

E05-102: ${}^3\text{He}(\vec{e}, e'd)$

Outline:

- Experimental Overview
- Status & Manpower
- Neutron Detector



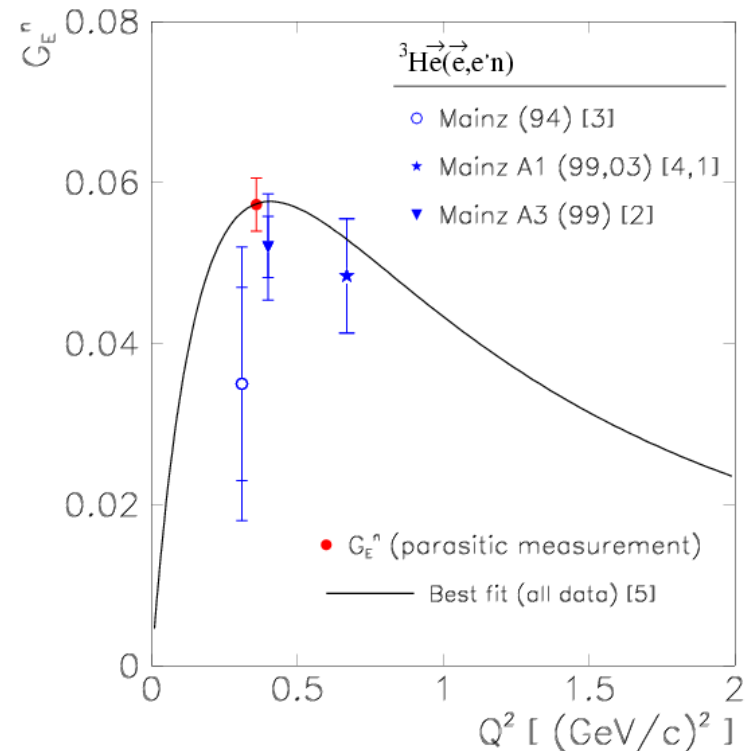
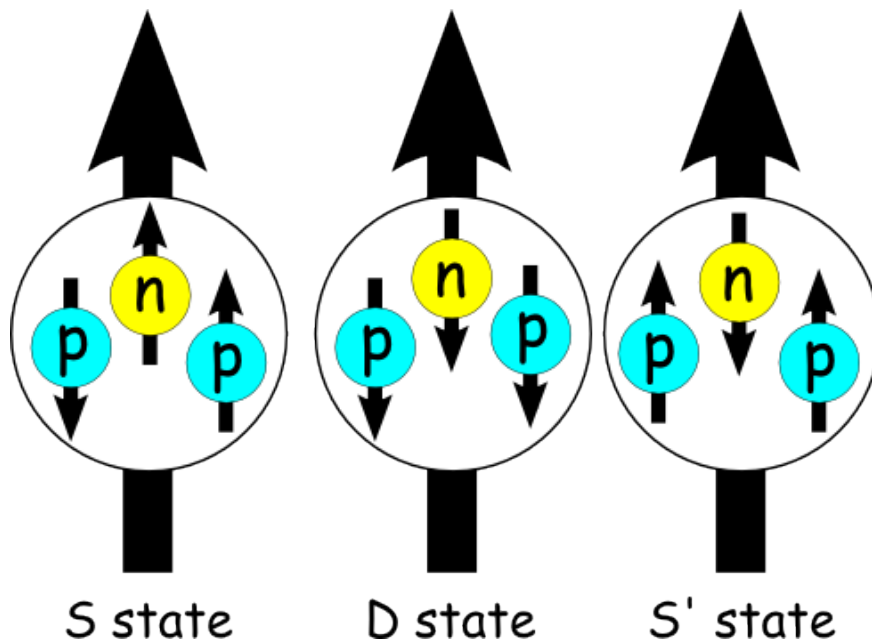
Overview

Purpose: To better understand the ^3He system.

Method: Measure double-polarized asymmetries in $^3\text{He}(\vec{e}, e'd)$.

Impact: Experimental constraints for using Polarized ^3He as an effective neutron target.

