

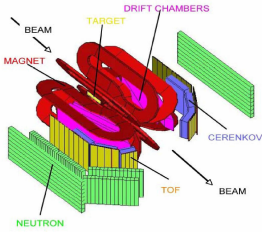
David Rodríguez Piñeiro
Mainz University
OLYMPUS Collaboration Meeting
DESY
26. 04. 2010



OLYMPUS

Collaboration Meeting

Luminosity Monitor
Calorimeter



Luminosity Monitor, Calorimeter

1.- Composition

- Crystals
- Frames
- Collimator

2.- Magnetic Field

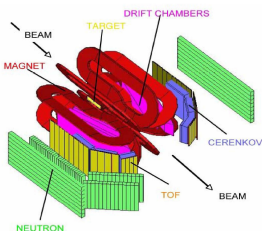
- Simulation

3.- Interference

4.- Support

- Movement
- Support

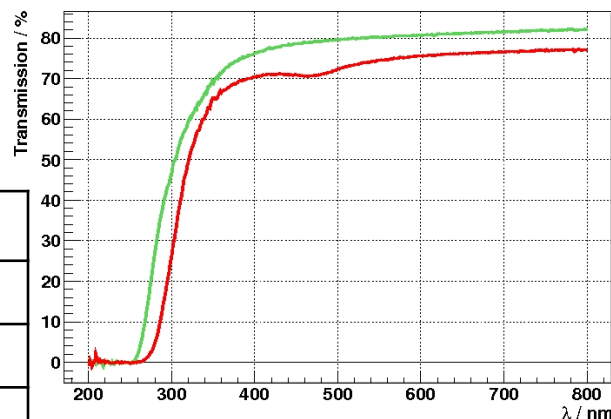
5.- Summary



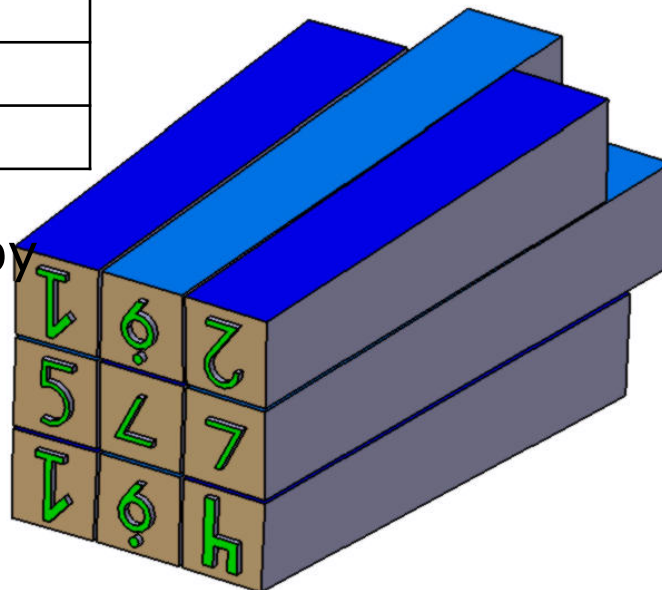
Luminosity Monitor, Calorimeter

Crystals; PbF_2

	Length	Total	Each Block
Type1	150,0	6	3
Type2	155,1	3	1-2
Type3	160,6	1	0-1
Type4	166,3	2	1
Type5	172,3	3	1-2
Type6	178,7	4	2
Type7	185,4	4	2



New Arrangement



Transmittance measured by
Christina Haberkorn

Verified: They **fulfil** the original specifications

1.- Composition

- Crystals

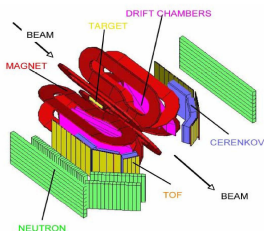
- Frames
- Collimator

2.- Magnetic Field

3.- Interference

4.- Support

5.- Summary



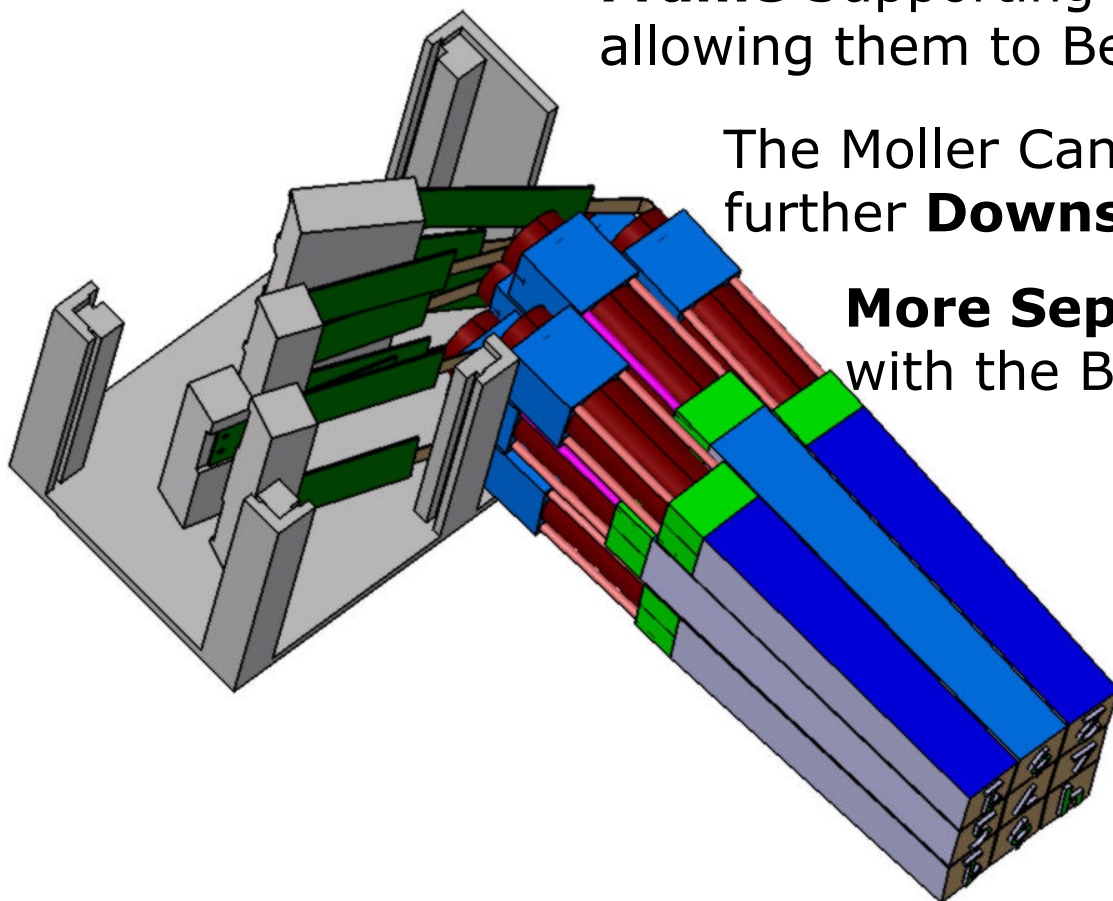
Luminosity Monitor, Calorimeter

Frame

Frame Supporting the Basis allowing them to Be **Tilted**

The Moller Can be Place further **Downstream**

More Separation with the Beam Pipe



1.- Composition

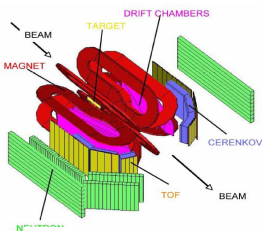
- Crystals
- Frames
- Collimator

2.- Magnetic Field

3.- Interference

4.- Support

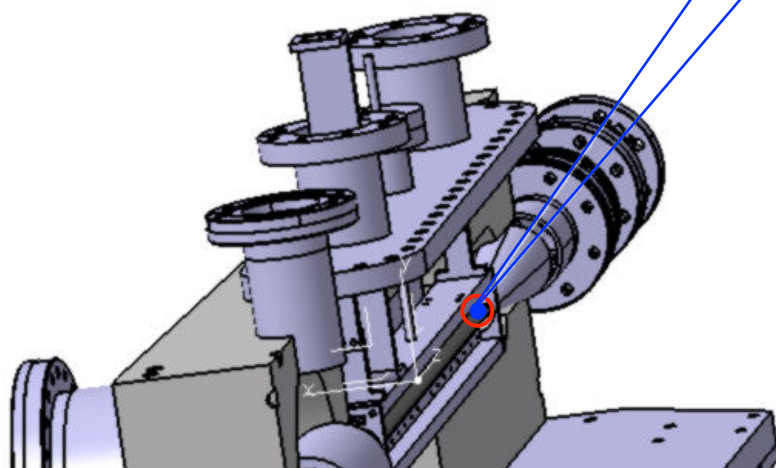
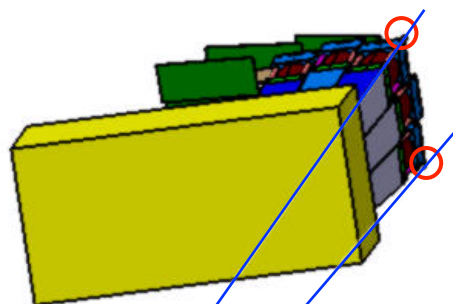
5.- Summary



