BeamCal Mechanics

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BeamCal:

ensures hermeticity of the detector to smallest polar angles

-important for searches

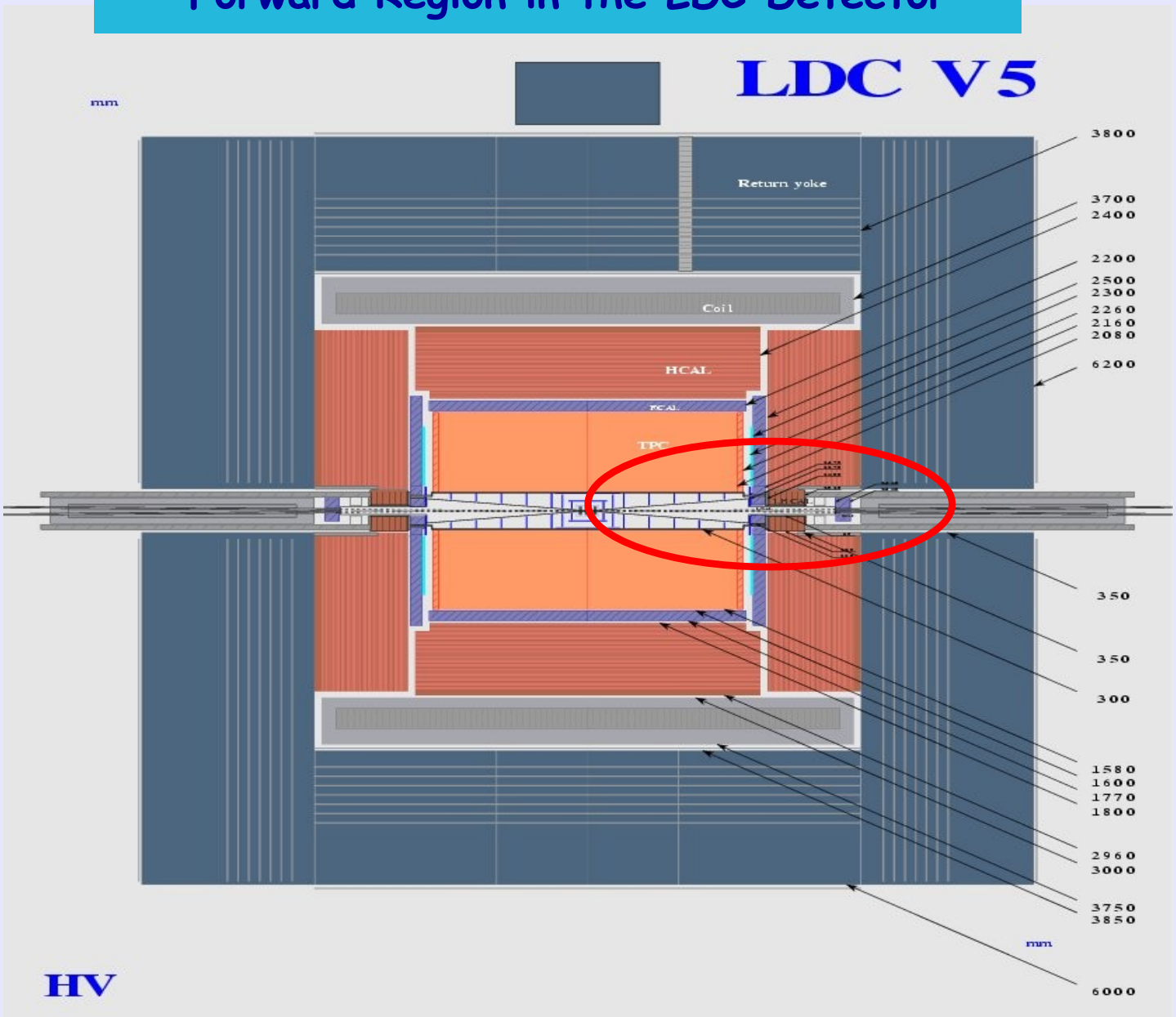
Serves as a feedback system for Lumi-optimisation and beam diagnostics

