

Y chamber

# Current Y chamber (?)

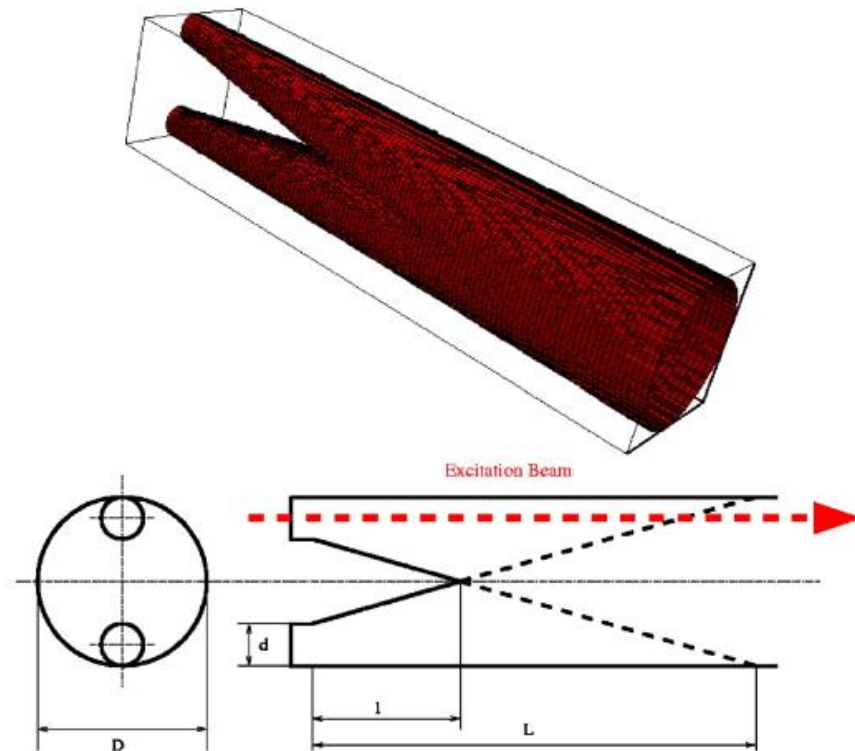


Fig. 2. Relevant geometry for the Y-junction. The upper picture shows the model used in the MAFIA simulations (circular geometry). The cross-sections are shown in the lower picture ( $L = 852$  mm,  $l = 260$  mm,  $d = 54$  mm,  $D = 180$  mm), where the arrow indicates the path of the exciting beam.

→ reminder: the optimized shape was a smooth merge of the pipes  
(On trapped modes in the LHC recombination chambers: numerical and experimental results, B. Spataro et al, NIMA 2004)

