



BLM thresholds in IR6 and IR7

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Outlook

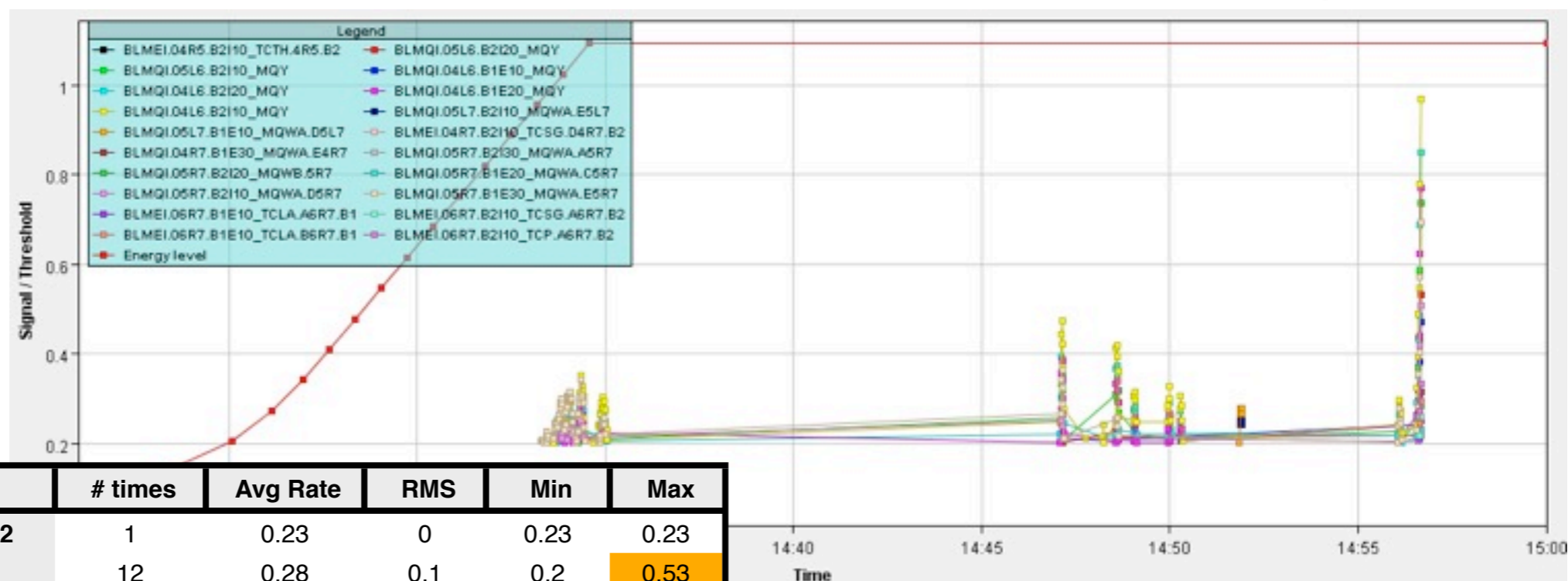
- Several fills dumped by slow losses in Q4L6 (leakage from IR7) and MQW (IR7)
- Summary of the observed losses (S/T in RS10, most limiting)
- Various proposed solutions to mitigate the problem.

Recall

- During TS a set of 9 families (41 monitors protecting TCP, TCSG and TCLA monitors in IR7) had their (Master) thresholds increased to avoid unnecessary beam dumps by slow losses.
- Five fills dumped by slow losses during last week. Four of them were dumped by losses in IR6 (leakage from IR7)
- Both MQWs and MQYs had their thresholds increased by a factor 2 in 2012.

Fill	Nb	Phase	Comment	
2800	852	Adjust	B2 losses up to 40% on some bunches.	Q4L6
2803	852	Adjust	B2 losses up to 25% on some bunches.	MQWR7
2804	852	Adjust	B2 losses up to 25% on some bunches.	Q4L6
2808	1374	Adjust	B2 losses up to 40% on some bunches.	Q4L6
2818	1374	Squeeze	B2 losses at end of squeeze. Rather large(r) losses in R & S on B2.	Q4L6

