SOME OBSERVATIONS DURING THE 25 ns MD done on 24-25/10/2011

Elias Métral (replacing GianluigiA and for many people from ABP, OP, BI, RF, ABT, Cryo, Vacuum etc. MANY THANKS!)

- Introduction => Goal of this MD
- Overview of this MD
- Some observations
  - FBCT and BSRT
  - RF stable phase shift
  - ADT and HEADTAIL monitor
  - Beam-induced heating on arc beam screens
  - Vacuum
  - MKI issues
- Conclusion

GOAL OF THIS MD

- 24 hours of 25 ns MD: From MO 24/10/11 08:00 till TU 25/10/11 08:00
- Fill with SPS batches of 72 bunches (with 925 ns in between), scrub and study ecloud effects (at 450 GeV)
- Goal: Reach ~ the same beam intensity currently used in physics (i.e. ~ 2E14 p) => Could be obtained with ~ 2000 bunches with ~ 1E11 p/b => Method:
  - ADT adjusted for 25 ns
  - Using high chromaticity 1st (to avoid the fast TMCI-like instability)
  - Then, after some scrubbing, try and reduce the chromaticity
- Try and quantify the SEY and reflectivity at the end of the scrubbing

- *Note: maximum # of bunches which can be injected with this scheme = 2100*

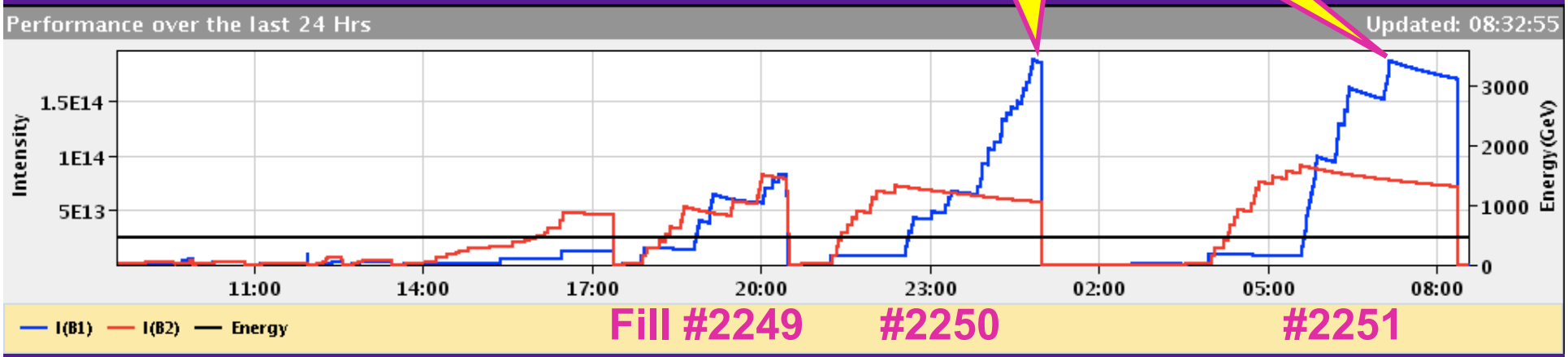
OVERVIEW OF THIS MD (1/3)

- **Till ~ 16:30: set-up of injection B2**
- **~ 17:30 to ~ 20:30 (~ 3 h) => Fill #2249: 1020 bunches each beam. Dump by BPM in IR6: intensity of some bunches was too low**
- **~ 21:00 to ~ 01:00 (~ 4 h) => Fill #2250: B1 2096 bunches and B2 804 bunches. Dump again by BPM in IR6**
- **~ 04:00 to ~ 08:30 (~ 4 h 30) => Fill #2251: B1 2100 bunches and B2 1020 bunches**

- ***Increased MKIs vacuum thresholds for the injection from 2E-9 mbar to 2.5E-9 mbar***
- ***All ecloud solenoids in the experimental areas have been switched off***
- ***Switching solenoids at MKI to 3A for injection and OFF for scrubbing***

OVERVIEW OF THIS MD (2/3)

