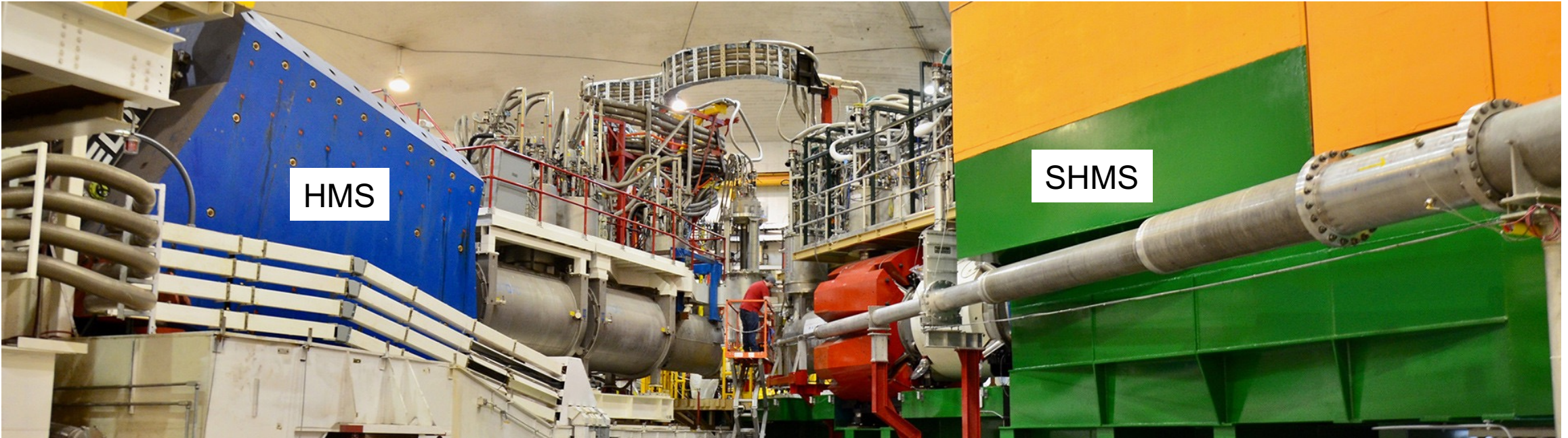


Hall C Update



Hall C Standard Equipment: High Momentum Spectrometer ([HMS](#)) and Super High Momentum Spectrometer ([SHMS](#))

