ALICE Forum

Colmar, 23.06.2004

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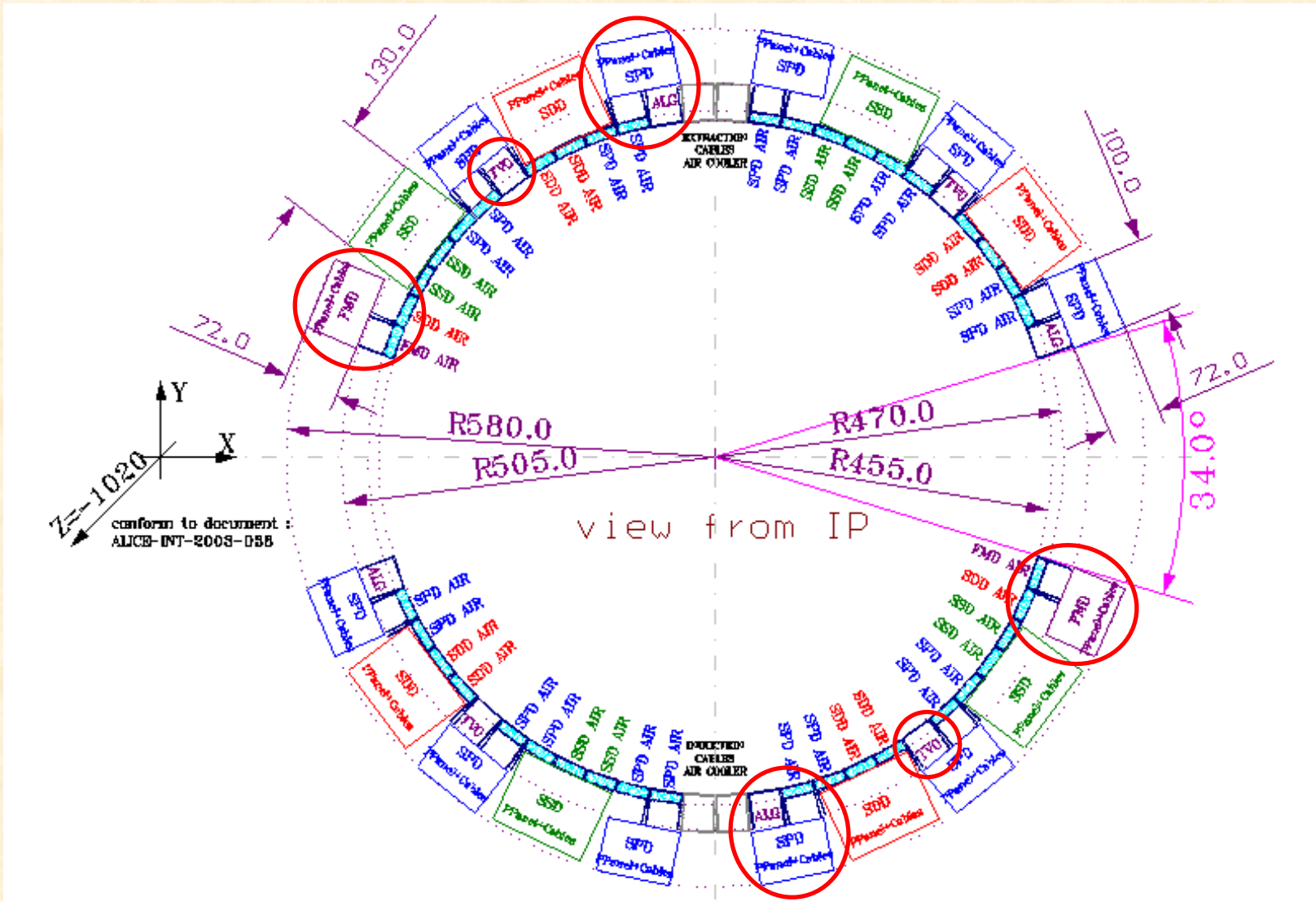
Outline

1. RB26:
   - 2003 scenario
   - SPD new requirements
   - T0 and V0 new requirements
   - FMD new requirements
   - May 2004 scenario (proposal)
2. RB24:
   - SSW and beam pipe support
   - SSW and FWD supports
   - FWD services
3. Conclusions

