Hall C Status

May 2025 NPS Collaboration Meeting

Mark Jones
Hall A/C Group Leader

Dave Gaskell
Hall A/C Deputy Group Leader

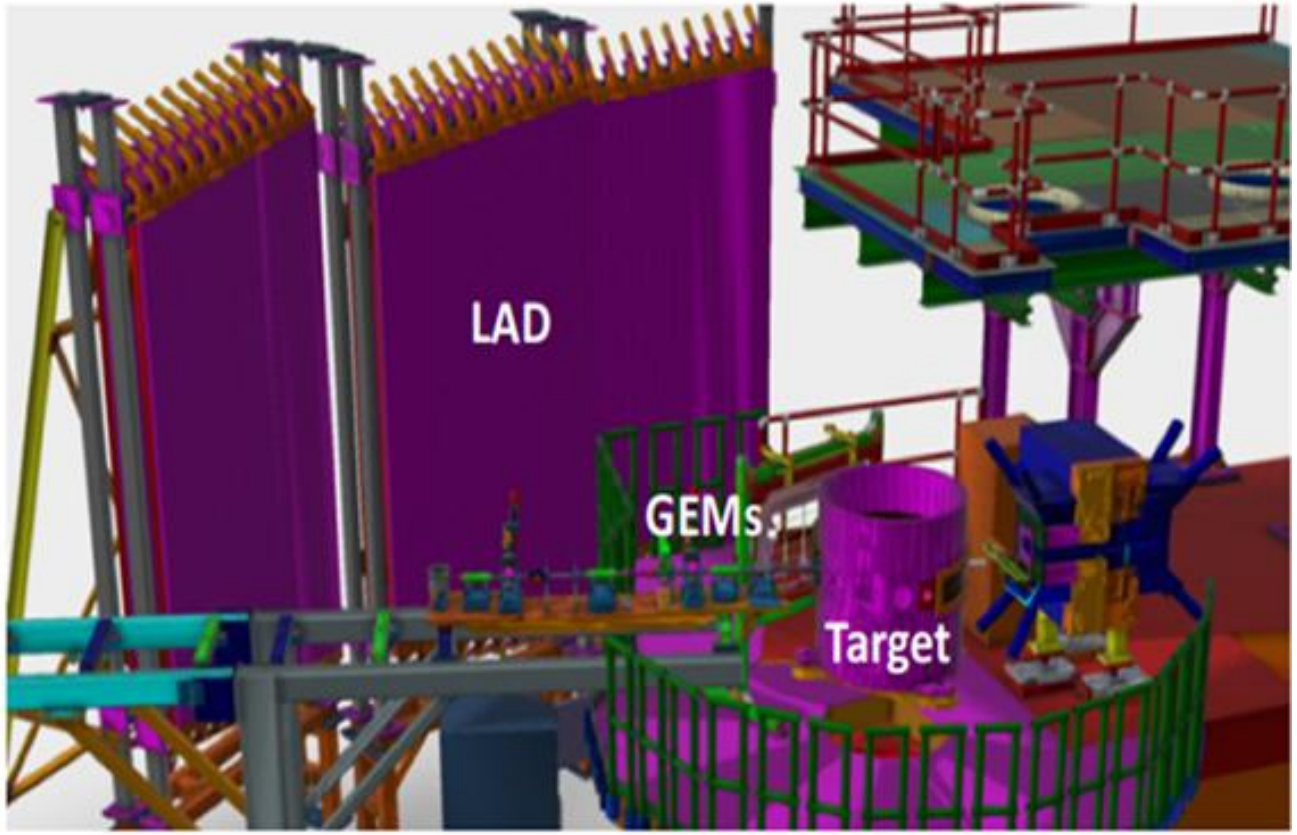
Hall C status

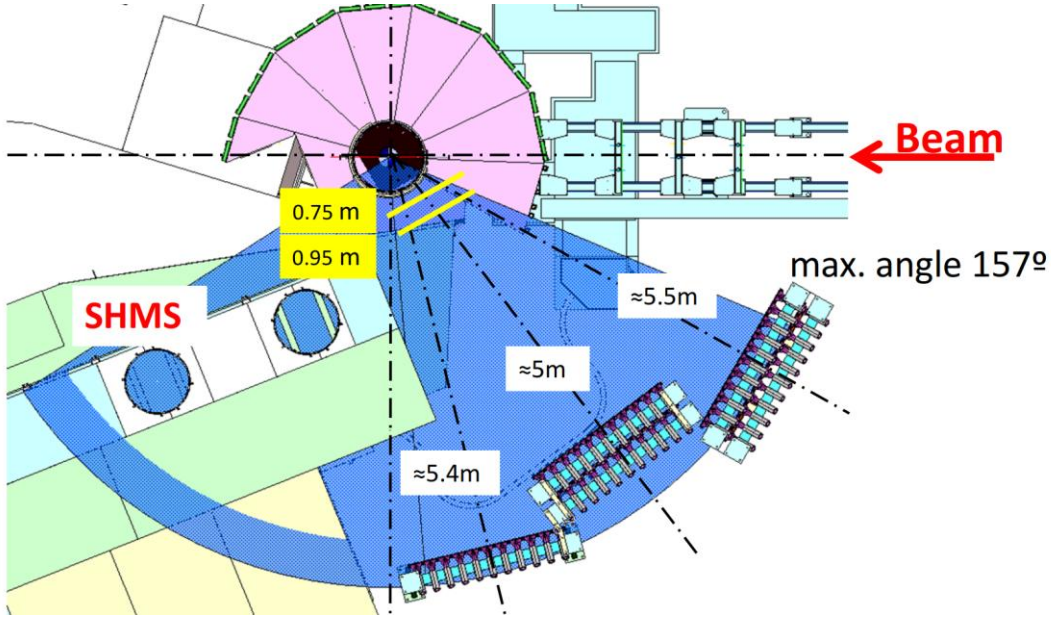
- Decision to shorten this run period to 20 weeks.
- E12-11-107 Spectator tagged DIS d(e,e'p_s) started on April 3rd 2025.
  - On April 21st , Hall C 480-volt switchboard had a short circuit. Also caused fuses in transformer upstream of switchboard to be blown.
  - All dirty power lost to hall. Repairs should be completed by May 7th
  - Power restoration on May 8th. Could take a few days to restore all equipment.
  - Will shift the schedule to complete the LAD experiment.
- Second set of experiments is about 3 calendar months (94 calendar days)
