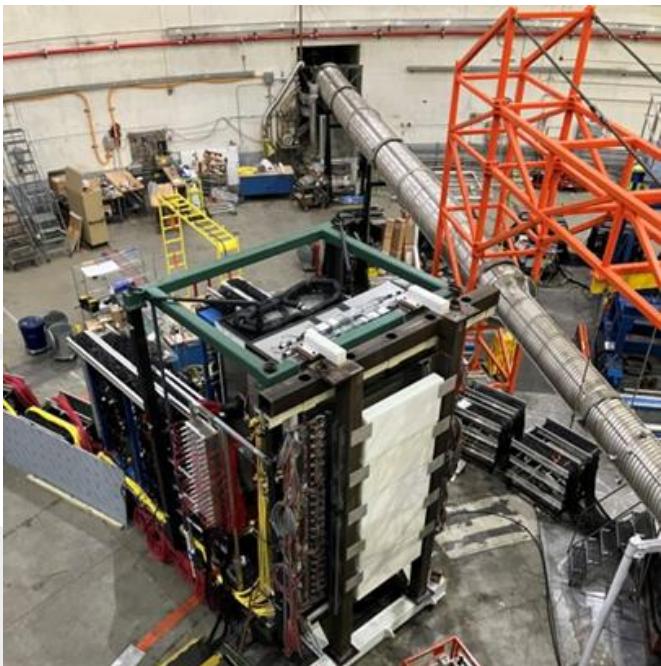


# Hall A Status

January 2026 Winter Hall A Collaboration Meeting

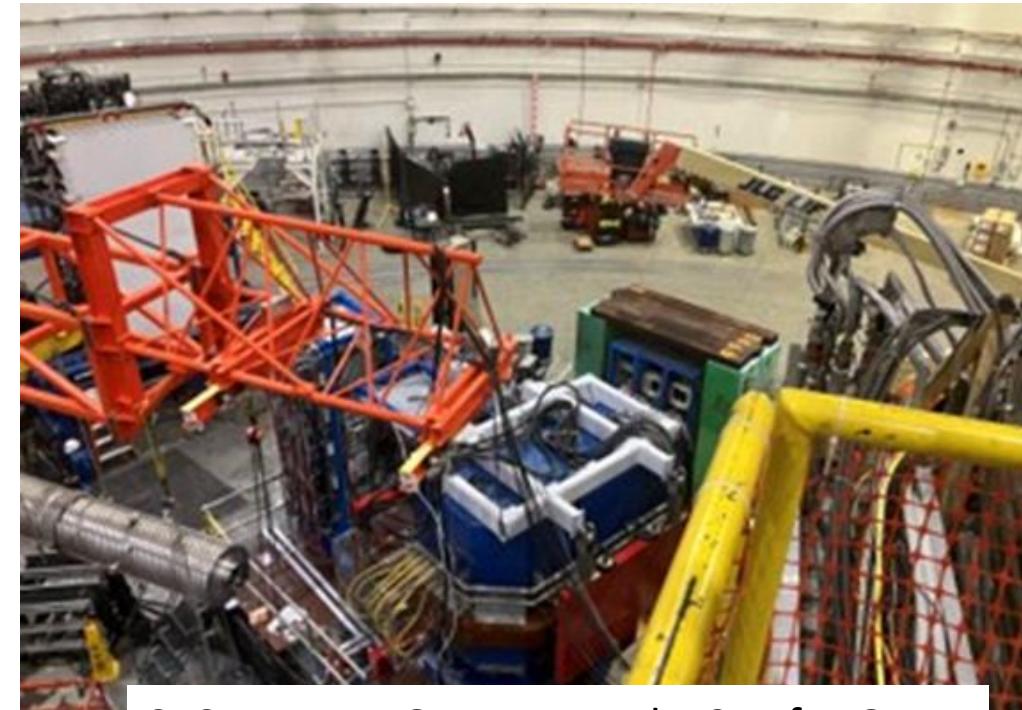


ECal and CDET for GEp

Jan 2025

**Jefferson Lab**

Mark Jones  
Hall A/C Group Leader



SBS magnet, GEM FPP and HCAL for GEp

Dave Gaskell  
