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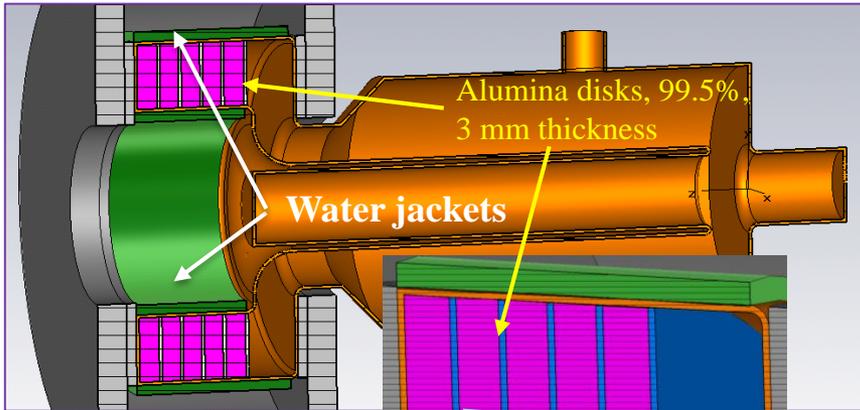
More thermal analyses and more on blocking capacitor

Gennady Romanov

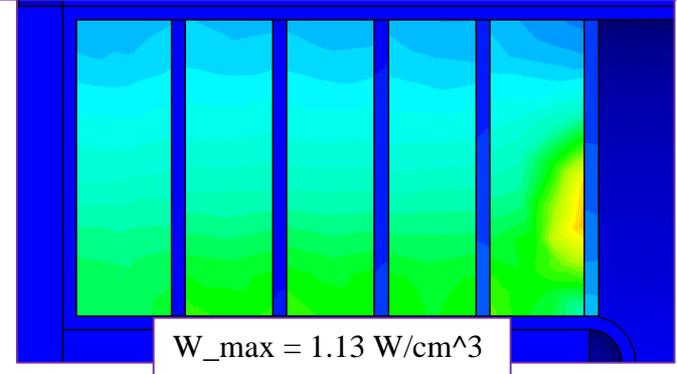
2nd Harmonic cavity Meeting

16/VII-2015

Thermal analyses with alumina cooling disks



Imported distribution of thermal losses for $f=74.7$ MHz



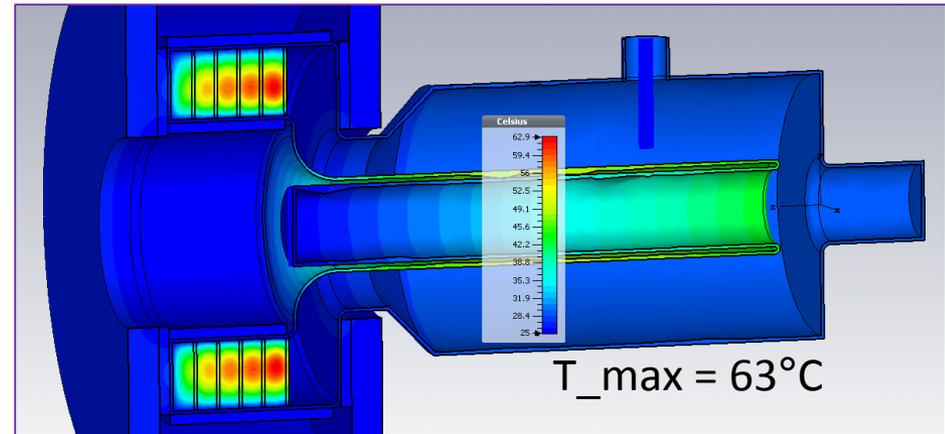
Thermal conductivity

Al_2O_3 - 30 W/K/m

Al800 - 3.5 W/K/m

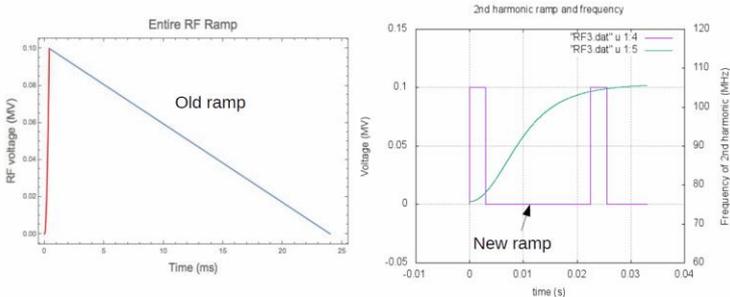
Why not TransTech G-810?
It is less lossy.

