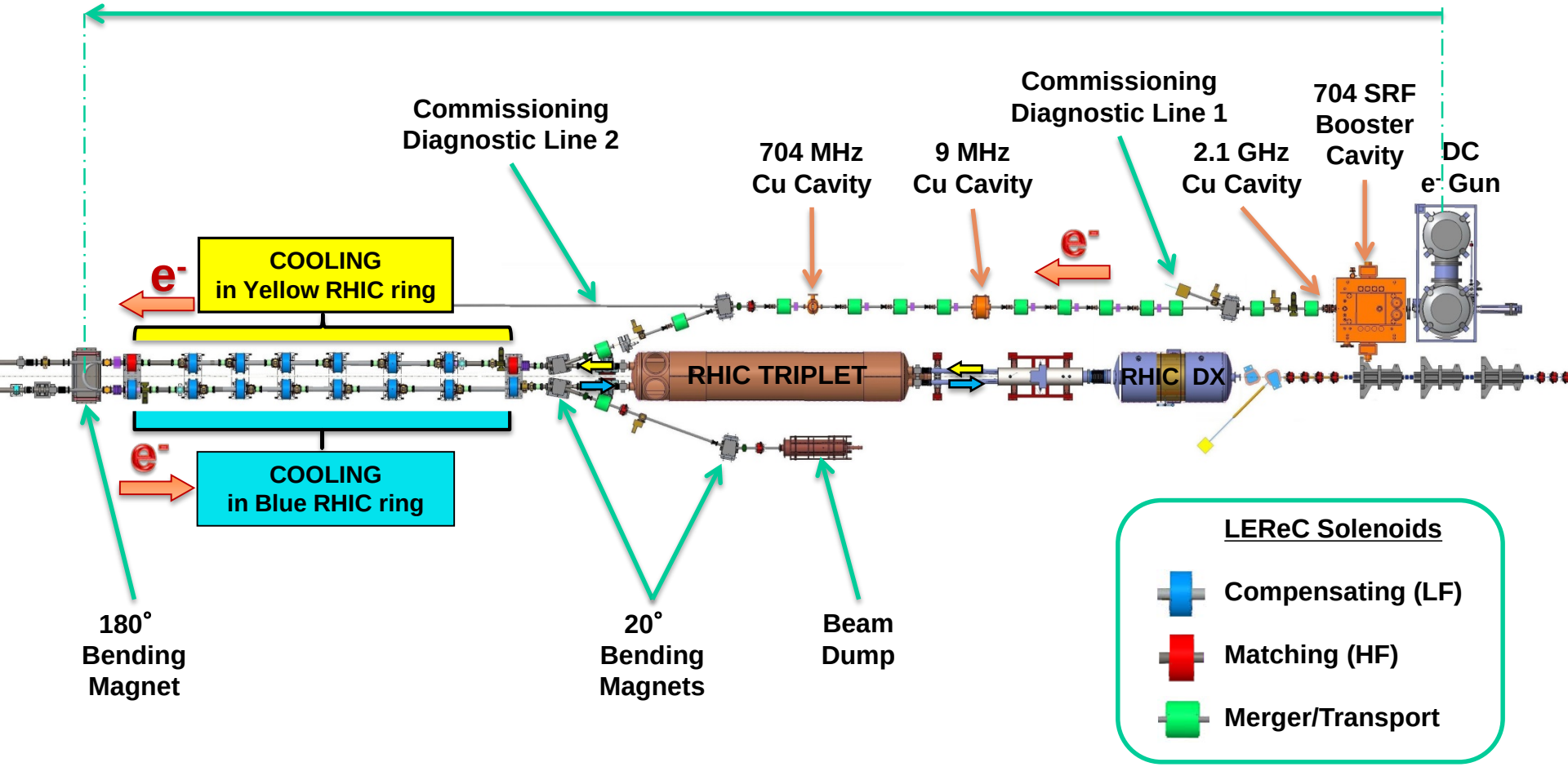
LEReC layout

63.9 m to IP2

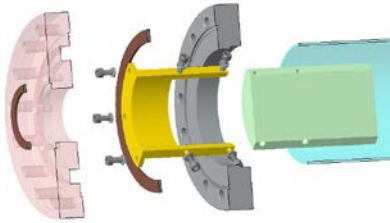


BPMs in Cooling Section (14 Locations)

Large Dia. BPM Housings (4.8 ID), 28mm buttons

- **Order Placed with MPF**
- **Final Design Review 6/23/2015, no issues**
- **Increased number of button first articles for 2 BPM's one standard, one 180 magnet special**
- **Agreed on vacuum bakeout for components**
- **First Article delivery buttons 9/21/2015 – passed survey and electrical check**
- **Housings delivered, pre-survey underway.**
- **All Buttons in house, Buttons inspected, tested, and sorted.**
- **Install on housing and leak check - Presurvey assembly and install.**
- **RF Gasket/resize gasket.**

2015 - Cooling Section *Standard* Profile Monitors



RF impedance design approved (Peter T.)

Ferrite ring mounting design complete. CMD5005 material.

Requisition for commercial vacuum linear stage, requisition complete

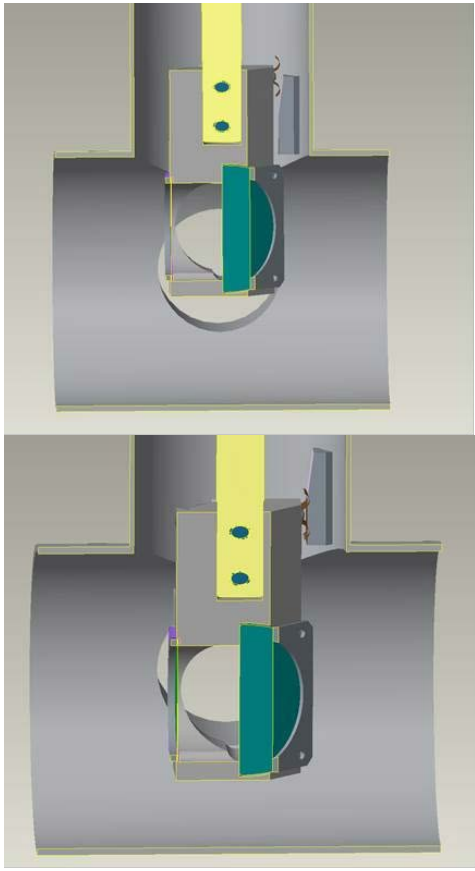
Chamber fabrication drawing complete – CS order chamber

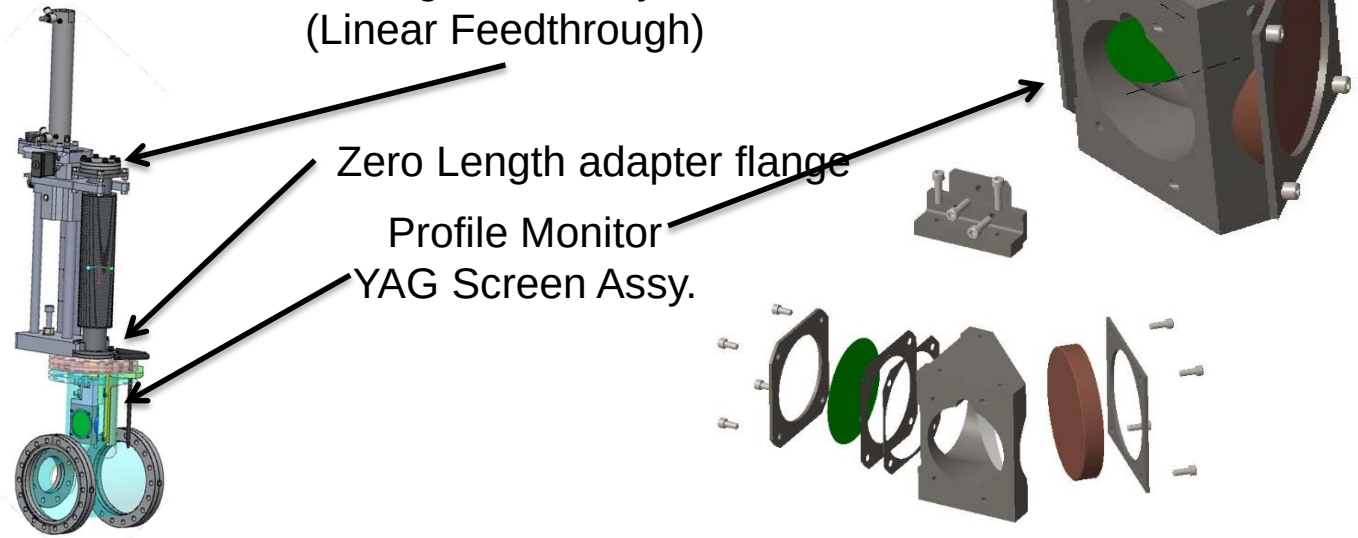
YAG screen/mirror holder design complete.

Fabrication drawings for YAG screen/mirror holder

Update design for ground fingers.

