

LHRS Analysis for d_2^n

Cross Section Corrections

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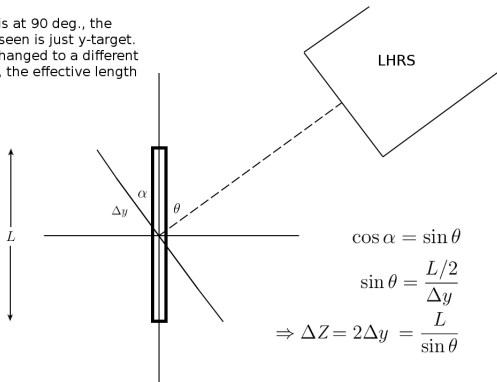
Outline

- 1 Cross Sections
 - Correction to the Formula
 - Effect on the Cross Sections and Comparisons
- 2 Summary

Correction to the Formula (1)

' ΔZ ' Term: The **Effective Target Length** Viewed by the LHRS

When the LHRS is at 90 deg., the effective length seen is just y-target. As the LHRS is changed to a different scattering angle, the effective length becomes **longer**.



$$\cos \alpha = \sin \theta$$

$$\sin \theta = \frac{L/2}{\Delta y}$$

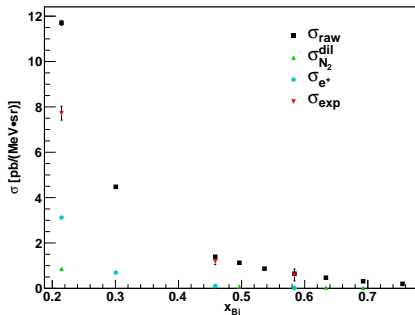
$$\Rightarrow \Delta Z = 2\Delta y = \frac{L}{\sin \theta}$$

- $L = y_{tg} = 9 \text{ cm}$ (full width in the cut)
 $\Rightarrow \Delta Z = (9 \text{ cm}) / \sin 45 = 12.73 \text{ cm}$

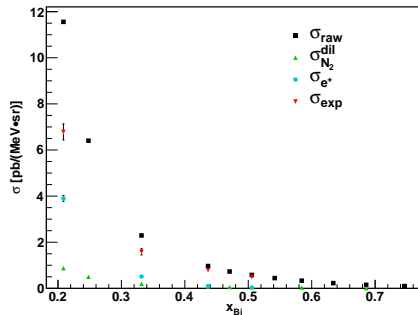
Effect on the Cross Sections (1)

Before Applying the Correction

^3He Cross Section ($E = 4.73 \text{ GeV}, \theta = 45^\circ$)



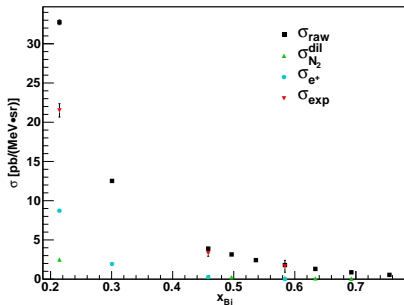
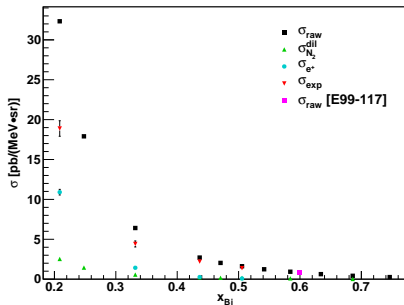
^3He Cross Section ($E = 5.89 \text{ GeV}, \theta = 45^\circ$)



- Applying the correction will effectively scale up the cross section (for all data sets) by a factor of ~ 3

Effect on the Cross Sections (2)

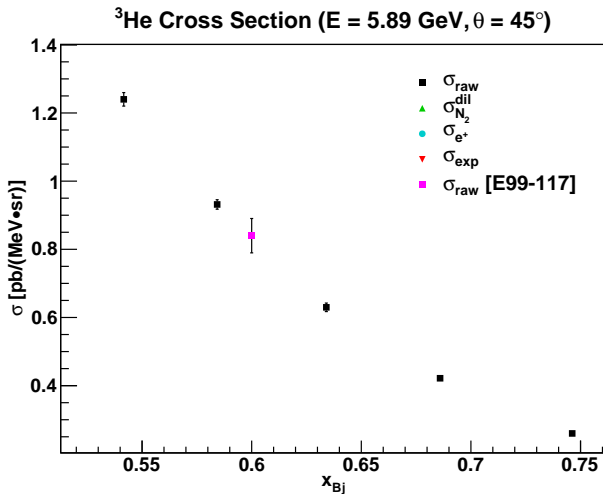
After Applying the Correction

³He Cross Section (E = 4.73 GeV, $\theta = 45^\circ$)³He Cross Section (E = 5.89 GeV, $\theta = 45^\circ$)

- Magenta point: from Xiao Chao's thesis
 - $x = 0.60, \theta = 45^\circ, E = 5.7 \text{ GeV}, Q^2 = 4.83 \text{ GeV}^2$
- Our kinematics (in that region):
 - $x = 0.58, \theta = 45^\circ, E = 5.89 \text{ GeV}, Q^2 = 4.89 \text{ GeV}^2$
 - $x = 0.63, \theta = 45^\circ, E = 5.89 \text{ GeV}, Q^2 = 5.21 \text{ GeV}^2$

Effect on the Cross Sections (3)

A Closer Look at the Comparison to Xiao Chao



Summary

- Cross Section:
 - ΔZ term has been corrected
 - Xiao Chao's cross section at 5-pass fits in well with the trend our data shows

What's Next?

- Acceptance:
 - Determine momentum dependence
- Cross Section:
 - Radiative Corrections