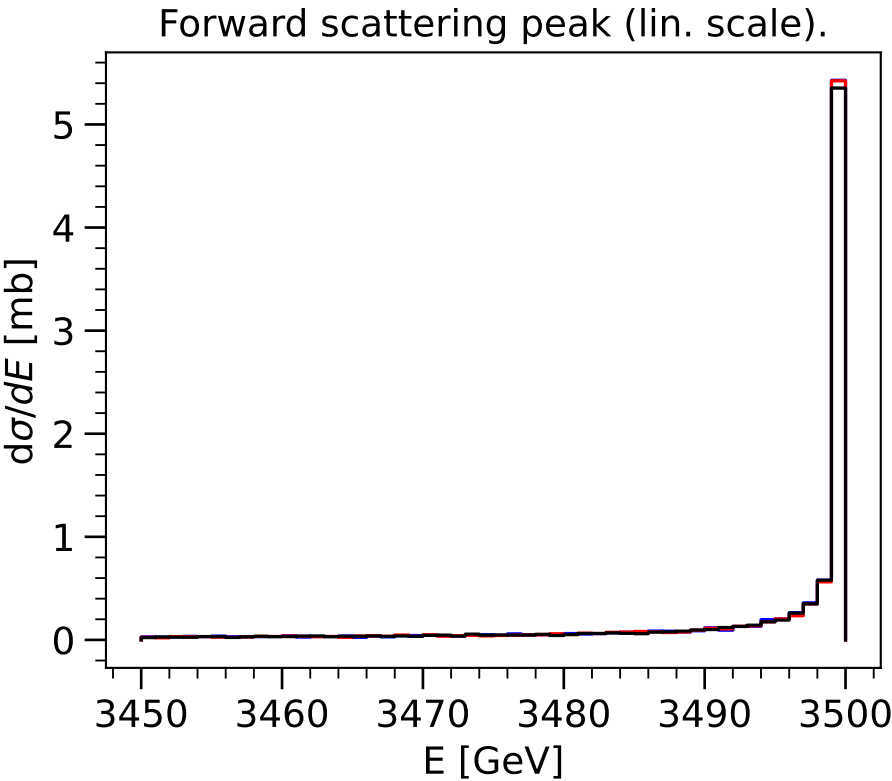
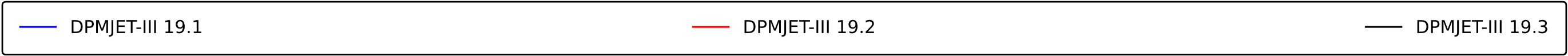
DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



Diffractive peak



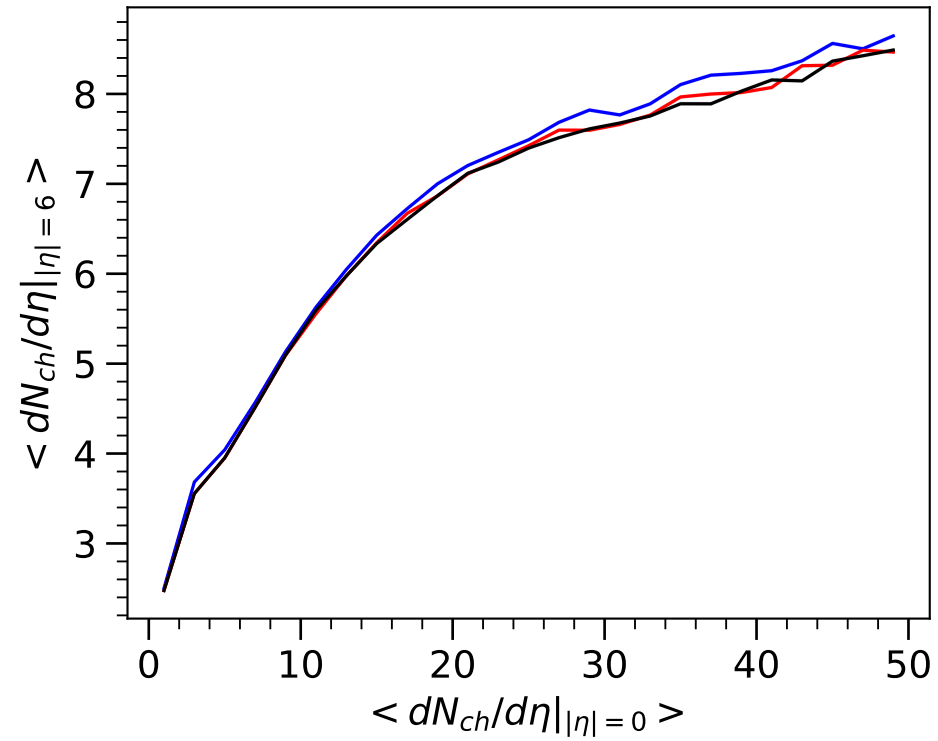
Forward Multiplicity ($|\eta| = 6$) as a function of Central Multiplicity ($|\eta| = 0$)

