

Hall C Status – January 2021



Hall C Publications

Measurement of the Beam-Normal Single-Spin Asymmetry for Elastic Electron Scattering from ^{12}C and ^{27}Al

[Phys. Rev. C **104**, 014606 \(2021\)](#) (Androic et al.) (QWEAK)

Spectroscopy of $A = 9$ hyperlithium by the $(e, e'K^+)$ reaction

[Phys. Rev. C **103**, L041301, \(2021\)](#) (Gogami et al.)

Ruling out color transparency in quasi-elastic $^{12}\text{C}(e, e'p)$ up to Q^2 of 14.2 (GeV/c)^2

[Phys. Rev. C, **126**, 082301 \(2021\)](#) (Bhetuwal et al.)

Probing the Deuteron at Very Large Internal Momenta

[Phys. Rev. Lett **125**, 262501 \(2020\)](#) (Yero et al.)

A Precision Measurement of the Beam-Normal SSA in Forward-Angle Elastic ep Scattering (QWEAK)

[Phys. Rev. Lett **125**, 112502 \(2020\)](#) (Androic et al.)

Parity-Violating Inelastic Electron-Proton Scattering at Low Q^2 Above the Resonance Region (QWEAK)

[Phys. Rev. C **101**, 055503 \(2020\)](#) (Androic et al.)

Hall C – 2020

Fall 2019

Polarized ^3He target installed

Spring 2020

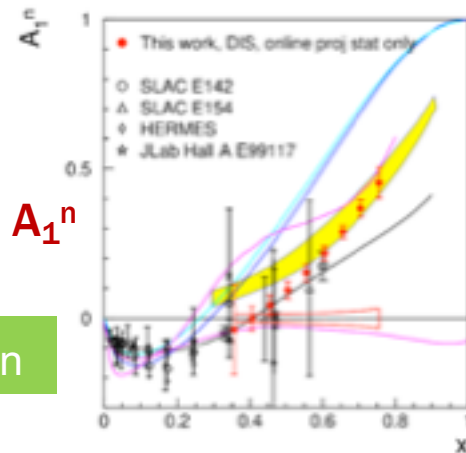
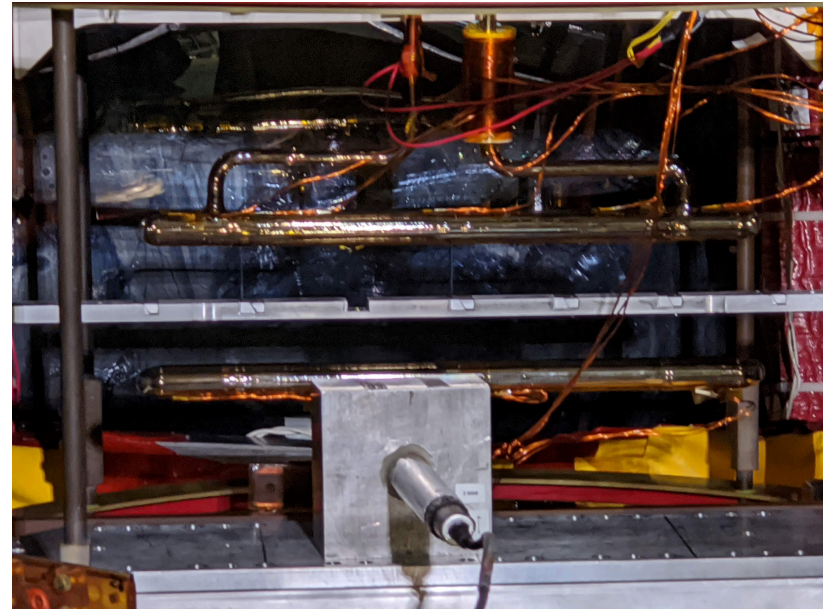
E12-06-110 A_1^n run

