

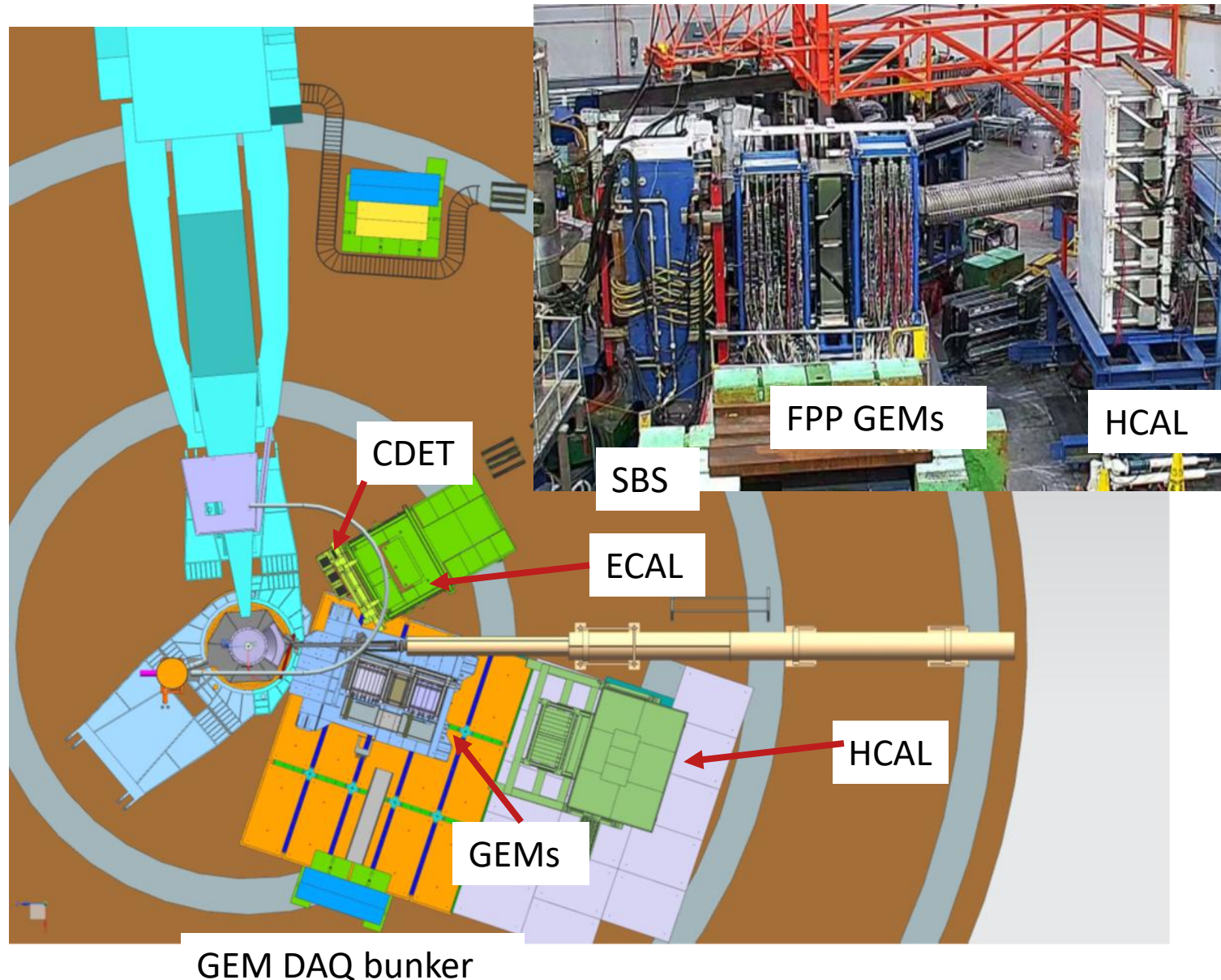
Hall A status report

Mark Jones, Hall A/C Group Leader, PAC54 meeting , July 2026



Last week status of MOLLER installation

Completed the GEp experiment: Measure the Proton's Electric to Magnetic Form Factor by Recoil Polarization