DPMJET-III 19.1

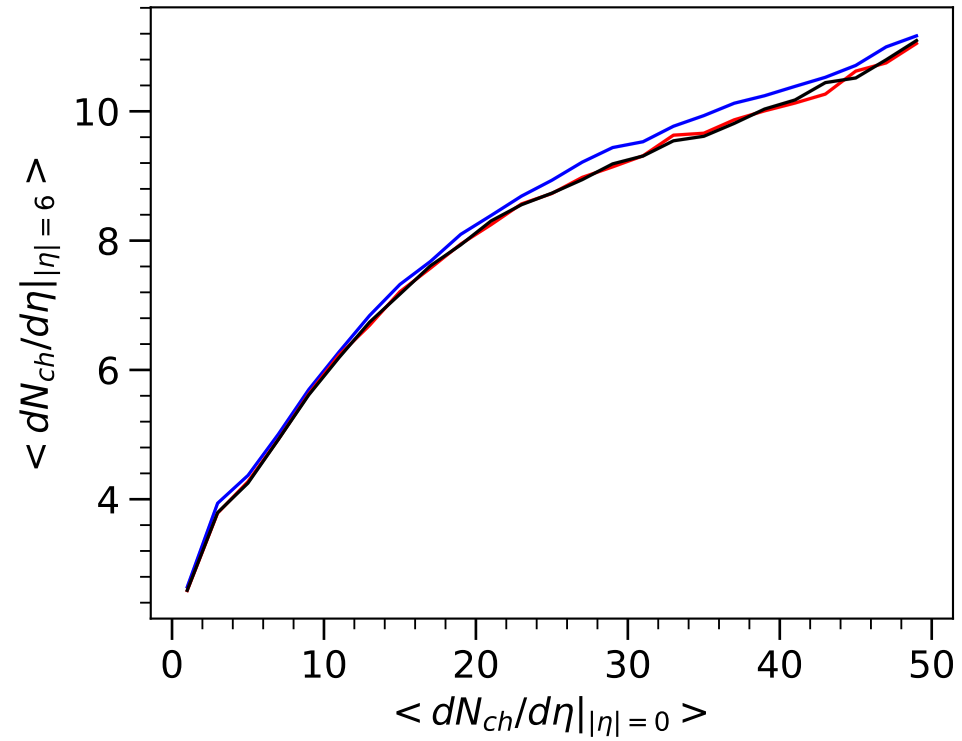
DPMJET-III 19.2

DPMJET-III 19.3

Forward vs Central, pp, 8.0TeV



Forward vs Central, pp, 13.0TeV

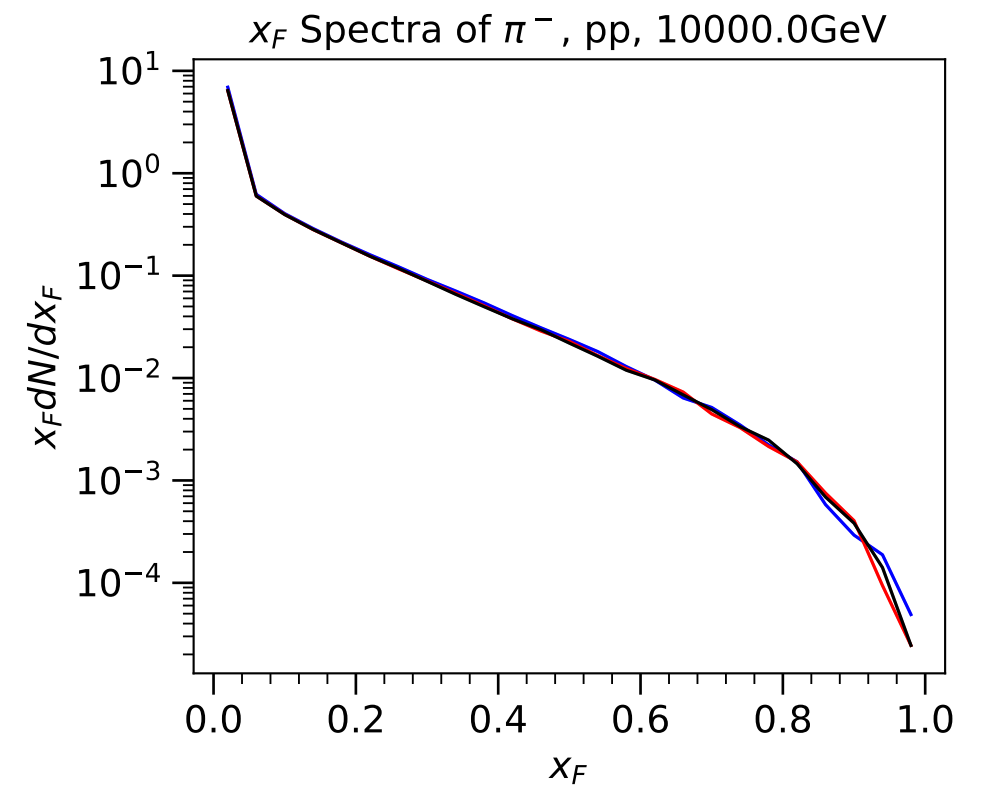
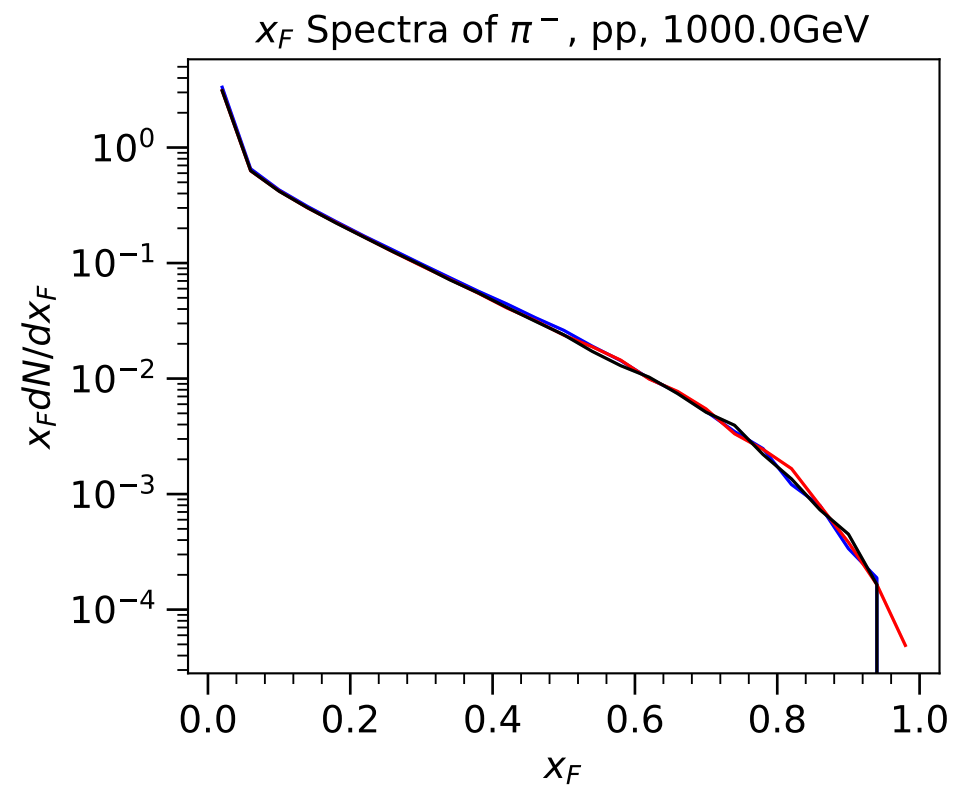
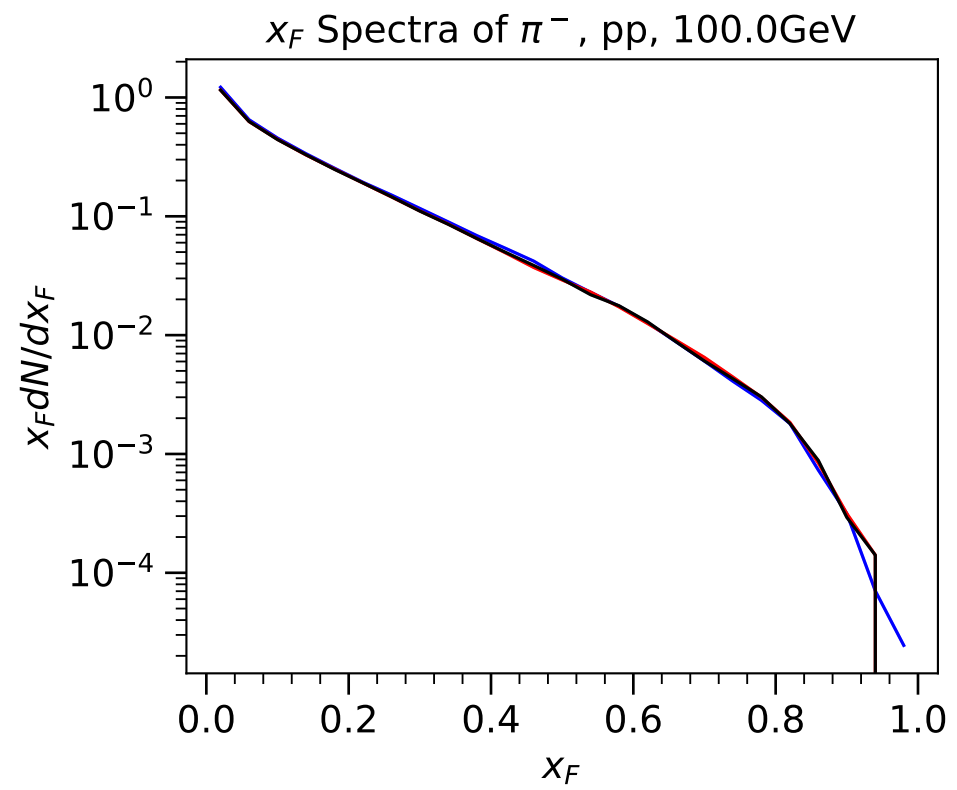


x_F Spectra of π^- in pp Collisions

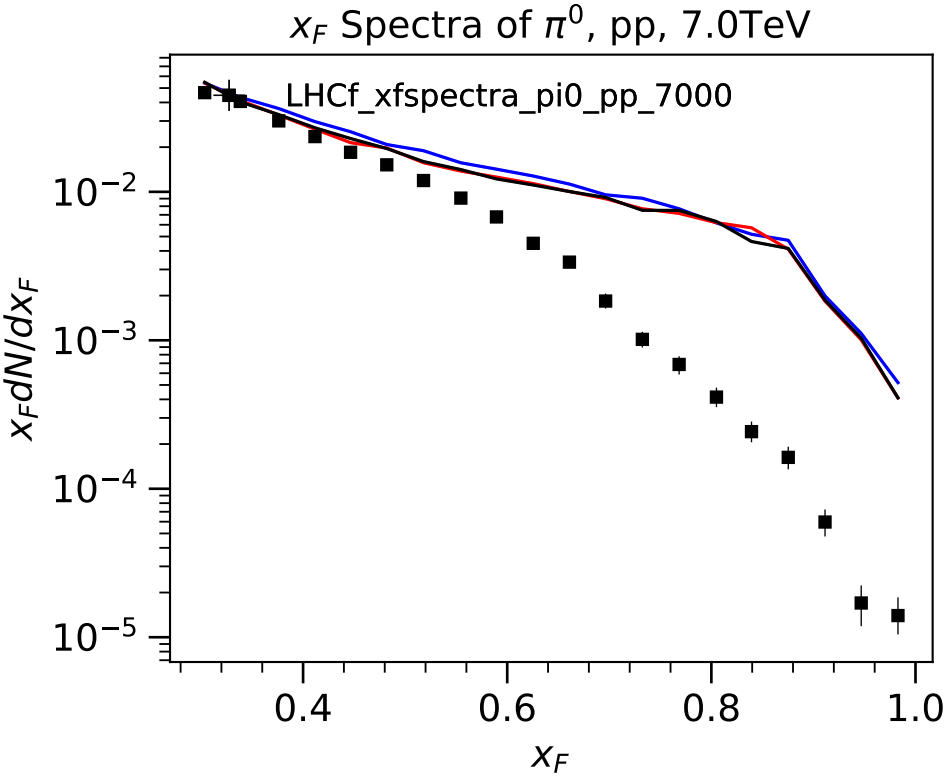
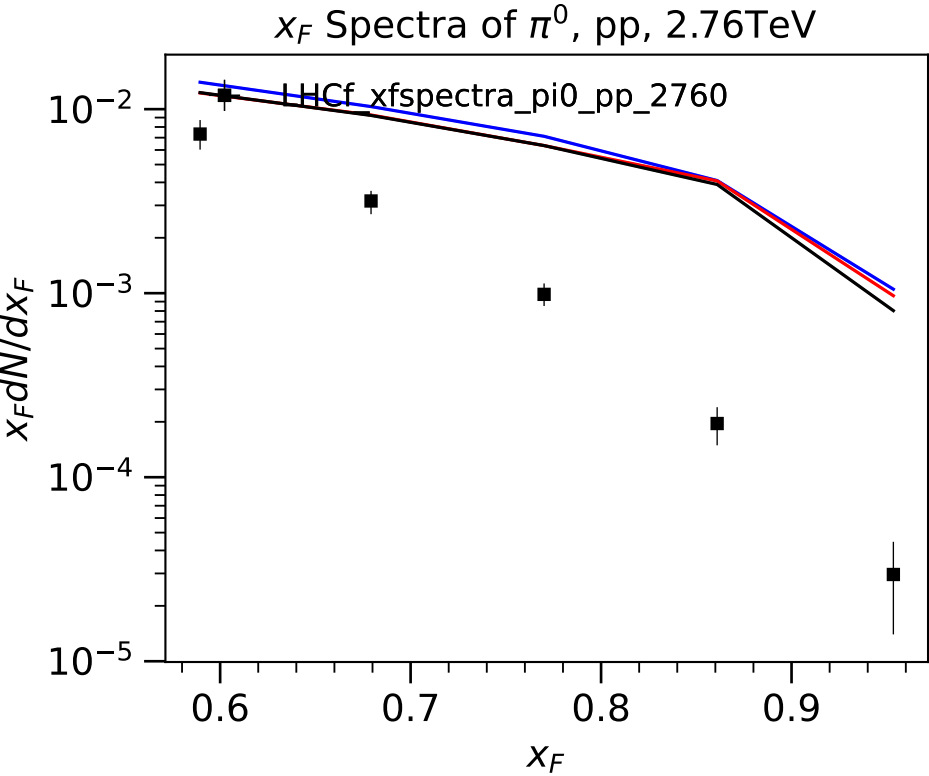
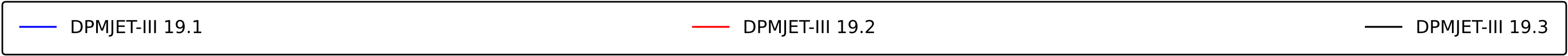
DPMJET-III 19.1