Simulation with thermal losses of $P=3.2$ kW and cooling water temperature of 25 °C, old ramp.



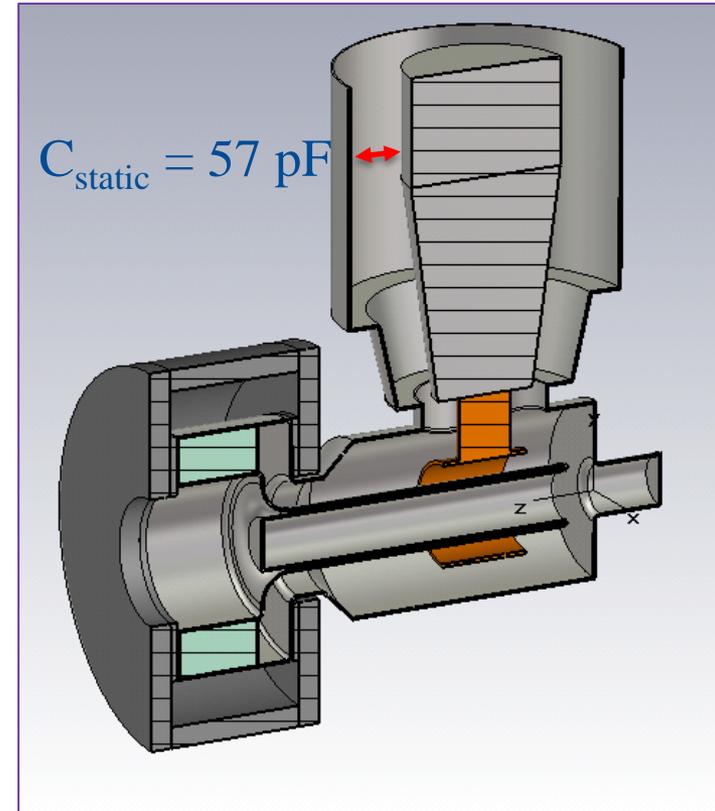
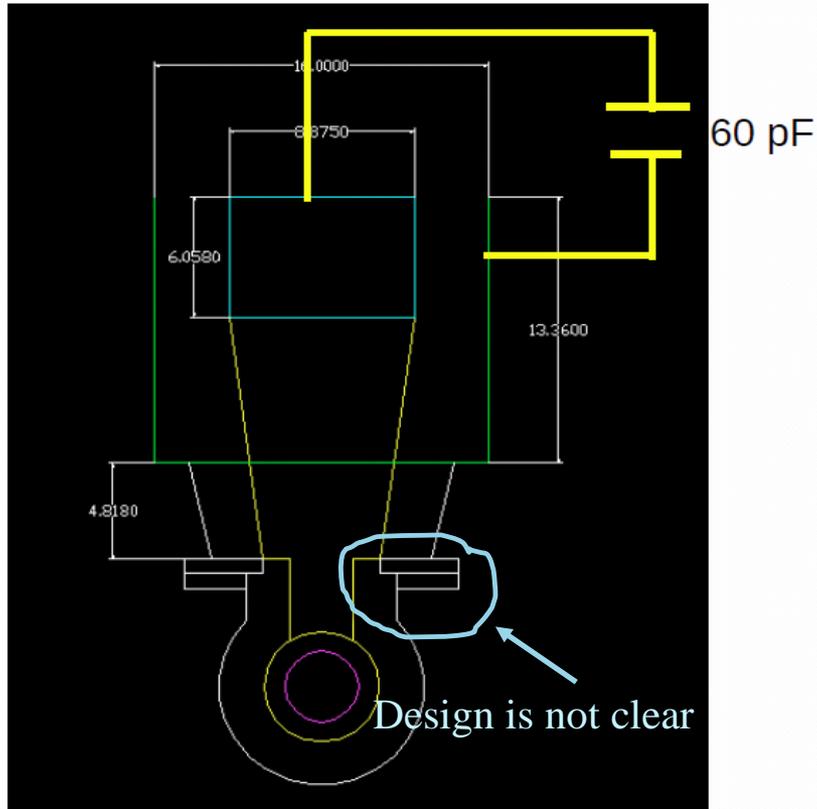
Temperature distribution