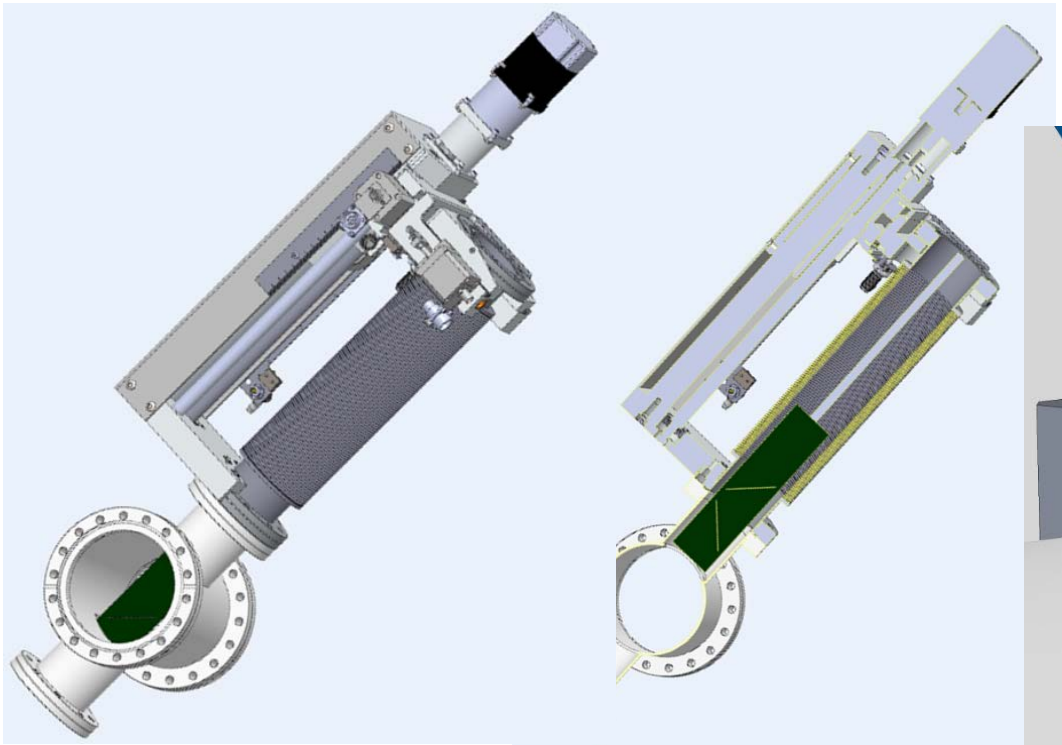
Fabrication and assembly schedule (Weiss)

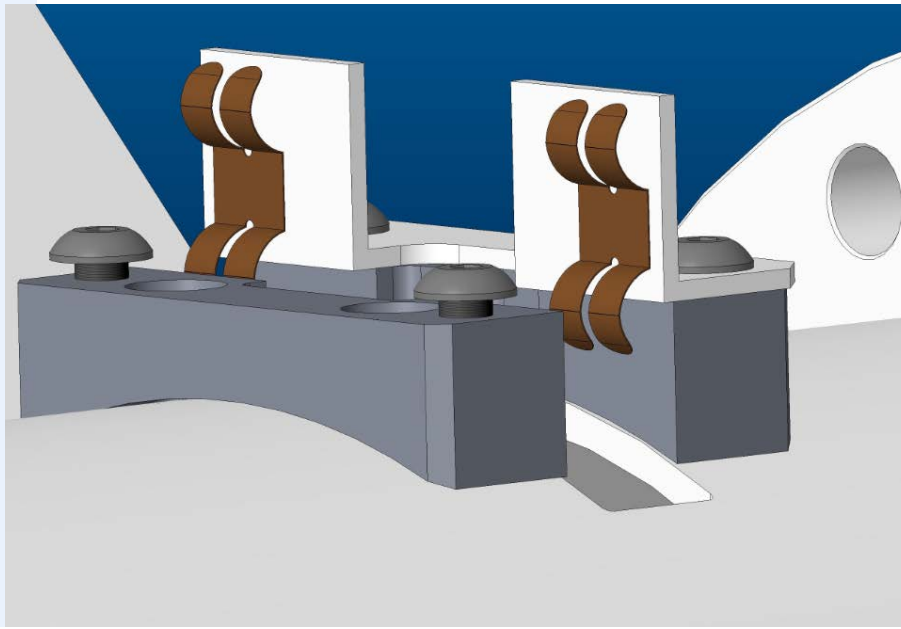




2015 - Cooling Section Emittance Slits

- **Requisition for commercial vacuum linear stage.**
- **Fabrication drawings complete and approved.**
- **Central Shops requisition approved for vacuum chamber and W slit.**
- **The slit needs to be grounded at the vacuum chamber when scanning.**
- Delivery dates: shifter, vacuum chamber, W slit, mounting hardware. (Weiss)





2016 - Cooling Section “hybrid” BPM, PM, Slit

RF impedance analysis complete

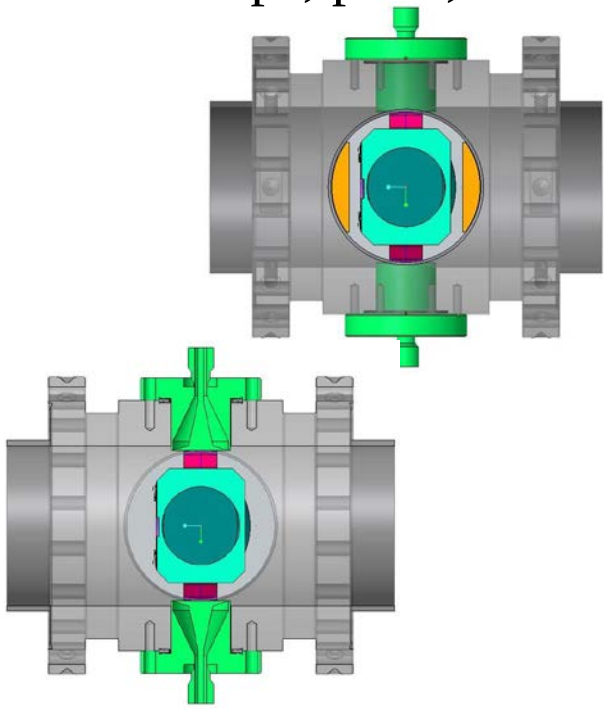
Chamber design complete

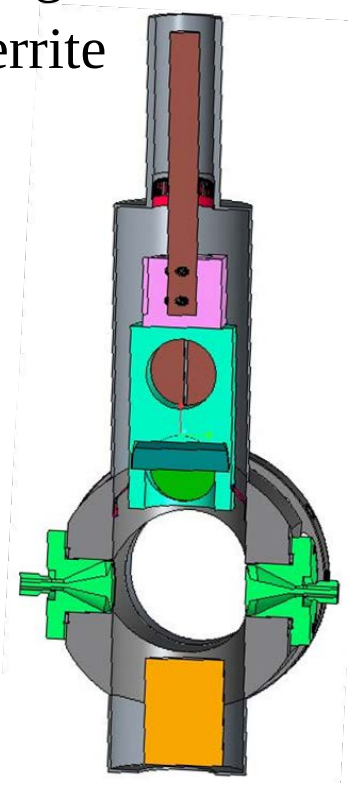
Chamber fabrication drawing complete

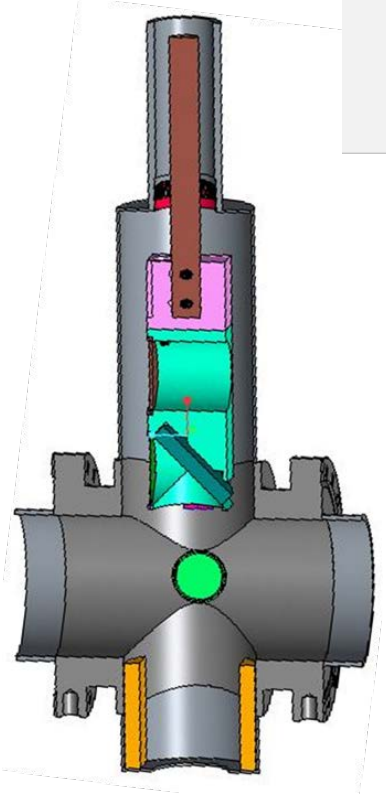
Complete component fabrication drawings

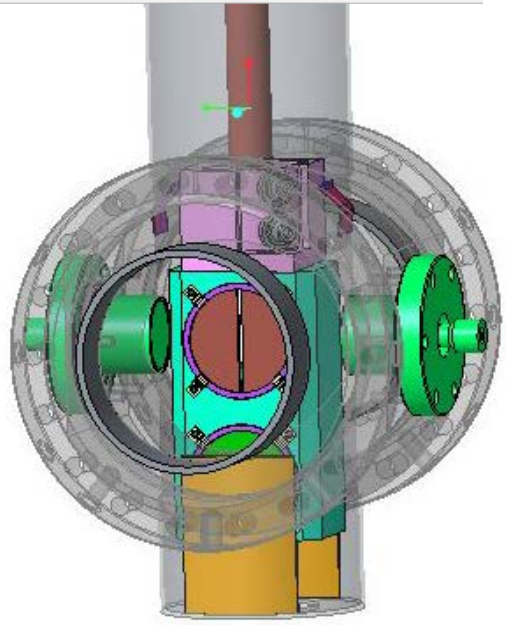
Complete assembly drawings

Order Shops, parts, and ferrite

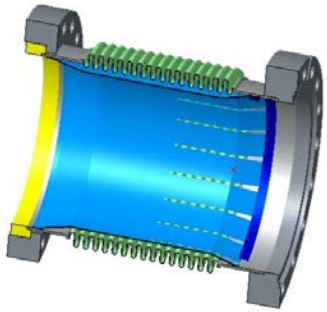








Vacuum Hardware



Beam line bellows & 180 accordion bellows purchase orders.

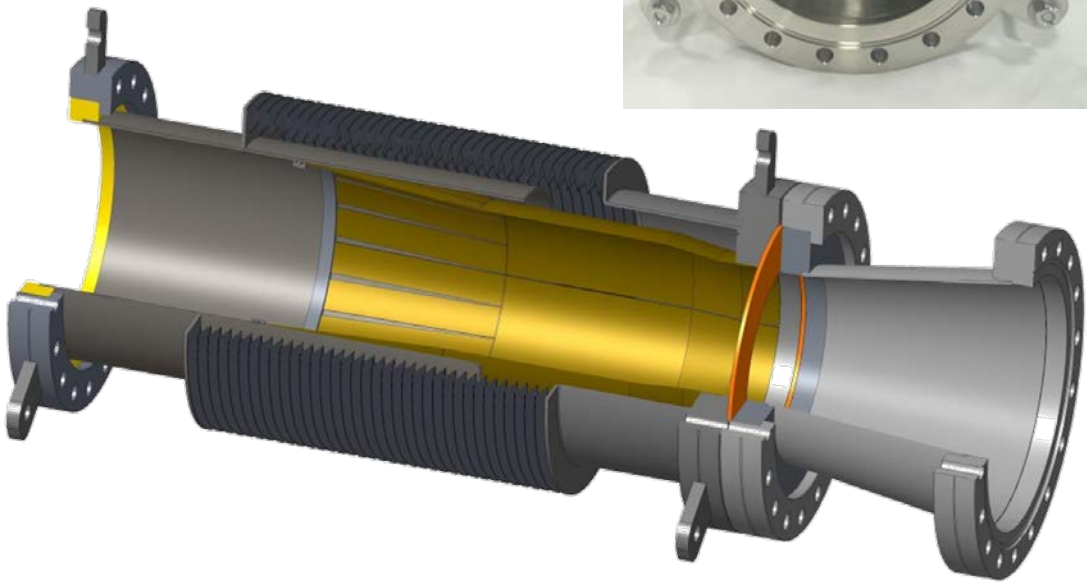
NEG coating underway 50% complete.

