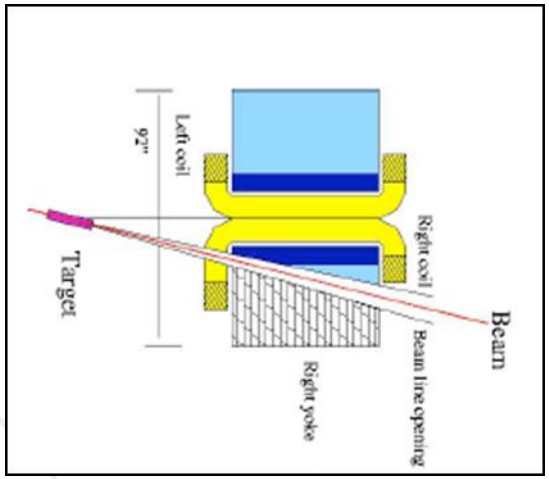
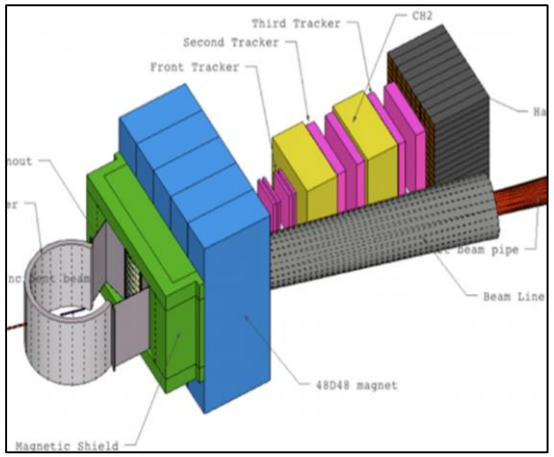
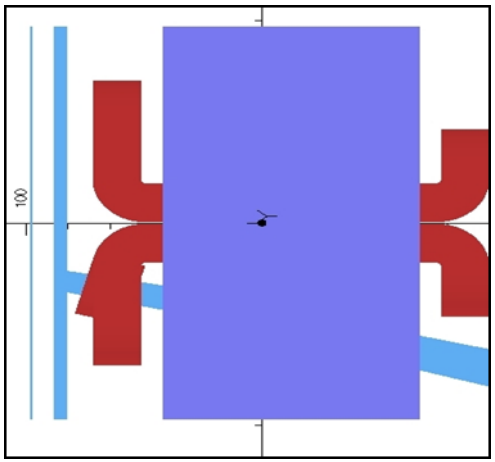
Hall A Winter Collaboration Meeting

