Hall A Status

January 2024 Winter Hall A Collaboration Meeting

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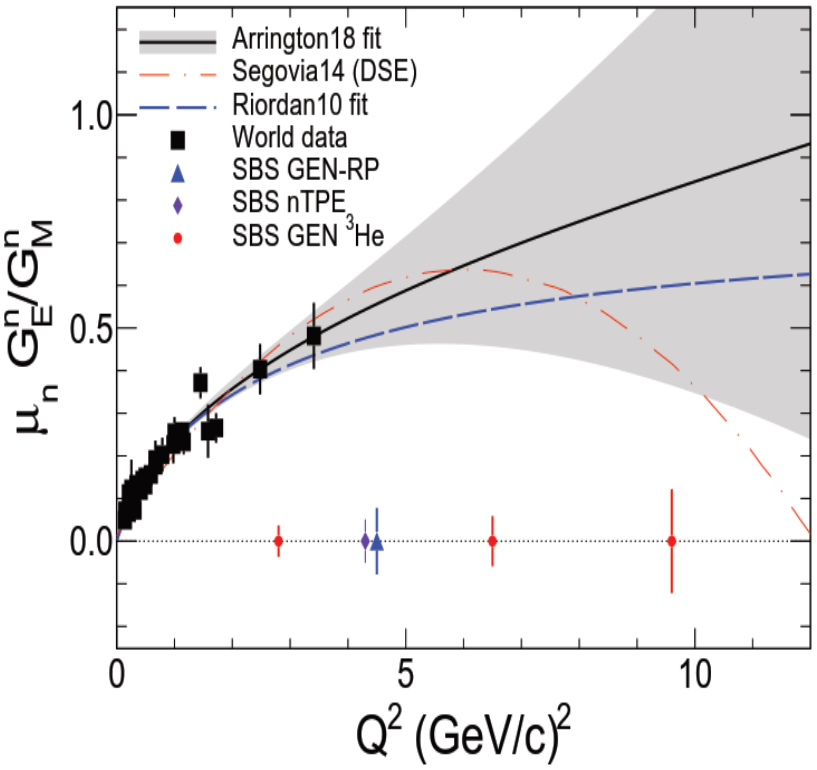
Jan 16 2024

