LHC RF Meeting 7th February 2008

Participants: Frode Weierud, Daniel Valuch, Wolfgang Hofle, John Molendijk, Thomas Bohl, Philippe Baudrenghien, Edmond Ciapala, Andy Butterworth, Vittorio Rossi, Joachim Tuckmantel, Eric Montesinos, Luca Arnaudon, Olivier Brunner, Maria Elena Angoletta, Pierre Maesen

1. Status of UX45 equipment:

4 Conditioning progress:

- Module 1 Beam 2 shows almost no degassing; a few small quenches were seen but passed through. Module 2 Beam 1 spent 3 days conditioning to reach 250kW 2 MV and was stopped due to X-ray emission: 30 mSv per hour with 8 cavities running. To protect the sector valves we should not push the gradient any further with all the cavities running at the same time. No main coupler vacuum interlocks have been seen with the new vacuum calibration. It seems there is no need to change the gauges for the 10⁻¹¹ versions.
- The helium recovery circuit through the main coupler, which is normally closed during conditioning, was opened yesterday on all 8 cavities in preparation for CW operation. The temperatures of the double tubes were seen to be descending towards the nominal value, and are being recorded during conditioning before switching on the coupler polarization voltage.

Feedback tests:

- Feedback tests started last Friday on Cavity 8 Beam 1. With the RF feedback loop closed, it was found that some gain was lacking due to a design change in the input level of the modulator board. The output level of the RF Feedback module was raised by 6dB to compensate. All RF Feedback modules will need to be modified.
- The open loop phase ripple of 4 degrees pk-pk was reduced to 0.2 degrees with the RF feedback loop closed.
- Noise in the 1kHz bandwidth was observed to be similar to that measured in SM18. Some difference was seen in the broadband (10MHz BW) noise with respect to SM18 measurements. Further investigations are underway: some wideband measurements will be performed with a mixer. Using the DDS the phase noise was seen to be about a factor 2 worse than when using a generator.
- The polar loop will be set up this week before moving on to the other cavities.
- Some cross-talk is seen between cavities. The natural cross-talk through the beam pipe depends on the loaded Q, and can produce a significant voltage in an unloaded cavity. This should be measured before the cavities are warmed up.
- The directivity of the cavity forward power measurement is not perfect: a variation of about 20% in power measurement is seen when moving the tuner across the resonance. R. Wagner has done some work on this Olivier will ask him for more information. A calibration of cavity forward power could also be done: this needs CW at resonance.
- Cryo stability: Stability seems very good. No large pressure variations have been seen, even during powering tests with magnet quenches.
- Software: Conditioning now works reliably with full remote control allowing efficient running from the lab or from home. FESA classes for the Tuner, Modulator, Setpoint and RF Feedback are in the process of being installed.

2. ADT:

- The faulty tetrode voltage cable has been checked, and no visible damage has been found in the tunnel. The damage could be between the shielding walls or on the platform. The faulty cable has been swapped with the HV divider cable.
- ↓ Inter-rack cabling is progressing well (around 160 cables).

3. Infrastructure:

Jean-Claude has 4 days left before he retires. As there will be many small items left over, we should centralize this activity (Christophe?). Jean-Claude's last few days would be usefully spent passing information on where spares are stocked etc.

4. SM18:

Cavity 21 is installed for validation of the coupler repair. The conditioning system needs to be installed. There will probably be no time for Low Level tests as we will only have 3 weeks cold.

5. Budget codes:

The LHC project codes are now finished: the remaining 600kCHF form the cost-to-completion has been transferred to the new exploitation codes.

Next meeting: Friday 15th February at 08:45 in the JB Adams room 864 2 B-14.

A. Butterworth, 13th February 2008