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

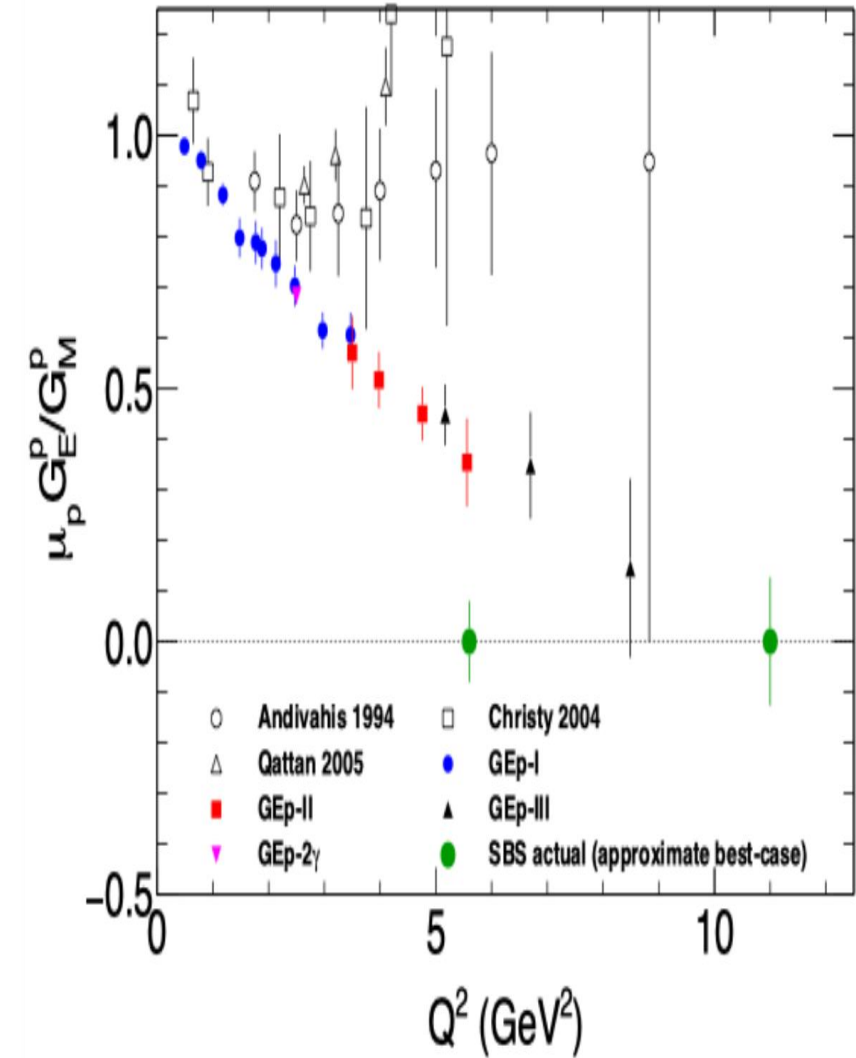
Proton Detection

- 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

GEp Experiment: Final SBS Form Factor experiment

GEp experiment run

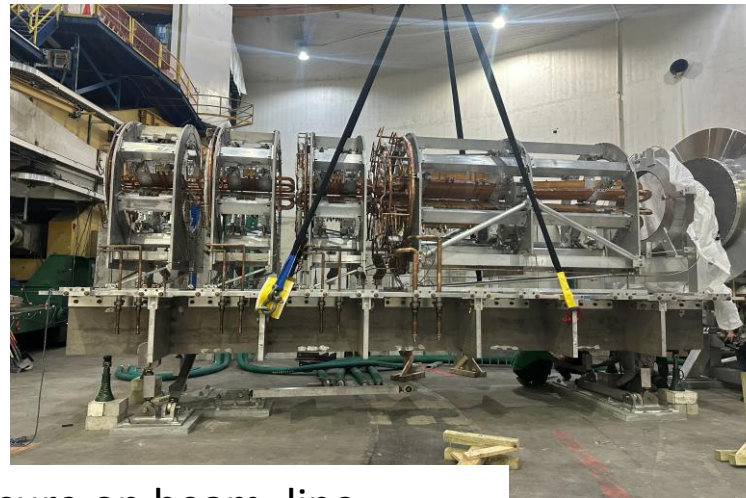
- Commissioning with 3 pass from April 11-17.
- Production with 3 pass from April 17-28.
 - $Q^2 = 5.6 \text{ GeV}^2$ obtained 3.7 C
- Changeover to 5 pass configuration from April 28 – May 5th