-supports maximum Luminosity

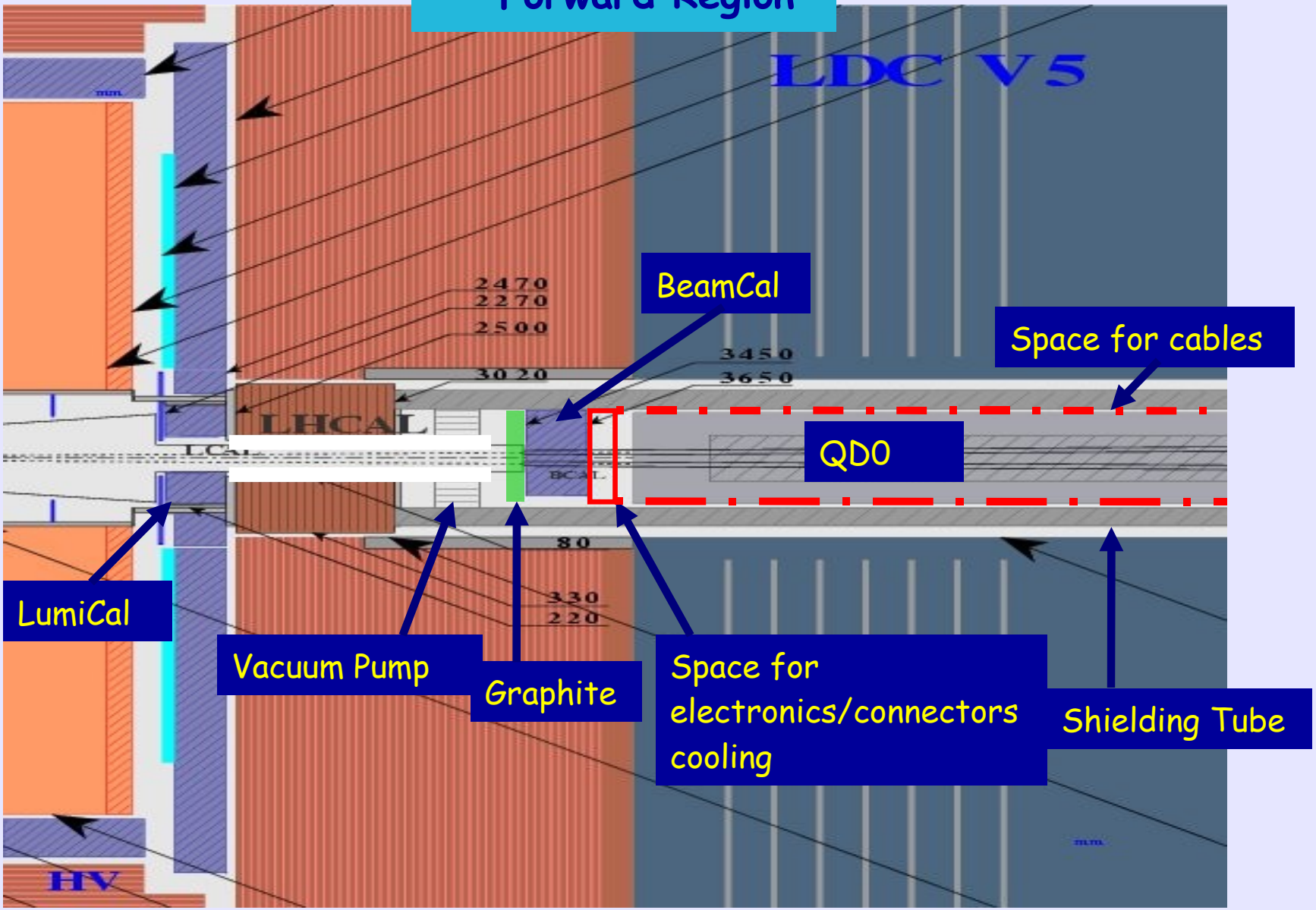
Current design (Example LDC, 14 mrad):

-compact, approach smallest possible Moliere radius
-30 Xo ???/W sampling calorimeter
-the shower is sampled every Xo (3.5 mm W)
-sensor plane thickness ~0.5 mm
-centered around the outgoing beampipe (detector phi symmetry broken)
-readout after each BX (Power dissipation, Electronics, Links)

