Quench Levels
Typical threshold on cold magnet based on LHC Note 44:

\[ T = Q_{BLM}(E) \frac{\Delta H(E,t)}{E_{dep}(E,t)} \]

- Filter correction
- Heat transfer to He
- He enthalpy
- Cable enthalpy
- Cryo
Comparison of various codes

Quench test result about 20 mJ/cc

Quench test result about 20 mJ/cc

Note44 – algorithm

ZEROODEE
(P-P. Granieri, 2008)

QP3 (A. Verweij)

RS05, factor 4
What has been tested (with beam)

Tested are really BLM thresholds, interpretation might be difficult!

\[ T = Q_{BLM}(E) \frac{\Delta H(E,t)}{E_{dep}(E,t)} \]
October 17th, 2010, quench test at 3.5 TeV

Cell 14R2

10^10 protons lost on magnet before dump

Quench level:

Note44: 300 mJ/cc

Geant4: 50 mJ/cc (preliminary!!!!)
One of the most spectacular quench tests: generate millisecond scale losses using with Wire Scanner at 3.5 TeV. Motivation: explore quench limit for losses similar to UFOs. Quench occurred after about 10 ms

Max $E_{\text{dep}}$
FLUKA: 62.5 mJ/cc
QP3: 38 mJ/cc (preliminary)
we call it a good agreement
Example: debris from ATLAS and slow beam losses in the triplet:

- ATLAS

In order to protect Q2 magnet the threshold for slow losses should be set very close to constant debris signal. Spurious beam dumps would be unavoidable.

Similar problem of radiation masking signal from dangerous beam loss is observed in other locations on LHC.
Idea: put BLM detectors closer to magnet coil.

Cryogenic BLMs undergo first tests right now at T9 beamline in East Hall.

Yesterday signals from Si and Diamond detectors were measured at 1.9 K.