MPP meeting 28 August 2009

Agenda:

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- Results of busbar beam loss simulations (J. Sancho)
- Additional BLMs for busbar protection (M. Sapinski)
- BLM system status (B. Dehning)
- AOB (J. Wenninger)

Present:

Jim Strait, Christos Zamantzas, Annika Nordt, M. Sapinski, Jan Uythoven, Bruno Puccio, Benjamin Todd, M. Ferro-Luzzi, D. Macina, R. Appleby, M. Deile, N. Bacchetta, Siegfried Wenig, R. Jacobsson, Bernd Dehning, J. Sancho, M. Brugger, Jorg Wenninger

Minutes:

Results of busbar beam loss simulations (J. Sancho)

J. Sancho presented the results of the busbar beam loss simulations that had already been shown at the LMC of August 5th where the decision was taken to operate the LHC initially at 3.5 TeV. The simulations cover loss scenarios for standard interconnections and for the empty cryostat. Beam 2 impacts were simulated at 3 and 5 TeV in MQ11 and MQ12 in IR7. The loss distributions were assumed to be either point-like at the exit of the quadrupoles to maximize losses in the busbars or distributed over the length of the quadrupoles. Special cases of losses distributed all along the empty cryostat and point like impacts close to the center of the empty cryostat were also simulated. It must be noted that the last case is very unphysical. The losses in the MQs could correspond for example to orbit bumps.

The results show that in all cases except the point loss at the center of the empty cryostat ('unphysical case') the magnets (either MQ or MB) quench long before the busbar. Assuming a quench level of 1 mJ/cm3 for the magnets and 1 mJ/cm length for the busbars, the margin between busbar and magnet is around 3 orders of magnitude. Since at 3 TeV the quench level for the magnets is around 10 mJ/cm3, the margin is reduced to around 2 orders of magnitude. The results will be updated with more accurate numbers concerning the quench levels. J. Wenninger proposed to adopt a set of standard reference values for quench levels for all future simulations.

In the discussions R. Assmann pointed out that he was extremely worried about orbit bumps and that such bumps must absolutely be prevented. While at higher energy bumps take long to develop (~ 10 of

seconds to minutes) and are easy to catch, this is not necessarily the case at injection (see the MPP of May 15th 2009 – J. Wenninger).

M. Sapinski pointed out that the magnet simulation program Roxie is now able to provide values for quench levels.

Special BLMs for busbar protection (M. Sapinski for E.B. Holzer)

At its meeting on August 5th the LMC recommended to install additional BLMs for busbar protection of the empty cryostats. In IR1, 3, 5 and 7 already installed BLMs at the exit of the MBs are almost in an ideal situation to protect the empty cryostat. No additional BLM is foreseen there. For the other IRs one additional BLM will be installed at the center of the empty cryostat.

B. Dehning remarked that he wanted to have a description of the use of the new BLMs and of their criticality.

B. Dehning also said that HERA had ~ 1000 quenches during its lifetime despite the fact that the thresholds were set to around 10% of the supposed quench level. This is partly due to the fact that losses faster than 5 ms could be prevented by the BLMs due to their 5 ms sampling time.

BLM Status (B. Dehning)

B. Dehning presented the status of the BLM system. Hardware checks and software advance now well, and the system should be ready for a reliability run in October.

The logging of the BLM data is now running at the nominal frequency of 1 Hz, but only 9 out of 12 sums (up to 1.3 second running sum) are logged.

AOB (J. Wenninger)

J. Wenninger presented the WEB page setup by A. Macpherson to document the MPS tests. The page is ready to receive data from the commissioning. Most of the test steps that have been specified in the MPS procedures have been prepared.

The implementation of the RF frequency interlock is progressing; the system should be in place in a few weeks. The interlock will be based on the energy distributed by the timing system.

Mixing of the revolution frequencies sent by the RF to the LBDS system is a severe failure that will lead to an asynchronous beam dump as soon as the RF frequencies of the two beams are not identical. In discussions with various people a possible scheme has come up that could allow a test before every injection: the RF frequency distribution must be perturbed or interrupted in order to trigger a failure on the LBDS TSU (Trigger Synchronization Unit). The feasibility will be evaluated in the near future.

Concerning extraction from the SPS a Beam Quality Monitor (BQM) build by the RF system is nearing operational state. The RF group has been encouraged to connect this system to the SPS BIS. The forthcoming TI2/TI8 test would be a god opportunity for a serious test of this system.