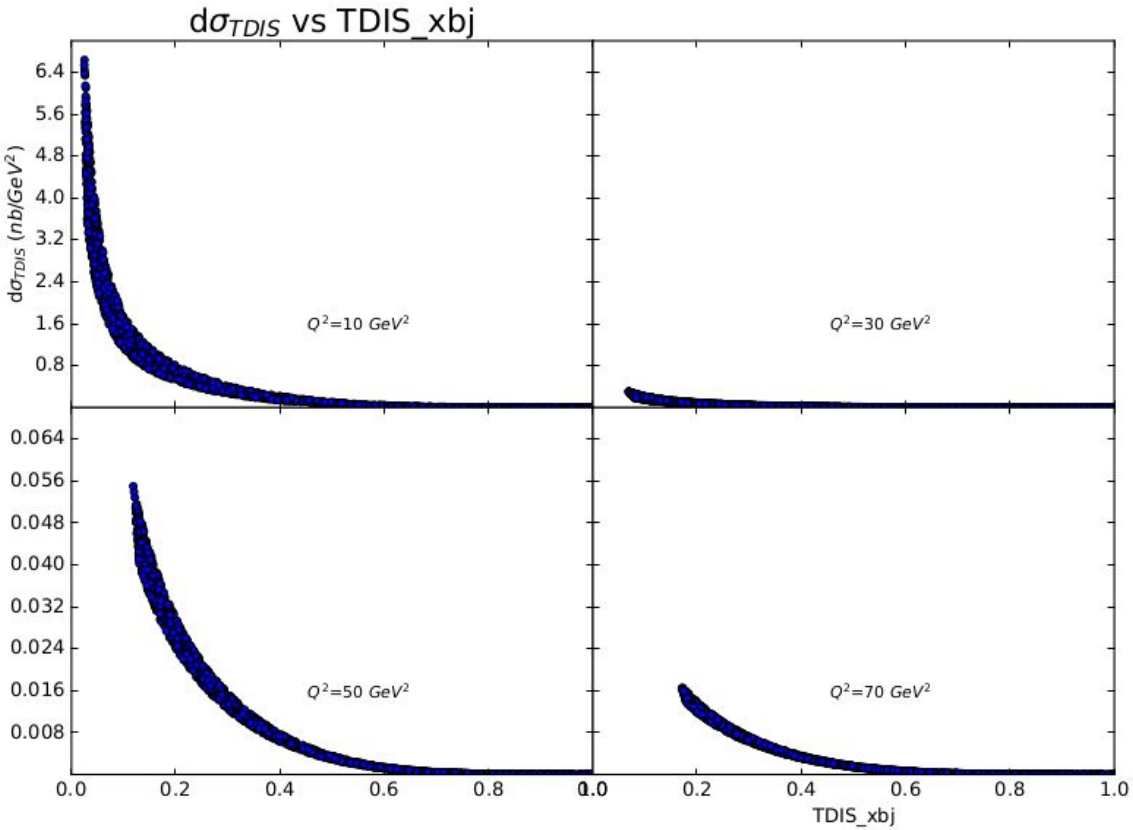
EIC Structure Function

Plot Overview

Richard Trotta

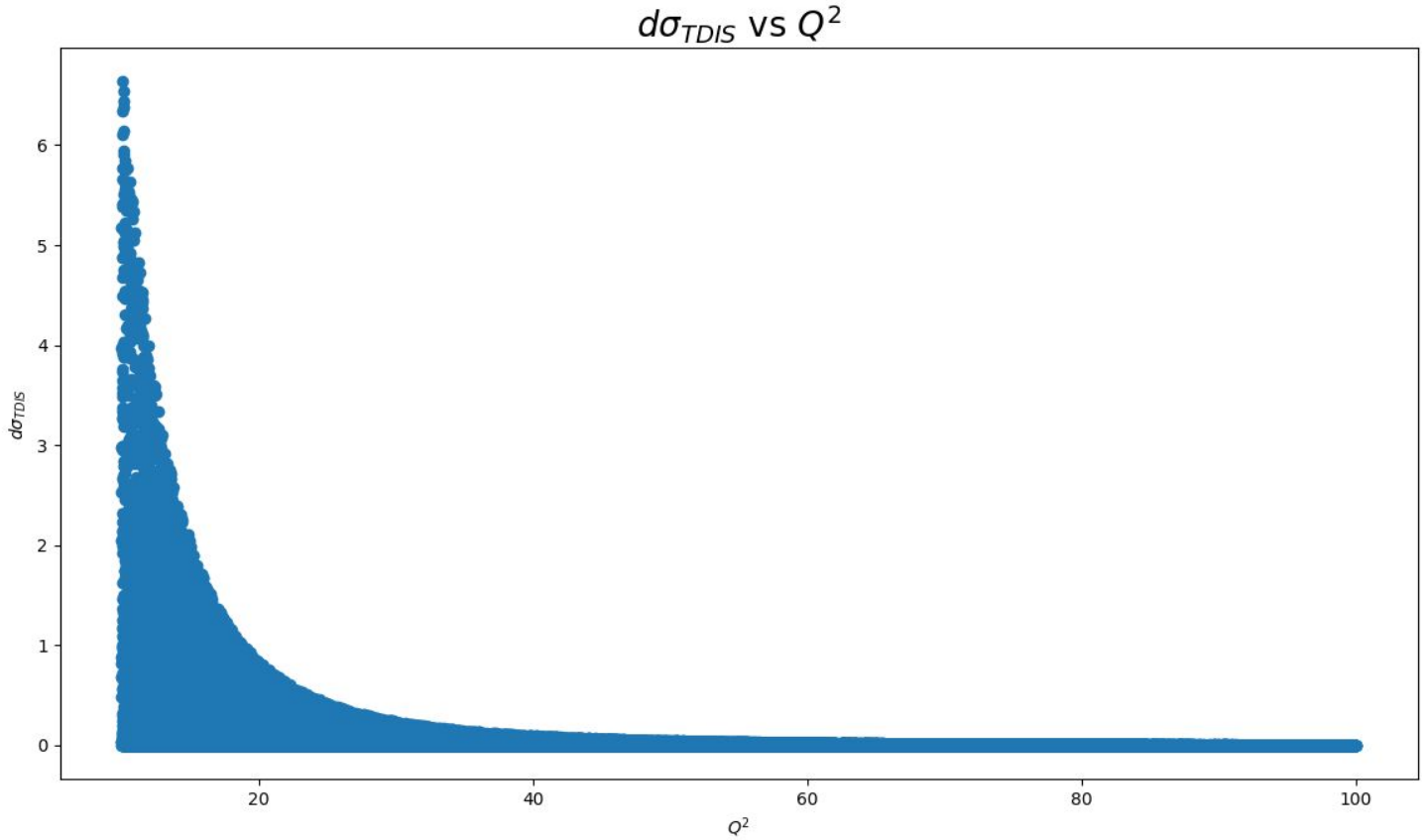
TDIS Cross Section vs xBj