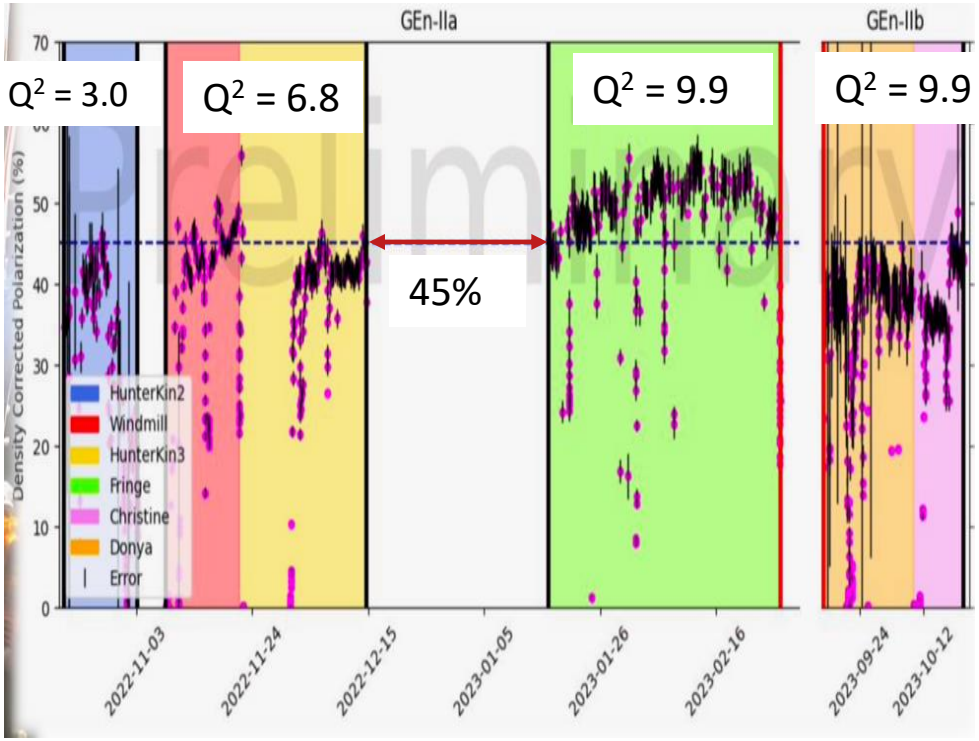
Overview of recent Hall A activities

- Completed Hall A crane repair in Aug 2023
- Lab wide “Safety Pause” delayed start of beam until Sept 12, 2023
  - Big Thanks to Zach Remele (Acting Work coordinator), Andrew Lumanog (Acting Deputy WC) , Travis Dodge, Casey Forehand and the new techs Caleb Graham and Sarah Ballard for getting the Hall ready.
- Ended GEn experiment on Oct 30th for 4 day changeover to the A_LL experiment
  - Clean up after target explosion. Install new target cell
  - Move SBS/BB to new kinematics
  - GEM repair work
  - On Friday Nov 3 found leak in the beam dump pump station.
  - Tuesday Nov 21 restarted beam to Hall A, but on Nov 23 more leaks.
  - Decided to cancel running the A_LL experiment.
  - Repair of leaks done last week.
