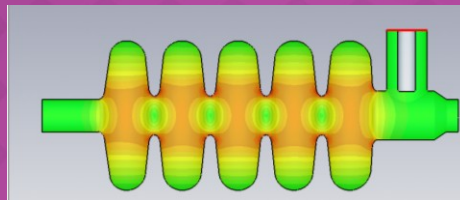


STATUS OF BETA=0.65 CAVITY DEVELOPMENT

G. Olry, H-M Gassot, S. Rousselot (IPN Orsay)



OUTLINE

Since the last EuCARD-SRF Meeting in March 2010...

Overall cavity design

- ◉ From march '10 to July '10: new cavity design under study based on
 - Proposal for having the same end-groups for cavity $\beta=1$ (CEA) and cavity $\beta=0.65$
 - New parameter for vacuum load: 1.5 bar@300K
- ◉ From July '10 to 15th Oct '10: Technical modifications to fit CERN's short-cryomodule requirements
- ◉ 15th Oct '10: $\beta=1$ elliptical cavities will not be settle inside CERN's short-cryomodule

Call for tender and first order

- ◉ Cavity and helium vessel technical drawings
- ◉ Niobium

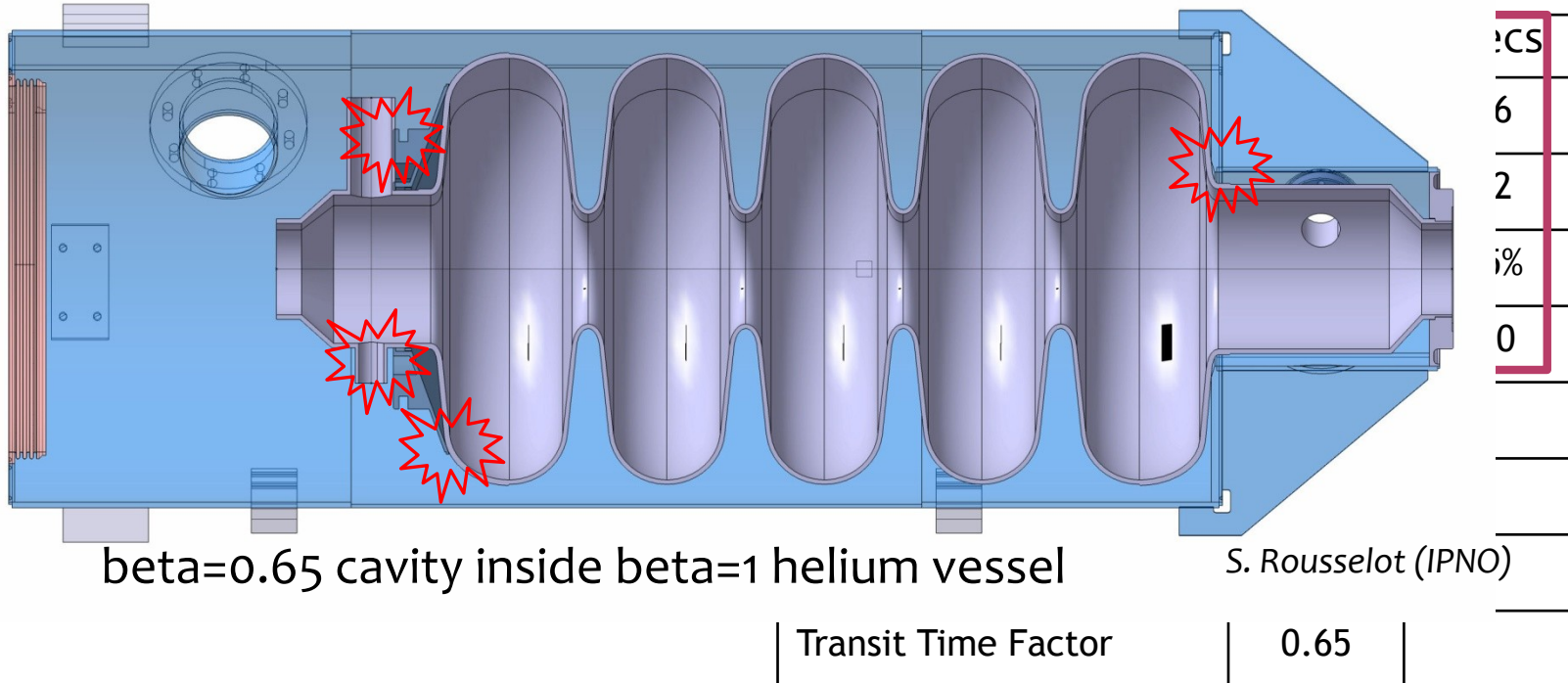
Conclusion

- ◉ Manpower & planning

NEW DESIGN...

