

LHC RF Meeting

5th March 2004

Present: Luca Arnaudon, Andy Butterworth, Philippe Baudrenghien, Olivier Brunner, Edmond Ciapala, Wolfgang Hofle, Trevor Linnecar, Roberto Losito, Joachim Tuckmantel.

Agenda:

- 1) ACS news - SM18 & Cavities
- 2) ACS News - Power
- 3) ADT news
- 4) Dust traps
- 5) ISR clean-out
- 6) Recent discussions on Vacuum, Cooling and ventilation, Layout & equipment naming.
- 7) AoB

1) ACS News (Roberto)

- **Module 3 tests** were completed by the end of week 9. All couplers have seen full power and the cavities have reached fields well above nominal. Zones of increased vacuum activity are repeatedly encountered when increasing the field; however these are always completely suppressed by the polarization. The couplers were tested OK for leak-tightness.
- **RF cabling:** Exact calibration of the fields was difficult due to cable problems. All RF cables in the area of the conditioning and measuring racks should be checked and connectors renewed where necessary. **(Action: Ed, Pierre Maesen)**
- **Planning:** Optimum planning of cavity conditioning and tuning and Low Level RF system tests was discussed. The [current SM18 planning](#) shows fast cool-down and cycling of Module 2, till mid April, then work on Module 1 till early September. LLRF tests are shown for the last 3 weeks of June. A three week slot is also planned at the end of October, during the second part of Module 2 work.
- **Power Couplers:** Two for the next module have been assembled, the bakeout of one is delayed for one week.
- **Soleil:** The agreement has been signed but we can expect some delay before resources can be allocated, due to re-definition of some of the details of the contract.

2) ACS Power (Olivier)

- **Klystron 8** has been tested, some tuning of one cavity was applied to get the correct frequency characteristic.
- **Circulators and Loads:** A batch of two circulators and loads has been received. The problem with detaching of the ferrites in the first section of the load has been solved. Special lower loss ferrite which has excessive absorption of the adhesive is replaced by the same ferrite as used in the other sections. The increased heating of the first section is still within acceptable limits.

3) ADT (Wolfgang)

- **Main feedthroughs:** Five examples have been received. Two will be sent back to the manufacturer. There is sparking with RF voltage above 4 kV. For DC up to 30 kV is OK. With RF a corona develops at a step on an outer edge of the ceramic. The shape will have to be modified. Vacuum is OK; tests are continuing.
- **Anode supplies:** The letter of intent was finally sent to the company on 24th Feb. The contract, F536, is still with the legal service.
- **Resistors:** A specification for resistors (150 kCHF) has been put into EDMS by Reinier Louwerse. A price inquiry is to be launched as soon as Reinier has time to prepare it.

- **Dubna:** Progress is slow. The Lesnoy plant will be visited at the end of February.
- **Drive amplifiers:** Measurements are going ahead at TCB. Frequency characteristics are essentially OK at powers up to 100 W. A 1 dB dip (in 42 dB) of the gain characteristic at 15 MHz. is judged acceptable. However a problem of excessive output noise has to be looked at. Tests at 200 W will now be done. One week of the two week burn-in period has passed. Acceptance and delivery of a prototype is scheduled for 9th March.
- **PLL tune measurements:** A meeting has taken place with BDI, on injecting the required excitation signals via the dampers and doing some joint prototype hardware development for SPS tests this year. Other synergy for longitudinal 1-T FB and damper Low-Level needs follow-up and decisions on responsibilities.
- **Filament voltage stabilization:** "Constant voltage transformers" can be used. These are heavy and bulky devices but very reliable, with a total cost of about 30 kCHF.

4) Dust Traps (Joachim)

- The motivation and proposal were presented to the LTC on 3 March 2004. A decision rests with Departmental Management. Only two instead of four originally planned would be needed, as it is expected that dust particles would travel with the beam. The resulting positioning means that they could not be mounted on the damper supports.

5) ISR clean-out

- **Dismantling of a LEP module:** This will be done by G. Pechaud and C. Nicou. TIS will then make the necessary radiation measurements.
- **General dismantling of LEP Modules:** Vacuum valves and equipment will be removed from all the modules. 16 couplers will be kept in ISR, being INB classified.

6) Recent discussions

- **Vacuum:** Some important points of the [meeting held 23rd February](#) :
 - A schematic layout is re-promised by M. Jimenez.
 - Positioning of electron stoppers awaits results on risk of D3 quench.
 - Positions of gauges and pumps previously given have been incorrect.
 - There is a proposal to use ACN space on one side of RUX45 for an electron cloud test apparatus. This would be subject to:
 - a) There being no adverse vacuum effects and
 - b) It not impeding the installation of ACN (crash program) when decided.
- **Cooling and ventilation:** The meeting held on 1st March concluded that an integrated cooling system should be looked at as the preferred option for the UX45 Faraday cages. However, if this requires flow of chilled water near the racks it would be unacceptable. The exact number of available ex-LEP ventilation units should be verified, to re-explore this option. **(Action: Volker with J-C Perrier)**
- **Layout & equipment naming:** A meeting was held with the main responsible S. Chemli. While the naming of the ACS system was clear, some details concerning the ADT system had to be clarified, still needing further input from the installation database administrators. The APW naming was also agreed. The names will now be included in a layout diagram.

(Action Volker with S. Girod)

! It was agreed that J-C Perrier must always be invited to such discussions.

7) AoB:

- **LLRF:** (Philippe) The ACS Tuner Front End Module has just been delivered. Initial tests look promising. The RF part has been partially tested and looks good, while the FPGA has been successfully booted.
- **Radiation:** (Andy) The final [simulations for UX45](#) show that the gain with the new layout is a factor 10 rather than 40 as originally estimated. The factor 10 is made up of a factor 4 due to the shielding wall and a factor 2-3 due to the racks being at ground rather

than beam level. However, the possibility of putting extra blocks in front of the LLRF racks gives a further factor 10 which would not have been possible with the old layout.

- **LHC Commissioning:** Olivier has to collect information on requirements and planning for the commissioning of the RF and damper systems in 2007. This is needed for Thursday 11th March. **(Action: All)**
- **MTF:** (Measurement and Test Folder)
 - The system will be studied with a view to its use for the production series damper driver amplifiers and possibly equipment produced in the Russian collaboration. **(Action: Wolfgang with Frode Weierud)**
 - For the ACS SC modules data is stored in the “follower”, a notebook always kept with the module.
 - Note that MTF and its use for LHC installation was the subject of a [presentation](#) by E. Manola at the AT LHC installation day on 11th November 2003. The installation day was summarized in LHC RF meeting of [12th Nov. 2003](#)

Next Meeting:

Friday 12th March 2004 at 08:45 in J. B. Adams Room (864-2-B14)

E. Ciapala, 8th March 2004.