BI MD during block 2

(Wed 29-06 22:00 – Thu 30-06 06:00)

A.Boccardi, D.Bellorad, E.Bravin, E.Calvo, B.Dehning,
J.Emery, M.Favier, J-J. Gras, A.Guerrero, A.Jeff, R.Jones,
T.Lefevre, A.Rabiller, F.Roncarolo, R.Steinhagen,
M.Sapinsk, L.Soby et al.

LSWG – 12 Jul 2011

BCT and FBCT

J-J. Gras, D.Bellorad, L.Soby et al.

AIM

- BCT (BCTDC and BCTFR) performance with high intensity bunches
- System B fast BCT (BCTFR) performance with the newly installed 75 MHz filters.
  - linearity with respect to BCTDC
  - The dependency on bunch length and beam position

During Ramp

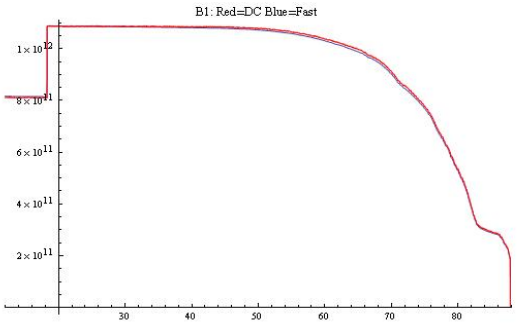
-Fast BCT measurements and bunch length not correlated anymore (below 1%)

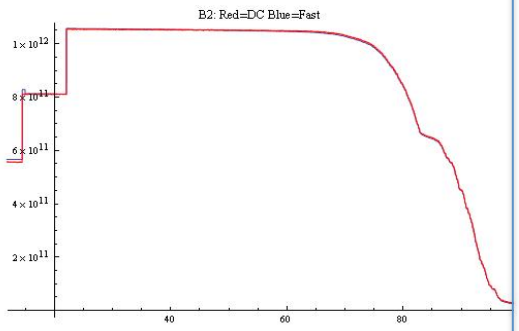
During Bumps

-DC BCT not correlated to beam position

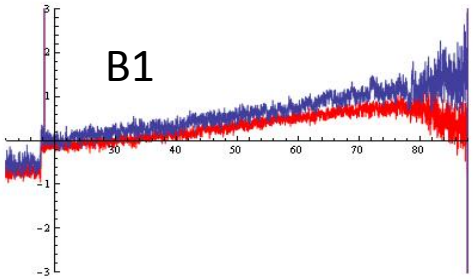
-FBCT : 0.5-1% variation per mm orbit excursion

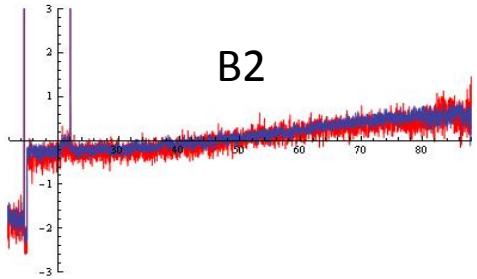
During Scraping





DC BCT/FBCT (BLUE=sys A, RED=sys B) [%]





Residual effect could be due to:
-Non linearity of the fast BCT
-Beam position variation during the scraping period
-Debunched beam population increasing during scraping.

BPMs

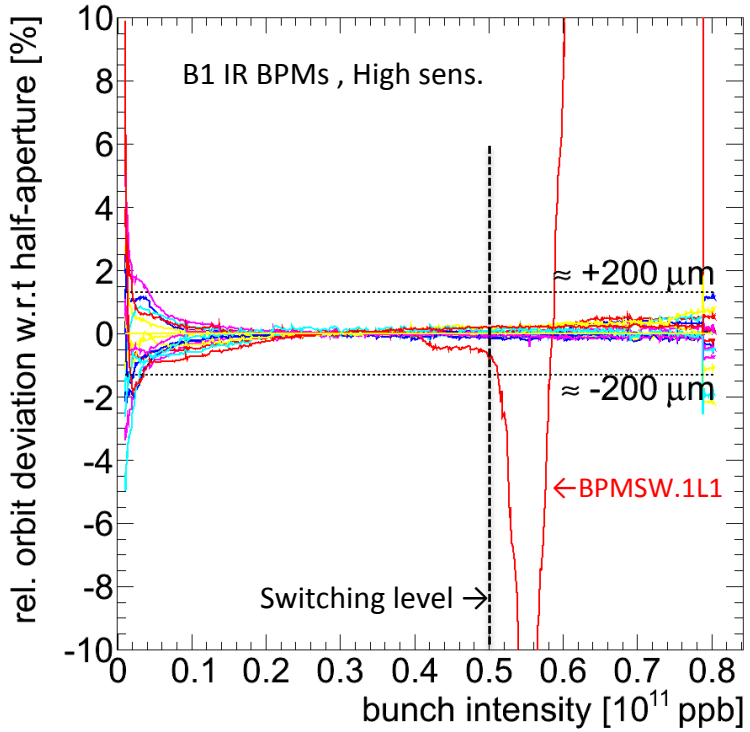
R.Steinhagen, E.Calvo, M. Gasior, R.Jones, T.Lefevre et al.