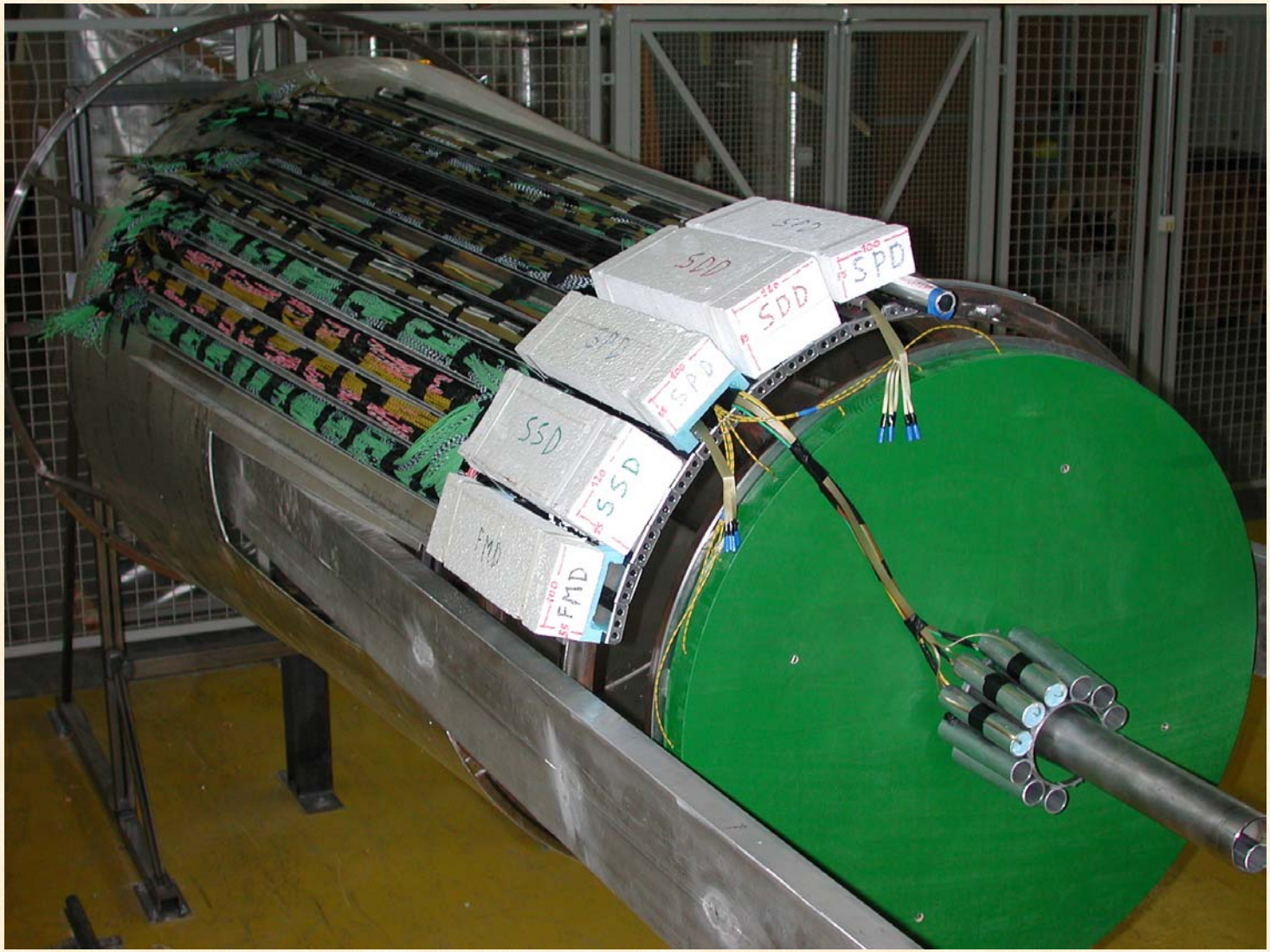
Forward Detector Integration

RB26 Service Distribution: 2003 Scenario



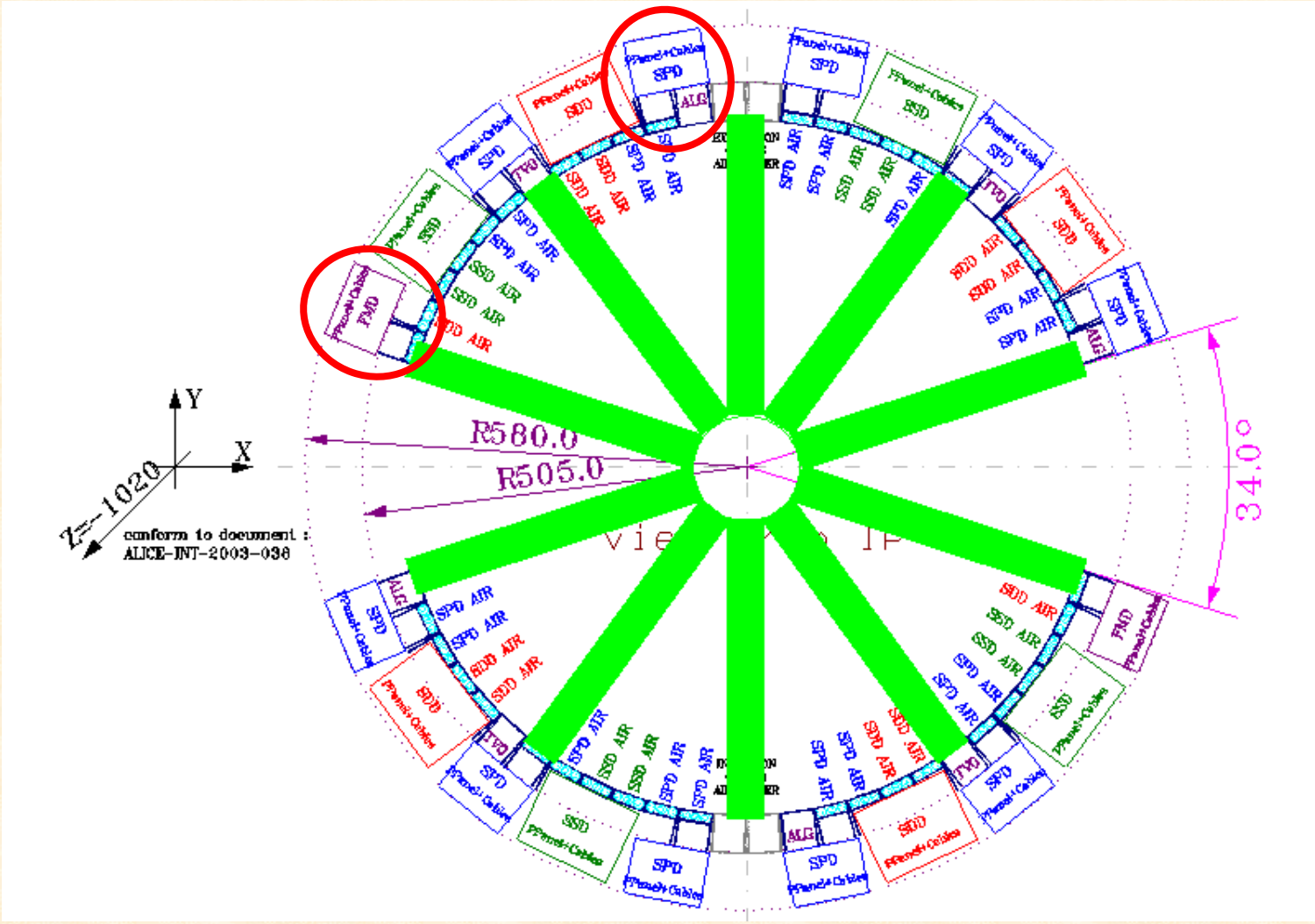
Forward Detector Integration

RB26 Service Distribution: 2003 Scenario



Forward Detector Integration

RB26 Service Distribution: SPD new requirements



SPD service distribution presented in March 2004

RB26 Service Distribution

T0 new requirements

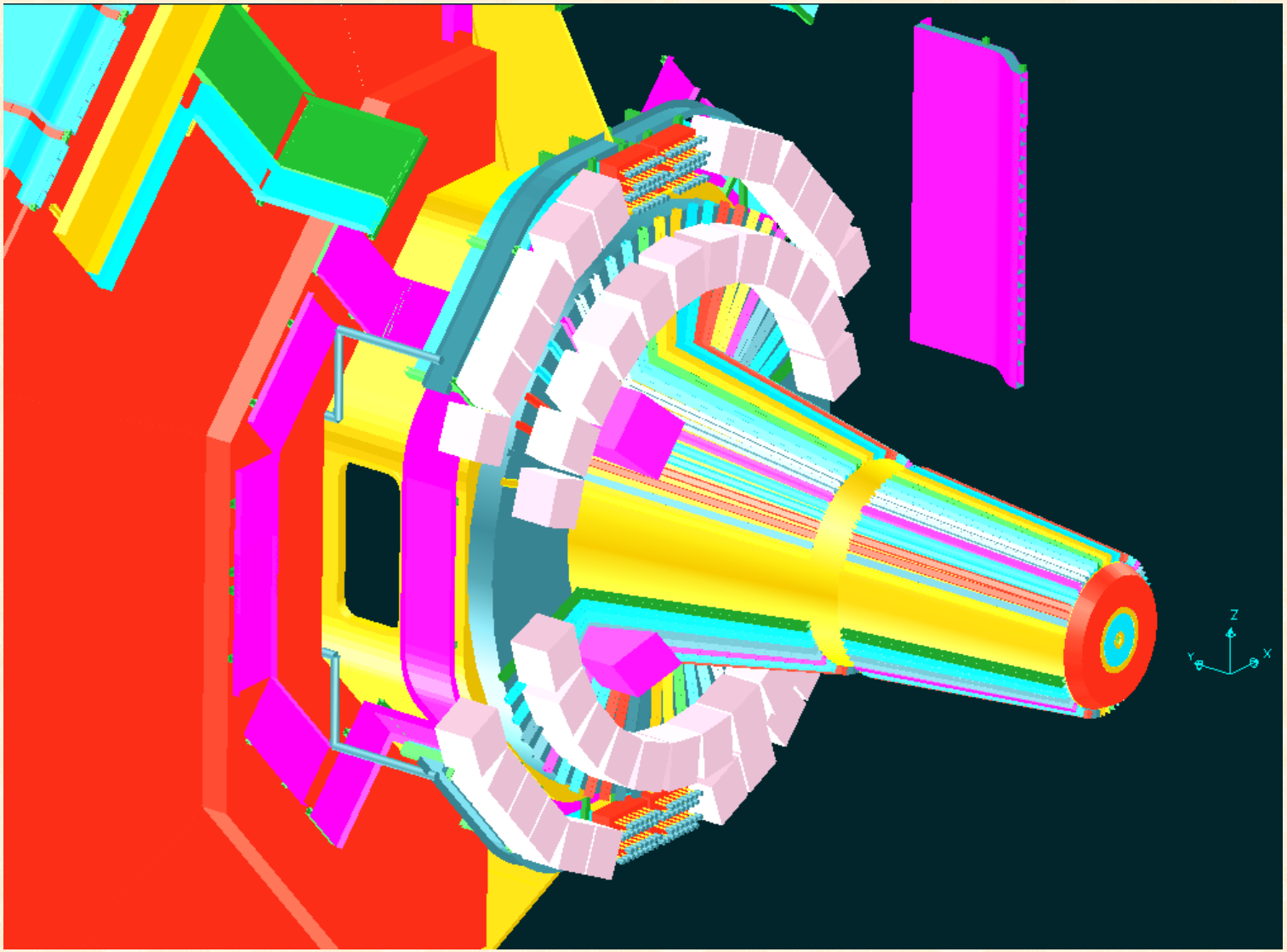
educe the signal cable length between the detector and the TRD-T0 shoe-box (TRD latency), positioned on the top part of the μ absorber support

- to avoid the handling of the detector with hanging long cables and fibres, install on the μ absorber a T0 patch panel (non foreseen in the 2003 scenario) with 12 HV, 12 signal and 12 fibre connectors.

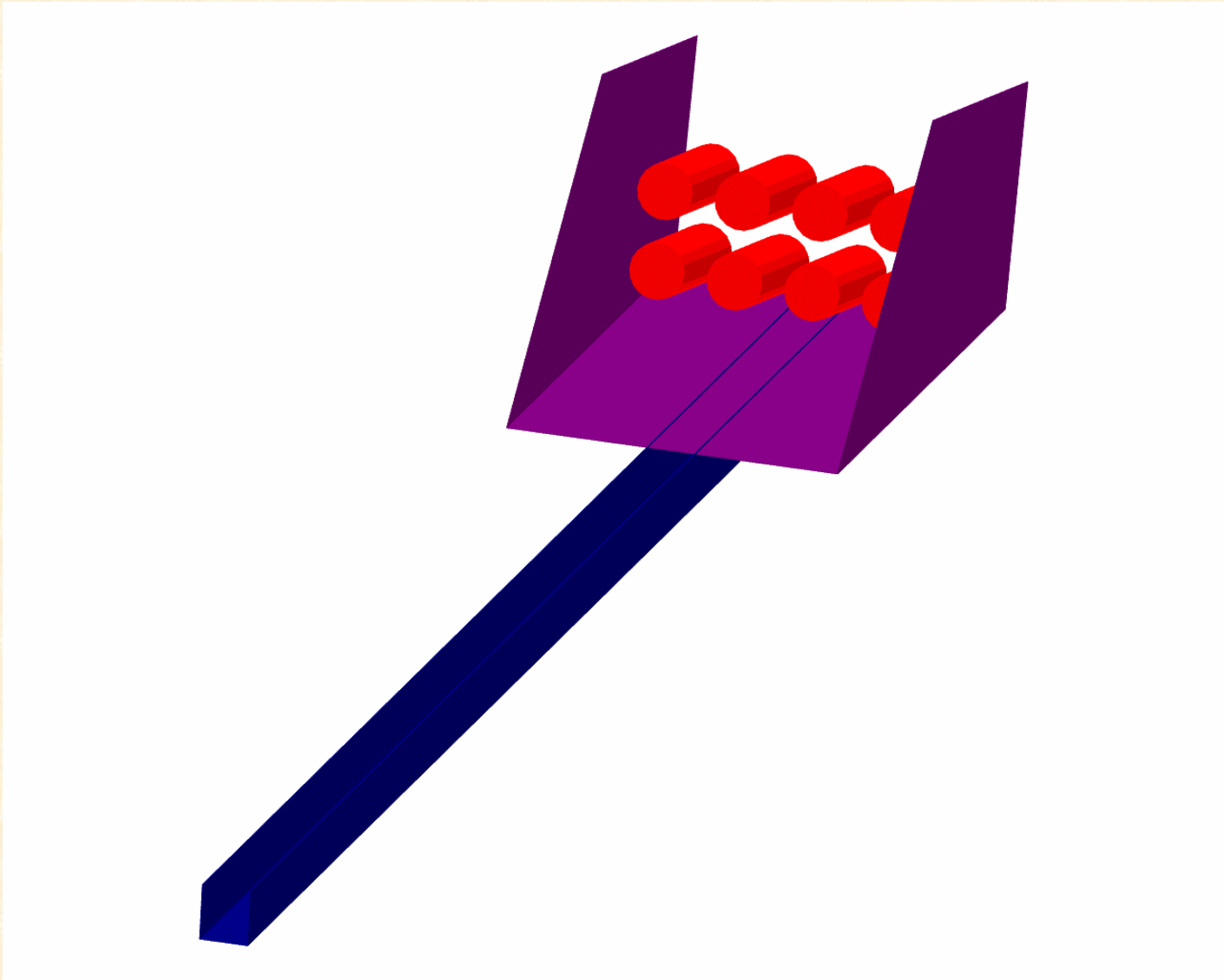
V0 new requirements

- The granularity of both V0A and V0C being fixed at 32, each of the 4 ducts on the μ absorber attributed to V0C should carry enough bundles of signal and calibration fibers sufficient for 8 PMs
- in order to perform the requested high time resolution, the PMs should be installed at <5 m from the detector
- Already at the entrance of the duct, the fibres should pass below the patch panels of the SPD placed on top of the duct

RB26 VOC fibres



VOC PMs



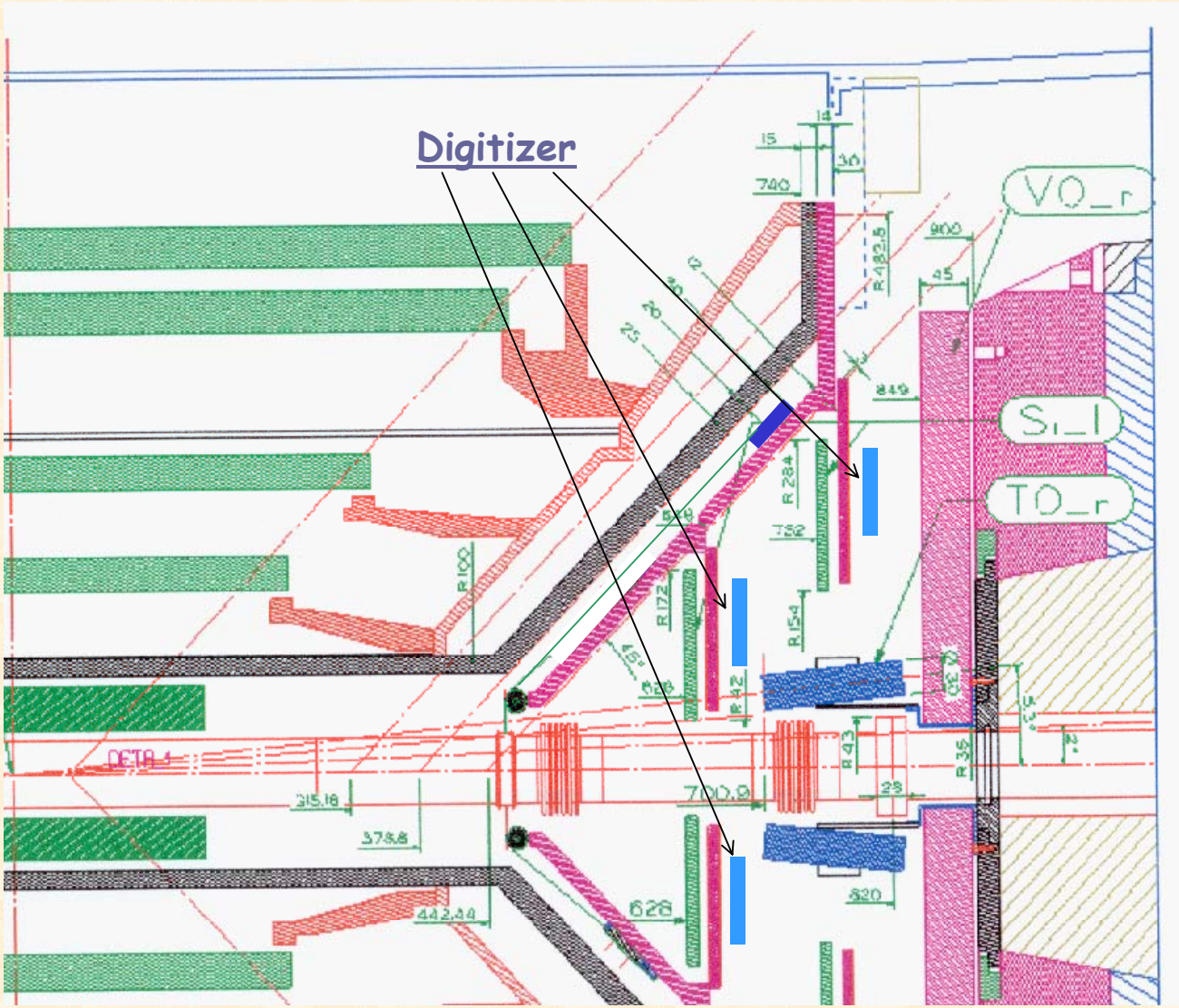
RB26 Service Distribution: FMD new requirements

It has been decided to use the TPC readout electronics for the FMD. As a consequence:

- the 4 Digitizers will be mounted on the other side of Si wafer support
- a unique RCU card will be sufficient for the whole detector and will be mounted on the μ absorber structure at a distance of less than 3 metres from the digitizers
- only a duct and a patch panel (instead of the two foreseen in the 2003 scenario) could be sufficient to carry all the services, including possible pipes for air cooling.
- for an easy installation it would be important to assigne to the FMD a nearly horizontal duct, as for the 2003 scenario.