Mechanical design of the tuner can be started



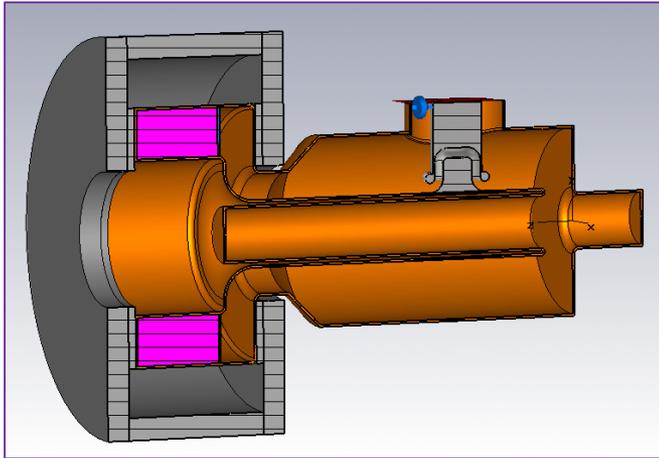
Coupler from Tan/Robyn

The 60 pF cap to simulate the tube

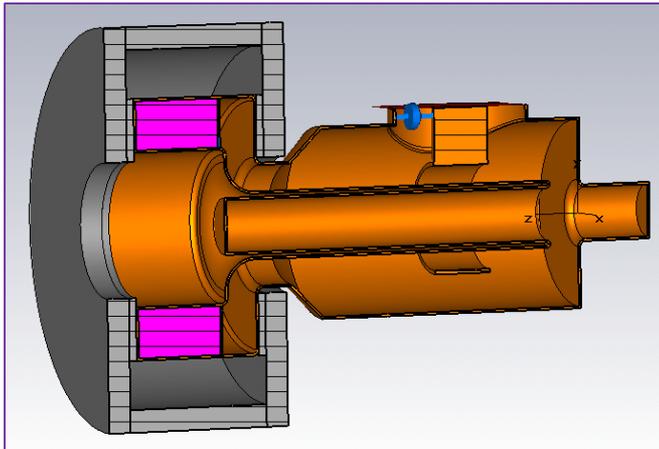


57 pF? May be a coincidence...

