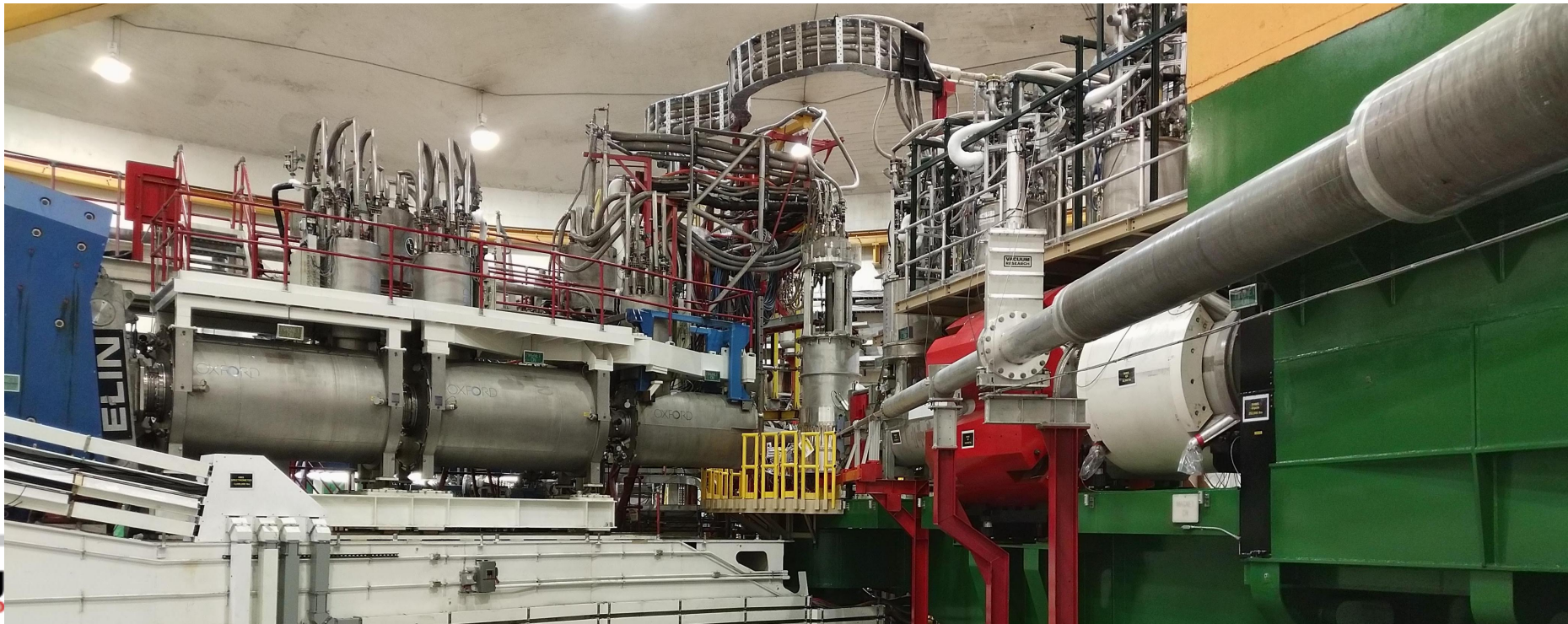
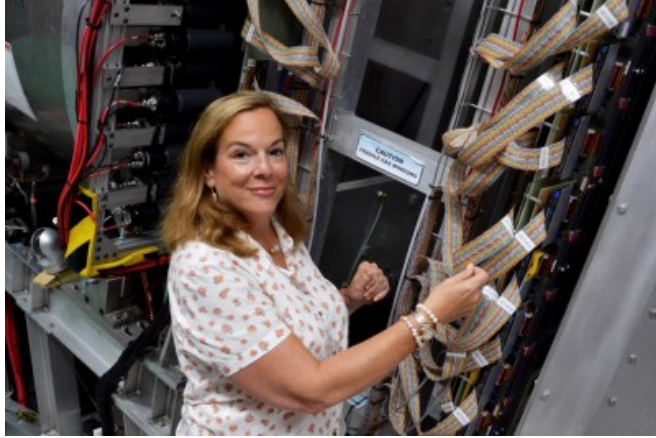


Hall A/C - December 2021



Changes!



Head of Physics Division:
Cynthia Keppel

Deputy:
Patrizia Rossi



Hall A/C Leader:
Mark Jones

Deputy:
Javier Gomez

Lab Deputy Director
for Science:
David Dean

Administrative support:

