

LHRS Analysis for d_2^n

Acceptance and SAMC Update Using Carbon Foils, Cross Sections and Positive Polarity Data

D. Flay

8/30/12

Outline

1 Acceptance

Comparing ^3He (Long) and ^{12}C (Foil) Targets

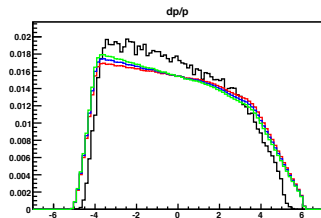
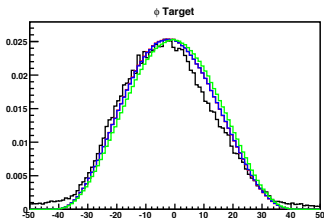
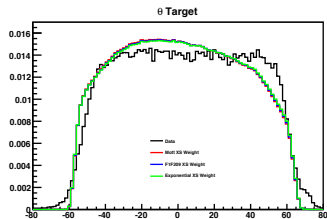
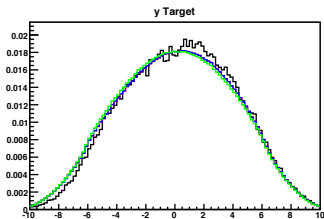
2 A Look Back at Cross Sections

^3He Quasi-Elastic Tail

3 Positive Polarity Data

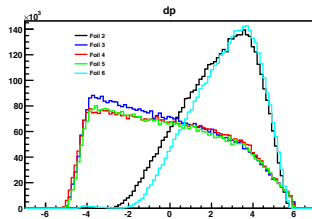
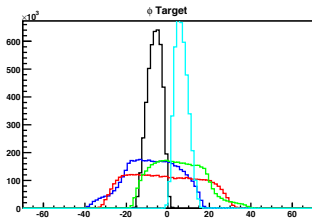
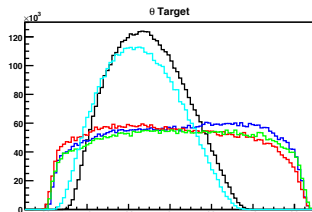
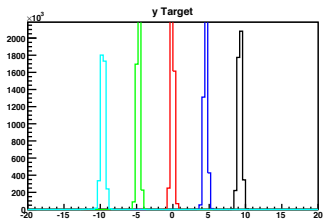
^3He (Long) Target

Target Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



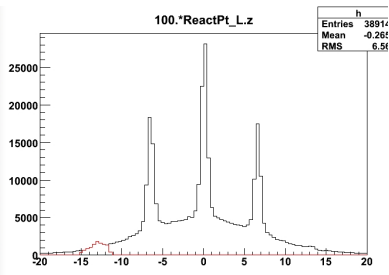
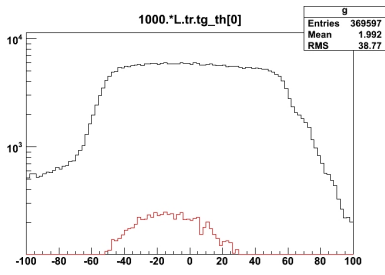
^{12}C (Foil) Target (1)

Target Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



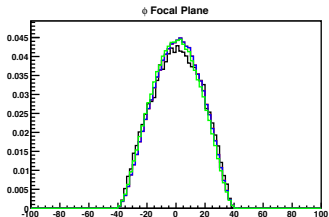
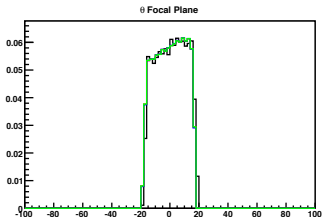
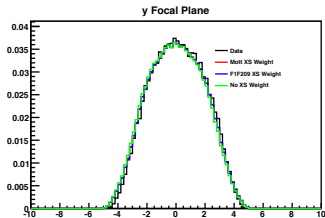
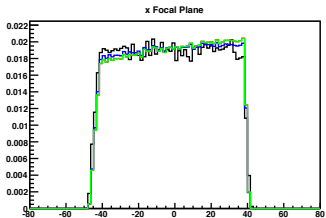
^{12}C (Foil) Target (2)

