

Hall A/C Status

Welcome to the Hall A/C Summer meeting!

- Focus of meeting is having longer talks which explore the physics topics important to Hall A and C
- Invited theorists to give talks on impact of experiments

June 2023 Hall A/C Summer Meeting

Safety pause at Jefferson Lab

- Had two recent incidents with LOTO at JLab ([all hands meeting](#))
 - Pause on work involving LOTOs until it is reauthorized.
 - 67 OSPs with LOTOs have been reviewed.
- With tragic events at SLAC and Fermilab
 - DOE directive that off hours high hazard work needed full support as during normal working hours. (High hazard is unmitigated risk code ≥ 3 or class 2,3 electrical)
 - Could not work in the tunnels or halls since ODH hazard. Now have a variance.
 - Need approval of COO and DOE site office.
 - Could affect the efficiency of running since a variance needs to be obtained in advance for each high hazard OSP.
- Incident with hazardous energy at JLab that is similar to SLAC
 - JLab safety pause to review all OSP with high hazard work ([video of meeting](#))
 - Division Safety Officer needs to review and approve the reauthorization.
 - Many OSPs. Takes time to review OSP, complete paperwork and have it approved.

Upcoming beam schedule

- Safety pause makes predictions of beam start date murky.
- Sent an email out yesterday after the MCC 1:30 meeting.
 - The start of the accelerator 2K cooldown is unclear, since it is taking longer than originally expected to get the cryo OSP's reviewed.
 - At this time, it is unclear when the 2K cool down will start as it requires a number of approvals and complex/risky tasks are being reviewed very carefully. Maybe in 2 weeks.
 - Once 2K cool down starts, it is two more weeks before the machine gets to 2K and then approximately one month to get beam to physics.
- Thus, we are now looking at something close to a two-month delay which puts beam start for all halls some time in beginning of Sept.
- Once the machine is at 2K, the timeline to beam start will be more clear.
- The beam schedule will be shifted overall, so end of beam sometime in May 2024

Changes to the Hall A/C staff

New Staff hires

- *Ciprian Gal* started Jan 16th.
- *Bill Henry* started March 16th.
- *Sanghwa Park* started June 1st.
- *Chandan Ghosh* will start July 3rd.
- *Hanjie Liu* will start Sept 1st.

Staff that has left

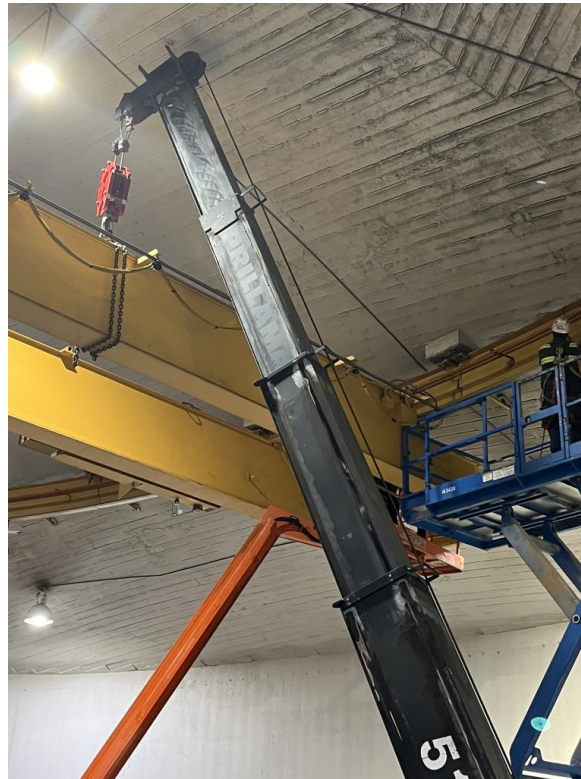
- Roger Carlini retired in Dec 2022.
- Greg Smith retired in April 2023.
- Jessie Butler left on June 23, 2023 for job with Dominion Energy
- Jack Segal left on June 28, 2023 for job at the European Spallation Source in Lund, Sweden.

Changes in staff roles

- Zachary Remele is the acting Hall A work coordinator
- Andrew Lumanog is the acting Hall A deputy work coordinator
- Dave Gaskell will become the supervisor for the Spectrometer Support Group.

Hall A Crane repair

- Started on May 29th . Replacement of the trucks is complete.
- Working on supports is ongoing. To be done around July 7th.
- Then load test and inspection.
- Plan to be completed by July 21st.