Forward Region in the LDC Detector

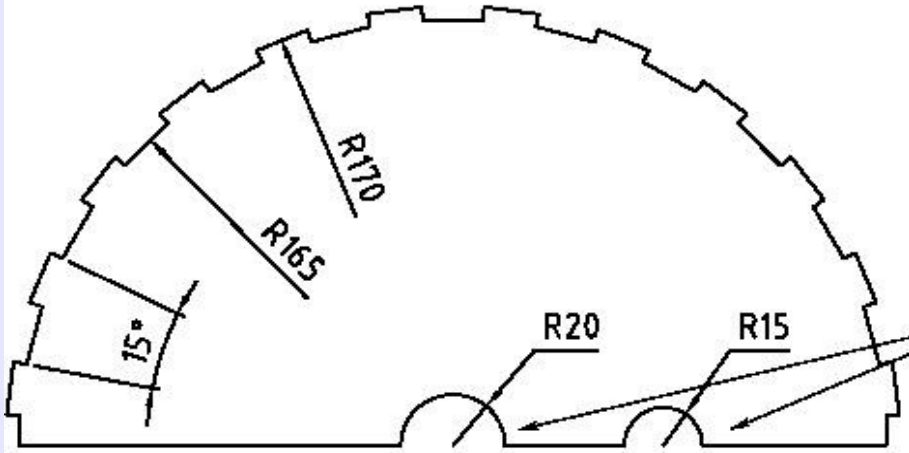


Forward Region



BeamCal Details

Half-Layer Mechanics



- **Absorber plate**

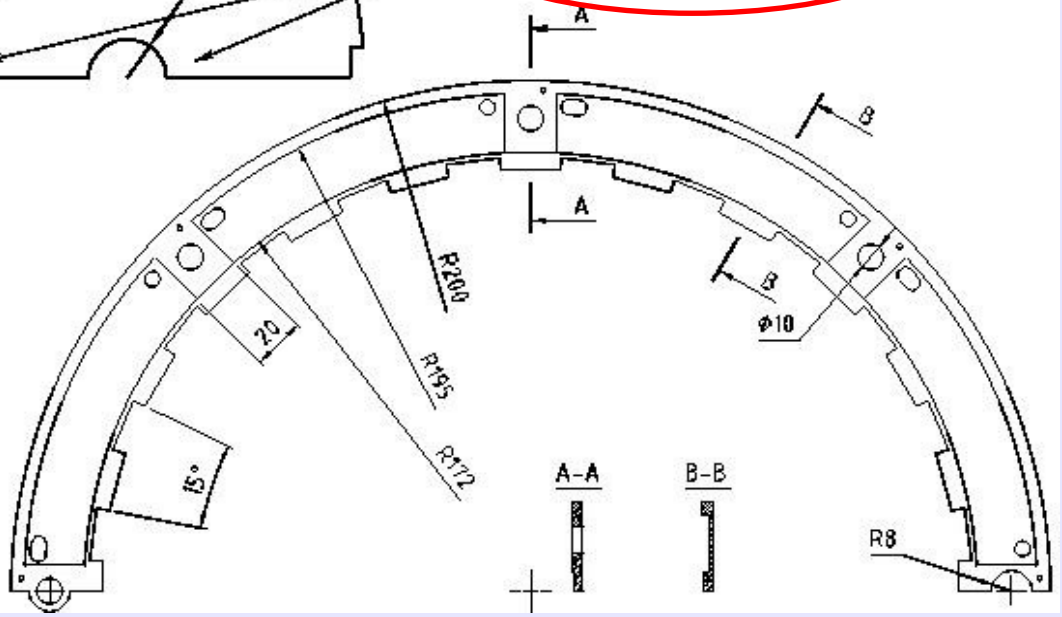
(tungsten , 3.5 mm thickness)

