

Report from ILD Regional Integration Meeting

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DESY



MDI/Integration Pre-Meeting
22. May 2011

The meeting:

- 2 day long regional meeting of the ILD MDI/Integration group at LAL/Orsay: April 19-20
 - Was meant to serve as preparation meeting to the ILD workshop in Japan
 - ~12 participants (Paris, DESY, Spain, Wisconsin)

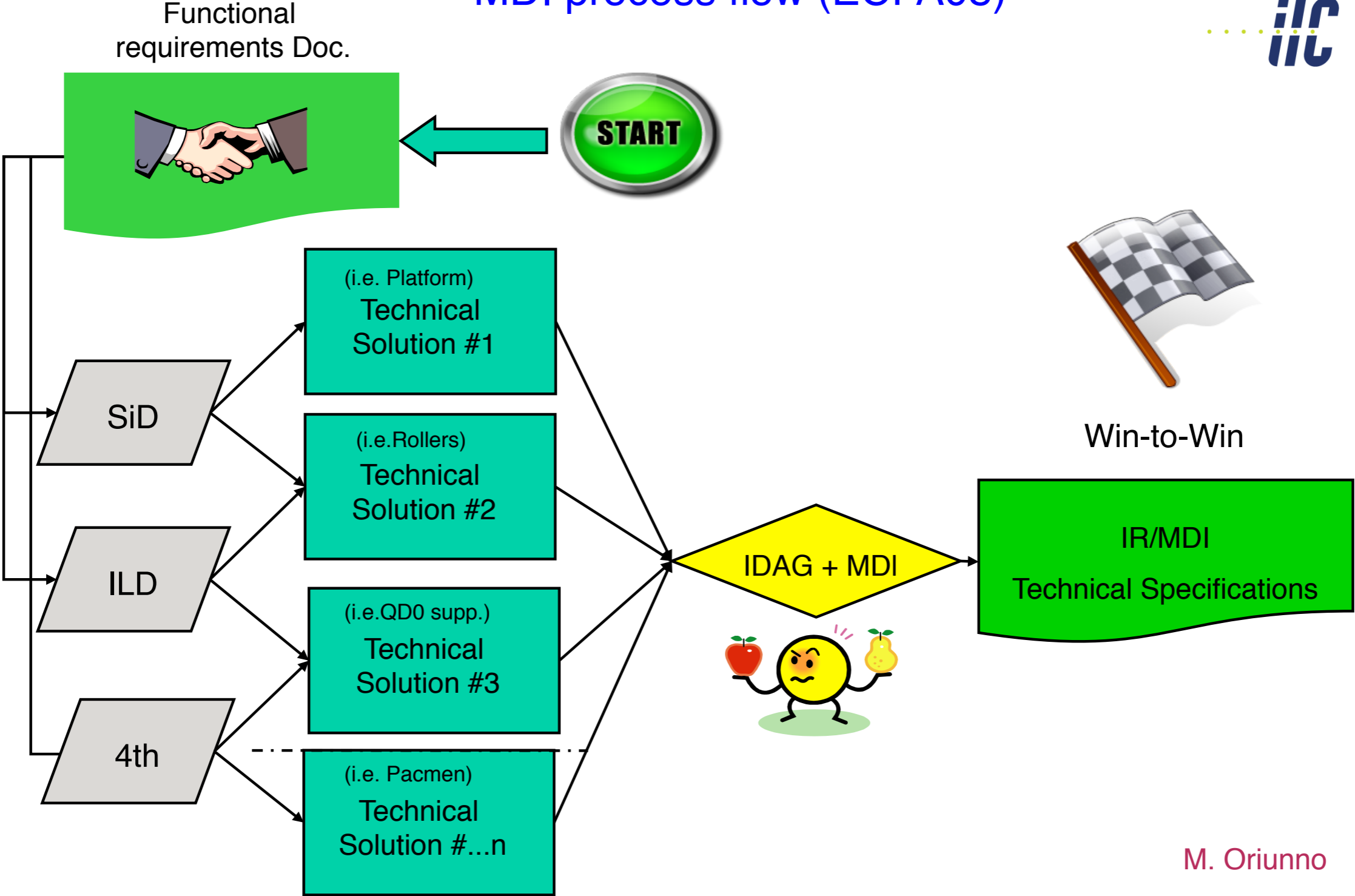
Main topics:

- Global MDI developments
- Underground hall design; interface to ILC-CFS and SID
 - Not part of this summary -> this afternoon
- Yoke design
- Inner detector integration
- Design documentation towards the DBD

Global MDI Developments

MDI Work Flow

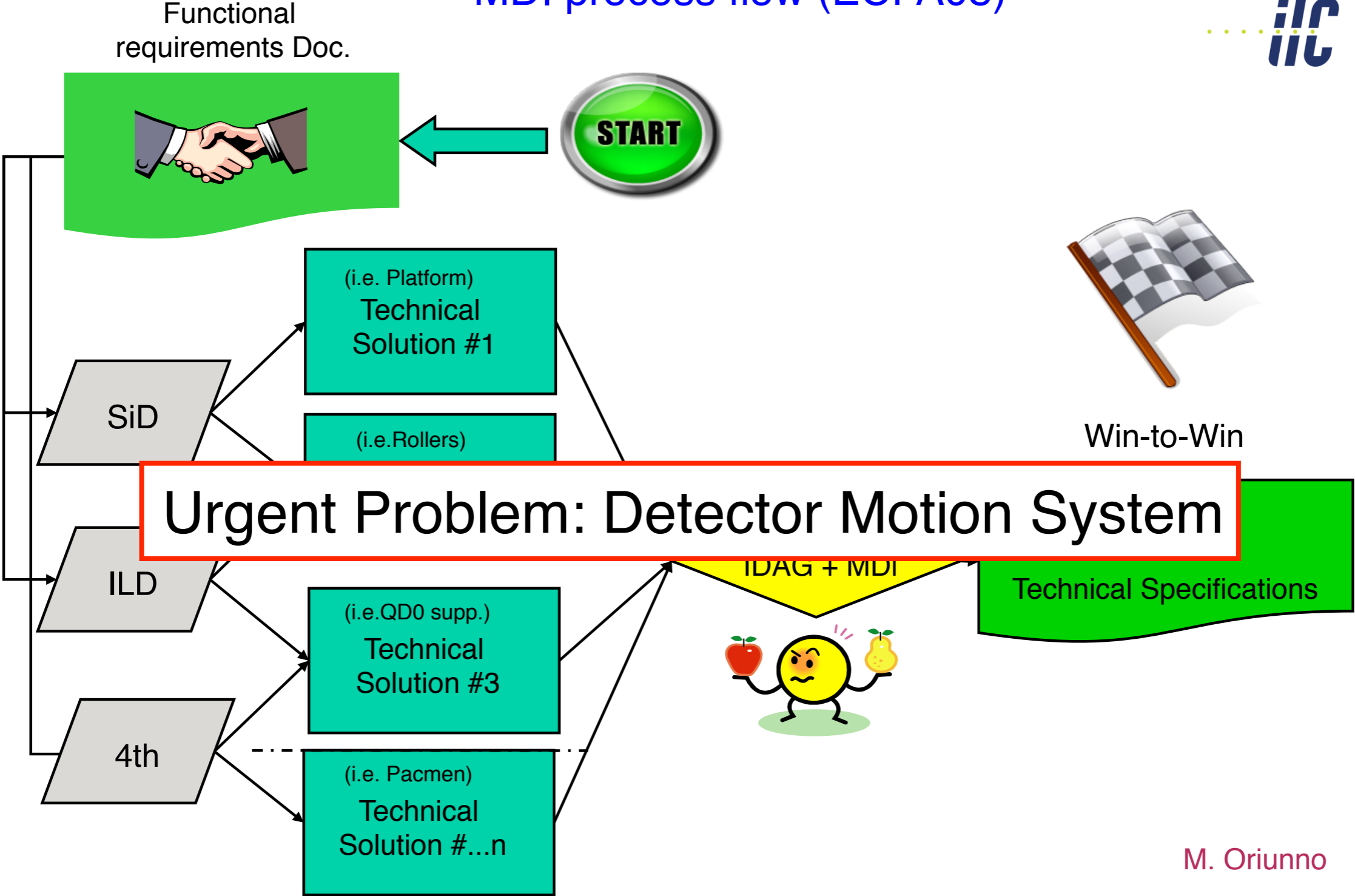
MDI process flow (ECFA08)



M. Oriunno

MDI Work Flow

MDI process flow (ECFA08)



