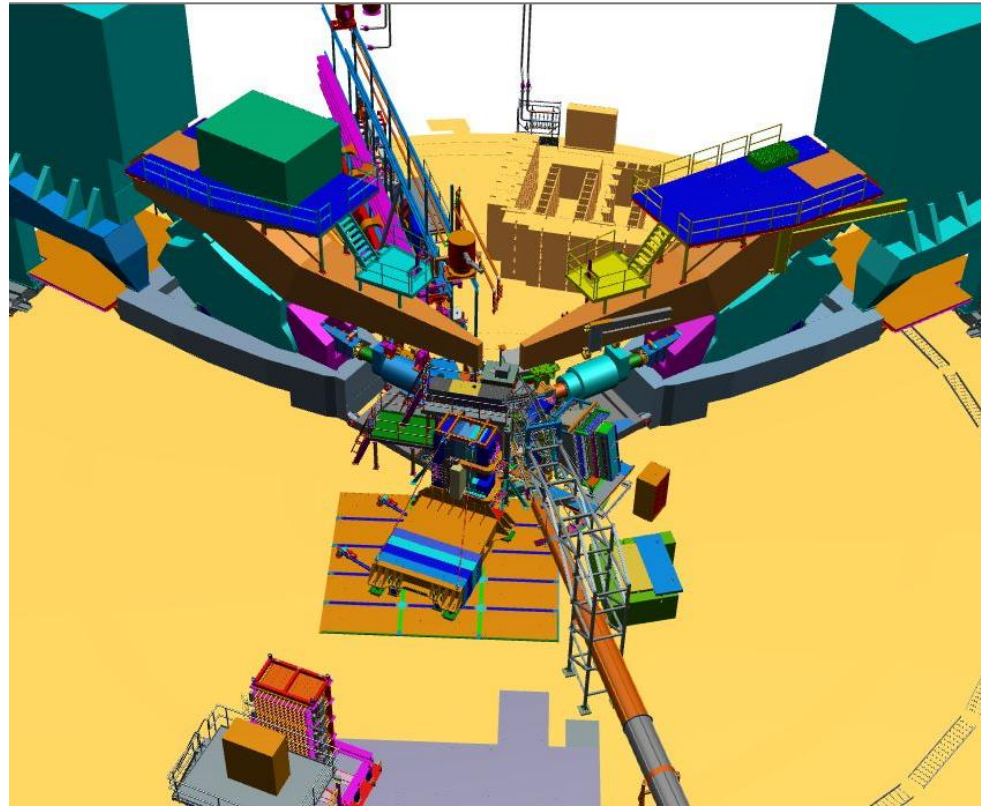


SBS Collaboration Meeting- July 2023

Engineering and Design Status

- GEn
- GEn-RP
- GEp



GEn

Robin Wines

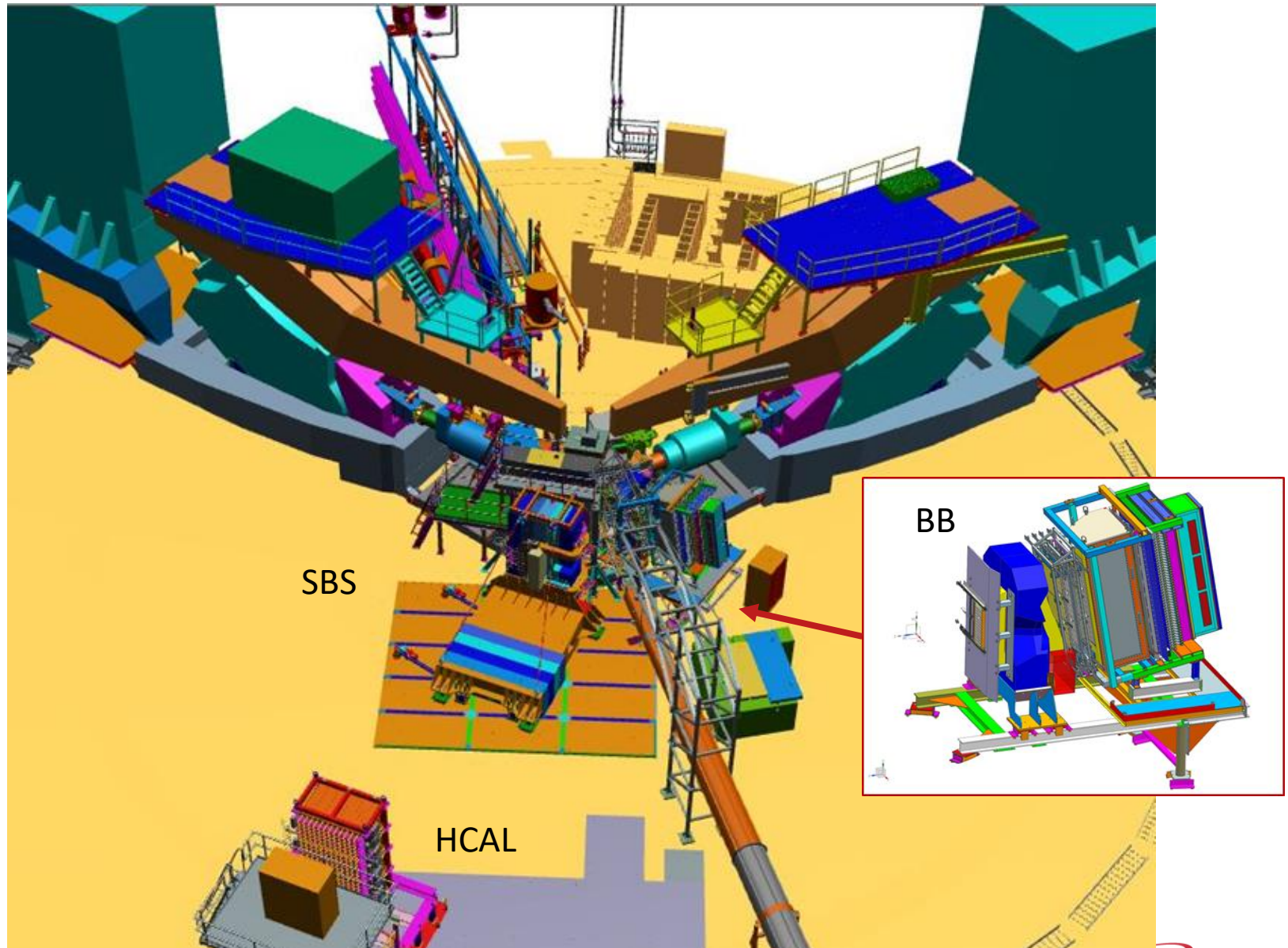
GEn Kinematics

2022.01.14b

HCAL 17.0m

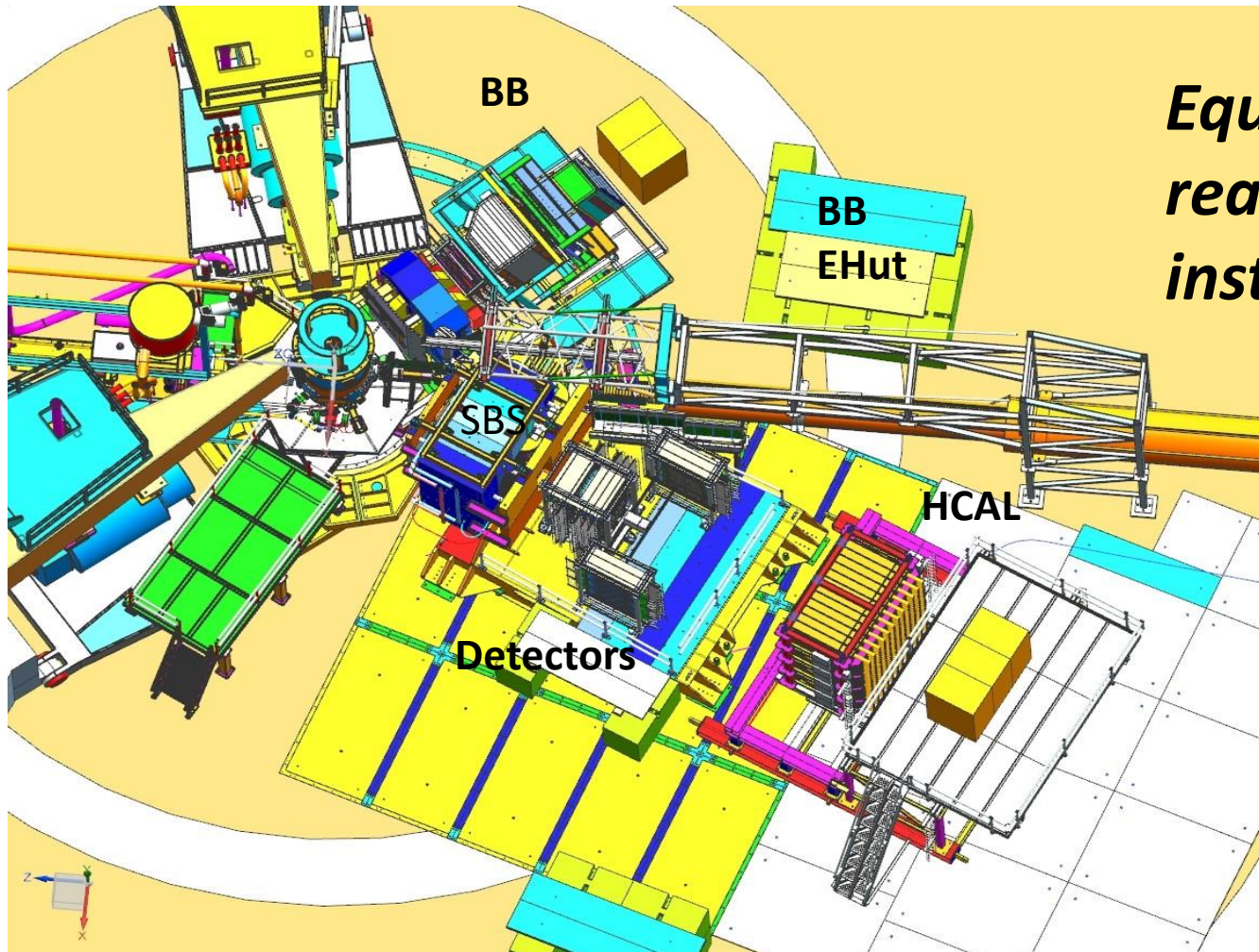
Name	Energy	Program	BB angle	BB distance	SBS angle	SBS distance	HCAL angle	Days	taking	item order	theta CM
el.-neutron	50 PAC days	Q2 GeV2						PAC days	hours		
Comm.	2.20	All tests	47.5	1.55	34.7	2.8	34.2	2		A	
GEN-1opt	2.20	Q2=1.8	47.5	1.55	34.7	2.8	34.2	2		B	
GEN-2opt	4.30	Q2=3.0	29.5	1.55	34.7	2.8	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	
<hr/>											
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