- Production at 5 pass started May 5th, Ran through Aug 26th.
 - Decided to run at lower Q^2 of 11.1 GeV^2
 - This increased rate by factor of 4.
 - Obtained 94.2 C
- Not able to run the $Q^2 = 8 \text{ GeV}^2$ setting and E12-24-010 which was high precision G_E/G_M to complement future positron data.
- Expect error bars on the best-case scenario in SBS tracking efficiency



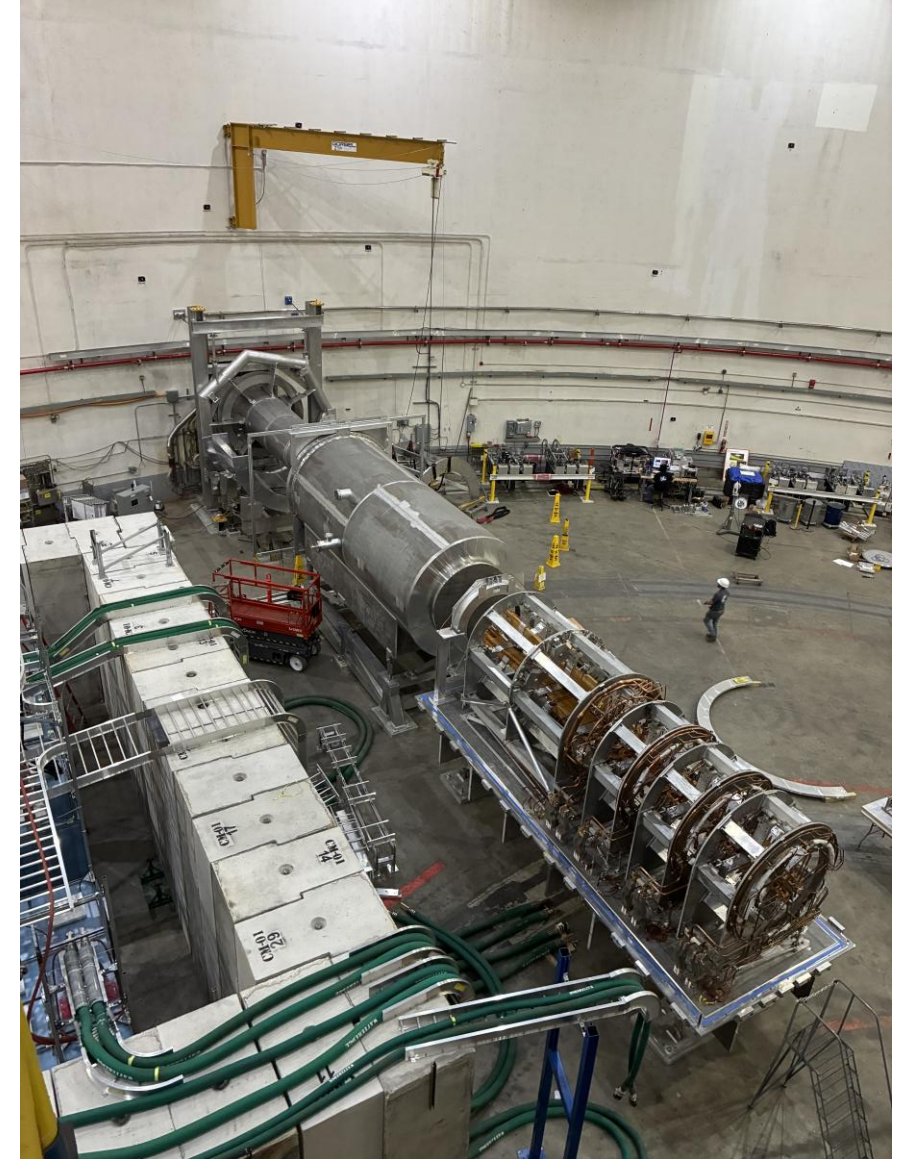
Installation of MOLLER in Hall A in 2026



