



Collaboration Meeting 33 - Glasgow

26th June 2012

Design Layout

Andrew Moss for Alan Grant, STFC



Overview



- **Review Panel Recommendations**
- **Coax Distribution**
- **Coax Installation**
- **Coax supports**
- **Magnetic Field – 4616 pre amp**
- **Next Steps**
- **Summary**



Recommendation from Review Panel

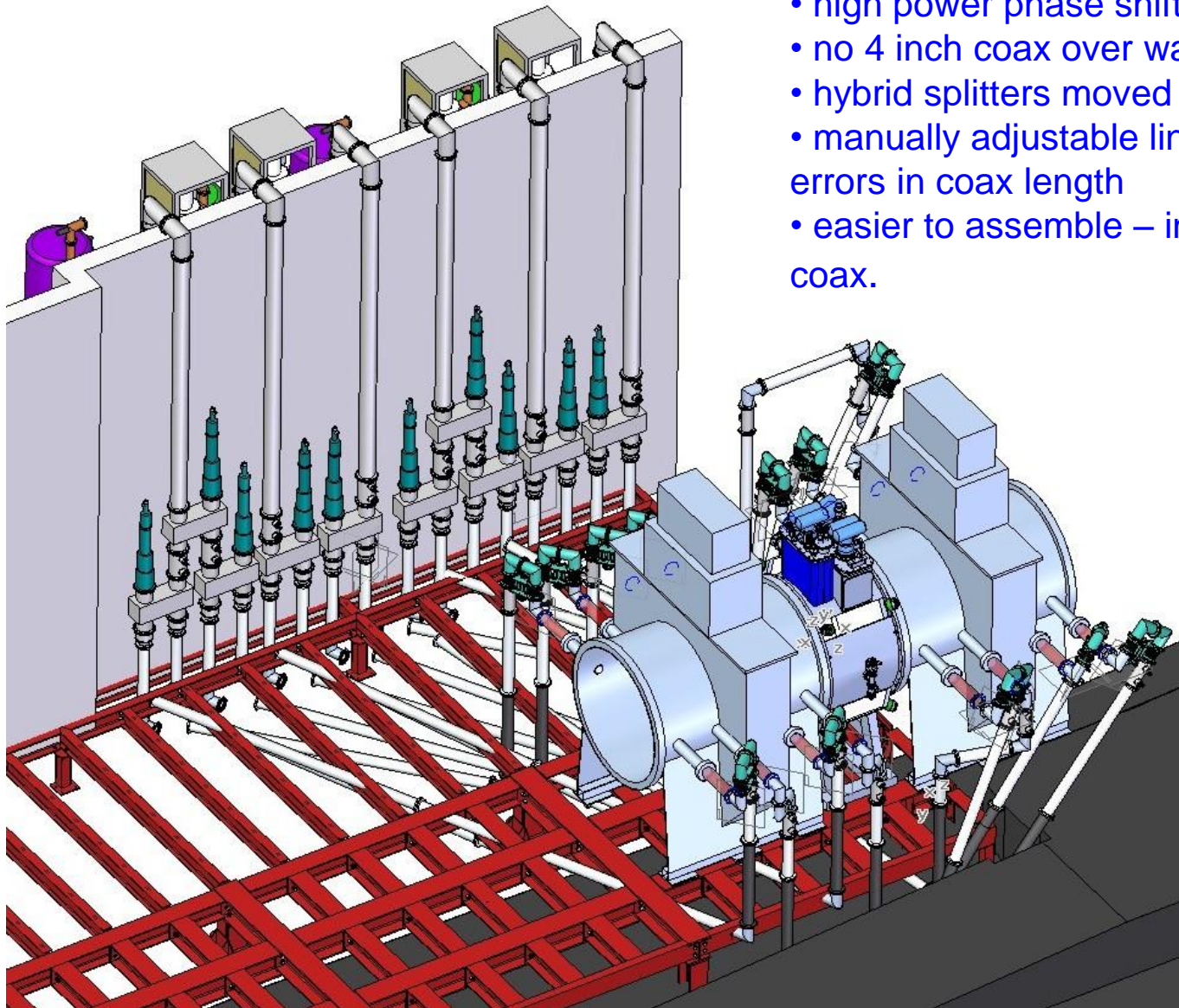
RF Distribution

- Coax high power phase shifters not warranted.
- Relocate Hybrid splitters from behind shield wall.
 - Provides more space for access to amplifiers.
 - Reduces the length and volume of 4" coax.
- Where possible reduce number of coaxial joints.