- Deinstallation of 3He target started and we are in midst of transition to GEn-RP and K_LL
- GEn-RP and K_LL will start on April 1st. GEp experiment scheduled for Oct 25th 2024.
- Staff changes
  - Lawrence Hurt hired as Hall A Work Coordinator
  - Zach Remele hired as Hall A Deputy Work Coordinator
  - Andrew Lumanog hired as EIC/MOLLER Work Coordinator

GEn using polarized helium target

- Started running the experiment at beginning of Oct 2022
- First time running with 60cm long 3He cell
  - 45-50% polarization in beam!
- Completed the Q^2 = 3.0 and 6.8 by Dec 2022. Run part of Q^2 = 9.9 from Jan to Mar 2023
- Completed the Q^2 = 9.9 kinematics by running from Sept 12 to Oct 30 2023.





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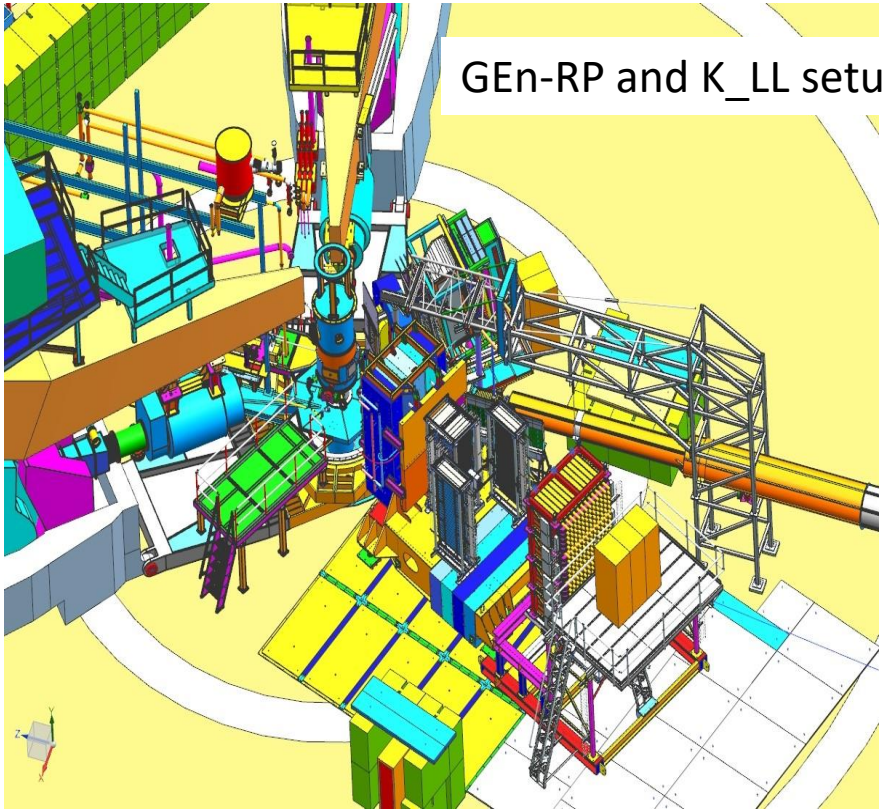
GEn-RP and K_LL in April 2024

