# Status of BLM Thresholds for Run 2

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M. Kalliokoski, B. Kolad, A. Lechner, O. Picha, V. Raginel, S. Redaelli, B. Salvachua, M. Sapinski,
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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).

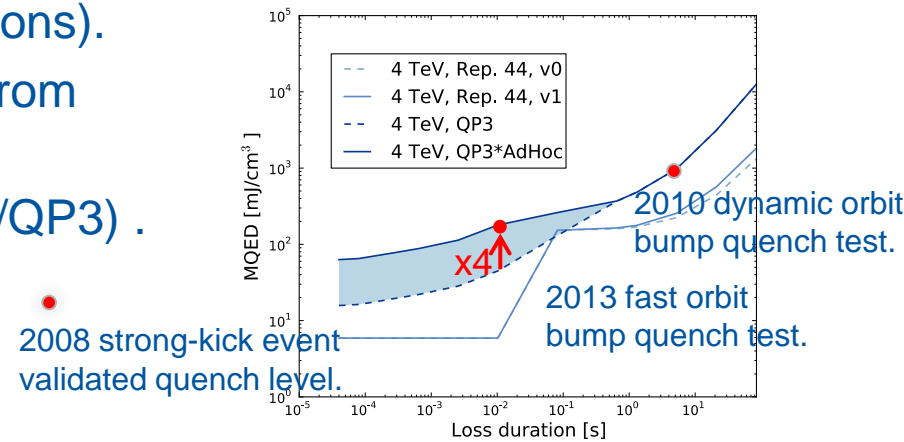 - First families and their thresholds created, ready for deployment.
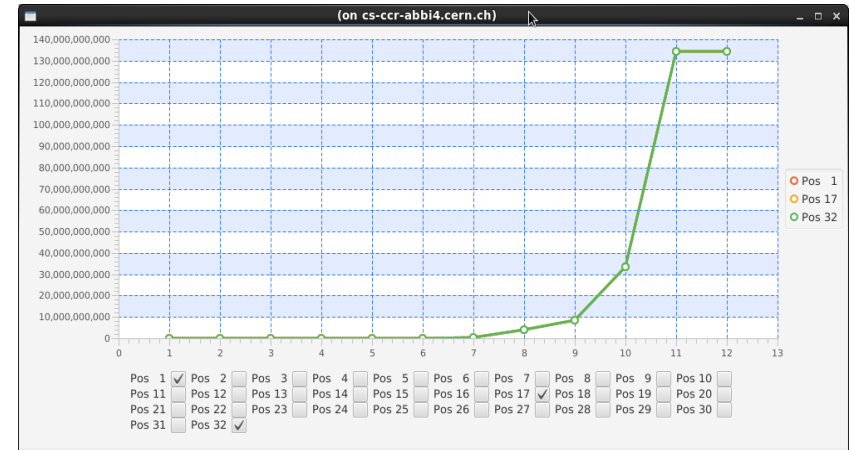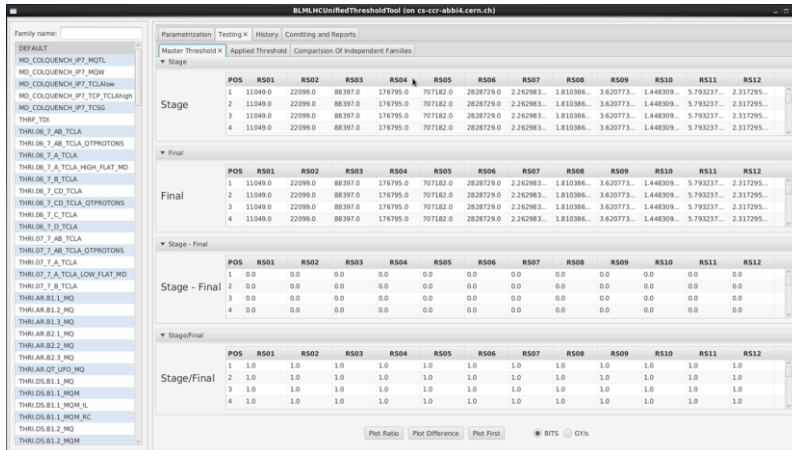
Goals for Threshol Updates, Analyses for UFO-specific Thresholds

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.

