MEASUREMENT OF DY ABSOLUTE CROSS-SECTION MEASUREMENT FOR P+P AND P+D COLLISIONS WITH 120GeV PROTON BEAM AT FERMILAB

Weekly Updates

Table of Contents

Overview

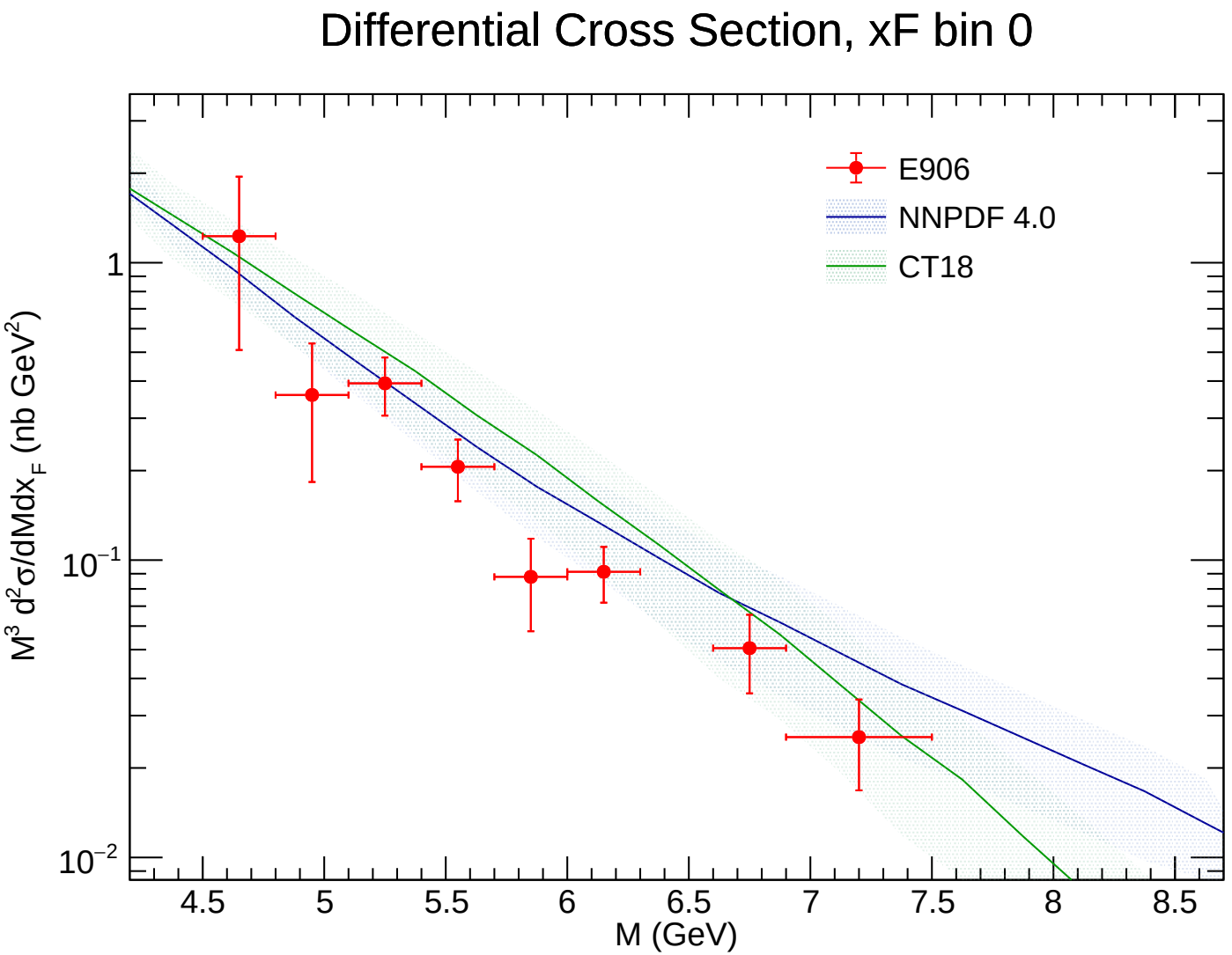
- Event Selection: Chuck cuts.
- Files Used:
  - Data and Mixed Events:
    `merged_RS67_3089LH2.root`
  - Empty Flask and Mixed Events:
    `merged_RS67_3089LH2.root`
  - J/ψ MC Events:
    `mc_jpsi_LH2_M027_S001_messy_occ_pTxFweight_v2.root`
  - ψ' MC Events:
    `mc_psiprime_LH2_M027_S001_messy_occ_pTxFweight_v2.root`
  - NNPDF4 File:
    `NNPDF40_xFnew_p.root`
  - CT18 File:
    `CT18_xFnew_p.root`

