

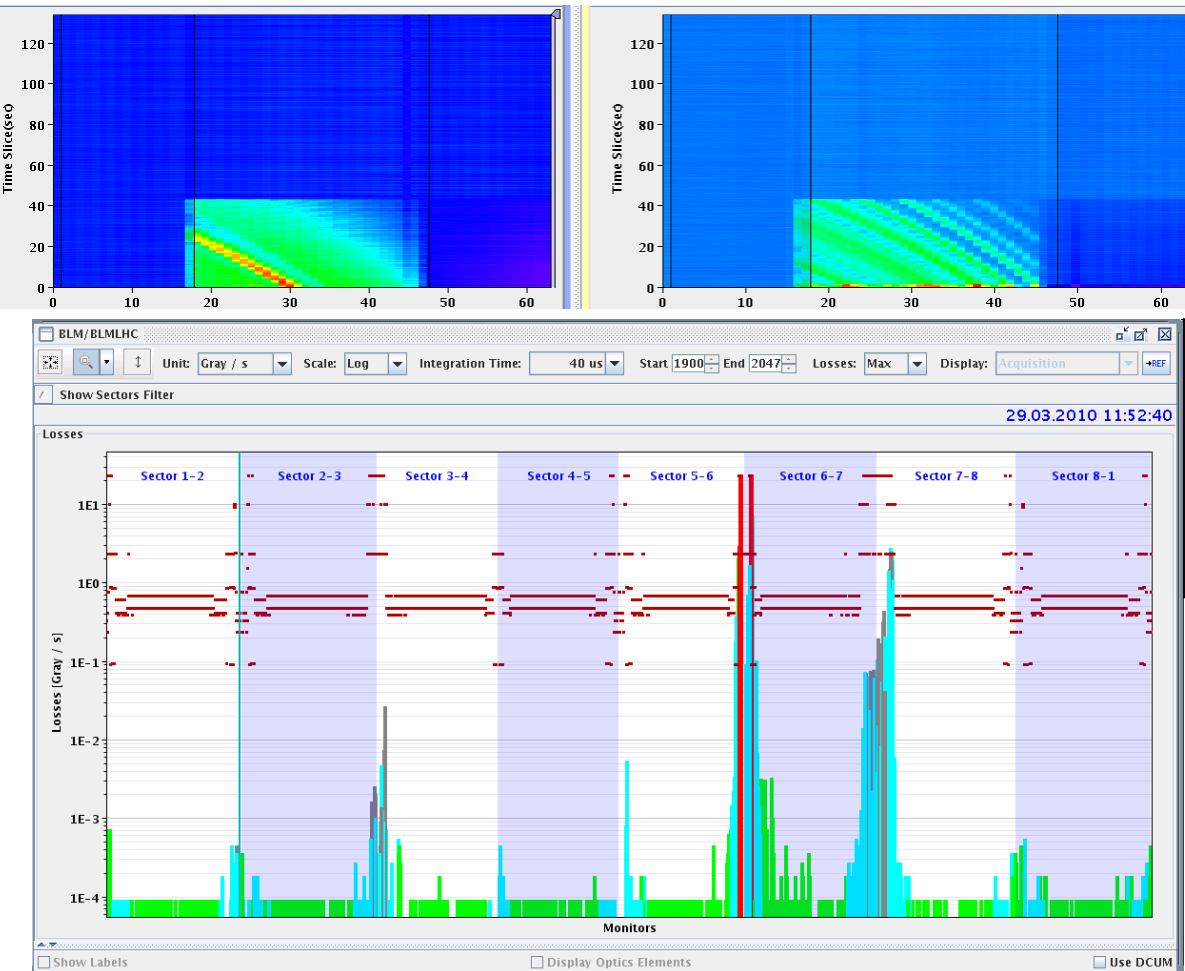
# Asynch dump tests at 3.5 TeV

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- 4 separate tests made to date
  - 1x 3.5 TeV unsqueezed
  - 2x 3.5 TeV squeezed, low intensity, centered
  - 1x 3.5 TeV squeezed, higher intensity, offset
- Assumptions
  - 36/120 of abort gap population impacts TCDQ
  - Uniform abort gap population (pending deeper analysis!)
  - $1e12$  p+/Gy response for BLMs at TCTs and TCDQ, TCSG, TCDS

