Cylindrical RP developments

RF optimization

Mechanic layout

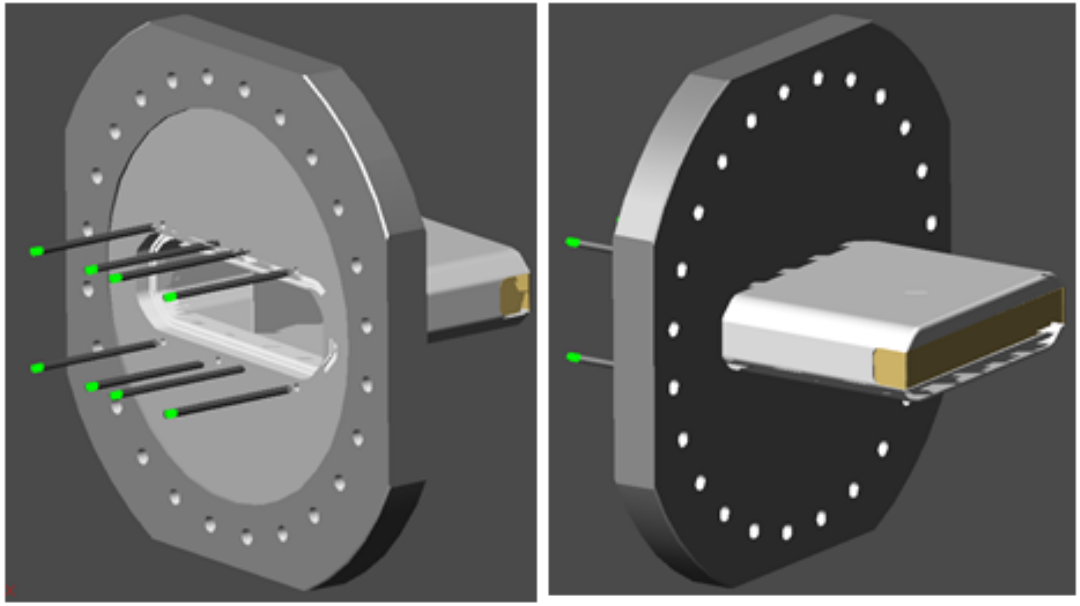
Production

History: Development of RP housing for timing detector-> rotation of box RP by 90°

November 2012

Possible housing for timing detector

- Impedance not favorable
- Flange size big enough to integrate the timing detector



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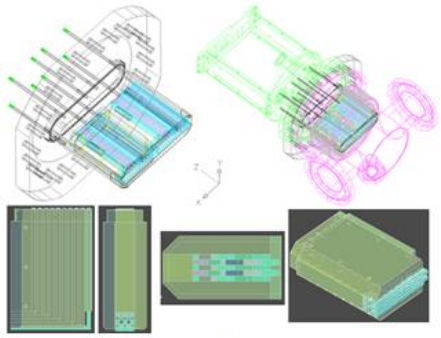
Example of Cherenkov timing detector

Horizontal RP with Cherenkov timing detector



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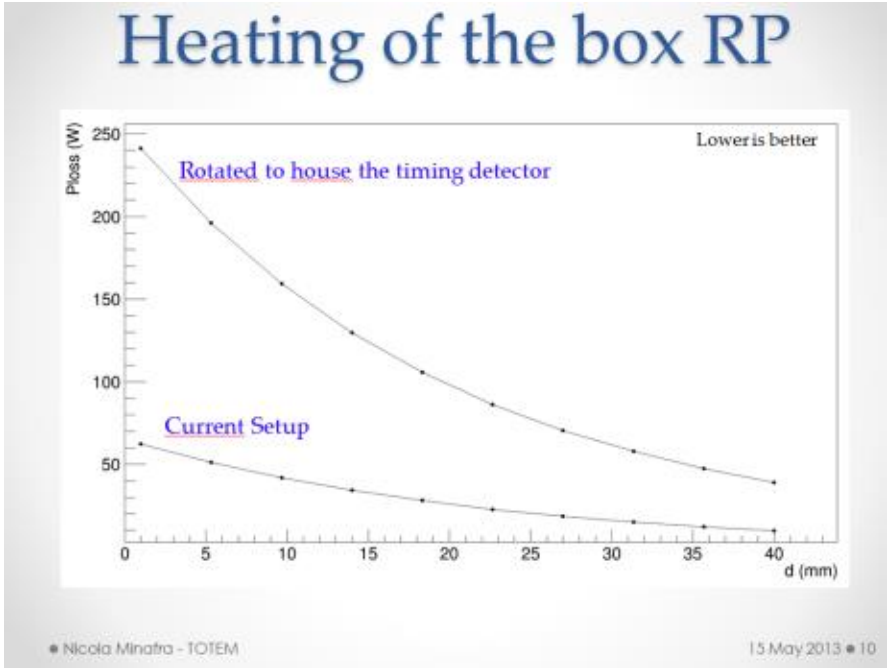
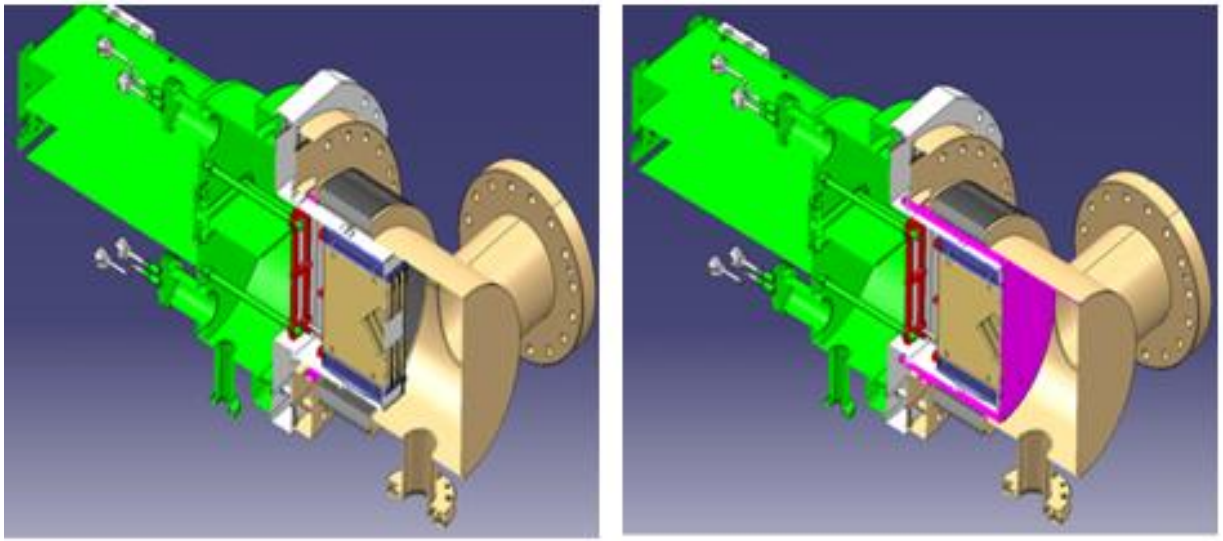
RF issues related to Roman Pot