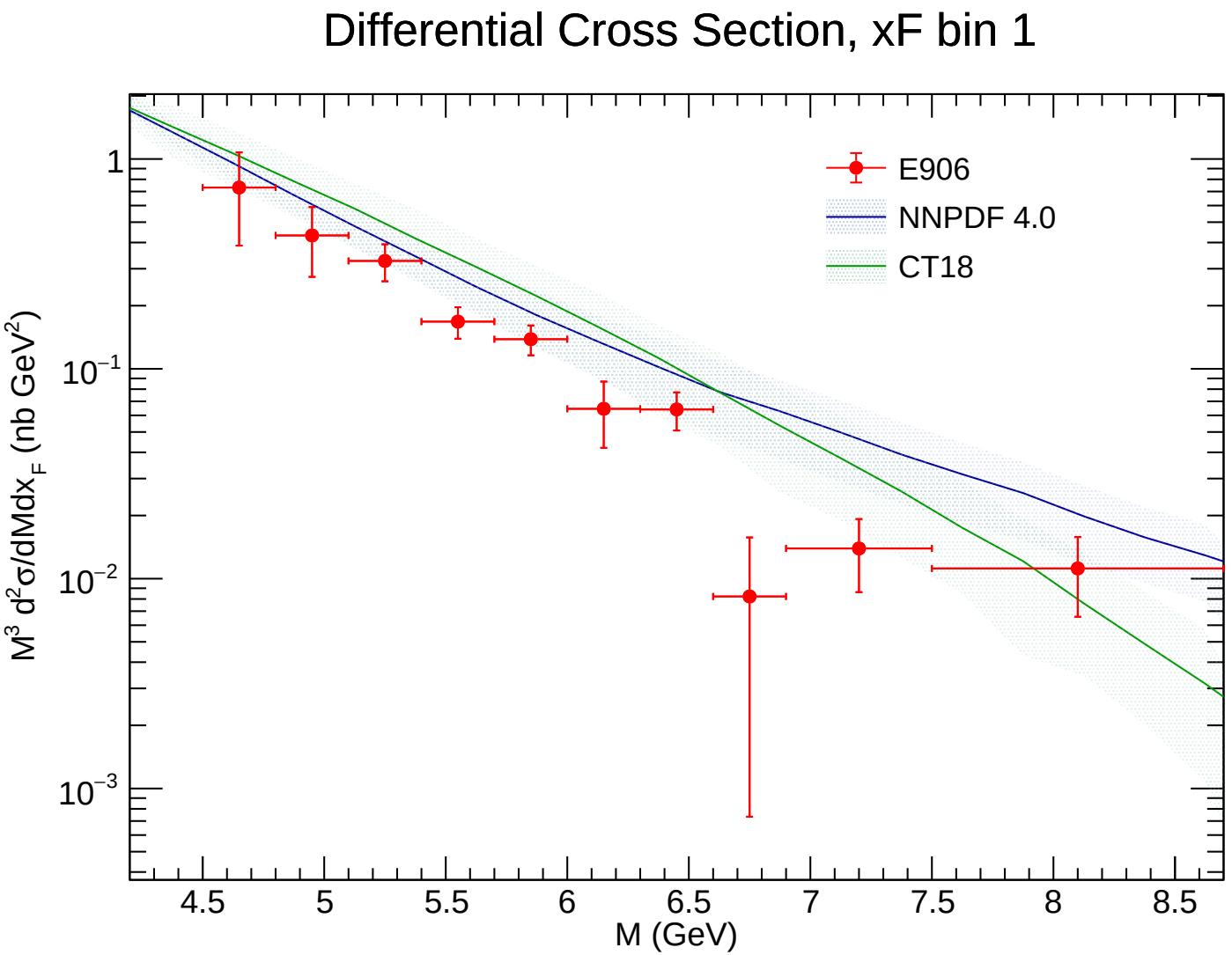
Analysis Steps

- Background Subtraction from Data by using MC templates:
  - Data and Mixed Events:
    $Y_{DY} = Y_{Data} - Y_{Mixed} - \alpha_{Flask}(Y_{emptyflask} - Y_{Mixed}) - \alpha_{J/\psi} Y_{J/\psi} - \alpha_{\psi'} Y_{\psi'}$
  - α_{Flask}:
    `4.94392`
  - $\alpha_{J/\psi}$:
    `2.1878e-03`
  - $\alpha_{\psi'}$:
    `3.4826e-03`
- Applying acceptance corrections:
  - Recorded in:
    `acceptance_h.root`
- kTracker efficiency corrections: 2
  - `1.77909`
  - `1.74145`
  - `1.62481`
  - `1.63713`
  - `1.57874`
  - `1.58371`
  - `1.47446`

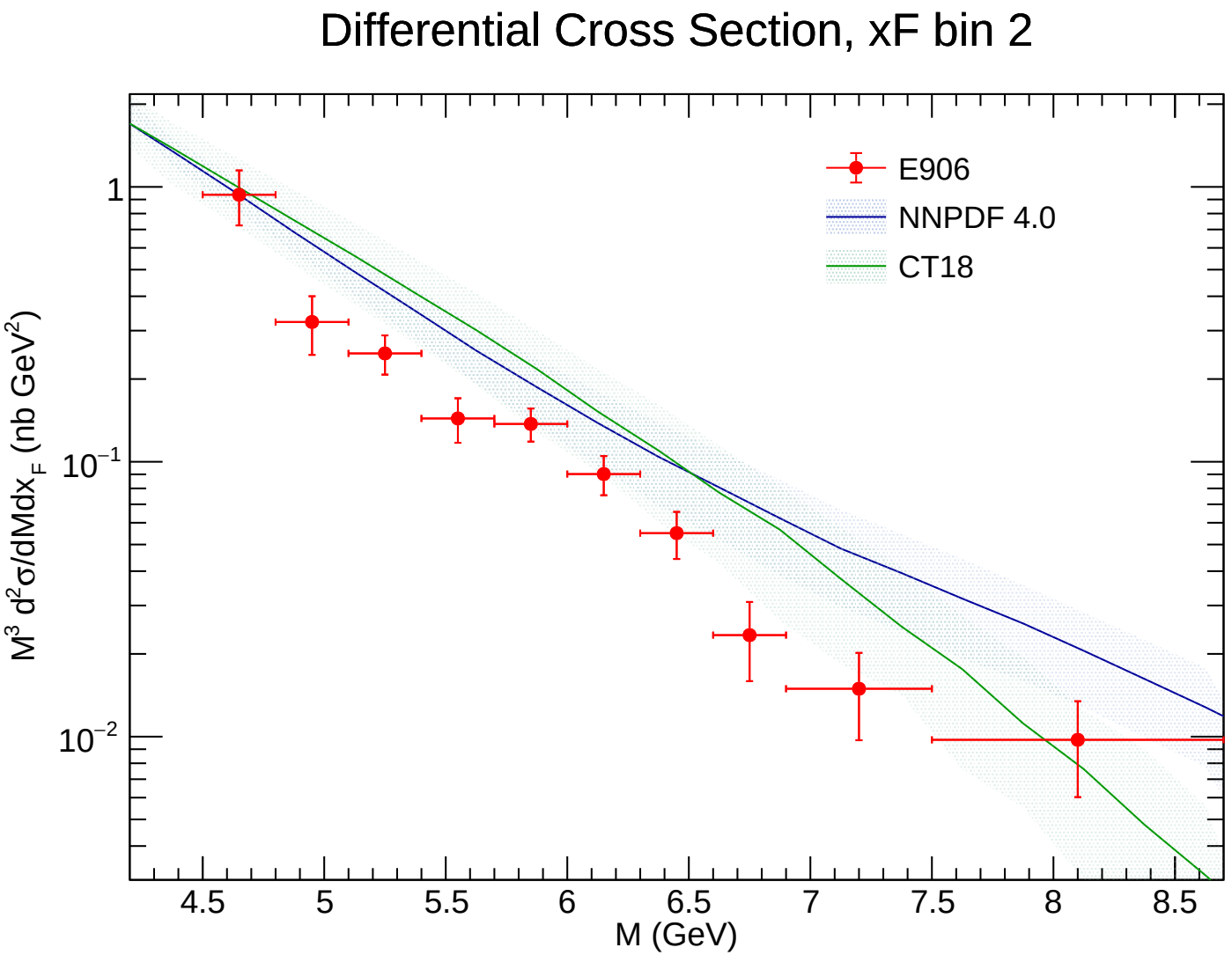
Analysis Steps (Continued)

- Scale for 1/live POT:
  - `3.48489e-8`
- Scale for hodo efficiencies:
  - `1.102`
- Cross-section definition:
  - $$M^3 \frac{d\sigma^2}{dMdx_F} = M^3 \frac{N_{events}}{\Delta M \delta x_F \mathcal{L}}$$

