Status of BLM Thresholds for Run 2

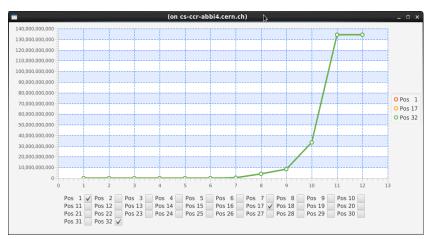
MPP, 13.03.2015B. Auchmann, A. Bertarelli, R. Bruce, F. Cerutti, B. Dehning, L. Esposito, E.B. Holzer,M. Kalliokoski, B. Kolad, A. Lechner, O. Picha, V. Raginel, S. Redaelli, B. Salvachua, M. Sapinski,N. Shetty, E. Skordis, M. Sobieszek, A. Verweij, D. Wollmann



BLM-LHC Unified-Threshold Tool

- New tool for generation/deployment/history tracking, etc.
- Threshold generating algorithms implemented with PL/SQL in Oracle DB (no more external C++ code).
- Milestones accomplished:
 - Successful generation of Run-1 thresholds.
 - Successful generation of new thresholds, e.g., for the UFO scenario (see following slides).
 - First families and their thresholds created, ready for deployment.

amily name:	Parametrization Te	esting	× History	Comitting an	d Reports										
DEFAULT	Master Threshold ×	App	lied Threshol	d Comparisi	on Of Indepen	dent Families									
MD_COLQUENCH_IP7_MQTL	▼ Stage														
MD_COLQUENCH_IP7_MQW															
MD_COLQUENCH_IP7_TCLAlow	Stage	POS		R502	R503	R504 k	R505	R506	R\$07	RS08	R509	R510	R511	R512	-
MD_COLQUENCH_IP7_TCP_TCLAhigh		1	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773	1.448309	5.793237	2.317295	
MD_COLQUENCH_IP7_TCSG		2	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773		5.793237		
THRF_TDI		3	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773		5.793237		
THRI.06_7_AB_TCLA		4	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773	1.448309	5.793237	2.317295	~
THRI.06_7_AB_TCLA_QTPROTONS															
THRI.06_7_A_TCLA	▼ Final														
THRI.06_7_A_TCLA_HIGH_FLAT_MD	Final	POS	RS01	R502	R503	R504	RS05	R\$06	R\$07	RSOR	R509	R\$10	R\$11	RS12	
THRI.06_7_B_TCLA		1	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773	1.448309	5.793237		
THRI.06_7_CD_TCLA		2	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386					
THRI.06_7_CD_TCLA_QTPROTONS		3	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773	1.448309	5.793237	2 317295	
THRI.06_7_C_TCLA		4	11049.0	22099.0	88397.0	176795.0	707182.0	2828729.0	2.262983	1.810386	3.620773	1.448309	5.793237	2.317295	
THRI.06_7_D_TCLA															V
THRI.07_7_AB_TCLA	▼ Stage - Final														
THRI.07_7_AB_TCLA_QTPROTONS	• stage • mai														
THRI.07_7_A_TCLA	Stage - Final	POS	RS01	RS02	RS03	RS04	RS05	R\$06	R\$07	RSOB	R509	R\$10	R\$11	RS12	
THRI.07_7_A_TCLA_LOW_FLAT_MD		1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
THRI.07_7_8_TCLA		2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THRLAR.B1.1_MQ		3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THRI.AR.B1.2_MQ		4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	~
THRI.AR.B1.3_MQ															
THRI.AR.82.1_MQ	▼ Stage/Final														
THRI.AR.B2.2_MQ		POS	8501	R502	R503		R505	R\$06	R507	RSOR	R509	R510			
THRI.AR.82.3_MQ	Stage/Final		RS01		R503	RS04	RS05	RS06	RS07	R508		R510	RS11	RS12	
THRLAR.QT_UFO_MQ				1.0							1.0				
THRI.DS.B1.1_MQ		2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
THRI.DS.81.1_MQM		3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
THRI.DS.81.1_MQM_IL		4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	~
THRI.DS.B1.1_MQM_RC															
THRI.DS.81.2_MQ						Plot Ratio Pl	ot Difference	Plot First		ITS GY/s					





Goals for Threshol Updates, Analyses for UFO-specific Thresholds

Goals of the update campaign:

- UFO thresholds in the arcs (new locations).
- Implementation of knowledge gained from quench tests and Run 1.
- Uniform methodology (FLUKA/MAD-X/QP3) .
- High level of documentation.