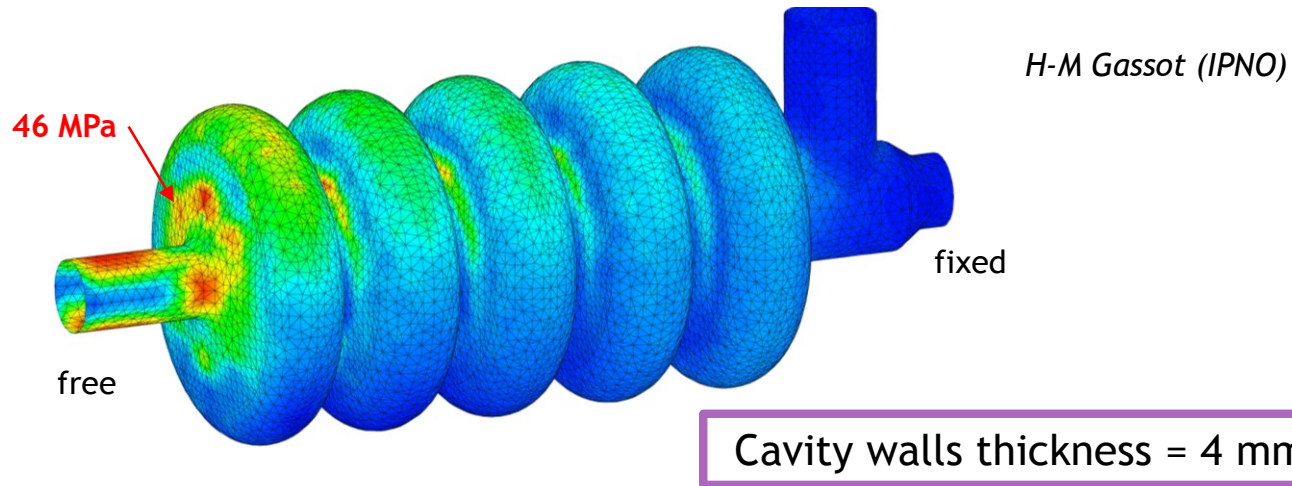
April'10: Identical END-GROUPS between $\beta=1$ & $\beta=0.65$ cavities → major changes on beta 0.65 cavity mechanical and RF designs:

- Bigger beam tube apertures
 - New design of the 2 external half cells (field flatness)
 - New location and interface of the power coupler (Q_{ext})
- New helium vessel
- New tuning system interface