# 3.5 TeV unsqueezed, centred

- 29/03/2010, 11:52:40
- $1.2 \times 10^{10}$  in 2b in B1,  $1.3 \times 10^{10}$  in 2b in B2, 120 s debunching
- Nothing reported from experiments



IR6 saturated

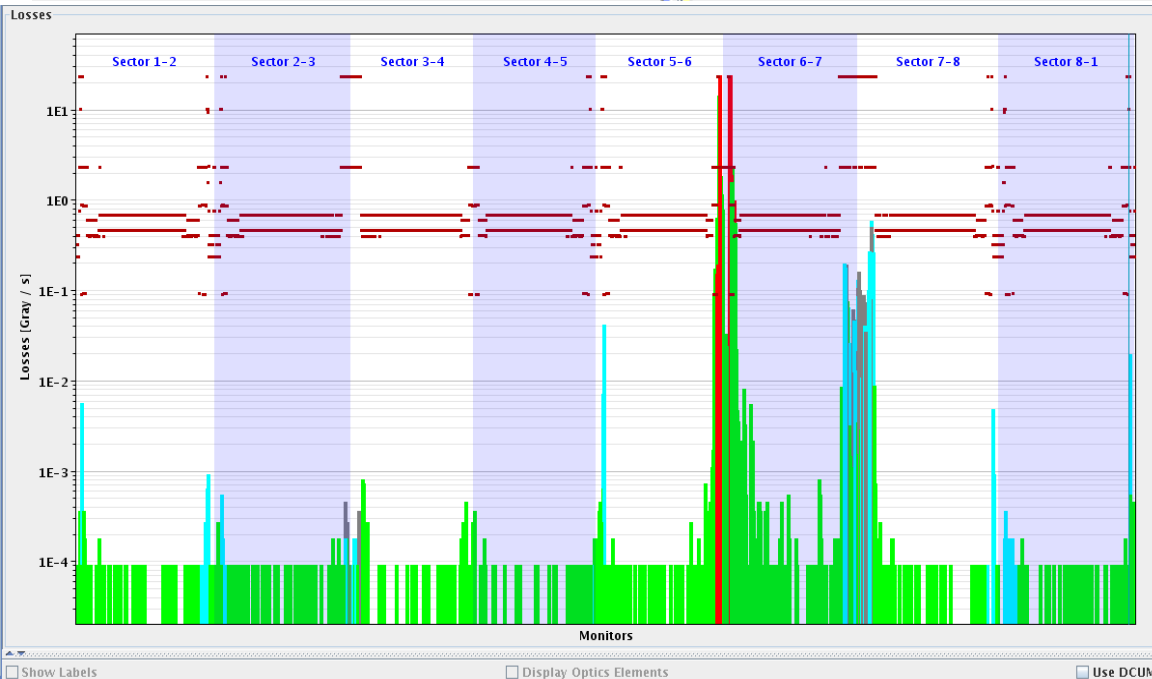
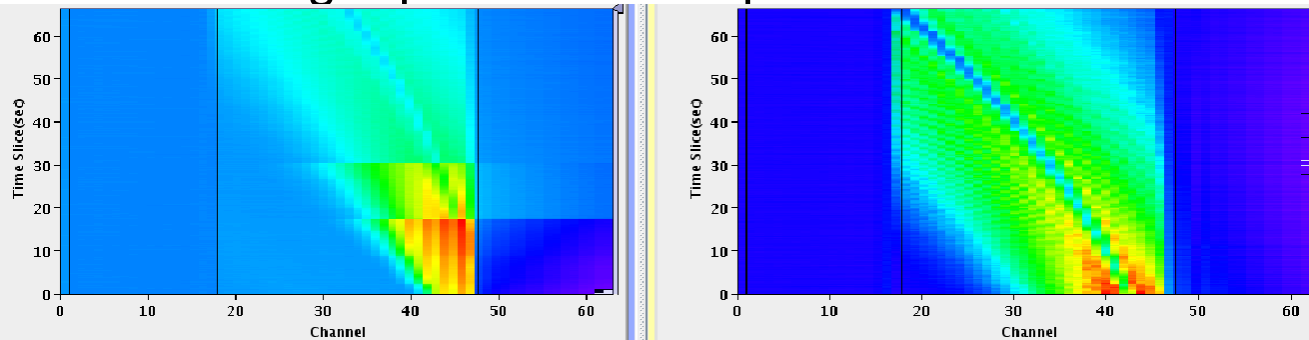
IR7 0.2 Gy/s

