

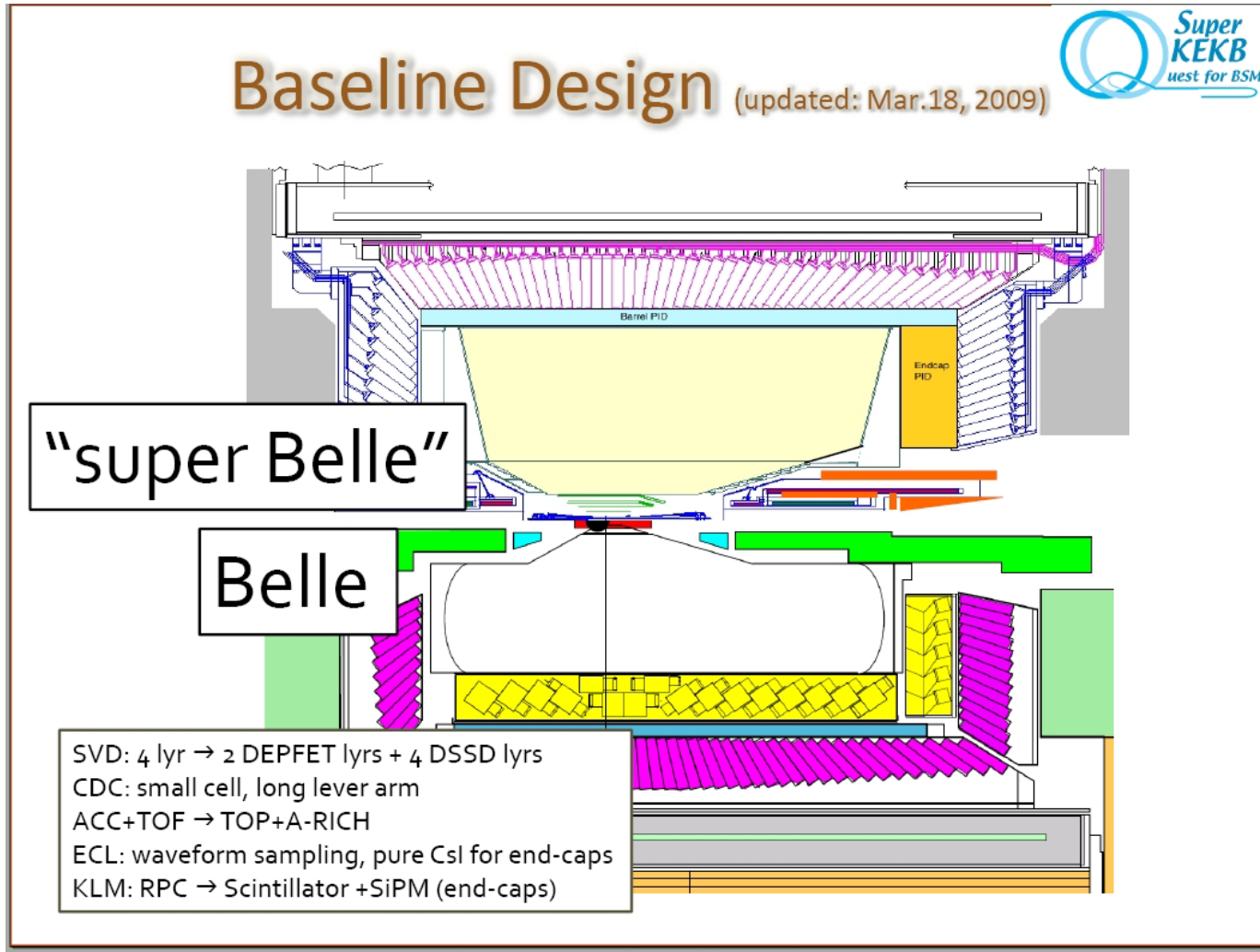
Pixel Integration Concepts and Considerations for Belle/Super-Belle
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Outline

- Overview of Belle detector and proposed upgrades
- CAD views of the Belle IR
- CAD views of PXD development
- PXD to Beampipe mounting concept
- PXD integration flow-down chart
- Summary and Comments