QP3 QuenchLevel

2010 dynamic orbit bump quench test.

2013 fast orbit bump quench test.

2008 strong-kick event validated quench level.
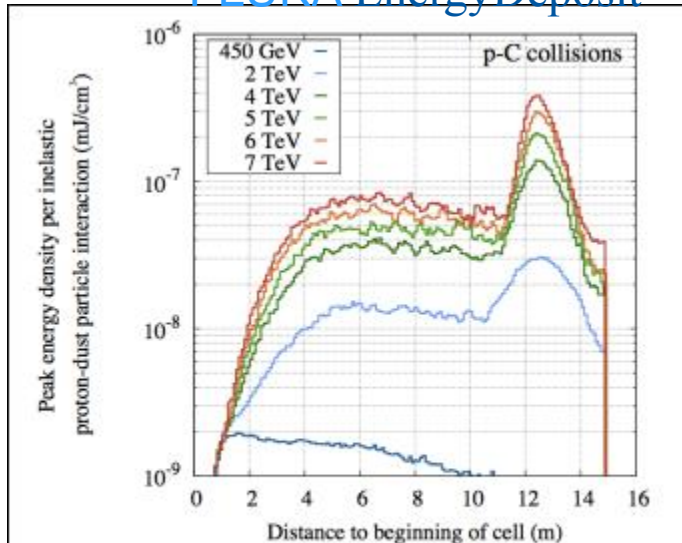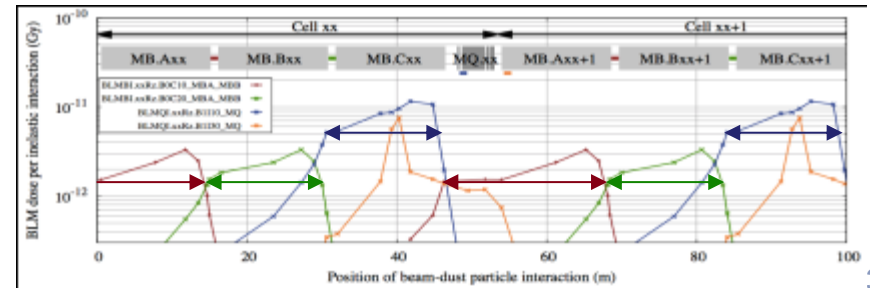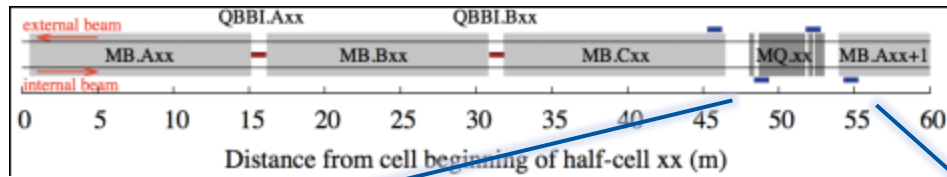
FLUKA EnergyDeposit

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.

