

COMMUNITY STANDARDS

Welcome to Jefferson Lab!

Everyone at Jefferson Lab has a responsibility to foster an environment where all employees, users, students, guests, visitors, and subcontractors feel safe, welcomed and supported in advancing the Lab's mission.



DIVERSE IN COMMUNITY
United in Science

While it is not possible to provide a complete list of the types of improper behavior below, prohibited conduct includes, but is not limited to:

- Offensive verbal comments
- Bullying or deliberate intimidation
- Stalking/following
- Repetitive photography of the same person(s)
- Gender-based insults
- Displaying or circulating sexually suggestive materials
- Inappropriate physical contact
- Unwelcome sexual attention or advances

Everyone is expected to embody the values of professionalism, respect, and diversity as well as cultivate a supportive and inclusive environment where the opinions of others are embraced. Behaviors not aligned with the lab's values will not be tolerated. Failure to adhere to this Community Standard may result in being barred from further lab events, suspension of site access including housing at the SURA Residence Facility, and/or removal from the site.

If you or someone else feels uncomfortable in the workplace or believe you are subjected to a hostile or harassing environment, or have any other related concerns, please contact the Jefferson Lab Ethics Officer, Rhonda Barbosa, immediately at rbarbosa@jlab.org or via the Lab's Ethics Hotline at <http://www.jsaecp.ethicspoint.com>. Alternately, you may contact your sponsor or the DEIA Program Manager at dei@jlab.org.

Hall A/C Status

JLab Open House on June 8, 2024



Josh Crafts, CUA grad, and the NPS calo



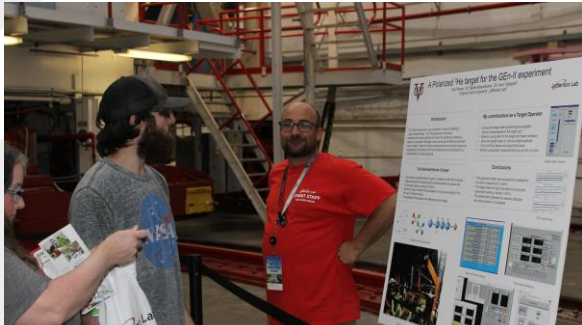
Mark Mathison, OU grad, at the NPS display



Sanghwa Park, Hall A/C staff, demonstrating principles of a spectrometer



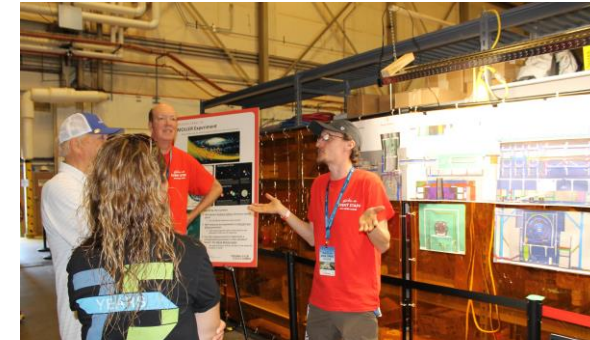
James Puckett, Andrew's son, holding the glass 3He cell with Arun Tadepalli.



Bill Henry, Hall A/C staff, and the 3He target poster



Chandan Ghosh, Hall A/C staff, demonstrating scintillators

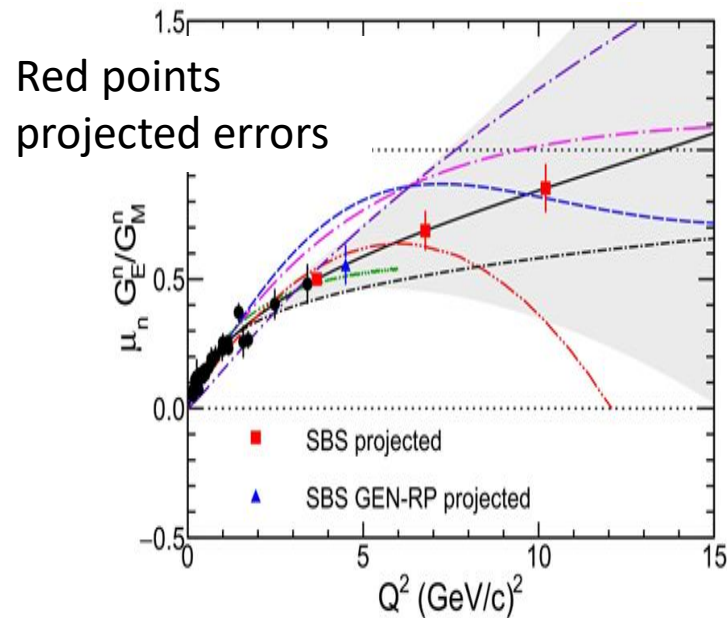


Ciprian Gal, Hall A/C staff, discussing the MOLLER experiment.