- The TDIS cross section has the expected behavior once f2π was corrected with proper f2p.
- Versus xBj



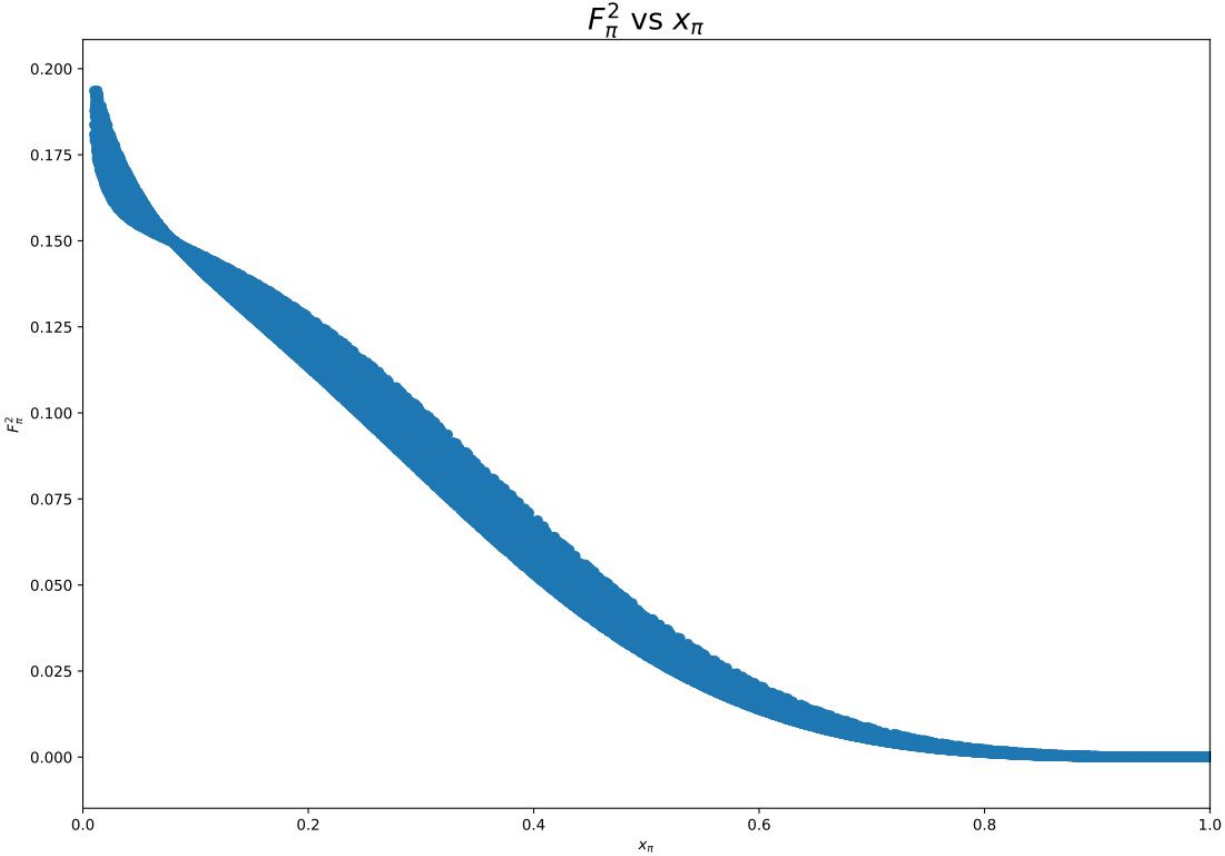
TDIS Cross Section vs Q^2 (no cuts)

