

107th Meeting of the LHC Collimation Study Group, September 12th, 2009

Present: Ralph Assmann (chairman), Giulia Bellodi, Chiara Bracco, Alessandro Dallochio, Bernd Dehning, Barbara Eva Holzer, Christoph Kurfuerst, Luisella Lari, Roberto Losito, Steve Lundgren (SLAC), Tom Markiewicz (SLAC, in visit at CERN), Nicolas Mounet, Stefano Redaelli (scientific secretary), Adriana Rossi, Jeff Smith (SLAC), Vasilis Vlachoudis, Daniel Wollmann.

Comments to the minutes

No comments to the previous minutes.

Agenda of this meeting

- News on collimator project organization (R. Assmann)

- Regular status reports:
 - a) Hardware and tunnel activities (O. Aberle)
 - b) Remote and beam commissioning (S. Redaelli)
 - c) Phase 2 at CERN
 - d) Phase 2 at SLAC (J. Smith)
 - e) FLUKA work (V. Vlachoudis)

- Collimator Analysis Program (CAP) from the CCC (C. Bracco)

List of actions from this meeting

Action	People	Deadline
Automated analysis of collimator machine protection sequence	S. Redaelli	2 weeks
Finalize MCS roles for collimators	Coll+MCS	2 weeks
First results of energy deposition studies at 3.5 TeV	FLUKA	2 weeks
Tracking outputs at 3.5 TeV with single diffractive flag	R. Assmann C. Bracco	2 weeks

(Complete list at <http://lhc-collimation.web.cern.ch/lhc-collimation/action.htm>)

The next meeting will be announced.

Minutes of the meeting

1 Regular status reports

1.1 Activity in the tunnel (R. Losito)

Activity in the tunnel is completed.

1.2 Remote and beam commissioning (S. Redaelli)

S. Redaelli presented highlight results from the remote commissioning, with particular emphasis on the results of global collimator ramp tests performed with all the collimators available in the tunnel. These tests are performed with the final configuration of the software. As a reference case, nominal settings for the 5 TeV energy ramp are considered.

Like it was found last year, the system shows an excellent reproducibility of settings both for the jaw corners and for the gap measurements. The accuracy of measurements is about 50 microns for the jaw corners and up to 200 microns for the gap measurements. Details of the executed profiles and on the excellent timing synchronization performance (about 6 microseconds across the 27 km of the machine) are available in Stefano's slides.

Ramp tests have now been fully integrated into the LHC sequencer and this has allowed us to perform repeatedly tests without interventions from the operational team (like it was required last year).

The system has been operated with RBAC fully deployed and MCS deployed on the top-level controls only for about one month without apparent issues. The MCS deployment into the low-level will be done next week, once Alessandro Masi will be back to CERN. This requires solving an issue with the STI-Piquet role on critical collimator properties.

1.3 Phase II activities at CERN (R. Assmann)

A. Bertarelli and A. Dallochio could not join the meeting and were excused.

R. Assmann reported that we are on track for the installation of the Phase II collimators in the SPS by the end of January.

Answering to a question by S. Redaelli, R. Assmann commented that we probably do not need a ECR because the prototype will replace the existing collimator.

R. Assmann also commented that we have now to follow-up the 2010 MD planning to prepare adequately the beam tests with the Phase II prototype.

1.4 FLUKA work (V. Vlachoudis)

R. Assmann presented some [introductory slides](#) about the operational scenarios of the collimator system and stressed the importance of performing FLUKA simulations for intermediate commissioning scenarios, namely for the operation with reduced beam energy. Direct proton losses in the warm aperture increase for lower energies and it is important to consider this aspect, which is less relevant at 7 TeV. With the tracking studies we cannot estimate the effect of the energy deposited in the warm elements and therefore FLUKA studies are crucial. The outcome of these studies can have an impact on the commissioning scenarios with relaxed settings that are being proposed and therefore the studies should be carried out with high priority.

R. Losito suggested that we should add additional monitoring for the radiation losses. S. Redaelli commented that there are some RAD monitors (used also in last year's sector test). But everybody agreed that additional monitoring would be welcome. But R. Assmann maintains that we need simulations to understand in details the various implications and that we cannot rely only on the measurements that will come only with beam.

V. Vlachoudis commented that the team has received inputs for the perfect case at 3.5 TeV and 5 TeV, without imperfections, and asked if it is more urgent to get the estimates of cleaning performance in the cold region or losses in the warm region. R. Assmann replied that both results are important.

V. Vlachoudis asked if starting without imperfections is a good idea. R. Assmann commented that it is better to have the first simulation results as soon as possible to set the level of the problem. More detailed simulations can come later.

V. Vlachoudis requested to have the single-diffractive flag implemented in `sixtrack`. R. Assmann commented that data were just not saved in previous runs and that the next provided inputs will contain it. Details of the inputs will be sorted out offline.

S. Redaelli asked if one can scale previous data at 450 GeV. V. Vlachoudis replied that data are indeed available but in the past the peak calculation in the warm magnets were not included every time. So, the simulations must be repeated.

1.5 Phase II activities at SLAC (J. Smith)

J. Smith reported on the preparation of the SLAC Phase II collimator prototype that is being prepared for the installation in the SPS for beam tests. A series of approval documents is being prepared for the acceptance of this prototype, which is mandatory for the integration in the SPS layout. R. Assmann commented that the installation will be done in a different slot than CERN Phase II prototype and therefore will need a new ECR. He encouraged everybody from the various teams to look in detail at the design and to comments on it before the prototype arrives at CERN.

The baseline is to deliver the prototype to CERN in August 2010 for beam tests before the end of the year.

The design features integrated BPMs, with bottoms only in the collimated plane. S. Redaelli commented that for the LHC it would also be needed to have bottoms in the other the other plane to make sure that the beam is well centred in the flat part of the round collimator. T. Markiewicz agreed and commented that this aspect is a specific for the SPS design. For the LHC we can have bottoms in both planes.

2 Collimation Analysis Program (CAP) tool from the CCC (C. Bracco)

C. Bracco presented the Collimator Analysis Program (CAP) tool that she has developed to analysis collimator position data in the CCC during hardware and beam commissioning. The program uses the collimator position files prepared by the program by D. Wollmann, presented at the collimation meeting of Set. 21th, 2009. Chiara illustrated the main features of the program and encouraged everybody to test it from the CCC.

R. Losito asked if the program is available publicly. C. Bracco replied that for the moment this is not the case because the data files used as an input are not available outside the CCC technical network. S. Redaelli commented that it should be possible to make these data available on a server. He will follow this up.

R. Assmann commented that he is also working on an analysis tool that will offer a a snapshot of the collimator data during the last week of operation.

Stefano Redaelli, 13-10-2009

The next meeting will be announced.