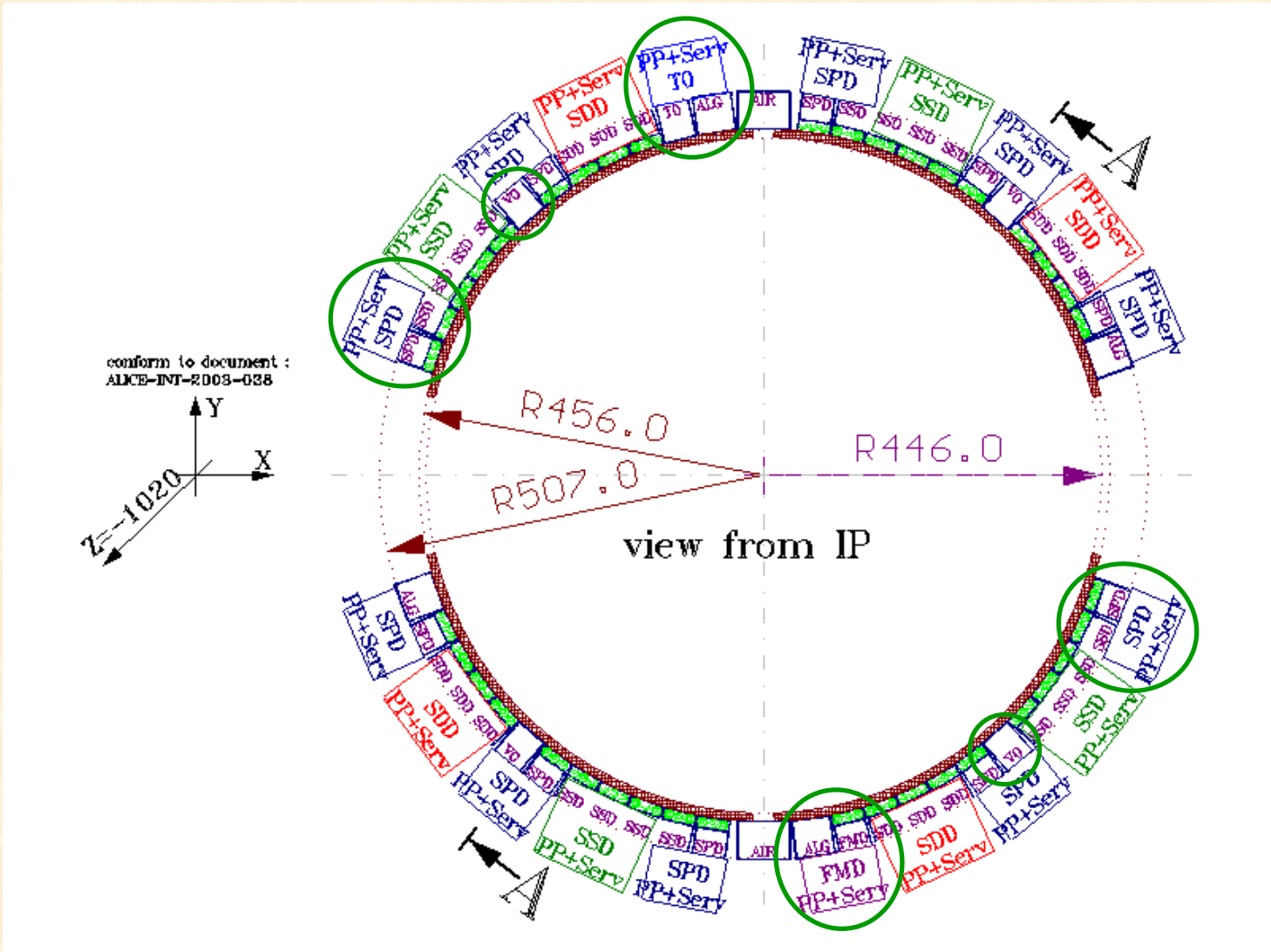
Forward Detector Integration

RB26: the FMD electronics new installation



Forward Detector Integration

RB26 Service Distribution: May 2004 proposal



Forward Detector Integration

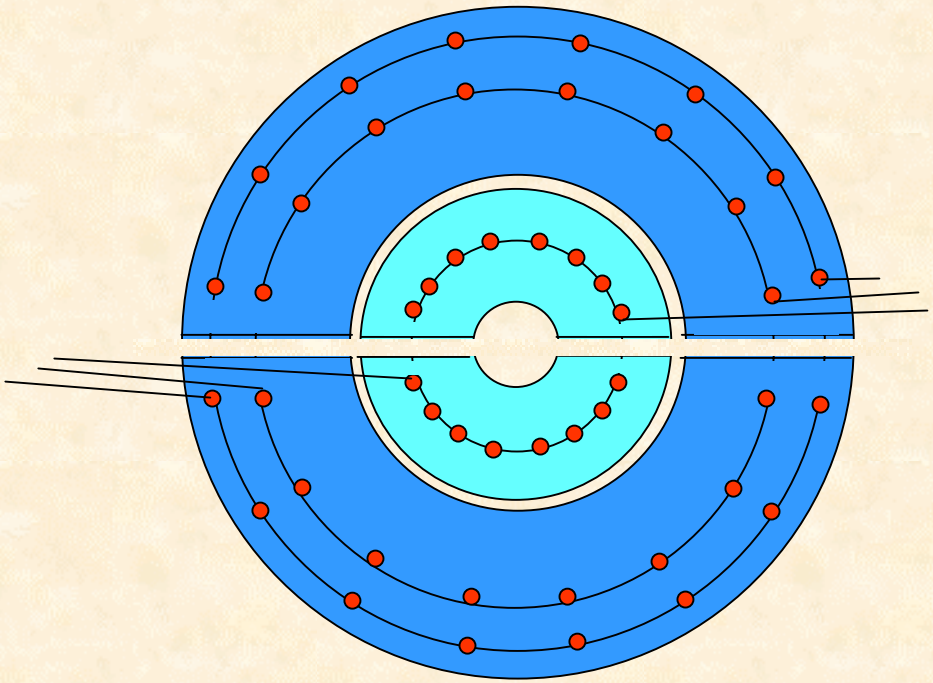
RB26 Service Distribution: May 2004 proposal

- assign exclusively to V0 the four ducts at 45°
  - Advantage: possibility to satisfy a reasonable increase of the V0 granularity
- assign to T0 the top patch panel and duct previously attributed to SPD (the duct could house also the power cables of the FMD)
  - Advantage: fulfil all the new requirements from T0
- assign to SPD the nearly horizontal patch panels and ducts previously attributed to FMD
  - Advantage: fulfil all the new requirements from SPD
- assign to FMD one of the bottom patch panels and a duct previously attributed to SPD
  - Advantage: fulfil the requirement from FMD concerning a unique and short connection between the 4 digitizers and the RCU
  - *Disanvantage:* *the pre-cabling of the two half-FMD as foreseen in the 2003 scenario is seriously affected*

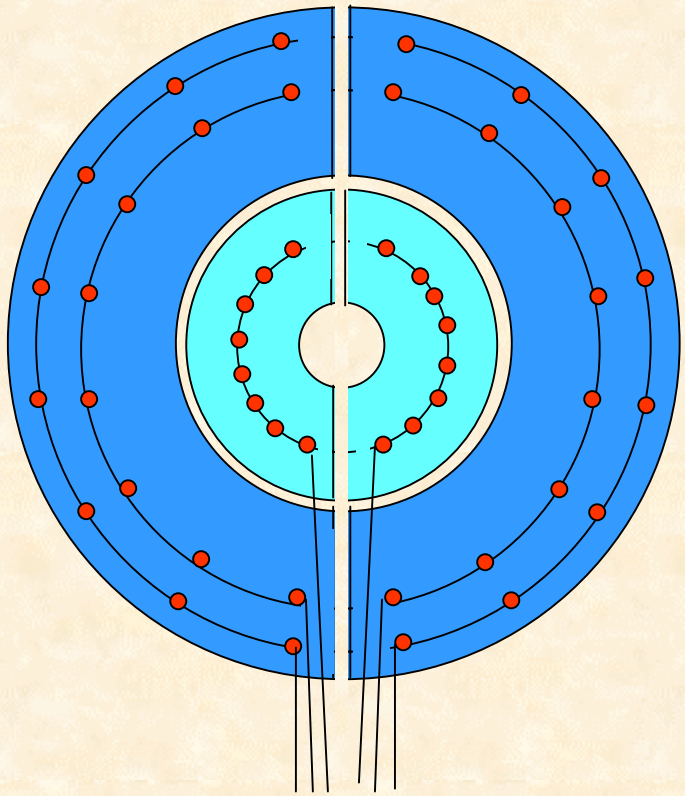
RB26: the two halfs of the FMD

RB26 Service Distribution: FMD

2003 scenario

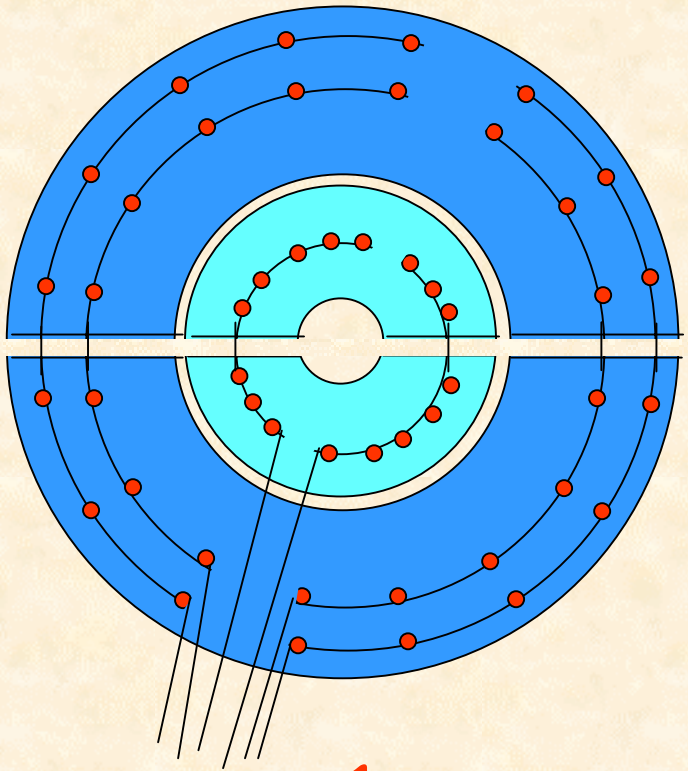


2004 possible scenario?



