

MPP meeting 13 August 2010

Original agenda:

- Analysis of beam dumps triggered by BLMs on cold elements (BLM team)
- External review in September (R. Schmidt/J. Wenninger).

Present:

Stefano Redaelli, Ruediger Schmidt, Nicola Bacchetta (CMS), Richard Hall-Wilton (CMS), Barbara Holzer, Massimiliano Ferro-Luzzi, Jan Uythoven, Eduardo Nebot, Annika Nordt, Mariusz Sapinski, Benjamin Todd, Yngve Levinsen, Helmut Burkhardt, Arjan Verweij, Jorg Wenninger, Mike Koratzinos.

Minutes:

Fast loss events on SC elements (Jorg and Annika)

Jorg made a short introduction of the subject that has captured the imagination of some people recently (and was also discussed during the last MPP meeting): We have had recently some fast losses on superconducting elements from protons that have somehow escaped the collimation systems. There are 4 such events. Main characteristics: fast losses (rise time 1.5-2.5msec); no beam loss on TCTs; in both H and V planes, and both B1 and B2; conditions before dump were good with good lifetimes. Possible ideas as to what can be the cause: a/dust falling from the top of the beam pipe. Timescales and losses have right order of magnitude. b/beam dynamics fast mechanisms (Lyn Evans' remark is if the unbunched beam can have different optics - Stefano thinks it is unlikely).

CMS mentioned that they have seen nothing during these events in their 40usec and 1 sec windows. Question: can CMS see the wire scans?

Annika then revisited the events (already presented in the last meeting) with more detail.

Event 1 dumped by RS04 (all others by RS05). This event has four precursors with similar characteristics but which did not dump the beam. These are seen in the long BLM buffer. TCH losses seem to be a bit delayed compared to MBB and TCP. There is an extra spike on TCH due to the dump itself. There is some pattern in the time distance of the precursors: around 60 and 100msec. Magnitude of loss is several 10^6 protons.

Event 2: On a 4.5K magnet, loss duration 640usec. The TCP has a signal 14 times higher. No precursors

Event 3, 4: RS05 trip. No precursors.

An interesting comparison was made with the only beam dump we have due to a wire scan. The Wire scan beam dump looks similar but slightly more symmetric in rise time and fall time. The precursors of event 1 (the only ones we can see the full evolution) look slightly asymmetric.

Search for similar events has been initiated. In 10 high intensity fills and looking for a signal at the level of 10% of threshold, zero events have been found. These types of events do not seem to be a regular occurrence. Next step: try looking for a lower signal (1-2% of threshold).

SixTrack simulation of an obstacle in the beam (Yngve)

Yngve talked about his Sixtrack simulation. He added a beam gas module to simulate pressure bumps/local obstacles. This analysis has been done at very short notice. He puts a stationary obstacle in the way of the beam. The obstacle is made out of protons (no heavy nuclei). He uses B1, b^* of 2m and a TCT position of 12.8sigma. He looked into events 3 and 4 (since they are both B1 events). He mentioned the shortcomings of the simulation: Sixtrack cannot track well heavily off-momentum particles and can only track protons. The loss patterns observed look very similar to the real data although in event 4 the third bump he predicts downstream is not seen in the real data.

Future work: TCT settings at 15sigma, optics at 3.5 b^* and heavy nuclei obstacles can be simulated. Also, the flying of the wire is a good show case to understand.

Mariutz: we can try a quench test with the wire scanner in the future. Another idea is to use the BGI (beam gas monitor) where we can put some gas to the vacuum chamber.

External review in September (Ruediger)

Ruediger presented the first iteration of the [external review](#) agenda. Dates are 6-8 September. Reviewers are from BNL, GSI, Fermilab, DESY, SNS and CERN. The committee will be chaired by Bacher and Luders. The question that the reviewers will be asked is: can we go to 30MJoule of beam power and under what conditions.