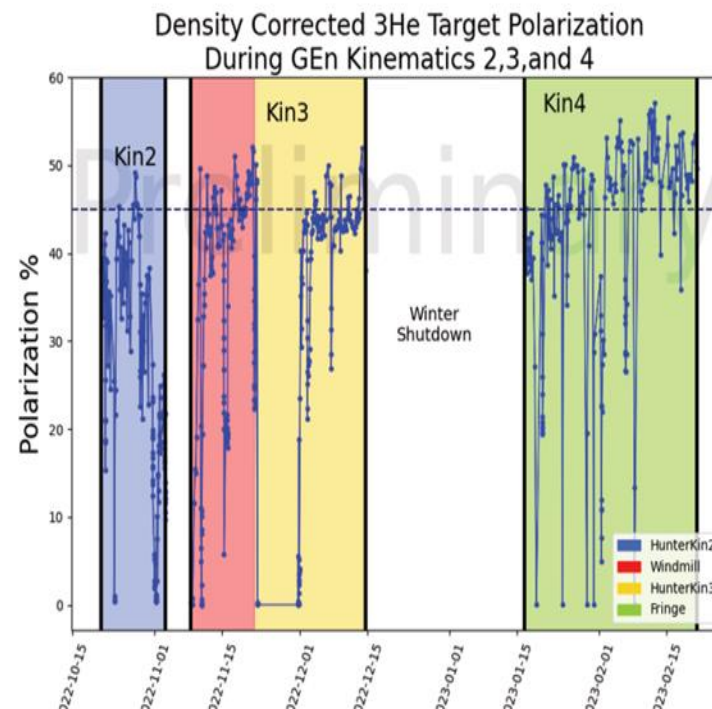
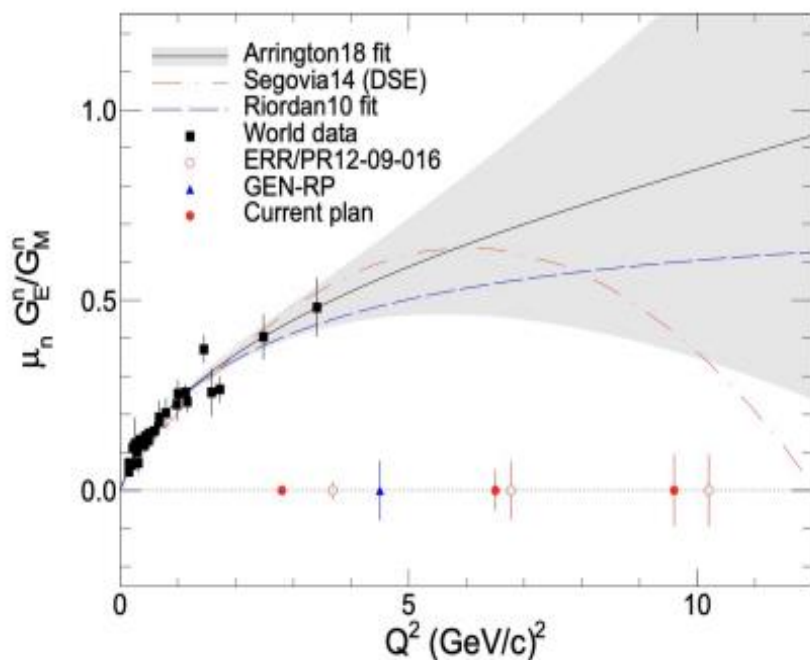


New trucks installed

Hall A Electric neutron form factor

- GEn experiment started in Oct 2022
- Measure beam-target asymmetry in quasi-free polarized neutron.
- First time running with 60cm long ^3He cell
- 50-55% polarization in beam!
- Completed $Q^2 = 2.9$ and 6.6 GeV^2
- $Q^2 = 9.9 \text{ GeV}^2$ is partially done. Complete in next run period.
- Also run the A_LL experiment:

“Double Spin Asymmetry in Wide-Angle Charged Pion Photoproduction”



GEN-RP experiment to run in Spring 2024

- Plan to measure at $Q^2 = 4.5$, $D(e, en)$, measure neutron recoil polarization
- Need to deinstall ^3He target and reinstall cryo target, side polarimeter detectors
- In addition, run K_LL experiment to measure the recoil polarization in WACS pion production $\vec{\gamma} n \rightarrow \pi^- \vec{p}$