- Overview of Belle detector and proposed upgrades



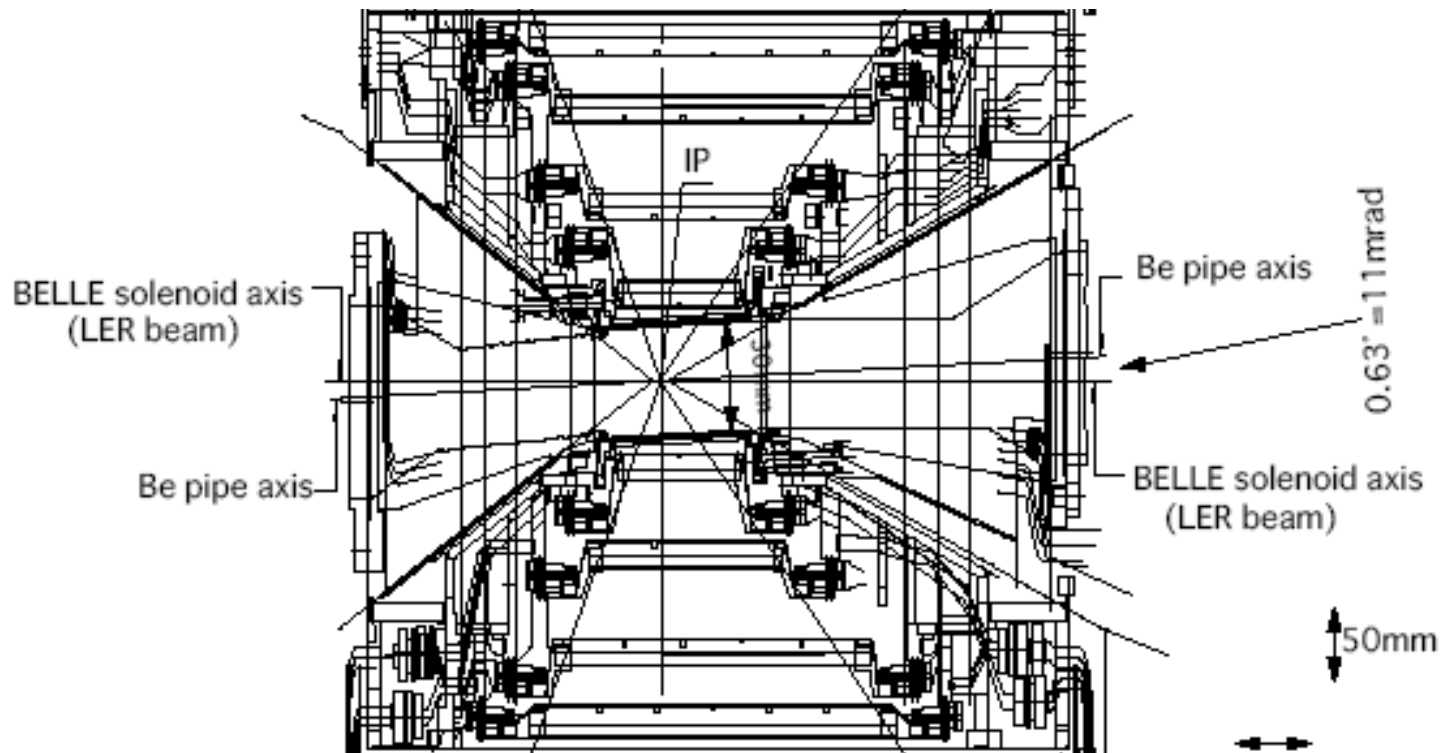
- Overview of Belle detector and proposed upgrades

THREE CRITICAL AXES in the current IR:

LER = SOLENOID AXIS (Belle central axis)