Pion Donut and Detector pipe on beam line

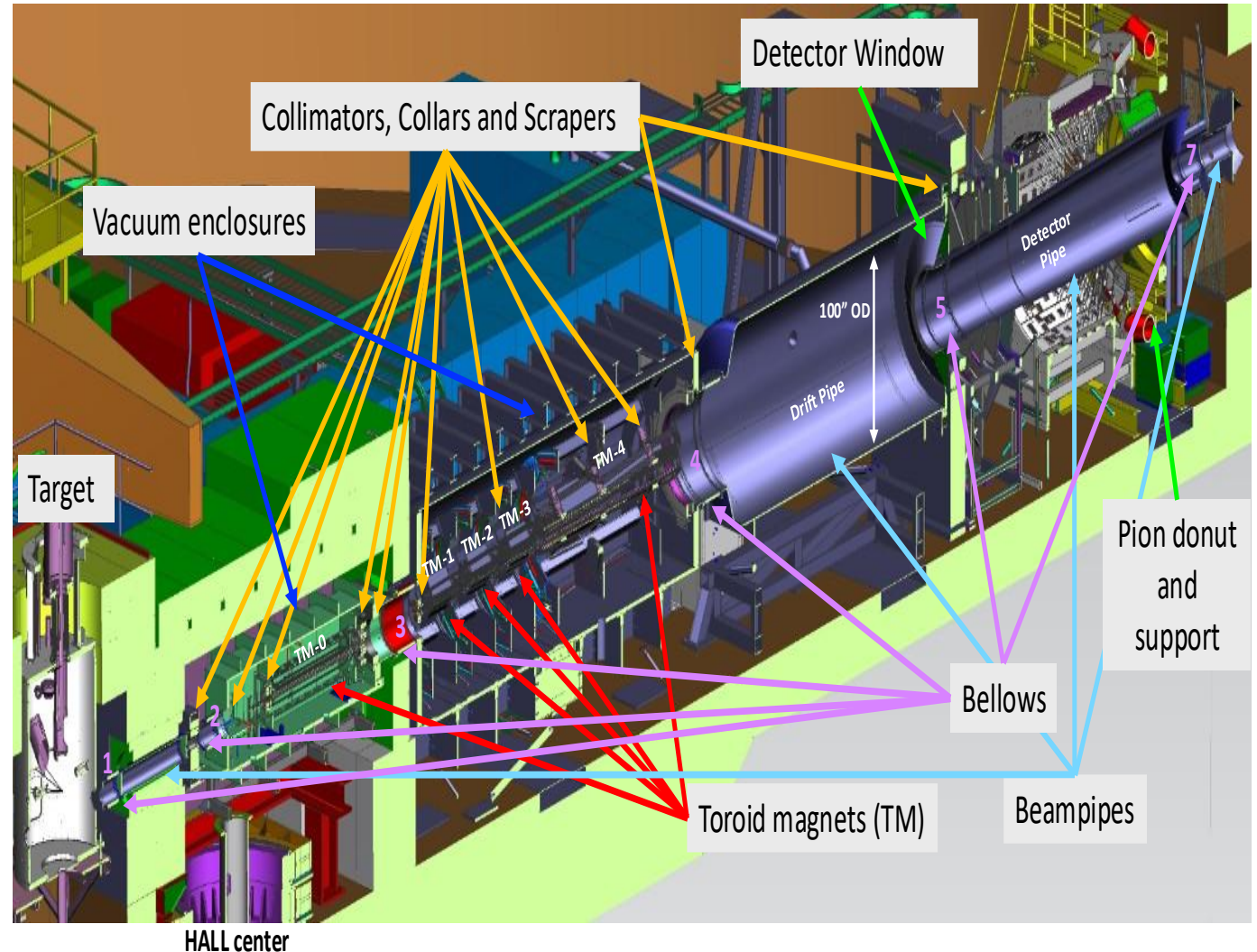