Mechanical Installation & Maintenance

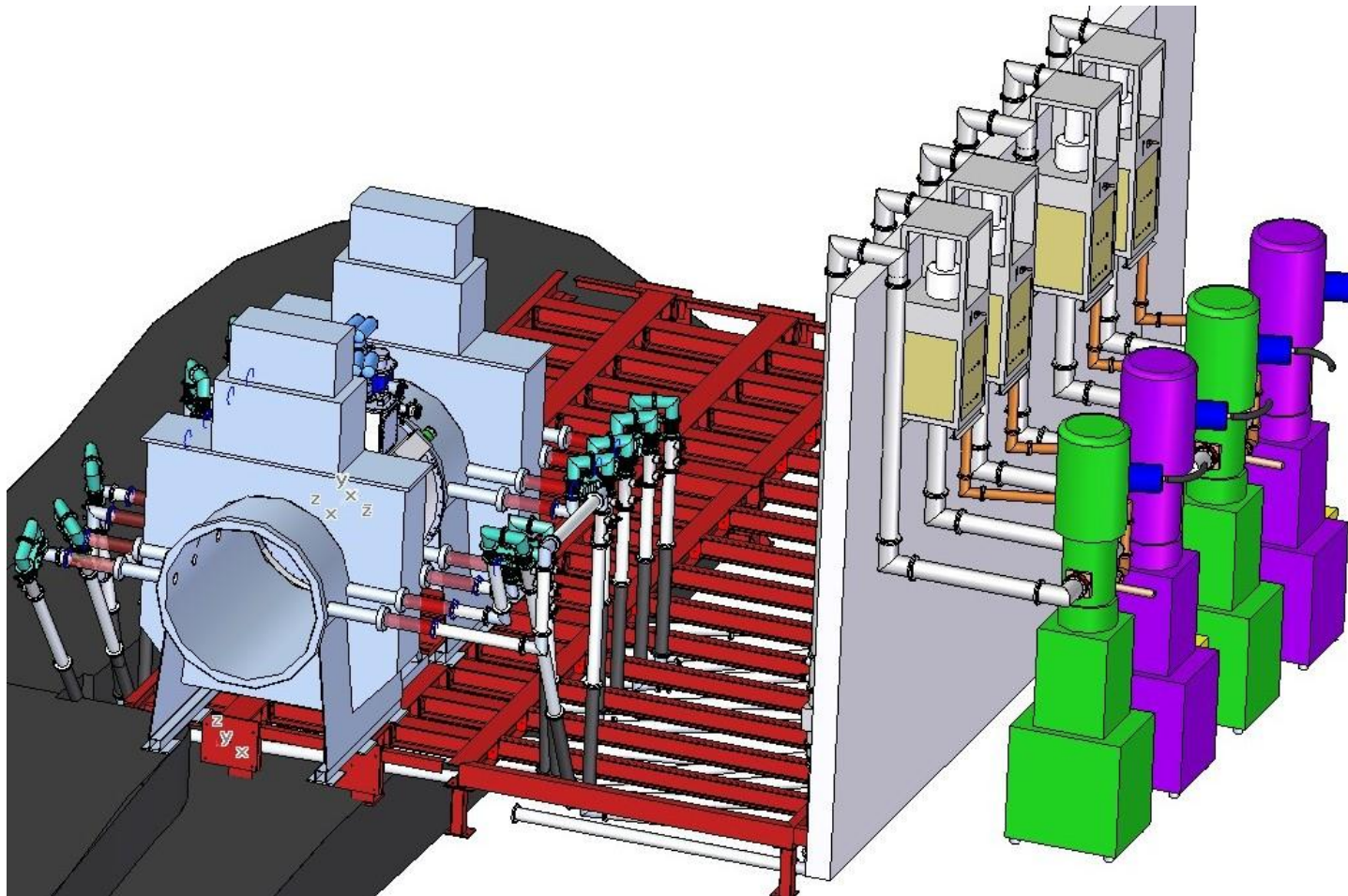
- Try and install all under floor coax distribution at stage V.
- Design improved mounting mechanism to minimise protrusions.
- Improve lateral movement capability for any miss-alignment of coax distribution during installation.

RF Layout – view from cooling channel side



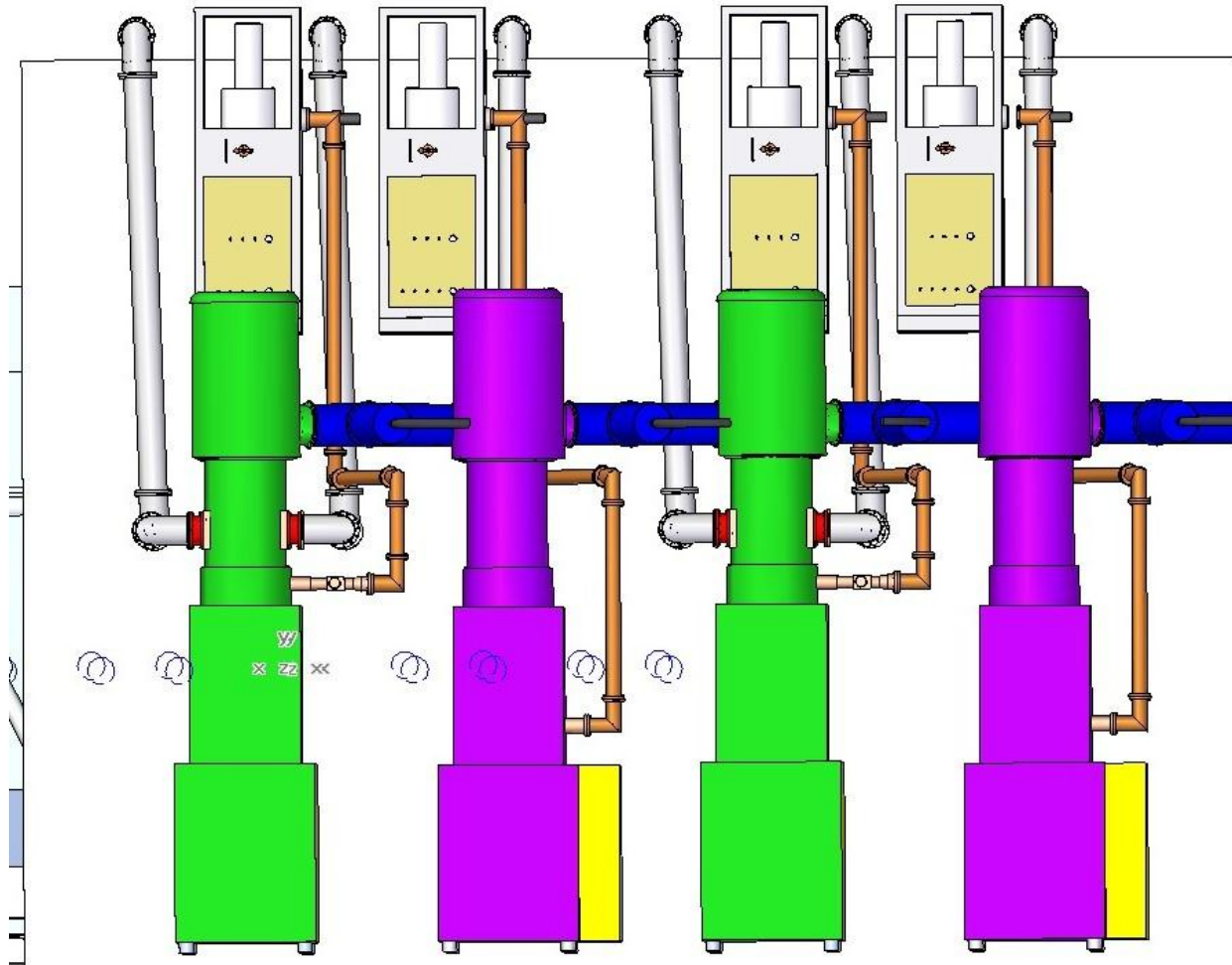
- high power phase shifters removed.
- no 4 inch coax over wall.
- hybrid splitters moved - more accessible
- manually adjustable line trimmers to take up errors in coax length
- easier to assemble – introduced flexible coax.

