LHRS Analysis for d_2^n

Cross Sections Binned in W, ν and x

D. Flay

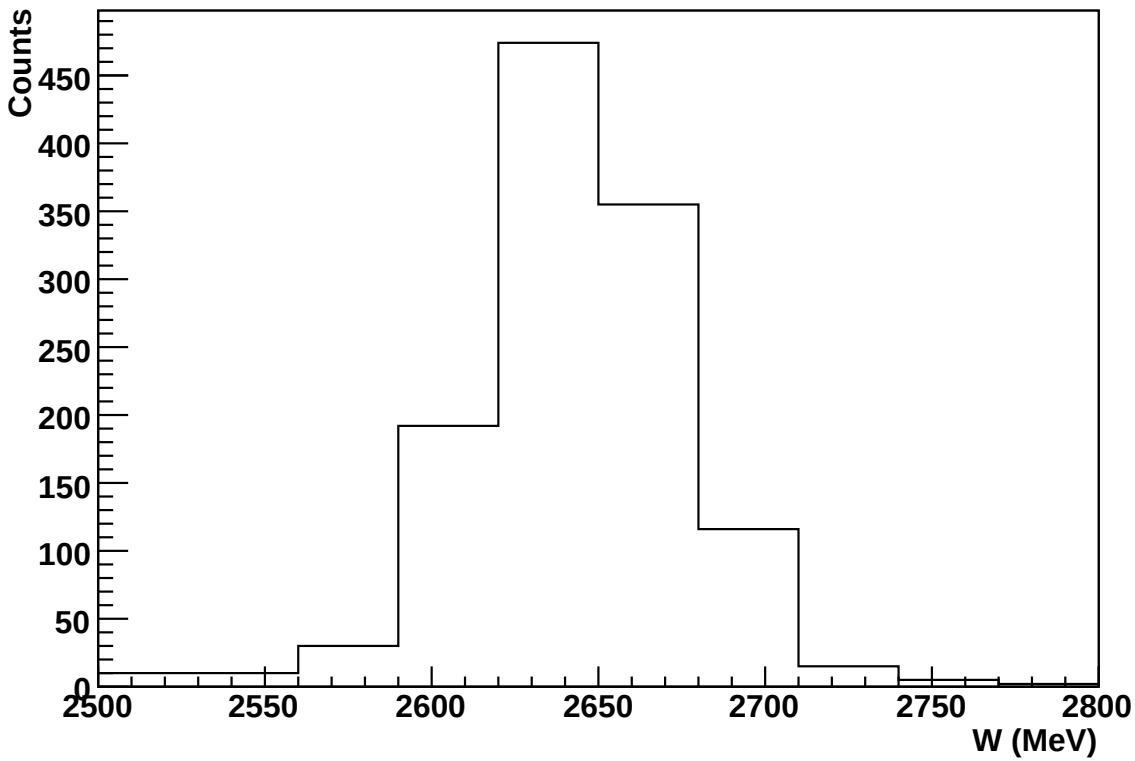
6/21/12

Outline

Rebinning of Cross Sections (1)

