TDI issues

- TDI setup & centering : scan the jaw across the beam (pilot).
  - ALICE : no problems – no ALICE beam dumps.
  - LHCb : scan not done since grazing the TDI always triggered dumps.
- Attempt to position the TDO with an angle were not very successful in IR8.
  - Always large signals in LHCb.

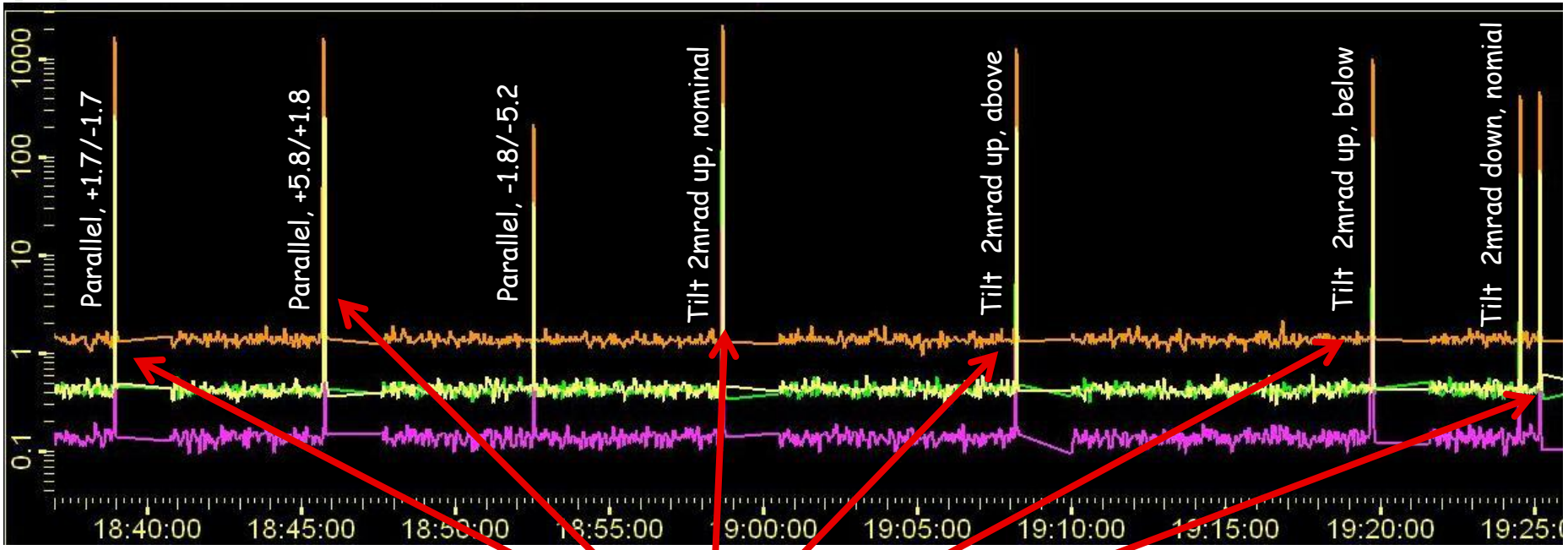
» Real difference in amount of beam reaching the experiment? (optics, geometry, trajectory…).

» Different sensitivity due to BCM locations??