E12-06-121 g_2^n/d_2^n setup
interrupted by MEDCON6

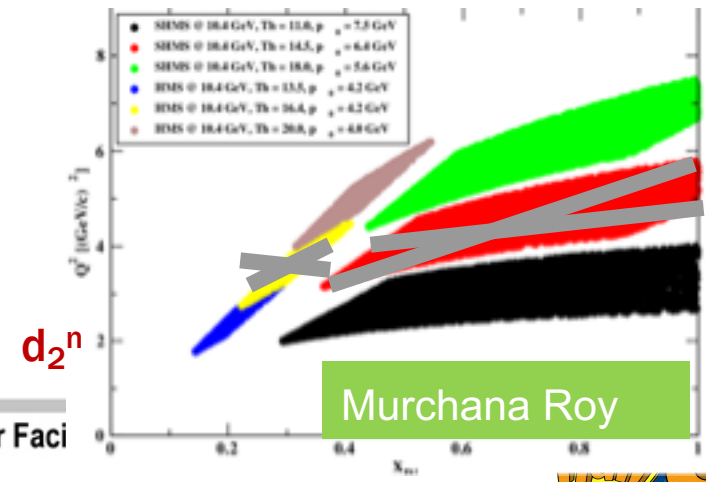
August/September 2020

E12-06-121 g_2^n/d_2^n

E12-06-121A ^3He elastic asymmetry



Jefferson National Accelerator Facility



Mingyu Chen

Murchana Roy

Jefferson Lab

Hall C – 2021+

→ August 22, 2021

Scheduled Accelerator Down, Hall Maintenance

August 23 – Dec 20, 2021 (possible 2 week delay)

E12-19-006 **Exclusive $p(e,e'\pi^\pm)$ LT separated cross sections (PionLT)**

Scaling and Pion Form Factor (was E12-06-101/E12-07-105)

Beam Energies 9.2, 8.0, 9.9, 6.0 GeV

May 2, 2022 – October 27, 2022

E12-17-005 **CaFe – Short Range Correlations $^{40}\text{Ca}(e,e'p)$, $^{48}\text{Ca}(e,e'p)$**

E12-10-008 **EMC effect, light to heavy nuclei**

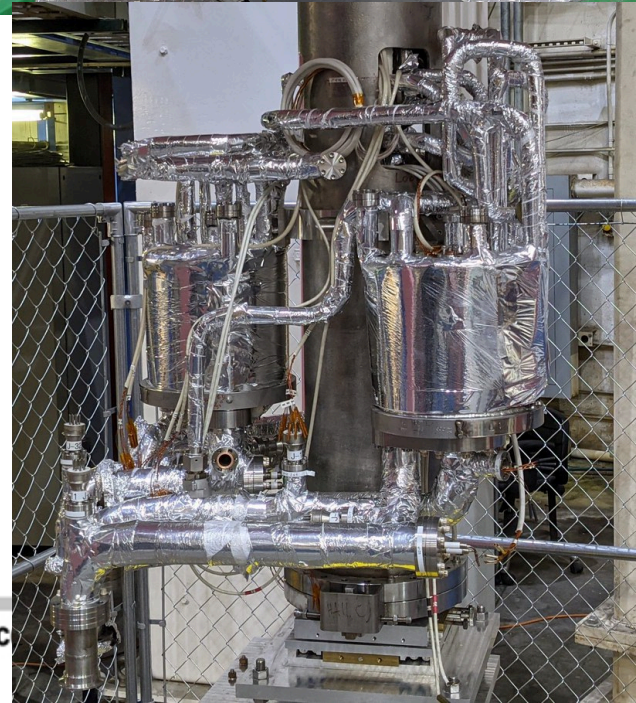
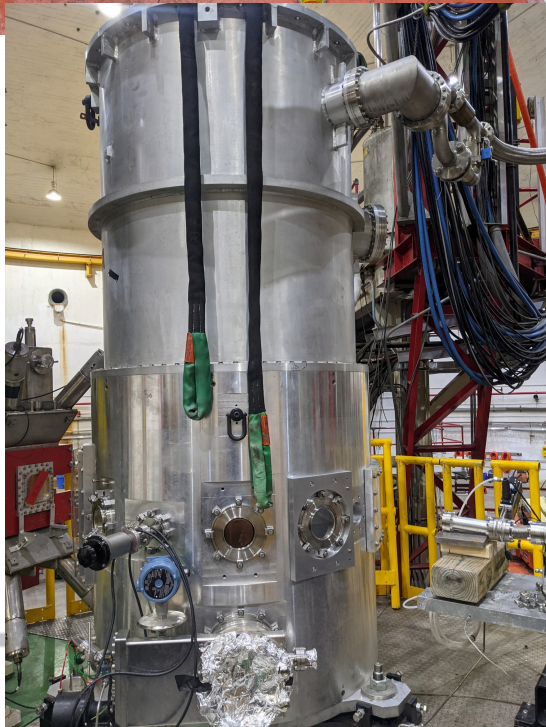
E12-06-105 **$x > 1$ light to heavy nuclei**