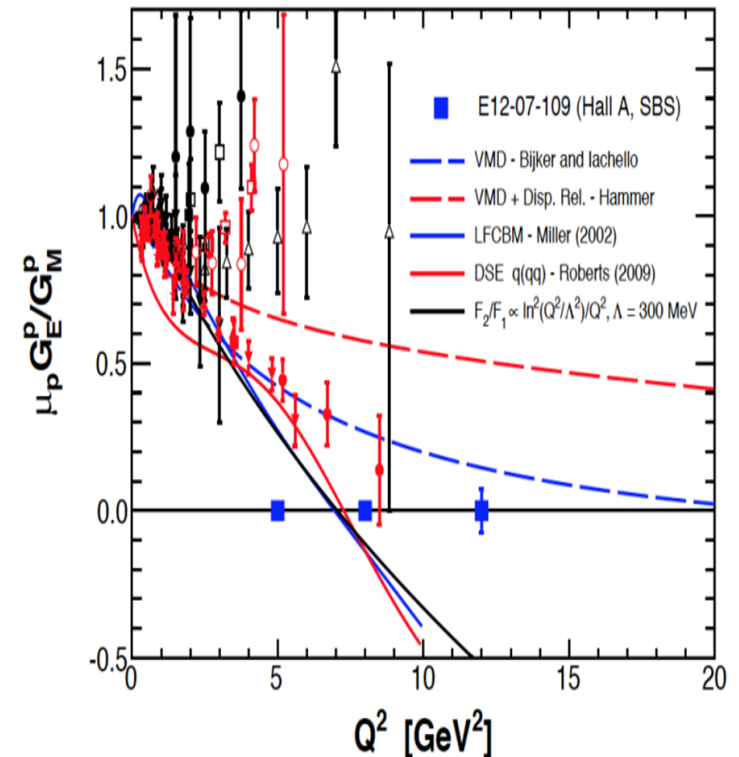
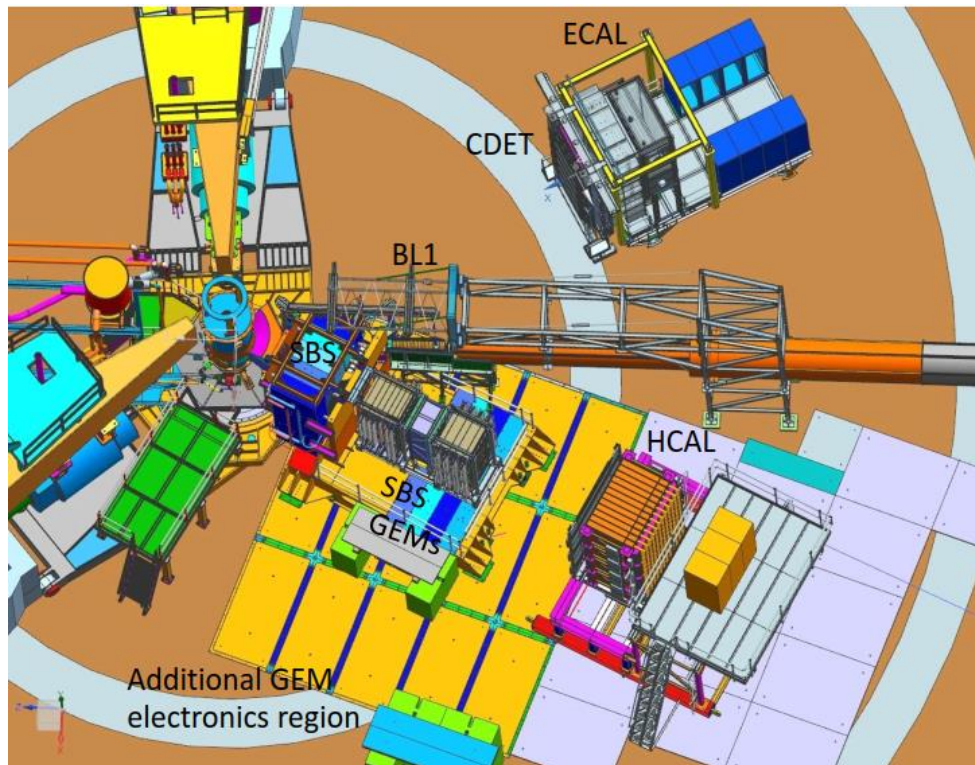
Inline SBS GEMs for GEN-RP being tested during GEN