TDI scan to reduce "pre-injection" background

- BCM response to TDI jaw alignment/position (gap ~3.4mm) with kick

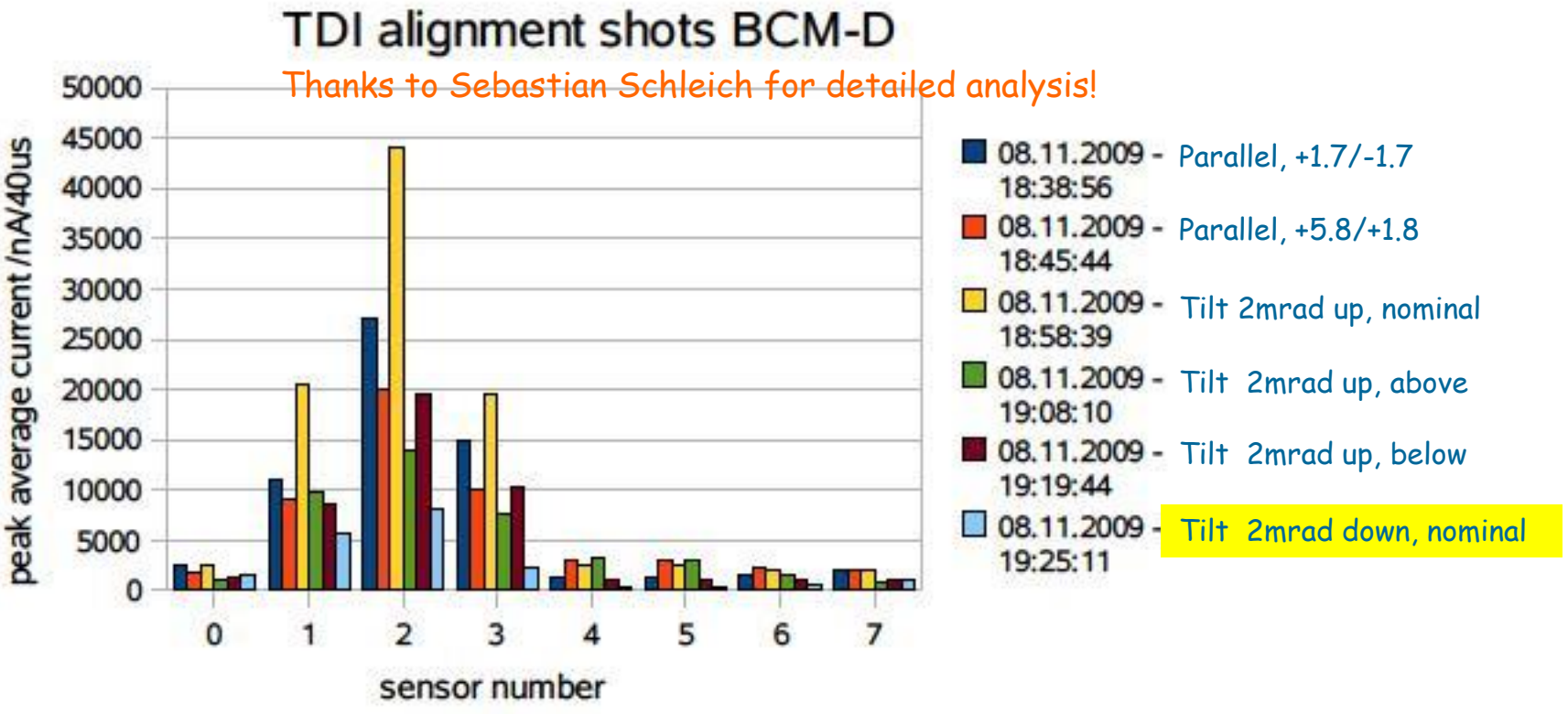
BCM current in nA



BCM dump

R. Jacobsson / 2nd Inj test
LPC 9.11.2009

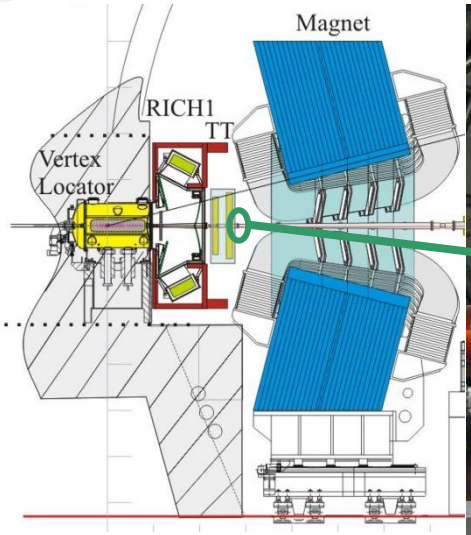
BCM response to TDI shots

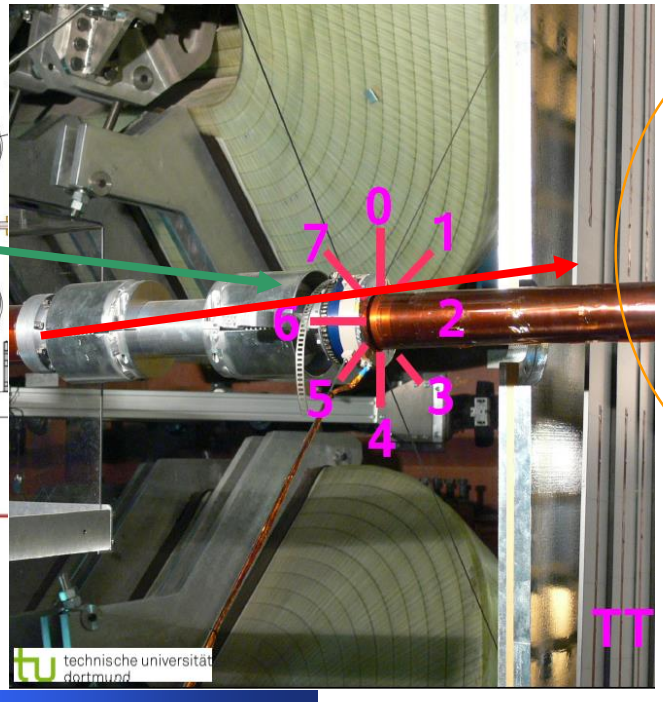


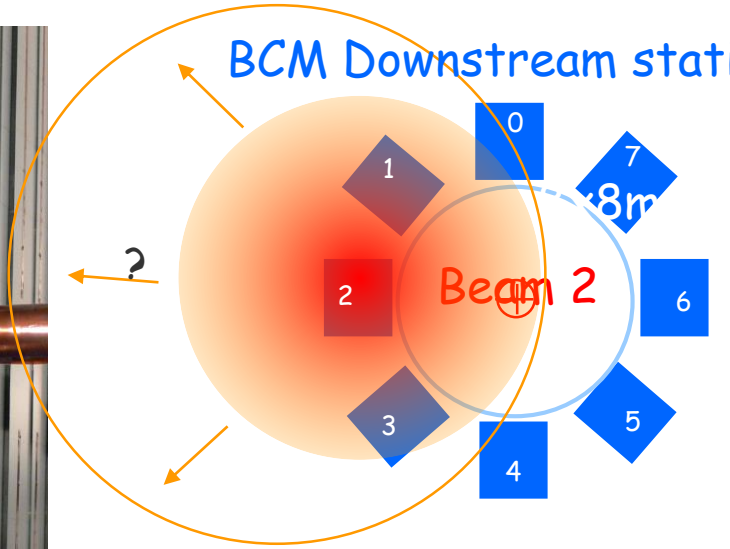
- Last was best but still about the same level as "Usual TDI dumps"
  - Requires more analysis to understand but it is not obvious
  - Discuss at MPP

Traditional annual LHCb dump

- TDI shot with MKI and jaws at -2.4/-5.9 mm @ Sunday 00:46:10
  - All previous shots typical "TDI levels"
  - Loss appeared as a concentrated shower at ~9 o'clock in BCM as seen along Beam 2
    - 7000 nA max seen in sensor 2 as compared to <200 nA typical TDI
    - 36 pA/mips ➔ >2×10^5 particles in sensor 2 ➔ >10^7 particles assuming an area of 10x10cm^2







User_permit

A. Di Mauro
MPP 3.07.2009

The user_permit (HW interlock) is based on the BCM-CFC-TELL1 chain developed by LHCb.

- Fast abort on RS2 (2x40μs CFC integration frames) coincidences:
  Dump the beam if 3 adjacent diamond sensors out of 4 show a current > thr_{RS2}
- Slow abort on ΣRS32 (32x40μs):
  Sorting out the two highest and the lowest of 8 sensors, dump the beam if ΣRS32 > $thr_{\Sigma RS32}$

Actual guess for thr_{RS2} ~ 5000 nA and for $thr_{\Sigma RS32}$ ~ 250 nA (to be x-checked …)

