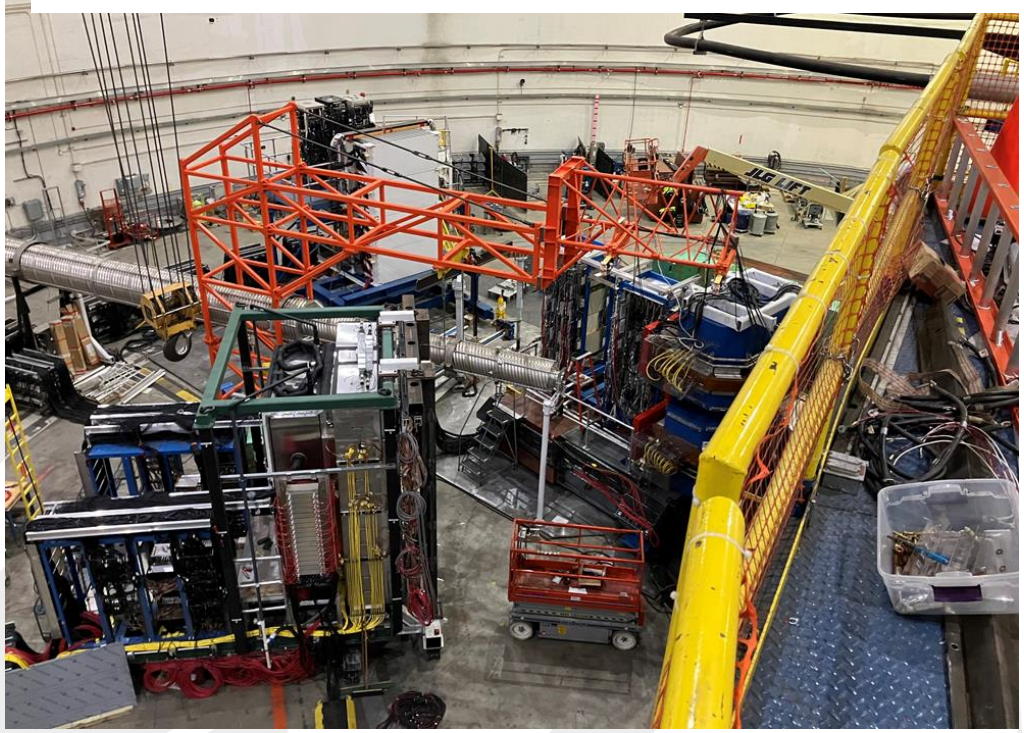
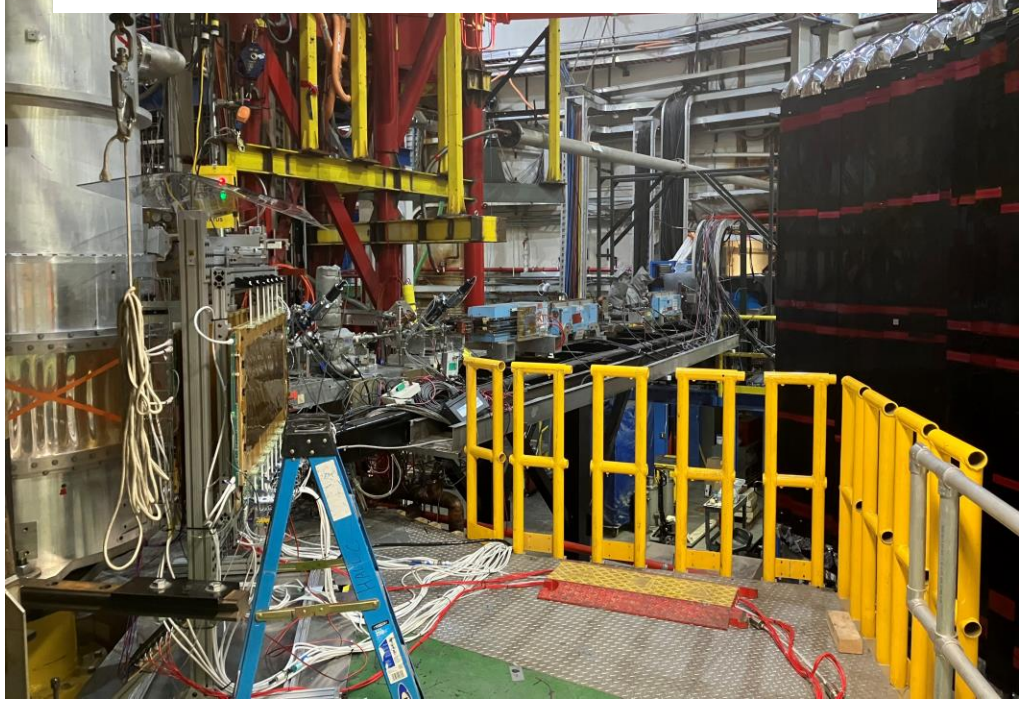
Hall A/C Status