DPMJET-III 19.2

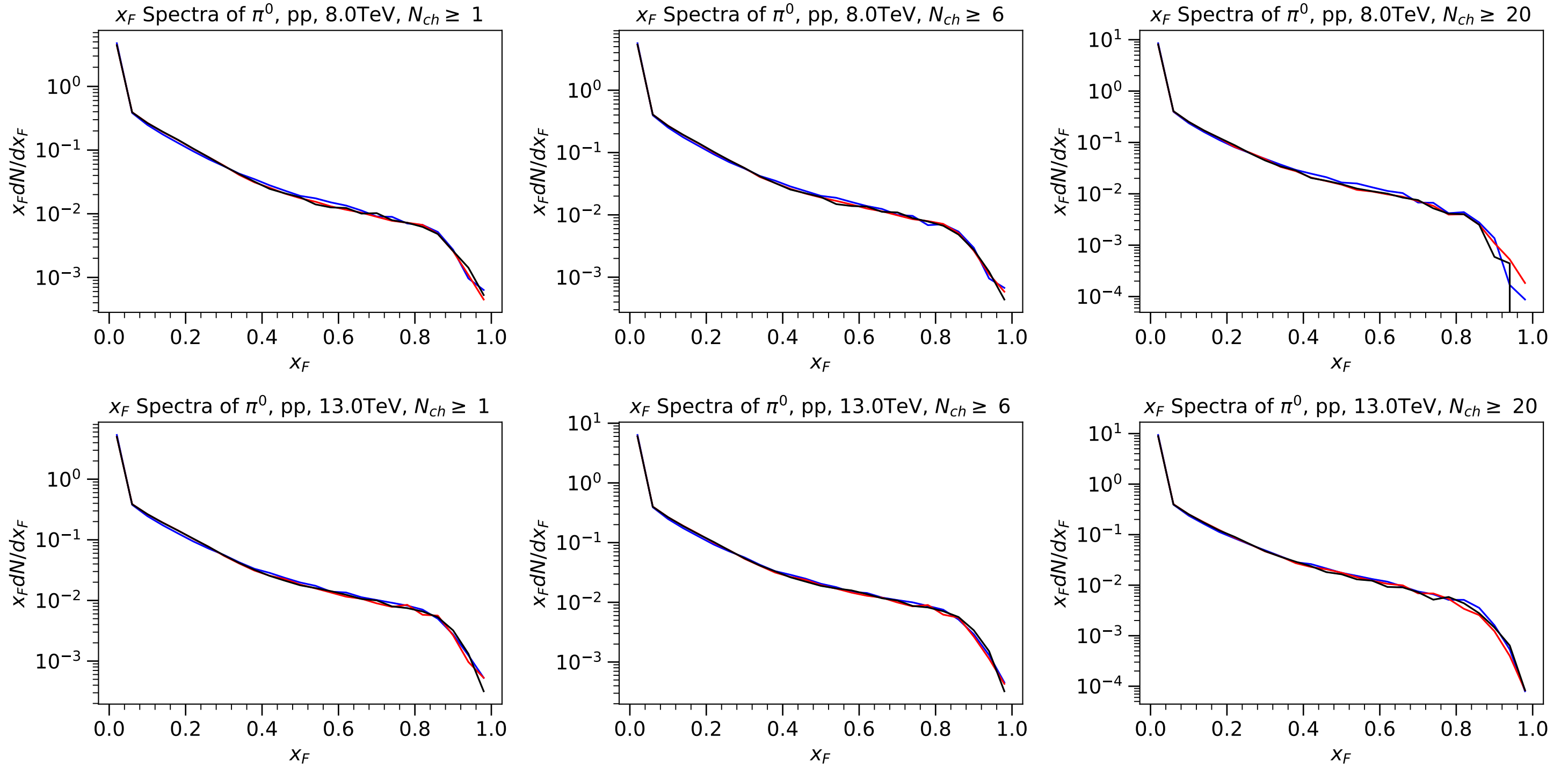
DPMJET-III 19.3



x_F Spectra of π^0 in pp Collisions



x_F Spectra of π^0 in pp Collisions

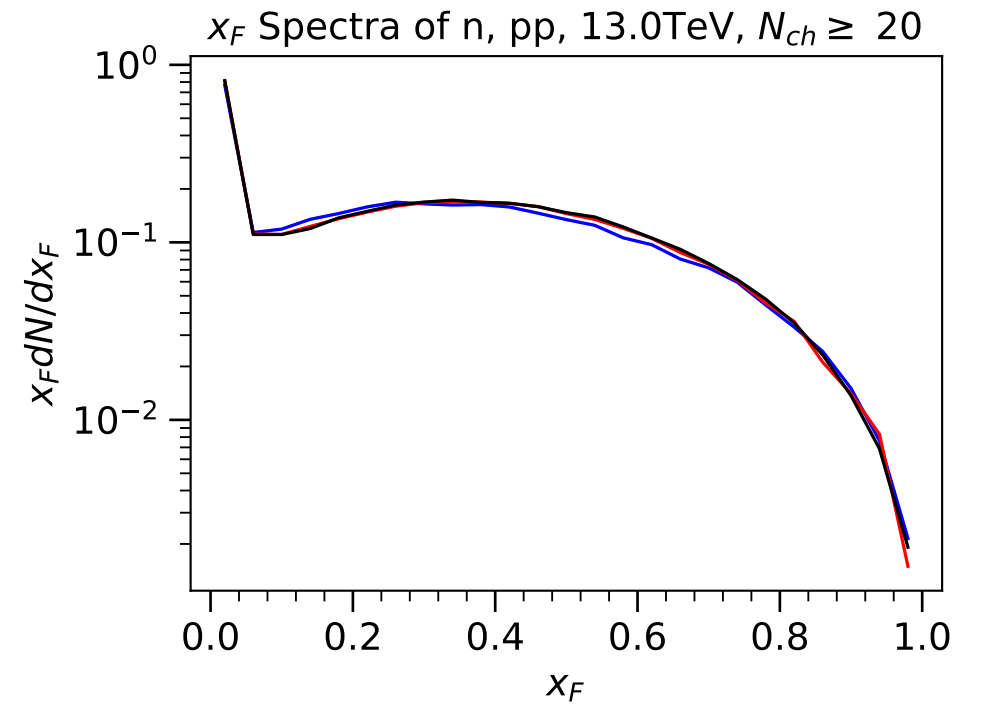