SBS Engineering

SBS in 2010







Robin Wines

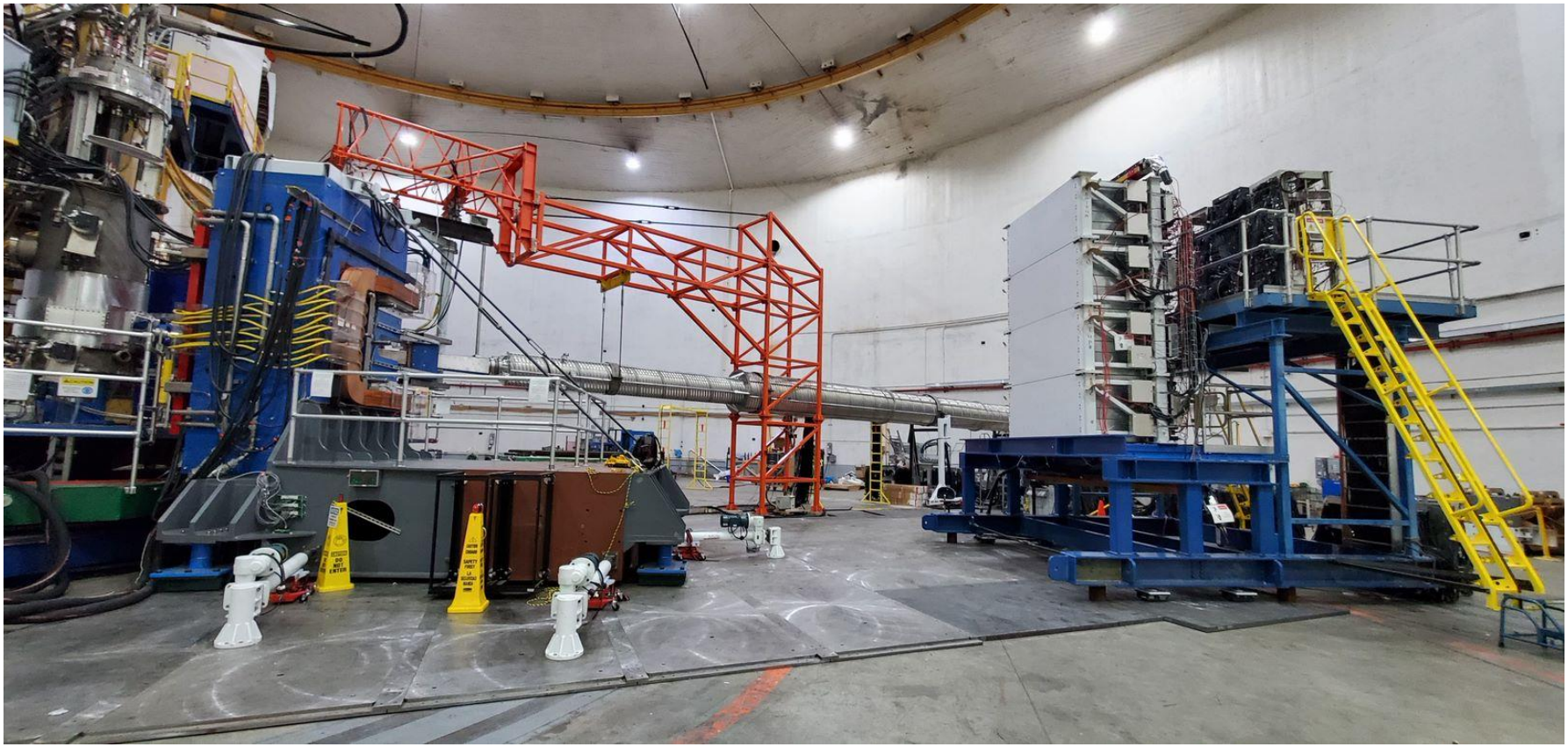
Jefferson Lab

U.S. DEPARTMENT OF ENERGY | Office of Science

JSA

SBS Engineering

SBS in 2021 – GMn experiment installed – now complete!



SBS Engineering

Priorities for Hall A Engineering (not necessarily based on experiment run/approval schedule)

- GEn installation with GEn-RP detectors and accommodation for Pion-ALL
- GEn-RP and Pion-KALL
- GEp
- SIDIS
- TDIS

Readiness of SBS equipment in parallel with meeting MOLLER project requirements and CLEO coil test requirement for SoLID.

SBS Engineering - GEn

Preliminary DRAFT Kinematics for GEn and Pion-ALL given to Engineering for layout and design considerations.

2022.01.14b

HCAL 17.0m

Name	Energy	Program	BB angle	BB distance	SBS angle	SBS distance	HCAL angle	Days	taking	item order	theta CM
el.-neutron	50 PAC days	Q2 GeV2						PAC days	hours		
Comm.	2.20	All tests	47.5	1.55	34.7	2.8	34.2	2		A	
GEN-1opt	2.20	Q2=1.8	47.5	1.55	34.7	2.8	34.2	2		B	
GEN-2opt	4.30	Q2=3.0	29.5	1.55	34.7	2.8	34.2	4		C	
GEN-3	6.40	Q2=6.8	35.9	1.55	22.1	2.8	21.6	10		D	
GEN-4	8.50	Q2=9.9	35.0	1.55	18.0	2.8	17.5	32		F	
pion-proton	10 PAC days	E_gamma		1.63							
PALL-A	6.40	4.5	37.5	1.55	27.4	2.8	26.9	2	6	I	96
PALL-B	6.40	4.5	29.5° ~~27.0~~	1.55	36.2	2.8	35.7	1	8	J	76
PALL-C	6.40	4.5	50.0	1.55	20.8	2.8	20.3	1	8	H	113
PALL-D	8.50	6.0	37.8	1.55	22.1	2.8	21.6	2	16	E	104
PALL-Eopt	10.60	7.5	33.7	1.55	20.8	2.8	20.2	4	60	G	103