- The TDIS cross section has the expected behavior once f2π was corrected with proper f2p.
- Versus Q^2



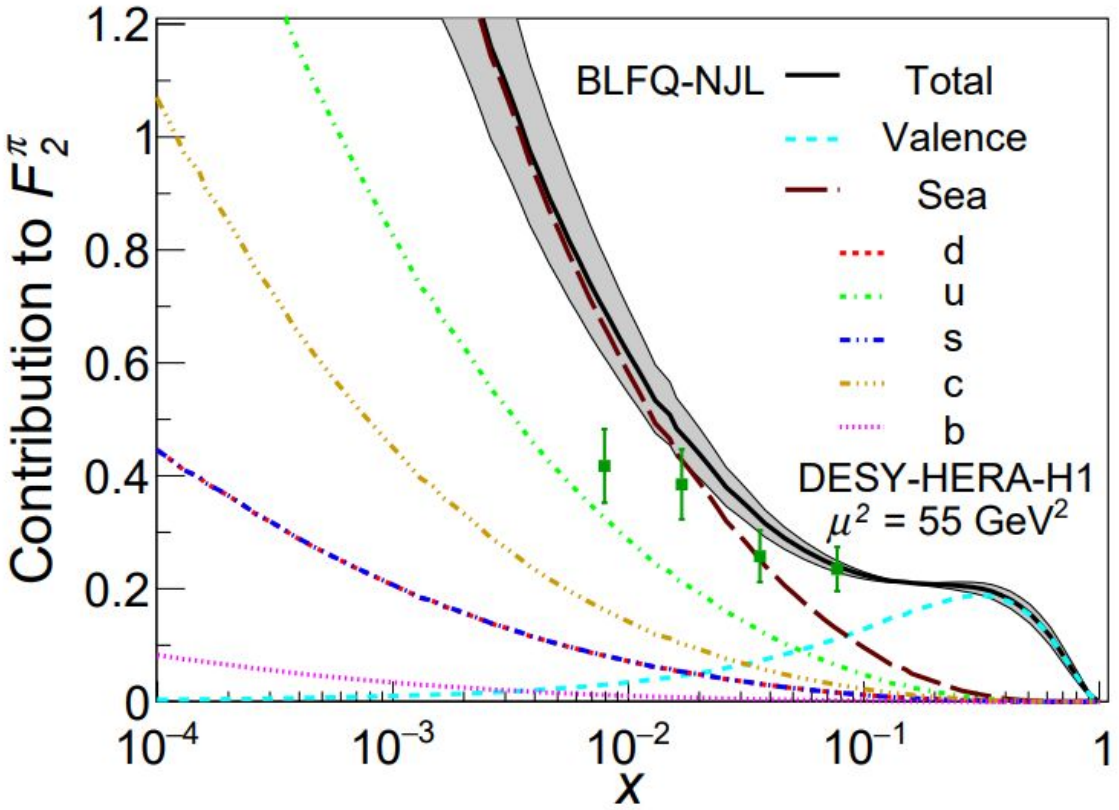
F2π vs x_{π} (no cuts)

- F2π with an input of x_{π}
- According to *J. Lan et. al., arXiv preprint (2019) arXiv:1907.01509*
  - Results of BLFQ-NJL deviates from the data at low x
  - As x increases the agreement with the data gets better
- It is difficult to see this agreement in a linear scale



