AGATA at GSI Mechanics 23/11/2010

John Strachan

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Structure

- Beam Geometry
- AGATA - doubles
- Target – Types
- AGATA – main structure
- HECTOR Detectors
- Overall layout at GSI/cabling
- Timescales

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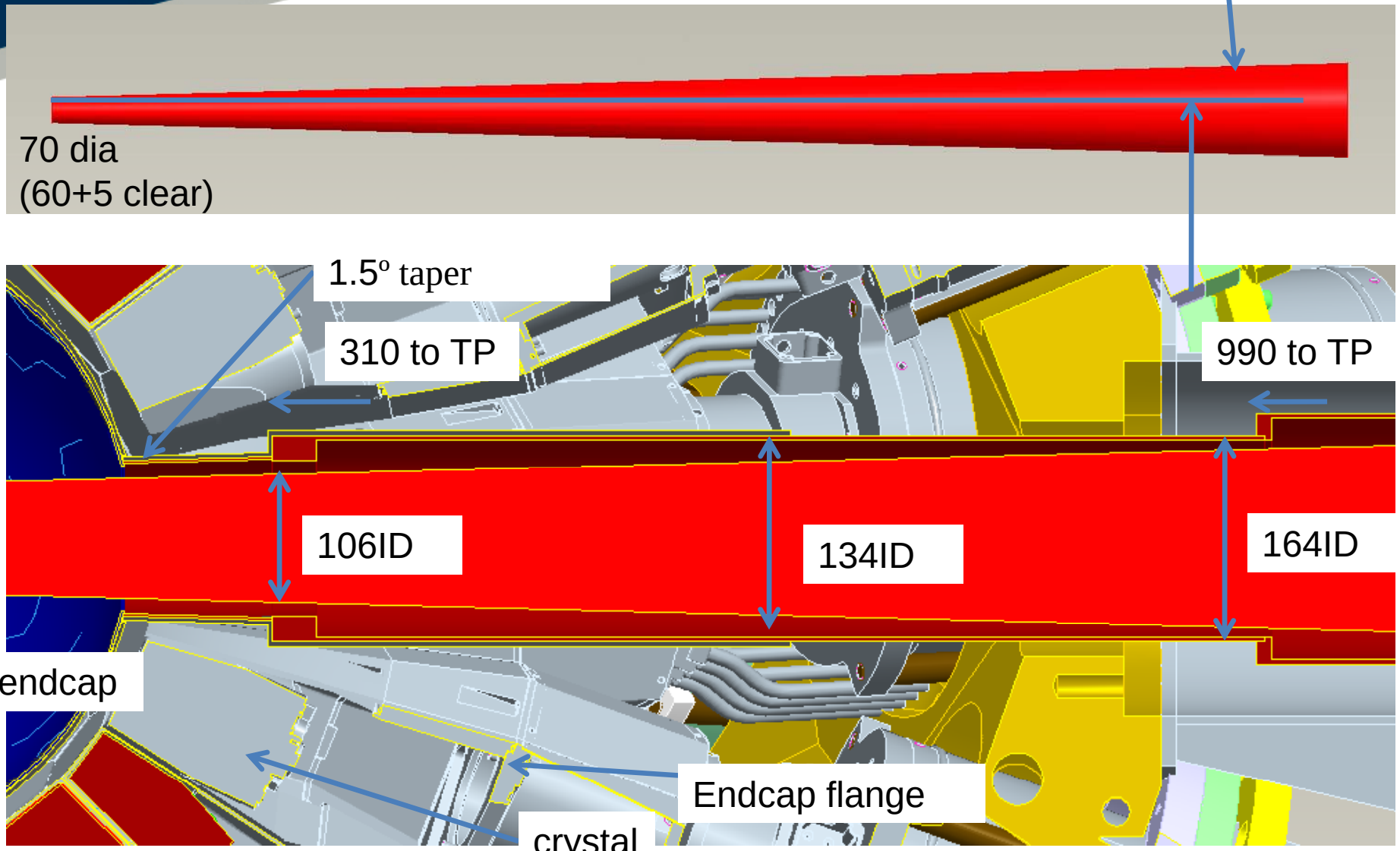
Beam Geometry



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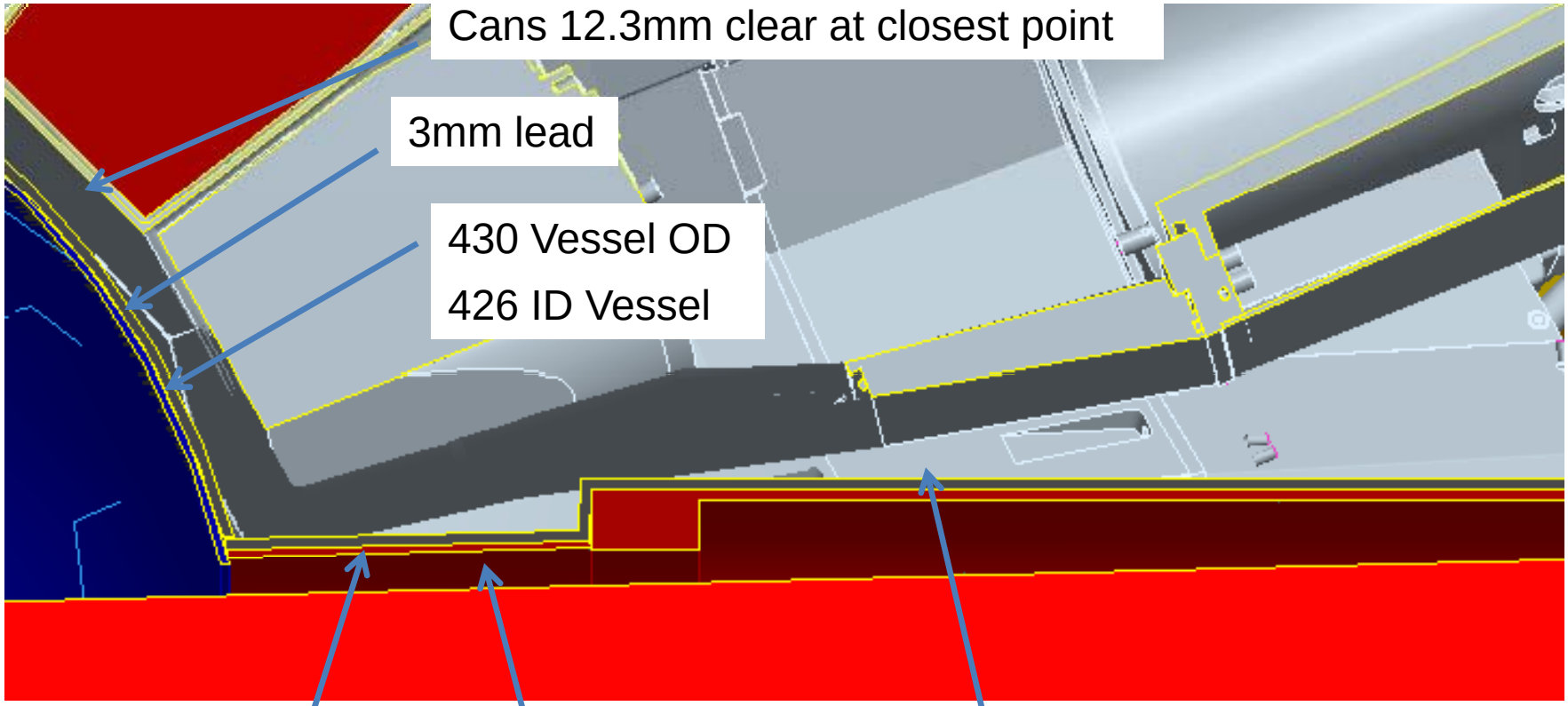
Beam Geometry



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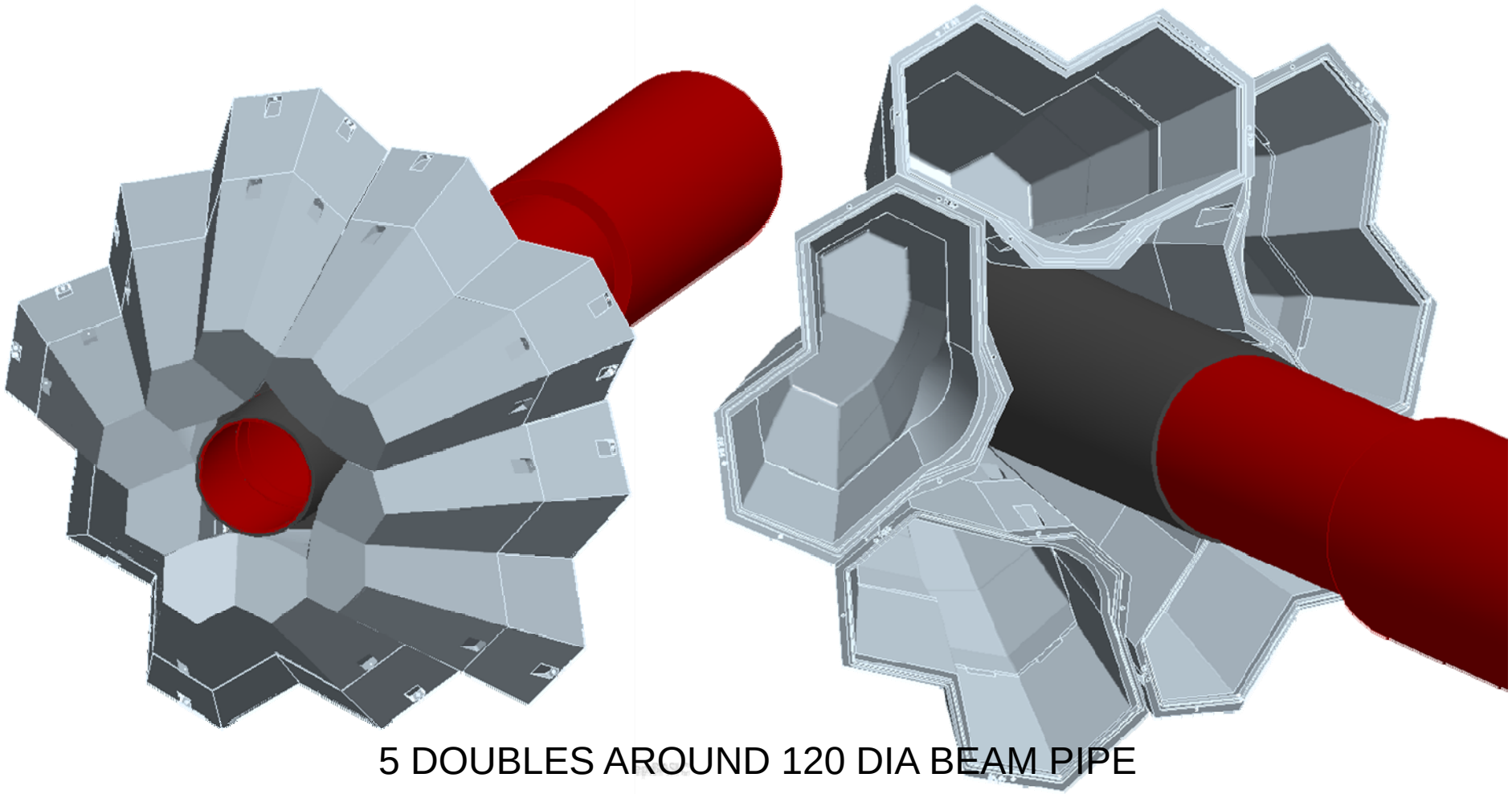
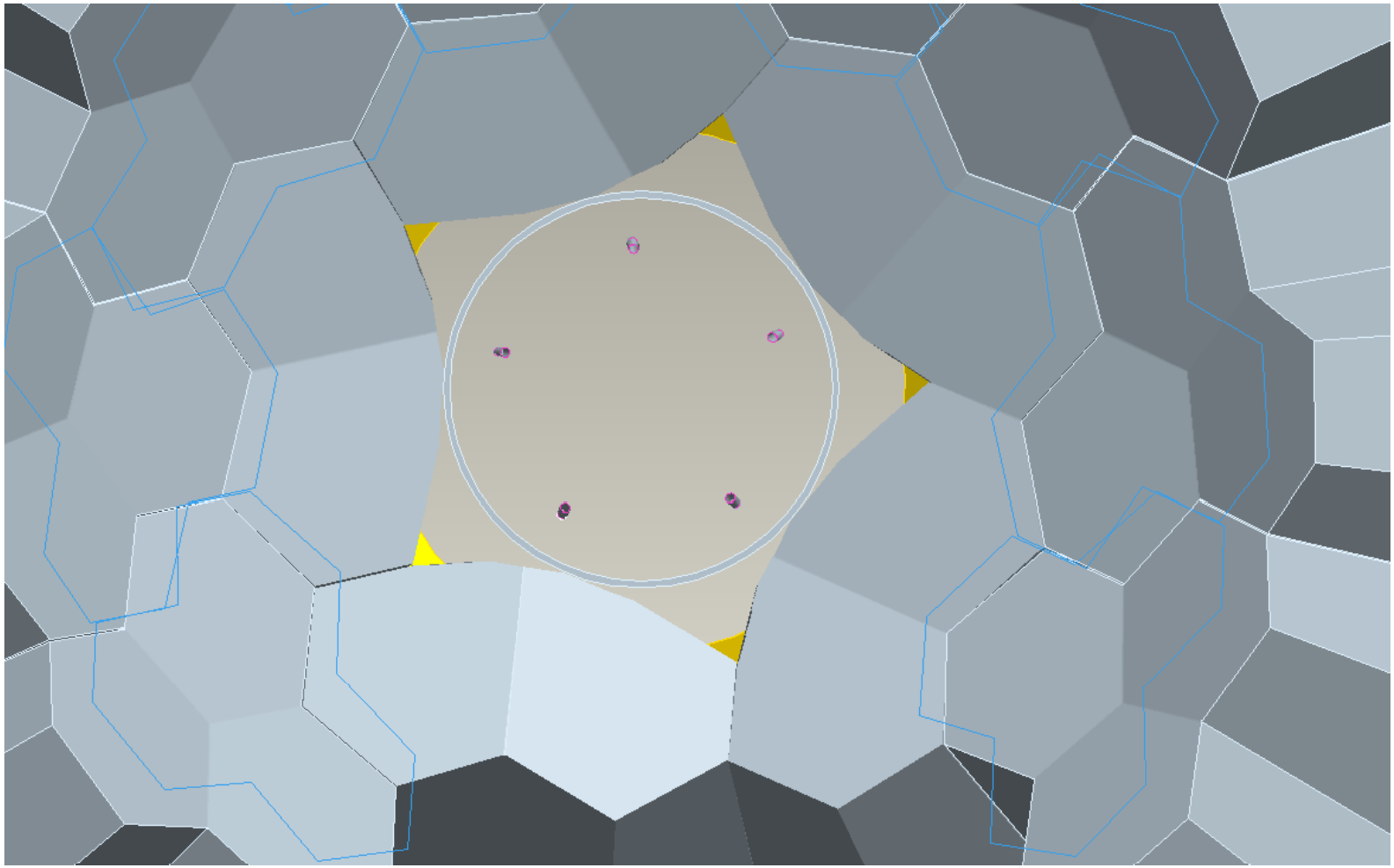
Agata Doubles

AGATA DOUBLE CRYOSTAT



5 DOUBLES AROUND 120 DIA BEAM PIPE



5 DOUBLES AROUND 120 OD BEAM PIPE
BEAMPIPE IS 0.36 mm CLEAR

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Target Types

Currently 3 target types are proposed.

Type 1. Liquid Hydrogen Target
From CEA Saclay, Alexandre Obertelli

Type 2. Plunger Target
From Cologne University, Christoph Fransen

Type 3. ‘Standard’ Target
To have a target ladder, and motion of +/-100mm in beam direction
As yet unspecified

A standard target chamber is envisioned that will suit each of these designs, and is part of the Type 3 project.

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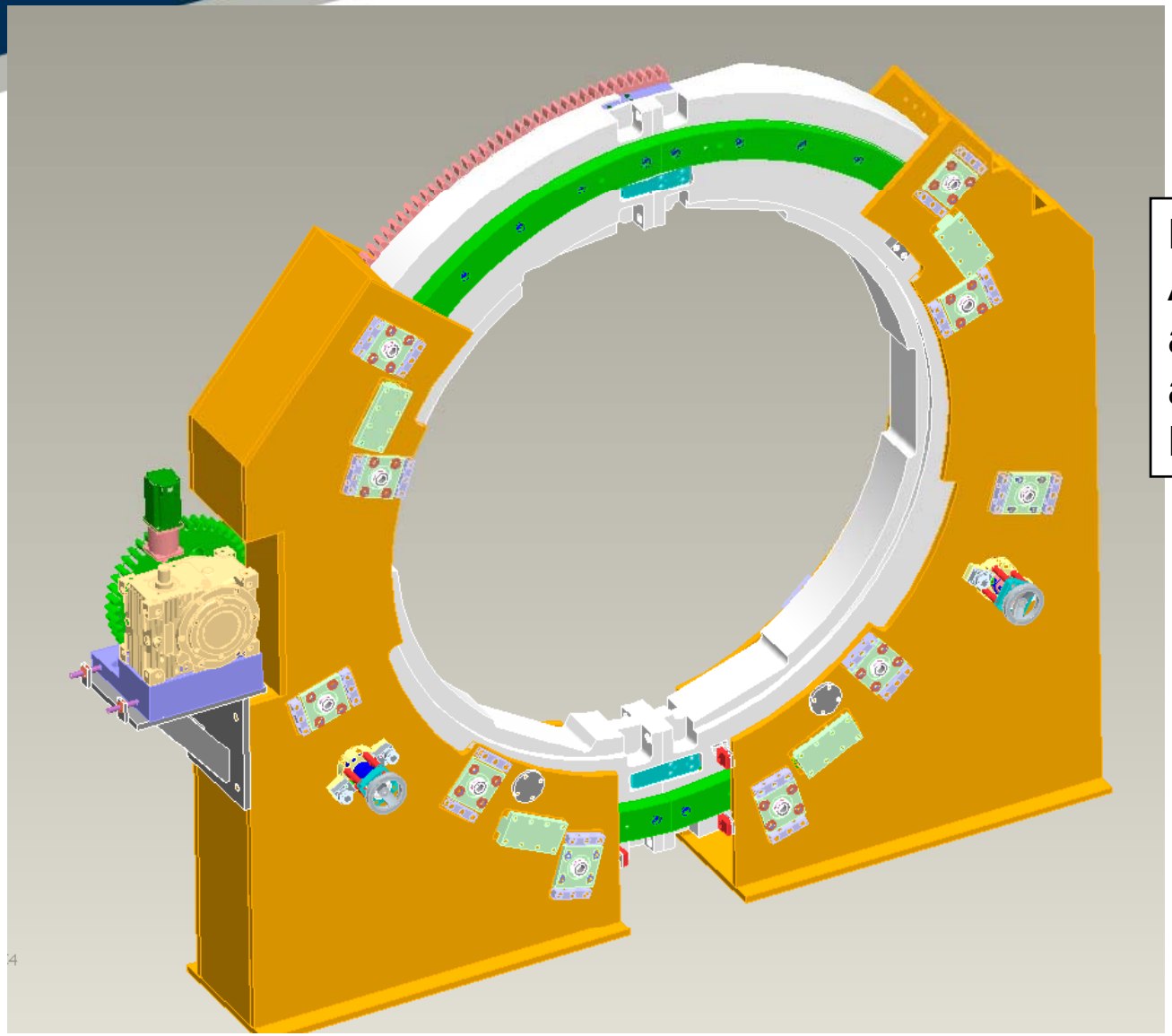
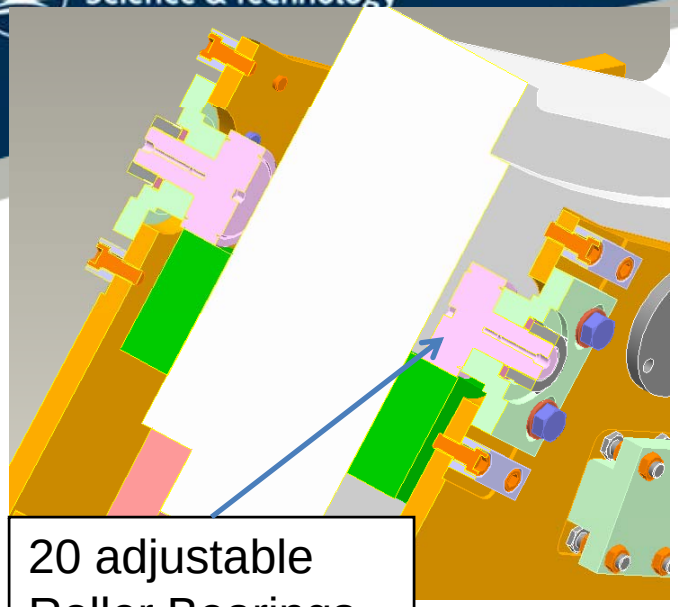
Main Frame



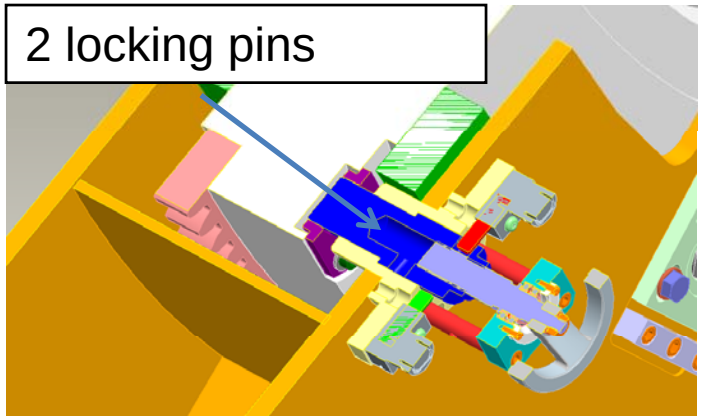
Main Frame
Aim is to build and test this arrangement at Daresbury.

