MPP meeting 30 October 2009

Original agenda:

Agenda:
- BLMs (B. Dehning et al)
- LHCb dump trigger on 'TDI event' (R. Jacobsson)
- Injection protection setup (B. Goddard et al)
- SMP status (B. Todd et al)

Present:

Aurelien Marsili, Brennan Goddard, Bernd Dehning, Richard Jacobsson (LHCb), Siegfried Wenig (ATLAS), Massimiliano Ferro-Luzzi, Mario Deile, Annika Nordt, Alick Macpherson, Richard Hall-Wilton, Wolfgang Bartmann, Christoph Kurfuerst, Mariusz Sapinski, Antonio Di Mauro (ALICE), Markus Brugger, Verena Kain, Hitomi Ikeda, Markus Zerlauth, Jorg Wenninger, Mike Koratzinos

Minutes:

Very condenced

Information (Jorg)

We had 4 beam dumps during the injection tests. Plus one without beam.

Other problem: smp goes in failsafe mode claims that no energy was received but the monitoring not in place to find out what goes on.

There will be another sector test in a week's time.

Chris: BLMs

Jorg: will request 2 hours next time.

Six chambers over threshold. PM event generated. Some problems. Latency 133us where cable is 20usec expected about 50usec. But within spec (loose spec) databases and applications basically working.

Captured data: problem understood: every trigger 50MB so not all data goes through. Some 'noisy' data: Bernd: not real noise, a digital issue that disappeared Sunday. [fixed display – shows thresholds] [ic: ionization chamber] 147 times over threshold [s/t signal over threshold]

Thresholds: run out of dynamic range, so threshold a factor of 4 lower than we need

We focus into the cold elements but we need to look into the warm elements as well.

Conclusions: blms removes the beam permit if signals oer threshold. Several data problems (IT) thrsholds to be looked up.

Leave aside 2+2 hours of setup next week.

Jorg: BPM no data propagated.

LHCB dump

Also dump last year. BCM station at 9 o' clock. (inside of the ring) 10E7 particles. Exactly at the same spot as last year. Full chan worked perfectly. Brenan: this was normal procedure, so this will always be a problem. Verena: we knew we were a bit low. Brenan: we can do some tests this w/e.

Another topic; beam loss scintillator. Can see exactly what happens in the machine. Not connected to the dump.can check injection quality

TCDI setting up

5 hours in ti8 centering scans for all tcdis. Worked very well. 1h per collimator. Beam size extracted is what we expected.

Scans take 2-3 hours. Alice muon chamber issues. Pull the injection inhibit. Some misunderstanding. Lessons to be learned. But alice said o.k…

TDI scans: suffer from dynamic range in BLMs

Beam losses during injection done in TI2 in September

Conclusion: learned a lot. Tdis identified best BLMs to use. /tdis/blm issues.

Lbds discussion frequency trims.

Jorg close the meeting.

Jorg first started with showing the meeting his proposal for the sector test BIC configuration, for discussion. This is the last test before testing with beam. He suggested a different approach from last year (where a minimal configuration was used) where as many as possible interlock settings would be set to nominal (the reasoning being that any large inefficiency is better to be known earlier rather than later).

There followed a discussion about planning, procedures and strategy for the period leading to first beams.

Collimator commissioning without beam (Ralph)

Ralph started by describing the collimator interlock system: it comprises three independent kinds of interlocks, the MP interlock (energy dependent), the cleaning interlock (time dependent) and the self-protection interlock (monitoring the jaw temperature). He reminded the meeting that the system is designed as a cleaning system and not a protection system and that it would be wrong to assume that everything beyond 6 sigma (the setting of the TCP) is safe.

All collimators are fully operational and most of the work needed for remote collimator commissioning aims at initial precision to minimize setup time. The deadline of the 2nd week of November has been set for running independent collimator ramp cycles. Ralph presented a detailed plan of tasks that need to be completed till then. There have been found larger than expected offsets in switches (but these are not critical as beam based alignment (BBA) will be used).

A worry mentioned is the recovery time after a power cut: currently it is 2-3 days.

In conclusion there are no major problems with remote commissioning.

DCDQ positioning and losses (Thomas)

Thomas updated his results first presented in this meeting in March 2009 treating the worst case of particles continuing in the LHC after an asynchronous dump. All analysis is using beam 1.

A surprising (at first) result was the losses seen on TCTs (although Ralph was quick to remind the meeting that the collimators at IP7 are for cleaning and not for covering a available phase space). Losses

in the TCTHs were above the damage limit. No losses were seen in IP8 (the question of if the beta* of IP8 was set to 10m or not was asked). Thomas then used a semi-analytical approach to verify the MADX results. In conclusion, the effect is real. The short term solution would be to retract the TCTHs. Ralph reminded the meeting that installing a more robust collimator is not an option. Everybody agreed that this is an important effect and should be studied further.

Tracking at 3.5TeV has not been completed yet.

Collimator setting proposal for 3.5TeV (Adriana)

Adrianna presented the proposal for the collimator settings at 3.5TeV. Overall ring aperture is given by triplet apertures in LSS1 and LSS5, which defines the collimator settings.

A the TCP, at 450GeV, 1mm is 1 sigma, whereas at 3.5TeV, 1mm is 2.8sigma. Primary collimators will be kept at their nominal setting (at 6sigma), whereas all other families will keep the same absolute distance to the primary collimator (in mm). Tables for collimator settings and operational range of the TCTs were given.

Impact of vacuum gate valves (Rob)

Rob presented the impact that an undesired closure of a vacuum valve would have on the LHC beam. Rob reminded the meeting that sector valves exist in all LSSs (and not in the arcs or the DS). They take 3 seconds to close, and some more time to seal. These valves are interlocked, so Rob's study would only be relevant in the unlikely case that this interlock does not work (interlocks have been known to have failed in the SPS). The relevant parameter here is the speed with which the flange of the valve (1.8cm thick) presents itself to the beam, which is 2micros per turn.

Rob in his FLUKA simulators considered the real valve positions, plus a fictitious 'study valve' immediately before Q7, to allow comparison to previously published magnet quench studies. Results of the simulations were that in all cases studied, the BLM system will see a signal and detect a quench on time with some margin, both at 3.5 and 7TeV (the quench level at 7TeV is 5E7 protons and at 3.5TeV 3E9 protons)

The study did not consider the potential damage to the valve itself, nor did it look at the interlocked gate valve either side of the experiments, between the TAS and Q1 but this can be revisited at the experiment's request. Neither did the study consider the case of injecting beam on a closed valve.

Jorg suggested that the BLM team should look at the numbers derived from the simulation, as we do have a margin but it is not an order-of-magnitude margin. Stefano raised the question as to what would be different if for some reason the closing valve is in the shadow of a collimator. Jorg suggested that if a possible case that has not been studied is proposed, we will look at it.