A bit less than 2E14 p



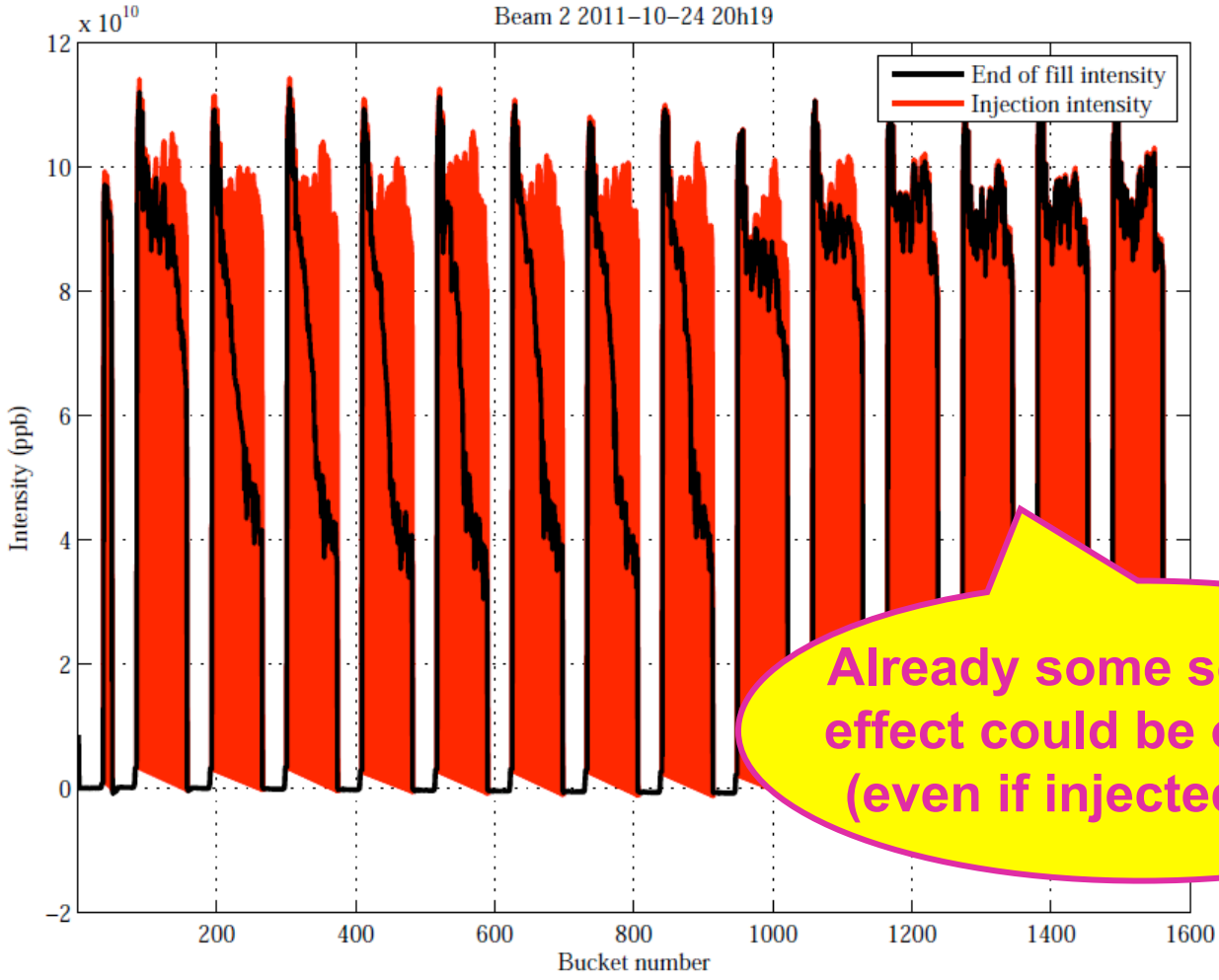
OVERVIEW OF THIS MD (3/3)

FILL #2249 (1/7)