E12-19-006 **Continue exclusive PionLT**

October 28, 2022 – December 20, 2022

Schedule Contingency

Restoring standard configuration



New HMS Quadrupole Supplies

25+ year old HMS quad supplies have been replaced.

Remote polarity reversal restored

Tested to full current

Q2 and Q3 tested down to 20 A



Detector Upgrades

HMS hodoscope

New PMTs, plastic and frame

Tubes tested, frame fabricated. Install 2022.

HMS Aerogel

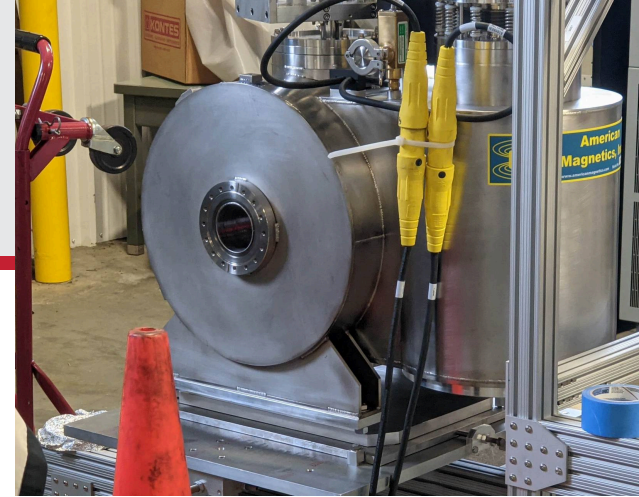
New 5" tubes ordered

SHMS Heavy Gas Cherenkov

Ordering new mirrors

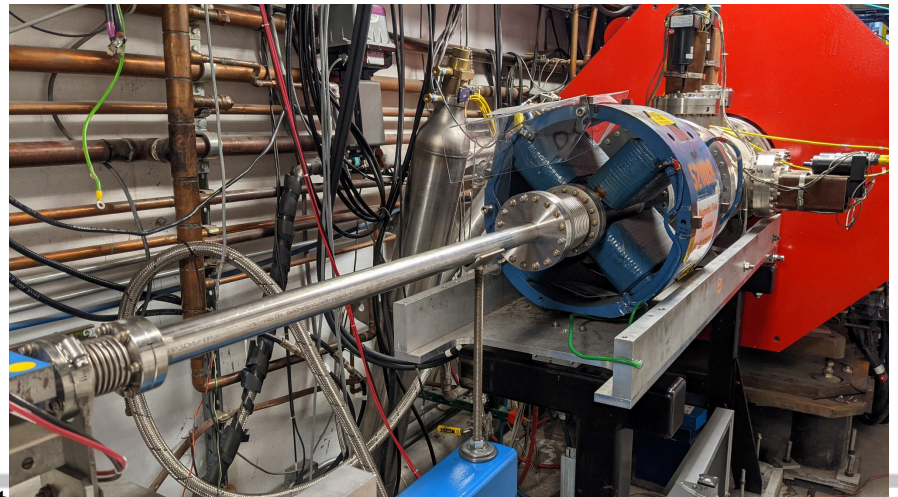


Moller solenoid replacement



New solenoid on loan to MOLLER collaboration for Kerr Effect measurements.

To be mapped in fall and installed in 2022.