  - E12-06-104 $R=\sigma_L/\sigma_T$ in SIDIS $\pi^{+/-}$ on 1H and 2H
  - E12-24-001 Nuclear Dependence (C,Cu) of R in SIDIS
  - Roughly can run 32 Calendar days the FY25 run period.
  - Would run the remaining 62 Calendar days in the FY26 run period

Hall C: Current run period

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

- Install Large Angle Detector to detect the spectator proton
- HMS/SHMS detect DIS electron
- Scattering chamber rotated so large opening to 157 deg
- 20cm LH2 target with opening for 157 deg





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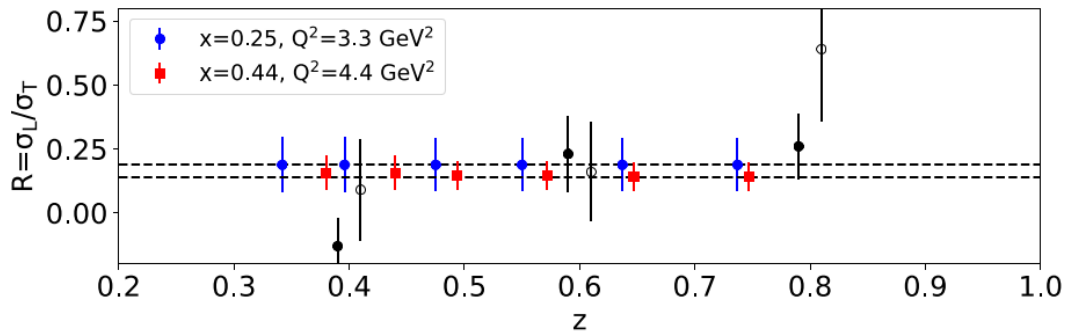
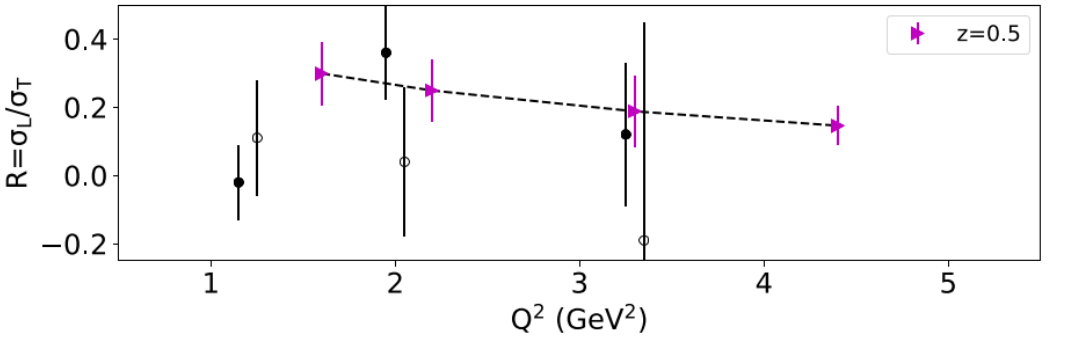
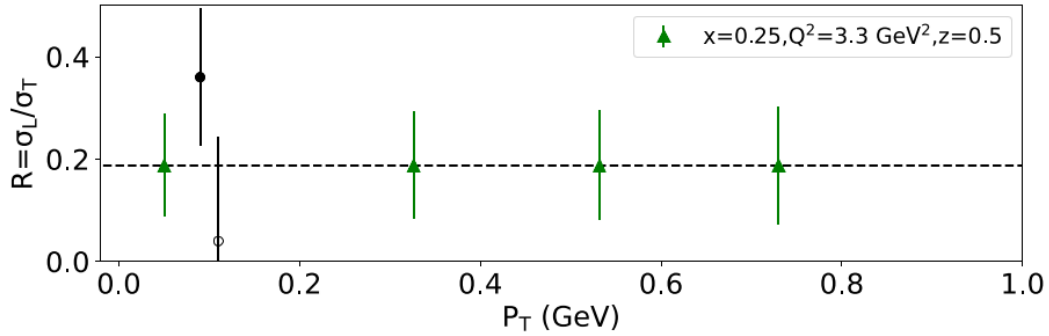
Hall C: Upcoming run period