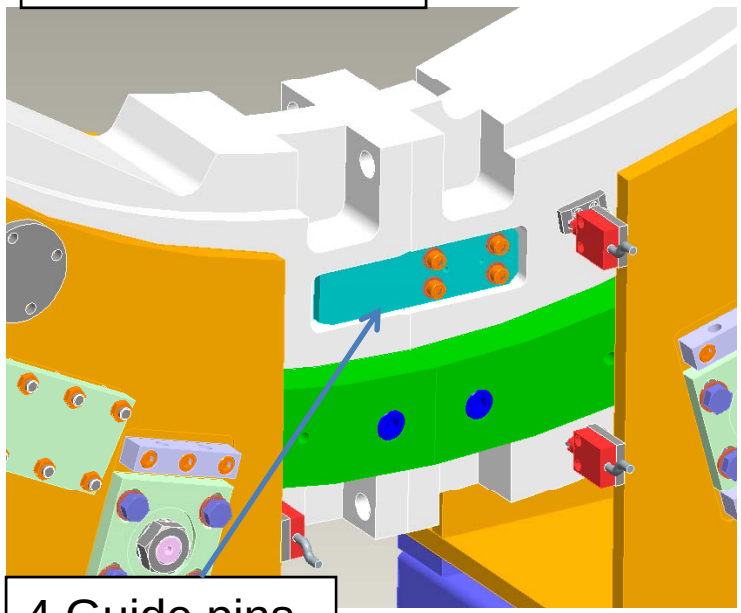
Main Frame Features.



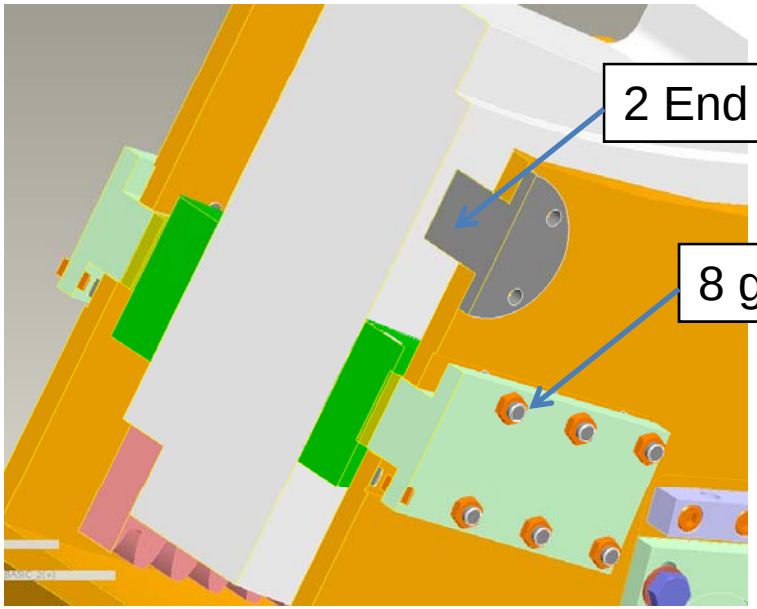
20 adjustable Roller Bearings

2 locking pins





4 Guide pins



2 End stops

8 guides

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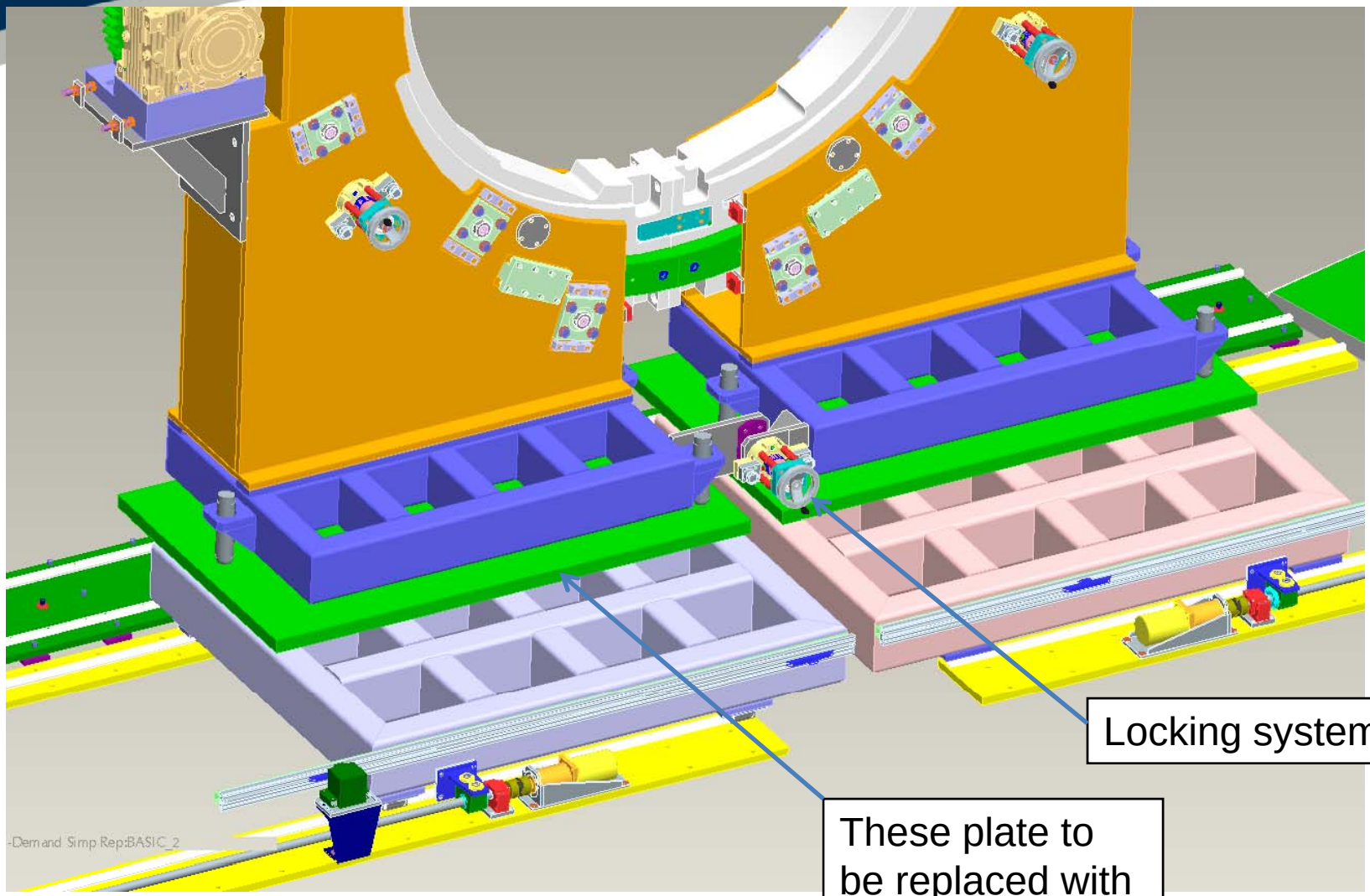
Lower Frame



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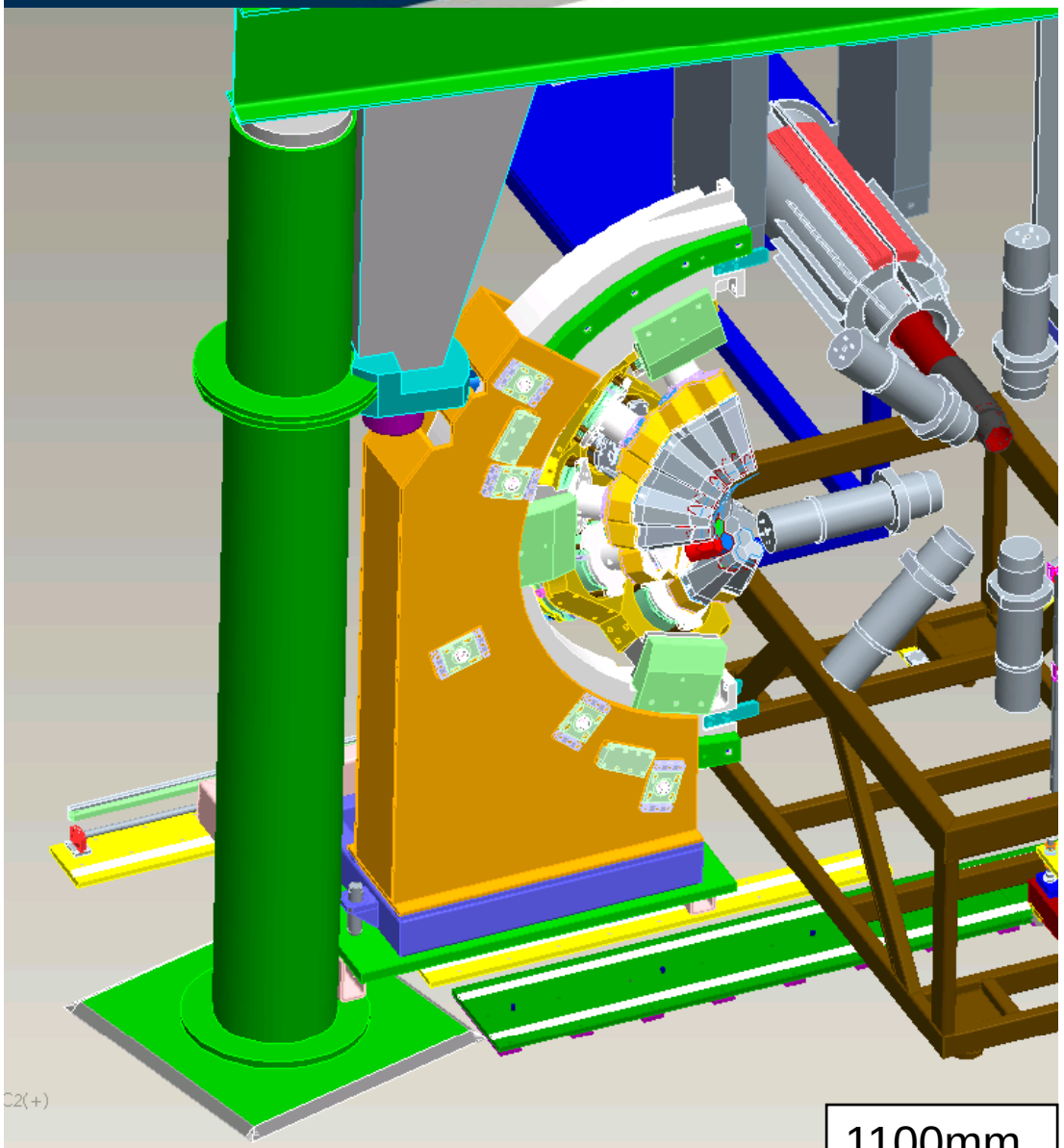
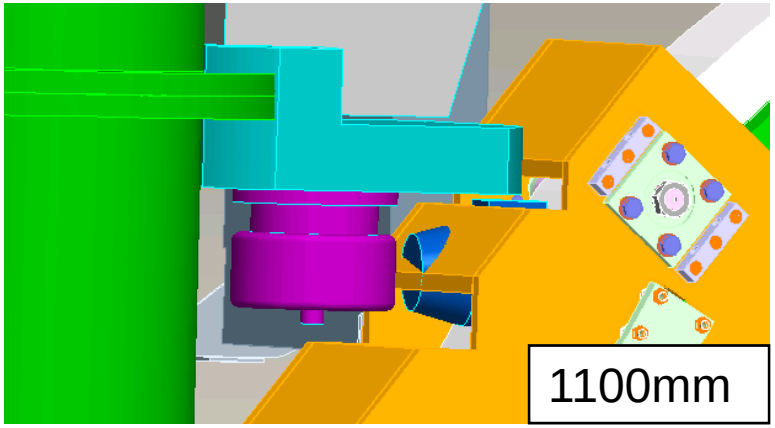
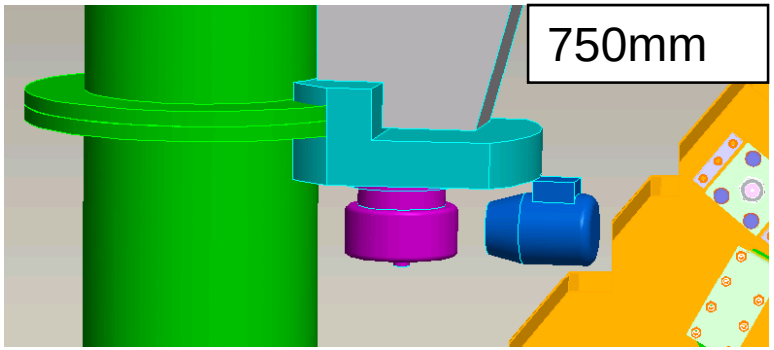


1100mm



1100mm



750mm

Ancillary detectors

Currently 2 ancillary detectors are proposed.

Type 1. Hector
From INFN Milano, Benedicte Million

Type 2. LYCCA
From GSI Plamen Boutakhov
Also Mike Bentley, and Peter Reiter

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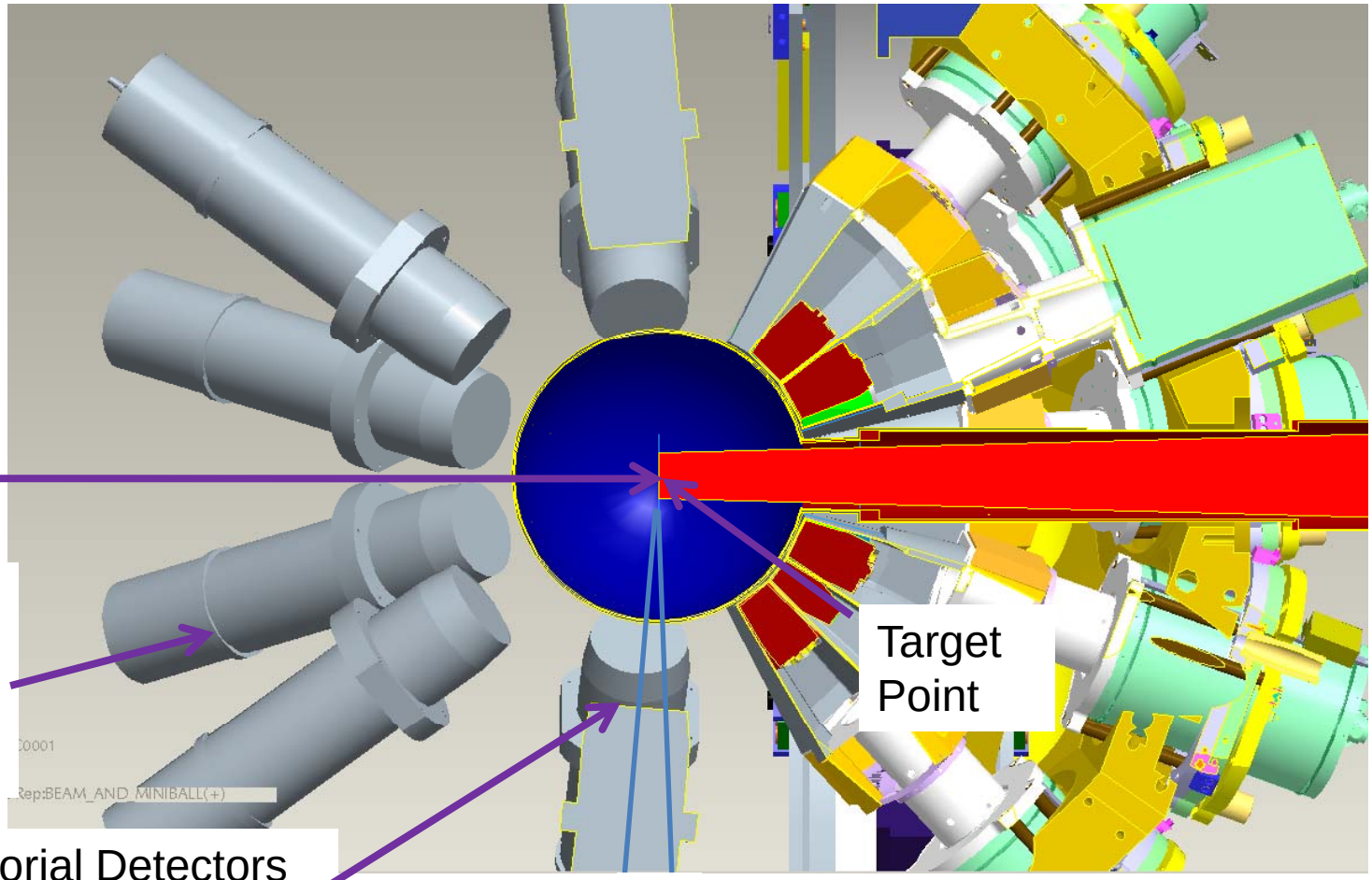
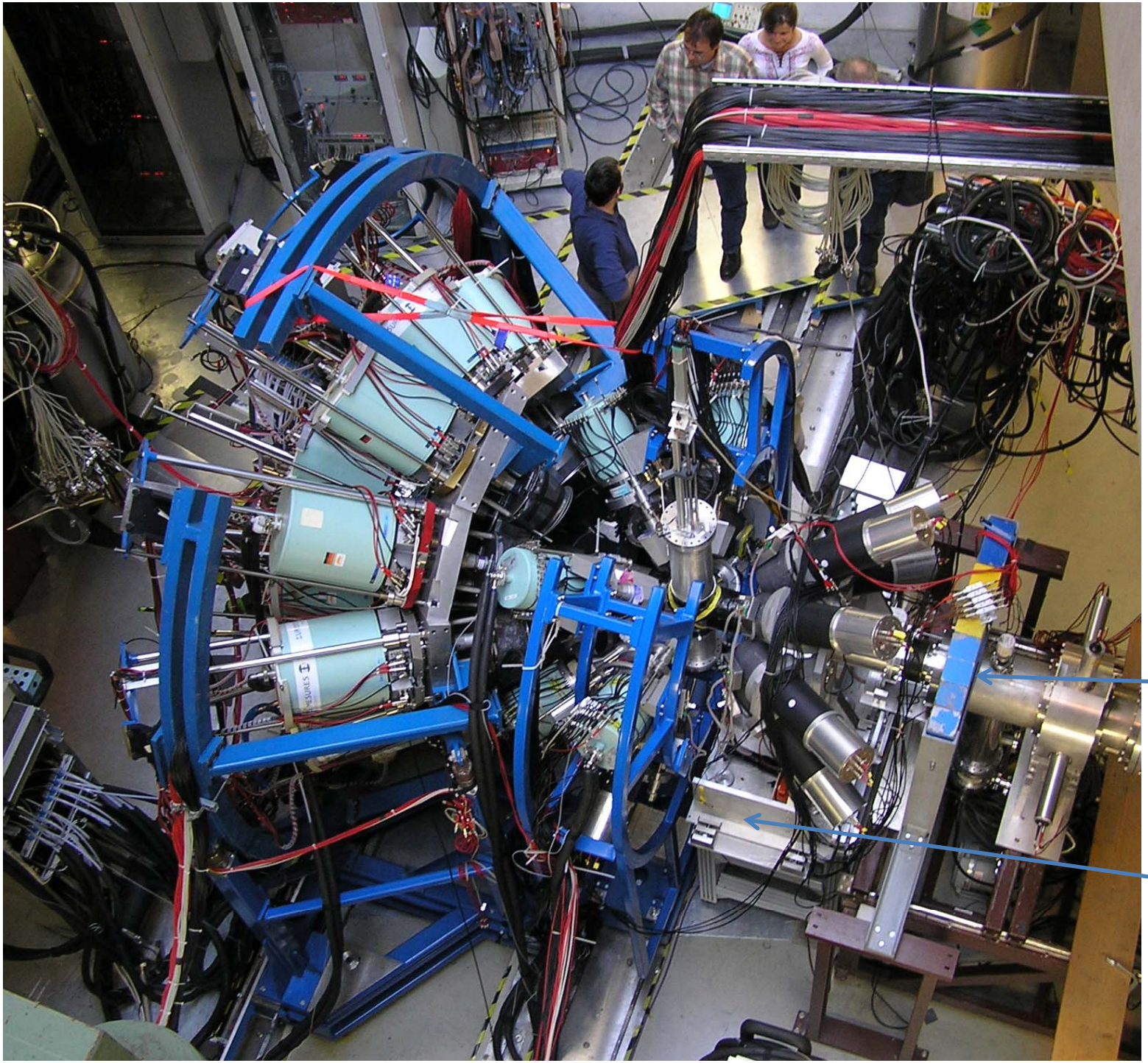
Hector




Lead Wall
HECTOR frame

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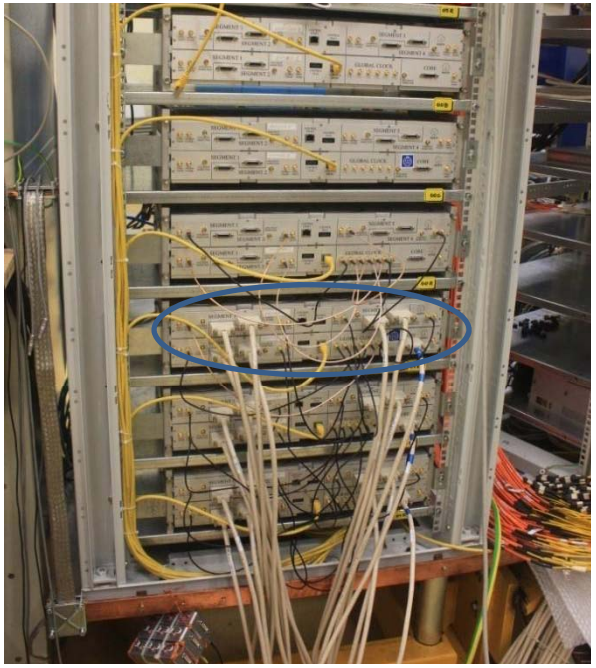
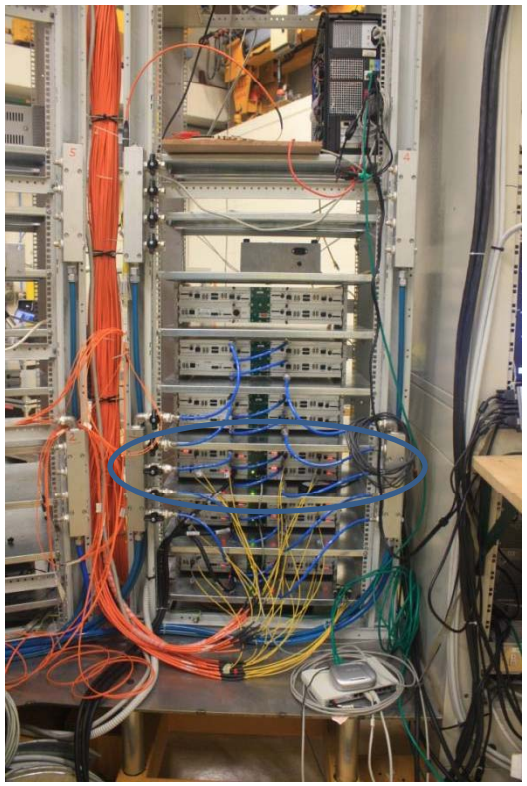
Cabling - Digitisers

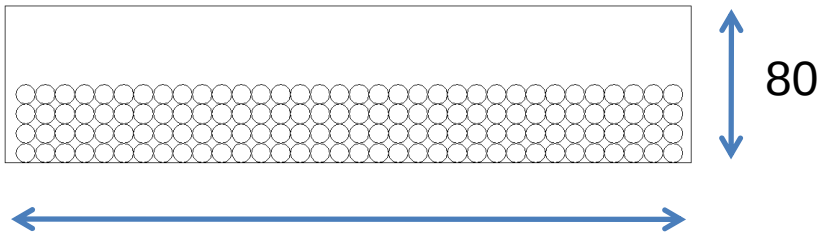




1 digitiser unit per crystal.
40 crystals required. For a 1pi sphere.
Digitisers installed at 160mm pitch.