Bonus!: Low Q^2 Measure of G_E^n



Experimental Requirements

Beam:

Polarization: $\geq 75\%$
Energy (w/ lock): $\sim 2.4 \text{ GeV}$
- spread (σ) $< 10^{-4}$
Current: $1-15 \mu\text{A}$
Raster size: $\sim 4 \times 4 \text{ mm}^2$

Target:

Type: Pol. ^3He
Polarization: $\geq 35\%$
Length: 40 cm

Spectrometers:

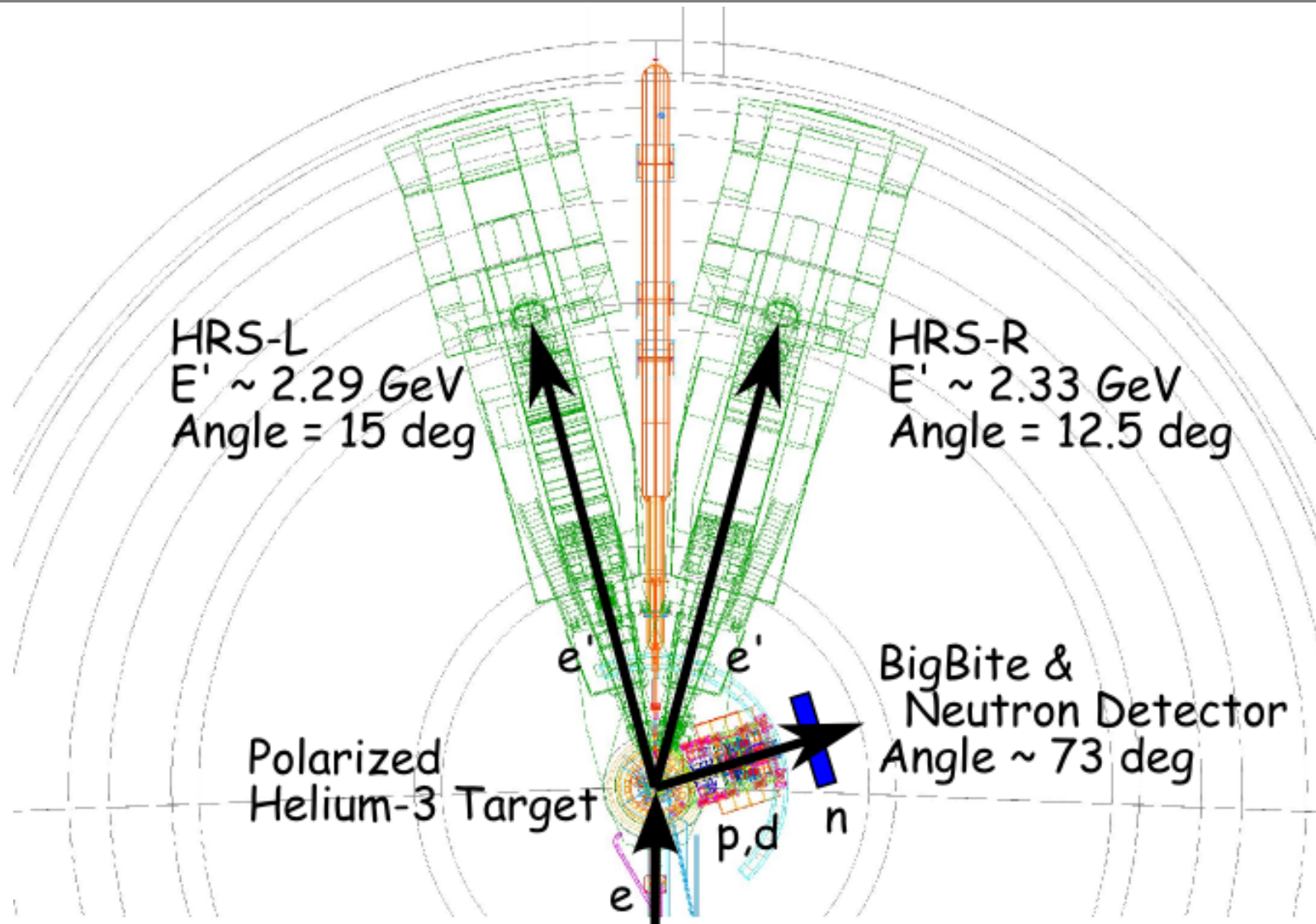
Standard: HRS-L, HRS-R

Special: BigBite Hadron Detector,
Neutron Detector

Total Beam Time: 15 days



Hall A Floor Plan



Manpower

<u>Item</u>	<u>Person (Institution)</u>
Installation "leapfrog"	D. Higinbotham, E. Folts (Jlab)
Safety Documentation	S. Sirca (U. of Ljubljana)
Data Analysis	X. Zhang (MIT)
Electronics/DAQ	B. Moffit (MIT)
Wire Chamber Upgrade	M. Shabestrai, N. Liyanaga (Uva), J. Annand (Glasgow)
Frame Modification	X. Zhang (MIT)