- E12-06-104 $R=\sigma_L/\sigma_T$ in SIDIS on 1H and 2H
- E12-24-001 Nuclear Dependence (C,Cu) of R in SIDIS

- 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 $R^{\pi^+}_{SIDIS} = R^{\pi^-}_{SIDIS}$ and $R^{H}_{SIDIS} = R^{D}_{SIDIS}$.
- With a factor of ten reduced statistics: map R^{K+}_{SIDIS} and R^{K-}_{SIDIS}.







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Near future Hall C schedule

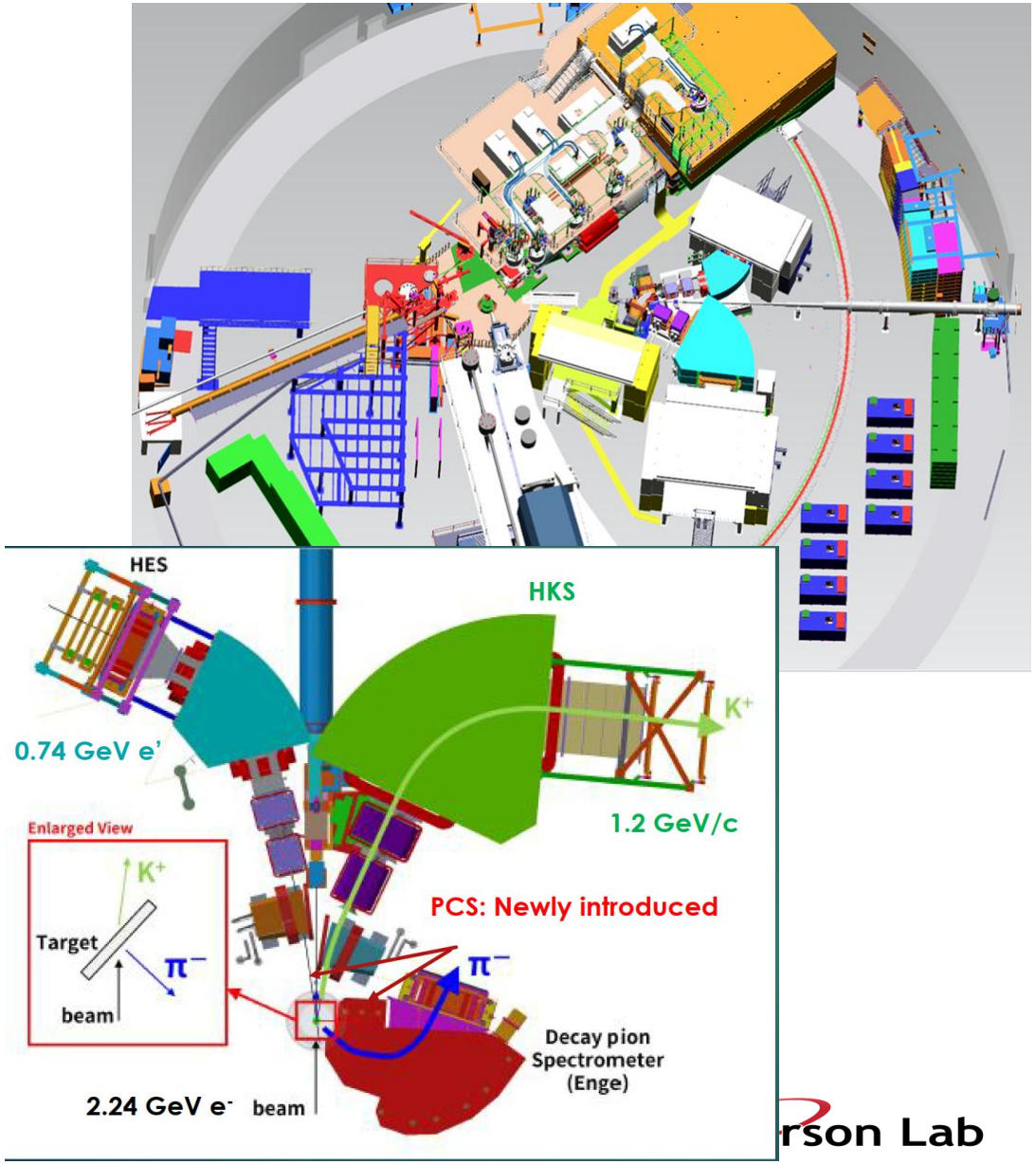
- FY26 assume 25 weeks and start in Feb 2026-July 2026.
  - Run HMS/SHMS experiments on the draft beam schedule
  - Complete E12-06-104 and E12-24-001
  - E12-06-107 Complete Pion Color Transparency
  - E12-22-001 N-Delta at low Q^2, Special beam energy to match Hall B.
  - E12-23-001 VCS at low Q^2, Special beam energy to match Hall B.
- FY27 run period is unclear when it would start.
  - Run standard HMS/SHMS experiments. Possibilities:
    - Run NucR, complete KaonLT, non-standard beam energies
    - E12-24-007, Nuclear Dependence in Beam Normal Spin Asymmetry in Elastic Scattering, non-standard beam energy, add detector to SHMS.
    - Complete VCS experiment
    - E12-23-010 Color Transparency in Maximal Rescattering Kinematics
    - E12-20-007 Backward-angle Exclusive pi0 Production above the Resonance Region

Hypernuclear experiments

- Experiments had ERR in Nov 2024. Much work is needed to pass the ERR. See report.
- Experiment PAC days. Total 149 PAC days. Assuming 50% efficiency that is 42 weeks. Two run periods.

Experiment	Title	PAC Days