Neutral Particle Spectrometer

Motivation for NPS: Validation of Reaction mechanisms for TMDs & GPDs

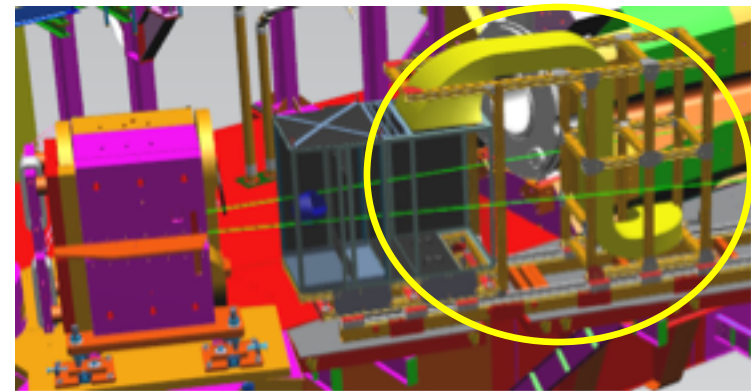
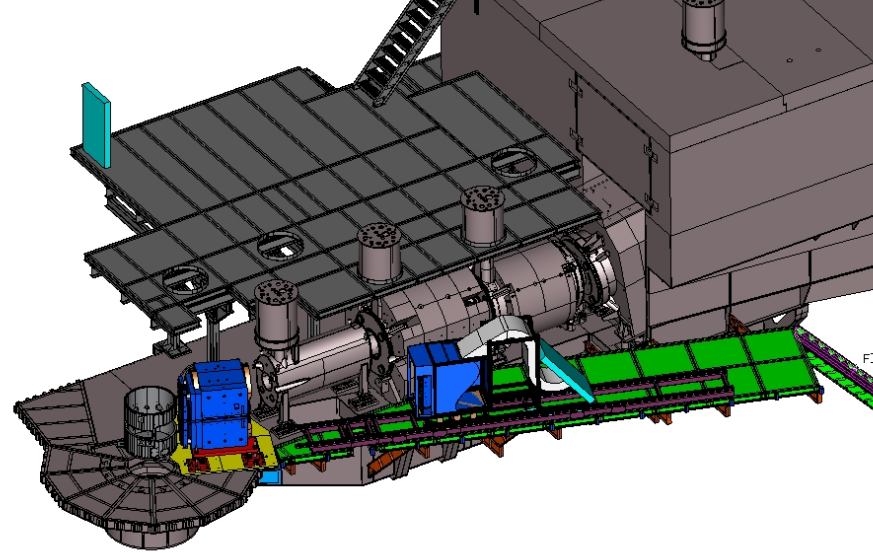
5 approved experiment: **DVCS & SIDIS ($e, e'\pi^0$), WACS(γ, π^0) & pol. WACS**

1 conditionally approved: Timelike Compton Scattering

NPS (Expts E12-13-010/E13-13-007, E12-14-003/E12-14-005) passed ERR, beam time request submitted

NPS: PbW04 calorimeter behind sweep magnet
Rides on SHMS carriage.

Supported by NSF MRI PHY-1530874



Hall C Engineering group:

SHMS Platform extension + stairs

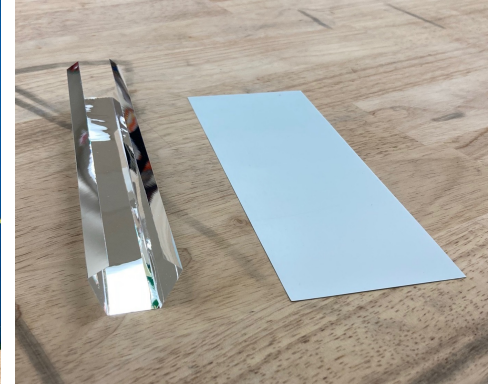
Detector and sweep mag support

Cable cart, trays, roof mods

Beamline modifications



NPS



NPS Calorimeter frame shipped from Orsay

30+ PbWO_4 crystals arrive per month

Reflectors for crystals pre-shaped

JLab Detector Support Group:

- Cable fabrication

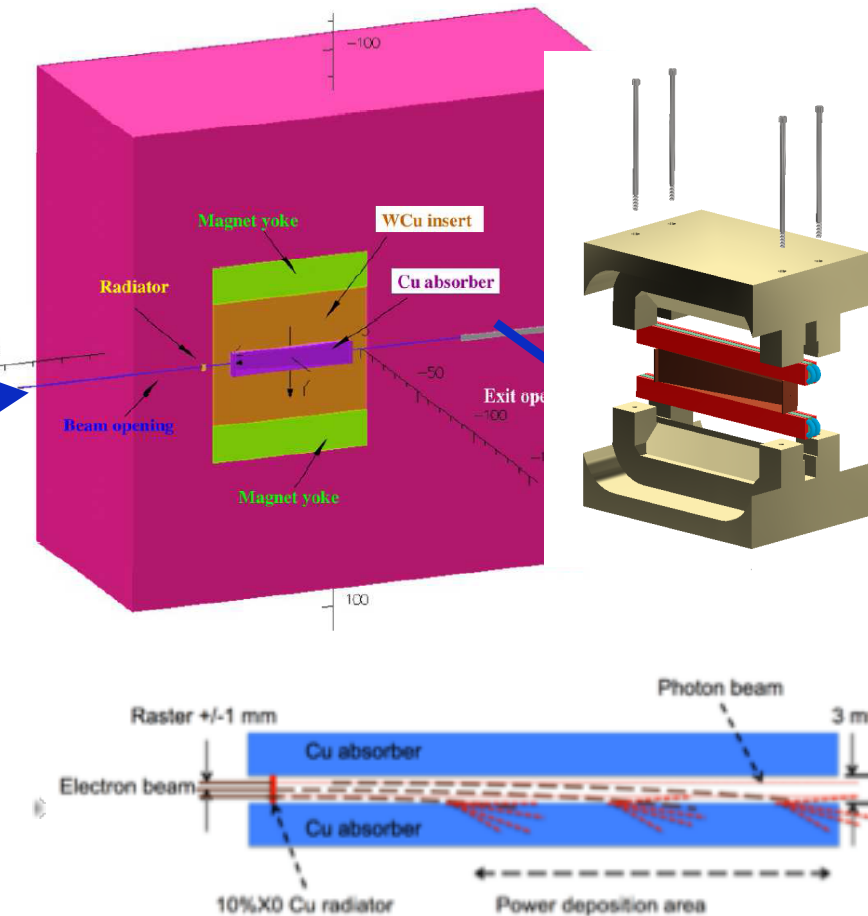
- Interlock system

- Controls – Environmental and HV

Compact Photon Source (Hall C)

A high-intensity compact photon source that could provide a factor of 30 gain in figure-of-merit for photo-production experiments of solid-state polarized targets

High-energy photoproduction in 3D dynamic proton structure – **two approved experiments to date (Polarized Wide-Angle Compton Scattering and Timelike Compton Scattering)**