Hall A/C Deputy Group Leader

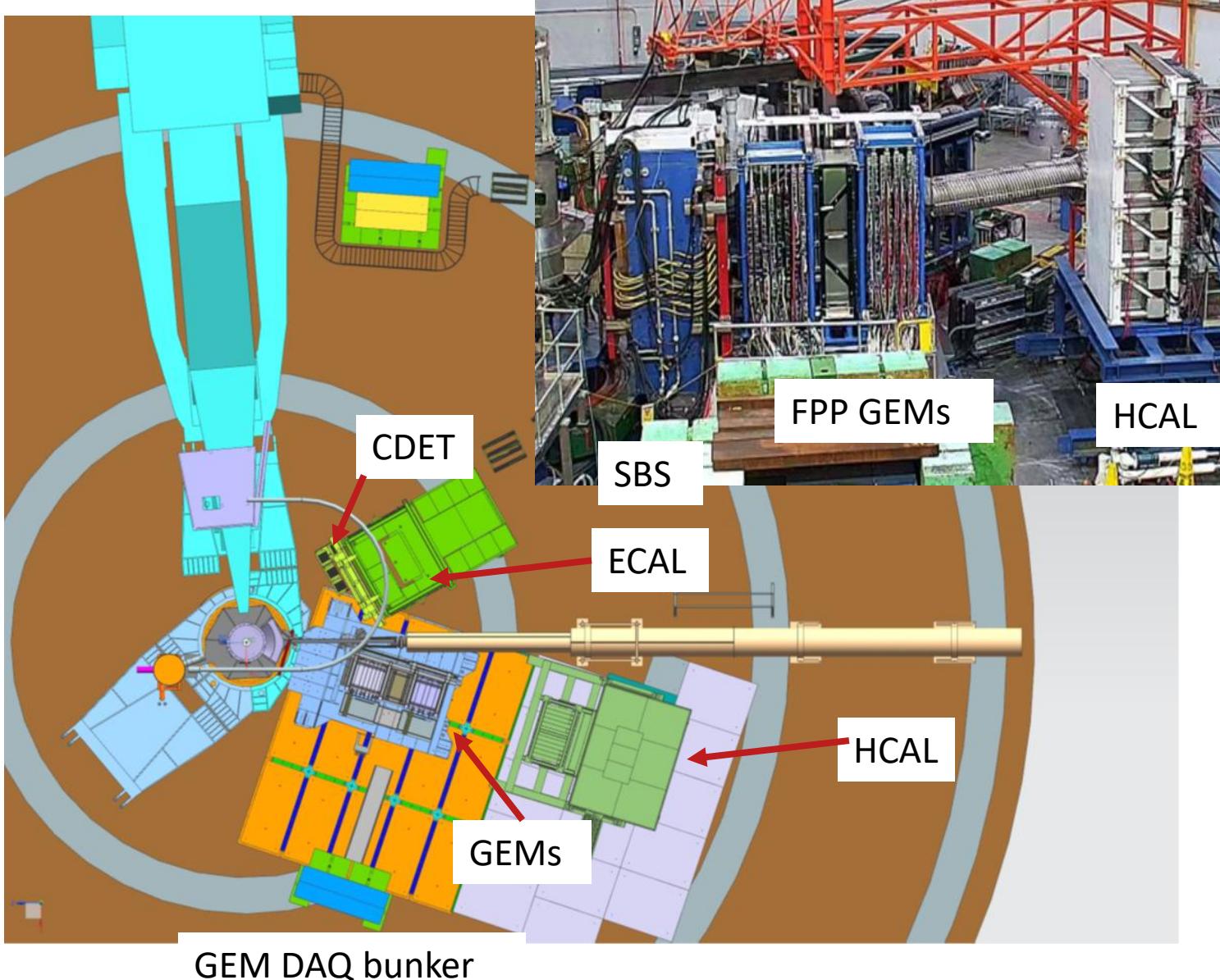


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Science



# 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

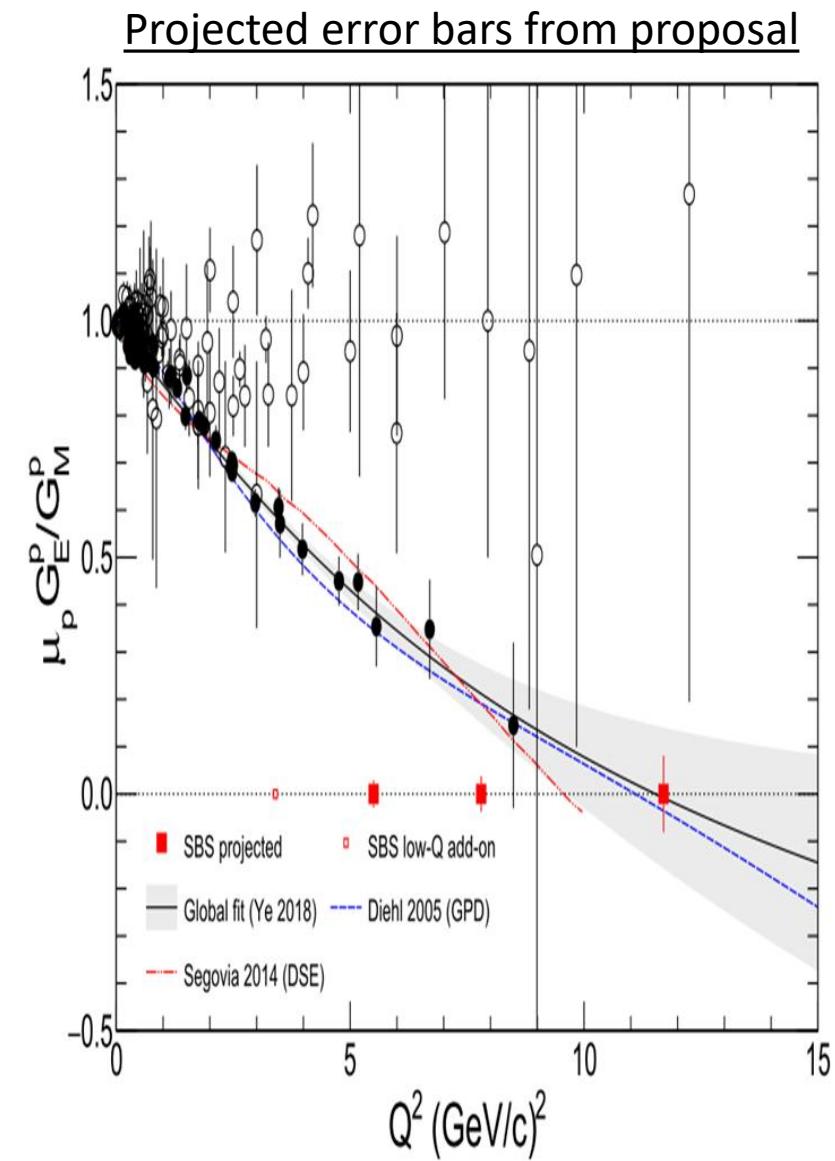
## Proton Detection

- 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 5<sup>th</sup>
- Production at 5 pass started May 5<sup>th</sup>, Ran through Aug 26<sup>th</sup>.
  - Decided to run at lower  $Q^2$  of 11.1  $\text{GeV}^2$ 
    - 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.
  - Three talks on Thursday to update status.