Say 20 crystals per side.
Two racks are required

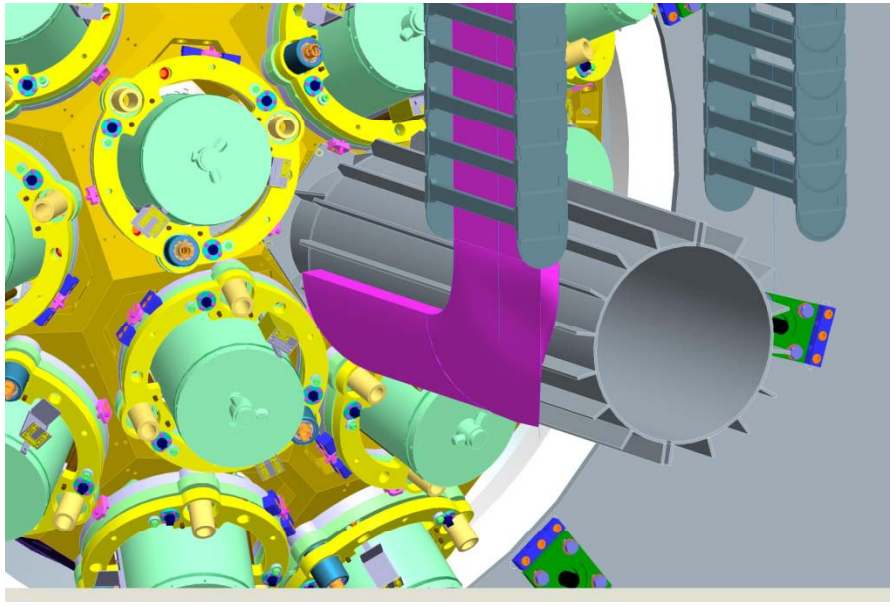
Cable routing

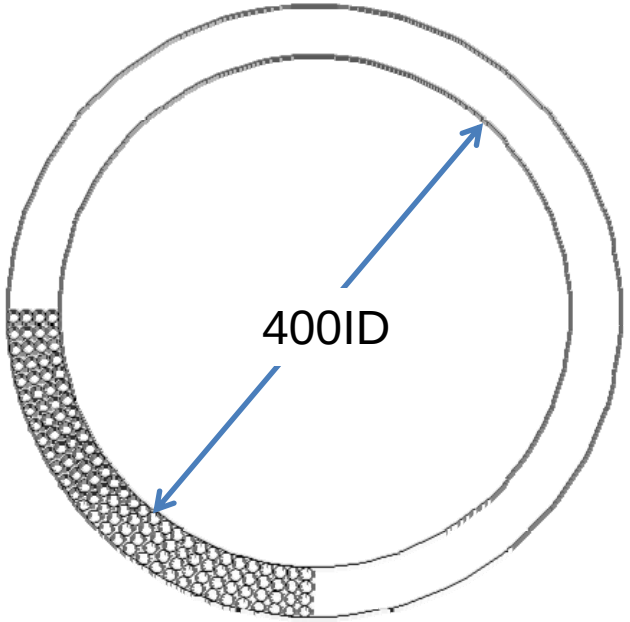


Allow for 40 crystals
7 cables per crystal
This is 280 cables
approx 140 cables per side.

MDR Cables are 13mm diameter

IGUS Series E4.80 can be used





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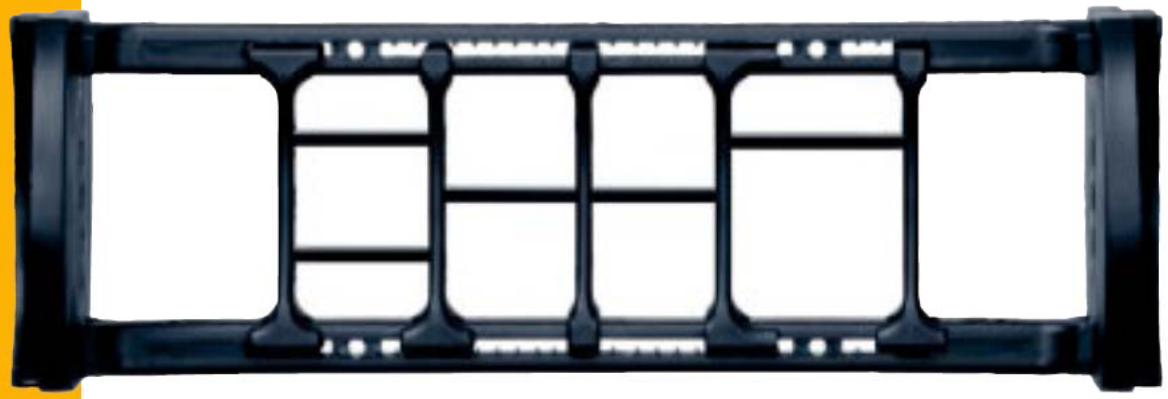
Cable routing

igus® E4.1 | The new interior separation kit



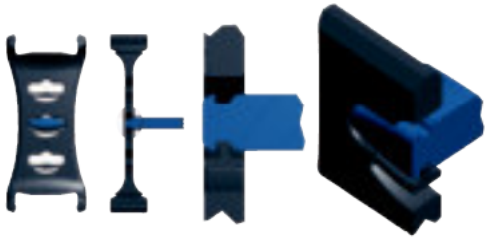
Realize a better separation, with fewer, standardized parts

Optimized and extended interior separation range for E4.1. The very cable friendly design increases your cables cycle life even further.

- Same separation for E-Chains® and E-Tubes
- Safe force closure connection
- Cable friendly plastic crossbars, optimized for low cable wear and long cycle life
- Fast assembly

For horizontal separation: full-width shelf

- Shelf locks safely into separators on both ends by special locking clip
- Separators can be moved freely over the shelf in horizontal direction
- No side plates necessary
- Multilayer separation continous or in single divisions with only one part possible



Need cable tray 350 x 160.

1 option is to start with 350 x 80, then add a second 350 x 80 when required.

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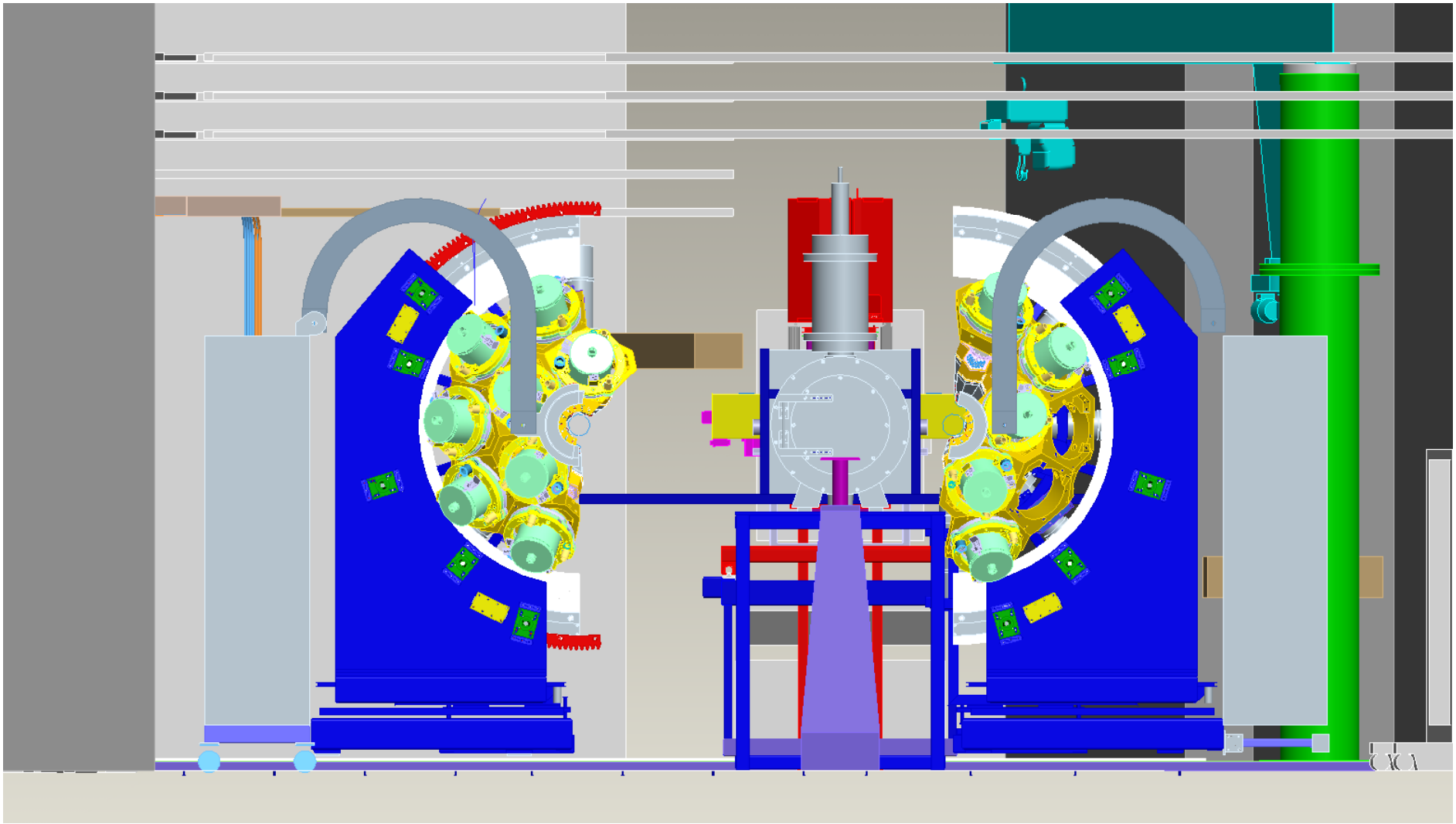
Elevation ball open



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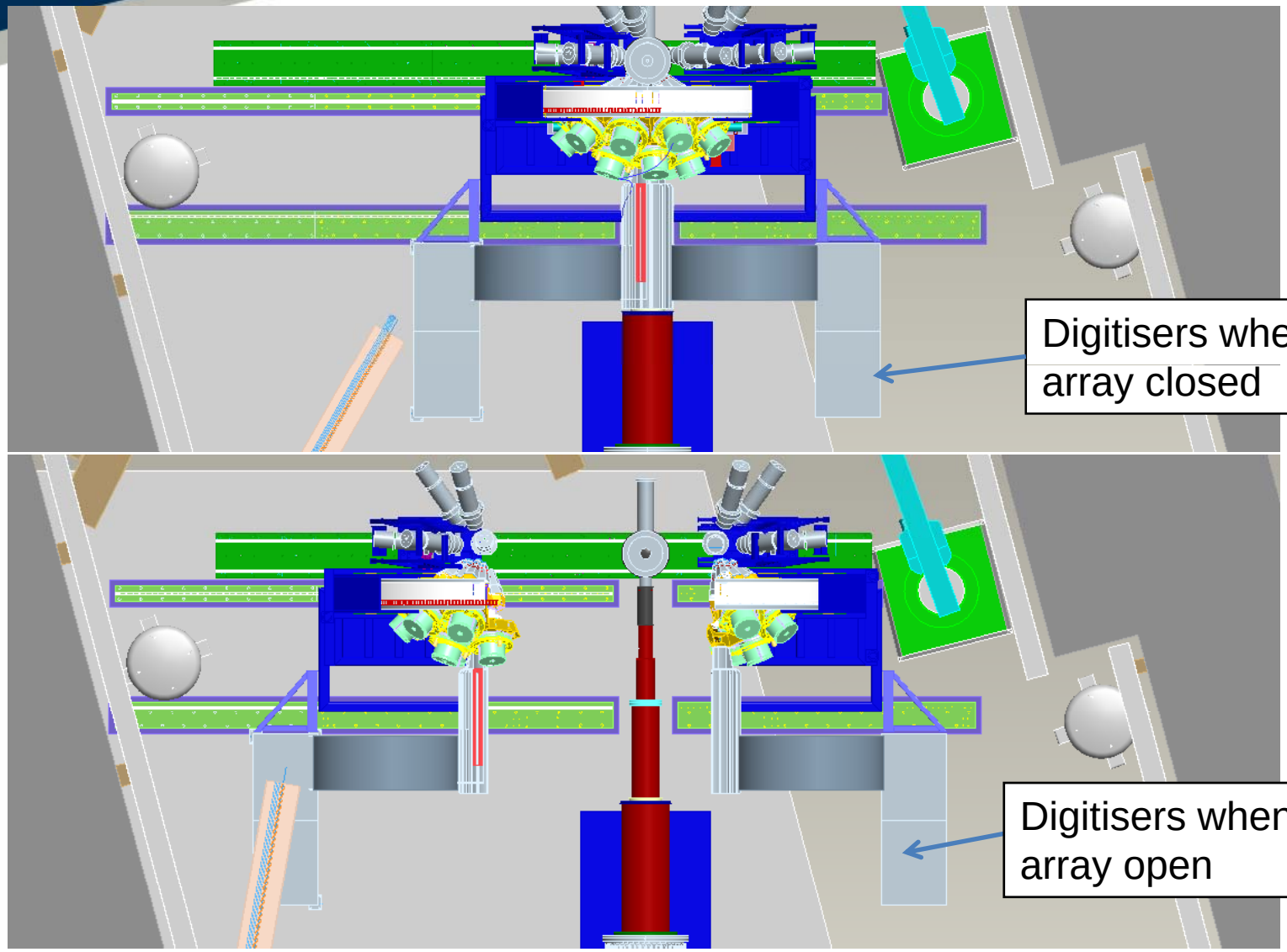
Digitiser Location



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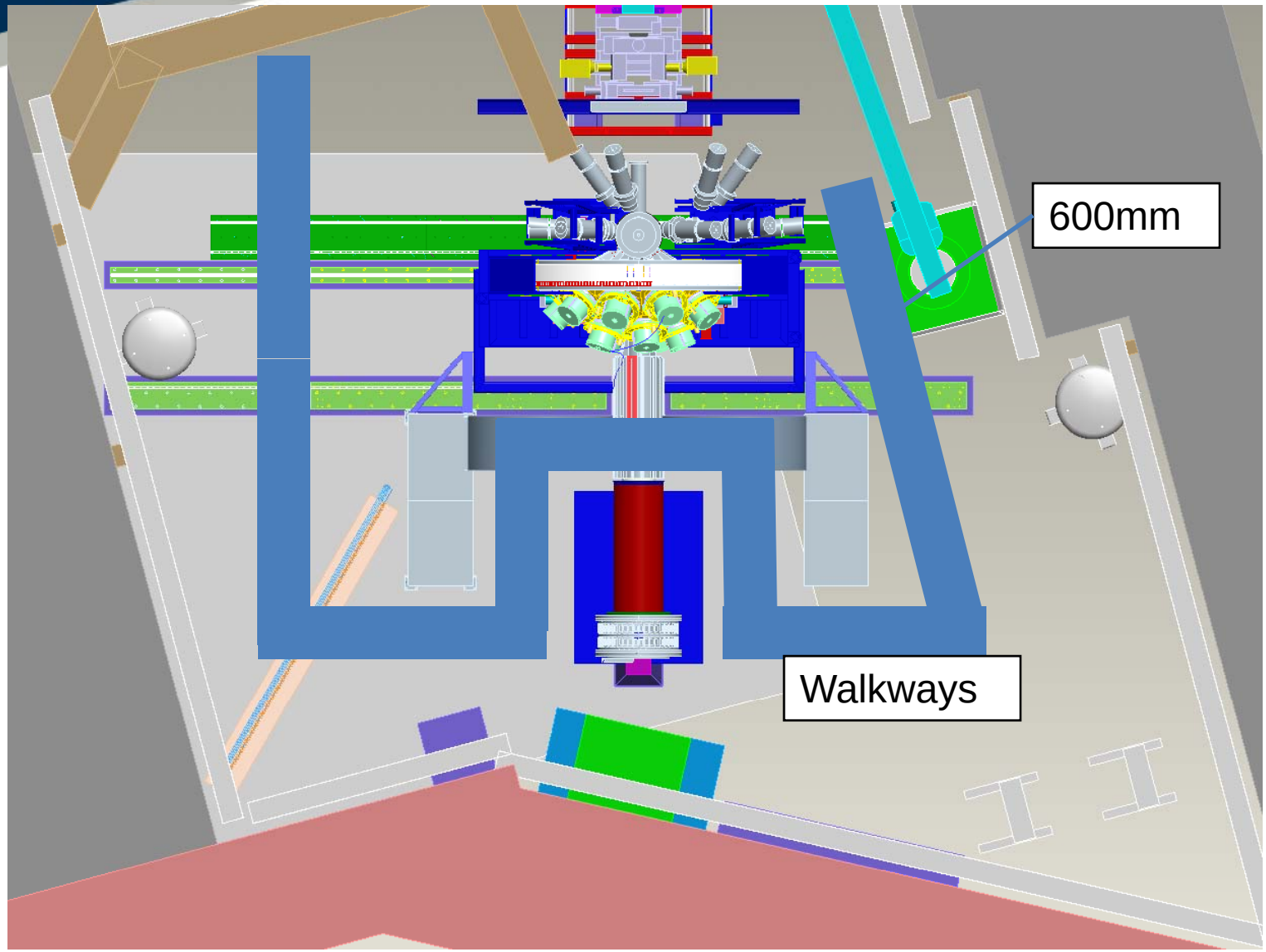
Access Routes ball closed