RF Layout – view behind shield wall

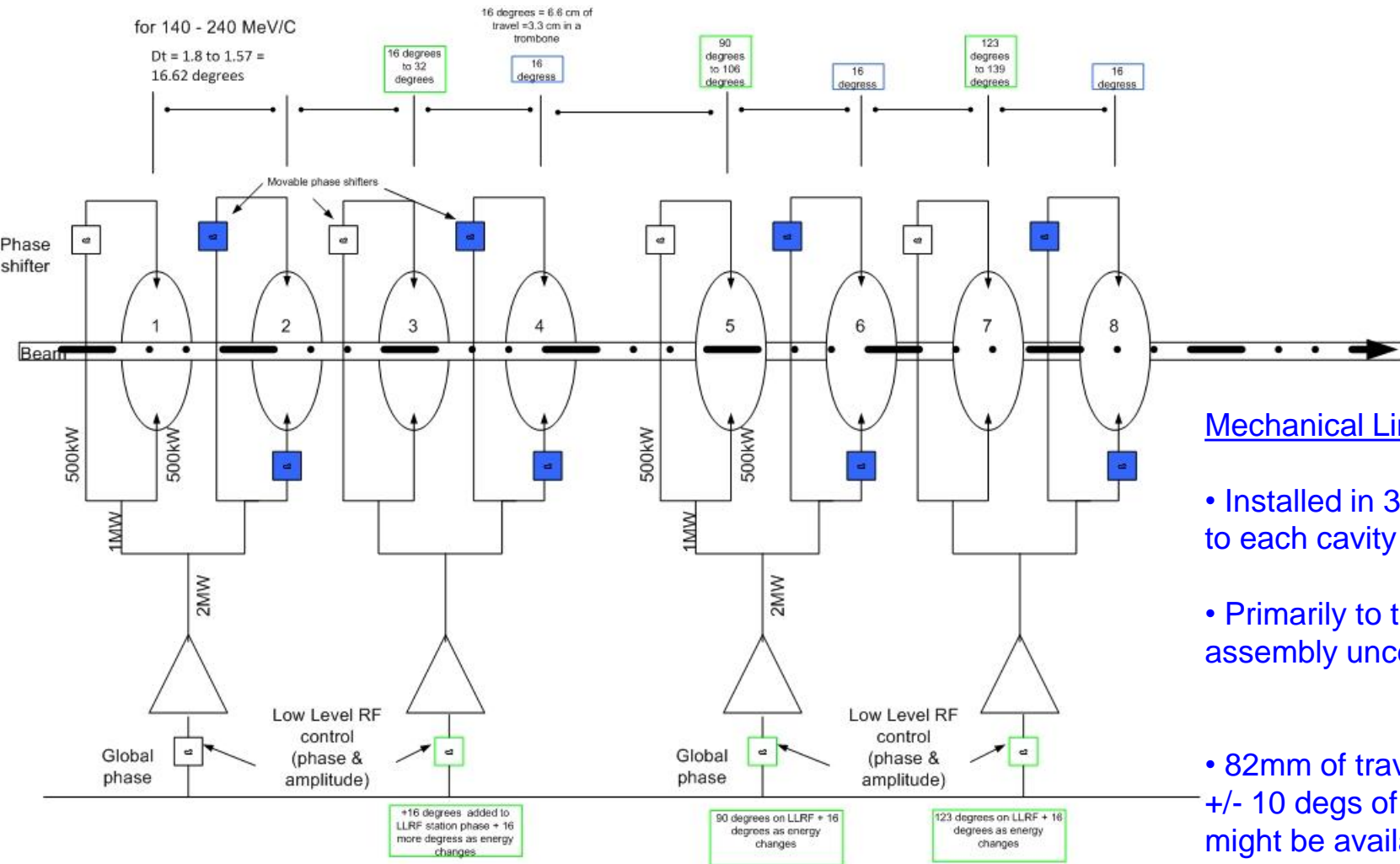


- hybrid splitters moved – space freed up behind wall.
- no coax distribution going under the wall.
- 6 off 6 inch coax over the top of wall.
- Coax length matching now takes place other side of wall – space less of a constraint.

RF Layout – view behind shield wall



Fixed Phase Operation Schematic Mechanical Line Trimmers for assembly uncertainties.