GEn configuration



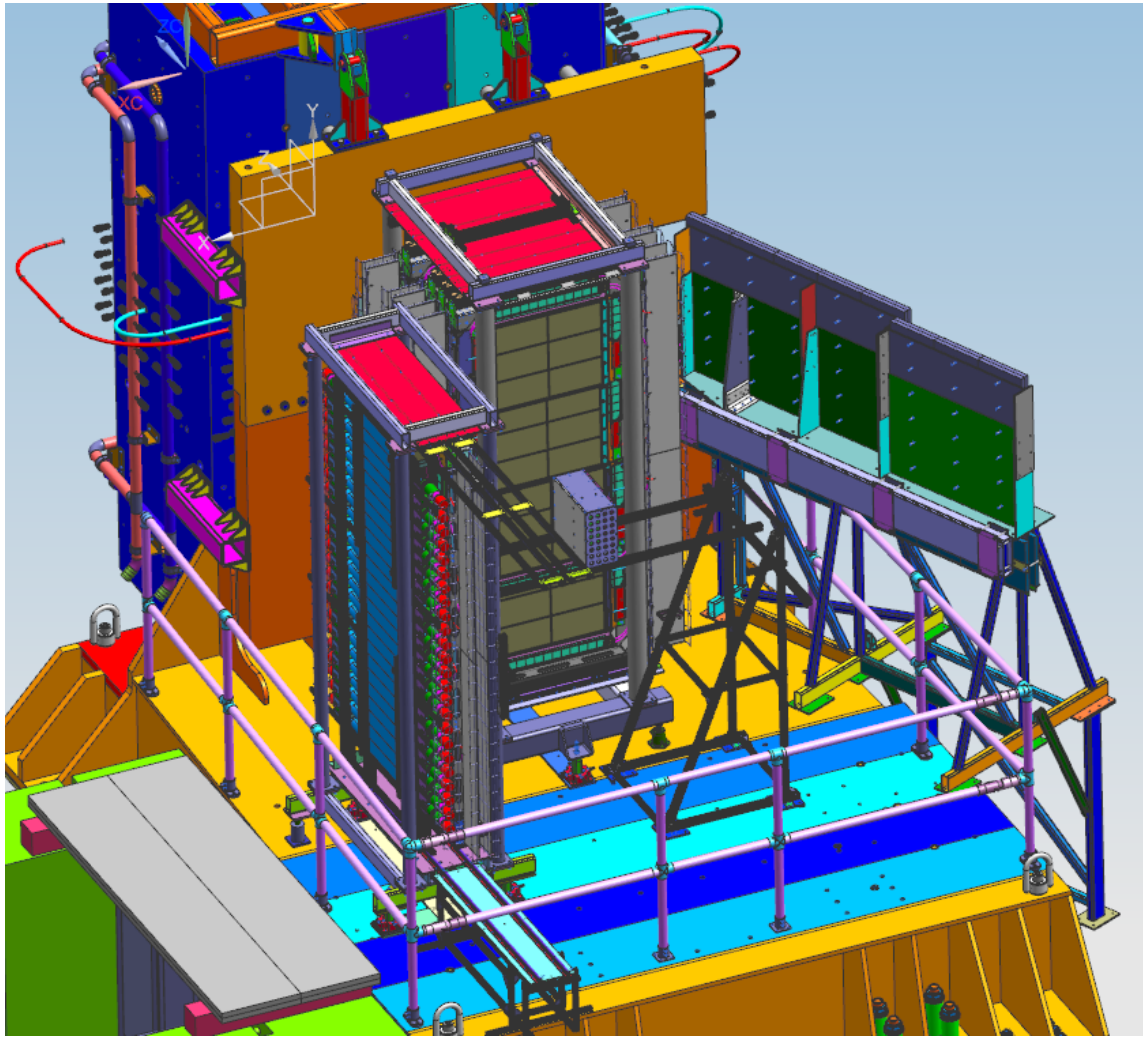
GEN-RP Experiment

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%



*Equipment
ready for
install.*

GEN-RP Experiment



- Experiment utilizing only CE and one PR detector assembly. This required redesign of Analyzer support.
- Analyzer support designed with use of 80/20. Drawings complete. Material on order for assembly in-house.

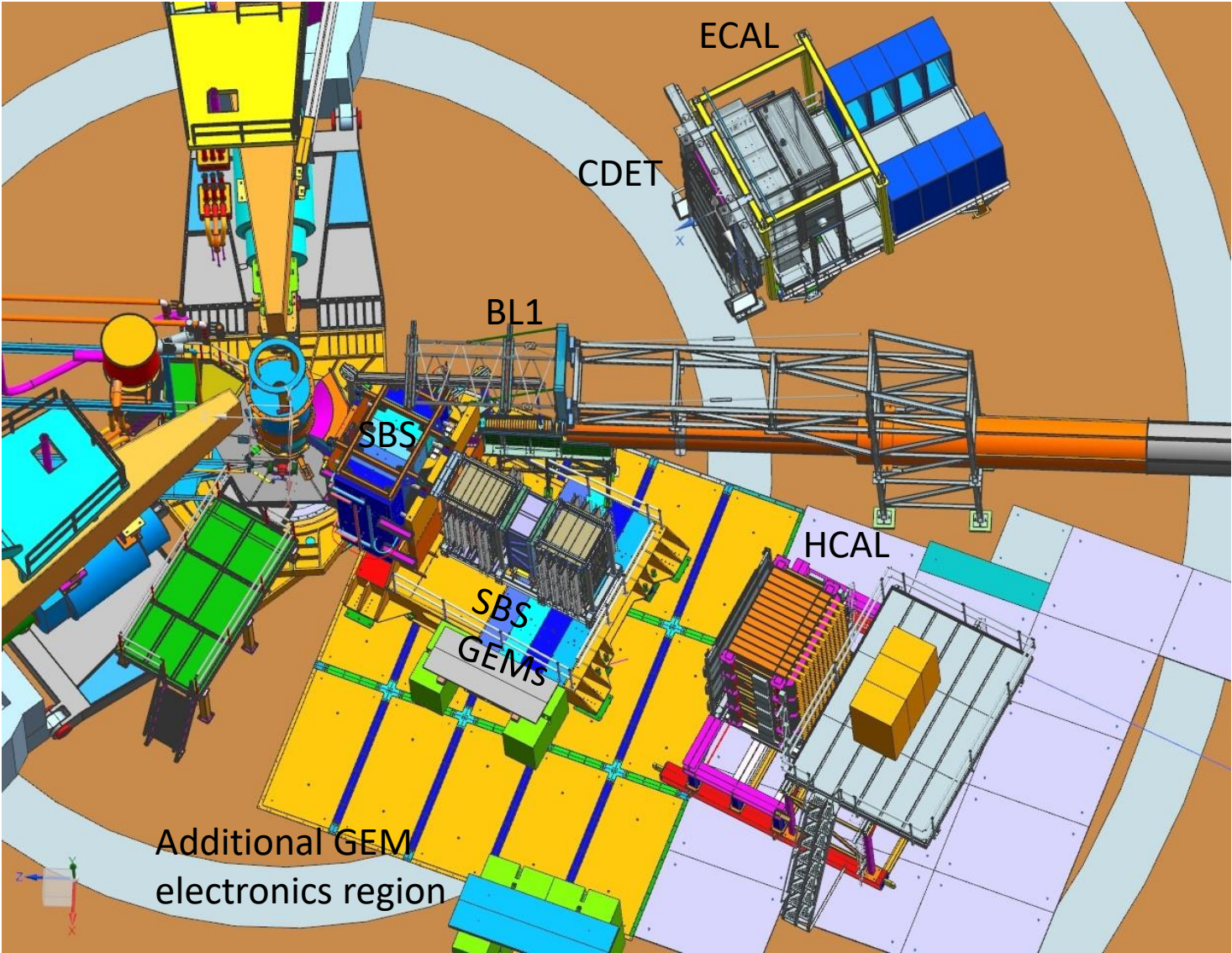
GEP Kinematics

Name	Energy	Program	ECAL	ECAL	SBS	SBS	HCAL	HCAL	P_nucleon	P_elect.	PAC days	Time, days	SBS current	J_in/J_out
		Q2, GeV2	angle	dist., m	angle	dist., m	angle	distance	GeV/c	GeV/c	at full Lum.	calendar	% 2100 amp	
GEP-0	6.40	GEP Comm.	29.8	9.5	25.7	1.60	25.7	10	3.86	3.36	0	2	100%	
GEP-1	6.40	GEP 5.5	29.8	9.5	25.7	1.60	25.7	10	3.86	3.36	2	4	100%	0.79/0.87
GEP-2	8.50	GEP 7.8	27.5	6.5	22.1	1.60	22.1	10	5.15	4.20	11	22	100%	0.76/0.82
GEP-3	10.60	GEP 11.7	30.0	4.5	16.9	1.60	16.9	10	7.26	4.22	32	62	100%	0.56/0.58