HER = 22mrad ROTATION ccw FROM LER

BEAMPIPE = 11mrad WRT BOTH LER and HER

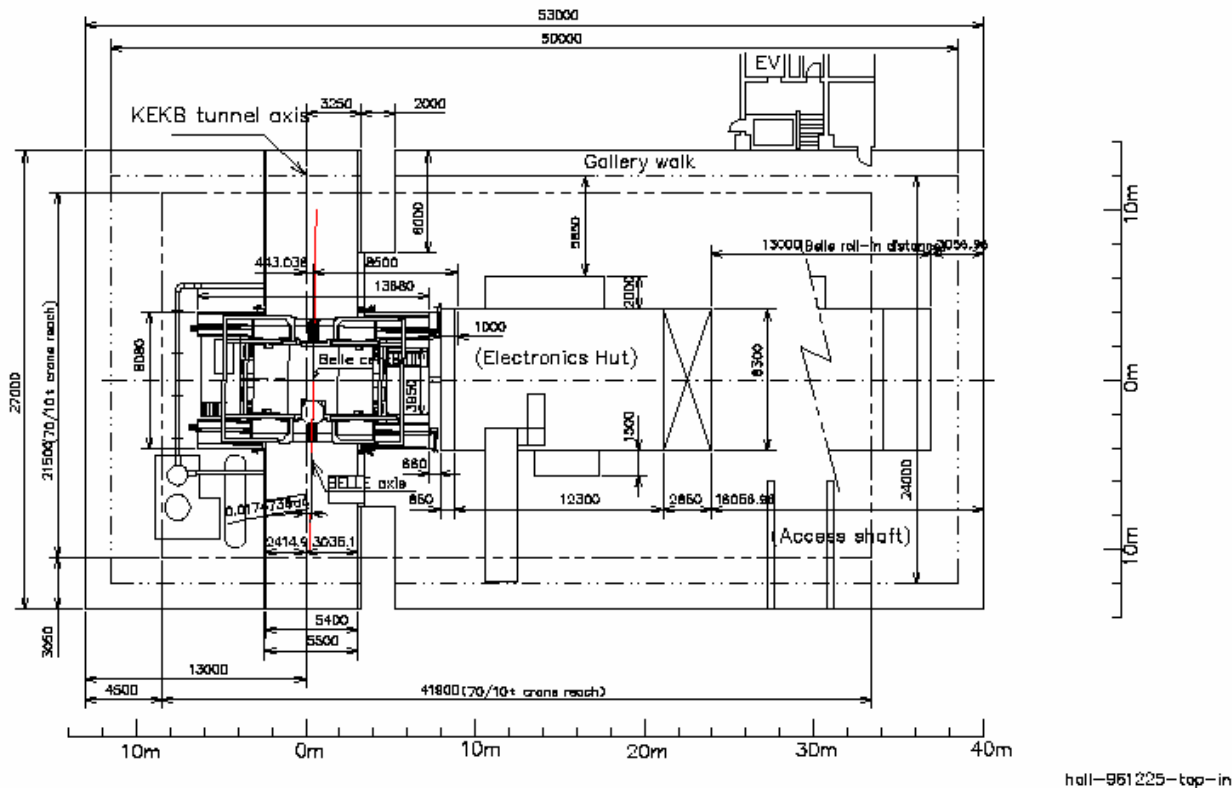


- Overview of Belle detector and proposed upgrades

Belle is currently rotated 17mrad (cw) from the KEKB tunnel axis.

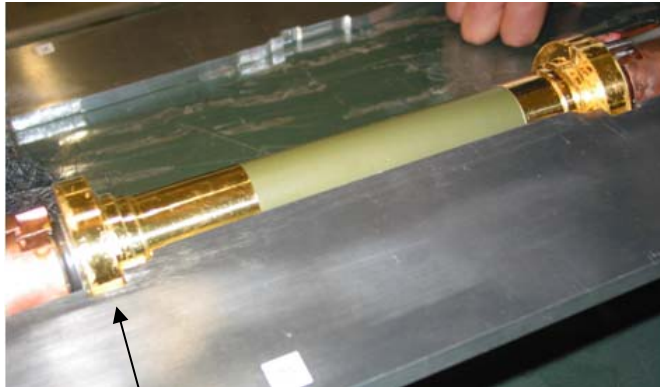
More rotation may be required as the HER-LER crossing angle increases.