Pac 54, July 6, 2026

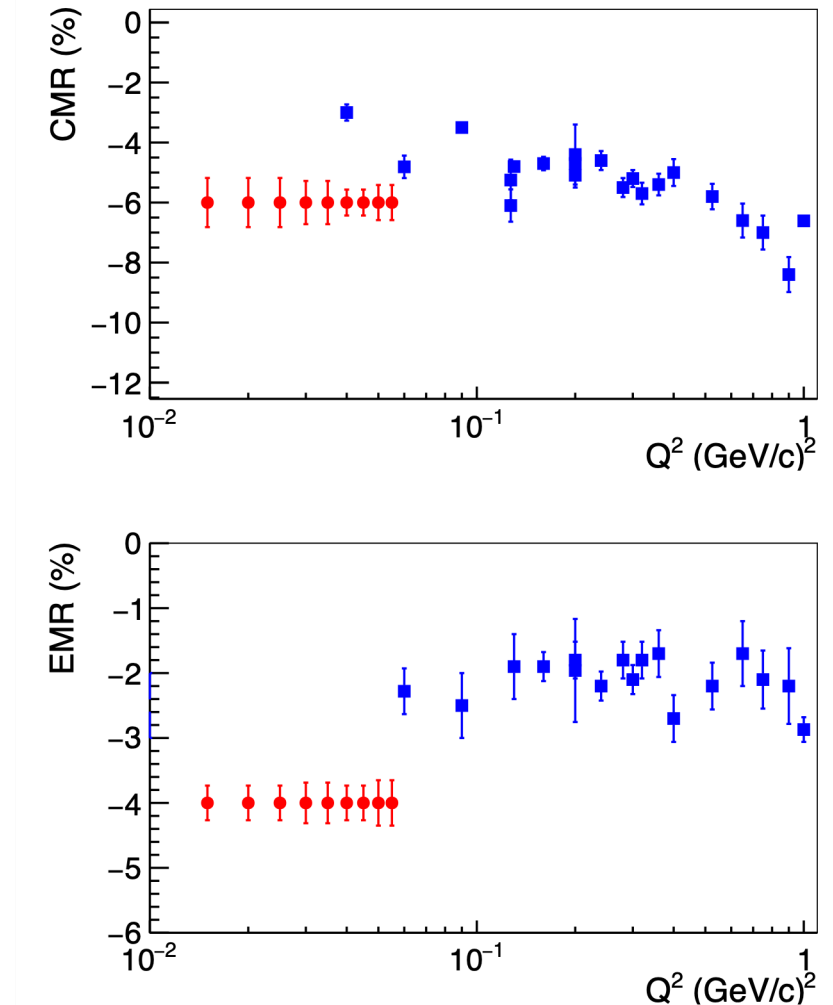
Mark Jones, Hall A/C Group Leader

Dave Gaskell, Hall A/C Deputy Group Leader

Hall C 2026 Low Energy Running

2 Hall C experiments made use of CEBAF low energy run period

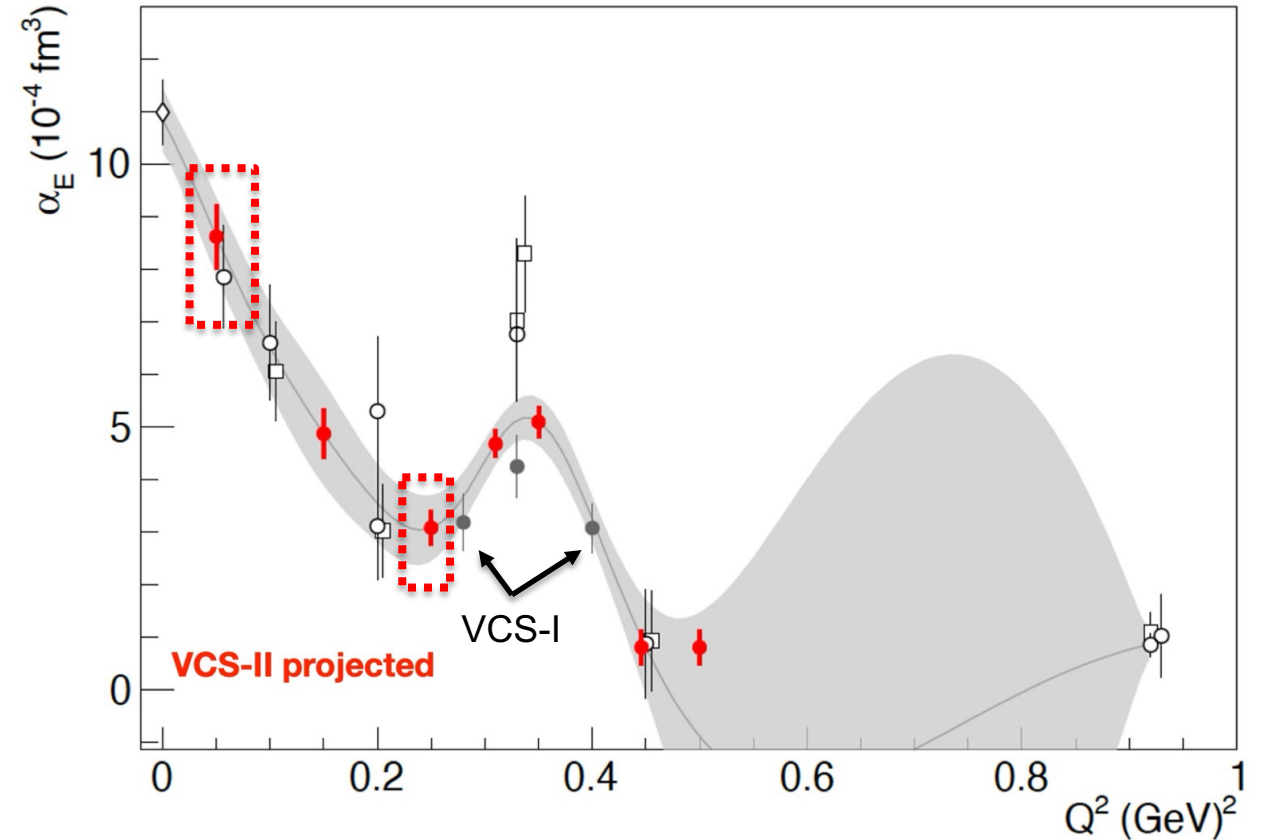
- [E12-22-001](#) Measurement of N- Δ form factor at low Q^2
- Extend existing measurements of electric and coulomb quadrupole amplitudes to low Q^2
- Test whether amplitudes converge as $Q^2 \rightarrow 0$
- Provide benchmark data for chiral effective field theory and lattice calculations
- Measured $p(e,e'p)\pi^0$ using HMS and SHMS at $E_{\text{beam}}=1.4$ GeV