Beam pipe cutouts

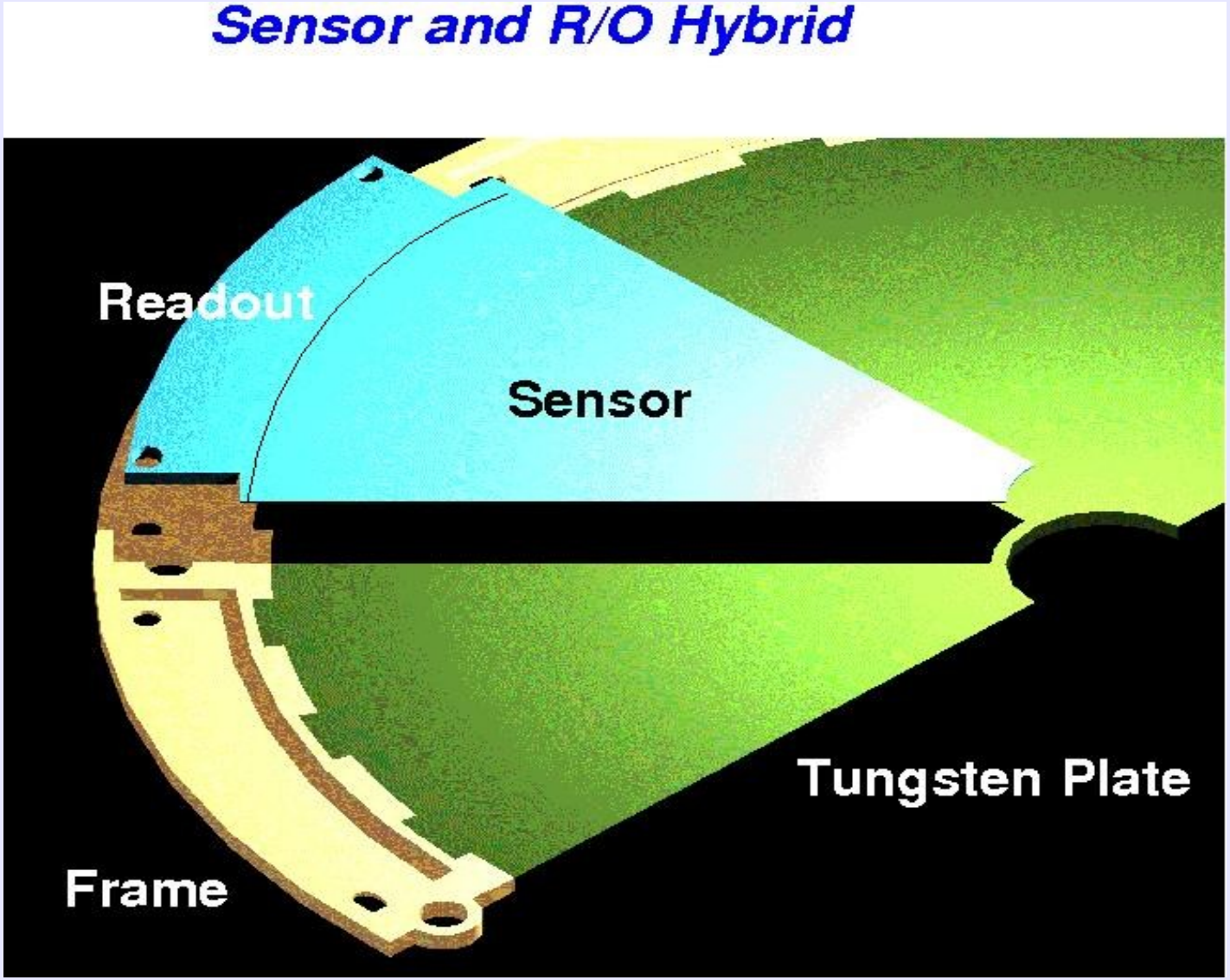
- **Frame**

(brass, 4 mm total thickness)

Parts are glued together

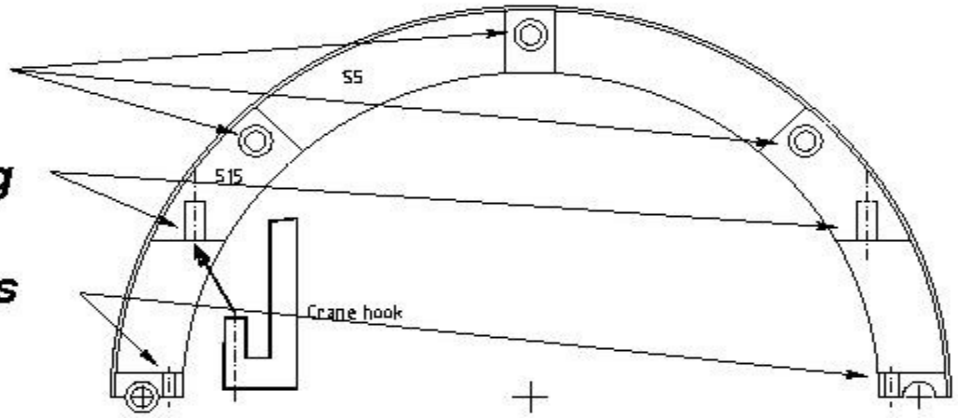


Absorber Layers and Sensors

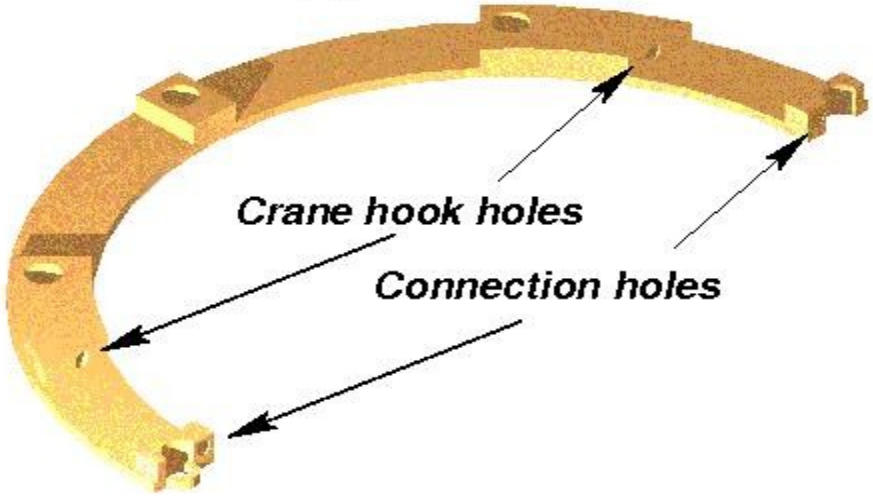


Front/Back support frames

- To fix BeamCal assembly
- To allow the crane handling
- To connect BeamCal halves

