

LHC RF Meeting

15th April 2005

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

1. ACS Modules (Pierre)

🚧 **Module 5:** Cool down and tuning measurements (cavity B) have been done. The frequency is exactly the same as before removal of the spacers. This indicates that the cavity has probably always been free when cold, before and after the change, and not in tension due to the torsion bars. The frequency vs. tuner position has been measured and the module is now being warmed up. The results will be checked but it does appear that obtaining lower frequency simply by removing spacers does not work. Compression with disc springs has already been taken up again and a test design using off-the-shelf parts is being looked at (Olivier + Pierre)

🚧 **Module 2:** There is still a possible problem with a leaking vacuum gauge on cavity D. The leak is very small and a decision on changing the gauge it will be made next week.

2. ACS Couplers and SA2 conditioning (Eric).

🚧 **SA2 Conditioning:** Conditioning of couplers MC120 and 121 continues at 300 kW.

🚧 **Coupler production:** The existing mechanical parts ($\lambda/4$ line and body assembly) planned to be used for the next two couplers may not be in a good enough condition for electron-beam welding. These parts had been used in an original window design and the re-machining has not been sufficiently precise to remove all of the copper of the original ring. This would mean that the next two couplers would only be assembled when the set of parts for a batch of six more couplers is completed, in 8 weeks time. Implications on the planning will be studied. **(Action: Eric, Pierre)**

3. ACS Power (Olivier)

🚧 **Klystron 17:** tests are continuing.

🚧 **Klystron ripple:** The SM18 tests have been concluded. We have reduced amplitude noise by a factor 3 to 4 and a phase noise by a factor 2. The principal outcomes are that we will keep the 5 Mohm divider and tetrode (the higher resistance means less power dissipation), keep the simpler and more reliable AC heater supply for the tetrode and use a 4 uF capacitor. The tuning of the power converter by AP-PO to reduce the 100 Hz ripple was essential. The results will be collected together in a brief summary report. **(Action: Olivier)**

4. ADT (Wolfgang)

🚧 **Feedthroughs:** Of the 50 feedthroughs received 5 have developed leaks after bakeout. These will be returned to the supplier. For the remaining 45 a number have already been baked twice, with no problems and we expect the 40 feedthroughs needed will be successfully obtained out of this number.

🚧 **Anode Supplies:** Delivery may be around 10 days later than planned. The function of the front panel "OFF" button has been specified; HV OFF only with 220/380 inside cabinet remaining on.

🚧 **Dubna:** Following the visit of the Dubna scientific secretary, V. Zhabitsky, a schedule of the work to be done and the delivery of equipment has been agreed. Important dates are the start of final assembly of the amplifiers at CERN in September and the sending of all 20 tanks in June, together with ceramics and electrodes. At the moment one amplifier and one electrode structure are ready to be sent.

🚧 **Tetrodes:** The order has passed Finance Committee. The contract details are being negotiated with the supplier. In the meantime we can order the sockets so that amplifier construction can continue.

5. APW (Thomas, Eric)

Drawings have been completed and a prototype is being assembled in the central workshops.

6. UPS supplies and emergency stop (Eric)

Following the questions last week on switch off of the damper HV supply and on emergency stop for UPS, Eric has contacted TS-EL. For certain systems that must never fail, e.g. GSM and some cryo systems, UPS is not connected to the general emergency stop. For the RF systems in SR4 and UX45 UPS is not relied on in this way and for personnel safety we should switch off all 220/380 V when an emergency button is pressed. This is as in BA3, where “RF Stop” switches off everything. We should study the proposed UPS layout in UX45 and SR4 to ensure that this arrangement is possible and that there are no implications for other equipment. **(Action Eric, Volker)**

7. LLRF

🔧 **Diagnostics (Thomas):** Details of the RF diagnostics systems in SR4 and UX45 are being finalized. Our deadline for giving cabling lists to ST-EL is 15th April. It was agreed that the lists should be given now and that the relatively small number of diagnostics coax cables be added as quickly as possible afterwards. There will be a brief presentation on the RF diagnostics systems in one of our next meetings.

🔧 **Timing standards and VME systems (Ed for John):** A meeting was held on 13th April and some [conclusions](#) reached. We can make extensive use of software triggered timing, e.g. for injection bucket switching. Standard AB-CO “CTRV” timing modules inside our VME crates will provide the software interrupts. Hardware signals will be passed via special interface modules to the allocated backplane lines, a number of which are dedicated to certain standard events and will be included in all crates. Signal levels and pulse lengths have been defined for these and also for external lines. There will be a follow up meeting next week.

8. Controls.

🔧 **ACS (Luca):** Another large order for parts has gone out.

🔧 **Interlocks (Luca):** Material for assembly of interlock system crates for ACS and ADT will be sent out next week.

🔧 **Acquisition Modules (Andy):** The specification for these is in EDMS (**MS-3362**); the documents have been presented to the specification committee. A list of signals to be monitored for PS and SPS RF systems has been presented at the APC. If this is approved the material could be perhaps added to the same IT.

9. SR4

🔧 **Floor modifications for ADT supplies:** We should wait for news on the duration of Jean-Claude’s absence before moving further. The question of the need for SC approval should be checked.

10. UX45 Installation

🔧 **CE Work:** The shielding wall is finished, waveguide holes will be drilled in the tunnel wall next week, work has started on the platforms and the bunkers will be constructed next week.

🔧 **False Floor:** Wooden panels are preferred to grill sections for the area inside and around the racks; an inexpensive solution still has to be found.

🔧 **Faraday Cage doors:** There is insufficient room for a 90 cm door, following the arrangements likely to be proposed by the supplier, due to the proximity of the Faraday cage. Solutions are: shifting the bunkers 10 cm nearer the wall (CE consequences and lack of remaining space between the wall and the back of the bunker), slightly increasing the size of the Faraday cages (smaller passage left between them) or simply reducing the door size to 80 cm. For now, the last option seems the

simplest with still no problem for access to the cages and minimum change to Faraday cage specs or UX45 CE work.

11. RUX45/UX45 Integration (Olivier/Ed)

🚧 **Cryo WRL, He safety outlets:** Have been followed up at a useful meeting with the integration team last week, together with L. Serio AT-CR. For the WRL space has already been reserved for heaters inside the tunnel. Connection can be made to the existing line in the tunnel. There is therefore no need for additional holes in the tunnel wall. Similarly for the safety outlets the required dimensions are such that the remaining space between the waveguides and the wall can be used.

12. MPWG external review:

In his [presentation on the ADT system](#) on 11th April, Wolfgang presented an overview of the system, implementation, controls and interlocks then brought up abort gap cleaning, worst case faults and protection. Results from the review are that a protection on 2σ orbit excursion will cover damper mis-phasing or similar errors. In general, there will be no kicker for aperture studies, energy tracking is critical, software validation and check-out procedures are of prime importance.

13. EVM and Budget Estimates

Trevor will present our budget estimates for the coming period, till end 2005. EVM is up to date for all systems.

Next Meeting: Friday 29th April at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 20th April 2005.