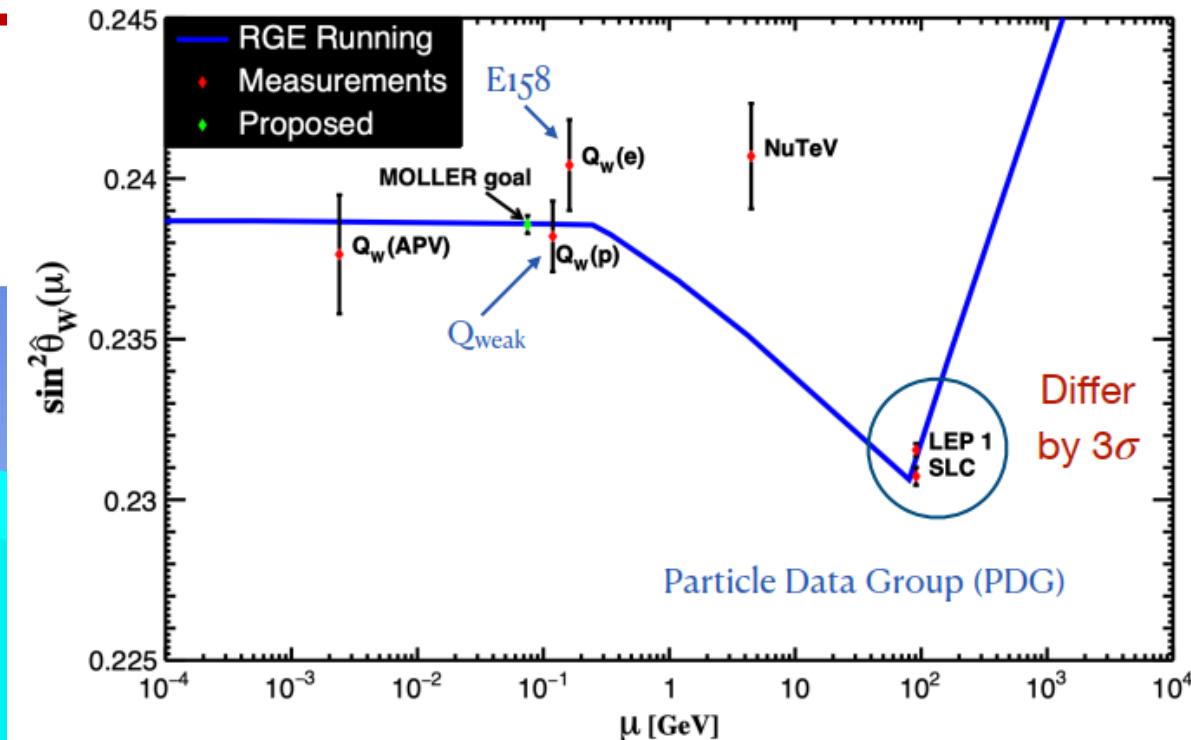
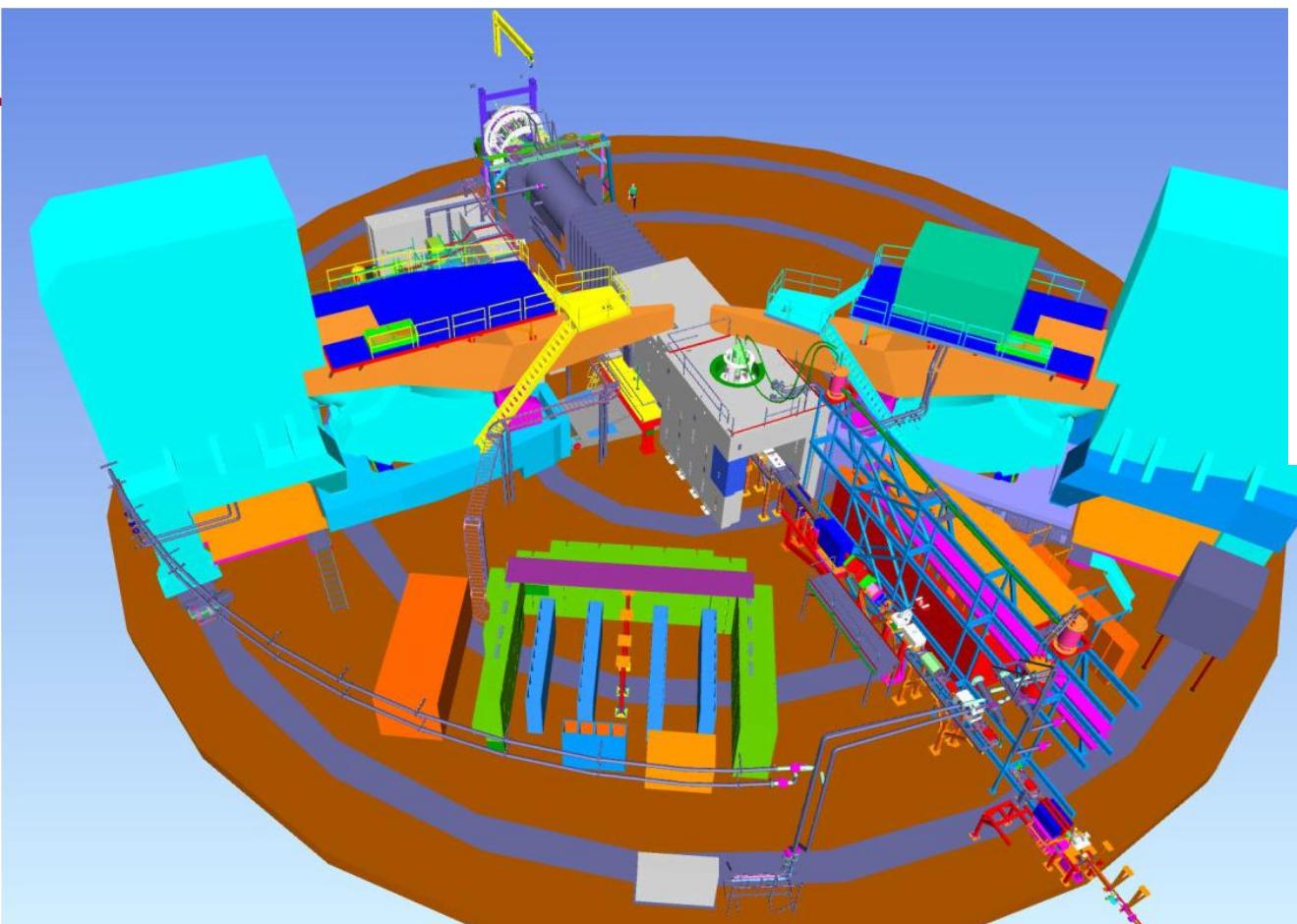
# Thursday Morning: Status of the SBS Form factor experiments