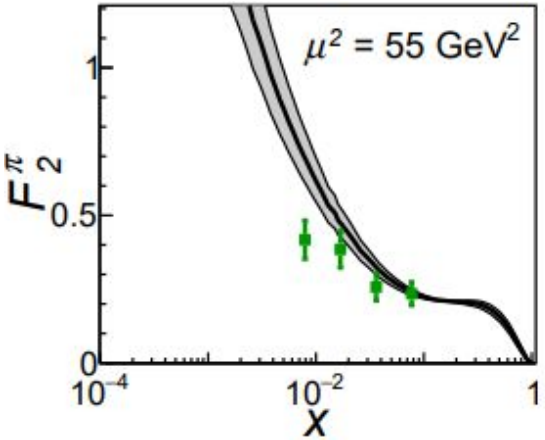
$F2\pi$ at low x_π vs high x_π

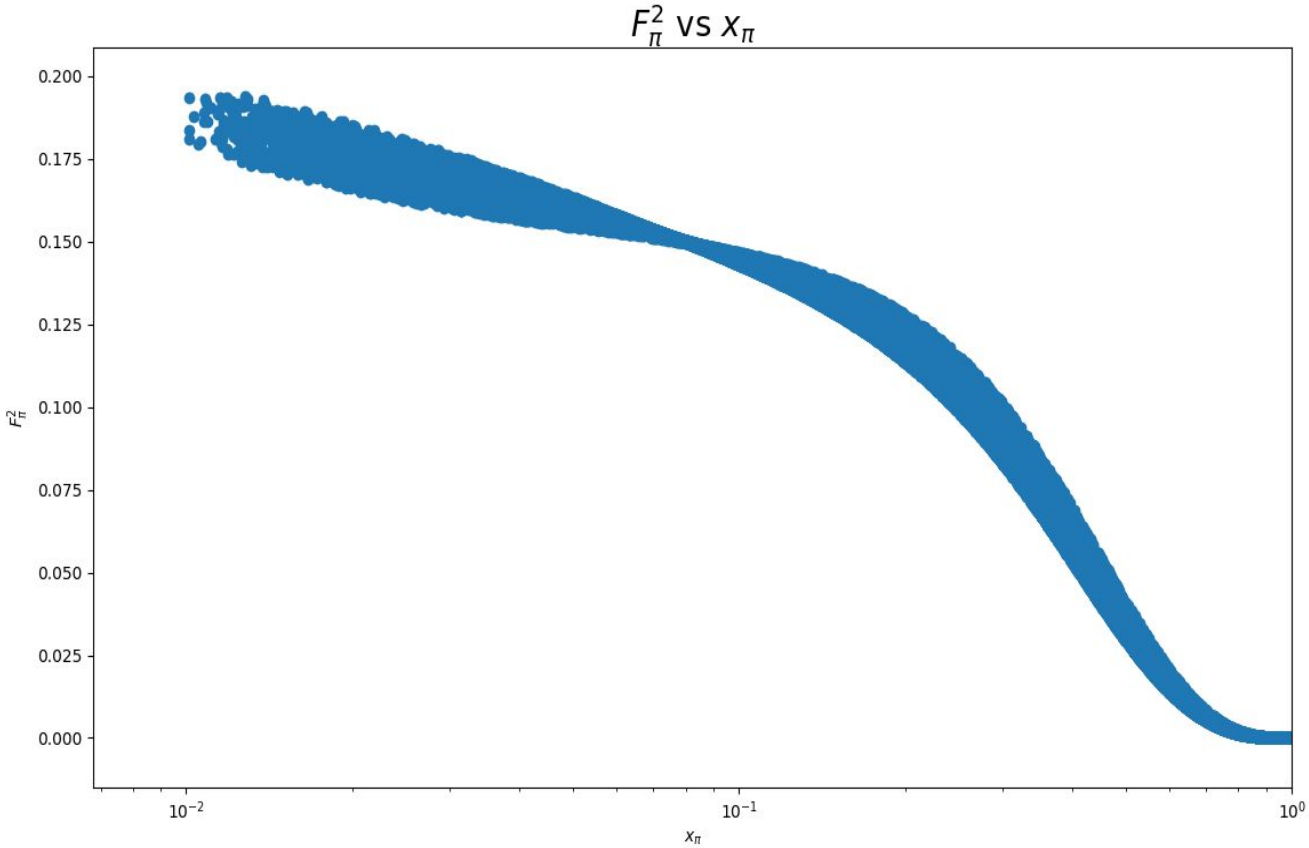
- Deviation from the data at low x due to
  - Dominated by sea quark contributions
- As x increases the valence quarks contribute more as the gluon contribution vanishes