GEN-RP setup

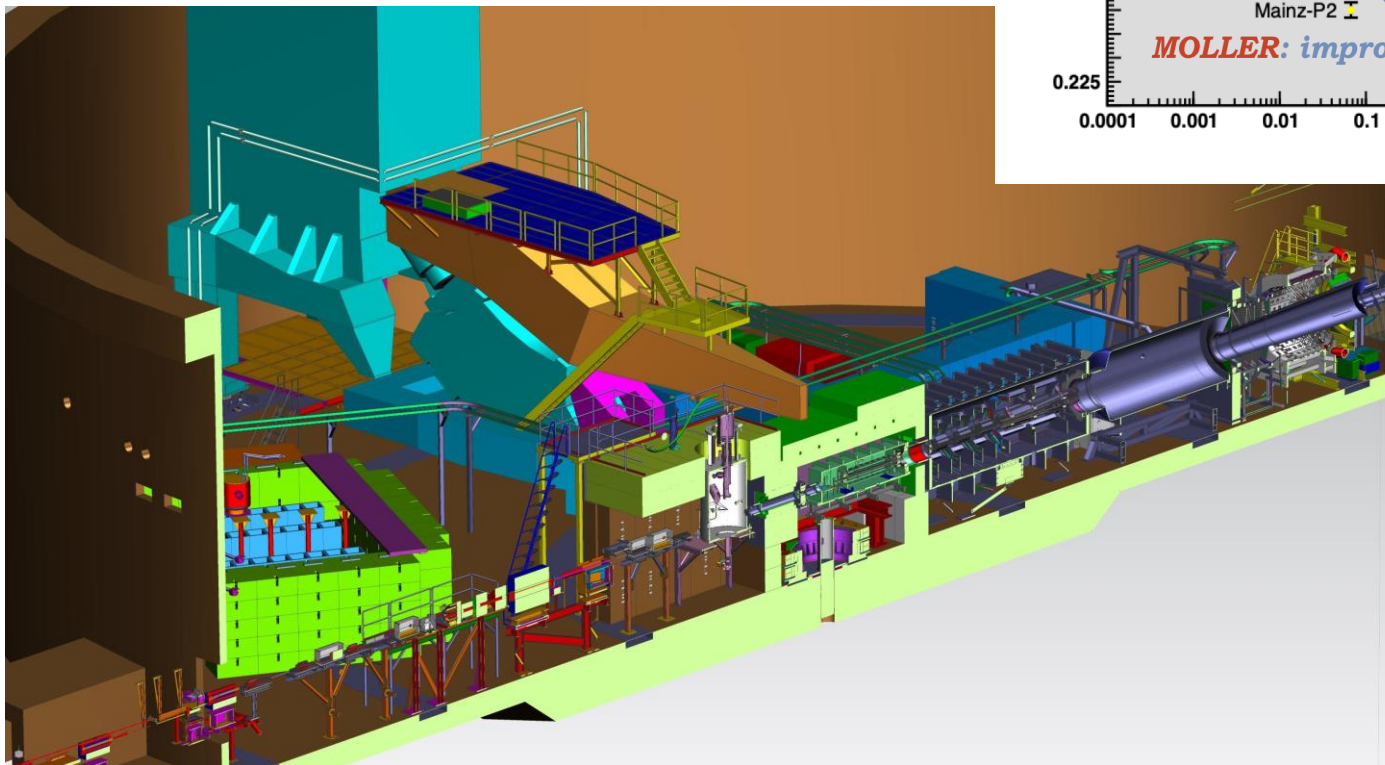
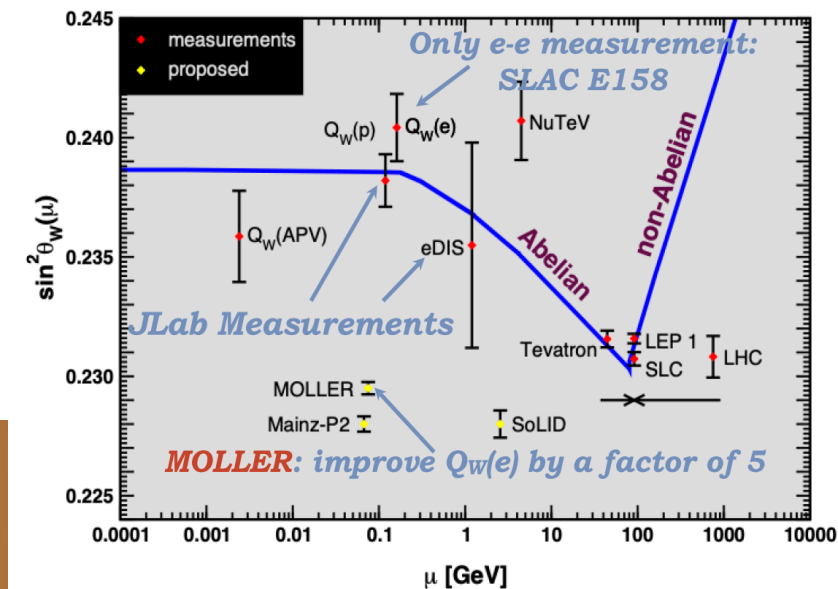
Proton electric form factor in Fall 2024

- Measure GEp by measuring recoil proton polarization in elastic scattering
- Need about 6 months for installation
- Experiment will run in late 2024 to spring 2025.
- Measure to $Q^2 = 12$



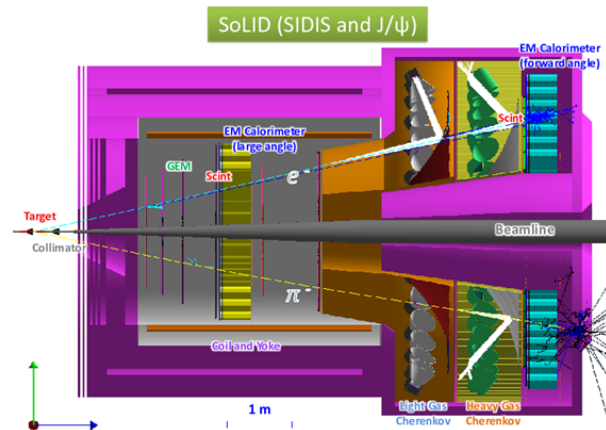
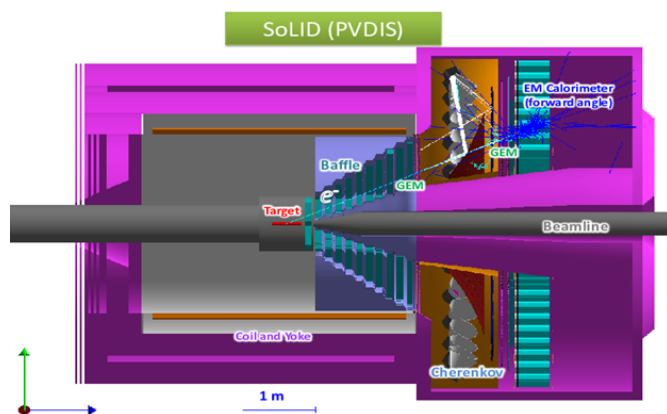
MOLLER Project

