

# LHC RF Meeting

15<sup>th</sup> February 2008

**Participants:** Frode Weierud, Daniel Valuch, Wolfgang Hofle, John Molendijk, Thomas Bohl, Edmond Ciapala, Andy Butterworth, Vittorio Rossi, Joachim Tuckmantel, Eric Montesinos, Luca Arnaudon, Elena Chapochnikova, Pierre Maesen

## 1. Status of UX45 equipment:



### Low-level tests:

- John reported on the Low-Level setting up of Cavities 8 and 7 Beam 1. The full notes can be found in the files Cav8B1\LogBook8B1.doc and Cav7B1\LogBook7B1.doc in the directory



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- The tuner, RF feedback and klystron polar loops were successfully set up on both cavities. The switch/protect limit level will need to be adjusted later on with a power sweep.
- With the RF feedback closed, it was found that around 12dB of gain was missing compared with the hardware previously tested in SM18. To compensate, the Feedback module was modified to increase its output level by 6dB and the Modulator RF gain was adjusted by +6dB. Modifications to all Feedback modules will be necessary.
- Phase noise measurements made with a vector voltmeter show that the 4 deg pk-pk measured in open loop reduces to around 0.2 deg pk-pk with the RF feedback loop closed. Digital acquisition using the Tuner ADC channel confirms this, and with averaging to 10kSPS as used by the tuner loop this reduces to 0.024 deg. With the RF feedback loop closed the phase noise is reduced below 5 kHz but shows a degradation above 5 kHz.
- A firmware modification was made to the klystron polar loop to set the integrator to a fixed setpoint when the loop is open. This is to avoid transients upon loop closure causing the RF feedback loop to be unstable.
- A gain drop of the analogue feedback is seen at the crossover frequency between the analogue and digital feedbacks. So far this is unexplained but not serious.
- The klystron secondary resonance on C7B1 is found to be at 3 MHz off centre frequency instead of the usual 4 MHz, and is thus out of range of the notch filter adjustment. With the variable capacitor set to its maximum value, the filter's centre frequency is just off the peak but the damping is more or less acceptable.
- When launching conditioning, the Tuner Control board is put into conditioning mode (acquisitions synchronized with the 20ms conditioning pulse repetition). It should be automatically put back into the default operational mode when conditioning is stopped (software modification needed).

## 2. UX45 planning:

-  Sector 45 will be warmed up on Tuesday 19th Feb, which gives 1 extra day available for RF commissioning. The zone will be open for 1 day on Friday 22<sup>nd</sup> followed by 2.5 weeks closed. There will be around 2 weeks of access starting in week 12.
-  From this week's experience, John estimates that around 0.5 day per line is needed for LLRF setup.

## 3. ADT Low Level & 1-T feedback:

-  Two Low Level 1-T feedback Boards have been received. Tests show that all modifications for configuring and programming work correctly and we are ready to launch the series. These modifications and the digital inputs variant are being implemented also in the new ADT cards.
-  The Hilbert and notch filter firmware blocks have been developed and are currently being tested.

**Next meeting:** Friday 22<sup>nd</sup> February at 08:45 in the JB Adams room 864 2 B-14.

A. Butterworth, 18th February 2008