F2π vs x_{π} (no cuts)

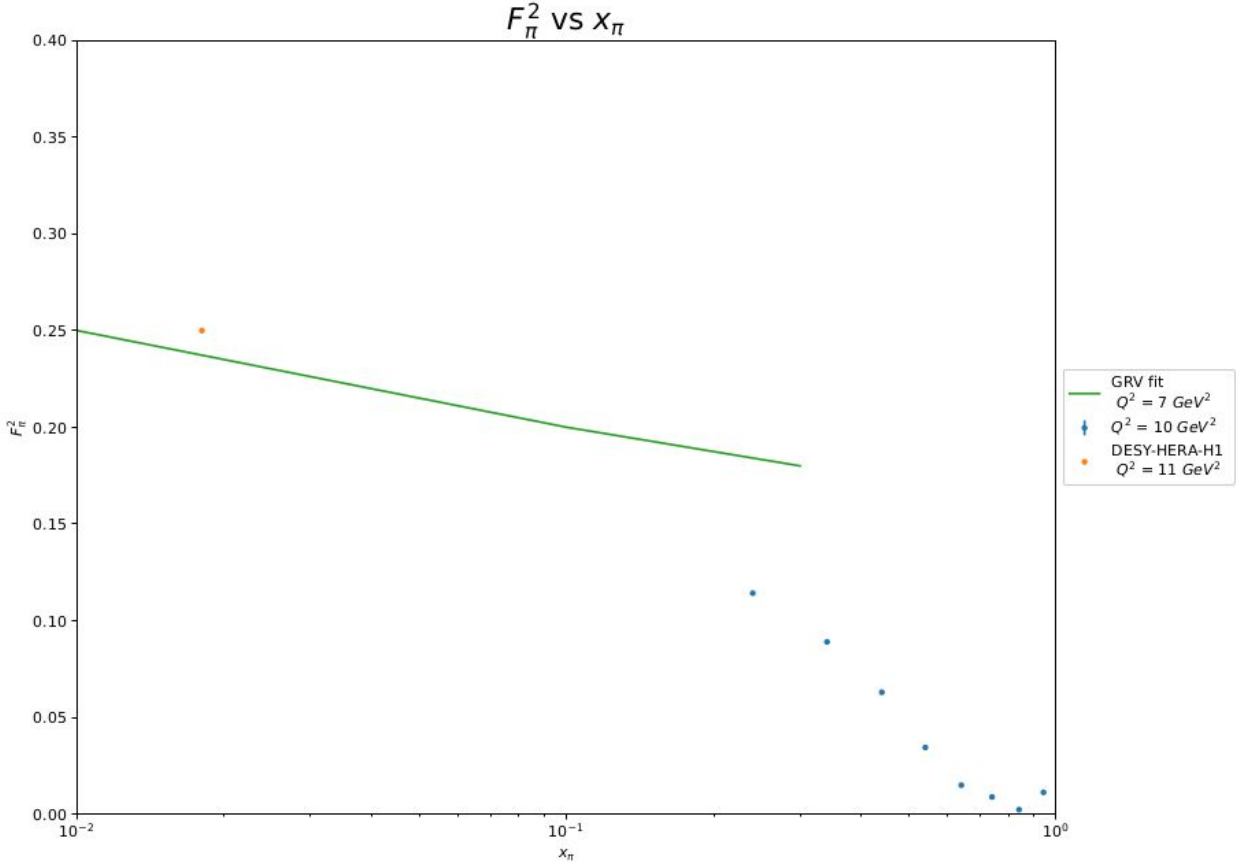
- F2π with an input of x_{π}
- If we now log the x axis we can see a similar trend