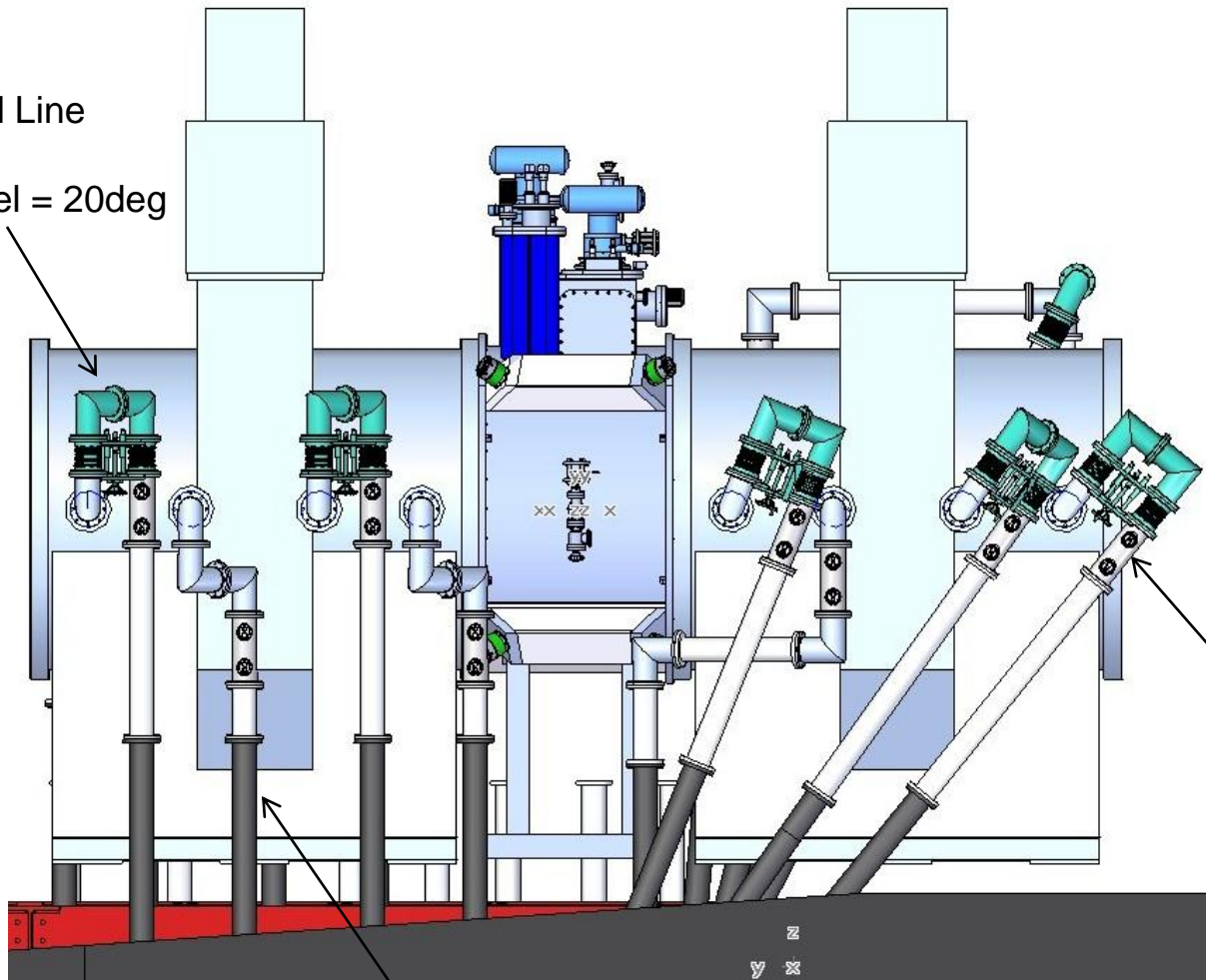


Mechanical Line Trimmers

- Installed in 3 of the lines to each cavity pair.
- Primarily to take up the assembly uncertainty.
- 82mm of travel, implies +/- 10 degs of trimming might be available.