- Qprime: ~ 13 in H and ~ 15 in V for both beams

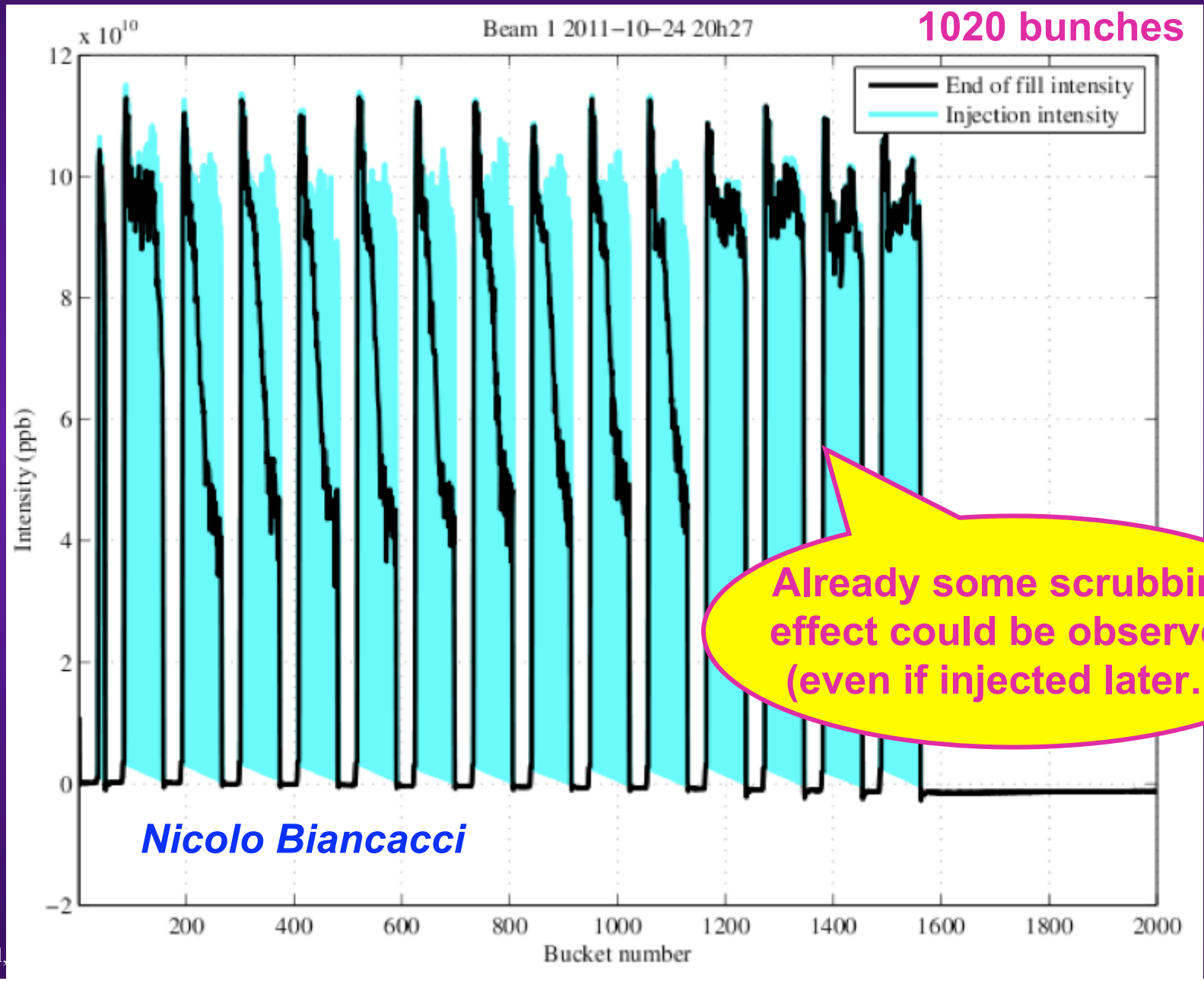
Nicolo Biancacci

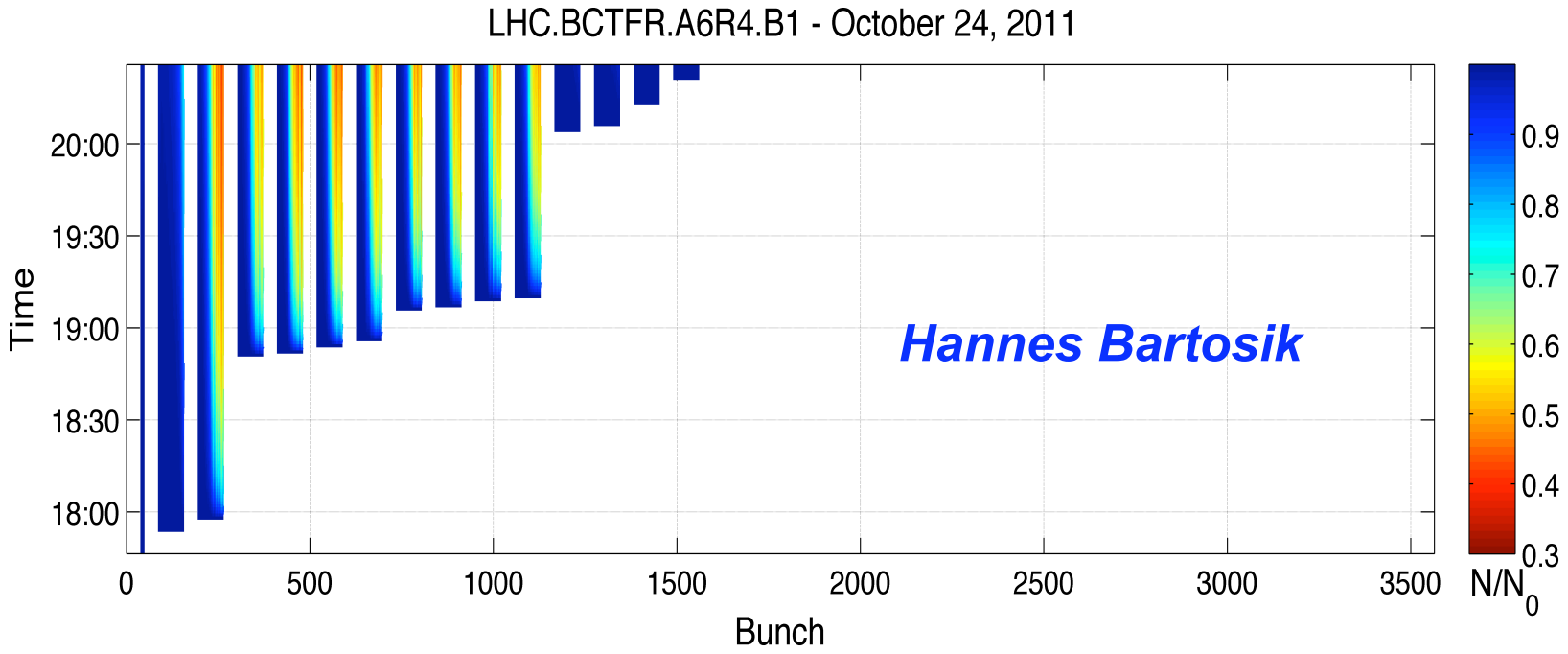
1020 bunches

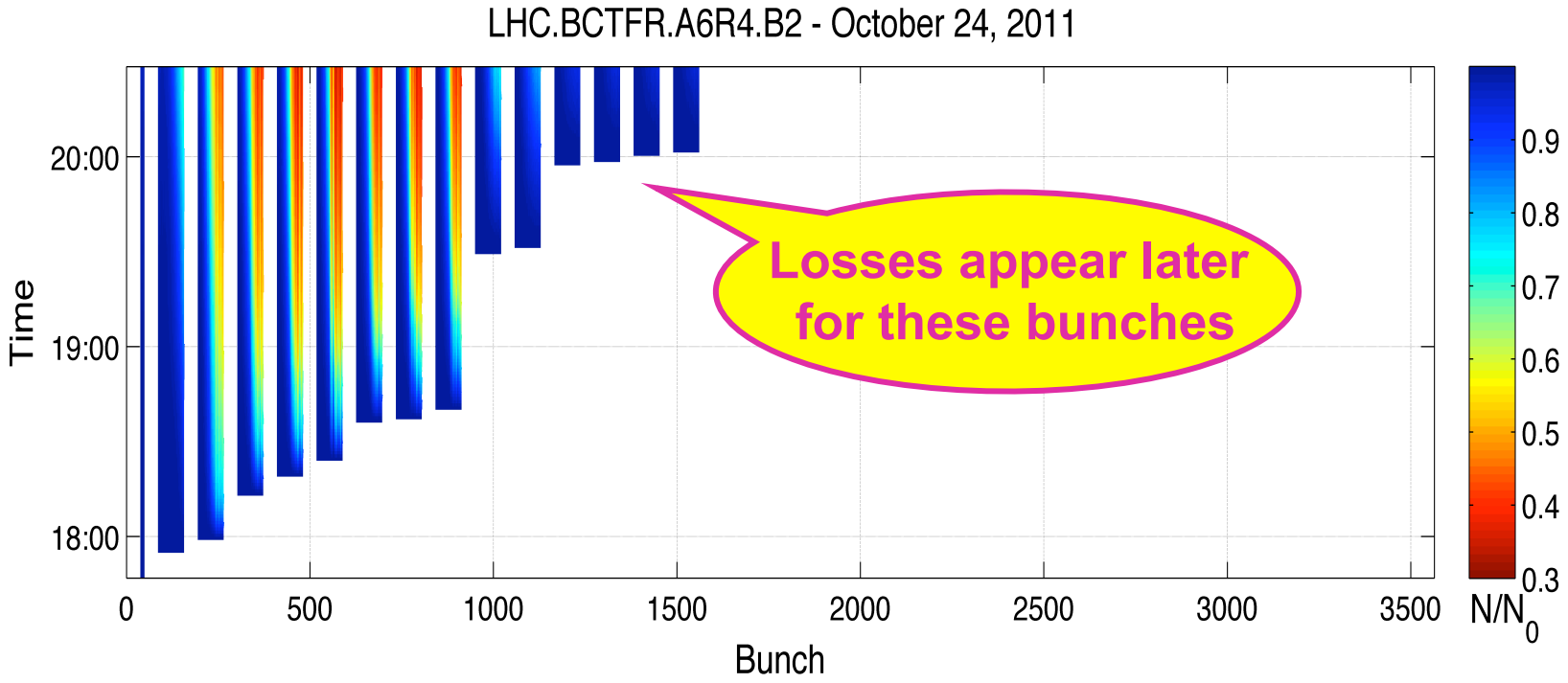


Already some scrubbing effect could be observed (even if injected later…)