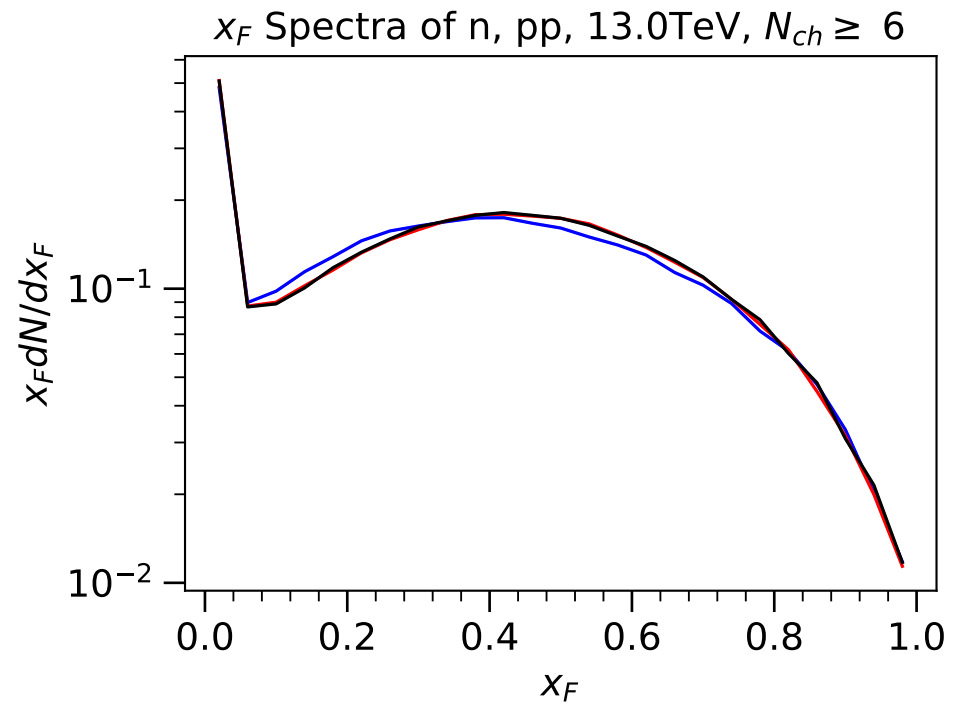
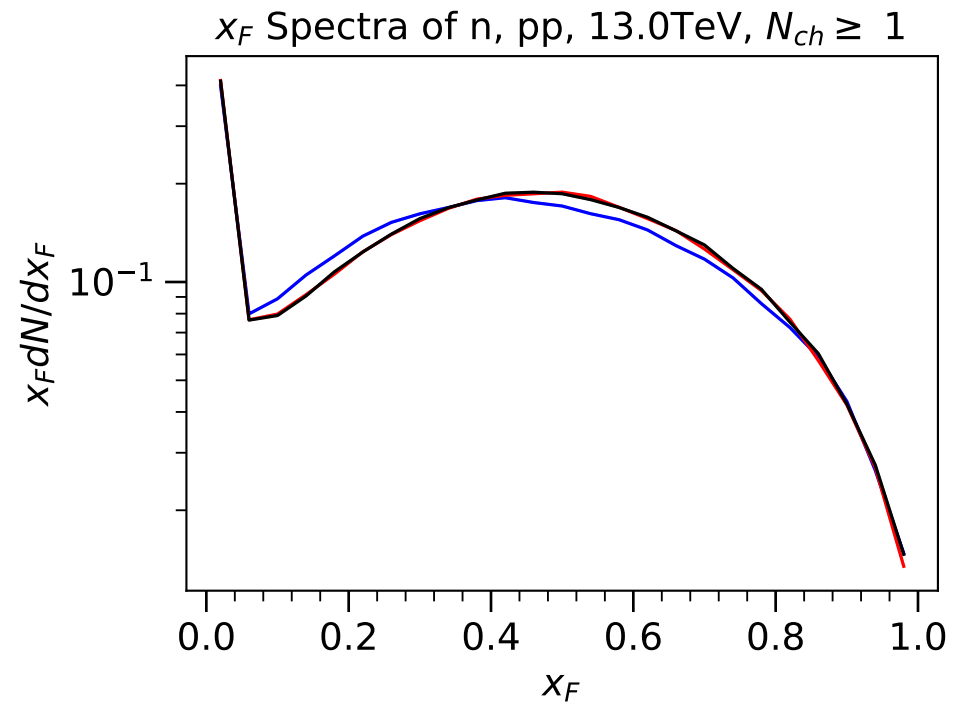
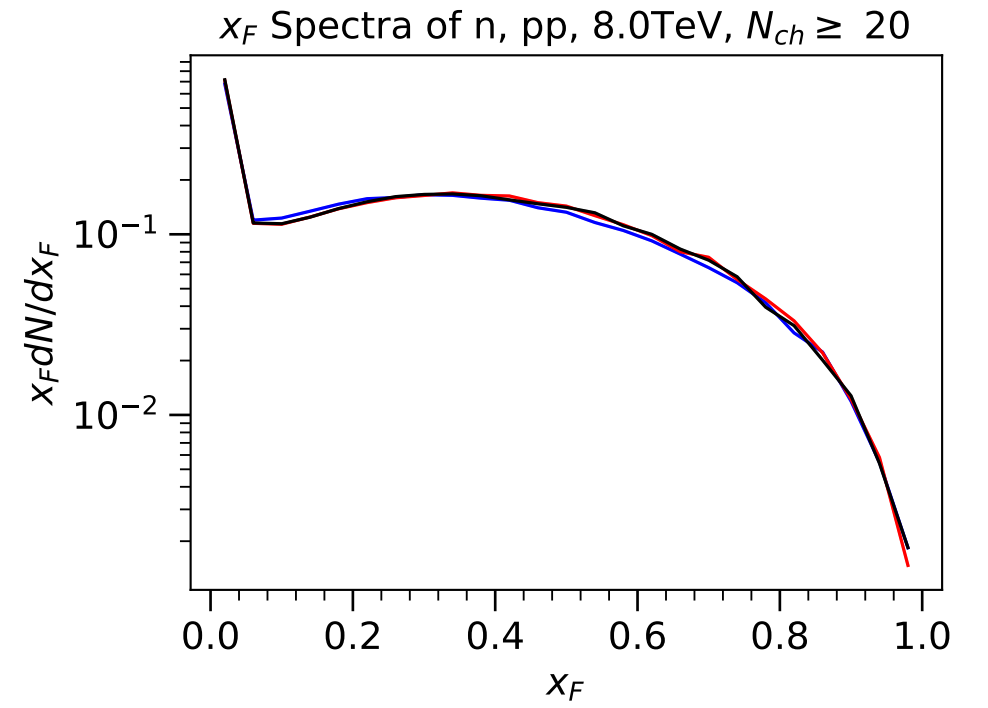
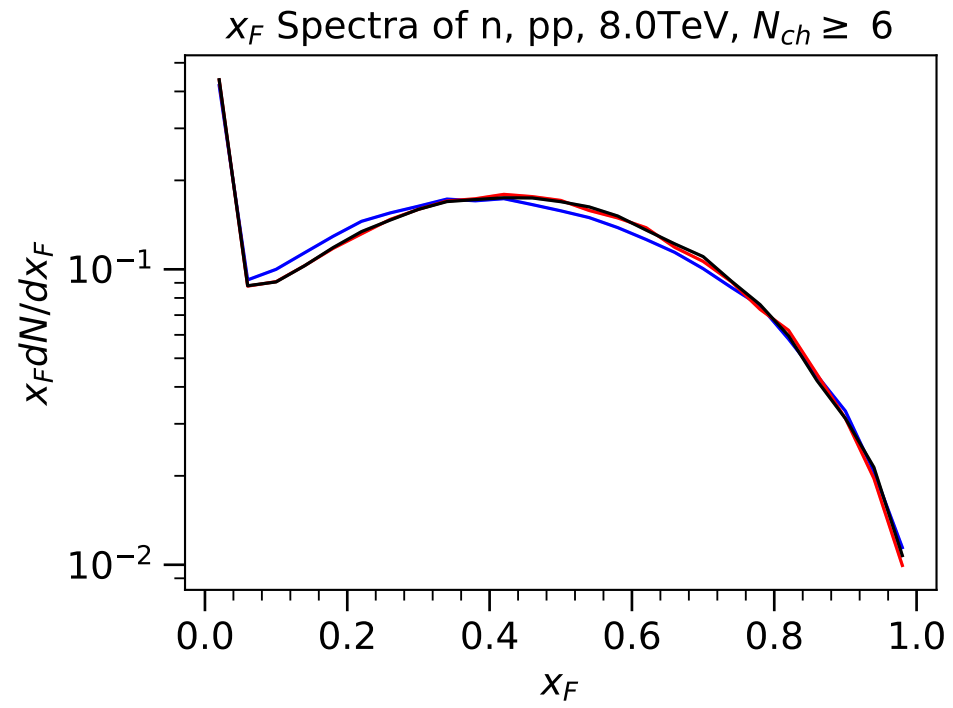
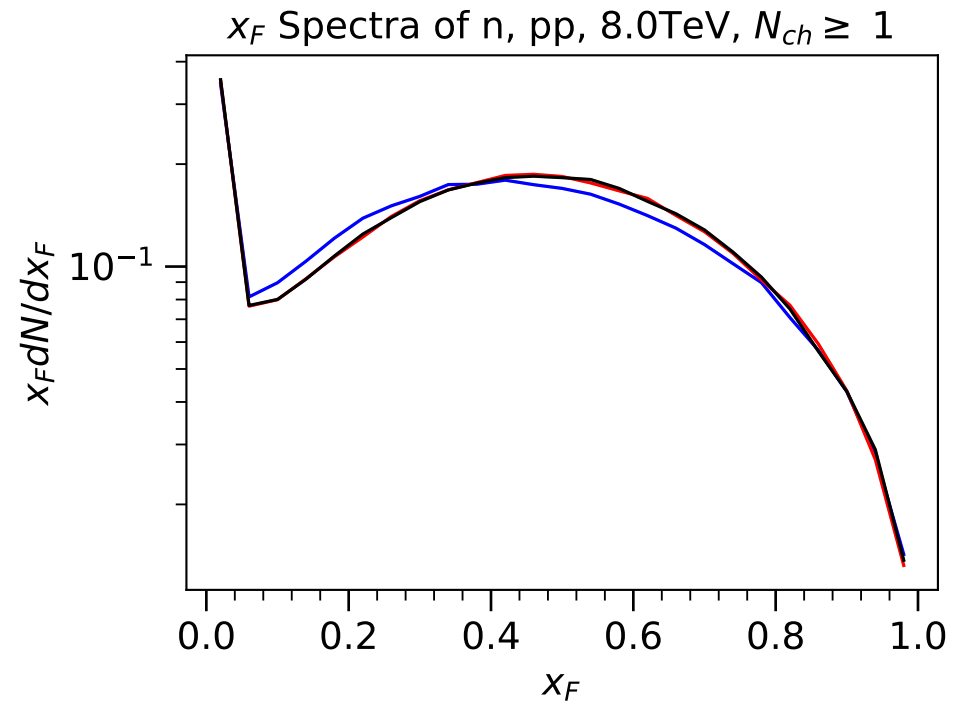