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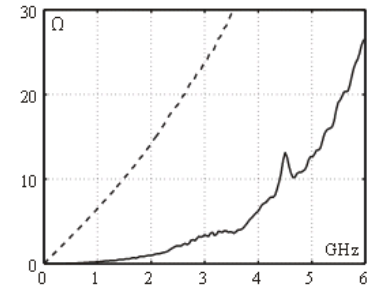
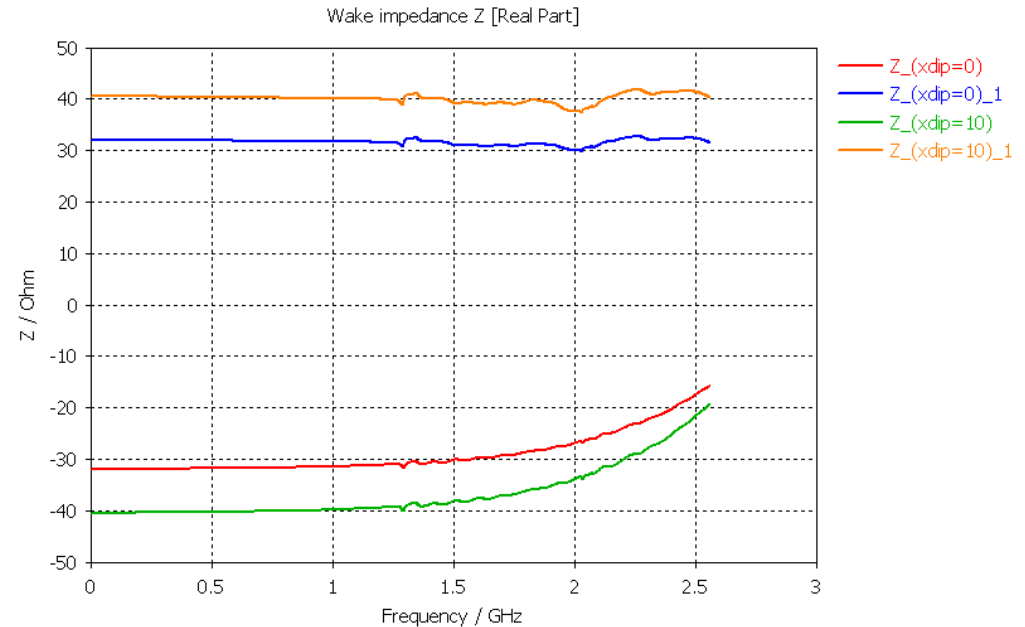
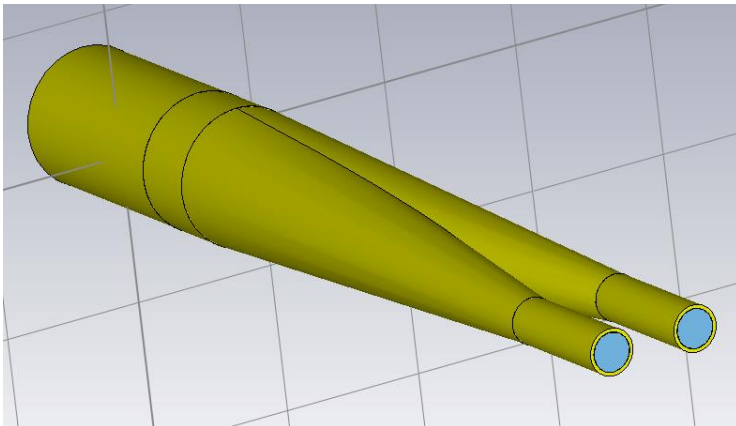
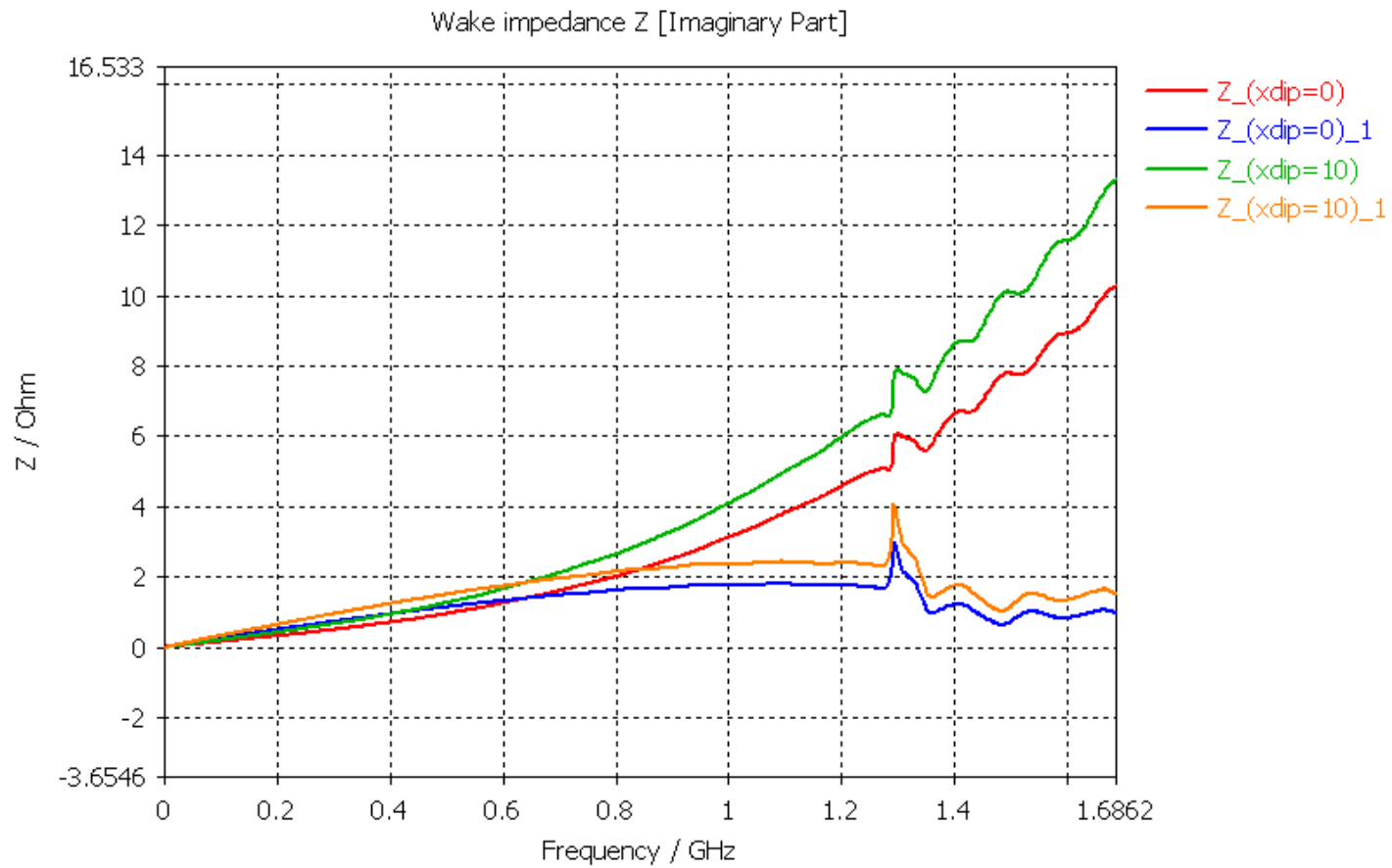