180 chamber need flanges, 20 chamber in shops

Shielded valves in house.

RF shielded gaskets ordered.

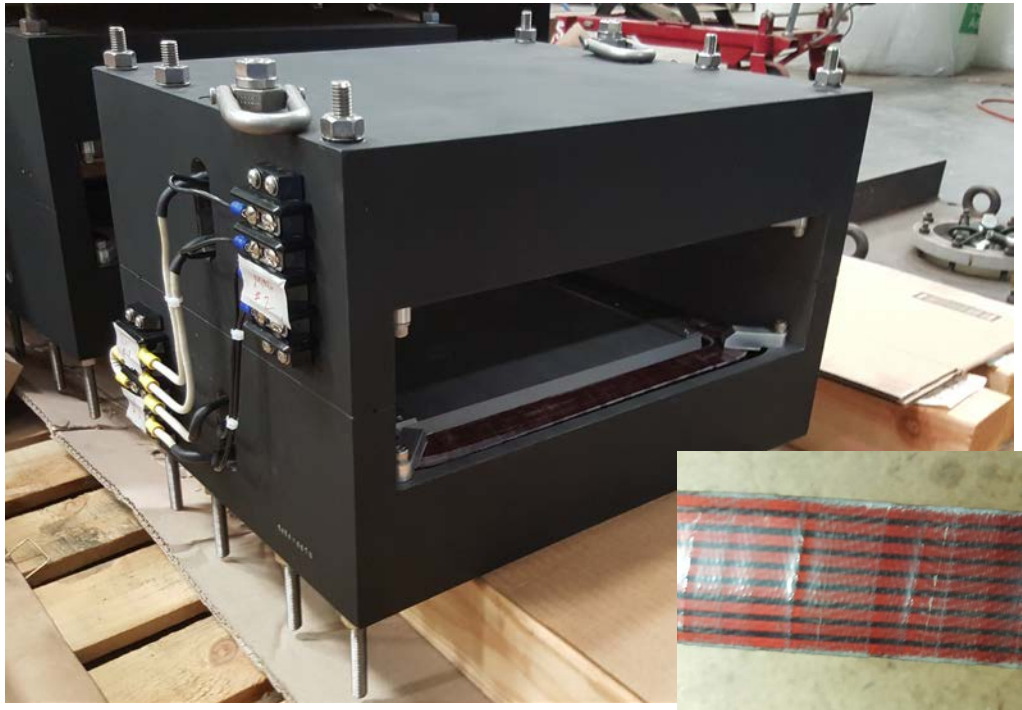
Heater blanket order?



20º Dipole Magnet

Delivery four magnets 10/30/2015

Magnet measurement, may start next week.



Electron tracking results and field qualities along trajectory on R=1 cm curved cylinder:

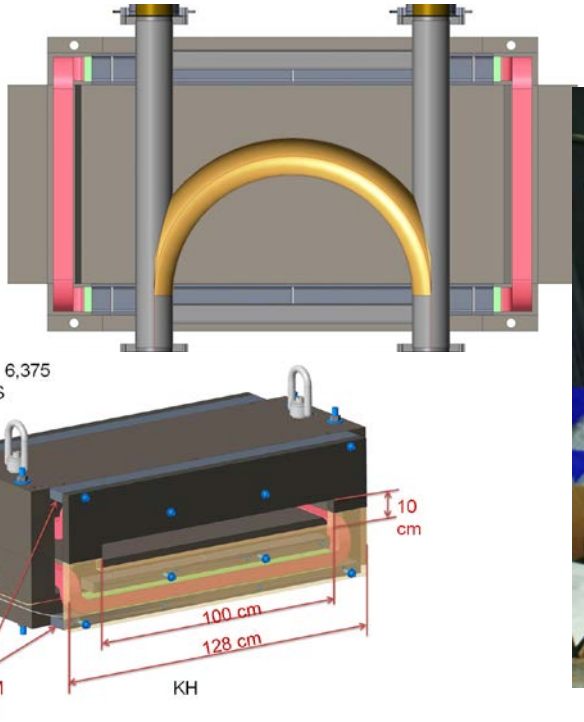
	Ek = 5 MeV	Ek = 1.6 MeV
Current per coil (Amp-turn)	1053.288	393.192
Overall current density (A/mm²) (overall coil cross-section 3.0x4.8 cm)	0.73145	0.27305
Central Gap Field (Gauss)	251.20	93.73
Half b1-integral (dipole) (G-cm)	3.1982E3	1.1930E3
Half b3-integral (6-pole) (G-cm) [Ratio to dipole integral]	1.803E-2 [5.64E-6]	7.019E-3 [5.88E-6]
Half bending angle from tracking tests (required 10°)	10.013°	10.006°

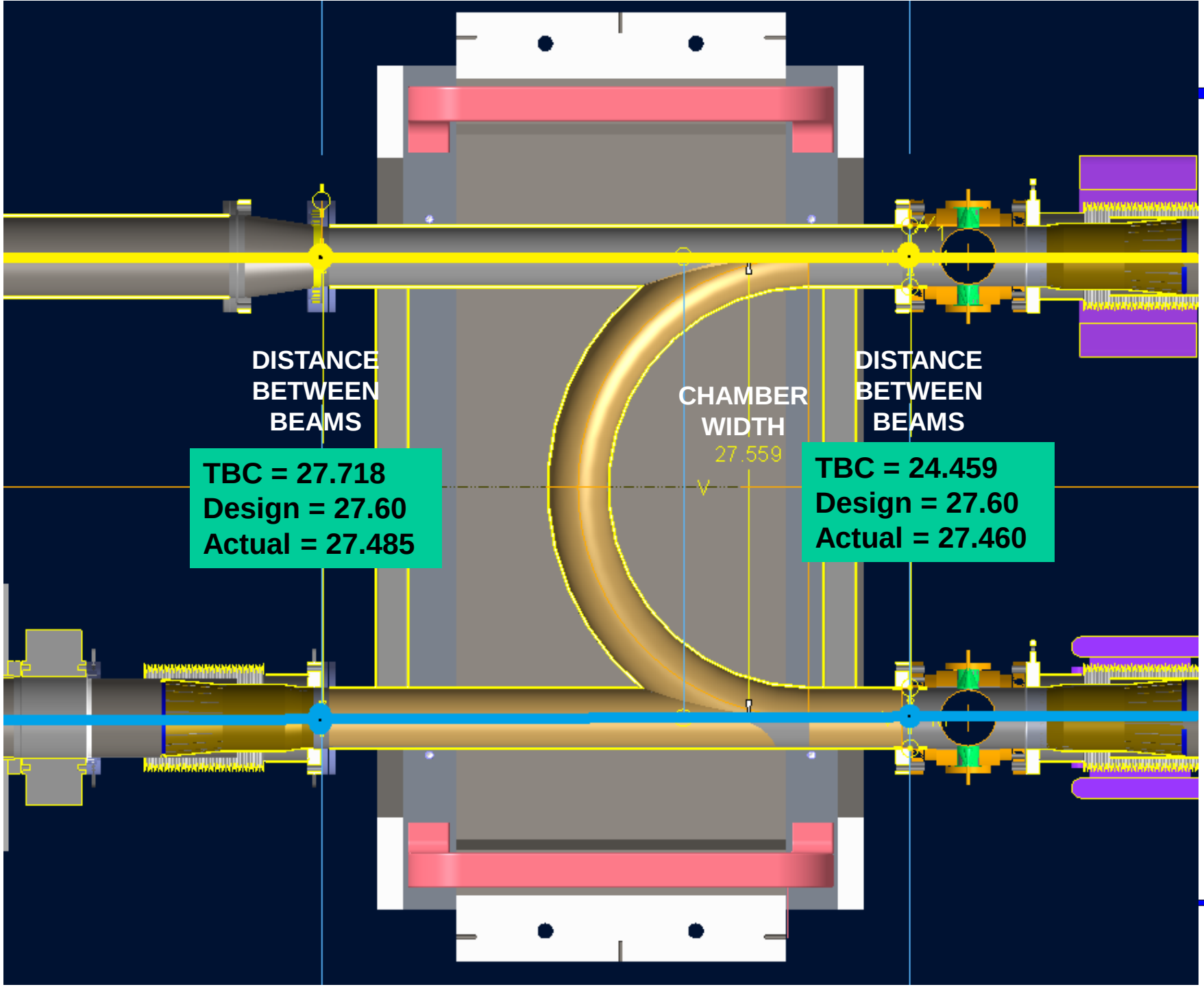
180º Dipole Magnet Revised

Need information on NMR probe in order to design 180 vacuum chamber mounting point.

180 vacuum chamber will not be installed this shutdown.

- NMR probe can be installed and tested with chamber during magnetic measurement.
- 180 dipole power supply stability could be evaluated during magnetic measurement with NMR probe read backs.
- Fabrication lead time for the PS is a concern.
- Can chamber welds be tested during magnetic measurement?