- RF simulation showed strong increase of beam induced heating for rotated RP box (90˚)



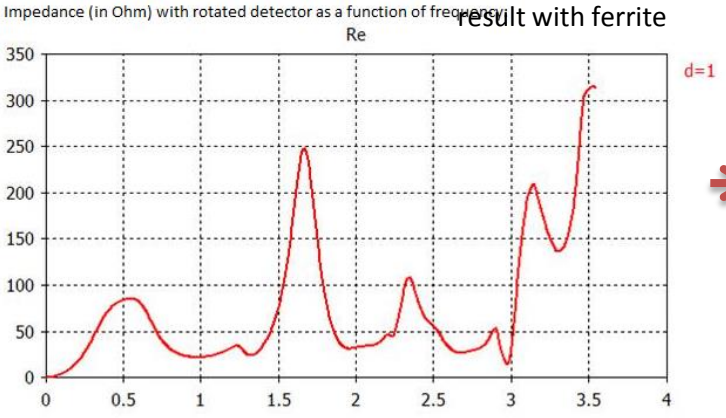
Study of cylindrical RP

Rectangular and cylindrical RP



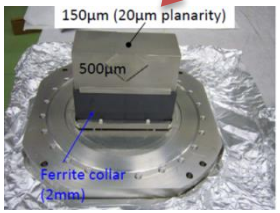
Optimization of RF characteristics

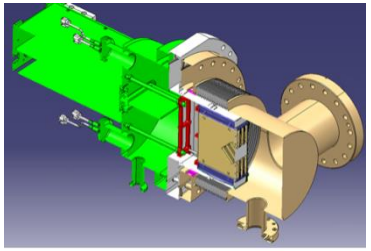
(first preliminary results B. Salvant, BE-ABP-ICE)