Line Trimmer Arrangement to South Side RF Couplers

Mechanical Line Trimmers
82mm travel = 20deg

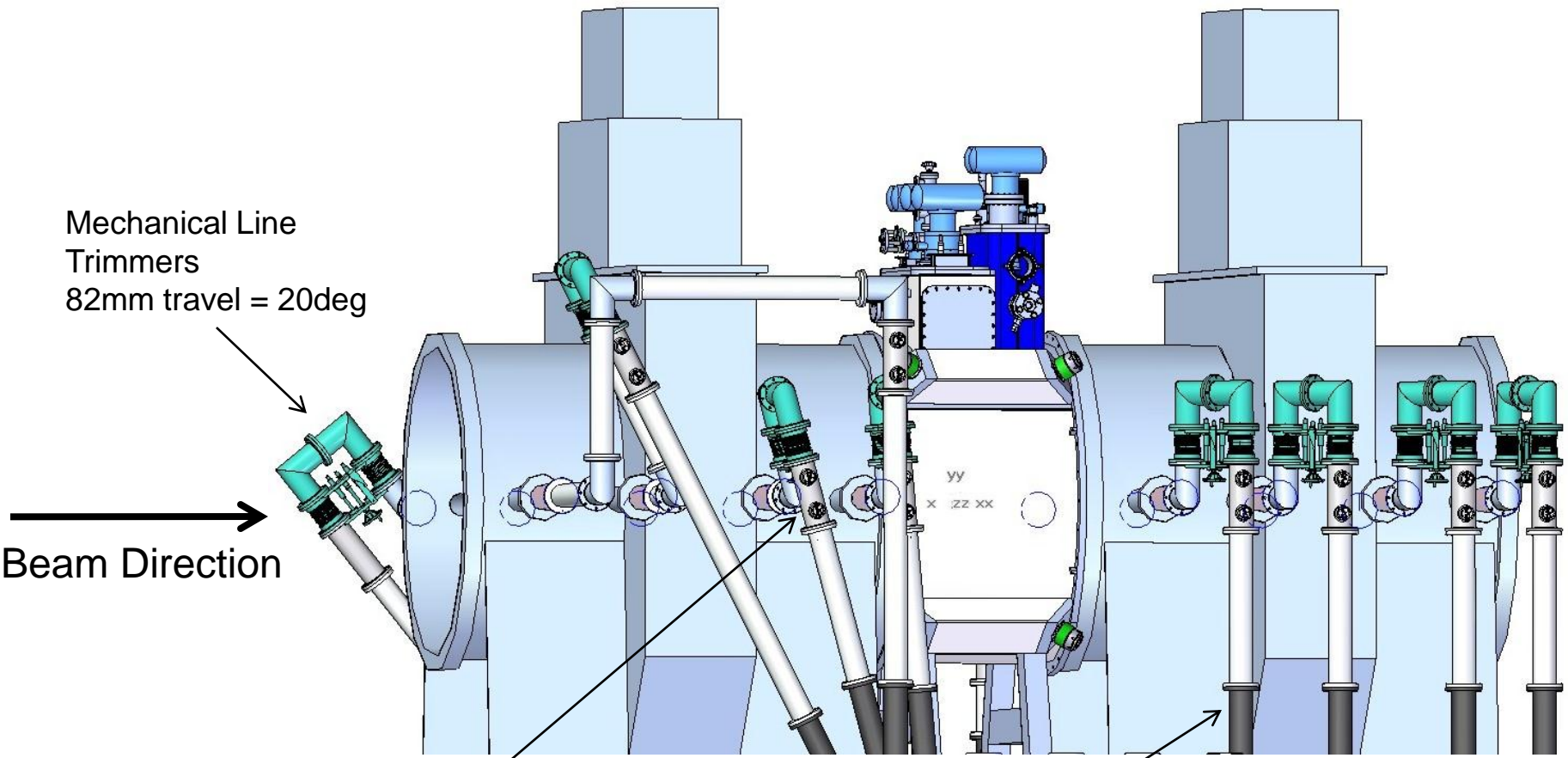


Beam Direction
←

Direction Coupler -
1 to each Coupler

4" Flexible coax for
any mis-alignment

Line Trimmer Arrangement to North Side RF Couplers



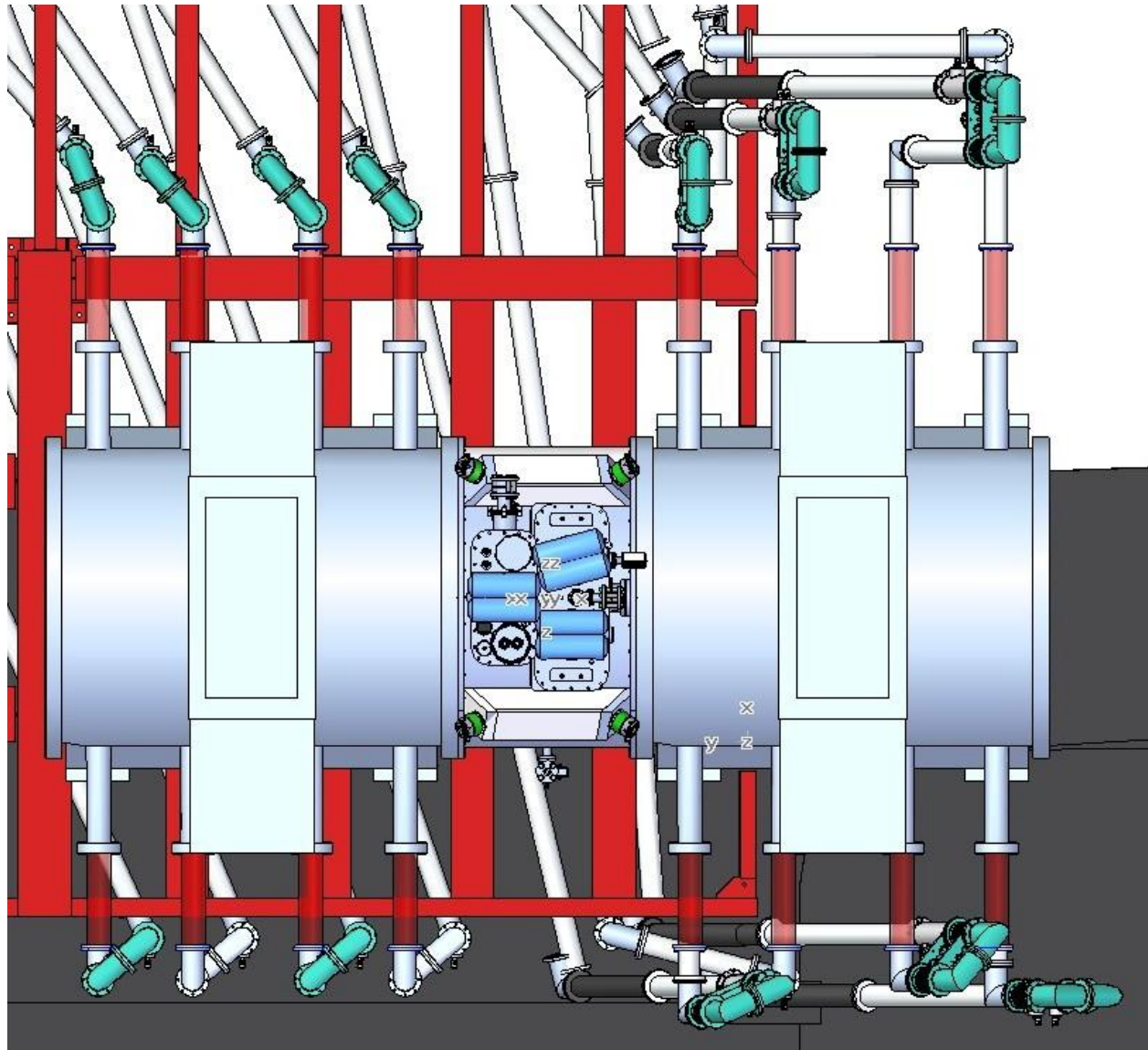
Mechanical Line Trimmers
82mm travel = 20deg