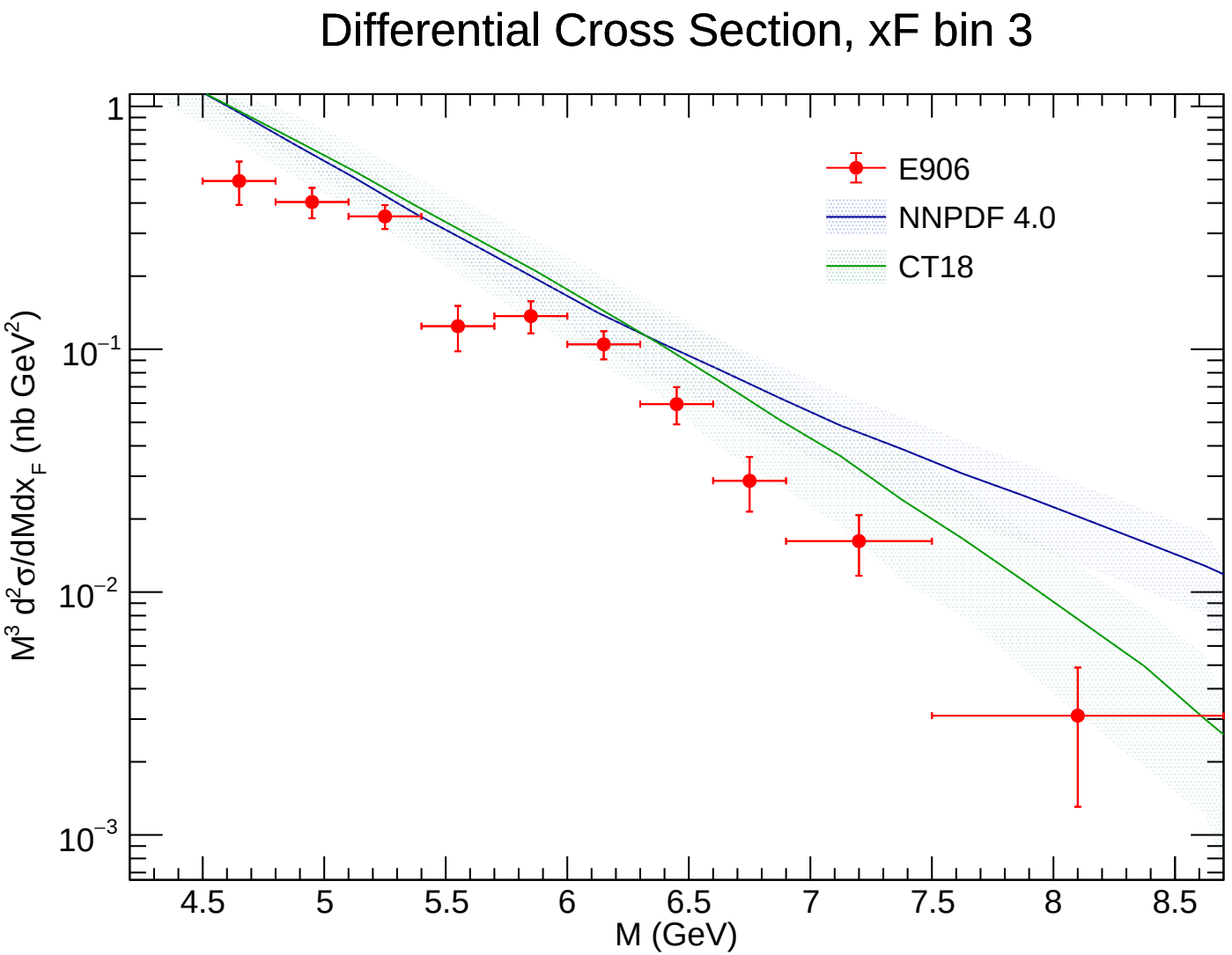

Differential Cross Section, xF bin 0
E906
NNPDF 4.0
CT18
$M^3\, d^2\sigma/dMdx_F$ (nb GeV^2)
1
10^{-1}
10^{-2}
4.5
5
5.5
6
6.5
7
7.5
8
8.5
M (GeV)


Differential Cross Section, xF bin 1
E906
NNPDF 4.0
CT18
$M^3\, d^2\sigma/dMdx_F$ (nb GeV^2)
1
10^{-1}
10^{-2}
10^{-3}
4.5
5
5.5
6
6.5
7
7.5
8
8.5
M (GeV)

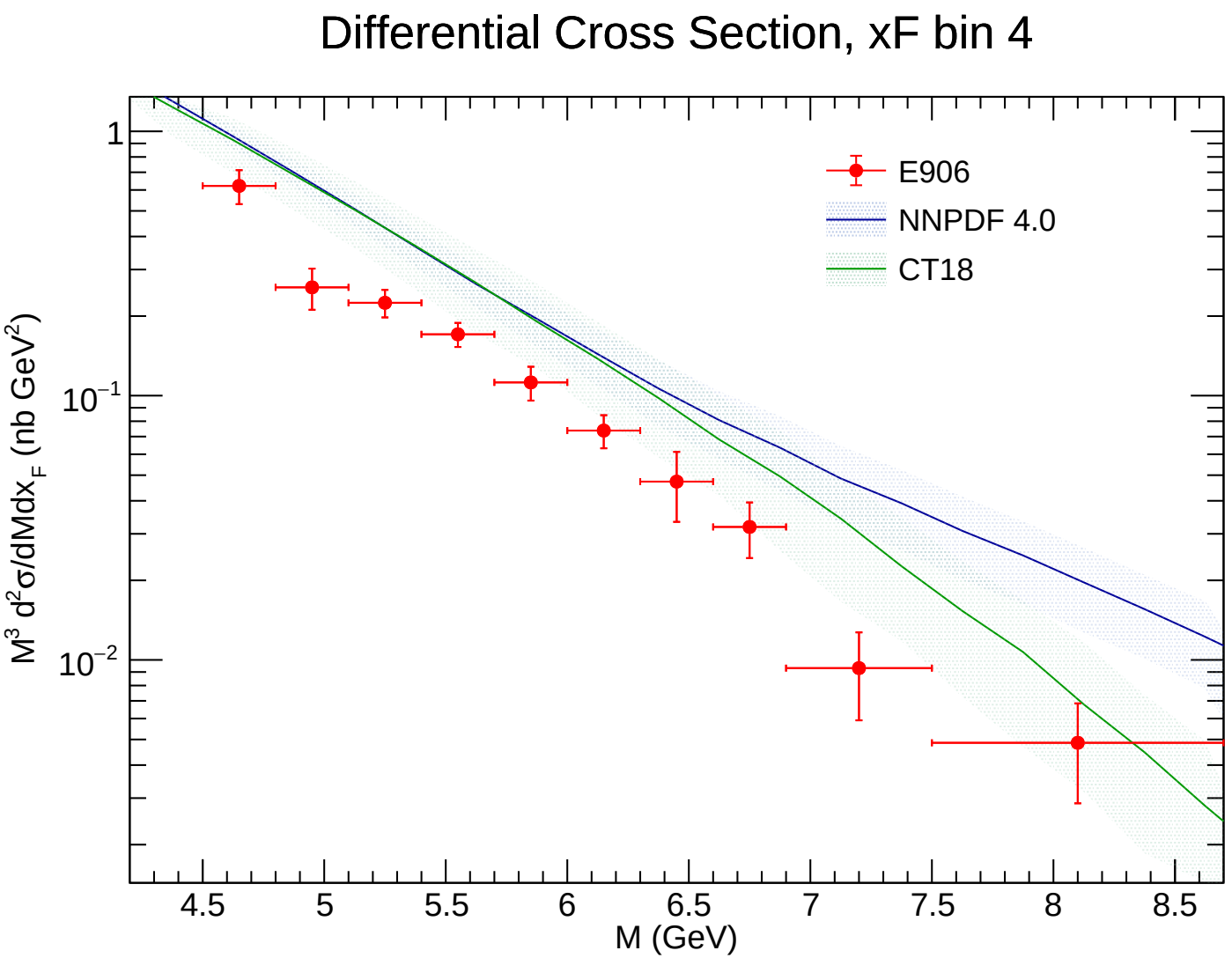
Double Differential Cross-Section: $0.1 \leq x_F < 0.15$