M. Oriunno

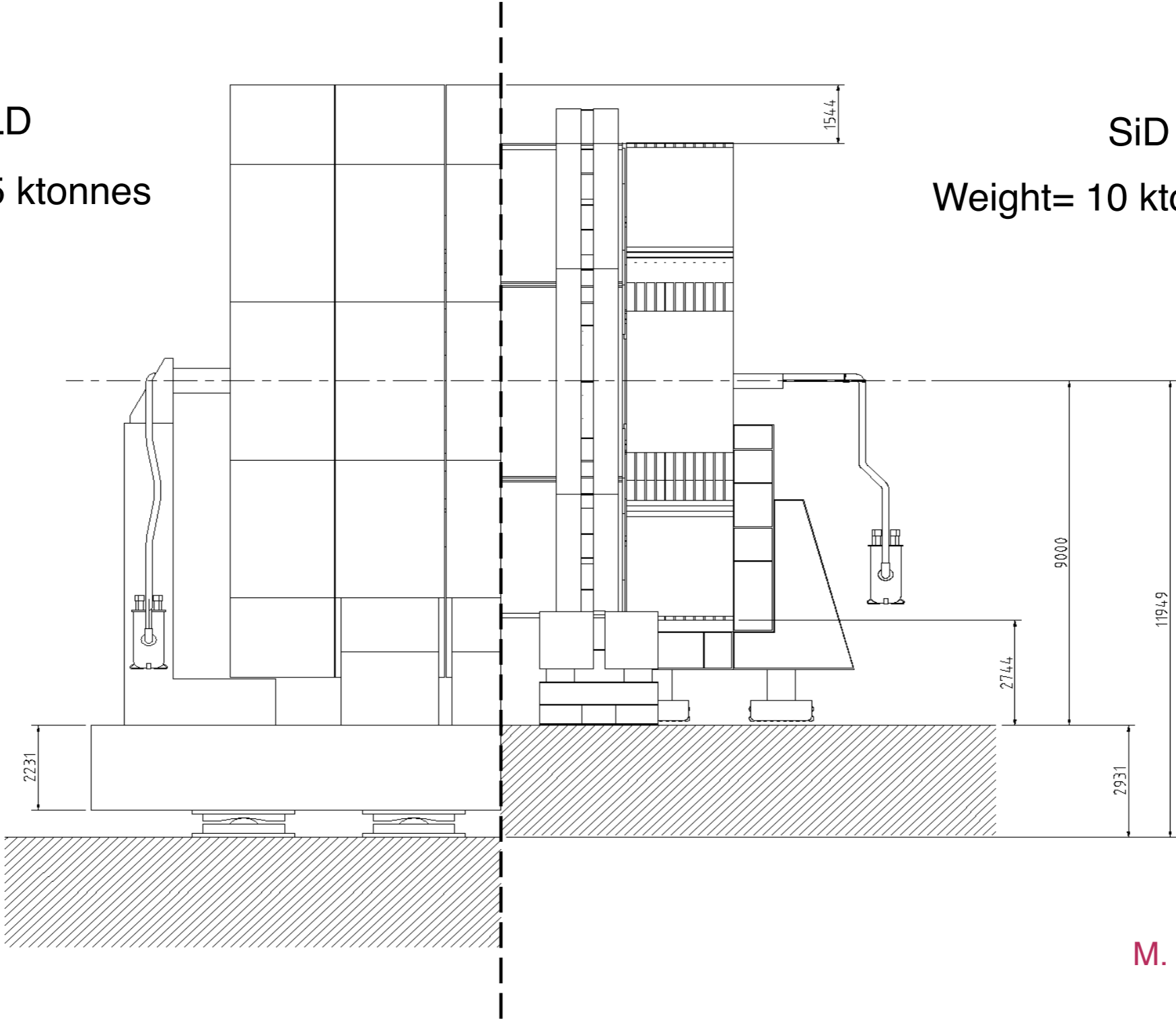
ILD and SiD Differences



ILD and SiD differences

ILD
Weight= 15 ktonnes

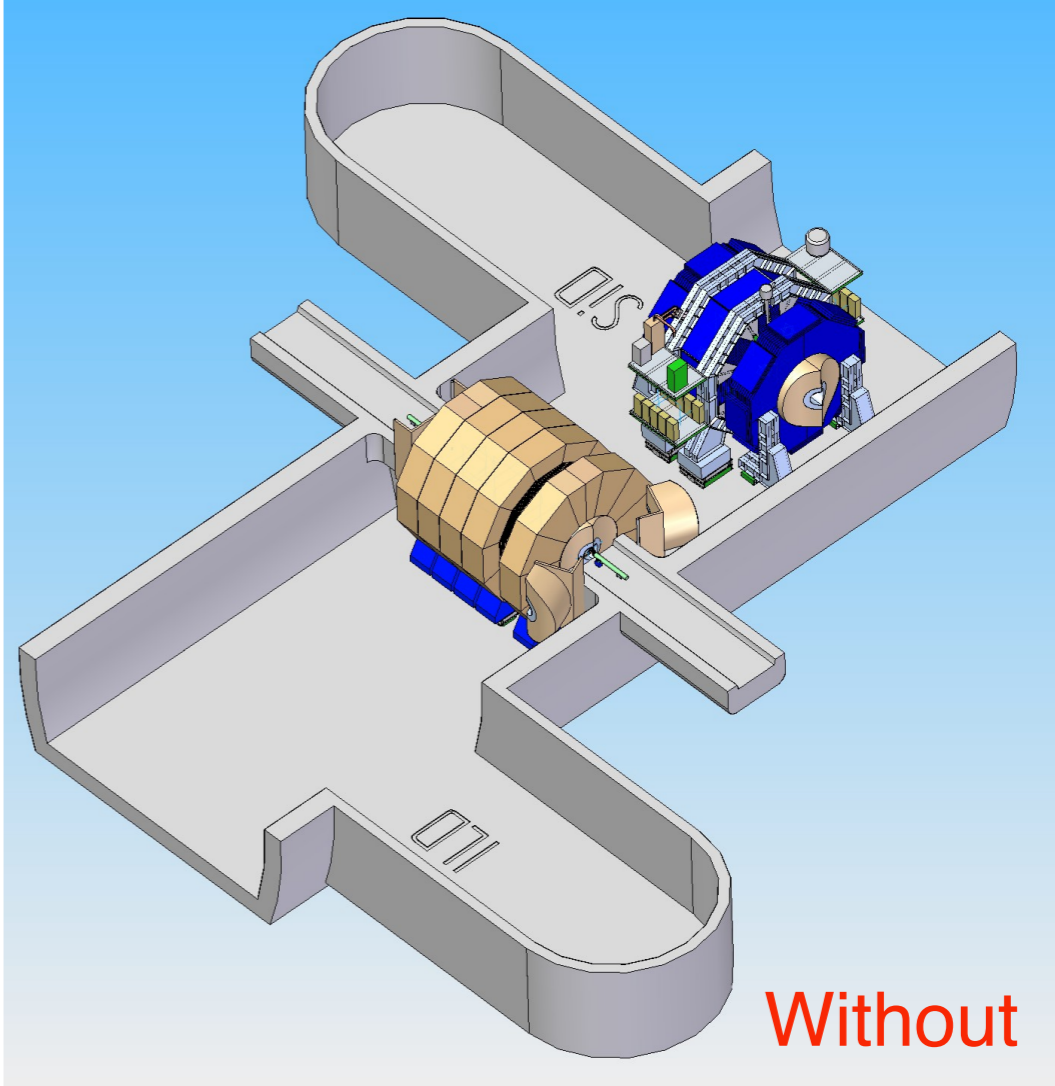
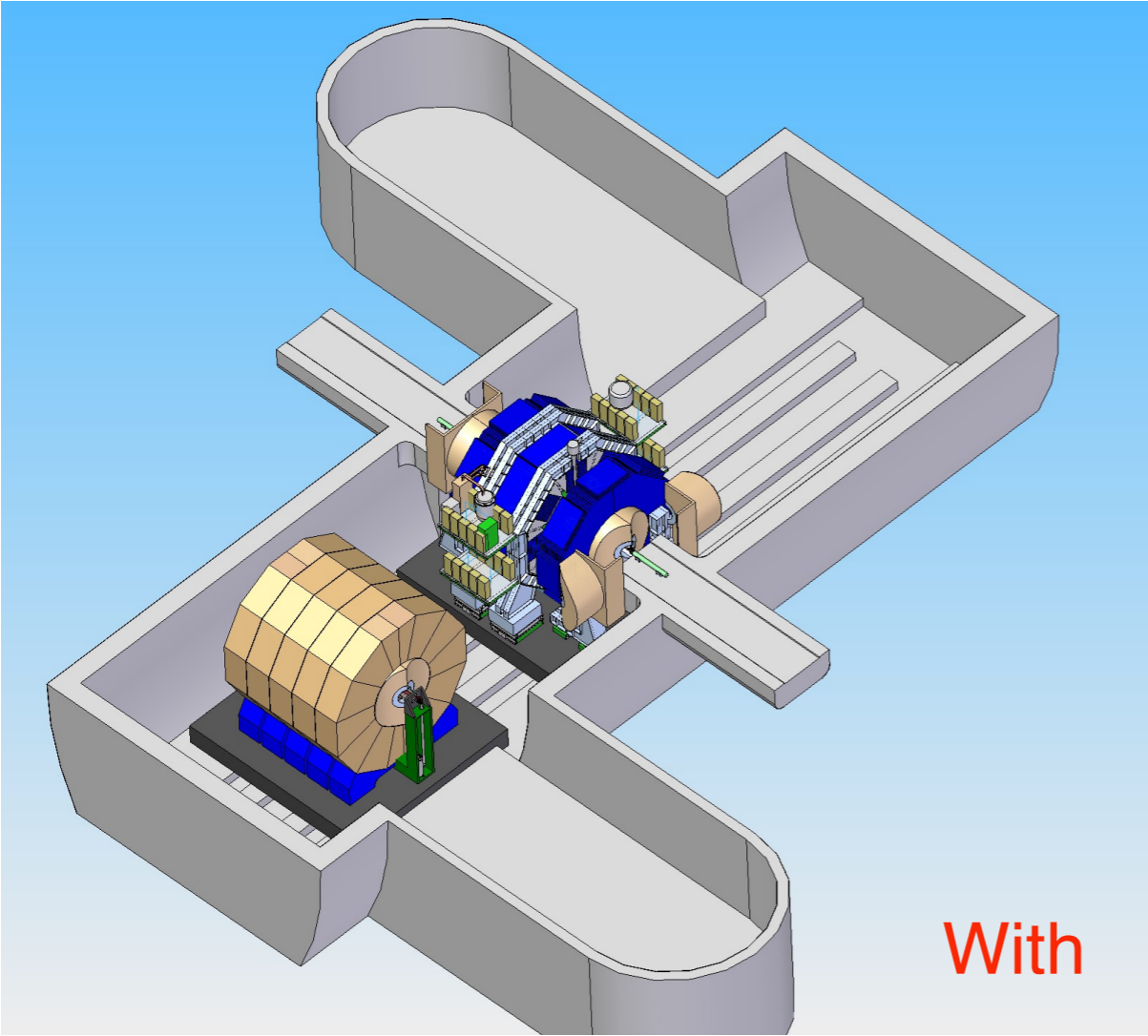
SiD
Weight= 10 ktonnes



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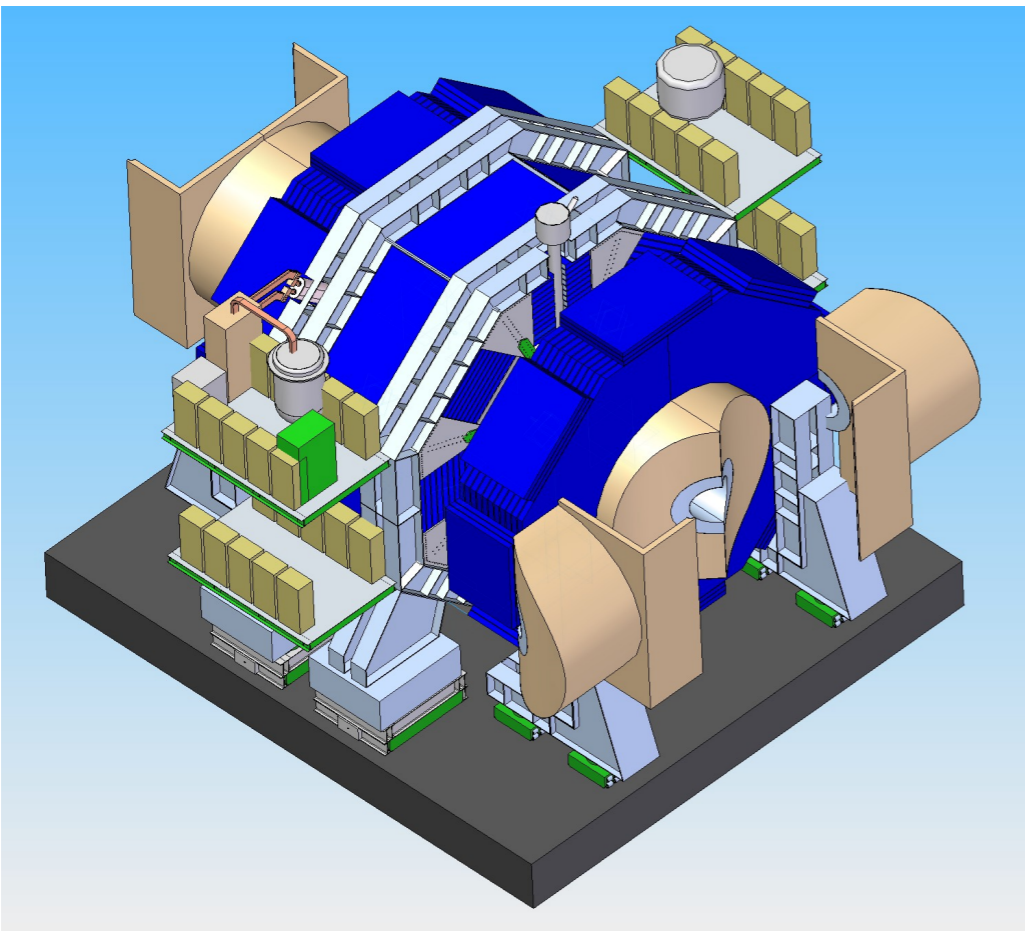
Detector Motion System

SiD and ILD with or without a platform ? ... 