A look at the Data



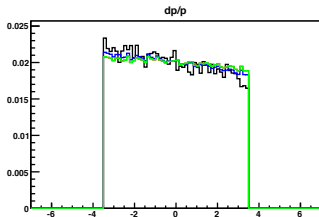
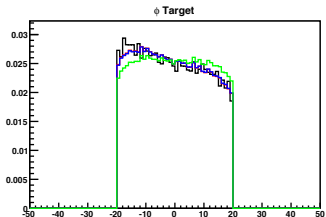
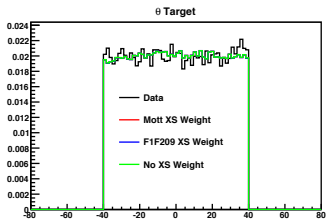
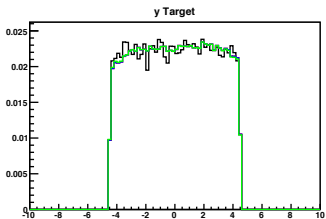
Data and SAMC With Target Cuts (1)

Focal Plane Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



Data and SAMC With Target Cuts (2)

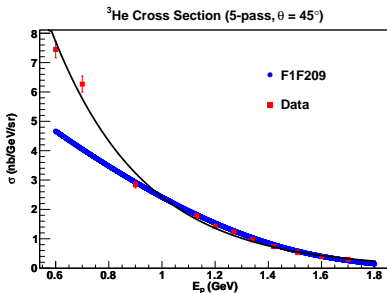
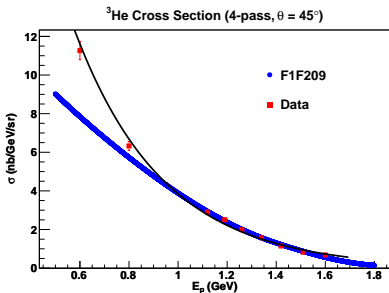
Target Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



A Look Back at Cross Sections (1)

Born Cross Sections

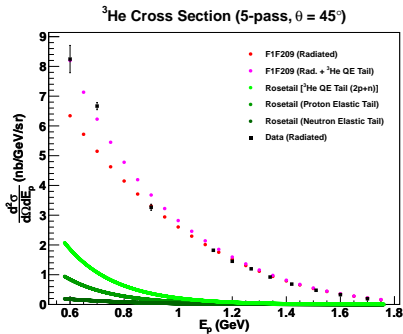
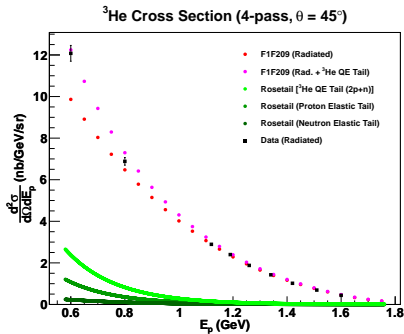
- When comparing our data to the F1F209 model, there's a considerable difference in slope as we approach low E_p



A Look Back at Cross Sections (2)

^3He Quasi-Elastic Tail

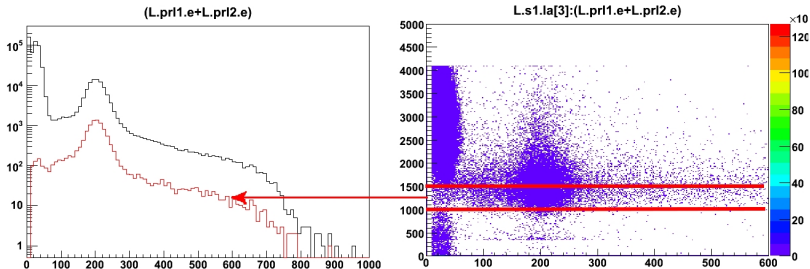
- In the RC's, the integration is carried out from the π production threshold down to the E_p point of interest \Rightarrow we need to subtract off the ^3He QE tail



Positive Polarity Data

Scintillator ADC vs. E Plots for PID

- Protons and deuterons contaminate the π^+ sample when calculating π^+ cross sections
- Could we use the scintillator ADCs vs. E to help with PID?