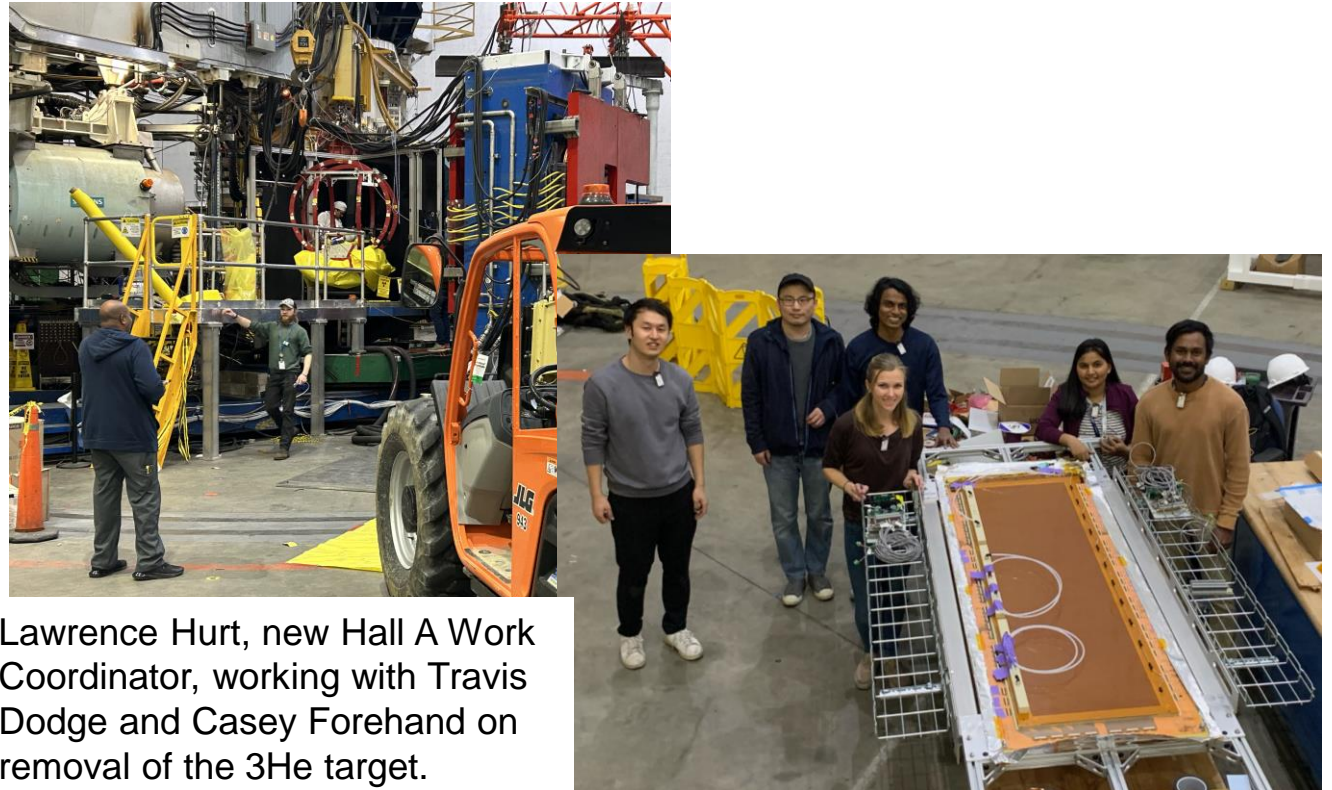
Mark Jones, Hall A/C Group Leader, PAC52 meeting , July 2024
Bob Michaels, Hall A/C Deputy Group Leader

Hall A: Completed Neutron G_E/G_M by Beam-target Asymmetry on polarized ^3He experiment

- Started in Oct 2022
 - Fall 22, Completed $Q^2= 2.9$ and 6.6 GeV^2
 - Started $Q^2 = 9.9 \text{ GeV}^2$ in Jan-Mar 2023
 - Sept/Oct 2023 Completed $Q^2 = 9.9 \text{ GeV}^2$
- Polarized ^3He target
 - First time running with 60cm long ^3He cell
 - 50-55% polarization in beam!



- Nov 3, Ready to start Wide-Angle Charged Pion Photoproduction (A_LL) on ^3He
 - Leak found in the Hall A dump pump station. Cancelled A_LL experiment
 - Leaks fixed in Jan 2024
- Changeover for GEN-RP. Remove the ^3He target, install cryo target, setup SBS