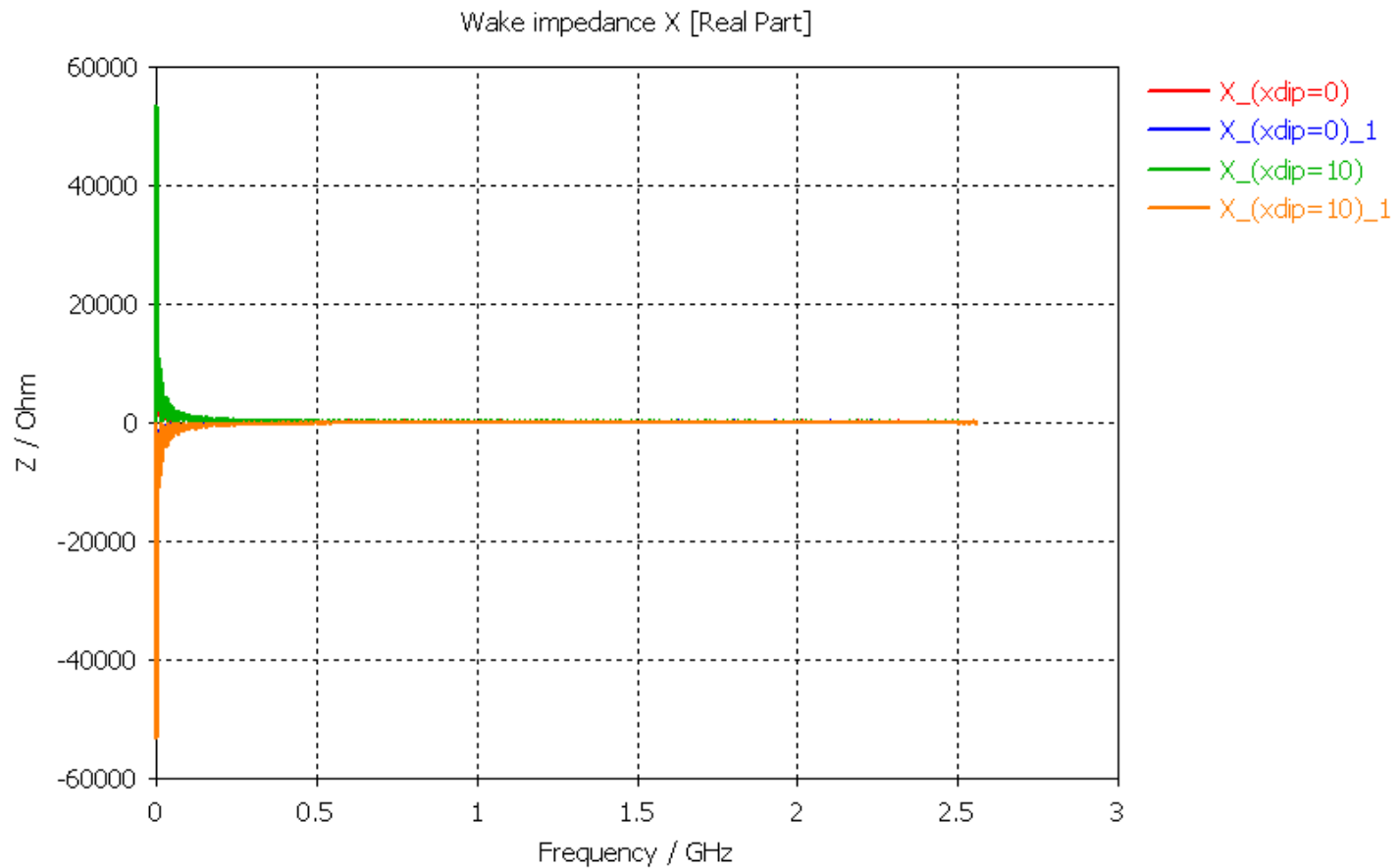
Fig. 8. Real part (solid line) and imaginary part (dashed line) of the impedance for the Y-chamber (actual structure, circular shape).