Hall A setup for GEp experiment



Hall C setup for LAD experiment



March 2025

APS March Meeting

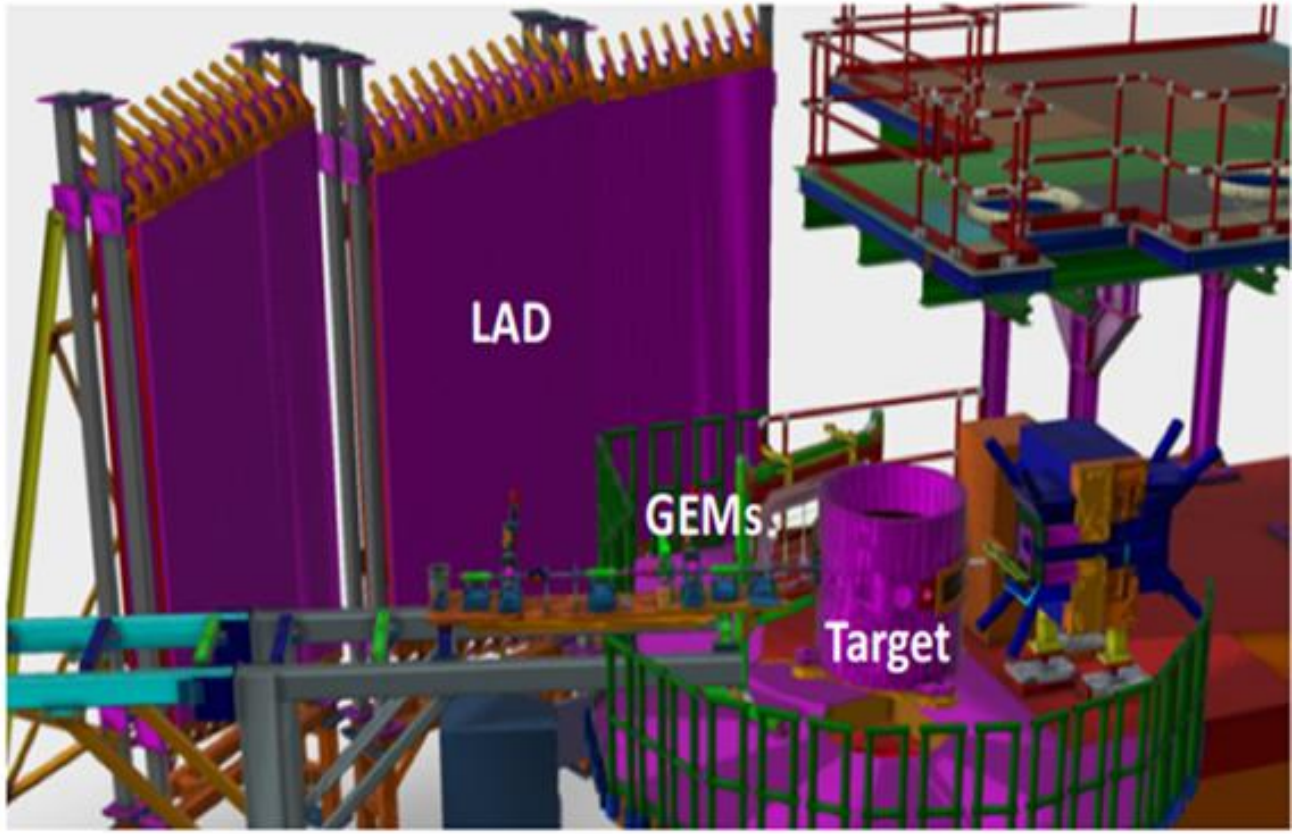
Hall C Present Status

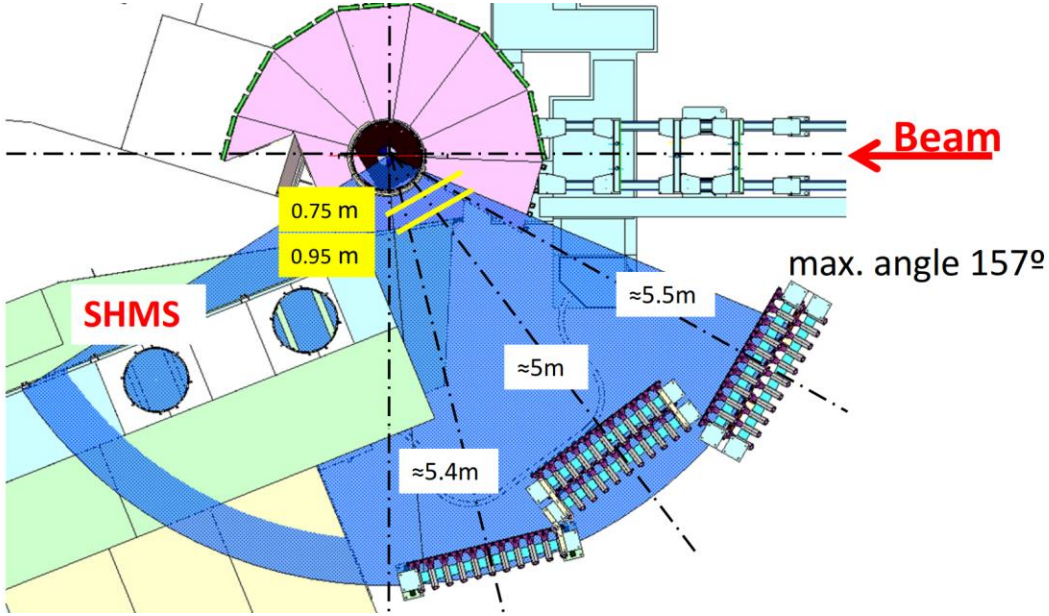
- Physics start date for Hall C March 21st.
- First experiment is about 3 calendar months
  - E12-11-107 Spectator tagged DIS d(e,e'p_s)
  - Start with commissioning at 3 pass for 2 PAC days.
    - Target changeover to deuterium (2 days)
    - Production at 5 pass for 38 PAC days.
- Schedule 2 day changeover.
- Second set of experiments is also about 3 calendar months
  - 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