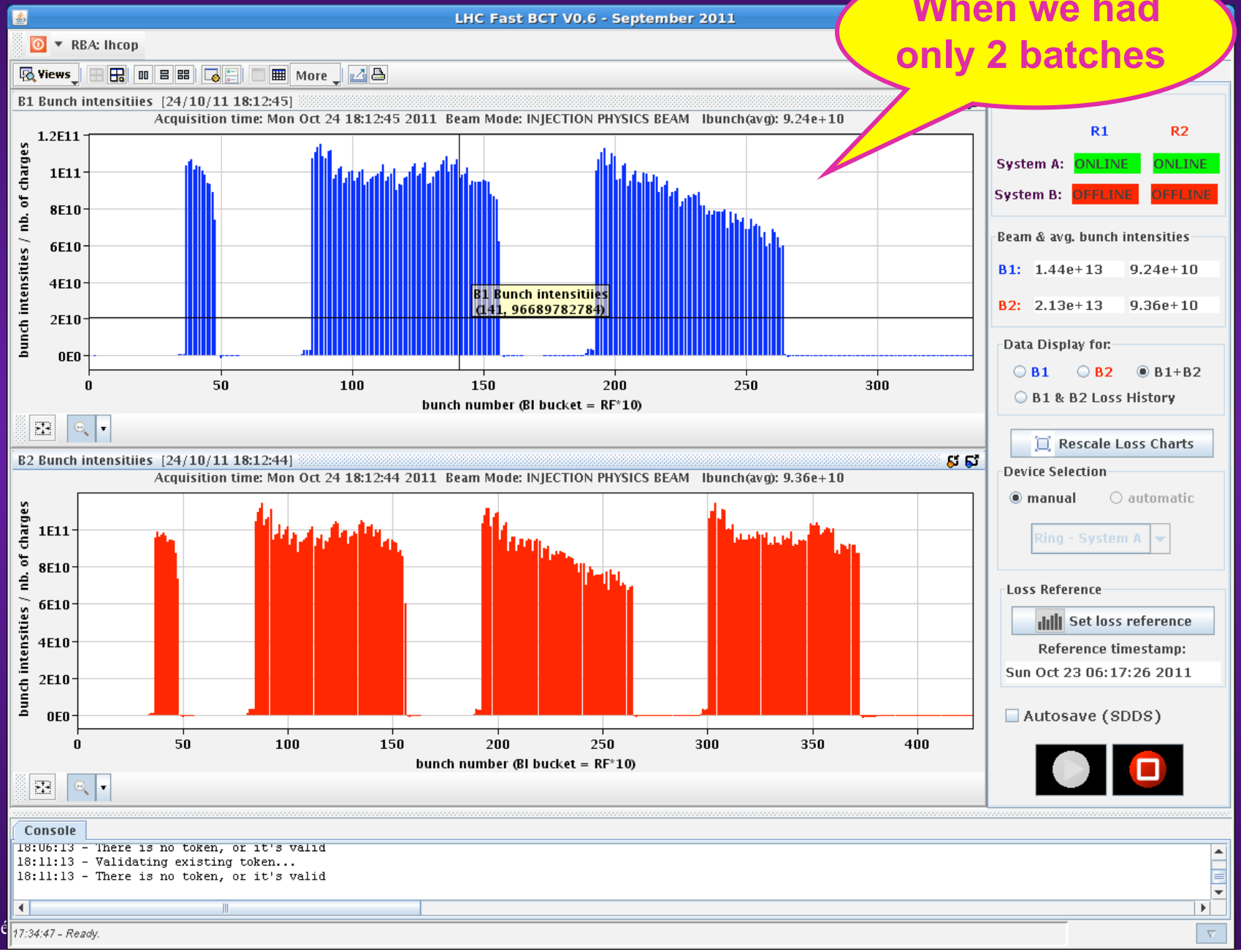
FILL #2249 (2/7)


Beam 1 2011−10−24 20h27
x 10^10
End of fill intensity
Injection intensity
Intensity (ppb)
Bucket number
1020 bunches
Already some scrubbing effect could be observed (even if injected later…)
Nicolo Biancacci