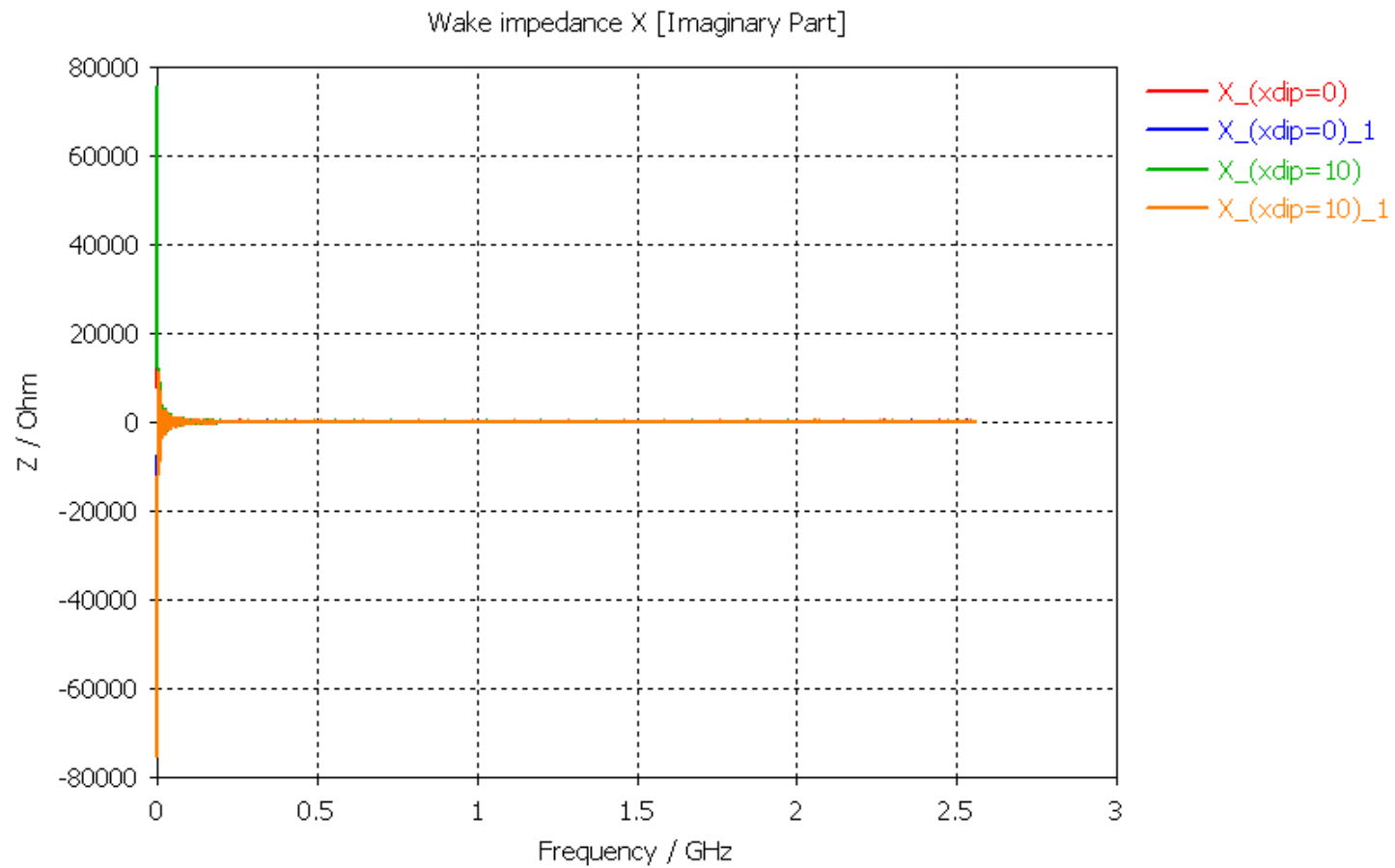
→ No visible mode below cutoff



→  $\text{Im}(Z_{\text{eff\_long}}/n) \sim 0.02 \text{ mOhm}$



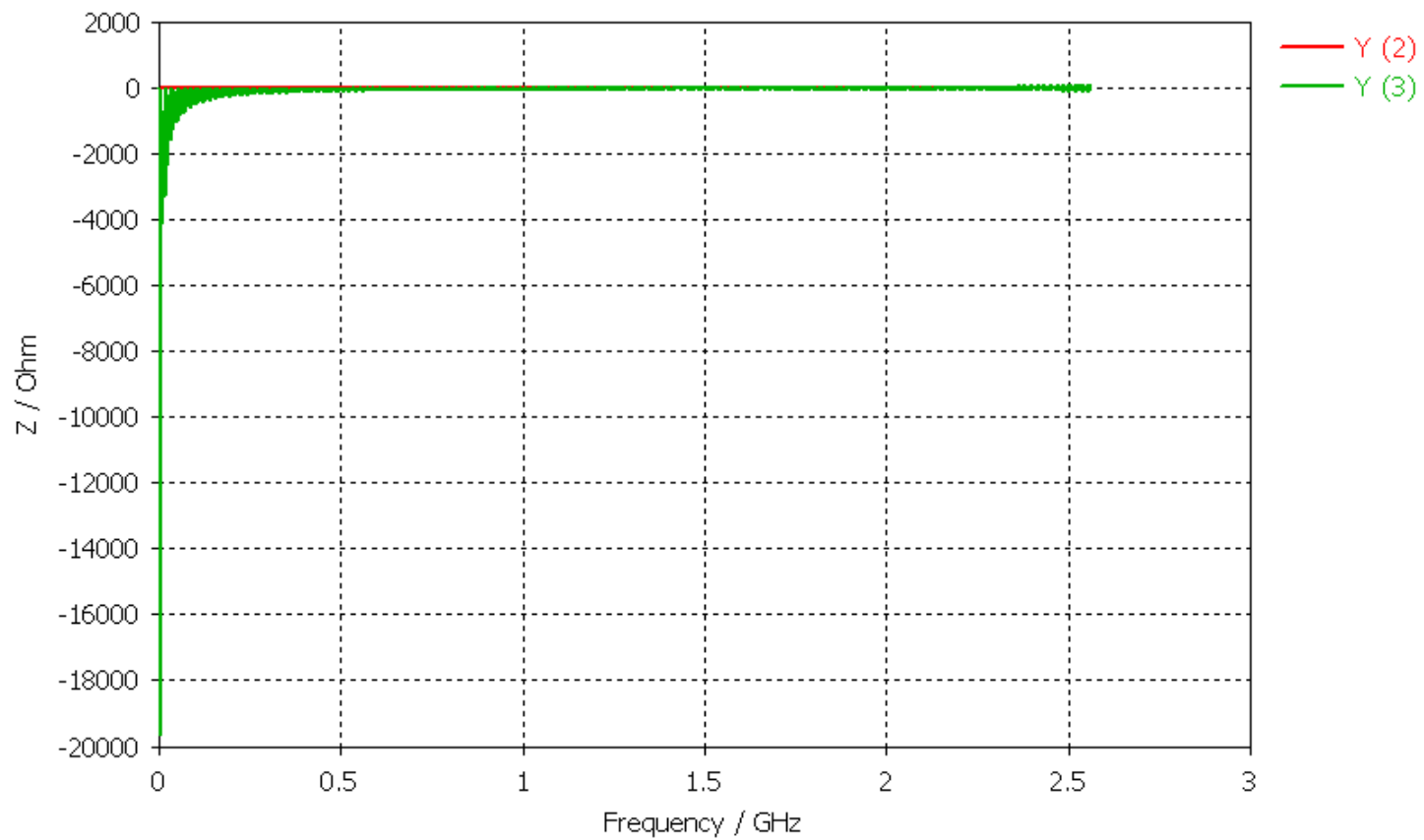
→ No visible mode