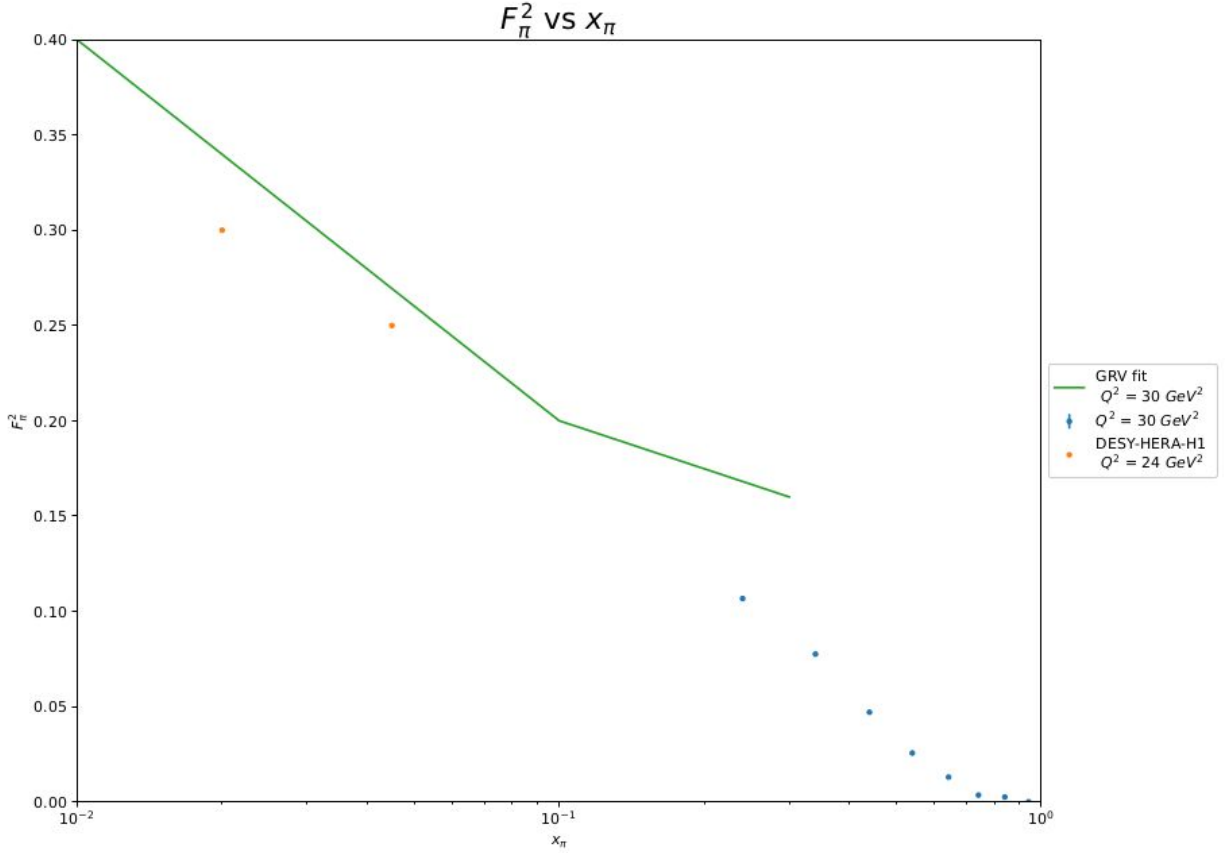


F2π with GRV fit/DESY-HERA-H1 data [Q^2= 10(7/11) GeV]

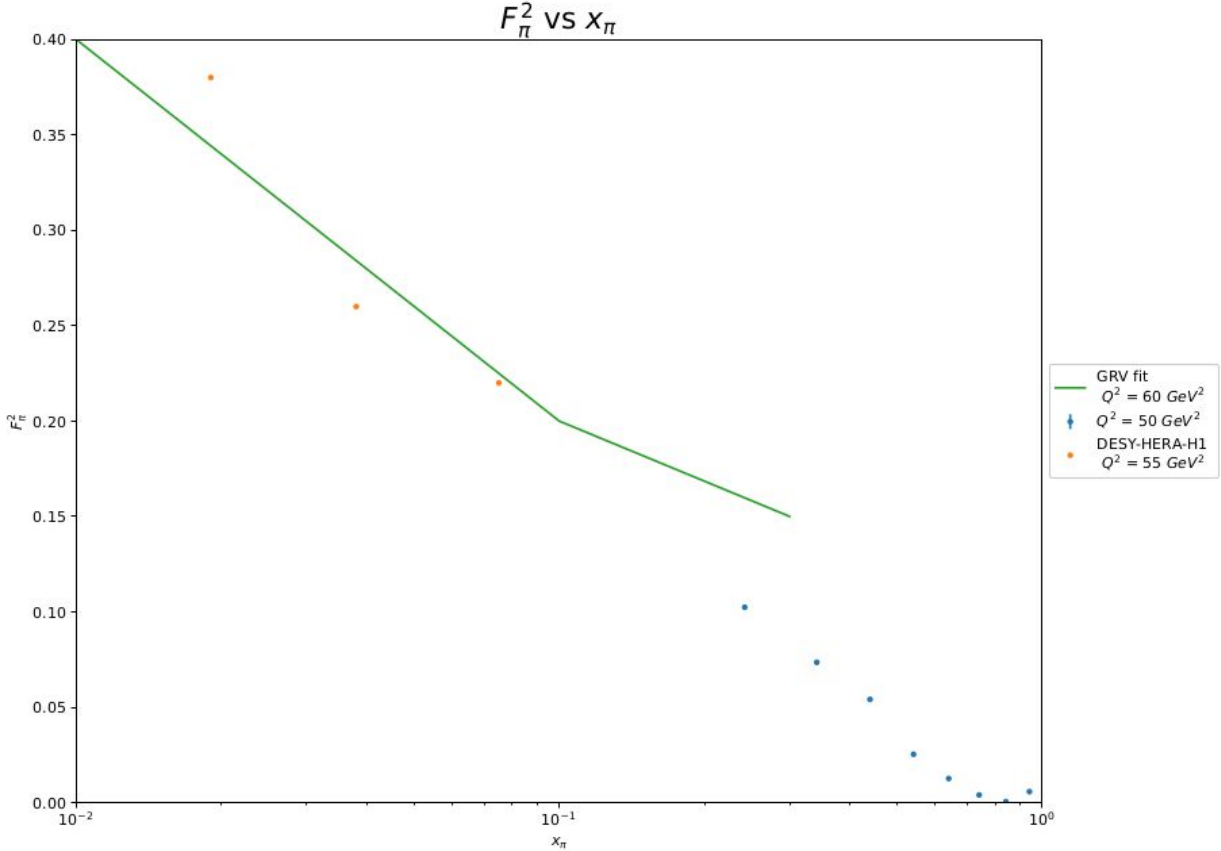
- DESY-HERA-H1 data and GRV fit (for three points) were eyeballed from plots
- There is a fair agreement between the data points, fit, and MC points