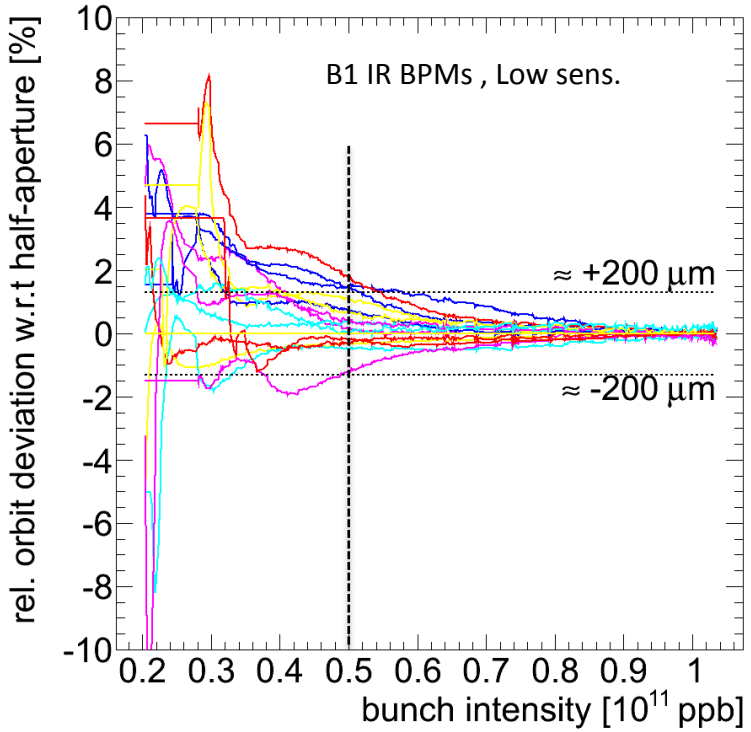
Aim

BPM revalidation after intensity card removal for IR6, exp. Irs, coll...
–verified linearity vs. bunch intensity changes
–lower trigger limits for nominal beams (↔ spurious IR6 BPM interlocks)

Main results:

– The intensity card removal has been effective.
– Intensity dependence < 200 um for high and low sensitivities modes in the IR BPMs.





WCM

R.Steinhagen, M. Gasior, R.Jones, T.Lefevre et al.

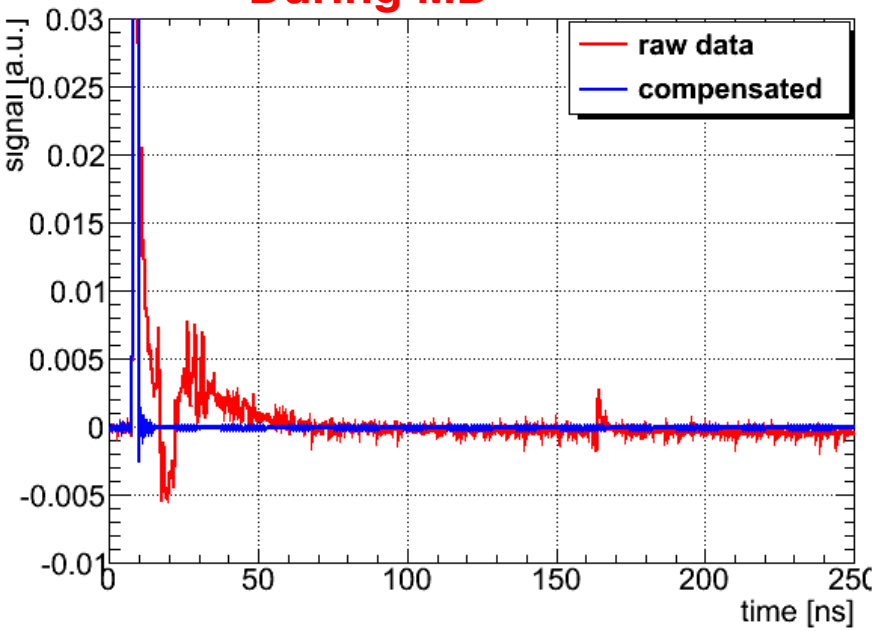
Aim

-Studies for detecting trailing ghosts/satellites and intensity accuracies < 10^{-4}
-verify compensation for reflections due to cable transitions and intrinsic WCM undershoot (AC-coupling)