SBS Engineering – GEn status

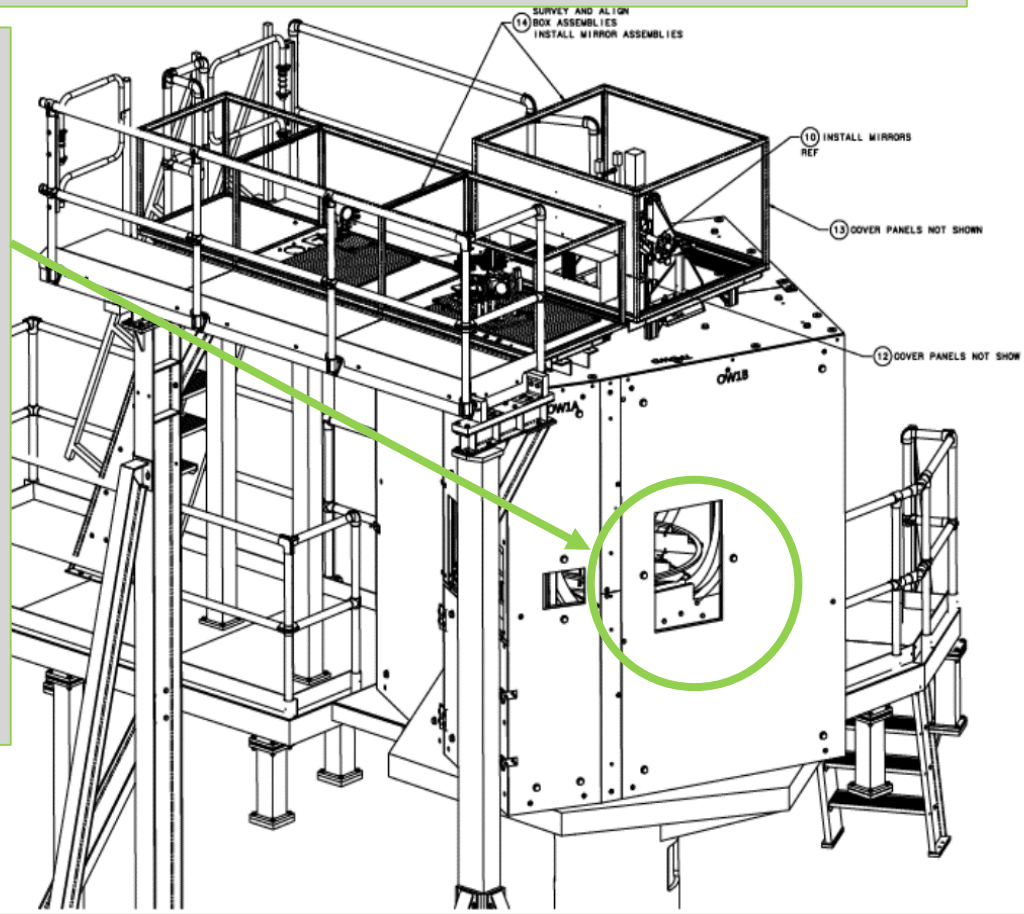
From GMn to GEn

- Polarized 3He Target
- Modify target shield box
- Modify SBS front field clamp
- Install SBS rear field clamp
- Change to Beamline 2 configuration
- Install GEn-RP CE detectors
- Add GEM Ehut on SBS side and Gen-RP PR detectors
- Change HCal floor plate layout
- Corrector magnet braces and BB restraints

