BLM THRESHOLDS FOR 2011

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Motivation

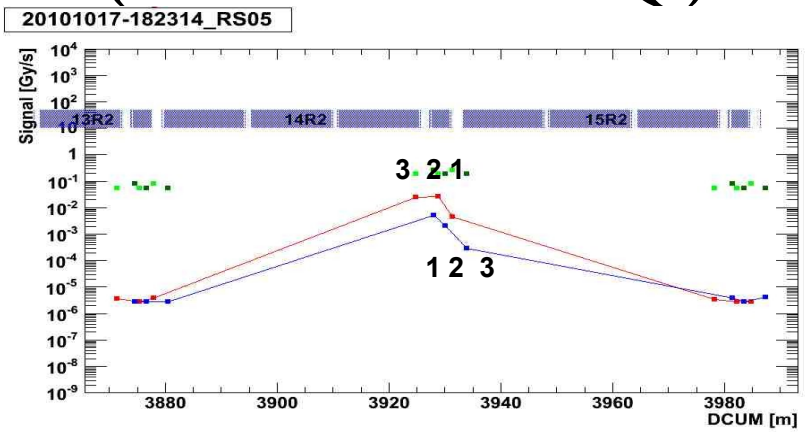
No final results from simulations. Tuning current cold magnet thresholds with measurements from 2010.

- UFO events provide information in the ms time scale. Current thresholds too conservative (no quench in the ms scale, even with WireScan quench test)

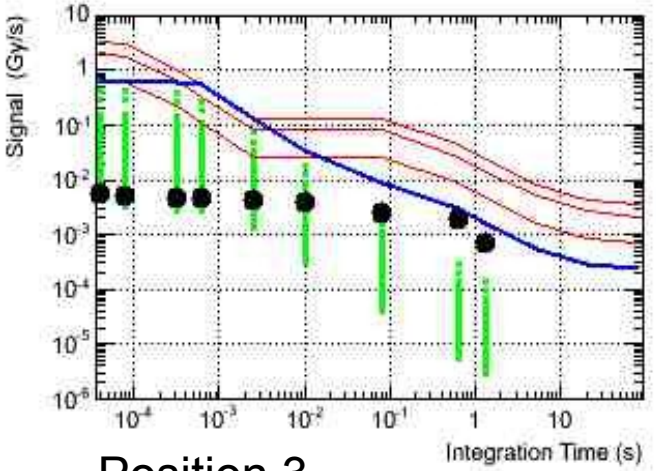
- Quench Limit measured in the ~ 1 s time scale during quench test. Meausrements indicate thresholds are currently too high

Tuning from measurements (MB and MQ)

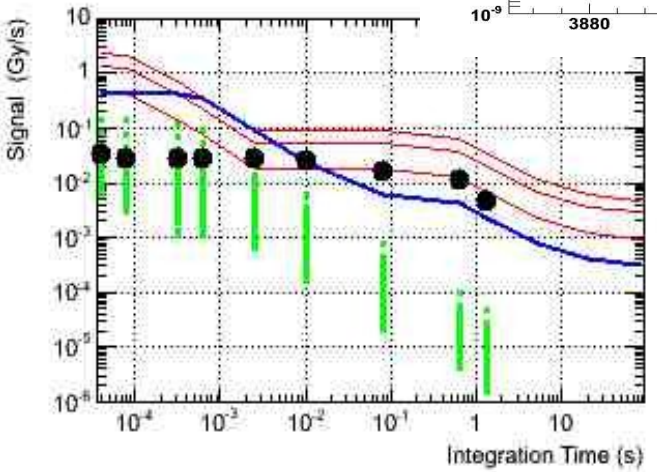
For both MQ and MB magnets we have measurements that show underestimation in the ms scale and overestimation in the ~5 s scale at top energy and in the 0.1-1 s scale at injection



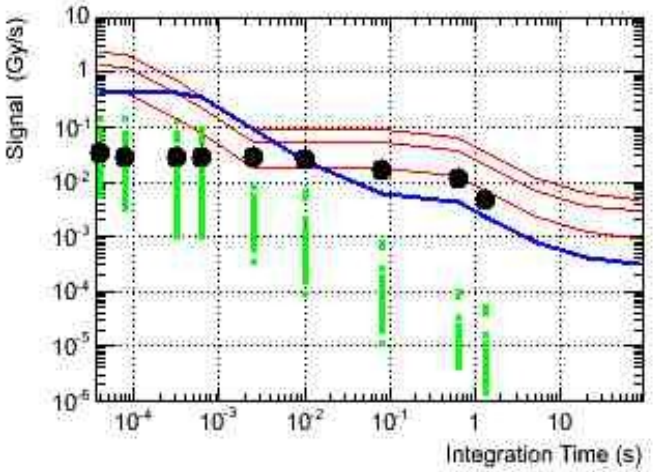
Position 1



Position 2



Position 3



Up to a Factor 5 increase of the threshold in RS03, RS04 and RS05. Factor 3 reduction for RS07 and higher.

- Thresholds during 2010 (MF=0.1, 0.3 and 0.5)
- Singal during UFOs
- Ginals During Quench (MQ.14R2 & MB. 17/10 18:23)
- Proposed Thresholds

What about other families?

In other cold elements we have observed UFOs (increase of thresholds RS03, RS04 and RS05 also valid) but we haven't measured the quench limit.