Beam Direction

Direction Coupler -
1 to each Coupler

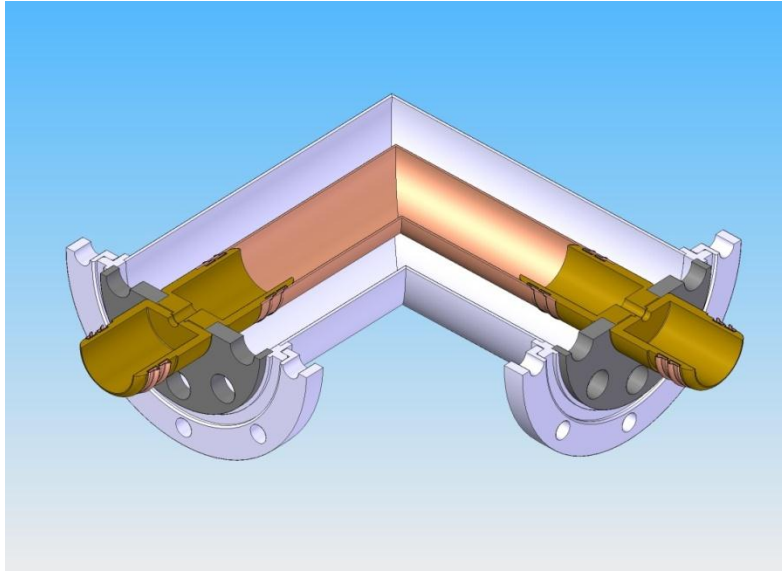
4" Flexible coax for
any mis-alignment

Clear Access for removal of AFC

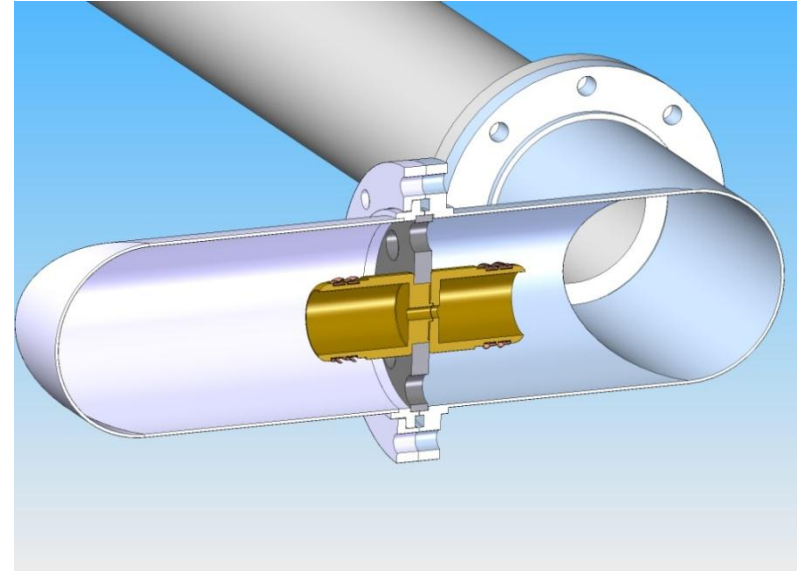


AFC's can be removed without having to dismantle any of the RF coax system

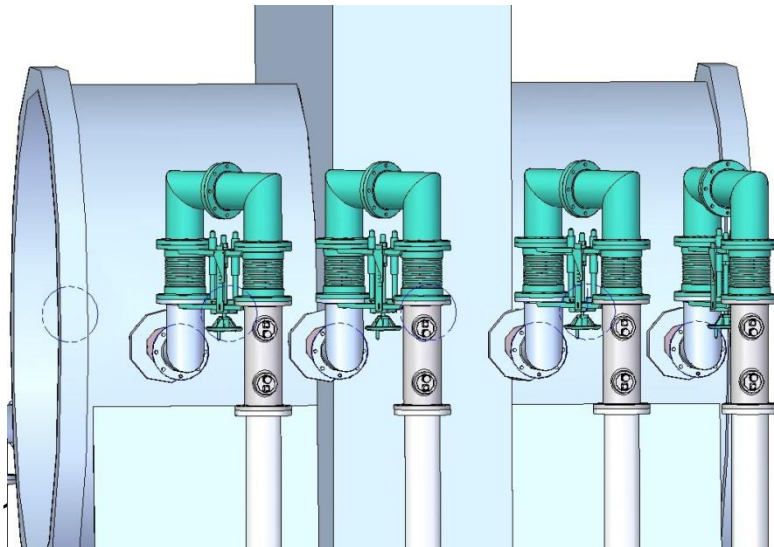
Coax Sections – Installation/Removal Concerns



