LHC RF Meeting

5th July 2007

Participants: Maria-Elena Angoletta, Luca Arnaudon, Edmond Ciapala, Trevor Linnecar, John Molendijk, Joachim Tückmantel, Frode Weierud.

1. P4 RF Installation/Commissioning

- **General P4 planning:** The latest general planning can be found in EDMS under **LHC-PM-MS-0005, document 102509.** Cool-down of sector 4-5 will start this week.

There will normally be no access into the tunnel; any urgent access needed must be coordinated with the Cryo control room at P4.

- **Vacuum and bake-out:** We have had the confirmation (Eric from AT-VA) that all the ADT kickers and APWs in sectors RB44, RB46 and the 2 BI AWPL pick-ups have been successfully leak tested after bakeout. **However** there is a suspected leak in the region of the short interconnection (Sector IP4). This will need to be checked when 80 K is reached and access is possible.

- **Cryo status:**

  - **QRL eXtensions – insulation vacuum:** The connections from the extensions to the main QRL insulating vacuum have not been completed. Temporary pumps have been put in place on the platforms of two ACS modules. These create vibrations and must be moved onto the ground. To be taken up with AT-ACR and AT-VA. **(Action:** Pierre, Ed**.)**

    These pumps will probably stay in place well into the foreseeable future as full warm-ups will be needed to weld the connecting pipes onto the QRLs.

  - **Test of cryo valves:** The remote control of the cryo valves has been tested by AT-ACR. They have been re-blocked. (C and D lines closed, WRLs open) Note that the valves (CV910) that needed to be changed were on the 1.8 K cryo lines. The valves for the ACS modules have not been changed.

  - **Instrumentation:** Some progress has been made. The capillary pressure measurements are available in the P4 cryo control room. We will also remotely monitor the two RF readouts per module during cool-down. For the moment all pressures are at atmospheric. Connection of the interlock on the insulation vacuum pressure is being agreed with AT-ACR. **We will need to make full checks at 80 K and at 20 K, before starting to fill the modules.**

- **Waveguide manipulations:** Waveguides nearest the modules have been removed in order to do the low power measurement using waveguide transitions, mounted on the passage side of the couplers. Since the planning does not now include warm-up before power tests we will need to mount the waveguides with the QRL cold. We have checked with AT-ACS that working near the QRL when cold does not carry any particular safety risks. Loss of vacuum (due to an accident) would cause pressure release in the refrigerators (but would incur serious delays in the cool-down!). The weakest part of the QRL is at the bellows and valve connections, none of which are close to the waveguides.

- **Cabling work:** The HOM cables are all now in place on the platform. They will be tested

2. Klystrons: Four klystrons in UX45 have had the boilers removed and returned to Thales. A batch of four new of the newly designed version is expected soon.

3. ADT and APW (Communicated by Eric)

- **RUX45** Eight amplifiers have been tested in-situ.

- **B867 Test Stand/Assembly Area:** Good progress has been made recently. 16 amplifiers have been tested. Tests were done at 12kV/7A, with 0dBM input source to the drivers. Some differences in response were seen, due to known differences in the tetrodes. The differences are however within acceptable limits. The Dubna team has now finished the assembly of all the 20 amplifiers; we are just waiting for HV resistors to finish 4 remaining amplifiers.

4. Controls Equipment in UX45

- **ACS Racks:** Now that all equipment has been installed and tested a complete tidying up of the cabling is under way.
- **Coupler controls:** Tests of coupler operation revealed an inversion for one cavity. **Note** that the convention for definition of the coupler position is in mm penetration of the antenna into the cavity. 0 mm is fully OUT, minimum coupling (i.e. highest field for given klystron power) and 60 mm is fully IN with maximum coupling (lowest field for given power).

5. LLRF in Faraday cages

- **VME Crates:** These have been brought into operation; the first tests are with the tuning control modules which are being installed in all crates. A problem with booting of the crates was traced to conflict of address with the CTRV GM timing modules in the crate, which use a fixed address. A solution will be found with AB-CO.
- **Short patch cables:** We urgently need to obtain the SMA and SMC patch cables for RF interconnection and clock distribution.

6. SM18:

- **Cryo Plant:** The cryo plant in SM18 will be warmed up, to remove water and impurities, with the aim of getting better efficiency. At present its performance is not even sufficient to handle the priority magnet tests. We will look at the situation after the warm-up, but following present progress the tests of the level gauges in SM18 may drop from the planning. We need to complete module 4 (Europe) and do tests on a complete cavity controller as soon as we have all the RF modules.

Next Meeting: Thursday 19th July at 08:45 in the JBA room.

(The presentation on the results obtained during the tests on the Klystron Polar Loops in SM18 has been postponed till September).

E. Ciapala, 16th July 2007.