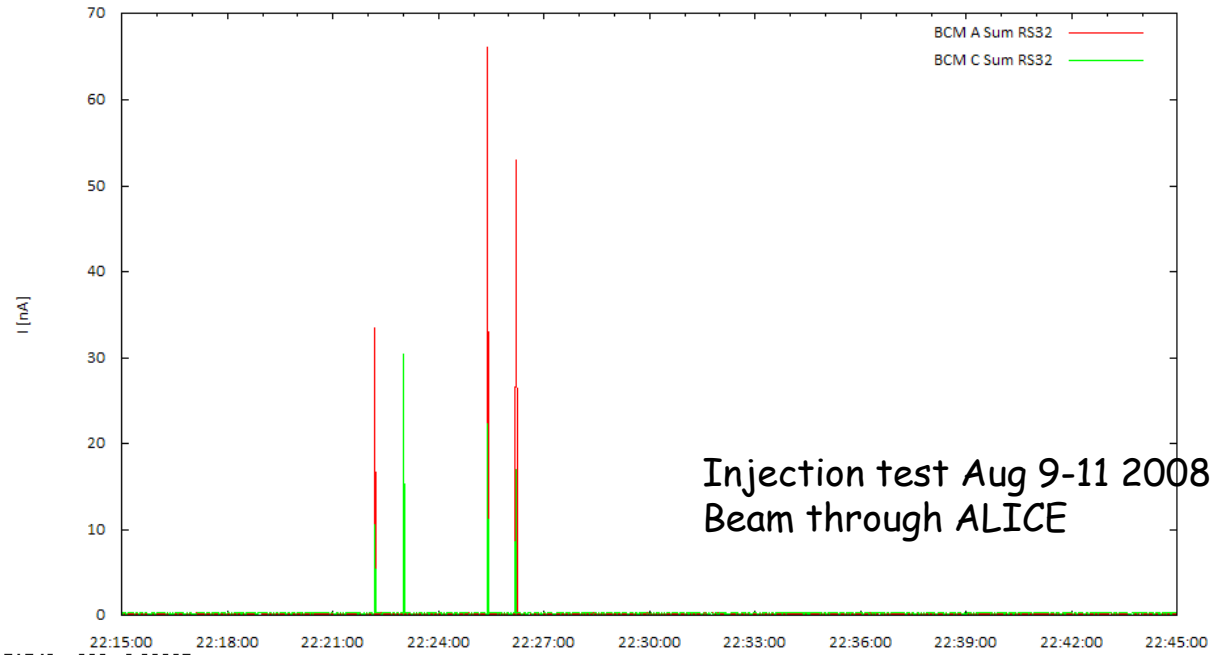
BCM currents from FLUKA simulation of injection failures by B. Pastirčák (ALICE Int. Note 2001-03), updated in Nov 07

(pilot bunch 5 × 10^9 p)

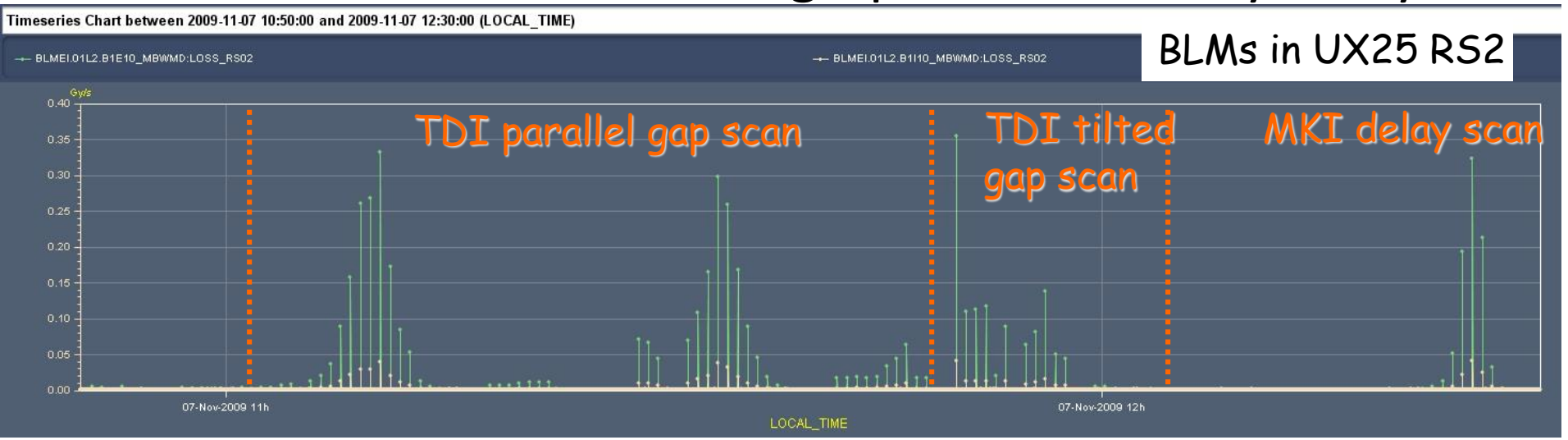
	RS2 [nA]	RS32 [nA]
BCM A	≈500-750	≈30-50
BCM C	≈100	≈6