TCTH.4R5.B2  $5 \times 10^{-3}$  Gy/s,  $2 \times 10^5$  p+

Leakage from TCDQ  $< 1 \times 10^{-4}$

# 3.5 TeV squeezed, centred

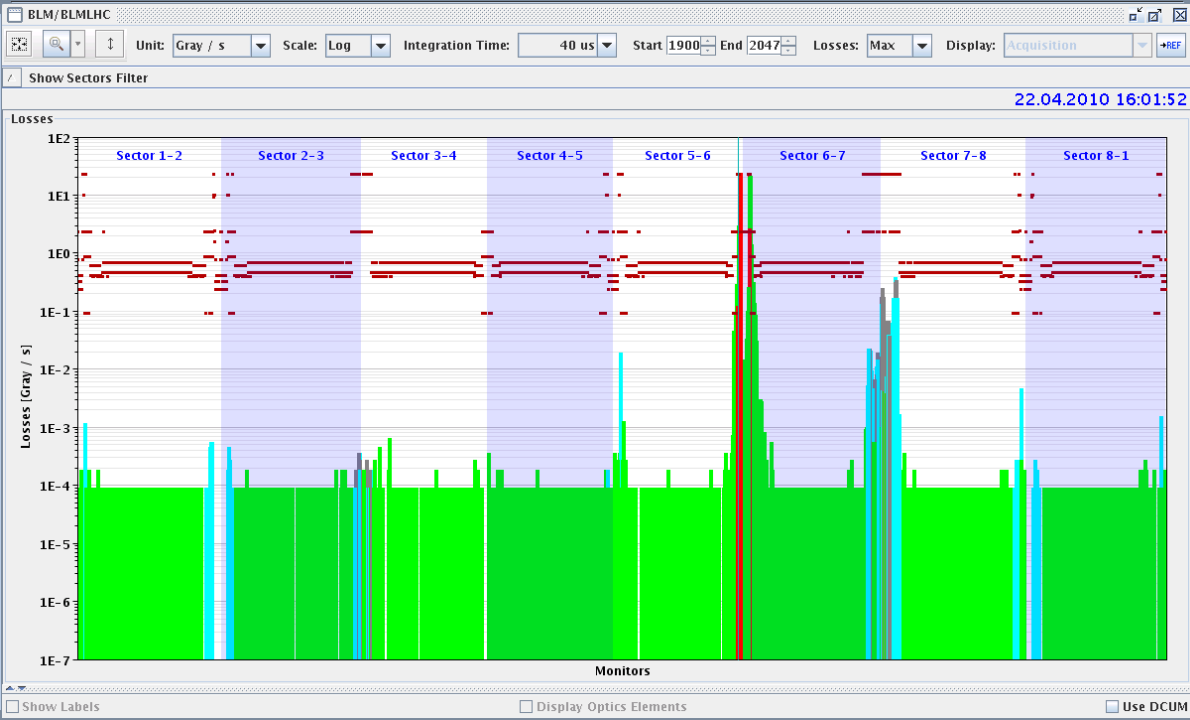
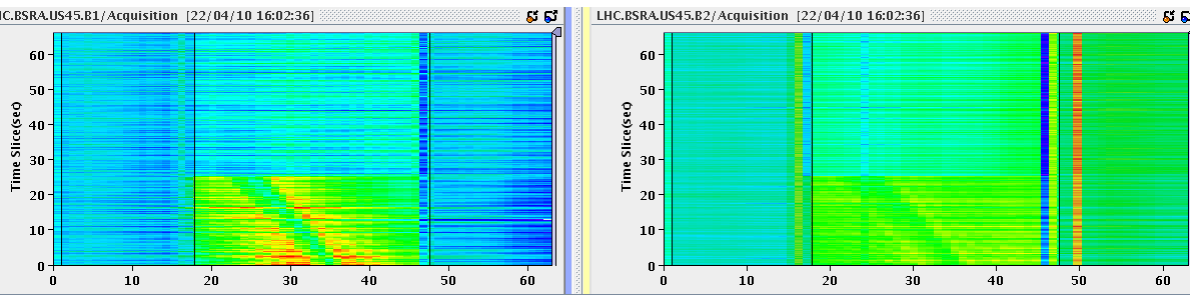
- 21/04/2010, 18:31:48
- $5e9$  in 2b in B1,  $<1e8$  in 2b in B2, 120 s debunching
- Nothing reported from experiments