Tsukuba Exp. Hall plan view



- Overview of Belle detector and proposed upgrades

Photos of the current R1.5cm beampipe



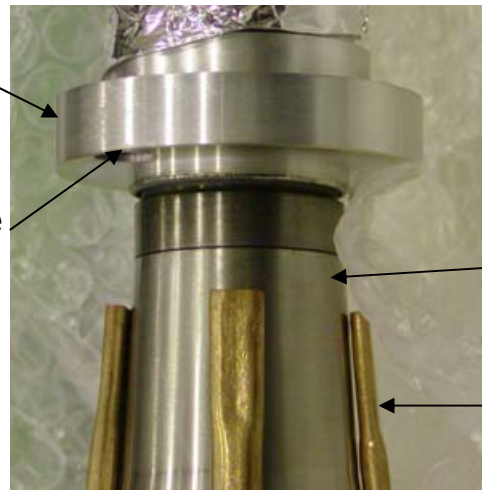
Support ring for Be
cooling tube

Hole for cooling tube

Tantalum mask assembly

Tungsten inner cone

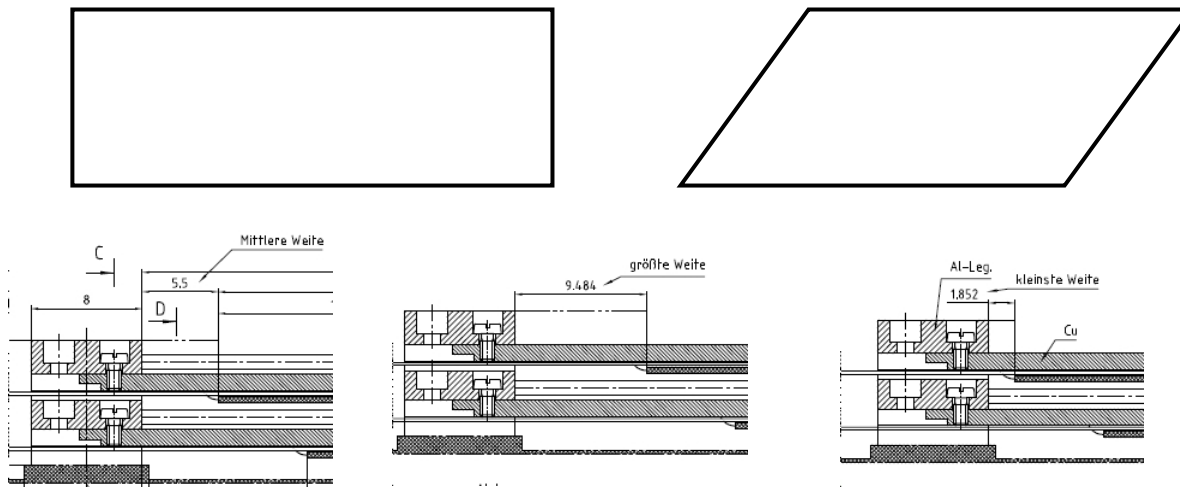
Cooling tubes



- Overview of Belle detector and proposed upgrades
- CAD views of the Belle IR
(current Super-Belle concept file)
- CAD views of PXD development
(PXD concept files: V03, V01f, V02a)

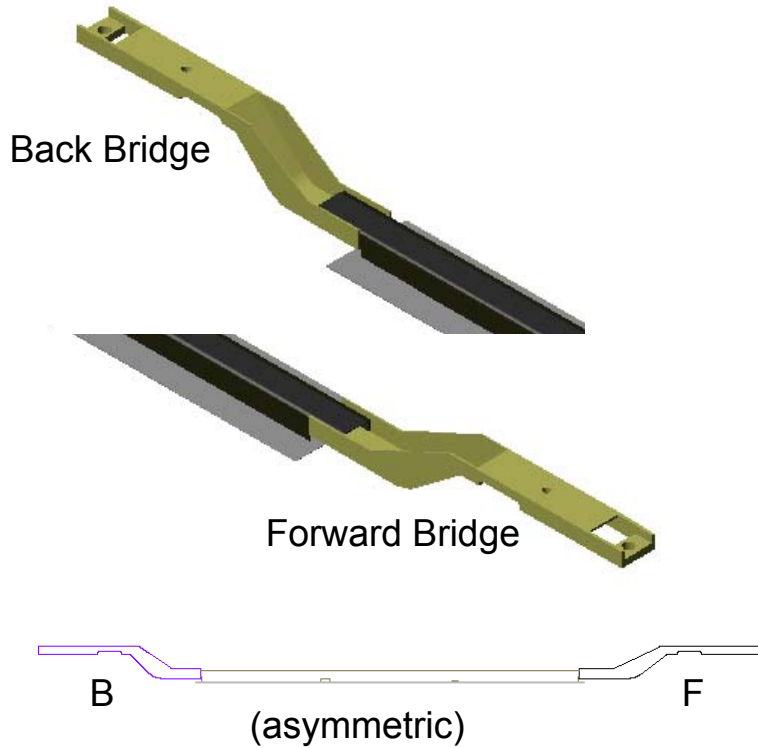
(switch from PowerPoint to ACAD)

- Summary from CAD files:
- The greater the crossing angle, the more difficult it is to cover the detector acceptance volume with the active area of the DEPFET sensors, while keeping the read-out chips out of the acceptance volume.
- What will be the final form factor of the PXD?