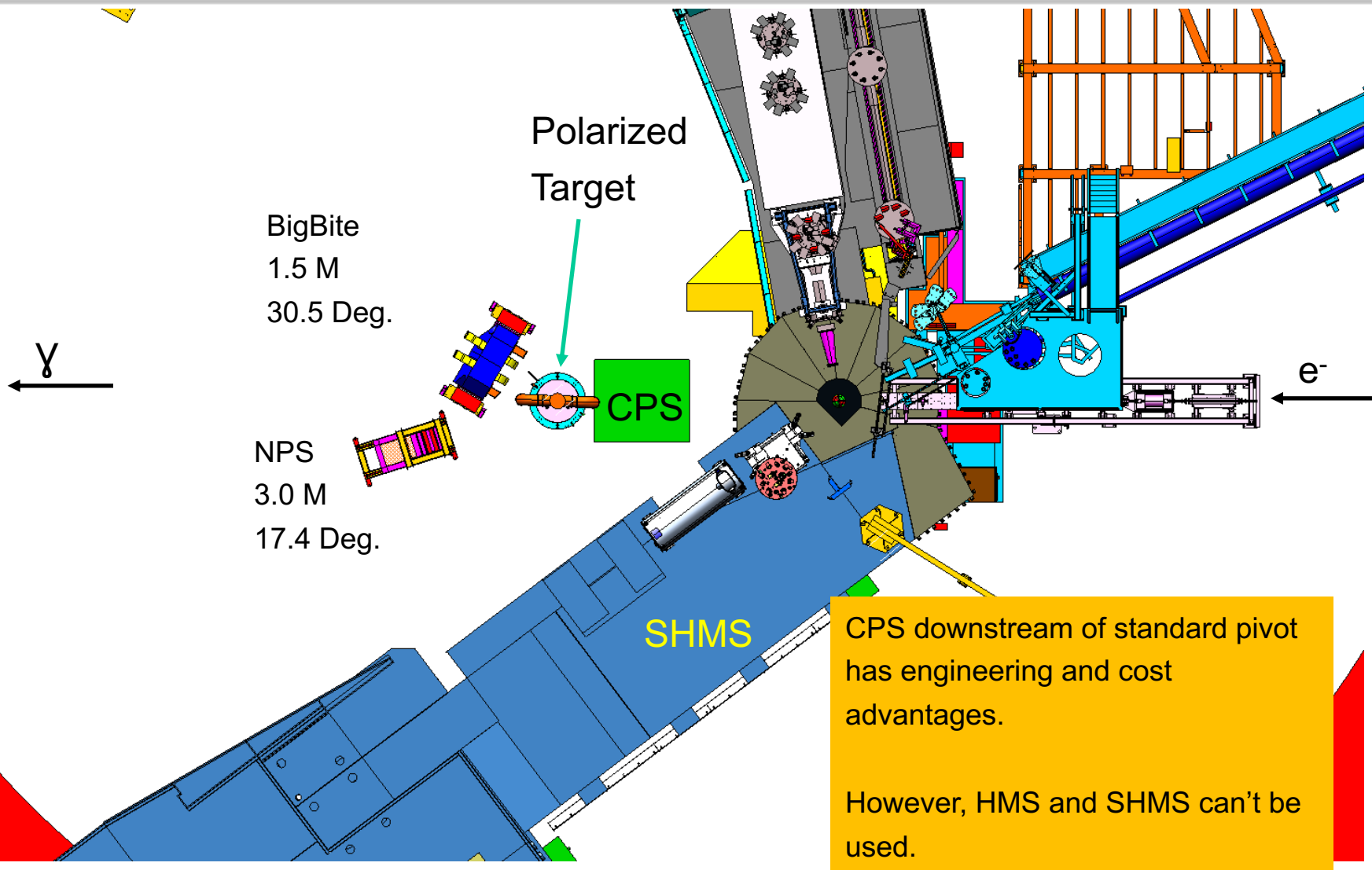
CPS conceptual design:

- a radiator to produce photons
- a magnet to dump the electrons with a small photon collimator
- a central copper absorber to handle the power deposition
- tungsten powder and borated plastic to hermetically shield

Conceptual Design for Hall C CPS
published in NIMA **957**, 163429 (2020)

