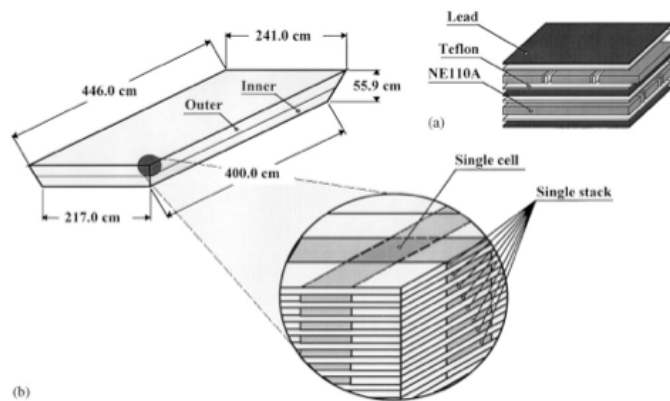


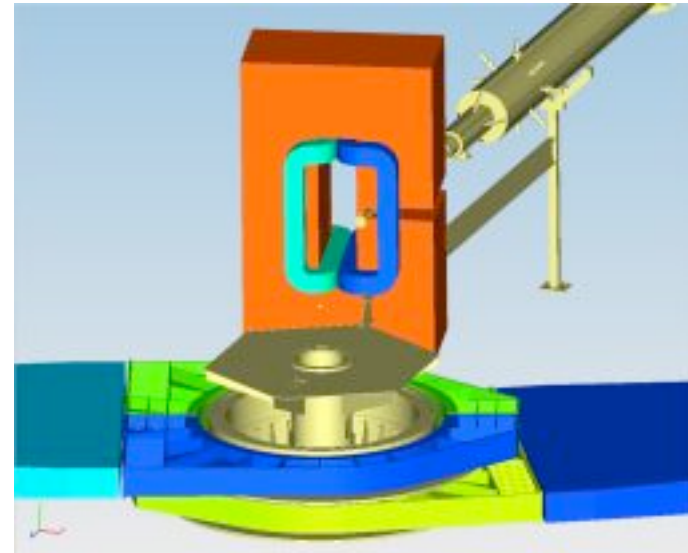
$A(e, e'pN)X$

Measuring SRC with the LAC + SuperBigBite

L. Weinstein, E. Piassetzky, S. Gilad, O. Hen, and D. Higinbotham

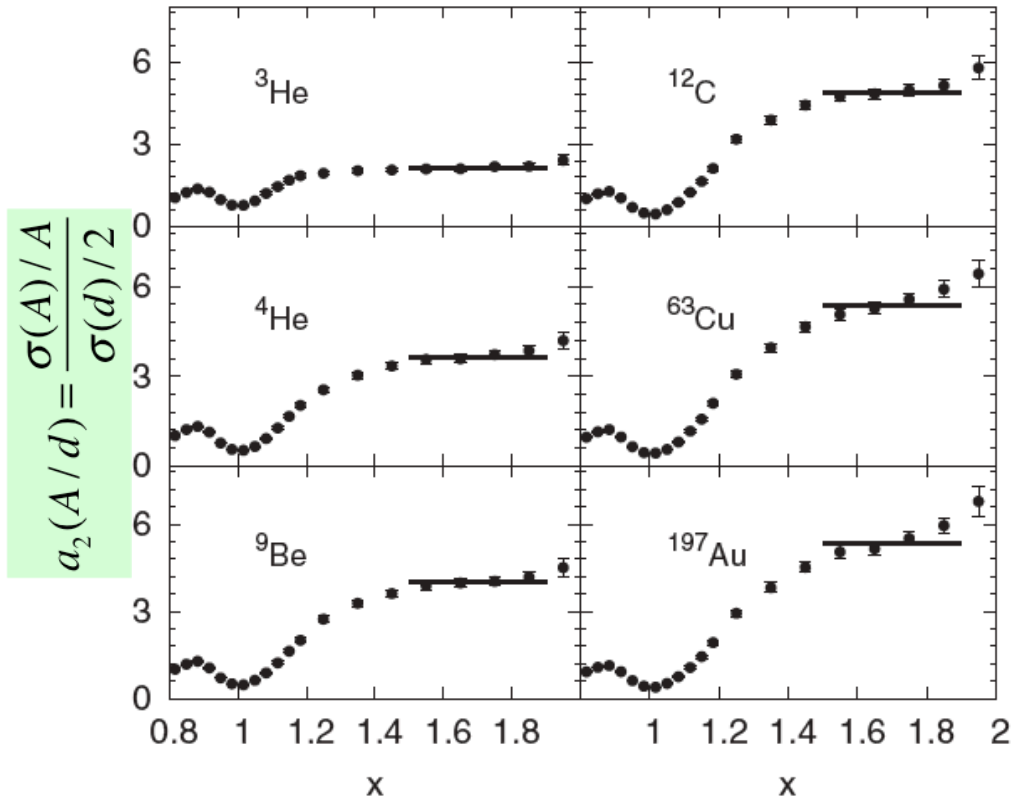


Large Angle Calorimeter