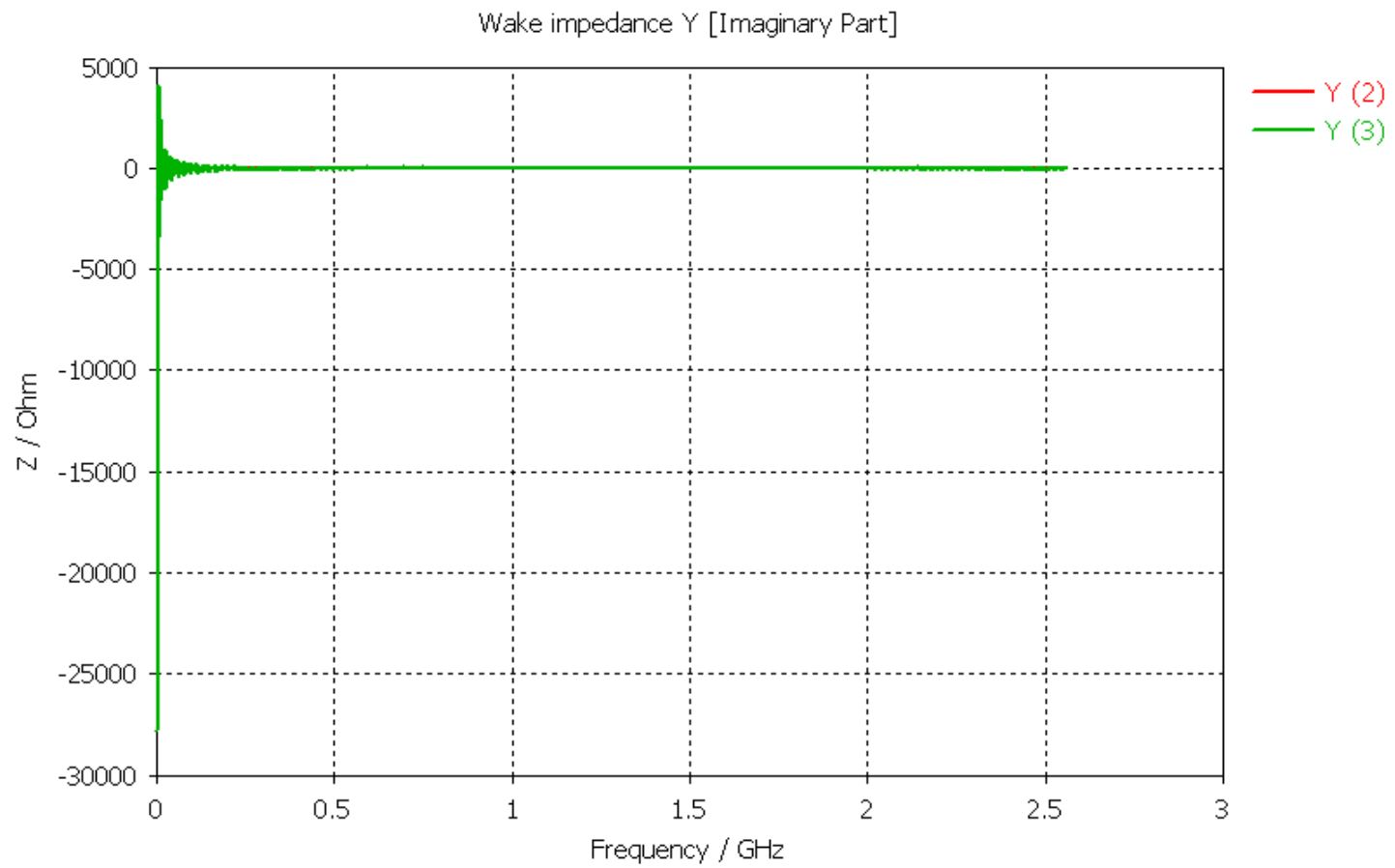


→ No visible mode

→  $\text{Im}(Z_{\text{eff}})$  not measurable

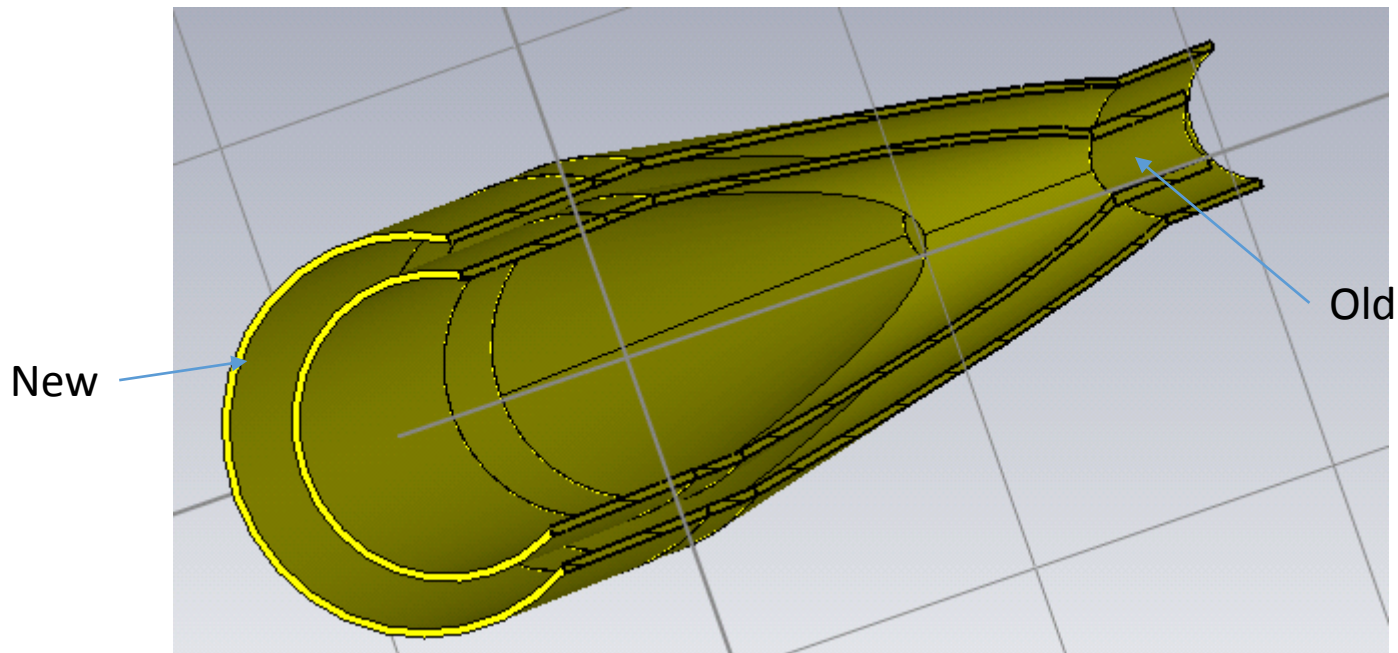
Wake impedance Y [Real Part]