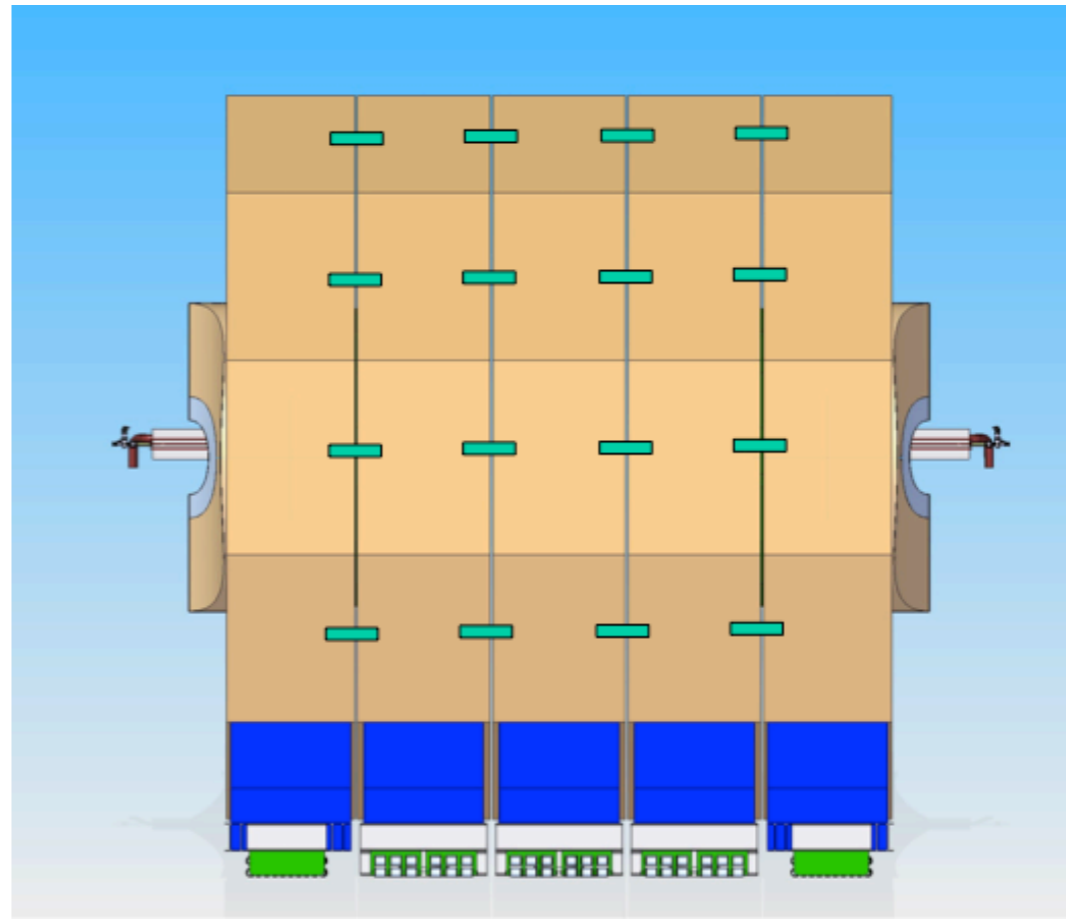


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Trade off study



SiD on Platform



ILD without Platform

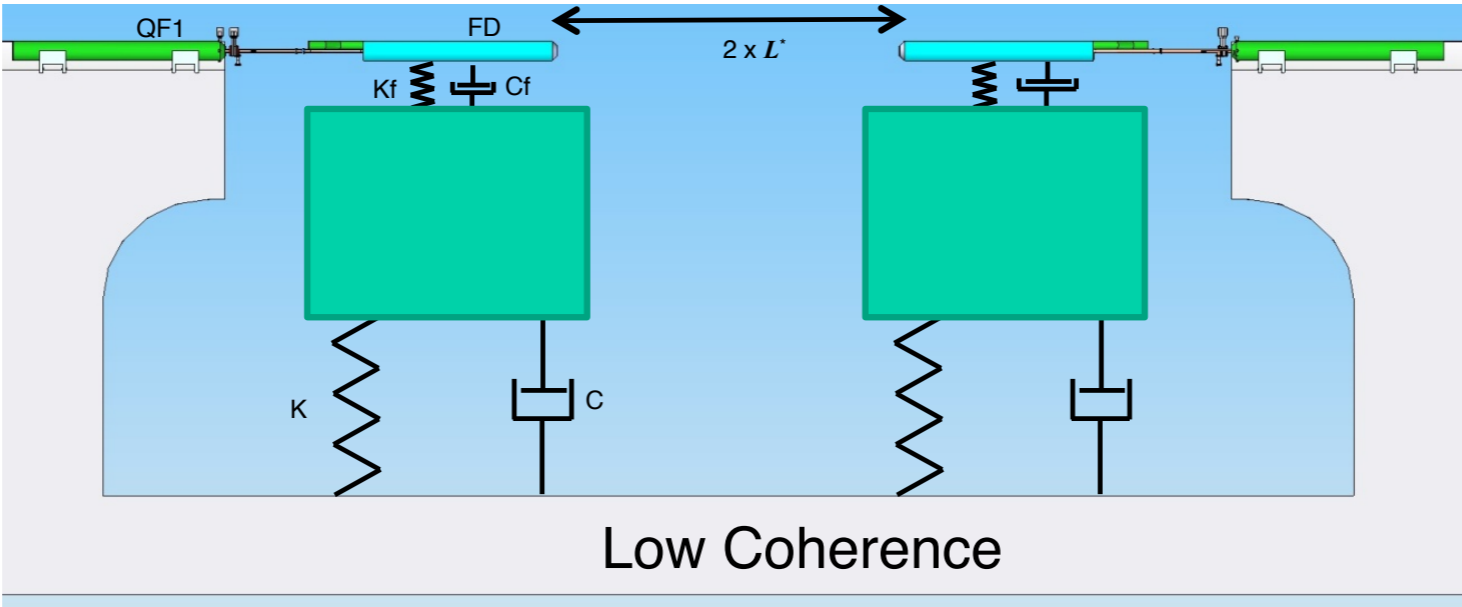
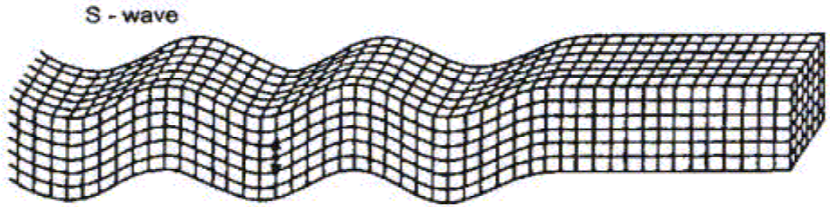
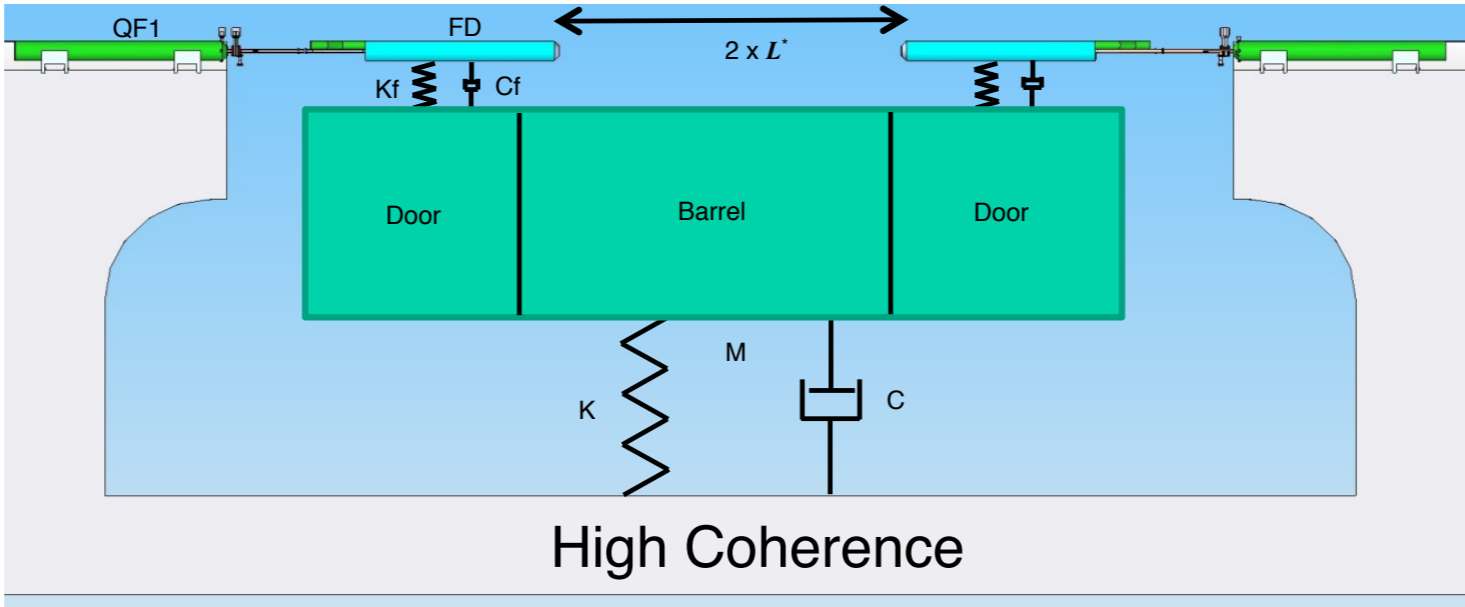
Mandatory requirements	SiD	ILD
Design Change Impact	None	High
Vibrations Amplification	Unkwon	Unkwon

M. Oriunno 13

QD0 Support Models



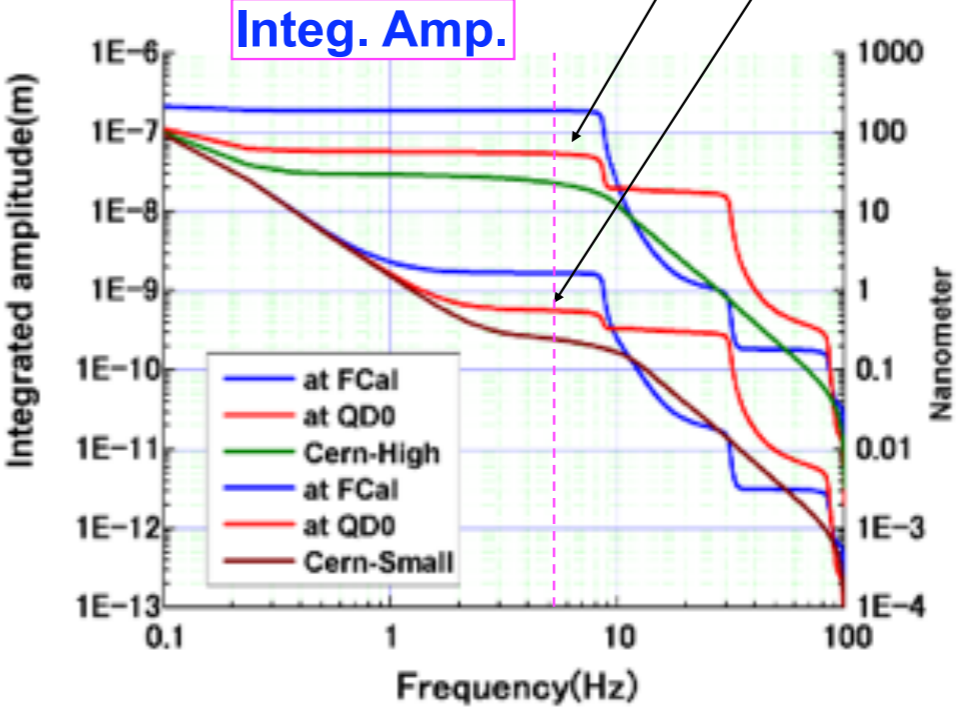
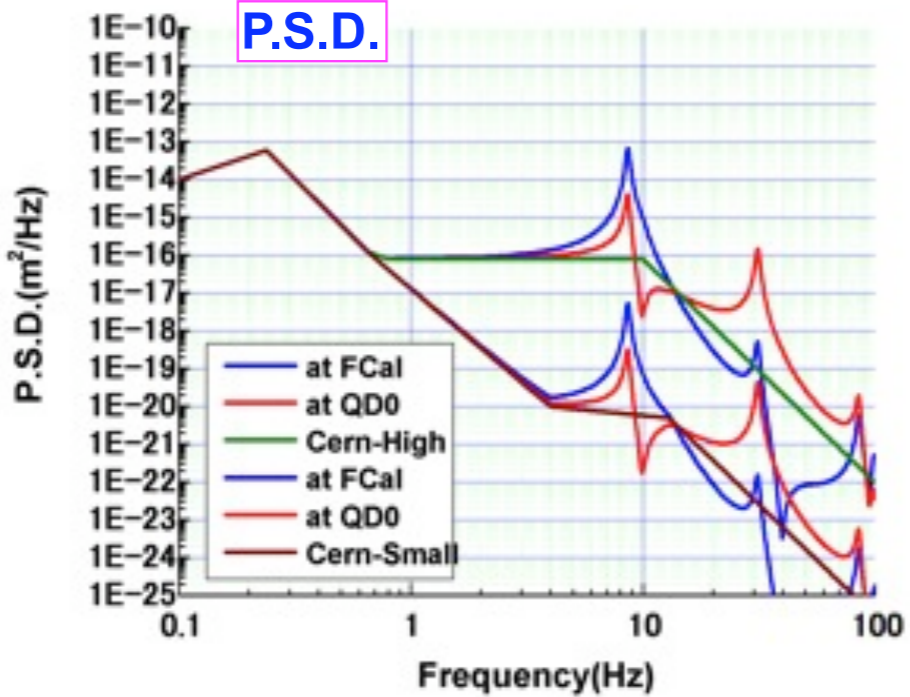
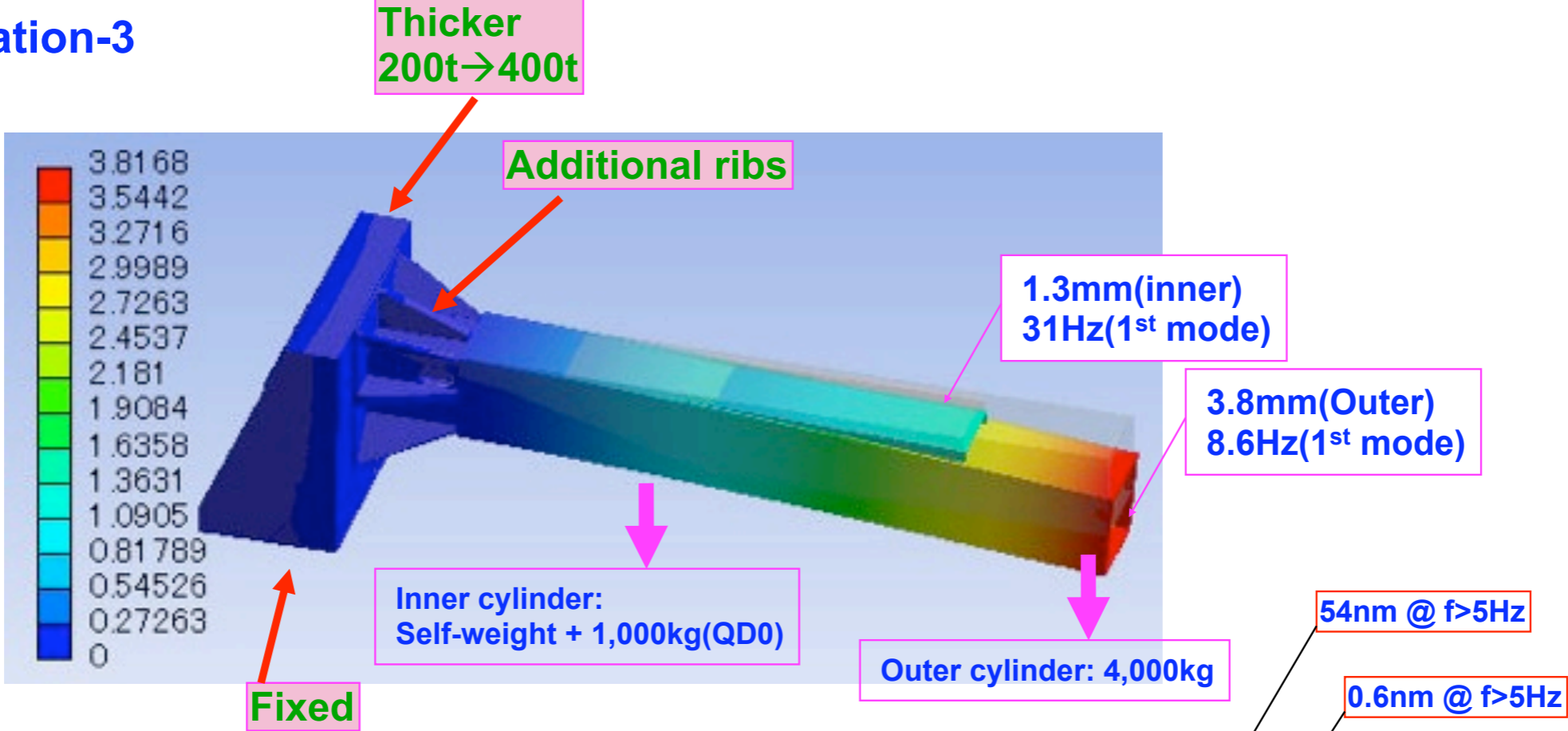
QD0 Supports



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ILD QD0 Support Vibration Analysis