result with ferrite

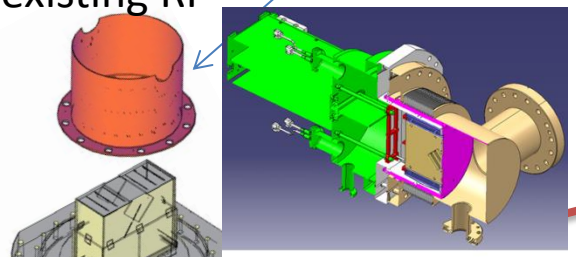
Present RP housing

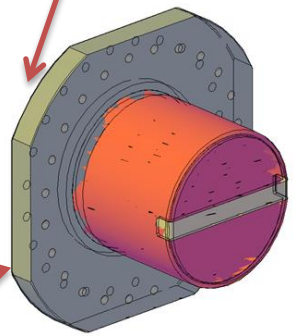


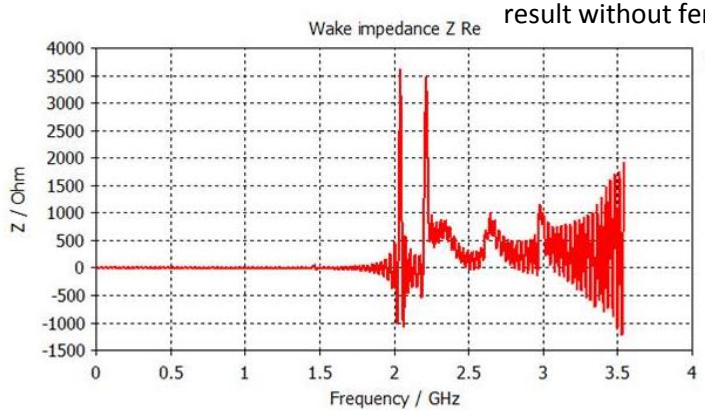


Study of new RP housing

Study of possible RF shielding for existing RP





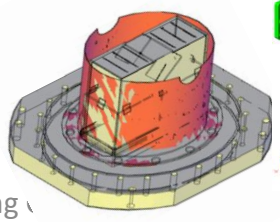


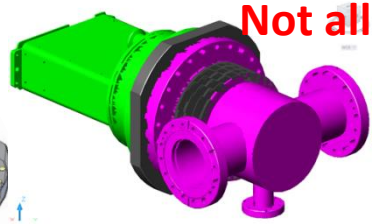
result without ferrite

Ideal cylindrical RP without gap

Study is ongoing

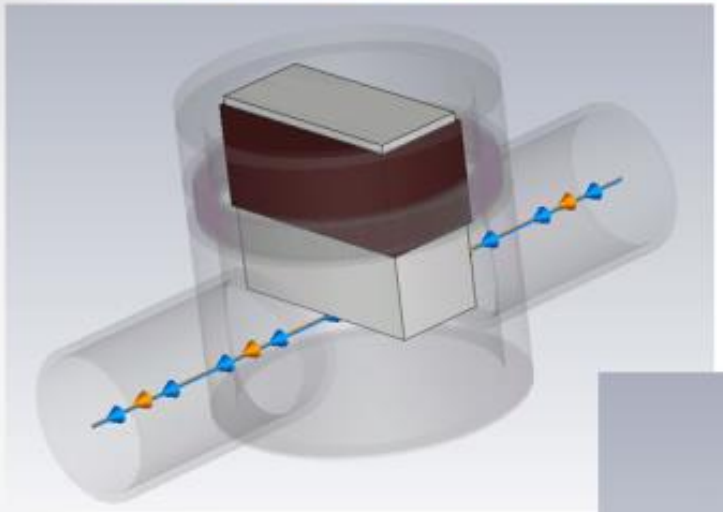
Not all issues are solved yet !