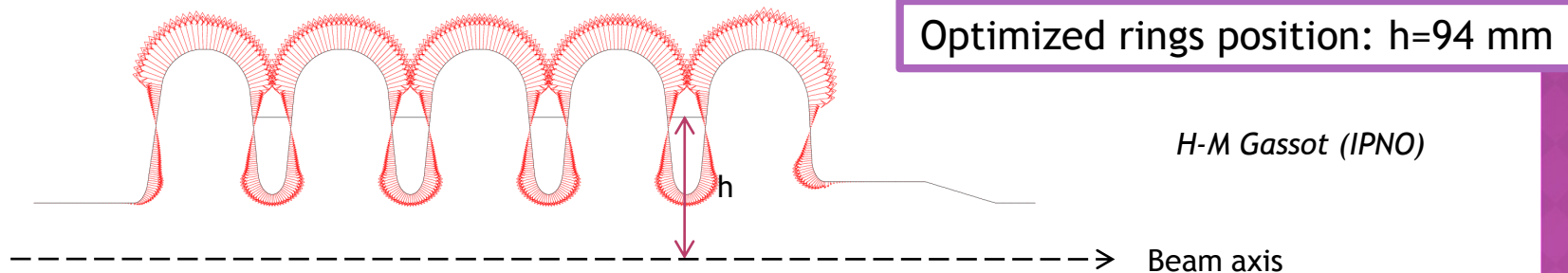


NEW PARAMETER FOR VACUUM LOAD

- Von Mises stresses for 1.5 bar @ 300K < 50 MPa with 4mm



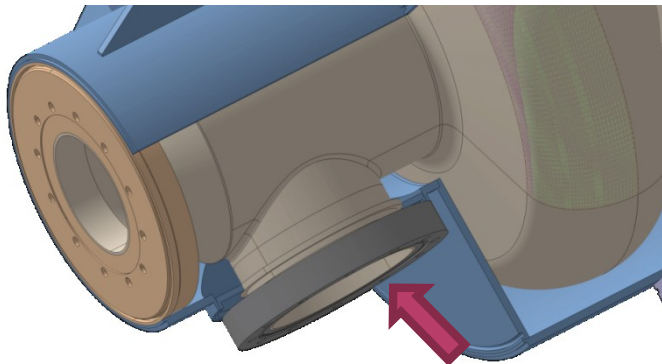
- Lorentz forces detuning with 1 stiffening ring : $K_L \sim -1.6 \text{ Hz}/(\text{MV}/\text{m})^2$



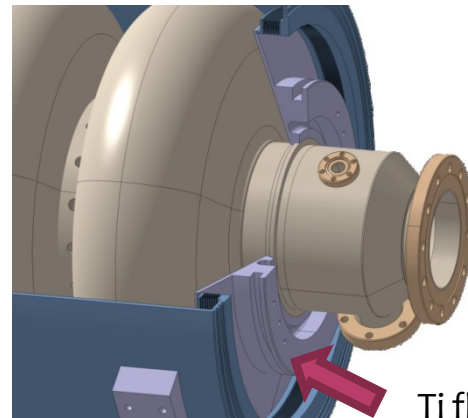
MODIFICATIONS

July '10 to 15th Oct '10: many iterations to fit the CERN's short-cryomodule requirements

- ◉ Tuning system & holding bars integration: pb of angular position...
- ◉ Power coupler flange material: SS, Ti, Nb/Ti
- ◉ Overall Helium vessel design: connecting parts between cavity/tank, cryogenics pipes location and size...