GEn status - Target

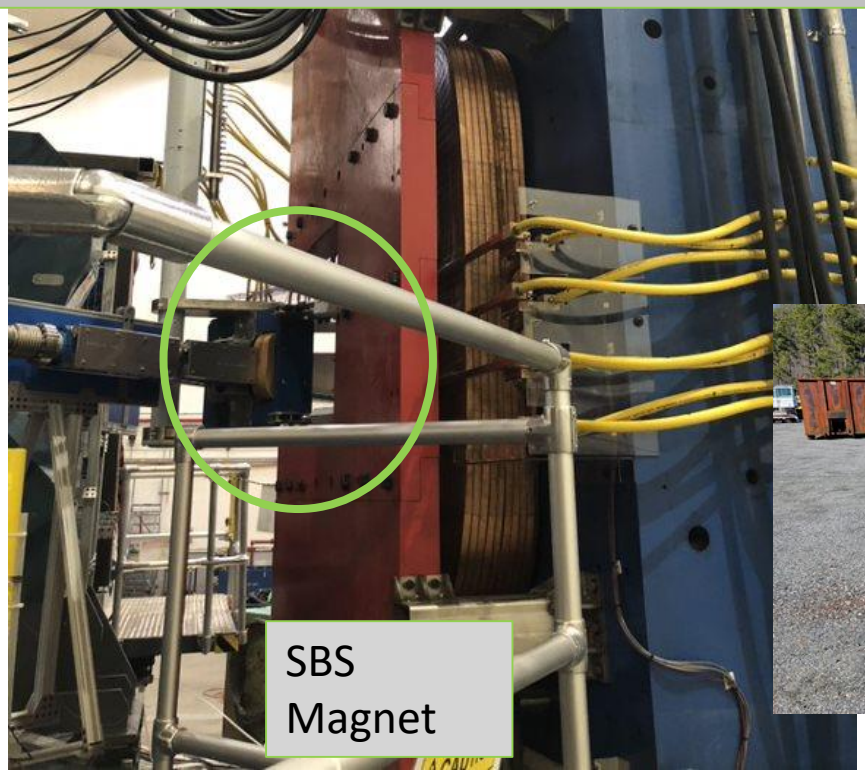
- All target components defined and purchased (few purchases remaining), installation sequence and survey & alignment requirements defined

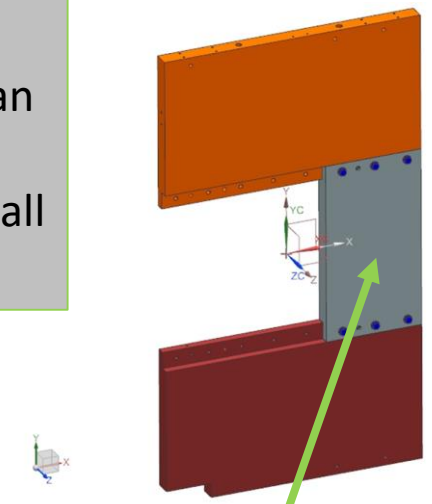
- Upper 2 platforms in fabrication- need by April 5
- Need to modify opening in shield box on BB side for acceptance clearance- need by March 30
- Bogdan and Vladimir are analyzing need for covers on shield box openings, we have design drawings and material for these if needed.



GEn status-SBS field clamps

- Front field clamp overlaps acceptance for GEn in current kinematics
- Replacing center piece of field clamp with new piece, Bogdan has checked field analysis for the new piece
- Have material, need to have machined by May 2022 for install
- Rear field clamp ready for install

