

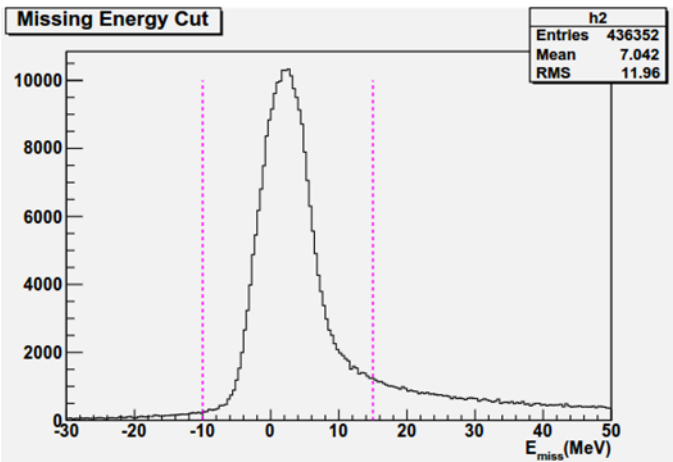
Deuteron Electro-Disintegration at Very High Missing Momenta (E10-003)

Spokespersons: W. Boeglin (FIU) and M Jones (Jlab)

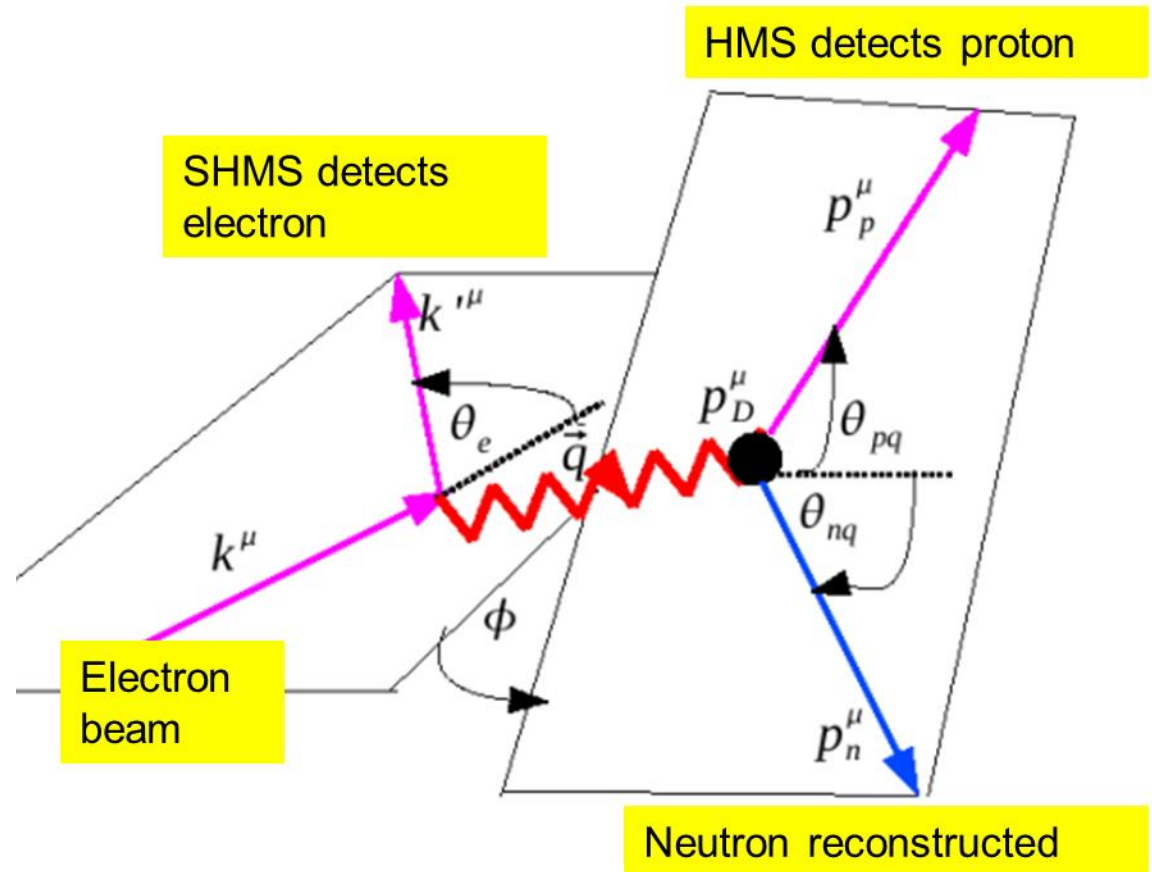
Graduate Student: Carlos Yero (FIU)

Beam time is 3 PAC days at beam energy of 10.6 GeV

Study the $D(e,e'p)n$ exclusive reaction by using cut on missing energy.