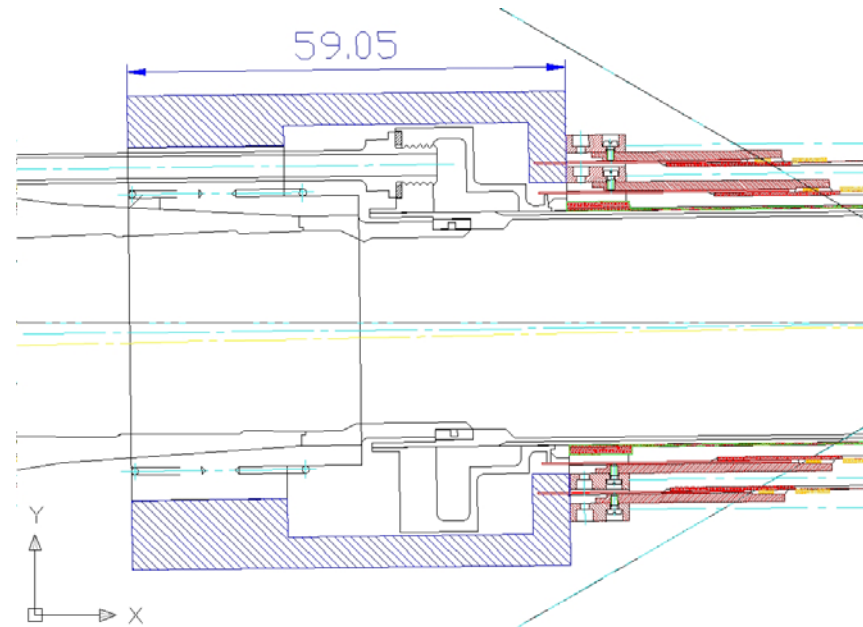


- PXD to Beampipe mounting concept: “The Bridge”
(A possible alternative to direct coupling to the Be center section)

SVD2 LADDER + Bridges



Mount the PXD to a structural component of the beampipe



(A new design for the cooling manifold could result in a shorter bridge structure. The current manifold is not structural.)

PXD Integration Flow-Down Chart

PXD MOUNTING AND COUPLING

To beampipe:

or

Not to beampipe:

Where on BP?

Mounts to SVD end rings?

Mount to Be section or more distal?

Oriented parallel to SVD or to BP?

(Mounting to Be requires thermal isolation)

(Need to design SVD end ring that allows PXD

Mechanical coupling to BP:

to be both near and parallel to the BP =>best.)

(Mechanical only or thermo/mechanical?)

The final crossing angle will impact this option

THERMOELECTRIC COUPLING CONSIDERATIONS

Thermally conductive?

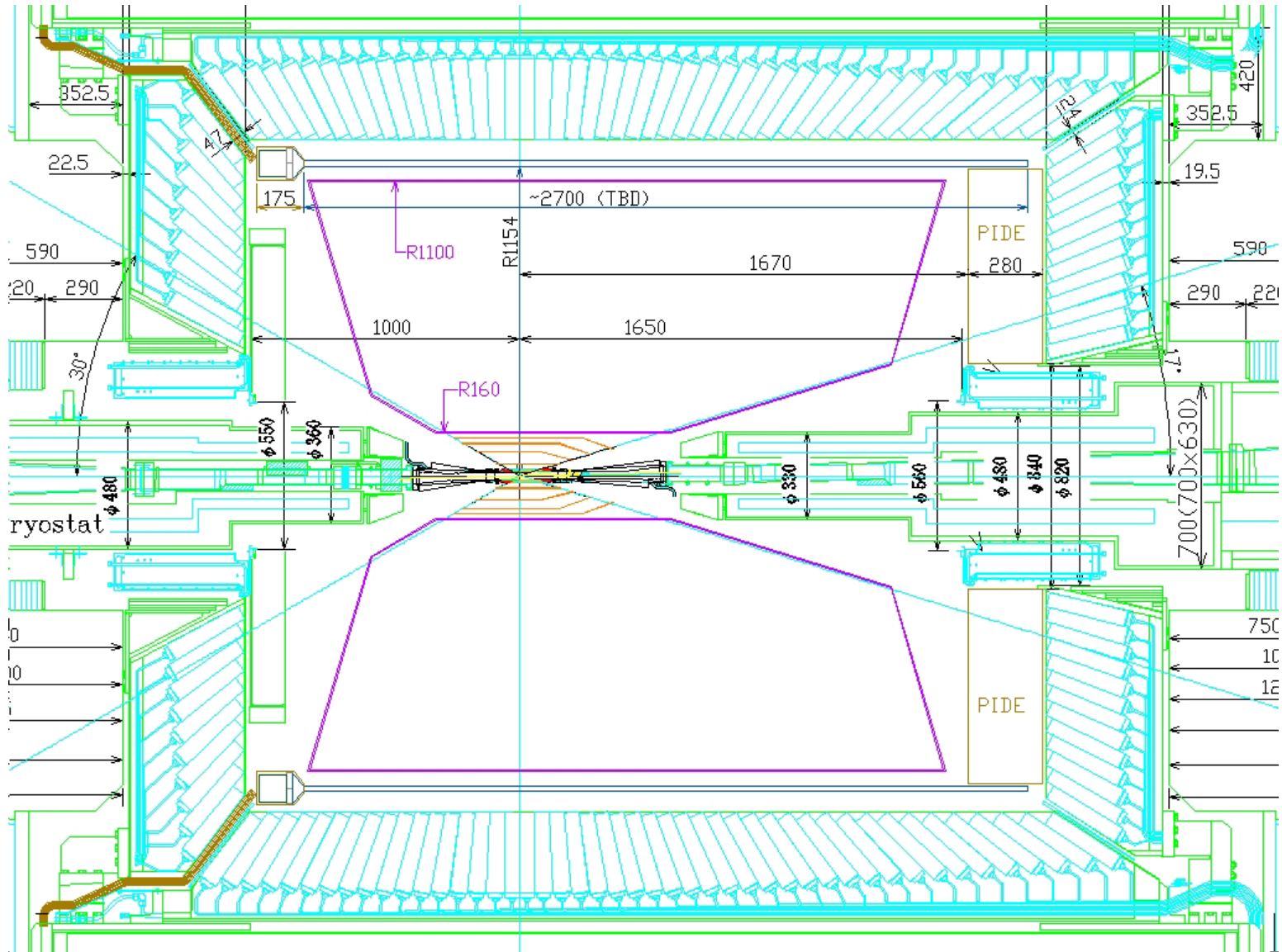
Electrically conductive?