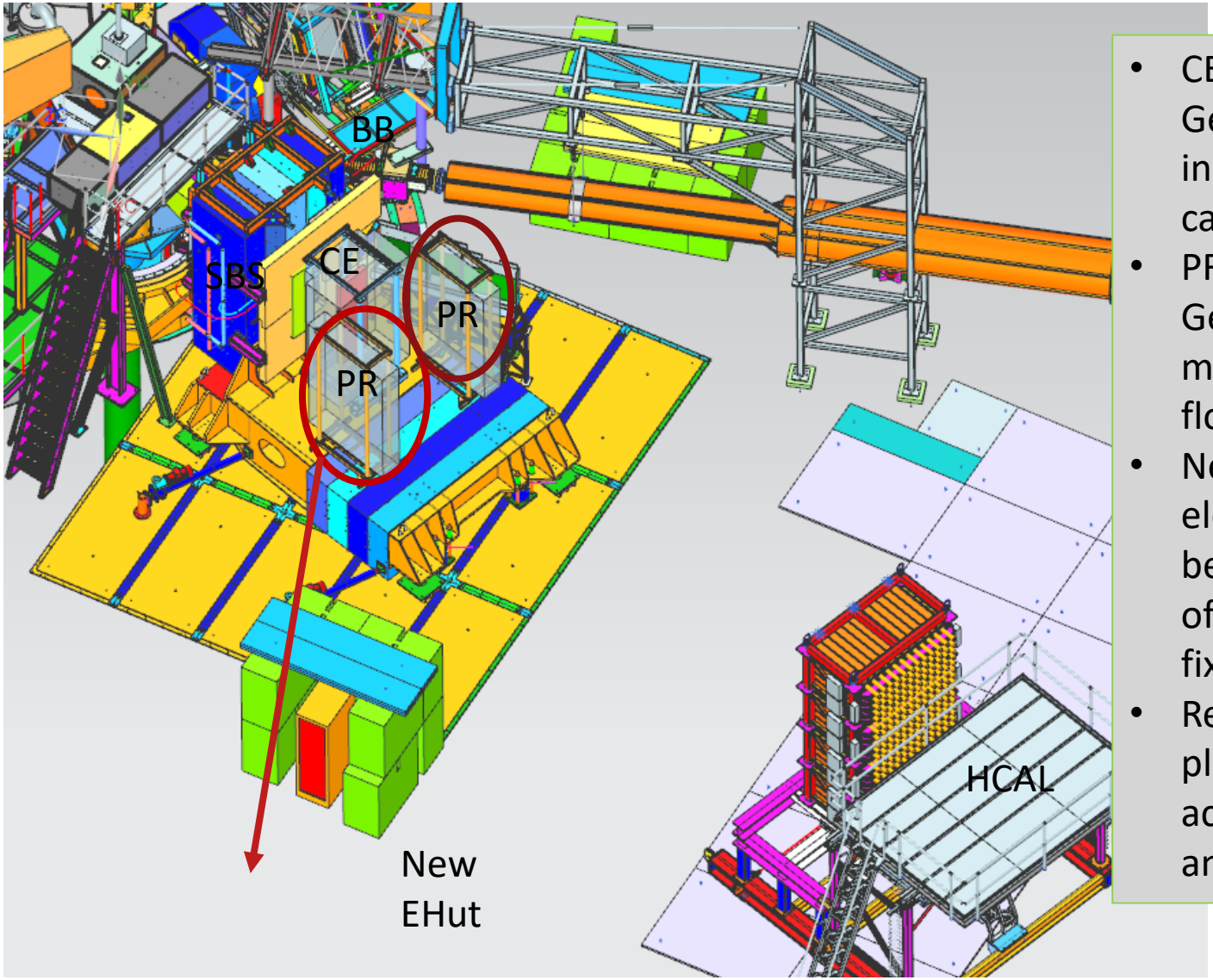




GEn status- Shielded Beamline

- Shielded beamline and correctors need to be reconfigured to BL2 setup
- All parts in-house