Example Losses. Fill 2818



Name	# times	Avg Rate	RMS	Min	Max
BLMEI.04R5.B2I10_TCTH.4R5.B2	1	0.23	0	0.23	0.23
BLMQI.05L6.B2I20_MQY	12	0.28	0.1	0.2	0.53
BLMQI.05L6.B2I10_MQY	66	0.25	0.09	0.2	0.74
BLMQI.04L6.B1E10_MQY	9	0.27	0.09	0.2	0.47
BLMQI.04L6.B2I20_MQY	95	0.27	0.09	0.2	0.85
BLMQI.04L6.B1E20_MQY	79	0.26	0.09	0.2	0.77
BLMQI.04L6.B2I10_MQY	118	0.29	0.1	0.2	0.97
BLMQI.05L7.B2I10_MQWA.E5L7	4	0.25	0.01	0.24	0.25
BLMQI.05L7.B1E10_MQWA.D5L7	5	0.26	0.03	0.2	0.28
BLMEI.04R7.B2I10_TCSG.D4R7.B2	1	0.22	0	0.22	0.22
BLMQI.04R7.B1E30_MQWA.E4R7	2	0.29	0.04	0.26	0.31
BLMQI.05R7.B2I30_MQWA.A5R7	1	0.22	0	0.22	0.22
BLMQI.05R7.B2I20_MQWB.5R7	2	0.26	0.04	0.23	0.28
BLMQI.05R7.B1E20_MQWA.C5R7	1	0.23	0	0.23	0.23
BLMQI.05R7.B2I10_MQWA.D5R7	32	0.24	0.06	0.2	0.51
BLMQI.05R7.B1E30_MQWA.E5R7	95	0.26	0.07	0.2	0.69
BLMEI.06R7.B1E10_TCLA.A6R7.B1	2	0.23	0.03	0.21	0.25
BLMEI.06R7.B2I10_TCSG.A6R7.B2	2	0.24	0.03	0.22	0.26
BLMEI.06R7.B1E10_TCLA.B6R7.B1	2	0.27	0.04	0.24	0.29
BLMEI.06R7.B2I10_TCP.A6R7.B2	2	0.3	0.04	0.27	0.33

- From beginning of ramp until dump
- Monitors with at least 1 read signal > 20% of threshold

Summary of losses

- Similar situation in all 5 fills.
- The most critical monitor is systematically the same MQY and MQWA

Summary: Maximum S/T in RS09 and RS10

# Fill	BLMQI.04L6.B2I10_MQY		BLMQI.05R7.B1E30_MQWA.E5R7	
	RS09	RS10	RS09	RS10
2800	0.36	>1.	0.26	0.9
2803	0.26	0.83	0.29	>1.0
2804	0.36	>1.0	0.2	0.7
2808	0.37	>1.0	0.21	0.51
2818	0.54	>1.0	0.28	0.69

- TCPs, TCSGs and TCLs reach up to 50% of threshold in the first three fills.

MQY (option 1)

- There is margin (factor 5–10) to increase thresholds via MF.

BLM	Threshold Factors
BLMQI.05L6.B2I30_MQY	0.300000
BLMQI.05L6.B1E10_MQY	0.100000
BLMQI.05L6.B2I20_MQY	0.100000
BLMQI.05L6.B1E20_MQY	0.100000
BLMQI.05L6.B2I10_MQY	0.200000
BLMQI.05L6.B1E30_MQY	0.300000
BLMQI.04L6.B2I30_MQY	0.300000
BLMQI.04L6.B1E10_MQY	0.100000
BLMQI.04L6.B2I20_MQY	0.100000
BLMQI.04L6.B1E20_MQY	0.100000
BLMQI.04L6.B2I10_MQY	0.200000
BLMQI.04L6.B1E30_MQY	0.300000
BLMQI.04R6.B2I30_MQY	0.300000
BLMQI.04R6.B1E10_MQY	0.200000
BLMQI.04R6.B2I20_MQY	0.100000
BLMQI.04R6.B1E20_MQY	0.100000
BLMQI.04R6.B2I10_MQY	0.100000
BLMQI.04R6.B1E30_MQY	0.300000
BLMQI.05R6.B2I30_MQY	0.300000
BLMQI.05R6.B1E10_MQY	0.200000
BLMQI.05R6.B2I20_MQY	0.100000
BLMQI.05R6.B1E20_MQY	0.100000

22/05/2012 MF increased from 0.1 to 0.2 to avoid dump due to leakage from IR7 to IR6

- MF = 0.3 for all BLMs inPos 3 (thresholds set to maximum)
- Remark MF= 0.33 => Applied threshold = best estimation of Quench level

MQY (option 2)

- Modification of Master threshold. Constant allowed dose rate after RS08 or RS09. Currently constant after RS10.