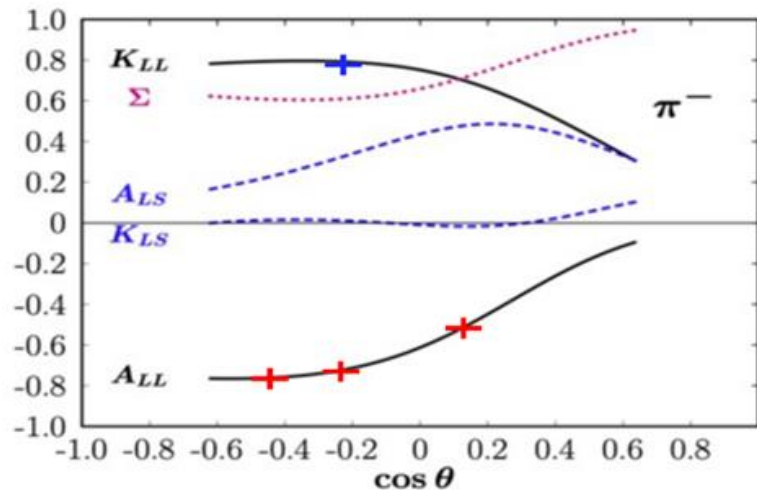
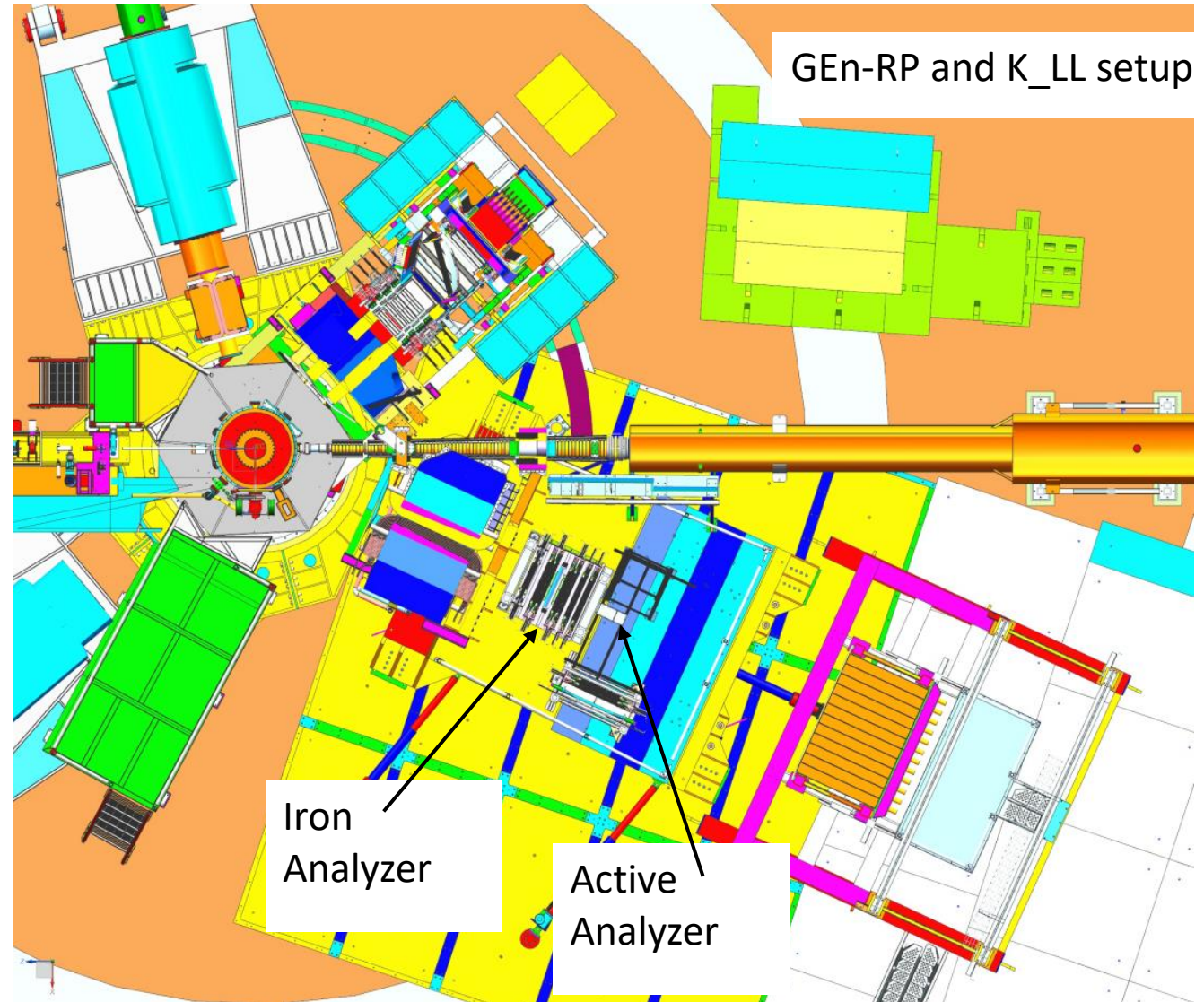


- Lawrence Hurt, new Hall A Work Coordinator, working with Travis Dodge and Casey Forehand on removal of the ^3He target.

Taiga, Xinzhan, Vimukthi, Holly, Saru and Bhasitha getting ready to prepare new GEM chamber from UVA for the GEN-RP experiment

Hall A: GEn-RP and K_LL ran in April/May 2024

- Measurement of the Ratio GEn/GMn at $Q^2 = 4.5$ by the Double-polarized d(een) Reaction
 - Outgoing neutron polarization measured by charge exchange with iron analyzer
 - Additional polarization measurement using the side detectors and 32 channel active analyzer
- Polarization Transfer in Wide-Angle Charged Pion Photoproduction (K_LL)

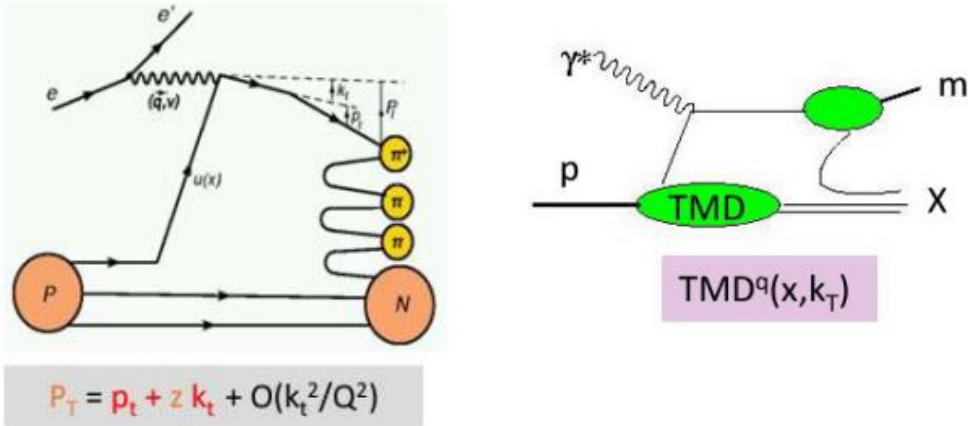


Hall C : Completed 4 NPS experiments from Sept 2023-May 2024

E12-13-007 & E12-23-014

E12-13-007 goal: Measure the **basic SIDIS cross sections** of π^0 production off the proton, including a map of the P_T dependence ($P_T \sim \Lambda < 0.5$ GeV), to validate (*) flavor decomposition and the k_T dependence of (unpolarized) up and down quarks