Summary

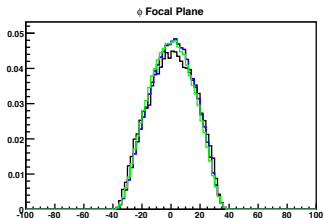
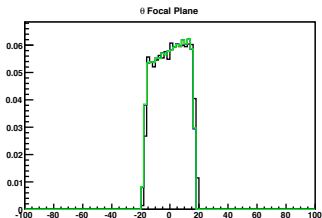
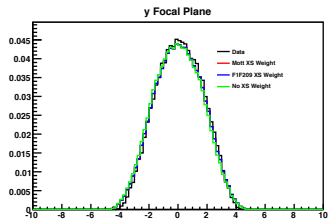
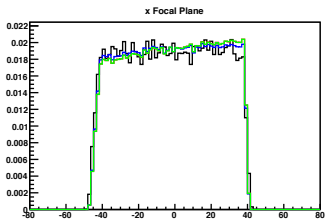
- Acceptance
 - It's clear that something odd is happening at the edge of the acceptance in y_{tg} (Z_{react})
 - Cutting on the central region in y_{tg} shows good agreement between SAMC and data, removing the structure seen in SAMC's θ_{tg}
- Cross Sections
 - Considering the RC's are carried out from π production threshold down to the E_p point of interest, we will need to subtract off the ^3He QE tail from the data before applying RC's
- π^+ Event Selection
 - We can identify events from the scintillator vs. E plot, but we don't gain much by using it

What's Next?

- Cross Sections
 - Subtract ^3He QE tail from radiated data and re-apply RC's
 - ^3He QE Tail Systematic errors
 - Vary t_b, t_a for external radiation calculations
 - Try different form factors for the neutron/proton (?)

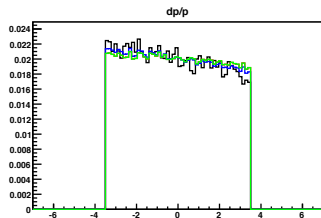
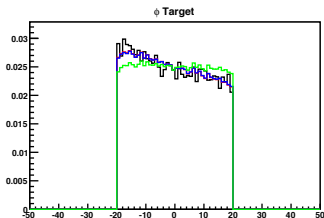
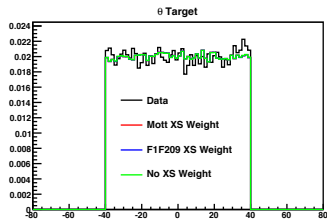
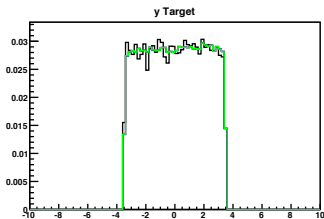
Appendix (1)

Focal Plane Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



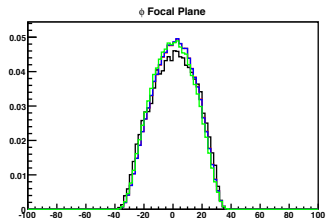
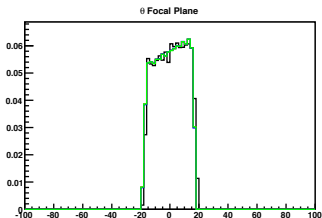
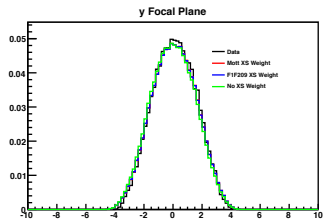
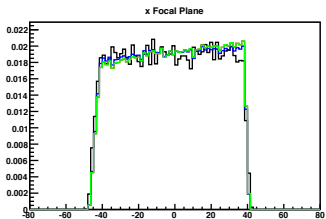
Appendix (2)

Target Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



Appendix (3)

Focal Plane Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV



Appendix (4)

Target Variables: $E_s = 4730$ MeV, $E_p = 600$ MeV

