55th BLM Threshold WG Meeting

Tuesday, 18 July 2017, 14:00 Europe/Zurich

774-2-058 (CERN)

Present at the Meeting: Anton Lechner, Christos Zamantzas, Daniel Wollmann, Alessio Mereghetti, Barbara Holzer, Sandrine Le Naour, Tatiana Medvedeva

Agenda:

- *Anton Lechner*: Quench margin for 16L2 loss events

Quench margin for 16L2 loss events:

Anton started with a review of the history of dumps preceded by losses in 16L2. Two of them happened during injection and 11 at 6.5 TeV. He then showed the spartial BLM patterns for dumps in bema 1 and beam to around the cell 16L2 with the comparison of measured BLM signals and FLUKA simulations, both normalized to the maximum BLM signal. The simultion assumes a point-like losses in QQBI.16L2 interconnect, which gives a good match with a measured BLM loss pattern. It is an indication tha the loss location is within few meters of this interconnect.

Christos: What is the maximum BLM signal?

Anton: The maximum BLM signal is the signal of the BLM with the highest signal. It is always time-integrated over the whole loss event for all BLMs, which gives a dose valus, than they are devided by the maximum dose value.

Barbara: How many loss events do you plot on top of each other?

Anton: 6 and 4.

There has also been simulations for energy depositions in the coils with the same assumption of the loss in the interconnect, at the center of the apperture. They predict the maximum energy density in MB coils due to MB curvature.

Alessio: Which material did you assume?

Anton: There is not much difference. I tried carbon, copper and gold (the later because of the coatting of the RF thingers in the interconnect).

The MB quench level depending on the loss duration are described by the calculations in the scope of electro-tharmal model (QP3) with an empirical correction from Run1 quench tests. The later UFO events (quenches) in 2016 nicely agreed with this result. The estimated energy deposit in MB coils in some of the reconstructed loss events in 16L2 are only factor 2-3 below the best extimate of quench level.

The BLM thresholds for MBs were set at the quench level in 2015. At the beginning of 2016 due to too many unnecessary UFO dumps which are hard to disentangle from the potential quenches, the thresholds at MBs were increased by a factor three for short RS (1-5). In time range relevant to 16L2 loss events (few msec to 200 msec) the thresholds are still a factor 1.3-3 above the quench level. This means that in case of the event with even higher losses there is a risk of dipole quench in cells 16L2/17L2.

There are two possible courses of action in this case. First option is to keep the present thresholds unchanged untill the first (or first few) dipole quenches. This would allow to study the quench levels in the 10-100 msec range and adjust the thresholds more precisely. At the same time, the loss events will not be truncated and would remain useful for the loss investigation. The disadvantage of this approache is in the time lost in recovering form the quenches. The second options is a quench preventing stratedgy (removing a UFO AdHoc correction and reducing the MF from 0.333 to 0.15). The advantages are in (likely) avoiding the quench and at the same time it would not introduce unnecessary dumps (since the collimators at IR7 would trigger the dump anyways). The disadvantages are that the quench levels in the time range 10-100 msec would not be rectified. Besides some of the loss events will be truncated and become less informative for the loss investigation studies.

Minutes by Tatiana