- ~55mm required to clear mating flange



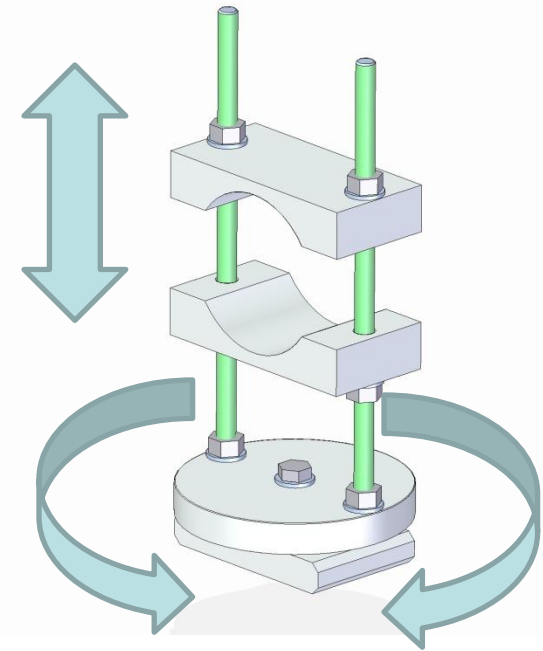
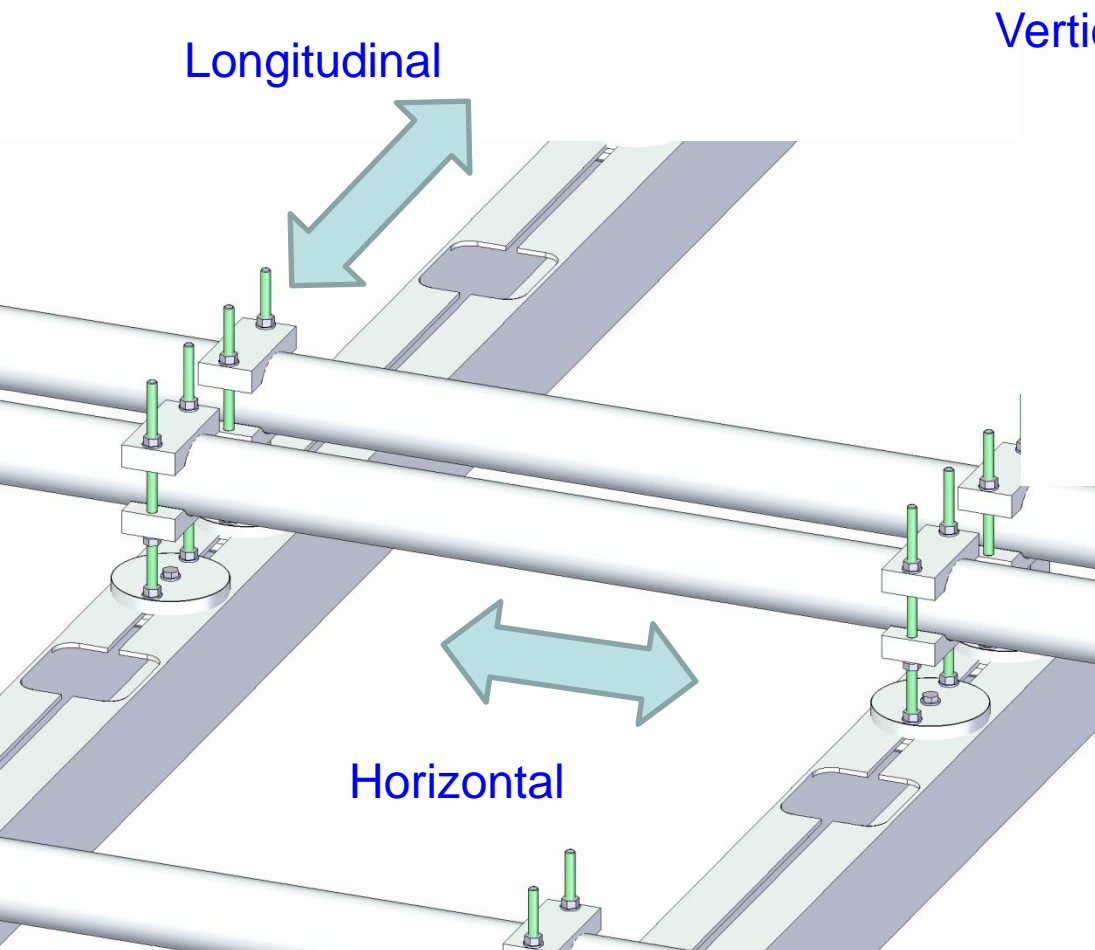
- Flexible coax system in each line.
- Have adjustment in clamp system.



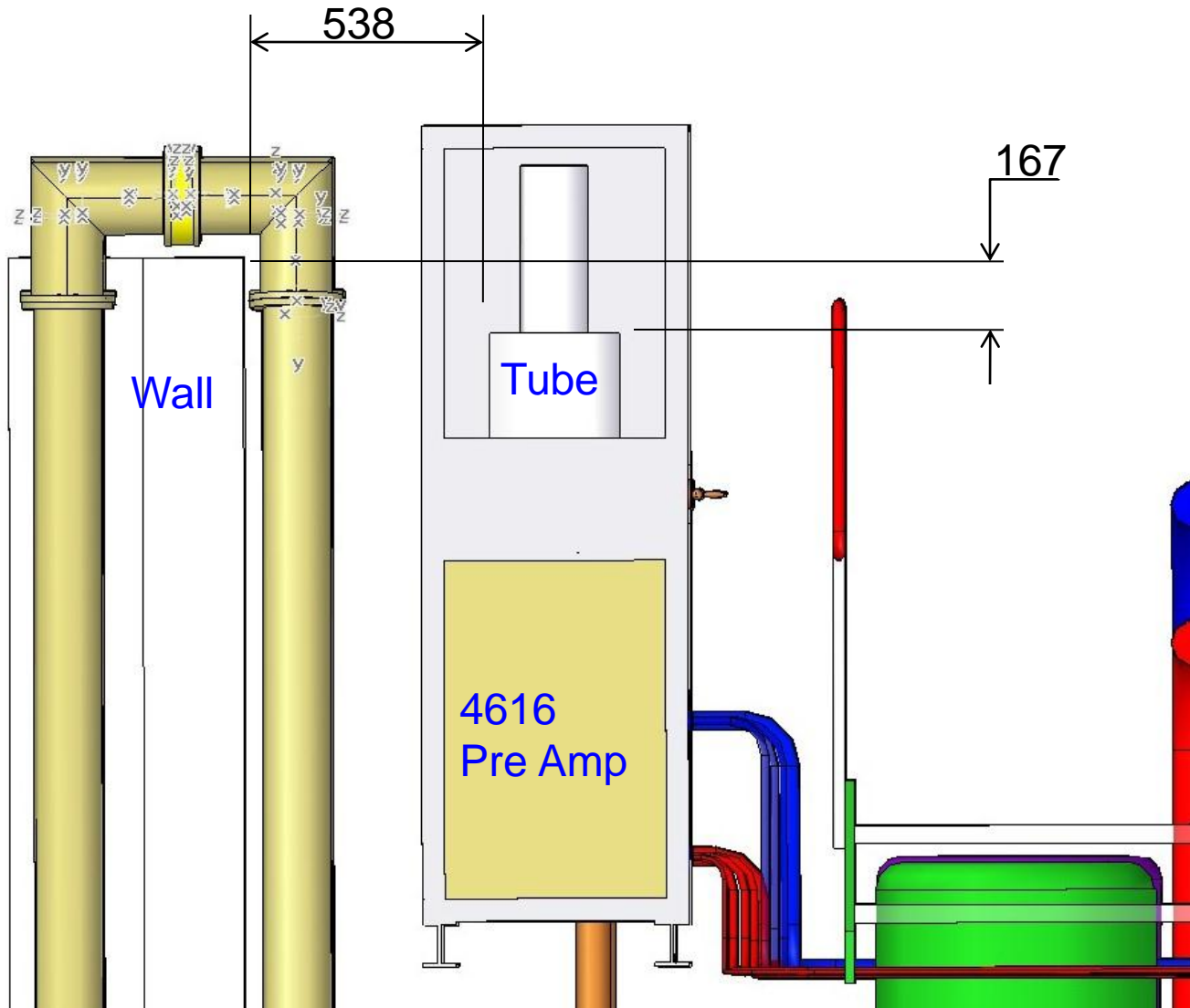
Phase shifters to be installed last in assembly sequence