Hall C: Upcoming 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



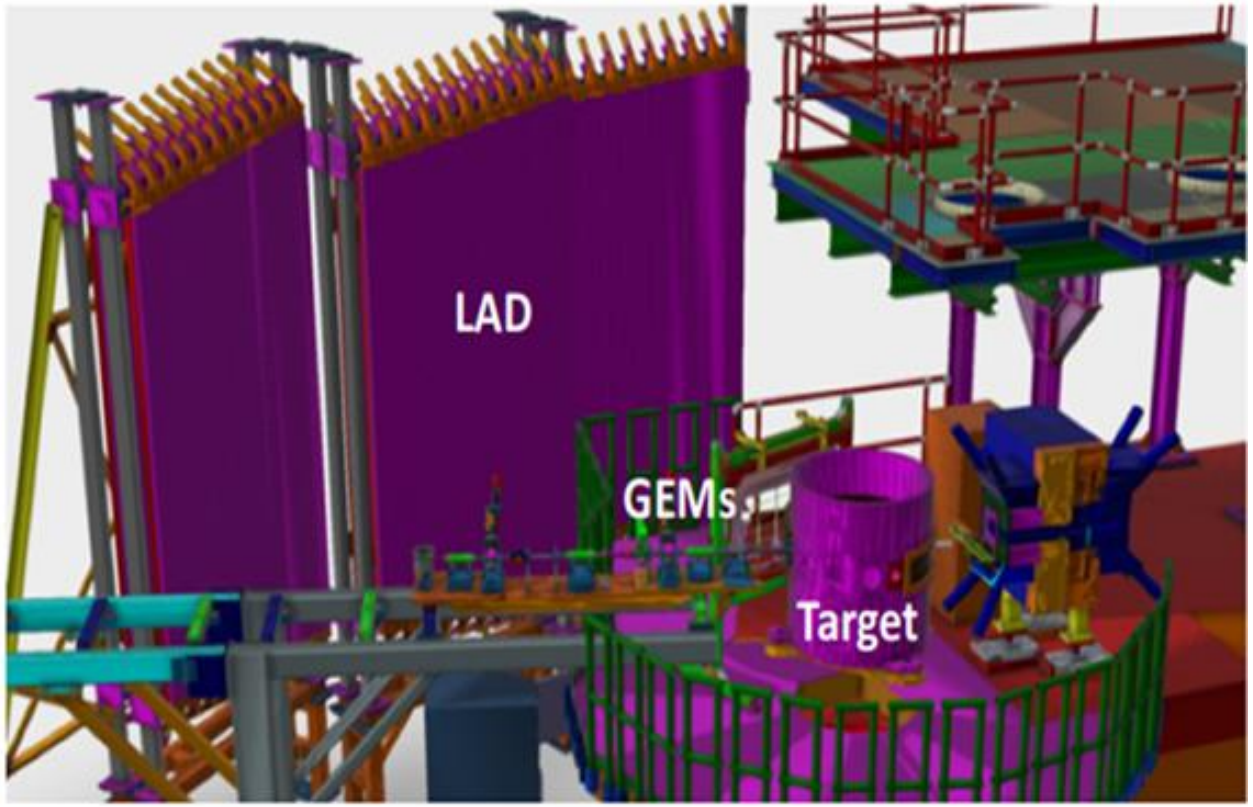


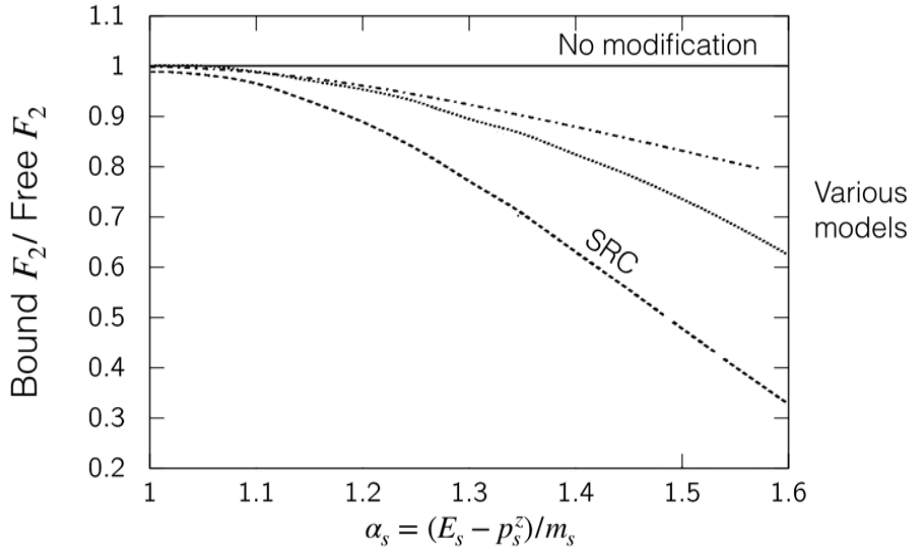
Jefferson Lab

Hall C: Upcoming 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