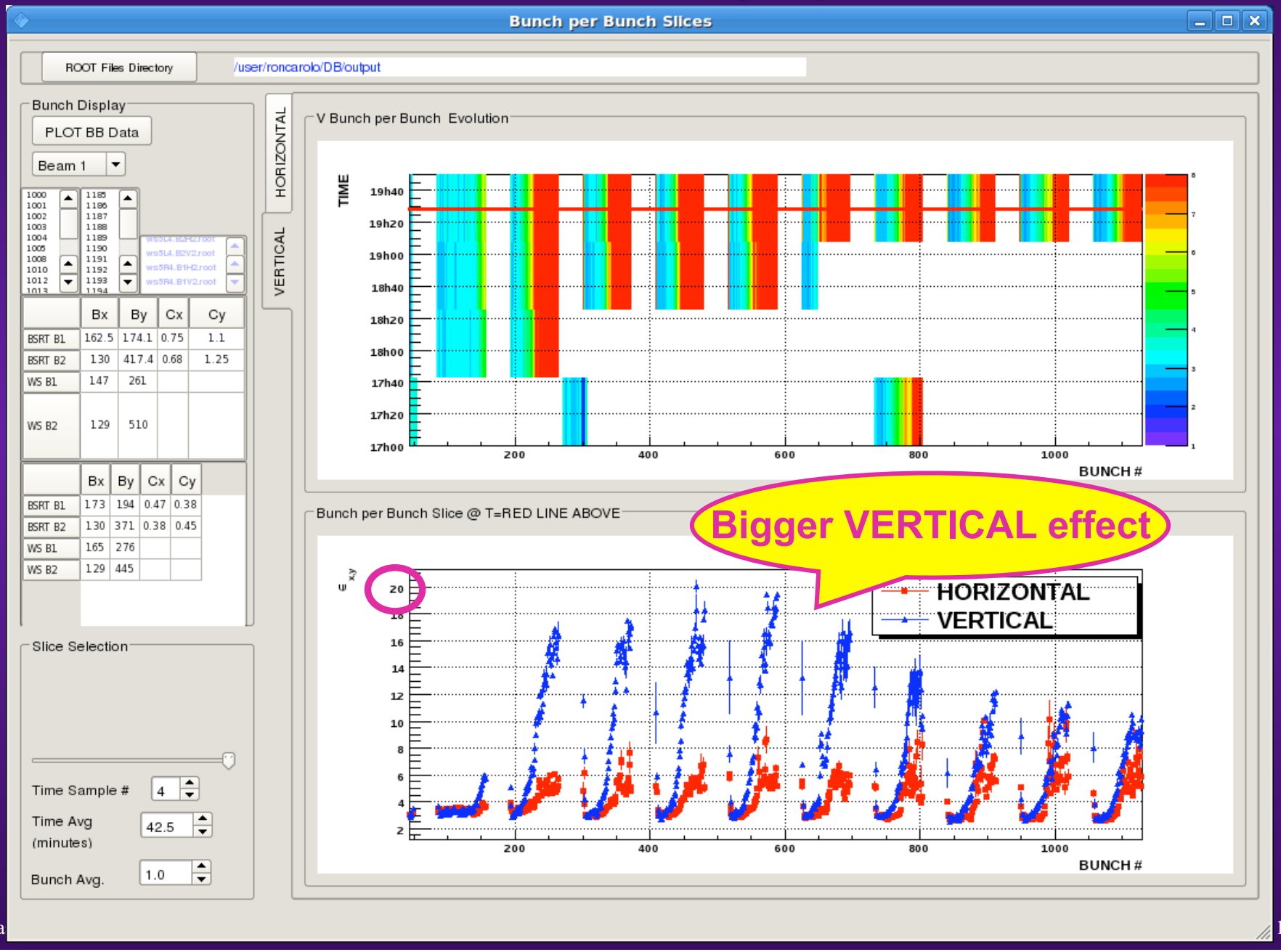

LHC.BCTFR.A6R4.B1 - October 24, 2011
Time
20:00
19:30
19:00
18:30
18:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
Hannes Bartosik
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0


LHC.BCTFR.A6R4.B2 - October 24, 2011
Time
20:00
19:00
18:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
Losses appear later
for these bunches
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0

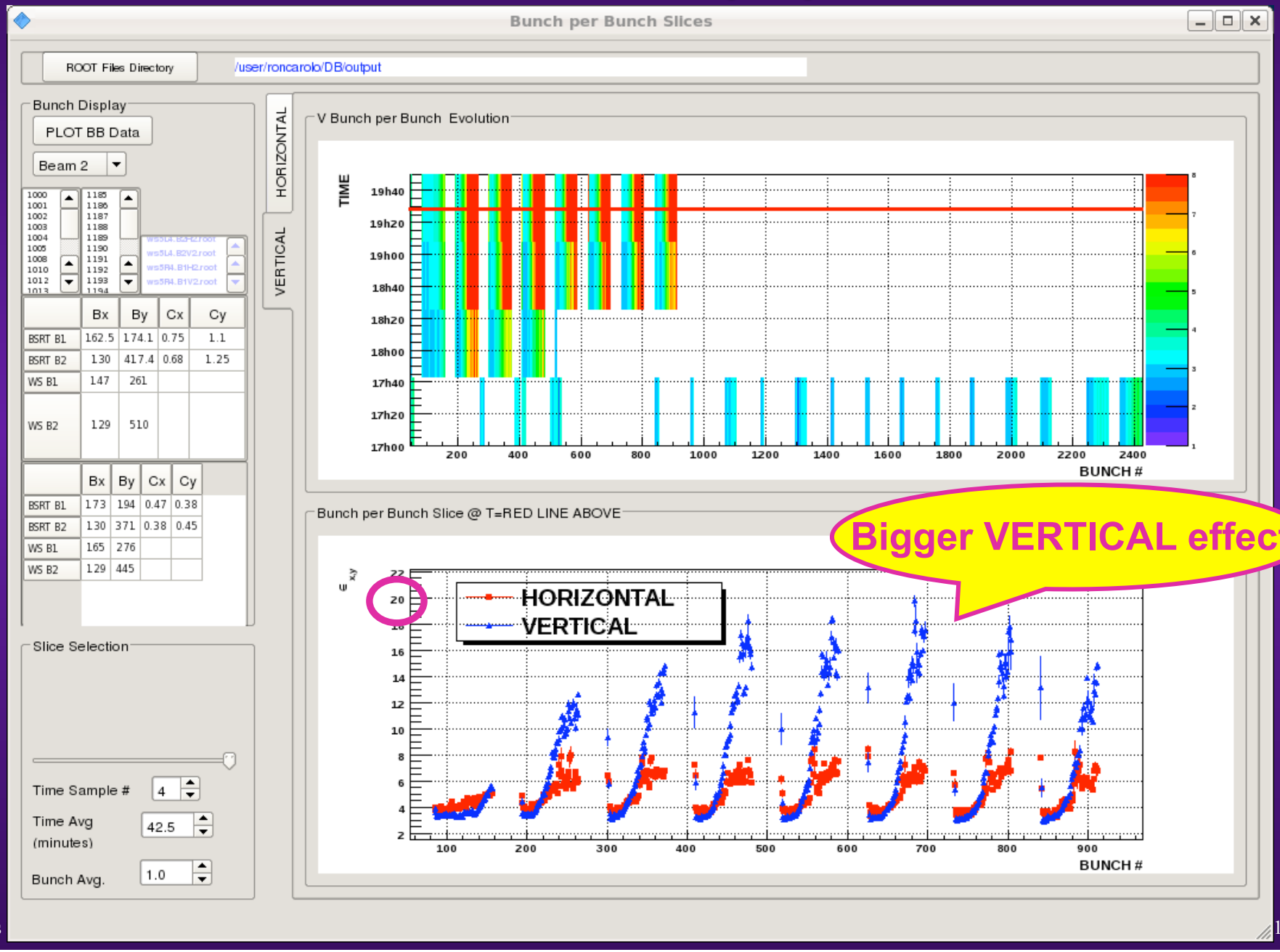
FILL #2249 (4/7)