Linked to framework of *Transverse Momentum Dependent Parton Distributions*
 Transverse momentum widths of quarks with **different flavor (and polarization)** can be different



PR12-23-014 expands on 12-13-007 (24 days) to include

- All three beam energies (not just 10.6 GeV)
- Both proton and deuteron targets

What it adds to JLAB12 SIDIS program:

- Precision measurement of R_{SIDIS} on π^0
- Precision proton/deuteron π^0 multiplicity ratios
- Larger Q^2 compared to CLAS12 for beam asymmetries, etc.

E12-13-010 (LH2) & E12-22-006 (LD2)

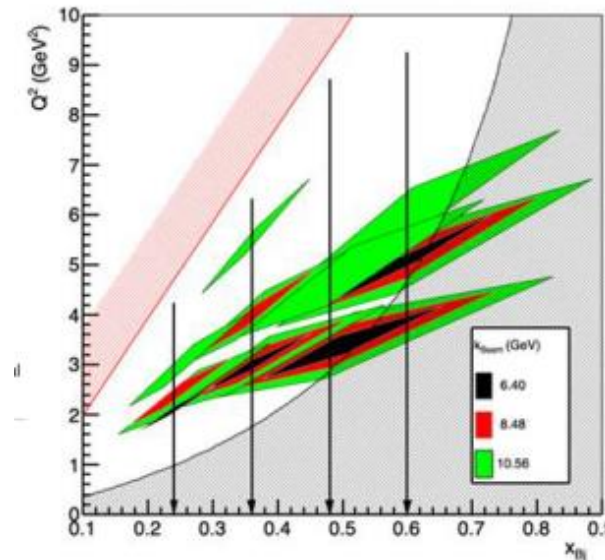
Simplest process: $e + p \rightarrow e' + p + \gamma$ (DVCS)

E12-13-010 DVCS measurements follow up on measurements in Hall A:

- Scaling of the Compton Form Factor
- Rosenbluth-like separation of DVCS:

$$\sigma = |BH|^2 + \text{Re}[DVCS^* BH] + |DVCS|^2$$
 $\sim E_{\text{beam}}^2$ $\sim E_{\text{beam}}^3$
- L/T separation of π^0 production

DVCS NPS/HallC/JLab 2023-2024



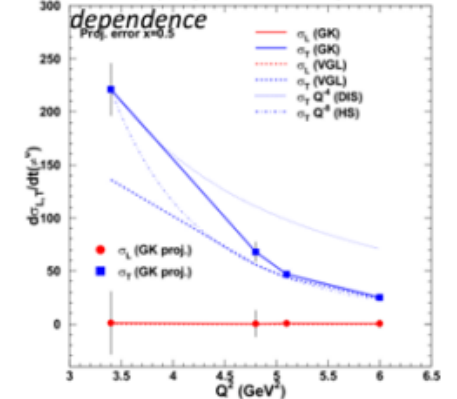
Projected Impact on flavor dependence of CFFs

- Simultaneous fit of E12-13-010 (p) and E12-22-006 (n)
- Real and imaginary parts of CFFs H and \tilde{H} and E (u & d) as free parameters (nDVCS not sensitive to \tilde{E})

π^0 Exclusive Cross Sections

- Relative L/T contribution to π^0 cross section important in probing transversity
- Results from Hall A at 6 GeV Jlab suggest that the longitudinal cross section in π^0 production is non-zero up to $Q^2=2$ GeV²

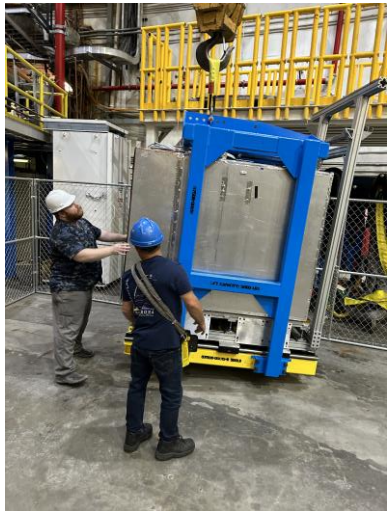
12 GeV projections: confirm Q^2/t



E12-13-010 provides also data on σ_T and σ_L at higher Q^2 for reliable interpretation of 12 GeV GPD data

Hall C: Deinstallation of NPS

Big thanks for Josh (who took the pictures), Artur, Hao, Wassim, Tae-hee, Mark and Christine for getting the NPS decabled