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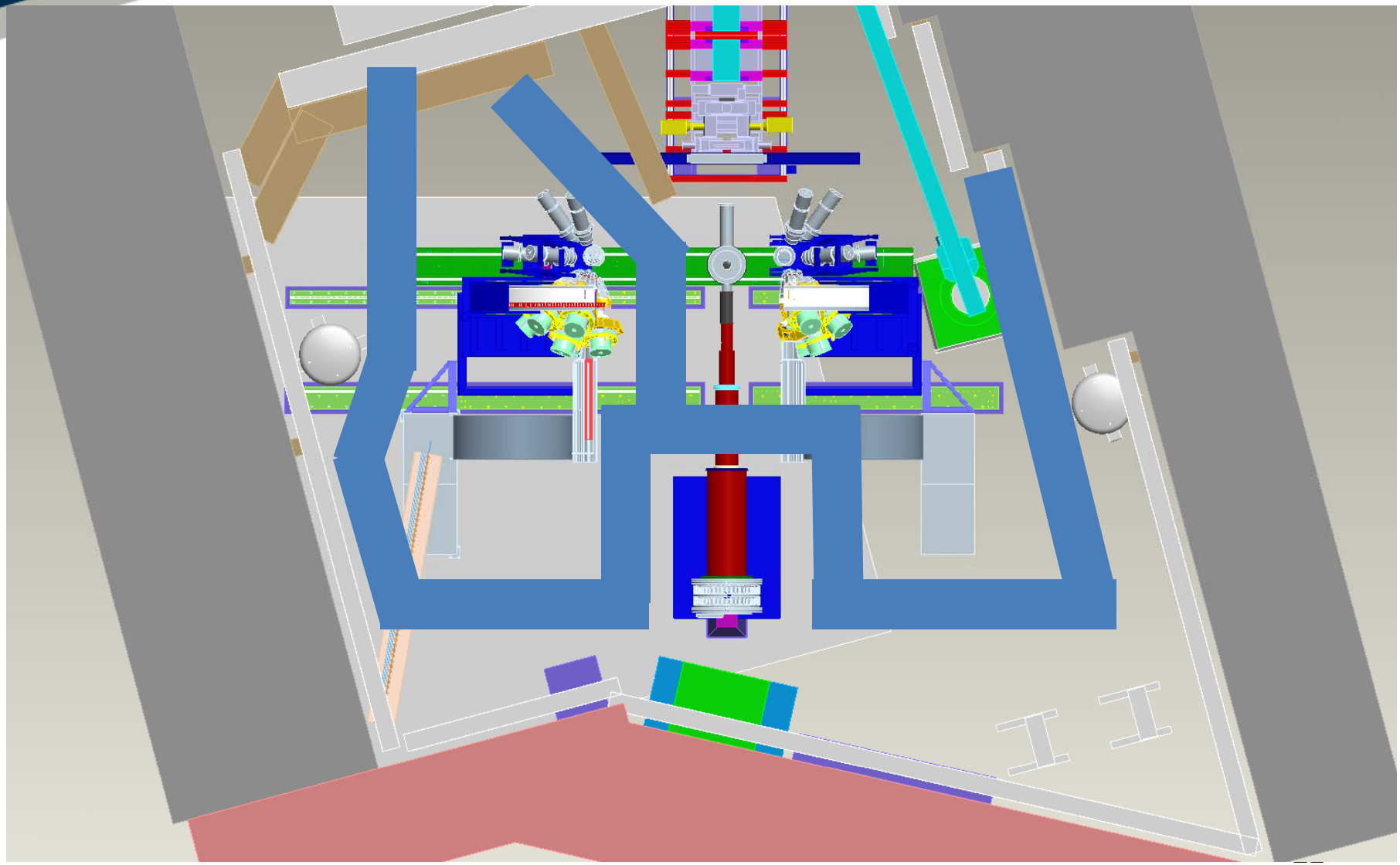
Access Routes ball open



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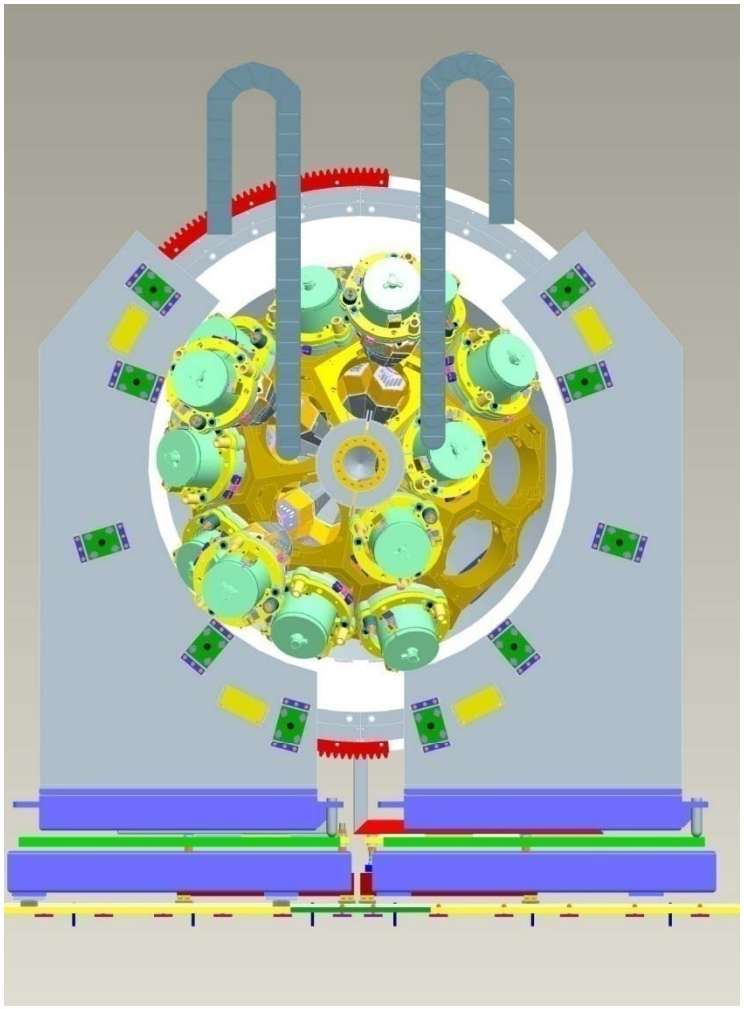
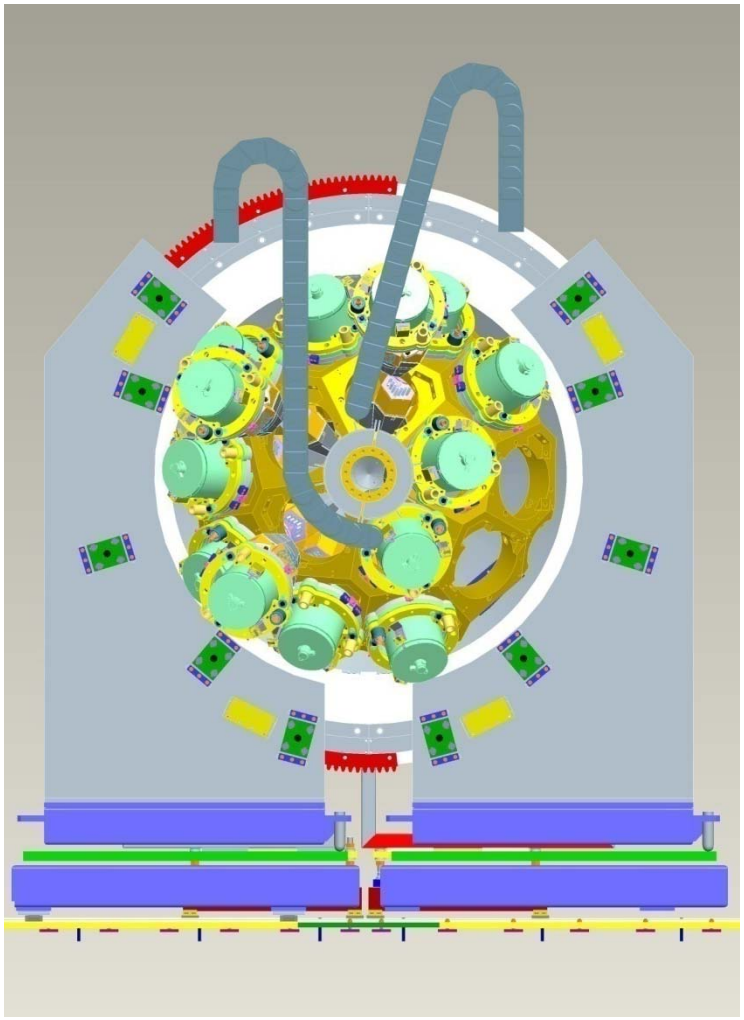
Cable coiler operation





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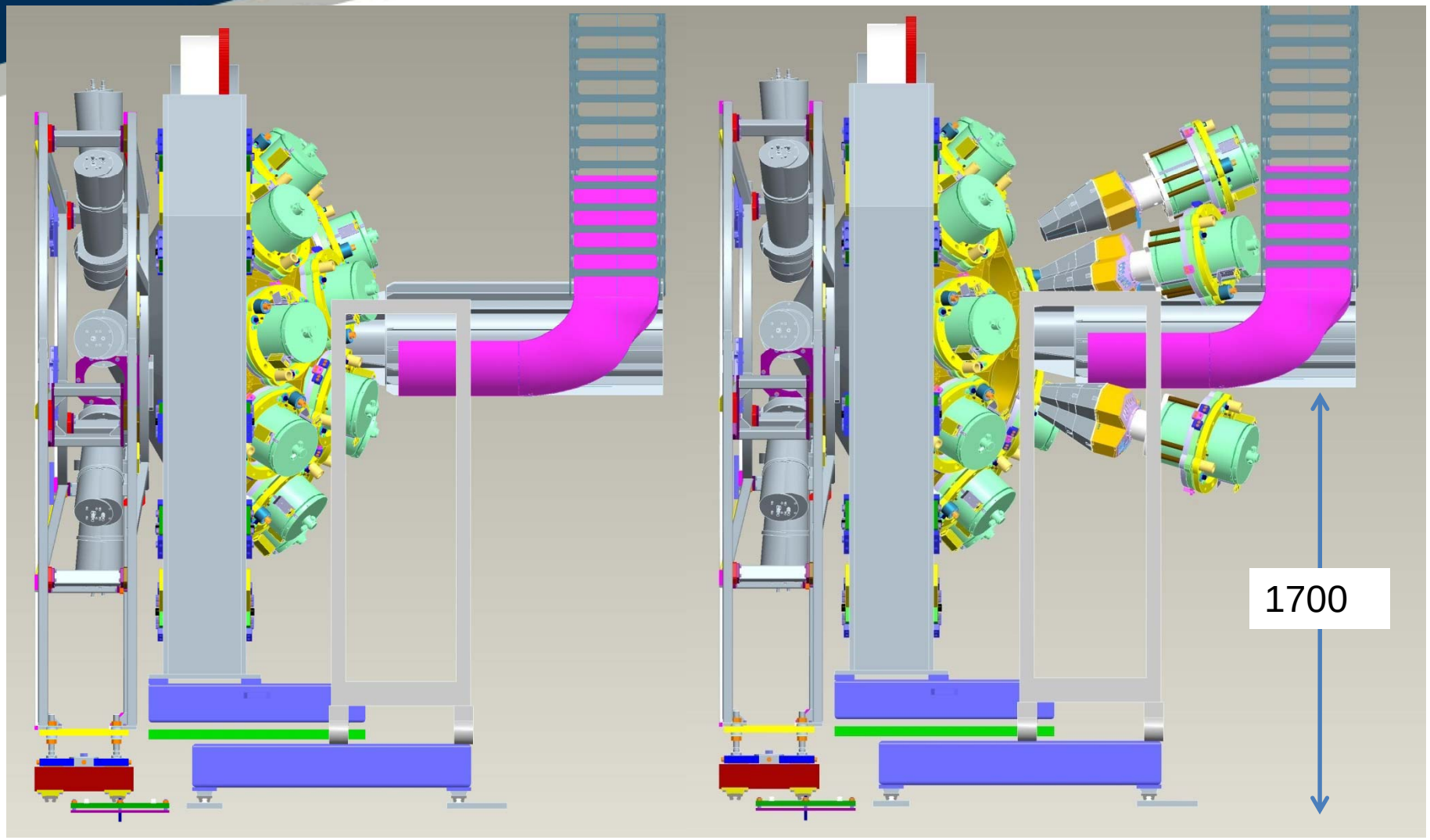

Detectors retracted 850mm

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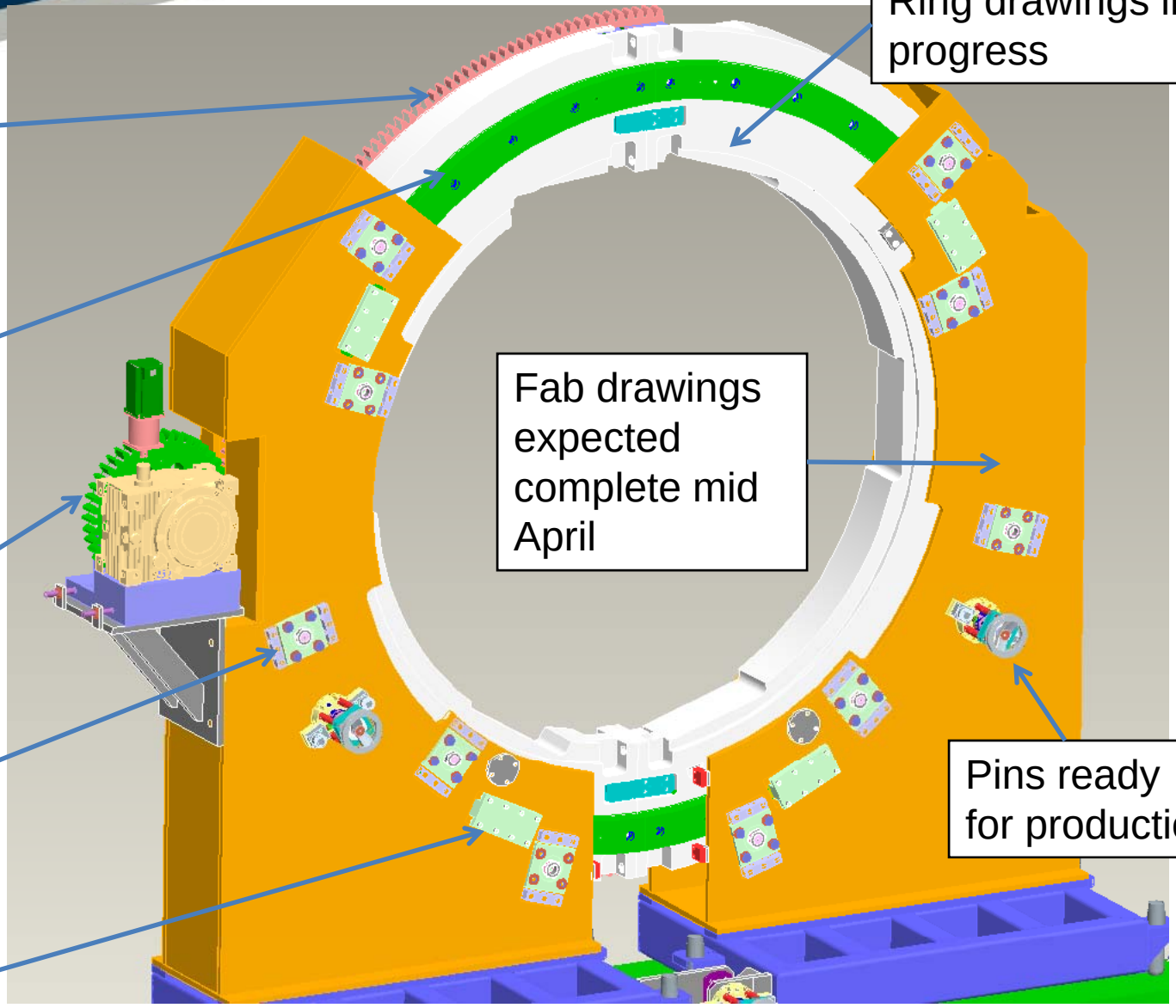
Material for Main Gear recieved

Rails in production at Liverpool

Gearbox arrangement on order

Cams in production at Liverpool

Brass pads in production at Liverpool



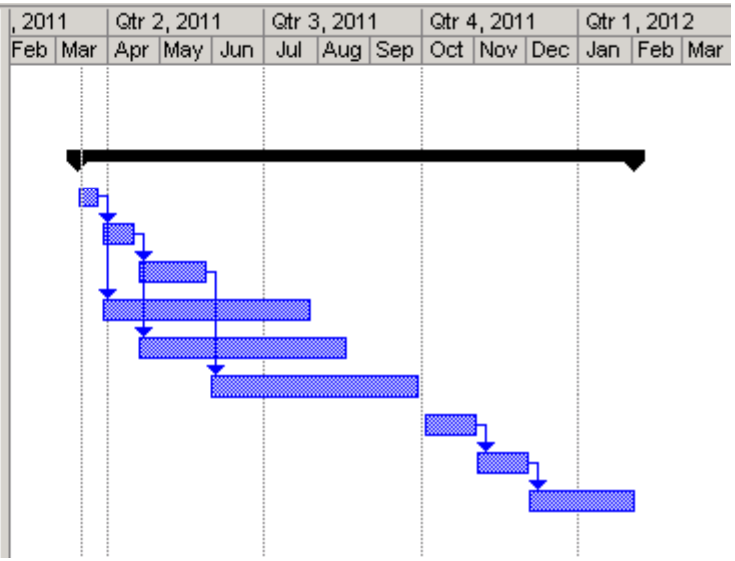
Ring drawings in progress

Fab drawings expected complete mid April

Pins ready for production

Timescales

Task Name	Duration	Start	Finish
AGATA/PreSpec at GSI	**233 days**	**Mon 14/03/11**	**Wed 01/02/12**
Detail of main aluminium ring	2 wks	Mon 14/03/11	Fri 25/03/11
Detail of main steel frame	3 wks	Mon 28/03/11	Fri 15/04/11
Detail lower steel frames	6 wks	Mon 18/04/11	Fri 27/05/11
manufacture of aluminium ring	4 mons	Mon 28/03/11	Wed 27/07/11
manufacture of main steel frame	4 mons	Mon 18/04/11	Wed 17/08/11
manufacture of lower steel frames	4 mons	Mon 30/05/11	Wed 28/09/11
Test assembly of rotating section only.	1 mon	Mon 03/10/11	Tue 01/11/11
Shipping of parts of GSI	1 mon	Wed 02/11/11	Thu 01/12/11
Installation of AGATA plus LYCCA for fast beam PreSpec	2 mons	Fri 02/12/11	Wed 01/02/12



Hector Timescales
Cable routing timescales

End of Update

Extra Slides if wish to develop any other areas.

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Structure

- Beam Geometry
- Target – Types
- Ancillay Detectors
- AGATA – structure
- Overall layout at GSI
- Cabling

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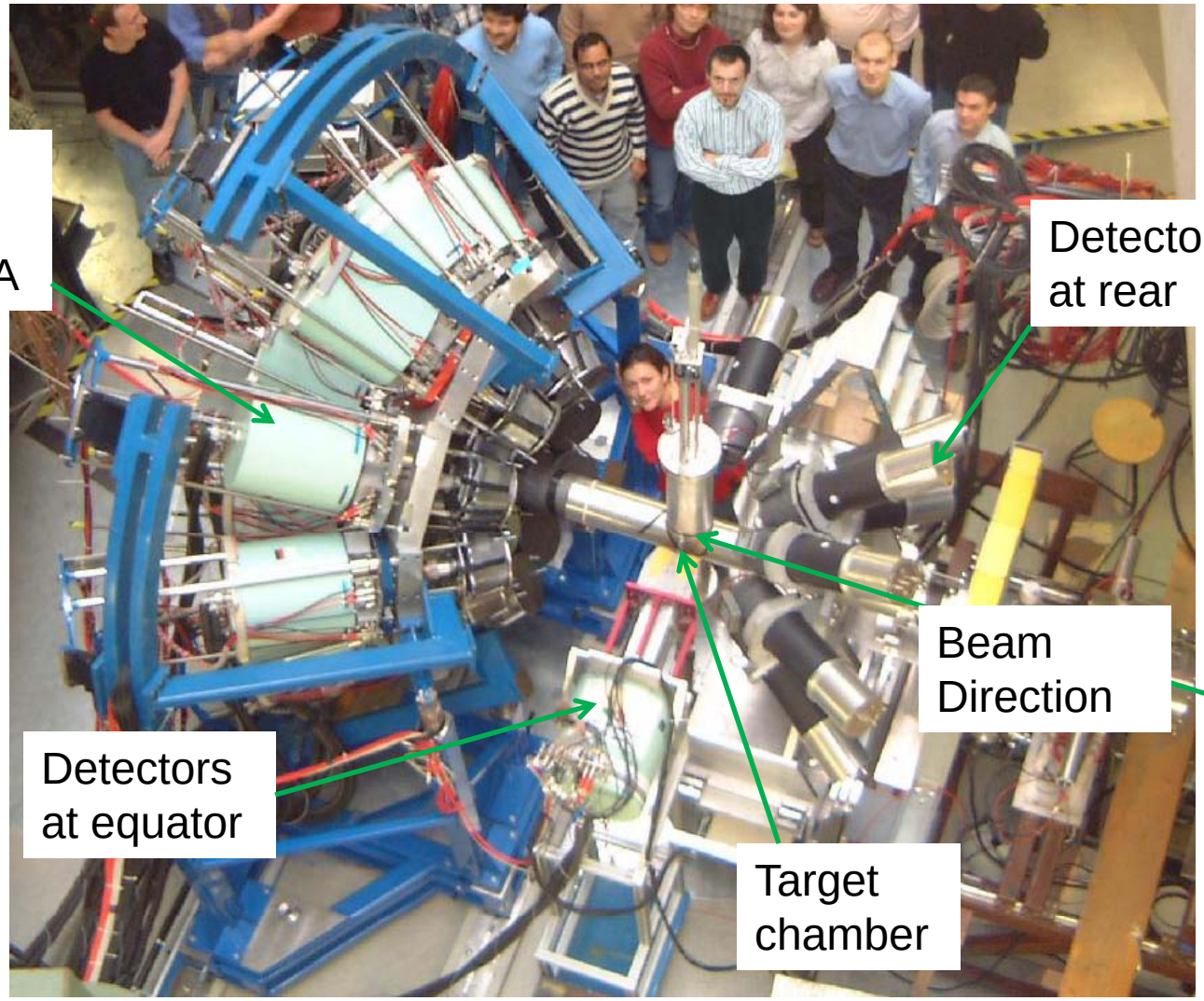
Location



