

10th Meeting of the LHC Beam Cleaning Study Group 10.4.2002

Present: *R. Assmann (chairman), I. Baishev, H. Burkhardt, B. Dehning, E. Gschwendtner, M. Hayes, V. Kain, D. Kaltchev, R. Schmidt,*

1) Impact of restructuring of accelerator sector on our work

R. Assmann mentioned the immediate effect of the restructuring on the Beam Cleaning Study Group. G. Burtin, C. Fischer, and R. Jung from SL/BI have stopped contributing to this group. They had been responsible for the mechanical design and construction of the LHC collimators. This activity will probably be assigned to a newly created group.

L. Bruno from SL/BT has joined tentatively our activity, however without the manpower required to perform a thorough mechanical design. R. Assmann and J.B. Jeanneret will follow-up.

2) Status of ongoing work (all)

Collimator material (R. Assmann): R. Assmann reported that there are two lines of work on the collimator material:

J.B. Jeanneret, I. Baishev, and T. Kurtyka et al are studying the impact of LHC beam on Beryllium collimators. The work is organized as following: 1) Shower simulation in a Be collimator (IB), (2) convolution for specified LHC beam loss during failure of dump kicker (JBJ), and (3) studies of material behavior (TK et al).

L. Bruno has started to consider the energy deposition of 15 ultimate intensity 7-TeV proton bunches swept over 5 beam sigmas from the surface of a graphite collimator. He will report on the preliminary results at a later meeting. He points out "that the SL/BT Target Section has presently no resources to perform anything but such simple "scoping" studies."

Preparation for Sixtrack simulations of snapback (M. Hayes): M. Hayes reported on the progress for generating Sixtrack input files. 56 stable seeds had been achieved with a computation time of 0.5-1.0 hours per seed. The goal is to set up 64 seeds, such that the dynamic aperture can be determined as well. The cases have linear and non-linear errors included with the orbit corrected to 1 mm rms. Coupling correction is performed each octant and also globally. Machines will be generated for the top and the bottom of the snapback.

Beam-based requirements (R. Assmann): R. Assmann reported that the work on beam-based requirements for the LHC collimation system is ongoing. B. Dehning argued for including a safety margin into the requirements, e.g. to use ultimate intensity instead of nominal.

Injection scenarios (H. Burkhardt): H. Burkhardt will continue his studies on injection scenarios and protection in the transfer lines. He will soon repeat his studies with MAD-X. It was suggested to review the possible beam problems when injecting into the LHC, including:

1. beam properties at the end of the SPS cycle
2. extraction errors from the SPS
3. imperfections and irregularities in the transfer line
4. injection errors into the LHC

It would be very useful to estimate the following beam properties at the LHC injection:

1. Variation in transverse beam position and angle (regular pulse to pulse, regular drift, irregular scenarios)
2. Variation in beam emittance (regular pulse to pulse, regular drift, irregular scenarios)
3. Variation in beam intensity (regular pulse to pulse, regular drift, irregular scenarios)

Cleaning efficiency (D. Kaltchev): D. Kaltchev repeated the conclusion of his AP forum. The cleaning efficiency can be significantly deteriorated from off-momentum protons after scattering in the collimator jaw. Work on a comparison between different codes is ongoing with R. Assmann.

Quadrupole failures (V. Kain): V. Kain reported that she is presently concentrating her work on quadrupole failures and subsequent beam loss.

Input data for BLM studies (R. Assmann): R. Assmann reported that work is ongoing between Verena, Edda, and himself to set up a more realistic and detailed model for predictions of the BLM signals.

Diffusion and beam halo (F. Zimmermann): F. Zimmermann reported that work was progressing on the study of diffusion processes in the LHC and on predicting the halo population. A first draft of an EPAC paper has been completed, but some errors must be corrected.

4) Next meeting

Next meeting will take place 10h30 April 24th, 2002. B. 112, 4C17.