x_F Spectra of n in pp Collisions

DPMJET-III 19.1

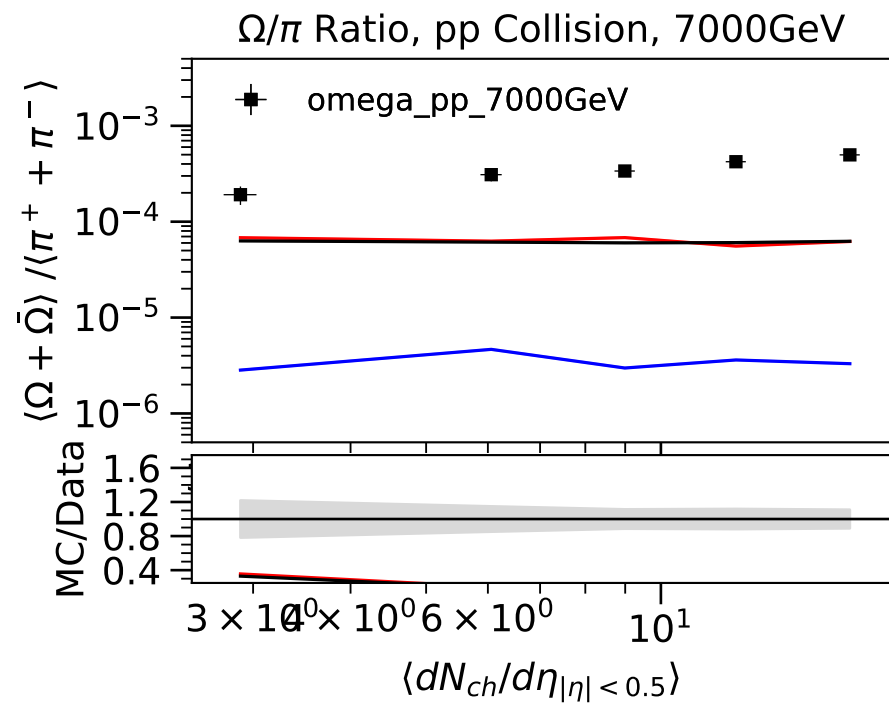
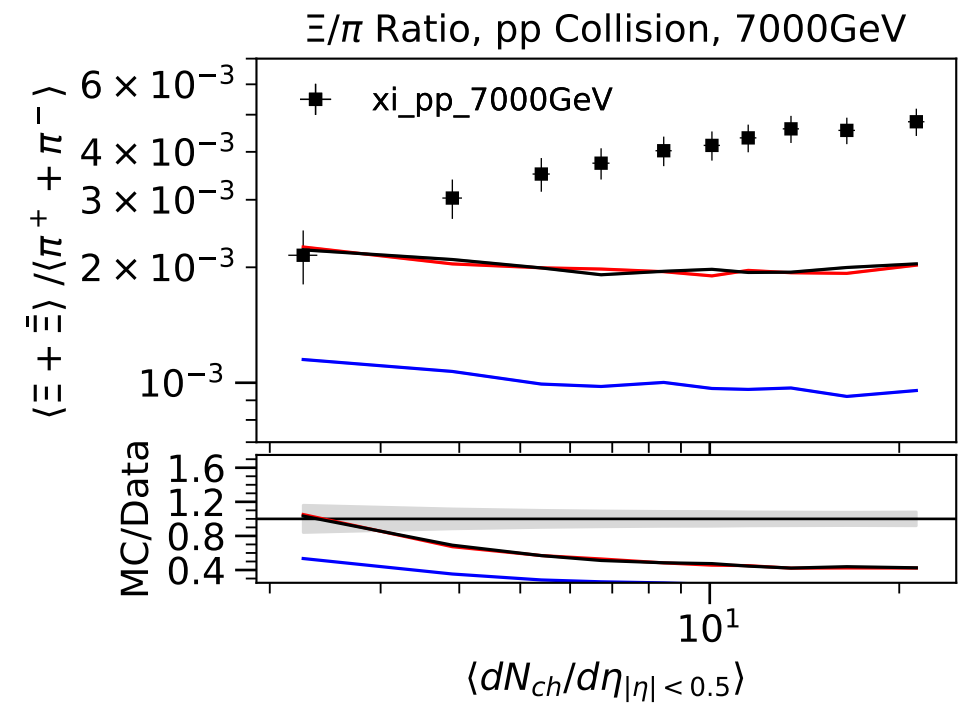
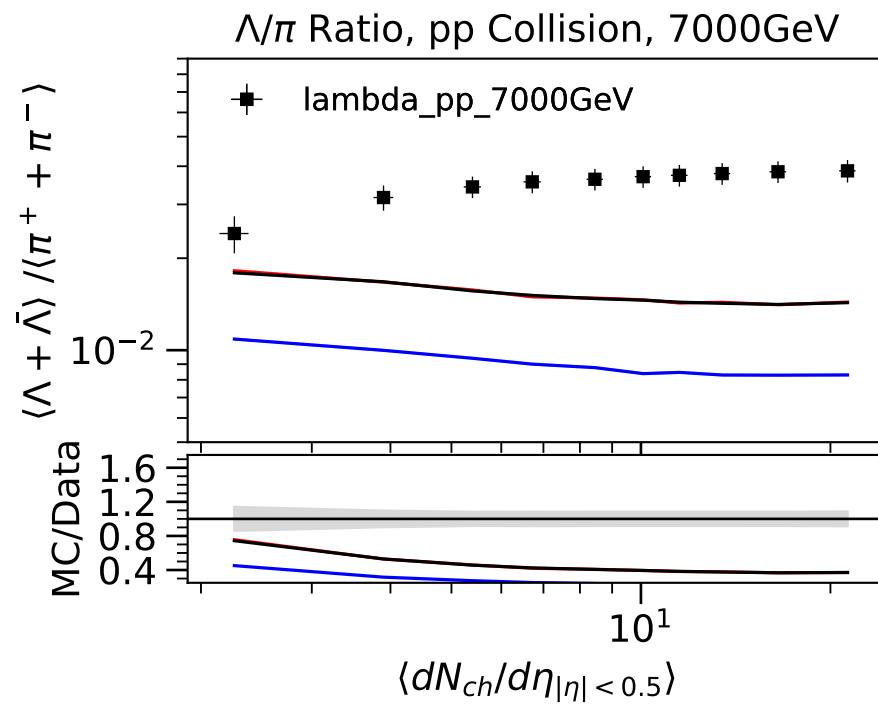
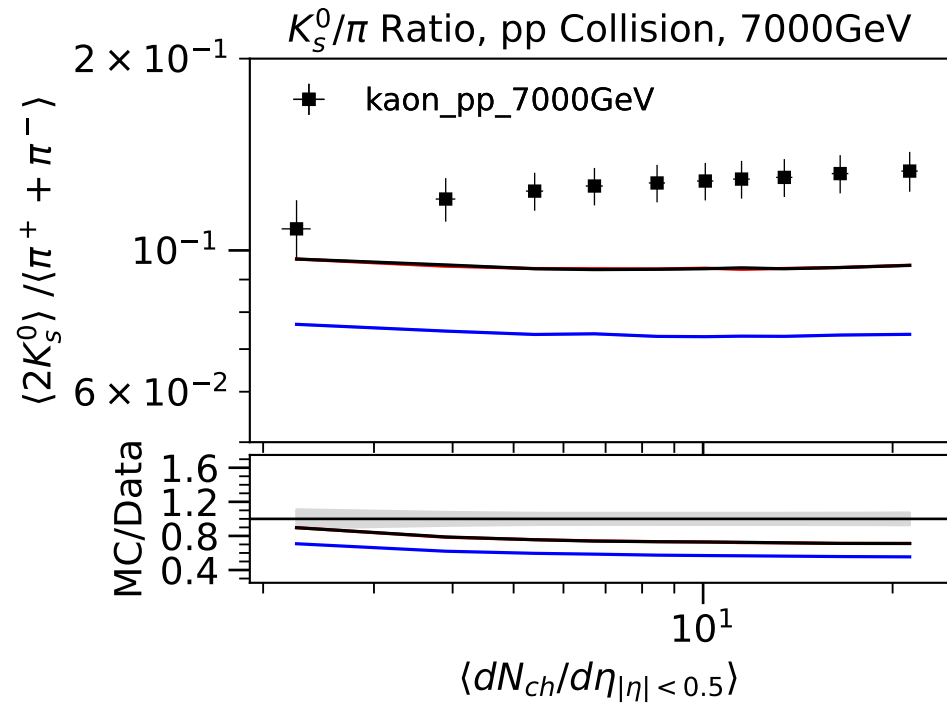
DPMJET-III 19.2