GEP requires

- SBS magnet with pole shims and coils configured for full current
- SBS field clamps
- Beamline 1 with corrector magnets braced
- SBS GEM detectors
- ECAL
- CDET
- HCAL
- Lead shielding
- Gate valve and differential pumping window
- Target scattering chamber with snout

GEp



SBS Magnet, Pole Shims and Field Clamps

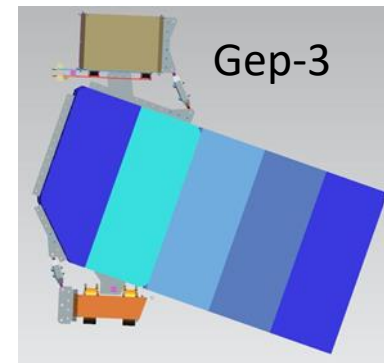
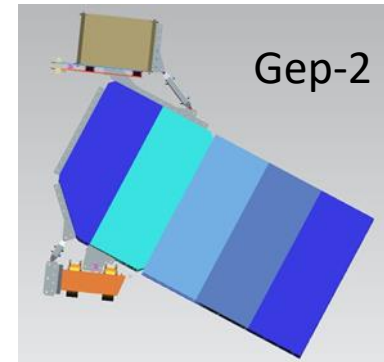
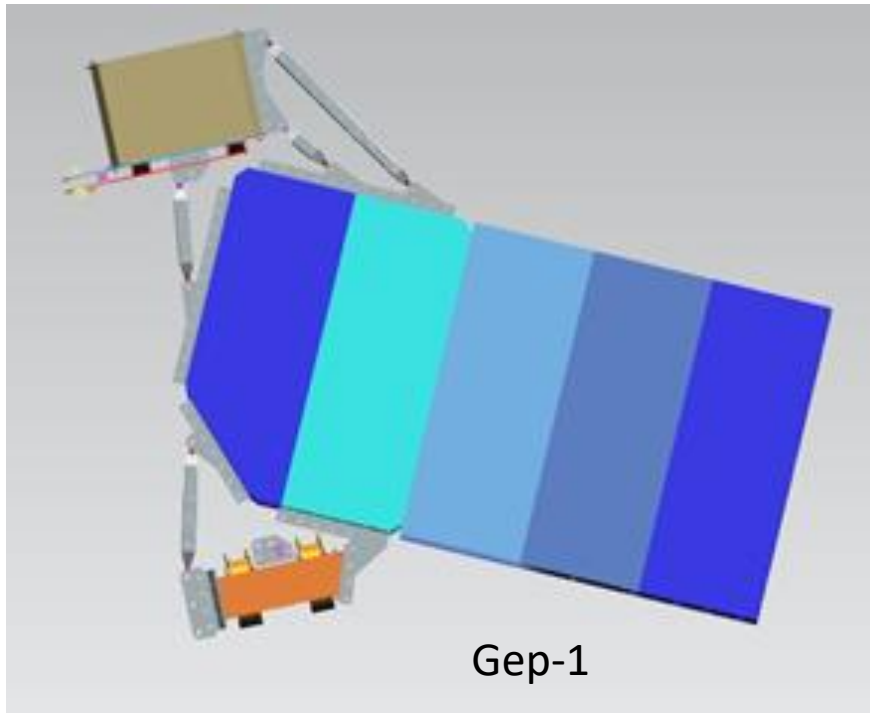


- Existing SBS magnet will be needed with all coils powered and pole shims inserted.
- Pole shims exist.
- Connections for coils exist.
- Field clamps exist.
- Field and force studies have been completed.