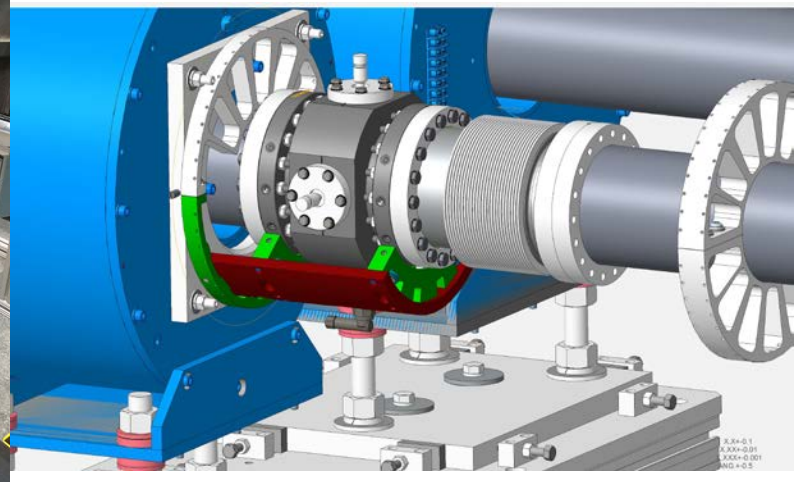



DISTANCE
BETWEEN
BEAMS
TBC = 27.718
Design = 27.60
Actual = 27.485
CHAMBER
WIDTH
27.559
DISTANCE
BETWEEN
BEAMS
TBC = 24.459
Design = 27.60
Actual = 27.460

Compensating and Matching Solenoids

Magnetic measurement near complete – this week

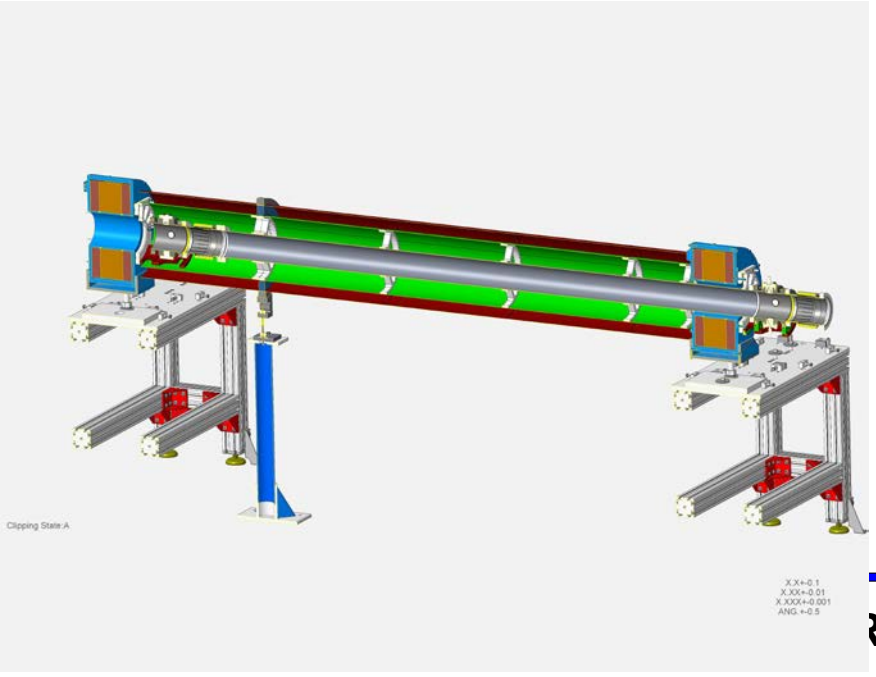
- Design mu metal shields/supports – magnet measurement. (Spring 2016)
- In tunnel magnetic measurement system of shields. (2016 shutdown)

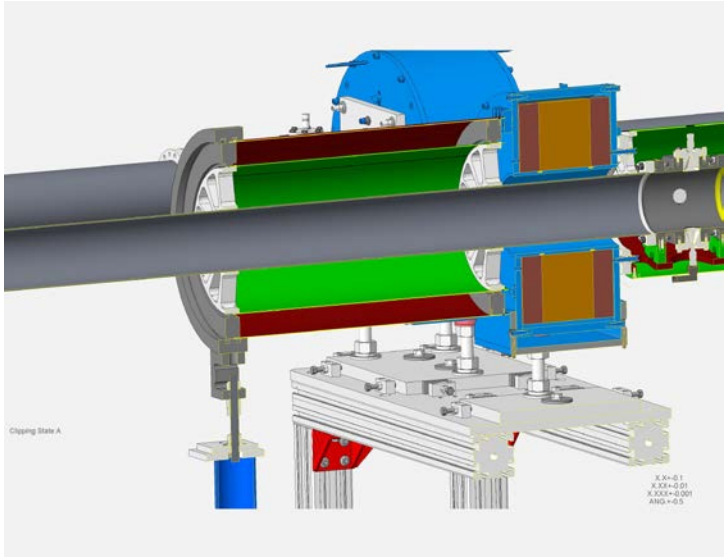


Compensating and Matching Solenoids

Magnetic shielding:

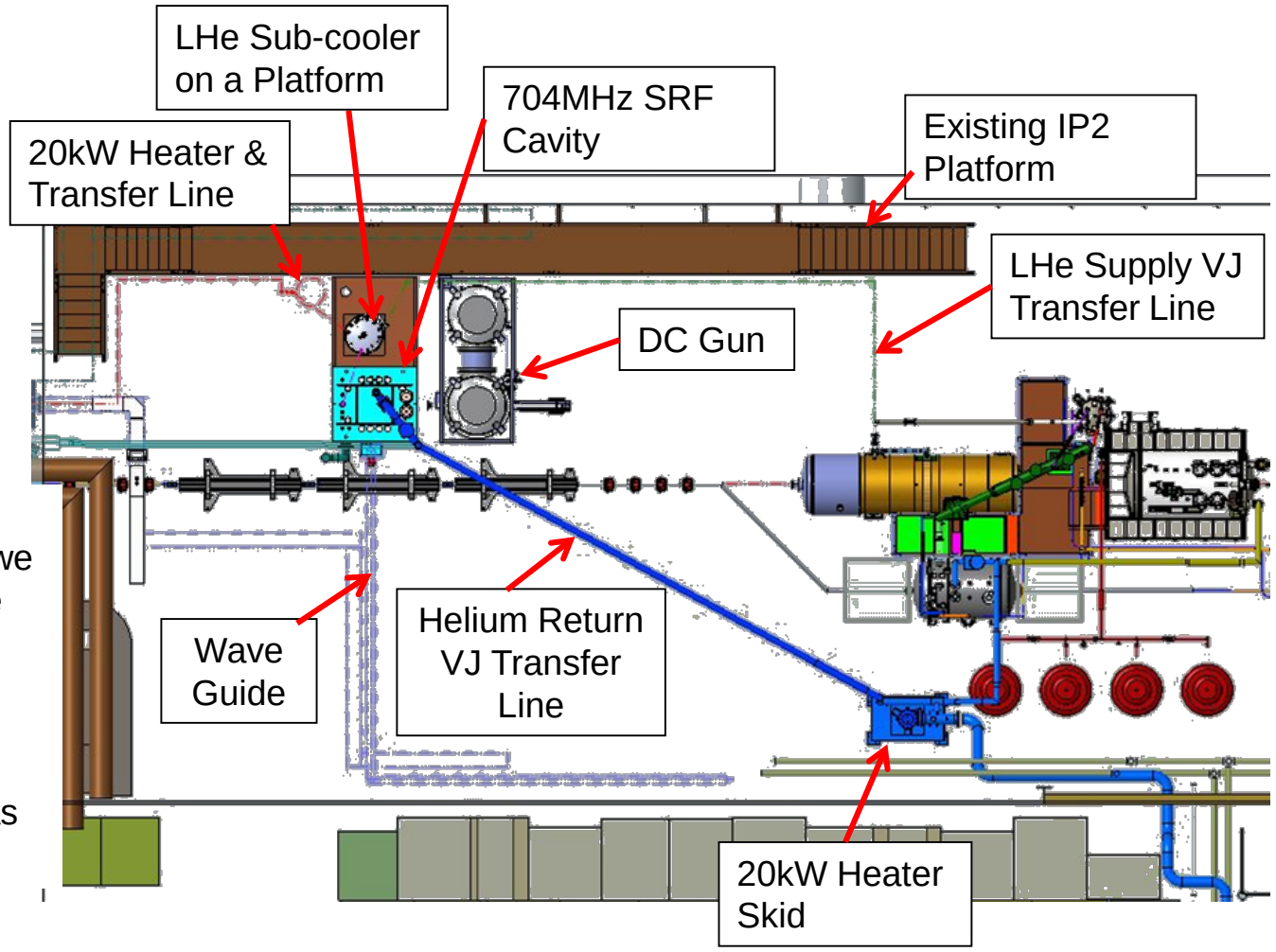
- The magnetic shielding will not be installed until the 2016 shutdown.
- The magnetic shielding test fixture will be used to develop and verify the design of the magnetic shielding assembly.
- A measurement probe system needs to be designed that can transit down the test fixture.
- After installation, measurements must be made in the tunnel to confirm that the installed shielding reduces the magnetic field in the beam tube to < 1 mG.
- **From Magnet Measurement Meeting: Test section will be built solenoid to solenoid rather than either side of a singe solenoid. This will require keeping one solenoid out of the tunnel this year.**





LEReC Cryogenic Component and Transfer Line Layout

1. Can we route the Helium Return VJ transfer line as shown?
2. Can the existing IP2 platform remain so that we can access the new LHe Sub-cooler platform and SRF Cavity top plate?
3. Can we route the LHe Supply VJ transfer line as shown?