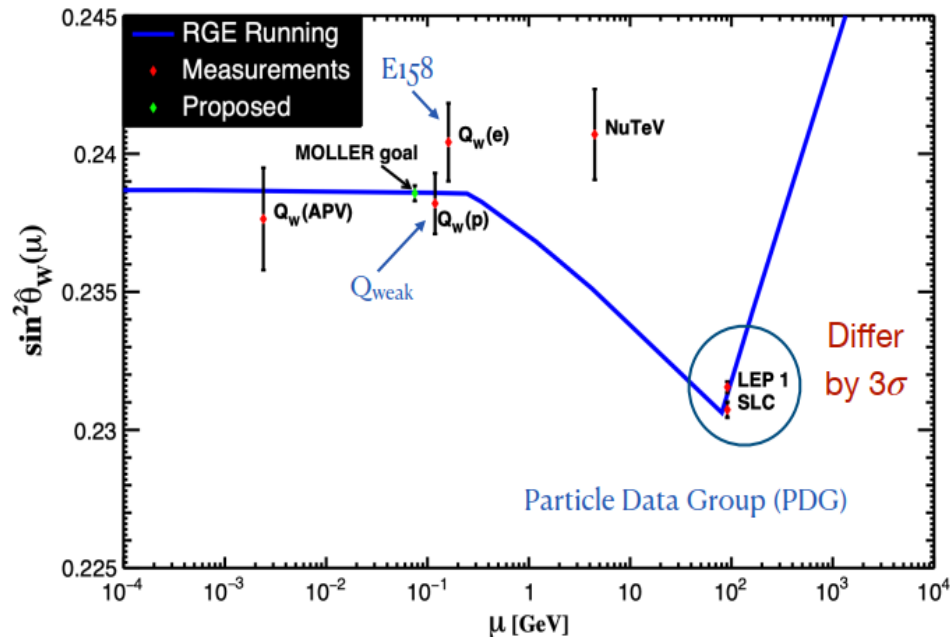