- Measurement of the Ratio GEn/GMn by the Double-polarized $^2\mathrm{H}(\vec{e}, e'\vec{n})$ Reaction
  - Outgoing neutron polarization measured by charge exchange
  - Additional polarization measurement using the side detectors and active analyzer
- Polarization Transfer in Wide-Angle Charged Pion Photoproduction (K_LL)

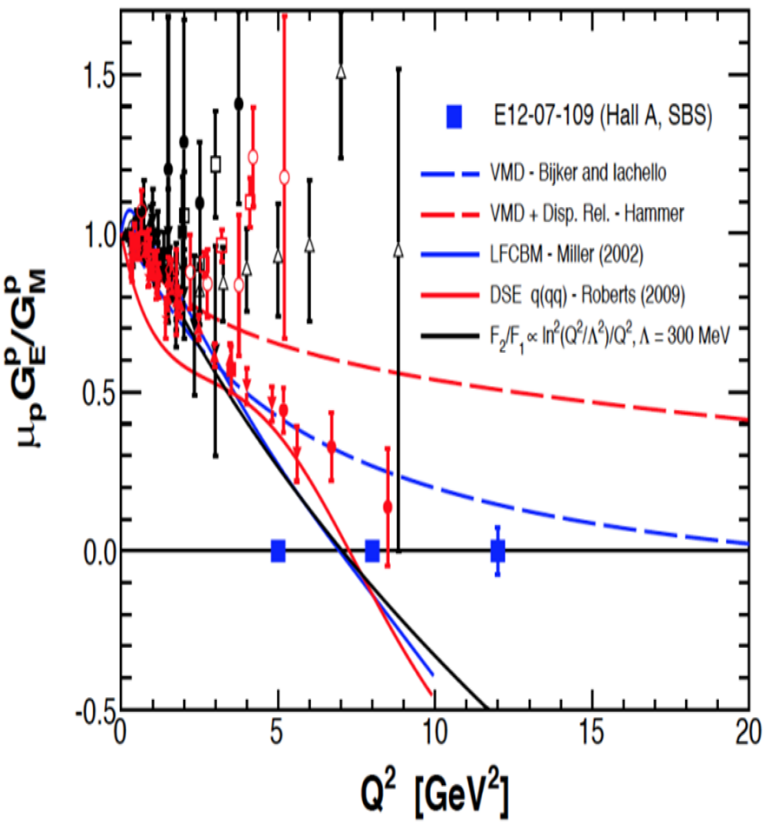


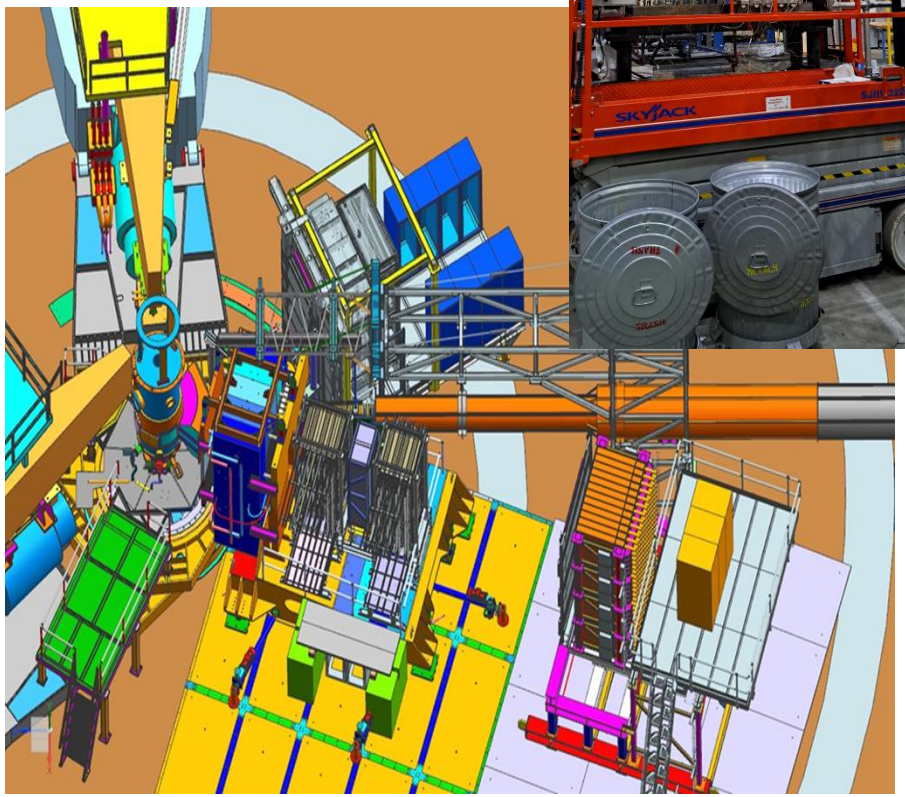
GEn-RP and K_LL setup

Inline SBS GEMs installed and used in GEn.

GEp experiment

- Installation begins in May 2024 and ends Oct 2024
- Experiment runs from Nov 2024 to April 2025
- Large Electron Calorimeter and Coordinate Detector replace BigBite
- Rearrange Bigbite and SBS GEM detectors
- Measure to $Q^2 = 12$