LEReC Cooling Section Design Room

LF & HF solenoid and 20^{o} dipole magnets fabrication drawings (KH)

Beam Diagnostics: BPM chamber and buttons (VDM)

Beam Line 5” bellows with shields fabrication drawings (GW)

20^{o} dipole vacuum chamber for impedence review (KH)

180^{o} dipole fabrication drawings (KH) Spectrometer magnet (180^{o} dipole) revisions (KH)

180^{o} vacuum chamber + large sliding bellows fabrication drawing (KH)

Beam Diagnostics ES W slit & chamber fabrication drawings (VDM)

20^{o} dipole vacuum chamber fabrication drawings (KH)

Cable tray and penetration drawings and excel sheet (AF)

Beam Diagnostics: PM vacuum chamber fabrication drawings (GW)

Beam Diagnostics: standard PM fabrication drawings (GW)

Beam Diagnostics: special “hybrid” ES/PM/BPM fabrication drawings (GW)

Beam line solenoid/BPM stands & vacuum chamber stand (VDM)

20^{o} magnet stand drawing (KH)

180^{o} magnet w/hybrid BPM stand drawings (KH) on hold

Magnetic shielding drawing and solenoid magnetic measurement test station (VDM) ***on hold***

In tunnel, magnetic measurement “mole” for stray field studies

HF dipole, quadrupole, and skew quadrupole corrector drawings

LEReC Design Room Source Design Work

DC Gun Vacuum Chamber Fabrication Drawings (JH)

DC Gun SF6 Pressure chamber specification control drawings (JH)

DC Gun cathode cooling design for Karl S. Cornell (JH)

DC Gun stands (JH)

DC Gun to SRF booster cavity beam line (JH)

DC Gun to SRF booster cavity laser port, view port, profile monitor (JH)

DC Gun to SRF booster cavity solenoid/corrector magnets

DC Gun to SRF booster cavity BPM's

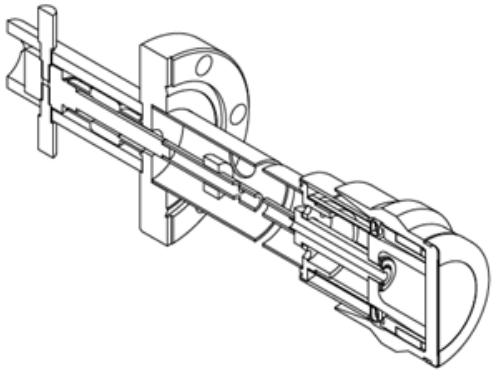
DC Gun cathode insertion drive assembly

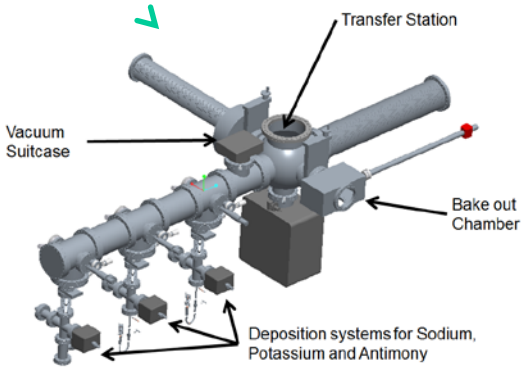
ERL Gun to Booster Cavity Modifications: U/S cathode to beam tube, FPC, D/S beamline & HOM (SS, JH)

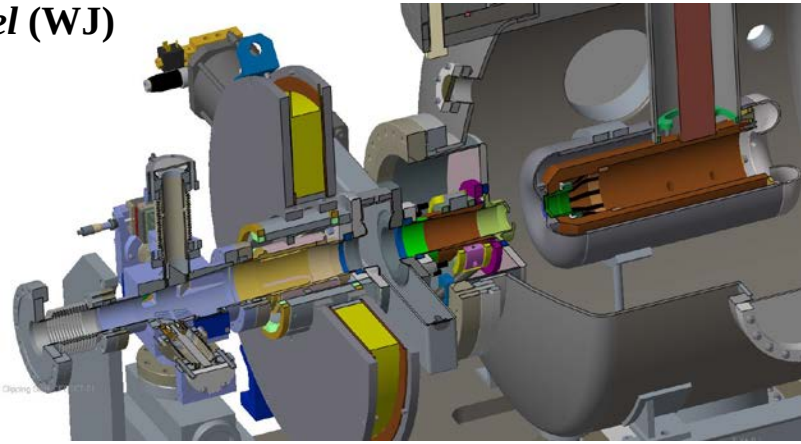
Cathode coating system cathode bakeout vacuum chamber & heater (BM)

Cathode coating system deposition vacuum chamber w/internal cathode transport system

Cathode coating system transport vacuum chamber – *ferris wheel* (WJ)







LEReC Design Room Other Work

RHIC 1:00 move real estate drawings (V.DM.)

~~Phase 2: 5 cell cavity positioning (RM) – Revised Position on hold~~

Phase 1 cryogenic system layout (RM)

2.1 GHz warm cavity spec. control drawings (MG)

2.1 GHz warm cavity tuner, wave guide, and warm test model (MG)

704 MHz warm cavity spec. control drawings (SP)

Transport & Merger line layout (RM)

- Locate booster cavity, solenoids, BPM's,
- RF Cavities, PM's, Diagnostic Lines

Transport & Merger Line Solenoids (KH)

Transport & Merger Line CT's (GW)

Transport & Merger Line BPM's (GW)

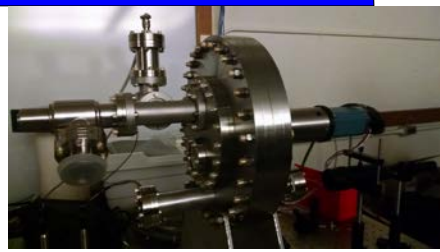
Transport & Merger Line Correctors

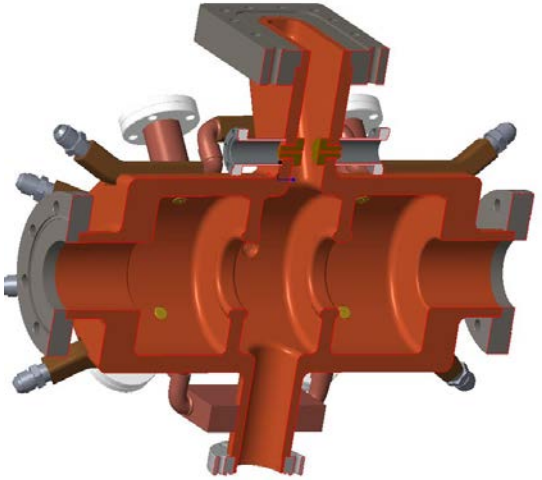
Transport & Merger Line Profile Monitors