Coax Supports

TEE SLOT RAILS



Pre Amp Tube Position Behind Shield Wall



Pre amp tube below level of shield wall ~ 0.16m and spaced ~ 0.53m back.

Initial magnet field analysis predict approx 8-10 gauss.

Next Steps – Design for Fixed Phase Angle of 124 degrees

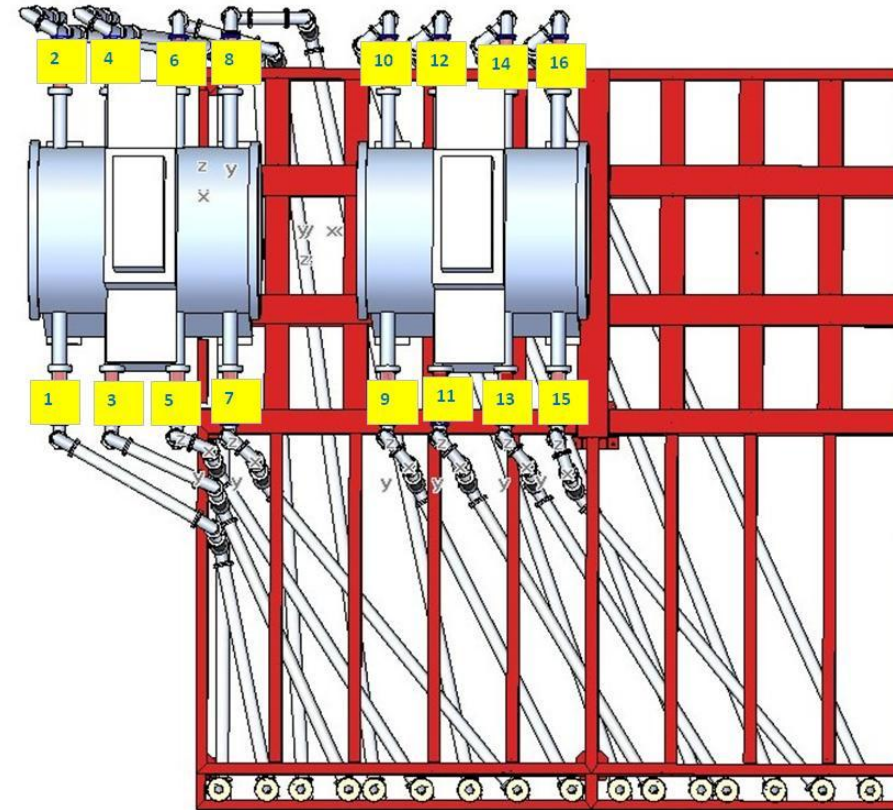


Coax Length to match Phase Requirement

Wavelength = speed of light/Frequency

Speed of light m/s 299792458
 Frequency Hz 201000000
 Wavelength m 1.491504766

Cavity	Coax No	Phase Angle deg	Phase Length Shift Difference w.r.t coax length 1 (mm)	Coax Length	Period Difference
1	1	0	0	8951.0	2.0
	2	0	0	11933.0	
2	3	124	513.74	8437.0	2.0
	4	124	513.74	11419.0	
3	5	0	0.00	8951.0	0.0
	6	0	0.00	8951.0	
4	7	124	513.74	8951.5	0.0
	8	124	513.74	8951.5	
5	9	0	0.00	8951.0	0.0
	10	0	0.00	8951.0	
6	11	124	513.74	8951.5	0.0
	12	124	513.74	8951.5	
7	13	0	0.00	8951.0	0.0
	14	0	0.00	8951.0	
8	15	124	513.74	8951.5	0.0
	16	124	513.74	8951.5	



RF Procurement

Don Summers has been supplied with RF component procurement list which he is working on. These include:-

- Line trimmers (mechanical adjustment)
- Dummy Loads
- Hybrid Splitters
- Reducers
- Directional Couplers
- Circulators
- Elbows

Summary

- *Addressed all of the issues raised by the review panel.*
- *Changed the design as per their recommendations.*
- *There are no clashes with the steel work on both the cooling channel false floor and the parked position false floor – lighting trunking clash on South mezzanine floor which is being resolved. Some concrete on south side needs to be removed.*
- *Installation made simpler with introduction of flexible coax and relocation of hybrid splitters.*
- *No clash issues with moving AFC's to parked position on false floor.*
- *Magnetic field calcs indicate no issues for 4616 pre amp.*
- *Fire officer has been consulted and agreed that what is proposed causes no access problems or issues.*