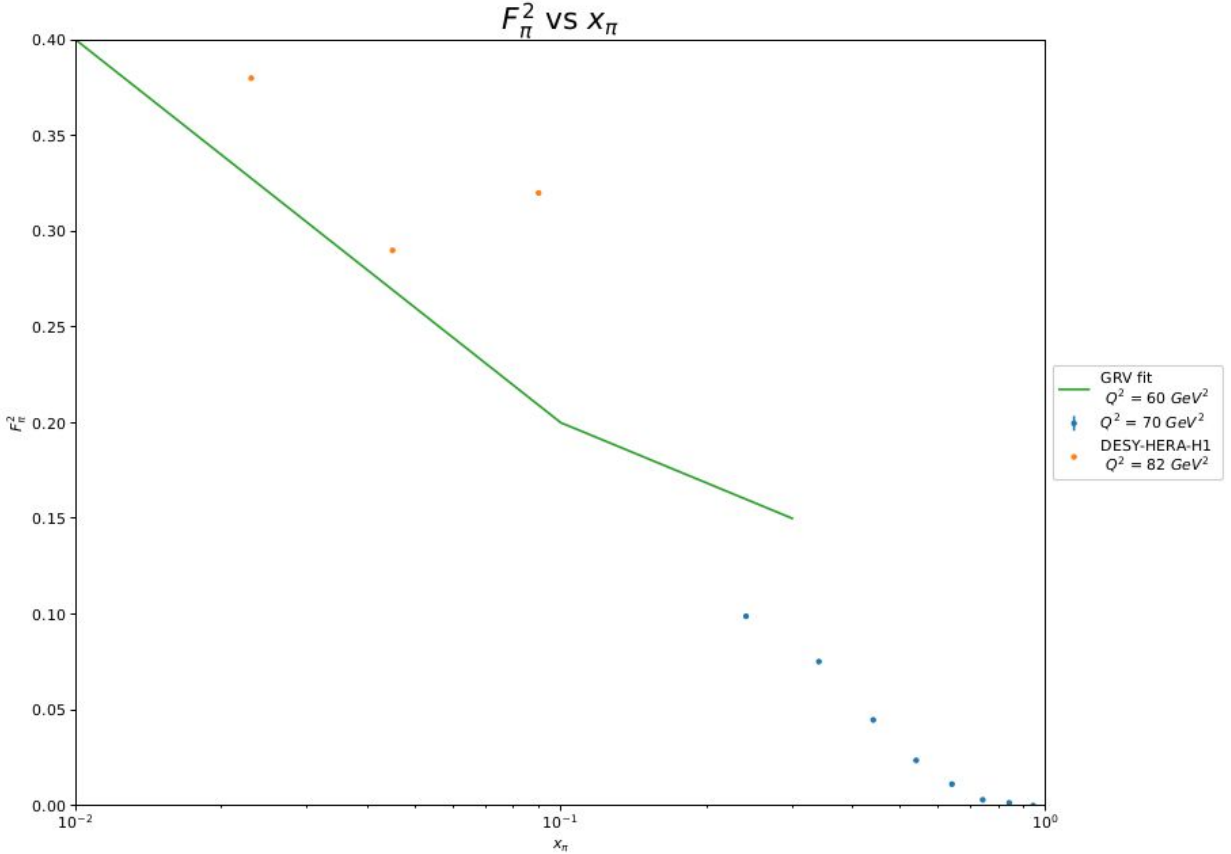
F2π with GRV fit/DESY-HERA-H1 data [Q^2= 30(30/24) GeV]