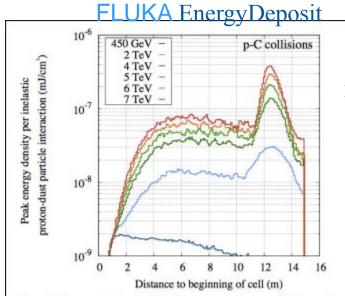
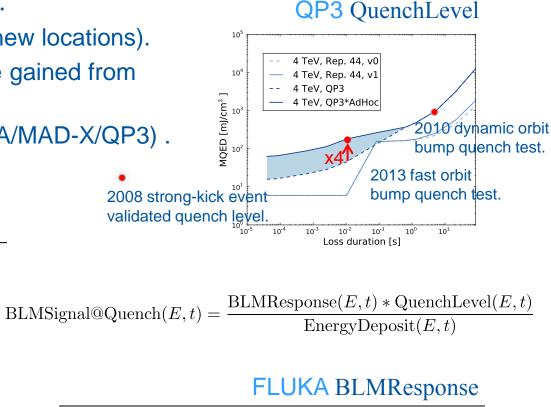
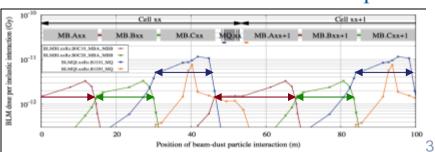
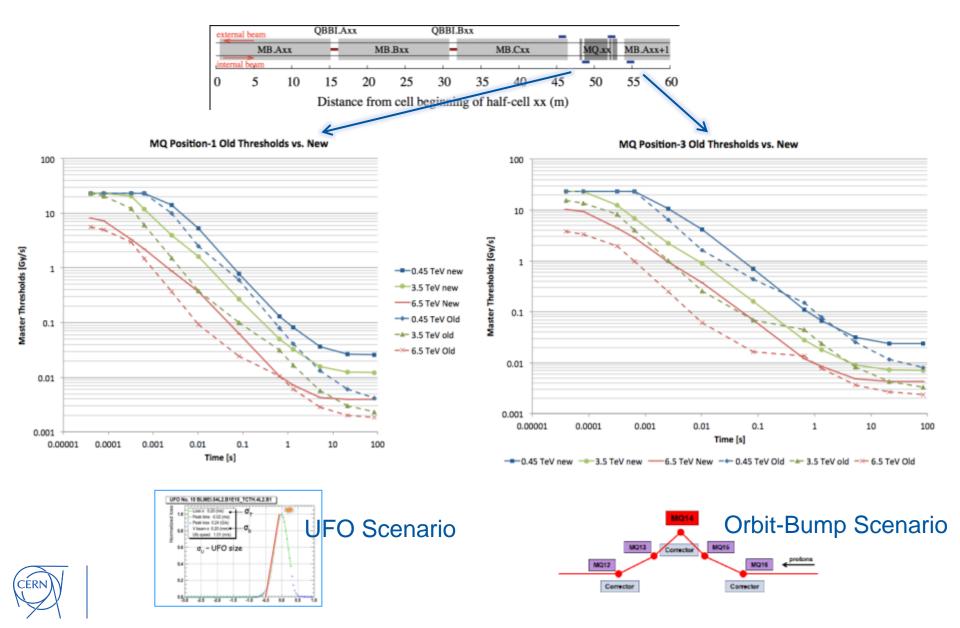


Figure: Peak energy density in MB coils per proton-dust particle interaction for different beam energies. The dust particle is assumed to be composed of carbon.





Examples of New Thresholds: MQ Positions-1 and 3



Prioritized List of Threshold Updates

- 1. Arc and DS thresholds (protection from UFO-induced quenches, new BLM locations).
- 2. Injection regions (New monitors/monitor configurations).
- 3. Inner triplets, IPQs, IPDs (updated beam-loss scenarios, quench levels).
- 4. Remaining injection-region monitors (beam-loss scenarios, quench levels)
- 5. MQWs (improved beam-loss scenarios, new damage-level analysis).
- 6. Collimators (new FLUKA models, updated damage levels)
- 7. DS-region horizontal BLMs on MBs for ion runs.
- 8. In absence of updates, pre-LS1 thresholds apply.

Green: Analysis complete. Ready as of March 17.

Blue: Analysis complete. To be implemented and validated according to prioritized list until startup. Remainder follows at latest during TS1.

Violet: Analysis approaching completion. Additional modifications based on early Run-2 data. To be implemented at latest during TS1.

Orange: Analysis not yet started.