Hall C 2026 Low Energy Running

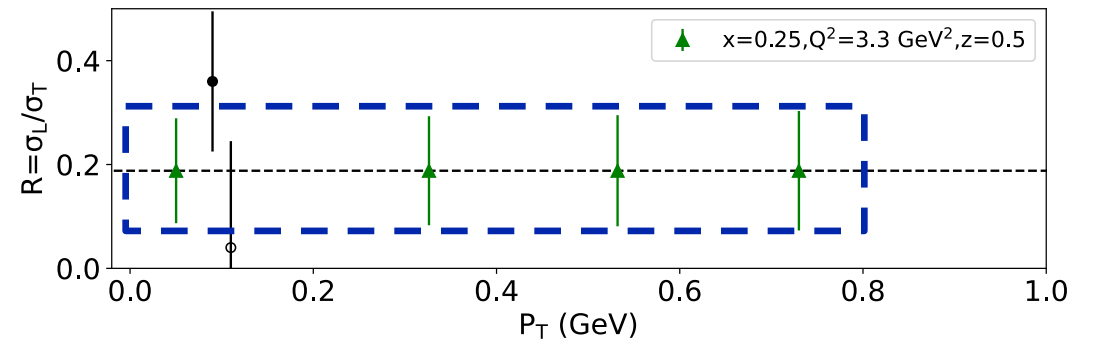
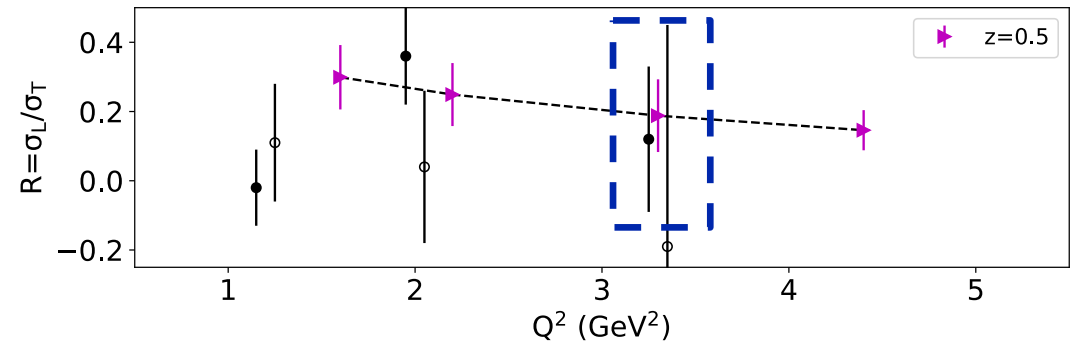
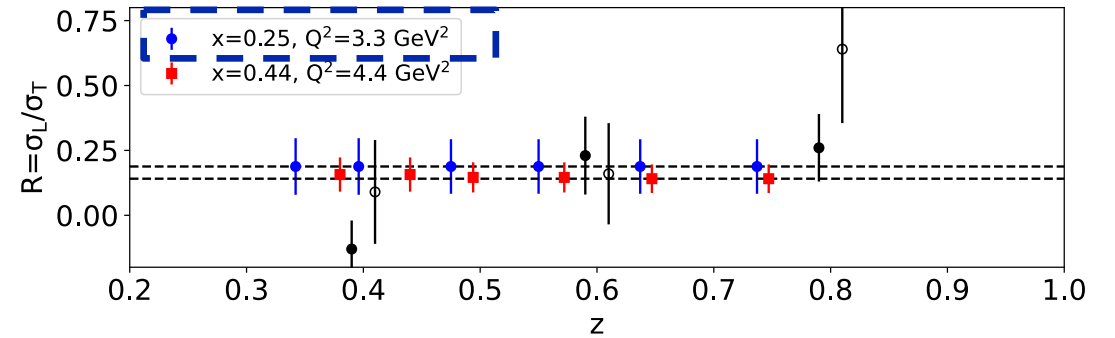
2 Hall C experiments made use of CEBAF low energy run period

- [E12-23-001](#) Proton Generalized Polarizabilities (VCS-II)
- Builds on results from VCS-I experiment that ran in 2019
- Extends Q^2 range, improves precision in region of interest
- Measured $p(e,e'p)\gamma$ reaction at $E_{\text{beam}}=1.4$ and 2.1 GeV
- Measured $Q^2=0.05$ and 0.25 GeV^2
- Remaining kinematics planned for 2027