- Inflation Reduction Act provided full funding.
- Passed Cd-3A review and spending CD-3A funds.
- CD2 /CD3 review in October 2023.
- Aggressive installation schedule of 18 months after GEp run ends
- 3 years of running.
- JLUO talk by Caryn Palatchi



SoLID : Solenoidal Large Intensity Device

- A series of SIDIS experiments will probe the confined motions (3-D imaging) of partons inside protons and neutrons including orbital motion, and uncover the rich QCD dynamics such as spin-orbital correlations.
- Parity Violating Deep Inelastic Scattering (PVDIS) to search for new interactions beyond the Standard Model.
- J/Ψ production near threshold will provide information on the pure gluonic component of QCD
- Completed the CLEO magnet cold test
- Successful parasitic test of high rate on detectors in Hall C
- Working to be recommendation in the Long Range Plan as it was in 2015 LRP.
- JLUO talk by Xiaochao Zheng



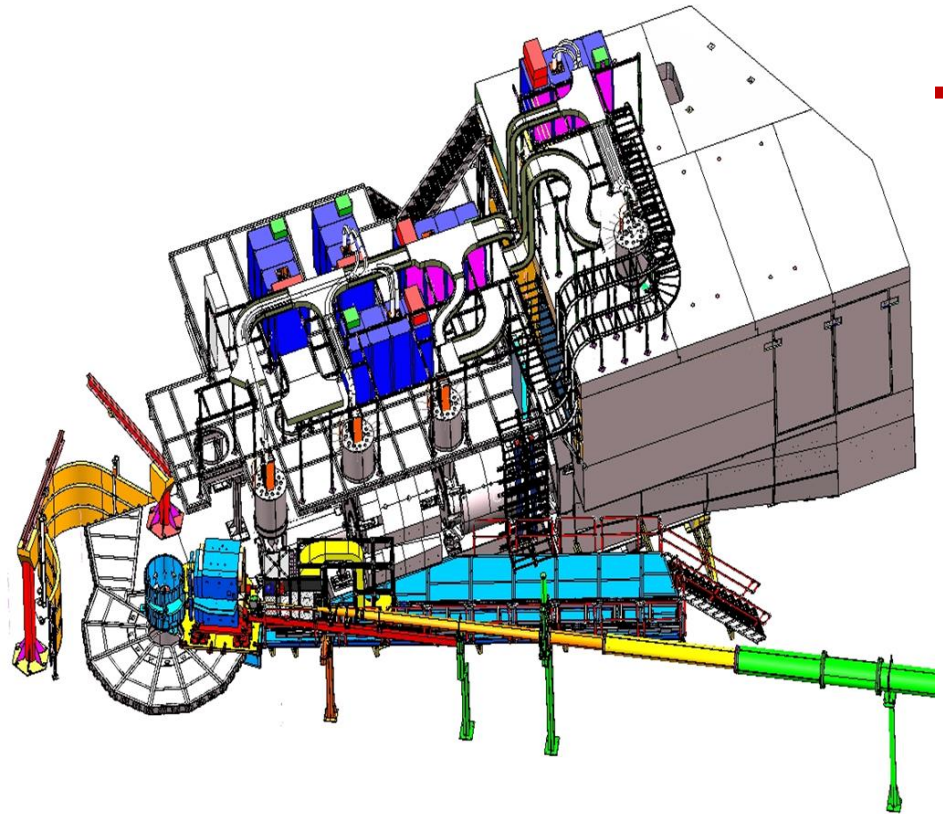
Unique Capability:

- ✓ High luminosity (10^{37-39})
- ✓ Large acceptance detector with full ϕ coverage
- ✓ State-of-the-Art Technology

Hall C Upcoming experiments

Neutral Particle Spectrometer

- Sweeping Magnet with calorimeter.
 - Magnet and power supply have been tested.
- NPS attached to SHMS carriage to allow easy angle change.
 - The calorimeter is on rails.
- 1080 Lead-Tungstate blocks in calorimeter to detect γ and π^0
- See JLUO talk by Tanja Horn



Two experiments using the NPS will run from Fall 2023 to May 2024

- E12-13-010 is two concurrent experiments
 - Exclusive Deeply Virtual Compton on proton
 - SIDIS $p(e, e', \pi^0)$ cross section.
 - Map the transverse momentum dependence.
- E12-22-006
 - Exclusive Deeply Virtual Compton on deuteron
 - Subtract the proton data from deuteron data to get neutron.
- Proposal PR12-23-014 would new run group that measures $R = \sigma_L / \sigma_T$ in SIDIS $p(e, e', \pi^0)$ cross section.