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- Neutron magnetic form factor experiment.
  - Preliminary results have been shown. Measured to  $Q^2 = 13.5$
  - NIMA Article on the BBCAL by Kate Evans and Provakar Datta ready to submit.
- Neutron two-photon exchange experiment at  $Q^2 = 4.5$ 
  - Measure neutron cross section at different epsilon and extract neutron GE/GM
- Neutron electric form factor experiment
  - Measure neutron GE/GM by beam-target asymmetry to  $Q^2 = 10$
  - World record luminosity for 60cm long polarized  $^3\text{He}$  target
- Neutron GE/GM by recoil polarization at  $Q^2 = 4.5$ 
  - Use new recoil polarization technique of charge exchange
- Proton GE/GM by recoil polarization
- Future experiments with the SBS and BigBite apparatus.

# MOLLER Experiment

- SBS Deinstallation completed. Installation has started.
- Spectrometer work in TestLab.
- Detectors arriving at JLab and W&M.
- Start running the experiment in 2027



Talk at 11:00 “MOLLER Overview” Ryan Conaway

Talk at 11:30 “Scientific Impact of MOLLER and P2”  
Jens Erler

Afternoon session on MOLLER

## SBS Deinstallation completed tasks

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- Decabling of the ECAL and HCAL organized by Chandan Ghosh, Simona Malace, Deb Biswas and Jiwan Poudel.
  - Over 30 people involved ( SBS users, MOLLER users, Staff).
- Deinstallation of the ECAL DAQ organized by Simona Malace and Paul King with students from W&M and Ohio U.
  - Installing MOLLER counting and integrating DAQ
- Deinstallation of the CDET organized by Ralph Marinaro (CNU) and Simona with CNU, W&M and Ohio U students
- Deinstallation of the SBS GEMs organized by Ching Him Leung, Ibrahim Albayrak and UVA postdoc and students.
- Deinstallation of the ECAL calorimeter organized by Don Jones with Bogdan and Lars Gustavson ( SSG tech).

# SBS Deinstallation completed

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- Moved ECAL, HCAL, CDET cables out of hall.
- Moved SBS GEMs in frames to the ESB. SBS electronics used by Hall B PRAD and MOLLER.
- Removed lead walls from SBS counterweight. Disassemble GEM DAQ and ECAL bunkers.
- Target group has removed the target assembly from the pivot and into the Hall C Physics Storage area.
- HCAL detectors moved to testlab. The HCAL stand and frame moved to laydown yard.
- Disassemble CDET detectors and detector frame.
- Removed the SBS magnet bus bars and LCW lines. Moved out of the hall.
- Large SBS front and rear field clamps removed and moved to laydown yard. SBS pole shim removed and take to ESB.
- Three electrical outages for Facilities checkout the clean, utility and truck ramp switchboards
- Disassembled ECAL large lifting fixture, calorimeter. ECAL platform to the laydown area.
- Moved SBS magnet steel and coils out of the hall to the TestLab HiBay.

# SBS Deinstallation completed

- Moved the SBS counterweight and floor plates out of hall to laydown yard.
- Removed bellows that attach shielded beam pipe and shielded exit Beam Pipe
- Disassembled Exit Beamline Tower and remove from Hall
- Disassembled (Corrugated) Exit Beam Pipe
- Removed Concrete Footing and Mounting Hardware for Tower and Exit Beam Pipe Support
- Moved the LHRs from 95 to 90 degrees
- Removed the scattering chamber