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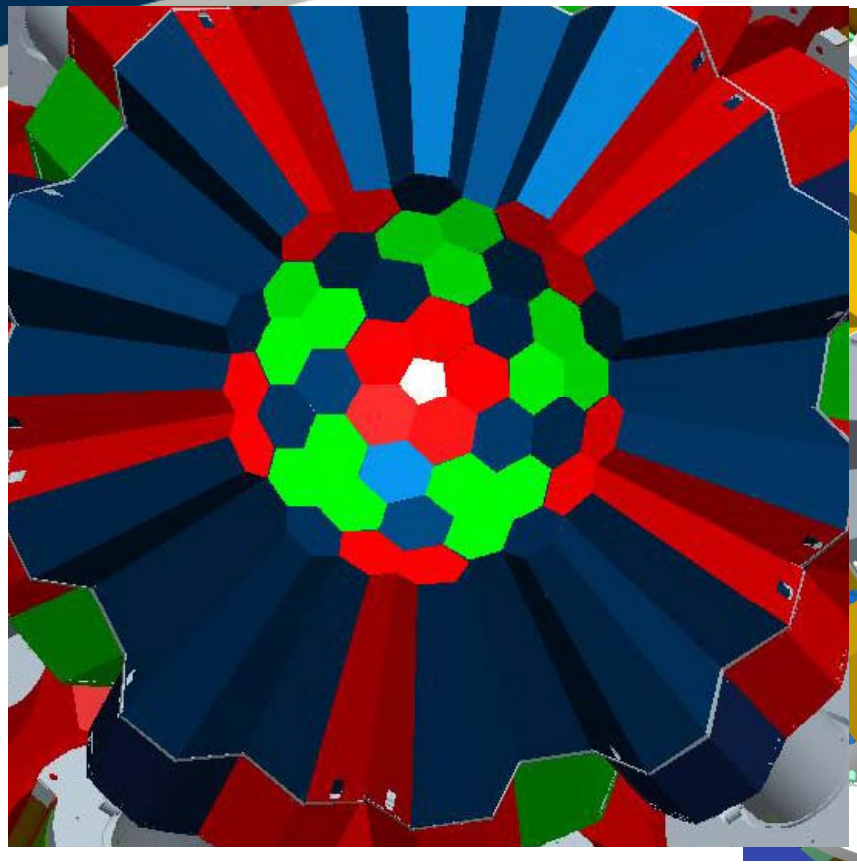
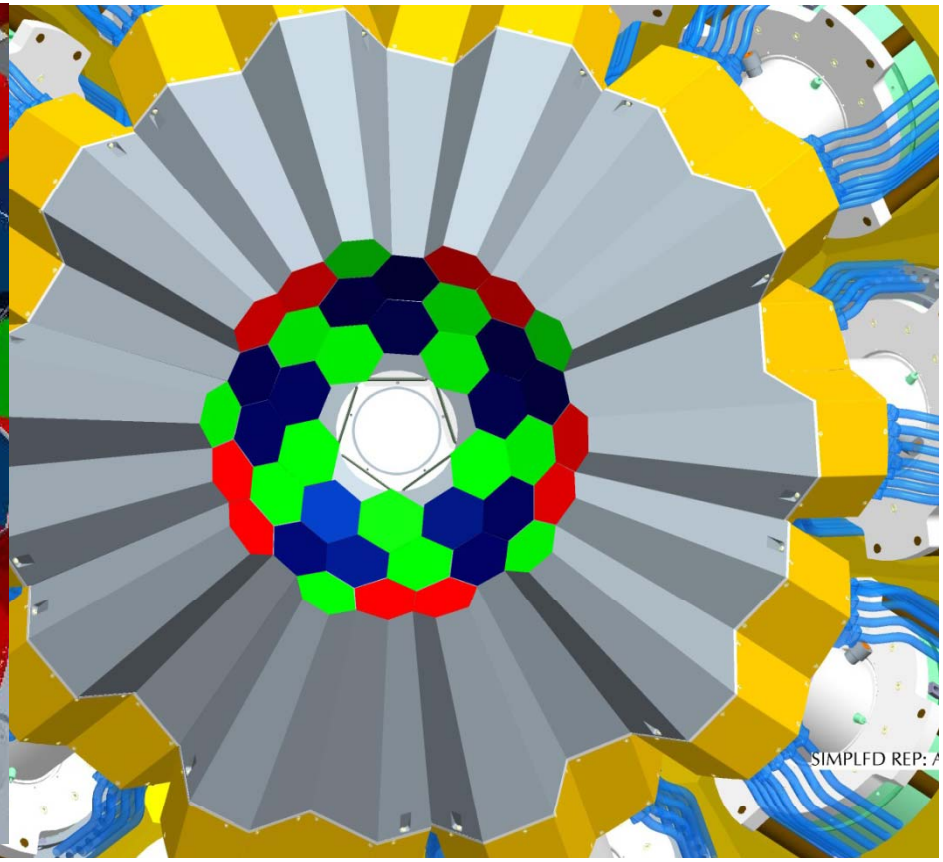
AGATA - GermaniumCrystal layout



Arrangement of 1 pi with triples



Proposed arrangement at GSI
Showing doubles in the first ring and triples in the second ring

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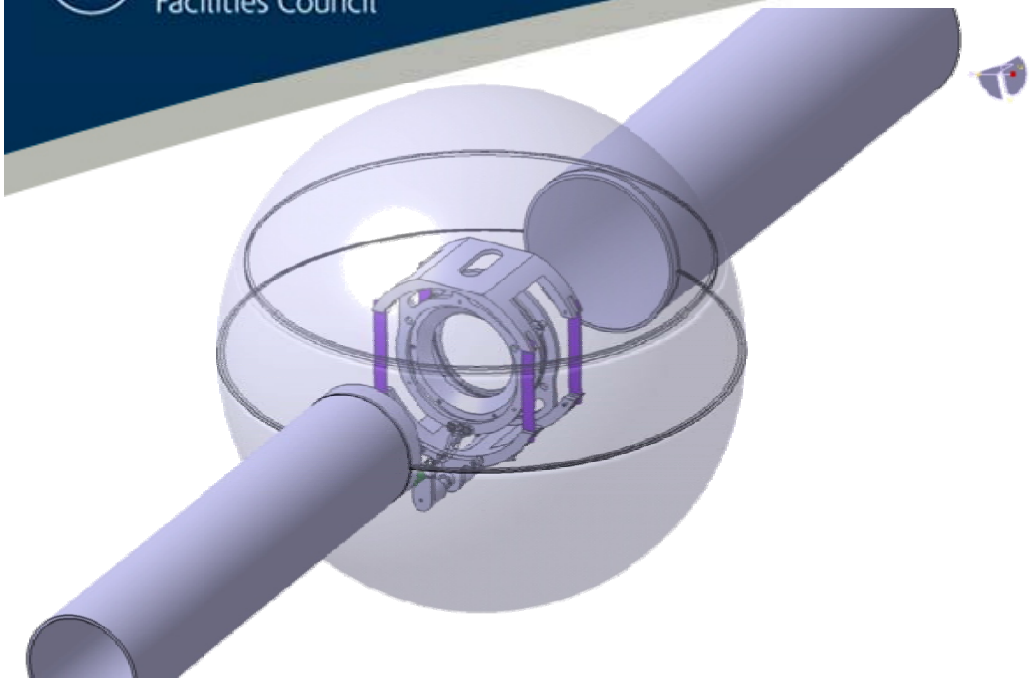
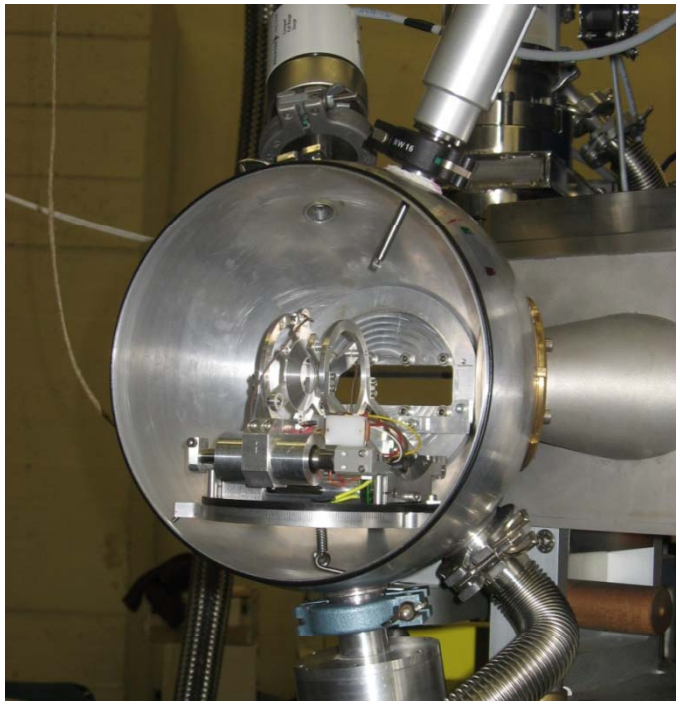
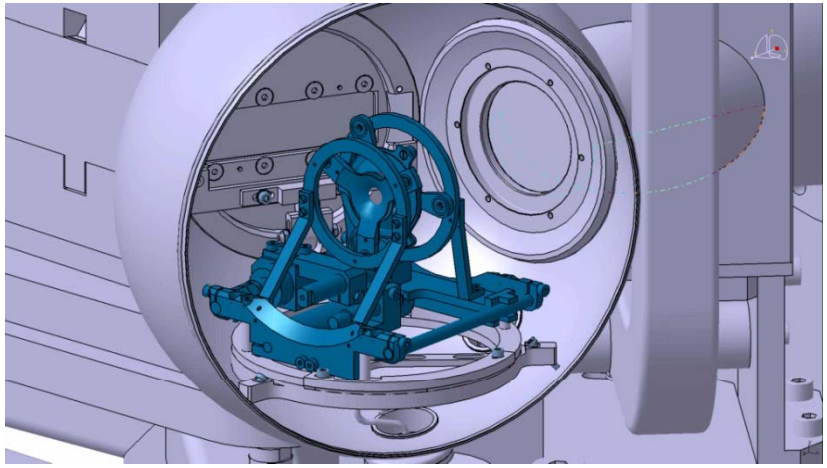
Plunger Target



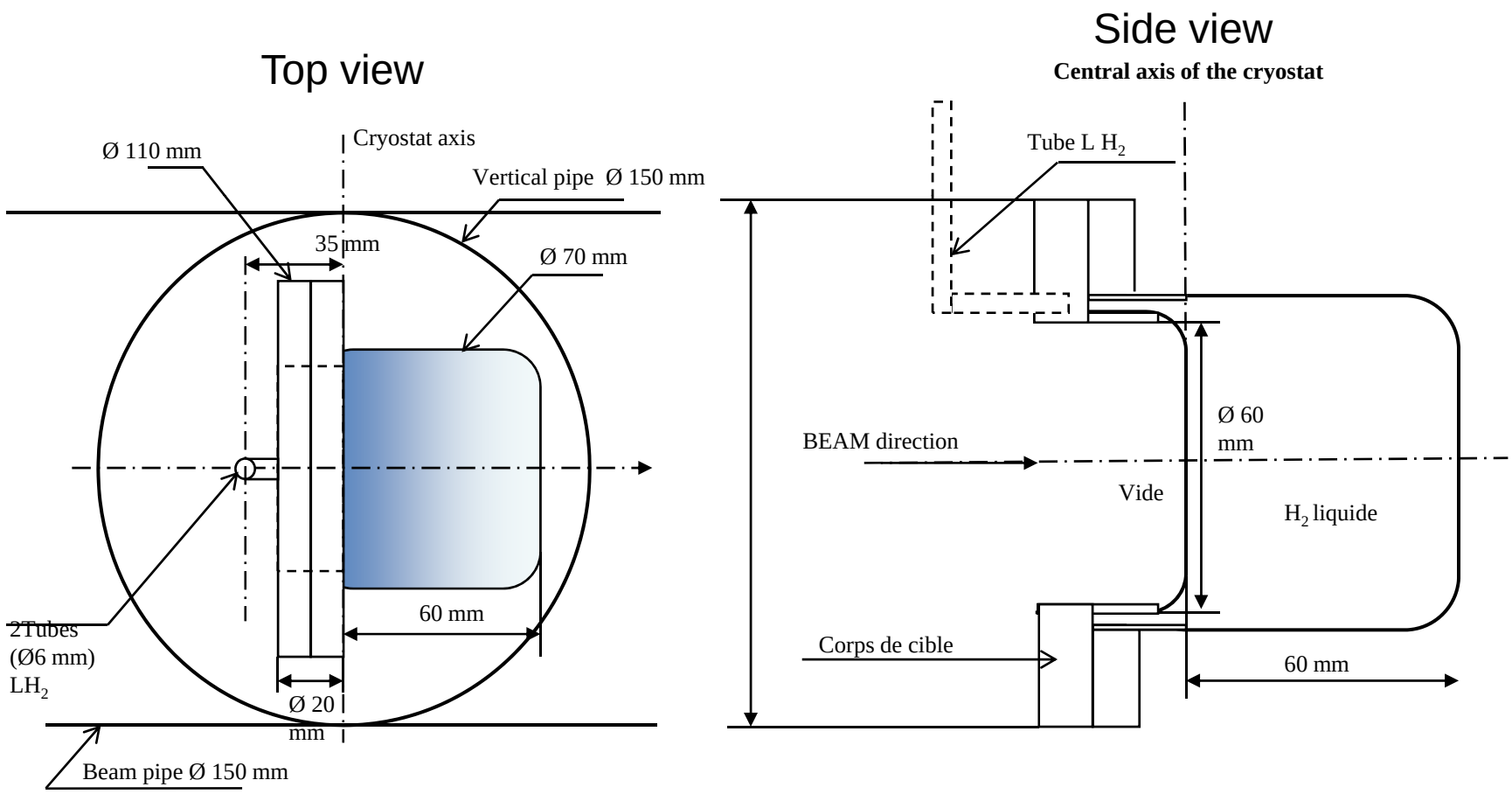




Very compact Mechanism to fit inside the target chamber. Some features within the target chamber required to mount the system.

Target-cell design

« Pocket » of liquid H2 (20 Kelvin) contained in a Mylar cell



Produced targets

Engineers in charge:
J.-M. Gheller, CEA Saclay
Ph. Chesny, CEA Saclay

September 2010

- Cell in one piece of Mylar
- 150 – 250 μm

∅ 70 mm, 61 mm thickness

Target cell planed:
- 20 mm
- 35 mm
- 61 mm (see picture)

Cryostat

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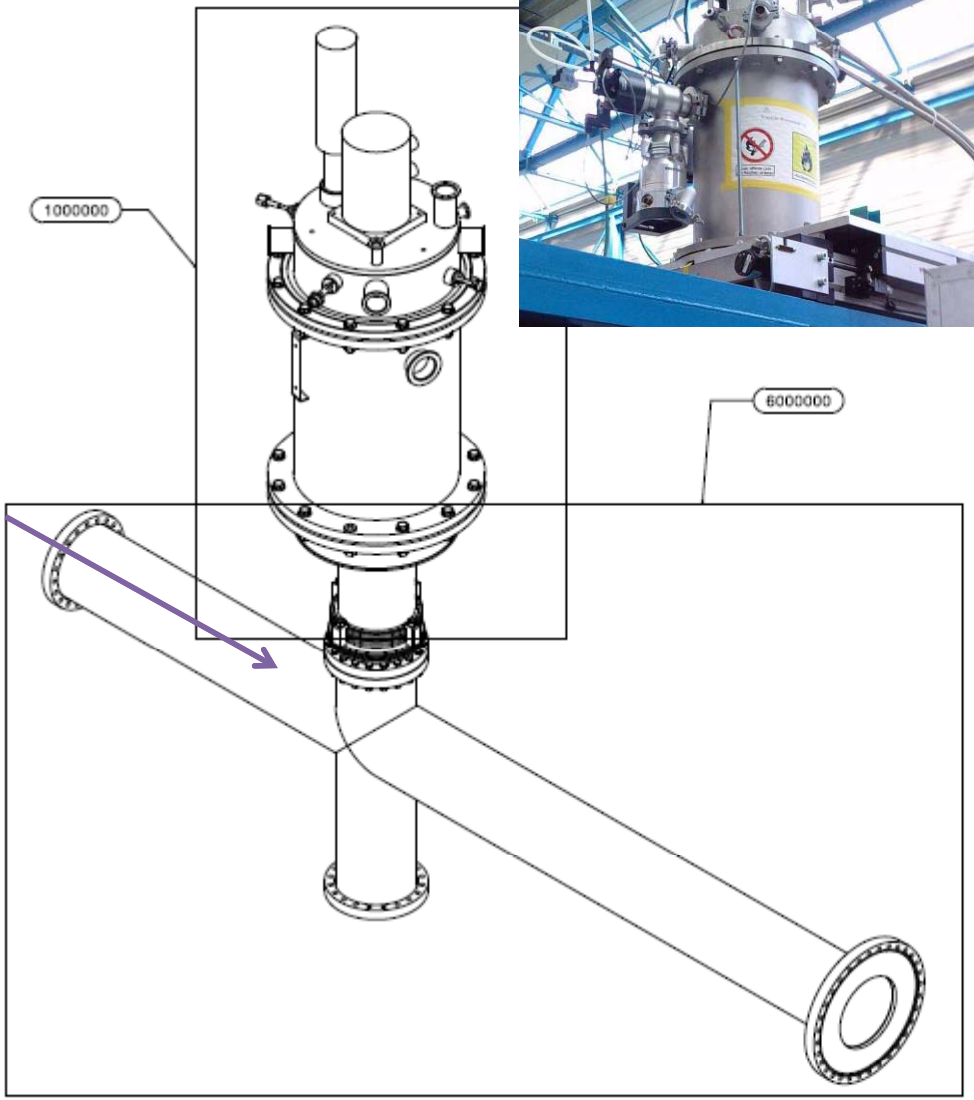