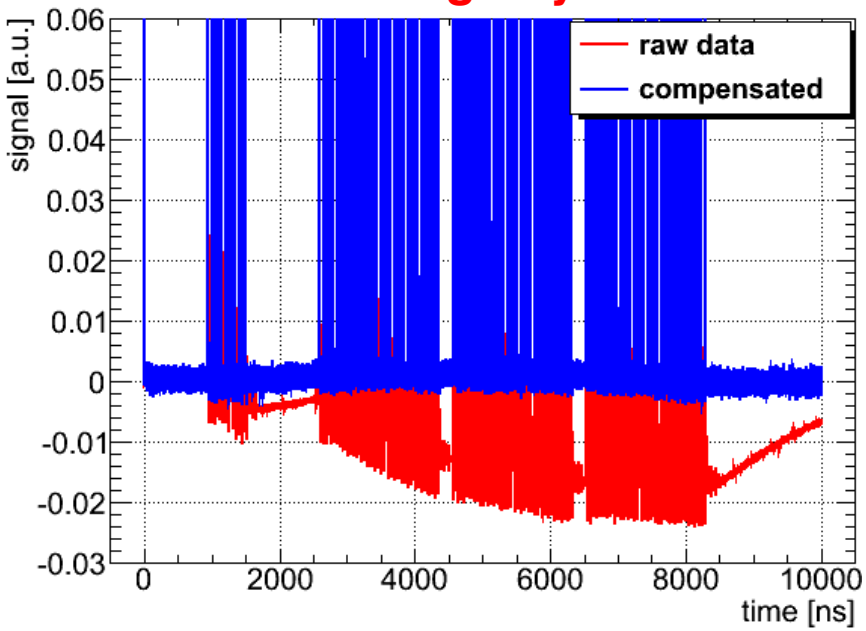
Main Results

-compensation works (see plots)
-Calibration remains noise limited (~10-3) → longer integration periods needed

During MD



During Physics



Schottky

M.Favier, R.Steinhagen, M. Gasior, R.Jones, T.Lefevre et al.

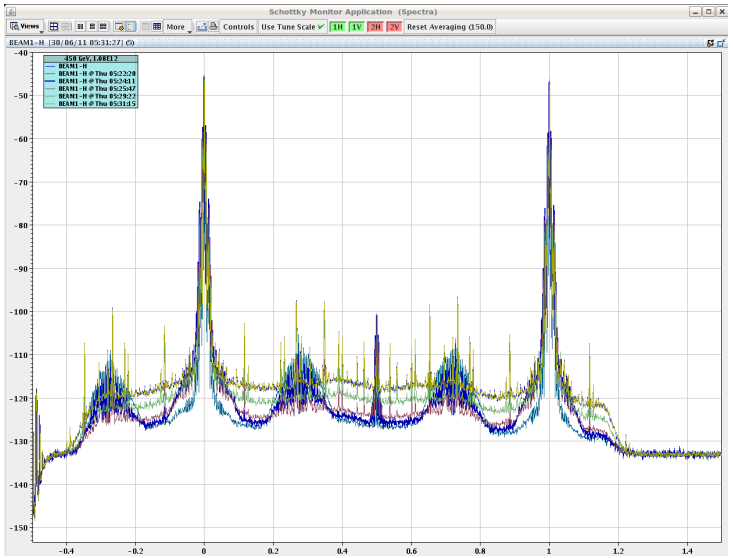
Aim

-Understand systems performances while changing beam intensity and beam position at the monitors (bumps).