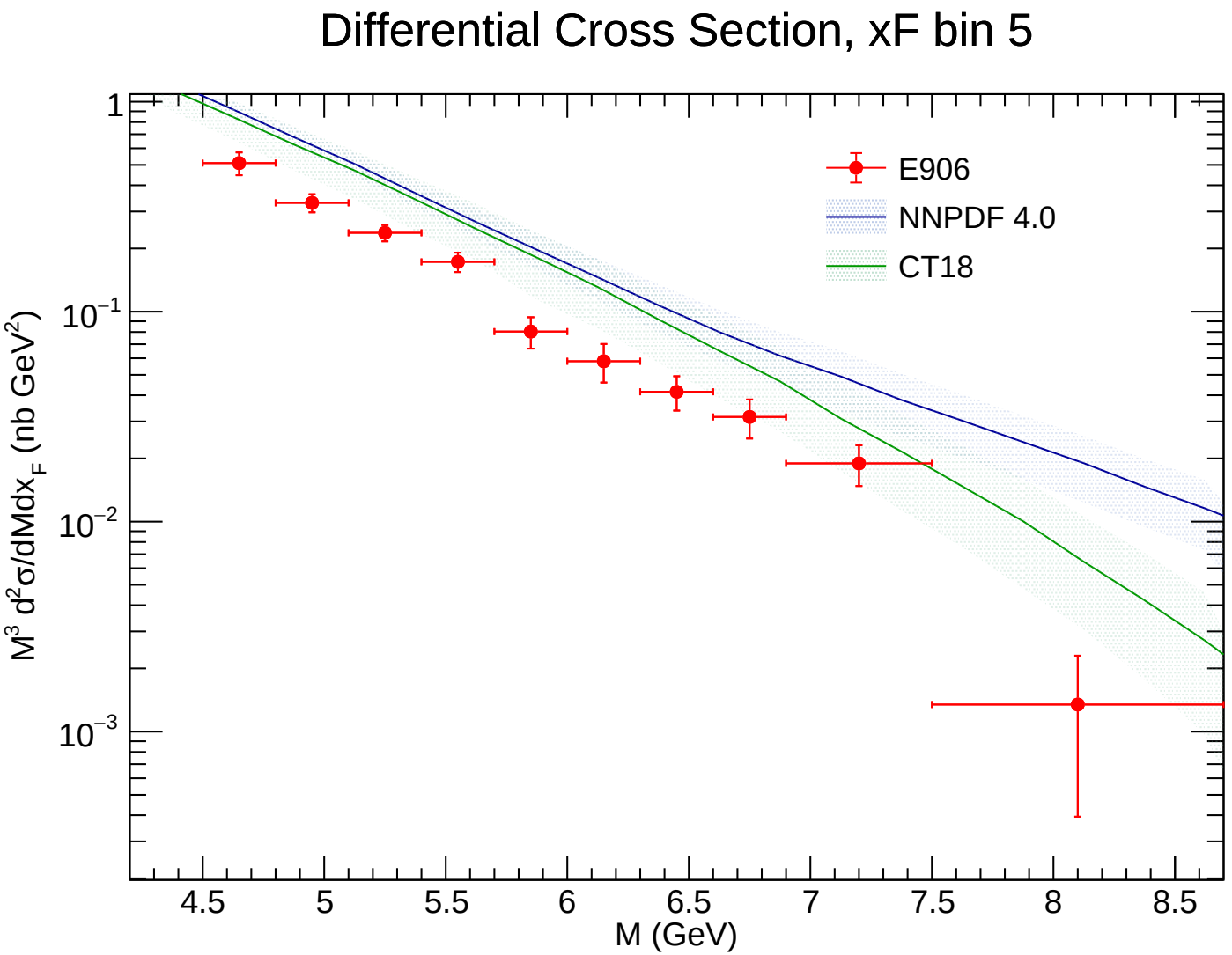


Double Differential Cross-Section: $0.15 \leq x_F < 0.2$

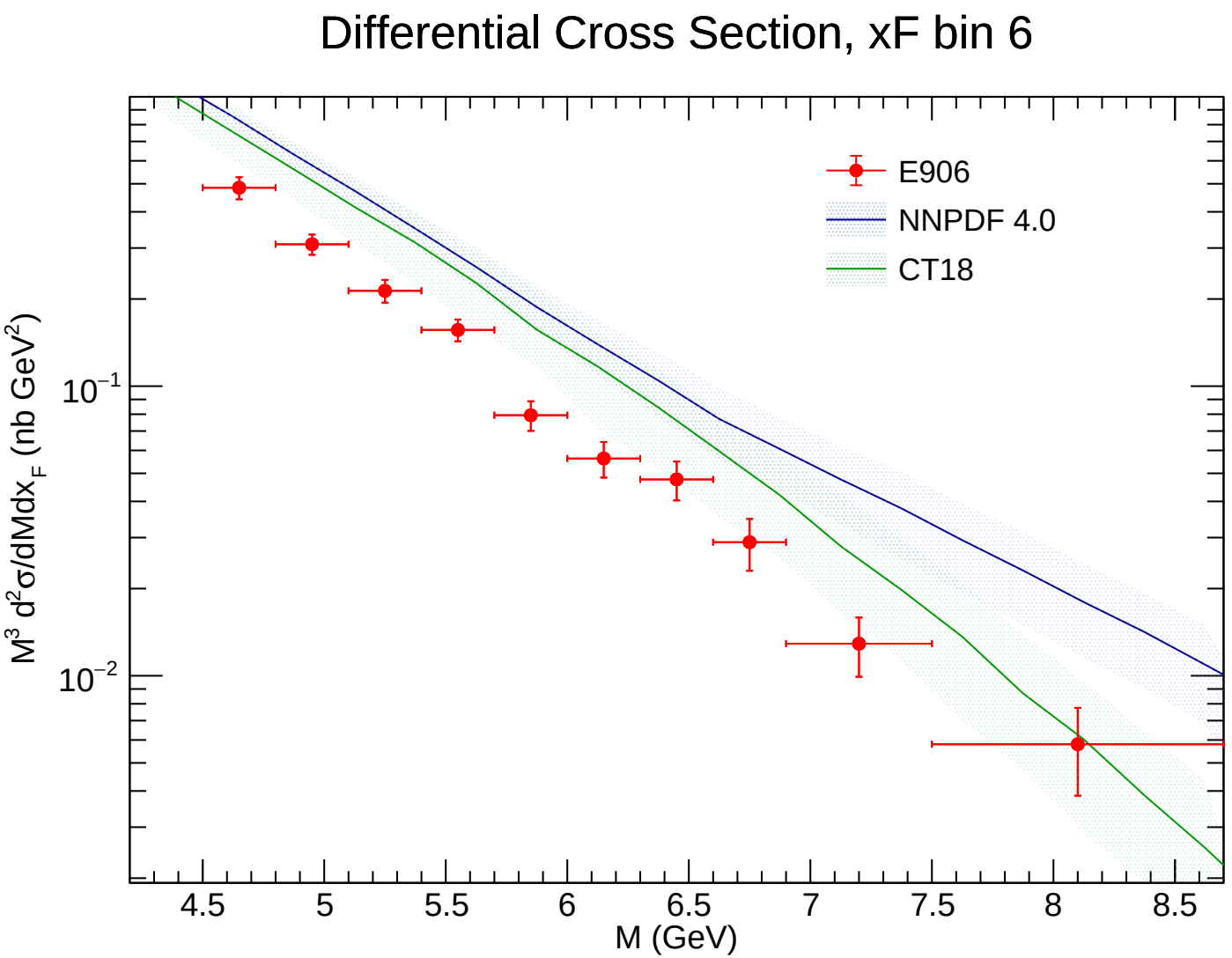


Double Differential Cross-Section: $0.2 \leq x_F < 0.25$

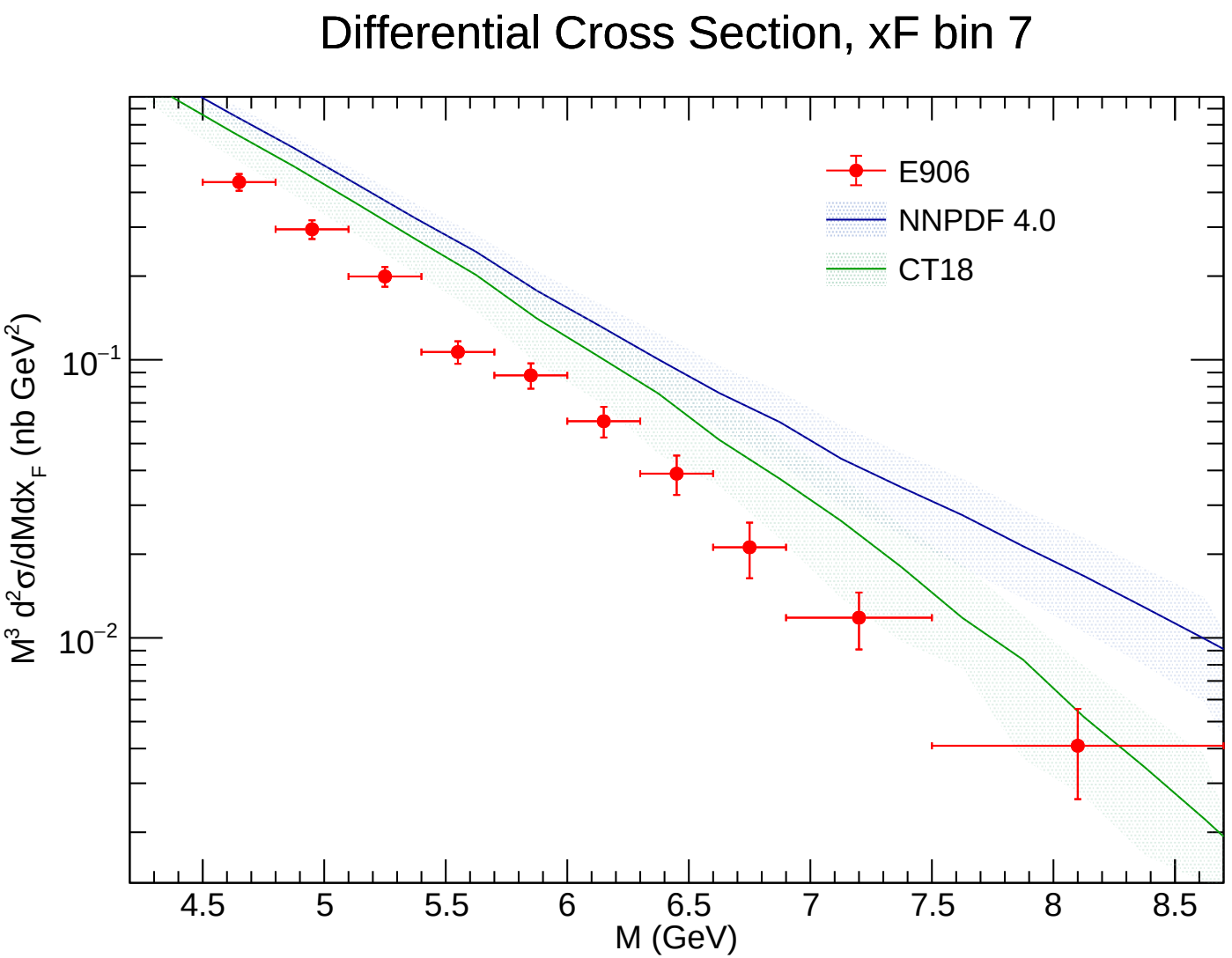