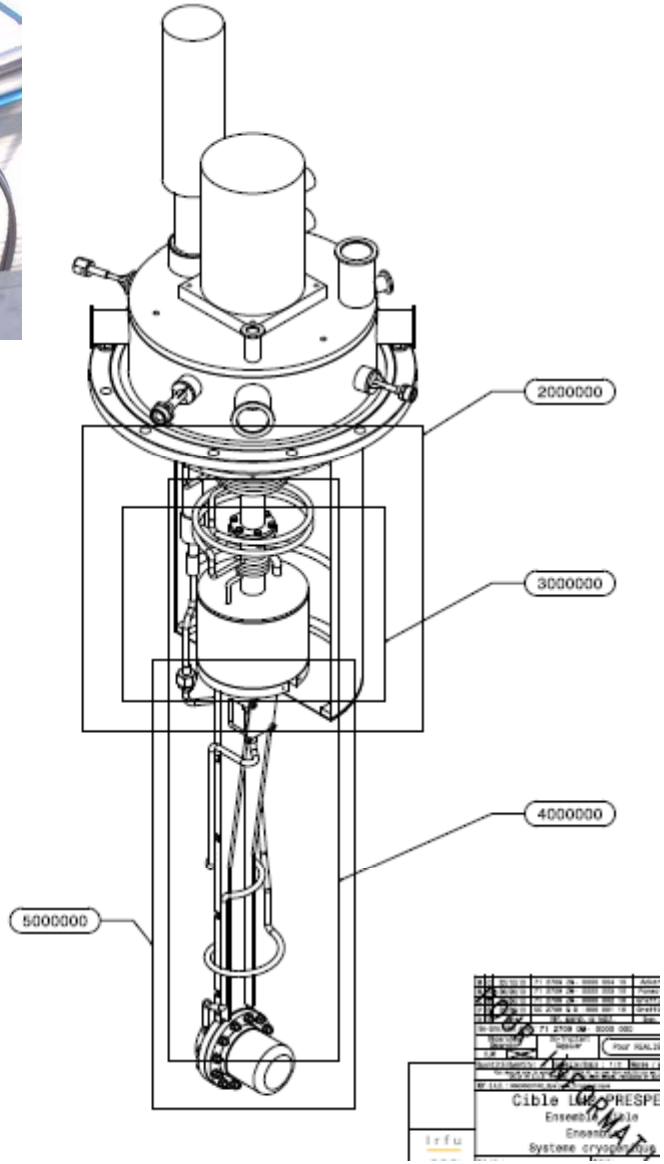

irfu

cea

saclay

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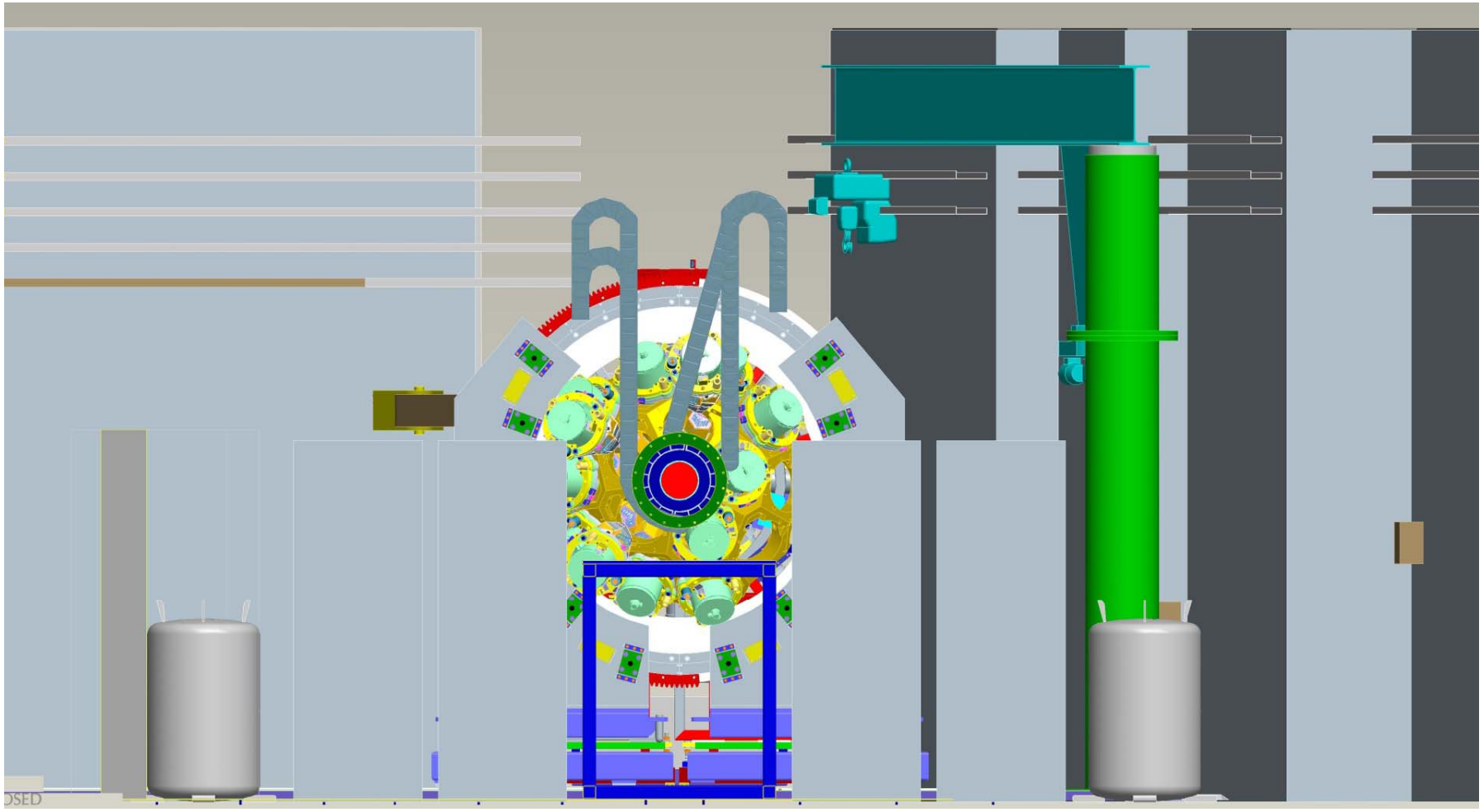
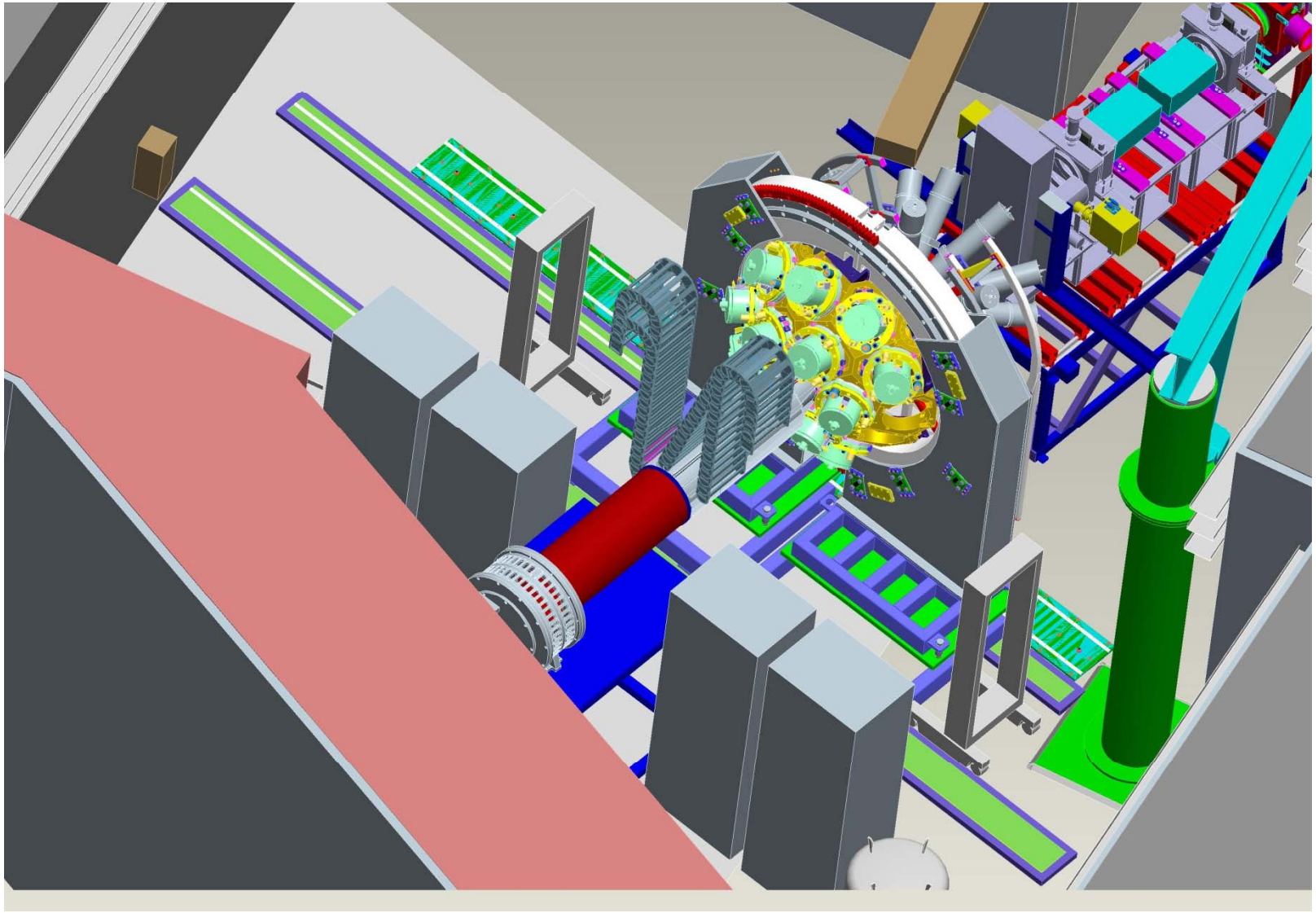
Front Elevation





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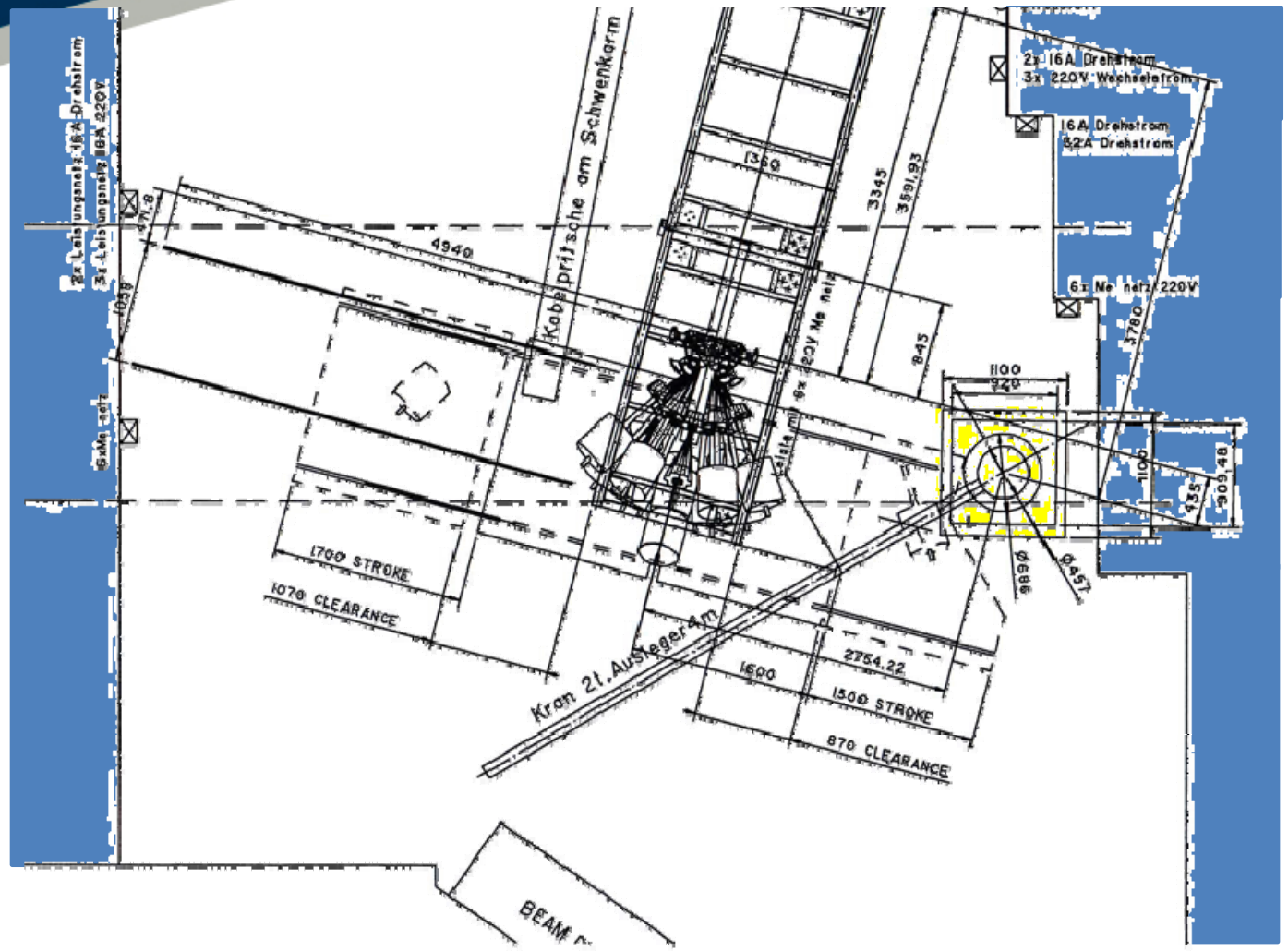
Location Constraints



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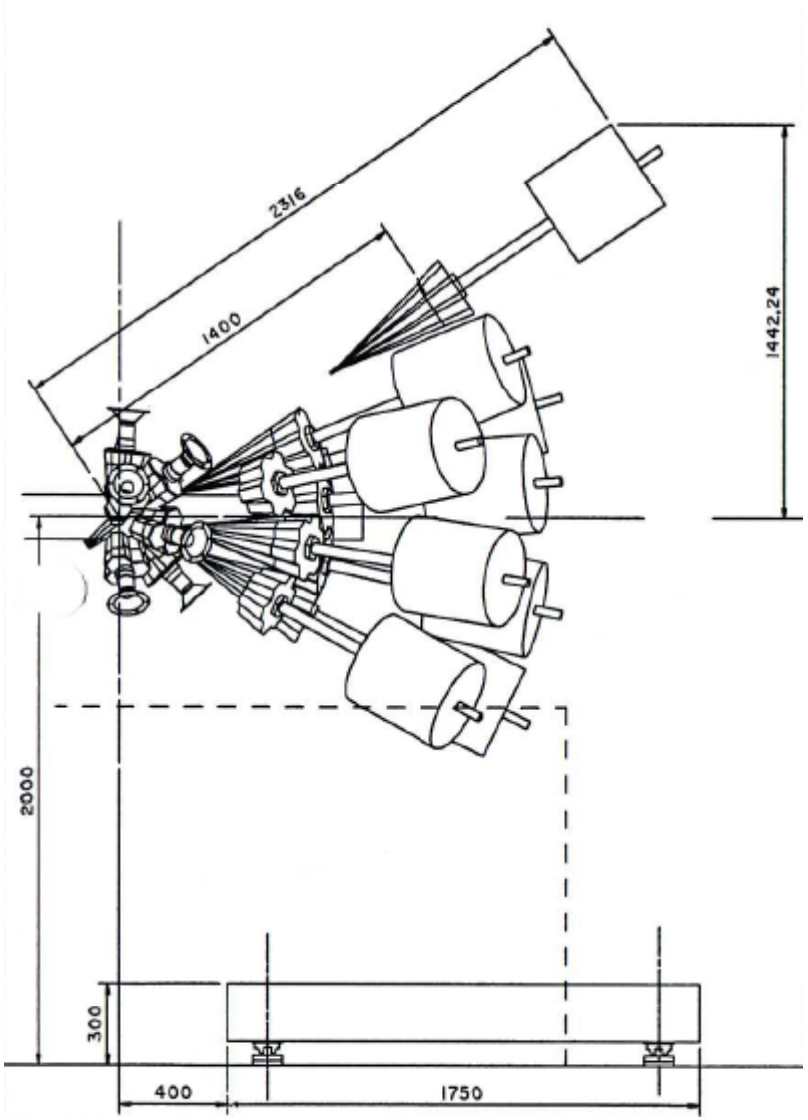
Location Constraints



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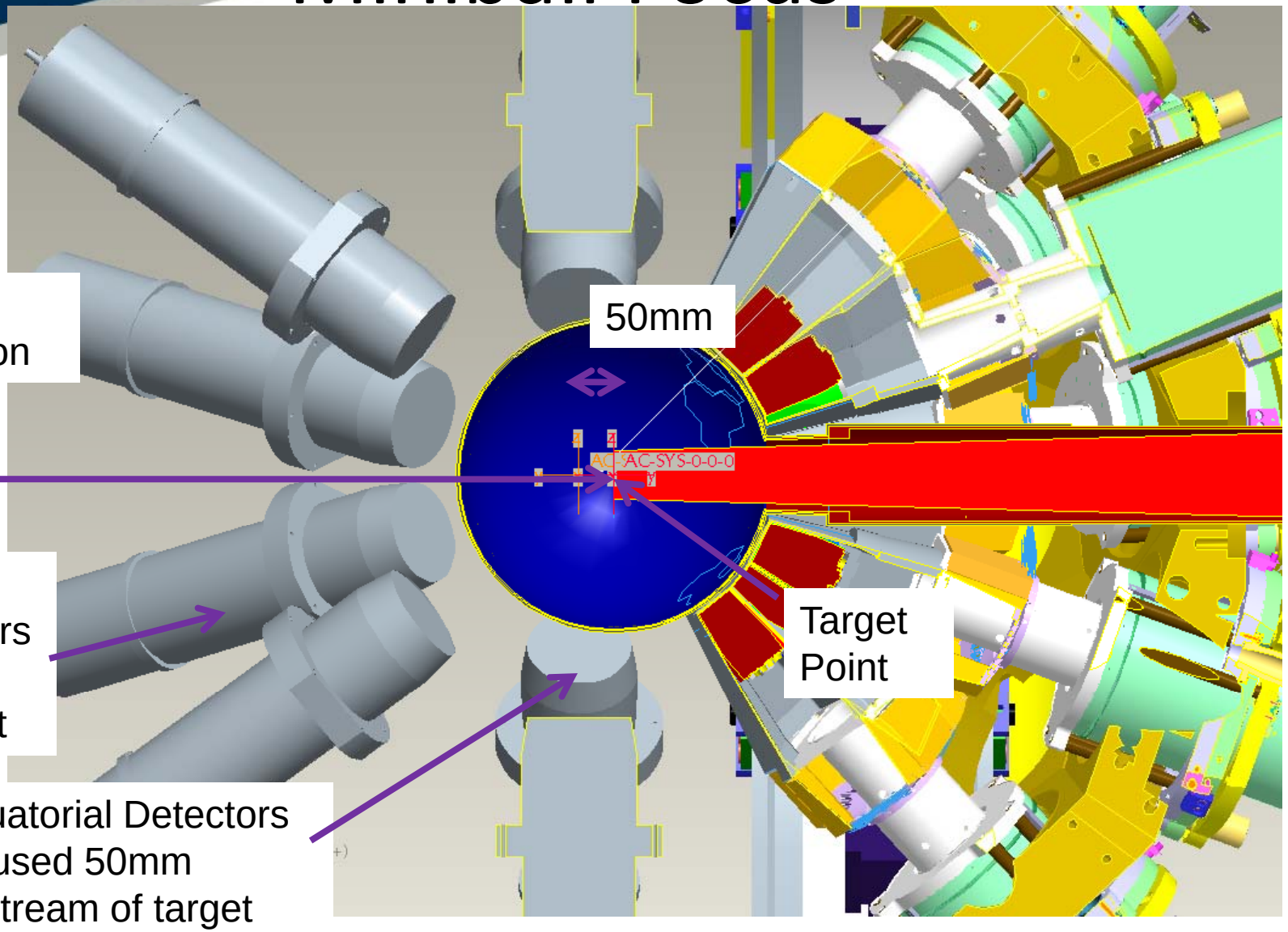
Miniball Focus



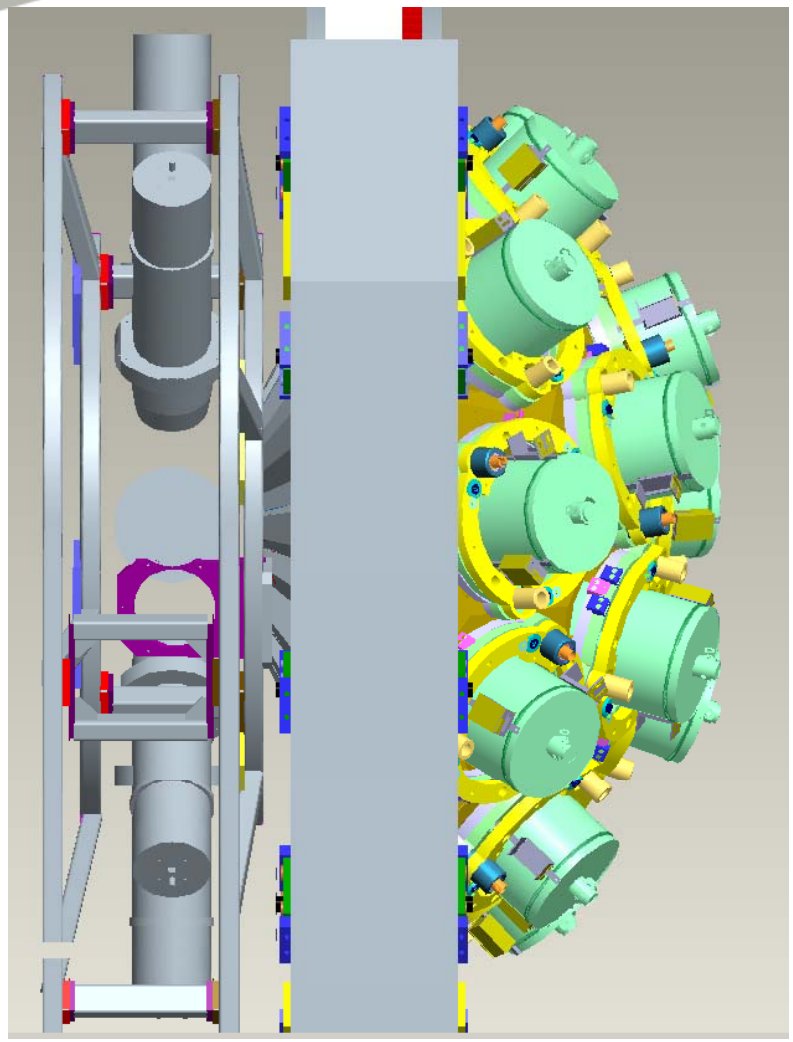
Beam Direction

Rear Detectors focused at target

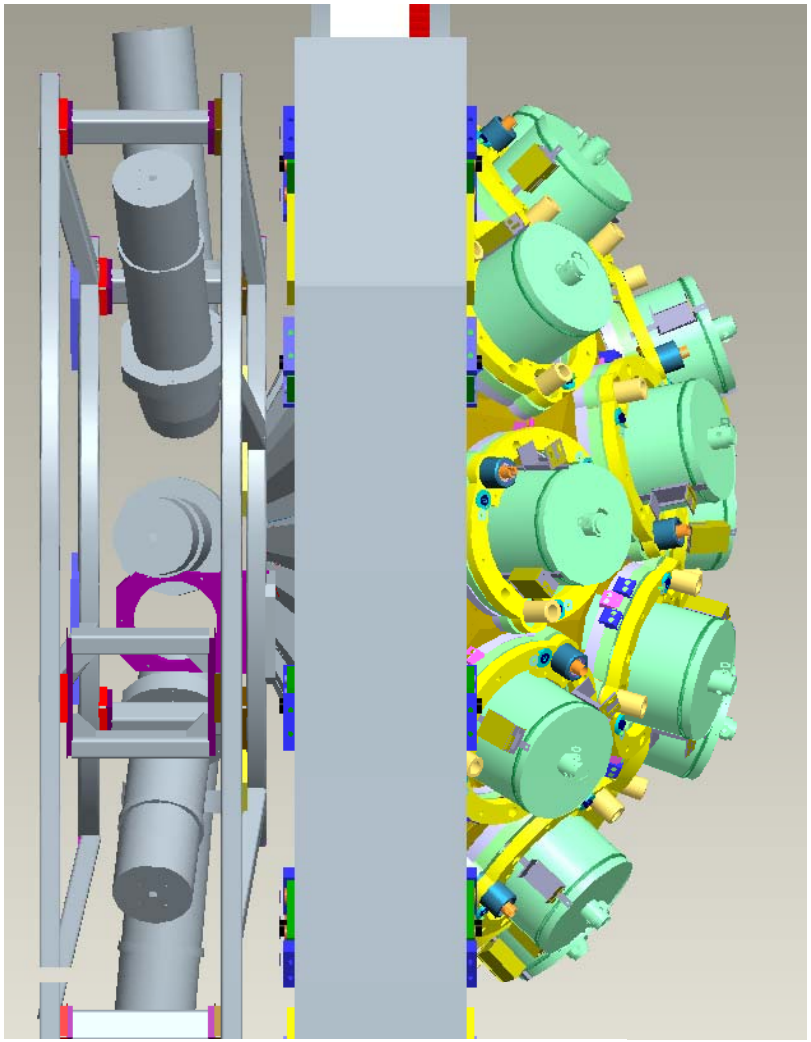
Equatorial Detectors focused 50mm upstream of target

