

11 July 2006

## Radiation Monitoring (RADMON) Working Group Meeting

### MINUTES OF THE MEETING HELD ON 11 JULY 2006

Present: V. Cindro, E. Dimovasili (Scientific Secretary), G. Faber, C. Fabjan, M. Fuerstner, M. Glaser, R. Hall-Wilton, C. Ilgner, C. Joram, M. Moll, A. Morsch, F. Ravotti, M. Tavlet, E. Tsesmelis (Chairman), W. Witzeling

#### 1. Federico Ravotti, *Status of Active Radiation Monitors*

Irradiation tests were performed in the IRRAD6 facility (PS- T7 area, mixed radiation field with charged hadrons) with a 24 GeV/c proton beam. The tests lasted 3 months and the results can be summarized as follows:

- The CMRP sensors show a low dynamic range in comparison with the BPW34 sensors.
- The REM (thin oxide) show higher dynamic range versus the LAAS (thick oxide).
- Measurements are in agreement with MC GEANT 4 simulations.
- Measurements are in agreement with readings of passive dosimeters.
- Above TID 10 Gy the REM/ LAAS can be used to detect variations in the spectral composition.

Integrated sensor carrier: it has reached its final design (possibility to include maximum 4 pin diodes, 4 RADFETs and a temperature sensor). All requirements of experiments have been considered and implemented (compactness, minimum material etc). Michael Moll also commented that the carrier can be provided to any team which does not have any special needs and is not interested in developing a new system. Very convenient readout.

#### 2. Marc Tavlet (ALICE)

ALICE will need passive and active monitors. They have specified the number and type of dosimeters needed, also for ELMB and control system. The Beam Condition Monitor (BCM) device being developed for LHCb will be duplicated for ALICE but an ALICE responsible will need to integrate the various components inside the ALICE experiment.

### 3. Vladimir Cindro (ATLAS)

- TID measurements: RADFET- thick oxide (LAAS) for low doses  
- thin oxide (REM) for high doses
- NIEL: PIN diodes - CMRP for low fluences ( $< 10^{12}$  n/cm<sup>2</sup>)  
- BPW34F for higher fluences ( $> 10^{12}$  n/cm<sup>2</sup>)  
EPI PIN diodes
- Thermal neutrons: DMILL bipolar transistor (ATMEL)  
(ONLY for the inner detector!)
- Monitors for calorimeter: all sensors delivered

(BCM) - diamond sensors to monitor background)

- Diamond sensors are radiation hard
- Fast signals
- Small leakage current
- Operating voltage: 1kVolt
- Situated at  $\pm 1.8$  m from the IP (corresponding to 12.5 ns, out of phase with machine background)
- Coincidence to be done on FPGA boards in control room

NINO amplifier- discriminator tests: threshold will be set directly on NINO

ELMB and DAC: they are the current sources for the sensors (RADFET & PIN), produced separately.

### 4. Richard Hall-Wilton (CMS)

BCM:

- Completely independent mechanically from rest of CMS detector
- Slow, medium, fast time response
- BCM installed at CDF was able to 'see' the trips of the magnet
- BCM2: will use the BLM electronics

### 5. Christoph Ilgner (LHCb)

A simple BCM system is currently under development in LHCb (and ALICE). A variety of active and passive sensors is being used for monitoring the LHC machine and is available to the experiments upon request. For passive sensors, a write-up on their properties is in preparation, including a proposal for housing.

## 6. Evangelia Dimovasili (TOTEM)

TOTEM will use both passive and active dosimeters.

**Passive:** RPLs and PAD (alanine) for 24 Roman Pots.

Both types of passive will be used to cover the range between mGy- MGy

**Active:** the option provided by Federico Ravotti will be used (24 pin diodes of low sensitivity, 24 pin diodes of high sensitivity, 24 thin oxide RADFET and 24 thick oxide RADFET). The idea is to integrate them on the motherboard. However, this is something still to be decided and then the design study has to be done by the electronics engineer (Walter Snoeys).

## 7. CONCLUSIONS AND ACTION ITEMS

- For the next agenda: the status of passive dosimetry
- Action list:
  - 1) Firm up requirements for CMS/LHCb/TOTEM active monitors.
  - 2) Schedules and milestones of individual radiation monitoring projects - to be provided by the experiments.
  - 3) ATLAS and CMS requirements for MAC-RADMON active monitors being developed by Thijs Wijnands.
  - 4) Integration resources for ALICE BCM.
  - 5) Locations for TOTEM active monitors.

Evangelia Dimovasili  
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