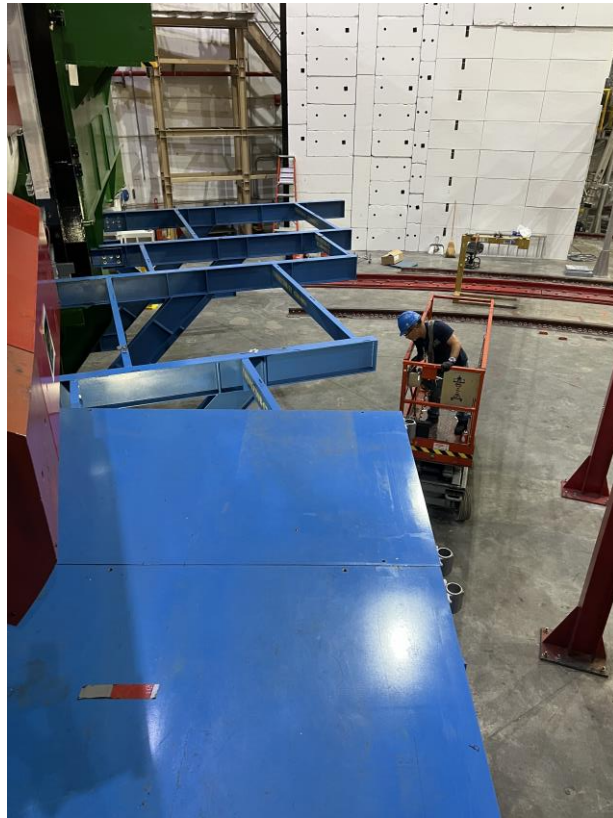


Hall C: Deinstallation of NPS

- Walter Kellner retired
- Jerry Nines is new Hall C Work Coordinator
- Larry Carraway is Deputy Work Coordinator



Robert Wilkinson and Michael Bowman, new tech



Larry Carraway

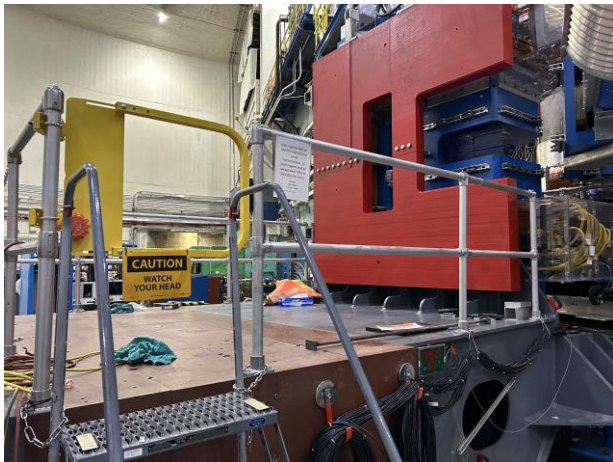


Hall A: SAD work

- Major effort to decable the Bigbite and SBS GEn-Rp setup.

Thanks!

- Ready to move BigBite detector stack to ESB this week.

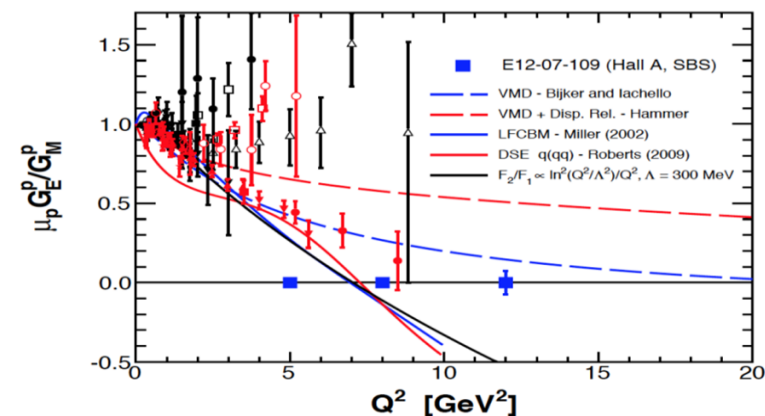


Switch gears for MOLLER PS

Fire Suppression replacement

Hall A Next Run period: Proton electric form factor

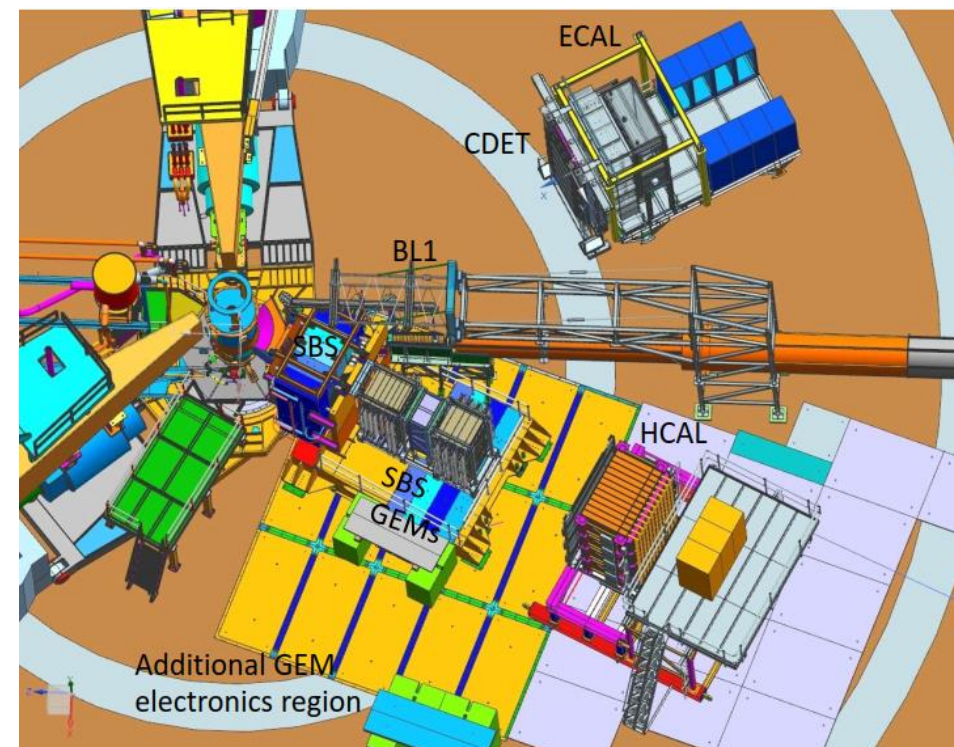
- Measure G_E^p by measuring recoil proton polarization in elastic scattering
- Currently deinstalling BigBite, installing ECAL and SBS GEMs
- Measure to $Q^2 = 12 \text{ GeV}^2$
- PAC approved high precision new $Q_2 = 3.7 \text{ GeV}^2$.