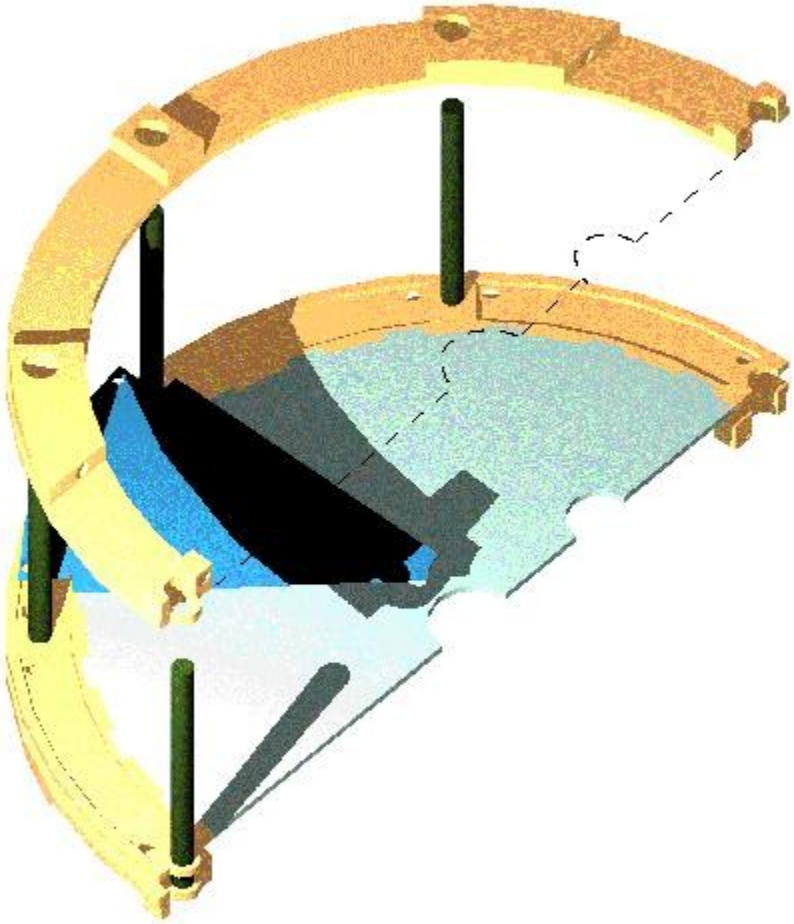


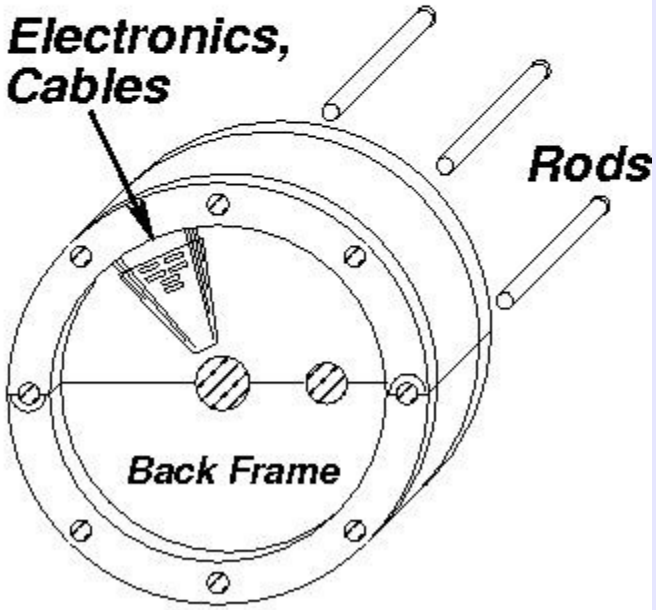
Support Frame



Back Frame is similar, but covers the sensor area and serves for cables, connectors and extra electronics placement