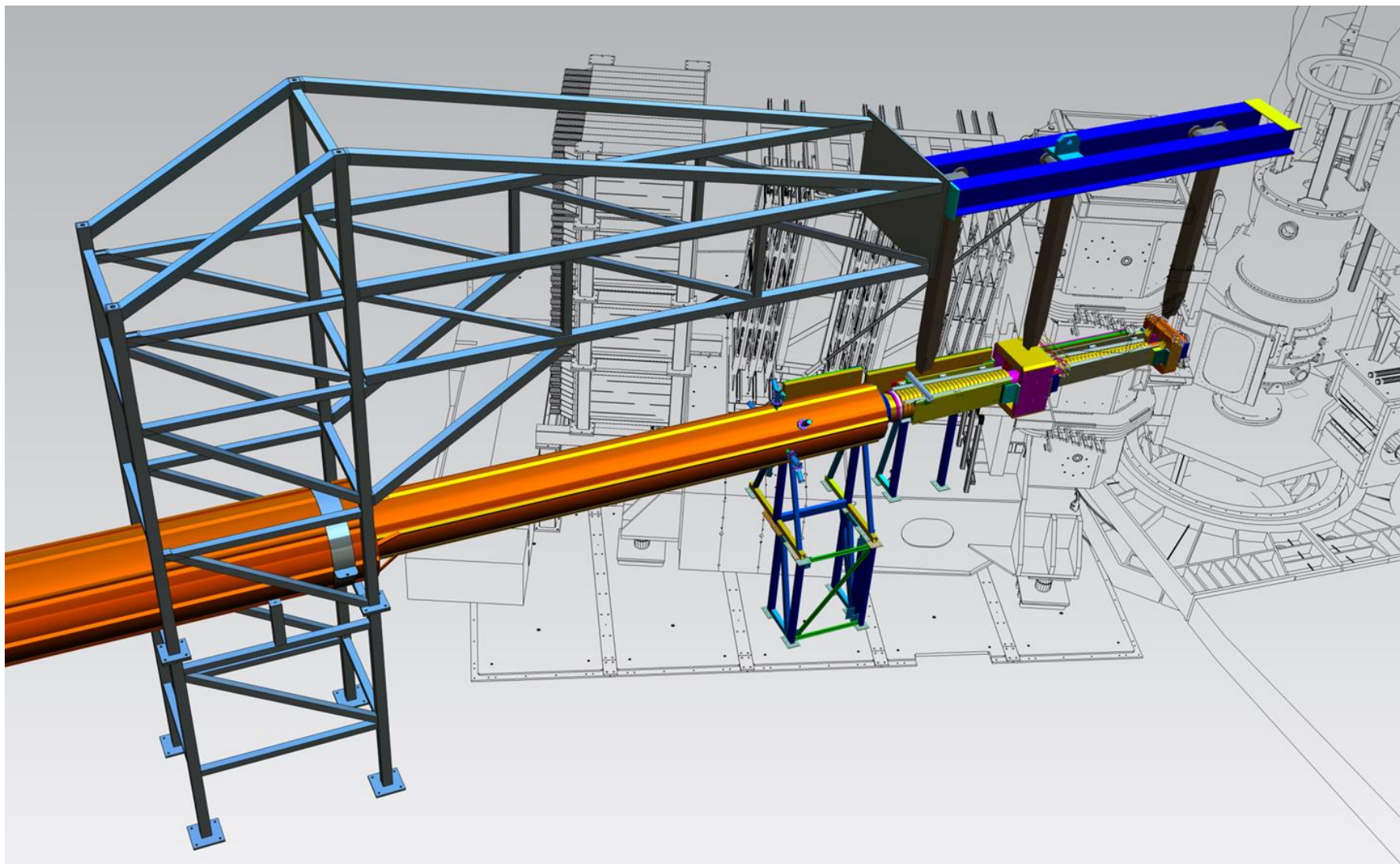


Correctors

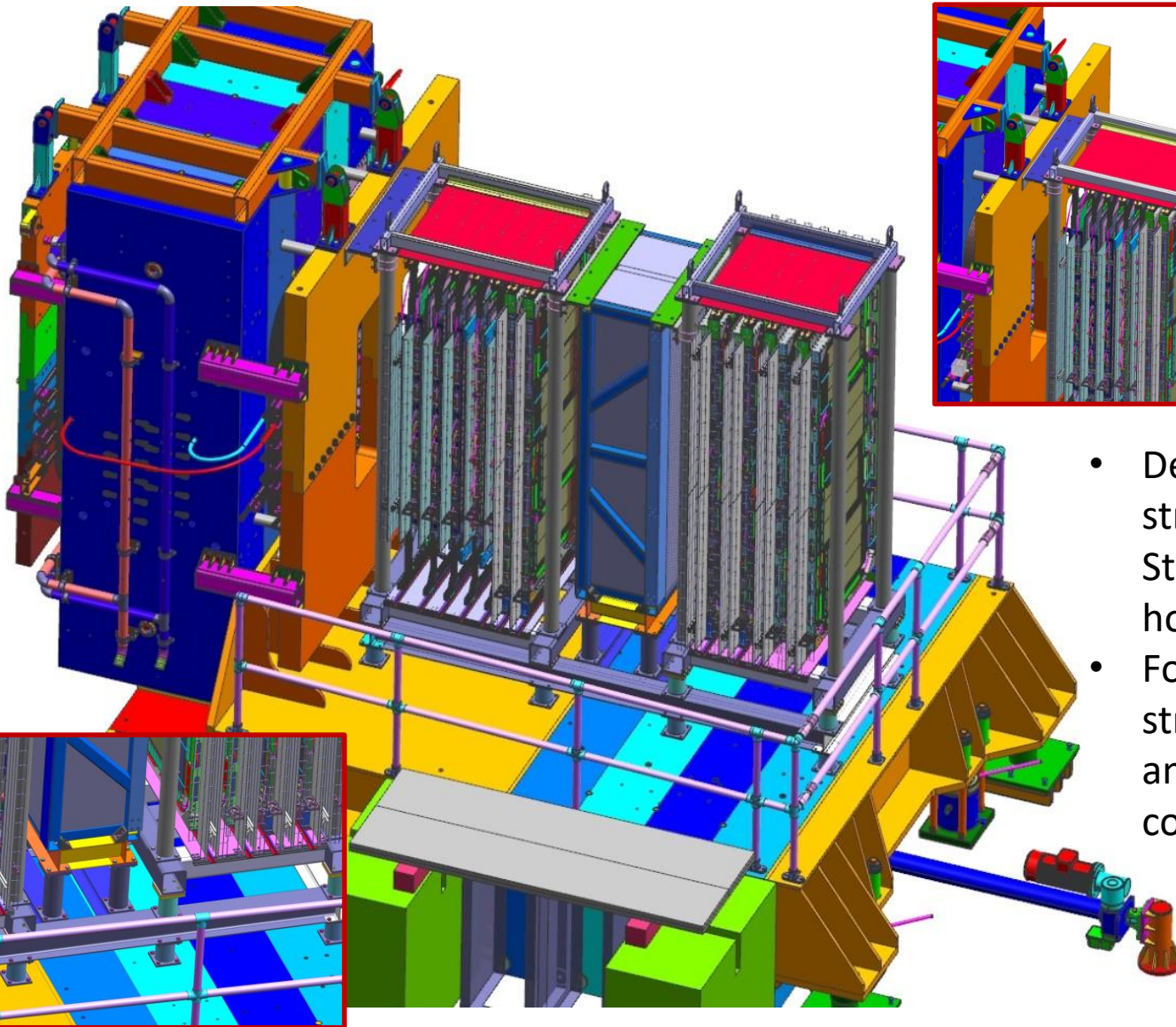
- Existing correctors to be used with existing Beamline-1 (BL1) configuration.
- Corrector braces have been designed and forces analyzed. Reusing braces plus fabrication started for additional pieces.