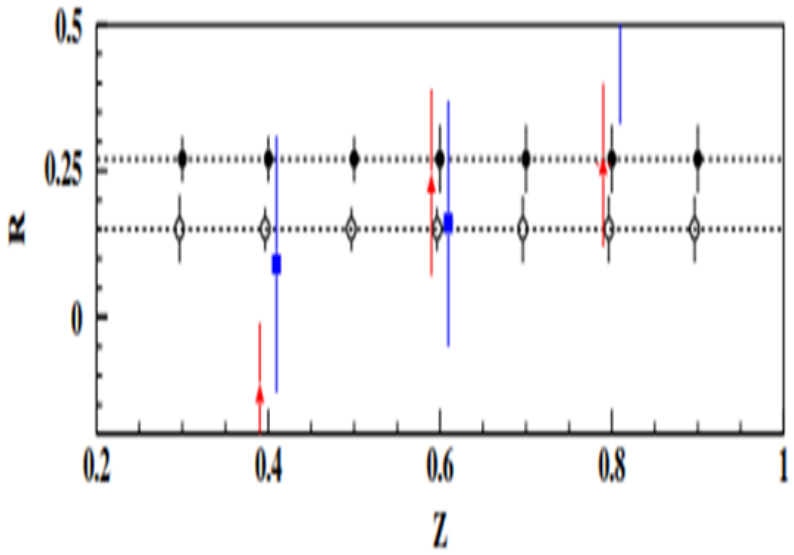


- Does the EMC Effect depend on nucleon virtuality?
- Measure Bound F_2 by tagging the SRC proton in D(ee'p) DIS and look for nuclear effects
- Will provide crucial information needed for identifying the origin of the EMC Effect