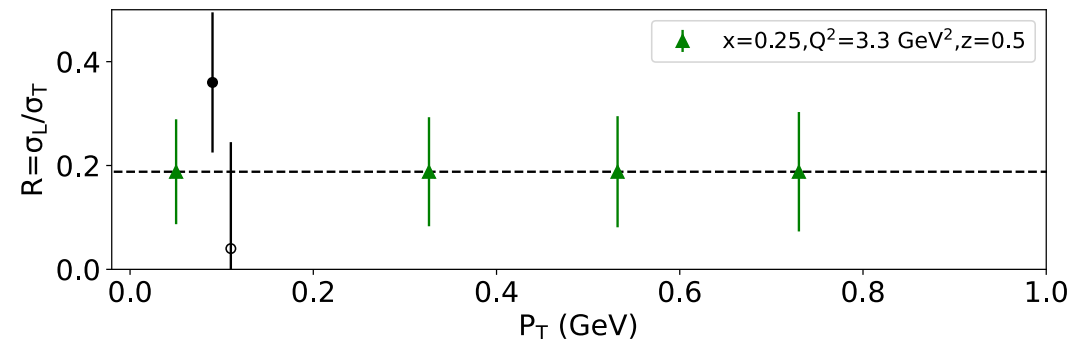
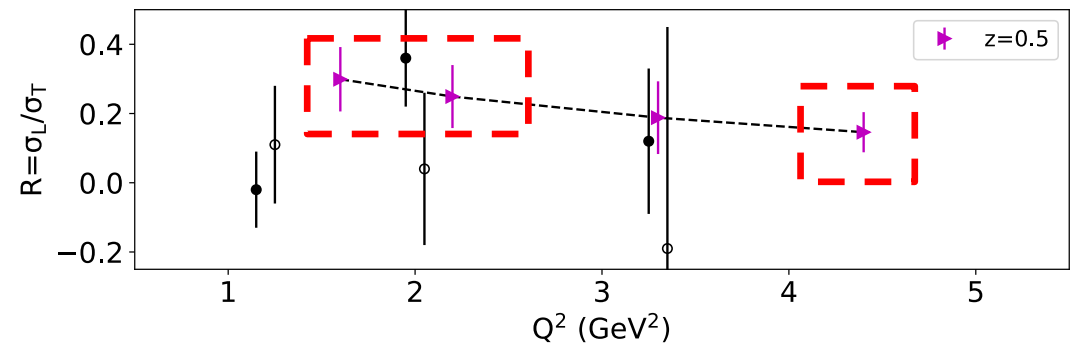
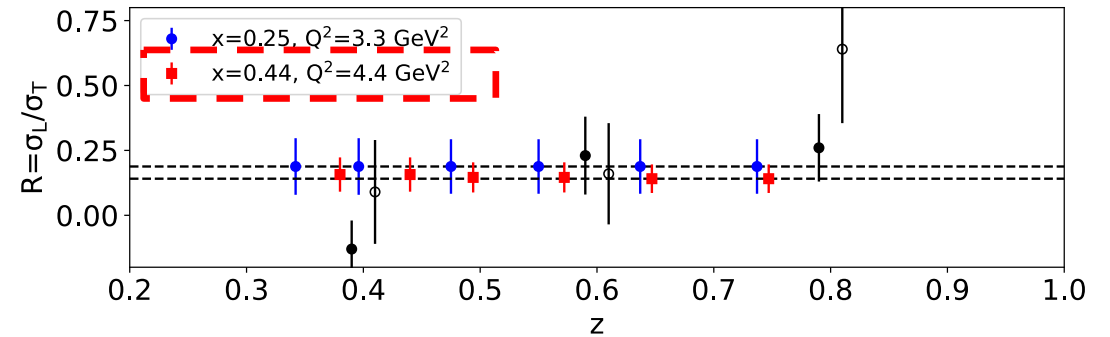
Currently Running: R-SIDIS (E12-06-104, E12-24-001)

- [E12-06-104](#) $R=\sigma_L/\sigma_T$ in charged pion SIDIS on ^1H and ^2H
- [E12-24-001](#) Nuclear Dependence of R in SIDIS (C and Cu)
- First half of R-SIDIS experiments completed in 2025
 - $x=0.25$, $Q^2=3.3 \text{ GeV}^2$, included scan in z and P_t