Calculation-3

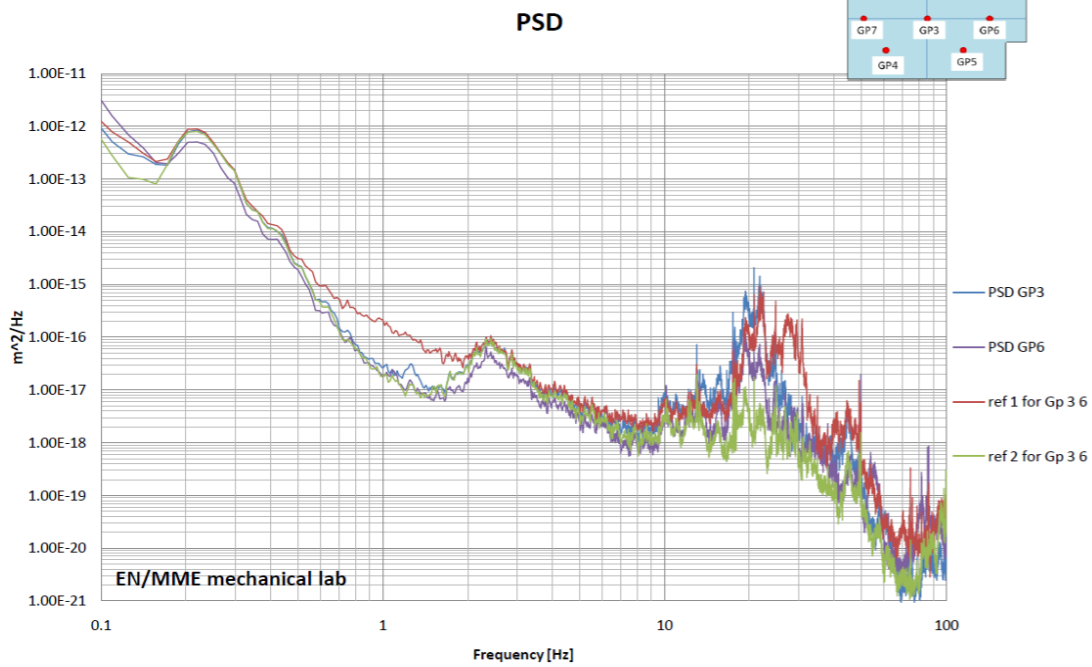


Vibration Measurements at CMS Plug

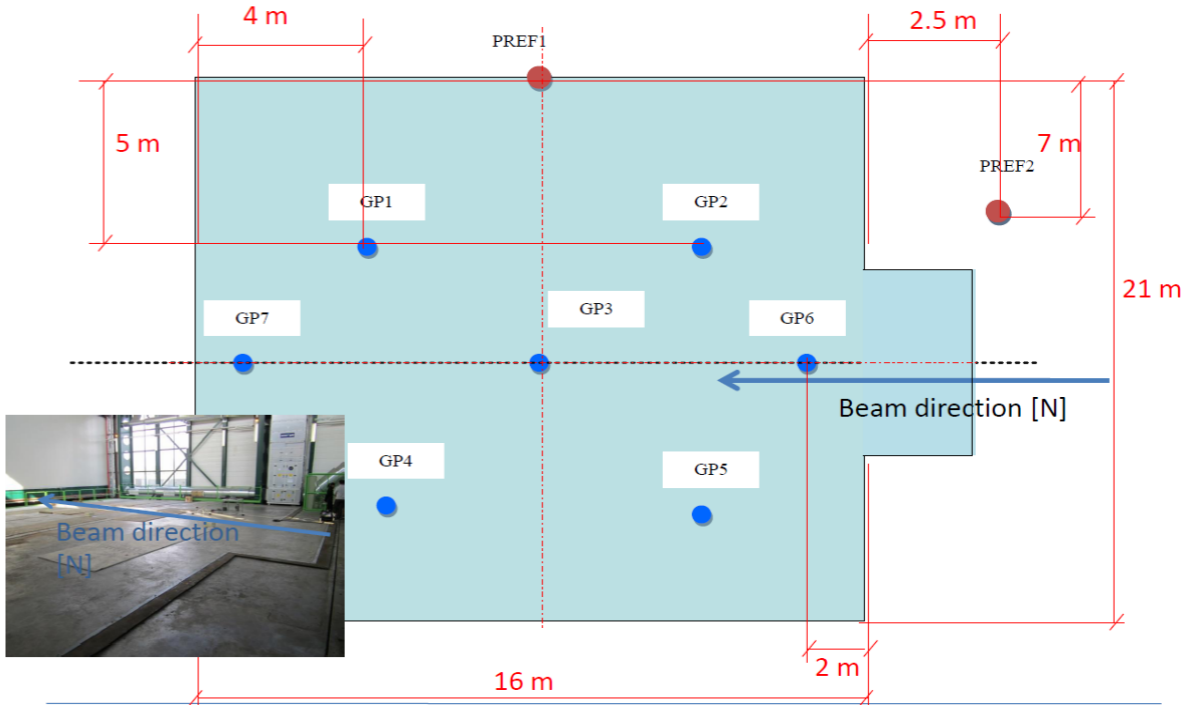
Experimental Vibration measurements – CMS Plug



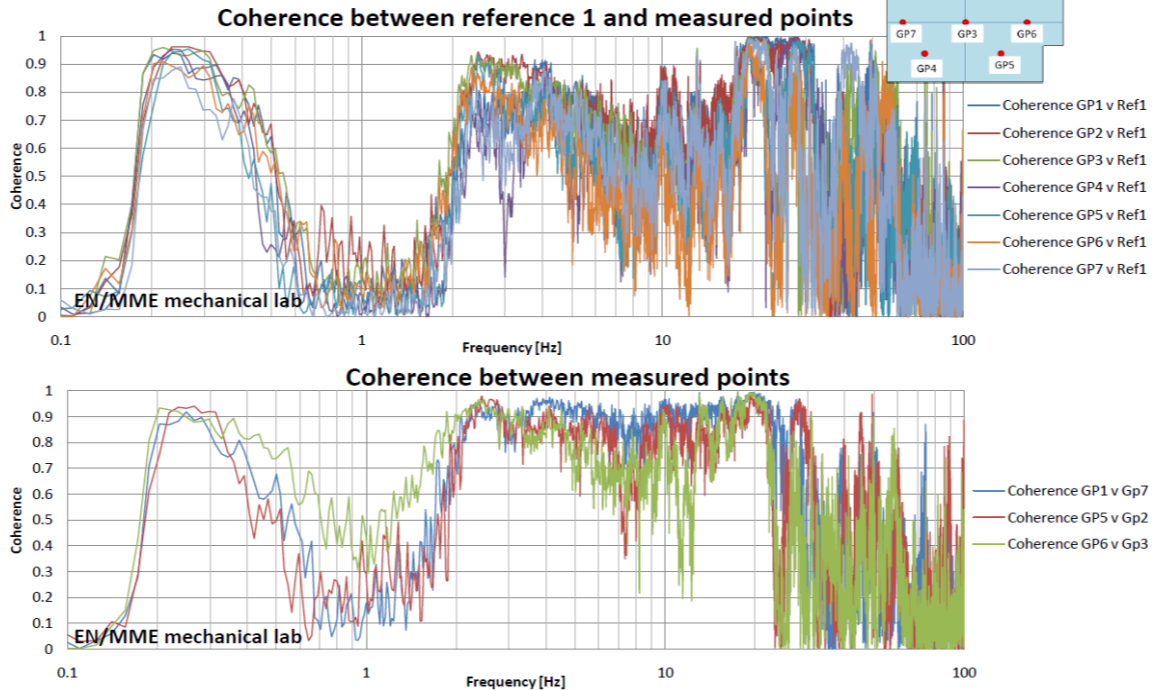
PSD for a typical measurement



Sensor position



Coherence Vertical direction

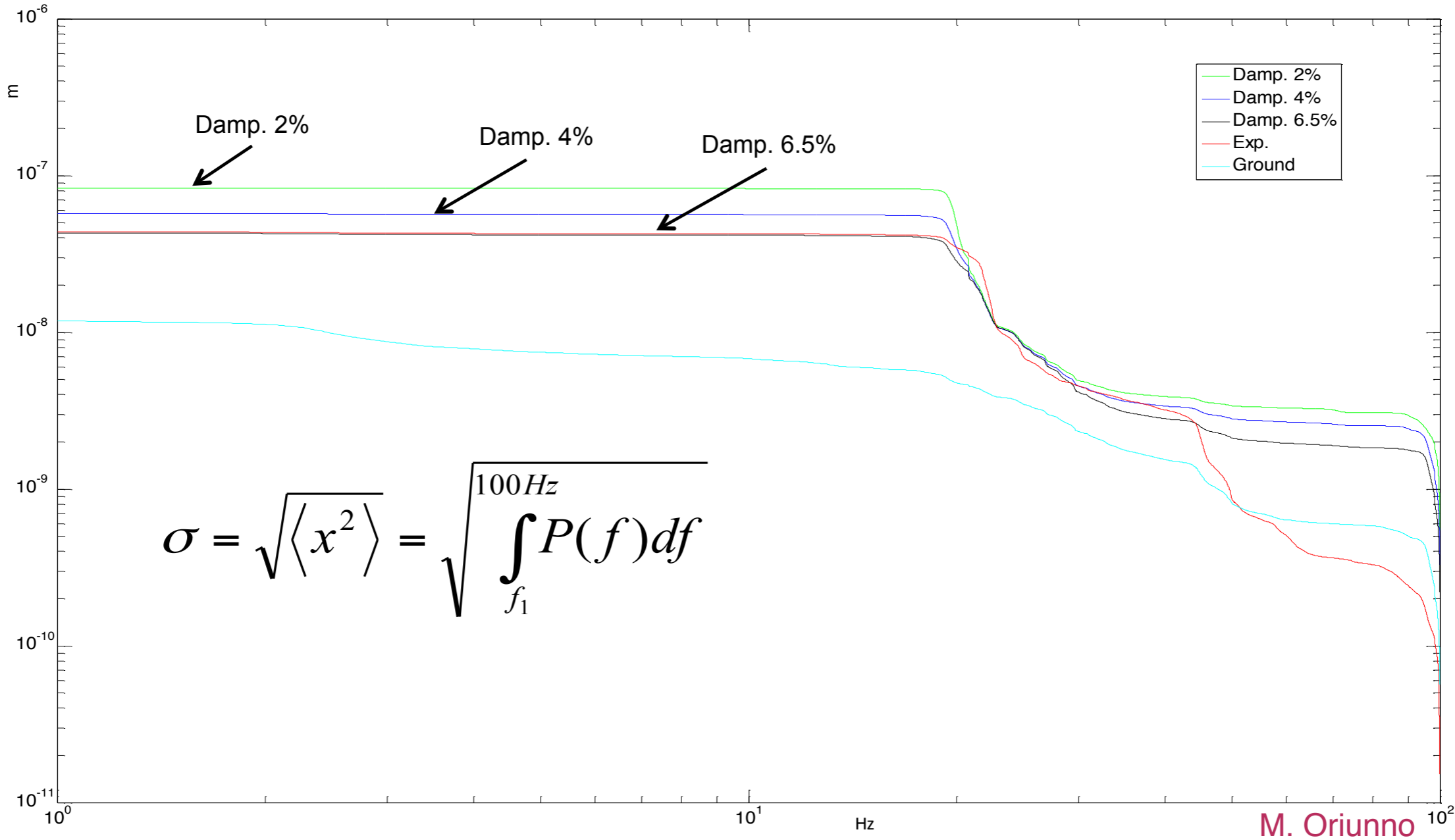


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Platform Vibration Amplification



Integrated Displacement (r.m.s.)



Conclusions

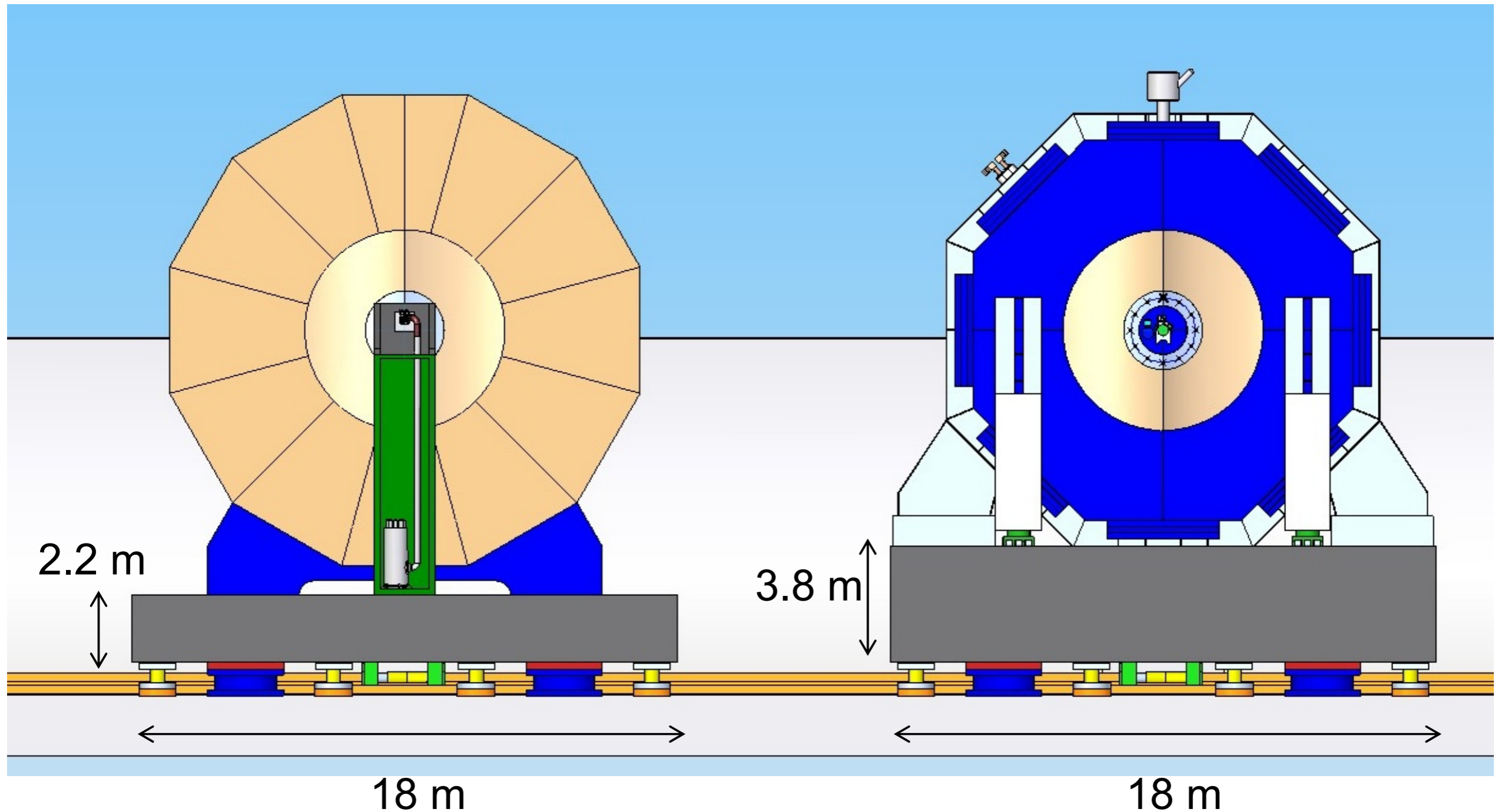


- Platforms are a technically acceptable solutions for the push pull, which preserves the respective design of the detectors and does not amplify the ground vibrations.
- The platforms must be designed according to a set of Functional Requirements, specifying the static and dynamic performances. These requirements will be defined by the detectors.
- The design and construction of the platforms becomes a task of the CFS group, which will develop the project along the requirements list and together with the detectors.