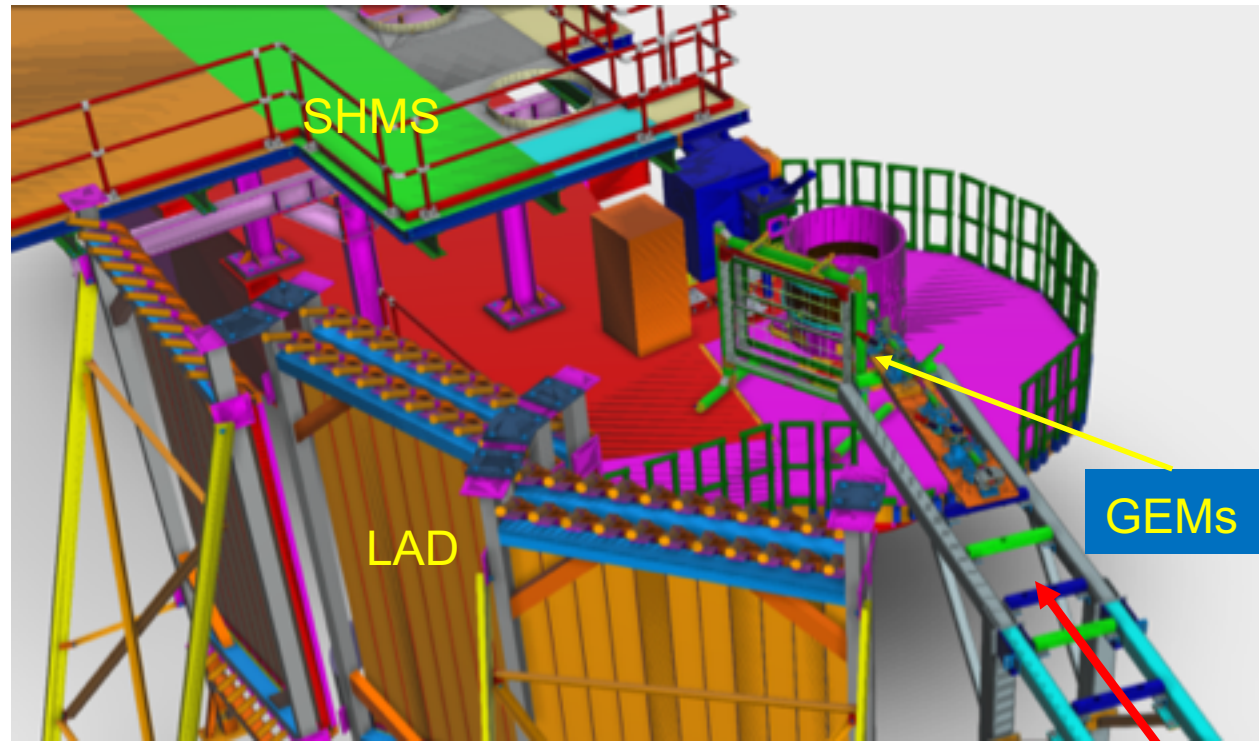
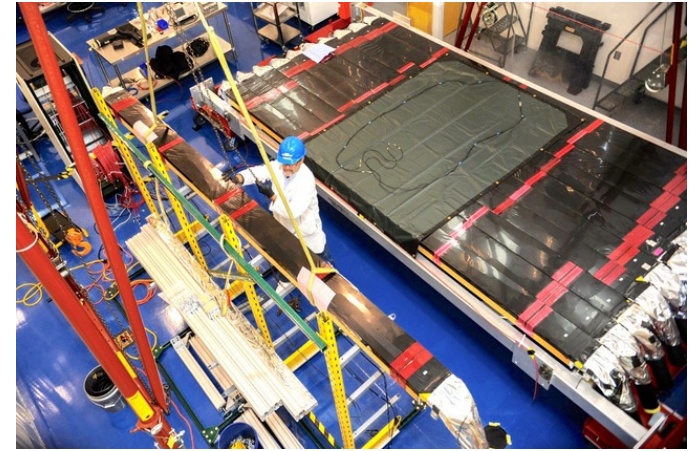
Hall C engineering group building Cu absorber prototype – test stresses and heat removal

CPS – Downstream of Pivot



LAD – Large Acceptance Detector

- E12-11-007: Deuteron EMC – $d(e,e' \text{ backward } p)$
- Very large solid angle for $L = 10^{36} \text{ cm}^{-2} \text{ s}^{-1}$ and $\theta > 90^\circ$
- Optimized for medium momentum nucleons
 $0.3 \leq p_N \leq 0.7 \text{ GeV}/c$
- Uses 5 scintillator planes which are built from old CLAS-6 TOF scintillators refurbished @ODU.
- HV supply for scintillator planes delivered.
- Successful ERR review, scheduling requested
- Will use PRAD GEMs



User Registration

All user registrations revoked at beginning of elevated MEDCON status to limit access to site.

Limited users allowed to reregister when site access approved by physics division

User registration required to have active computer account

Many user computer accounts expiring August 31, 2021

Please re-register as user (remote or on-site)

<https://misportal.jlab.org/jlabAccess/>

Physics division approval still required for user access. Contact me for more details.

Physics division approval not needed for shift work.

If coming for shift work, please re-register as user.

(Contact me anyway.)