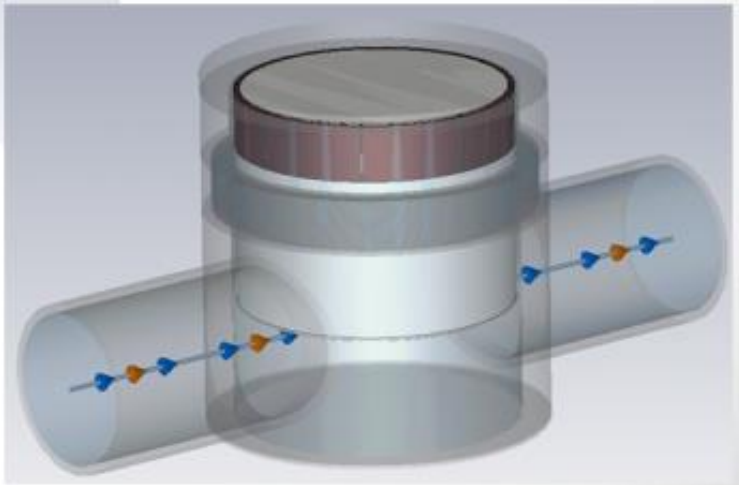


RF simulation of cylindrical RP with ferrite on top

From Box to Cylinder



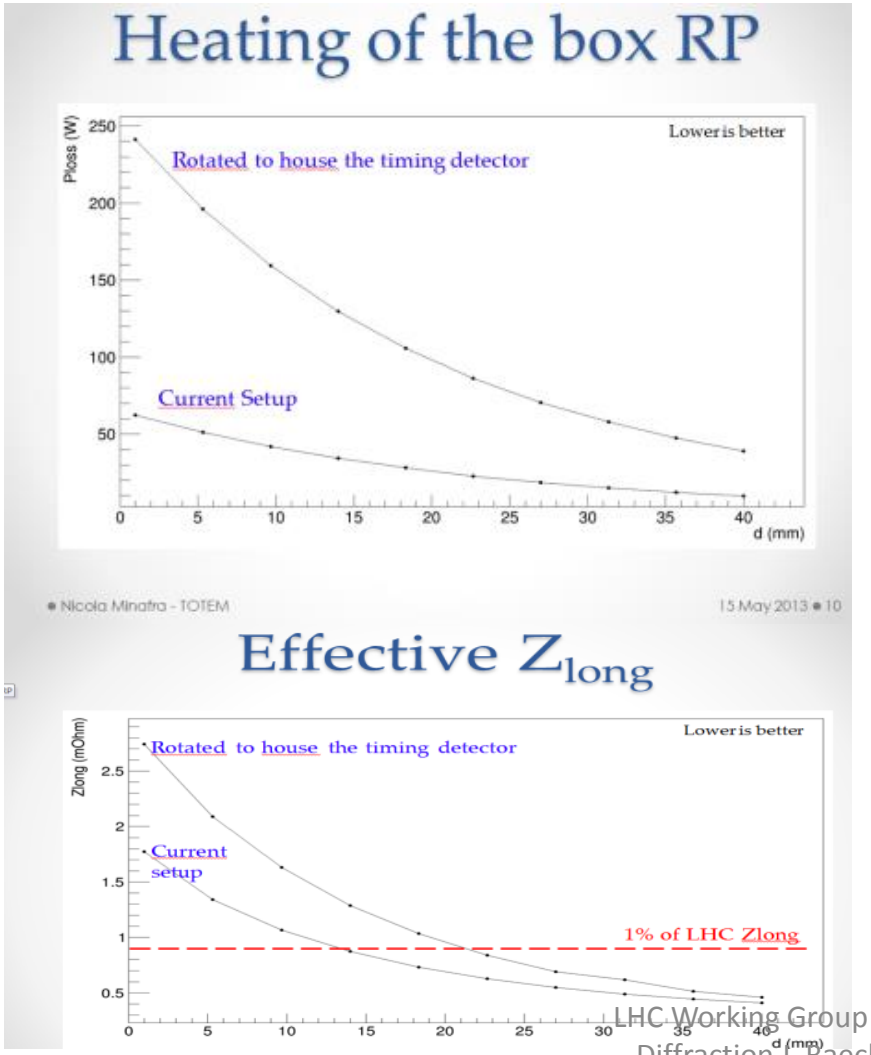
The main problem is the vaccum cavity between the RP and the flange: box RP and cylindrical flange.

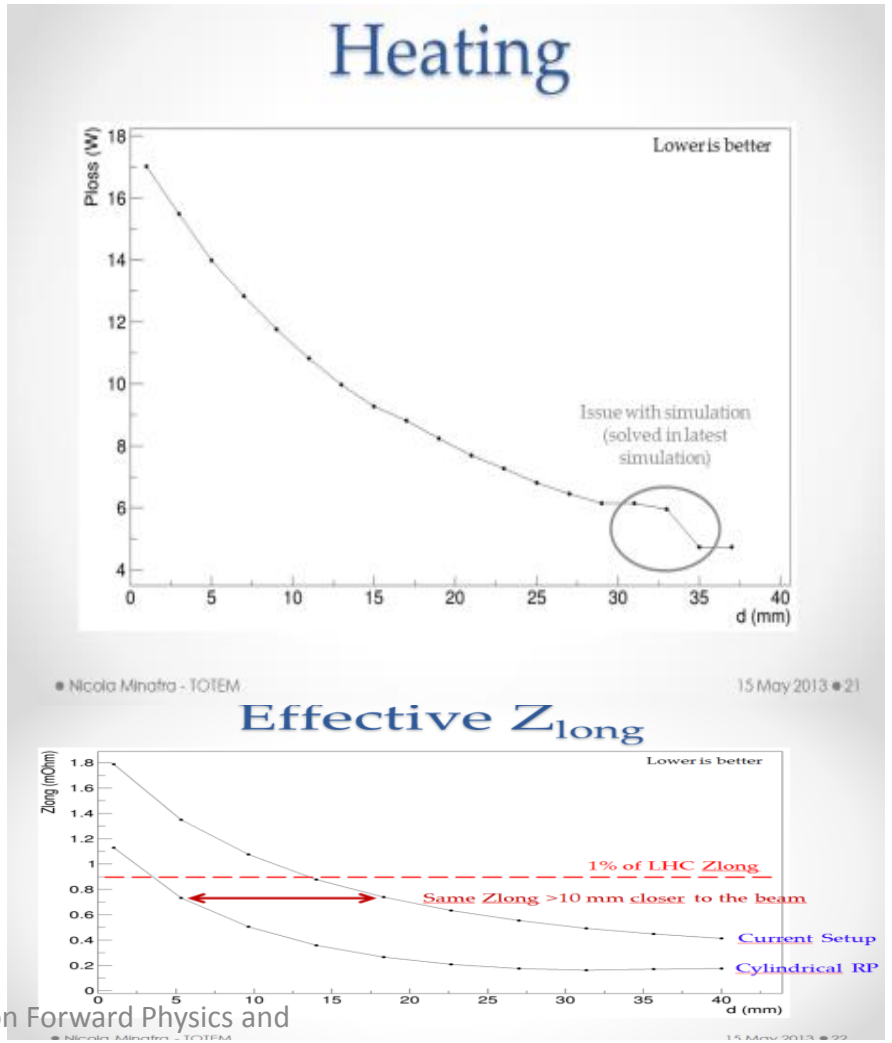


With a cylindrical RP the cavity is filled:

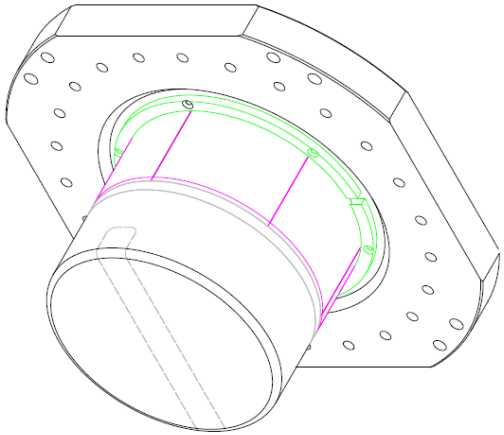
- Better RF behaviour
- More space available inside the RP (detector, cooling, power line, ...)