Flange of the coupler port

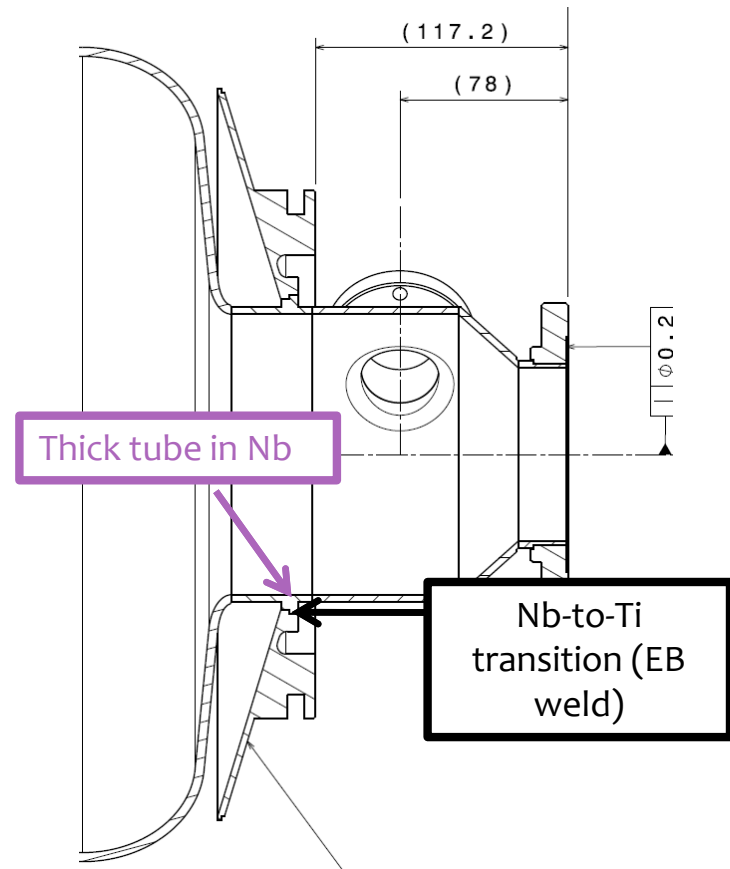
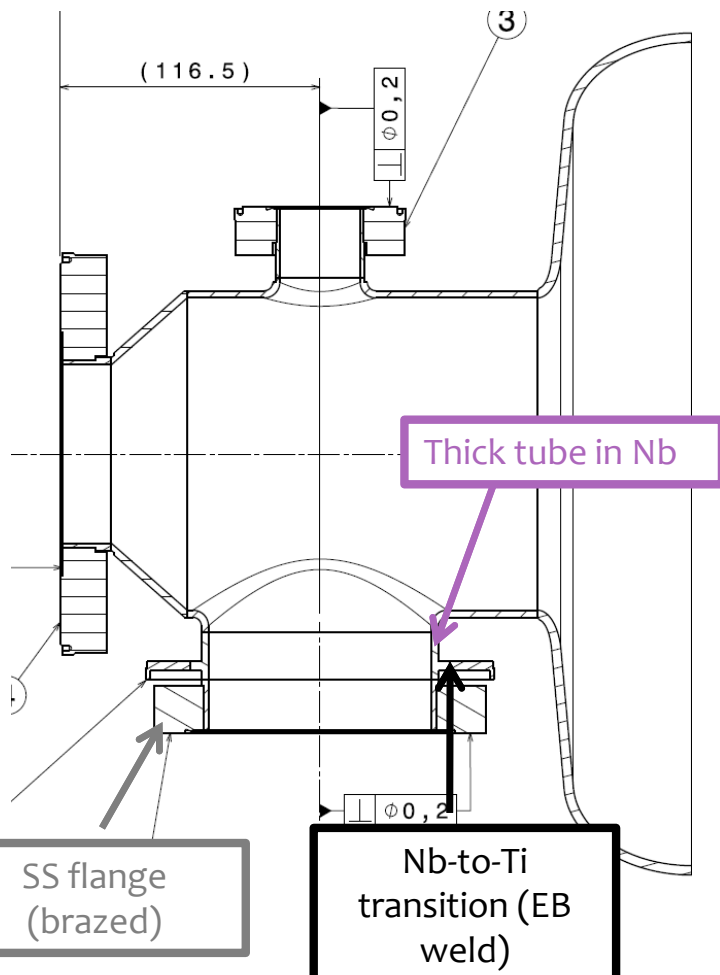


Ti flange for the tuning system

FINAL DESIGN

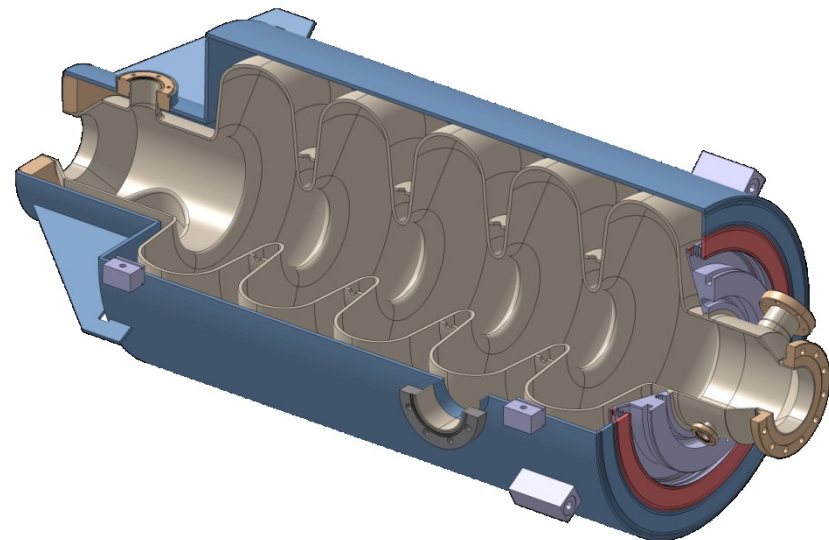
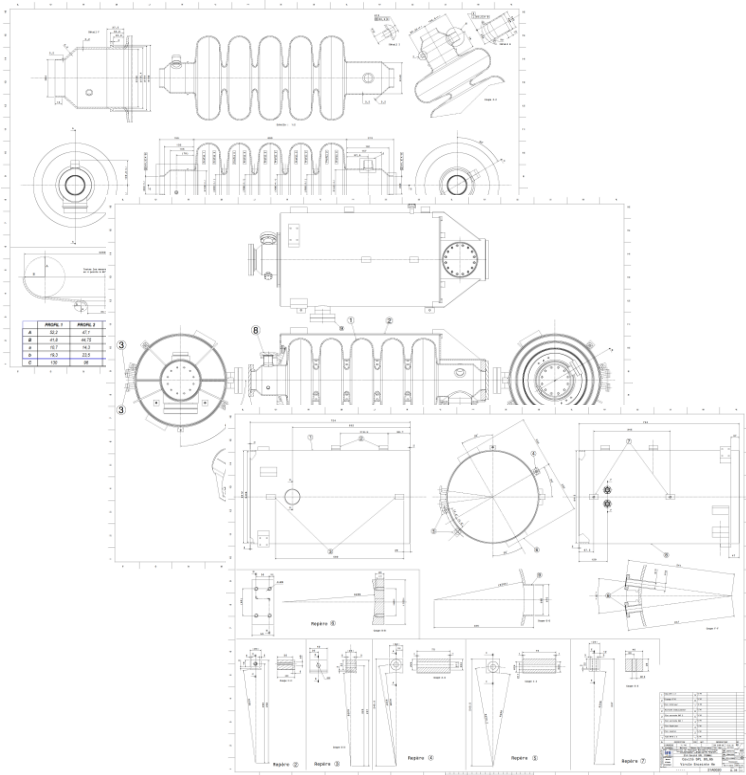
15th Oct '10: CERN-CEA-CNRS major decision → **Beta=1 and Beta=0.65 cavities will be tested in CRYHOLAB only!**