Luminosity Monitor, Calorimeter

Collimator

Optimized Shape
from the Target to
Protect PMT and Bases
with the New Vacuum
System Geometry



Lead
10 cm Long

1.- Composition

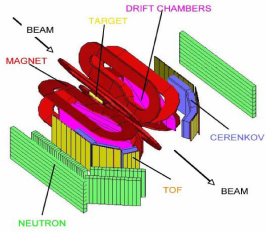
- Crystals
- Frames
- **Collimator**

2.- Magnetic Field

3.- Interference

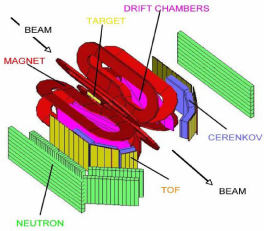
4.- Support

5.- Summary



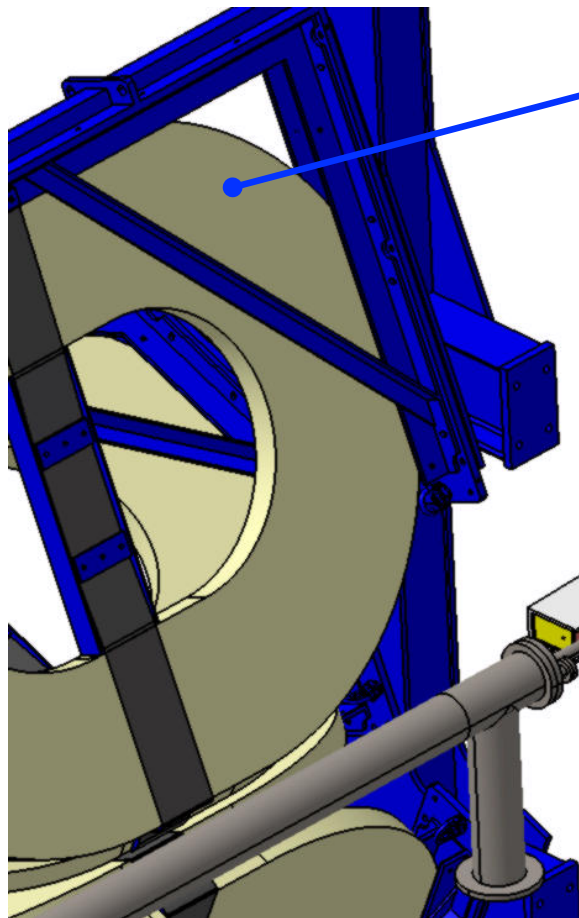
Luminosity Monitor, Calorimeter

2.- Magnetic Field

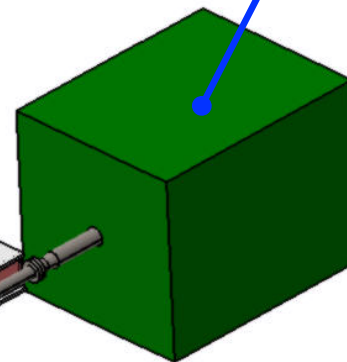


Luminosity Monitor, Calorimeter

Magnetic Field I



Coils and Quad



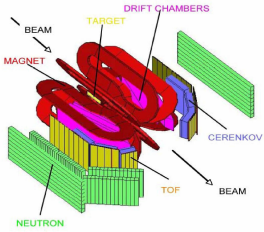
1.- Composition

2.- Magnetic Field

3.- Interference

4.- Support

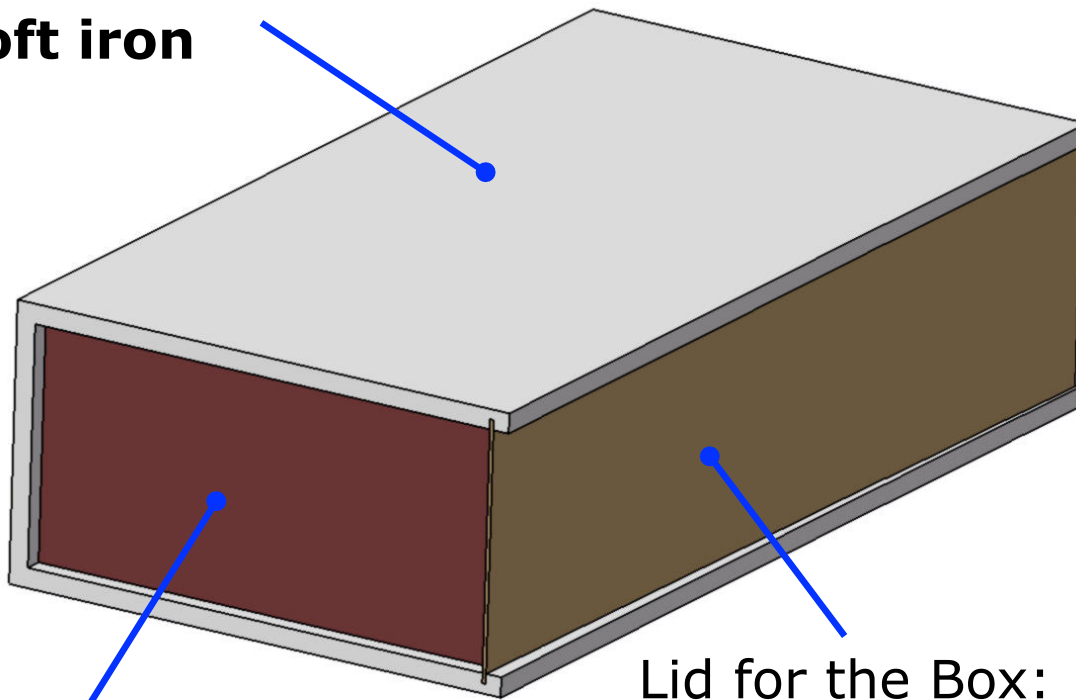
