β=1 cavity: parameters
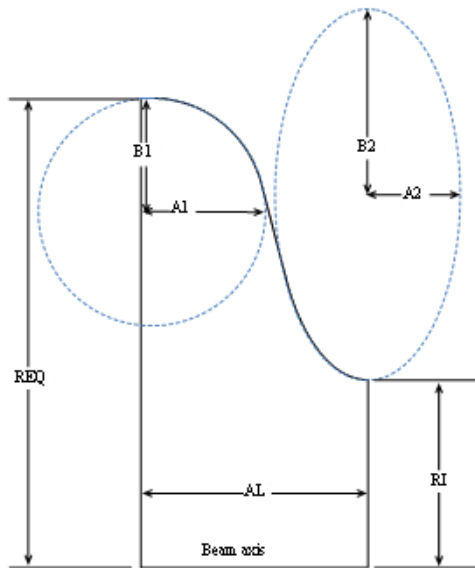
⚠ Dimensions for cavity fabrication before any chemical polishing and at room Temp.

	outer ½ cell pick-up side	inner ½ cells	outer ½ cell FPC side
External radius (REQ)	190.86	190.86	190.86
Iris radius (RI)	64.89	64.49	69.90
Length (AL)	103.22	106.62	103.22
Equator ellipse a (A1)	74.36	77.41	74.36
Equator ellipse b (B1)	83.19	77.41	76.80
Iris ellipse a (A2)	18.73	22.33	18.73
Iris ellipse b (B2)	25.14	35.35	25.14
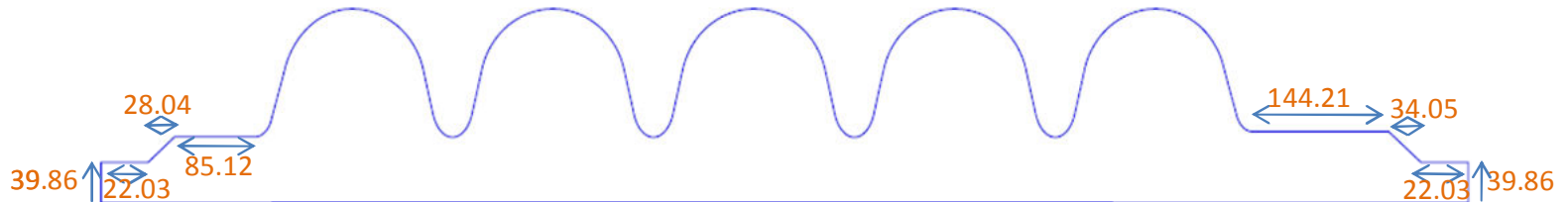
β=1 cavity: concepts

Fabrication of cavity and He tank without brazing
- Helium tank made of Ti
- flanges made of NbTi

Coupler port cooled by LHe
- one beam tube inside the He tank with FPC and HOM ports
- opposite beam tube under vacuum with PU and HOM ports
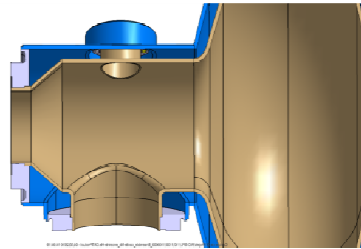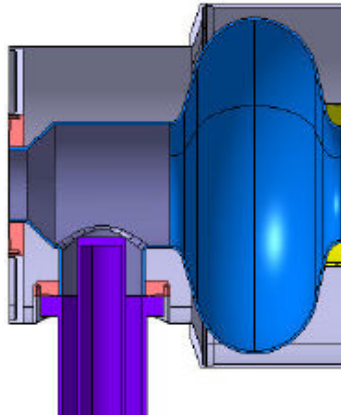
Lateral frequency tuner
- located on the beam tube under vacuum
- symetric action with one piezo actuator