Reminder (Note44) :

$$T = S_{BLM}(E_b) \cdot \Delta Q\,(E_b,t) \,/\, E_D\,(E_b,t)$$

BLM signal — quench margin — energy deposited in coil

1. $t<t_{metal}$: ΔQ = enthalpy limit (ΔH),
2. $t_{metal}<t<t_{helium}$: $\Delta Q = \Delta H$+5%Helium,
3. $t>t_{helium}$: ΔQ = 5%Helium+SteadyFlow·t

The measured Quenches (MQ,MB) happened at a time scale where He has an important contribution. For other magnets working at 1.9 K is safer to asume that our current thresholds are overestimated and decrease them by a factor 3.

Families to change

Beam Position

- THRI.AR.B(1,2).(1,2,3)_MQ (2160)
- THRI.DS.B(1,2).(1,2,3)_MQ (181)
- THRI.SS.B(1,2).(1,2,3)_MQ (18)

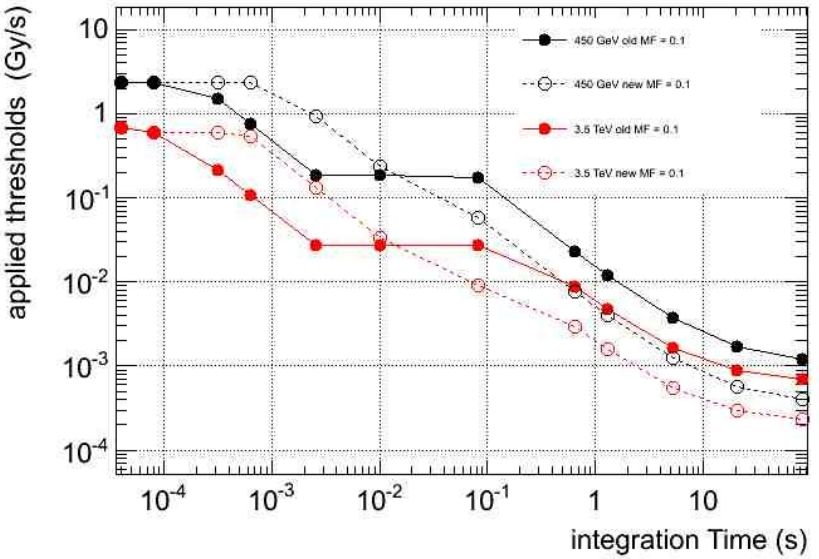
- THRI_B(1,2).(1,2,3)_MB (239)

- THRI.SS.B(1,2).(1,2,3)_MQM (80)
- THRI.DS.B(1,2).(1,2,3)_MQM (181)

- THRI_B(1,2).(1,2,3)_MQXA (47)
- THRI_B(1,2).3B_MQXA (12)
- THRI_B(1,2).(2,3)_MQXB (64)
- THRI_B1.3_MQXA_OI (1)

- THRI_(1,2)_MBX (3)
- THRI_(1,2)_MBX_OI (4)

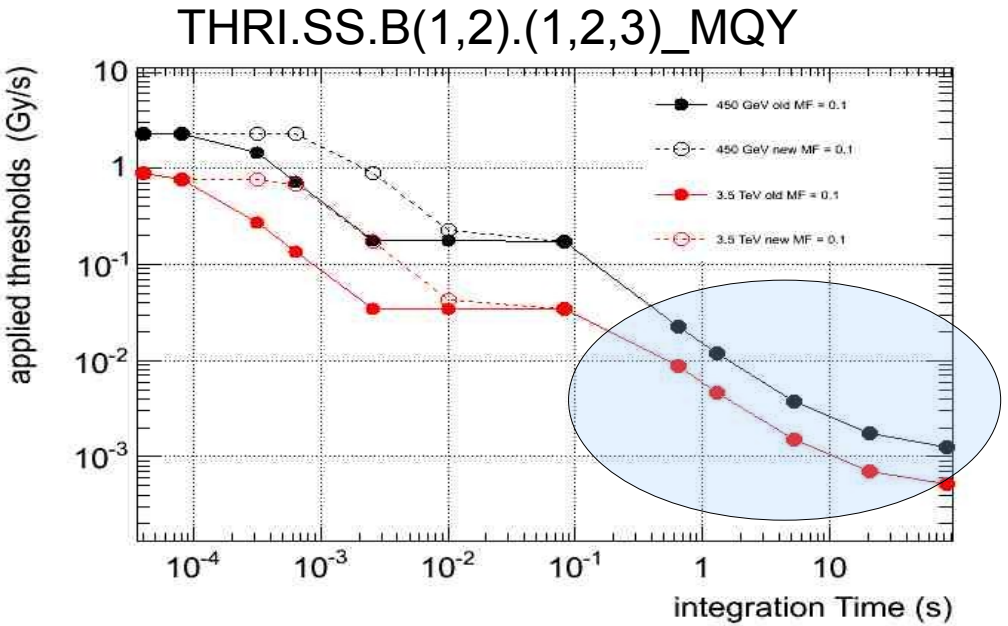
THRI.AR.B1.1_MQ



Up to a factor 5 increase of the threshold in RS03, RS04 and RS05. Factor 3 reduction for RS07 and higher.

MQY

In this case the temperature is different from MQ,MB and we have no way to extrapolate. In principle only correct for UFOs.



Should we be conservative and reduce the long RS by a factor 3?

Families to be changed

- THRI.SS.B(1,2).(1,2,3)_MQY (106)
- THRI.SS.B(1,2).1_MQY_IL (2)