5.- Summary



Luminosity Monitor, Calorimeter

Magnetic Field II

Box: **10 mm**
Soft iron



Front Cover:
0,5 mm MuMetal

Lid for the Box:
2 mm MuMetal

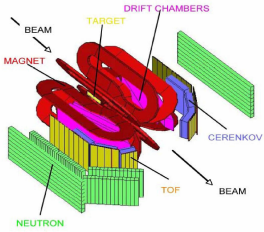
1.- Composition

2.- Magnetic Field

3.- Interference

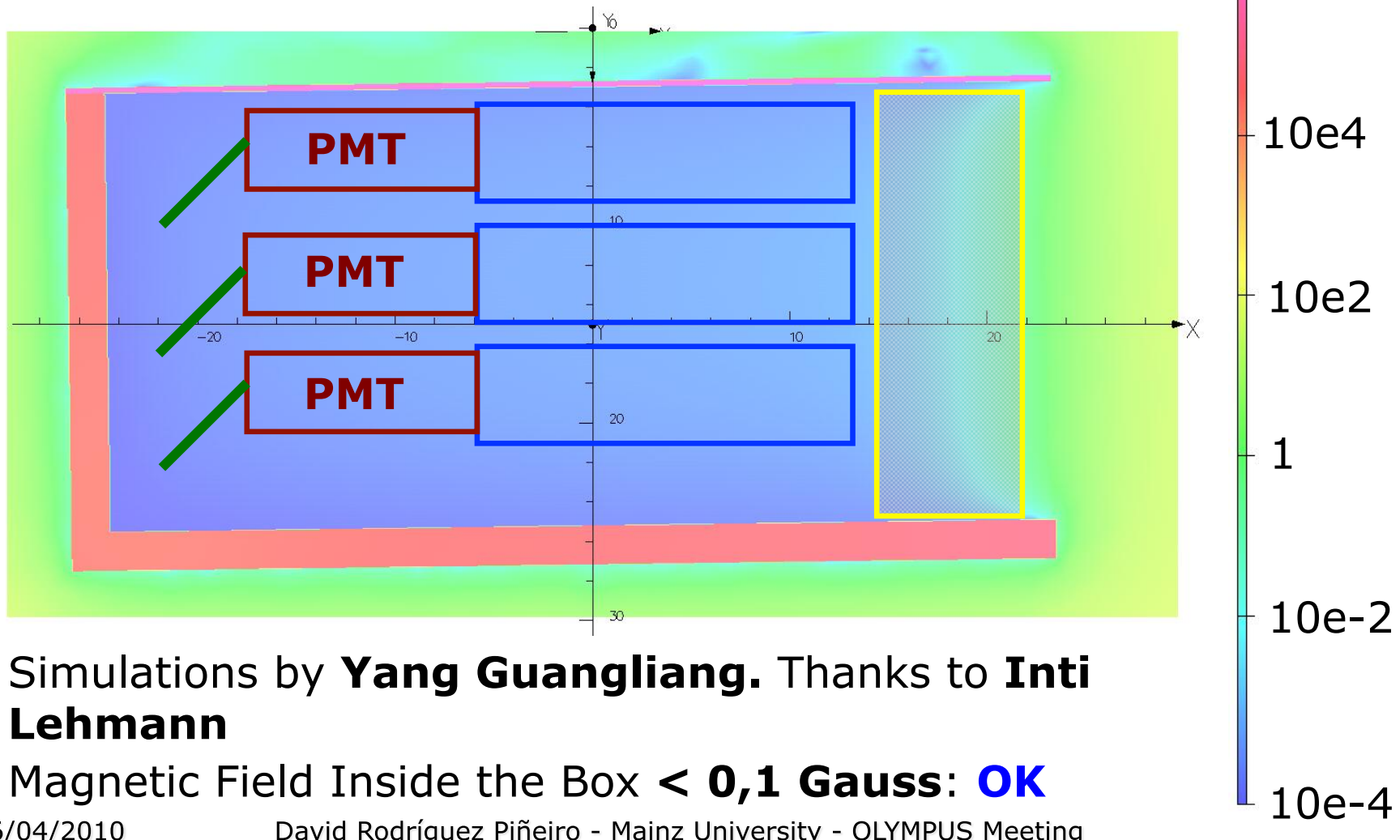
4.- Support

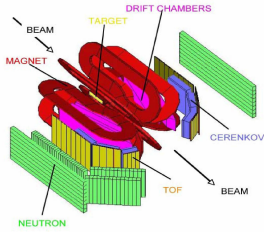
5.- Summary



Luminosity Monitor, Calorimeter

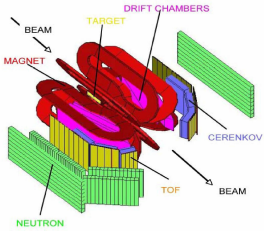
Magnetic Field III





Luminosity Monitor, Calorimeter

3.- Interference



Luminosity Monitor, Calorimeter

Interference

	2,3 GeV 1,28°	2,0 GeV 1,19°
Region 1	Moller Box – Beam Pipe	
Region 2	Beam Pipe Windows	
Region 3	Button Monitor	
Region 4	Target Cell	