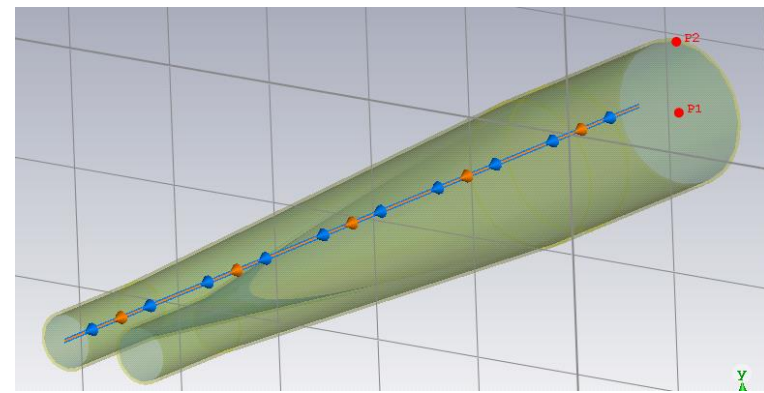




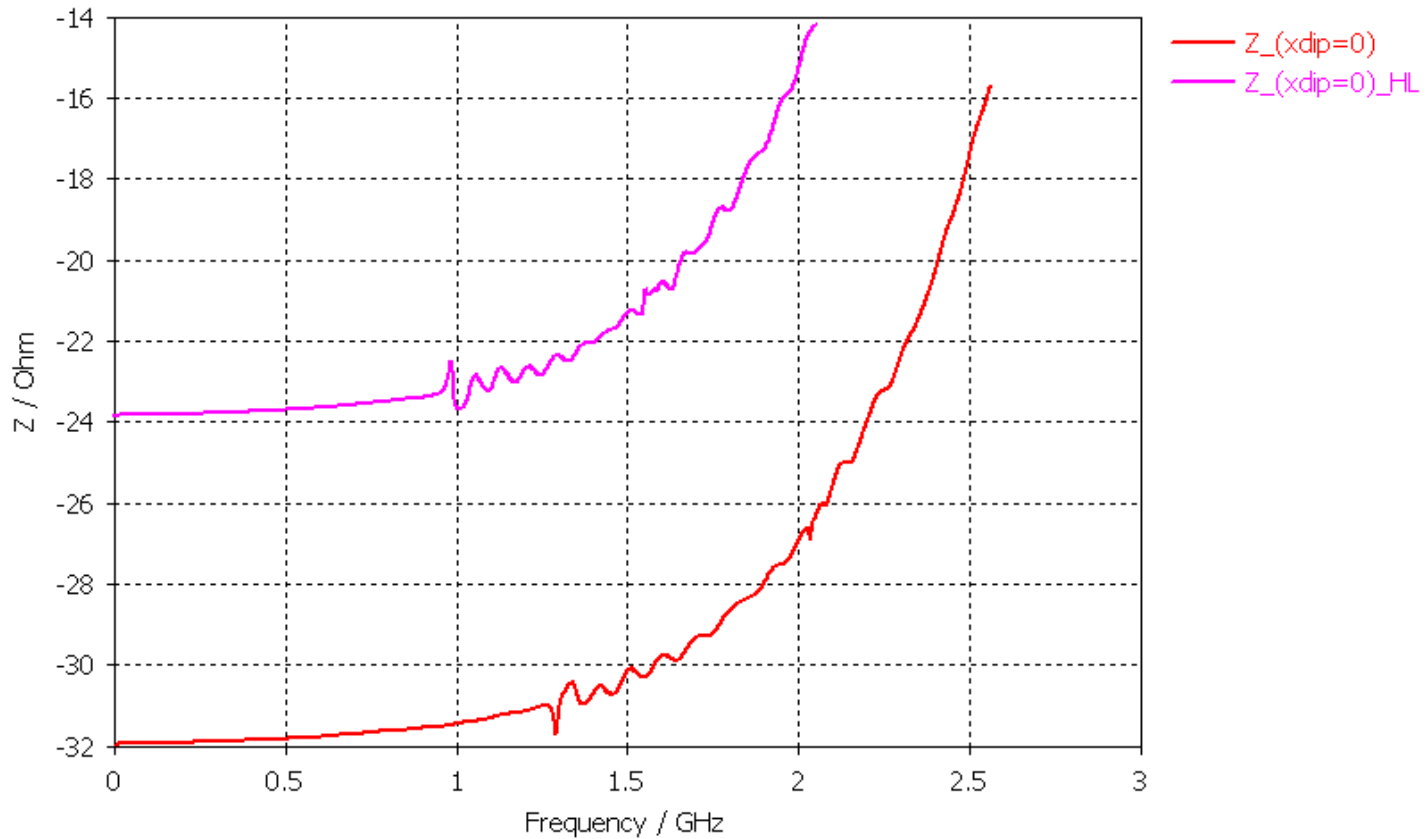
# New Y chamber



Larger diameters  $\rightarrow$  lower frequency for modes but also lower resistive wall