DPMJET-III 19.3



ALICE - K_S^0 , Λ , Ξ , Ω to π Ratio

Ratios of Secondary Particles to $\langle\pi\rangle$ in pp Collisions

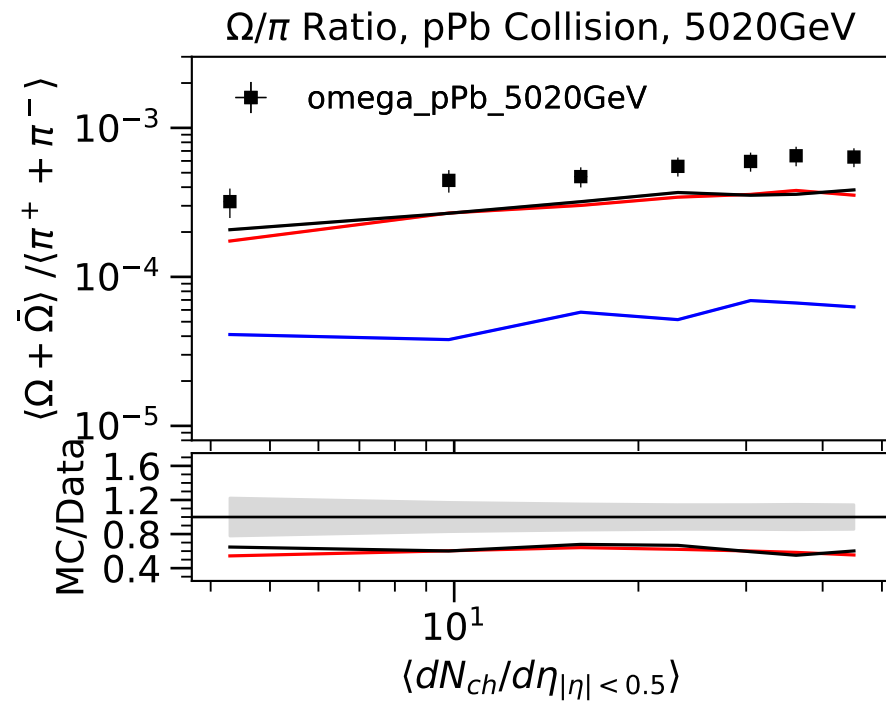
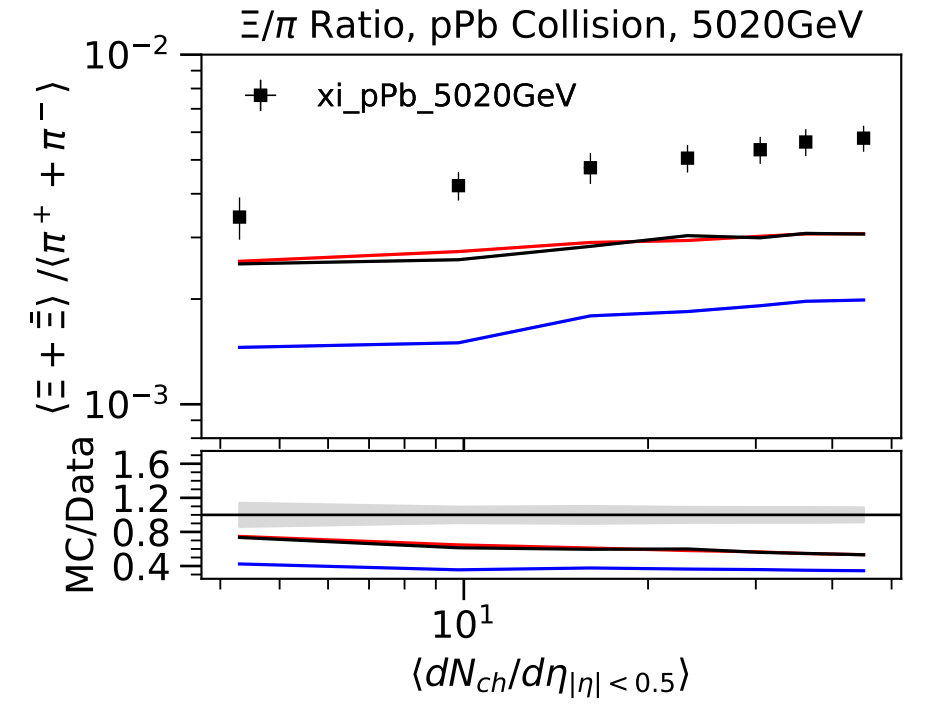
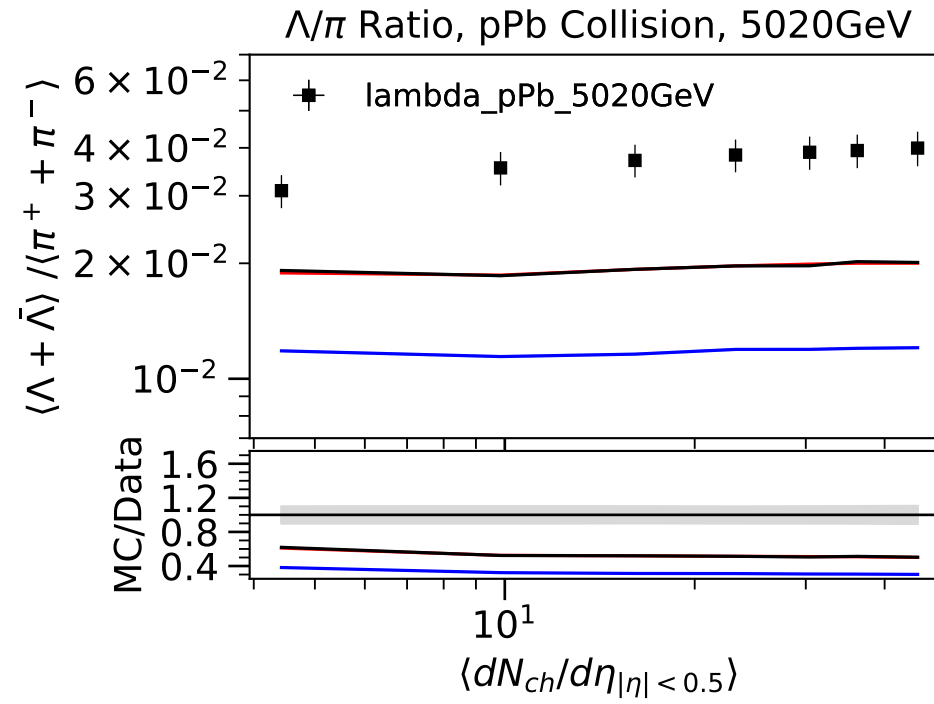
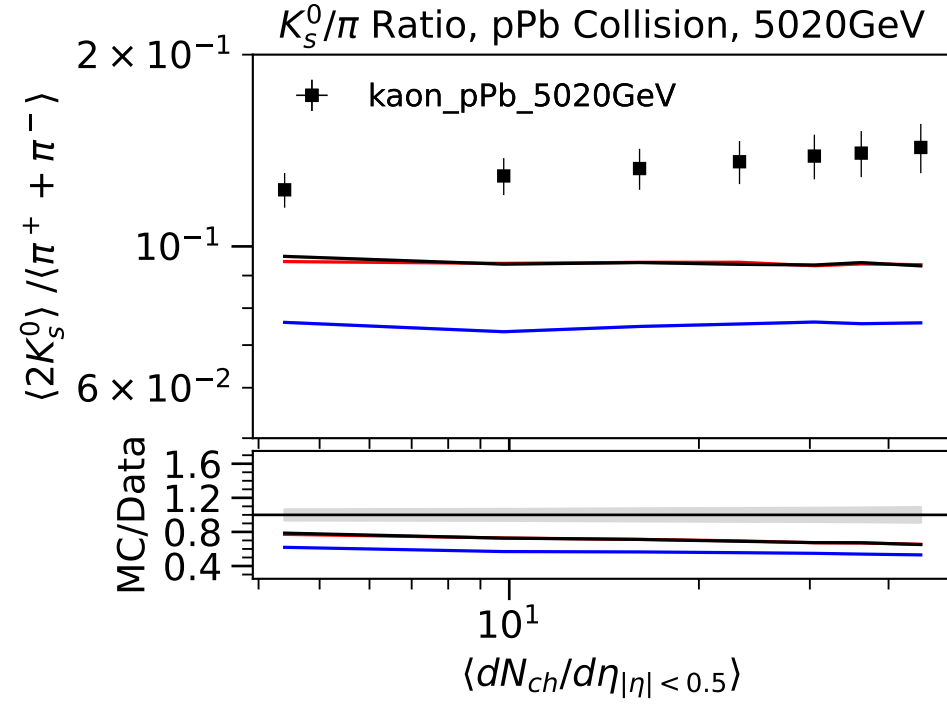