Beamline BL1 Configuration

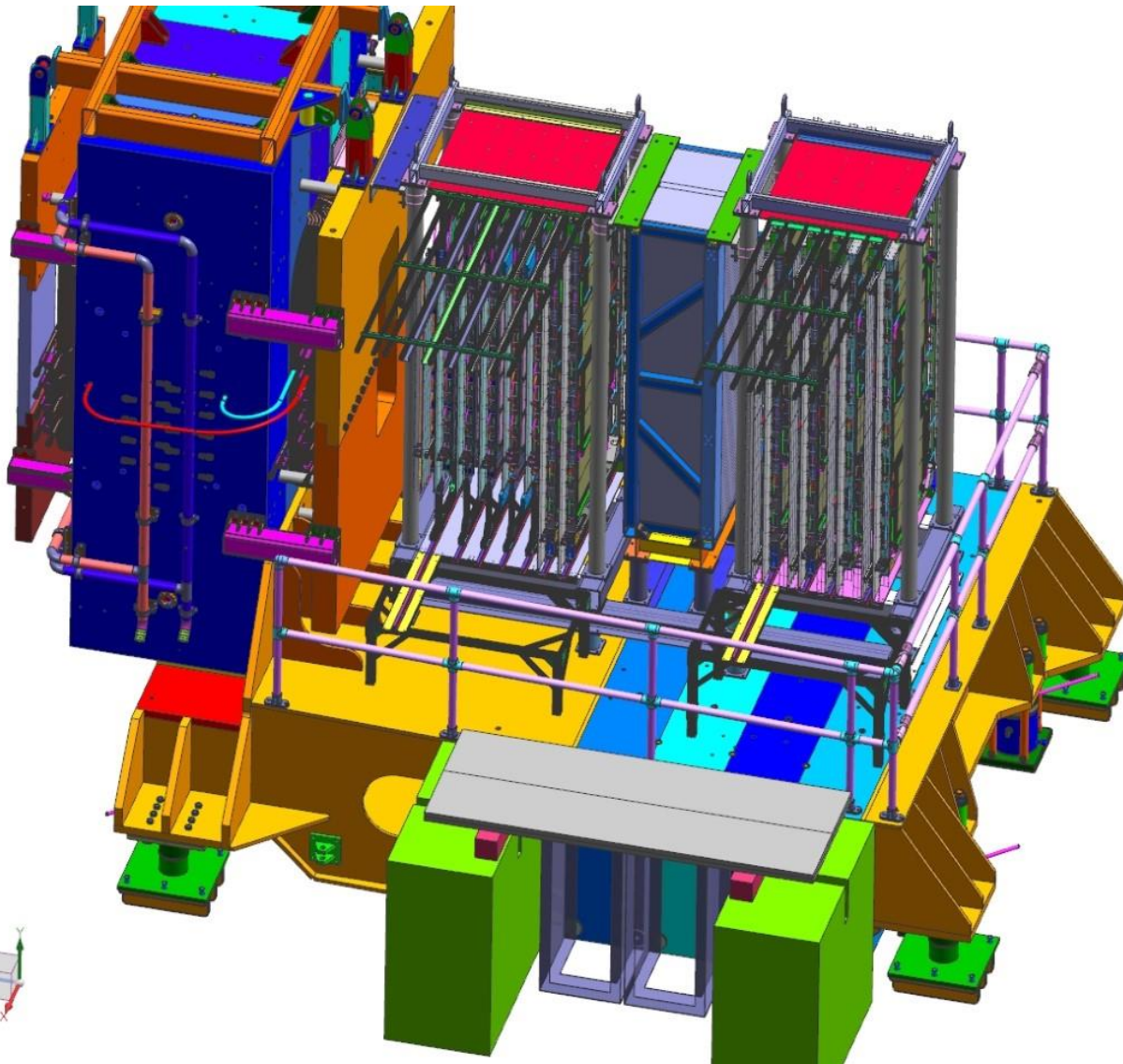


SBS Detector/GEMs



- Detectors and support structure are defined. Structure to be built in-house.
- Forces require bracing of structure to field clamp and base of counterweight structure.

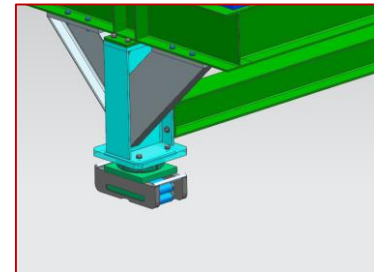
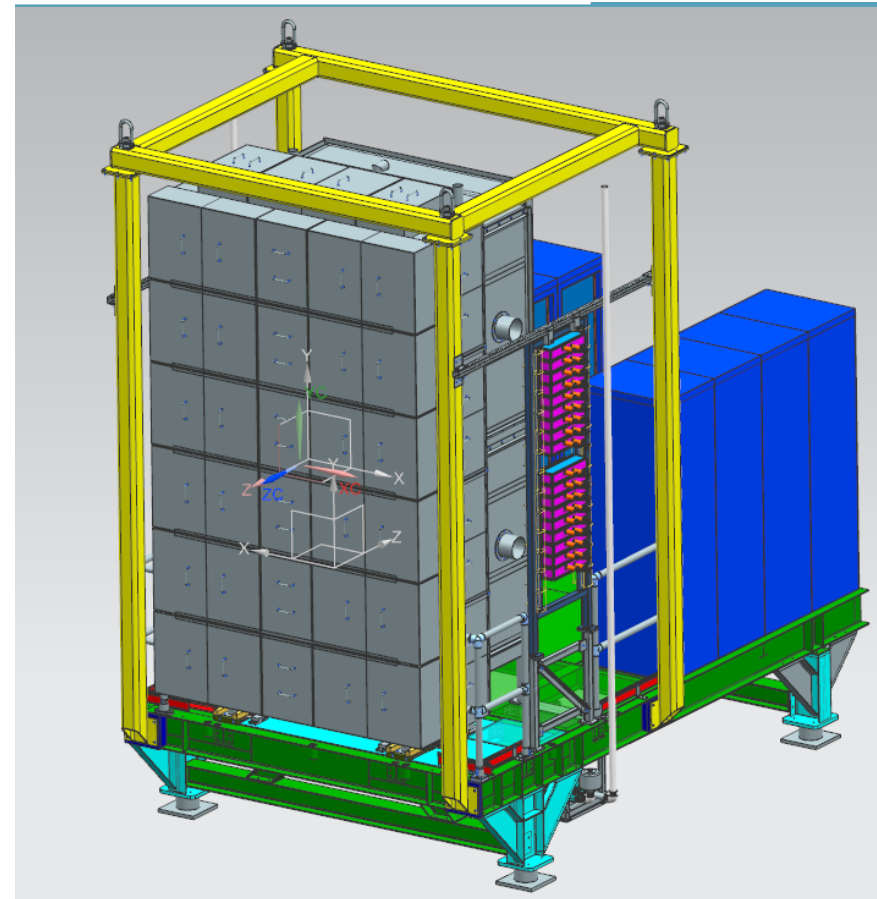
SBS Detector Access



- Detectors to be pre-assembled in support frame and installed as assembly.
- Maintenance platforms to be used for counterweight base height maintenance.
- Maintenance at higher reach will require access from manlift or removal to Hall floor.
- Technicians installed ramp over existing cable tray. Evaluating if this will be used with maintenance platforms.