Division: Stephanie Tysor stysor@jlab.org

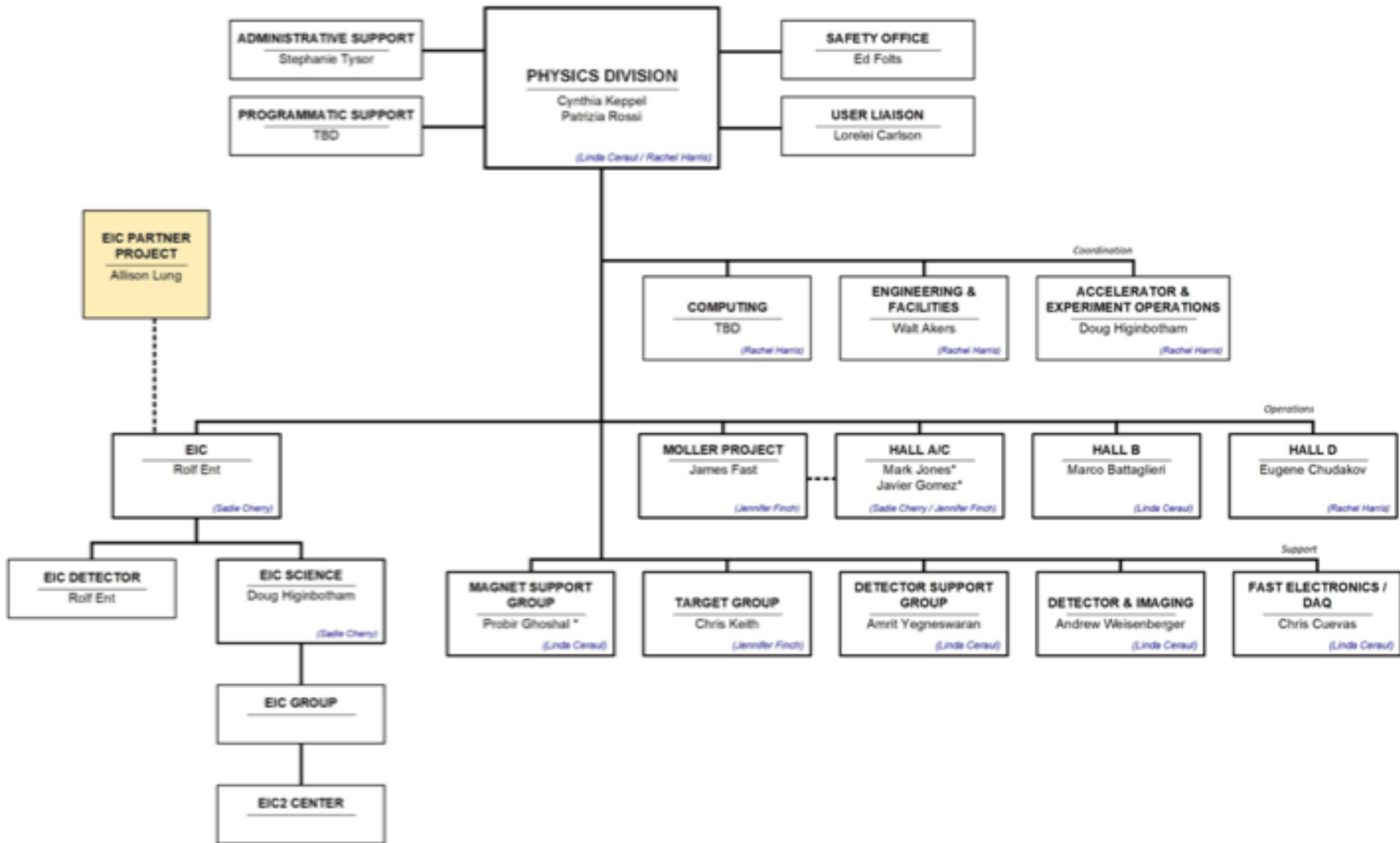
A/C:

Sadie Cherry cherry@jlab.org

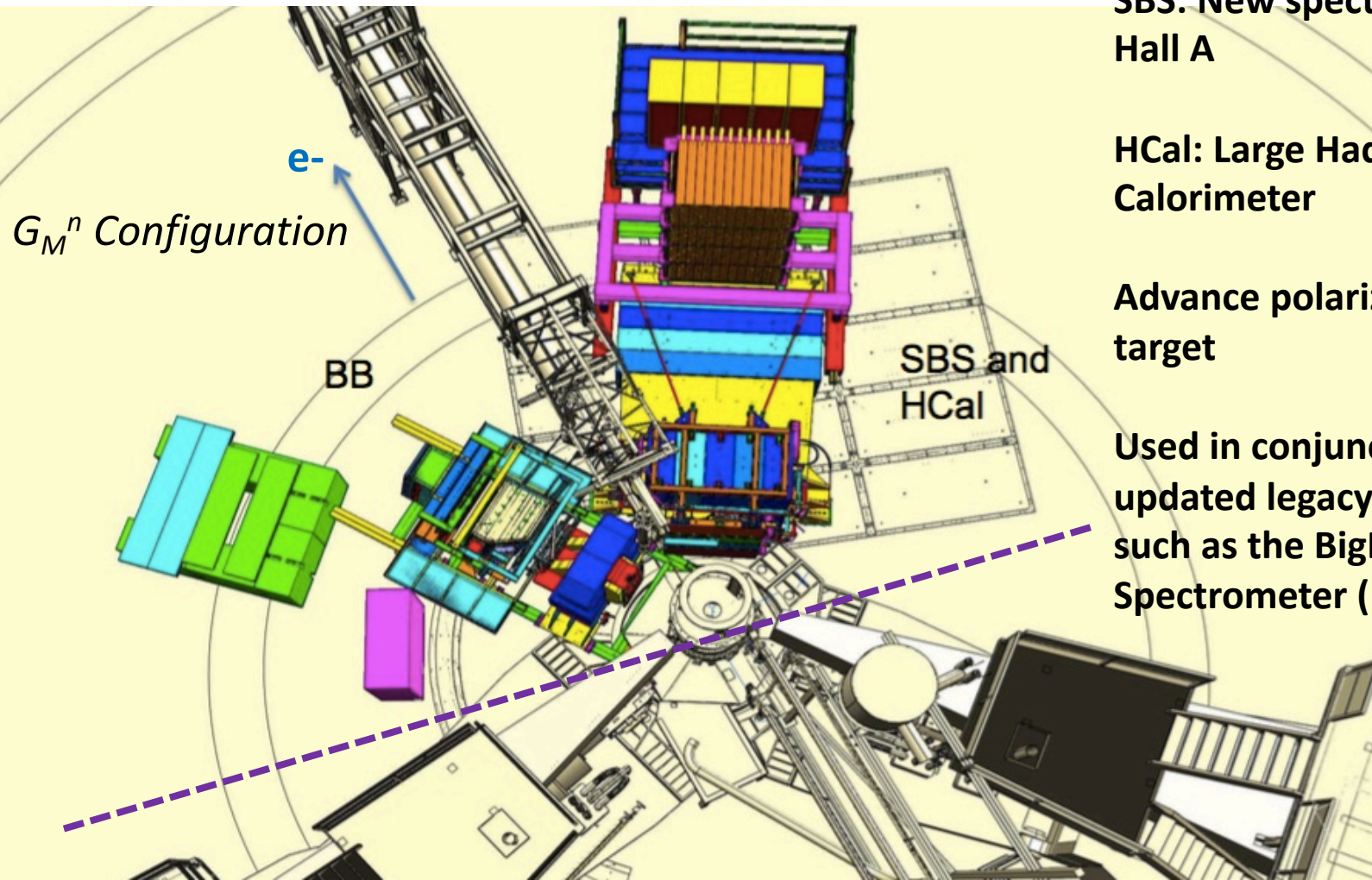
Jennifer Finch finch@jlab.org



Physics Division Organization



Hall A SuperBigBite Spectrometer (SBS)