Differential Cross Section, xF bin 5
E906
NNPDF 4.0
CT18
$M^3\, d^2\sigma/dMdx_F$ (nb GeV^2)
M (GeV)
1
10^{-1}
10^{-2}
10^{-3}
4.5
5
5.5
6
6.5
7
7.5
8
8.5

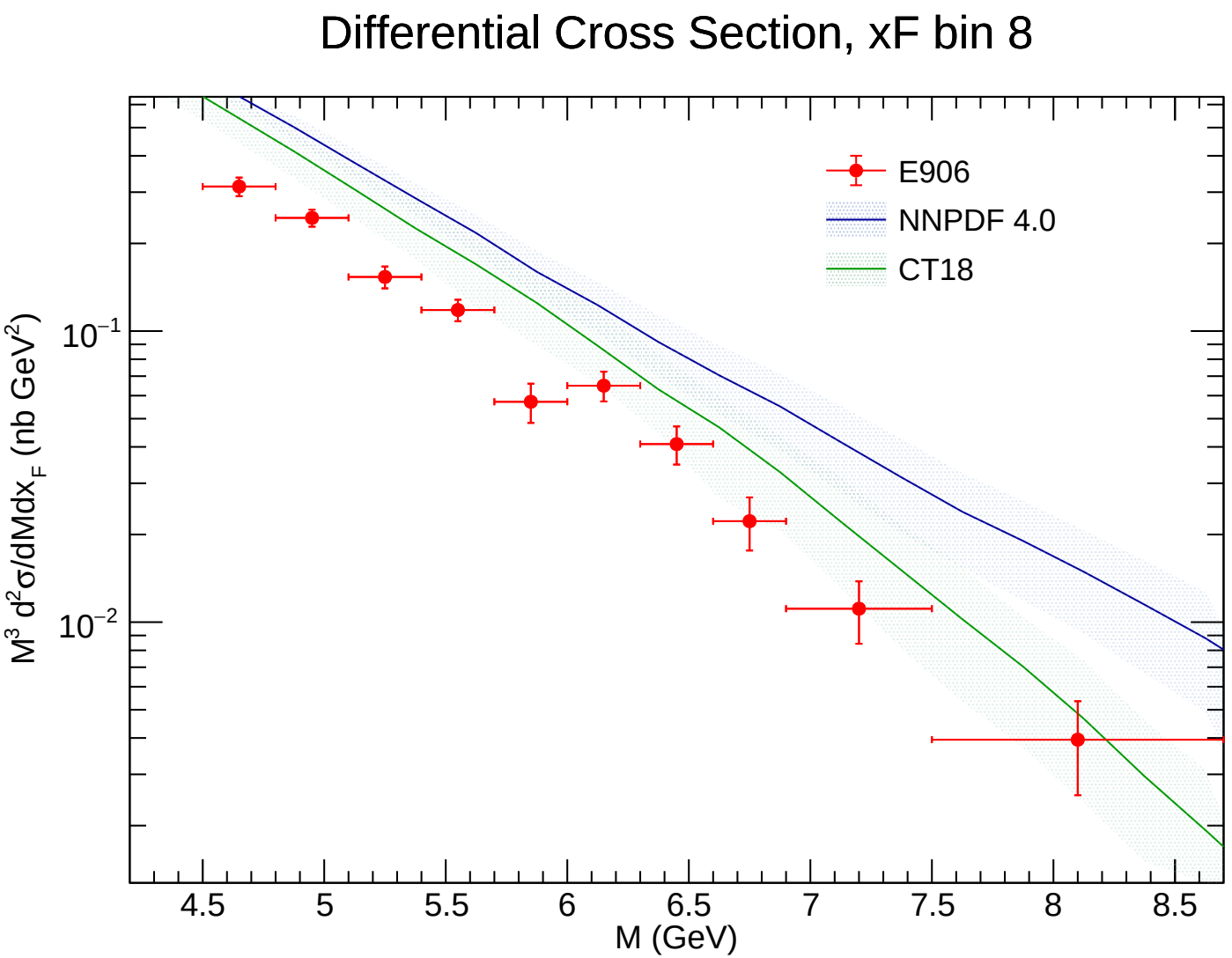
Double Differential Cross-Section: $0.3 \leq x_F < 0.35$