RB26 Service Distribution: FMD

May 2004 proposals



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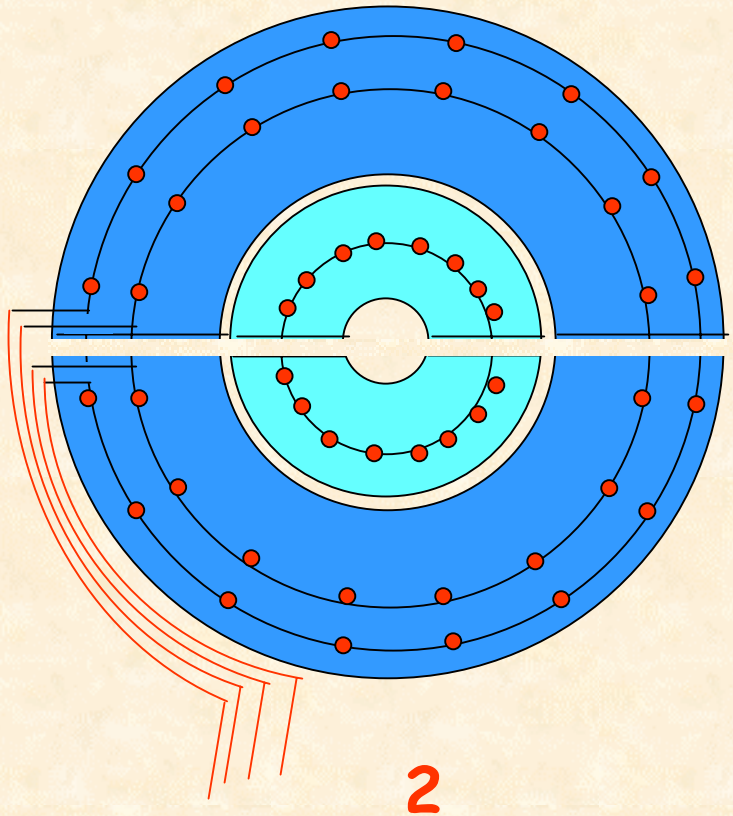

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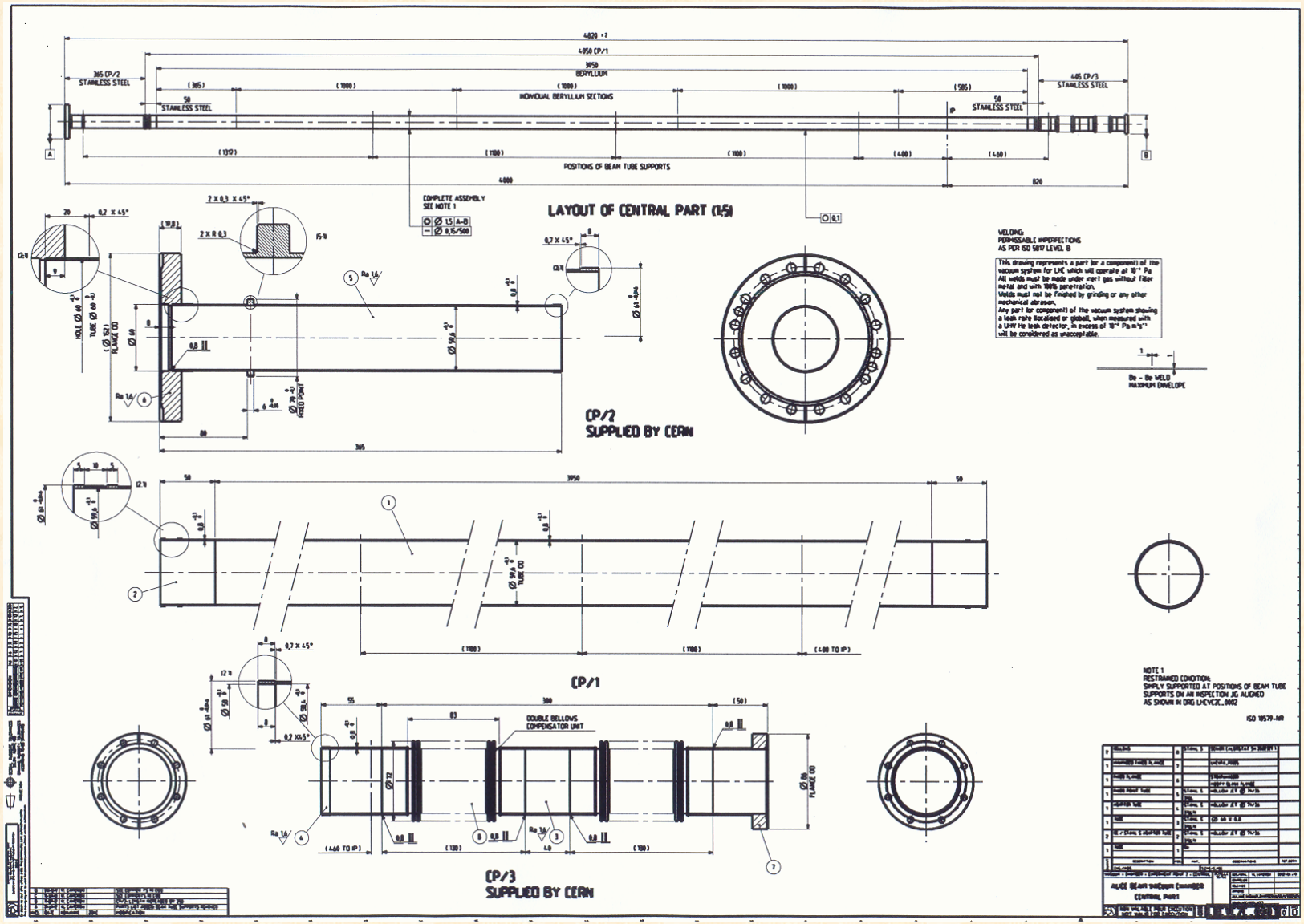
Forward Detector Integration

The central beam pipe

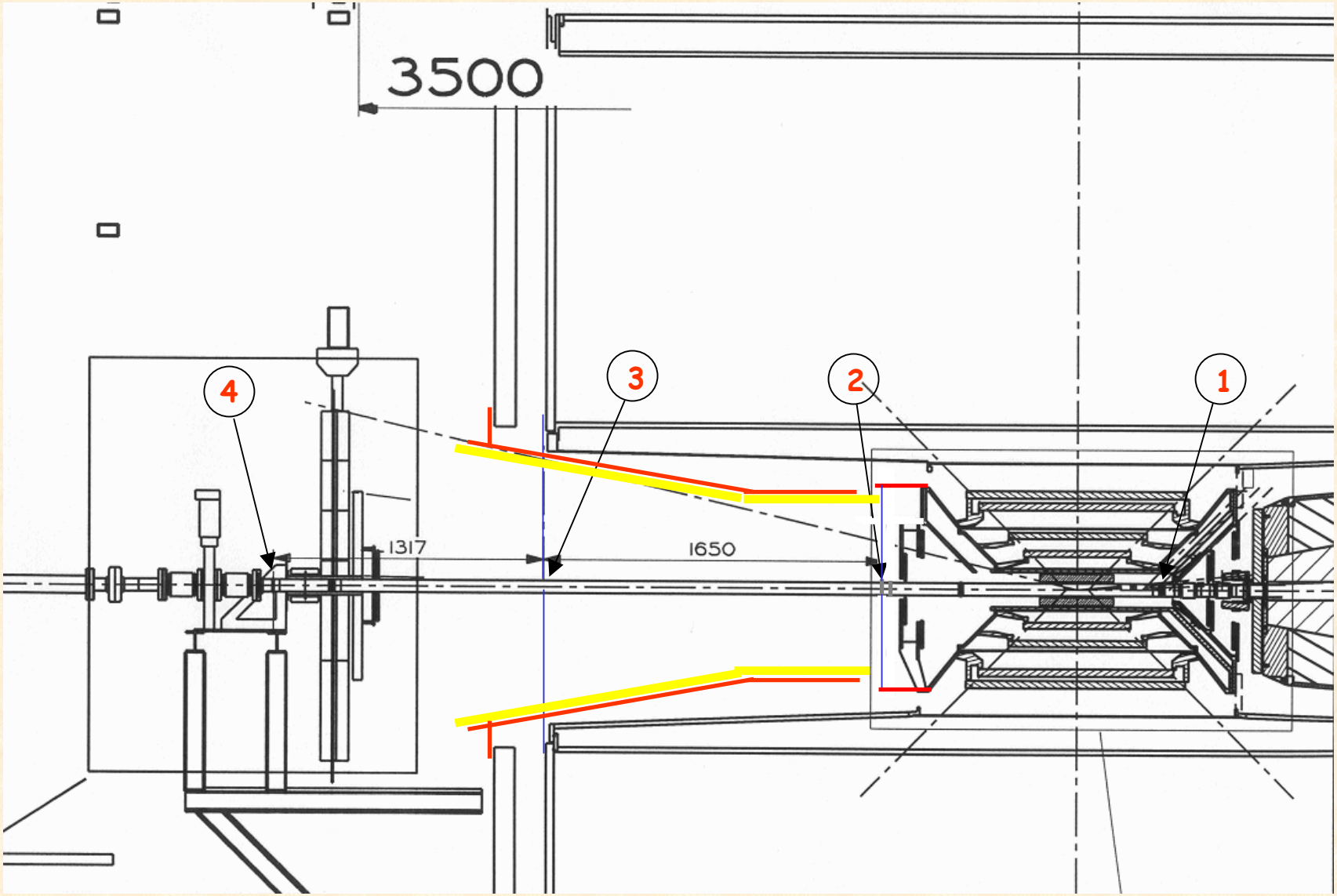


The central beam pipe supports: Requirements

- All the central beam pipe supports must be fixed to the same mechanical system to protect welded and brazed connections
- at RB26 the central beam pipe flange must be connected via two bellows to the flange of the beam pipe fixed to the m absorber
- at RB24 the central beam pipe must be fixed with no degrees of freedom in x, y, z and in rotation
- the various supports must protect the central beam pipe from vibrations with frequency > 50-60 Hz
- the distance between two successive supports should be as regular as possible
- the radial clearance between beam pipe and detectors mounted on the same support as the beam pipe must be ≥ 5.0 mm, having taken into account all the design and fabrication tolerances
- the radial clearance between beam pipe and detectors non mounted on the same support as the beam pipe must be ≥ 10.0 mm, having taken into account all the design and fabrication tolerances