NPS installation



Removal of the SHMS HB magnet



Back to the standard cryo target setup.



Rad 2 area from the previous experiments

NPS Calorimeter into the Hall



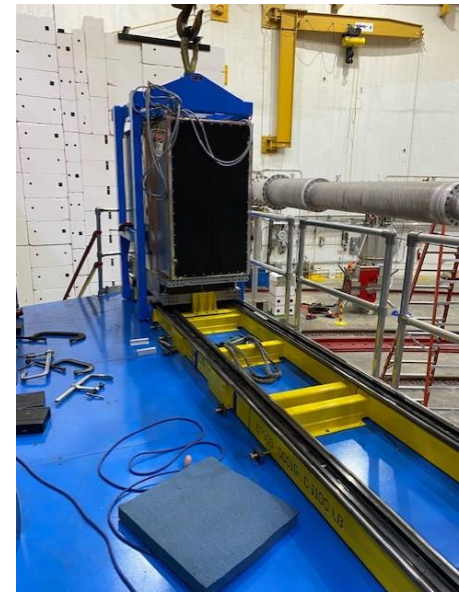
Calo in the EEL before transport to the hall



Students attaching markers for the fiducialization



Calo craned on platform



Calo on rails

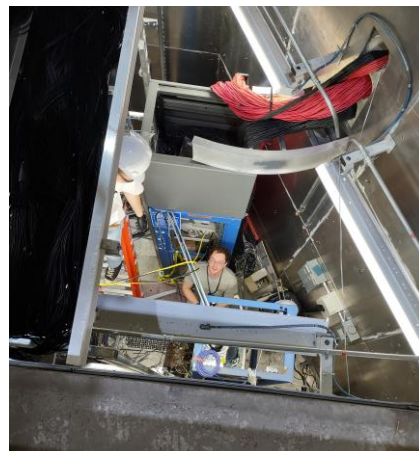
NPS Cabling