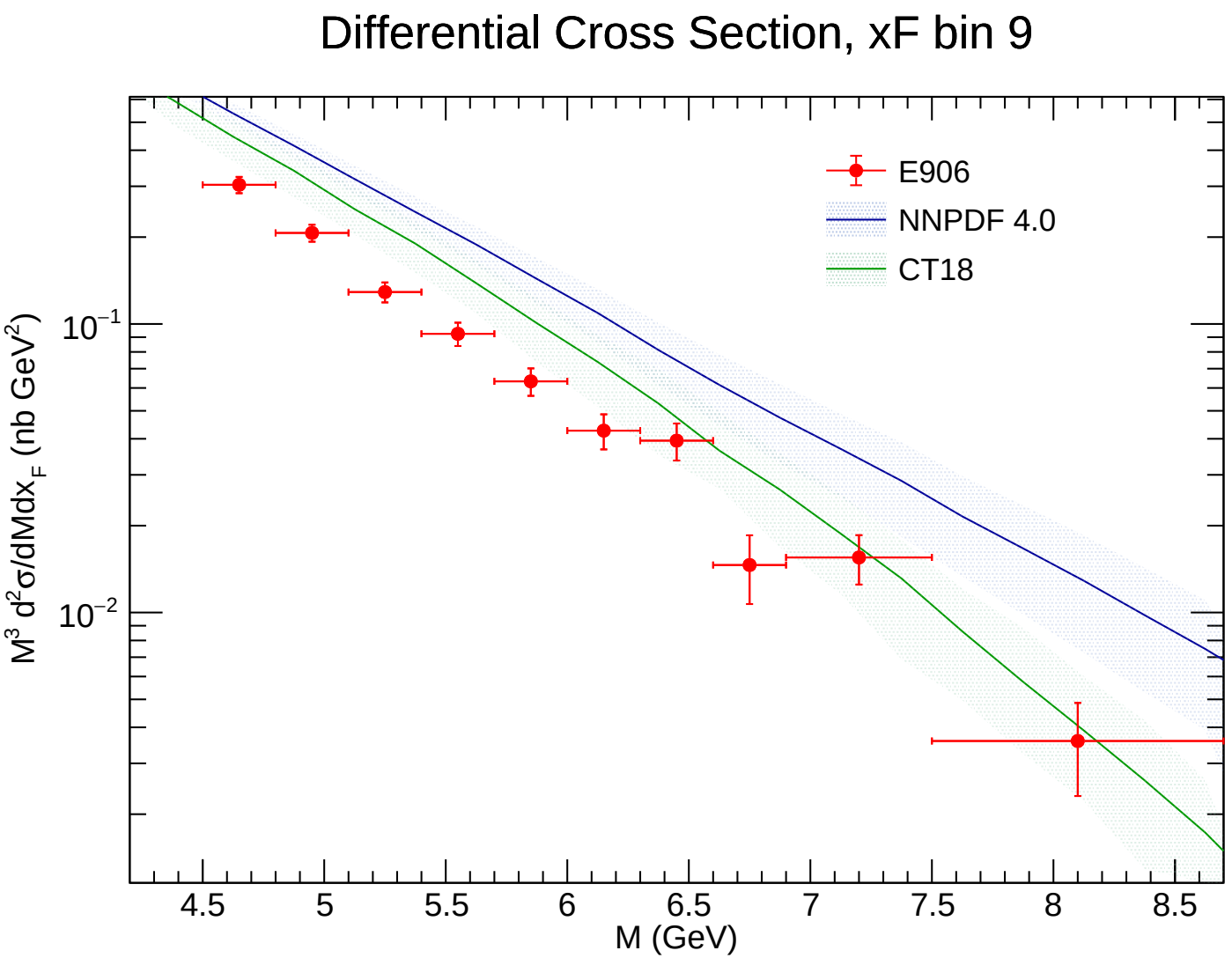
Double Differential Cross-Section: $0.35 \leq x_F < 0.4$



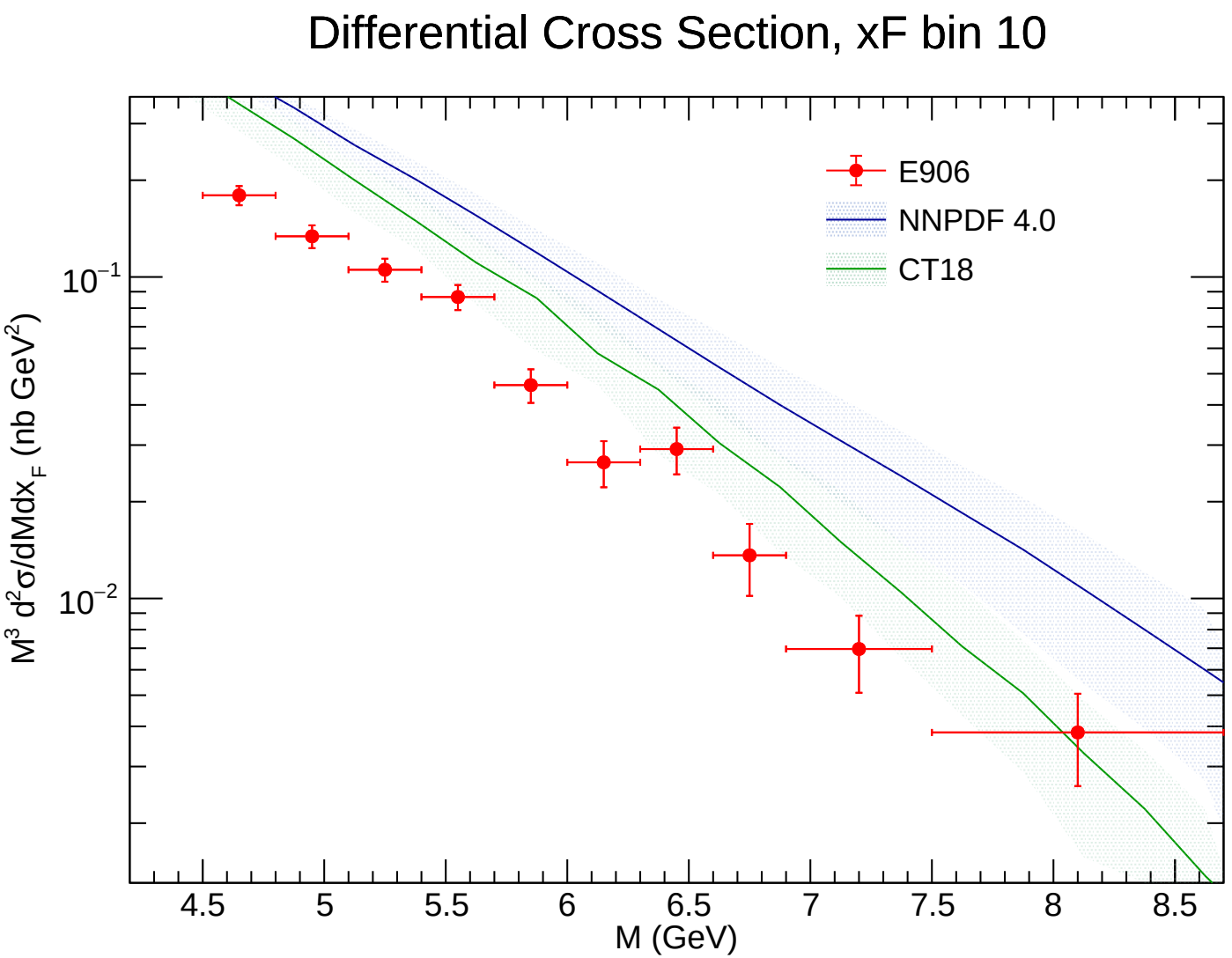
Double Differential Cross-Section: $0.4 \leq x_F < 0.45$