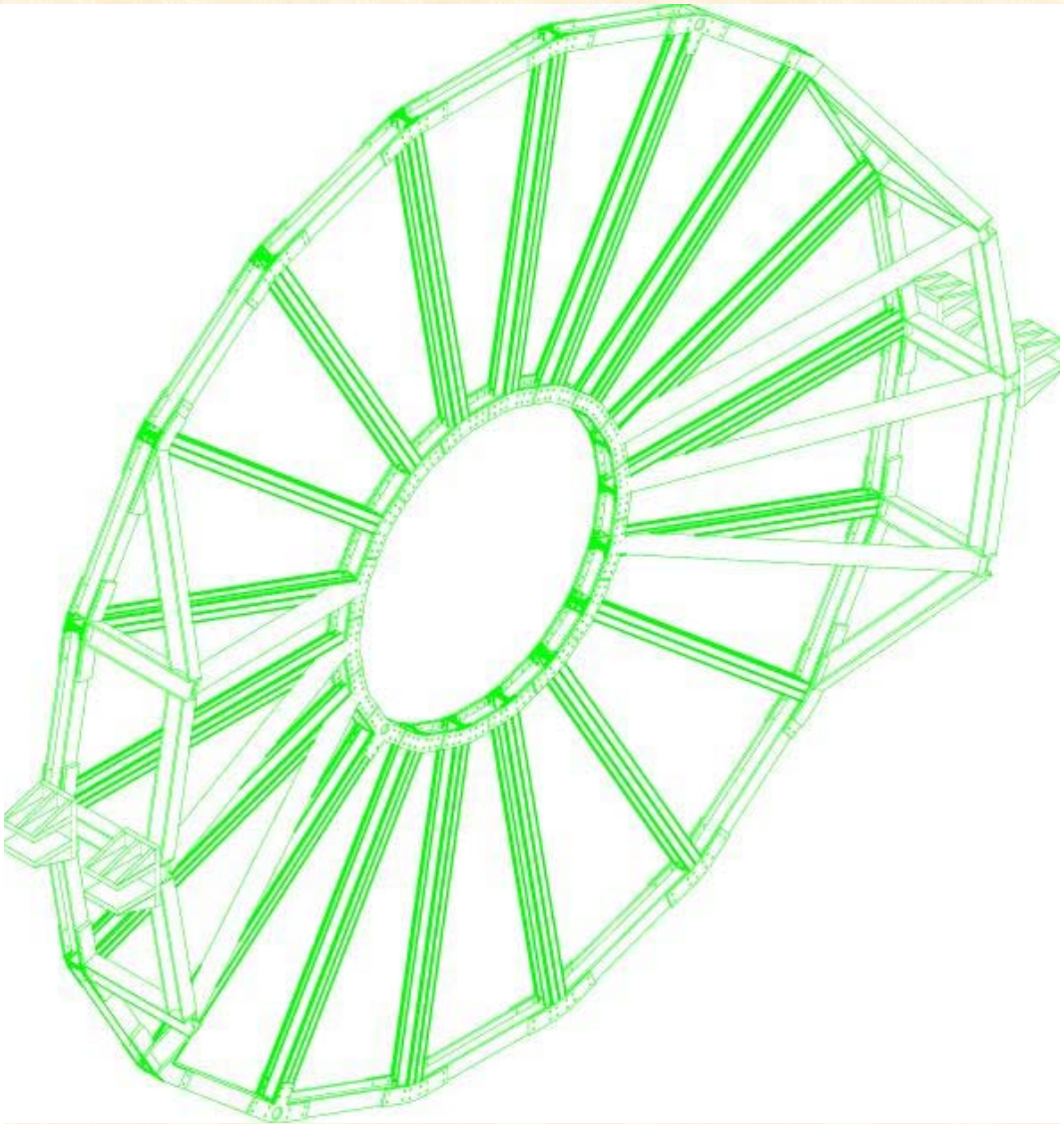
Forward Detector Integration

The central beam pipe supports

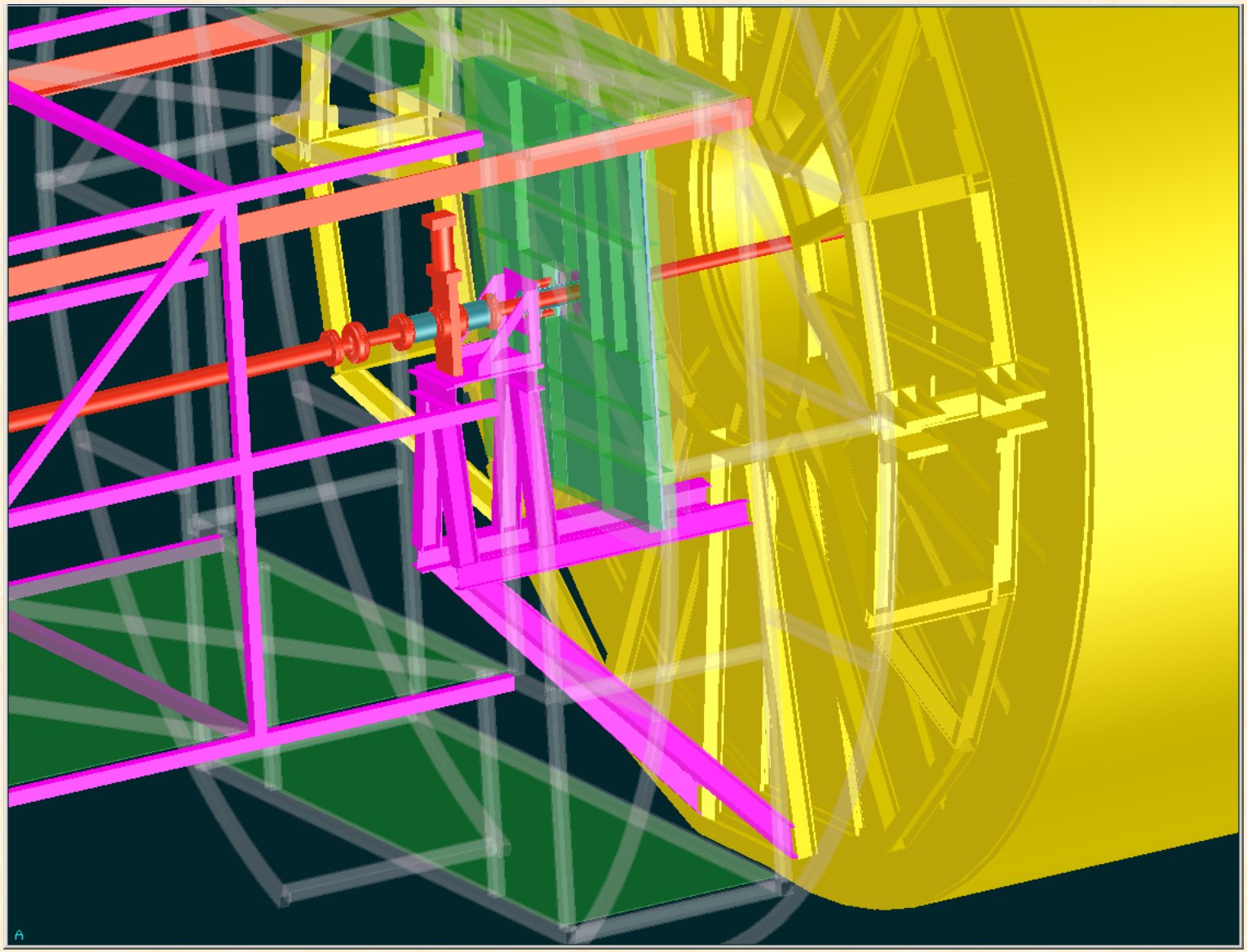


Forward Detector Integration

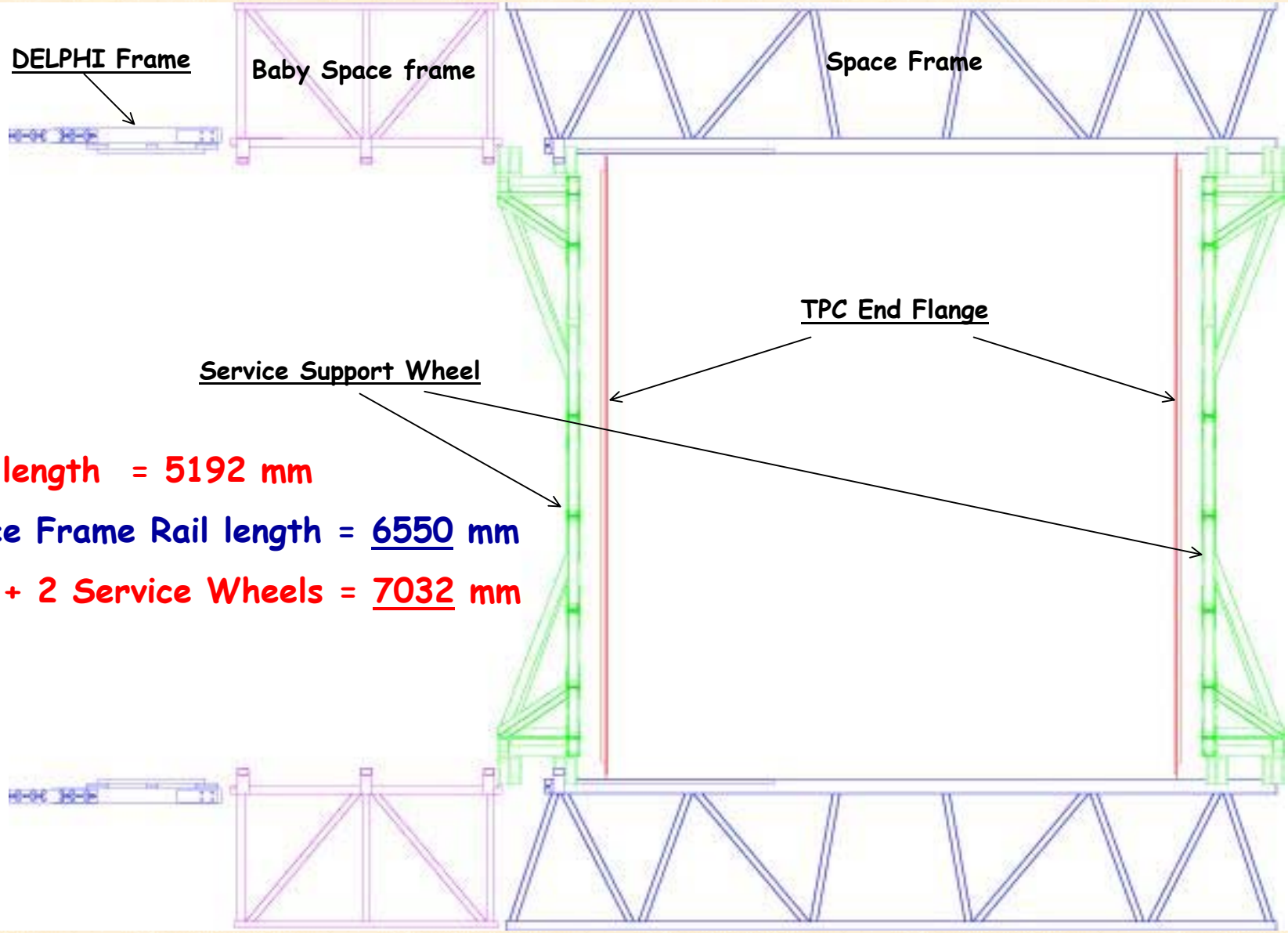
The Service Support Wheel



Forward Detector Integration



Forward Detector Integration



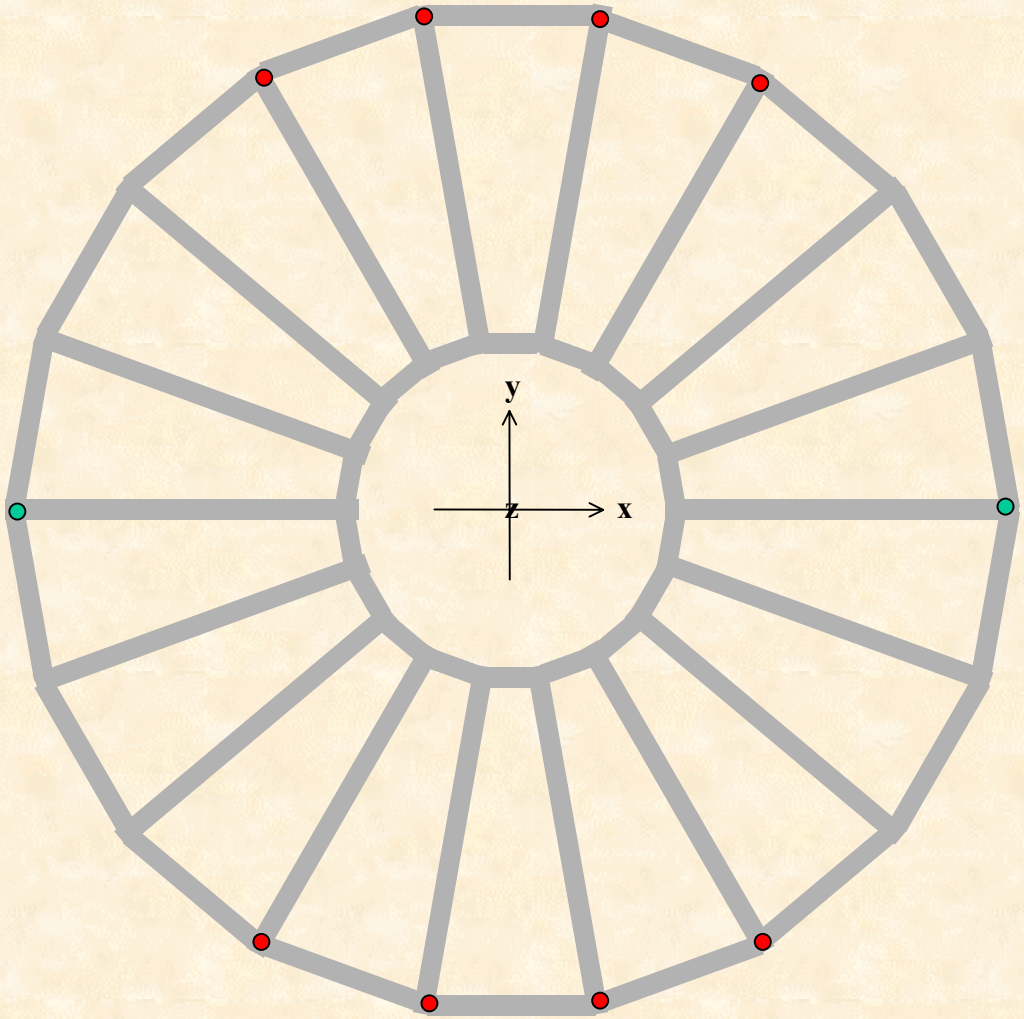
TPC length = 5192 mm

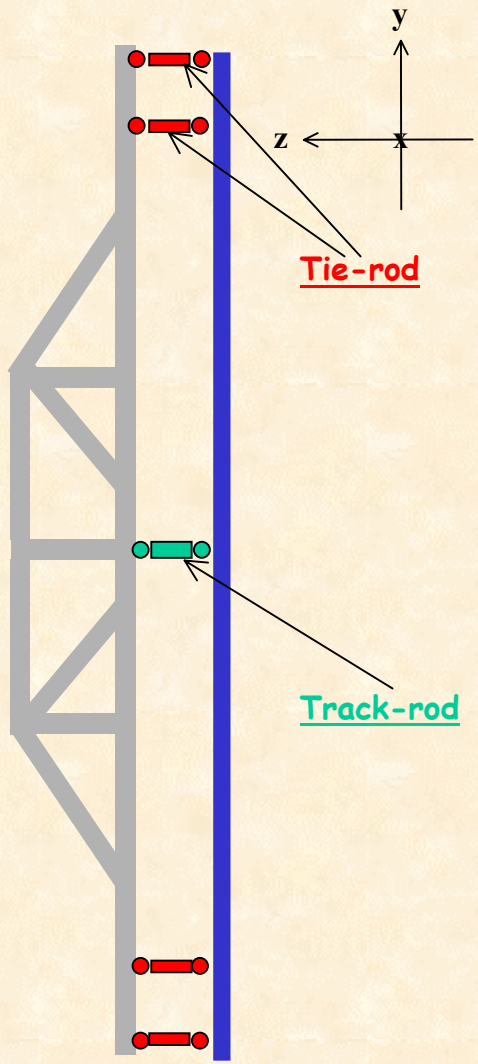