F2π with GRV fit/DESY-HERA-H1 data [Q^2= 50(60/55) GeV]

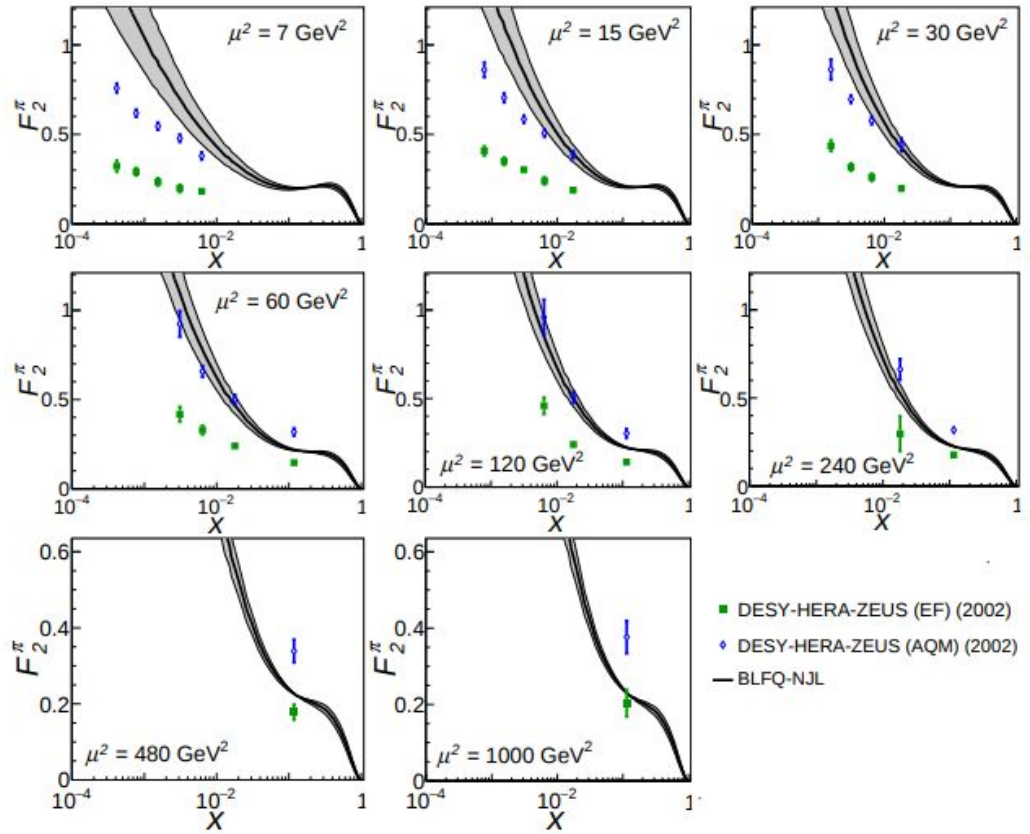


F2π with GRV fit/DESY-HERA-H1 data [Q^2= 70(60/82) GeV]



Q^2 dependence

- The Q^2 increasing does drop the f2π, but it is not expected to drop by much until at higher Q^2 settings
- The previous few slides show a small decrease in f2π but not by very much, which is expected



F2π estimates and uncertainties

- The calculated values for f2π, xpi, and the stat uncertainty are very similar especially at low x.
- The high x comparison falls off as my calculated stat uncertainties stay below 1%

Richard	**Q2=10 GeV2**	**no cuts**							
F2pi	nan	0.114	0.089	0.063	0.034	0.015	0.009	0.002	0.011
xpi	nan	0.25	0.35	0.45	0.55	0.65	0.75	0.85	0.95
stat uncern %	nan	0.45%	0.51%	0.54%	0.64%	0.69%	0.67%	0.71%	0.82%
Rik	**Q2=9 GeV2**	**no cuts**							
F2pi	0.152	0.140	0.110	0.088	0.060	0.039	0.020	0.008	nan
xpi	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	nan
stat uncern %	0.42%	0.45%	0.50%	0.55%	0.28%	0.80%	1.90%	3.00%	nan

Extra

F2π vs xBj

- A similar behavior is seen for xBj as the input