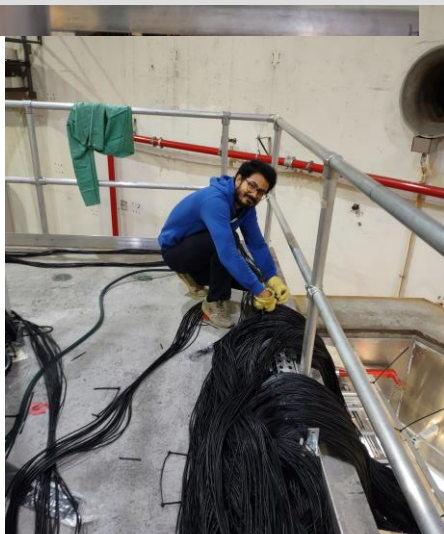
Hao Huang



Buddhiman Tamang



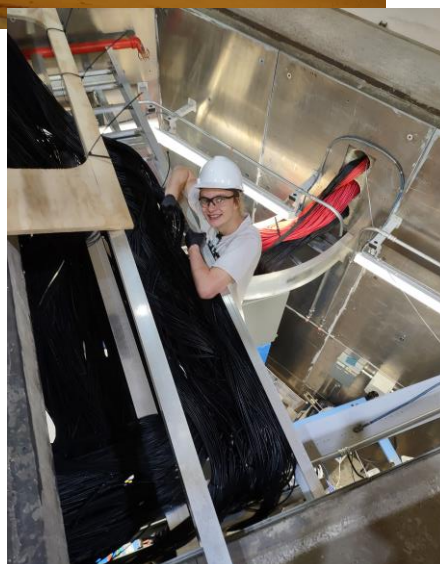
Mitch Kerver



Wassim Hamdi



Jimmy Caylor



Pierre Pichard

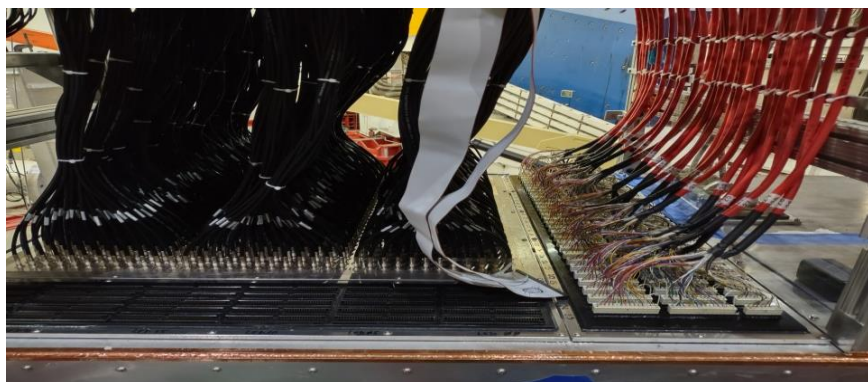
Hall C 2023: Cabling



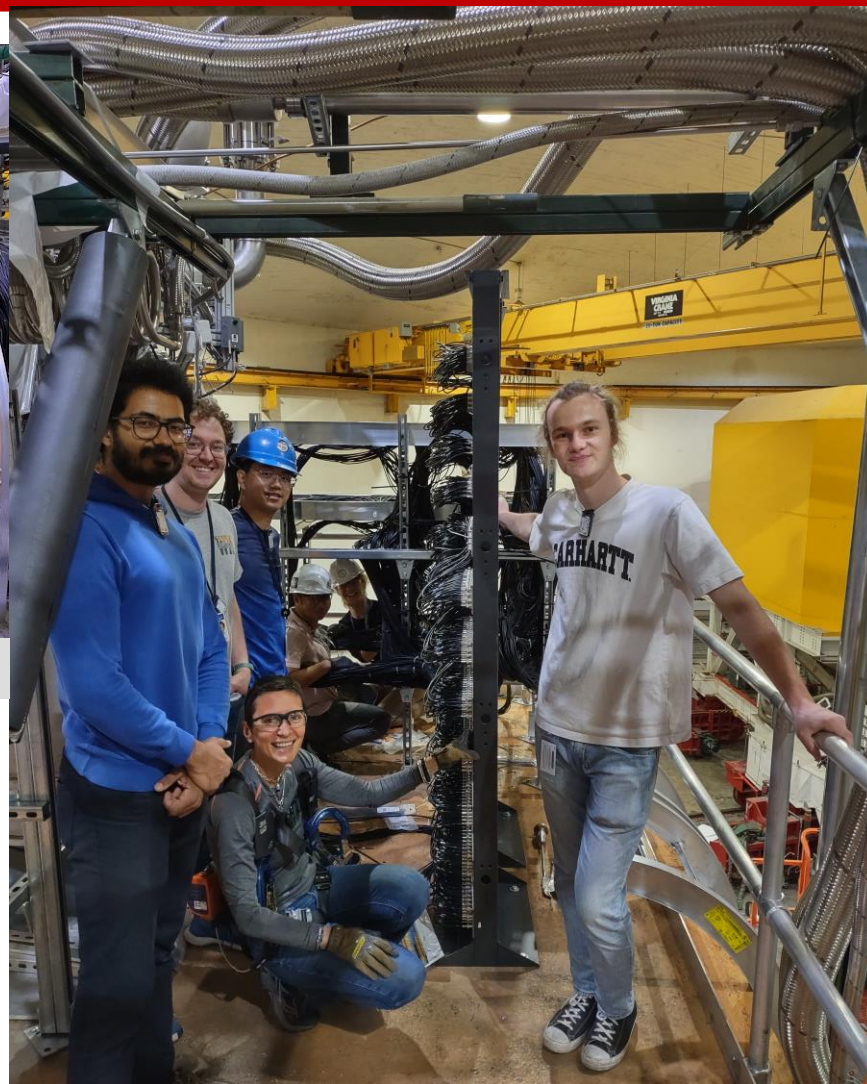
Cabling at patch panel on top of SHMS



Simona Malace



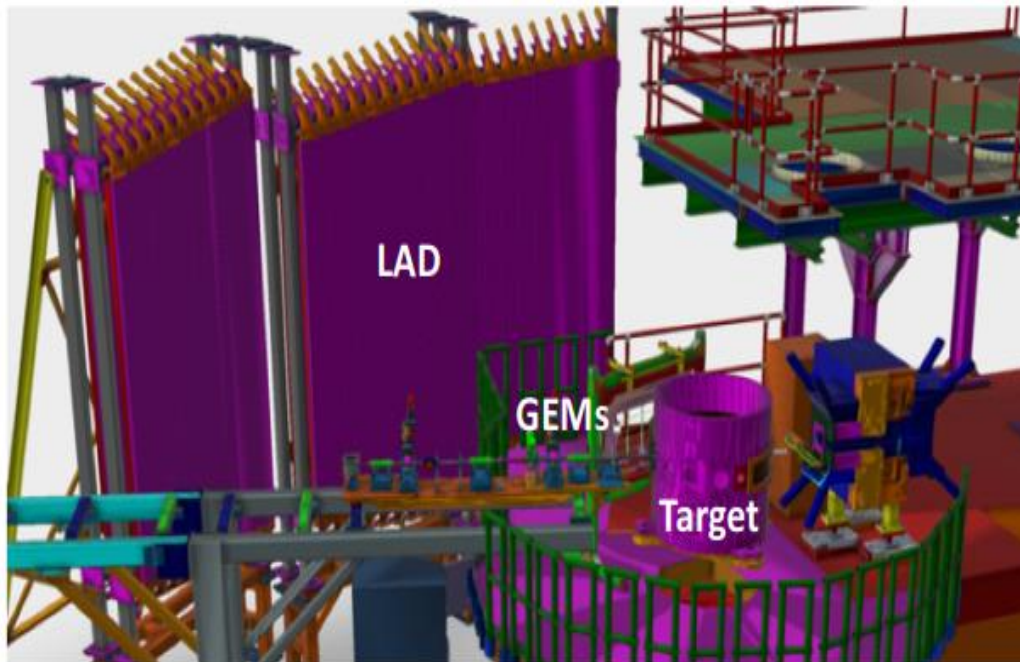
2x1080 signal cables and 30 HV cables connected