IR6 B2.TCDQ 14 Gy/s  
IR7  $6e-1$  Gy/s  
TCTH.4R5.B2  $4e-2$  Gy/s,  $2e6$  p+  
Leakage from B2.TCDQ  $\sim 3e-3$

# 3.5 TeV squeezed, centred

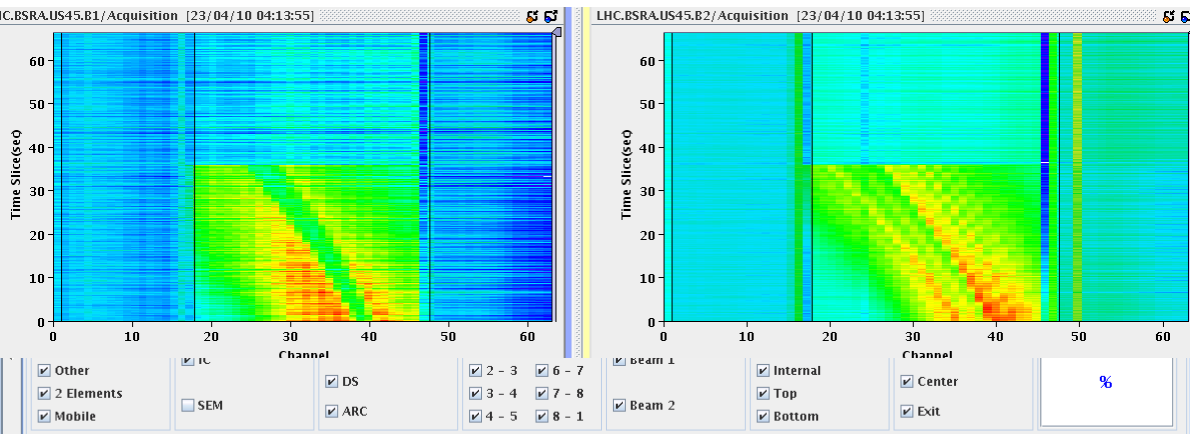
- 22/04/2010, 16:01:52
- $<2e9$  in 2b in B1,  $<5e8$  in 2b in B2, 90 s debunching
- Nothing reported from experiments