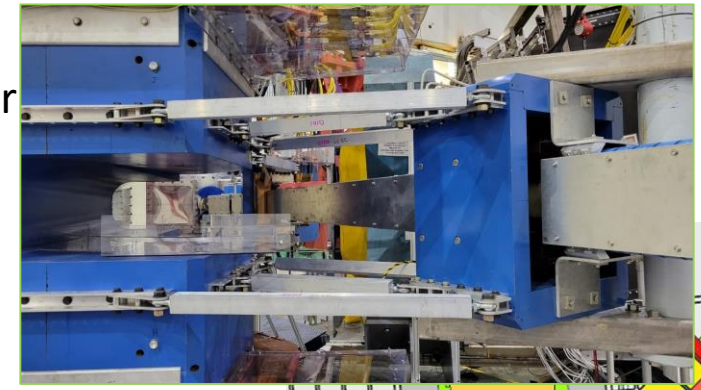
GEn status - detectors

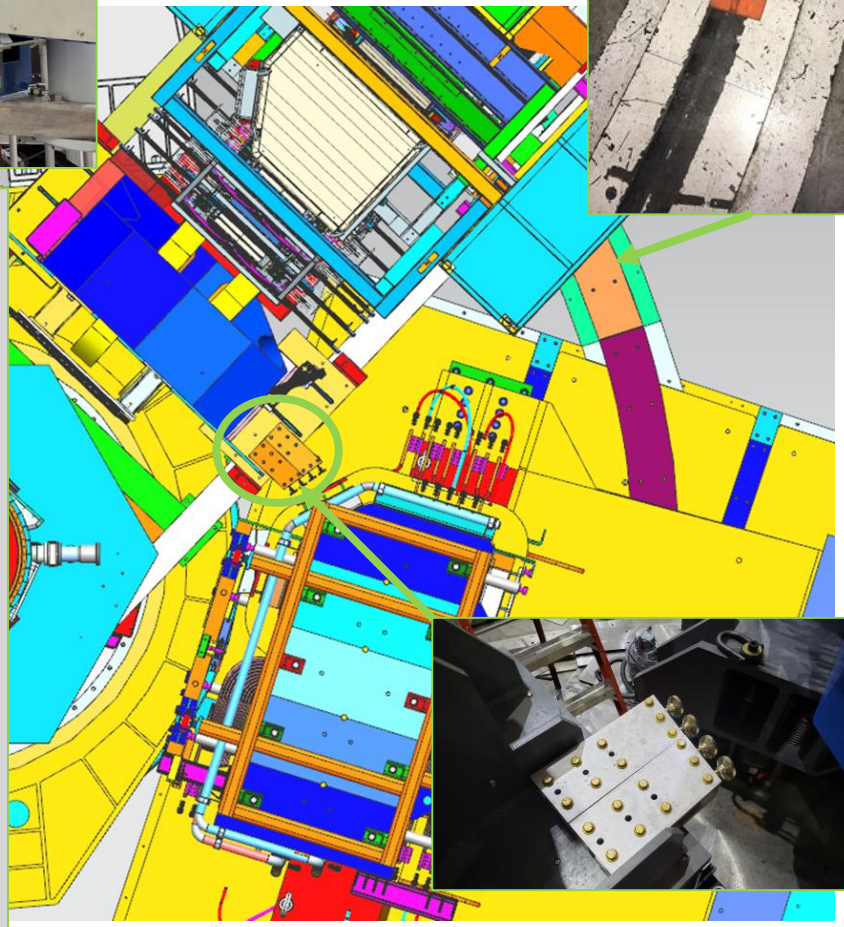


- CE detectors from Gen-RP to be installed on SBS carriage
- PR detectors from Gen-RP to be moved to Hall A floor
- New GEM electronics hut to be built to the right of SBS carriage in fixed location
- Relocate HCAL floor plates to accommodate angles

GEn status – magnet braces

Corrector braces





- Bogdan is analyzing the fields and forces for the GEn kinematics.
- Results will determine corrector braces required and restraints utilized on BB.
- Bumpers installed between BB and SBS
- Clamps used on BB rails
- Stoppers on BB floor rails
- Chainfall attached in tension between BB and HRS-R link
- Braces and restraints designed for 3X the load

(beamline hidden in view)

GEn-RP and Pion-KLL

Name	Energy	Program	BB angle	BB distance	SBS angle	SBS distance	HCAL angle	HCAL distan.	SBS current % 2100 amp
SBS-12	4.03	GEn-RP	42.5	1.55	25.9	2.25	25.9	9	50%
SBS-13	6.00	PionKLL	39.2	1.55	25.9	2.25	25.9	9	50%

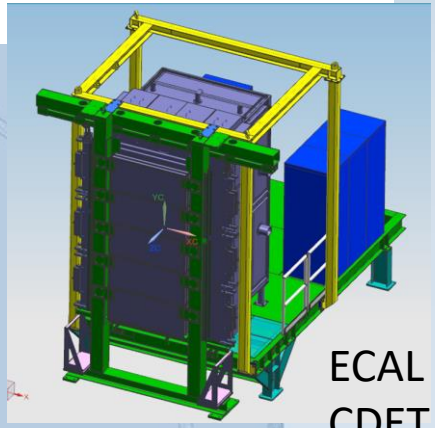
- Detectors in assembly
- All components in-house