MC Simulations	X. Zhang, B. Moffit (MIT)
Run Plan	B. Moffit (MIT), D. Higinbotham (Jlab)
^3He Target	Hall A - ^3He Target Group
Scintillator Planes	B. Moffit (MIT), J. Annand (Glasgow)
Neutron Detector	B. Moffit (MIT), E. Piassetzky (Tel Aviv)



E05-102 Milestones

<u>Task</u>	<u>Comment</u>	<u>Deadline</u>
Neutron Detector		
Test 88 Scintillator PMTs	Complete	
Install Veto Counters	1 week	Early 2008
Test Veto Counters	1 week	Early 2008
Plan for electronics reconfiguration	In Progress	07/01/07
MC simulations	In Progress	

Other Milestones (not specific to E05-102) have been discussed.



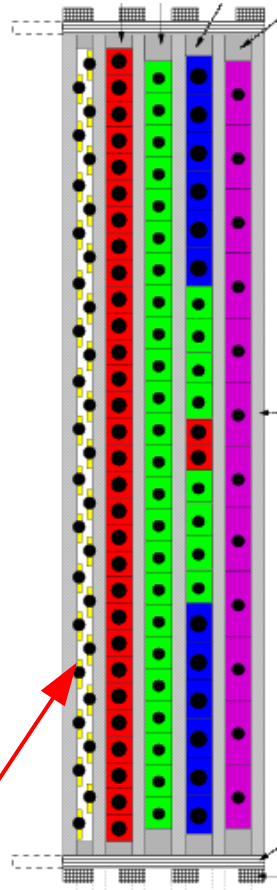
Neutron Detector

Shield Wall

2" Lead
1" Iron

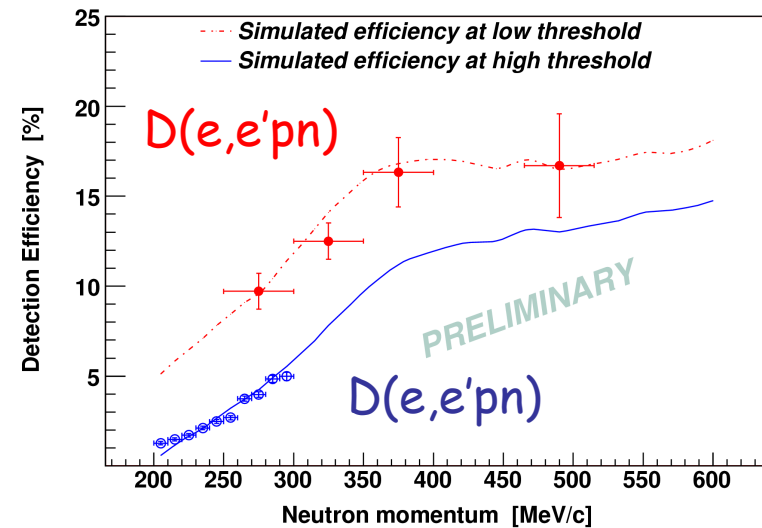


4 Layers of
Scintillator Detectors



Veto Counters

Measured Detection Efficiency
from SRC (E01-015)