Thermal Coupling and Routing for Cooling are Mandatory Considerations

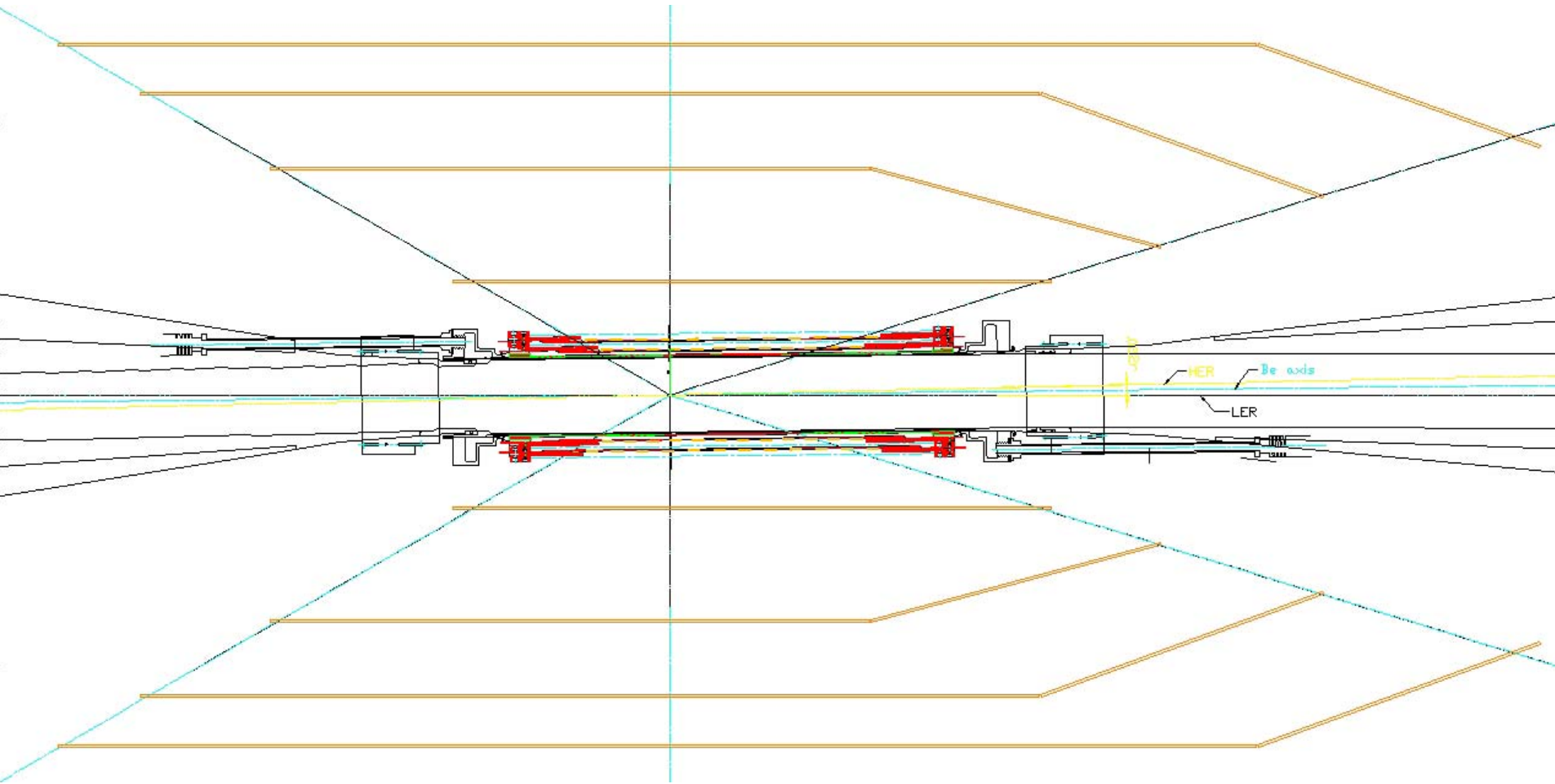
- Summary and Comments

- 1) Design of the Super-Belle BP (or SVD endring) needs to include PXD integration.
- 2) Mounting: Direct thermal coupling of the PXD to the BP is likely to result in thermal excursions for the PXD.
- 3) Mechanical considerations look manageable at this early stage.
- 4) Routing for cabling and cooling remains undefined and needs attention.
- 5) Designs that we can see now look OK.
- 6) It's what we do not see that needs to be determined.