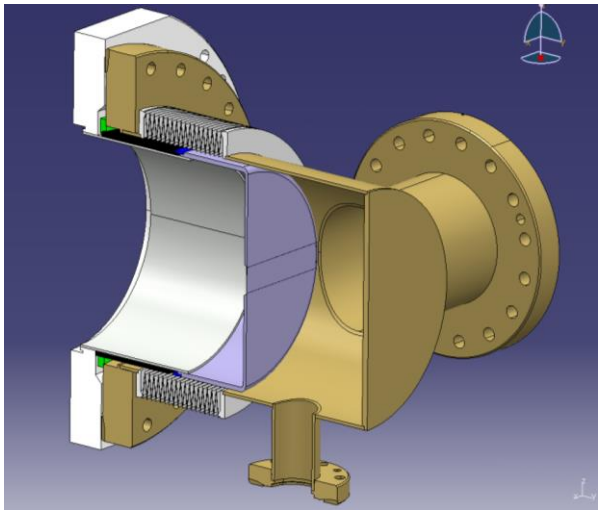
Comparison
RP box <-> RP cylindrical

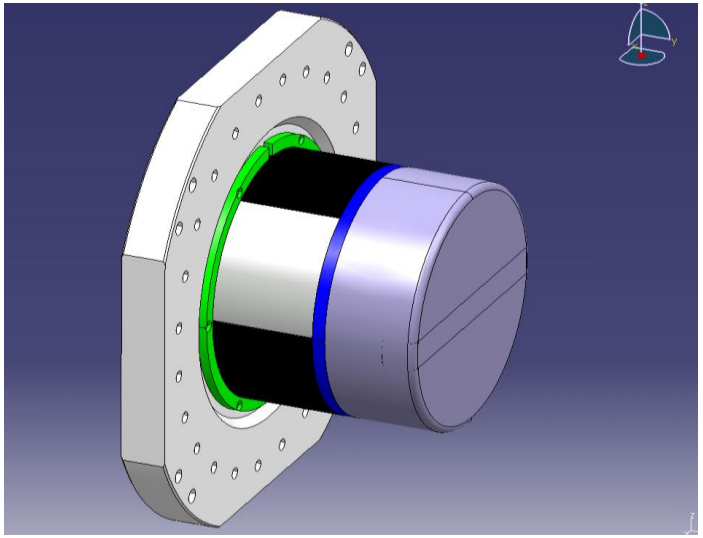


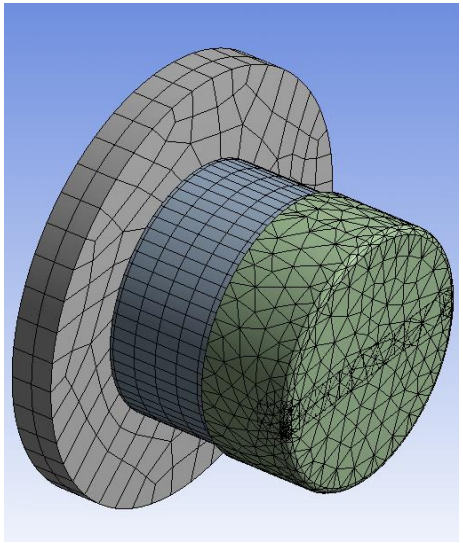


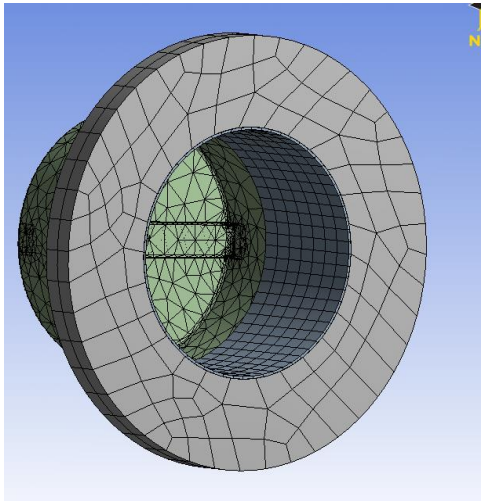
Cylindrical Roman Pot
Mechanical design study (D. Druzhkin & D. Perini)