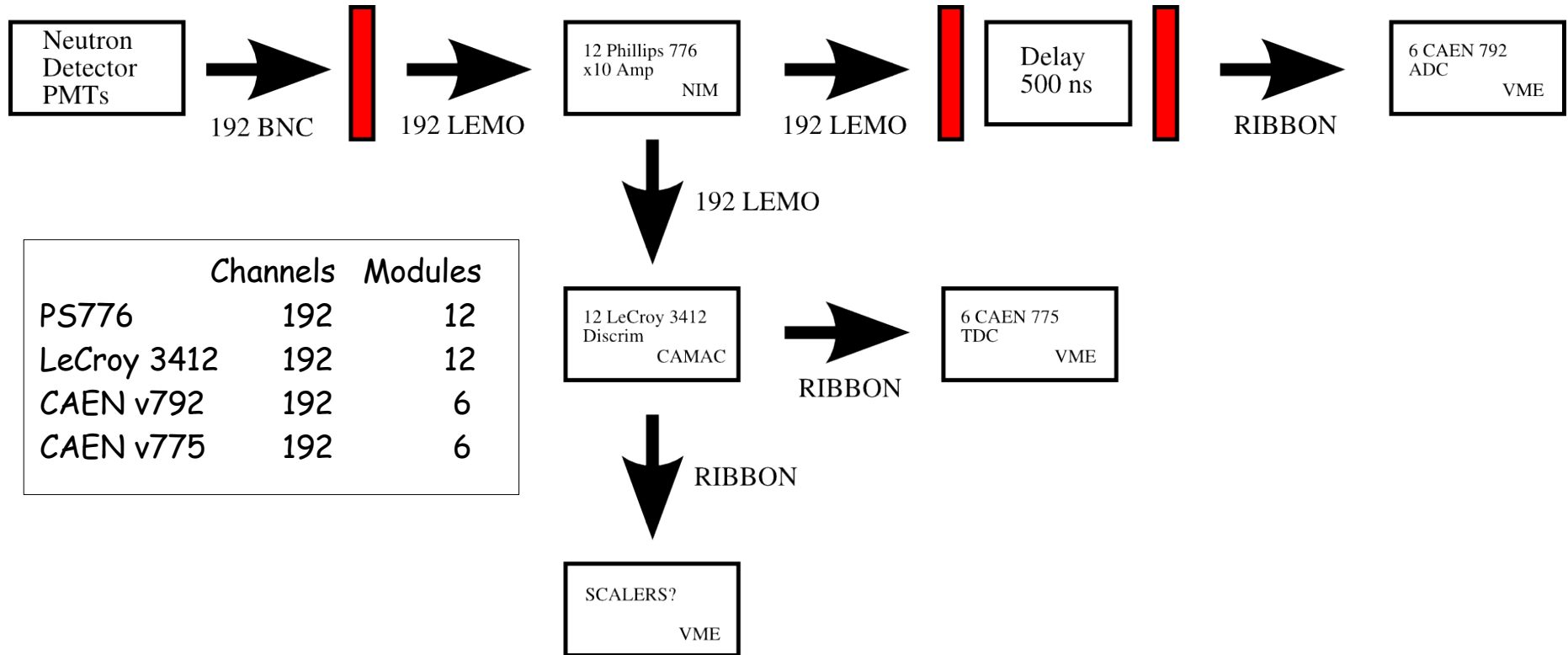
Current Status:

PMTs Tested: OK!

Vetos to be installed and tested.



Neutron Detector Electronics



Trigger from HRS-L: Low (e,e) rates (~300 Hz)



Backup: Kinematics and Rates

		----- Singles -----				Accidentals
	Central kinematics	(e,e') [Hz]	(e,d) [Hz]	(e,p) [Hz]	(e, π^+) [Hz]	(e,e'd) [1/hr]
HRS L	$\Theta_e = 15.0^\circ$ $E' = 2294 \text{ MeV}/c$	300				
HRS R	$\Theta_e = 12.5^\circ$ $E' = 2332 \text{ MeV}/c$	1300				
BigBite	$\Theta_d = 72.8^\circ$ $p_d = 300 - 900 \text{ MeV}/c$ $p_r = 0 - 200 \text{ MeV}/c$		280	40	12	<10