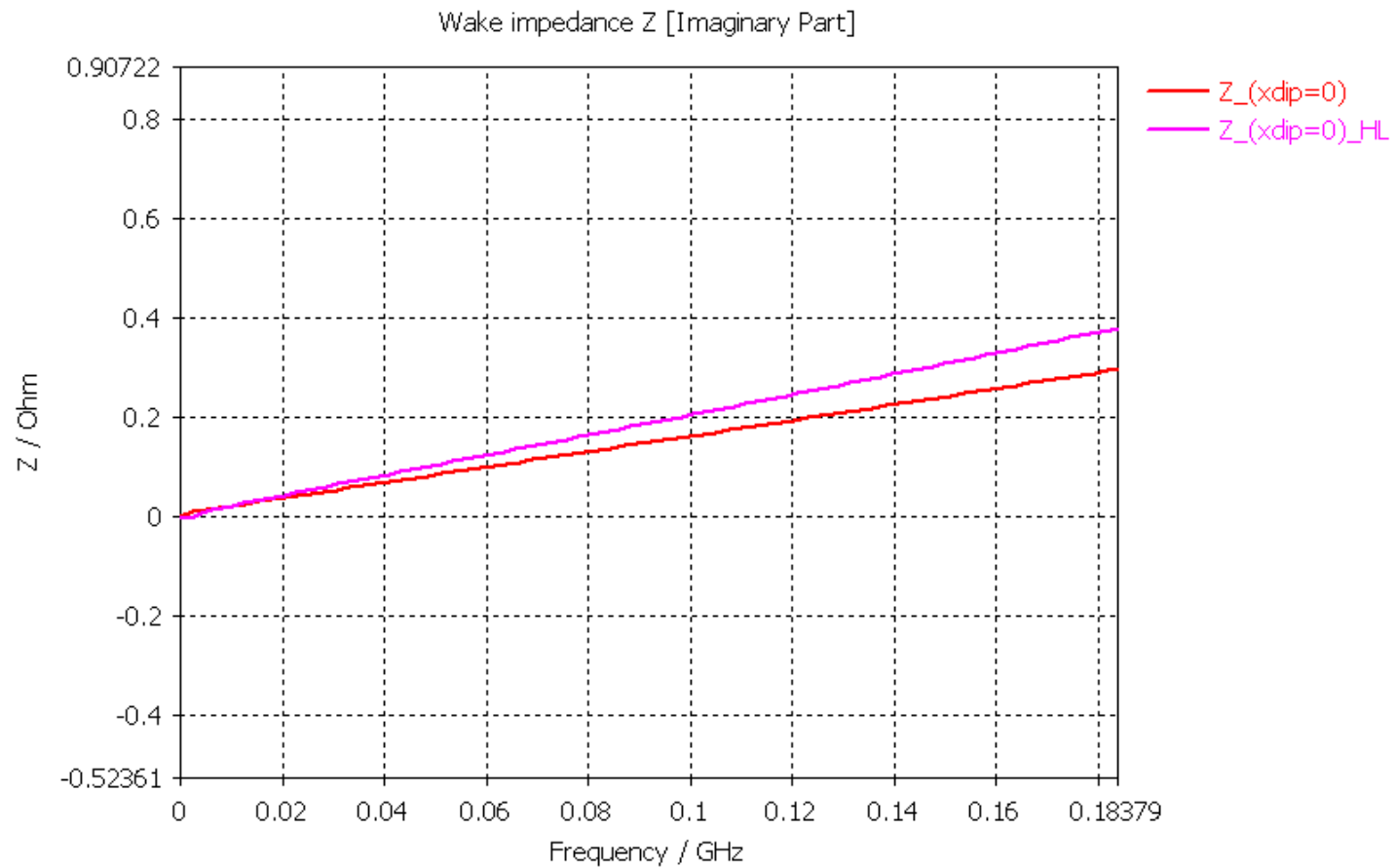


Wake impedance Z [Real Part]



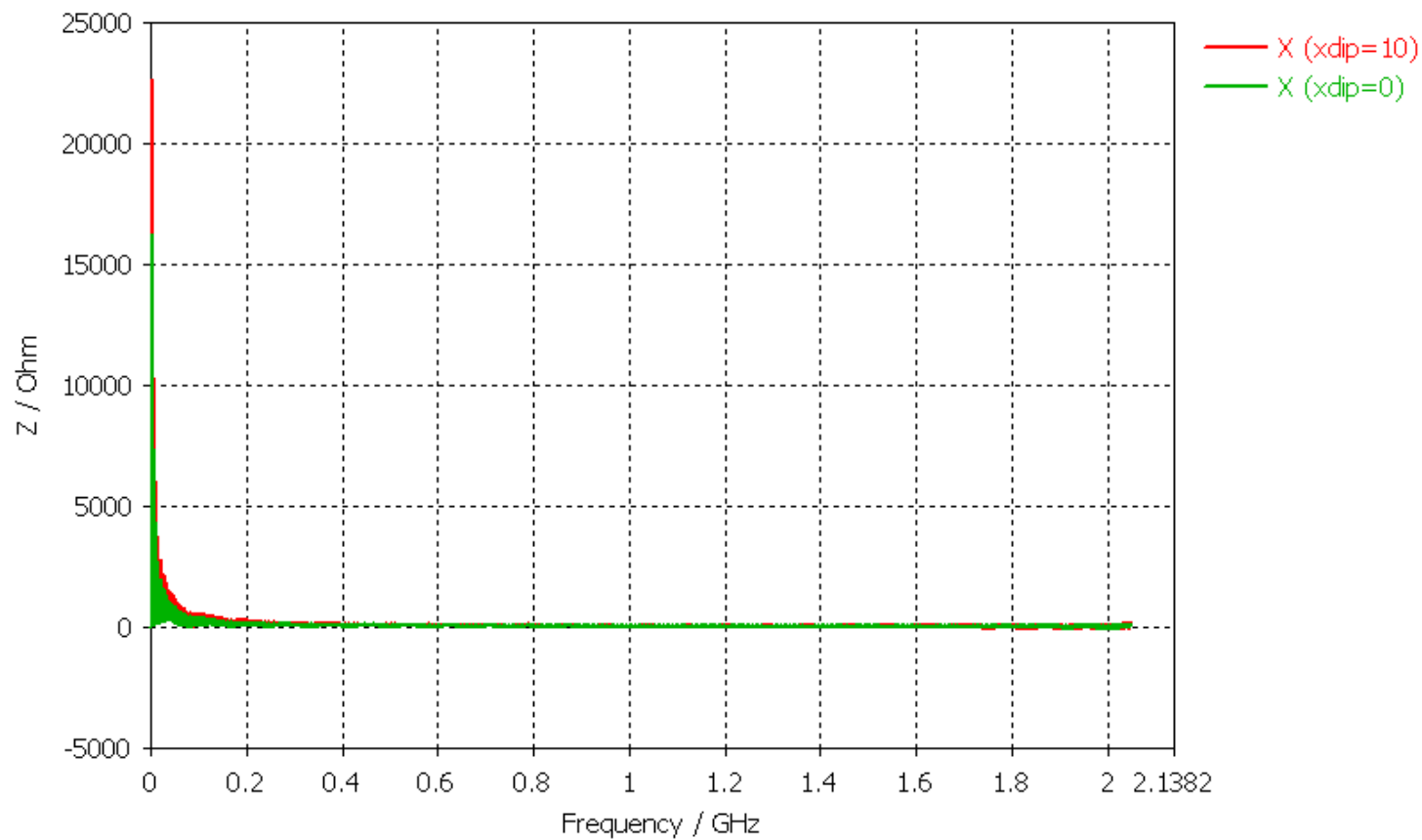
→ Lower frequencies and lower impact due to taper IN (and of course taper OUT – not shown).