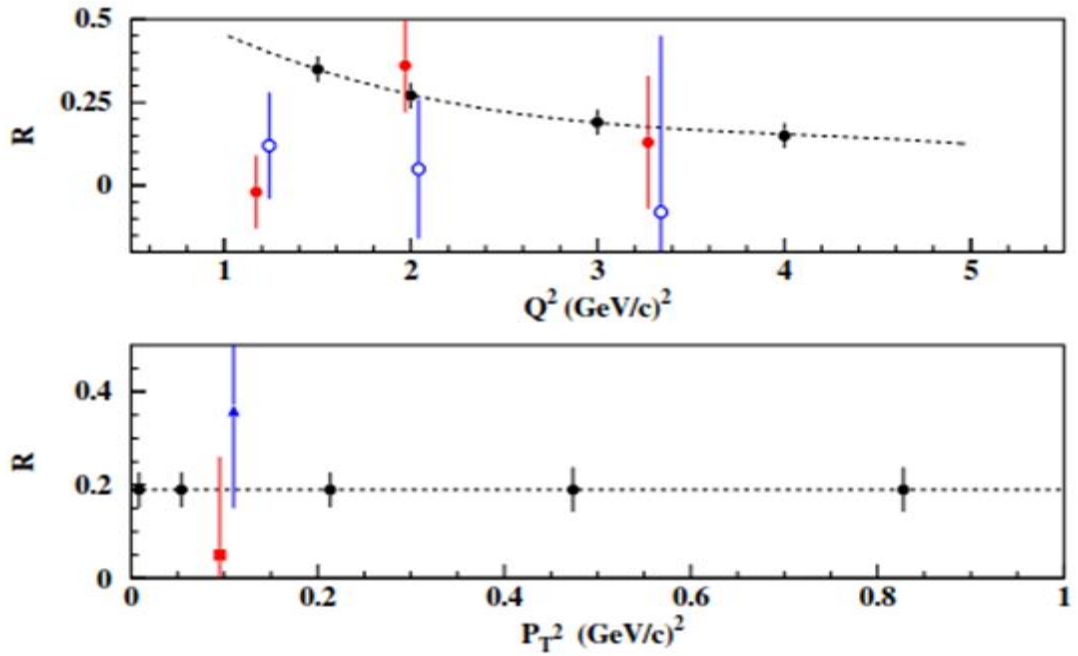
Hall C: Upcoming run period

- E12-06-104 R=σ_L/σ_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}.



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



Jefferson Lab

Hall A Status

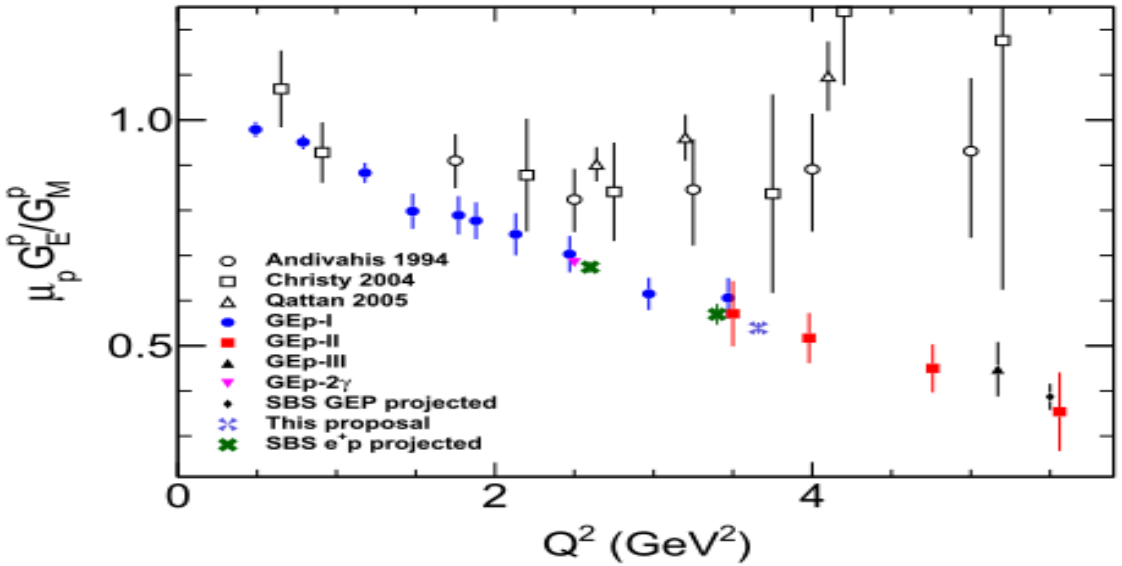
- Physics start date for Hall A March 26th.
- The GEp experiment will run from March 26 to August 27th 2025.
- MOLLER installation will start after GEp run.
  - Lots of equipment as arrived at JLab: Spectrometer coils, Power supply, large beam pipe sections, target scattering chamber etc. Visit the Testlab!
  - W&M high bay is being used for assembly of detectors.