When we had only 2 batches
LHC Fast BCT V0.6 - September 2011
RBA: lhcop
Views
More
B1 Bunch intensitiies [24/10/11 18:12:45]
Acquisition time: Mon Oct 24 18:12:45 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 9.24e+10
bunch intensities / nb. of charges
1.2E11
1E11
8E10
6E10
4E10
2E10
0E0
0
50
100
150
200
250
300
bunch number (Bl bucket = RF*10)
B1 Bunch intensitiies
(141, 96689782784)
B2 Bunch intensitiies [24/10/11 18:12:44]
Acquisition time: Mon Oct 24 18:12:44 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 9.36e+10
bunch intensities / nb. of charges
1E11
8E10
6E10
4E10
2E10
0E0
0
50
100
150
200
250
300
350
400
bunch number (Bl bucket = RF*10)
R1
R2
System A: ONLINE ONLINE
System B: OFFLINE OFFLINE
Beam & avg. bunch intensities
B1: 1.44e+13 9.24e+10
B2: 2.13e+13 9.36e+10
Data Display for:
B1
B2
B1+B2
B1 & B2 Loss History
Rescale Loss Charts
Device Selection
manual
automatic
Ring - System A
Loss Reference
Set loss reference
Reference timestamp:
Sun Oct 23 06:17:26 2011
Autosave (SDDS)
Console
18:06:13 - There is no token, or it's valid
18:11:13 - Validating existing token...
18:11:13 - There is no token, or it's valid
17:34:47 - Ready.

FILL #2249 (5/7)