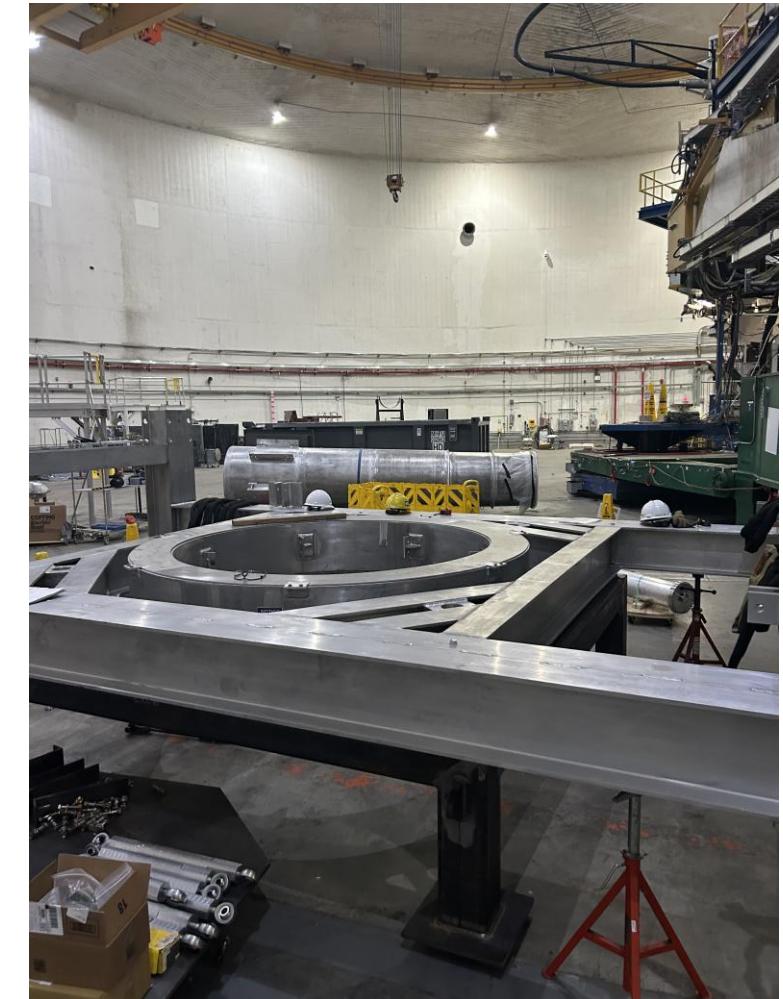
# MOLLER Completed Tasks

- Heidi Fansler and techs have prepared the cryo and removed U-tubes from entrance distribution can.
- Vacuum, I&C and DC power groups have prepared the upstream beamline.
- Engineering Mechanical group removed upstream beamline regions.
- HRS quads and link removed