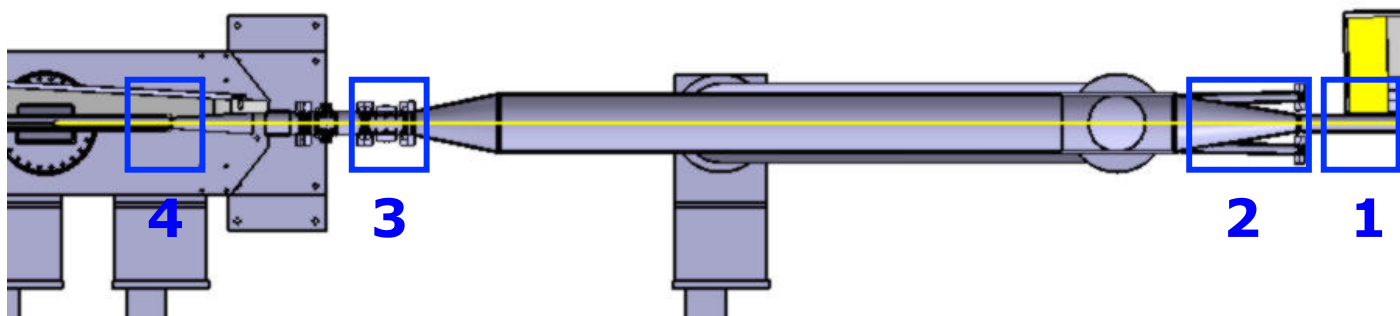
1.– Composition

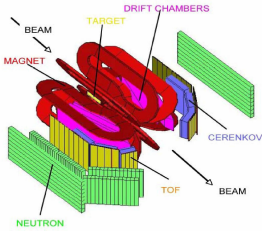
2.– Magnetic Field

3.– Interference

4.– Support

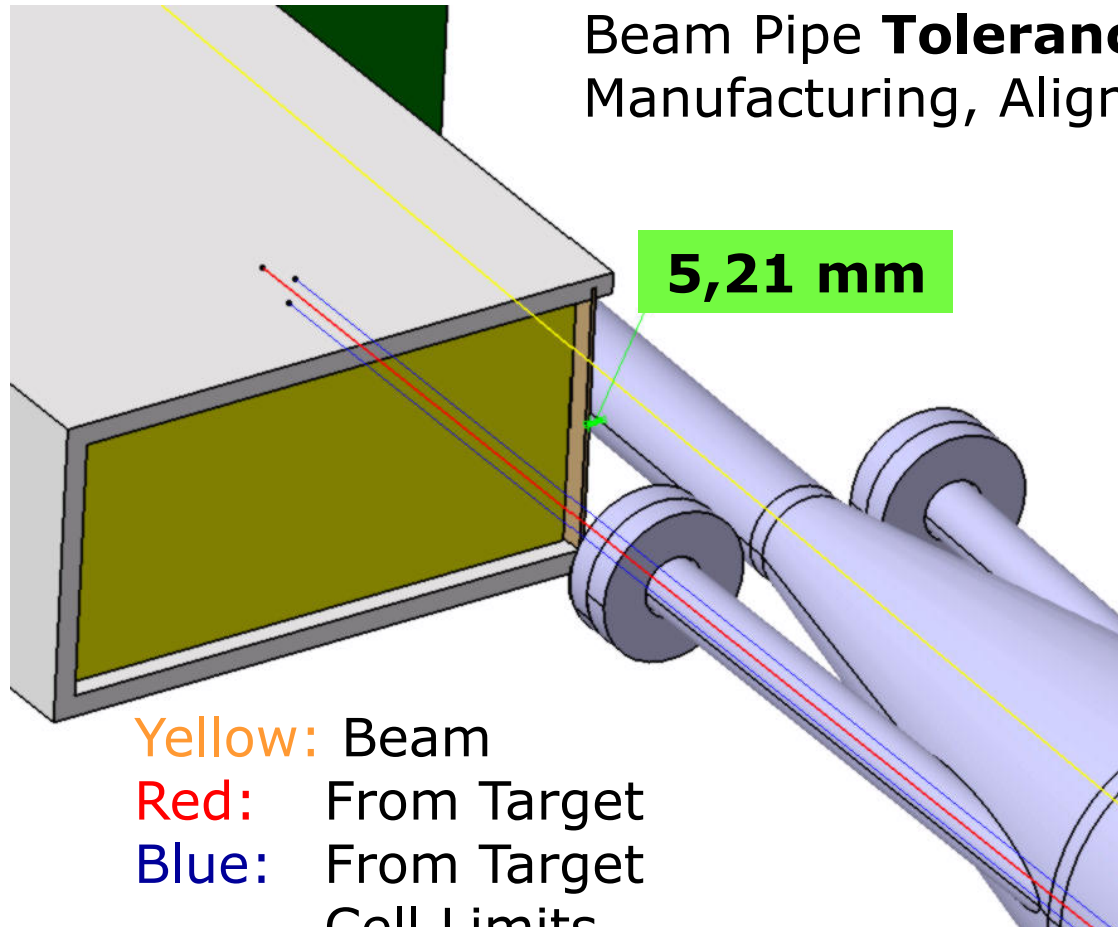
5.– Summary





Luminosity Monitor, Calorimeter

2,0 GeV; 1,28° - Region 1



Yellow: Beam
Red: From Target
Blue: From Target
 Cell Limits

Beam Pipe **Tolerance:**
Manufacturing, Alignment

5,21 mm

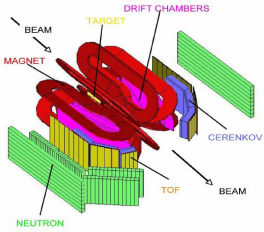
1.- Composition

2.- Magnetic Field

3.- Interference

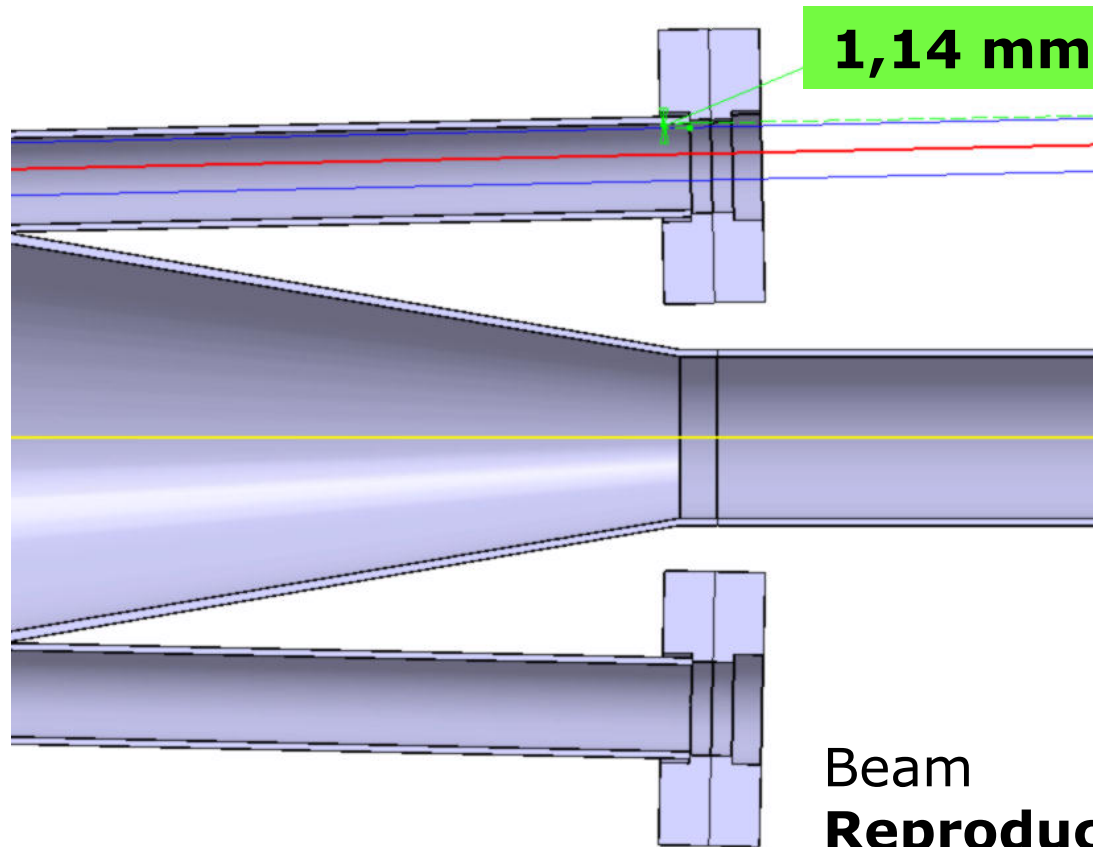
4.- Support

5.- Summary



Luminosity Monitor, Calorimeter

2,0 GeV; 1,28° - Region 2



Beam
Reproducibility

1.- Composition

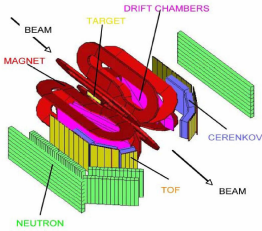
2.- Magnetic Field

3.- Interference

4.- Support