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Yoke Design

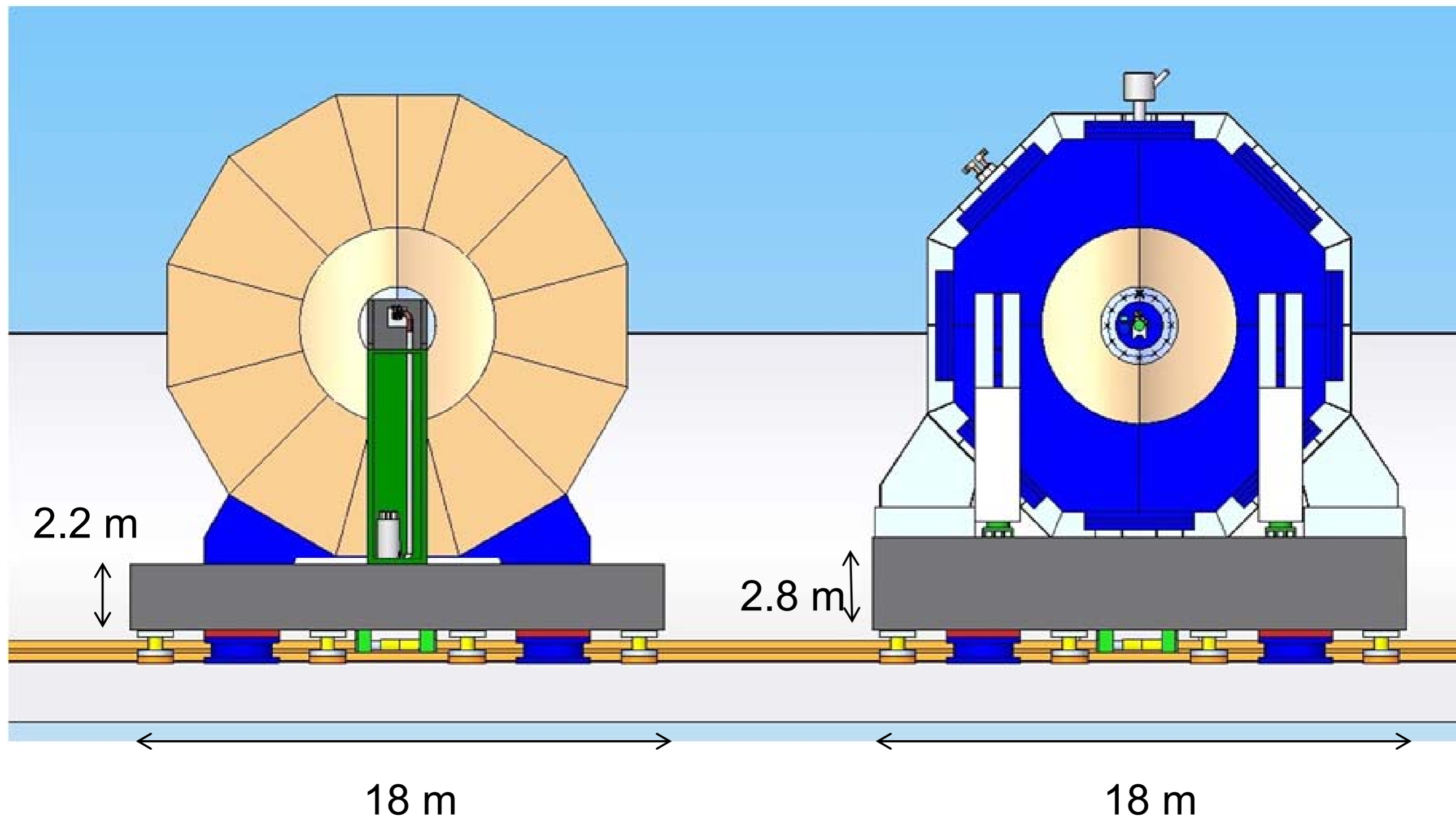
Reducing ILD Beam Height



From M. Oriunno @ SiD workshop 2010 after CERN workshop

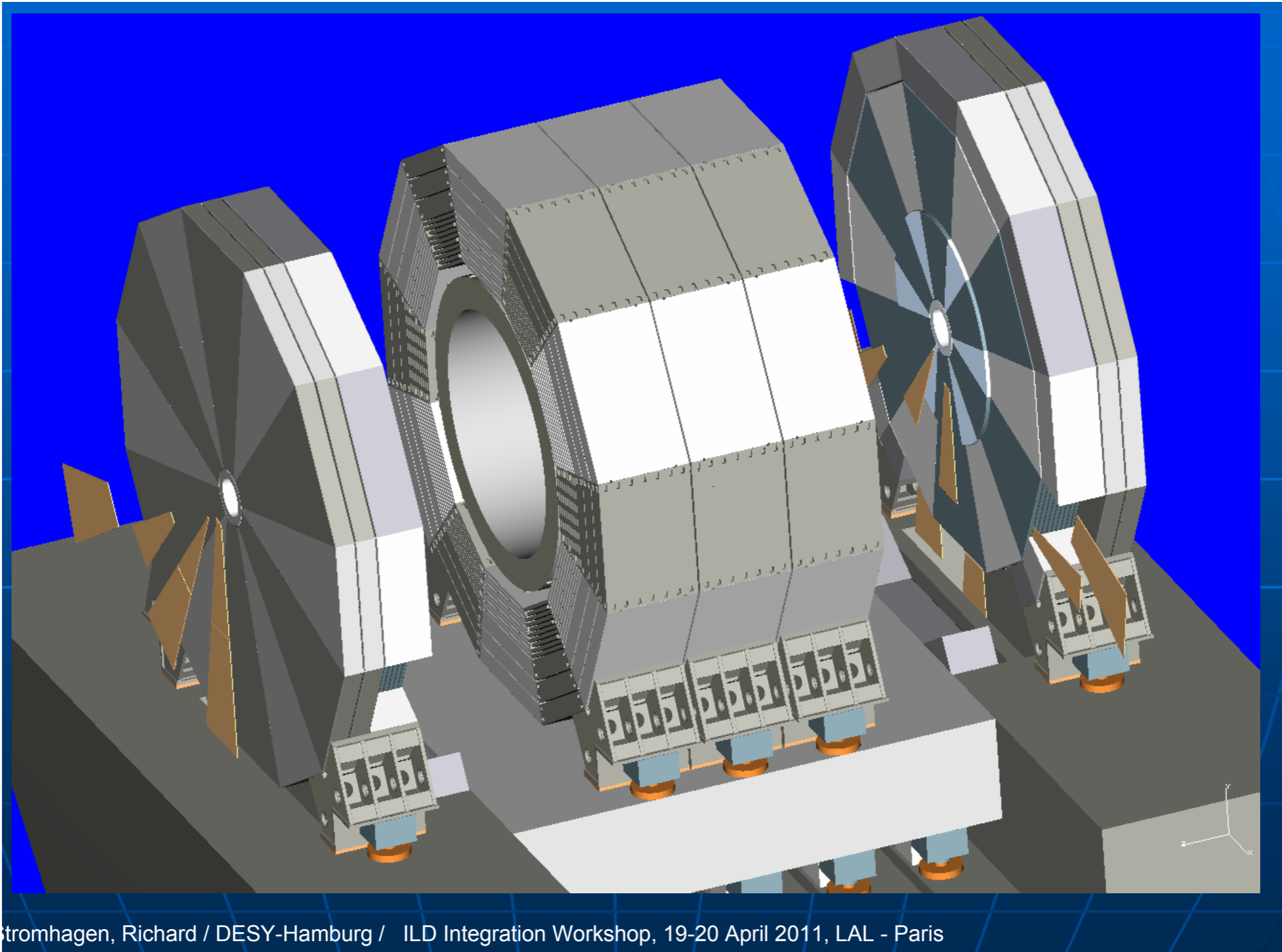
- Beam height difference between SiD and ILD: 1.6m
- This results in different floor levels in the underground hall

Reducing ILD Beam Height



- Reducing difference to 0.6m
 - Maybe even less if yoke instrumentation design will be changed

Engineering model of yoke



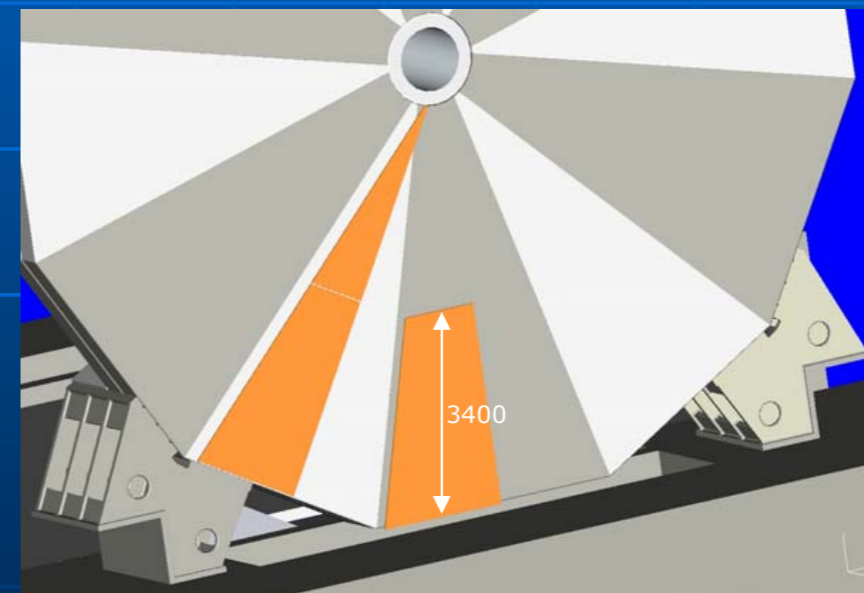
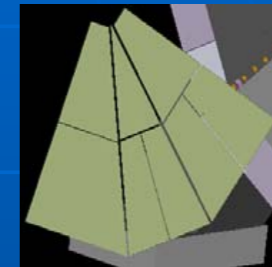
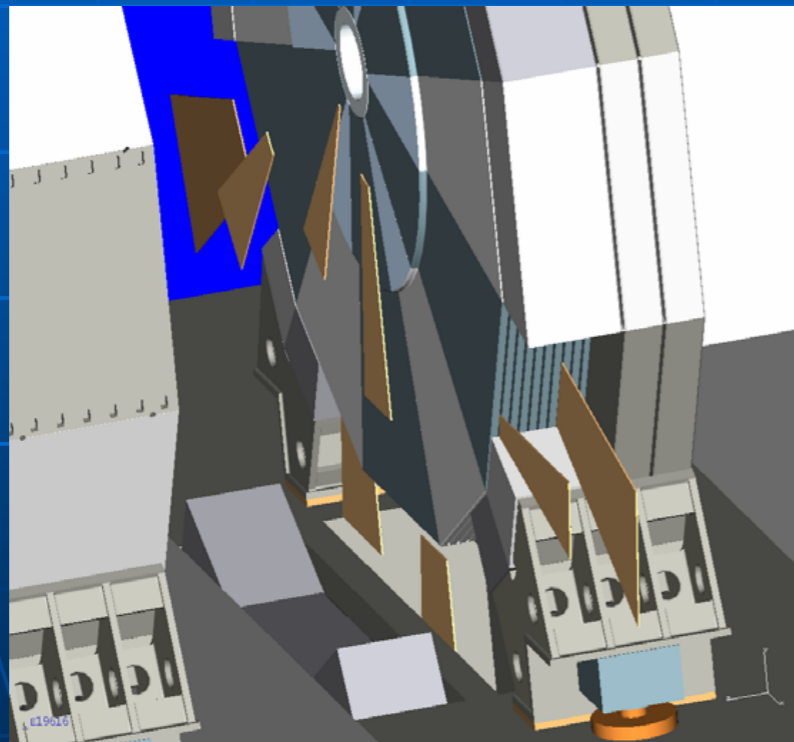
- Updated to 8m beam height

Yoke Design

Chamber Assembly End Cape

chamber assembly practical only for 2 or 3 segments

Geometry: $\sim 3400 \times \sim 2200 \times$ thickness between $25 \sim 30$ [mm]



