HALL-B EG2 Analysis

Looking for pp-SRC in C, Fe and Pb

(e,e'p) Selection

"blind" kinematical cuts:

- x_B>1.2
- P_{miss}>300 MeV/c
- Identification of struck protons
- Avoiding "Delta" contamination

*Data shown here is for ¹²C only.

Identification of struck protons



(e,e'p) missing mass distribution



Note: Small amount (~20%) of (e,e'p) events with large missing mass

Missing mass peak asymmetry



Peak has a ~20 MeV shift from "real" proton mass.
Could be due to calibration or due to CM motion.
Will check cut sensitivity in the final results.

Final (e,e'p) cuts

- x_B>1.2
- IPmiss|>300 MeV/c
- |P|>900 MeV/c
- θ_{pq}<30°
- Missing mass < 1100 +/- 20 MeV/c²

(e,e'p) Kinematics











$$E_{m} = \omega - T_{P} - T_{B}$$
$$T_{B} = \omega + M_{A} - E_{struck} - \sqrt{\left(\omega + M_{A} - E_{struck}\right)^{2} - P_{miss}^{2}}$$







(e,e'pp) selection

- Cut on x_B>1.2
- Choose only (e,e'pp) events in which one proton can be identified clearly as the struck proton
- Cut on |P_{miss}|>300 MeV/c
- Cut on (e,e'p) missing mass

~590 (e,e'pp) events pass these cuts

*NO CUTS ON THE RECOIL PROTON

Struck proton identification

Cut on one "struck" proton with |P_{miss}|>300 MeV/c and look at the other proton

Only 12 events have 2 protons that pass the "struck" proton cut



(e,e'p) missing mass distribution (for (e,e'pp) events only)



(e,e'pp) Kinematics















$$E_{m} = \omega - T_{P} - T_{B}$$
$$T_{B} = \omega + M_{A} - E_{struck} - \sqrt{\left(\omega + M_{A} - E_{struck}\right)^{2} - P_{miss}^{2}}$$







pp-SRC results

Angular Correlation



CM Fits

BG=24%

σ=164±10

0.4

0.7

0.6

0.8

BG=32%

σ=162±13

0.9

0.8

1.0 |Р_{см}

1.0 Р^у СМ



(e,e'pp)/(e,e'p)



questions for discussion / ToDo List

- BG Determination
- |P_{CM}| Fits
- CM Fits for the opening angle distribution
- Simulations:
 - Proton momentum correction
 - Acceptance correction for the CM fits
 - Acceptance corrections for the (e,e'pp) channel
- Cuts:
 - X_B Must be >1.2? can increase statistics by cutting on >1.1?
 - Missing Mass Is it the best cut to use? What other possibilities should we consider?