ECAL Front view.
All Supermodules
(1700 blocks) installed.
Installing heaters



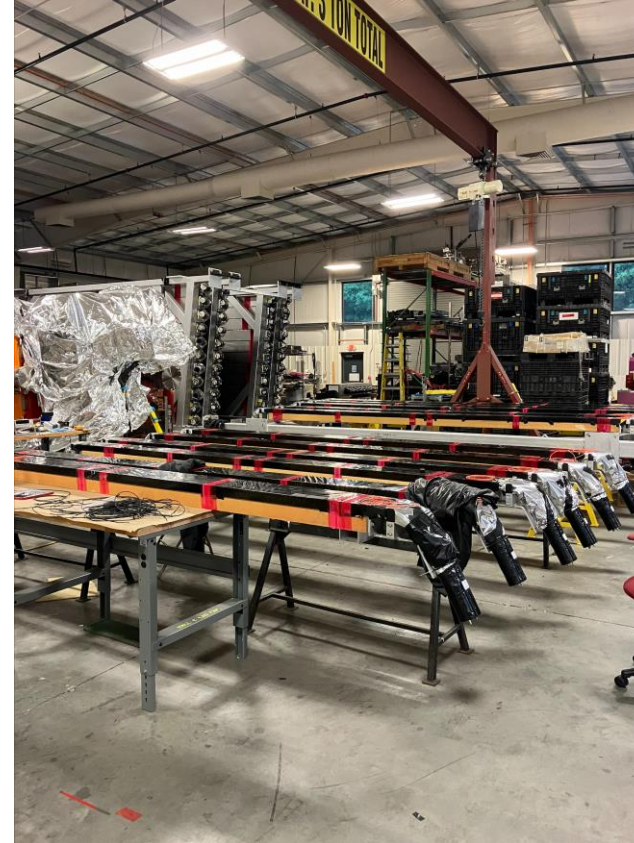
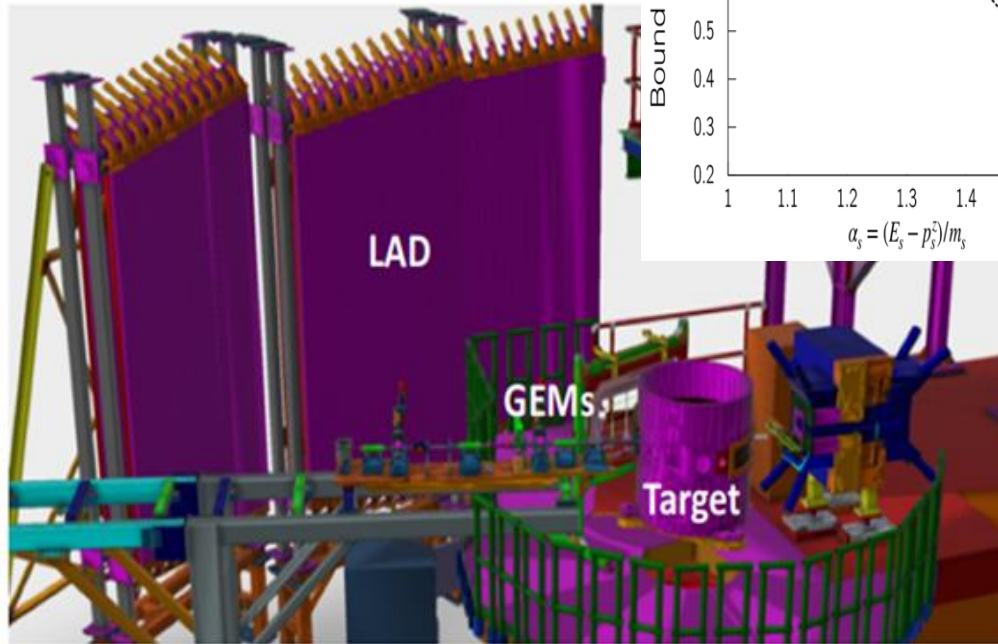
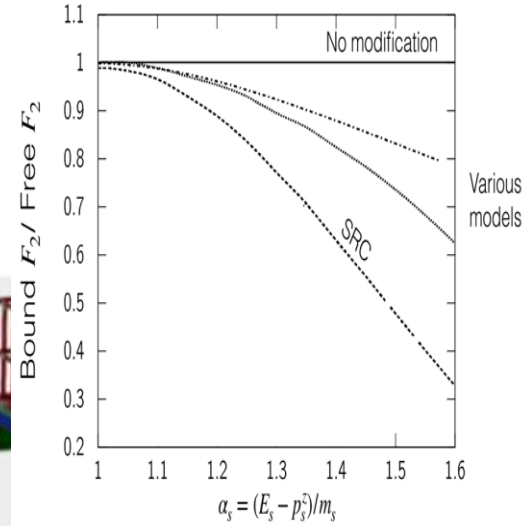
ECAL Rear view.
Cooling system is installed.