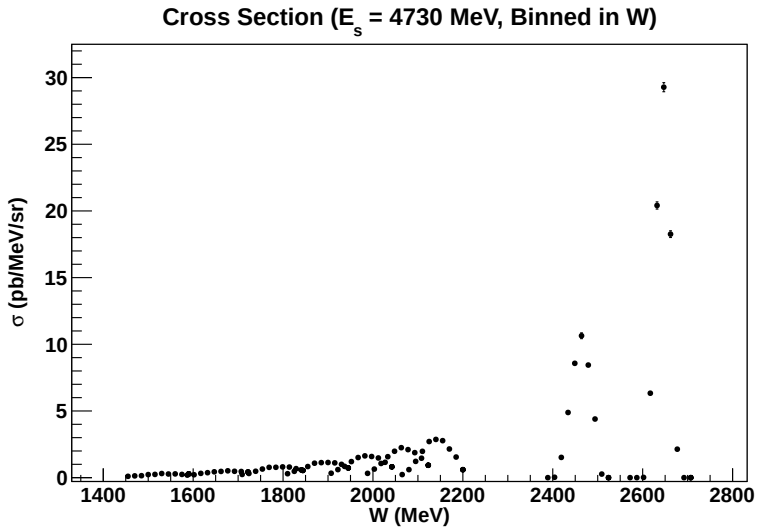
Method

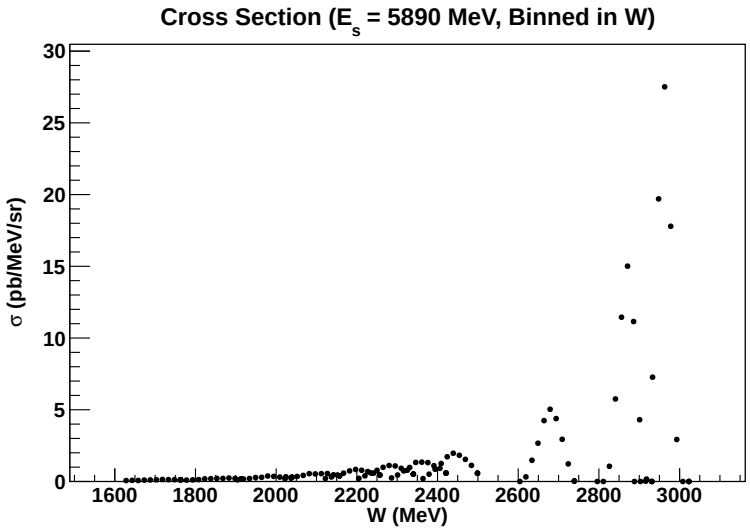
1. Apply all analysis cuts (PID, target, beam, etc.)
2. Plot the binning variable (W, ν, x, etc.)
3. For N_{cut}, count the number of events in each bin



Rebinning of Cross Sections (2)

Raw ^{3}He Cross Section Binned in W

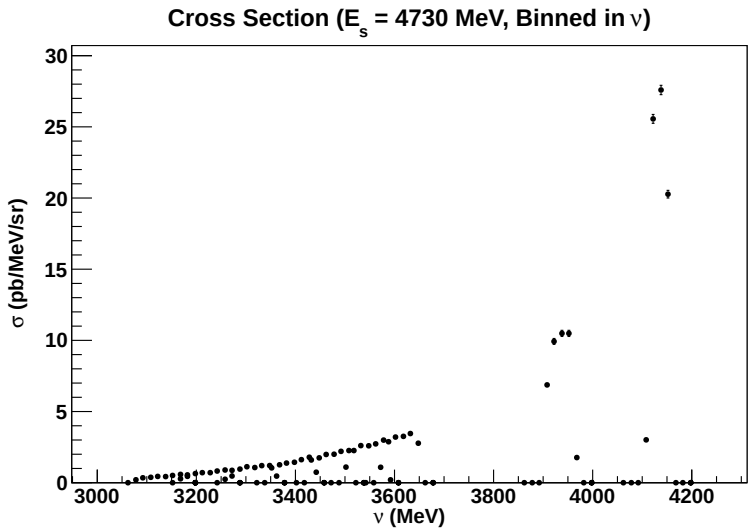


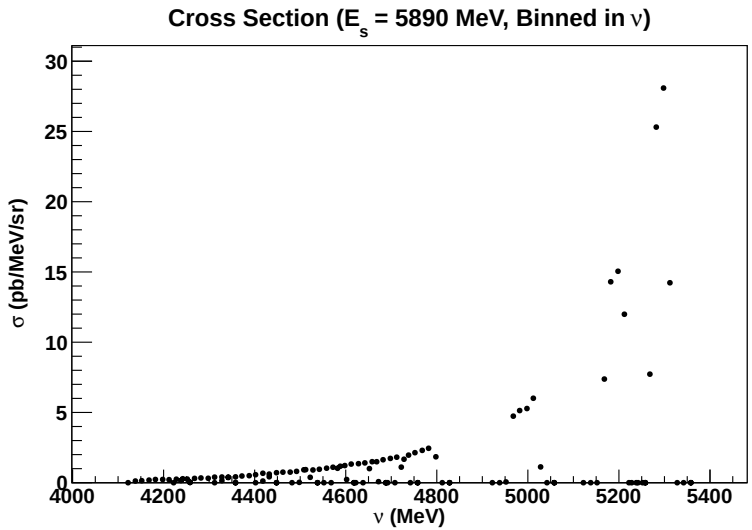


- These cross sections are: $\frac{d^2\sigma}{d\Omega dW}$
  - 10 bins per p_0
  - Jacobian not applied