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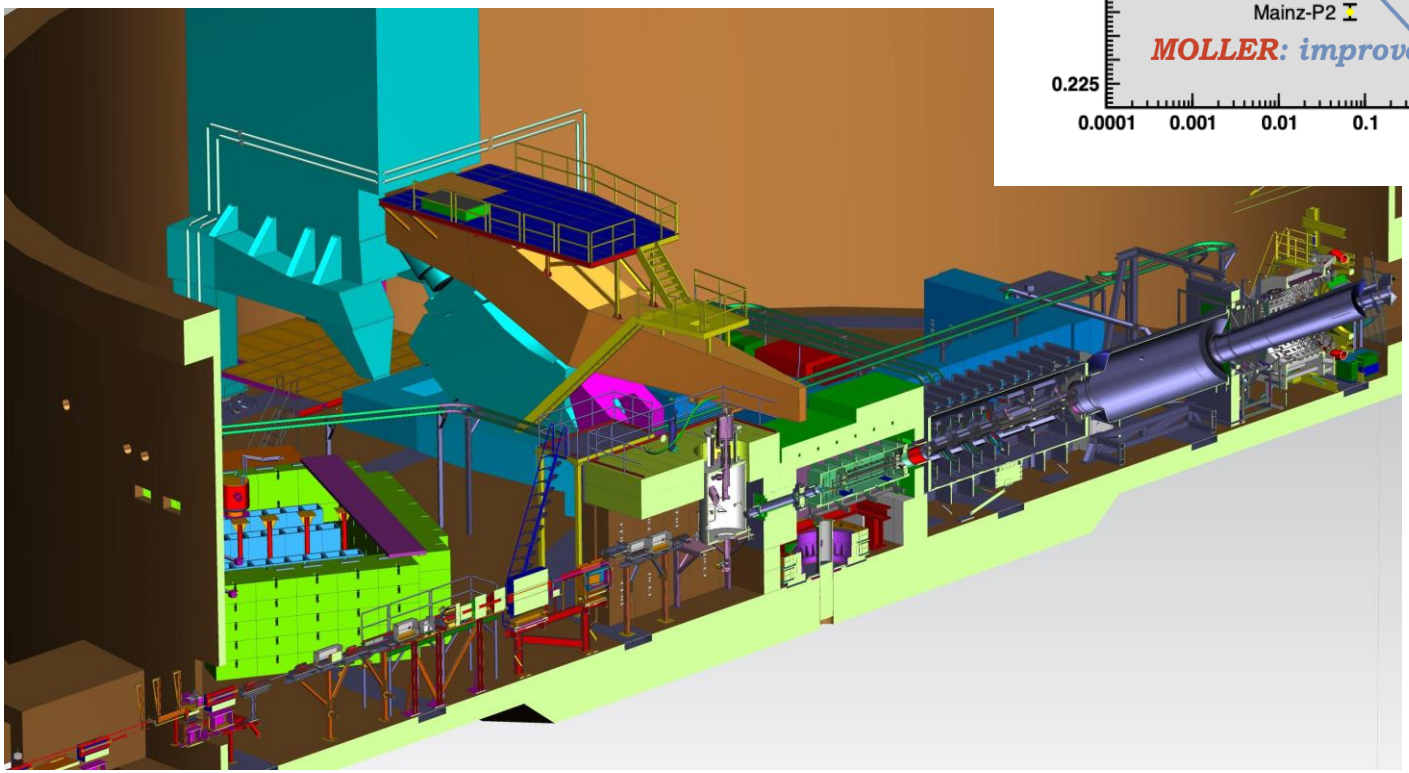
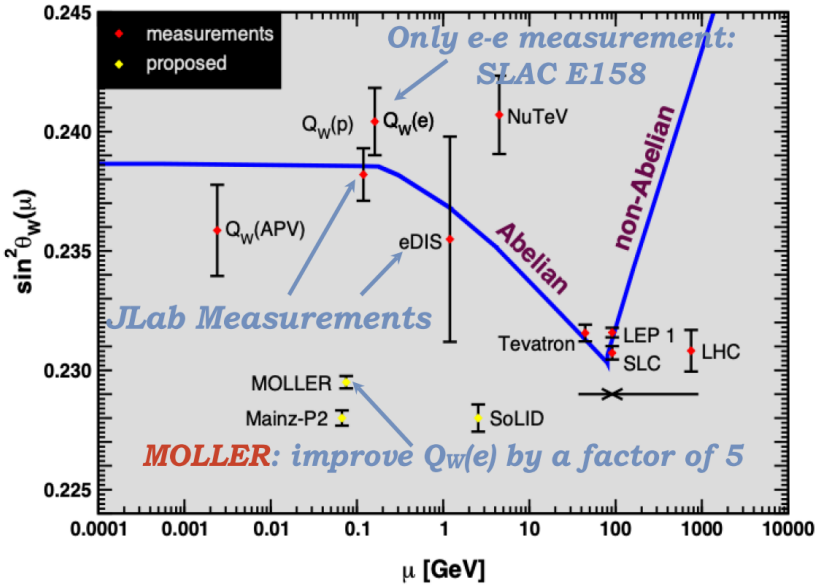
MOLLER Experiment

- Passed Cd-3A review and spending CD-3A funds.
- CD2 /CD3 review in October 2023.
- Start SBS deinstallation in May 2025
- 3 years of running.