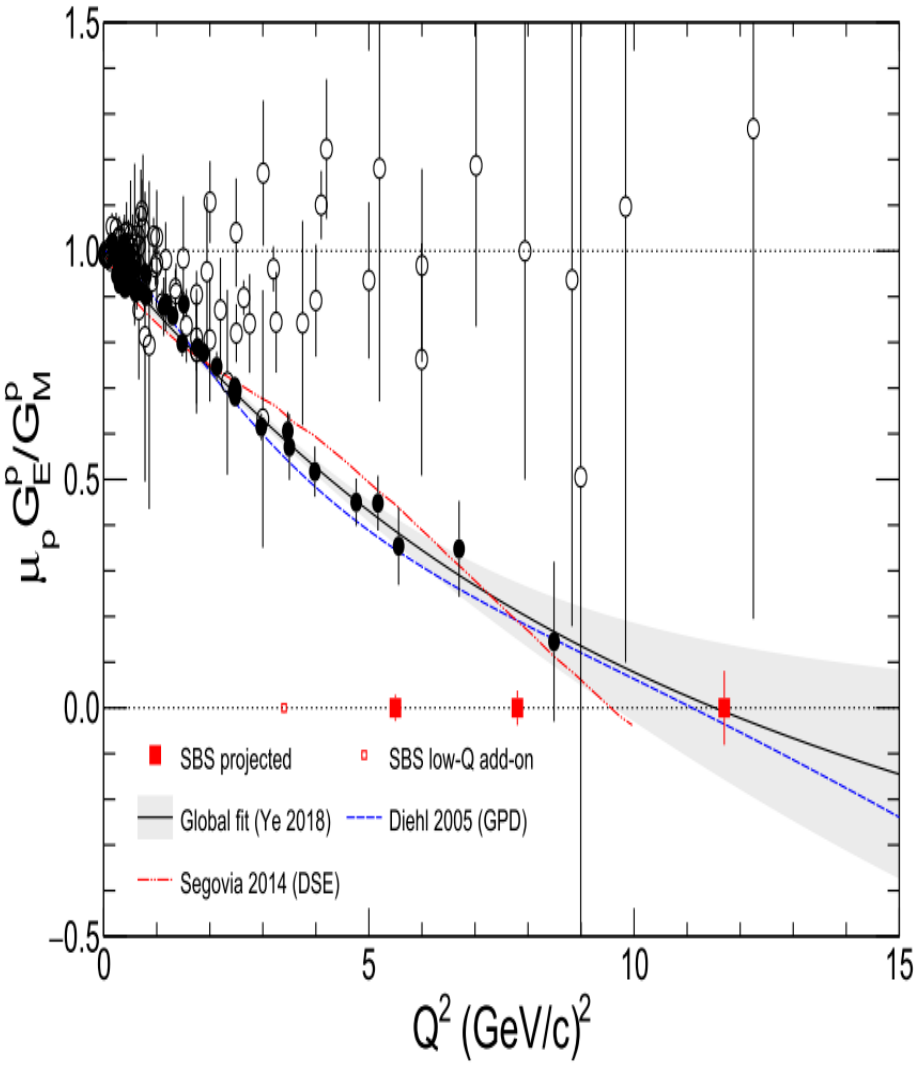
Hall A and C represented by many talks at the APS meeting. One highlight is:

- **Mini-Symposium: Early Results from Nucleon Form Factor Campaign with SBS at JLab I**
  - 8:30 am – 10:06 am, Tuesday March 18
  - *Precision Measurements of Nucleon Structure - The JLab SBS Program: Past, Present, and Future*
    - Presenter: Jimmy Caylor
- **Mini-Symposium: Early Results from Nucleon Form Factor Campaign with SBS at JLab II**
  - 1:30 pm – 3:18 pm,Tuesday March 18
  - *Preliminary Results of the SBS-GMn Experiment with Super BigBite Spectrometer at Jefferson Lab's Hall A*
    - Presenter: Provakar Datta

GEP: Ratio of proton electric to magnetic form factor

- Last experiment in series of neutron and proton elastic electric and magnetic form factor experiments.
- Six graduate students on the experiment.
- E12-07-109 Measure proton electric form factor to Q^2 =12
- E12-24-010 High-precision measurement of proton form factor ratio with Polarization Transfer,
  - Spokespeople: A. Puckett*, J. Bernauer and A. Schmidt
  - Measure proton G_E/G_M to 1% statistical precision at Q^2 = 3.8
  - *"The primary motivation for this request is to improve the precision of the polarization data at this Q^2 in anticipation of the comparison to a future measurement using positrons, described in a previous LOI to PAC51 (LOI12-23-008)."*