Target Point

Miniball Frame



Linear Detectors focused at 50mm upstream from target



Canted Detectors focused at target

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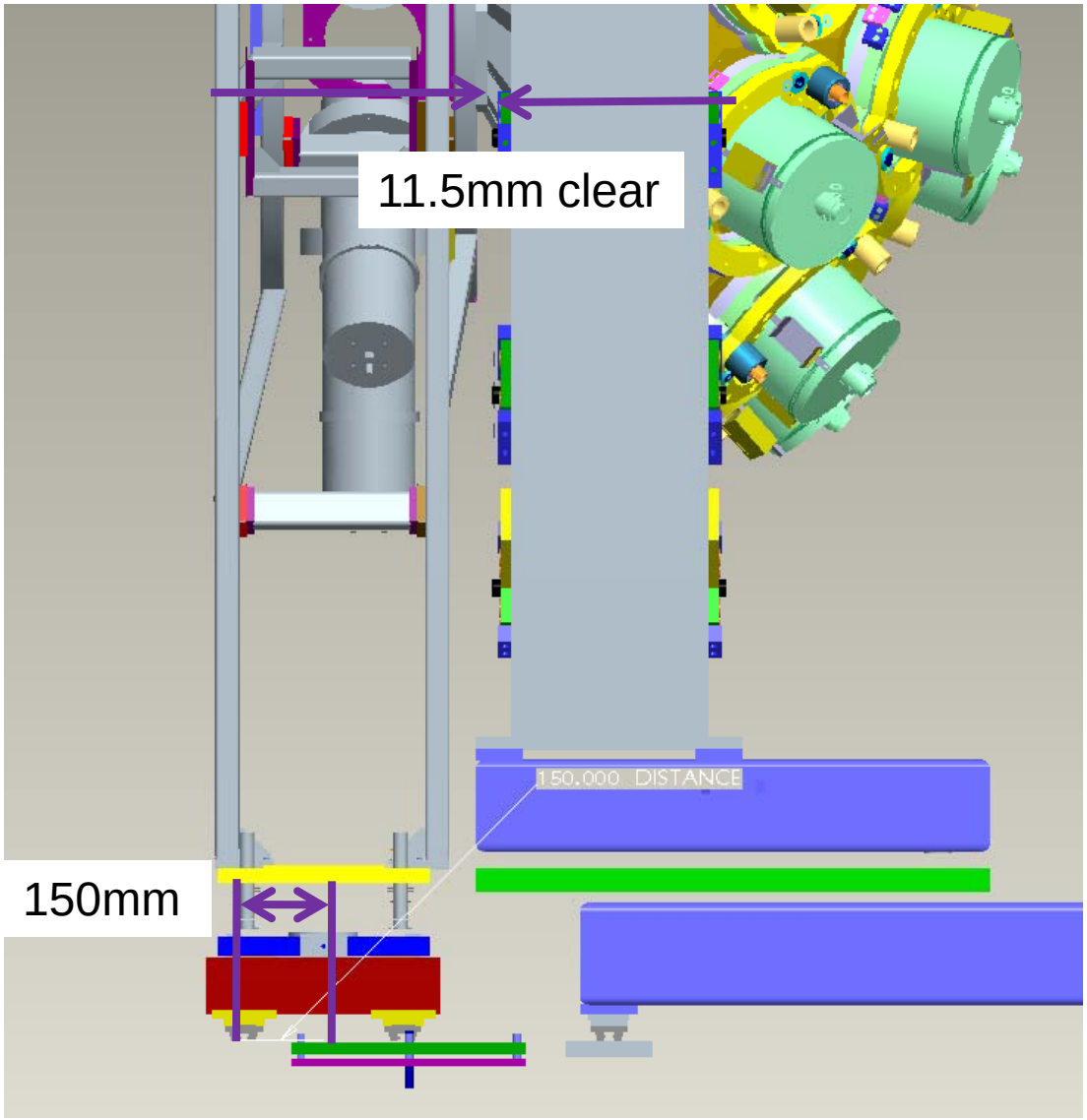
Miniball Stand



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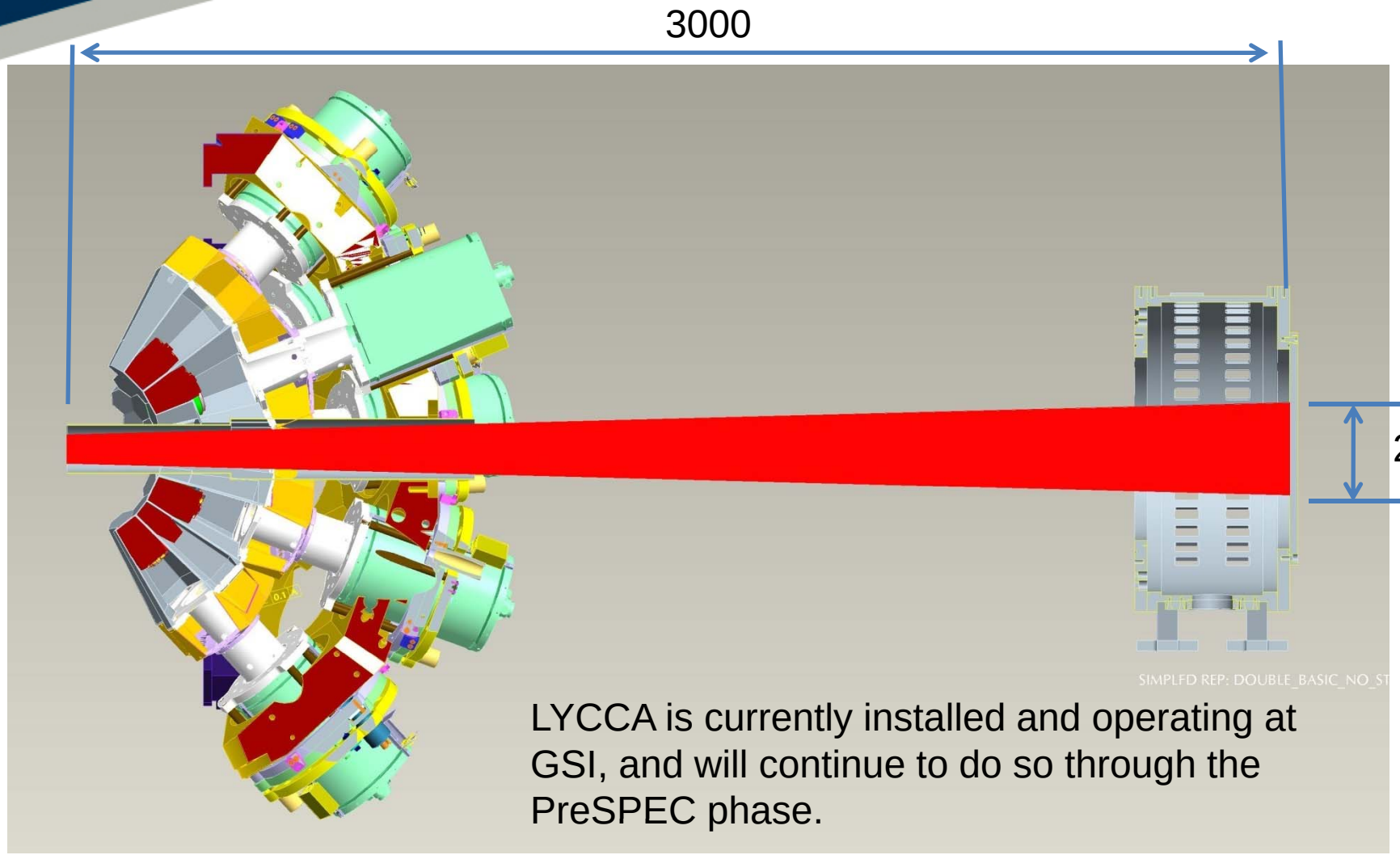
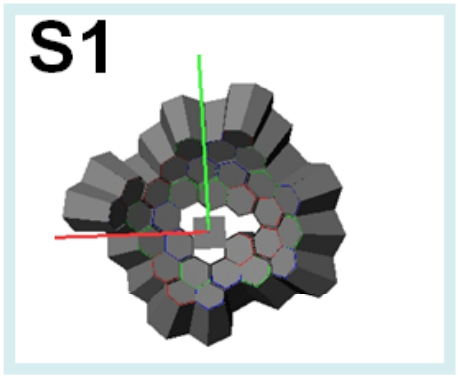
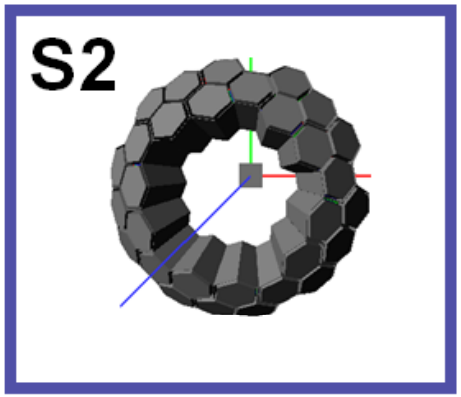
LYCCA

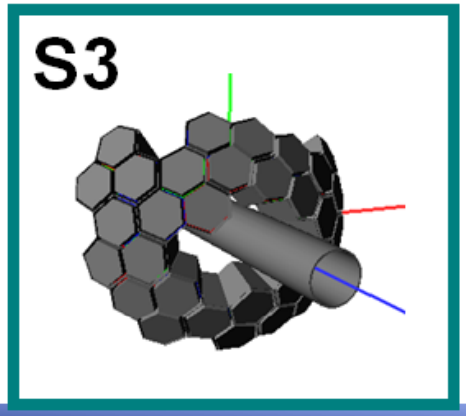


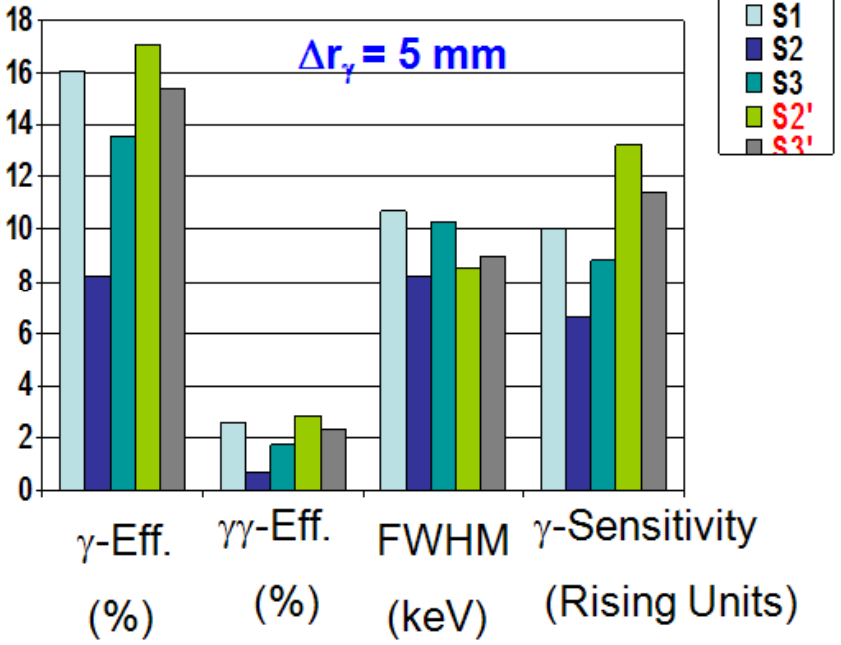
LYCCA is currently installed and operating at GSI, and will continue to do so through the PreSPEC phase.

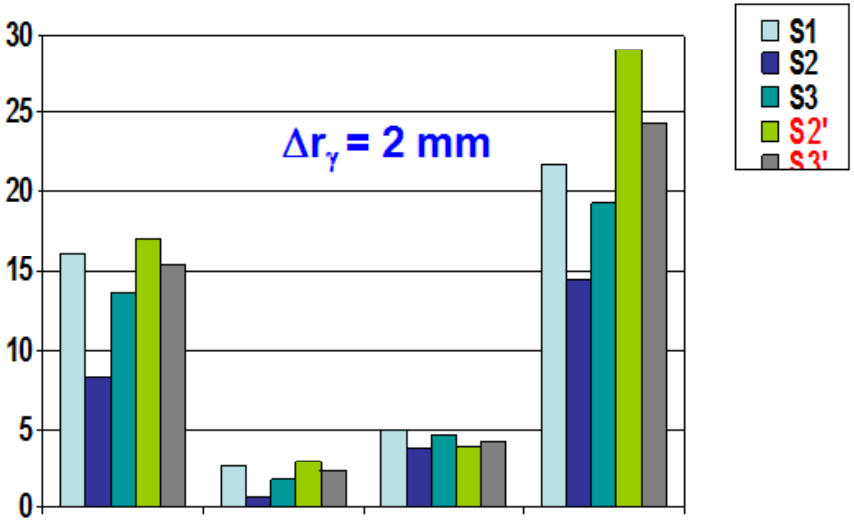
Simulations











Shell Geometries performance comparison: Summary

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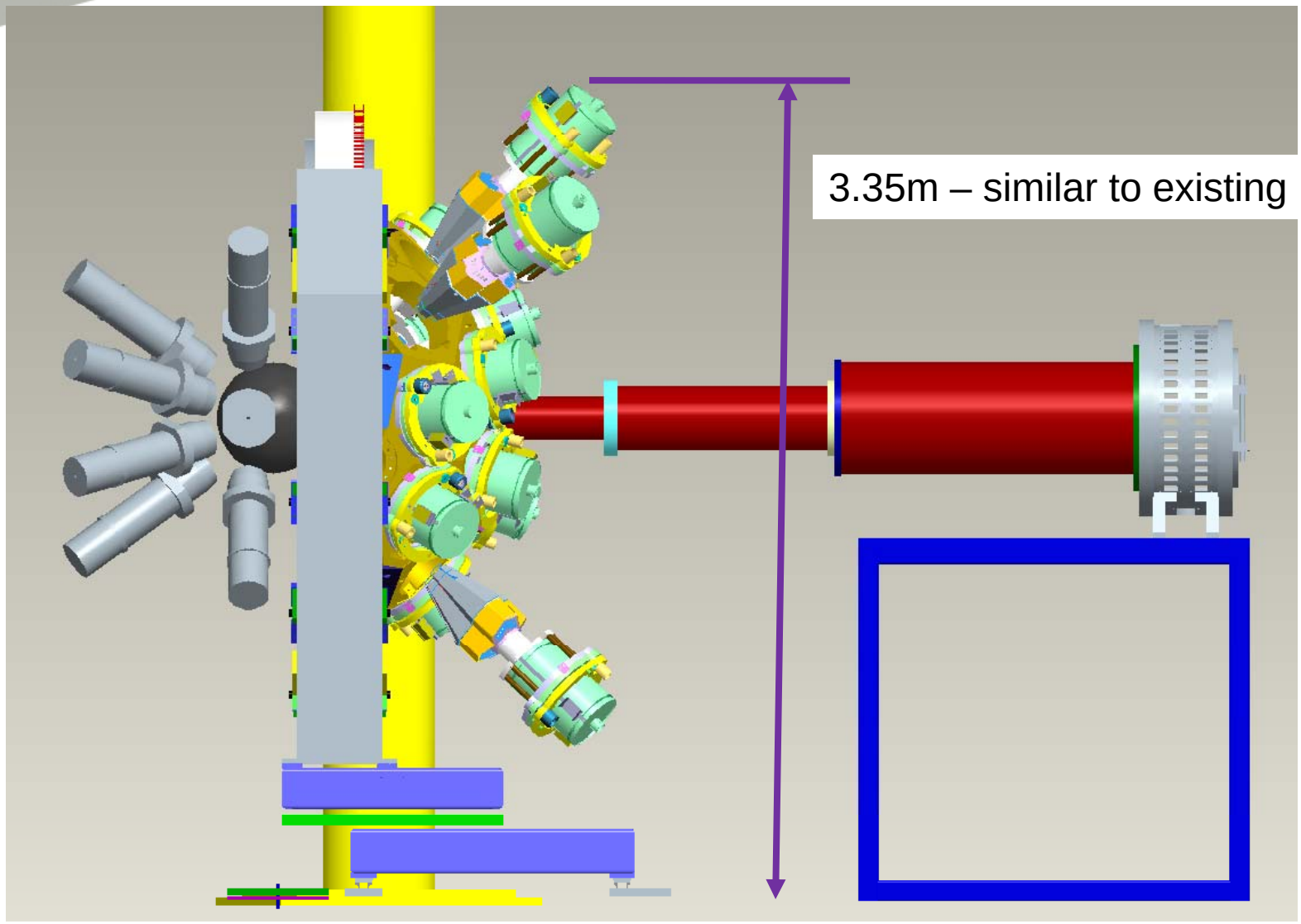
Loading/Unloading GSI



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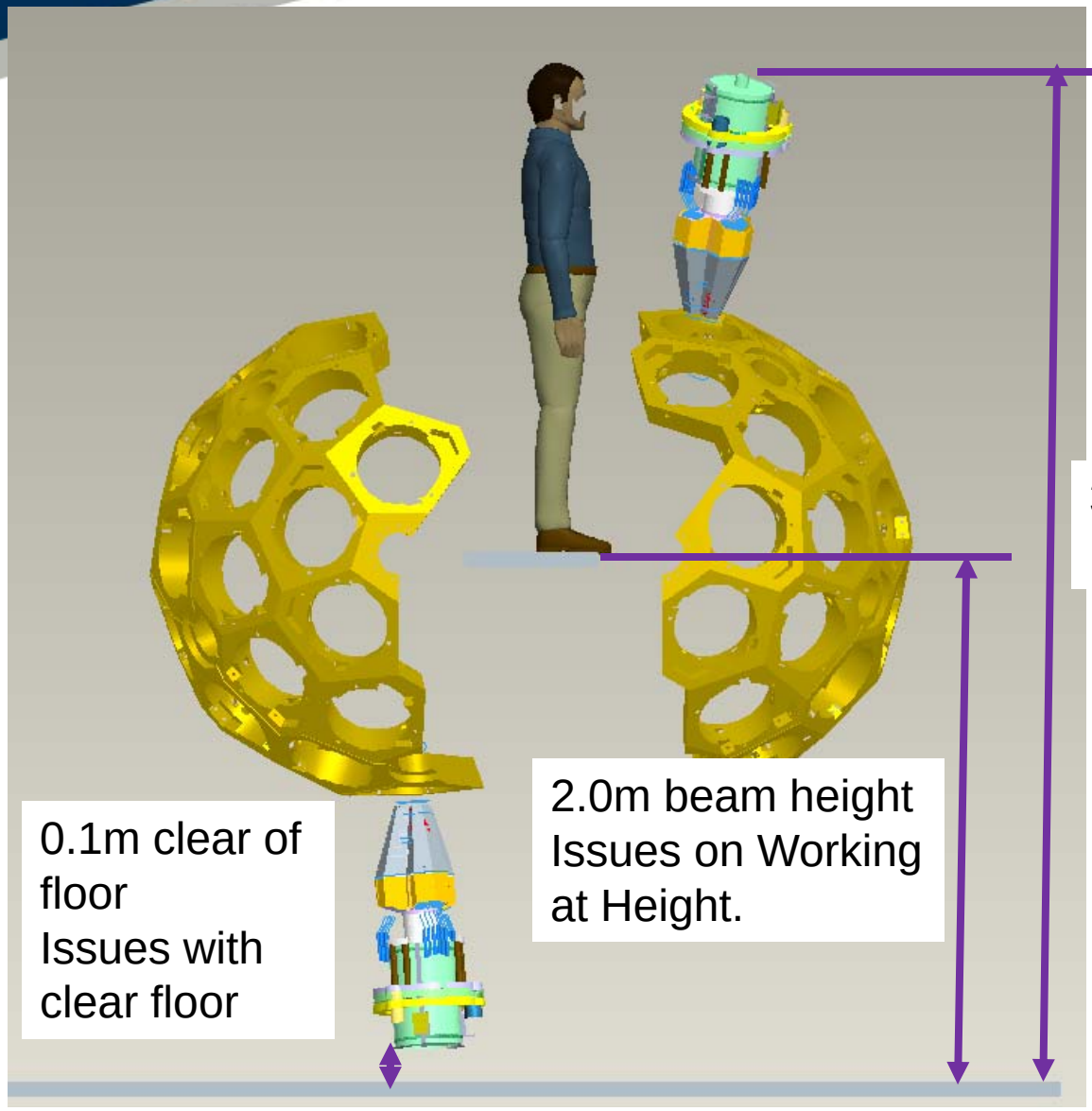
Access to Top and Base detectors in Fixed Array



