Minutes RF structure meeting 02.08.2007

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news & facts:

- the final draft of a technical note on Linac4 beam dynamics is ready, which studies in detail the design used in the Linac4 TDR. It shows that: i) PMQs have to be aligned with a precision < 0.1 mm, ii) the alignment between tanks should be around 0.2 mm, iii) at the SPL duty cycle there are hot spots with up to ~5 W towards the end of the CCDTL. For the new Linac4 design the following points need to be addressed: i) can we have 0.2 mm alignment errors between the sections of one DTL tank?, ii) there is a steerer between tank2 and 3 and possibly between tank1 and 2, iii) the mixed DTL focusing scheme FD and FFDD needs to be tested for varying currents with statistical errors.
- the shielding calculations have foreseen 10 W point like losses, which means that the shielding should be sufficient,
- in the PIMS section we now have 2 half-height wave-guides in one duct (between klystron hall and accelerating tunnel),
- the klystron modulator for the 3 MeV test stand has been tested up to 100 kV,
- DTL drift tube shapes for the prototype have been recalculated for fixed tuners that provide up to + 1 MHz, this should be repeated for for a hub of -+ 0.5 MHz: (action Suitbert)
- Carlo found out that there are two types of coax to wave-guide transitions available from LEP: i) measurement transitions (high-precision) and ii) "production" transitions (low-precision), meaning that we should find some of the measurements transitions for future prototype tests,
- the price for the copper test pieces from Zollern will be twice as expensive as originally estimated: 24 k¤

high-power test of Russian CCDTL prototype

- Rolf re-calibrated the detectors and measured the directivity of the directional couplers,
- measured 360 kW into the cavity (-+ 20% errors), 391 and 380 kW in the accelerating cells (-+ 10 - 15% errors), and 611 kW DC power on klystron current and voltage,
- for the public we will announce > 330 kW in the cavity at the full SPL duty cycle (5%), Q=38000 (92% of superfish taking into account the coupling and the stems),
- Suitbert calculated the water flow in the drift tubes from cooling water measurements and heat depositions (from Superfish): around 0.5 l/m (probably 2.5 bars),
- after 20 minutes at SPL duty cycle the vacuum becomes too bad: probably the pumps are too small,
- cooling water flow can be increased for the next round of measurements,
- it is clear that with the present cooling system we could never reach 15% duty cycle (for which the structure was designed),

decisions taken:

- due to the low duty cycle we will not need scrapers within the accelerating section of Linac4, for the SPL - depending on the losses - one may have to add carbon rings to the "hot" quadrupoles,
- gradient measurements of the PMQs inside the drift tubes will only be done to check a possible gradient degradation (after the laser welding) but not to check the alignment or the harmonic content, this will be done with the PMQs outside of the drift tubes,
- a new power meter will be ordered to improve the measurement precision for high-power tests,
- for the SPL duty cycle the RF has to maintain the full duty cycle even if the beam duty cycle changes, otherwise the structures will constantly change their frequency,
- for Linac4 we will not have cooled tuners, for SPL operation they will be exchanged against cooled tuners,

new actions

Assigned to	Start date	Description	State	Result	
MatteoPasini, RolfWegner	2007-07-27	write a report on the CCDTL prototype measurement and pick-up calibration		CCDTL prototypes: test results, M. Pasini, M. Vretenar, R. Wegner, CARE-Report-2007-036-HIPPI	edit
MatteoPasini, RolfWegner	2007-07-27	perform X-ray measurements on the CCDTL prototypes at different locations for different duty cycles			edit
SuitbertRamberger	2007-07-27	re-calculate the drift tube shapes for the DTL prototype, so that the tuners provide -+ 0.5 MHz tuning range			edit

updated ActionListRF

minutes by Frank Gerigk

-- FrankGerigk - 02 Aug 2007

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