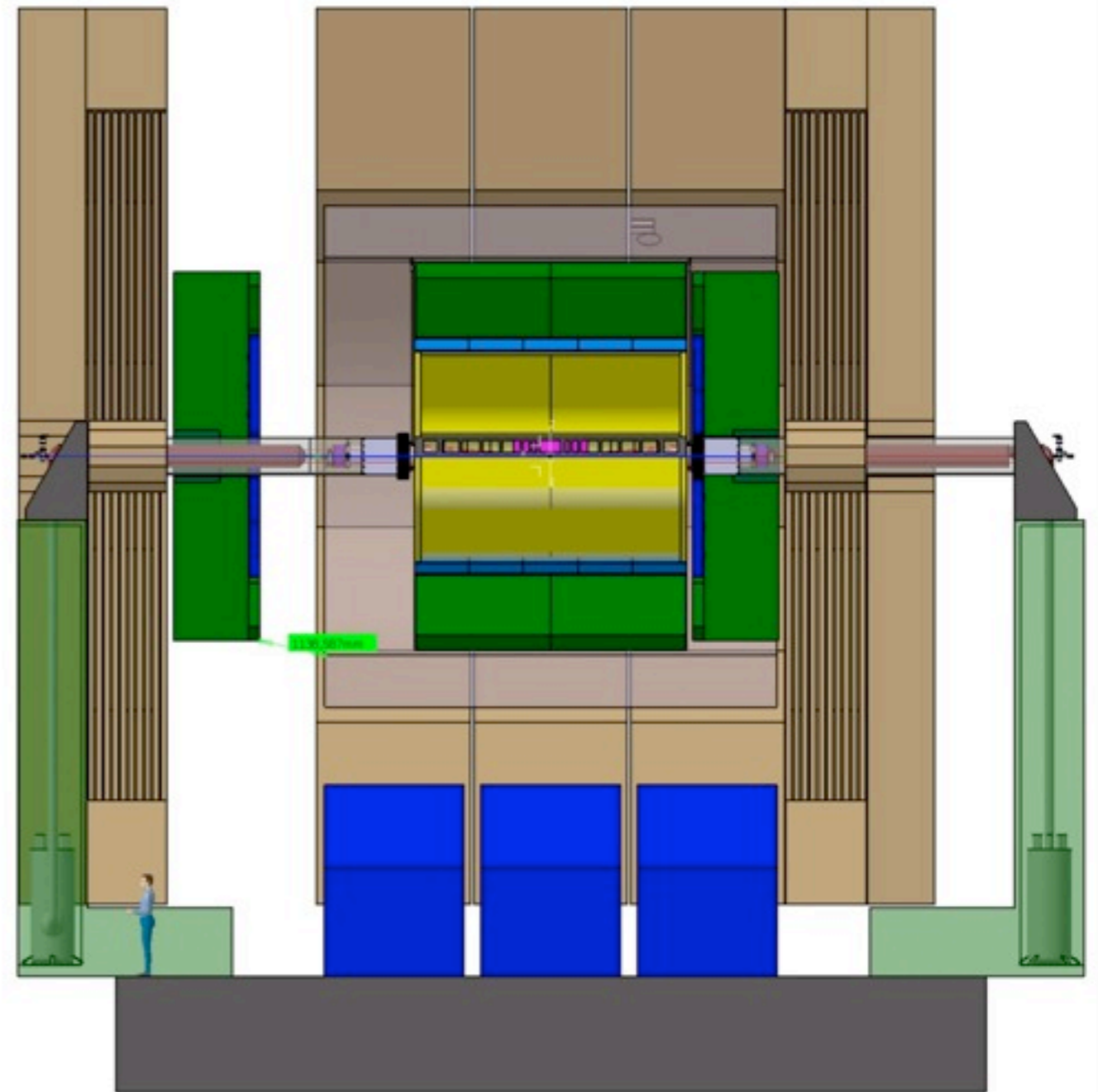
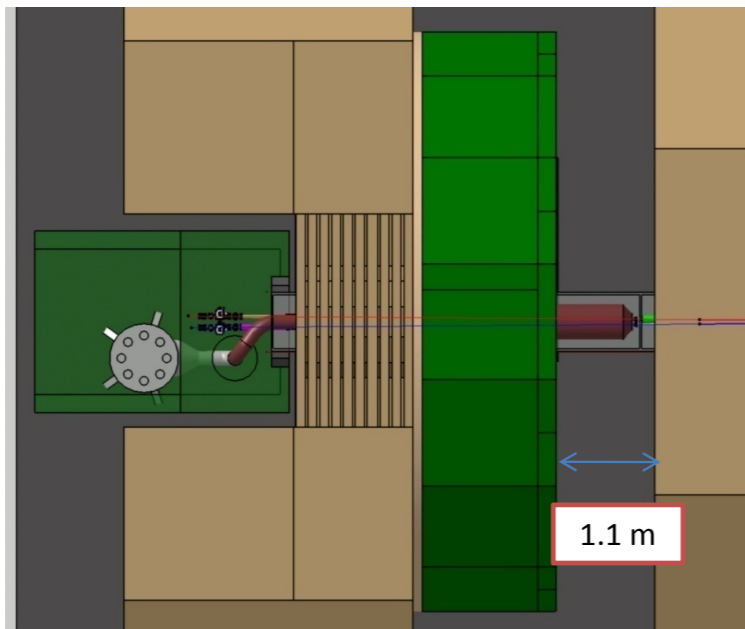
Stromhagen, Richard / DESY-Hamburg / ILD Integration Workshop, 19-20 April 2011, LAL - Paris

8

- Muon chamber installation in end cap gets more complicated...

Opening on the Beam (- or not)?

- Present design foresees opening of the detector on the beam:
 - Partially split endcap yoke allows ~ 1 m wide access space between coil and endcap calorimeters
 - Allows for limited maintenance in the beam position(?)
 - Every major work would be done in the parking position - push pull!
- But:
 - A real engineering challenge which puts hard boundary conditions on many other things

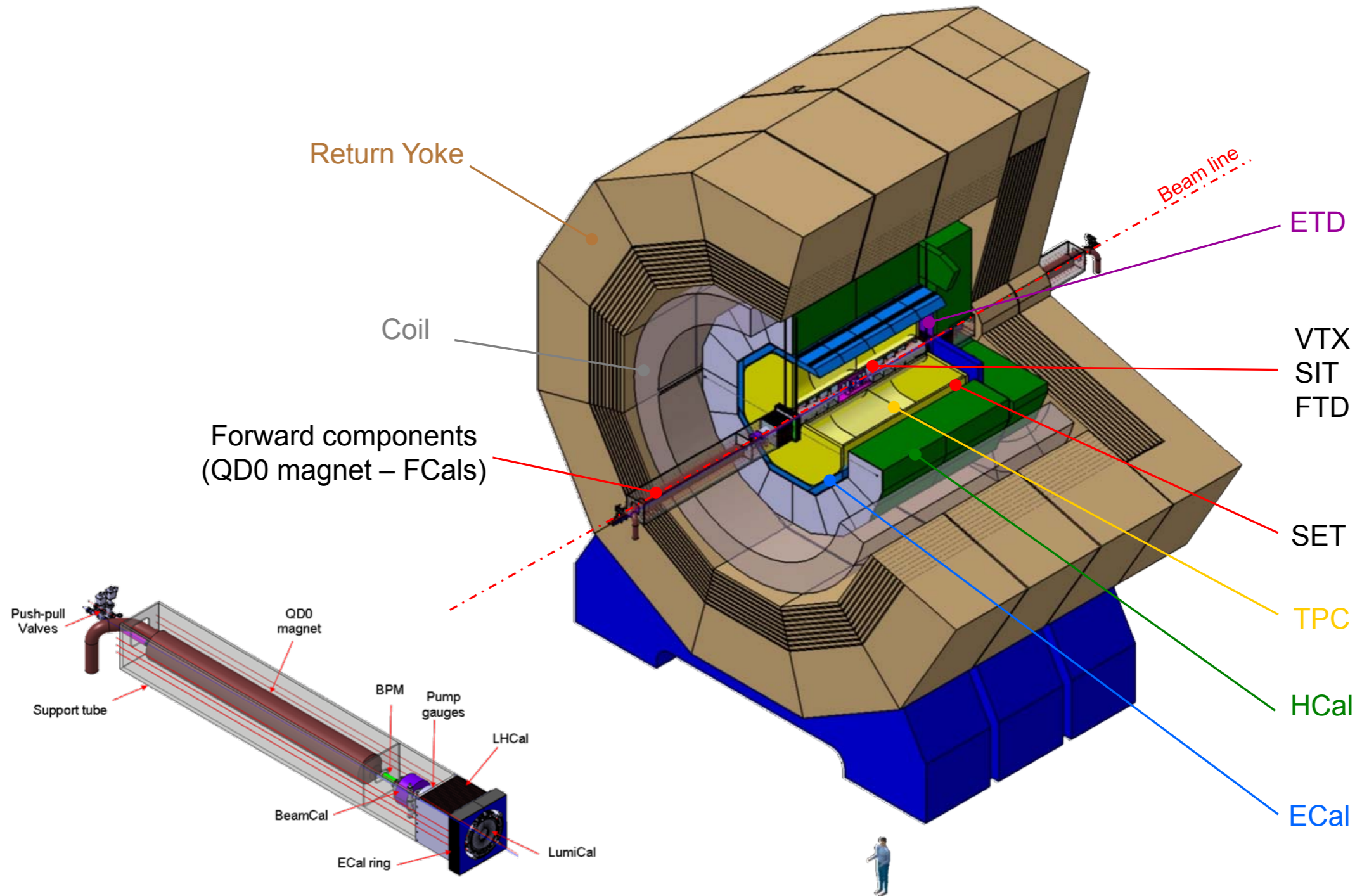


- We will propose to the ILD management to abandon the opening-on-the-beam scenario
- Work on opening scenario w/o split endcap in parking position

Detector Integration Status



ILD overview





Goals for the integration studies



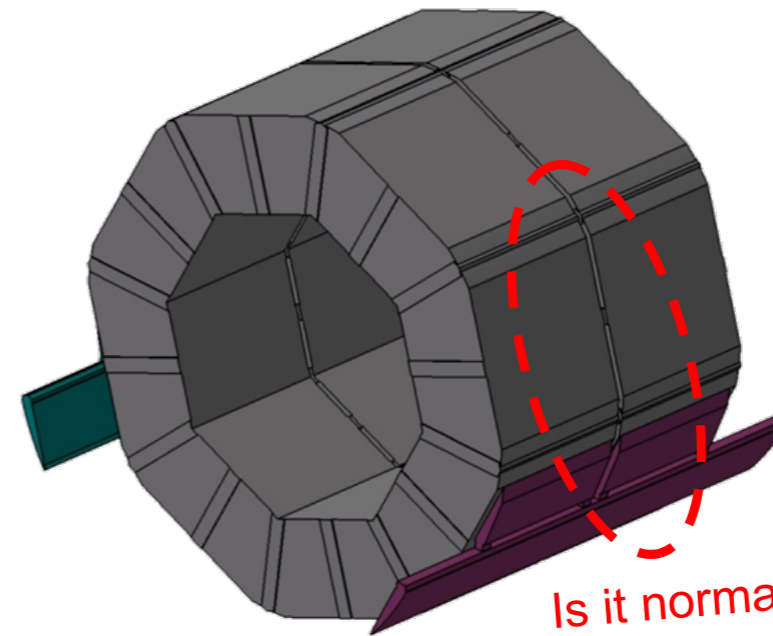
- For 2012 :
 - **Complete basic mechanical integration of the baseline design accounting for insensitive zones such as the beam holes, support structure, cables, gaps or inner detector material**
 - **Develop a realistic simulation model of the baseline design, including the identified faults and limitations**
- So for the ILD workshop in May :
 - **Define a software baseline for mass production (Ties)**
 - **Needed to estimate as much as possible the insensitive material**
 - Especially for the inner region !



AHCAL



- CAD model for the barrel has been recently provided by K. Gadow
- Will be soon integrated



Is it normal to have a crack here?

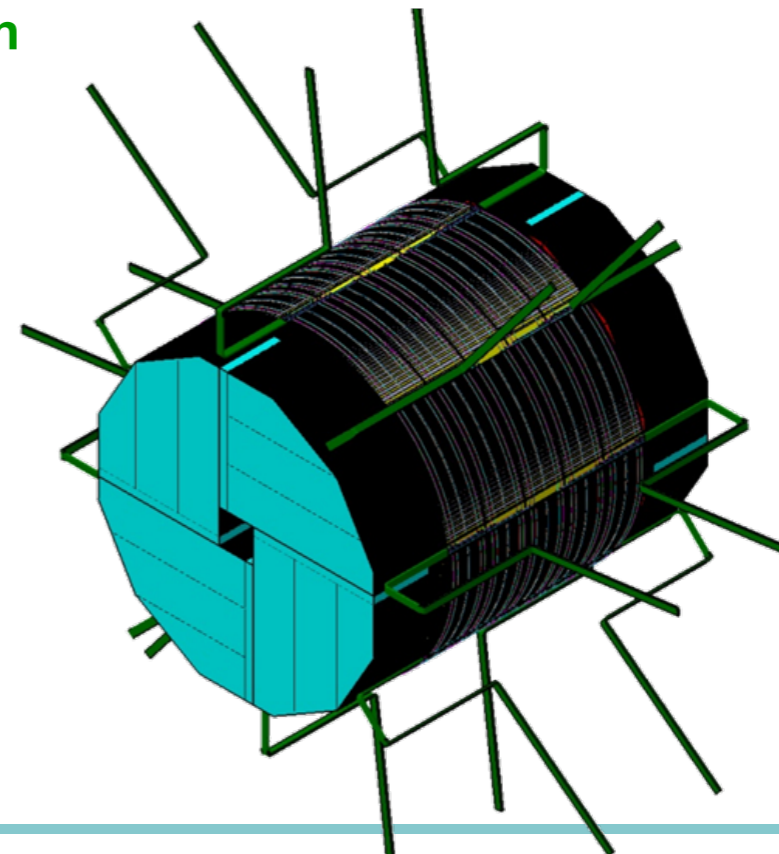
- Dimensions are not correct
 - **Rin : 1948 must be 2058**
 - **Rout : 3212 must be 3345**
 - **Z : 2215 with electronic must be 2420**



