

LHC RF Meeting

1st July 2005

Present: Luca Arnaudon, Philippe Baudrenghien, Thomas Bohl, Andy Butterworth, Olivier Brunner, Edmond Ciapala, Trevor Linnekar, Pierre Maesen, Elena Shaposhnikova, Frode Weierud.

1. ACS Couplers

✚ Assembly of couplers MC124 and 125 has begun and couplers 122 and 123 will be mounted on the test cavity next week, on schedule for conditioning in SA2.

2. ACS Modules and SM18 (Pierre)

✚ **Module 2 conditioning:** Cavity D is progressing well and is nearly at 8 MV/m. The conditioning is done alternately with LLRF tests (See below)

✚ **Spring compensation:** The [frequency / tuner position characteristic](#) was measured for cavity B of module 5, now fitted with the prototype set of four springs. The lower frequency has been successfully reduced by 75 kHz and the tuner moves correctly through its working range. This is a very good result. The slope of the curve has changed slightly, this may be due to the torsion bars. An important difference, making comparison with previous measurements difficult, is that the cavities are now under vacuum. We estimate the extra loading on the tuner motor and torsion bars to be around 11 to 12 % (i.e. 22.5 kN/mm compared to 20 kN/mm without compensation). A modified set of 8 springs will be made and fitted to two cavities on module 5 for tests with cryo. The springs themselves will also be tested and measured at lower temperatures.

✚ **SM18 Planning:** The planning will be re-studied, with the aims giving some extra time for LLRF tests and also to do a cool-down test on module 5. Module 4 would in the meantime be completed and fitted with the next four couplers, allowing it (rather than module 5) to be tested and conditioned by the end of the year. (Module 4 is however the module needing the most work for its completion)

✚ **HOM Measurements:** We should do the necessary measurements to ensure that all the HOMs have the expected characteristics and there are no possibilities for trapped modes inside the cavities. Details of the tests needed are to be elaborated with Elena and Joachim.

(Action: Ed, Pierre, Joachim, Elena)

3. LLRF Tests in SM18 (Philippe)

✚ **Tuning:** Tests on the tuner RF front and the Tuner control module have just started; the results are already very positive. Phase and amplitude signals measured and recovered from internal ram show exactly the expected klystron ripple harmonics and the noise due to the system itself is within 2 LSB. ($<1/10^\circ$ in phase). The slow phase drift due to variation in helium pressure is also seen. Setting of the phase offset (or rotation) was verified and a complete check of all signal channels done. Completion of tests, including the closing of the tuning loop will be done as soon as the final DSP software is completed and the modified tuning drive chassis is put in place.

✚ **RF feedback:** This module, with analog demodulator and using a specially fitted prototype modulator, is also ready for tests next week.

4. B867 and ADT

✚ **Amplifier:** Tests have been slightly delayed due to a misunderstanding on the cabling of the control and interlocks connectors on the amplifier. The Russian team now has the correct list and they are modifying the connections.

✚ **Interlocks:** The overall architecture will be finalized as soon as possible after Eric's return.

(Action: Luca, Eric)

5. APW

✚ **Coating:** Impedance and power dissipation estimates are being studied with AB-ABP.

✚ **Ferrites:** There are some difficulties at present with the machining of the ferrites.

6. UX45 Installation (Olivier)

✚ **Progress of CE work:** There has been important progress, however the quality of some CE work is extremely bad, with a number of serious problems to be resolved:

- **Bunker roof:** Badly made with use of poor material; it does not properly support the weight of persons walking on top and is probably too weak to support the ventilation units for the Faraday cages. The roof will also need to be given extra sealing to make the bunker airtight. Solutions are to put additional concrete on the roof or to add a top floor supported by metal beams. To be discussed with CE (D. Parchet TS-IC) today.
- **Platform:** The construction is not rigid enough and it will need to be reinforced and have additional wall fixing.
- **Support of ventilation units on platform:** There is serious doubt as to whether the second floor level is strong enough to support the air conditioning units.
- **Platform floor grills:** The grill spacing is too big (3 cm) and does not conform to CERN regulations.
- **Faraday cage passerelle:** The construction is not rigid enough; this will also need to be reinforced.

We have checked that all the above items were correctly specified on our side. Bringing all installations up to spec. is the responsibility of TS-CE and the contractors.

✚ **Cable trays:** These are now fully defined and solutions have been found for supporting them in the areas of the cavern walls, avoiding interference with existing walkways. Supports are being installed for the cable trays which pass between the ACS and ADT racks. Completing cable tray installation is a priority, in order to be ready for the first stage of the cable pulling campaign.

✚ **Cable lists (Luca):** Lists for ACS have been given to ST-EL, there will be some modifications and equipment responsables are asked not to make any changes in the lists for now. Naming of patch panels has been discussed with the database team, we have had to alter the names of a number of them to make them compatible with the standard formats.

✚ **Faraday cages:** An Autocad drawing of the Faraday cage and its surrounding infrastructure is needed for the installation of the cage. This will be obtained from the integration Euclid files by Y. Muttoni. (busy at the moment). Enlarging the passerelle to provide better access to cables can be done after the rest of the installation is complete. Exact positioning of the air ducts can also be defined afterwards.

7. SR4 (Olivier)

✚ The Visite d'Inspection Commune (VIC) for the reinforcing the floor in SR4 for the ADT supplies has taken place and the work will start next week.

8. AoB

✚ **Radiation for BDI equipment (Ed for Joachim):** A meeting took place ([see minutes](#)) with BDI on radiation issues for the synchrotron radiation telescope and other BDI equipment around IR4. A shielding wall is planned between the cavities and D3, to be installed after the end of installation. Radiation studies will be done. (For cavity radiation these should probably be based on SM18 measurements on the modules). Clearly, the final arrangement of any shielding, which must in any case be movable for transport through the area, will be determined by measured radiation doses during early LHC running.

Next Meeting: Friday 8th July at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 4th July 2005.

Outstanding Actions (Reminders)

1. **UX45 Earthing:** We have not yet managed to contact J. Pedersen on the layout for connection of the earthing lines to the main earthing systems (*Action Ed, Olivier with ST-EL*)