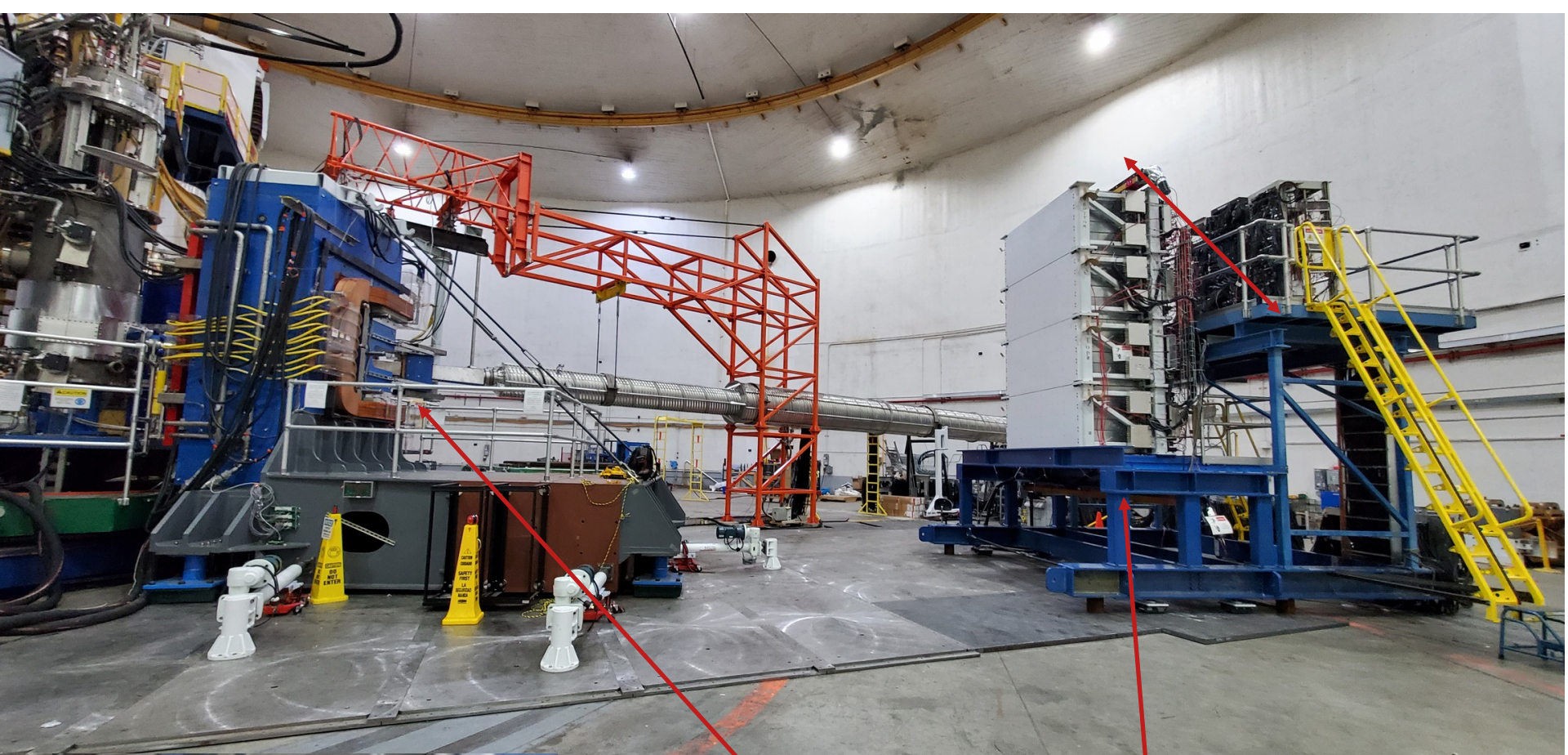


SBS: New spectrometer for Hall A

HCal: Large Hadron Calorimeter

Advance polarized ^3He target

Used in conjunction with updated legacy equipment such as the BigBite Spectrometer (BB)

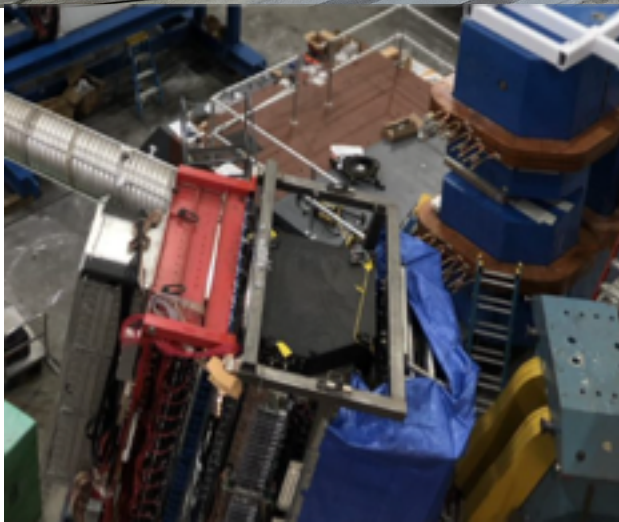


SBS Magnet

HCal

BigBite

Installed with mobile crane!
(Hall A crane broken)



Hall A Scheduling

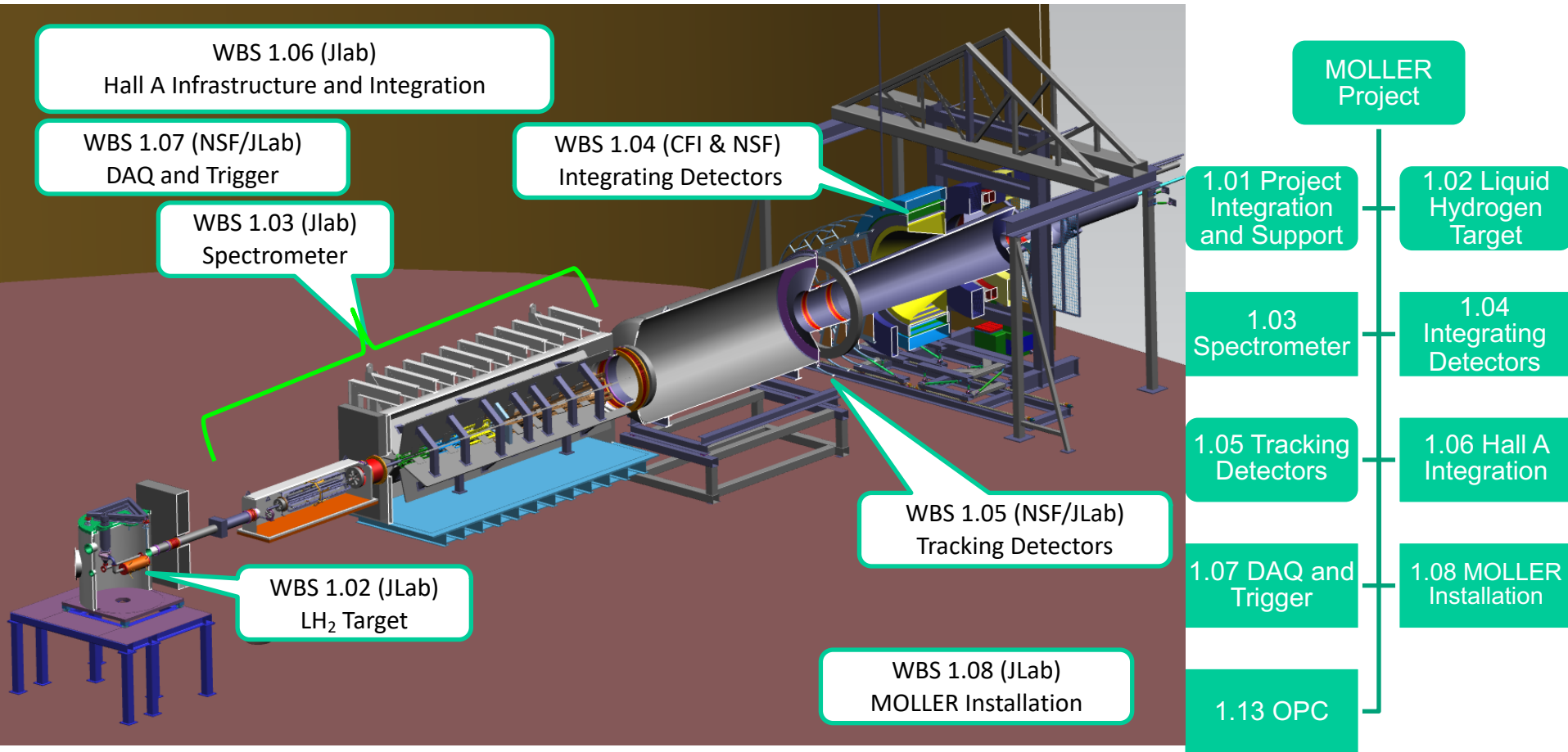
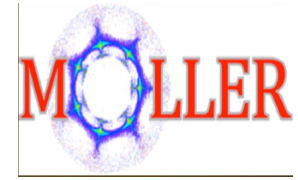
- Present to Feb 7th 2022
 - Neutron magnetic form factor up to $Q^2 = 13.6$
 - Two photon exchange in elastic electron-neutron scattering at $Q^2 = 4.5$
- Feb 7th 2022 to July 7th 2022
 - Installation of the polarized ^3He target
- July 8th – Nov 8th 2022
 - Neutron electric form factor by asymmetry up to $Q^2 = 10$
 - A_{LL} in wide angle photo-produced pion on polarized neutron
- Nov 9th 2022 – Feb 14th 2023
 - Installation of the cryo targets and SBS neutron recoil polarimeter
- Feb 15th – Mar 14th 2023
 - Neutron electric factor by recoil polarimeter $Q^2 = 4.5$
 - K_{LL} in wide angle photo-produced pion on neutron
- After this there is no official schedule
 - Run GEp (45 PAC days) and SIDIS (90 PAC days) with polarized neutron
 - Moller experiment
 - SoLID experiments