MQY P1

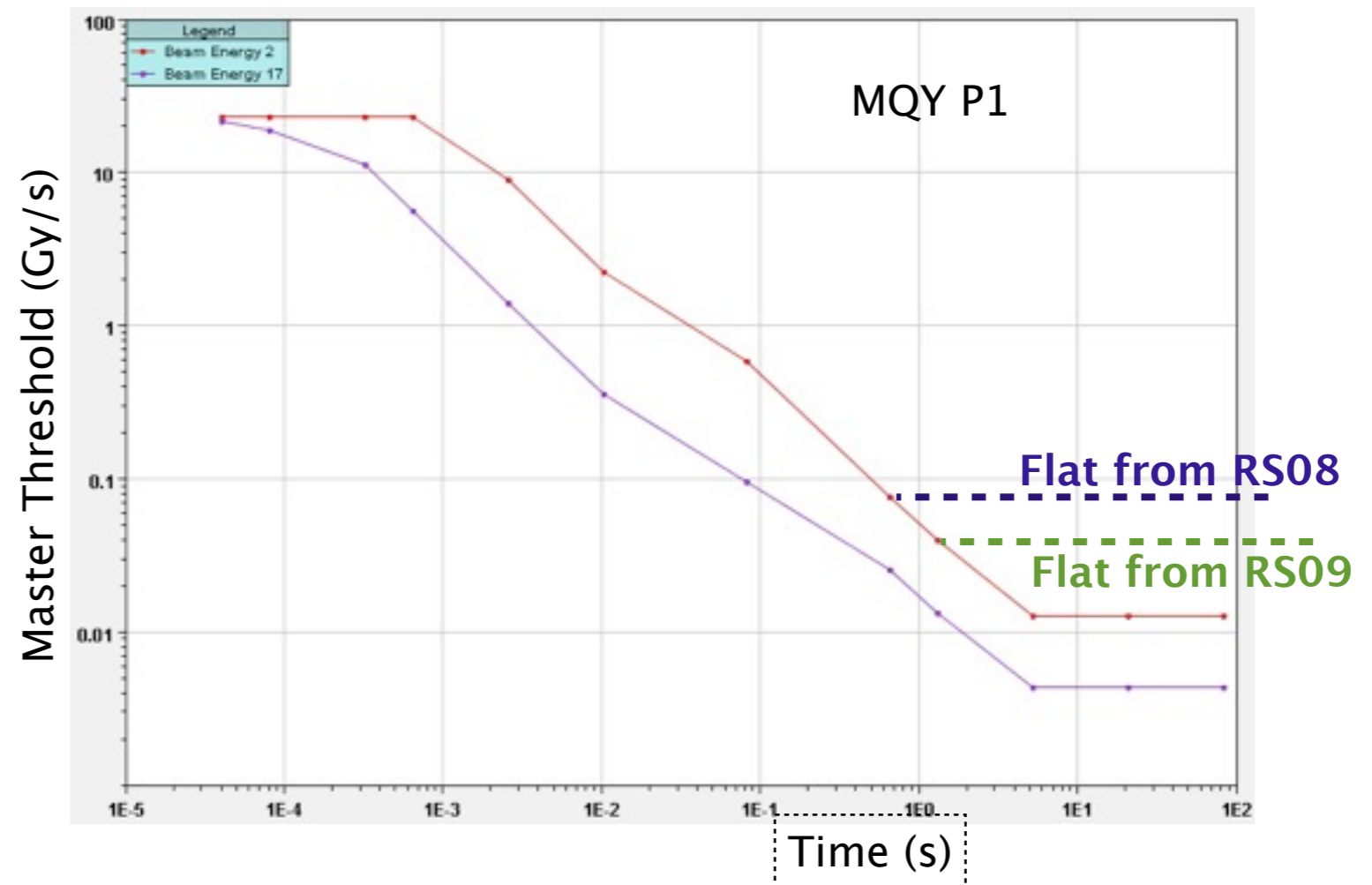
BLMQI.05L6.B2E10_MQY
 BLMQI.05L6.B2I10_MQY
 BLMQI.04L6.B1E10_MQY
 BLMQI.04L6.B2I10_MQY