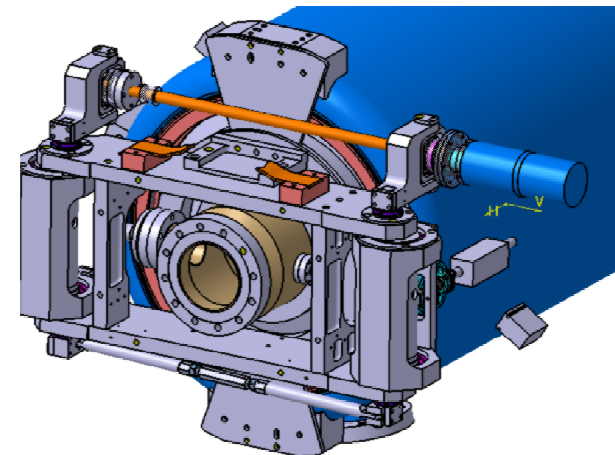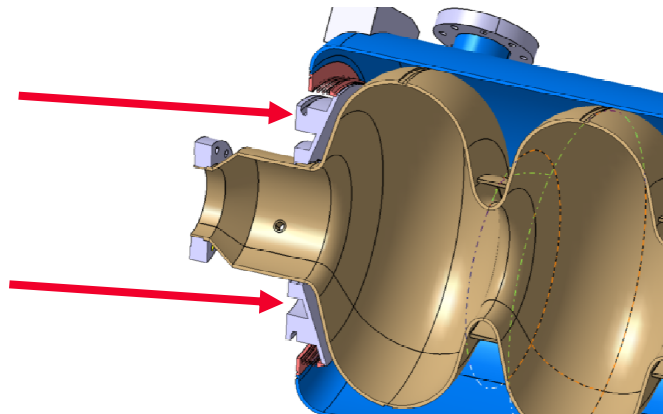Same concepts used at CERN (see Ofelia's presentation)

β=1 cavity: studies

2 modifications from CERN design

1) Smaller tank diameter around the beam tube

- easier access to flange surface (cleaning, assembly)
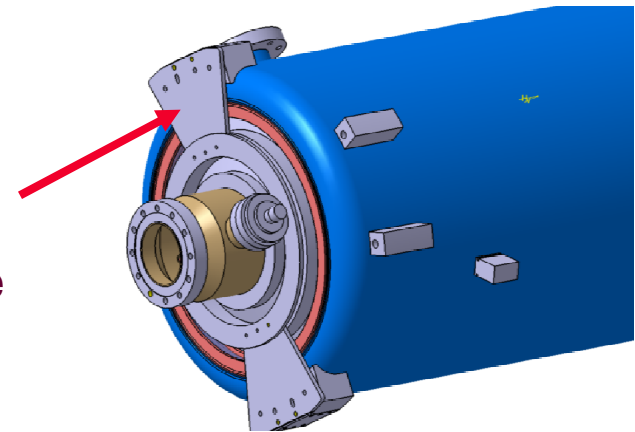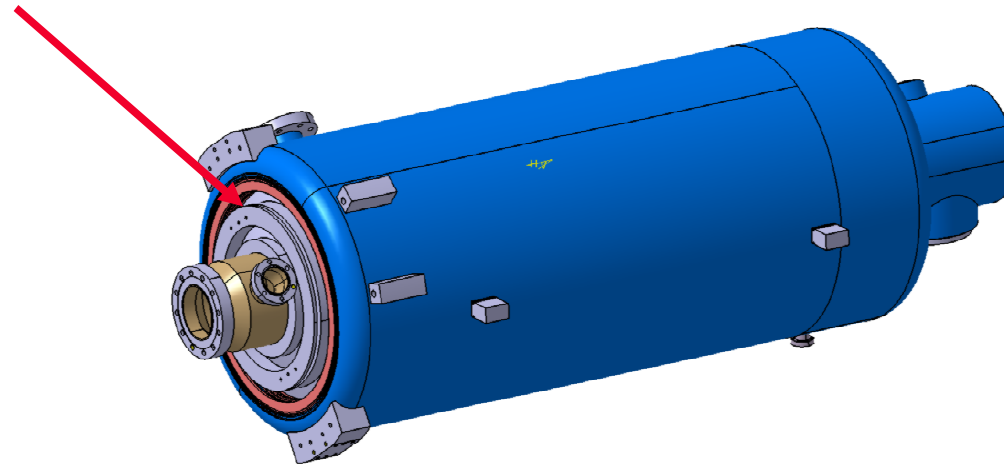- smaller volume of LHe

2) tuner fixed on Ti flange (XFEL-like)

- easier assembly on cavity string
- standard beam tube flange
- larger room for HOM and flanges