Major reconfigurations of SBS setup

MOLLER Project Underway

DOE CD-1 approved December 2020

NSF Midscale and CFI/RM (Canada) quickly followed



MOLLER Notional Schedule

Activity	Start	End	2020				2021				2022				2023				2024			
			FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4
SAD and SBS Installation	9/21/20	9/1/21																				
SBS Physics Run 1	9/2/21	12/24/21																				
SBS Physics Run 2	5/1/22	12/24/22																				
SBS Physics Run 3	1/15/23	5/15/23																				
SBS Physics Run 4	10/1/23	12/24/23																				
SBS Physics Run 5	1/15/24	5/15/24																				
MOLLER Design and Engineering	12/15/20	9/30/22																				
MOLLER Procurement and Assembly	9/1/22	3/15/25																				
MOLLER Installation and Checkout (no beam)	5/20/24	6/25/25																				
MOLLER Commissioning Run (49 PAC days)	6/26/25	10/2/25																				
MOLLER Physics Run 1 (60 PAC days)	1/15/26	5/15/26																				
MOLLER Physics Run 2A (57 PAC days)	9/1/26	12/24/26																				
MOLLER Physics Run 2B (60 PAC days)	1/15/27	5/15/27																				
MOLLER Physics Run 3A (57 PAC days)	9/1/27	12/24/27																				
MOLLER Physics Run 3B (60 PAC days)	1/15/28	5/14/28																				

Q4	2025				2026				2027				2028				2029				
	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	FQ1	FQ2	FQ3	FQ4	

MOLLER schedule determined by funding.

Large DOE/NSF/CFI investment

Installation unlikely to be delayed if ready

SoLID

Solenoidal detector:

Semi-inclusive DIS

Near threshold J/ψ

Parity Violating DIS

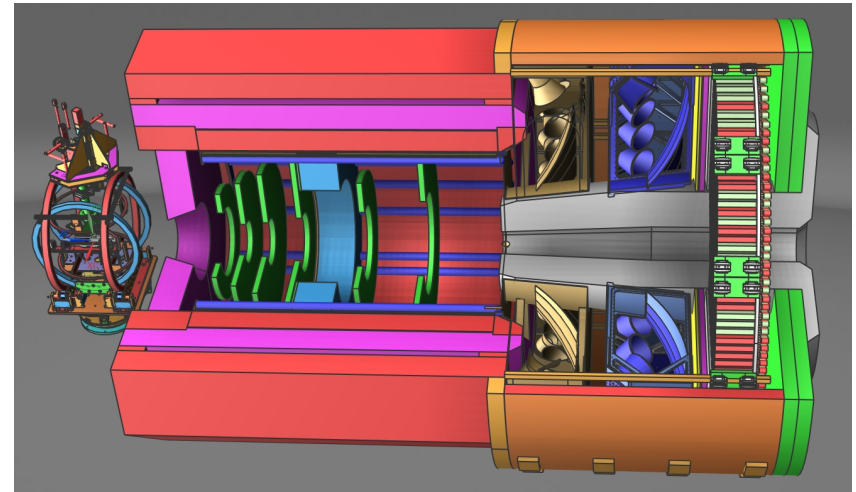
Several years of approved expts

Recent DOE Science Review

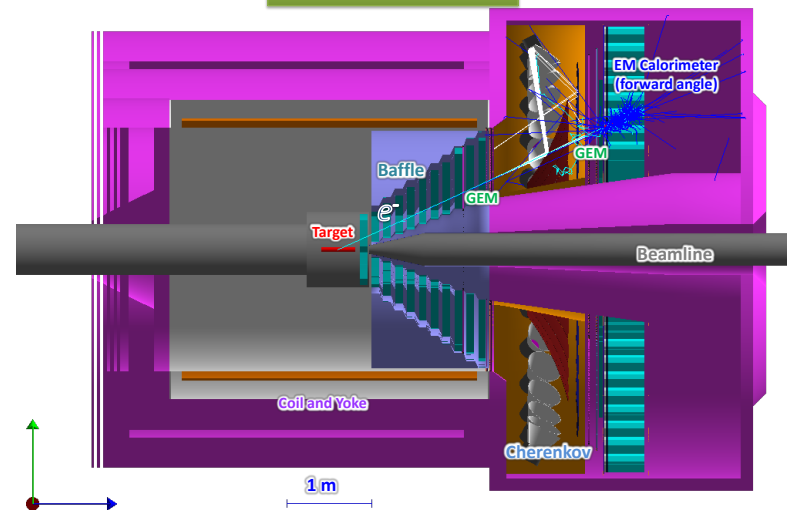
Waiting for CD-0 approval

Has received pre R&D funding

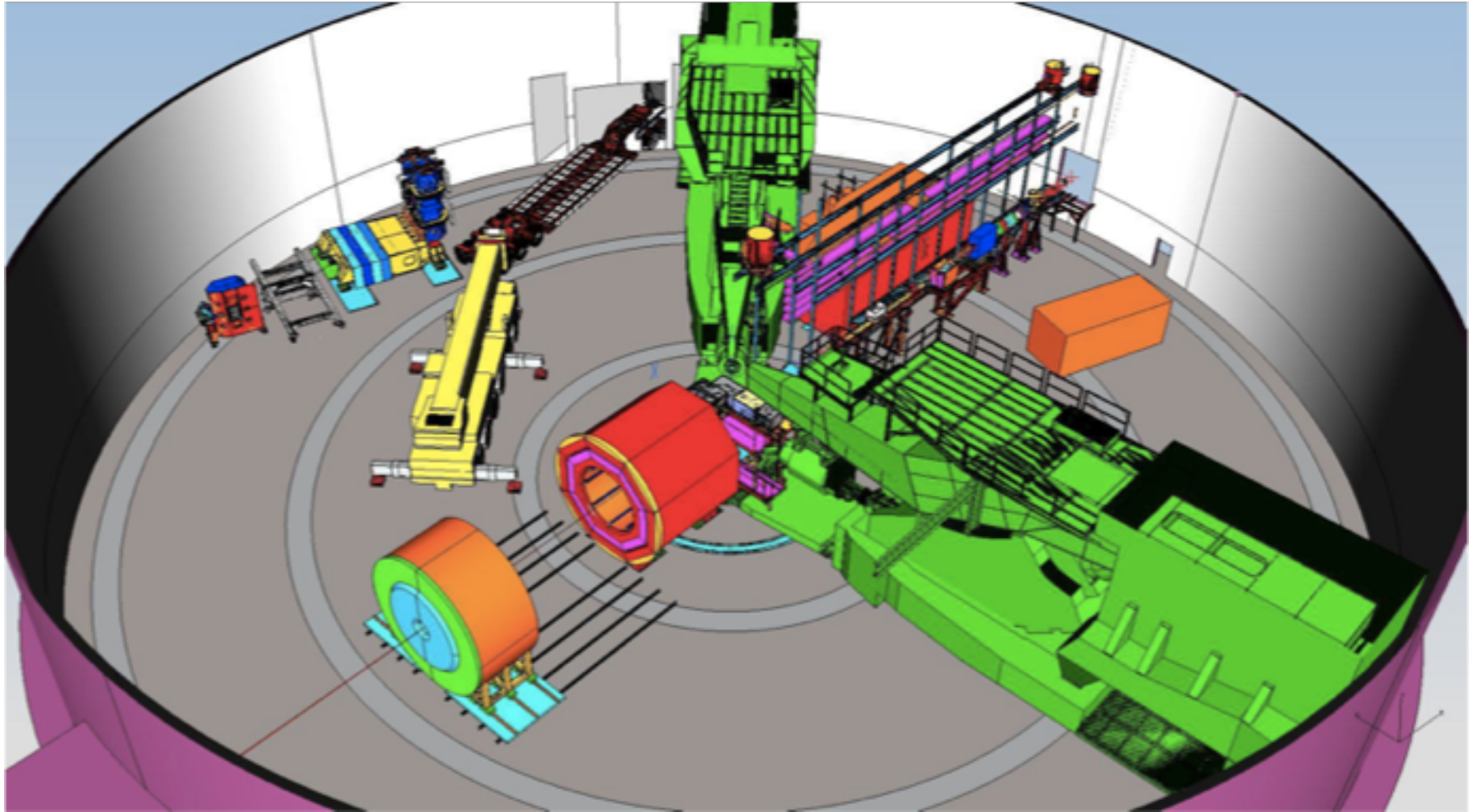
Polarized ^3He ("neutron") @ SoLID



SoLID (PVDIS)