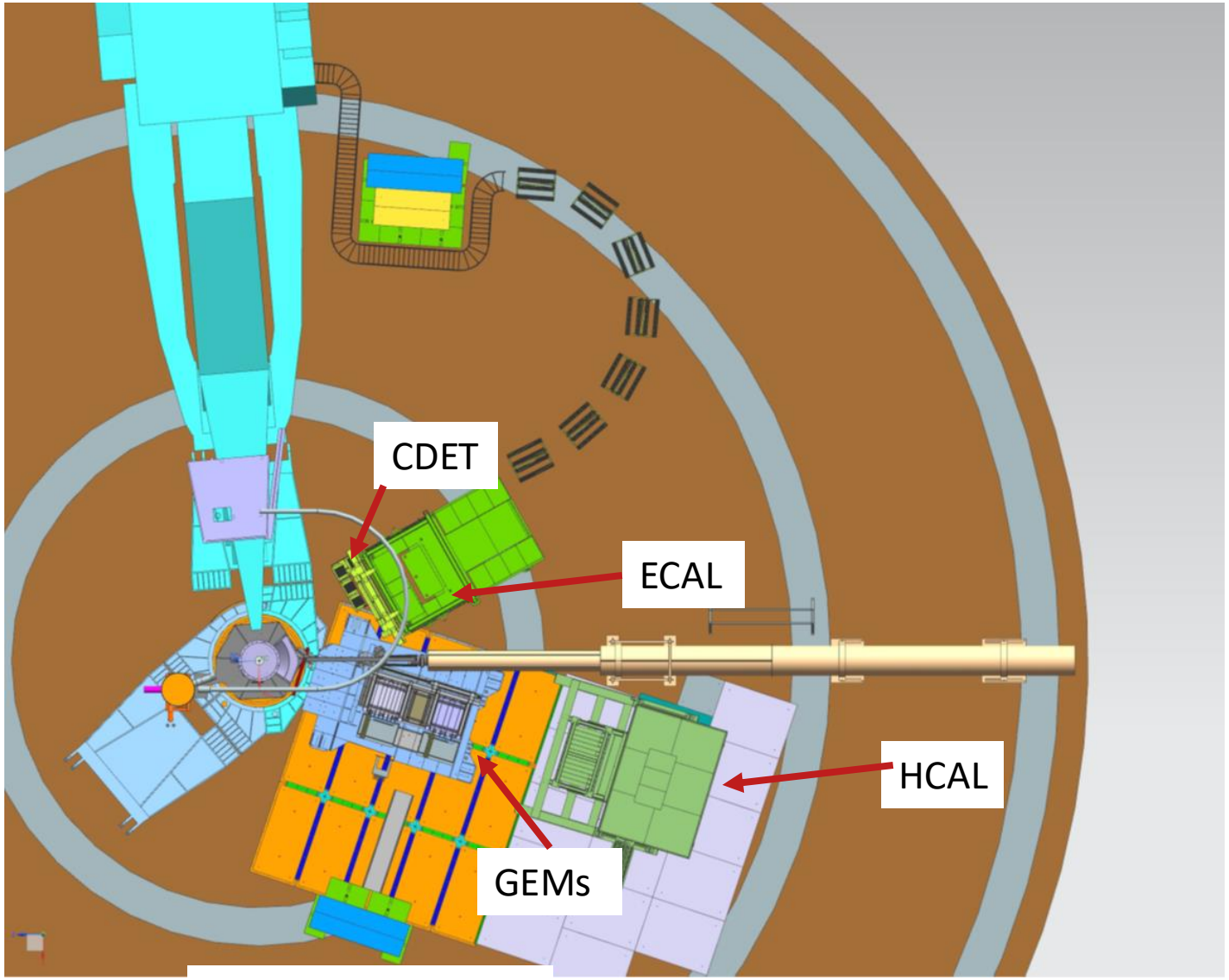




Figures by Andrew Puckett from E12-24-010 proposal

Jefferson Lab

Overview of detectors: Layout for Q^2= 12 kinematic point



GEM DAQ bunker

Electron Detection

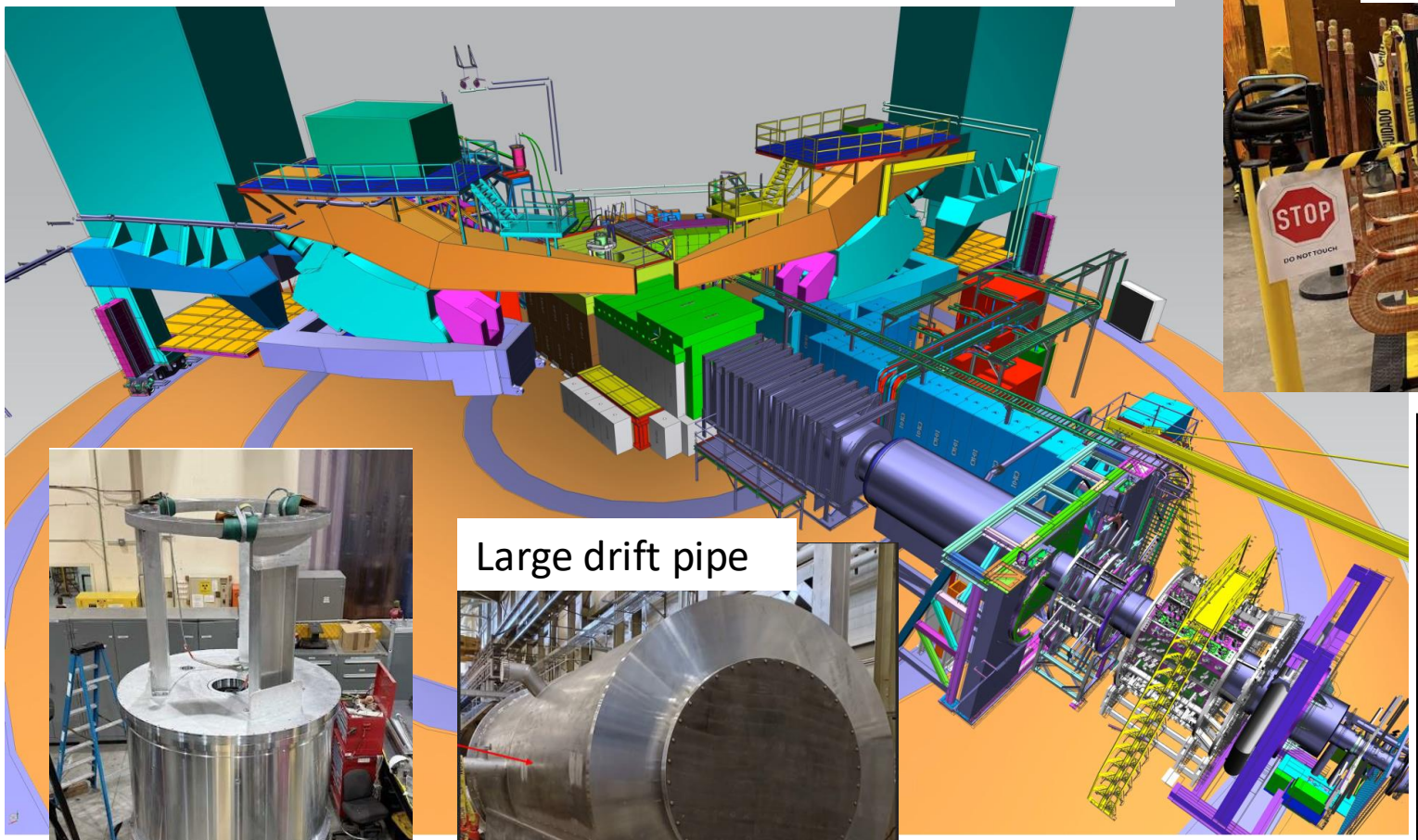
- Electron Calorimeter (ECAL)
  - 1656 Lead glass blocks
  - Trigger formed in FADC from clusters
  - Need good energy calibration at FADC
  - Tight cut on elastic to reduce accidentals
  - Measure angle and energy
- Coordinate Detector (CDET)
  - 2352 scintillator bars, 2 layers
  - Measures vertical angle
  - Aids track finding in front GEMs
  - Reduce the photon background

Proton Detection

- GEMS Front and rear tracker
  - Each 8 layers of GEMs
  - Measure momentum, z-target, angles
  - Plastic analyzer for rescattering protons
  - Measure the recoil polarization of protons
- Hadron Calorimeter (HCAL)
  - 288 iron/scintillator blocks
  - Trigger formed in FADC from clusters
  - Aids track finding in rear trackers