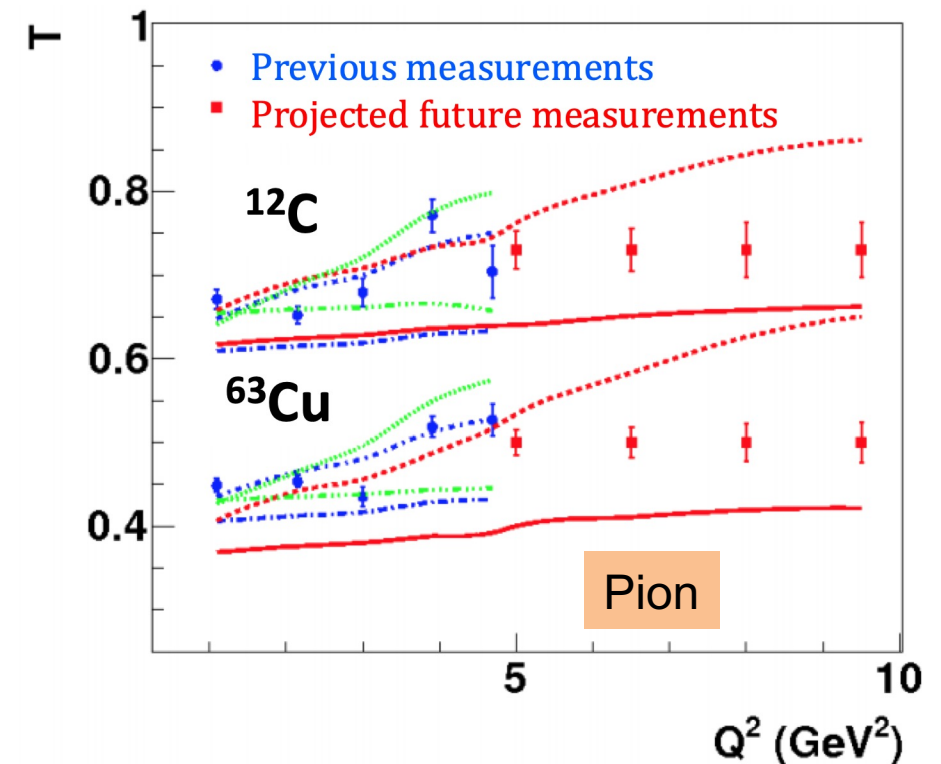
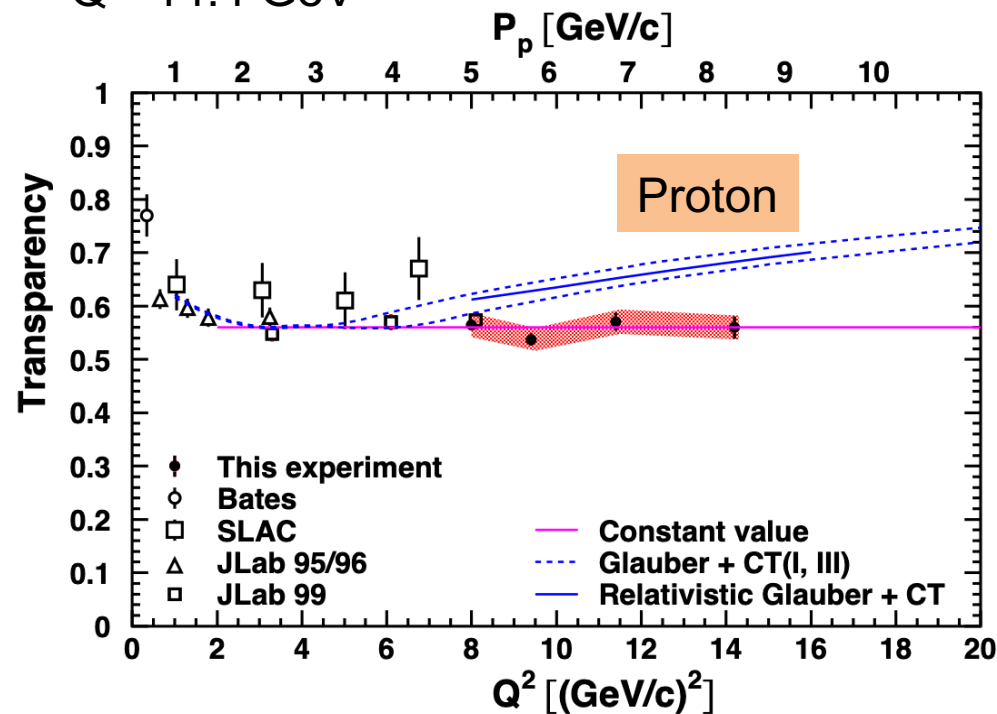
Currently Running: R-SIDIS (E12-06-104, E12-24-001)

- [E12-06-104](#) $R=\sigma_L/\sigma_T$ in charged pion SIDIS on ^1H and ^2H
- [E12-24-001](#) Nuclear Dependence of R in SIDIS (C and Cu)
- First half of R-SIDIS experiments completed in 2025
 - $x=0.25$, $Q^2=3.3 \text{ GeV}^2$, included scan in z and P_t
- Second half of R-SIDIS running now
 - x/Q^2 scan at fixed $z=0.5$, additional z scan at $x=0.44$
- Experiment goals:
 - Map R_H for $x=0.16$ to 0.44
 - Map R_H , R_D , R_A as a function of P_t for $x=0.25$
 - Map R_H , R_D , R_A as a function of z at $x=0.25$
 - Map R_H as a function of z at $x=0.44$
 - Compare R_{SIDIS} to R_{DIS} for all settings