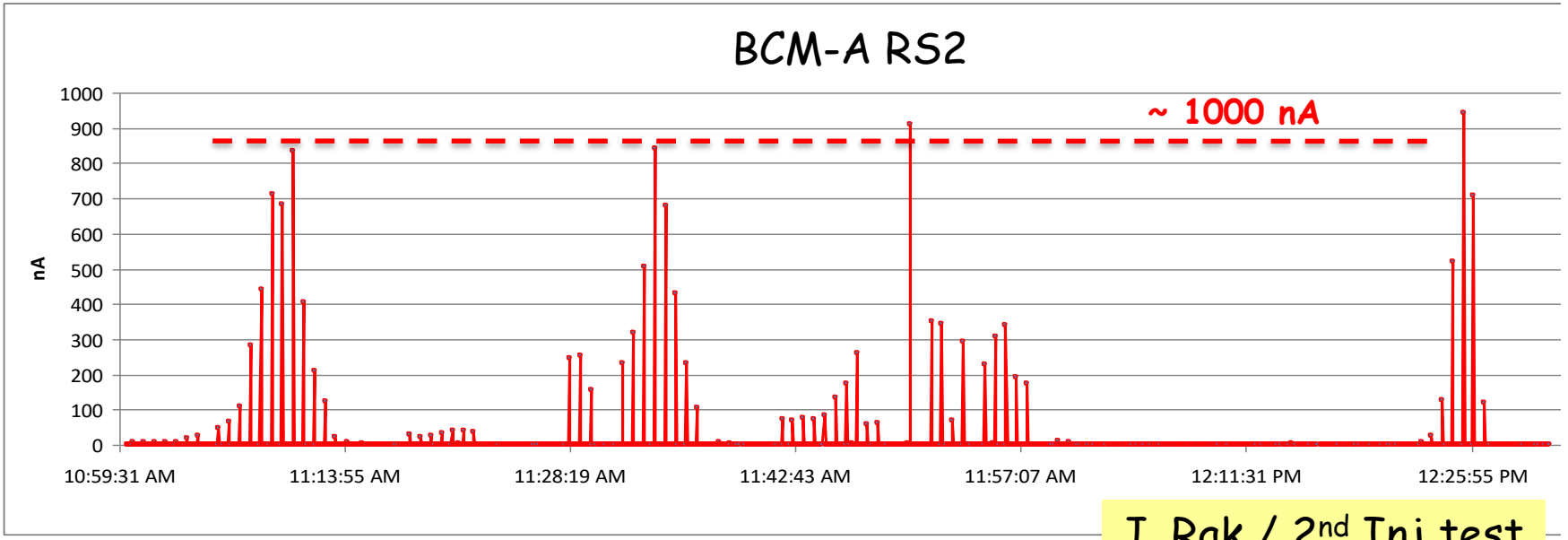
TDI grazing (pilot bunch 5 × 10^9 p)

	RS2 [nA]	RS32 [nA]
BCM A	≈900-2700	≈55-170
BCM C	≈325	≈20



Beam losses on TDI setting-up and MKI delay study





J. Rak / 2nd Inj test
LPC 9.11.2009

ALICE needs to be OFF (HV+LV)

What are the plans for these kind of studies during normal operation?