+ 4 symmetric in R6

MQY P2

BLMQI.05L6.B2E20_MQY
 BLMQI.05L6.B2I20_MQY
 BLMQI.04L6.B1E20_MQY
 BLMQI.04L6.B2I20_MQY

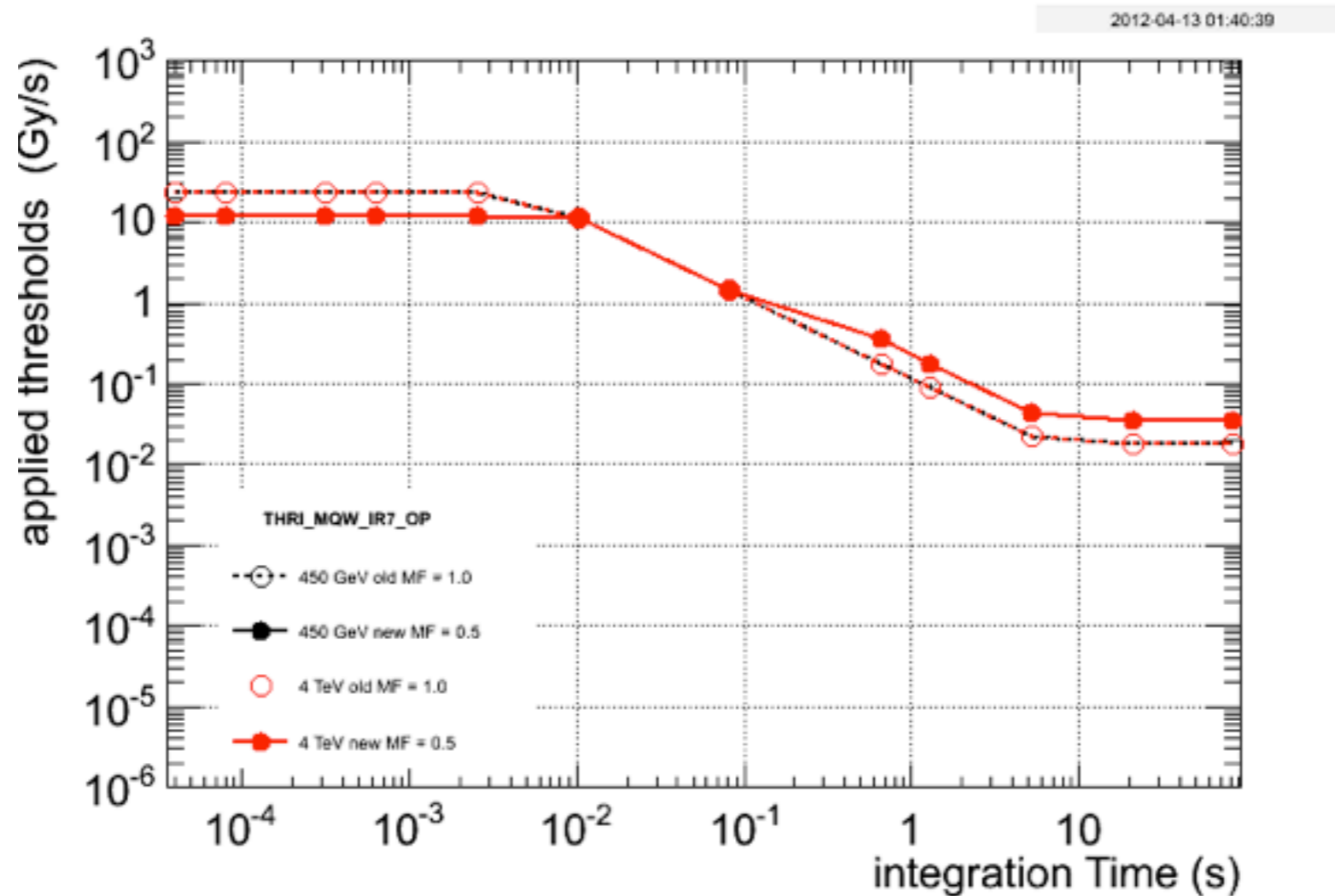
+ 4 symmetric in R6



ratio (master) new/old	RS08		RS09		Current Master Threshold (Gy/s)	
	450GeV	4TeV	450GeV	4TeV	450GeV	4TeV
MQY.P1	6	5.8	3.14	3.06	1.23E-02	4.34E-03
MQY.P2	6	5.8	3.14	3.06	1.08E-02	3.75E-03

MQW (option 1)

- A factor 2 increase of thresholds in the long running sums was deployed on 13/04/2012.
- A factor 2 extra increase available via MF.



- With MF = 1.0 = > Factor 4 increase with respect to 2011 in RS08 and above (factor 2 in RS06 and RS07).

Summary and Conclusions

- Five fills produced beam dumps due to losses in IR6 (Q4) and IR7 (MQW).
- All 5 dumps due to signals exceeding the threshold in RS10 (5 s)
- Proposed new thresholds for MQY (Q4L&R6 and Q5L&R6) and MQW in IR7.