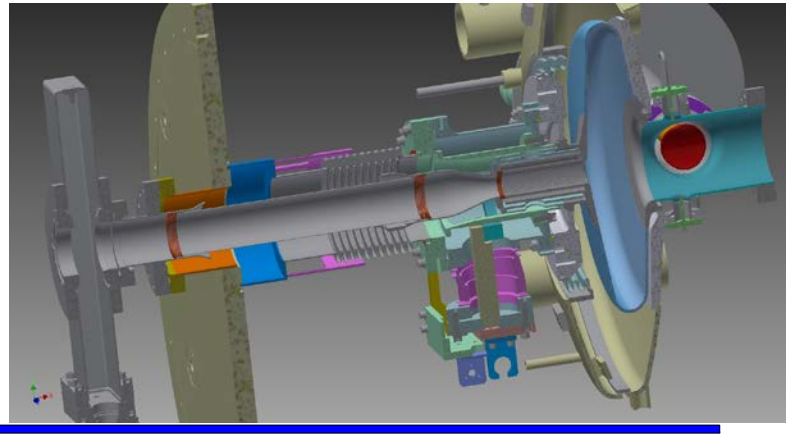
Merger Line Flying Wire

Diagnostic Beam Lines and Components

- Kickers, RF cavity, beam dump,







Extra slides

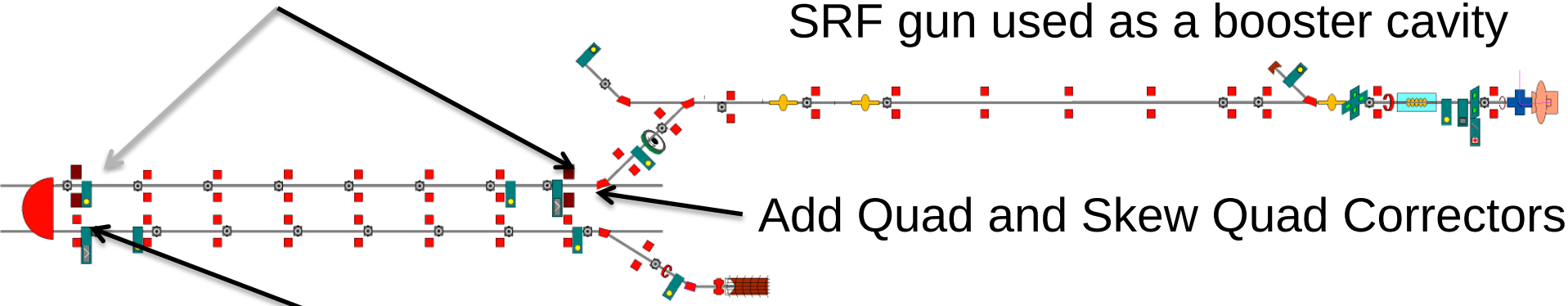
Overall Layout

64 m

IP2

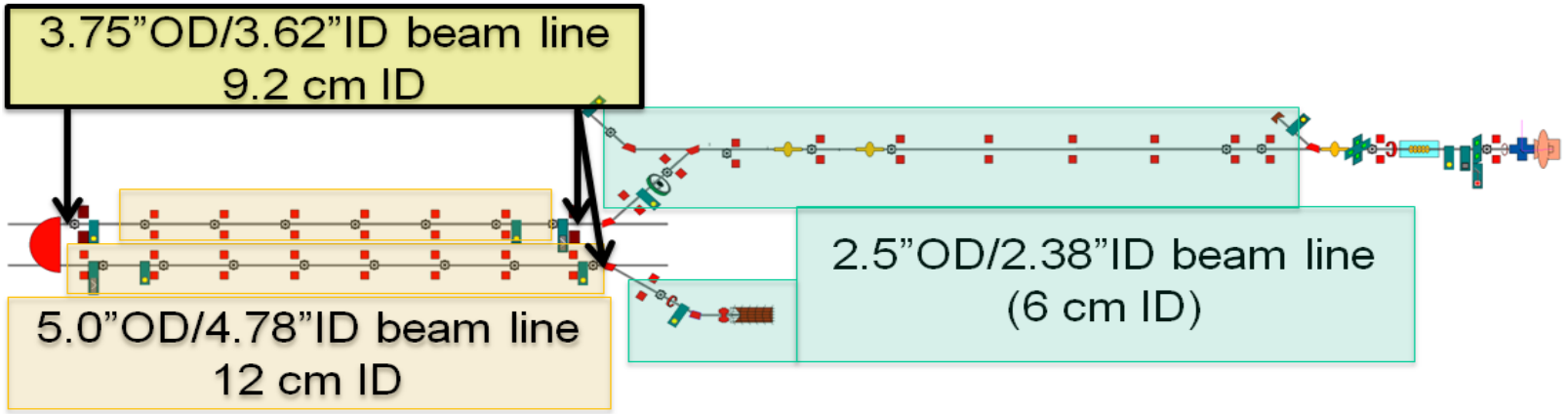
H & V Correctors

LEReC-I (1.6-2MeV): Gun to dump
SRF gun used as a booster cavity



Add Quad and Skew Quad Correctors

Add Quad and Skew Quad Correctors



9/16/15

Phase 1 Block 7.vsd

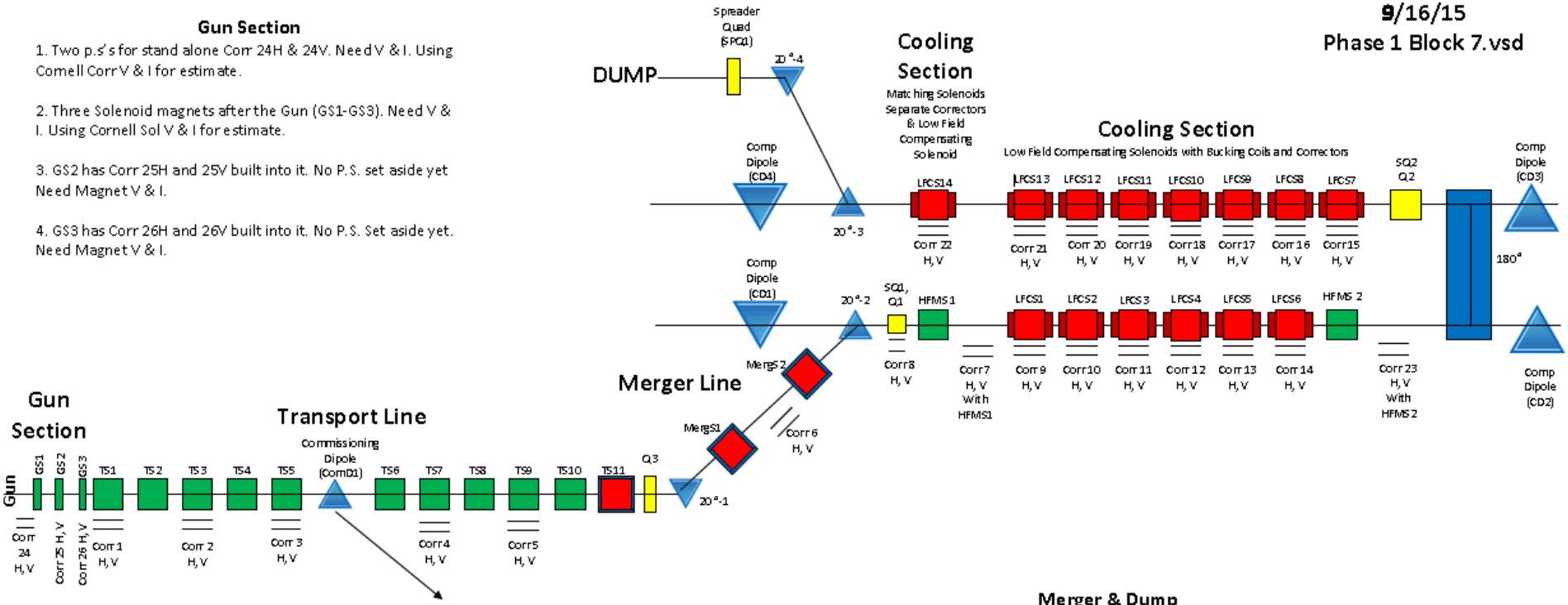
Gun Section

1. Two p.s's for stand alone Corr 24H & 24V. Need V & I. Using Cornell Corr V & I for estimate.

2. Three Solenoid magnets after the Gun (GS1-GS3). Need V & I. Using Cornell Sol V & I for estimate.

3. GS2 has Corr 25H and 25V built into it. No P.S. set aside yet Need Magnet V & I.

4. GS3 has Corr 26H and 26V built into it. No P.S. Set aside yet. Need Magnet V & I.



Transport Line

1. 11 p.s's for 11 Sol magnets (TS1-11) . Need V & I, For now using 11-250V 50A GEN ps's. Need V & I. TS1-10 are 500G. TS11=1.1kG.

2. 10 Corr p.s.'s for only 5 Corrector (Corr1-5) magnets. Need V & I, For now using ten ERL 15V 10A SHIM p.s.'s. Do we need more than 5 Corr magnets? Are they in the correct location?

3. 1 p.s. for one Commissioning Dipole (ComD1). Need V & I, For now using ERL extraction dipole with ERL ps which is Kepco BOP GL 50V 20A

4. 1 p.s. for one Quad, Q3, Use ERL 15V 10A SHIM ps, taking quad from ERL.

Notes

1. Don't forget we need FWD's and for kepcos we might need blocking diode to make it unipolar, however this may not be true because we may want kepcos to work bipolar to get rid of remnant field
2. Tell Bob V about new 30V 25A ps's we added because LFCS14 is running as a single magnet and update D Phillips racks.
3. I really need V & I for TS1-11 and MergS1-S2.
4. TS2 & TS5 are replaced by 2 chicanes (zig zags) for Phase II.

Merger & Dump

1. 2 p.s.'s needed for two 1.1kG Solenoid Magnets (MergS1-2). I~20A?, V is ~146.8V? I don't know what I should be for 1.1kG. Use 200V 50A Gen ps
2. 2 p.s.'s needed for one Corrector magnet (Corr 6). Need V & I, For now using 2 ERL 15V 10A SHIM p.s.'s.
3. 1 p.s., ERL Kepco BOP GL 50V 20A for four 20° magnets in series. 20°-1&2 in Merger Section. 20°-3&4 in dump section.

Cooling Section

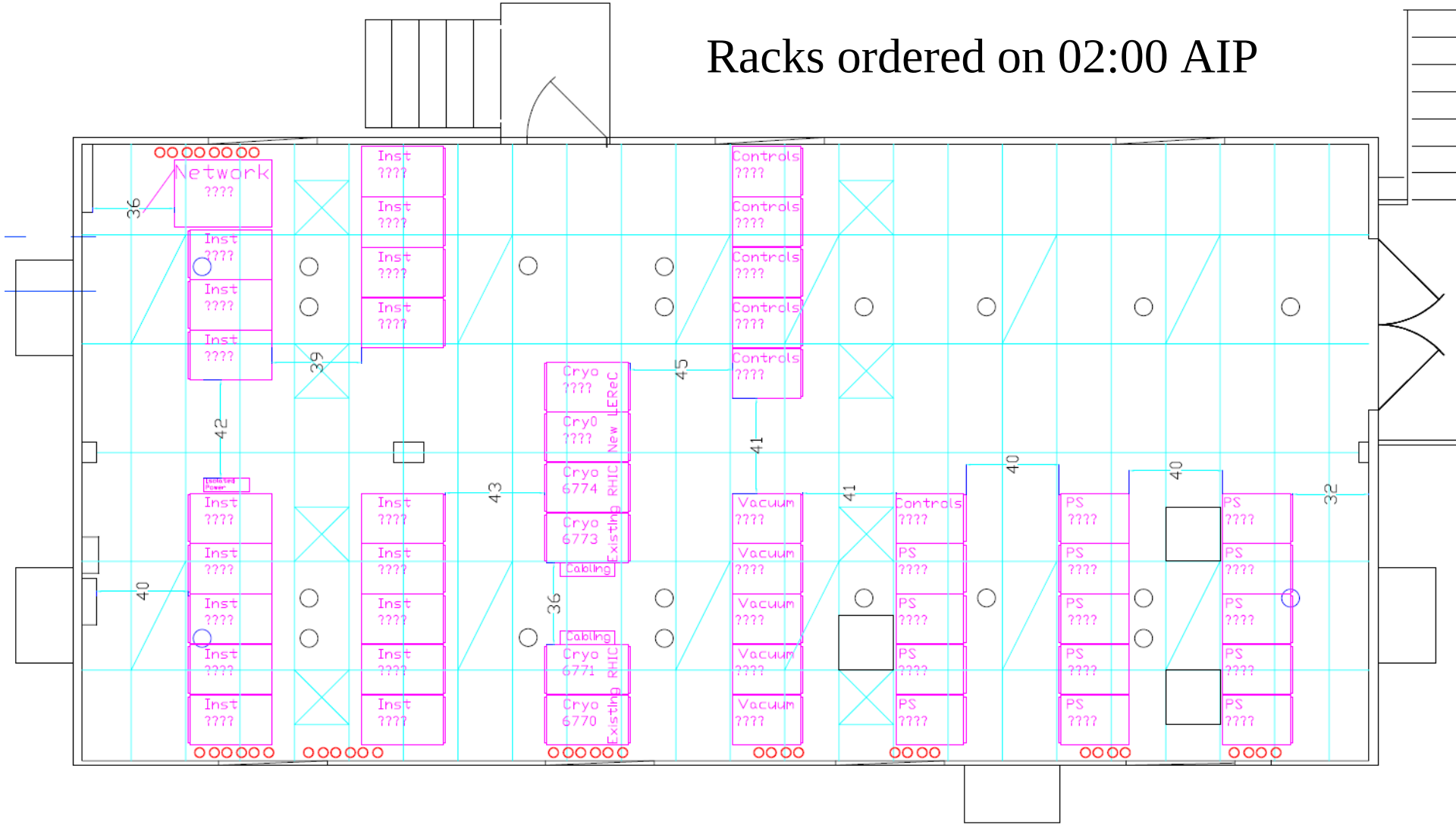
1. 1 p.s. 150V 22A for LFCSc1-6 cores 6 in series
2. 1 p.s. 150V 22A for LFCSbc1-6 buck coils (2x) 6 in series
3. 28 p.s.'s 20V 2A BIRA MCOR for Correctors, Corr 9-22 with LFCS magnets.
4. 1 p.s. 150V 22A for LFCSc7-13 cores 7 in series
5. 1 p.s. 150V 22A for LFCSbc7-13 buck coils (2x) 7 in series
6. 1 p.s. 30V 25A for LFCSc14 core single
7. 1 p.s. 30V 25A for LFCSbc14 buck coils 2 in series from one magnet
8. 1 180° p.s. +/-30ppm? Need to sit down with Alexei, Bob about specs, have 3 options, 39.3V, 7.8A
9. 2 p.s.'s 30V 25A for High Field Matching Solenoids (HFMS1-2)
10. 4 p.s.'s for HFMS Correctors (Corr 7 & 23), need real Mag V & I. For now using ERL 15V 10A SHIMS
11. 1 p.s. for Compensating Dipoles (CD1-4). All 4 in series. Use one kepco 50V 20A p.s.
12. 1 p.s. for Skew Quad (SQ1) V & I needed, 1 p.s. for Quad (Q1) V & I needed, 2 ps's for Corr 8 (V&I needed)
13. 1 p.s. for Skew Quad (SQ2) V & I needed, 1 p.s. for Quad (Q2) V & I needed