Models of coupler with lumped capacitance

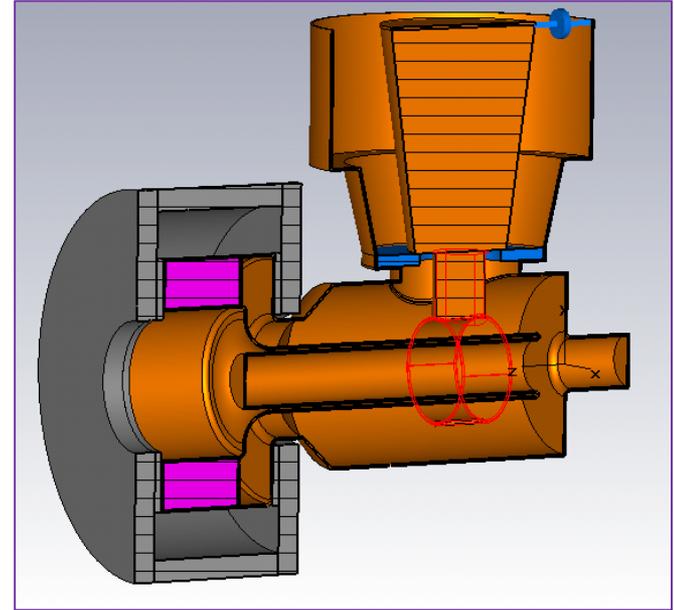


Scaled TRIUMF coupler, cutoff at the ceramic window



Tan/Robyn, cutoff at the ceramic window

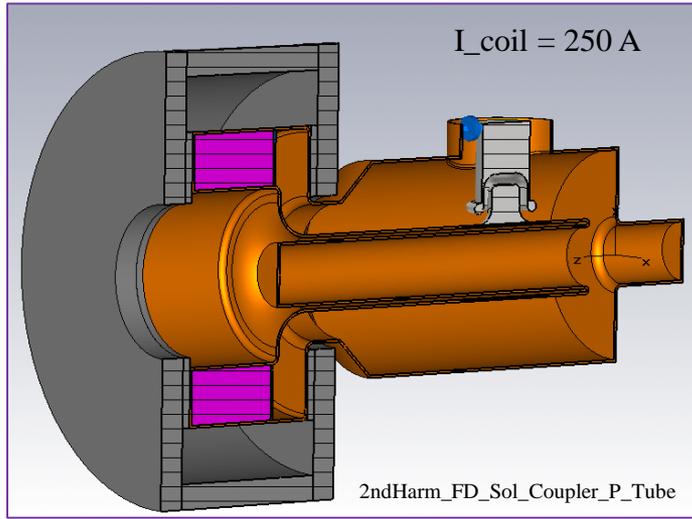
“The tetrode, which was difficult to be treated in MWS, was taken into account by a method of the lumped circuit element.” (K.Suda et al, TUPB095, Linac2012)



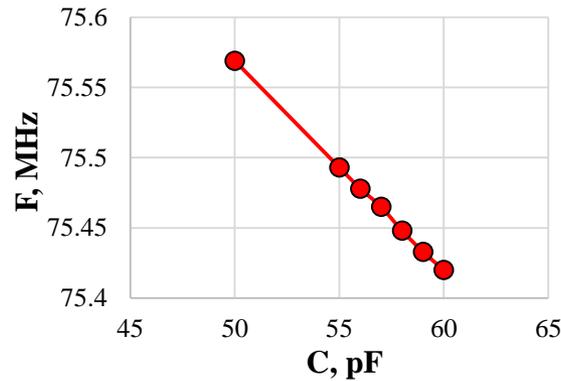
Tan/Robyn, cutoff at the beginning of transmission line. Ceramic window – Al_2O_3 , $\epsilon = 9.9$ (it was not taken into account in calculation of C_{static}).

It is possible technically to incorporate lumped elements into CST models. It seems that they are taken into account properly. But lumped elements disturb RF fields, that may be a problem.

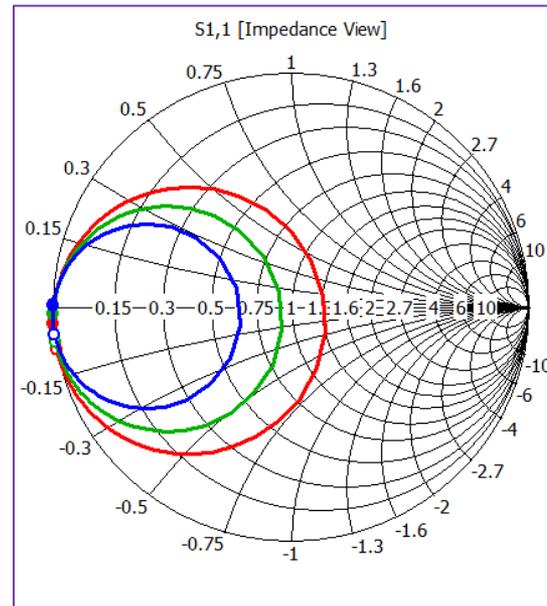
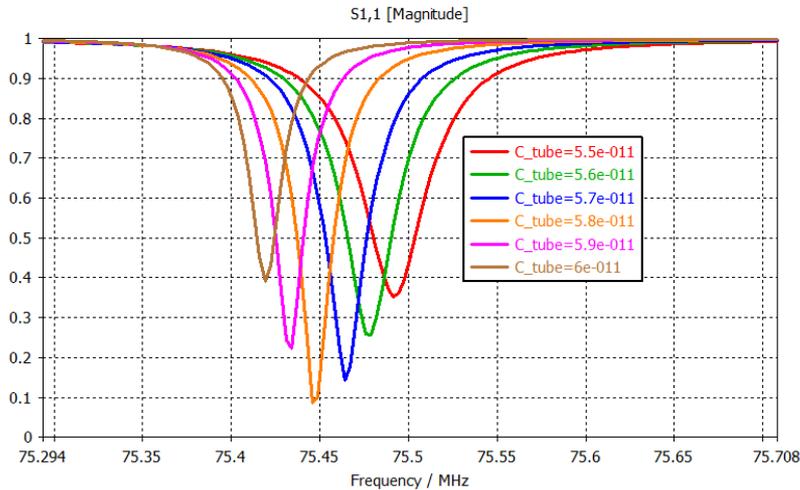
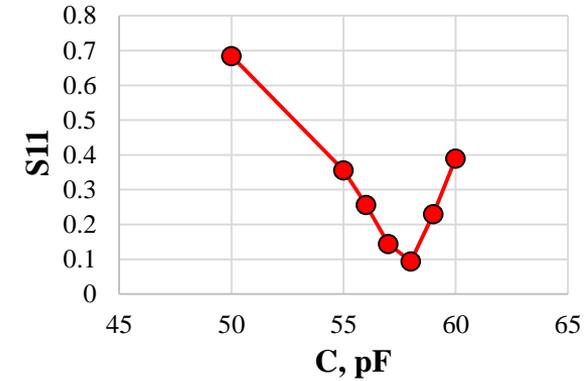
Scaled TRIUMF coupler, cutoff at the ceramic window