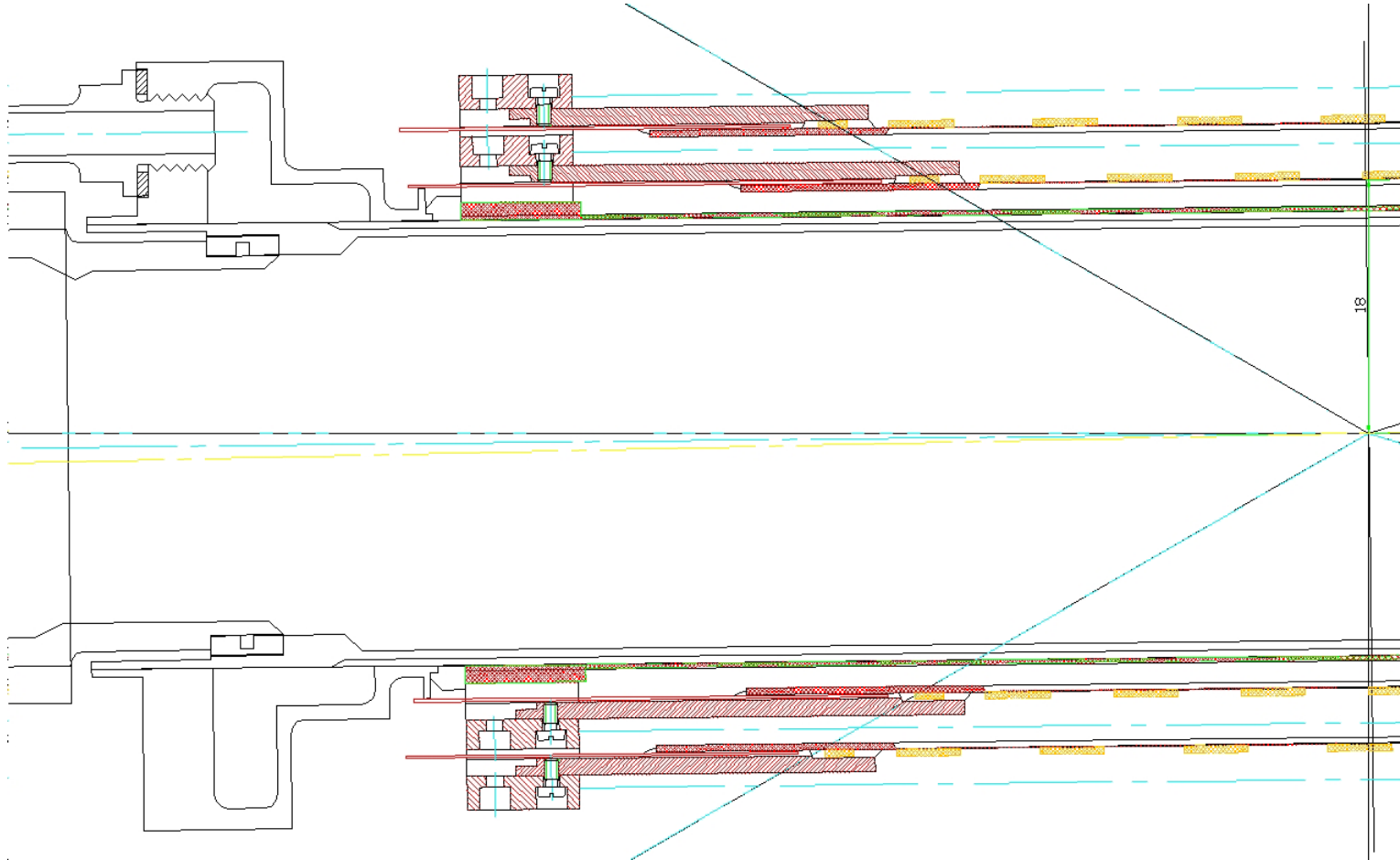
- Back-up slides: screen grabs of CAD