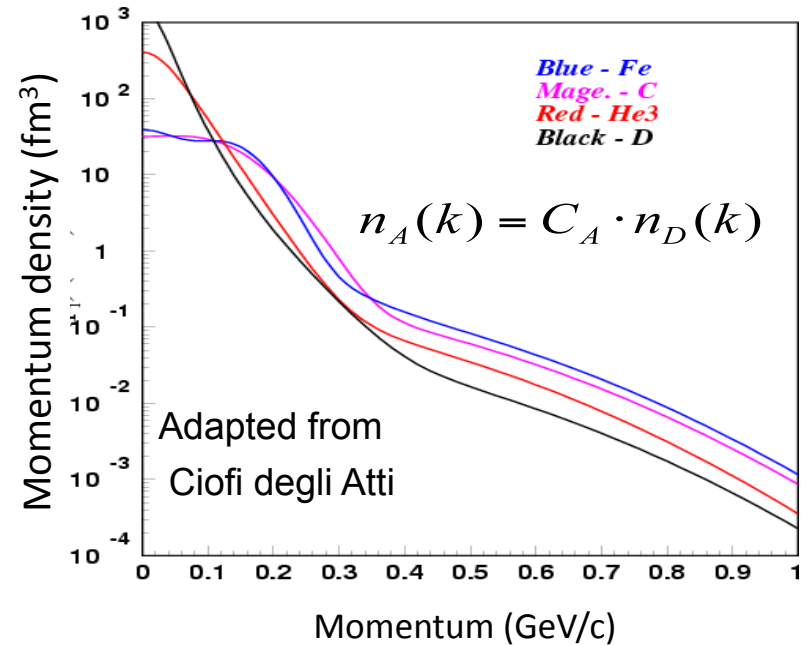


SuperBigBite Dipole

SRC / High Momentum Components

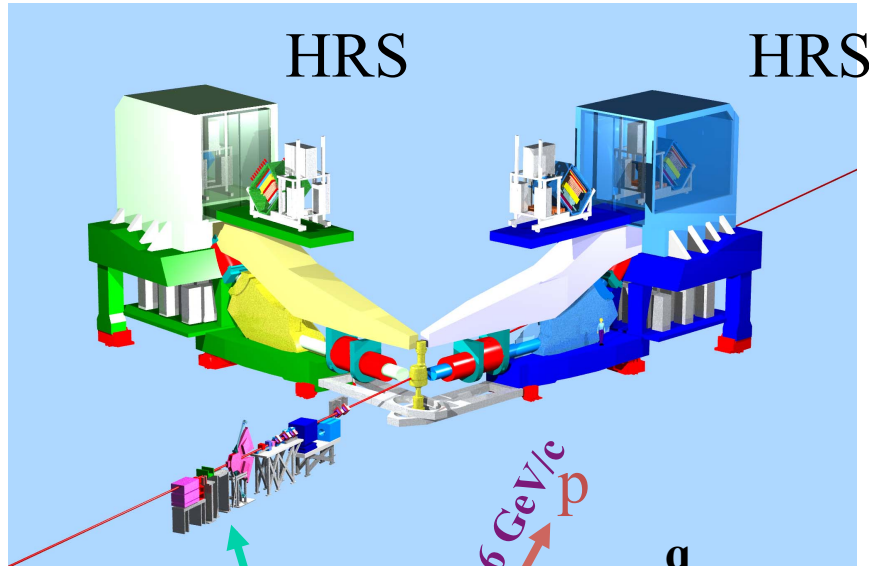


N. Fomin et al., Phys. Rev. Lett. **108** (2012) 092502



Needed for understanding EMC Effect, Neutron Scattering from Nuclear Targets, etc.