Downstream Enclosure on beam line



Running MOLLER in Hall A in 2027 and beyond

- Finish installation and complete CD4 by March or April 2027.
- Running of MOLLER starting in July 2027.
 - Could start earlier with lower current running.
 - Will have to see the efficiency of the MOLLER target to understand what currents the Hall C target can run.
- Running MOLLER for 3 years (2028-2030). Assuming 32 week run periods.



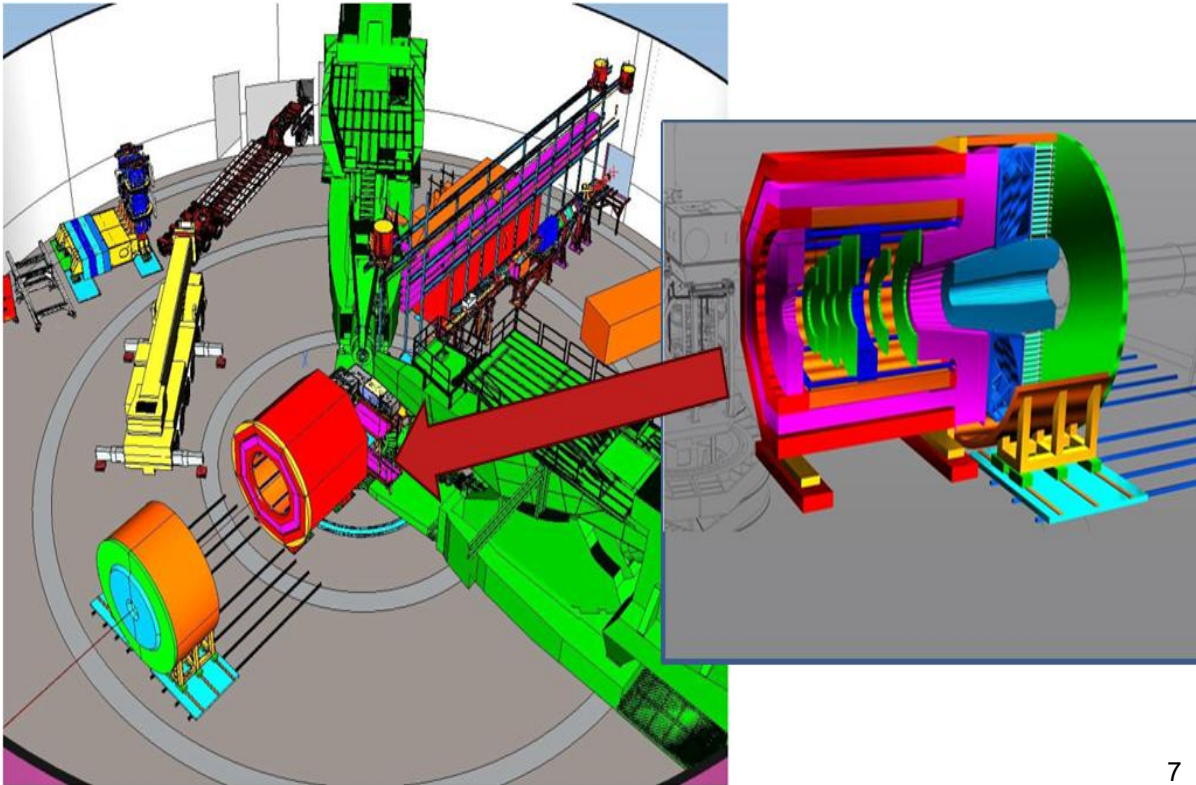
Possible Future Hall A Experiments

Two SBS experiments under Jeopardy review at this PAC 54

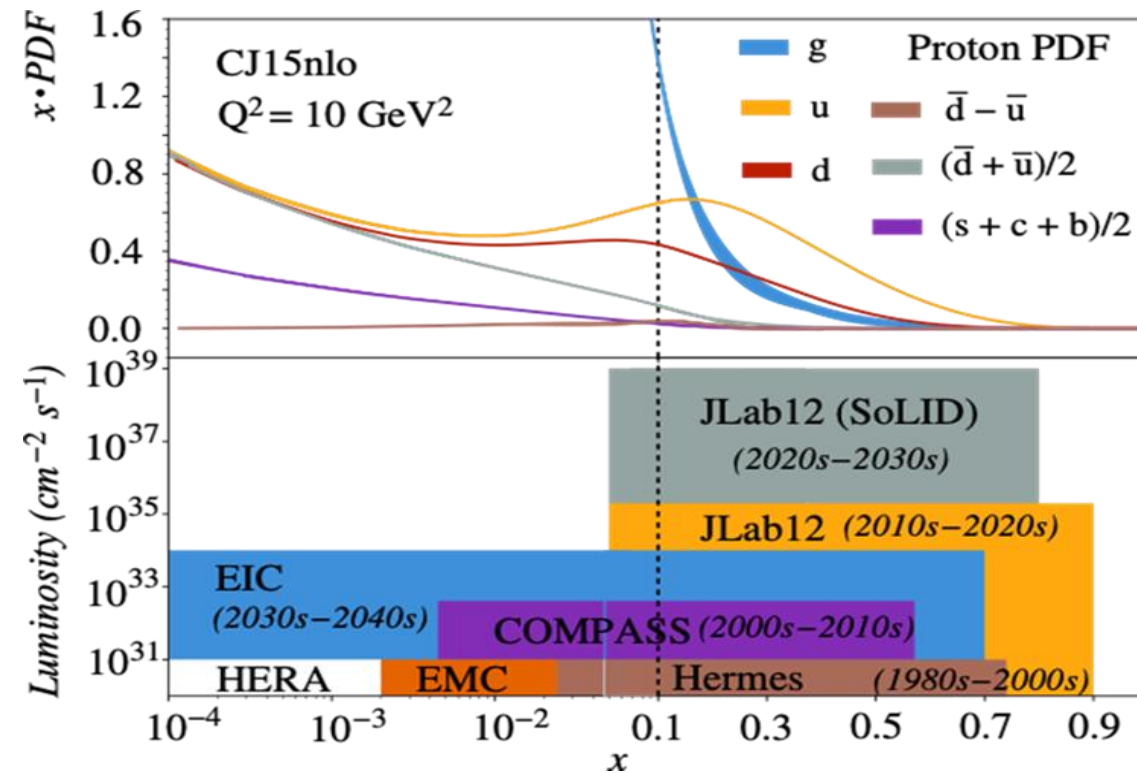
- Measurement of Tagged Deep Inelastic Scattering, C12-15-006, A- rating.
 - Tagged DIS to study pion structure functions.
 - Needs to pass the C1 Lab technical review. Had reviews in 2019 and 2022.
 - Approved in Jeopardy process in 2023.
 - Two run group experiments
 - ❑ C12-15-006A Measurement of kaon structure function through TDIS. PAC 45 (2017)
 - ✓ World-first direct extraction of kaon structure function
 - ❑ C12-15-006B TDIS-n: Tagged DIS Measurement of the Neutron Structure Function. PAC 49 (2021)
 - ✓ A broad study of the neutron structure at DIS and resonance regime, with EMC effect in the deuteron studies and GMn
- “Semi-Inclusive Deep Inelastic Scattering on a Transversely Polarized He-3 Target Using the BigBite and Super BigBite”, E12-09-018, A- rating.
 - TMDs with polarized neutrons at large Q^2 and x .
 - Transverse-Target Spin Asymmetries.
 - BigBite with standard detectors.