SoLID in Hall A



Hall C – 2022+

Now – February 7, 2022

**E12-19-006 Exclusive $p(e, e'\pi^\pm)$ LT separated cross sections (PionLT)
Scaling and Pion Form Factor (was E12-06-101/E12-07-105)**

June 8, 2022 – March 14, 2023 – Standard Equipment SHMS/HMS

E12-17-005 CaFe – Short Range Correlations $^{40}\text{Ca}(e, e'p)$, $^{48}\text{Ca}(e, e'p)$

E12-10-008 EMC effect, light to heavy nuclei

E12-06-105 $x > 1$ light to heavy nuclei

E12-19-006 Continue exclusive PionLT

E12-10-003 Deuteron Electrodisintegration

2023/2024

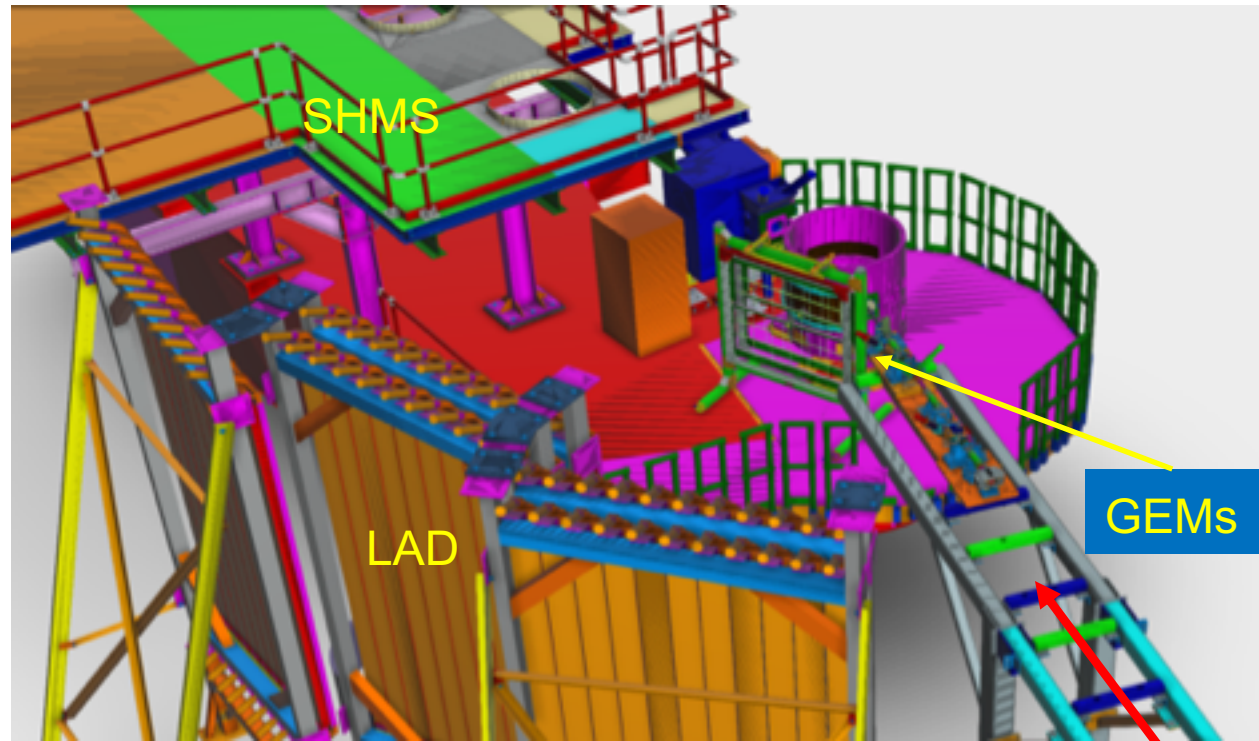
Not scheduled: Likely run

Neutral Particle Spectrometer program – (HMS + Calorimeter)

Large Acceptance Detector – (SHMS/HMS + GEMs + Large Scint Bars)

LAD – Large Acceptance Detector

- E12-11-007: Deuteron EMC – $d(e, e' \text{ backward } p)$
- Very large solid angle for $L = 10^{36} \text{ cm}^{-2} \text{ s}^{-1}$ and $\theta > 90^\circ$
- Optimized for medium momentum nucleons
 $0.3 \leq p_N \leq 0.7 \text{ GeV}/c$
- Uses 5 scintillator planes which are built from old CLAS-6 TOF scintillators refurbished @ODU.
- HV supply for scintillator planes delivered.
- Successful ERR review, scheduling requested
- Will use PRAD GEMs