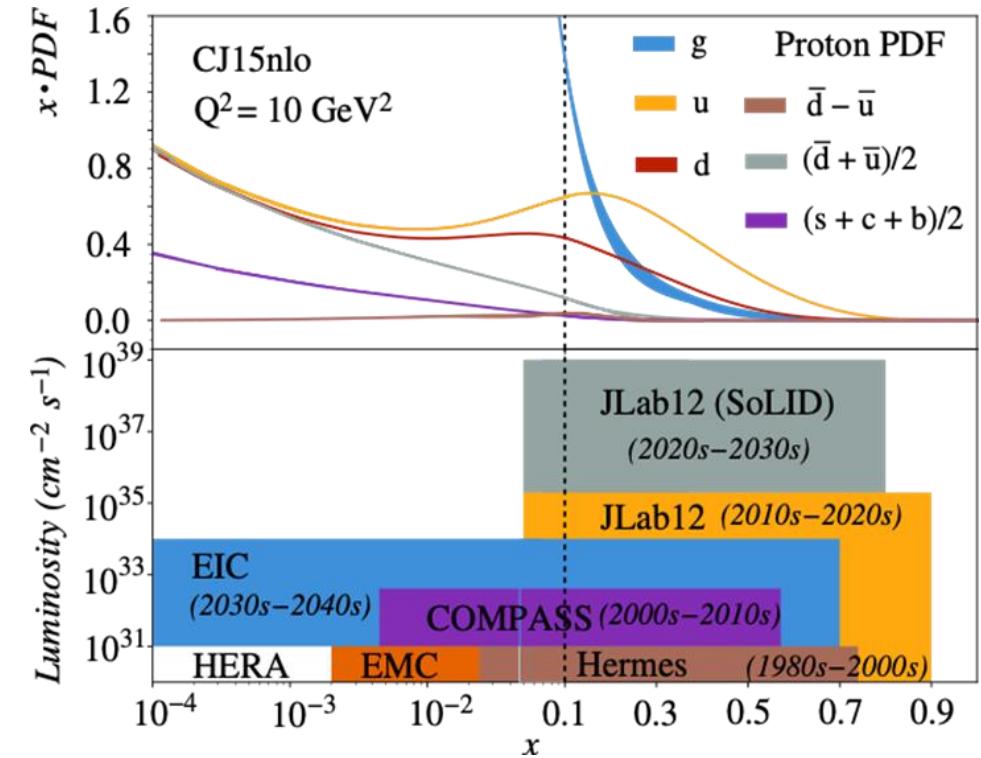
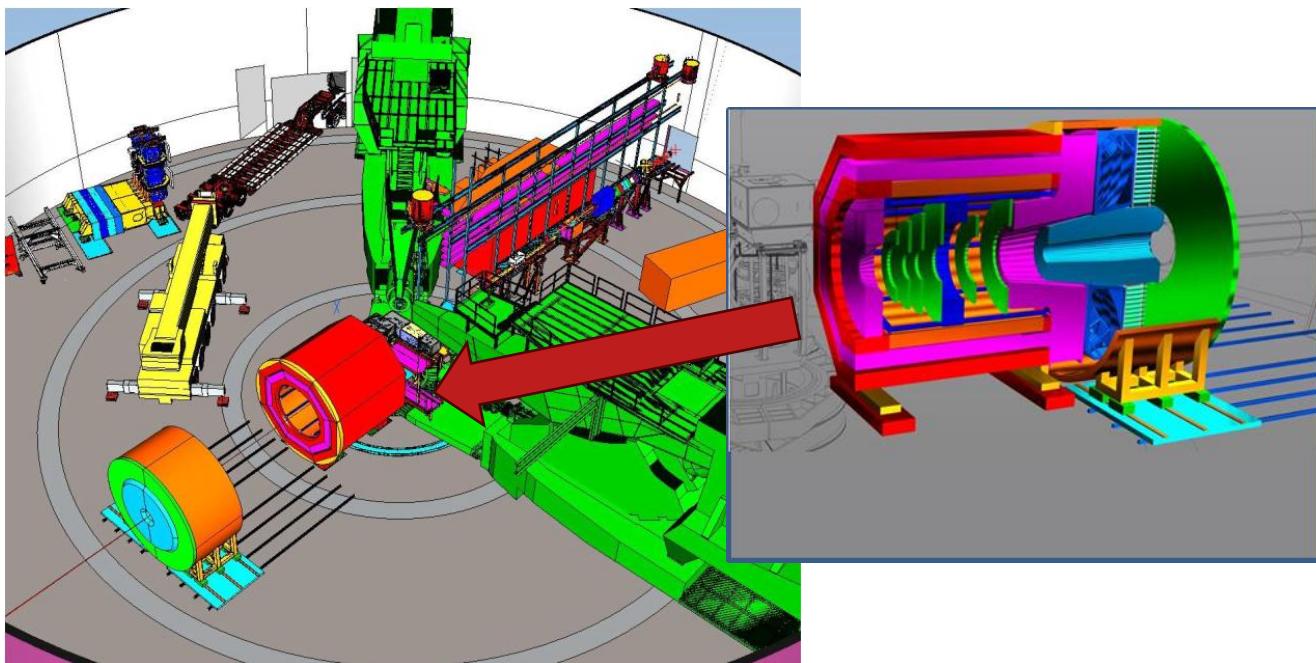
# MOLLER Completed and Ongoing Tasks

- Transported pion donut frame to hall
- MOLLER LCW installation ongoing
- Detector pipe and pion donut transported to hall
- Hall D tech working on assembly of the pion donut.
- SAM pipe installed. Needs to be leak checked.



# 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.
- $J/\psi$  production near threshold will provide information on the pure gluonic component of QCD



- SoLID in recommendation #4 of the NSAC Long Range Plan

“We recommend capitalizing on the unique ways in which nuclear physics can advance discovery science and applications for society by investing in additional projects and new strategic opportunities”... which include “the Solenoidal Large Intensity Device (SoLID) at Jefferson Lab”.

## ***Summary***

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- SBS Form factor experiments are completed.  
    Talks on Thursday morning.
- SBS deinstalled and MOLLER installation has started.
- MOLLER will start running in 2027.  
    Talks today.
- SOLID Beam test in Hall C in 2026.  
    Talks on Thursday afternoon.
- Two invited talks
  - Today 11:30 “Scientific Impact of MOLLER and P2” by Jens Erler
  - Thurs 13:30 ““Neutrino Measurements and Their Connection to JLab Electron Beam Measurements” by Kate Scholberg