Frequency vs capacitance

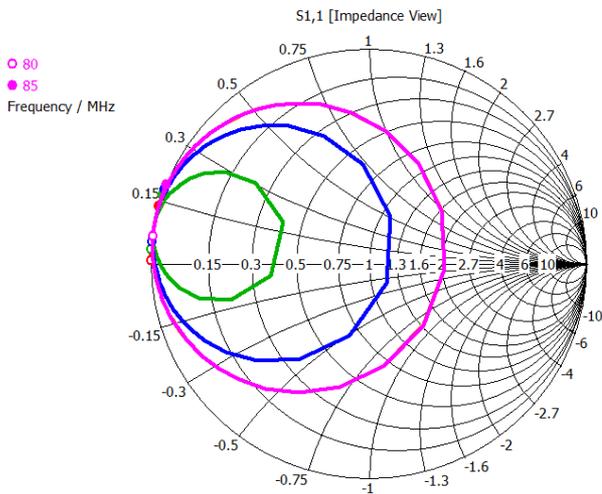
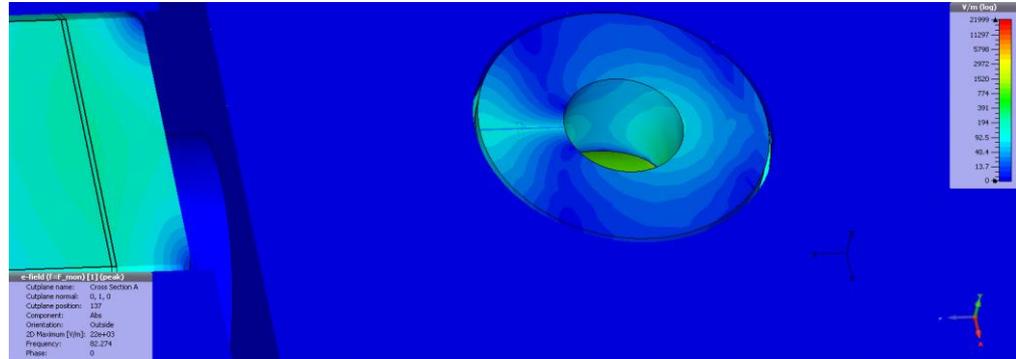
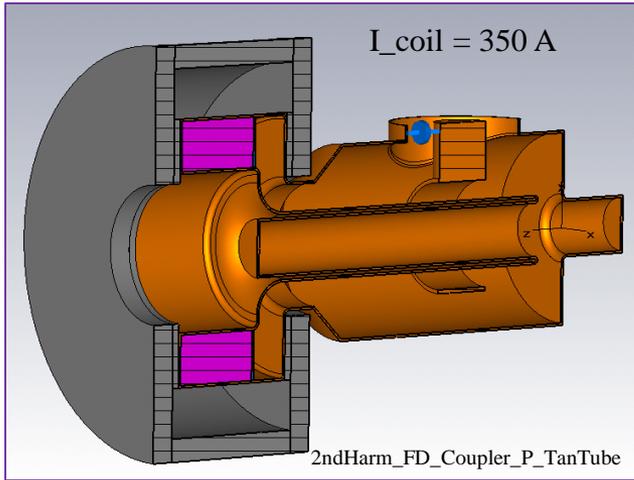