Hall C: Next run period

E12-11-107 Spectator tagged DIS $d(e, e' p_s)$

- Install Large Angle Detector
- HMS/SHMS detect electron



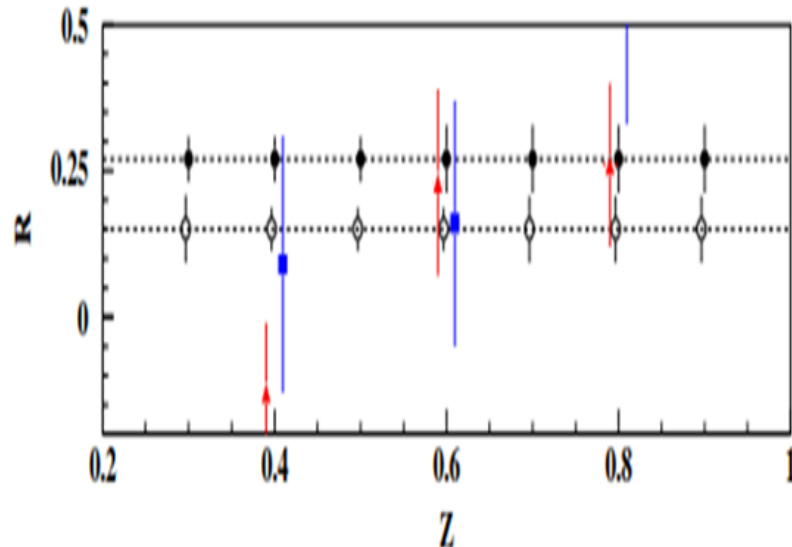
- Does the EMC Effect depend on nucleon virtuality?
- Measure Bound F_2 by tagging the SRC proton in $D(ee'p)$ DIS and look for nuclear effects
- Will provide crucial information needed for identifying the origin of the EMC Effect

Hall C: Next run period

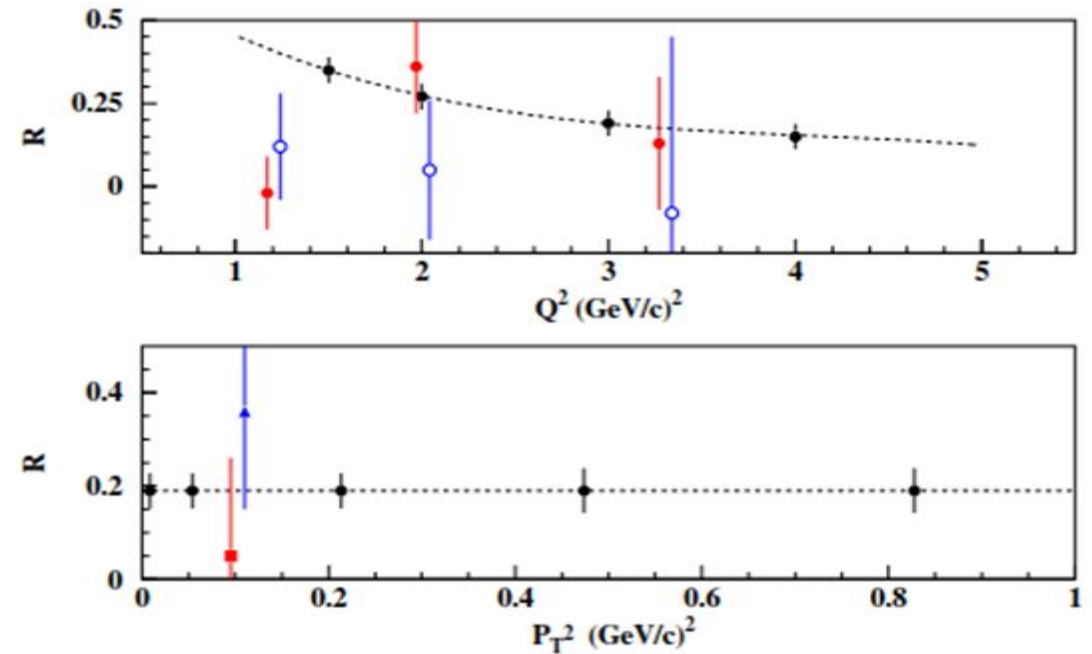
• E12-06-104 $R = \sigma_L / \sigma_T$ in SIDIS on 1H and 2H

- Verify whether $R_{SIDIS} = R_{DIS}$.
- Check the z -dependence of R from the semi-inclusive to the exclusive region.
- Verify that R_{SIDIS} anneals to R_{DIS} at large p_T .
- Verify if R_{SIDIS} follows the Q^2 dependence of R_{DIS} , at two values of x .
- Verify that $R_{SIDIS}^{\pi^+} = R_{SIDIS}^{\pi^-}$ and $R_{SIDIS}^H = R_{SIDIS}^D$.
- With a factor of ten reduced statistics: map $R_{SIDIS}^{K^+}$ and $R_{SIDIS}^{K^-}$.