Irfu

cea
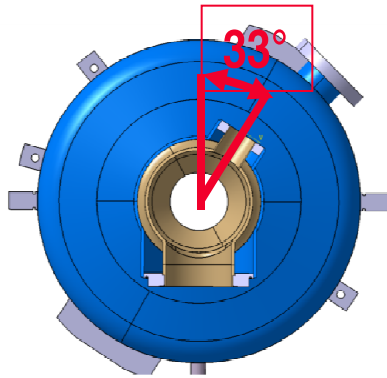
saclay

β=1 cavity: studies

The same Ti flange is used in the assembly sequence:

Special ass'y tool used in clean room for cavity leak check
This tool is removed out of CR once the full assembly of the
tuner on the cavity is done
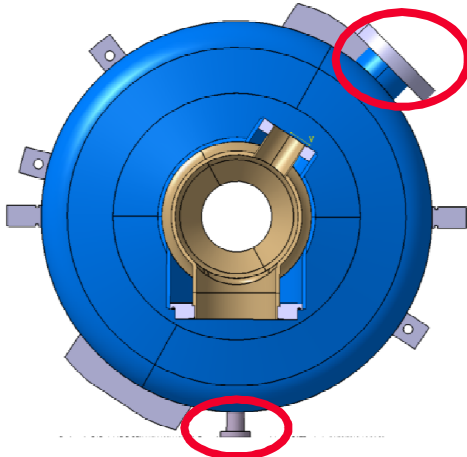(still to be optimised)

Irfu
cea
saclay

β=1 cavity: our questions

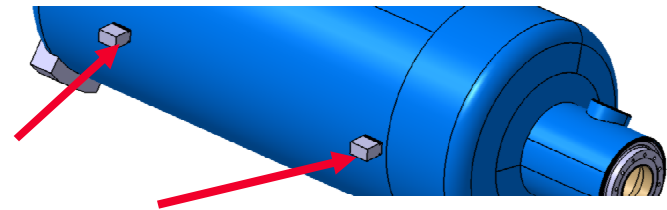1) Is HOM coupler angle frozen ?

33°

Due to this angle, extra Ti weld are needed
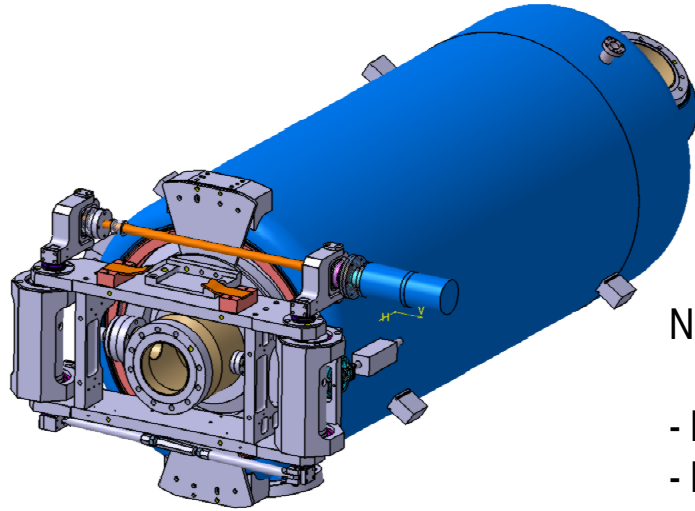0° angle would ease the fabrication of Ti tank

I r f u

cea

saclay
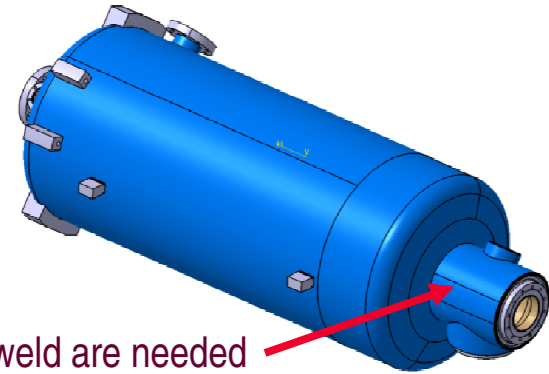
2) How many ports for Liquid Helium ?
   Which orientation ? Which size ?

3) Other pieces to be welded on the tank ?

β=1 cavity: studies

Next steps:

- Fix the angles and dimensions of couplers and Helium ports
- Reduce the tank diameter
- Add smooth holes in some pieces welded to He Tank
- Optimisation of the tank stiffness (> 100 kN/mm)
- Optimisation of the piezo frame (> 40 kN/mm)
- Modify the Ti flange and related tool
- Fix the coupler flange