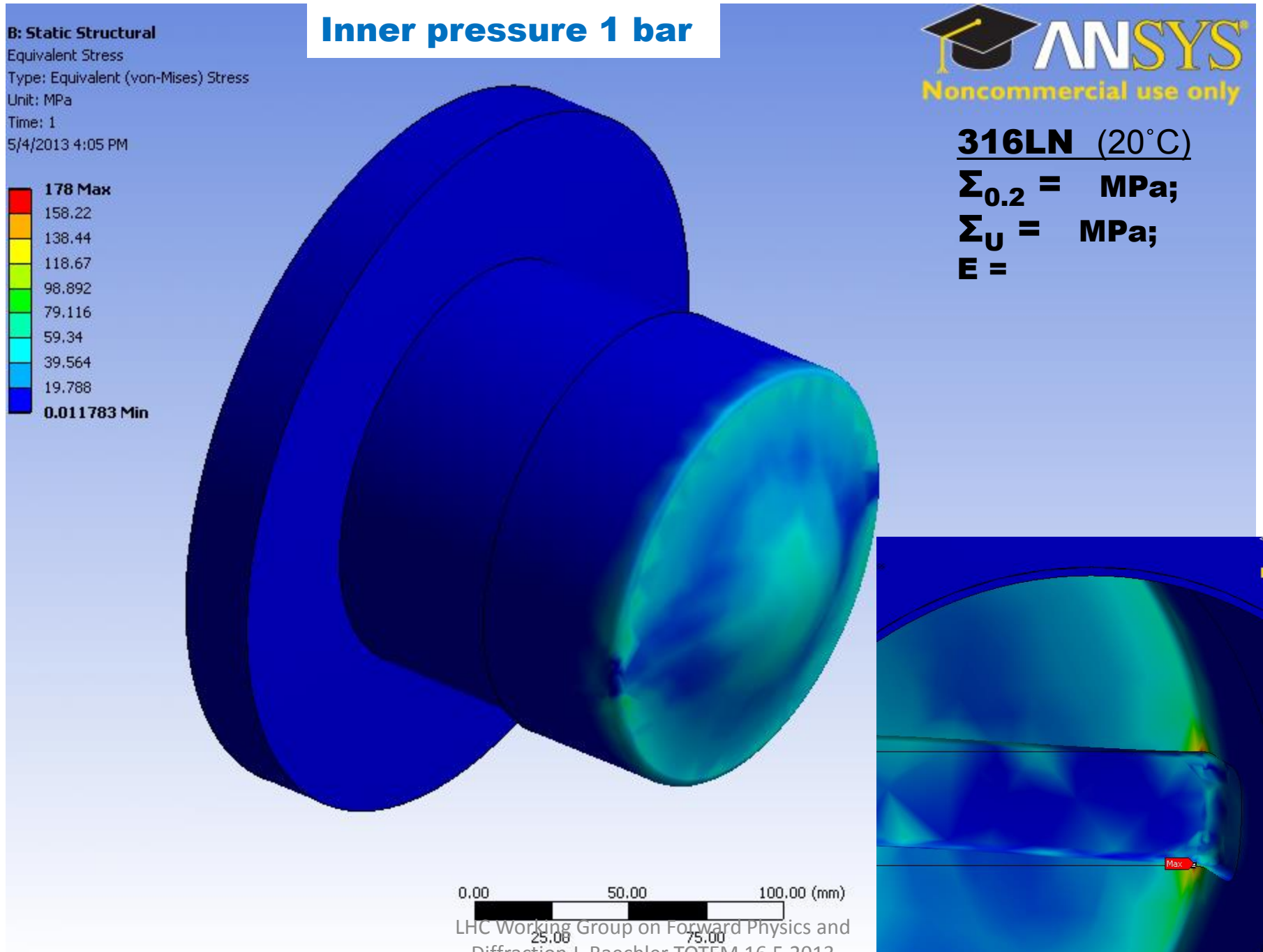




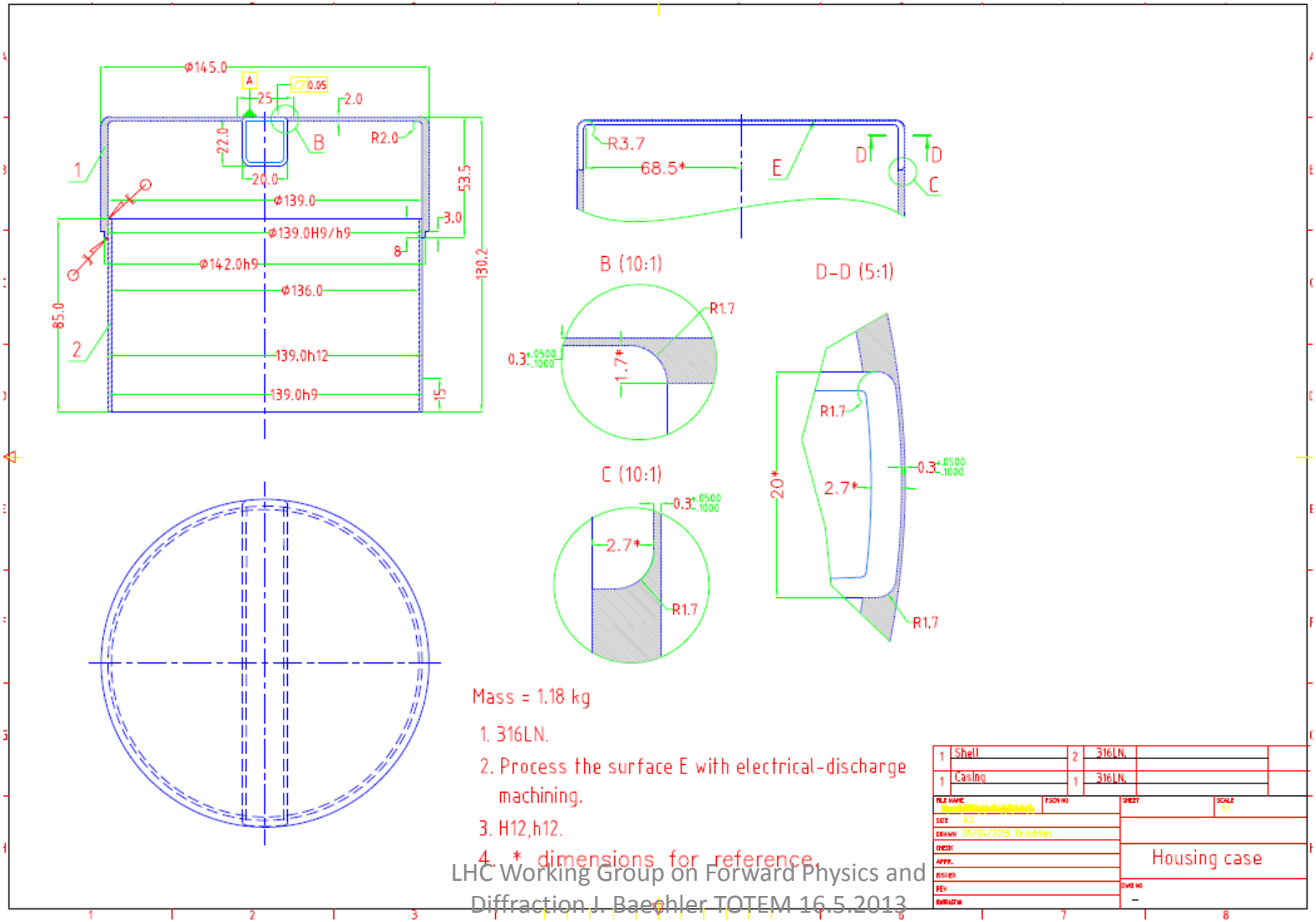




Inner pressure 1 bar

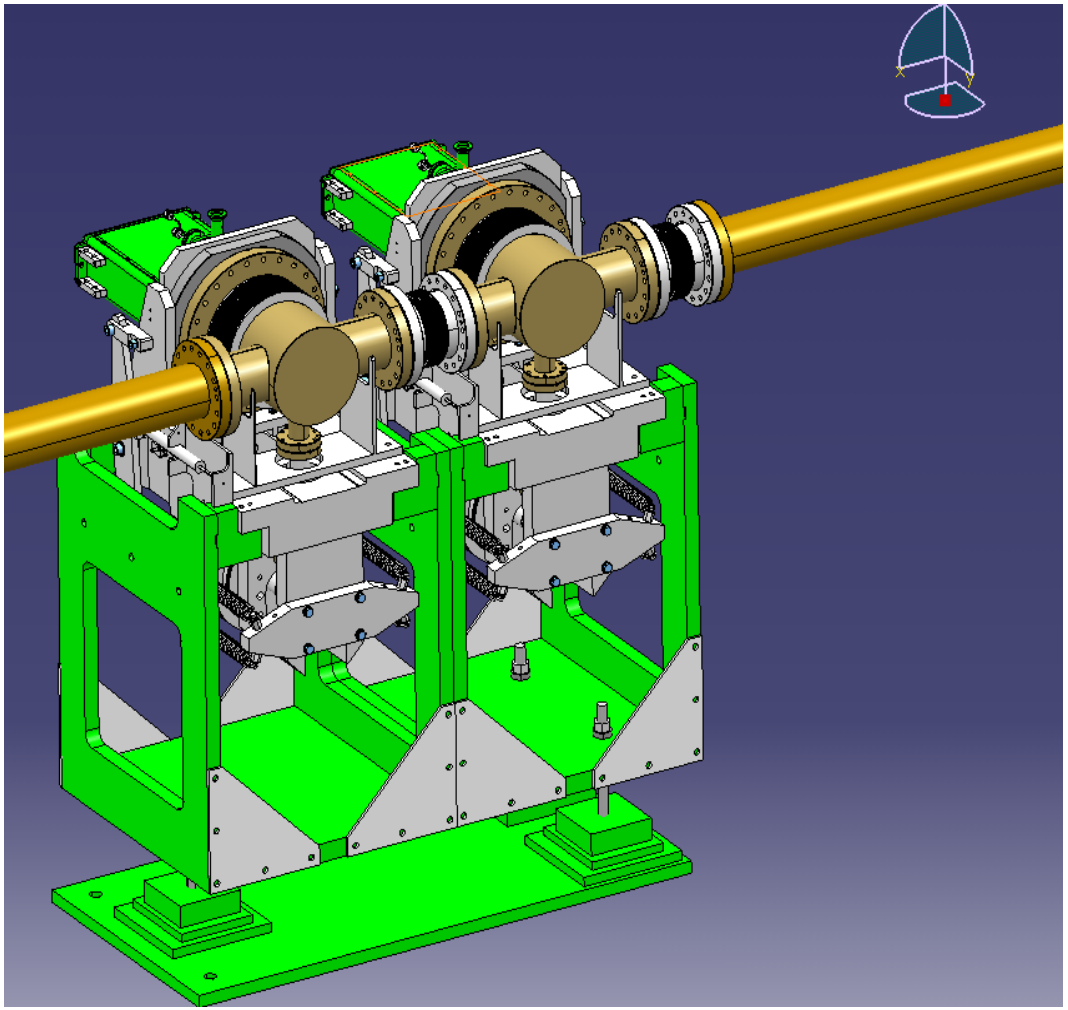


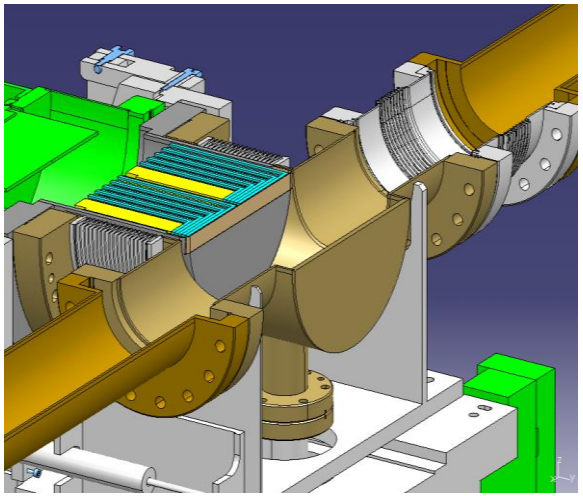
Cylindrical RP

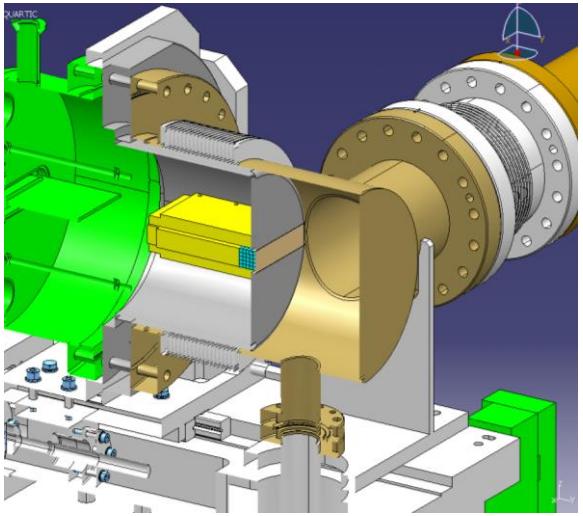


Roman Pot -> Integration study

- cylindrical RP in horizontal station
-L bar QUARTIC in cylindrical RP (TIMING detector)







STATUS
TOTEM CYLINDRICAL ROMAN POT

- RF optimization of new cylindrical RP finished
- Production drawing ready and under approval
- Prototype production scheduled for May-June 2013