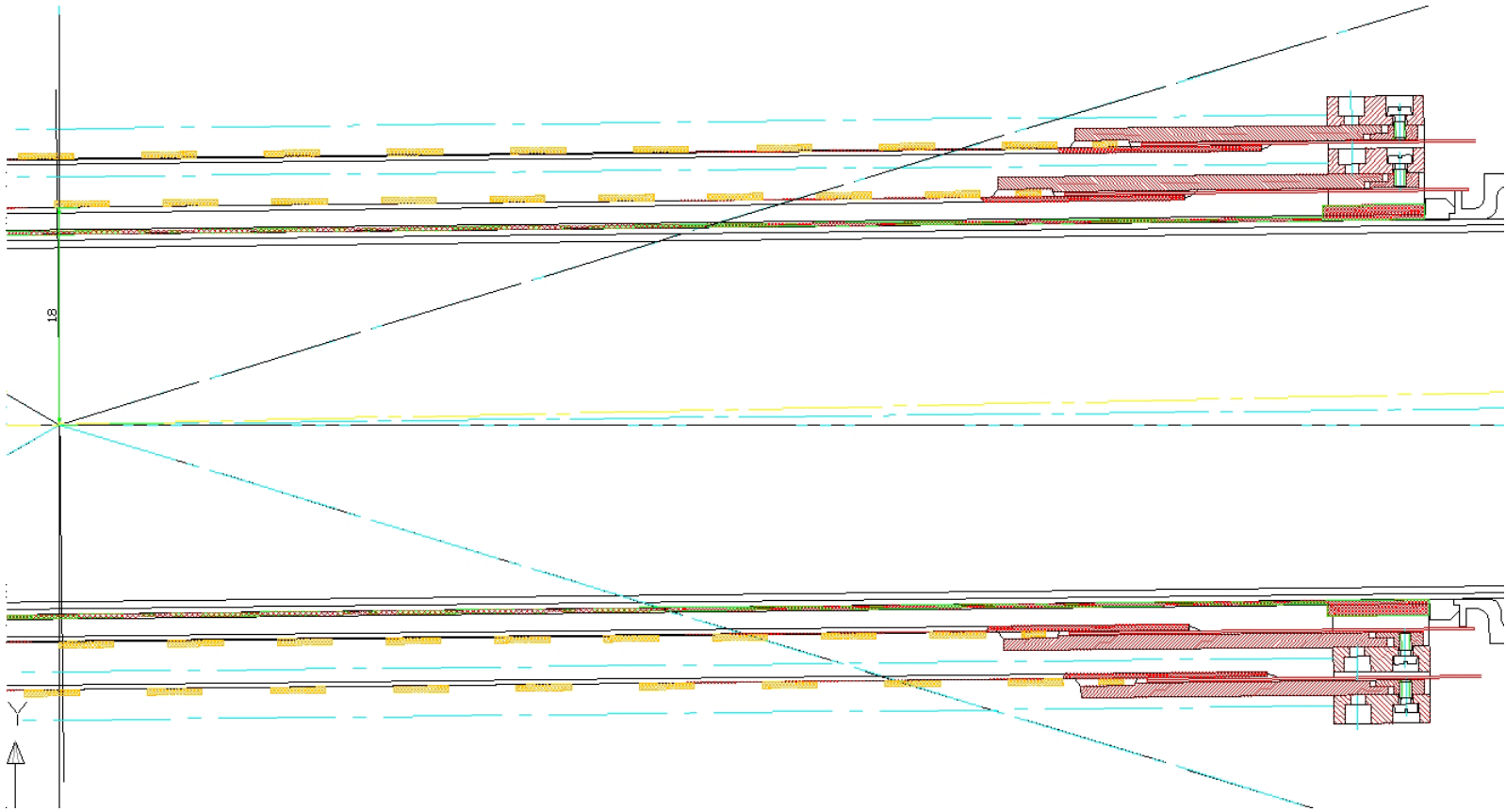
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