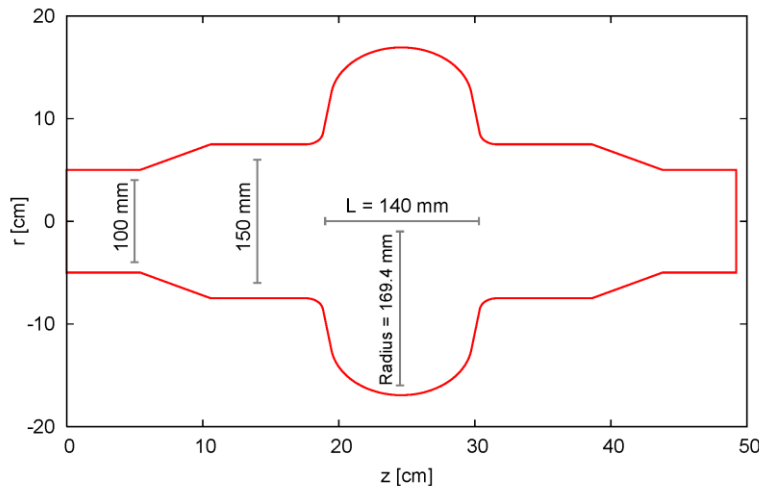


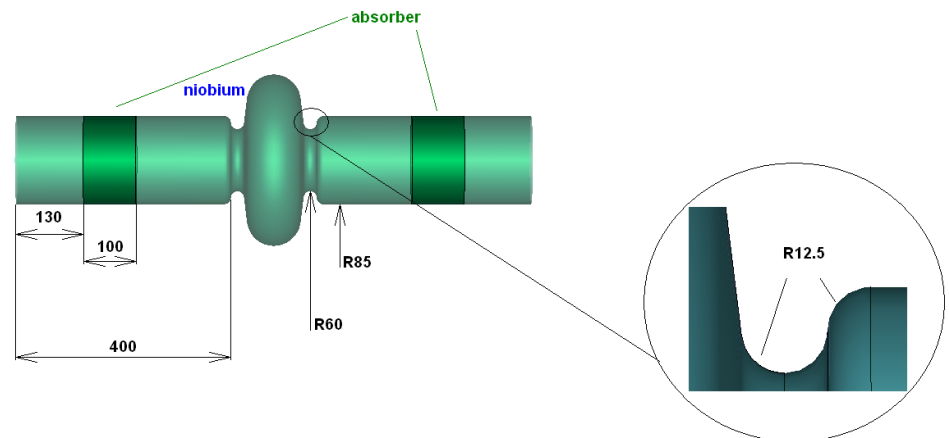
800 MHz impact on HL-LHC impedance model

- Impedance model in work (deliverable of WP 2.4 for November 2013)
- Until the HL-LHC impedance model is available, we use the current impedance model as benchmark
- The higher order modes should be efficiently damped by couplers or dampers
- The low frequency impedance should remain low compared to the rest of the machine
- Work on new design of 800 MHz RF cavities by:
 - R. Calaga, L. Ficcadenti, J. Tückmantel (CERN BE-RF) → see talk by L. Ficcadenti at [HL-LHC LARP meeting](#) (Nov 2012)
 - M. Zobov (LNF INF Frascati), R. Bolgov, Ya. Shashkov, N. Sobenin (MEPHI, Moscow)

CERN design (draft)



LNF design (draft)



800 MHz impact on HL-LHC impedance model

	5 CERN cavities (ABCI simulations R. Calaga)	5 Frascati/Moscow cavity (ABCI simulations M. Zobov + CST)	LHC Total impedance (at injection)
Low frequency Longitudinal effective impedance	~4.2 m Ω	~5.6 m Ω	90 m Ω
Low frequency Transverse effective impedance (*)	~5 k Ω /m	~5 k Ω /m	2 to 4 M Ω /m

(*) assuming average beta function at location of cavities

First remarks:

- both designs are similar from the low frequency impedance point of view.
- The transverse part is negligible if the beta function is not too high (~ 0.2% of total effective impedance).
- The longitudinal part is not negligible (~5% of total effective impedance). Do we have margin?