UA9 Collaboration meeting (phone conference), 19 June 2009

Debriefing on the UA9 MD of 18 June 2009

Participants: G. Arduini, C. Bracco, G. Cavoto, Y. Gavrikov, Y. Ivanov, W. Scandale, M. Silari, A. Taratin

Phone connection: E. Laface (CERN), D. Bolognini, S. Hasan, M. Prest (Como), R. Santacesaria (Rome)

14:30 Introduction by W. Scandale and M. Silari
14:45 C. Bracco: summary of SPS operation
15:00 E. Laface: data acquisition
15:15 G. Cavoto: GEM
15:30 S. Hasan: Si-detector
15:45 Y. Ivanov: Cerenkov detector
16:00 M. Silari: installation in SPS
16:15 G. Arduini: beam set-up

A brief account was given of the three aspects involved with the MD:
- SPS operation
- Detector operation
- Installation work

Chiara Bracco gave a brief account of the SPS operation. Below is a summary extracted from the notes written by S. Redaelli on the SPS logbook:

"We only had coasting beam for about 2 h starting at 4 am. In this limited time we could:
- verify all the agreed beam measurements with coasting cycle;
- centre the LHC collimator jaw around the local beam orbit and set it to opening of about 6 sigmas (final values to be confirmed after detailed look at the measured data);
- perform relative alignment of the TAL with respect to the 6 sigma beam envelope defined by the collimator. We found that the TAL got closer to the beam than at collimator at a position of +64.5mm from the OUT switches;
- perform relative alignment of the crystal-1 with respect to the 6 sigma beam envelope defined by the collimator. We found that the crystal got close to the beam than the collimator at a position of 76.6 mm from the OUT switches;
- perform a first angular scan of crystal-1 with crystal into the beam. This scan showed that the position of the crystal is strongly affected by the angle settings, which is obviously not good. This require follow-up.

Clearly the data quoted above are to be considered as preliminary and will have to be confirmed by careful off-line analysis of the measured data.

It is also worth noticing that for all the devices moved we verified the correct functioning of the control applications, of the logging and of the private data acquisitions."

Emanuele Laface summarized the operation and data acquisition of the machine instrumentation (see slides). The SPS BLMs and the wire scanners did not work. Beam lifetime, emittance, tune, orbit, and the position of TAL and crystal after scraping with the collimator were measured. The beam seemed stable. The system to increase emittance could not be tested because of lack of time.

Gianluca Cavoto (see slides) reported that F. Murtas did some checks on the GEM in the morning and slightly increased the thresholds. Some tests with beam were done starting at 6:20 am, after a problem with the Java interface was fixed by A. Masi. The GEM saw some signal, but it still has to be optimized. More work is needed on the thresholds. It would be interesting to take some data during normal operation of SPS.

Said Hasan reported that the Si-detectors worked fine during the run. The only difference with respect to the other runs is a lower occupancy, i.e. less particles. Single events take only one particle. During normal SPS operation (high intensity beam) each single trigger of the detector collects about 10 to 20 particles.

Yuri Ivanov gave an account of the data acquisition of the Cerenkov detectors. In coast regime the counting rates from the detectors in position "out of beam" was about 300/s for the near crystal detector and about 3000/s for the near collimator position. These values are very close to the rate when there was no beam in the ring. The amplitudes of the signals under the chosen HV supplies were tens mV. The discriminator thresholds were set at 10 mV.

A larger counting rate from the collimator quartz may be induced by residual radioactivity in the collimator, and by weak light in the ring near the collimator (one window was found, and closed, near the collimator, there may be other windows anywhere at larger distances).

When the collimator was moved in the beam, the counting rate from the quartz near collimator rapidly increased up to about 50000/s due to pulses with period of about 20 microseconds, amplitude about 1 V and duration of a few tens nanoseconds (it means that many protons on each turn are detected as one pulse from the detector). The large rate fell down during about 10 seconds to the rate of about 5000/s (from pulses of smaller amplitudes).

Signals and counting rate from the quartz near crystal did not change during operation with the collimator.

Other observations, to be correctly interpreted, require more synchronization with manipulations of the UA9 equipment from the SPS control room. This analysis can be performed later when obtaining access to the UA9 experimental database.

An interesting observation was made at 7:02 am of coincidences between large signals in both quartz detectors on each turn.

Marco Silari briefly explained the installation work performed in SPS LSS5 in the morning. The intervention was needed 1) to change the quartz and its support in the tank, which required venting the tank and re-pumping after the installation was terminated, and 2) to install the Medipix detector in the

Roman Pot. The intervention took 3 hours longer than expected because the activation measured in contact with the tank was more than 1 mSv/h, and more that 10 mSv/h on the alumimium support of the quartz, which implied a careful planning of the job. An additional delay was caused by a concomitant glitch on the 400 kV line, which required patrolling the SPS sextant after the intervention was completed. Both the quartz and the Medipix were installed successfully.

Gianluigi Arduini described the setting up of the beam for coast.

19:30 vacuum valve opening after intervention on crystal tank in LSS5 and start of the setting-up of the cycle with beam and coast tests. This was interrupted from 22:50 to 01:15 because of a problem with one of the main power supplies. At 04:00 first coast possible after solving some interlock problems.

Pending problems are:
- acquisition of standard BLMs (from the latest information this could be a problem limited to LSS5)
- wire scanner in coast
- tune acquisition seems to work (to be confirmed)
- orbit acquisition in coast does not work
- 1000-turn acquisition in coast needs to be tested

Timing issues remain for the RF functions (being followed-up).

Interlocks:
- Software Interlock "MKD Early ENABLED" must be disabled
- MKP User permit needs to be forced with expert application

A public repository will be created for storing all UA9 information and results.

Some cyclical losses have been observed. This could be due to an element pulsing even when in coast (to be further investigated). Emanuele is checking whether the losses where exactly periodic.

UA9 MD program for Thursday 18 June 2009

9:00 – 11:00 Access in LSS5 to change and re-adjust the quartz for the crystal experiment (vacuum has to be broken in tank) and install Medipix in Roman Pot

11:00 – 15:00 Close SPS and pump. Start the HW compensation of the cycle to be used for crystal studies + test coasts (parasitic tests of the instrumentation G. Cavoto, F. Murtas, Y. Ivanov, Y. Gavrikov, M. Prest et al.)

15:00 – 24:00 Setting-up of the cycle with beam (E. Metral, G. Arduini, OP)
   To be logged:
   a) Orbit and multi-turn orbit
   b) BWS (profile monitors)
   c) BLMs (SPS and LHC)
   d) BCT and Fast BCT
   e) Tune
 (parasitic tests of the instrumentation, G. Cavoto, F. Murtas, Y. Ivanov, Y. Gavrikov, M. Prest et al.)

24:00 – 03:00 Test of emittance blow-up by means of transverse feedback (E. Laface)
(parasitic tests of the instrumentation, G. Cavoto, F. Murtas, Y. Ivanov, Y. Gavrikov, M. Prest et al.)

03:00 – 07:00 Beam based alignment (C. Bracco, E. Laface, A. Masi, V. Previtali, S. Redaelli, Y. Ivanov, Y Gavrikov, A. Taratin) of:
ORDER OT THE TEST:
LHC Collimator
TAL Collimator
Crystal 2
Scatterer
Cerenkov
Crystal 1
Roman pot (first the inner and then the outer pot)

Detector acquisition in the presence of beam should be tested (M. Prest et al., G. Cavoto, F. Murtas, Y. Gavrikov, Y. Ivanov, A. Masi)