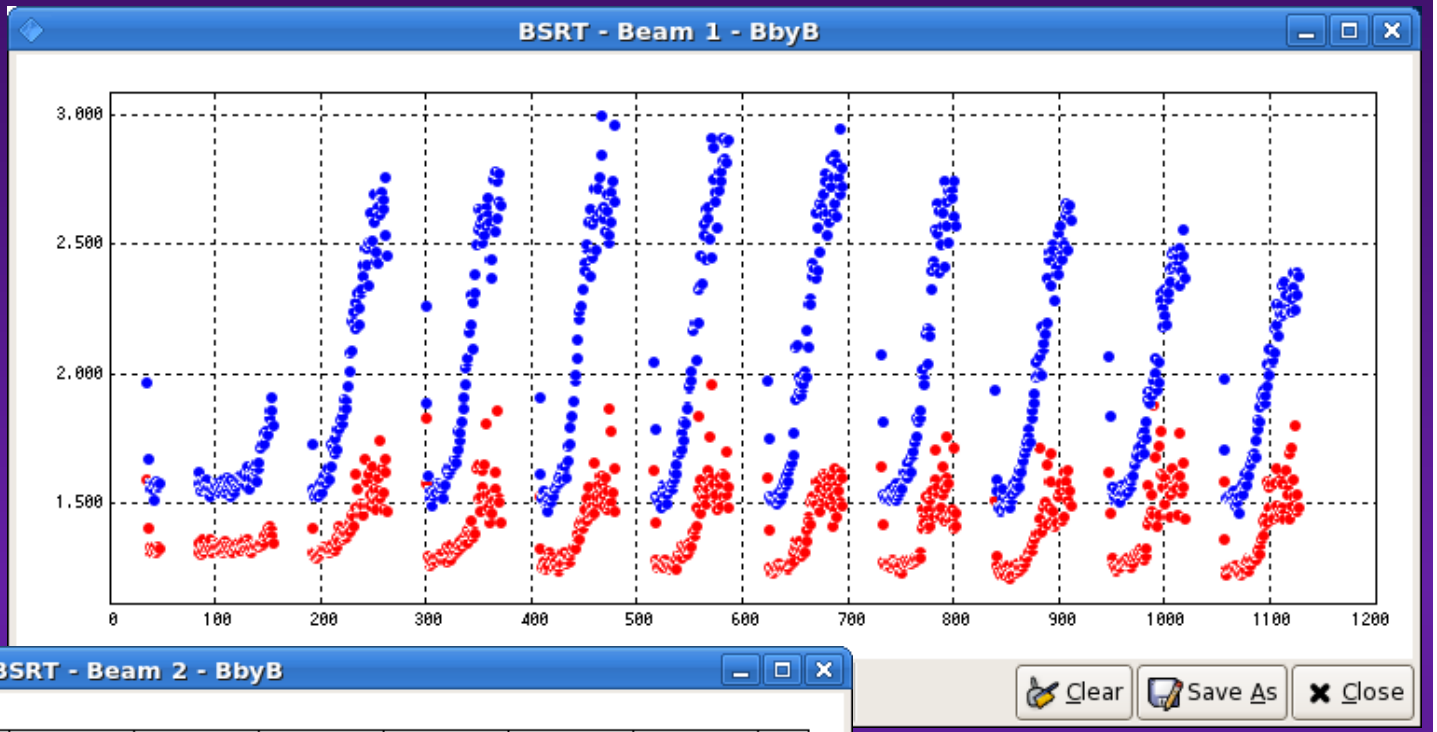

Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 1
HORIZONTAL
VERTICAL
V Bunch per Bunch Evolution
TIME
19h40
19h20
19h00
18h40
18h20
18h00
17h40
17h20
17h00
200
400
600
800
1000
BUNCH #
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Bunch per Bunch Slice @ T=RED LINE ABOVE
Bigger VERTICAL effect
HORIZONTAL
VERTICAL
Slice Selection
Time Sample # 4
Time Avg (minutes) 42.5
Bunch Avg. 1.0

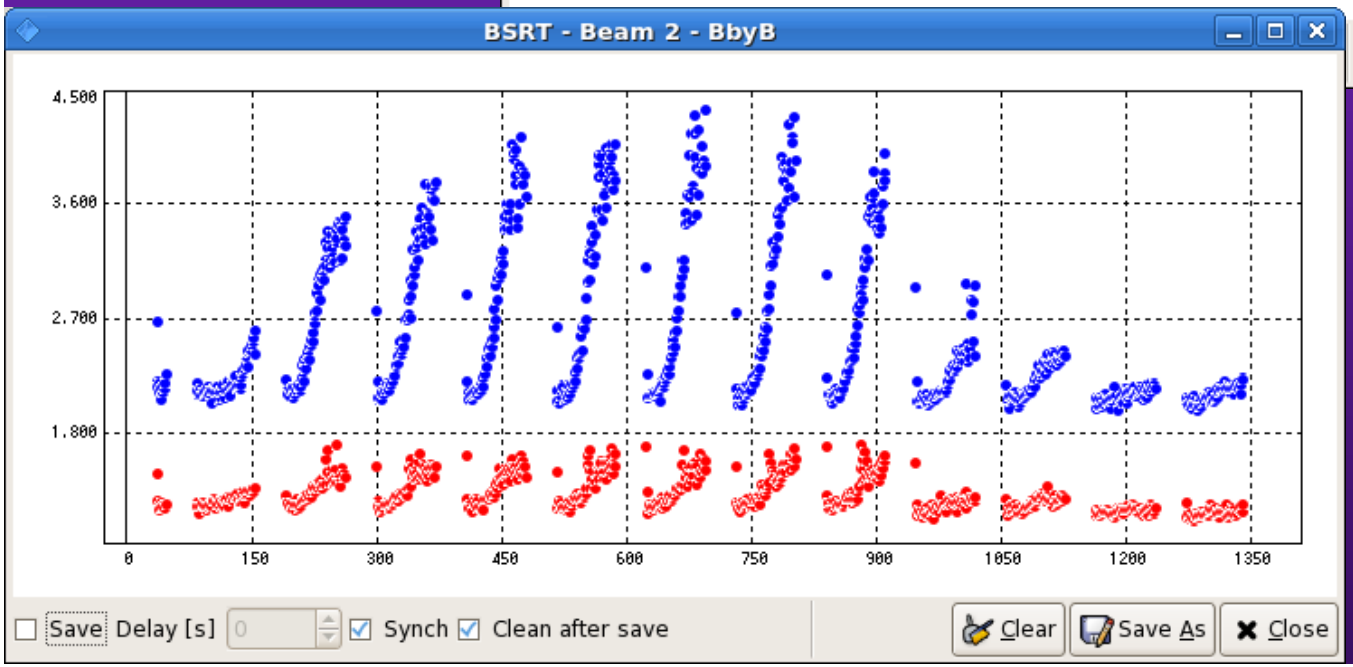
FILL #2249 (6/7)


Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 2
HORIZONTAL
VERTICAL
V Bunch per Bunch Evolution
TIME
19h40
19h20
19h00
18h40
18h20
18h00
17h40
17h20
17h00
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
BUNCH #
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Bunch per Bunch Slice @ T=RED LINE ABOVE
Bigger VERTICAL effect
HORIZONTAL
VERTICAL
BUNCH #
Slice Selection
Time Sample # 4
Time Avg (minutes) 42.5
Bunch Avg. 1.0