Next Experiment in 2026: pionCT

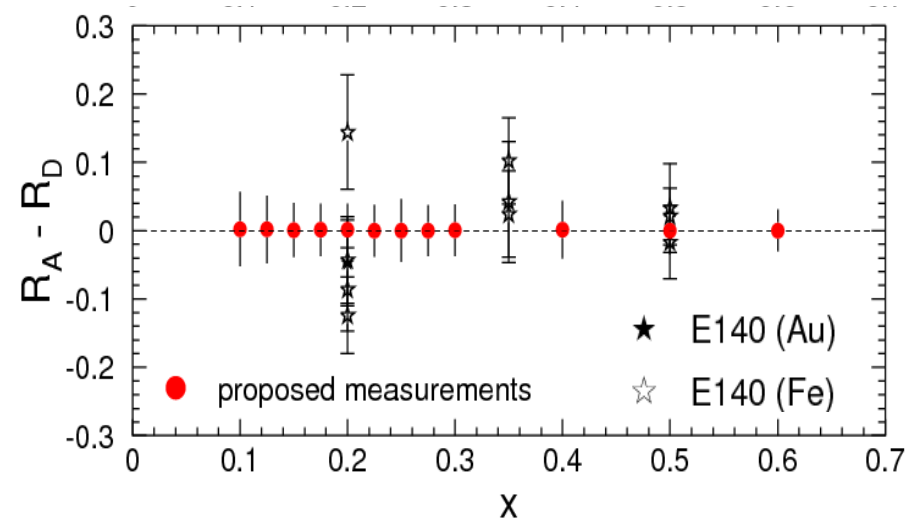
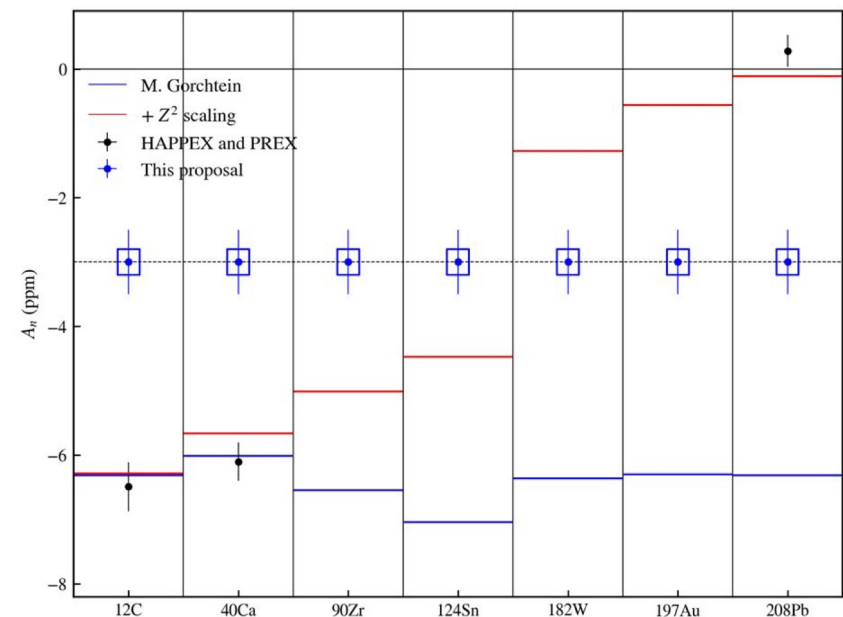
- [E12-06-107](#) Search for Color Transparency at 12 GeV
- First part ran in 2018 as 12 GeV Hall C Commissioning Experiment
- Color transparency in (e,e'p) ruled out up to $Q^2=14.4 \text{ GeV}^2$
- 2026 run will search for Color transparency up to $Q^2=9 \text{ GeV}^2$ using pion electroproduction
- Compare exclusive π^+ cross section from ^1H to C and Cu
- Color Transparency for mesons expected to set in at lower Q^2 than for proton



Hall C Experiments for 2027

- 2027 will also have low energy (~ 1 GeV) run period, then transition to high energy
- [E12-24-007](#) Elastic A_T on Nuclei $\rightarrow$ parity-like experiment, new integrating mode setup
- L-T separations
 - [E12-14-002](#) R-DIS on Nucleons and Nuclei
 - [E12-09-011](#) Kaon-LT experiment (complete 8 PAC days)
- [E12-23-001](#) VCS-II – complete 4 remaining Q^2 settings
- [E12-20-007](#) u-channel π^0 experiment (1.5 days for Q^2 scaling test)
- [E12-25-007](#) Strangeness D-term using ϕ electroproduction (partial)