JLAB Hall A SRC Experiments



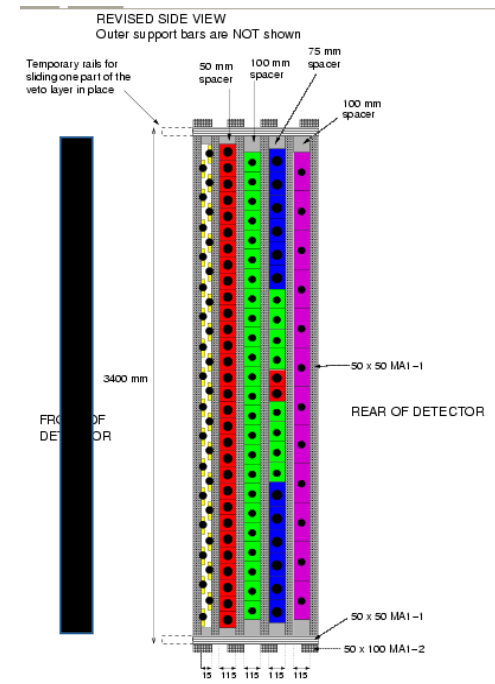
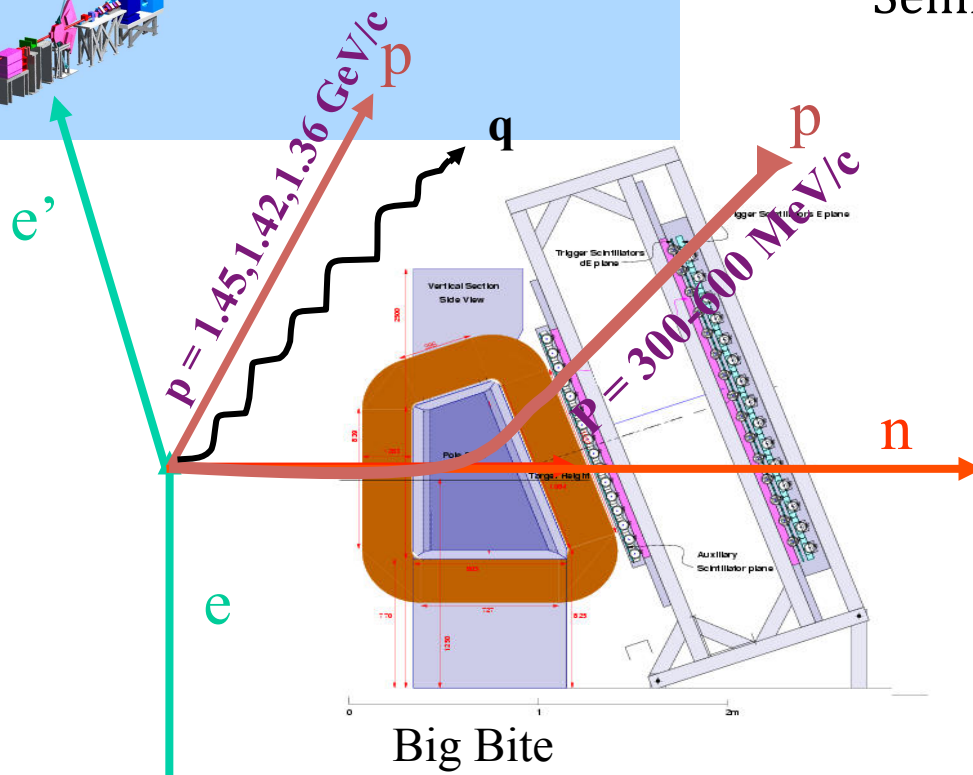
Use $^1(e,e'p)$ as a tag to measure $^1(e,e'pN)/(e,e'p)$

Kinematics:

$$Q^2 \approx 2.0$$

$$x_B \approx 1.2$$

“Semi anti-parallel” kinematics



Lead wall HAND

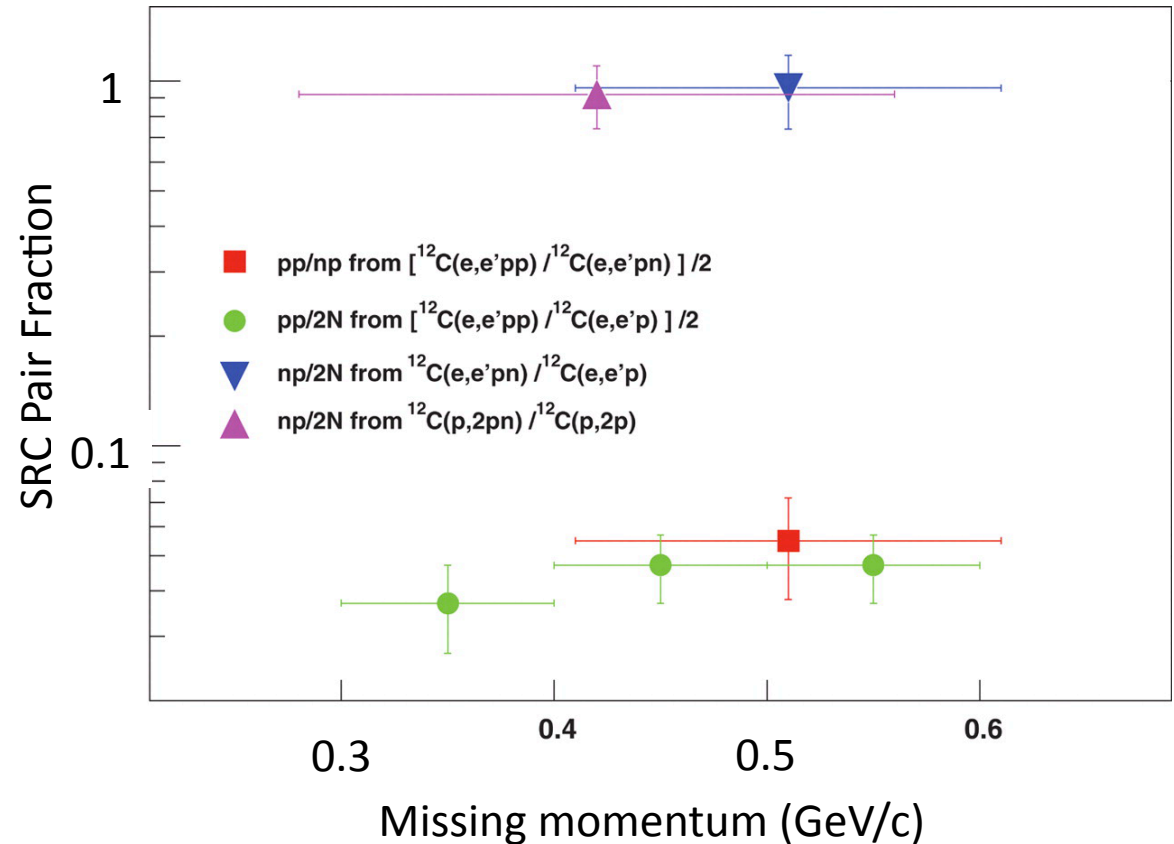
Results from the E01-015 Experiments

- Almost **all** protons with $p_{\text{miss}} > 300 \text{ MeV}/c$ in $^{12}\text{C}(e,e'p)$ have a paired proton or neutron with similar momentum in opposite direction

$$\frac{{}^{12}\text{C}(e,e'p\bar{p})}{{}^{12}\text{C}(e,e'p)} = 96^{+4}_{-23} \%$$