DHCAL

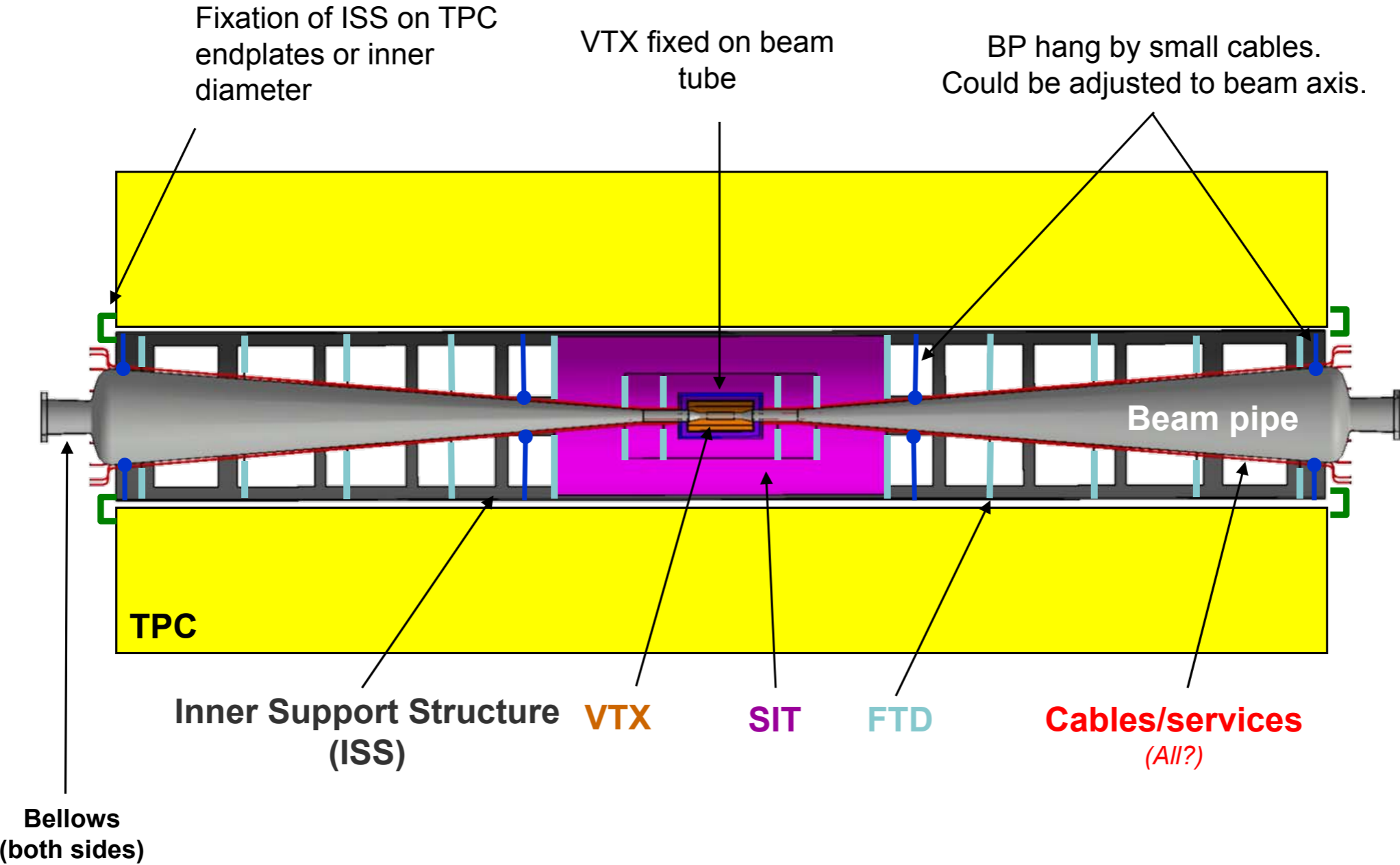


- We had an integration meeting end of 2010
 - **Still a lot of work to be done for understanding the mechanical structure**
- CAD model has been sent on Monday by JC Ianigro (IPNL)
 - **Barrel + EndCap**
 - **Services of Barrel**
- DHCAL fixation on EndCap Yoke under studied
 - **Must avoid constraint when magnet is on**
 - **Could be used for the AHCAL version**
- Dimensions seem OK





Inner region - reminder

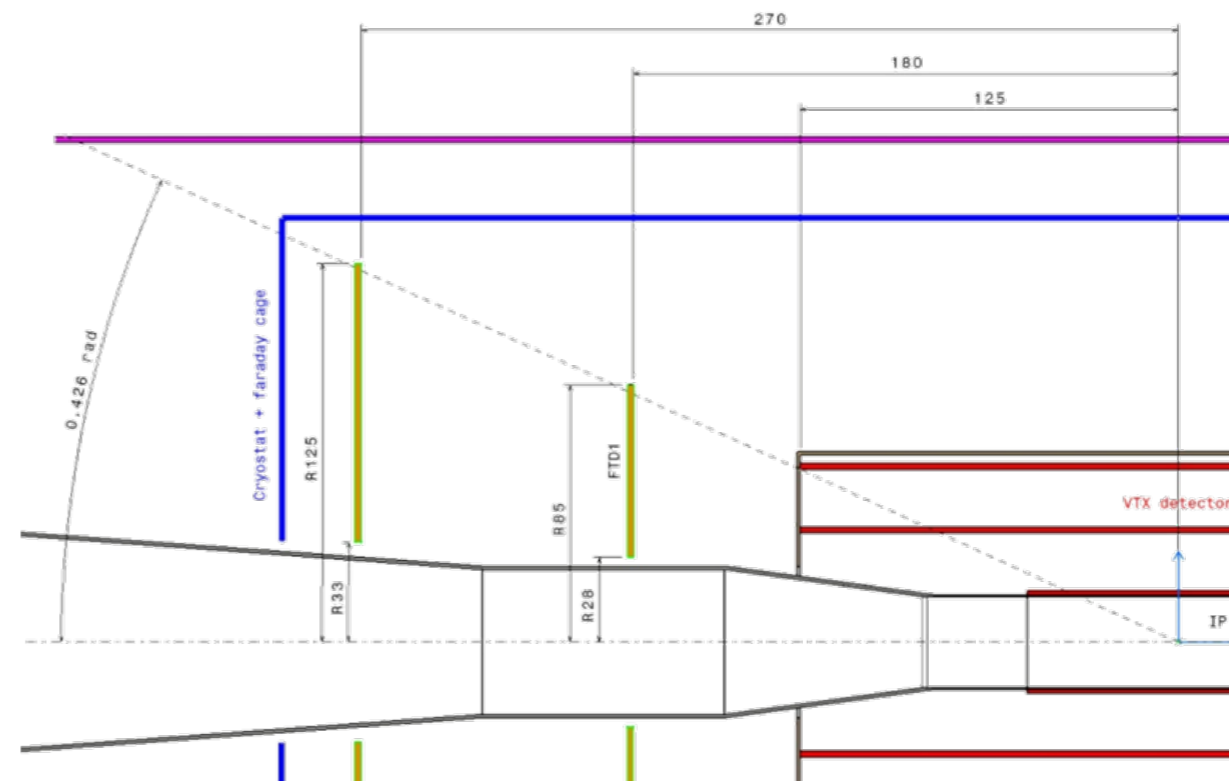




Discussions about FTD1&2 and VTX

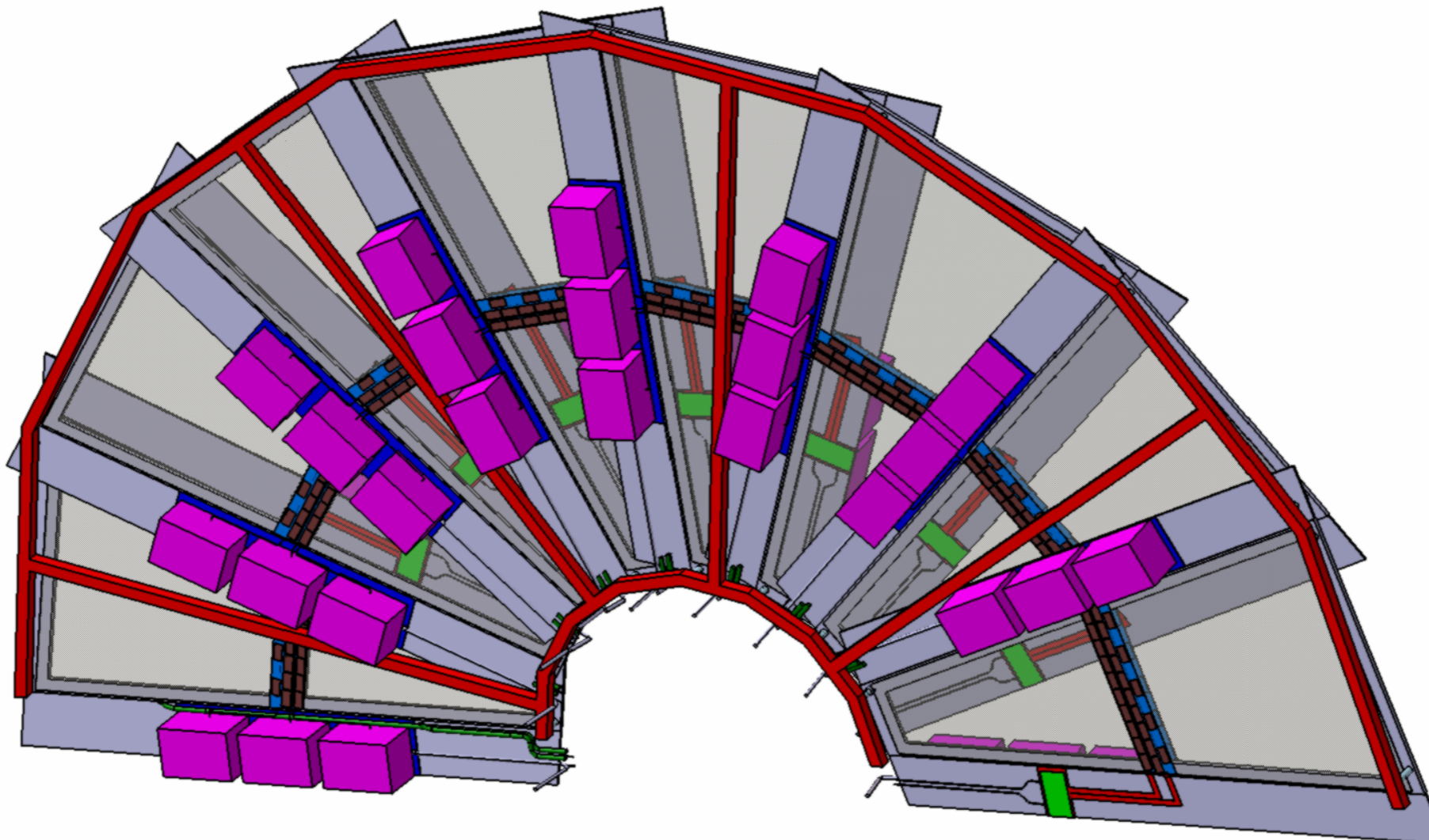


- FTD1&2 use Pixel sensors
 - **Might need a cryostat and a faraday cage as the Vertex**
- Discussion ongoing to review their integration :
 - **Integrated in the same cryostat than the VTX**
 - **Position and dimensions would be modified**
 - **Integration procedure too**



Microstrip FTD Example (D. Moya)

ELECTRONIC AND CABLE LAYOUT



- DC-DC converters maybe a good solution in terms of power distribution but too much material budget (careful study is in progress.)

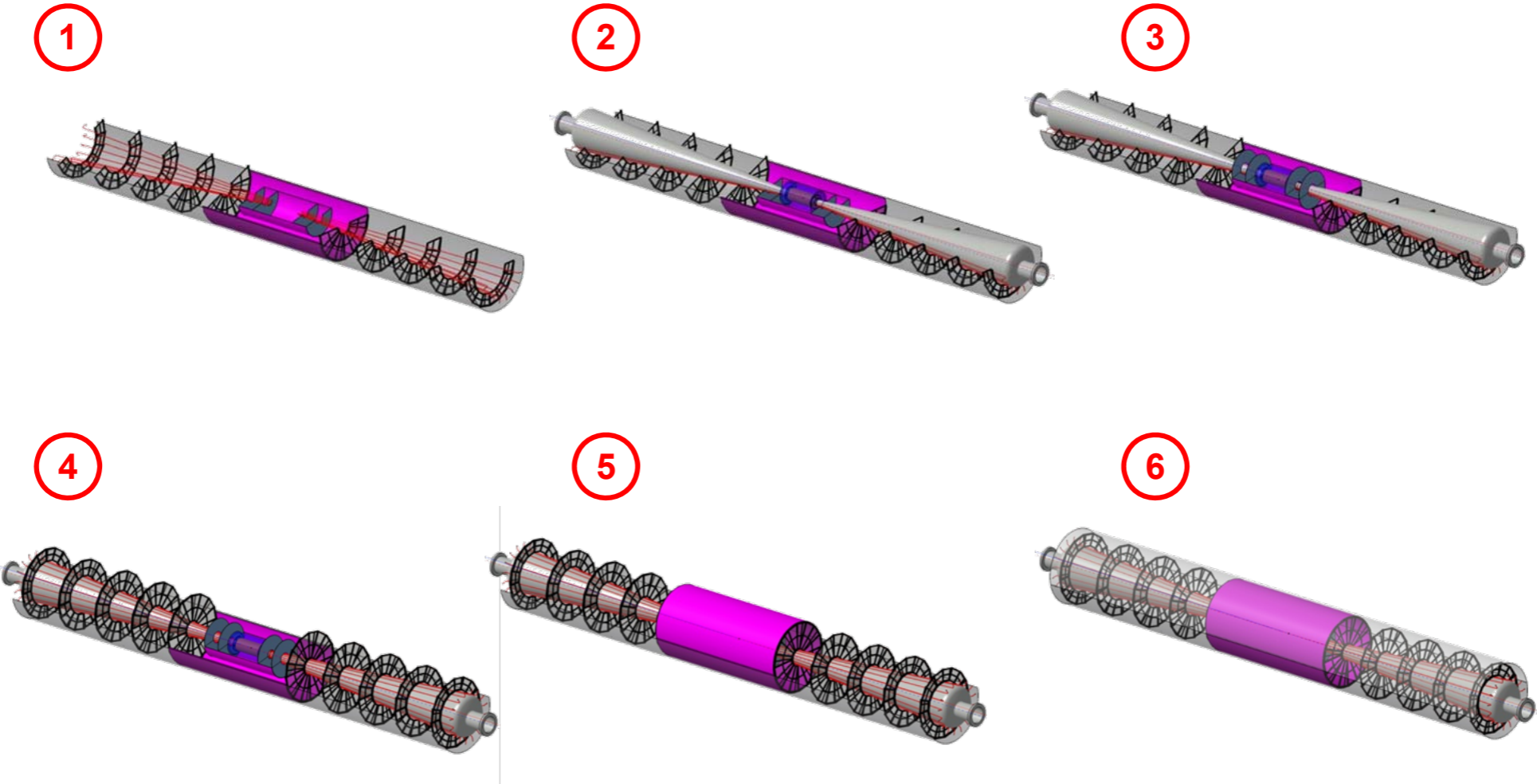
13th October '10, D. Moya / moyad@ifca.unican.es

14

Inner Detector Assembly Procedure



One proposal



MDI/Integration regional meeting

M. Joré – Integration status

13

- What about the SIT??