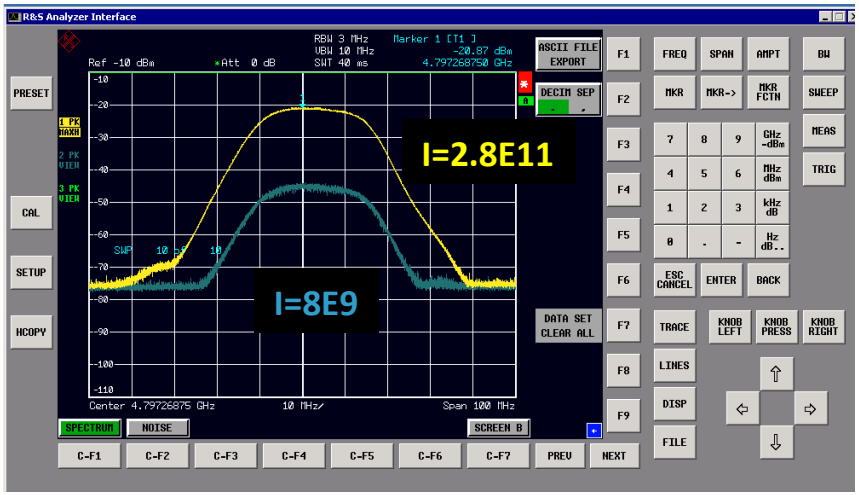
Main Results

-Good signals at any beam intensities for B1H, saturation seen on the other channels.
-No significant dependences of B1V, B2H and B2V on beam position probably due to some phase differences.
-B1H shows dependencies on beam position at the monitor -> Signal originally well centred.

B1H signal during bumps



Power Spectrum from B1H after the Gate



During TS: phasing of all 4 systems electrically centered, to be tested with beam

BSRT

F. Roncarolo, A.Rabillier, E. Bravin, A.Boccardi, A.Jeff

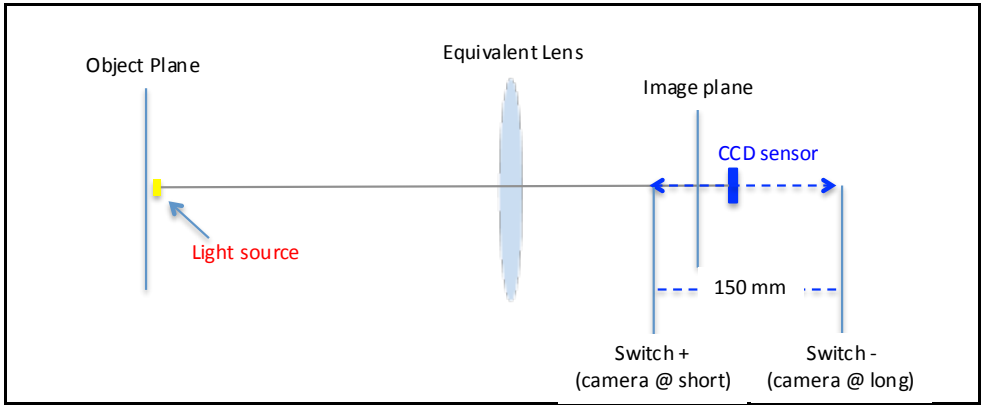
Aim

-study magnification and focusing with CO bumps while moving CCD camera

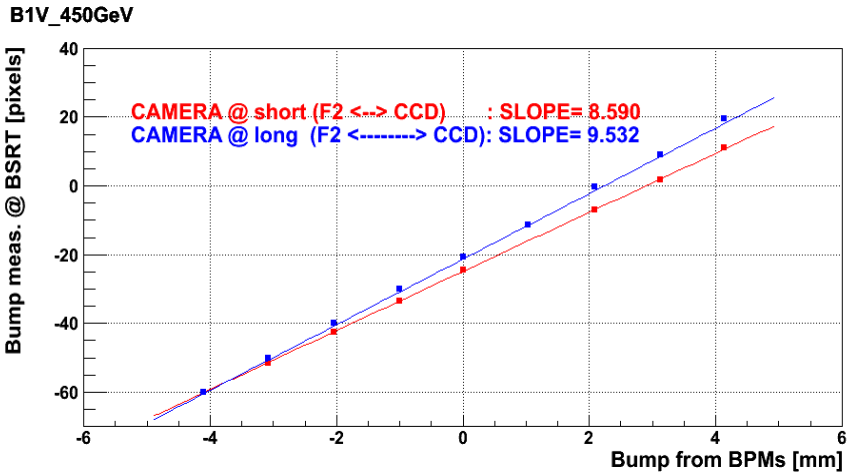
Main Results

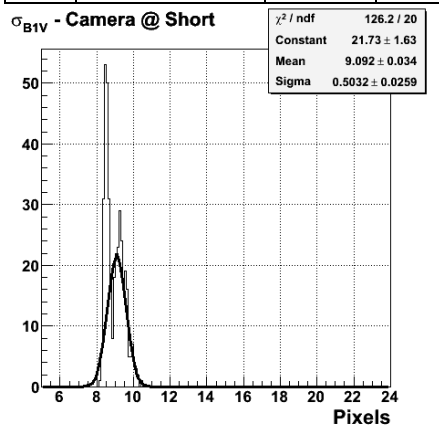
-a lot of useful data to digest

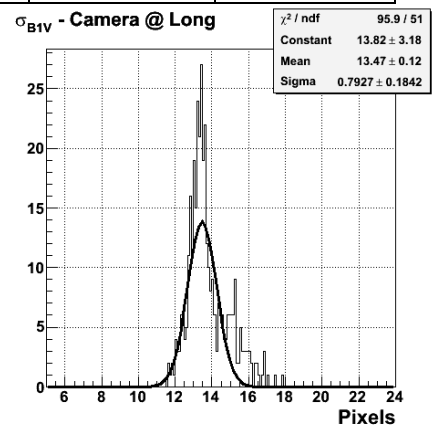
-preliminary: looks we need to advance further the camera, to be confirmed by more simulations



