# LHC RF Meeting 3rd June 2009

**Participants:** Urs Wehrle, Wolfgang Weingarten, Vittorio Rossi, Pierre Maesen, Luca Arnaudon, Joachim Tuckmantel, Andy Butterworth, Edmond Ciapala, Oliver Brunner, Trevor Linnecar, Elena Shaposhnikova, Thomas Bohl, Wolfgang Hofle, Frode Weierud, Frederic Dubouchet, John Molendijk, Maria Elena Angoletta, Philippe Baudrenghien

## 1. LHC status and planning

- All 16 klystrons have been run at nominal power. This had to be stopped due to a transformer problem in the electrical distribution. There are two 400kV transformers, one is off until the end of July for repairs. We can run only half of the klystrons in parallel due to the reduced load capacity. Conditioning will have to be started one cavity after another to limit the total power. We can reduce the cathode current; this requires adjustment to avoid problems with drive level saturation in the switch and limit.
- Tests were performed with Delphine's control application and the LSA sequencer in a dry run from the CCC for switching mode (ON, OFF etc.) of individual lines and groups of cavities.
- The cooldown in sector 4-5 starts in 2 weeks but we will only be able to close the RF zone in mid-July. So conditioning cannot start before mid-July. The planning is on the RF Operation web site.
- ↓ Sector 4-5 may be warmed up after the splice tests. This will be decided soon.

# **2.** ADT

- 4 All modules are consigned for low level measurements and cable checks tomorrow. All HOM loads have been installed (FSU).
- Power tests are foreseen for next week if Wolfgang's team have finished their measurements, and if compatible with ACS main coupler activity (to confirm with Olivier).

#### 3. SM18

- Module LHC5 has been emptied and warmed up. There may be helium for the vertical cryostat next week, but not before July for the module.
- The module has been conditioned to 2.2MV per cavity. There is a list of actions (temperature probes etc.) to be performed. The module will be opened for tuner modification.
- 4 The module will not be used for future LLRF tests; instead the single cavity will be put back.
- Some deconditioning was noticed when doing LLRF tests, including a few MC vacuum trips (without DC bias), which are not good for conditioning.
- Philippe said that we will need to condition more thoroughly in UX45 this year since we will have appreciable beam intensity and not only the 400MHz carrier. Pierre replied that although in SM18 only the carrier with slow sweep was used for conditioning, all cavities in UX45 were conditioned with the second frequency (fast sweep) at -20dB.

## 4. LLRF

- I-Turn feedback: tests have been successful with a simulated beam signal. The 1-T feedback now needs to be included in the MATLAB applications. It will be installed in all cavities for the startup. Vittorio will make a presentation in the next LHC-RF meeting.
- A large discrepancy (10 20%) has been seen in the Q of cavity D, measured with a network analyser, compared with the previous measurements. Cavity B was approximately correct. This should be re-measured in SM18, and perhaps systematically in UX45, at least at Q values of 20000 and 60000. This can be done with the klystron. Philippe also said there was a large spread in coupler position for the same Q. Olivier said that in all cavities the position varies between 19 and 22mm for Q=20000. The voltage calibration with beam done last September was accurate to about 10%.

## 5. Access to UX45 during powering tests

The best option is considered to be the reinforcement of the green ventilation doors in the tunnel to withstand the pressure increase in the event of a helium release. If this is done we can have access to UX45 ground floor during magnet powering. Otherwise any powering tests in all sectors between 2-3 and 7-8 will block access to UX45.

## 6. Operation dry runs

- It was foreseen by OP to perform two dry runs: week 26 for ADT and week 27 for the Beam Control. The aim of these dry runs is to drive the systems through the LHC cycle using the LHC sequencer and (more or less) final software applications.
- After discussion it has been decided to push back the ADT tests until August to allow us to concentrate on getting the Beam Control ready.

#### 7. Controls and software

- Reorganisation and software updates will be performed on the Beam Control system next week to be operational for the week 27 dry run.
- These interventions on the Beam Control system will perturb the experiments due to interruptions in the reference clocks. To avoid this we will disconnect the Beam Control from the clock distribution and replace with a synthesizer.
- FESA migration to 2.10: The migration of the cavity controller software is done; we now need to fix a date to deploy and test it in SM18, before installing it in UX45. The Beam Control is in progress, at the same time as the other modifications (Fred). We will need a testing period, including checks of the LabVIEW applications.
- The supply situation for VME CPUs is critical: no more PowerPC CPUs are available, and the new Intel CPUs are still not deployed as an operational platform. CO hope to recover about 10 CPUs from the timing crates in BA3 by migrating these urgently to the new system, which should ease the situation. At least 1 more PowerPC CPU is needed for PSB tests.

#### 8. Beam commissioning meeting

This is an open meeting on Tuesdays at 15h30 in the CCC large conference room. The minutes can be found <u>here</u>. Andy will go regularly but everyone is invited.

## **9.** AOB

A number of people from the experiments will visit UX45 tomorrow with Philippe. Note that CERN personnel cannot get access as visitors; they are required to make an access request and take the relevant safety training and habilitation electrique.

A. Butterworth, 4th June 2009