Detailed Design Documentation for the DBD

Technical Design Documentation for the ILC-TDR

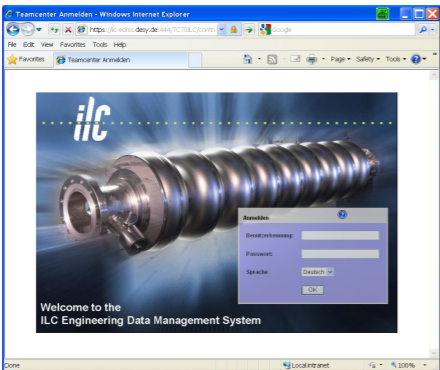
TDD, TDR and ILC-EDMS



Technical Design Report (TDR) summarizes TDD for publication

Technical Design Documentation (TDD) captures entire design efforts, results & rationale

Parameters Specifications Cost Estimation Calculations CAD Models Design Summary



ILC-EDMS organizes the Technical Design Documentation, providing structure, traceability, version & configuration mgt., and change control



- We need the same for ILD, the DBD cannot contain it all!

ILD Top Level WBS Node

Has Description : 6 objects

Name
Definition of the ILD reference detector.B.1.4
LC Contacts.A.1.1
LD - Letter of Intent.A.1.1
LD Coordinate System Definition.A.1.1
LD Workplan-LCWS 2010.A.1.1
... more items

Has Design : 3 objects

Name
ILD Model.A.1.1
ILD Placeholder Model.A.1.3
ILD detector simulation model.A.1.1



- ILD Work Breakdown Structure exists already!

ILD and EDMS

Related Items

Related Items

The screenshot shows a web browser window titled 'Item Information - Mozilla Firefox' displaying a table of related items for 'Generic Part, D00000000523907,A,4,1'. A green box highlights the 'Related Items' tab, and a green arrow points to the table.

EDMS-ID	Name	Description	Work Status	Access Scheme in Use	Item Type	Last Modified by	Last Update	Language	Superseded
D00000000523907,A,4,1	ILD		Working (in Vault)	Project: ILC_ILD_WBS	Assembly	Buesser_Karsten	01.03.2011 16:36:15	English	False
Item contained by Bookmark collections									
Attaches									
Has Description									
D00000000913575,A,1,1	ILC Contacts	ILC contact people and working group leaders	Working	Team: ILC_ILD_Team		Eucker_Silke	04.06.2010 11:05:56	English	False
D00000000913605,A,1,1	ILD0dimensions-weight130209	ILD0dimensions-weight130209	Released	Project: ILC_Integration		List_Benno	01.04.2011 13:09:59	English	False
D00000000913635,B,1,4	Definition of the ILC reference detector	Definition of the ILC reference detector, updated version 13.11.2008. ILC global parameters for LOI	Released	Project: ILC_Integration		List_Benno	18.04.2011 14:07:42	English	False
D00000000913665,A,1,1	ILD Workplan-LCWS 2010	ILDworkplan-LCWS10.pdf	Working	Team: ILC_ILD_Team		Eucker_Silke	13.10.2010 12:29:53	English	False
D00000000913695,A,1,1	ILD - Letter of Intent	ILC International Large Detector Letter of Intent February 2010	Released	Project: ILC_ILD_WBS		Buesser_Karsten	01.03.2011 16:39:17	English	False
D00000000914315,A,1,1	ILD Coordinate System Definition	ILD Coordinate System Definition (derived from ILC predecessor LDC)	Working	Team: ILC_ILD_Team		Buesser_Karsten	25.06.2010 13:19:07	English	False
Has Design									
D00000000872433,A,1,3	ILD Placeholder Model		Working	Team: ILC_CAD_Integration_Team	Assembly	Welle_Norbert	02.07.2010 13:48:34		False
D00000000985823,A,1,1	ILD detector simulation model	ILD detector as implemented in the Mokka simulation	Working	Team: ILC_Physics-and-Optimization_Team	Assembly	List_Benno	08.04.2011 09:50:10		False
D00000000989043,A,1,1	ILD Model	STEP import from ILC_SM4_05-04-11.stp; Author: Matthieu Jore, LAL	Working	Team: ILC_CAD_Integration_Team	Assembly	Welle_Norbert	12.04.2011 16:25:54		False
Has Fabrication Part									
Is Realized As									
Is used by Generic Part									
Uses Generic Parts									



3

• And there is already information stored!

Parameter Documents in EDMS

Important Documents: Parameter Tables

- ILD0dimensions-weight130209:
D00000000913605

Parameter	Value	Unit
Barrel yoke length	6000	t
Endcap yoke	2250	t
Total yoke	12450	t
Barrel yoke length	6000	t
Endcap yoke	2250	t
Total yoke	12450	t
Barrel yoke length	6000	t
Endcap yoke	2250	t
Total yoke	12450	t
Barrel yoke length	6000	t
Endcap yoke	2250	t
Total yoke	12450	t

Definition of the ILD reference detector

ILD Joint steering board, September 21, 2008
(updated version: November 13, 2008 F. Goede)

1. Introduction

In the following document the ILD detector is defined, as discussed on the second ILD meeting in Cambridge, UK, September 2008. The detector defined is the so-called reference detector for ILD, which has the following implications:

- The overall dimensions and main features of the detector are defined as a basis for the further evolution of ILD. They will be used for the I.O.I in 2009.
- The details of the detector are defined primarily for the purpose of performance studies. This detector will be implemented in the ILD simulation software (MORKEA and Jupiter) and will be used for future performance studies. This detector will be used for any large scale Monte Carlo production from now on.
- As much as possible the choice of parameters is based on studies which were presented at Cambridge. However in many cases studies have either not yet been finished, or are still inconclusive. Decisions taken in these cases are driven by the desire to define one detector. They may change later, once more information is available, or better reconstruction and/or analysis techniques have been developed.
- Whenever possible we have tried to define a virtual detector, which will deliver a certain performance, but which does not define a specific technology. In some cases this does not mean that ILD has chosen this technology typically the technology chosen is the currently most mature technology. This however does not imply any pre-dominance on an eventual technology choice for the ILD group.
- In some cases we distinguish between a baseline detector, and possible upgrade or extension options. This refers to additional detector elements, which may or may not be included, depending primarily on the wanted performance, and possible optimisation results.
- In many cases we have not yet chosen a specific technology, but follow more than one solution. The solutions currently are all considered with equal weight, and achieving more R&D results on all of them is considered of highest priority. During the process leading up to the I.O.I we will continue to evaluate this, and decide how many different options we will describe in the I.O.I.

2. Basic Parameters

The following table shows the main parameters of ILD_1:

Coil	Value	Description
Rmin	3440	(Molins: coil and cryostat modelled as one Al tube with 750 thickness)
Rmax	4190	
Z	3872	

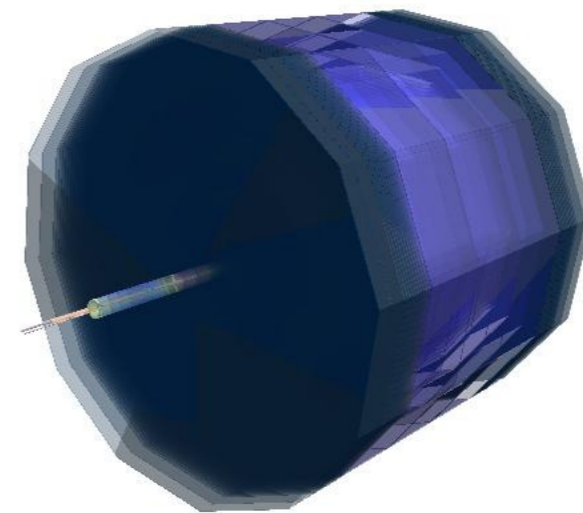
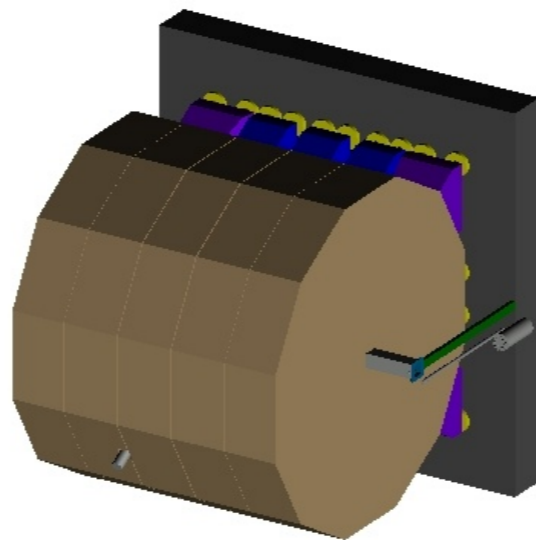
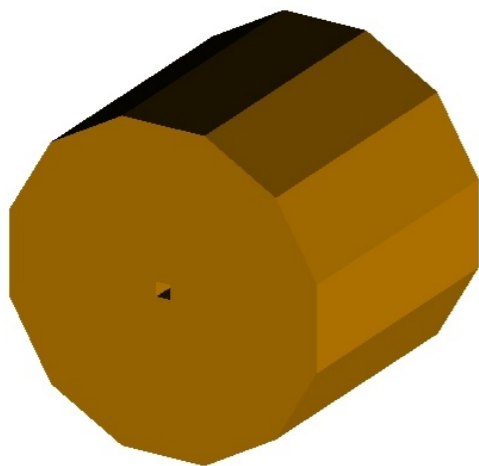
- Definition of the ILD reference detector:
D00000000913635
- Both taken from ILD Wiki pages
- If I had a Wiki password, I would have put links to EDMS into Wiki



- Parameter lists

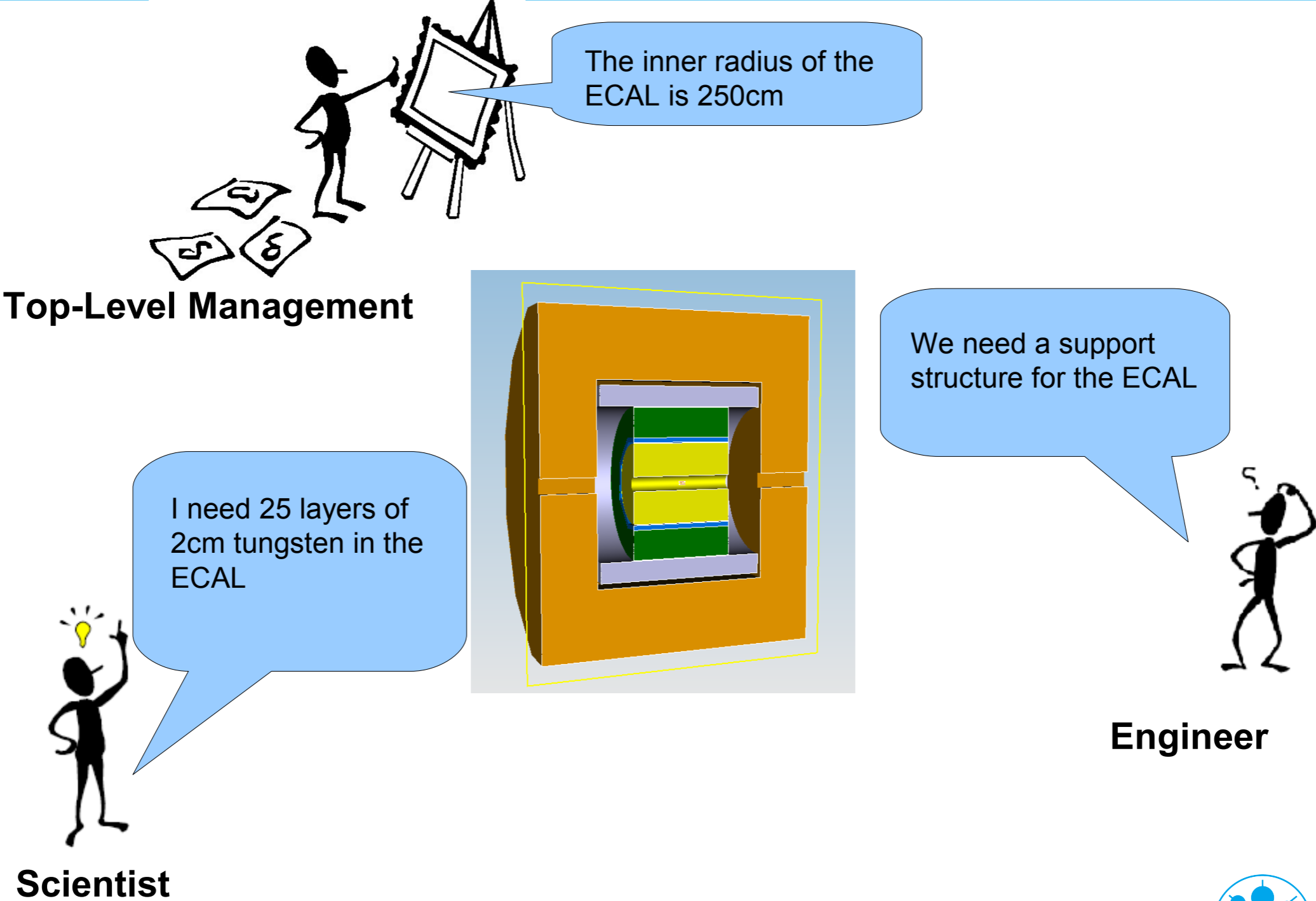
Available CAD Models for ILD in EDMS

- D00000000872433: Placeholder model: Still a very preliminary version
- D00000000989043: Engineering model from Matthieu
→ will be updated
- D00000000952125: Mokka simulation model ILD_01_pre01
→ the plan is to update this model, as new Mokka pre-releases become available
→ Also available as 3D-PDF (but veeeeeeeery slow, because of too much detail in SIT/SET/ETD subdetectors)
- It is possible that you cannot access (some) of the models, until they have been released



Detailed Design Documentation Serves Many Needs

Different Points of View



Conclusion

- The MDI work has become a friendly collaboration between detector concepts, ILC-CFS, ILC-BDS and CLIC!
- The ILD engineering model gets more realistic
- Many open issues are identified
- Unfortunately the work is resources-driven not task-driven

- We should make sure that the „ILD Legacy“ is documented properly so that it can be used whenever, wherever and whatever TeV lepton collider will be built