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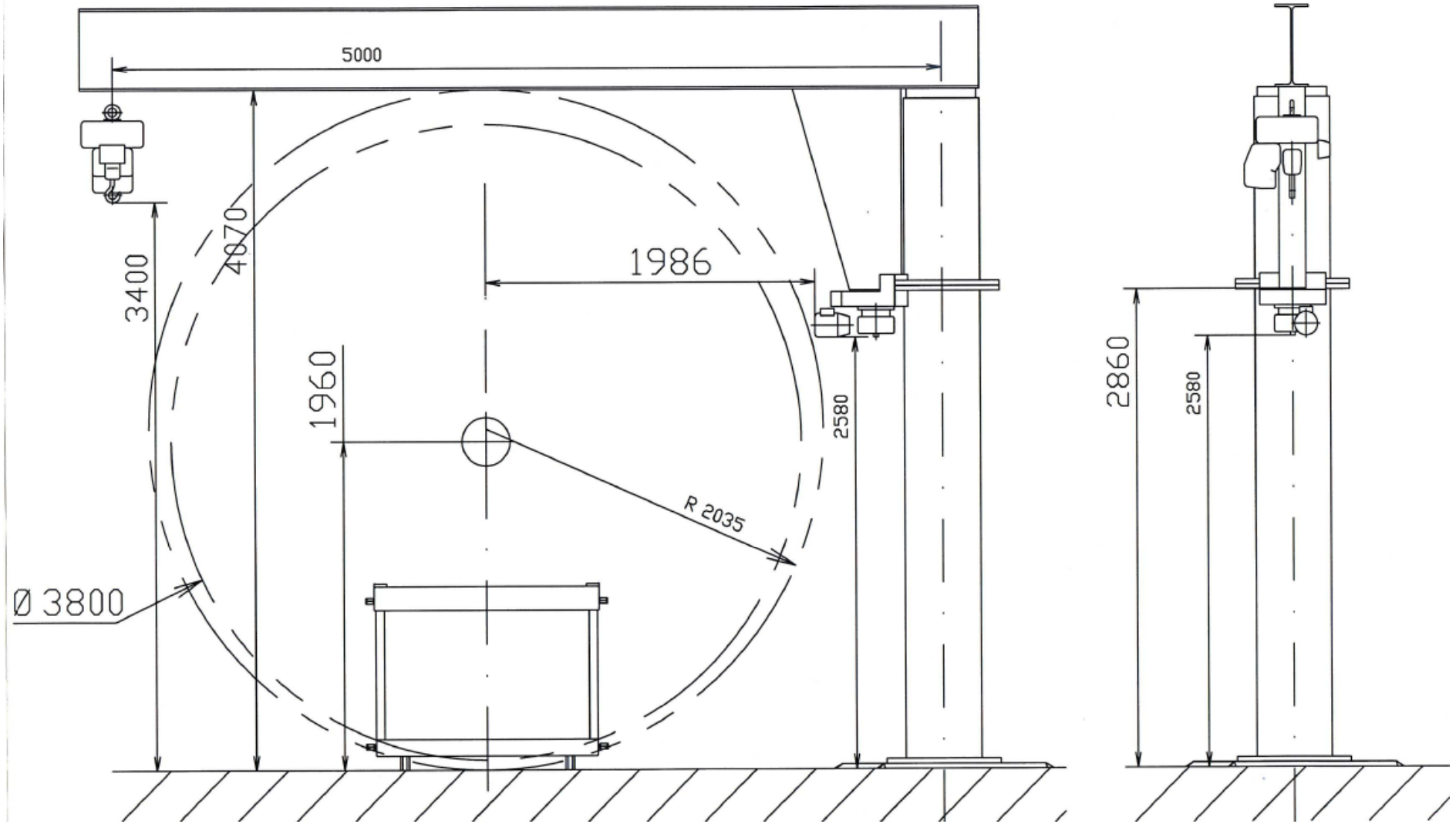
GSI Crane Height



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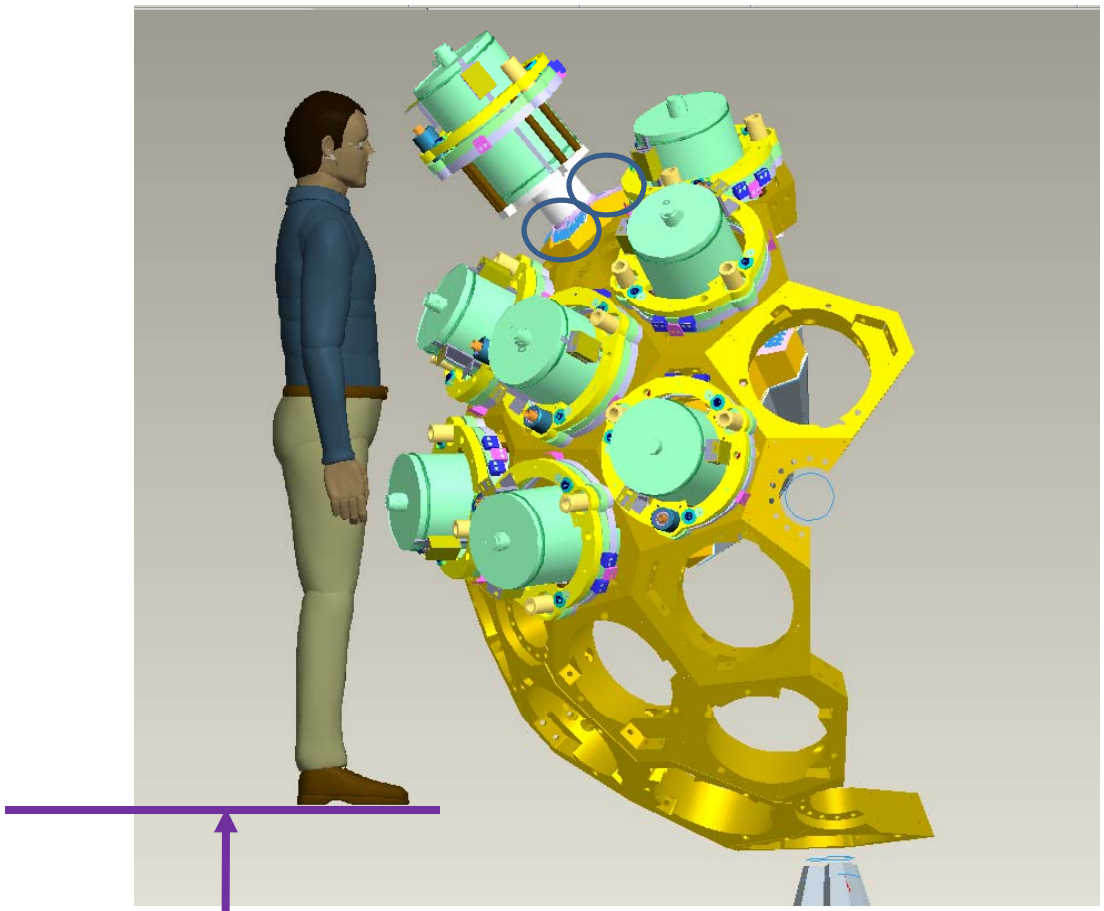
Access to Electrical connectors

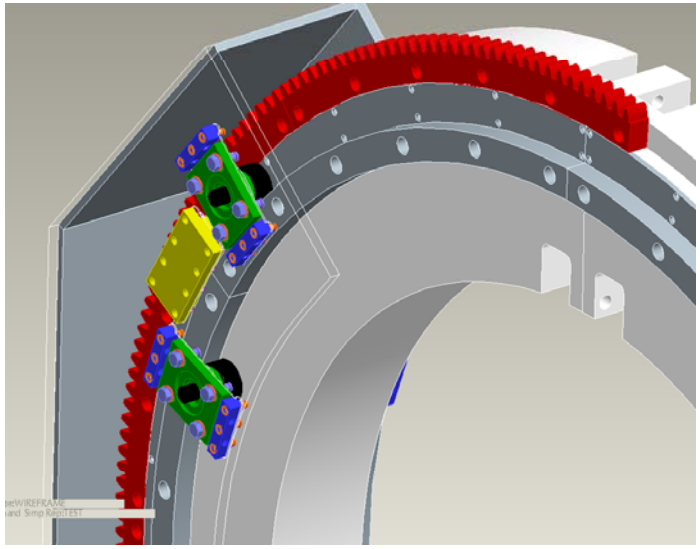


1.2m to floor

Loading

Conclusion:- Rotating Structure is required to ensure safe loading.
If not at GSI, then certainly at FAIR.

Due to – Working at heights.
Crane Heights
Proximity to floor of detector (at FAIR)



NOTE – Detectors can only be loaded when the two halves of the array are closed.

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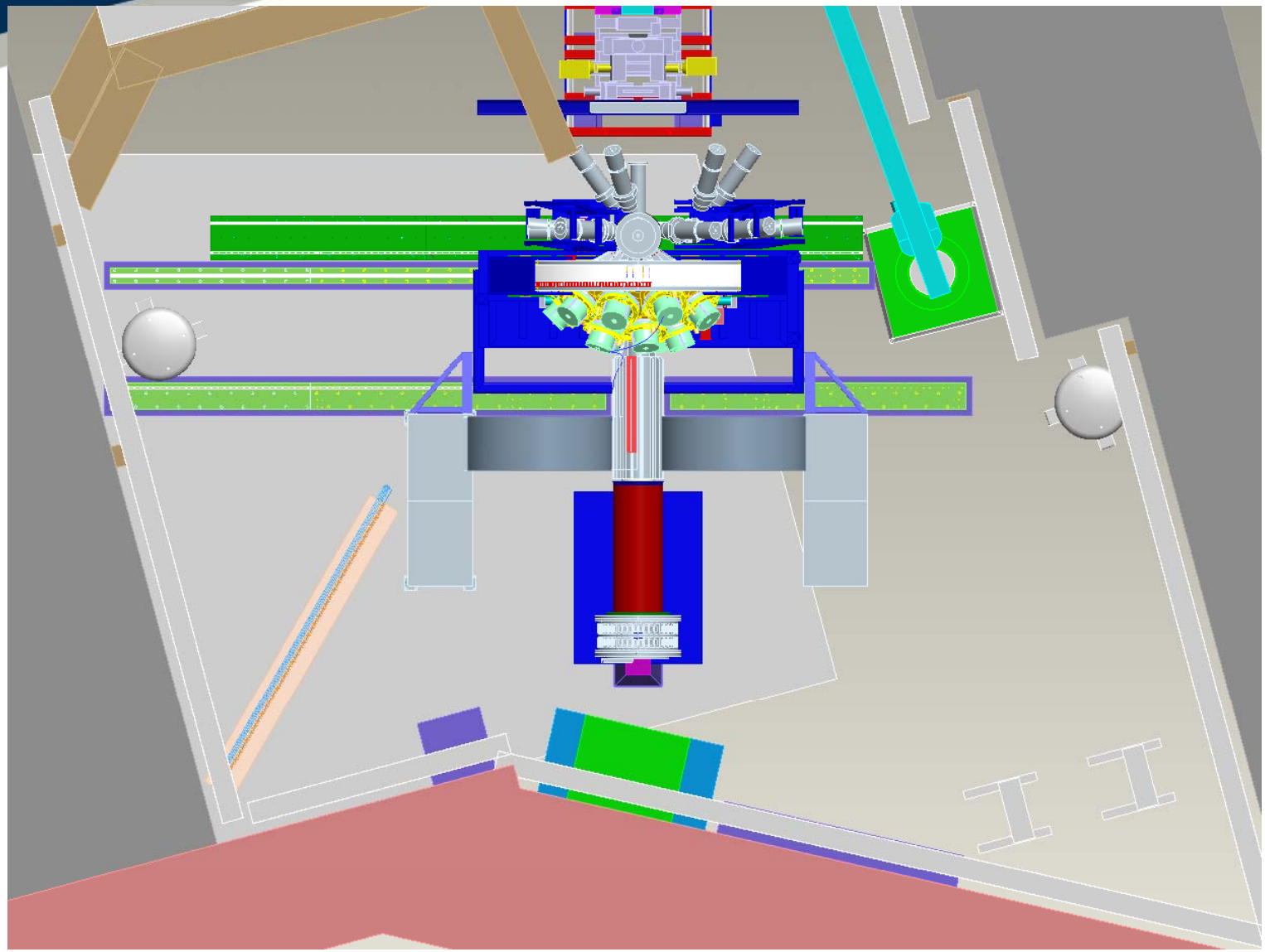

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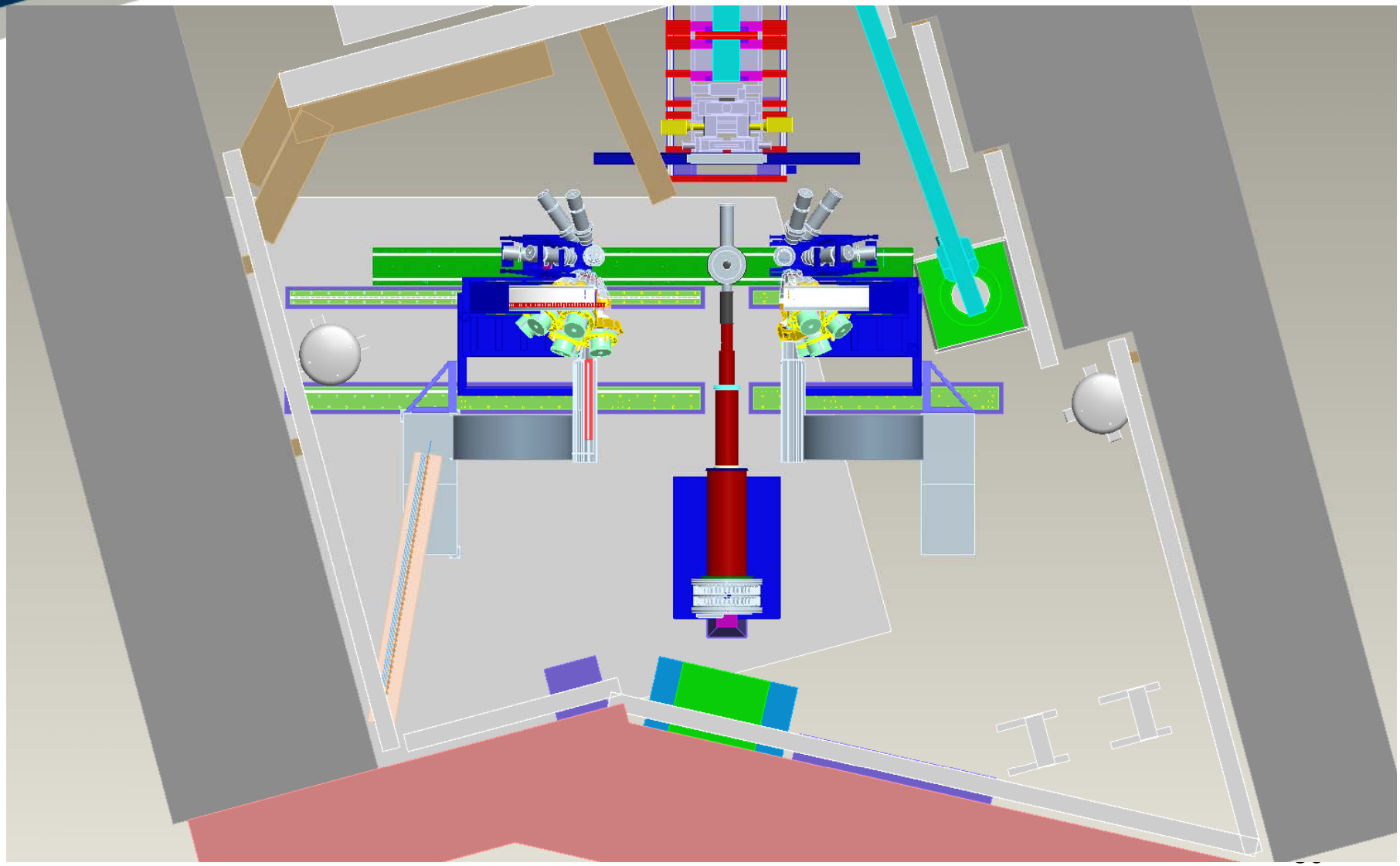

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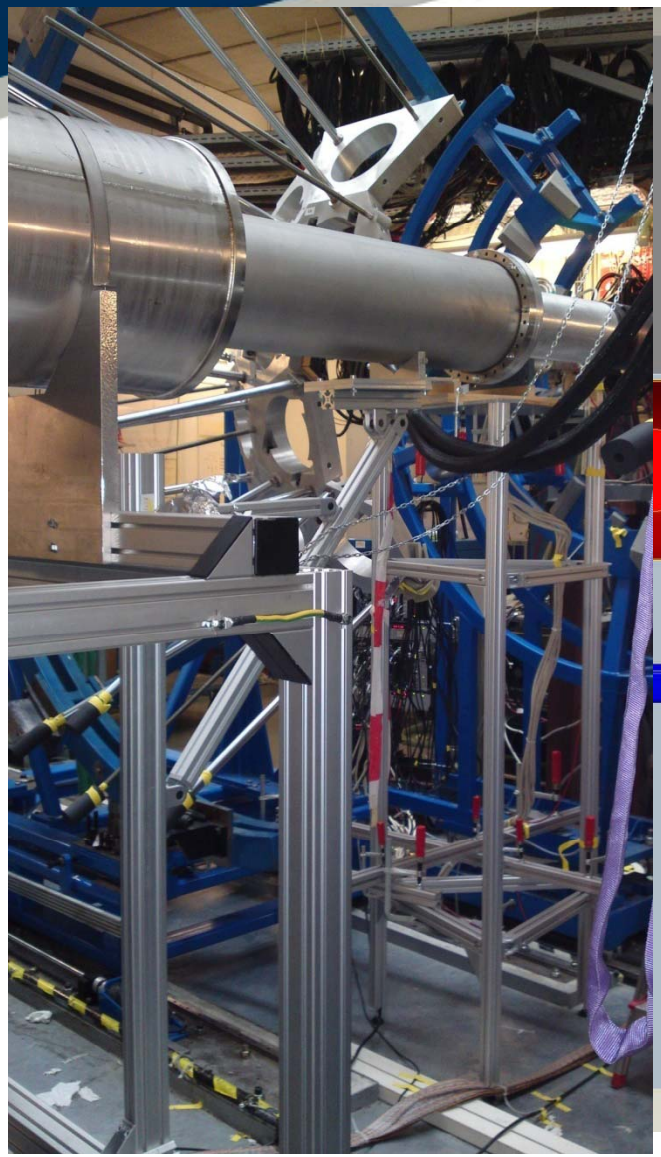
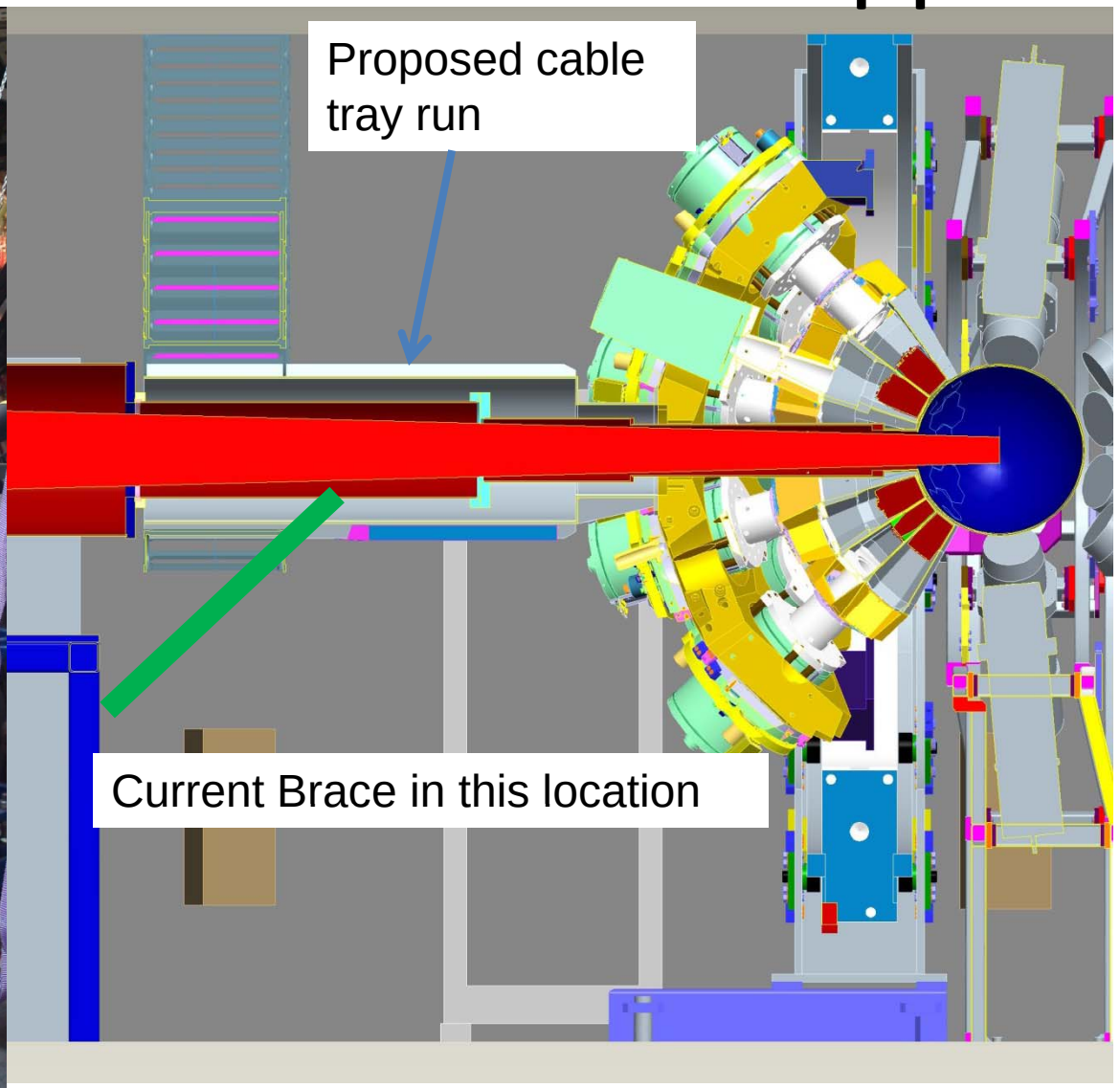
LYCCA Beamline support





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End on view of Detectors