Space Frame Rail length = 6550 mm

TPC + 2 Service Wheels = 7032 mm

Forward Detector Integration

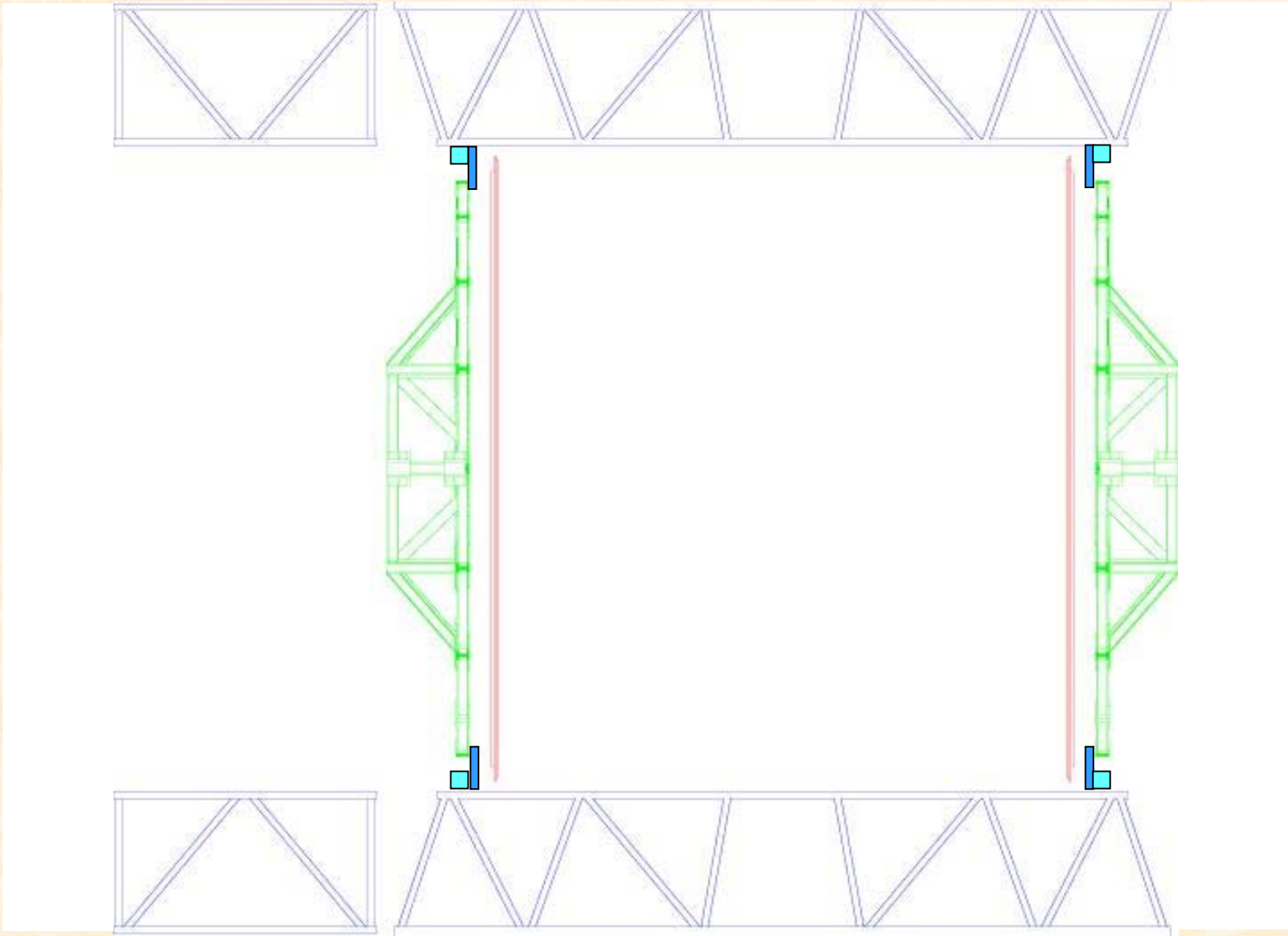
Scenario during TPC & SSW installation





Forward Detector Integration

Scenario with TPC & SSW installed



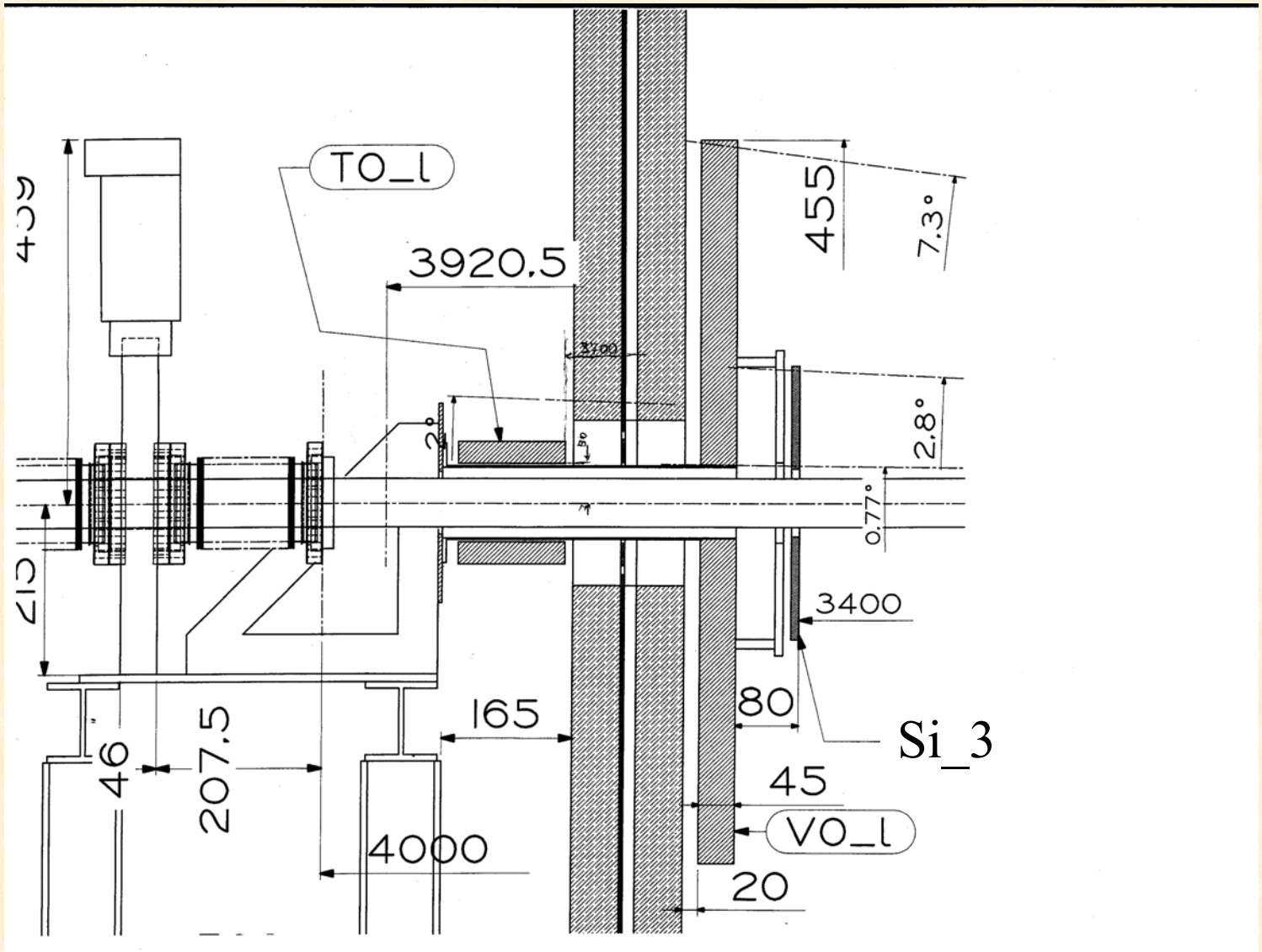
Beam pipe support

Open question

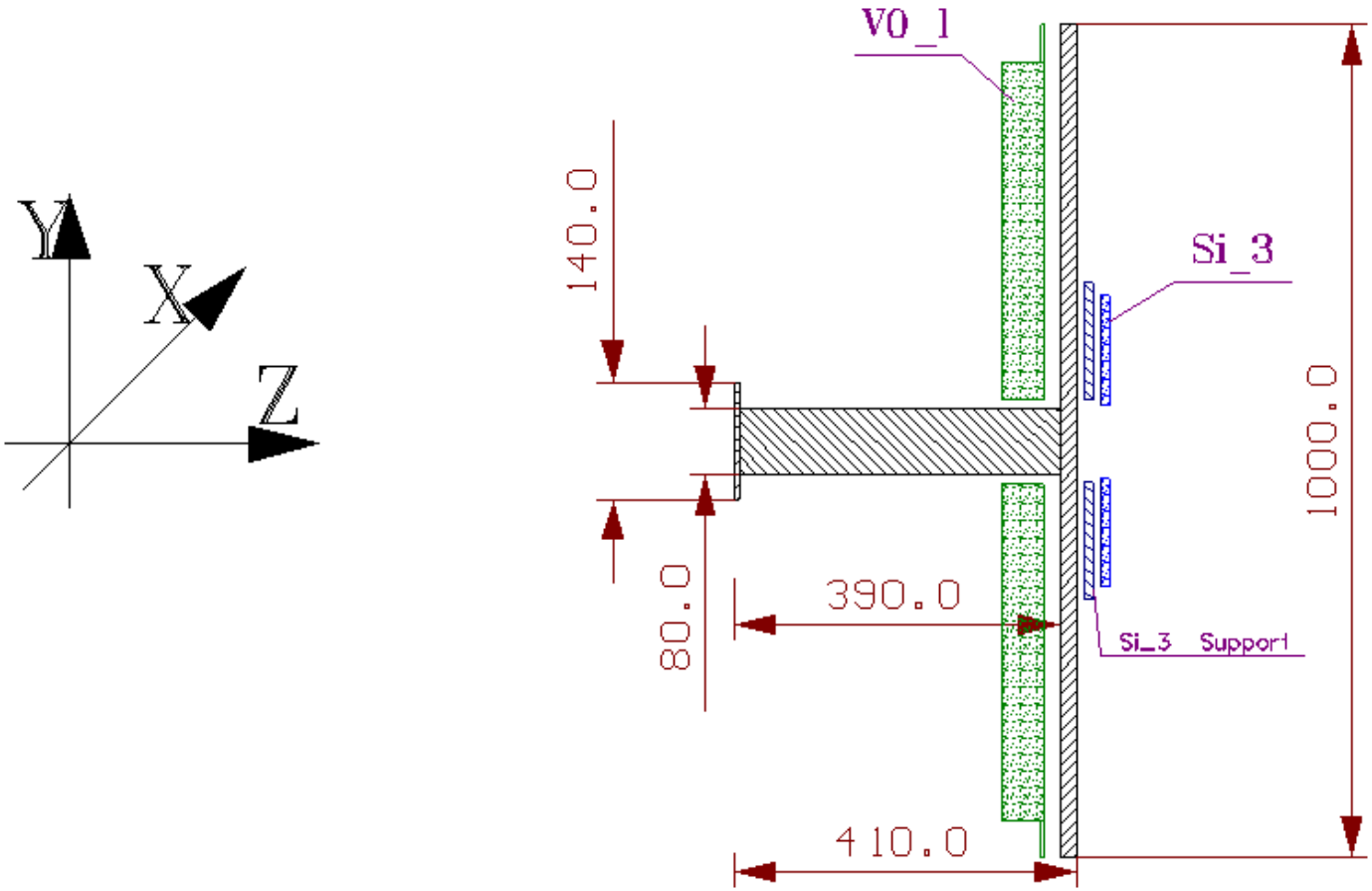
