Noise and dump thresholds at foreseen LIC locations

E. Nebot for the BLM team

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MOTIVATION

- Little Ionization Chamber (LIC). LHC-IC type detectors with reduced active volume (~30) and filled with N2 at low pressure (0.4 bar).

- Sensitivity reduction by ~60.

LIC threshold = IC thresholds/60.

- How does the noise compare to the dump thresholds? Should have a factor 5-10 margin.

- Here we compare the estimated noise levels with the foreseen dump thresholds at 5 TeV.

NOISE ESTIMATION

- Noise assumed to come from analog cables (not detectors). Estimated from BLMs currently connected to channels were LICs are foreseen.

- Noise = Max signal observed during periods without beam (14 days from21/12/2011)

- Example IC/LIC IR7 Noise comparison

Monitor Name	Noise (Gy/s)	Type
BLMEI.06R7.B2I10_TCSG.A6R7.B2	6.33E-03	IC
BLMEL.06R7.B2I20_TCSG.A6R7.B2	1.07E-02	LIC
BLMEL.06R7.B2I21_TCSG.A6R7.B2	7.70E-03	LIC
BLMEL.06R7.B2I22_TCSG.A6R7.B2	6.60E-03	LIC

AFFECTED MONITORS

- Several parameters of interest for current (no LIC) configuration.

Monitor Name	Conn BIS	Filter	MF	Mas. Thres. (Gy/s)
BLMQI.08L2.B2I10_MQML	YES	NO	0.5	2.8
BLMEI.06L2.B1E0_MSIB	YES	SMALL	0.2	23.7
BLMEI.04L2.B1E10_TDI.4L2.B1	NO	NO	1.0	23.7
BLMQI.03R8.B1I30_MQXA	YES	NO	1.0	0.4
BLMEI.04R8.B2E10_MBXB	YES	NO	1.0	15.9
BLMEI.06R8.B2E0_MSIB	YES	SMALL	1.0	23.7
BLMEI.04R8.B2E10_TDI.4L2.B1	NO	NO	0.2	23.7

THRESHOLD TO NOISE RATIOS

- Expected factor 5-10 from noise to threshold.

Monitor Name	Noise (Gy/s)	App T (Gy/s)	App T LIC (Gy/s)	Thr(LIC)/Noise
BLMQI.08L2.B2I10_MQML	1.00E-02	1.38	0.023	2.3
BLMEI.06L2.B1E0_MSIB	1.41E-02	4.74	0.079	5.6
BLMEI.04L2.B1E10_TDI.4L2.B1	2.19E-02	23.7	0.395	18.0
BLMQI.03R8.B1I30_MQXA	1.04E-02	0.44	0.007	0.7
BLMEI.04R8.B2E10_MBXB	2.72E-02	15.99	0.267	9.8
BLMEI.06R8.B2E0_MSIB	1.13E-02	4.74	0.079	7.0
BLMEI.04R8.B2E10_TDI.4L2.B1	1.81E-02	23.7	0.395	21.8

- Several locations cause problems (at 5TeV):
  * LIC in spare channels (if available).
  * LIC in channels with new cables.
  * Increase thres. in short RS to noise level.