GEp

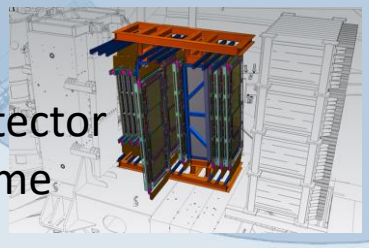
GEp 07109 Hydrogen HRS-BR deg. 140.0°

NX ARR.	Q² GeV²	BB deg.	BB m	SBS deg.	SBS m	HCAL deg.	HCAL m	HRSBL deg.	B line	Flr Config.	ECAL deg.	ECAL m
GEp 5.0	5.0	N/A	N/A	25.7°	1.6	see SBS deg.	6.8	105.0°	1	1	29.0°	9.0
GEp 8.0	8.0	N/A	N/A	22.1°	1.6		6.8		1	1	26.7°	6.5
GEp 12.0	12.0	N/A	N/A	16.9°	1.6		6.8		1	1	29.0°	4.5

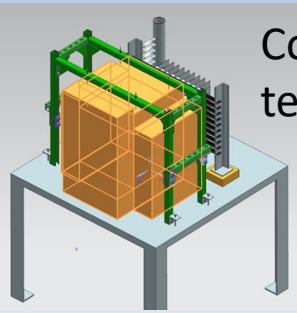
- ✓ SBS magnet
- • SBS sieve plate- need pattern for new plate
- ✓ SBS magnet – upstream and downstream field clamps
- ✓ HCAL
- • ECAL- cooling tests to be done, detailing support structure
- • CDet- working on support with ECal location
- • SBS detectors on CW- frame purchased, support to be revised
- ✓ 40 cm Hydrogen Target with scattering chamber Snout
- ✓ BL1
- ✓ Lead wall
- ✓ Main EHut, EHut to right of CW



ECAL & CDET



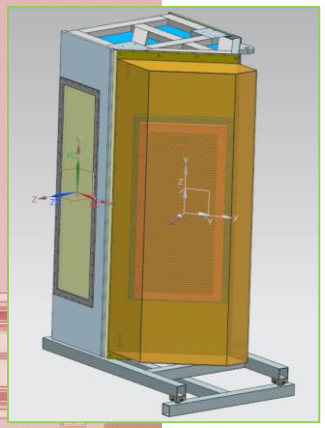
Detector frame



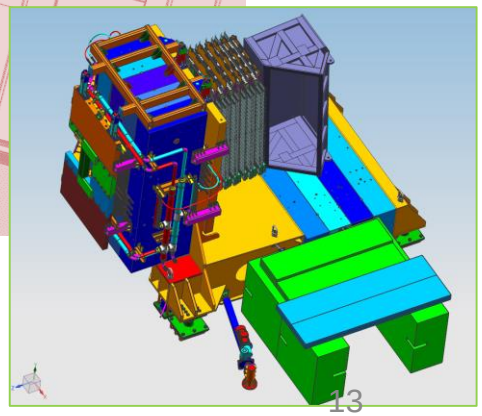
Cooling test setup

SIDIS

SIDIS - 09018 - Polarized He3								HRS-BR parked at 140.0°		
NX ARR.	Q² GeV²	BB deg.	BB m	SBS deg.	SBS m	HCAL deg.	HCAL m	HRS-BL deg.	B Line	Fir Config.
SIDIS 01	?	30.0°	1.55	14.0°	2.8	see SBS	8.5	105.0°	2	HCAL 5



- ✓ SBS magnet
- sieve plate
- ✓ SBS magnet-upstream and downstream field clamps
- ✓ BB magnet with field clamp and sieve plate
- ✓ BB detectors
- GEMs and RICH detectors on SBS arm(CW) –working on support for RICH detector
- ✓ HCAL
- ✓ Main EHut, BB EHut and EHut to right of CW
- Polarized 3He Target and access platforms
- ✓ BL2
- ✓ Lead wall on CW



TDIS

- ✓ SBS magnet
- 5T Solenoid
- GEMs
- ?

SUMMARY

- **Preparing for GEn installation**
- **GEn-RP ready**
- **Continue working on GEp, SIDIS and TDIS**