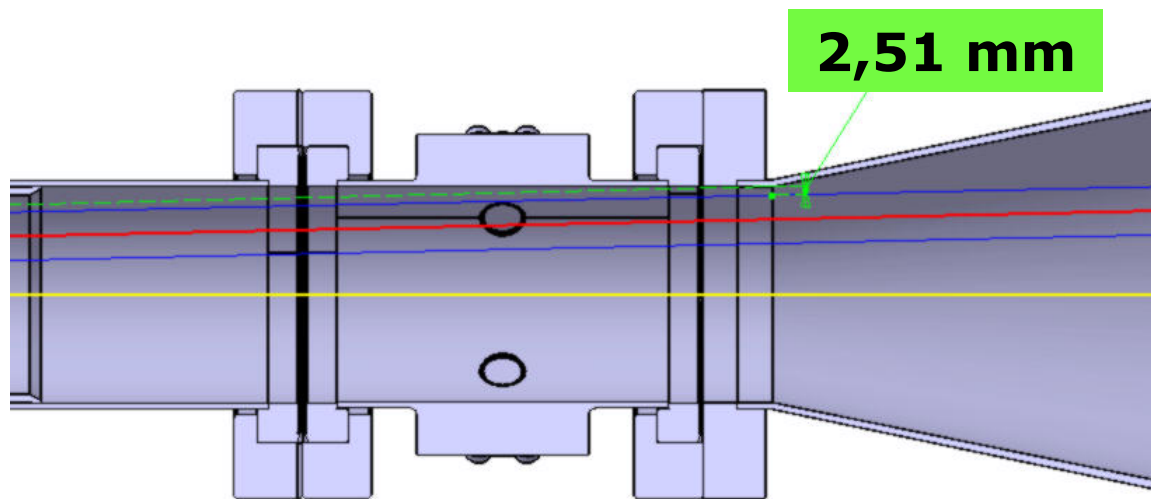
5.- Summary

Beam Pipe **Tolerance**: Manufacturing, Alignment



Luminosity Monitor, Calorimeter

2,0 GeV; 1,28° - Region 3



1.- Composition

2.- Magnetic Field

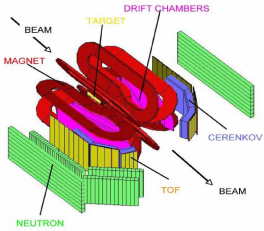
3.- Interference

4.- Support

5.- Summary

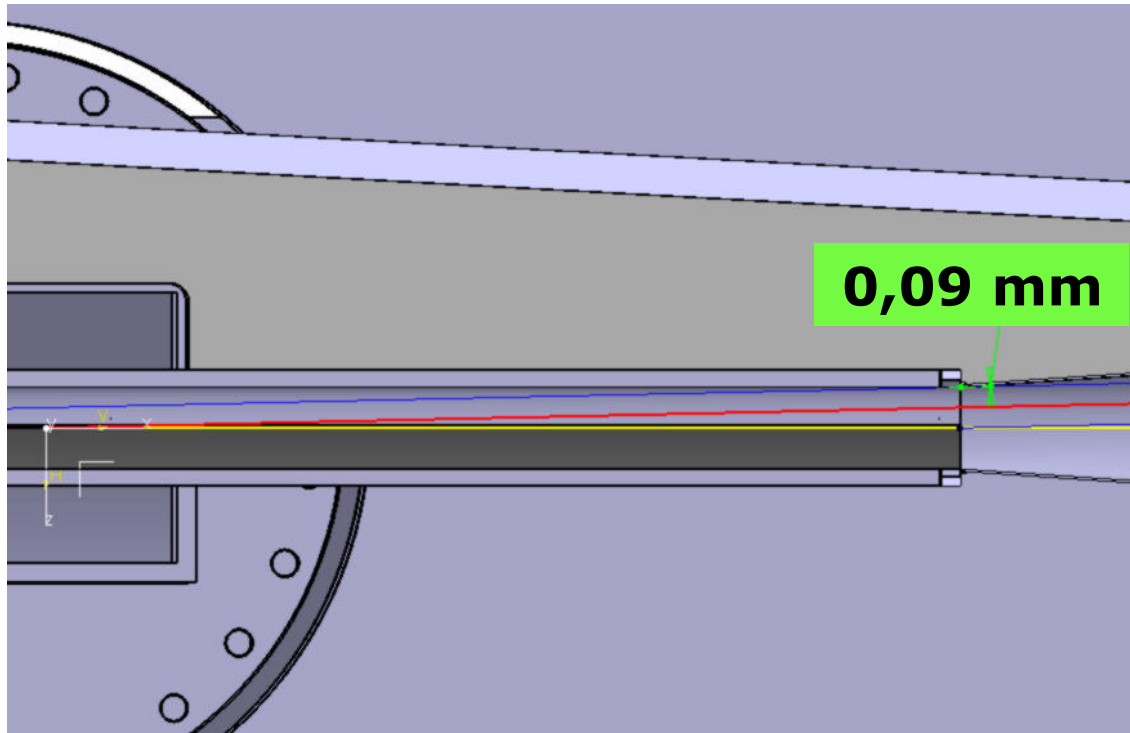
Beam Reproducibility

Beam Pipe Tolerance: Manufacturing, Alignment



Luminosity Monitor, Calorimeter

2,0 GeV; 1,28° - Region 4



Beam **Reproducibility**

Beam Pipe **Tolerance**: Manufacturing, Alignment

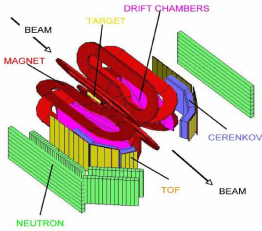
1.- Composition

2.- Magnetic Field

3.- Interference

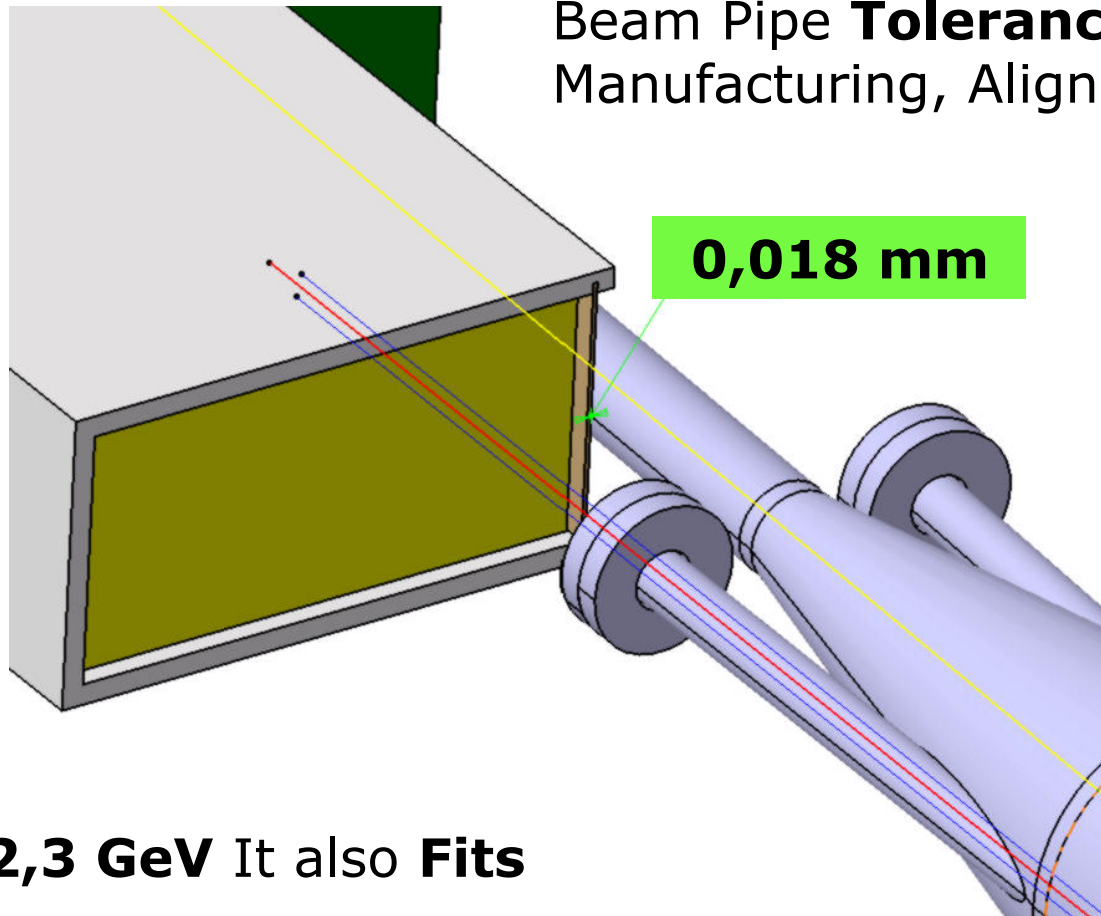
4.- Support

5.- Summary



Luminosity Monitor, Calorimeter

2,3 GeV; 1,19° - Region 1