- Mechanical and vacuum tests will follow the prototype production
- RP stations with standard dimensions Production (Vacuum Praha)possible – production drawing for 2 two independent horizontal RP are ready
- Study of material budget with GEANT4 simulation (talk of F. Nemes)

STATUS
TOTEM CYLINDRICAL RF SHIELDING

- RF optimization of new cylindrical RP in final design phase
- Prototype production scheduled for May-June 2013
- Vacuum test scheduled after prototype production

Sharing of work overview with CERN groups (not complete)

EN-MEF-LE (coordination, synchronization with LHC planning & scheduling)

PH-DT (RP mechanics, vacuum, motor, services, cable production .. ..)

PH-ESE (electronic issues, fibers, HV cables…)

EN-CV-DC (RP cooling system)

EN-MEF-SI (cables)

EN-MME-DI (new RP production)

EN-ICE-SIC (FESA)

TE-VSC-LBV (ferrite – vacuum measurements, beam pipe)

TE-MPE-PE (LHC machine protection)

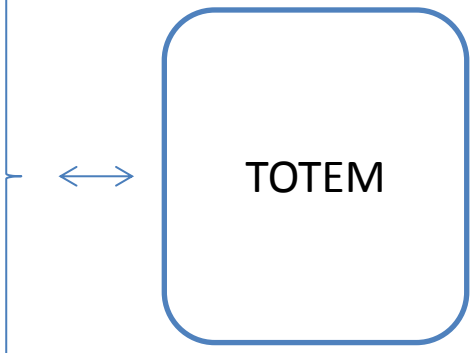
DGS-RP-AS (radiation protection)

PH-UCM (RP engineering, integration,…)

BE-ABP-ICE (RP – RF study & optimization)

BE-OP-LHC (Operation of RP – CCC)

BE-ABP-LCU (collimators)



work packages & schedule