S11 vs lumped capacitance

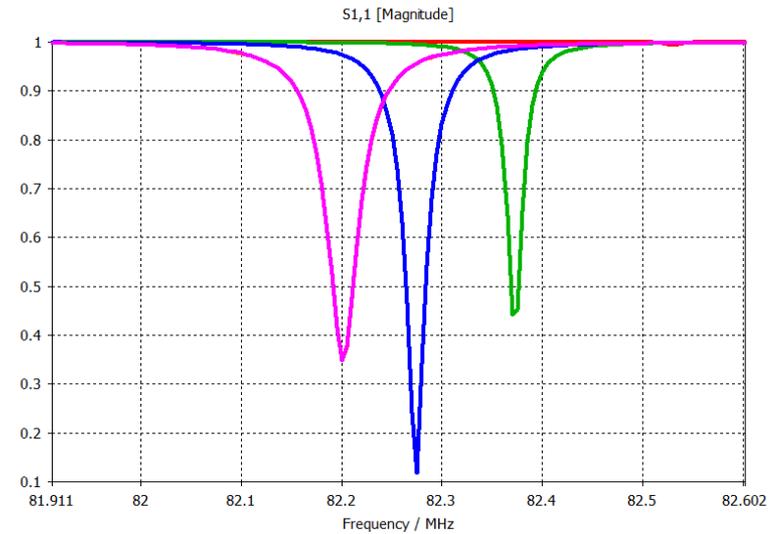


$C = 57 \text{ pF}$
 $C = 58 \text{ pF}$
 $C = 59 \text{ pF}$

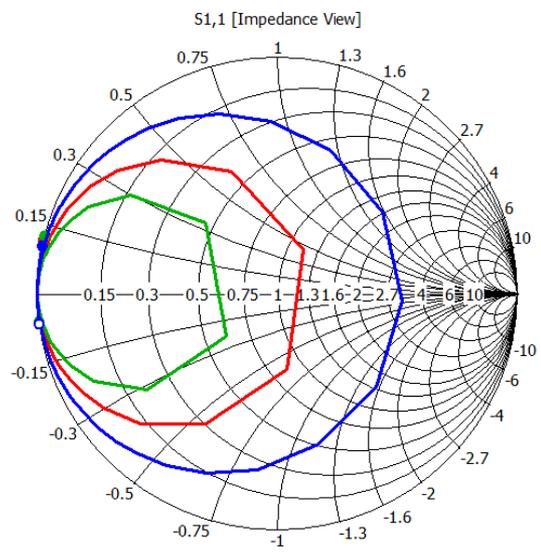
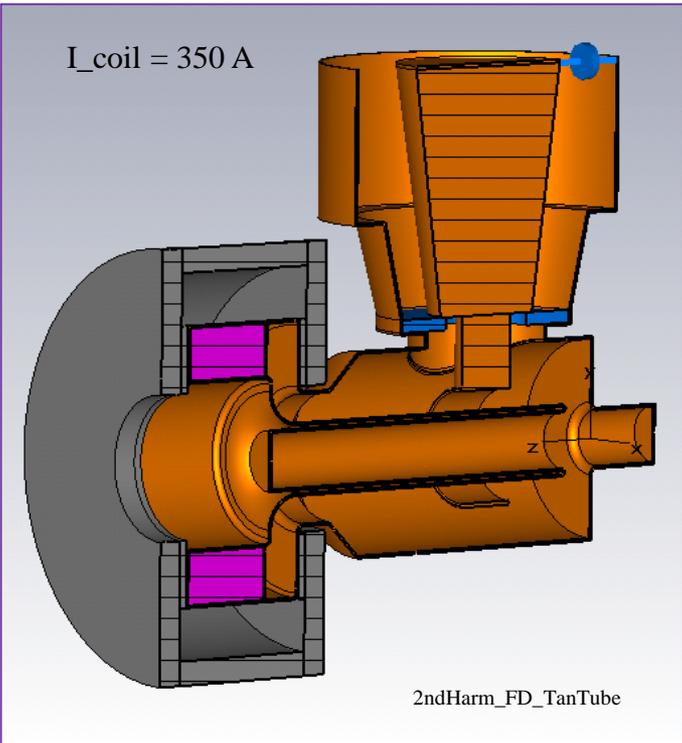
Tan/Robyn, cutoff at the ceramic window



$C = 34 \text{ pF}$
 $C = 34.5 \text{ pF}$
 $C = 35 \text{ pF}$



Tan/Robyn, cutoff at the beginning of transmission line



$C = 16.8 \text{ pF}$
 $C = 17 \text{ pF}$
 $C = 17.1 \text{ pF}$