Rebinning of Cross Sections (3)

Raw ^{3}He Cross Section Binned in ν

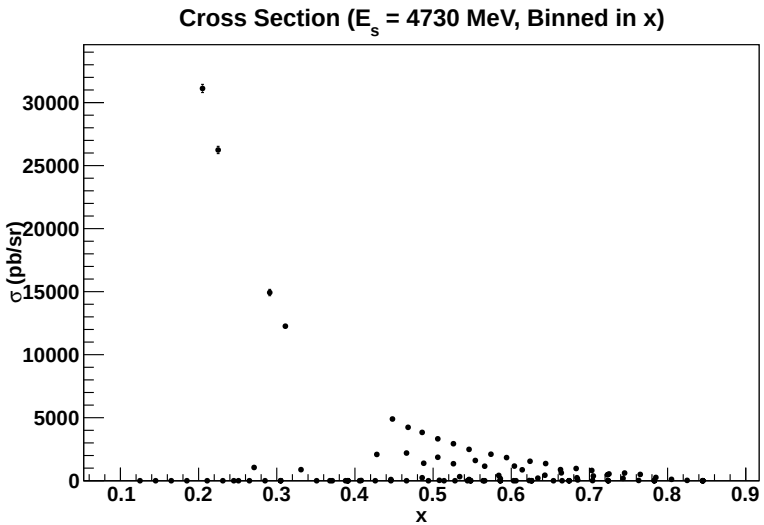


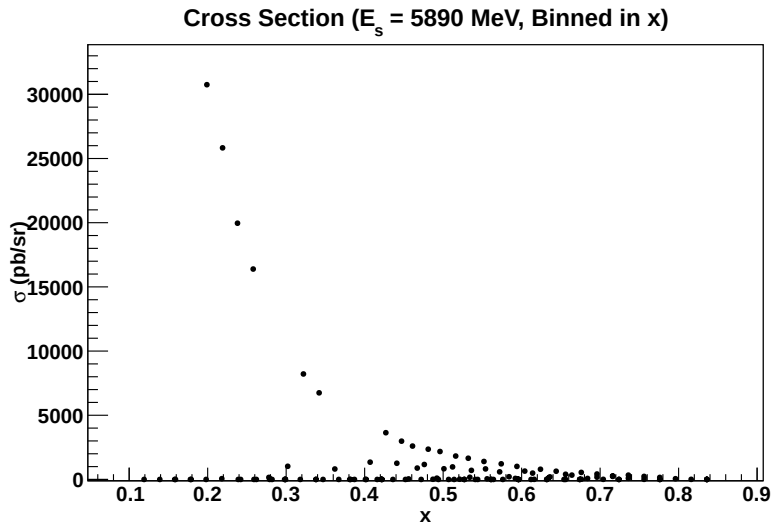


- These cross sections are: $\frac{d^2\sigma}{d\Omega d\nu}$
  - 10 bins per p_0
  - Jacobian = 1

Rebinning of Cross Sections (4)

Raw ^{3}He Cross Section Binned in x





- These cross sections are: $\frac{d^2\sigma}{d\Omega dx}$
  - 10 bins per p_0
  - Jacobian not applied

Rebinning of Cross Sections

Discussion

- There's a lot of 'binning effects' in the data
  - Some of the structure can be removed by decreasing the number of bins per p_0 setting
- How many bins should we use?
  - It seems best to vary this per p_0 setting (maybe don't re-bin higher p_0 and only do it for lower values)
- What is the 'right' way to do this 'finite acceptance correction'? Previous experiments (E94-010) have said it was a $\sim$2% effect
  - Clearly, the structure seen on the previous slides is larger than 2%

Summary

- Rebinning of cross sections allows for more data points, but with less statistical precision
  - Binning effects seen at low p_0

What's Next?

- Acceptance
  - Get fortran version of code running with F1F209
  - finalize and verify multiscattering effects
  - How to insert cross-section weighting into acceptance weight (and should we?)
- Finite acceptance
  - Determine proper method
  - How many bins to use?
- $\pi^{+,-}$ cross sections compared to Wiser code
  - Are there protons or other garbage contaminating the π^{+} data?
  - Using our cross sections may be better for the Geant4 simulation of BigBite (?)