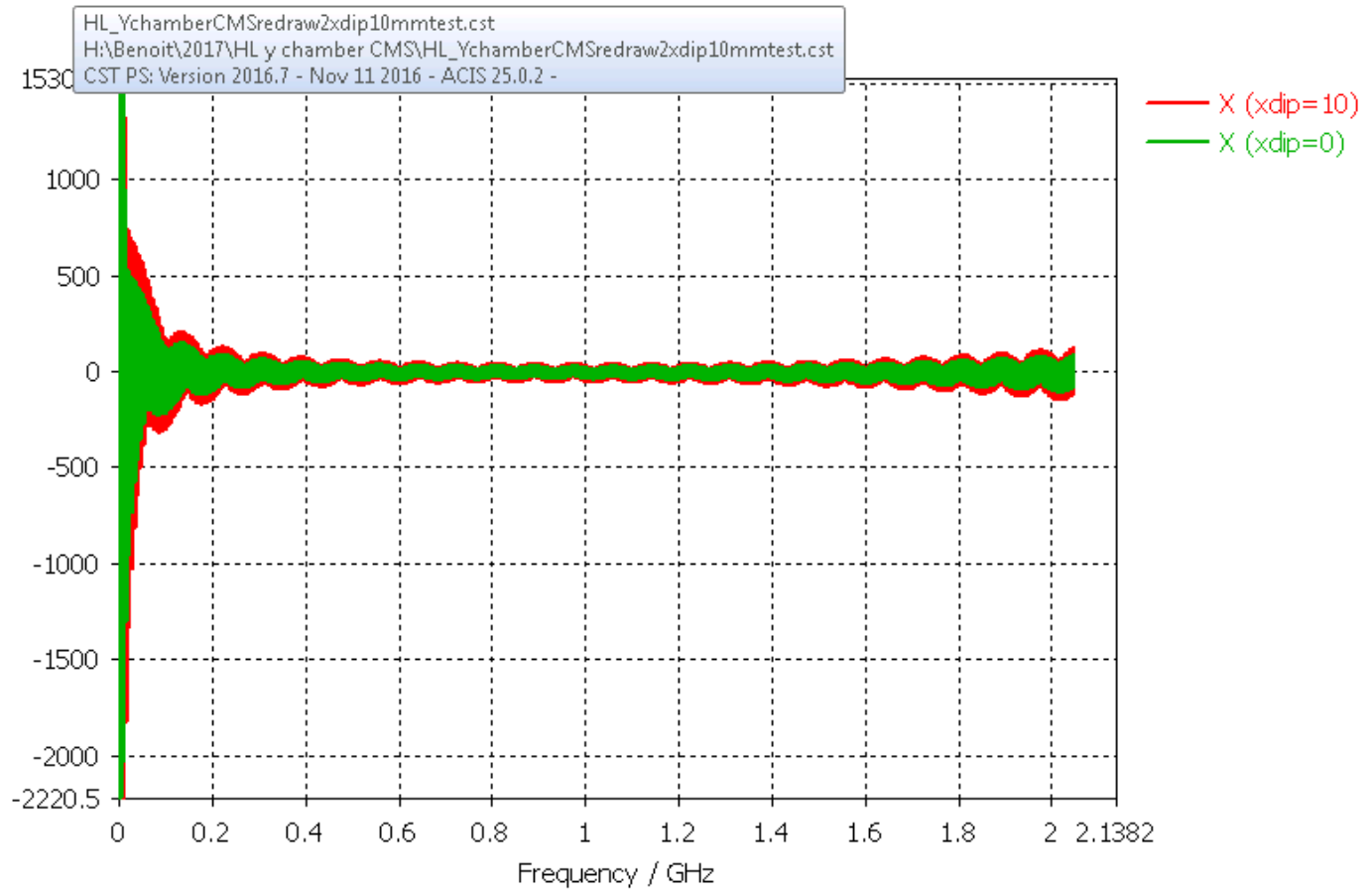
→ No visible significant mode.



$\text{Im}(Z_{\text{eff\_long}}/n)$  slightly higher (0.03 instead of 0.02 mOhm)  $\rightarrow$  still negligible

Wake impedance X [Real Part]





# Conclusions

- Geometry of the Y chamber already well optimized
- No significant mode or effective contribution