Comparison **Switch – (Camera @ Long)** vs **Switch + (Camera @ Short)**					
	Magnification Ratio	**Sigma Ratio [pix]**	**Sigma Ratio [mm]**	**DeltaSigma [%] before norm for cal factor**	**DeltaSigma [%] after norm for cal factor**
B1 H	1.126	1.104	0.981	10.437	-1.901
B1 V	1.110	1.482	1.335	48.152	33.511
B2H	1.093	1.268	1.160	26.761	16.027
B2V	1.095	1.492	1.363	49.225	36.273







WS

A. Guerrero, J.Emery, B.Dehning et al.

Aim

-response of the profile integral to the PM gain variation

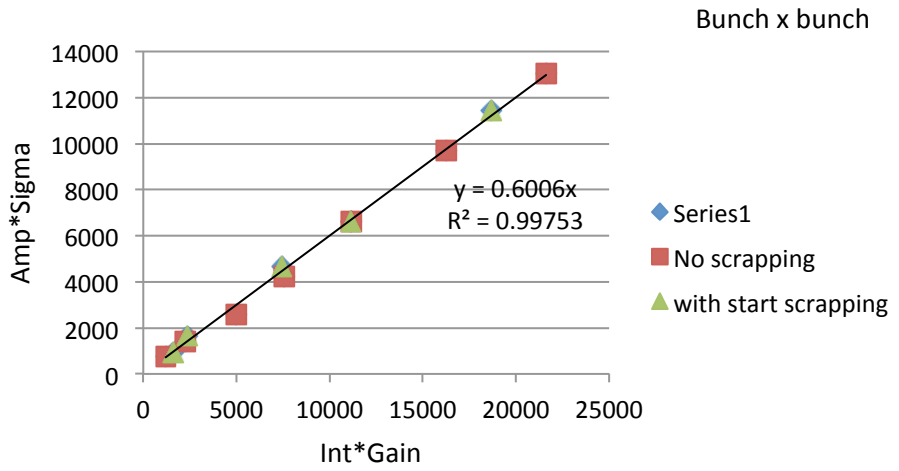
-track the emittance from PSB to LHC

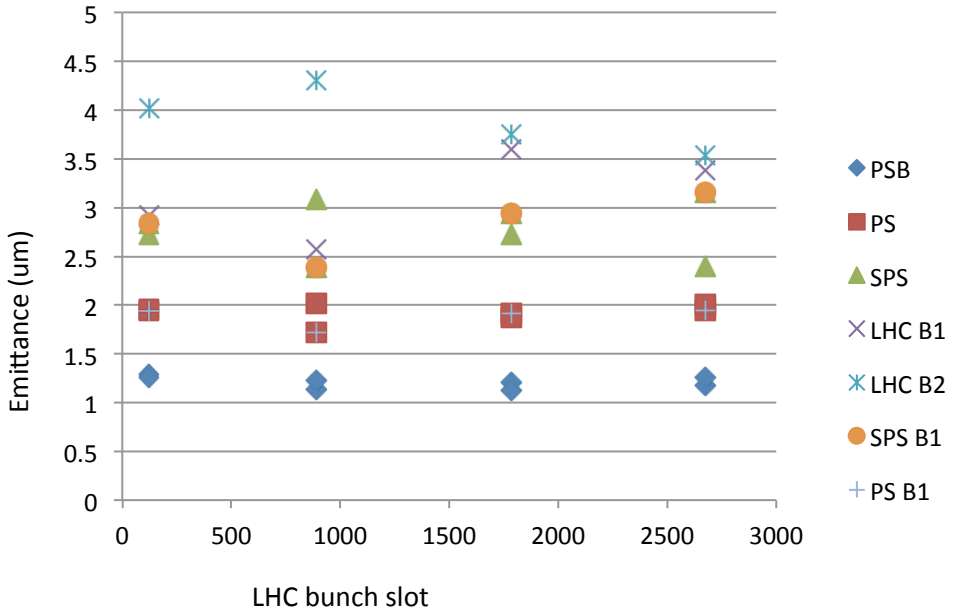
Main Results

-the b x b measurement: ADC saturation before the PM actually saturates. The relation is linear along all possible voltage variation.