Assembly, Cabling, Extra Electronics

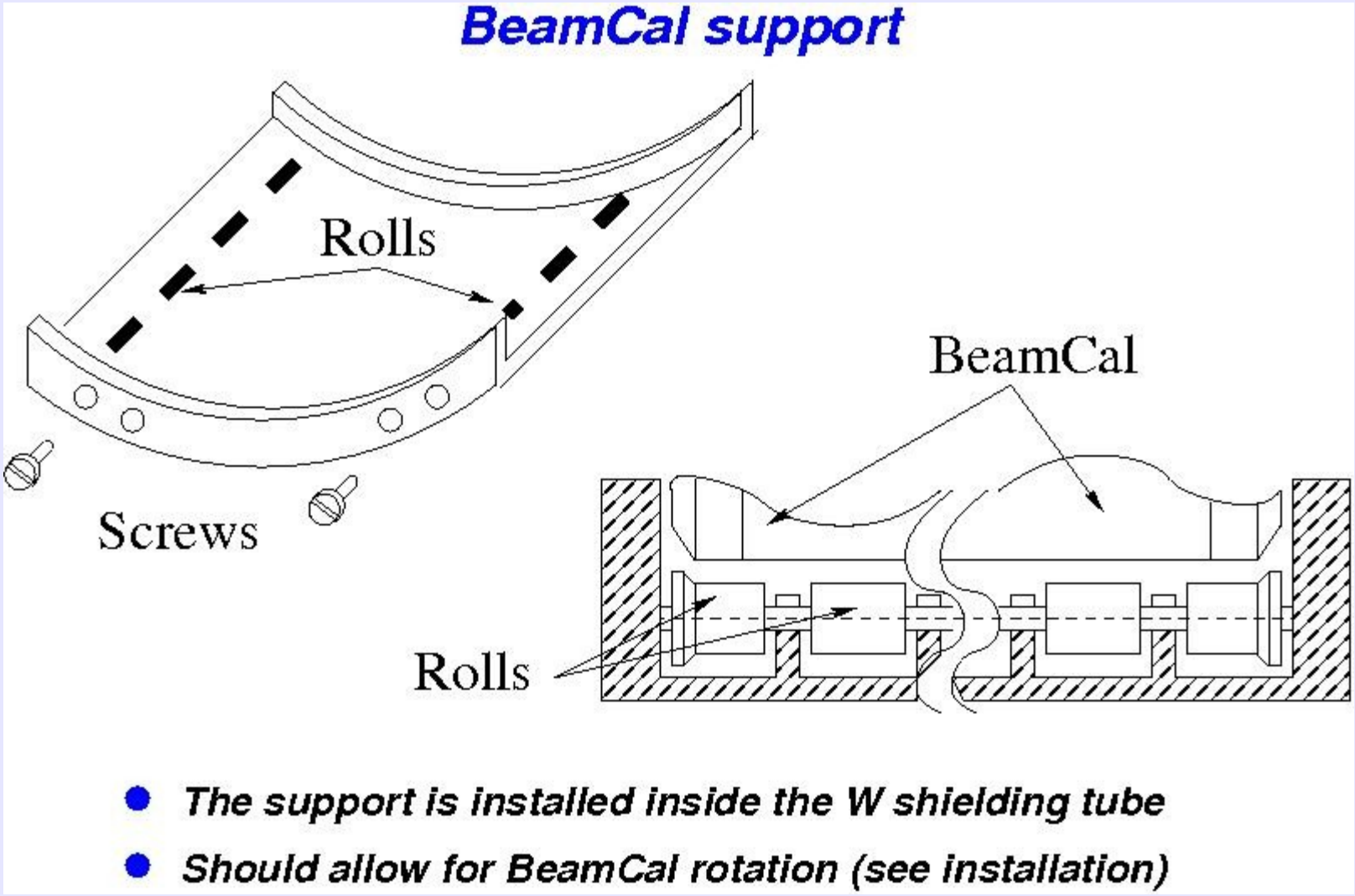




Back view

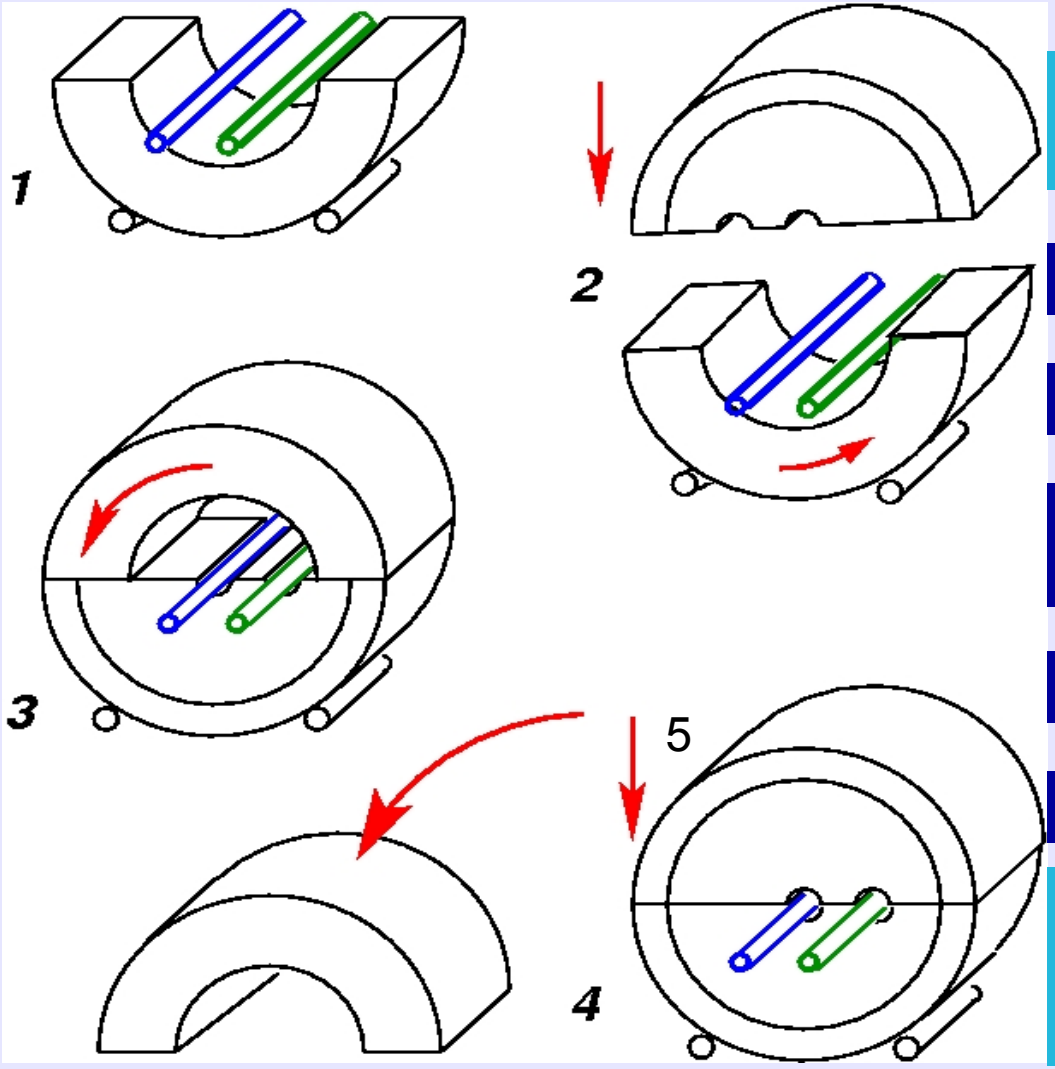
Total mass: ~200 kg

BeamCal positioning inside the Shielding Tube



- *The support is installed inside the W shielding tube*
- *Should allow for BeamCal rotation (see installation)*

The Mounting Procedure for BeamCal



Installation and disassembly must be possible without opening the vacuum!