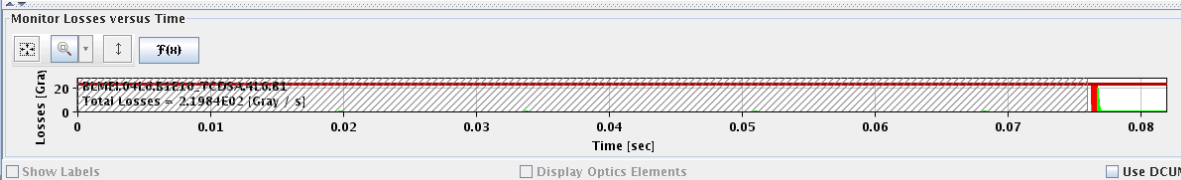
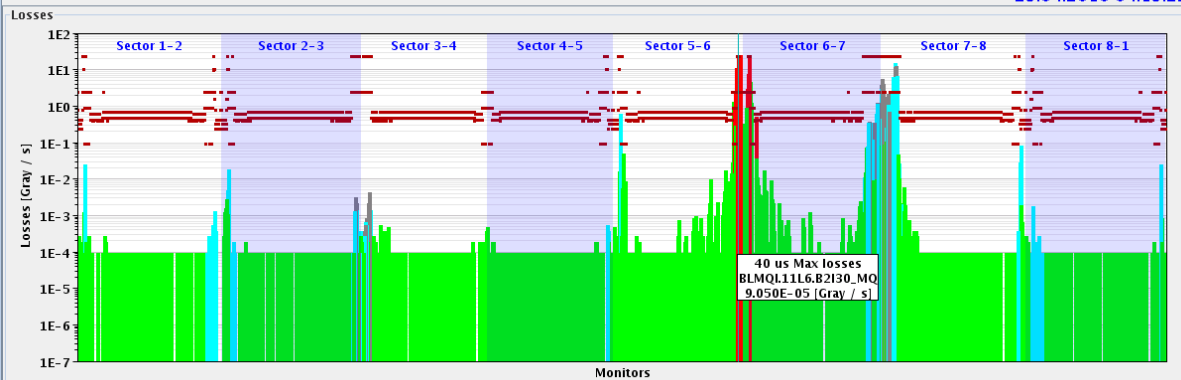
IR6 B2.TCDQ 5Gy/s  
IR7 3e-1Gy/s  
TCTH.4R5.B2 2e-2 Gy/s, 1e6 p+  
Leakage from TCDQ 4e-3

# 3.5 TeV squeezed, 1 $\sigma$ offset

- 23/04/2010, 04:13:22
- 1.6e10 in 2b in B1, 1.7e10 in 2b in B2, 90 s debunching, 1  $\sigma$  offset
  - Measured  $\sim 4e9$  in abort gap at moment of dump



23.04.2010 04:13:22



IR6 saturated  
IR7 15Gy/s  
TCTH.4R5.B2 0.6 Gy/s, 2e7 p+

Leakage from TCDQ  $\sim 2e-2$  from BLMs (but saturated). Using abort gap population gives  $\sim 2e-3$

# 3.5 TeV squeezed, 1 $\sigma$ offset

- Other observations
  - About  $4-6 \times 10^7$  p+/m – ‘limit’ for abort gap at 7 TeV defined as  $1 \times 10^6$  p+/m, for Q4 quench
  - No quench of Q4 (factor 10 above BLM threshold)
- Experiments with  $5-7 \times 10^9$  in abort gap:
  - **ALICE**: “Nothing was observed in the ALICE at 4:13 this morning.”
  - **CMS**: “small increases in activity (BCM1F fast diamond and BSC scintillators) at around 16:12 yesterday and this morning at the end of the long fill. Neither dump resulted in any visible BCM2/1L (Abort systems) activity”
  - **LHCb**: “You are not impressing us! We saw nothing at 16.02 and 04.12.”
  - **ATLAS**: “We saw more [BCM] activity then yesterday including significant activity in the low gain channels. We instead didn't see anything on the BLMs.”

# Some other considerations

- Structure on BSRA signal – what is this??
- Results must be treated as preliminary
  - Analysis of various unsaturated BLM data and comparing signals gives estimates of between 0.03% and 0.3% leakage to P5.TCT
    - comparable to the other estimates
  - Cross-calibration of losses “v.difficult” because of BLM saturation at 40 us.
  - p+ on TCT calculated from assumed  $1e12$  p+/Gy scaling – to measure!
  - Main contribution to leakage probably from only a few  $\sigma$  impact parameter on TCDQ system – increases leakage figure!
  - Abort gap population and distribution known more accurately when BSRA not saturated
- Actions, analysis ongoing to improve some of these unknowns – needs supporting measurements

# Summary

- Estimated  $1e-4$  leakage from TCDQ system unsqueezed, and around  $2-4e-3$  leakage squeezed.
  - Based on this, full sweep can let maybe 0.1 bunches through to TCT. However, almost certainly seeing scattering from TCSG/TCDQ and not 'primary'  $p+$  (yet)
- Cannot yet conclude on effect of  $1 \sigma$  offset – not hugely different from beam centered
- Analysis to refine with abort gap population data
- BLM saturation in P6 needs to be addressed if we want to make this calibration more accurate, together with measure of response for TCT/TCDQ/TCSG6

Preliminary!