$$\frac{{}^{12}\text{C}(e,e'p\bar{n})}{{}^{12}\text{C}(e,e'p)} = 9.5 \pm 2\%$$

- np SRC is ~ 18 times larger than pp or nn SRC



R. Subedi *et al.*, Science **320** (5882), 1476 (2008)

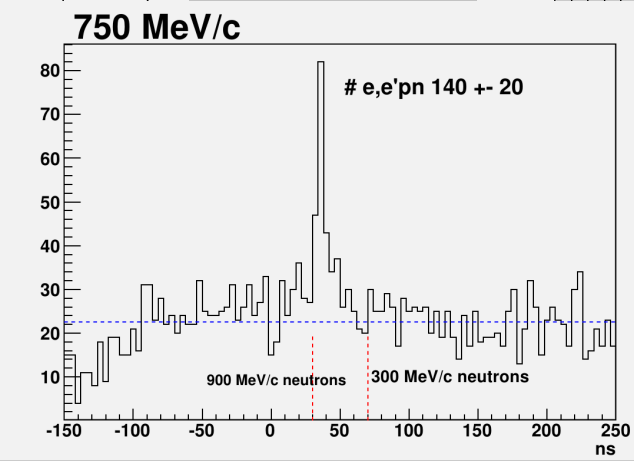
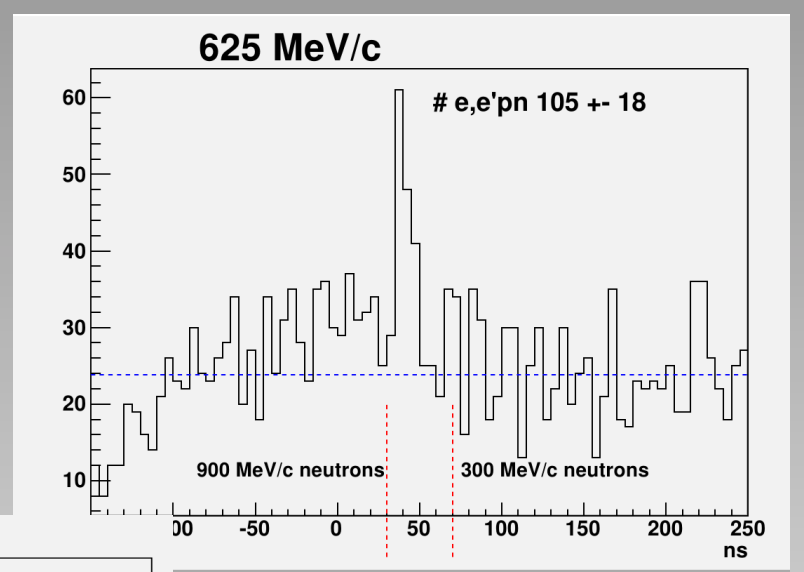
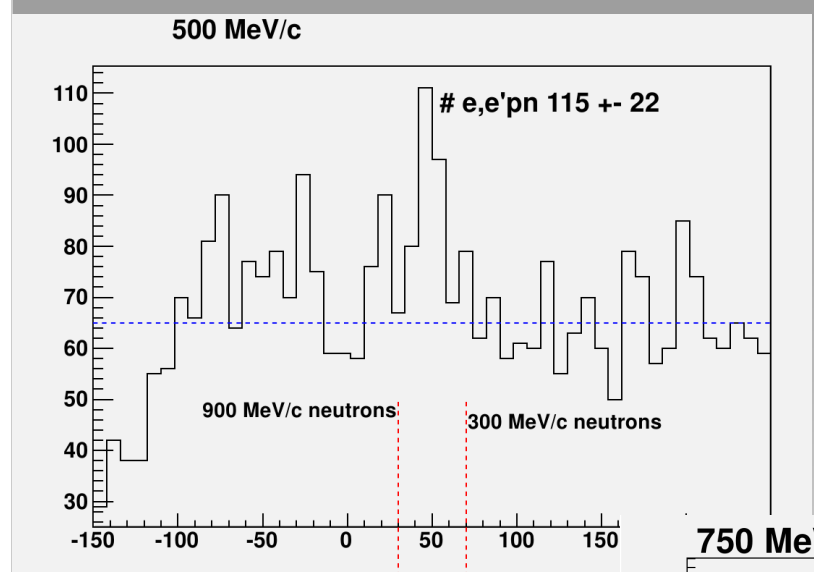
R. Shneor *et al.*, PRL**99**, 072501 (2007)

Hall A : E07-006



$$Q^2 \approx 2 \text{ GeV}^2 \quad x_B > 1.05$$

3 kinematical set up in each:
~2000 (e,e'p) events
100-150 (e,e'pn) events



PRELIMINARY

How can we do better?

- Higher beam energy \rightarrow higher Mott cross section
 - $Q^2=2 \text{ GeV}^2$, $x_B=1.2$ and $E_{\text{beam}}=11 \text{ GeV} \rightarrow E_f=10 \text{ GeV}$
 - cannot use HRS at large x_B and large E_{beam}
- Use SuperBigBite to get larger electron momenta and larger solid angle
 - But no electron identification
- Use the CLAS6 Large Angle Calorimeter for SBB electron ID

Crude count rate comparison

- Previous measurements limited to $L = 10^{37} \text{ cm}^{-2}\text{s}^{-1}$ by signal to noise ratios.
- The singles rate for the backward nucleon (detected in BigBite) should not depend strongly on incident electron energy.

At the same electron kinematics as E01-015 and E07-006 ($Q^2 = 2 \text{ GeV}^2$ and $x_B = 1.2$) we can get 70 times more rate at the same luminosity:

$$\frac{\sigma_{Mott}(11 \text{ GeV})}{\sigma_{Mott}(5 \text{ GeV})} \cdot \frac{30 \text{ msr (SBB)}}{6 \text{ msr (HRS)}} = 14 \cdot 5 = 70$$

100 ($e, e'pn$) counts \rightarrow 7000 counts!

More Data!

- With 70 times more data (at the same kinematics), we can
 - Greatly improve our measurements of the probability that a high momentum proton has a correlated partner
 - Greatly improve our measurements of the angular distribution of the correlated partners
 - Refine our measurements of *pp* vs *pn* pairs
 - Extend the measurements to much larger proton momentum and explore the region of central correlations much better
- The LAC has been recovered from CLAS6
- It needs to be stored in climate controlled space before summer
 - This task is in progress
- We anticipate submitting a proposal to the next PAC.