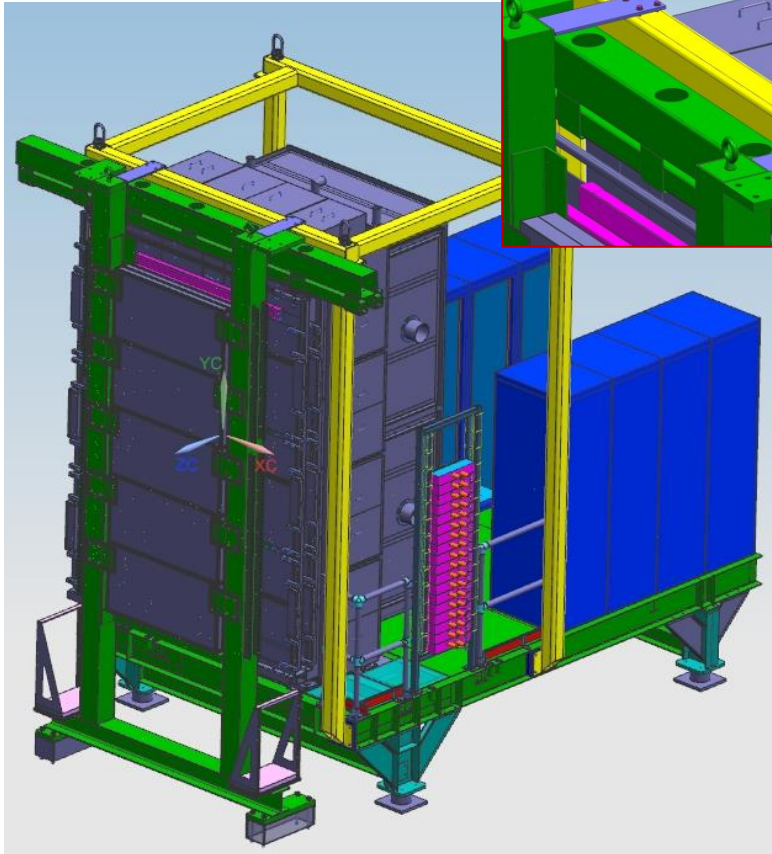
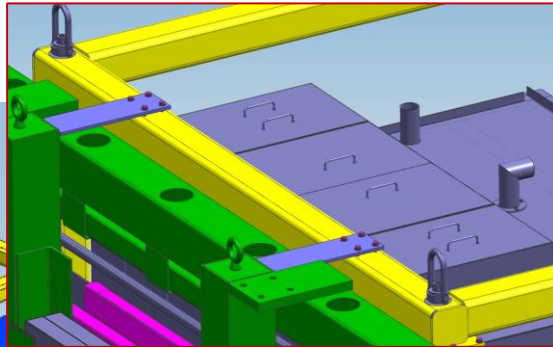
ECAL

- Assembled Weight=31600 lbs
- ECAL to be assembled in Hall.
- Modules to be inserted with temporary hoisting mechanism attached to (yellow) frame. Personnel access from manlift and ladder
- ECAL is rotated into position on Hilman poly rollers.
- In position the Hilman rollers are elevated from floor and replaced by support feet.
- Base ,rollers and support legs are existing.
- Frame is being installed.
- Heat load and effects on structure are being evaluated.
- Continue design and fabrication efforts on mounting of Counters to top, pump mount, covers and brackets for insulation.



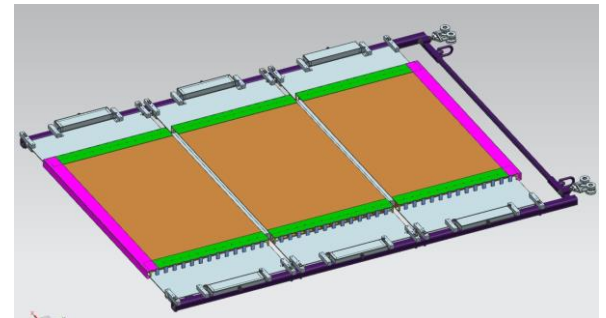
CDET

- Assembled Weight = 7900 lbs
- CDET braced to ECAL frame and floor in position.



- HDPE shielding designed to be inserted in CDET frame prior to panels.

- In assemble and during motion of ECAL, CDET frame has temporary bracing to stand alone.
- CDET frame and supports exist. Stand alone bracing to be built in-house
- CDET panels are assembled horizontally and inserted vertically onto frame rails with stops for maintaining position. Panel frames designed and in review for fabrication.



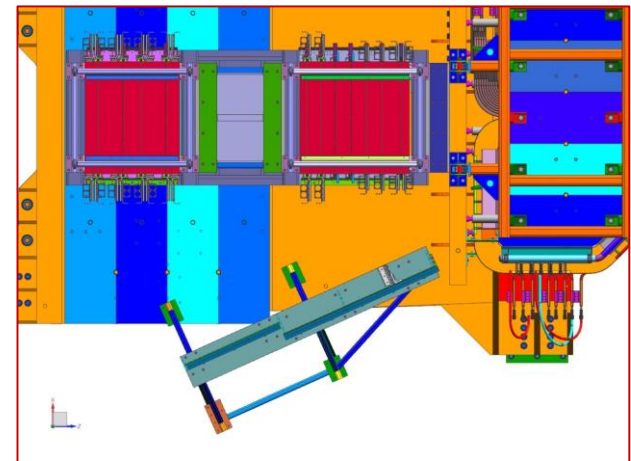
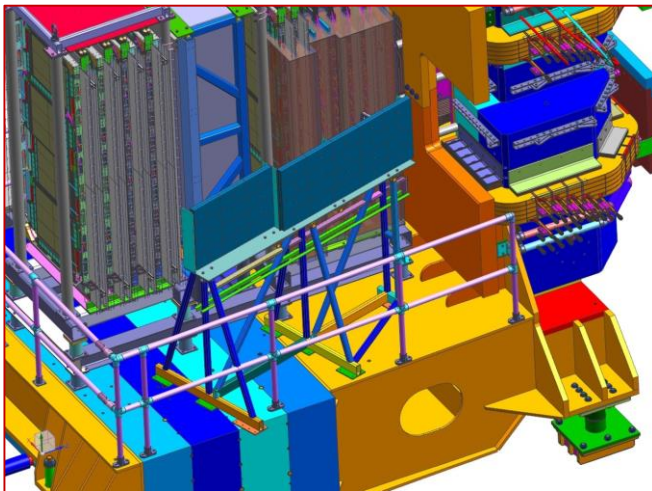
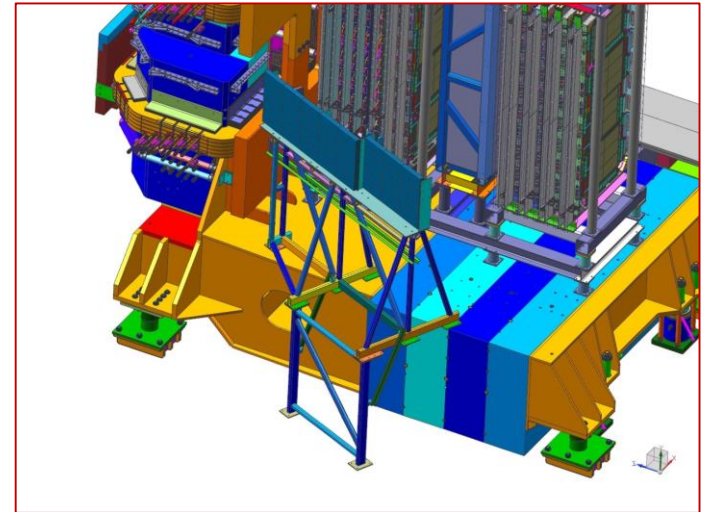
HCAL