Neutral Particle Spectrometer

Motivation for NPS: Validation of Reaction mechanisms for TMDs & GPDs

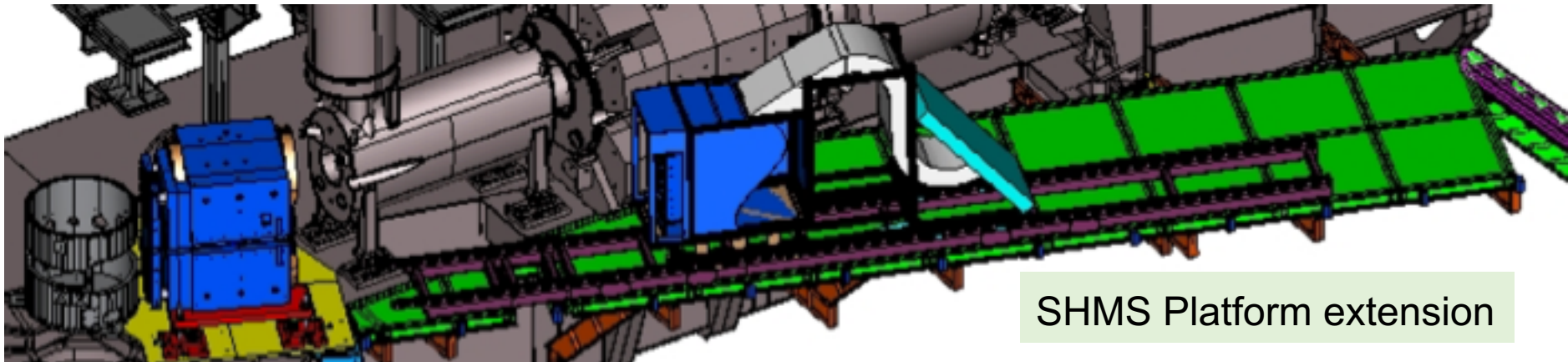
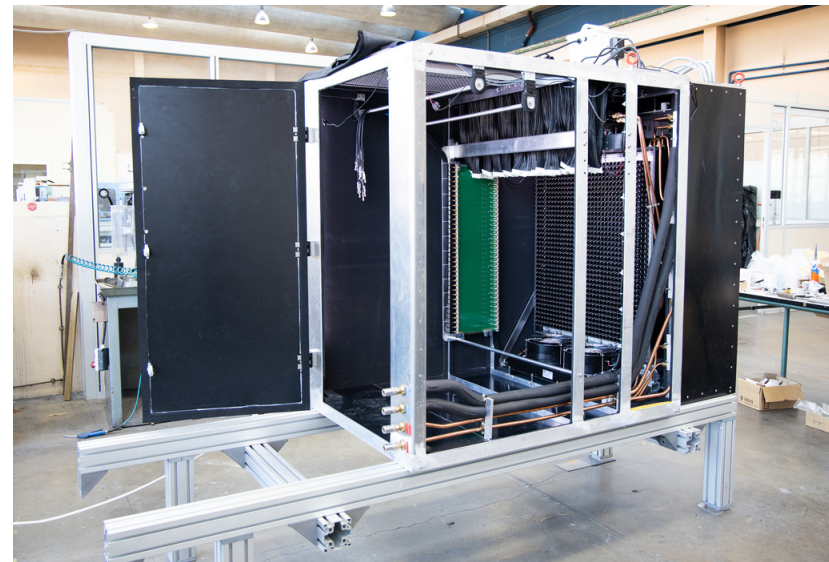
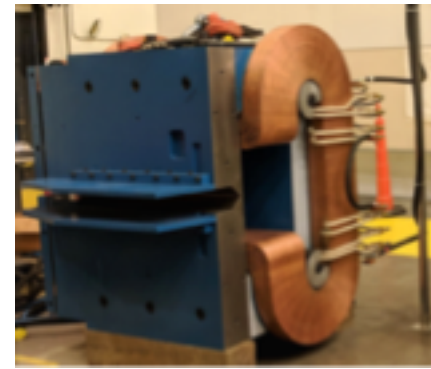
5 approved experiment: **DVCS & SIDIS ($e, e'\pi^0$), WACS(γ, π^0) & pol. WACS**

1 conditionally approved: Timelike Compton Scattering

NPS (Expts E12-13-010/E13-13-007, E12-14-003/E12-14-005) passed ERR, beam time request submitted

NPS: PbW04 calorimeter behind sweep magnet Rides on SHMS carriage.

Supported by NSF MRI PHY-1530874



SHMS Platform extension

Personal Thoughts

No room for installations between SBS and MOLLER unless MOLLER funding is very slow

Hall A not available until 2029, longer if SoLID is funded and ready

Hall C has several years of approved program, but has more flexibility

Hall could be available for hypernuclear physics in 2025

Returning tritium to JLab would be very difficult

Collaborate with other tritium advocates