18 December 2003

# LHC EXPERIMENT-ACCELERATOR DATA EXCHANGE WORKING GROUP (LEADE)

## Minutes of the 14th Meeting held on 15 December 2003

Present: Ph. Baudrenghien, I. Efthymiopoulos, N. Ellis, D. Evans, S. Hutchins, Ch. Ilgner, R. Jacobsson, R. Jones, D. Macina, W. Smith, E. Tsesmelis, Th. Wengler

## 1. MATTERS ARISING

Approval of the minutes:
The minutes of the 13th LEADE meeting were approved without modification.

## 2. PRELIMINARY REPORT ON LUMINOMETER CALIBRATION (I. Efthymiopoulos)

Ilias Efthymiopoulos gave a preliminary report on the ongoing studies concerning the calibration of the luminometers. Using special machine runs, the goal is to achieve an accuracy of a few % and it is expected that systematic errors will be the limiting factor. The procedure is based on using information from the machine optics and current, van der Meer scans and a cross-check against the TOTEM measurements. A detailed presentation will be given at the February 2004 meeting.

## 3. UPDATE ON LUMINOSITY MONITORING INSTALLATION AT IR2 (D. Macina)

Daniela Macina presented the status of the luminosity monitoring installation at IP2. She reiterated that integration of the ALICE ZDC with the CdTe option for the luminometer is feasible but that further studies are needed to integrate the ZDC with the Ionization Chamber option. In particular, details on the acceptable beam aperture are required as input. A decision on the choice of luminometer will be taken early in 2004. The machine groups will use the luminometer to bring the proton beams into collision. The ongoing work for IP2 can be equally applied to IP8 in the case of LHCb.

## 4. REPORT ON LONGITUDINAL PROFILE MONITOR (S. Hutchins)

The LHC Longitudinal Profile Monitor (LPM) presented by Steve Hutchins is a non-intercepting diagnostic system which is based on the analysis of synchrotron radiation from a bending magnet. The preferred synchrotron source is that provided by superconducting undulator magnets installed at IR4. The proposed

location of the source is upstream of the D3 separator magnet, inside its cryostat. The system will measure the longitudinal density distribution of the LHC beams with a wide dynamic range of more than $10^5$. The monitor is particularly suited to measure the tails of the bunches, to detect ghost bunches or a debunched fraction of the beam. It can also be used to monitor the dump gap and to ensure that it does not become filled with beam. Data related to the beam core distribution – centre of gravity, edges, length, and shape – will also be measured.

The LPM is being developed by LBL as part of the US contribution to the LHC and its Functional Specification is under EDMS Document Number 328145.

The present work focuses on making the choice of technology and completing a prototype design. The LPM has, however, found to be not suitable for the measurement of the abort gap (AG). Measurement of the AG is considered to be of highest importance and this is reflected in the priorities now set. To increase the reliability/availability and performance of the AG and LPM, separate warm undulators are being considered and an initial design will be available in March 2004. A shortage of manpower was noted to complete these projects. Due to the importance of the measurements, LEADE encourages the parties developing the monitors to ensure that adequate resources are available to complete the projects.

## 5. RF RANGE FOR LHC ION OPERATION (P. Baudrenghien)

Philippe Baudrenghien reported briefly on the RF swing for LHC operation with ions. As the ions are less relativistic, the swing during the ramp is expected to be greater than for protons, i.e. about 550 Hz versus 130 Hz at 40 MHz. However, the experiments are not expected to be affected as they will be locking into the RF only when stable collisions are established and at which point there will be no swing in the RF.

Moreover, the RF group does not guarantee any meaningful RF signals when there is no beam in the machine, i.e. during degaussing, access and shutdown. The experiments are requested to provide a local 40 MHz reference to the TTC input during these periods. Once beam is in the machine, the input could be switched back to that from the RF beam reference from Point 4.

## 6. TTC TIMING ISSUES (R. Jones)

Rhodri Jones reported on changes to the TTC Timing signals from the LHC Machine. He reported that, unlike the case for the LHC experiments, the TTC Transmission Crate in the PCR is no longer used by the LHC Machine as these signals are now fed into the TTCtx module instead. As a consequence, interfacing the TTC signals from the machine to the experiments must now be re-visited as a matter of urgency. More generally, the experiments are asked to provide a single contactperson to follow developments in the TTC and to liaise with the machine.

Action: E. Tsesmelis

Moreover, Rhodri Jones requested that the experiments provide him with details on what signals and messages the experiments are expecting from the Beam Synchronous Timing Receiver Interface (BOBR) of the Beam Observation System.

Action: LHC Experiment Contactpersons

**Provisional Dates for LEADE Meetings in 2004:**

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| 9 February | 19 July |
| 29 March | 6 September |
| 10 May | 18 October |
| 14 June | 13 December |

Ch. Ilgner