PAC Approve 7 days for Nuclear Dependence of R

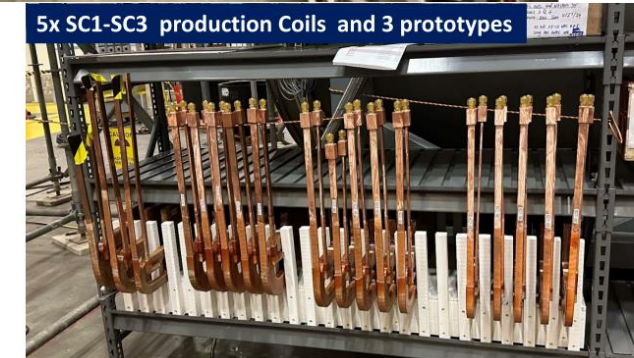
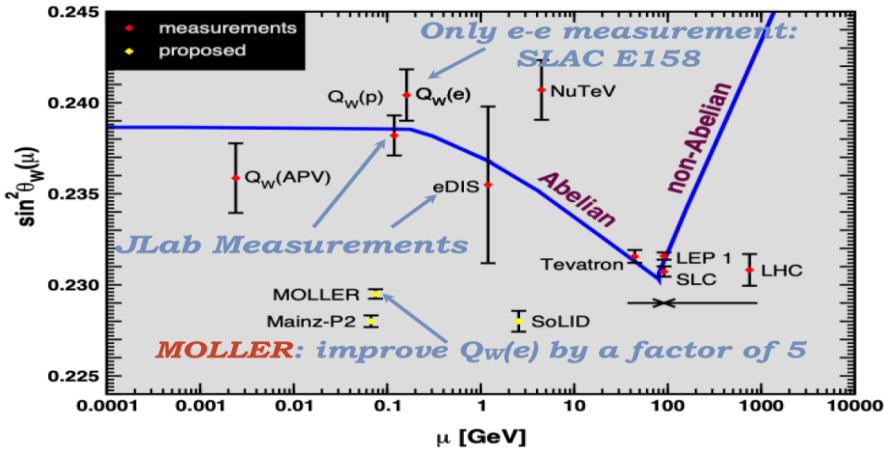


- Map $R_{SIDIS}^H + R_{SIDIS}^D$ as function of z at $x = 0.2$ and $Q^2 = 2.0 \text{ GeV}^2$ (168 Hours)
- Map R_{SIDIS}^H as a function of z at $x = 0.4$ and $Q^2 = 4.0 \text{ GeV}^2$ (319 Hours)
- Map R_{SIDIS}^H as a function of p_T^2 at $x = 0.3$ and $Q^2 = 3.0 \text{ GeV}^2$ (311 Hours)
- Add kinematics to map R_{SIDIS}^H for $Q^2 = 1.5\text{-}5.0 \text{ GeV}^2$ (88 Hours)



Hall A : MOLLER

- Inflation Reduction Act provided full funding.
- In Jan 2023, passed CD-3A review and spending CD-3A funds.
- CD2 /CD3 review in October 2023.
- In May 2024, ESAAB Approval: MOLLER Project CD-2/3
- Installation after GEP run ends
- Reuben Fair is PM, Klaus Dehmelt is Deputy PM.



PAC 52 closeout

NUMBER	TITLE	CONTACT PERSON	HALL	DAYS REQUESTED	DAYS AWARDED	SCIENTIFIC RATING	PAC DECISION
New Proposals							
PR12-24-001	Measurement of the Nuclear Dependence of σ_L/σ_T in Semi-Inclusive Deep Inelastic Scattering	Dave Gaskell	C	5	7	A-	approved
PR12-24-002	Exploring the Transition Region of QCD with the Proton's g_2 Spin Structure Function	David Ruth	C	26			C2
PR12-24-003	Studying Lambda interactions in nuclear matter with the $^{208}\text{Pb}(e, e' K^+)$ (^{208}Pb)TI reaction	Franco Garibaldi	C	42	42	A-	approved
PR12-24-004	Study of charge symmetry breaking in p-shell hypernuclei	Toshiyuki Gogami	C	24	24	A-	approved
PR12-24-011	Study of a triaxially deformed nucleus using a Lambda particle as a probe	Satoshi N Nakamura	C	28	28	A-	approved
PR12-24-013	An isospin dependence study of the Lambda-N interaction through the high precision spectroscopy of Lambda hypernuclei	Satoshi N Nakamura	C	62 (55)	55	A-	approved
PR12-24-007	Nuclear Dependence of Beam Normal Single Spin Asymmetry in Elastic Scattering from Nuclei	Ciprian Gal	C	9	9	A	approved
PR12-24-010	High-precision measurement of $\mu_p G_E^p/G_M^p$ at $Q^2 = 3.7 \text{ GeV}^2$ via Polarization Transfer	Andrew Puckett	A	2	2	A-	approved
PR12-24-008	Inclusive Studies of ^3N Short-Range Correlations	Burcu Duran	C	57			deferred
PR12-24-012	Isospin structure of ^3N short-range correlations and the nucleon structure functions in ^3H and ^3He	Shujie Li	C	53			deferred

Hall A/C Summary

Hall C outlook

- Successfully completed 4 NPS experiments
- Next run period expected to be 24 weeks
 - Run LAD and R-SIDIS
 - Had to move Pion CT experiment another run period
- Current LOTO safety pause means uncertain date for start of physics (Late Jan/Feb 2025???)
- Near term future running
 - Following run periods standard HMS/SHMS with non-standard beam energies (188 PAC days)
 - Hypernuclear experiments (149 PAC days)
- Long term future (no particular order)
 - Polarized deuteron target experiments
 - NPS Calo experiments
 - Strange Form Factor
 - SBS SIDIS polarized ^3He and TDIS.

Hall A outlook

- Successfully completed GMn,nTPE, GEn, GEn-RP and K_LL
- Next run period will complete GEp
- MOLLER
 - Early procurements from CD3A are arriving
 - CD2/CD3 ESAAB Approval in May 2024
 - NSF and Canadian detector construction progressing
- SoLID
 - Part of recommendation #4 in the NSAC LRP
 - Dec 2023, redid the cost estimate of the SoLID project
 - Lab is looking at ways to “redirect” money from Jlab’s OPS and capitol to share cost of project.