$$\mathrm{BLMSignal@Quench}(E,t) = \frac{\mathrm{BLMResponse}(E,t) * \mathrm{QuenchLevel}(E,t)}{\mathrm{EnergyDeposit}(E,t)}$$
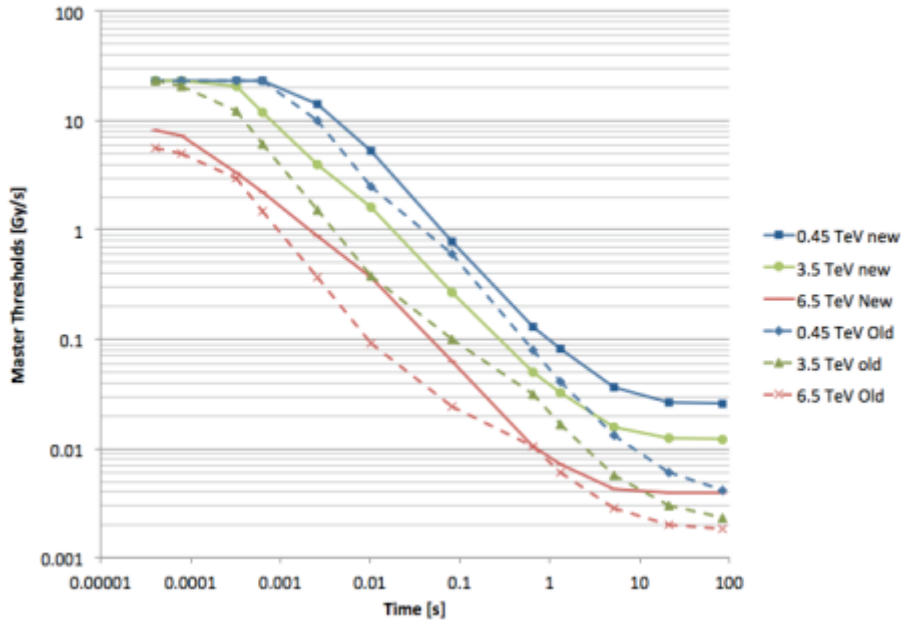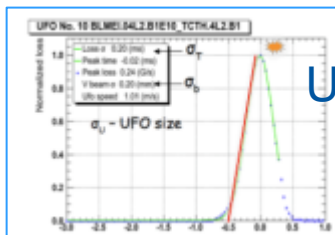
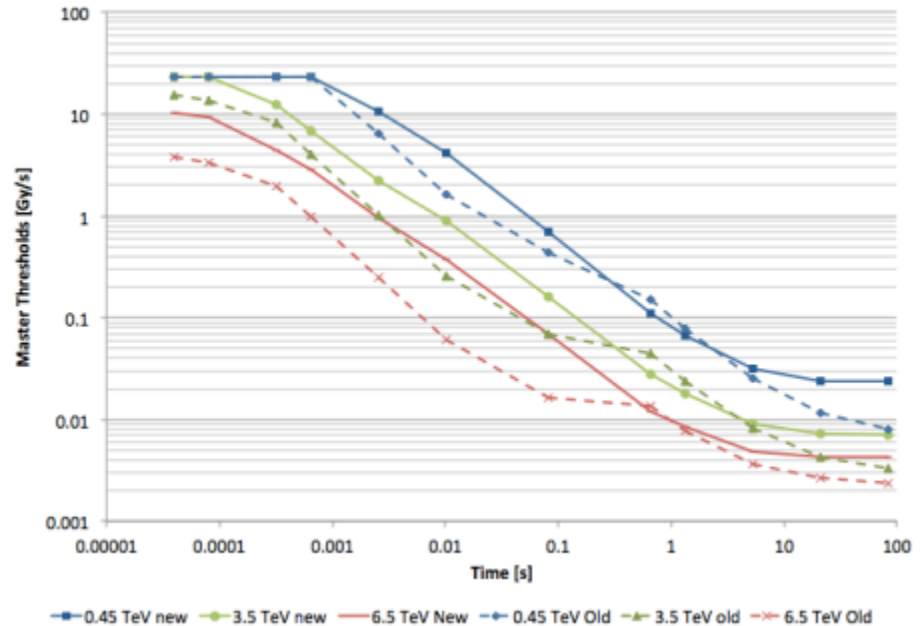## FLUKA BLMResponse

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Examples of New Thresholds: MQ Positions-1 and 3
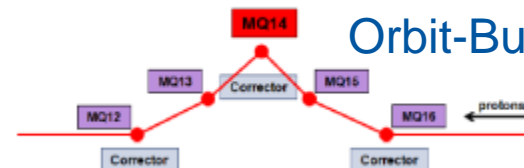

MQ Position-1 Old Thresholds vs. New

MQ Position-3 Old Thresholds vs. New

UFO Scenario

Orbit-Bump Scenario

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.