Ratios of Secondary Particles to $\langle\pi\rangle$ in pPb Collisions

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

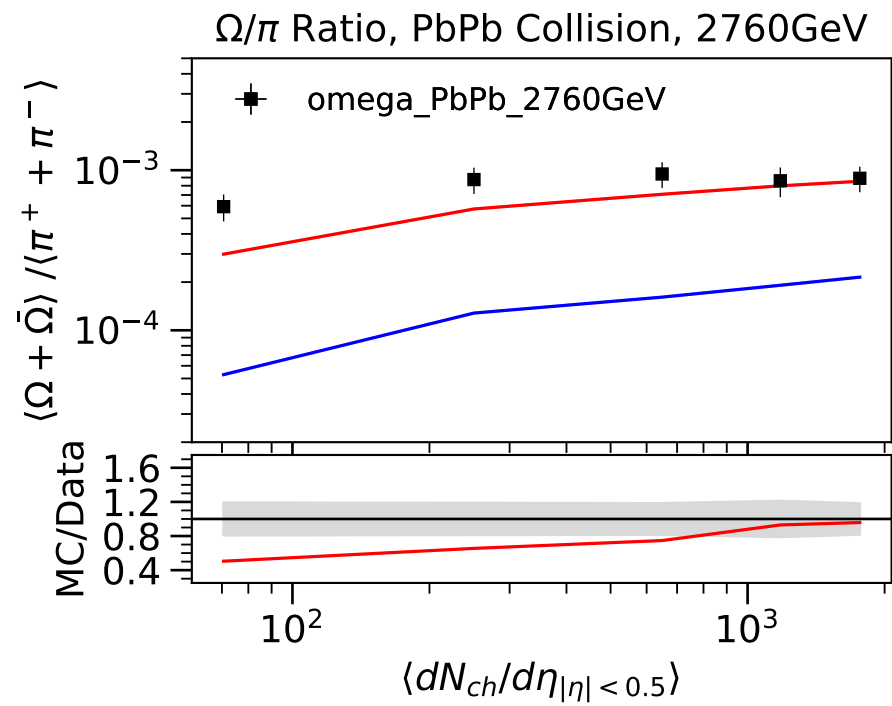
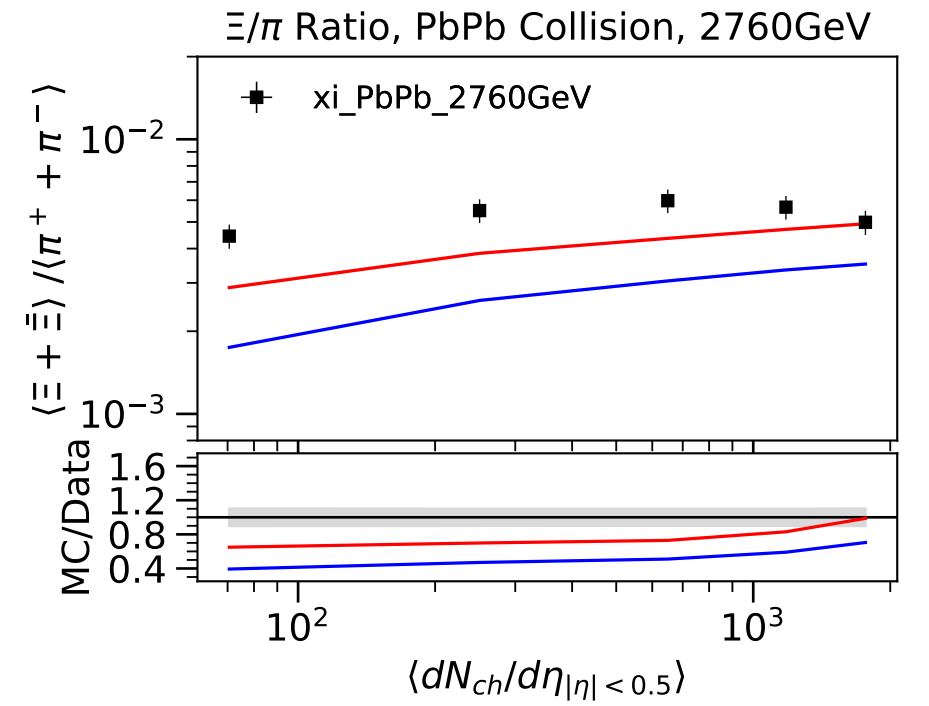
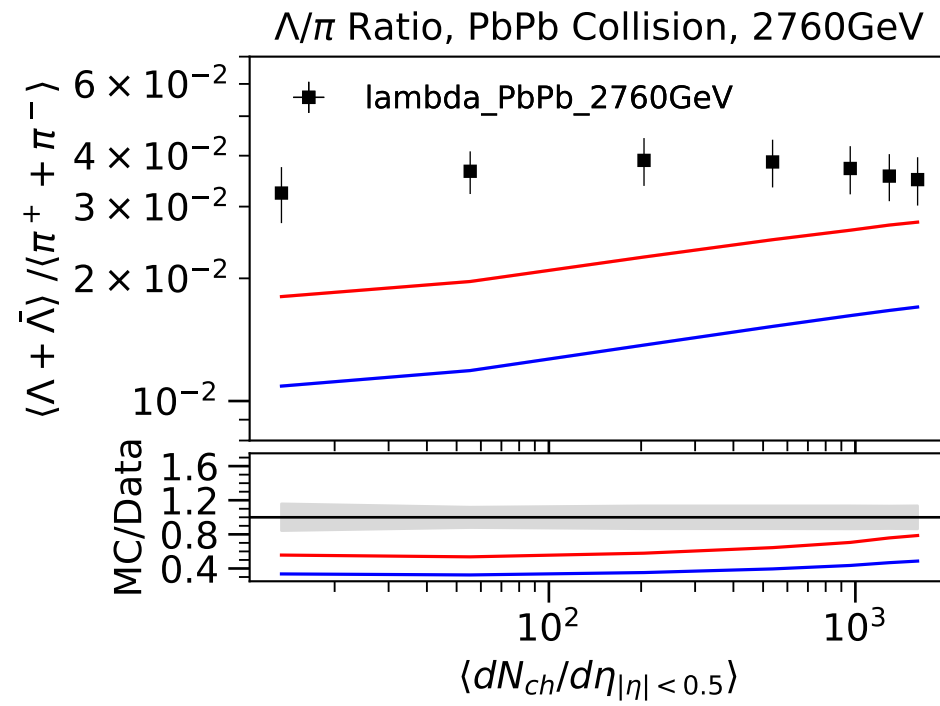
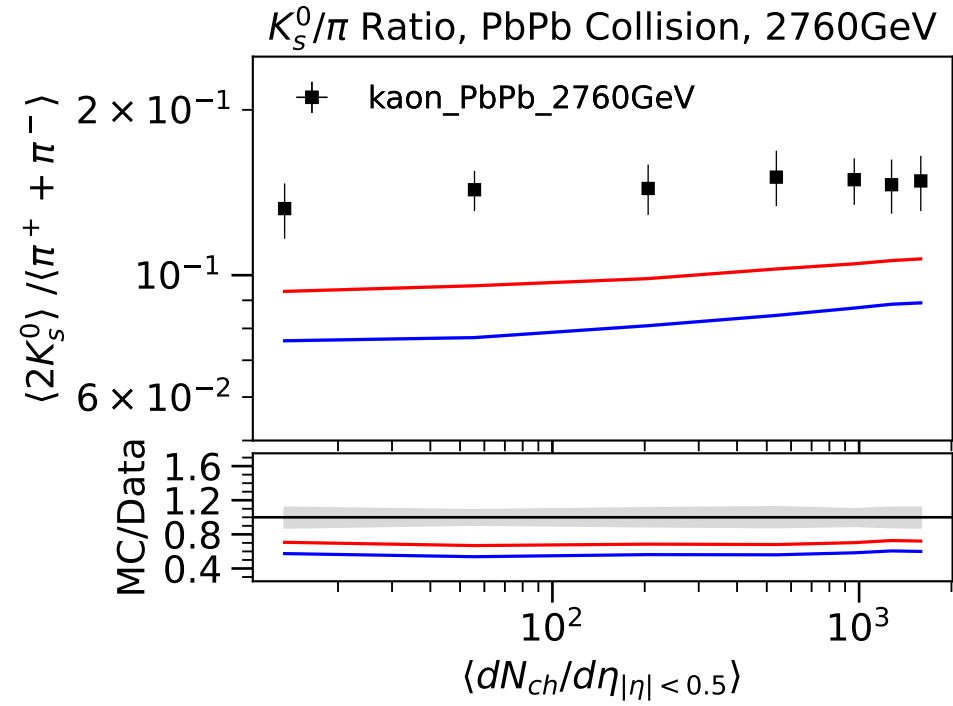


