



UFO quench test

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UFO quench test using ADT

Mariusz Sapinski for BLM team, Daniel Valuch for ADT,
Tobias Baer for UFO data

CERN - BE-BI

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The trick that did the job

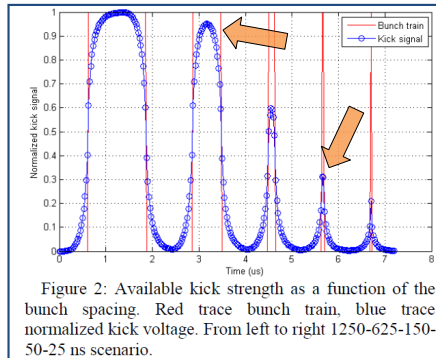
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(from Evian 2011 paper by Wolfgang and Daniel)



*Normalized ADT kick voltage for 625ns bunch spacing configuration is about **a factor 3 larger** than for 50ns bunch spacing.*

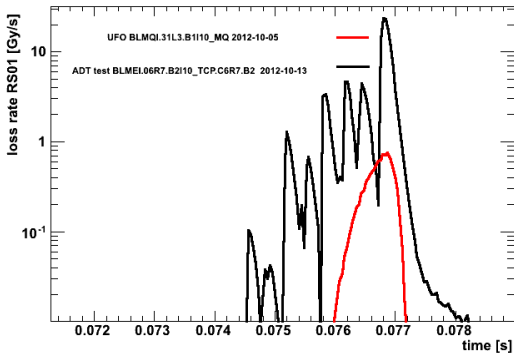




Comparison of UFO and ADT loss

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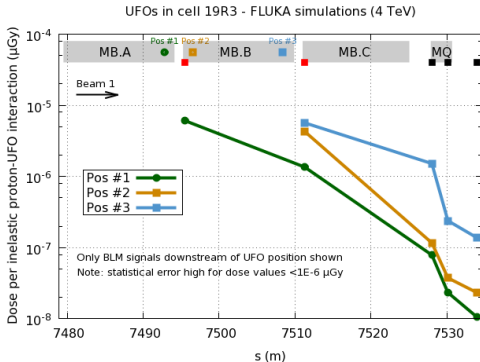




UFO and collimation - signal per proton

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Monitors after interconnection:

- $5 \cdot 10^{-12}$ Gy/proton
- for collimators we typically think 2x more (i.e. 10^{-11} Gy/proton)

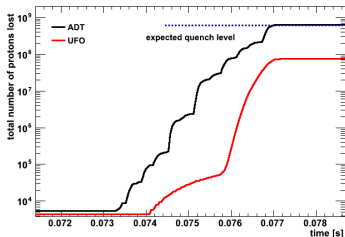
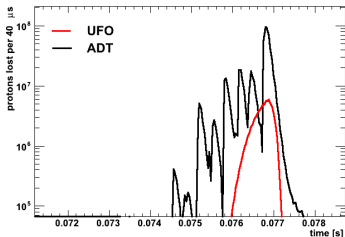


Renormalizing MD and UFO results to number of lost protons

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Assuming previous, very approximate BLM calibrations...



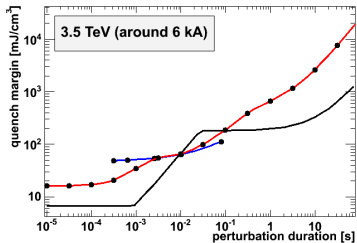
- initial bunch intensity $8.6 \cdot 10^9$ (?)
- dump line measurement...?
- where the quench level comes from?



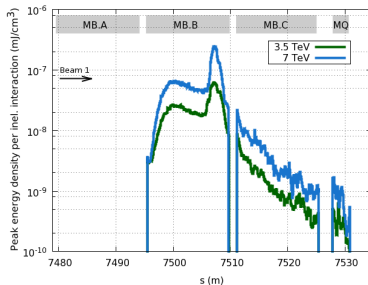
Expected Quench limits

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$$N_{\text{prot}} = \frac{30 \text{ mJ/cc}}{5 \cdot 10^{-8} \text{ mJ/cc}} = 6 \cdot 10^8 \text{ protons}$$





Conclusion and plan

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- **The loss generated during ADT+MQ MD should be very close to magnet quenching at UFO timescale**
- Analysis still preliminary, need to check diamond data, evaluate how much contribution from dump we see on TCP, etc...
- Experiment proposal:
 - disable BLMs in the cell (otherwise we risk to dump without quenching, estimated signal at quench in RS01 is about 10 Gy/s, but better not to risk...)
 - inject 10 bunches with various intensities intensities ($2 \cdot 10^9 \dots 5 \cdot 10^{10}$), small emittance
 - create bump until we see losses
 - retract the bump by distance needed to reach ADT saturation (0.2-0.3 mm - see next slide)
 - blow bunch-after-bunch from the lowest to the highest intensity



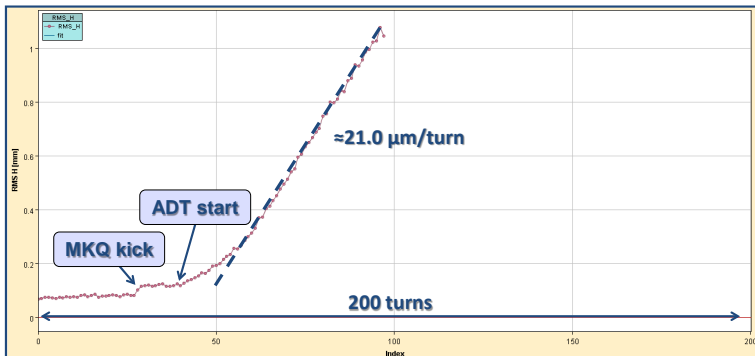
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4TeV test on 13.10.2012 06:30:31 (**625ns bunch spacing** ADT mode):



RMS arc position risetime: 21.0 μm/turn