In order to safely support the beam pipe according to the existing scenario, it is essential to make sure that TPC and SSWs, in operation position, can be considered as elements of a unique and stable mechanical system.

Forward Detector Integration

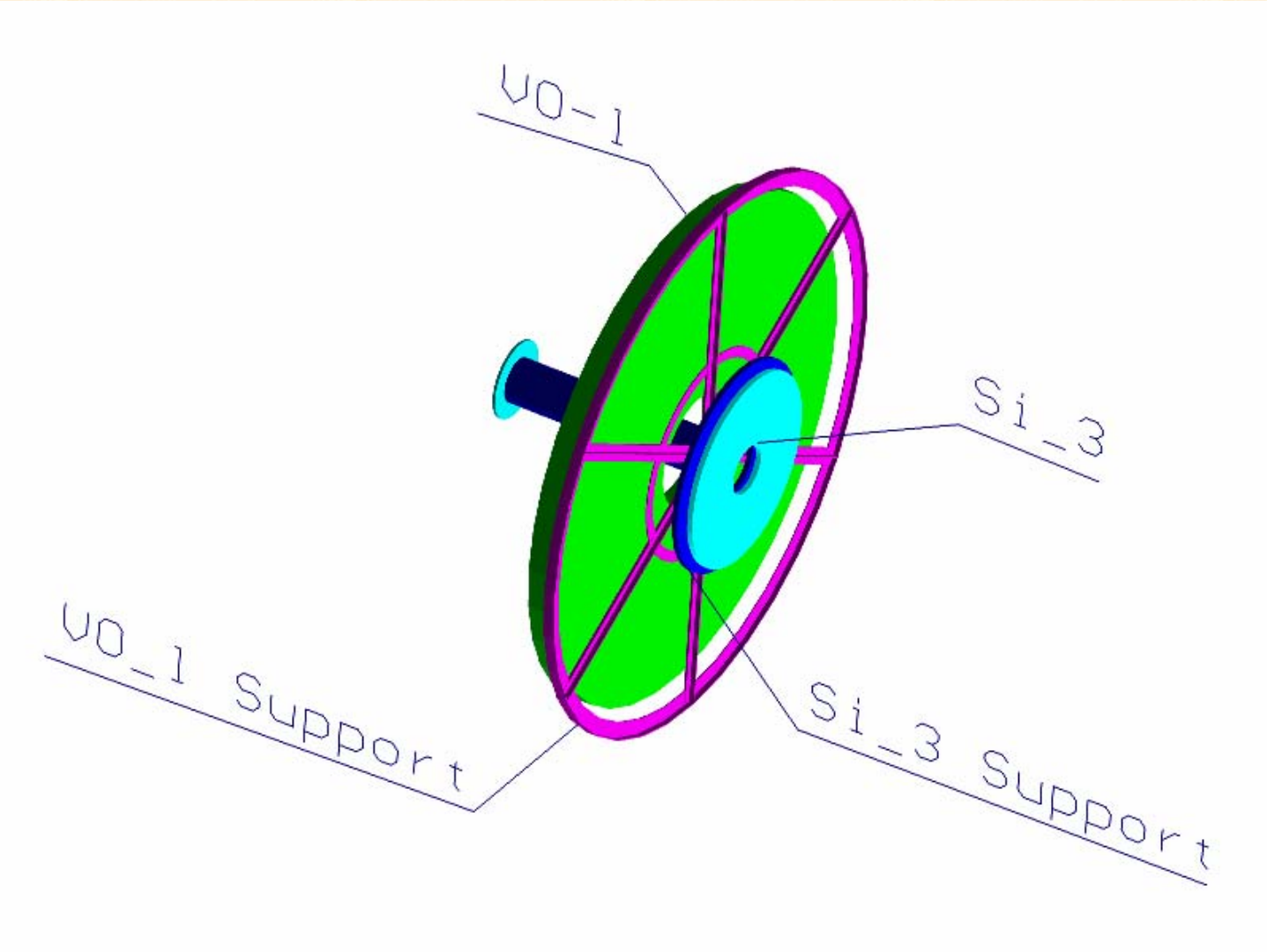
RB24 V0_L & Si_3 present position



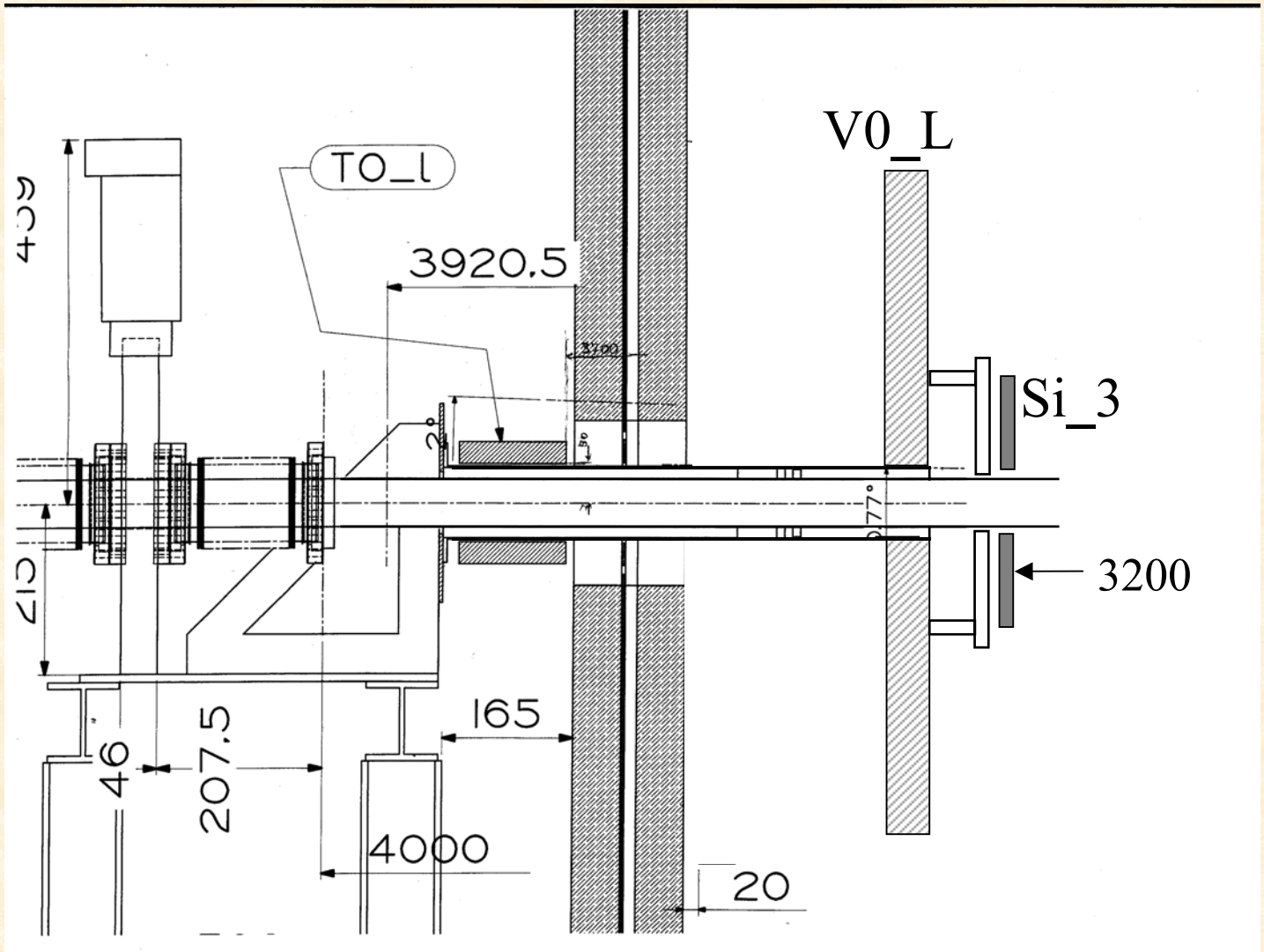
RB24 T0_L, V0_L and Si_3 support (sketch)



RB24 T0_L, V0_L and Si_3 support (sketch)

