

# LHC RF Meeting

5th June 2008

**Participants:** Edmond Ciapala, Vittorio Rossi, John Molendijk, Daniel Valuch, Urs Wehrle, Thomas Bohl, Andy Butterworth, Joachim Tuckmantel, Pierre Maesen, Luca Arnaudon, Olivier Brunner, Maria Elena Angoletta, Philippe Baudrenghien

## 1. Point 4 status and planning

- + **Sector 3-4:** Should start cooling cavities in week 25. The following week, low power measurements, then cavity conditioning (should take a few days if all goes well).
- + **Sector 4-5:** No dates yet for cavity cool-down.
- + No dates for first beam, but 4 weeks late, which pushes the earliest date to end August.
- + **Cavity Controllers:** everything is installed. The Tuner Control FPGA and DSP code needs to be updated. Everything needs to be fully installed and ready with all Low Level hardware and software operational in week 25.
- + **Time required for commissioning:** We expect conditioning to take longer for one module in 3-4 where a leak has been repaired. Commissioning of DFBs in the RF zone will mean lots of accesses. Point 4 is not the highest priority for the cryo group, who are short of personnel, so we are still waiting for cooldown.
- + **Access:** Biometric identification is now required for access via the PM and PZ. For the arcs (via the yellow doors at end of UAs), an EDH form is required. If we wish, we can request that the RF zone becomes a restricted area where all interventions will have to be approved by the zone owner. Olivier will investigate this.

## 2. Risk to the cavities from vacuum interventions

- + A potentially dangerous situation was encountered last week: a suspicious bellows was found between the cavities and the wiggler in sector 4-5. The vacuum chamber was opened in order to replace the bellows, leaving only the cavity sector valve between atmosphere and the cavity vacuum. It has been agreed that in future V. Baglin will inform Olivier directly in future if this type of intervention is envisaged. The bakeout equipment has been installed, with bakeout and NEG reactivation scheduled for next week. A. Boucherie will follow up the procedure. There are no APWs in this beam pipe in this sector.

## 3. Low Level RF

- + **Beam Phase module:** Daniel showed a fully operational prototype Beam Phase module. A detailed description can be found in the LLRF workshop poster in the 864 RC corridor. The noise performance has not been measured yet.
- + **Crate Management Module:** A cabled prototype has been received. Thermal, power supply and JTAG tests have been successful, the FPGA boots and the VME is working. Some problems with firmware. One hardware problem has been found: the function receiver optocoupler is incorrectly connected. This has been patched on the prototype but needs a version 2. The function serial data communication has been shown to work correctly, even over the long cable to the Beam Control test setup in office RC27.
- + **VCXO:** Validated, communicates correctly with the LL Loops interface.
- + **LL Loops interface:** A problem with missing  $f_{rev}$  pulses has been solved.
- + **Synchro module:** There is a firmware problem which gives spurious phase measurements from time to time. The same problem has been seen in the SPS rephasing test setup. José is working on it.
- + **ADT-DSPU:** Cards assembled with SMD components, being sent for soldering for mechanical components. Delivery expected tomorrow.
- + **General FPGA clock input problem:** A general problem has been found with many board designs where there is a violation of the i/o standard on an FPGA clock input. Overload of this input could cause latch-up. John has designed a miniature piggyback board which replaces a resistor and performs the level translation. About 75 boards are affected, and will be replaced in stages.

#### 4. Beam Observation

- ✚ The main thing missing is the front-end crates for signal distribution. Two were made by the design office. They were nicely made but with the wrong attenuators put in the wrong place. Urs estimates that using the design office is cheaper than using the FSU. The interface with the Rabbit controller works. 2 crates plus RF cabling are ready to install on the UX45 platform. An estimated 3-5 days are required to install and test them.
- ✚ The slow (250 MHz) National Instruments acquisition boards are not yet installed in SR4.
- ✚ VME peak detectors are missing (José), and may not be available for startup. The 400MHz beam component is available in Daniel's board, and this could be used instead of a peak detector.

#### 5. SPS rephasing

- ✚ This has been shown to work correctly in the lab. The first two 3 stages, frequency setting and coarse rephasing with a frequency bump, work OK. The third stage, locking (fine rephasing) works but is slightly noisy due to the spurious phase measurements seen in the Synchro module.

#### 6. SM18

- ✚ **Module LHC 5:** Welding has finished on the double tube, leak tightness check today.

#### 7. RF radiation safety

- ✚ It is planned to install 2 antennas (industrial detectors), 1 on each side of UX45 with flashing lights. For each line, a flashing light has been installed showing the HV status. Spare cables will be used to route the status from the RF antennas to the PLC. Personal monitors will also be bought to check for waveguide leaks etc.

#### 8. AOB

- ✚ US-LARP come on 17 June. Software help ongoing to interface our equipment with Matlab.
- ✚ Philippe reiterated the need for a Power piquet service.

A. Butterworth, 10th June 2008