Dump

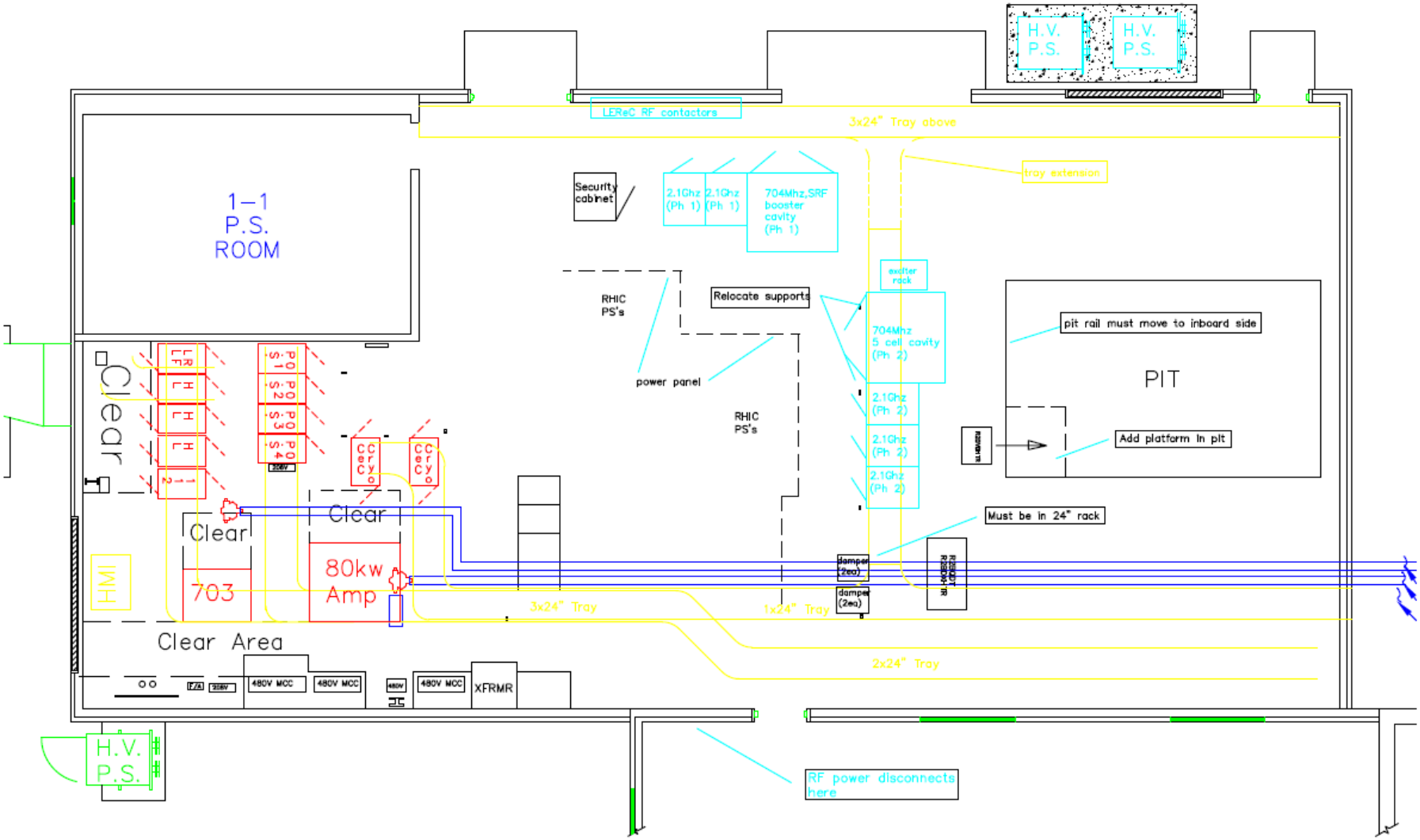
1. 1 p.s. needed for one Spreader Quad Magnet (SPQ1), No V & I, told to use ERL 15V 10A SHIM p.s.