-not the same for the 'turn' acquisition where the logarithmic ADC provides a much larger dynamic range

-A significant but consistent blow-up is seen between each consecutive machine except for the B1 injection from SPS to LHC





BGI

M. Sapinski, B.Dehning et al.

- The BGI has been taking data over whole 8 hours MD period, including 2-dimensional image data for the most interesting moments with the highest beam intensities.
  - This 2D data were taken together with corresponding wire scans. They remain still to be analysed, however the control of the camera gain and gate has been lost before the MD (they were based on temporary installation prone to radiation) and therefore these important parameters were not optimized for data taking as well as they were not controlled.

- It should be stressed the control of the cameras has been reestabilished just after the MD, during the technical stop.

- During the whole MD a new expert application was also tested and a list of corrections has been prepared.

LDM

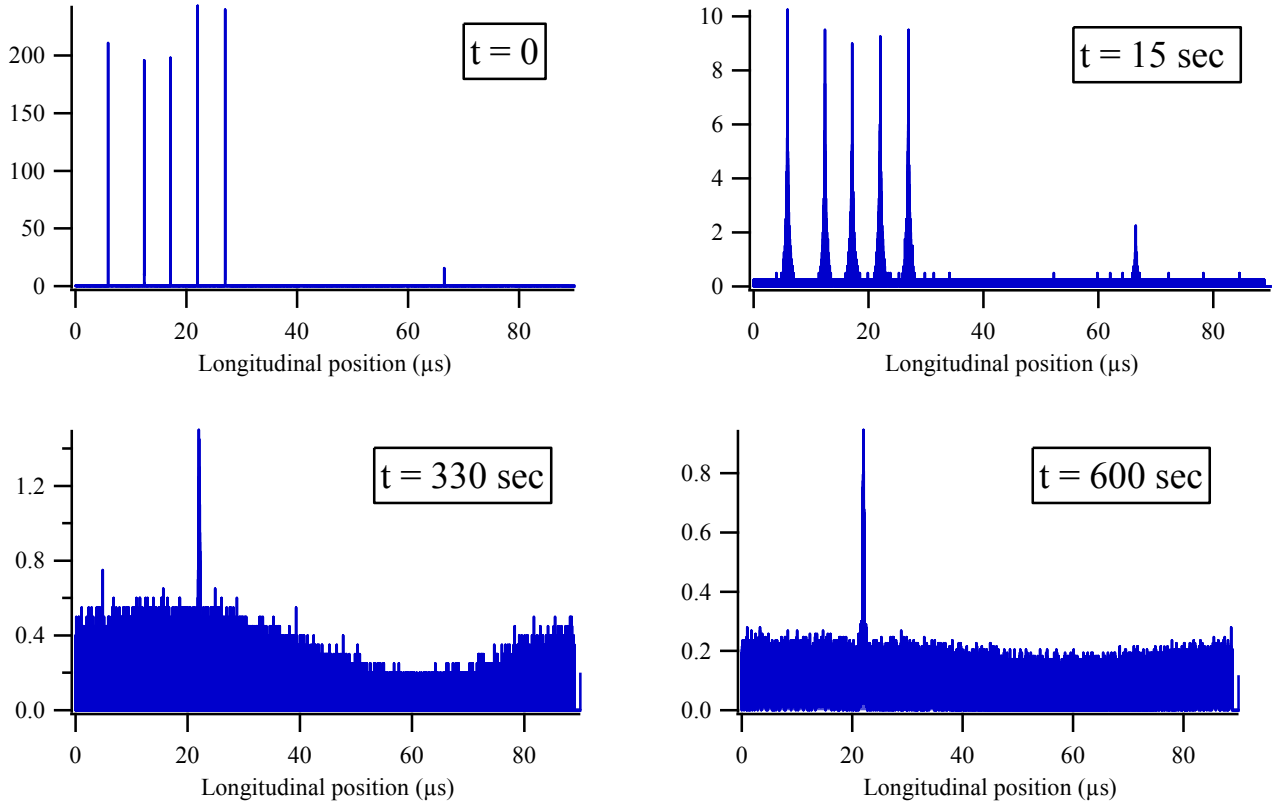
A.Jeff, A.Boccardi, A.Rabillier, E. Bravin , F. Roncarolo

Aim

-study after pulsing correction
-monitor de-bunching when switching off the RF

Main Results

-improved knowledge of after-pulsing correction
-anomalous debunching of 1 bunch in B1



AGM

A.Boccardi, A.Rabillier, E. Bravin , F. Roncarolo, A.Jeff

- Period 1: scraping with 4 bunches >2E11 (parassitic)
  The BSRA linearity has been checked against fast and slow BCTs for both beams placing the gate on a bunch. Data to be analysed, preliminary results show good agreement over an extended range of intensities