1 montage of an auxiliary structure

2 montage of the first half barrel

3 Turn the barrel and bring the first calorimeter half barrel in final position

4 remove the auxiliary structure

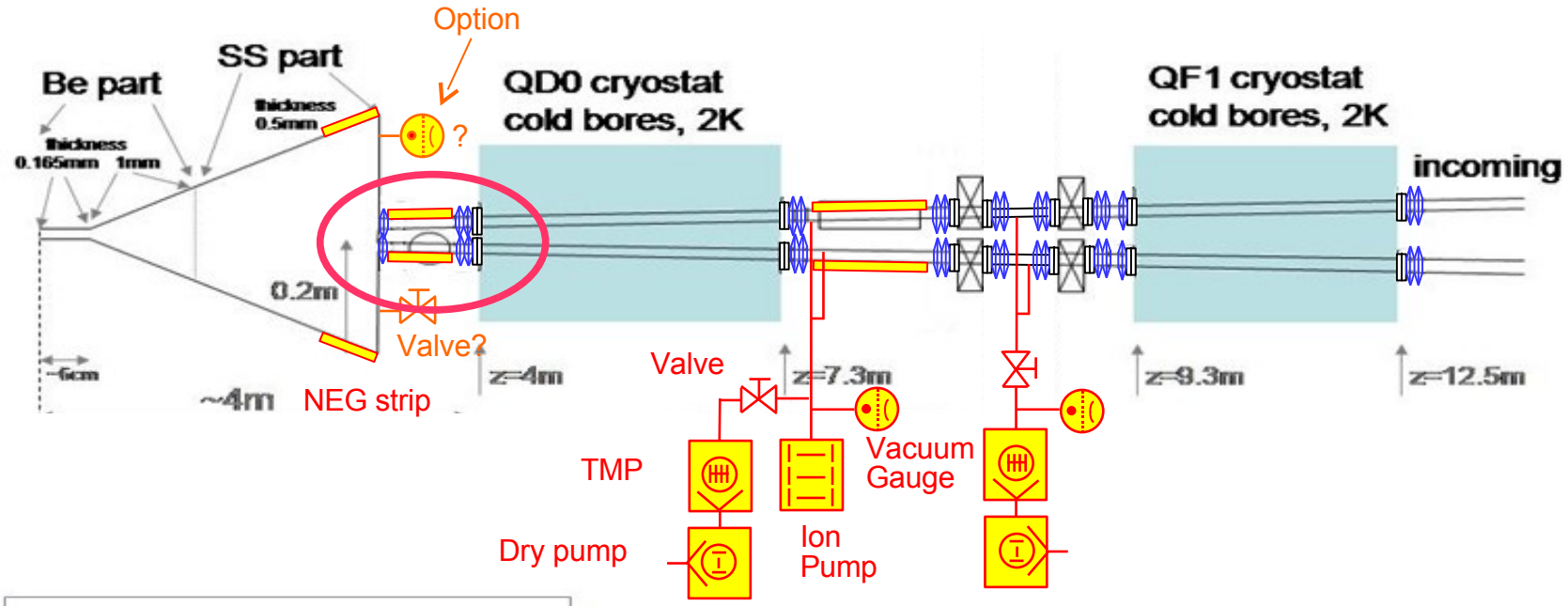
5 montage of the second half barrel

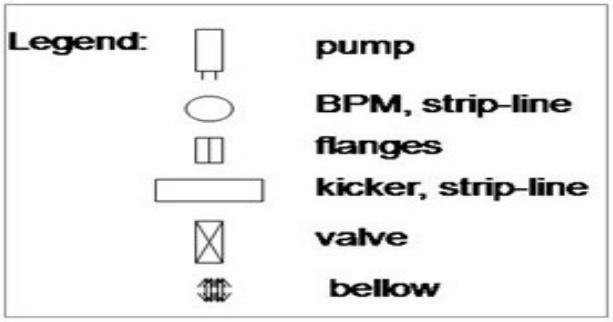
To perform this procedure the upper half of the shielding tube has to be removed

Basic design_15

Yusuke Suetsugu: Summary on vacuum requirements....