Brahms Trailer 1002 D Racks

Racks ordered on 02:00 AIP

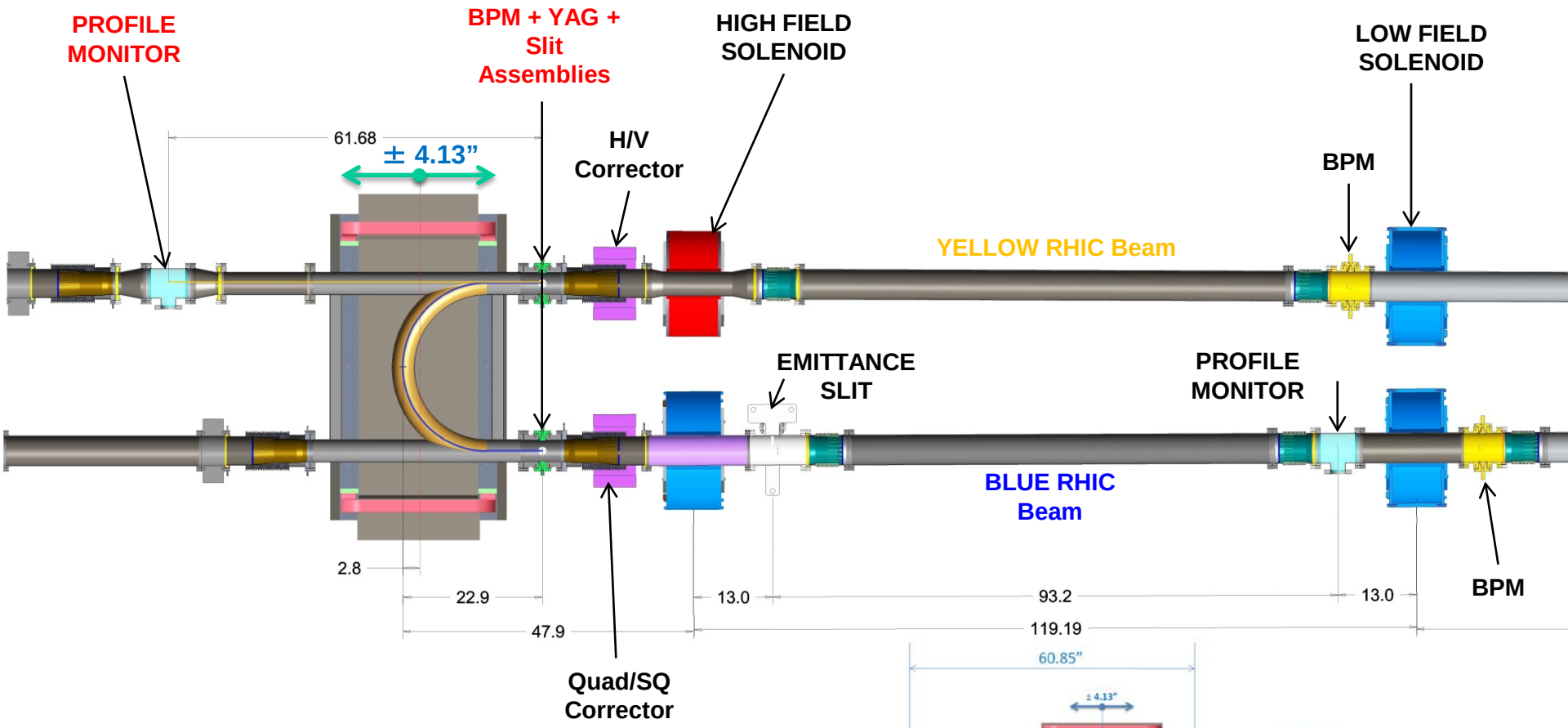


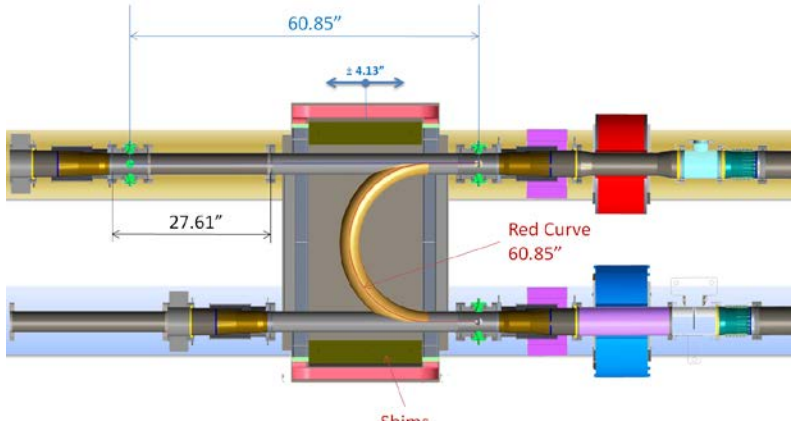
1002B RF Power Supplies



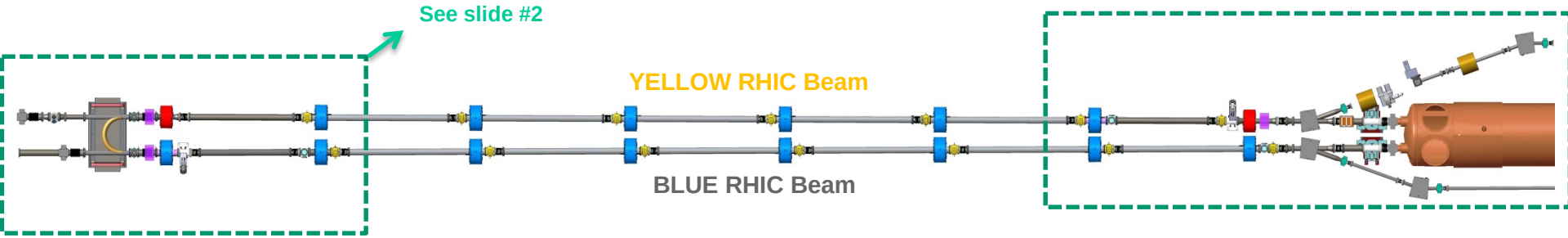
Low Energy RHIC electron *Cooling*

180º Dipole Magnet Neighborhood IV

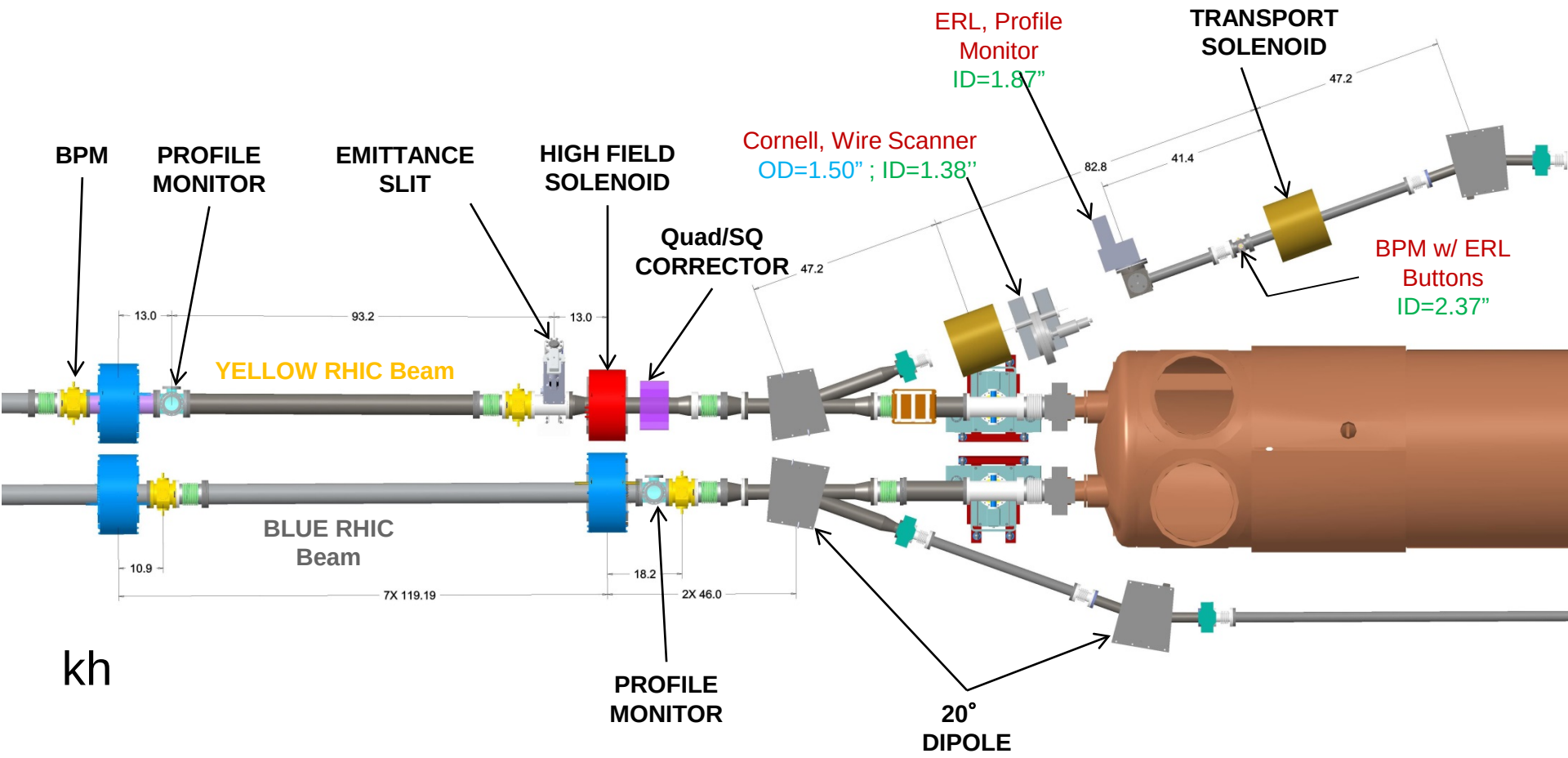




kh

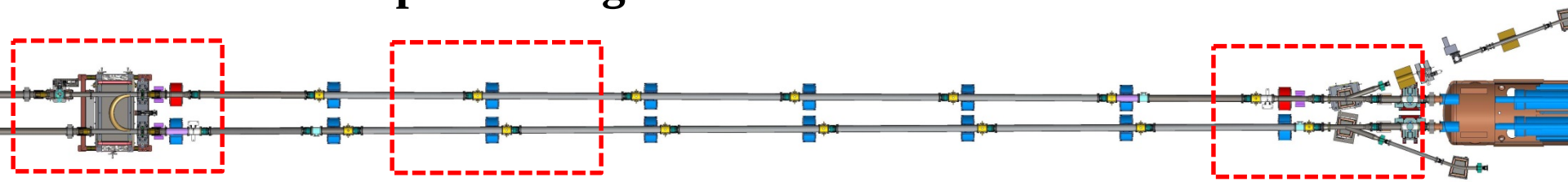


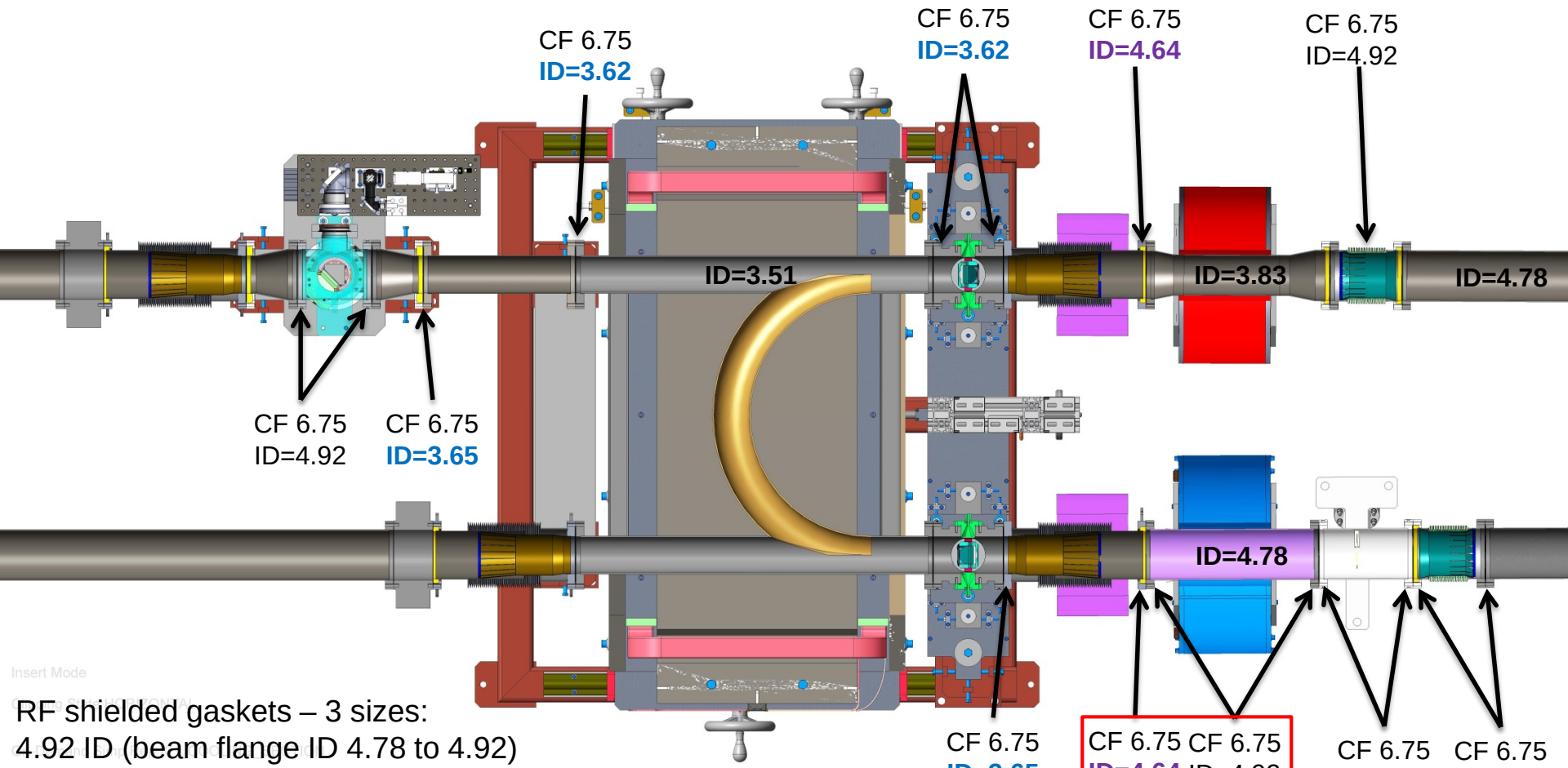
20º Dipole Neighborhood IV



kh

Special RF gasket dimensions





RF shielded gaskets – 3 sizes:
4.92 ID (beam flange ID 4.78 to 4.92)
4.64 ID
3.65 ID (beam flange ID 3.62 to 3.65)

KH