LHC RF Meeting
25th February 2005

Present: Luca Arnaudon, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Pierre Maesen, John Molendijk, Elena Shaposhnikova, Joachim Tückmantel, Daniel Valuch, Frode Weierud.

1. ACS Couplers, SA2 and conditioning

- **SA2 Conditioning:** Conditioning of couplers MC118 and 119 will be completed by the end of week 9. They will then be fitted to module 2 together with already completed 116 and 117.
- **Couplers MC120 and 121**: The niobium/ceramic second polarization ring on coupler 121 was replaced, the coupler reassembled and bake-out will be completed next week.

2. ACS Modules and SM18 (Pierre)

- **Module 3:** Low power measurements in the bunker have been completed and the waveguides connected. Conditioning can start on Eric's return next week
- **Soleil:** The tests have been completed successfully, with above nominal field reached in both cavities and above nominal power on the couplers.
- **Cavity Tuning:** The mechanical tuning procedures done to change the cavity frequencies have been looked at closely. On reassembly, after the cavity has been compressed to reduce the frequency (the common situation) additional spacing pieces (0.8 mm) are added between the torsion bar fixation and the cavity flange. This puts tension on the torsion bar and stretches the cavity. On cool down the cavity is prevented from contracting relative to its supporting frame, as would tend to if it were free due to a) the difference in thermal expansion coefficients between copper and steel and b) the lower temperature of the cavity with respect to the frame. Hence we can lower the frequency of the cavity when cold by decreasing the amount of pre-stretch i.e. reducing the amount of this additional spacing. A further gain would be obtained by leaving a space to allow some natural contraction of the cavity with respect to the frame. The same effect would be obtained by tightening without spacers, putting the torsion bar in compression at warm. (Joachim)

  The spec on the lower frequency is: **400.687 MHz +- 10 kHz.** The difference in frequency between warm and cold is 1.7 Mhz +/- 50 kHz.
- **Module 5:** has been opened, without removing superinsulation from adjacent cavities. Cavity B will be measured warm.

3. ADT (Frode)

- **Drive Amplifiers:** A decision still has to be taken on rejecting two amplifiers.
- **Anode Supplies:** The lifting support system proposed is not acceptable; the hooks are on the bottom of the unit. (?)

4. Low Level RF (John)

- **Tuner Control module:** First tests on the second version of the Tuner Control card have been very encouraging. I and Q demodulation has been tested on one RF channel. Varying the phase of the test RF input through 360 ° using a trombone gives the expected circle on the I Q plot. The amount of jitter on the measured samples appears to be very low, around 5 least significant digits (2-3 bits) in the 14 bit word size. There is however a fixed offset in the AD conversion, which shows up as a slight displacement of the centre of the circle from the origin. This is being investigated. Some software will be needed for the further tests. A problem with the new CPU module remains to be solved.
- **RF feedback:** The RF part is being tested by Donat; again it looks promising.

5. Signal Acquisition Systems (Andy)

- For ADT we need 64 channels of acquisition at 100 Msamples/s, storing information in a circular buffer over 1000 turns. We will purchase the modules via a joint IT with AB-BT, who have requirements for two other similar types of module. The purchase of seven Compact PCI crates for these modules is part of a bulk order now being put out by AB-CO.

6. ACS Cryo System (Ed)

A meeting was held with AT-CR on 18th February to follow-up proposals in the presentation by S. Claudet at the 2005 LHC Performance Workshop on the cryo system at Point 4. A brief summary of the meeting is available here.

In summary, the problem of D-line overpressure is taken care of by a TIS approved safety check valve. The main function of the warm recovery line would be to evacuate helium from static losses with the D-Line outlet closed, avoiding use of the safety valves on the modules. There will be an adjustable regulating valve on the outlet.

Issues to be followed up:

1) Is discharge now allowed into tunnel, without passage to cavern, since He quantities are lower?
2) Choice of valves.

Other options, i.e. direct connection to cold box ('Option 2') can not be implemented now, even with 'infinite resources'. Even for the above changes an ECR is needed, once the above details are resolved.

7. AoB

- **Drawings (Ed)** We now have FSU help for drawings, starting next week. A first task will be shielded boxes for Daniel.
- **Pick-ups in RUX45 (Elena)** At the last LTC a point was raised on information still to be supplied by us to AB-BDI on pick-ups. This needs to be clarified with S. Chemli. **(Action Volker/Olivier)**
- **Access system, valves and stoppers etc.:** Ghislain Roy would like to use the electron stoppers to be installed on either side of the ACS system as 'access safety blocks', inserted whenever there is an access in the machine to finally ensure that no circulating beam can remain. The risk to the cavities and problems of frequent operation of these modified sector valves were discussed. i.e. dust, reliability. The present agreed logic for valve and stopper operation indicates operation of valves and stoppers for any access, even when IR4 will not be entered and this seems unnecessary. These points will be brought up with Ghislain.

(Action Ed/Olivier)

- **TCC presentation on RF System and installation:** will probably not be until August.

Next Meeting: Friday 4th March at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 2nd March 2005.