 - SuperBigBite with GEMs, RICH and HCAL.
 - Approved in Jeopardy process in 2021.

SoLID update

- SoLID collaboration meeting Feb 19-20, 2026
 - Strong collaboration with new proposals and run groups
- Draft NIM article on the productive pre R&D test at high luminosity that was done in Hall C parasitically in 2022-3
- New pre R&D test in Hall C during present run period focused on testing MPGDs at high luminosity.



Maximize the science return of 12 GeV CEBAF upgrade by combining high luminosity of 10^{37} to 10^{39} with large acceptance spectrometer.



SoLID future

The SoLID physics program

- Five A rated experiments, one A- rated experiment, one A rated and C1 conditional approved experiment
 - Eight run group experiments
- Wide ranging physics program:
 - J/psi threshold production
 - Gluon Field, Proton Mass and Mass Radius
 - PVDIS
 - Standard Model Precision Test and Structure Function ratio d/u
 - 3 experiments to measure TMDs and Single Spin Asymmetries on polarized proton and neutrons by SIDIS
 - Two-photon exchange study measuring A_N in proton in the DIS.
 - GPDs
 - DDVCS (A rated and C1 conditionally approved)
 - Run groups: Deep Exclusive Meson Production and TCS

Difficult budget times for a new project

- Collaboration is working to develop a plan for a high luminosity spectrometer using CLEO magnet and subset of detectors. A start would be the J/Psi experiment and a multi-stage approach.
- Planning to have high luminosity workshop in conjunction with other halls in October 2026 at JLab.