- Layout of pumps





Apertures typically r=1cm in incoming beamline, and r=1.2cm+0.08cm*Z(m) in the outgoing beamline

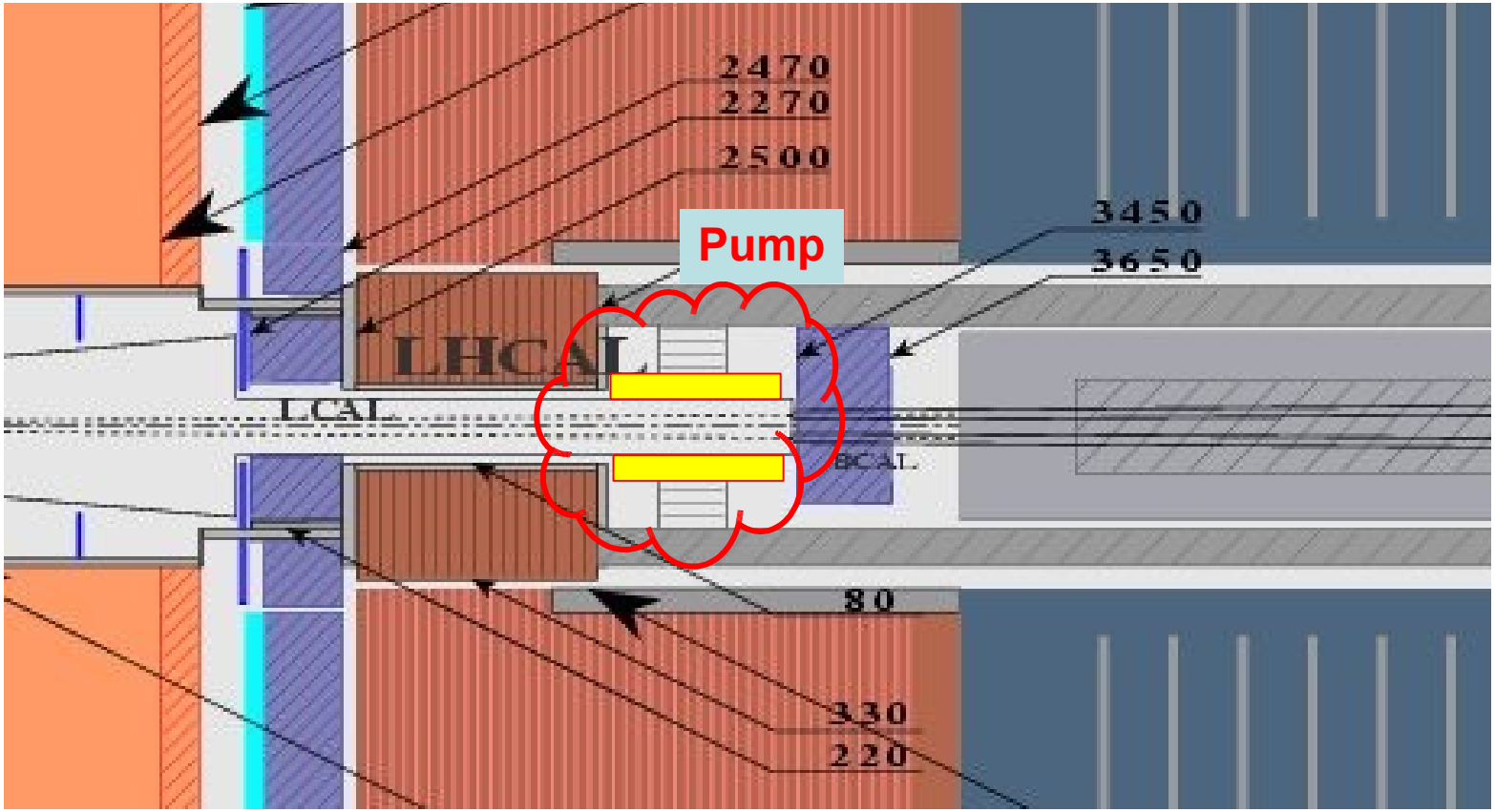
Be-SS connection is permanent

(Y. Suetsugu)

Basic design_11

Yusuke Suetsugu: Summary on vacuum requirements....

- for LDC



N. Meyners **(Y. Suetsugu)**

Summary

BeamCal (LDC)

- Length in Z: 15 cm bare calorimeter
  ~10 cm graphite in front (reduction of backscattered electrons).
  ~10 cm space at the rare side (electronics, connectors)
- Inner and outer instrumented radius: 20 – 165 mm
- Full outer Radius: 200 mm
- Outer radius including support: 220 mm
- Total weight: ~200 kg
- Upper part of the shielding tube must be removable
- Crane operation necessary for montage/demontage

-Details of FEE are not yet fixed, but there will be connectors, power and signal cables…….