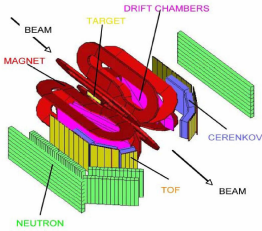


Beam Pipe **Tolerance:**
Manufacturing, Alignment

0,018 mm

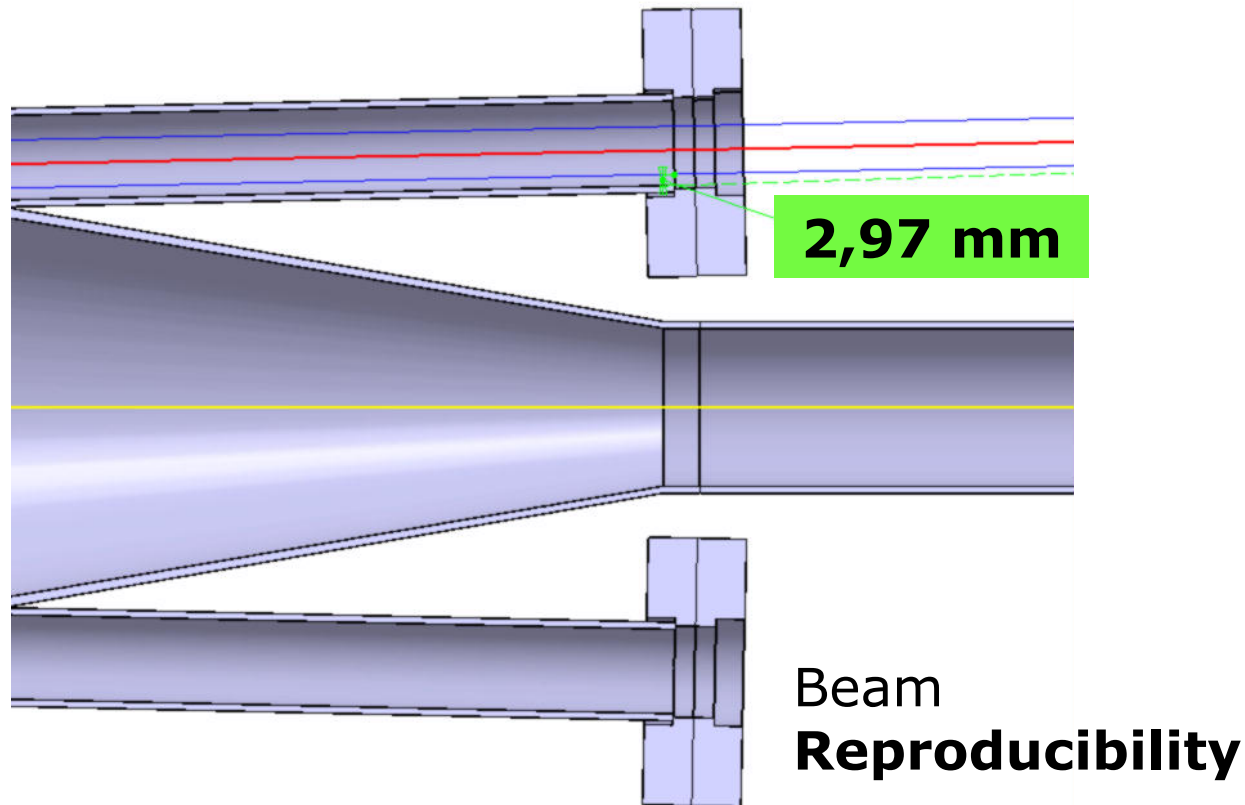
At **2,3 GeV** It also **Fits**

- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- Support
- 5.- Summary



Luminosity Monitor, Calorimeter

2,3 GeV; 1,19° - Region 2



1.- Composition

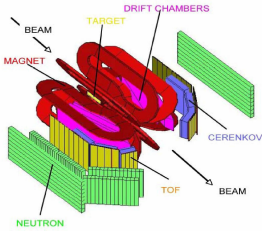
2.- Magnetic Field

3.- Interference

4.- Support

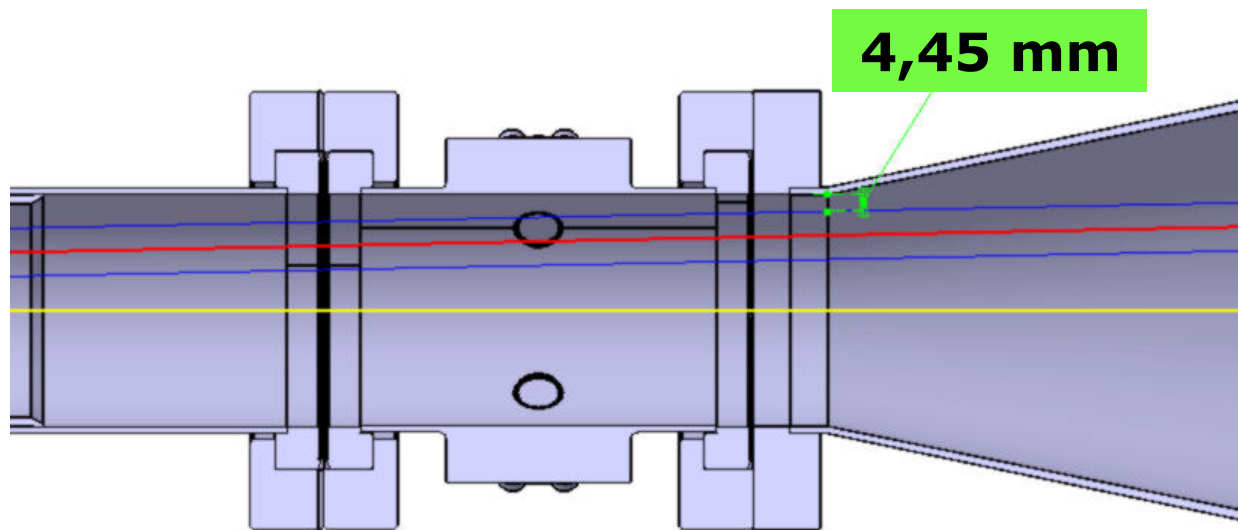
5.- Summary

Beam Pipe **Tolerance**: Manufacturing, Alignment



Luminosity Monitor, Calorimeter

2,3 GeV; 1,19° - Region 3



1.- Composition

2.- Magnetic Field

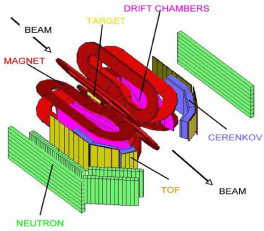
3.- Interference

4.- Support

5.- Summary

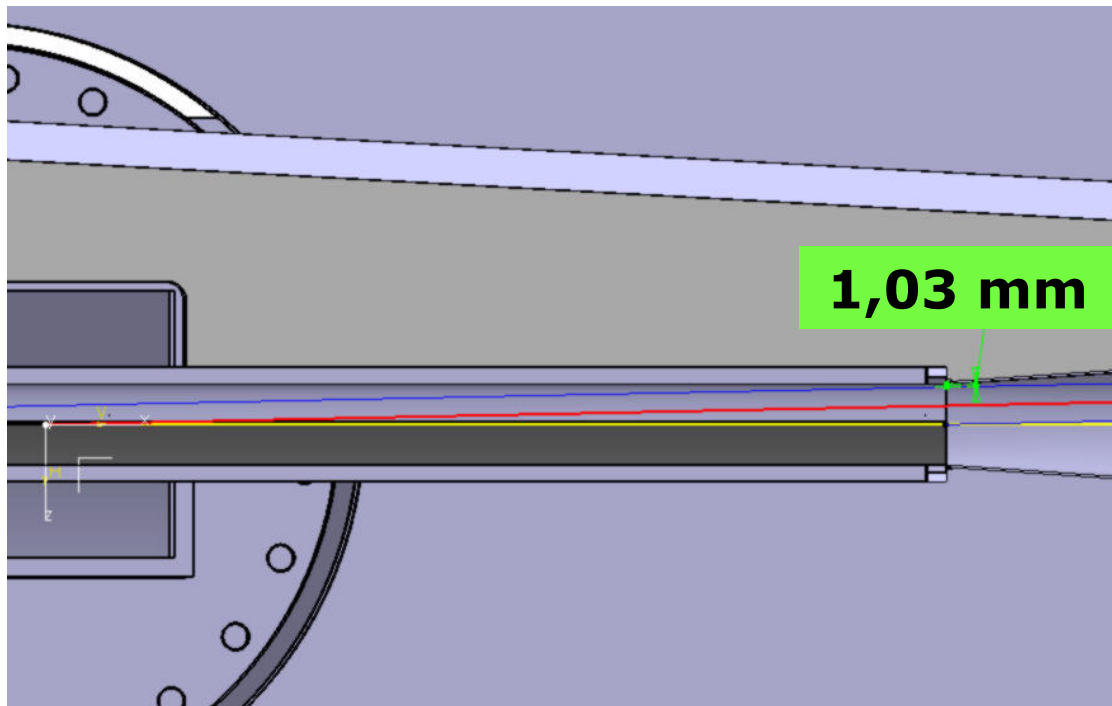