→ No more constraints on interfaces and helium vessel design



CALL FOR TENDER

- Technical drawings: ready
- Technical specifications: ready
- Call for tender: currently under progress



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NIOBIUM

- ◉ Nb sheets: 4.2 mm (cells), 3.2 mm (end-groups), 2 mm (pick-up & HOM ports)
- ◉ 3 offers for RRR>250
 - Neyco: 69700 euros
 - Plansee: 67500 euros
 - Tokyodenkai: 62600 euros → winner!...
- ◉ "small" budget overrun of about 100%!
- ◉ Nb sheets: 520 €/kg! (270 € in 2006, 350 € in 2008)
- ◉ Thick tubes for cavity-to-helium vessel transition
 - Coupler side: 1500 euros
 - Tuning system side: 3300 euros
- ◉ Material received in February this year

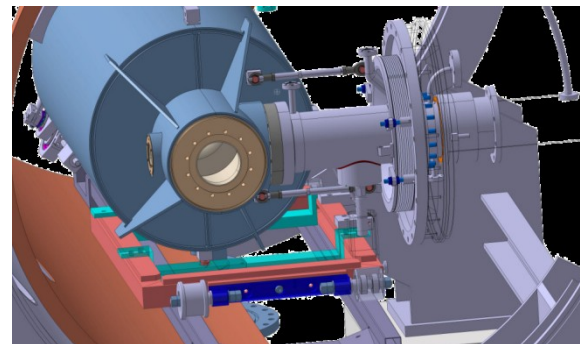
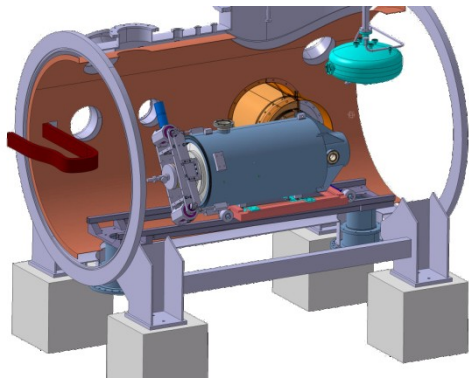
CONCLUSION

MANPOWER

- From April '09 to end of March '10: 15.24 p.m

PLANNING

- --> end of June '11: call for tender (public contract > 125k€ HT)
- July '11: choice of the manufacturer
- Sept '11: beginning of the fabrication
- June '12: cavity delivery w/o helium vessel → field flatness
- July '12: helium vessel welding
- Sept '12: cavity preparation (BCP + HPR) & assembly in clean room
- **Oct '12: test in vertical cryostat**
- Before end of March '13: cavity installation & test in CRYHOLAB



THANK YOU FOR YOUR ATTENTION