MPP meeting 13 May 2011

Original agenda:

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- Proposed strategy for beam based alignment of TOTEM/ALFA + LVDT resets
during operation (M.Deile)
- Analysis of magnet quenches during grazing event + can we make the SEMs
usable in the future? (A.Nordt)
- Update of UFO studies + efforts to localize UFOs (T.Baer)
- AOB
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Present:

Matteo Solfaroli, Barbara Holzer, Mario Deile, Ruediger Schmidt, Siegfried Wenig (Atlas), Patrick Fassnacht (Atlas), Antonello Di Mauro (Alice), Mario Deile (Totem), Massimiliano Ferro-Luzzi, Verena Kain, Laurette Ponce, Mariusz Sapinski, Wolfgang Bartmann, Anton Lechner, Sigrid Wagner , Stephane Gabourin, Ben Todd, Yngve Levinsen, Bernd Dehning, Arjan Verweij, Tobias Baer, Markus Zerlauth, Mike Koratzinos.

Minutes:

TOTEM/ALFA beam based alignment (M. Deile)

Mario presented the proposal for the alignment programme with beam for Totem and Alfa: there are 32 pots to be aligned for Totem and 8 for Alfa. The method is similar to that of collimators setting up . To prepare this exercise we need to increase monitor factors of nearby BLMs . This is similar to what we did last year. Beam conditions: nominal optics with collisions (will take data) but beam mode = adjust (with override key to be able to put movable devices in – key does not override position limits, only movable devices allowed in). Bunching: 1 bunch of 8-10E10, emittance 3-3.5um, then 9 pilots of 1E6 colliding everywhere. We will do emittance measurements during this exercise.

Simplified sequence shown: start TCPs at 5-5.5sigma. Start first with horizontal TOTEM and ALFA. Iterative process, move TCP then move Totem, then again the TCP, etc. Vertical pots: 1 sigma further than TCP; horizontal: 2 sigma further. [Ruediger: it is not excluded (although very unlikely) that an asynchronous beam dump would have the beam hit the roman pots (horizontal). Simulations of such an event under way.] Then all collimators and pots to nominal settings and loss map. Programme is long

(estimated 12 to 14 hours), procedure exists as an excel sheet. There followed a discussion as to who is in charge in the CCC during this and similar tests. Ideally it should be an EIC who is also from the collimation team.

Revision of RP movement control (M. Deile)

Last year RPs operated successfully, however a few issues were identified. EDMS document prepared.

Issues: (a) systematic stop of motors before reaching the desired position. solved; (b) missing redundancy in the position measurement: LVDTs can drift; use motors encoders also; (c)position limits modifyable by operation sequences: an additional inner dump limit for each pot that would dump the beam has been implemented and tested. (Need to see how we deal with these situations in the future)

More details on the above issues were then presented: The premature stops: due to non-linearity (motor step size is 4.95-> 4.89 instead of 5um). The system works by moving to the out stoppers and counting steps to reach a certain position. Future upgrades: use motor resolvers for axis rotation measurement and a finite state machine for controls.

Quench analysis 18/4/11 00:06:44 (Annika Nord)

Annika showed the status of the quench analysis of the massive loss in A78 at injection (MKI failure) of 18/4/11. 11 magnets quenched, 139 BLMs triggered ,1E12 protons missing, 2 quenchinos. Some BLMs saturated.

Q6L8: expected and actual dose differs by a factor of 3. SEM performance: max loss 12kGy/s (SEM in 01L8) and 38kGy/s (SEM in 06L8). There are noise spikes of 1000Gy/s at a rate of once per hour.

Quench of MBA and MBB in 8L8: estimate is 6-8E9 protons lost, inconsistent with SEM readings. Quench of MBA and MBB in 9L8: 2.5-3E9 protons lost. 12L8: 6-8E9 protons lost. Quench of 13L8: 1E9 lost protons. quenchino seen. Quenchino expected at 2-4E9. Arjan: all quenches seen here are quenchinos as they would have recovered if the QPS threshold was not to be hit). Quench in 16L8 1.5E9 protons lost. In total 7-14E10 protons were recorded to be lost by the BLM system (a factor of 10 lower than the protons missing).

An interesting feature of the losses is that there is a pattern every 4 cells. The reason might be a combination of beta and dispersion. Work on the triplet R8 analysis has started.

Conclusions: some thresholds should be re-visited; One SEM gave reasonable limits, the other SEMs gave a signal but correlation with ICs is not clear. The thresholds seem more or less to be at the right level.

Update on UFOs (T. Baer)

Tobias gave us an update on the UFO tools and analysis: The UFO buster is online using 1Hz data. It has accumulated over 4000 triggers; 230 triggers were manually verified out of which 70% real UFOs 10% ambiguous 20% false.

For the rest of the analysis Tobias only considered flat top UFOs with signal >0.5% of threshold: 53 UFOs remain from the subset of 230, 51 of them are real UFOs. Most UFOs are at 1/1000 threshold of RS5. Spatial distribution of UFOs shows UFOs seen in all sectors, peaking in the middle of the arc. Only exception is that there are nearly no UFOs left of IP4 at 3.5TeV. At 450GeV, UFOs are only seen at MKIs (Only circulating beams considered).

UFO rate: 10 per hour. Remarkably flat over this year's running period. There seems to be no cleaning effect and no correlation with intensity (except if the two effects have opposite contribution up to now)

UFOs at MKIs: 460 of them (104 at IP2, 335 at IP8). We see a loss spike at injection, then a series of UFOs after injection.

Dump events: 1/5/11 very clean UFO at Stable beams. The dump by Alice on 14/4/11 is much less clear. Could be a UFino.

Next steps: trigger acquisition of turn by turn data. UFO buster will be integrated in BLM concentrator. For better localization of MKI UFOs it might be a good idea to install additional BLMs.

Outlook: About 3000 UFOs so far this year, only 2 dumped the beam. The UFO rate goes up quite aggressively with energy. Next step is to improve diagnostics. Key to understanding might be the concentration around MKI (factor of 3 more at pt8). Ruediger: what would the UFO dump rate be with 7TeV thresholds?