Beam Reproducibility

Beam Pipe Tolerance: Manufacturing, Alignment



Luminosity Monitor, Calorimeter

2,3 GeV; 1,19° - Region 4



Beam Reproducibility

Beam Pipe Tolerance: Manufacturing, Alignment

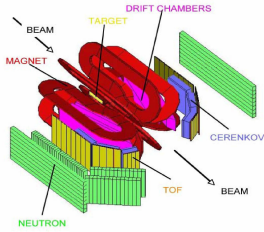
1.- Composition

2.- Magnetic Field

3.- Interference

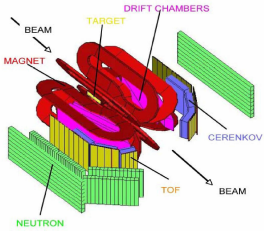
4.- Support

5.- Summary



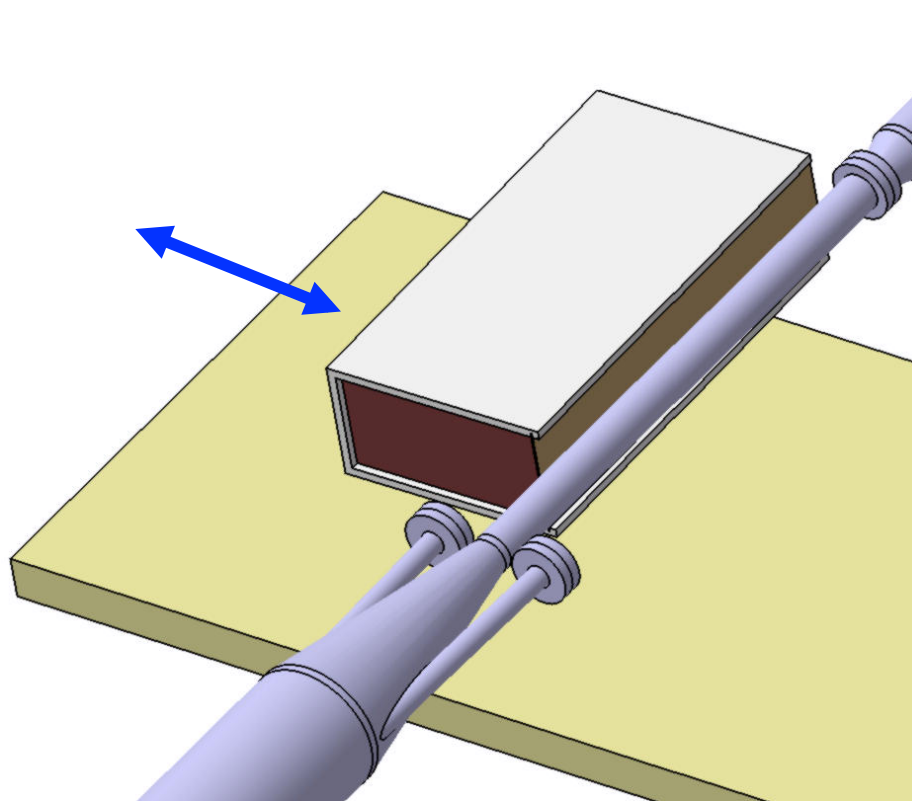
Luminosity Monitor, Calorimeter

4.- Support



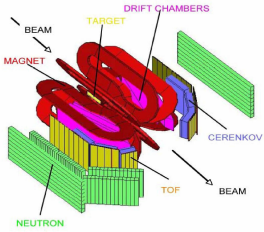
Luminosity Monitor, Calorimeter

Movement



Movement Due to Beam
Alignment: **Linear Rails**

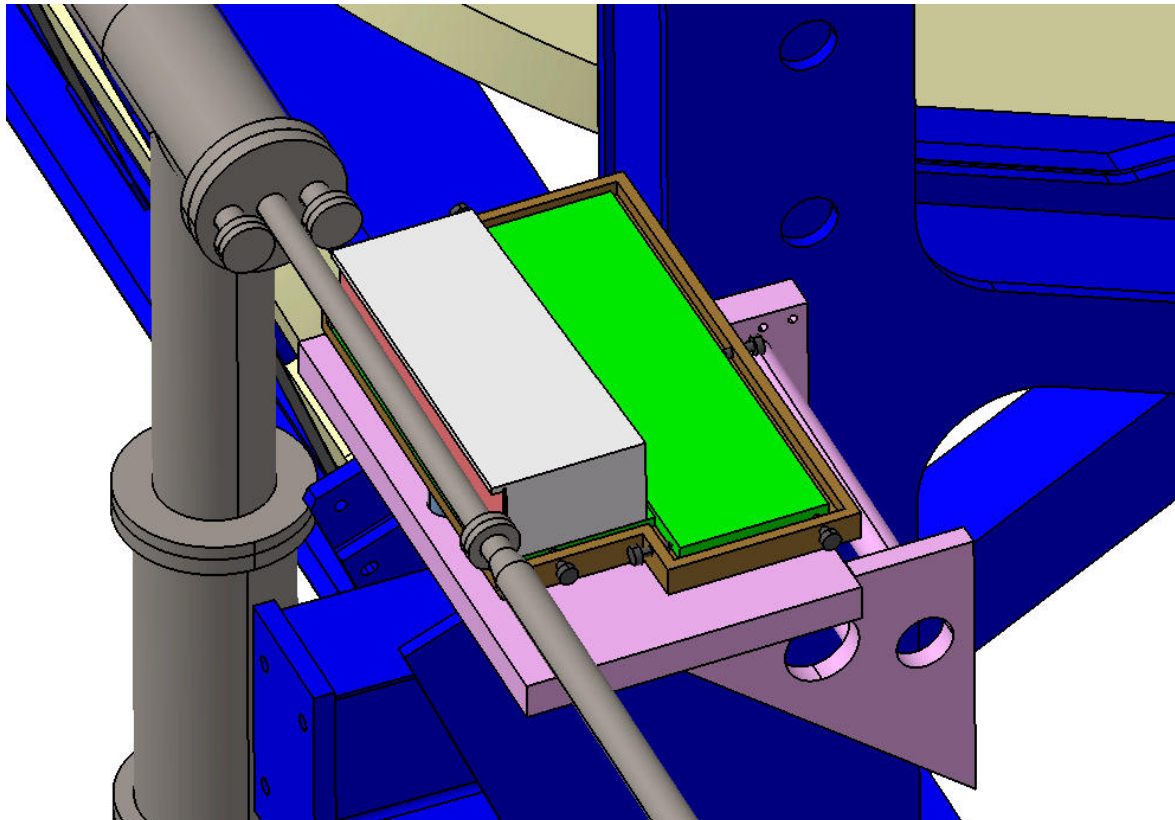
- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- **Support**
 - **Movement**
 - Support
- 5.- Summary



