

Minutes RF structure meeting 11.07.2008

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CCDTL:

- We have to check if E. Mauros simulations for the induced radiation in Linac4 are still valid if we replace the EMQs in the CCDTL with SmCo PMQs (**action:** M. Vretenar)
- Steel order for the half tanks is under preparation, purchasing office is now contacting companies. Most likely we can avoid going to tender because we need the material for the end of 2008 in Russia.
- Steel for the coupling cells still needs to be ordered and the amounts of copper for the stems and drift tubes needs to be verified (**action:** F. Gerigk).
- We assume that we need only one pump for one module, which is attached to the wave-guide coupler. Additionally we will have one pumping slot in the first and last cavity of each module, which can then be used for rough pumping. Need to verify integration of this approach (**action:** F. Gerigk).
- To finalise the material orders we need to fix the geometry. For this 2 items have to finished:
 - ◆ 3D simulations of coupling holes, taking into account the larger tank diameter of 520 mm. Since the volume of the cavities is now larger, probably the coupling coefficient went down. So we first need to check to coupling coefficient, then to see if we can increase the coupling coefficient by increasing the size of the slot. Probably the size of the coupling cell needs to be increased to find the space for a larger coupling slot. During these re-adjustments the space for the quadrupole should not become smaller (**action:** G. DeMichele).
 - ◆ The general layout needs to be finalised: we assume 950 kW in the first module and then 1000 kW in all the other modules. This will allow to make small adjustments in synchronous phase (for longitudinal beam matching) without changing the output energy of the first module. We hope to slightly increase the output energy of the CCDTL, so that we have a bit more margin for the PIMS (**action:** G. DeMichele).
- We assume 80% of the superfish ZTT, plus the losses on the stems and coupling holes. Not included are additional losses due to the power coupler and the tuners.

PIMS:

- Despite the expected slight increase in input energy for the PIMS, we keep the prototype design as it is. If the energy is higher this will only result in a marginally larger phase slip in the outer cells.
- For the PIMS we assume ZTT-30% to account for all losses. All different contributions to the reduction of shunt impedance were reviewed by R. Wegner:

effect	worst case reduction	expected reduction
coupling slots	11.5	11.0
surface roughness	9.0	7.0
wave guide coupler (1/7 of ZTT total)	5.0	2.0
end cells (2/7 of ZTT total)	-2.0	-4.0
average ZTT reduction due to heating (Linac4 duty cycle 0.1%)	0.0	0.0
average ZTT reduction due to heating (SPL duty cycle 10%)	5.0	3.5
e-beam welding groove for welding discs and cylinders	2.5	2.0
tuning rings (df= -1.0 MHz ... +1.0 MHz)	6.3	3.3
tuner (RF finger)	2.0	0.5
tuner (without RF finger)	3.5	1.0
sum, Linac4 0.1%, tuner with RF finger	34.3	21.8
sum, Linac4 0.1%, tuner without RF finger	35.8	22.3
sum, SPL 10%, tuner without RF finger	40.8	25.8

- It was concluded that for Linac4 the assumption ZTT-30% is realistic, while for the SPL it is a bit tight (due the warming-up of the structure). However, in case of the SPL we don't need to have lower gradients in the last two cavities, which are used for energy ramping in case of Linac4. This means that a possible reduction in output energy of the PIMS can be compensated by raising the field level in the last 2 cavities. (It was artificially lowered to be able to achieve fast ramping speeds).
- If necessary, one could reduce the tuning range, which would reduce the size of the "tuning islands" on the side walls. This will be re-considered after the prototype has been measured.
- The vacuum pumping is done on one port, which connects to the wave-guide coupler.
- After several meetings with the CERN workshop, it was agreed to machine the centre cell out of a thick cylinder, so that the RF port can be machined out of bulk copper. This avoids complicated welding operations but it means that this piece has to go into the brazing oven to connect the RF port flanges (stainless steel) with the RF port tube. This will be the only piece of the PIMS that is brazed.
- We must not forget order copper for the de-buncher in the transfer line and to order copper for a spare module.

DTL:

- Francesco Grespan will start on August 1st. It was decided that he will work on a tuning procedure for the DTL. The first approach should be to use an analytical model based on coupled circuits. If this turns out to be too complicated then an empirical approach should be developed. S. Ramberger will supervise his work in the beginning because F. Gerigk is not at CERN during August. We will then probably have a common supervision by F. Gerigk and S. Ramberger.
- It should be checked if JM Lacroix can spend some time on the CCDTL/DTL once the hot model drawings are finished (end July).

-- FrankGerigk - 11 Jul 2008

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