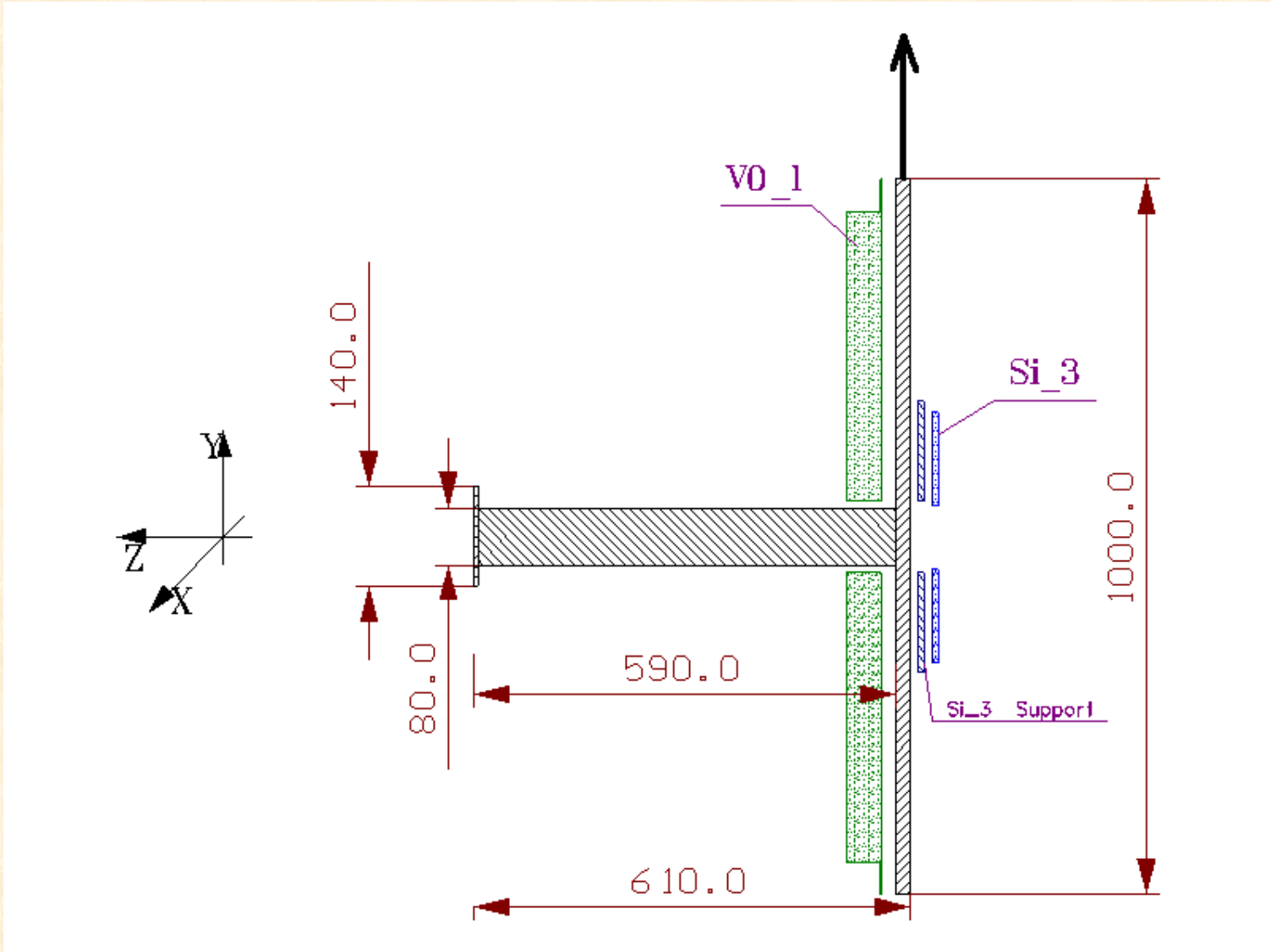


RB24 V0_L & Si_3 new position (proposal)



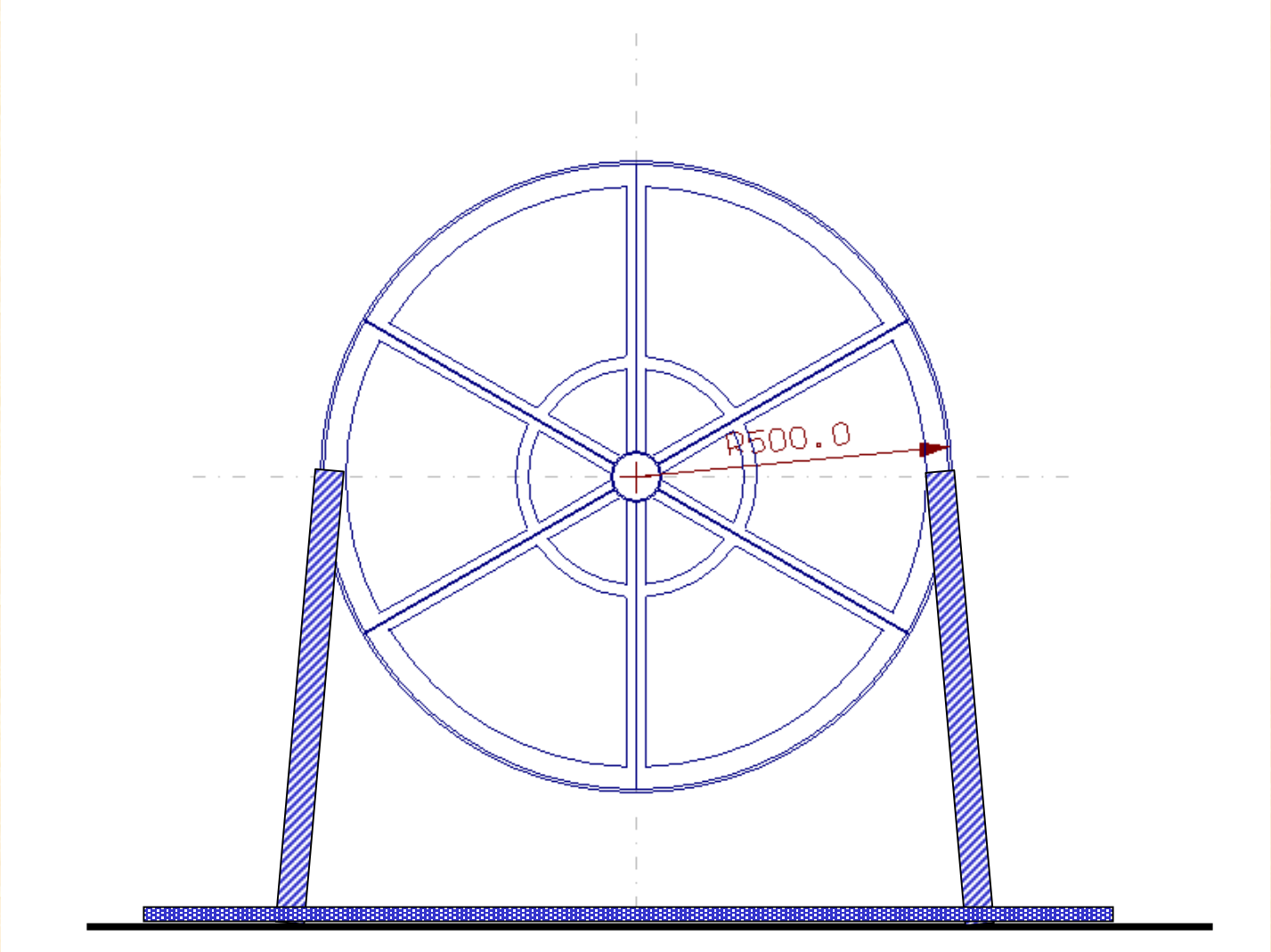
Forward Detector Integration

RB24 T0_L, V0_L and Si_3 possible new support (sketch)



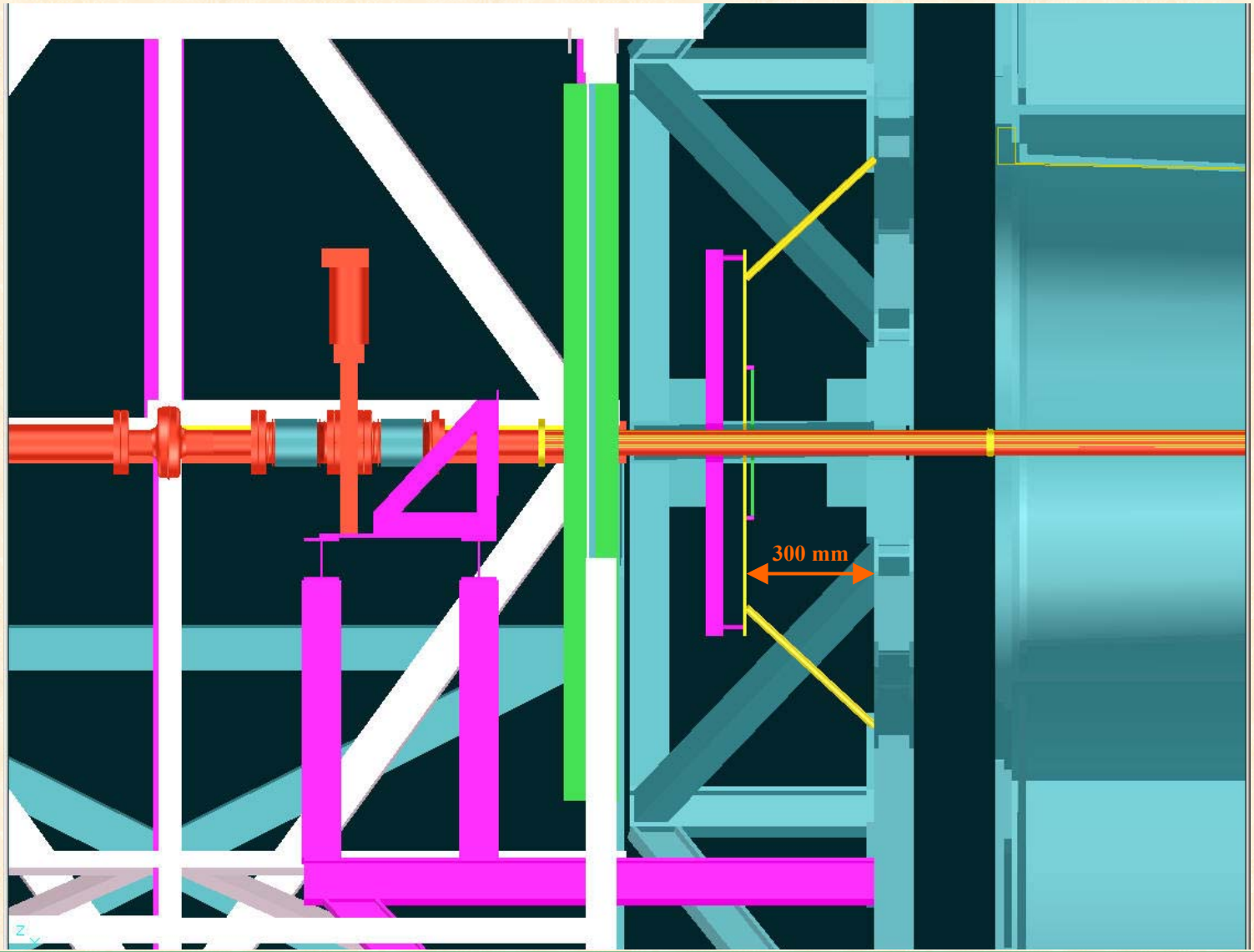
Forward Detector Integration

RB24 T0_L, V0_L and Si_3 new possible support reinforced



Forward Detector Integration

RB24 T0_L, V0_L and Si_3 second new possible support



RB24 FWD services

Warning

Due to the modifications not yet finalised in the service distribution on RB24 and to the unclear scenario with the Beam Pipe and the FWD supports on RB24, the detailed study of the ITS and FWD service distribution on that side is not yet launched.

Conclusions

- On RB26, the scenario with the service distribution on the μ absorber up to the shoe-boxes is rather clear with the exception of the FMD cabling problem
- on RB26, it is urgent to define the size of the various shoe-boxes in order to finalise the situation on the m absorber support (hole for alignment, …)
- on RB24 the situation of the service scenario for ITS and FWDs looks dramatic in particular in view of the imminent redaction of the FMD TDR

All the projects involved are warmly invited to provide information and answers when requested.