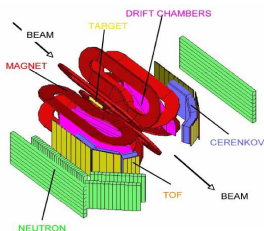
Luminosity Monitor, Calorimeter

Support I

Before: Attached to the K-Beams

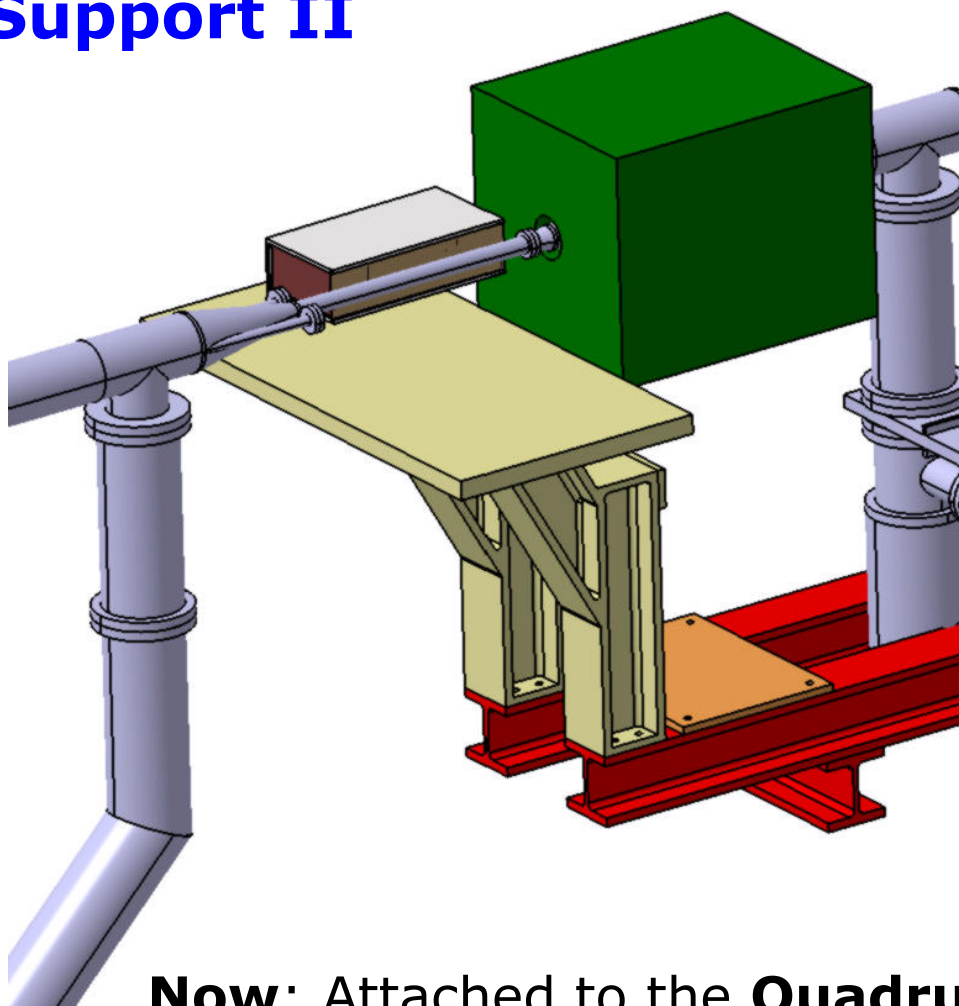


- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- Support
 - Movement
 - Support
- 5.- Summary



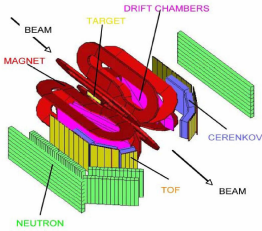
Luminosity Monitor, Calorimeter

Support II



Now: Attached to the **Quadrupole Stand**

- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- **Support**
 - Movement
 - **Support**
- 5.- Summary



Support III

Full Load Attached Quad Stand

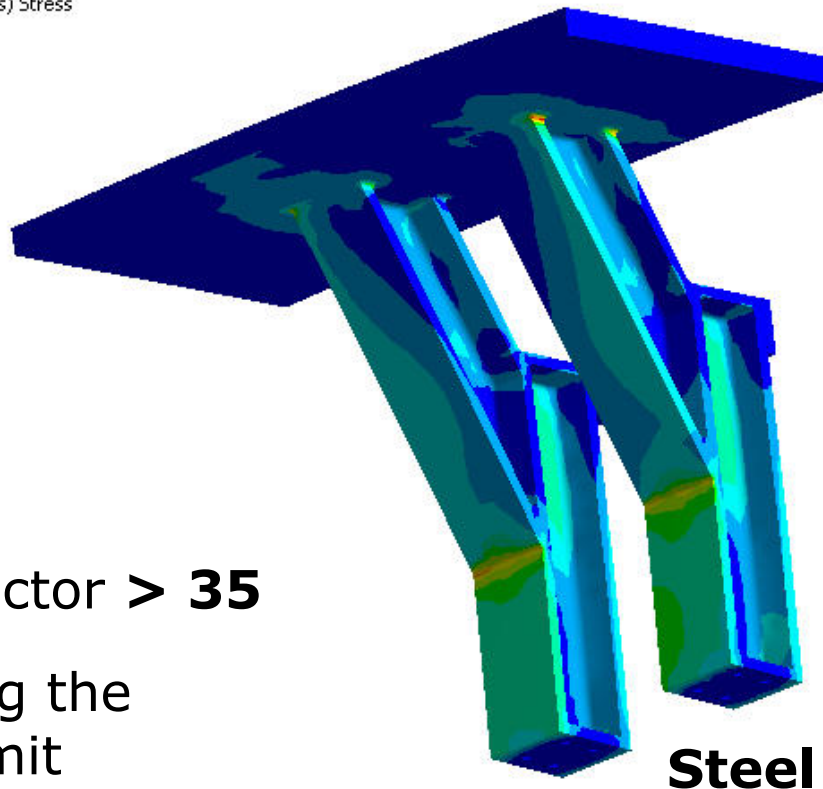
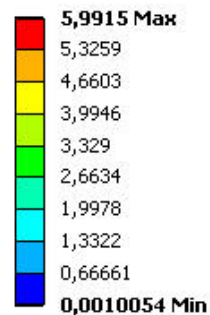
Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: MPa

Time: 1

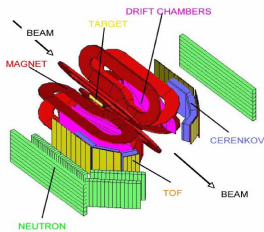
24/04/2010 16:01



Safety Factor > 35

Regarding the
elastic limit

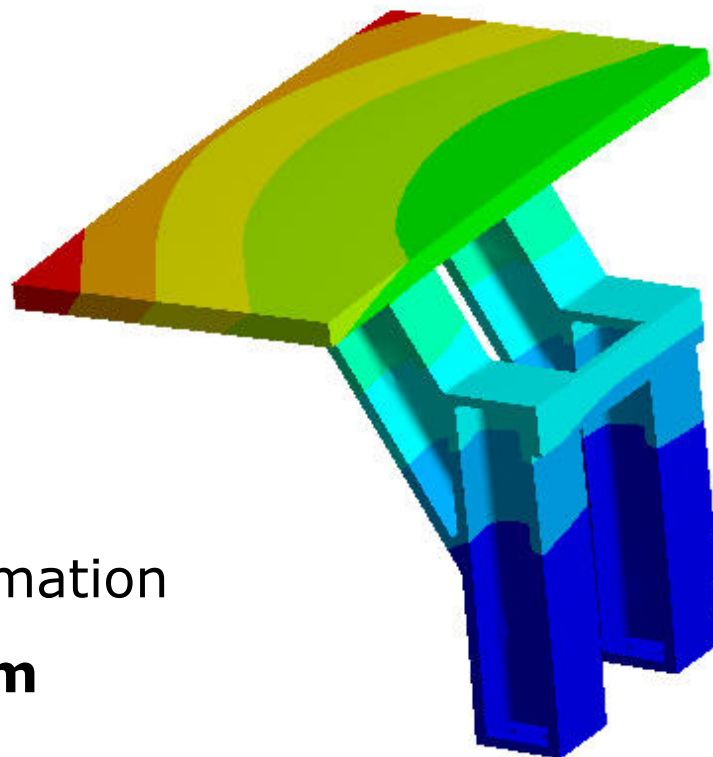
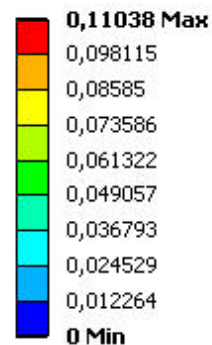
- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- Support
 - Movement
 - Support
- 5.- Summary



Luminosity Monitor, Calorimeter

Support IV

Total Deformation
 Type: Total Deformation
 Unit: mm
 Time: 1
 24/04/2010 16:02

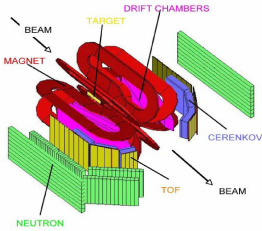


Steel

Total Deformation

< 0,11 mm

- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- **Support**
 - Movement
 - **Support**
- 5.- Summary



Luminosity Monitor, Calorimeter

Summary

Crystals **Arrangement Redone** after Transmittance Measurement

Space Gained

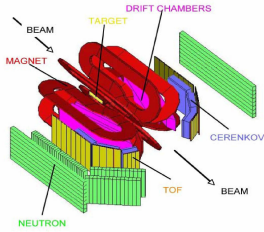
Possible **Interference** with the Beam Pipe

Enough Magnetic Shielding for the PMT

Support: from K-Beams to **Quad Stand**

After **Interference** with the Beam Pipe:
Detailed **Simulations** will Be Done

- 1.- Composition
- 2.- Magnetic Field
- 3.- Interference
- 4.- Support
- 5.- Summary



Luminosity Monitor, Calorimeter

Thank you!

Personal Contact:

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web.mit.edu/OLYMPUS