Revision of Direct Dump BLM thresholds

E. Nebot for the BLM team

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MOTIVATION

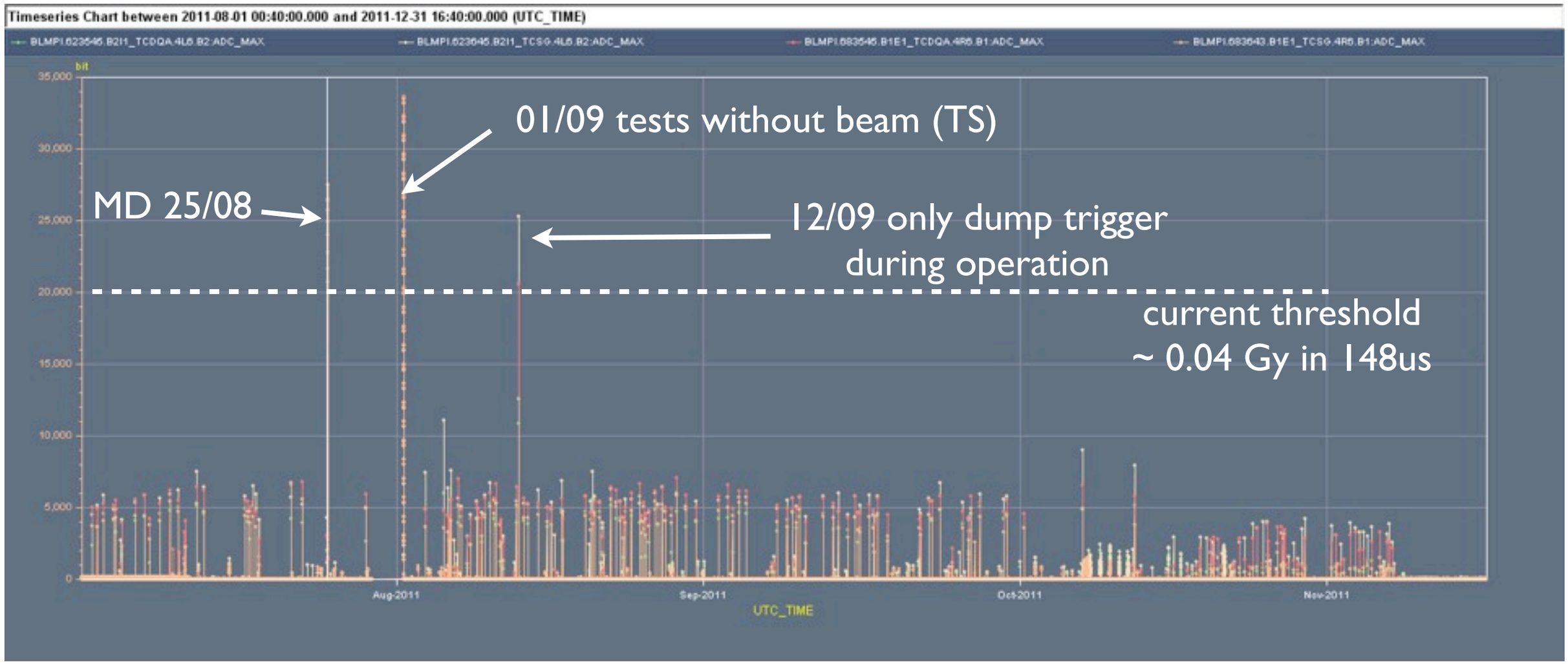
- Direct Dump BLMs are operational since July 3rd.

- Dump thresholds, 0.04 Gy , (LHC-BLMPI-ECR-00011) based on two conditions:
  * Calibration exercise during 2 MDs.
  * No beam dumps requested by these system during normal operation.

- Too conservative? Would we reach that threshold in case of BIS or BLM failure?

DIRECT DUMP READINGS (01/08-31/12)

One single event over dump threshold over 1/2 year during LHC normal operation.



SOME STATISTICS

- Investigation of events with signals (in at least one of 4 detectors) higher than 0.01 Gy (5K ADC counts).

- After 05/09/2011 there were 61 events.

- In all these 61 events a beam dump was triggered by another system.

Backup

CONVERSION FACTOR

Hi Jan:

Let me explain how I computed the conversion factor for the Direct Dump BLM. From the Dynamic range (50mA/65536 ADC counts) we have that each bit corresponds to 0.763E-6 A.

As mentioned in our discussion the Ionization Chambers have a low pass filter with time constant 138us. Since from the read out we get the peak signal I assume that the signals smoothes out in this 138us so one ADC count corresponds to a charge collection of 0.763E-6 A x 138us = 1.05E-11 C.

Now assuming an average energy of 34.8 MeV to produce an electron-ion pair in N2 we have that 1Gy(N2) = 5.26 E-5 C. Combining the results above we have a conversion factors between adc counts and Gy (collected in 138us) of

2.0E-6 Gy/adc count.

I apply this factor to the Direct dump for the signals collected during the MD and compare them with the IC with filter located at the same location and I get that the signals in the DD monitor are roughly 1/2 the signals in the IC with filter. See plot below.

Cheers

Eduardo