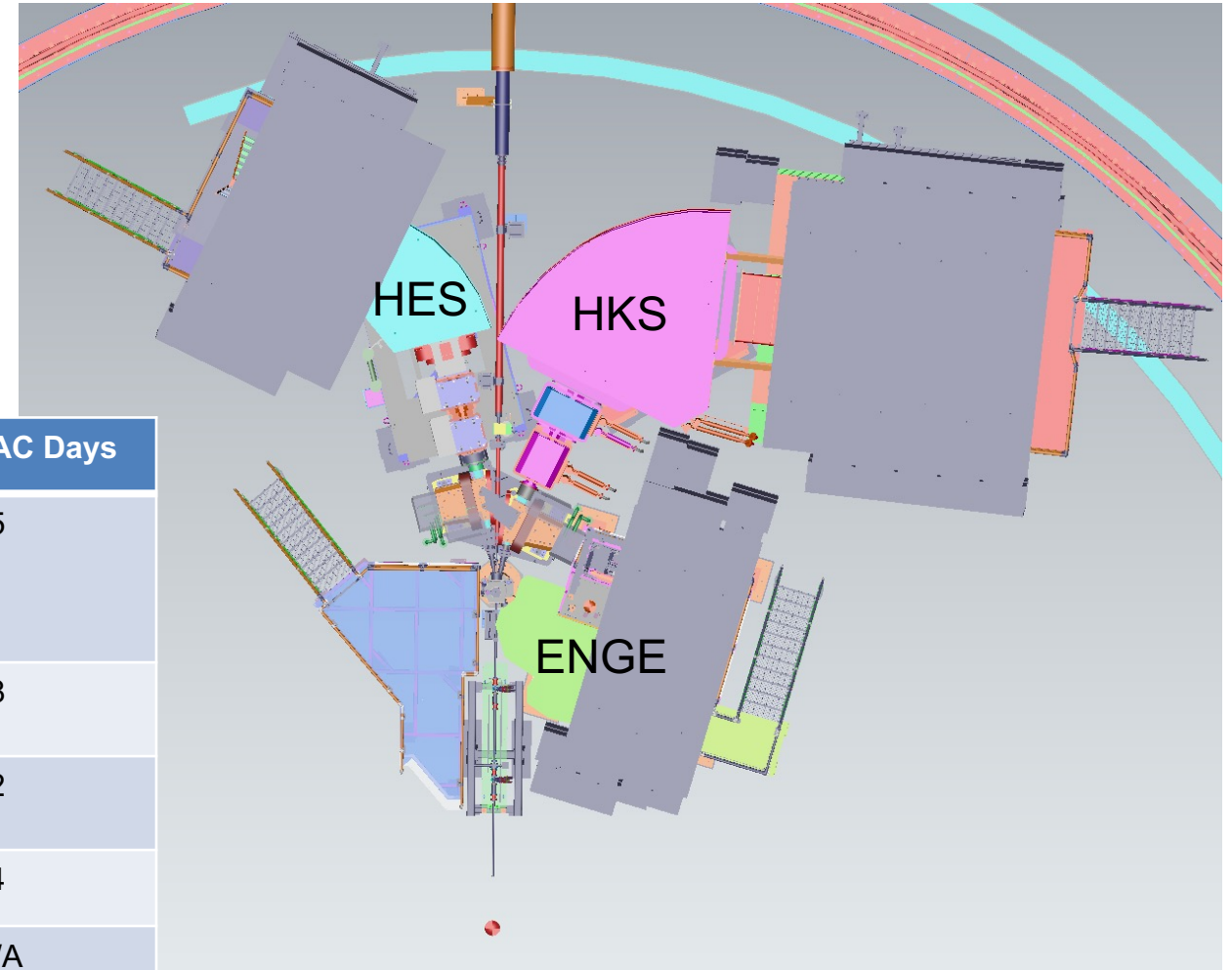
Low energy



Hypernuclear Experiments

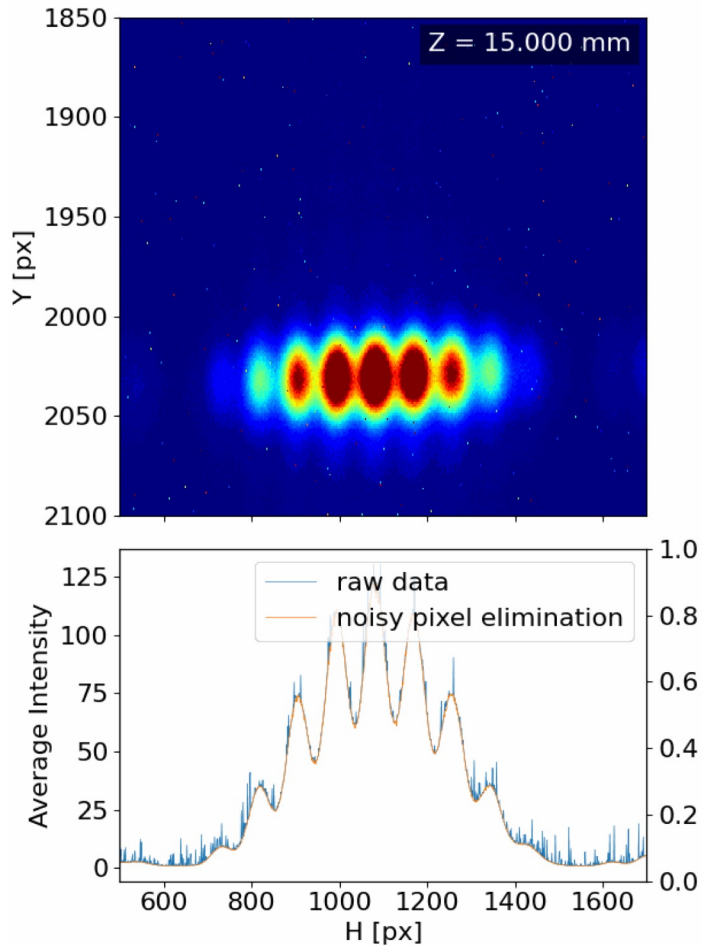
- Fall of 2027 – plan to begin installation for hypernuclear experiments
- **Successful ERR in June 2026**
- Installation through 2028 – start running in early 2029
 - No cryogenic magnets or cryotargets
 - Compatible with MOLLER in Hall A