Ratios of Secondary Particles to $\langle\pi\rangle$ in PbPb Collisions

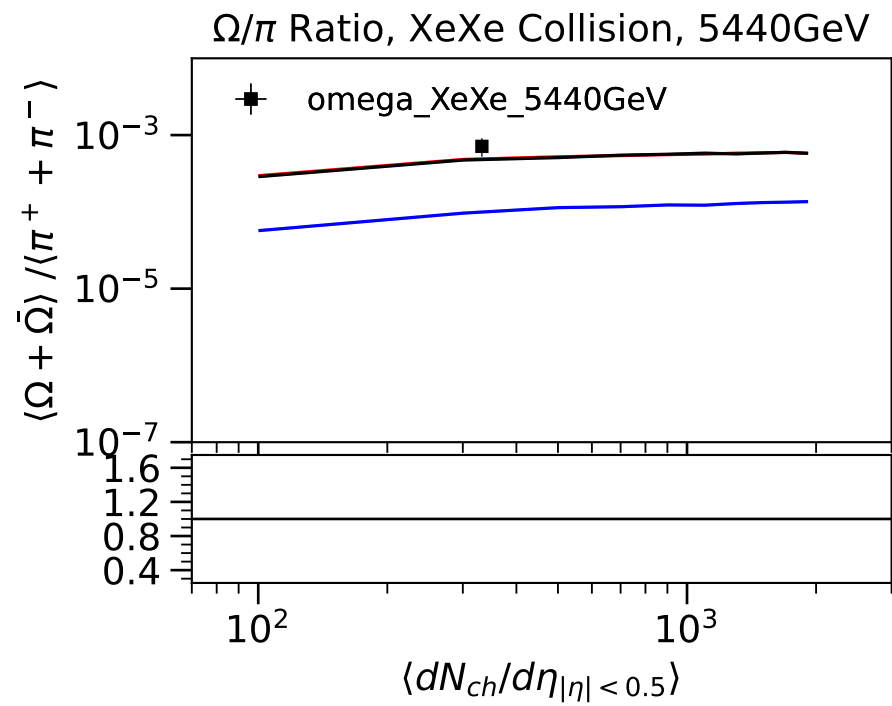
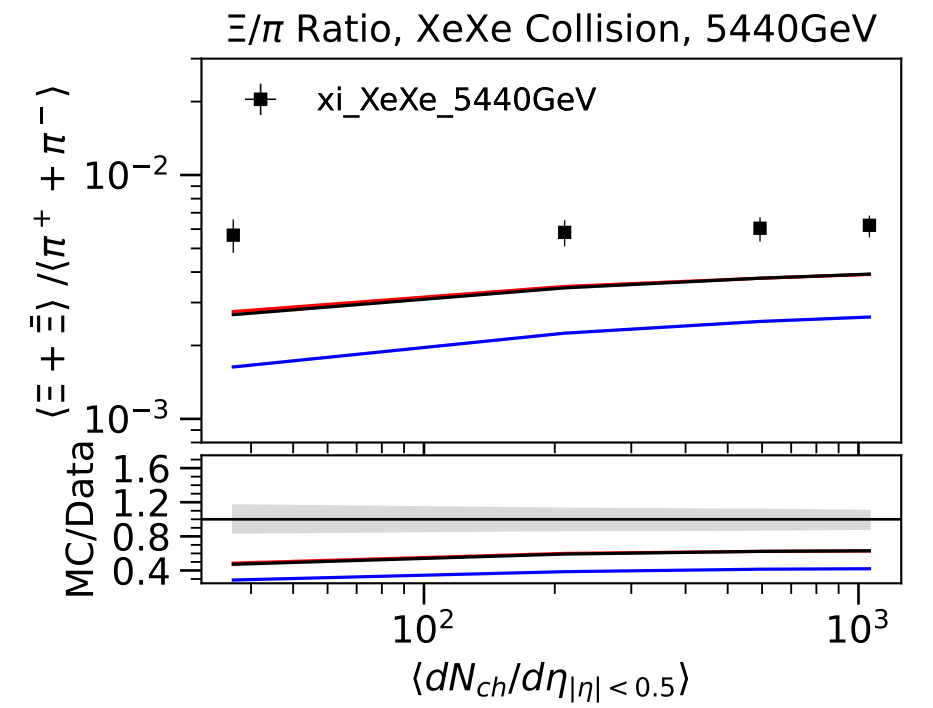
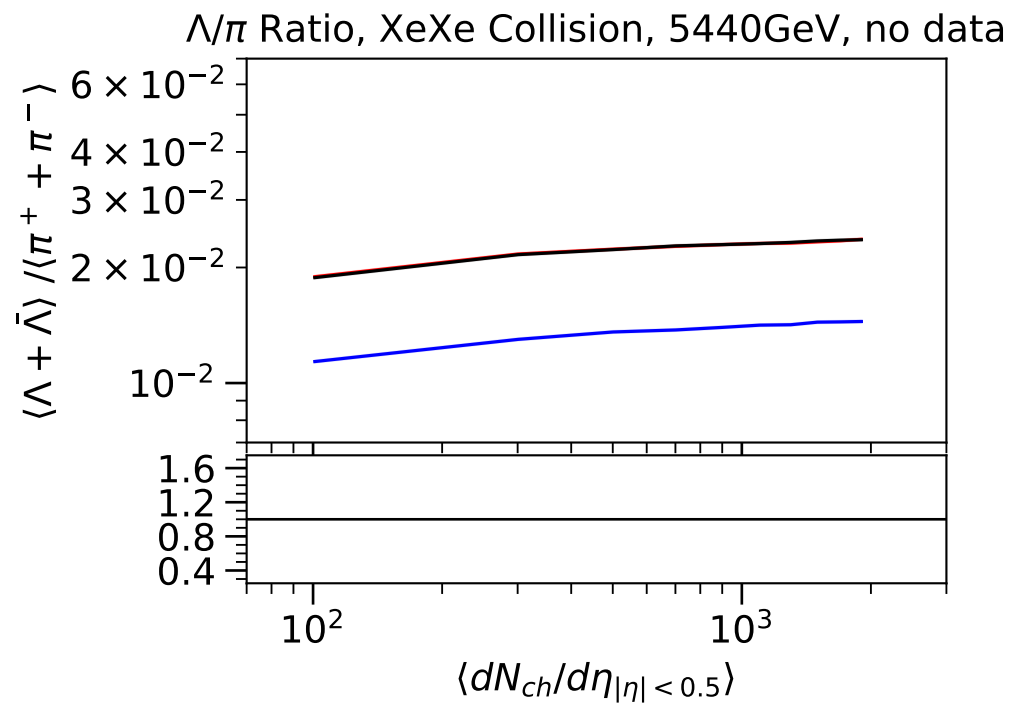
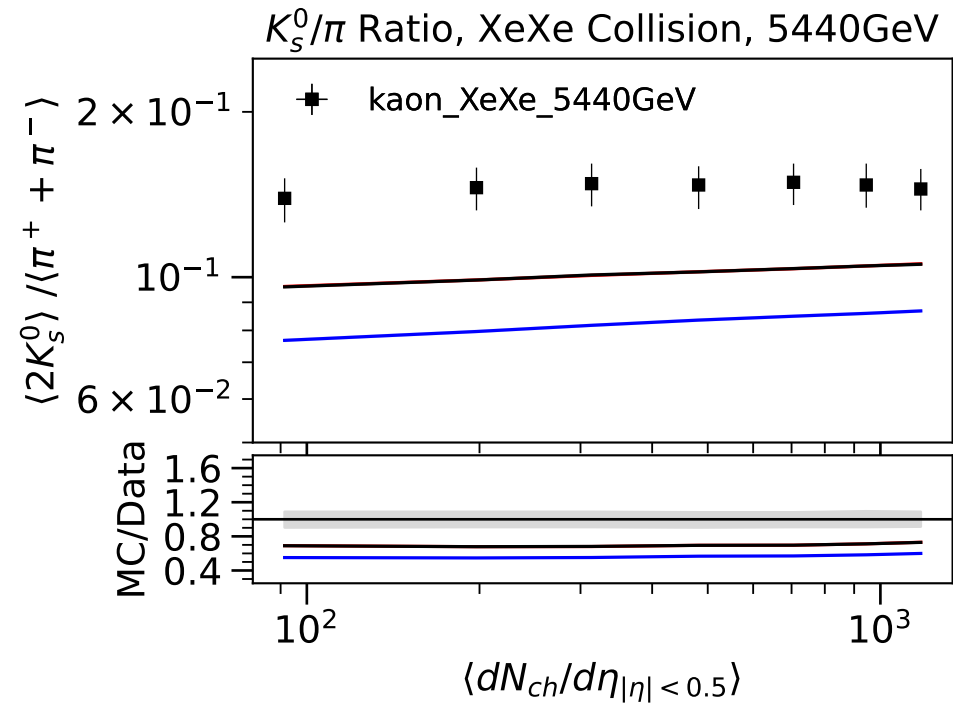
DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3



Ratios of Secondary Particles to $\langle \pi \rangle$ in XeXe Collisions



LHC: proton lead runs

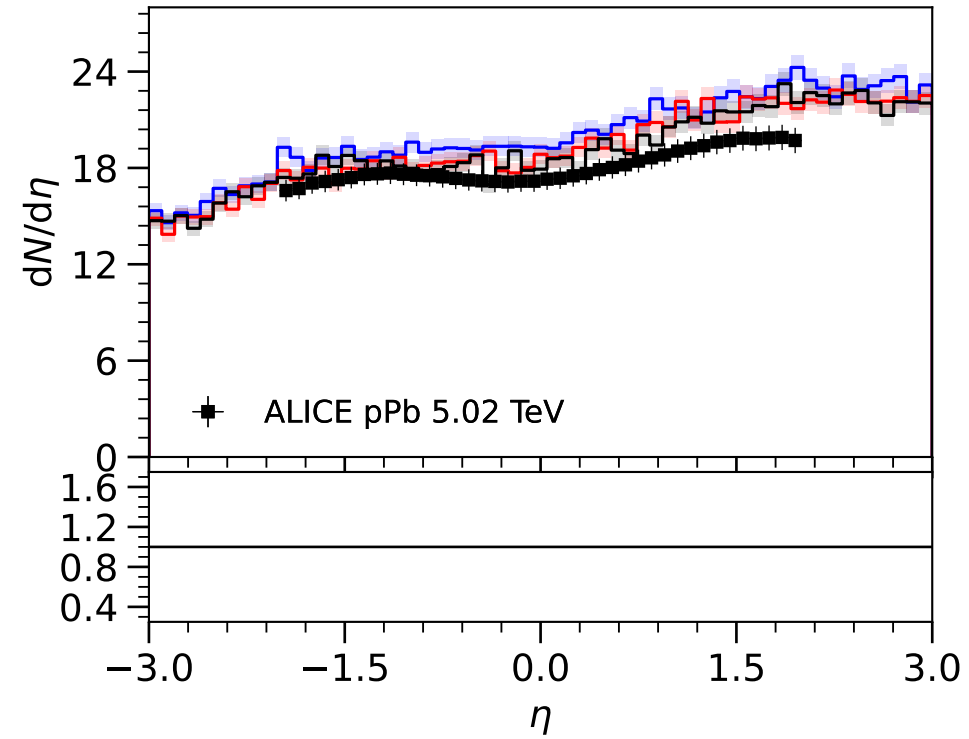
ALICE - NSD pPb η distribution.

DPMJET-III 19.1

DPMJET-III 19.2

DPMJET-III 19.3

ALICE NSD pPb 5020 GeV



ALICE NSD pPb 8160 GeV