MOLLER installation starts after GEp

Equipment is arriving at Jlab and W&M (detector assembly)

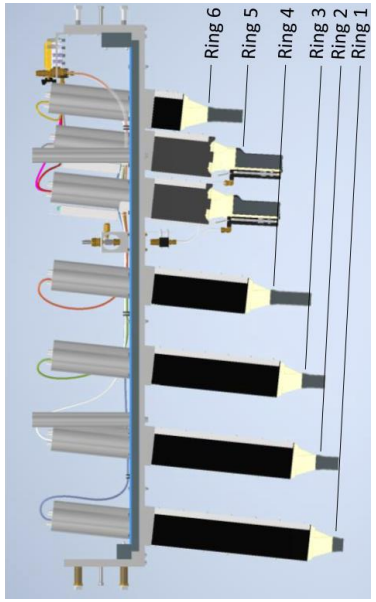


All coils for downstream magnet at JLab

Large drift pipe

Target Scattering Chamber

Main detector segment at W&M



Jefferson Lab

Hall A and C Outlook

Hall C

- Current run period from March 21 to September 15th 2025
  - E12-11-107 Spectator tagged DIS d(e,e'p_s) for about 3 month
  - Followed by about 3 months for:
    - 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
- Next run period in FY26 will be the beginning of 2026.
  - E12-06-107 Complete Pion Color Transparency
  - E12-14-002 Run standard beam energies for NucR
  - 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.

Hall A

- Current run period from March 26 to August 27th 2025.
  - E12-07-109 Measure proton electric form factor to Q^2 =12
  - E12-24-010 High-precision measurement of proton form factor ratio with Polarization Transfer
- SBS deinstallation and MOLLER installation