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 $208\text{Pb}(e,e'K^+)(208_\Lambda\text{TI})$ 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

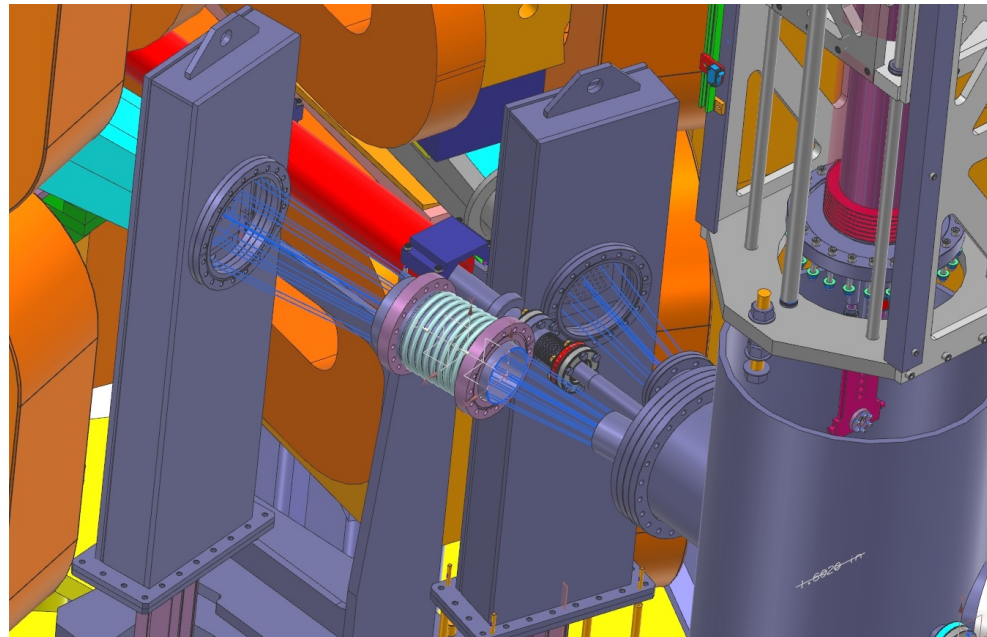


Hypernuclear Preparations

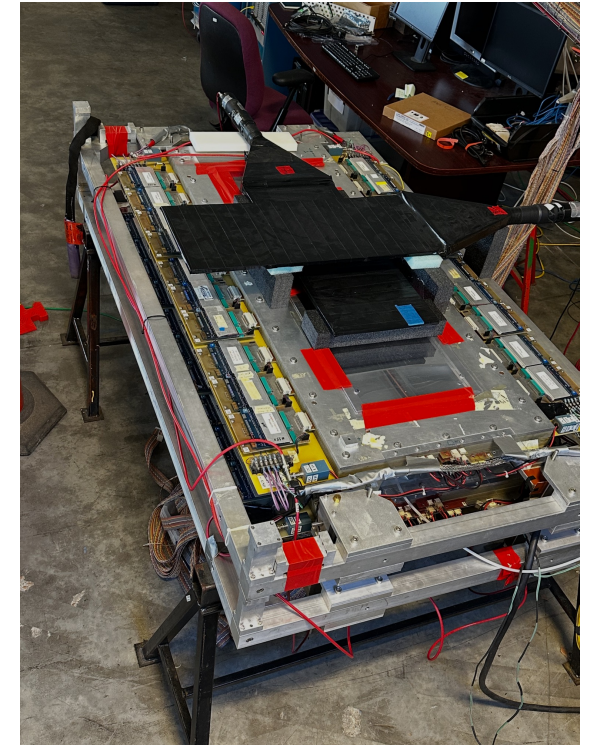
Beam tests of new Synchrotron
Light Interferometer to measure
energy spread



Design of new beamline and spectrometer
collimator systems



Drift chamber cosmic tests



Hall C Far Future – Polarized Target

After hypernuclear program, transition to experiments using tensor and vector polarized targets
 → Hypernuclear deinstallation, tensor polarized target installation spring 2030-31 (estimated)

E12-13-011: The Deuteron
Tensor Structure Function b_1

E12-15-005: Measurements of
the Quasi-Elastic and Elastic
Deuteron Tensor Asymmetries

E12-24-002: Revealing the
Transition Region of QCD with
the Proton's g_2 structure
function



*Requires additional
installation time for chicane
to accommodate transversely
polarized target*