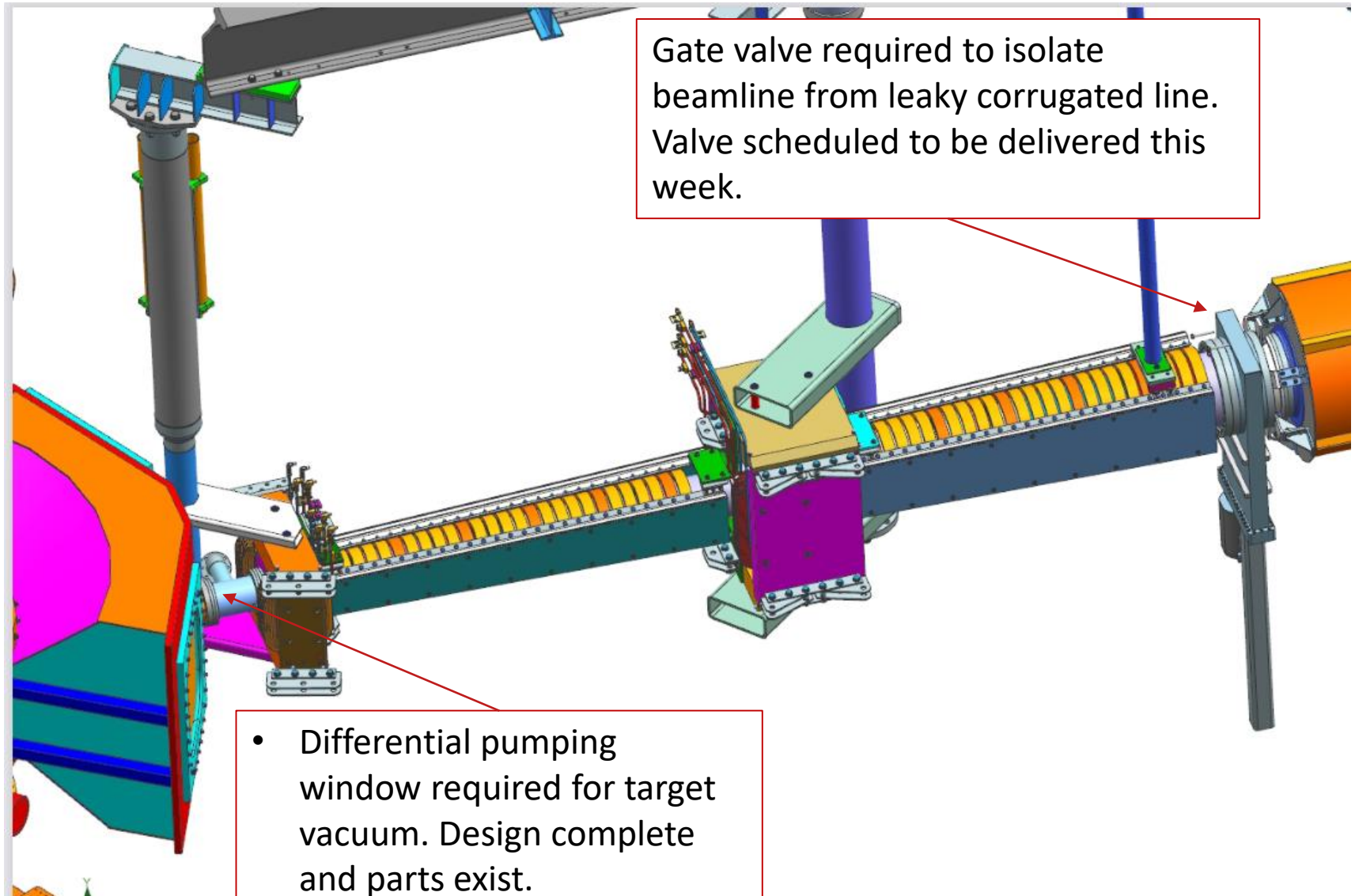
- Existing HCAL to continue use in Hall for GEp.

Lead Shielding

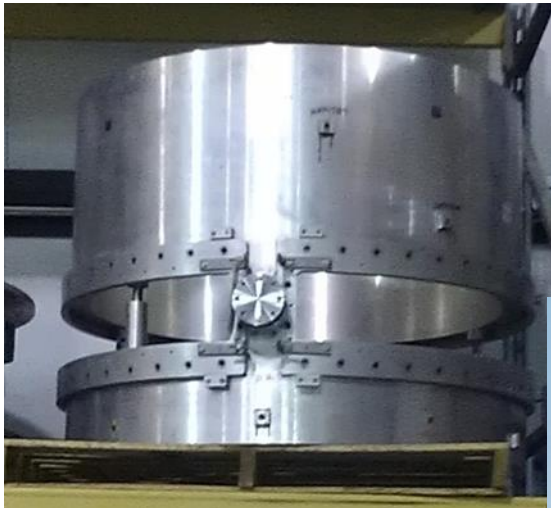
- Lead shielding wall required between beamline and SBS GEMs.
- Lead shielding wall exists.
- Installation requires securing support frame to the counterweight support floor and to the Hall floor.



Vacuum Beamline

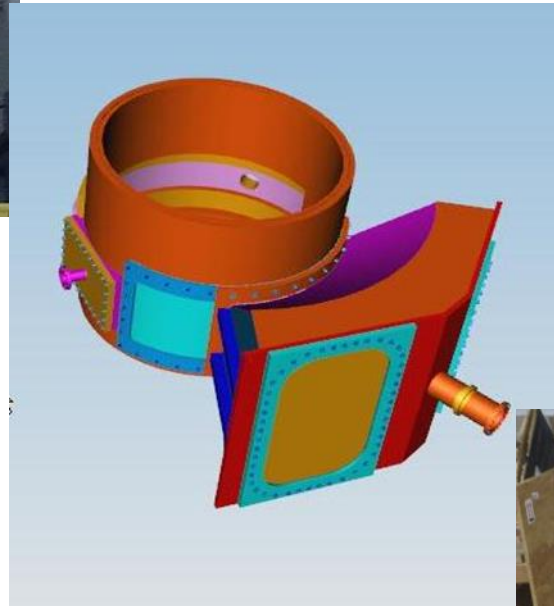


Vacuum Chamber



Target Chamber

- Utilizing existing scattering chamber.
- Vacuum snout has been delivered.
- Vacuum windows delivered.



Vacuum Snout



- GEn equipment and configuration ready.
- GEn-RP equipment ready.
- GEp equipment defined.
- *Thank you much!*

