LHC RF Meeting
4th November 2005

Present: Luca Arnaudon, Thomas Bohl, Olivier Brunner, Thomas Bohl, Andy Butterworth, Edmond Ciapala, Trevor Linnecar, Wolfgang Höfle, Pierre Maesen, John Molendijk, Joachim Tückmantel, Volker Rödel, Daniel Valuch, Frode Weierud.

1. ACS Modules and SM18 (Pierre)

- **Module 5:** has been cold for nearly three weeks. The lower frequencies of the disc spring compensated cavities (B and C) have stabilized. See latest PLOT. The module will be taken out next week.
- **Module 2:** The antenna signals on cavity D (low signal indicated on antenna during last power test in bunker) have been compared with cavity A (cavities warm). With a swept signal applied to transition pieces mounted on the coupler inputs identical Q-values of 30,000 and couplings of -67 dB were measured on both antennas of both cavities. There is therefore no problem with the antenna connections on cavity D. Remaining possible explanations are icing in the He tank N-connecter from the bellows accident or the presence of attenuation or saturation in the measuring chain - the latter has to be checked again.
- **Compensating springs (Olivier):** We now have enough disc springs for 40 assemblies (i.e. for 10 cavities).
- **Drawings:** Archiving is needed of the many drawings related to the ACS modules. Either we establish a streamlined approval process in CDD or enter the drawings directly in EDMS. Apparently CDD gives only restricted access to the original Autocad drawing. The responsible persons are being contacted to find the best solution.

2. ACS Power (Olivier)

- **Klystrons:** The last production klystron has completed its tests in H112.
- **Drive chain:** Measurement of the response of pre-driver, driver and klystron, and saturation levels were done last week on the klystron in SM18 (K001) and the one presently in H112 (K020). See respective curves. The klystron in SM18 has its cavity 1 at the tuning limit. It has lower gain than the 'ideal' klystron K020 (lighter curve on second plot) and also saturates at high drive, rather than having the decreasing gain (negative incremental gain!) of an ideal klystron with overdrive. This (K001) is good for stability, but gain is less constant throughout the range and the concern is optimising maximum loop gain to get best 50 Hz and harmonics rejection throughout the range. On the other hand group delay is better with the non ideal klystron. The second curve shows re-tuning of klystron 020 to make it similar to K001. A klystron with the 'ideal' characteristic will now be tested in SM18 with RF feedback, in order to decide on the best klystron tuning.

3. UX45 installation (Olivier)

- **Platform:** The top floor has been constructed with smaller section beams than in the original design. The present design has not been approved. In view of doubts about its strength and stability all work on the platform has been stopped. Additionally, as already noted, the floor grill spacing is too large. We are now discussing with TS-CE – a re-study will probably be done to decide on necessary modifications
- **Cabling:** Pulling of flexwell cables is progressing well. The damaged 7/8 inch cable has been successfully repaired by simply reforming it with a circular sectioned clamp. Note that tooling and material for splicing flexwell cables can be obtained. The two 1-5/8 flexwell cables for the APW have been pulled to SR4. An outline planning of the cabling campaign has been prepared, showing the different systems. Completion of all cable pulling is planned for week 21 next year.

- **General Planning –** Vacuum. A draft planning for vacuum installation in RUX45 has been prepared by M. Jimenez. This will be put in a general UX45 planning. All equipment for the tunnel should be in place by the beginning of June for the right side and the end of June for the left.
- **Floor reinforcement in SR4:** An additional six bars will be put in place by an external company. D. Parchet (TS-IC) will give the final approval when the work is done.

4. ADT (Wolfgang)

- **Kicker tanks:** The 15 kicker tanks recently delivered will be cleaned by us before leak testing (Miguel Jimenez). Note that these 15 plus one already delivered makes the total required for installation. (Four spares have also been completed at Dubna, one of which has to be re-done). Before bake-out of the completed assemblies we need to destructively test one electrode to determine the maximum safe bake-out temperature. The results will be discussed with Miguel. While it would be possible to bake-out the kicker tanks *before* fitting the electrodes we still need to know the maximum allowed bakeout temperature for subsequent bake-out in the tunnel.
- **Amplifiers:** Some final details of the amplifier need to be agreed between Eric and the JINR responsible, to allow the series production to go on at Dubna, so that we can have minimum retro-fitting after delivery.
- **Power Converters, transport & testing:** Imtech are ready to deliver more units but we have bottlenecks in testing in B867 and in transporting to SR4. For the latter a suitable lifting arrangement needs to be approved before handling by transport. Some short-term storage space in B867 may be worth looking for.
- **Water-cooled resistors:** A new design is being studied by the supplier – it divides the resistor into two parts, reducing the pressure at the centre now believed to be the cause of the problems.
- **ADT Interlocks (Luca):**
  1) *The power interlock controller* (PIC) will be housed in a small chassis next to the pair of drive amplifiers, providing a signal to the fast interlock controller.
  2) *Vacuum interlocks:* No fast vacuum interlock to cut RF or HV.
  3) Access system interlock: A fast input will be provided to cut HV when the zone is in access mode.
  4) *Ug1 supply:* No need for a separate fast interlock on Ug1 to cut HV. Rely on PLC control of the supply.

  Assembly of the fast interlocks crates for ADT will start this month.
- **Drive amplifier firmware (John):** The problem with downloading into the second amplifier batch is not resolved. It may be related to the download software version differences. Still to be resolved…

5. APW (Thomas)

- **Prototype testing:** The measurement set up is being worked on. The response characteristic of the prototype needs some adjustments.
- **UX45 installation:** Observation system patch panels are being installed in the UX45 cryo side racks.

6. Low Level RF

- **Series production of electronics modules (Wolfgang):** The overall planning for all low-level RF and beam control modules is being completed. We would like to get the information on ACS cavity/klystron and RF timing and transmission to them ASAP, since the quantities involved are large and deadlines for HW commissioning and sector test are looming close.
- **Conditioning Module (John):** Work on this has started with the design of the DDS interface. More details of the hardware design and the software structure need to be agreed very soon.

7. Software & Diagnostics (Andy)

- **FESA V2.6** is now being implemented. Support from the FESA team is good. Although documentation is lagging this is not a real problem for the moment.

- **LabVIEW applications:** Using the 'LabVIEW CMW Wrapper' developed by Roman Sorokoletov, LabVIEW test applications have been put in place for the ACS Tuner Control module in SM18 and the ADT test stand. (Roman & Luca, with drivers and test programs from Frode). These use the full standard FESA/IEPLC CMW chain. The results are encouraging and also significant in that they represent a full 'vertical slice' for each of our PLC and LLRF VME based applications, using all 'AB-CO standard' components.

  A website has been created by Roman for the LabVIEW CMW wrapper.
  See http://ab-rf-cs-cmwwrapper.web.cern.ch/ab-rf-cs-cmwwrapper/

- **Acquisition boards:** A sample board from National Instruments was tested. The specification meeting for the supply of these boards will be held shortly….

8. AoB

- **Stores delivery delays:** Luca, Daniel, John and Wolfgang will provide Trevor with some examples of the supply problems recently experienced. Trevor will then contact stores management.

Next Meeting: Friday 11th November at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 9th November 2005.