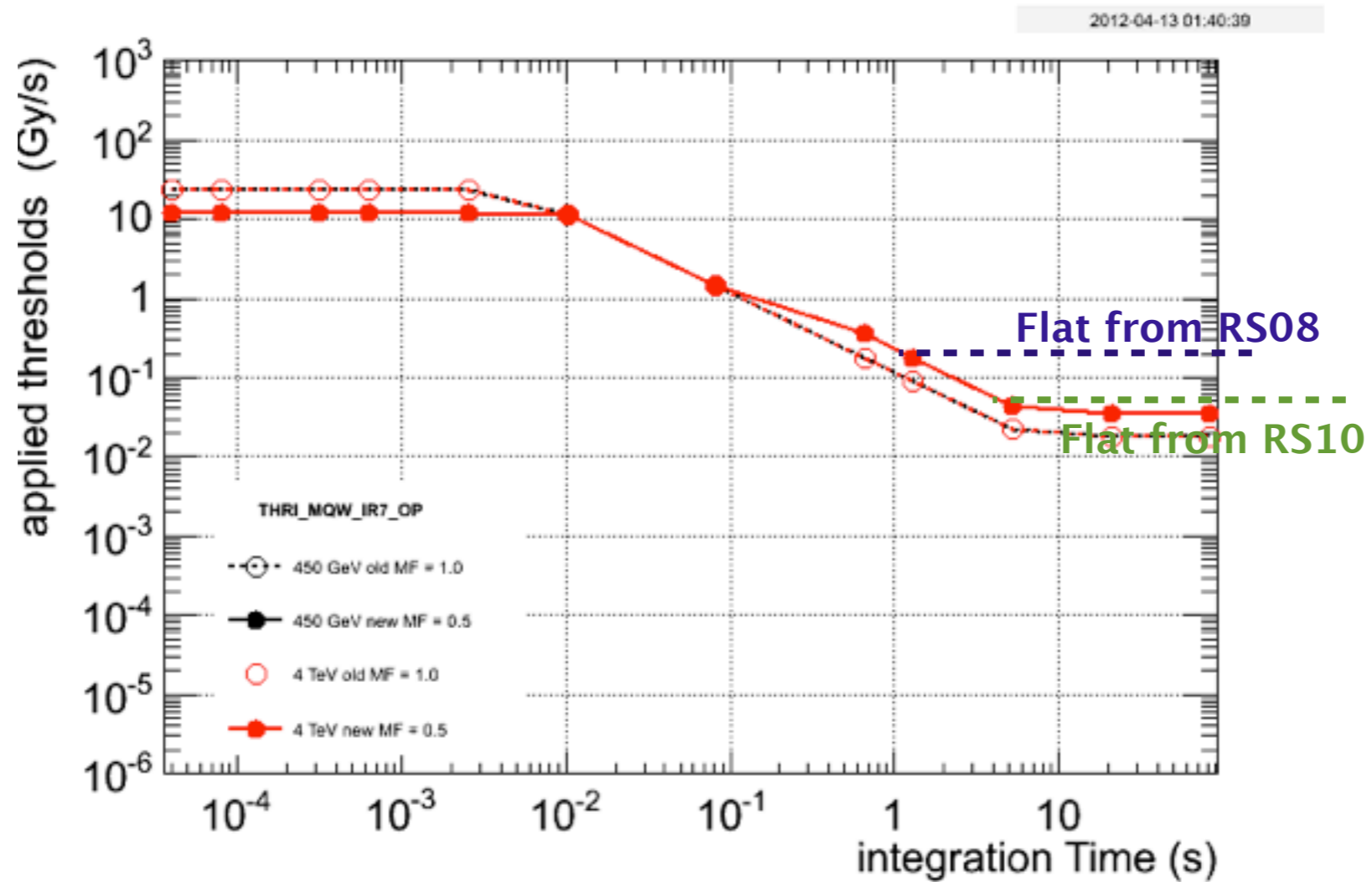
Possible solutions:

- Increase of MF.
- Constant dose after RS09 (or RS08).

Extra slides

MQW (option 2)

- Modification of Master threshold. Constant allowed dose rate after RS08 or RS09. Currently constant after RS10.



ratio (master) new/old	RS09		RS10		Current MF RS11,RS12	
	450 GeV	4TeV	450 GeV	4TeV	450	4TeV
MQW	4.97	4.97	1.24	1.24	7.04E-02	7.04E-02