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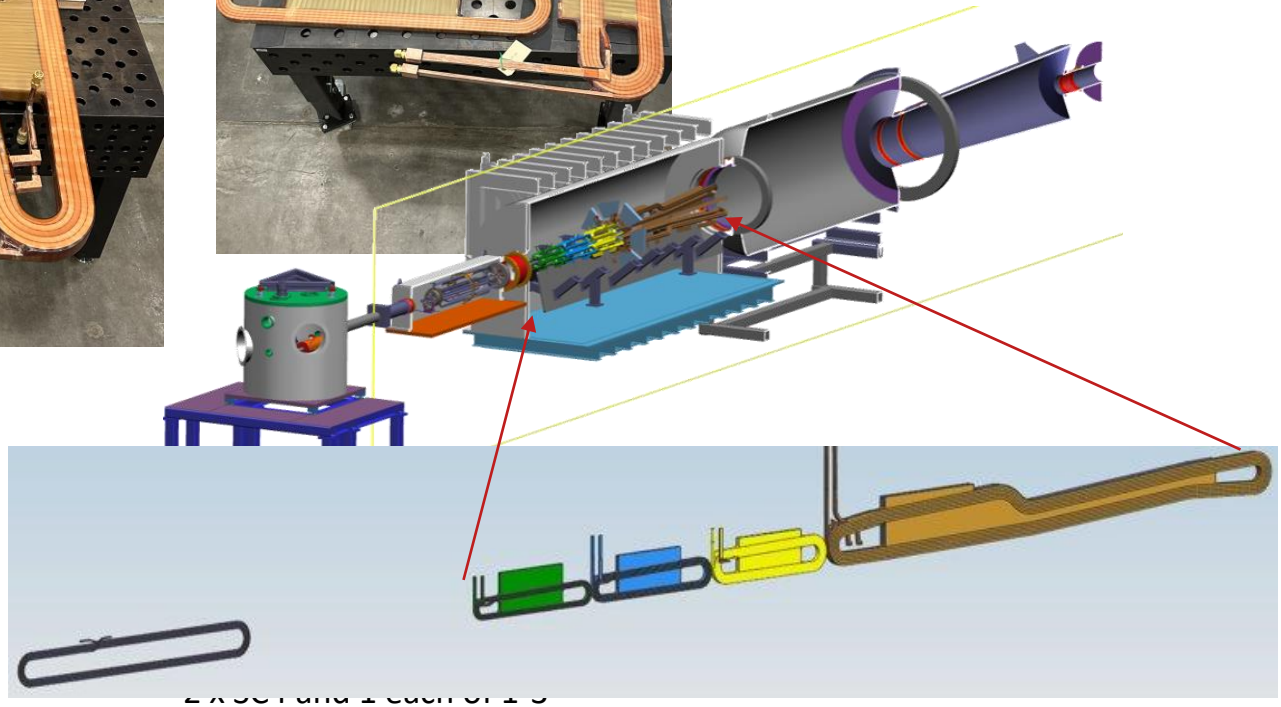
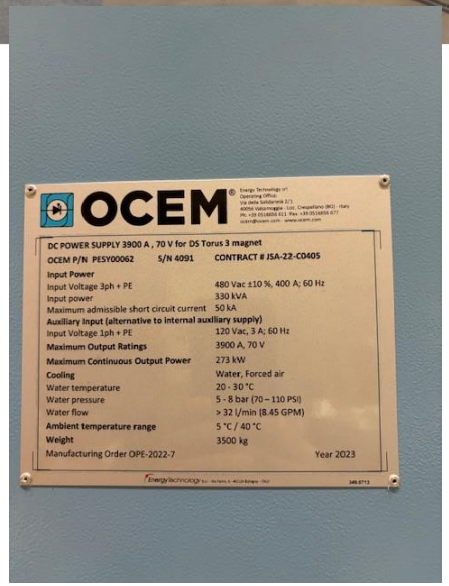
MOLLER updates

Spectrometer – First 5 Down Stream Toroid Production Coils Received



MOLLER Recent Deliveries – Prototype Magnet Power Supply

Loading the MPS at OCEM (12/21/2023)