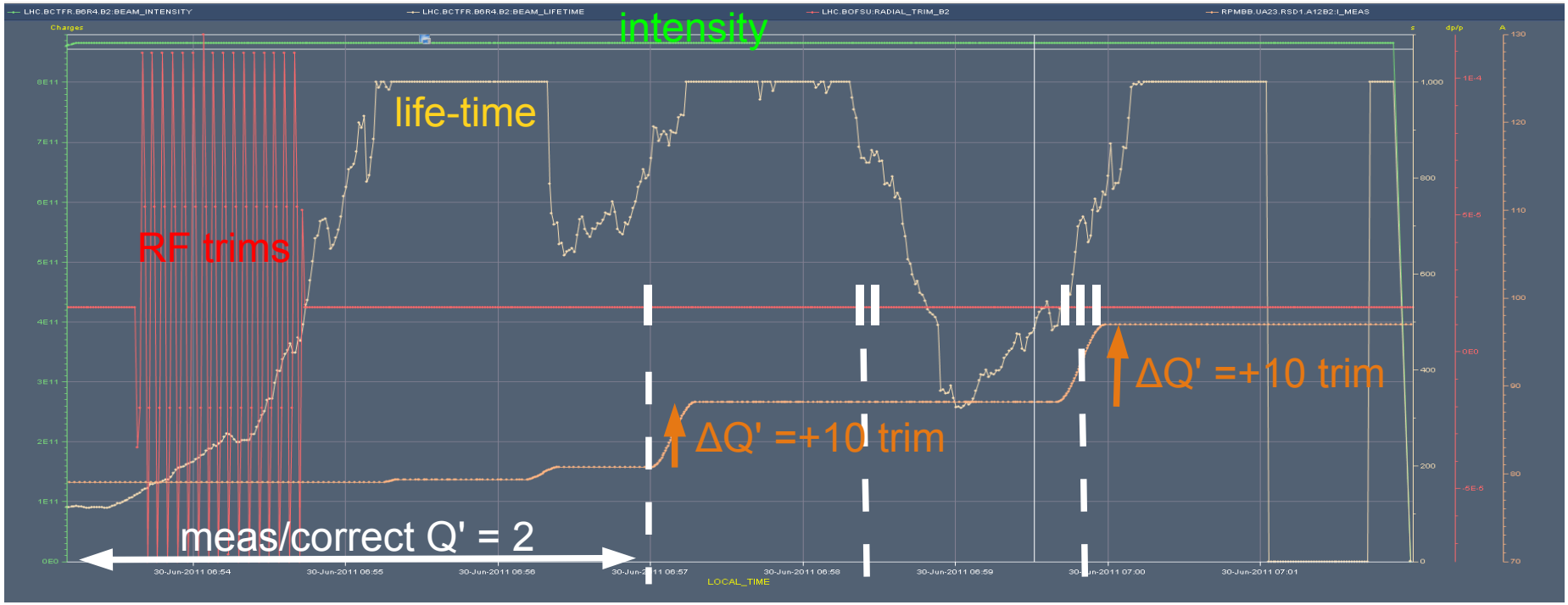
- Period 2: Scraping on 1 beam and RF off on the other (4.78E11 total intensity)
  With the RF off has been verified the calibration with unbunched beam (closer to real conditions) against DCBCT. The DC recovery algorithm seems to work and no major differences has been observed between the calibration done with a bunch and with DC beam.

- Period 3: bumps at 450GeV (parassitic)
  Verification of the dependency on the beam position: data to be analysed. No major effect noted except for b1 horizontal with a 4mm positive bump.

- Period 4: ramp (parassitic)
  Data acquired to verify the calibration Vs. Energy and the new FESA.
  At the end of the ramp it was also possible to calibrate the little trombone effect. Even considering a small problem during the ramp with the auto steering of the BSRT the error on the calibration remained in the order of 10% over the full energy range.