E12-23-013	An isospin dependence study of the Lambda-N interaction through the high precision spectroscopy of Lambda hypernuclei	55
E12-24-011	Study of a triaxially deformed nucleus using a Lambda particle as a probe	28
E12-24-003	Studying Lambda interactions in nuclear matter with the ^{208}Pb(e,e' K+)$^{208}{}_{\Lambda}$Tl reaction	42
E12-24-004	Study of charge symmetry breaking in p-shell hypernuclei	24
Run Group	High-resolution spectroscopy of light hypernuclei with the decay-pion spectroscopy (ENGE magnet)	N/A

- MOLLER will be running in Hall A during the time that Hypernuclear experiments would run



Schedule beyond Hypernuclear

- MOLLER running in Hall A (65uA at 5 pass) until 2030. Limits current to Hall C.
- Likely candidates are experiments using polarized ammonia targets
  - E12-13-011 The Deuteron Tensor Structure Function b1
  - E12-15-005 Measurements of the Quasi-Elastic and Elastic Deuteron Tensor Asymmetries
  - PR12-24-002 Exploring the Transition Region of QCD with the Proton's g2 Spin Structure Function
    - C2 approval, needs to go back to PAC
- Have an exciting list of approved experiments
  - Experiments using the NPS: Complete Hall A DVCS, Wide Angle Compton and Exclusive photoproduction
  - Polarization observables in WACS using the Compton Photon Source, polarized NH3 target, NPS and BigBite
  - The experiment: "A Search for a Nonzero Strange Form Factor of the Proton at 2.5 (GeV/c)^2"
  - Experiments using the SBS/BB
    - SIDIS on polarized 3He target
    - Tagged DIS to measure the pion/kaon structure functions