## LHC RF Meeting 10th February 2010

**Participants:** Luca Arnaudon, Andy Butterworth, Edmond Ciapala, , Michael Jaussi, Frederic Dubouchet, John Molendijk, Urs Wehrle, Olivier Brunner, Frode Weierud, Wolfgang Hofle, David Landre, Jose Noirjean, Reinier Louwerse, David Glenat, Eric Montesinos, Daniel Valuch, Pierre Maesen

### 1. ACS

- **He pressure interlock:** The first idea was to use the HW signal for He Level, but this not possible without hardware modifications to the cryo system. Two possibilities remain:
  - 1. Make our own internal interlock on the HOM Allen Bradley temperature measurements,
  - 2. Take one He level gauge out of the cryo system and use it to make interlock. This does not upset cryo regulation (to be confirmed by S. Claudet). This will need modifications in our racks.
- Crowbars: Improvements have been made for noise rejection etc.: adjusted heater voltages and added a missing capacitor. This has been done on 3 out of the 4 modulators. Pablo is installing new filters on the 230V.
- Circulator control: Philippe and David are doing measurements, also in 112. No new hardware will be available before the startup.
- Circulator S22 measurements are being done using Daniel's proposed measuring technique. Use the klystron forward signal, the diameter of the circle depends on the TCU setting. The optimal S22 was found around -25dB, with a circulator adjustment which is not optimal for S11 but acceptable. We may have to find a compromise between the two. At higher power levels, the circle diameter stays the same, so the ratio is acceptable. At low power the ratio is very poor. It was found that on cavity 5B2 the Ic fwd and reverse signals were inverted, and the same on 6B2. All cavities will be checked.
- Klystron collector: Thales simulations show that the water speed is 1m/s instead of the necessary 2. The boiler will be inverted so the water goes down instead of up. But there is a power limitation due to the limited evacuation of bubbles. We will run at 50kV/8A, which gives 200kW RF. Saturation is seen at usual drive level. Tests will be done running for couple of weeks at full power in 112.
- Arc detectors: had to lower interlock level to allow test lamps to fire. Seems they have suffered for radiation, even with new design (iron shielding). Will replace faulty ones. Needs investigation. Relying on RP equipment for radiation measurements. We have ex-LEP electronics and some ion chambers, can re-install the system. Was tested in SM18 but didn't see any signal.
- Conditioning: Started on Friday. Conditioning over the weekend and start of week. All at 2MV apart from 1 or 2 which need more conditioning. There have been 2 major incidents:
  - Replaced 1 klystron with spare as the RF output was overheating. This klystron is now in 112.
  - HV bunker ventilation failed on 1 bunker. CV will buy 1 spare system.
- 18kV interlock on the power converter MCB has been requested by PO and provided by EL. It appears as "VS fault" in the power converter. Delphine now displays it in the RF application. Status of the cell is available from TIM via the FESA passerelle (K. Kostro).

# **2.** ADT

- \rm Noise:
  - Chokes have been installed in UX45 on all Flexwells, and the noise has been suppressed by 13dB for the 8kHz line, and by 20dB for 16kHz line. More investigation is needed if it becomes necessary to reduce these further. EL have been asked for a schematic of the grounding in SR4. With both our UPSs (8kHz) off we still see an undiminished 16kHz which must come from elsewhere.
  - BI input (Sigma/delta DAC): the proposed filters have not yet been developed. This input is switched off for the moment.

- The 8kHz lines on the tune are still seen when ADT is off, so this excitation comes from elsewhere.
- The Flexwell cables between SR4 and UX45 have an impedance of 9mohm and a few tens of uH which is much less than the grounding cable. This means that the surface equipment is effectively grounded by our Flexwells.
- Cables: Damage has been found, with some cables flattened over a substantial length. The replacement cables are perfect. JC Gillaume asks if the other cables are not acceptable. This is probably due to the use of improper tools for the original cabling.
- **Abort gap cleaning:** The cleaning pulse shape needs optimisation: we must characterise all amplifiers and correct to optimise pulse shape, especially the tail.
- **ADT power:** All OK, it has been running since a long time.

# 3. LLRF

Loops setting up: We still need to verify the Q measurements, then we can set up properly. Beam capture will be on 22 Feb according to the LHC schedule.

#### 4. Beam diagnostics

- **Waiting for an OASIS update to address certain points.**
- Fibre optic Rx sent away for repair. Signal routing done via a spare cable to the UX45 platform with a programmable attenuator for the BQM.
- **4** Switching in SR4 has been installed.
- Scopes: The ScopeExplorer software has been installed on the terminal server, so we can now remotely control them. We still need to buy a scope for the Faraday Cage.
- Front-end computer problems have been fixed.

#### 5. Standby service

- The proposal is to organise 3 piquet teams:
  - ADT power (with SPS)
  - LLRF (with SPS)
  - Power/cavities
- One of the last 2 will always be a controls expert.
- Greg and Andy will organise the lists together.
- A specialist telephone list will be provided to the piquet.
- A. Butterworth, 10th February 2010