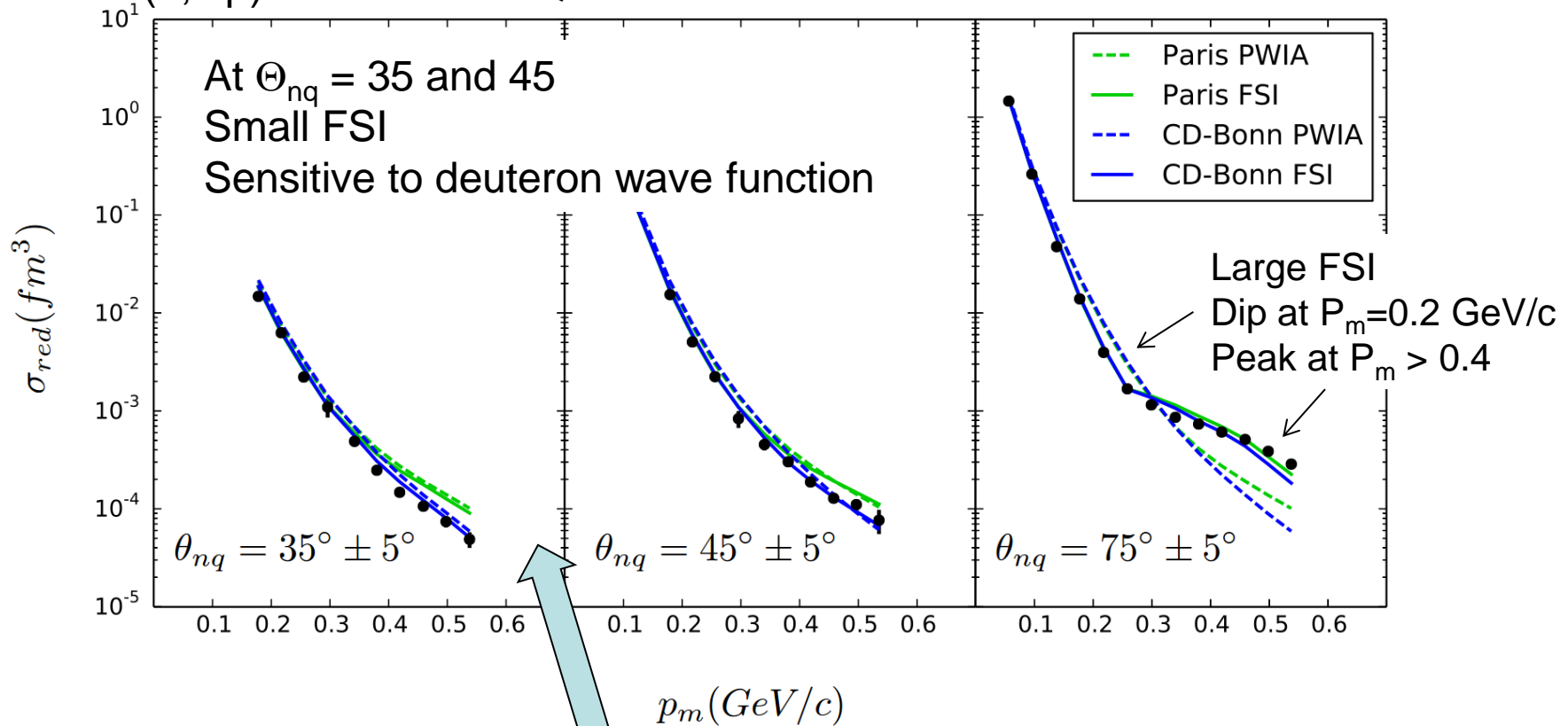
E_{miss} (MeV)



Previous Hall A experiment

Compare reduced cross section to theoretical calculation of only PWIA, PWIA+FSI with different NN potentials. In PWIA, σ_{red} maps the momentum distribution.

Data for $d(e,e'p)n$ reaction at $Q^2 = 3.25 \text{ GeV}^2$.



New Hall C will focus at $\theta_{nq} = 40^\circ$ and $p_m > 0.5 \text{ GeV}/c$ at $Q^2 = 4.25$ where the difference to NN potential is larger

E12-10-003 Collaboration

Motivation:

- Explore a new kinematical region of the 2-nucleon system above $p_m > 0.5$ GeV/c
- No Deuteron data exist at these kinematics!
- Short range correlation studies cover similar region on missing momenta
- Models are able to reproduce the present data within 20%.
- Signs of a dependence on NN potential at highest missing momentum

The experiment will:

- Determine cross sections at missing momenta above 0.5 GeV/c
- Measure at well defined kinematic settings at $Q^2 = 4.25$
- Selected kinematics to minimize contributions from FSI
- Selected kinematics to minimize effects of delta excitation

Outline a scaled down version of the experiment for the Hall C commissioning period.