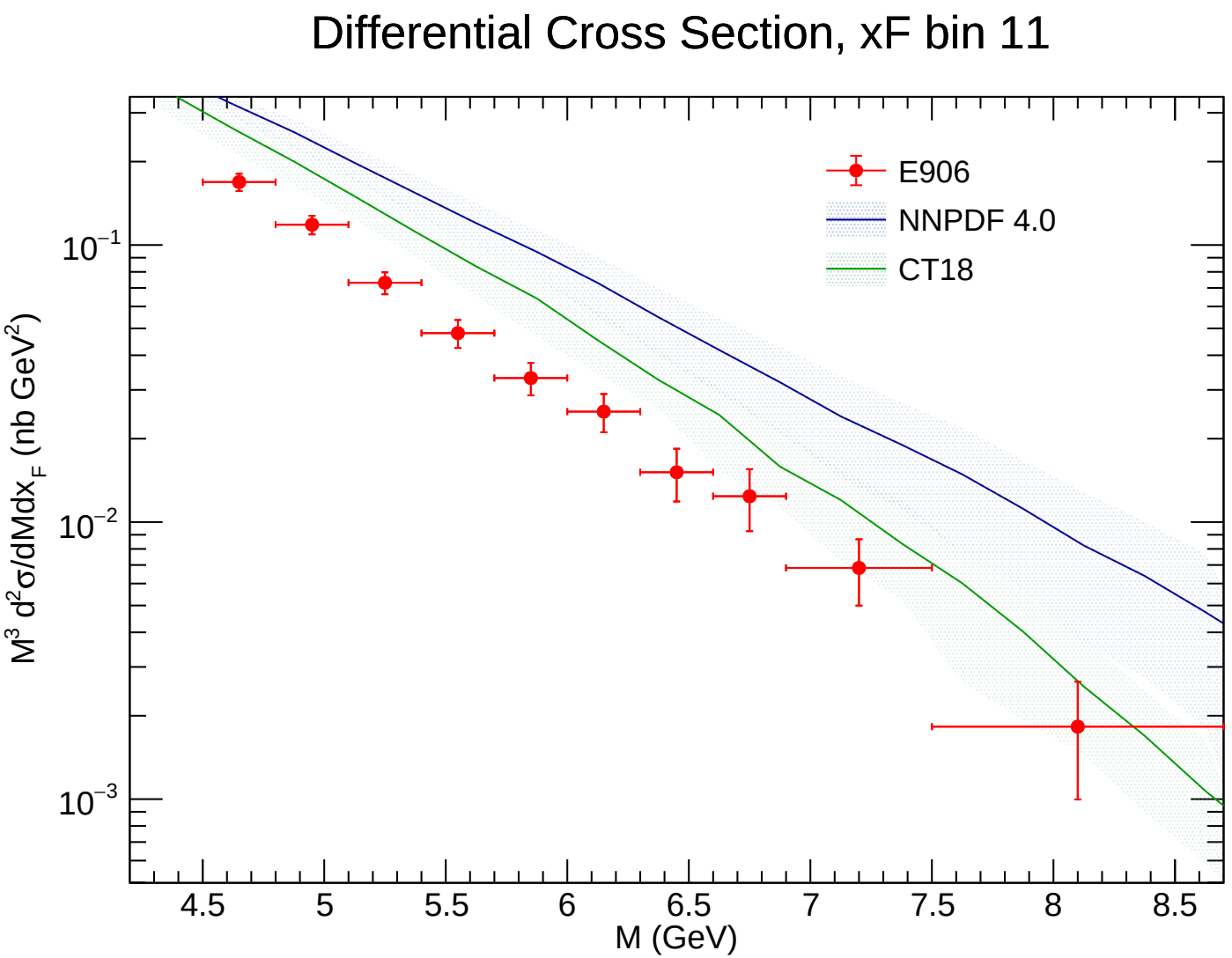
Double Differential Cross-Section: $0.45 \leq x_F < 0.5$



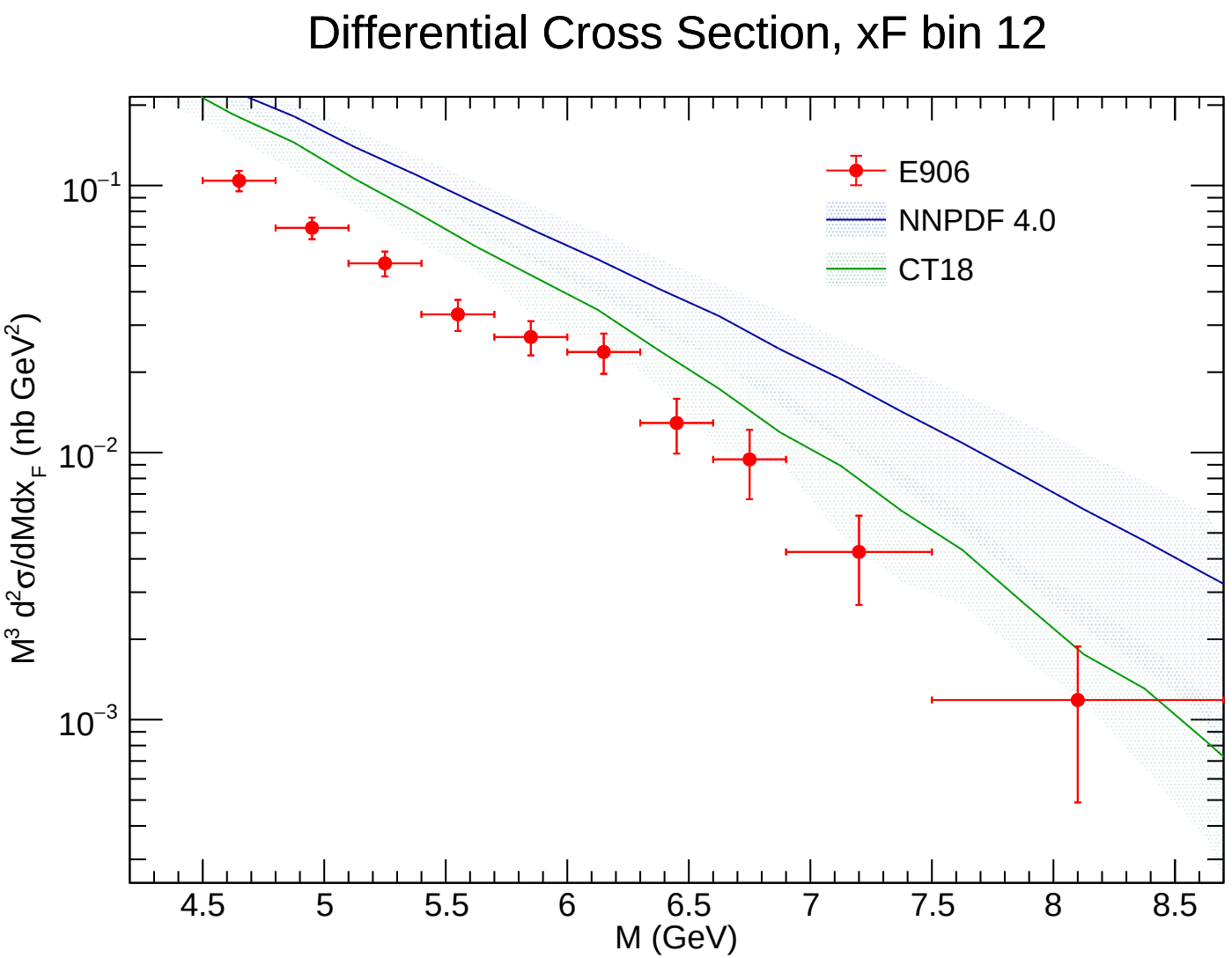
Double Differential Cross-Section: $0.5 \leq x_F < 0.55$