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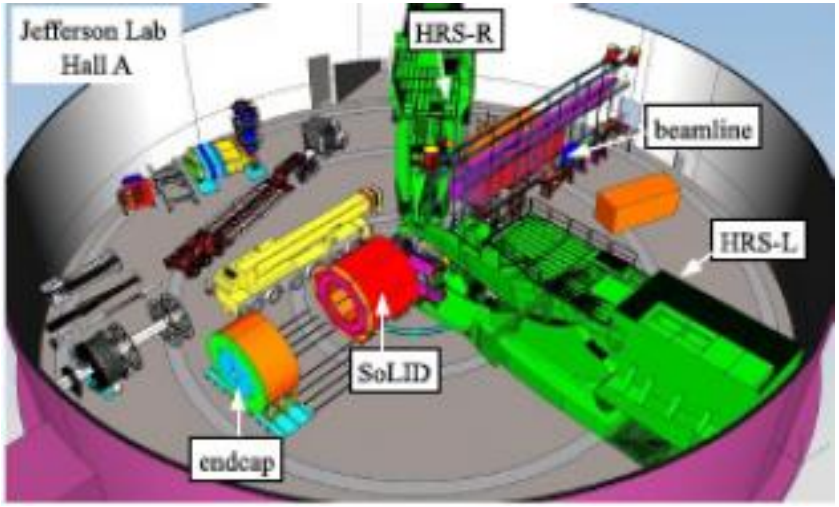
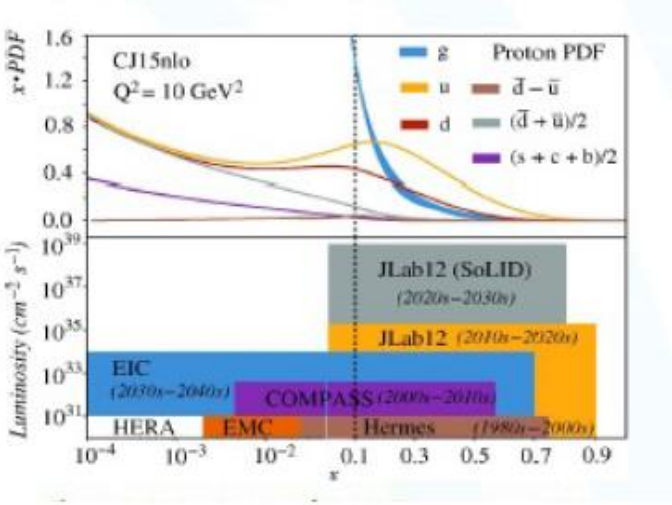
SoLID： Solenoidal Large Intensity Device

- 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/Ψ production near threshold will provide information on the pure gluonic component of QCD
- Talks by Ye Tian, Sylvester Joosten and Xinzhan Bai





- 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".

SBS Form Factor summary

- At midpoint in the SBS experimental program *(overview talk by Gordon Cates)*
- Analysis of neutron G_M experiment to $Q^2 = 13.5$ and Neutron TPE at $Q^2 = 4.5$ is well underway. *(talks by Provakar Datta and Eric Fuchey)*
  - Commissioned a new BigBite Spectrometer with GEMs *(talks by Vimukthi Gamage, Andrew Puckett)*, 189 channel Hodoscope, 600 channel GRINCH, 289 channels of Calorimeter.
  - Commissioned a new Super BigBite Spectrometer with GEMs and HCAL *(talk by Jiwan Poudel)*
- Completed the polarized 3He program to measure neutron G_E/G_M to $Q^2 = 9.9$
  - 60cm long target at 50% polarization with 45uA *(talk by Hunter Presley)*
  - Overview and analysis *(talk by Sean Jeffas)*
- GEn-RP to measure neutron G_E/G_M at $Q^2 = 4.5$ by recoil polarimetry and WACS pion production K_LL to run in April 2024 *(talk by Michael Kohl)*
- GEp to measure proton G_E/G_M to $Q^2 = 12.0$ by recoil polarimetry is scheduled to start on Oct 25, 2024 and preparation in Hall. *(talk by Jimmy Caylor)*
- Newly accepted proposal to measure the strange quark form factor at $Q^2 = 2.5$ *(talk by Kent Paschke)*

Future in Hall A

- MOLLER experiment
  - Spending CD-3A long lead time funds by Feb 2024.
    - 1st set of DS Spectrometer coils and power supply arrived at the TestLab.
  - SBS deinstallation scheduled to start May 2025
  - Talks by Prakash Gautam and Sayak Chatterjee
- Dark Matter search in a Beam Dump eXperiment (talk by Marco Battaglieri)
- SoLID experimental program
  - Part of recommendation #4 in the NSAC Long Range Plan
  - Pre R&D has been done to reduce risk
  - Revised and updated cost estimate
  - Working with management to see how Capitol and OPS spending can be part of project funding.
- Positron and 20+ GeV JLab upgrade