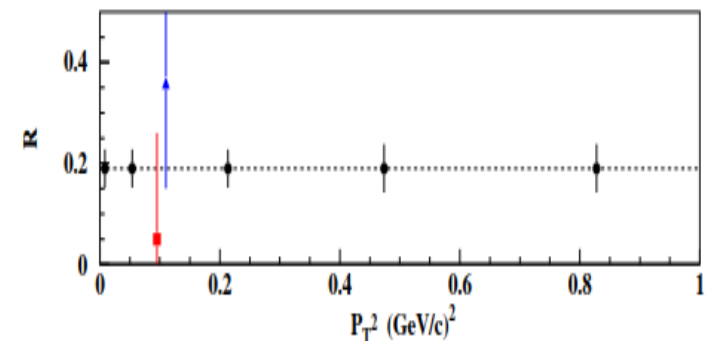
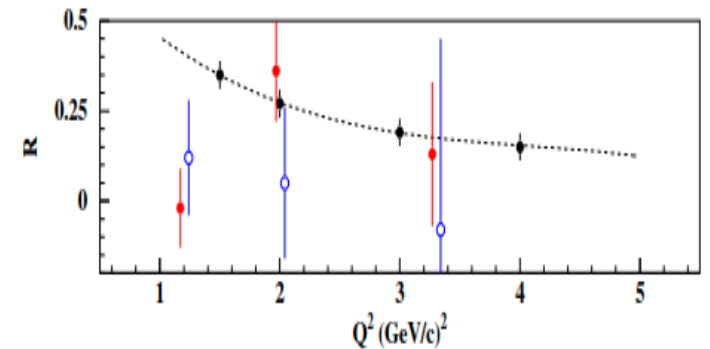
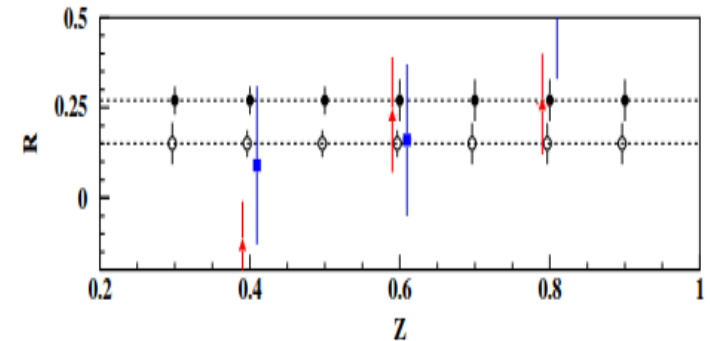
Cabling crew

Experiments to run in Fall 2024- Spring 2025

- Standard SHMS/HMS
 - E12-06-104 $R=\sigma_L/\sigma_T$ in SIDIS on 1H and 2H
 - E12-06-107 Complete CT experiment
 - E12-11-107 Spectator tagged DIS $d(e,e'p_s)$
Install Large Angle Detector
HMS/SHMS detect electron



$R=\sigma_L/\sigma_T$ in SIDIS



- Starting in Fall 2025
 - Standard SHMS/HMS experiments.
 - Experiments with non-standard beam energies
 - New proposals
- Running during MOLLER and after:
 - During MOLLER, limits on total target power and beam current in the two halls
 - Hypernuclear experiments in 2026
 - Polarized deuteron experiments
 - WACS and other experiments using the NPS
 - Experiments using the Compact Photon Source
 - Capital project is ongoing
 - SBS/BB experiments that did not run in Hall A
 - Exciting new letters of intent
- Future plans have to work with needs of the other halls and target group resources.

Summary

- We will work through this safety pause and run exciting physics experiments:
 - DVCS/SIDIS with NPS
 - Neutron electric form factor extracted from ^3He and recoil polarization
 - **Sign up for shifts and run coordinator.**
- PAC (week of July 24th)
 - 16 Letters of Intent (4 of 16 for positron beams) (3 positron and 7 electron for Hall C, 1 positron Hall A)
 - 12 New Proposals (6 of 12 for positron beams) (3 positron and 4 electron for Hall C)
- Amazing physics program ahead
 - Hall A
 - Complete the SBS form factor program, MOLLER and then SOLID
 - Hall C
 - LAD experiment, $R=\sigma_L/\sigma_T$ in SIDIS, Complete CT experiment
 - Hypernuclear experiments, polarized deuteron
 - Many more
- Enjoy the meeting. Ask questions of the speakers!

Party tonight from 6-8
Flyers are available with directions.
Arun is arranging for pizza. Tell him what toppings you want!