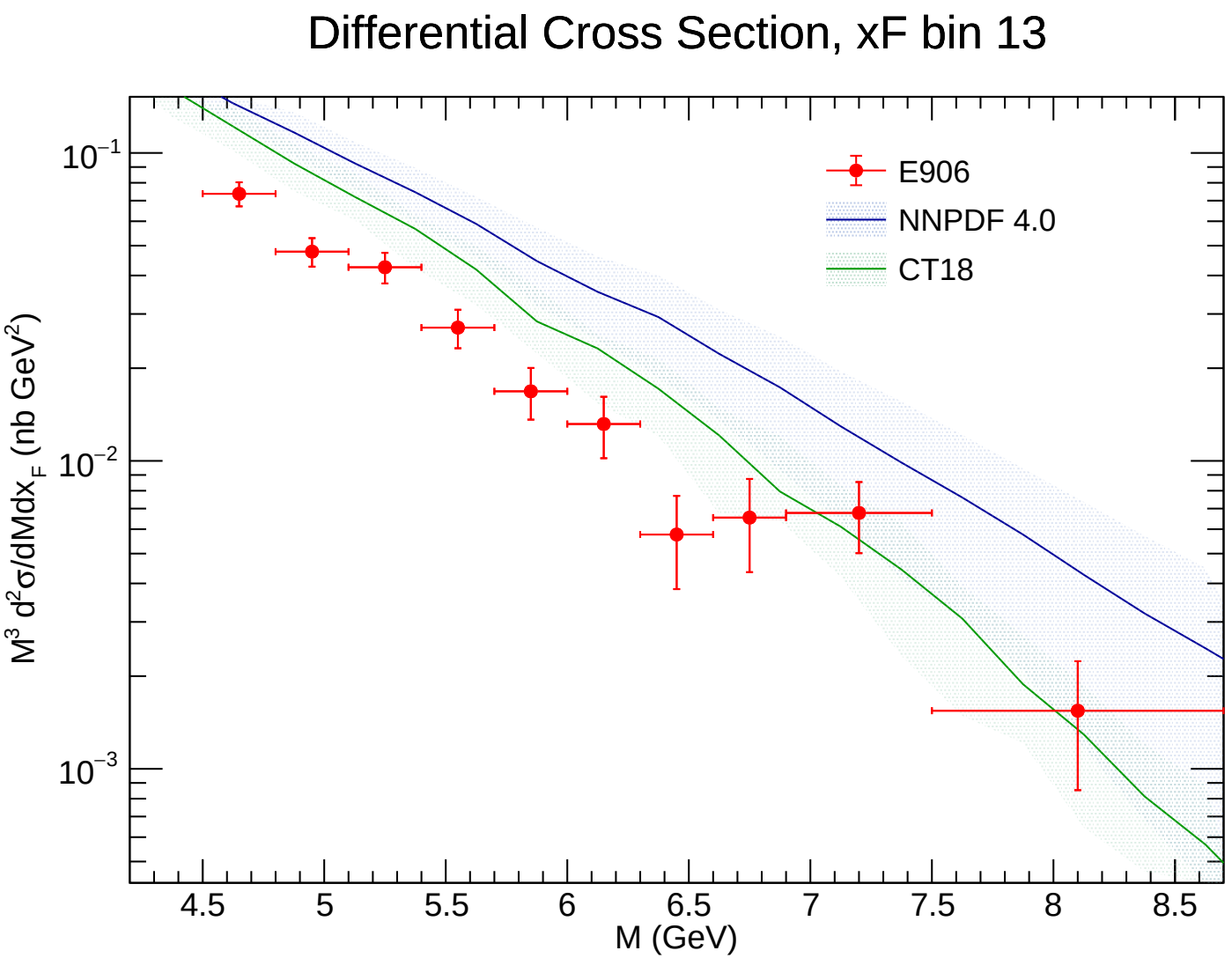
Double Differential Cross-Section: $0.55 \leq x_F < 0.6$



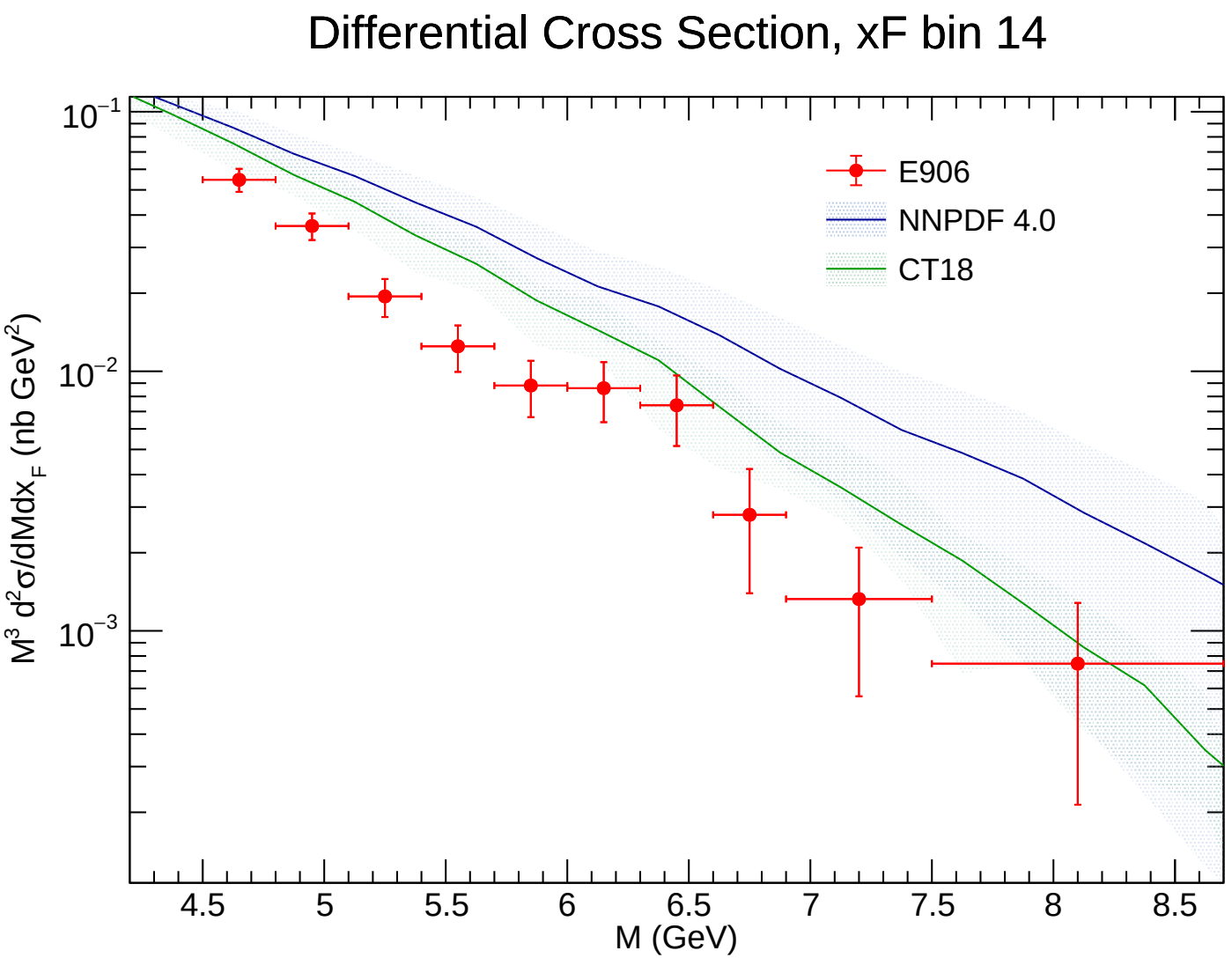
Double Differential Cross-Section: $0.6 \leq x_F < 0.65$



Double Differential Cross-Section: $0.65 \leq x_F < 0.7$



Double Differential Cross-Section: $0.7 \leq x_F < 0.75$



Double Differential Cross-Section: $0.75 \leq x_F < 0.8$