Kinematics and Beam Time

Beam:

Energy: 10.6 GeV

Current: 70 μ A

Electron arm *fixed* at:

SHMS at $p_{\text{cen}} = 8.92$ GeV/c

$\theta_e = 12.17^\circ$ $Q^2 = 4.25$ (GeV/c)²

$x = 1.35$ $\theta_{\text{nq}} = 40^\circ$

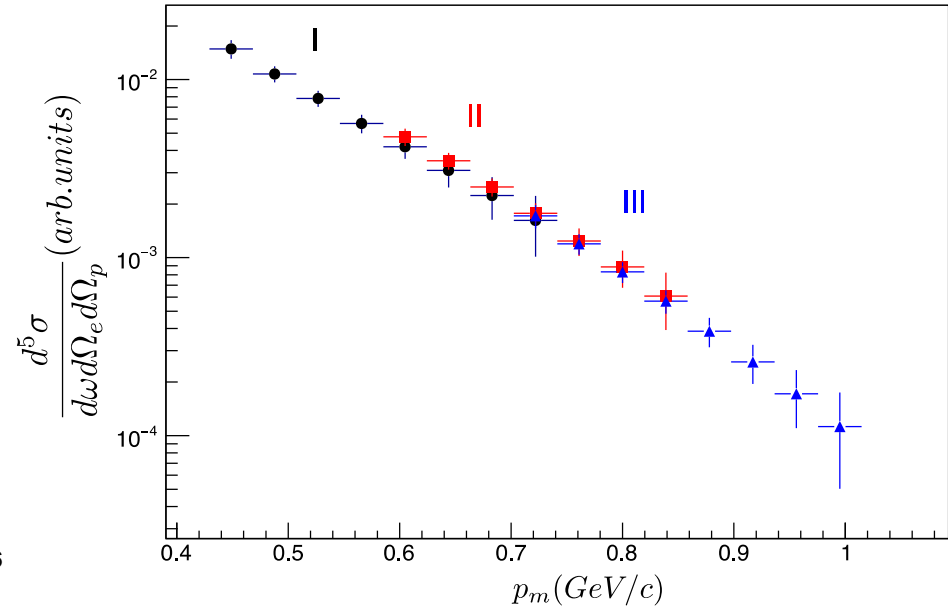
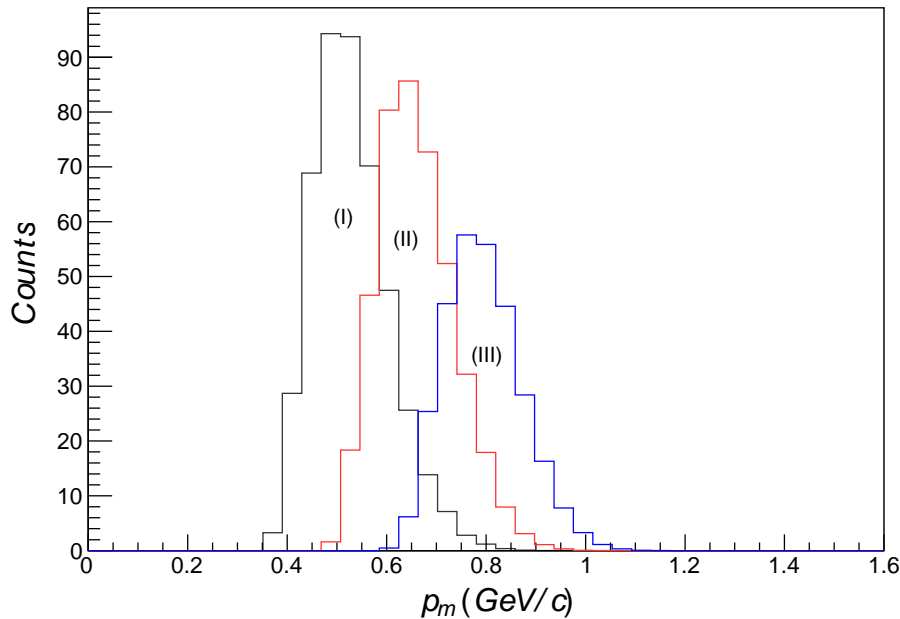
Vary proton arm to measure :

$p_m = 0.5, 0.65, 0.8$ GeV/c

HMS $2.12 \leq p_{\text{cen}} \leq 2.3$ GeV/c

Angles: $59.6^\circ \geq \theta_p \geq 53.1$

Detect electron and proton and reconstruct missing mass of neutron.



- I. $p_m = 0.5$ (GeV/c), beam time 8 hours
- II. $p_m = 0.65$ (GeV/c), beam time 18 hours
- III. $p_m = 0.8$ (GeV/c), beam time 36 hours

E12-10-003 Collaboration

- One of the four short commissioning experiments and all experiments will work as one commissioning collaboration to cover shifts.
- The FIU group that will participate in the commissioning shifts:
 - two graduate students: Carlos Yero (thesis experiment) and Jonathan Castellanos
 - three faculty.
- Presently, Carlos Yero is at JLab working on the DAQ electronics and trigger.
- Analysis of the experiment expected to be quick, since the analysis tools from previous Hall A experiment can be used.
- Excellent theoretical support by the work of M. Sargsian, W. P. Ford, S. Jeschonnek and J. W. Van Orden.