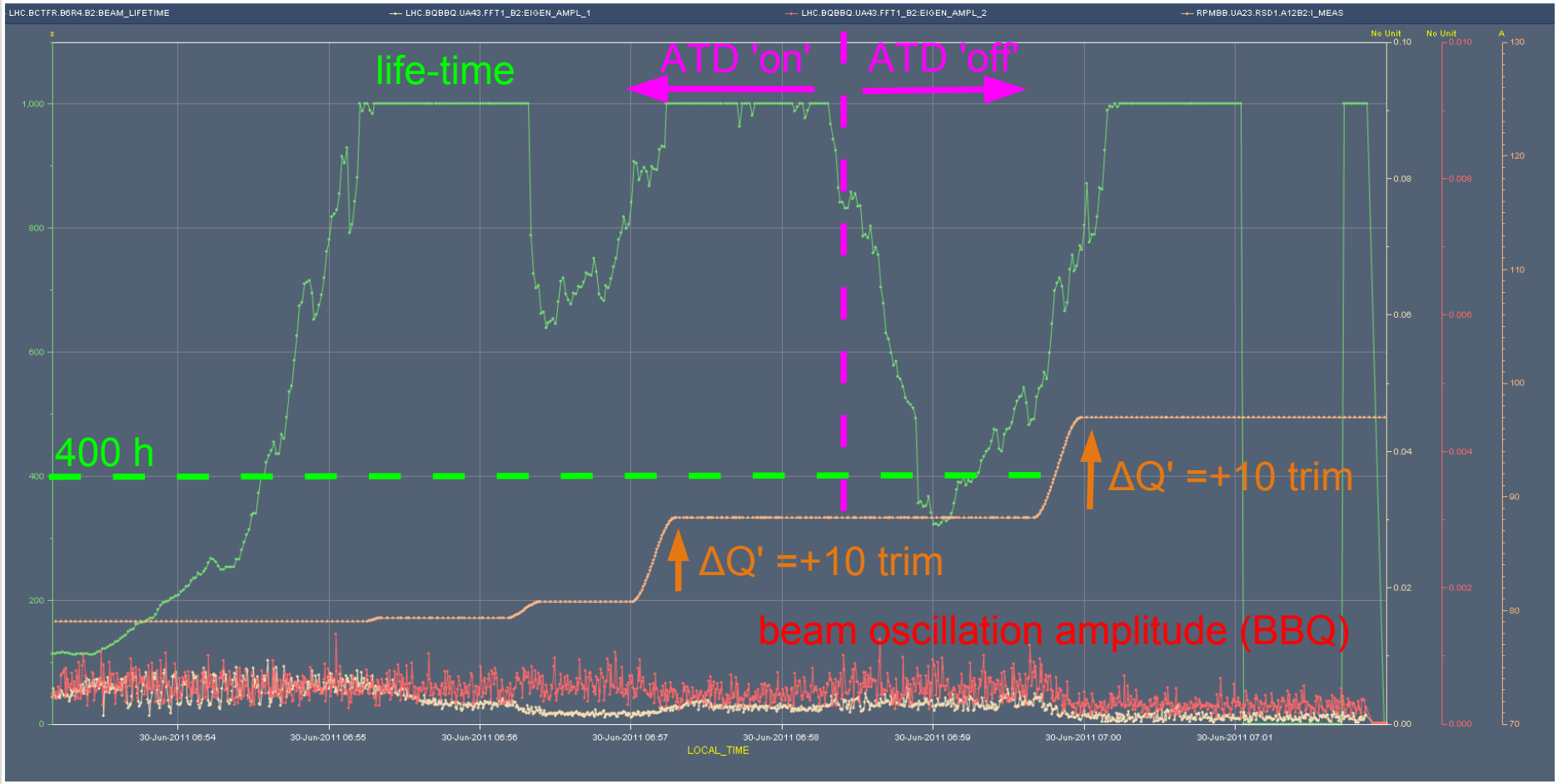
At the very end of our BI-MD (~7:00, 2011-06-30): Does the Single-Bunch Emittance Growth depend on Q'?

- Exp. setup to assess criticality of Q' measurement/control:
  - Ramped 12 nominal bunches (~$1.2 \cdot 10^{11}$ p/b, 1.1 ns) to 3.5 TeV
  - measured and corrected Q' to 2 units in both planes
    → Q' can be measured/corrected with nominal beam
  - fixed BSRT B2 acquisition to single bunch for better resolution
- Outline of what has been measured:
  I. Increased ΔQ' = +10 units → no (noticeable) e-growth or life-time drop
  II. Transverse damper 'off' → no e-growth and negligible life-time drop
  III. Increase by yet another ΔQ' = +10 units → same observation (=nothing)



Beam Oscillation Amplitude

- Life-time increased while modulating (removing tails?)
- No substantial impact of Q' (nor ADT) on observed oscillation amplitudes
- Most life-time dips related to when 'touching' the machine
  (Q/Q' trims, ADT 'on ↔ off' transitions etc..)



(Absent of) Beam Size Growth for large Q'

- Somewhat unexpected effect…related to oct. field (circuits where ± ~150 A)
- Q' to ~22 units further stabilises the beam → no apparent beam size growth
- Open question:
  - cross-checks: 450 GeV? Octupoles 'off'? bunch trains?
  - How important is ADT or Q' control actually after injection/ramp?