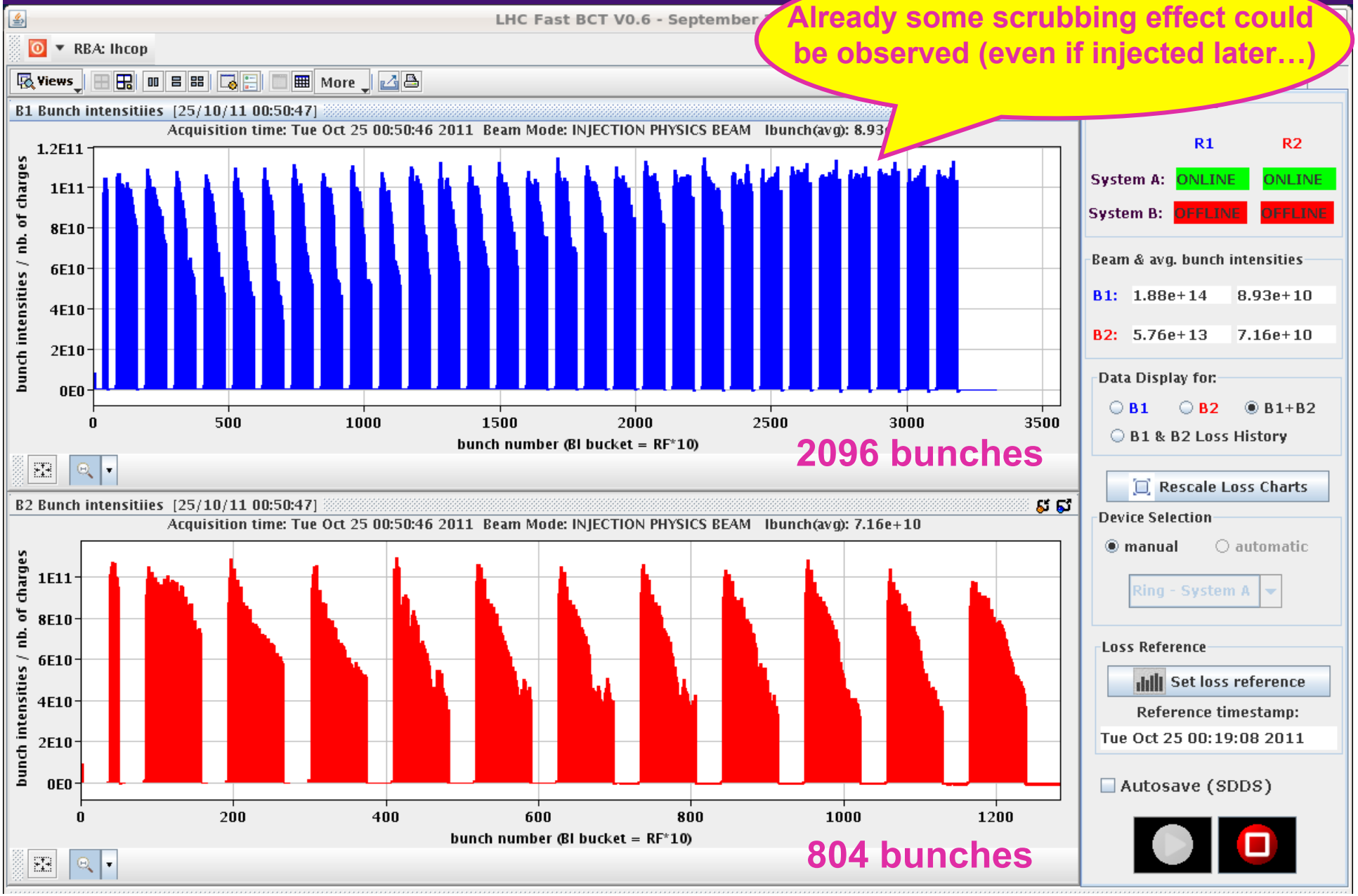
FILL #2249 (7/7)

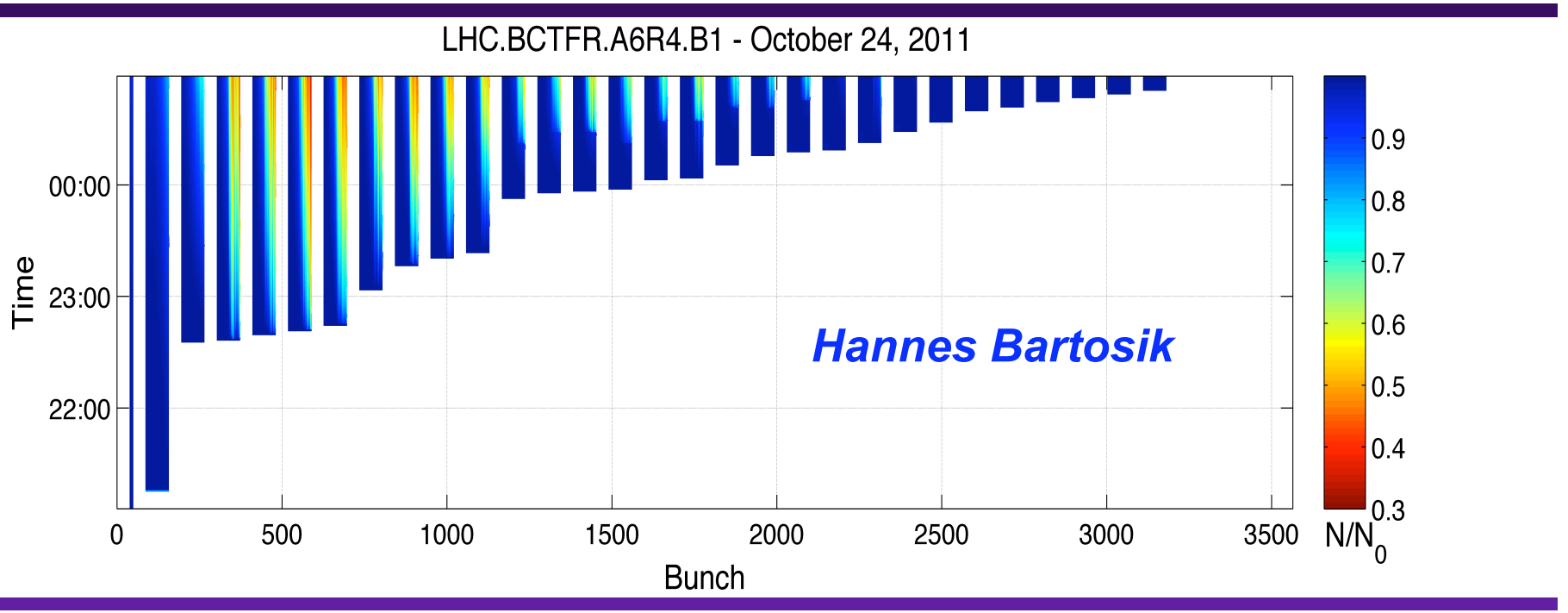
- Some other BSRT meas. (beam sizes) at ~ 20:10

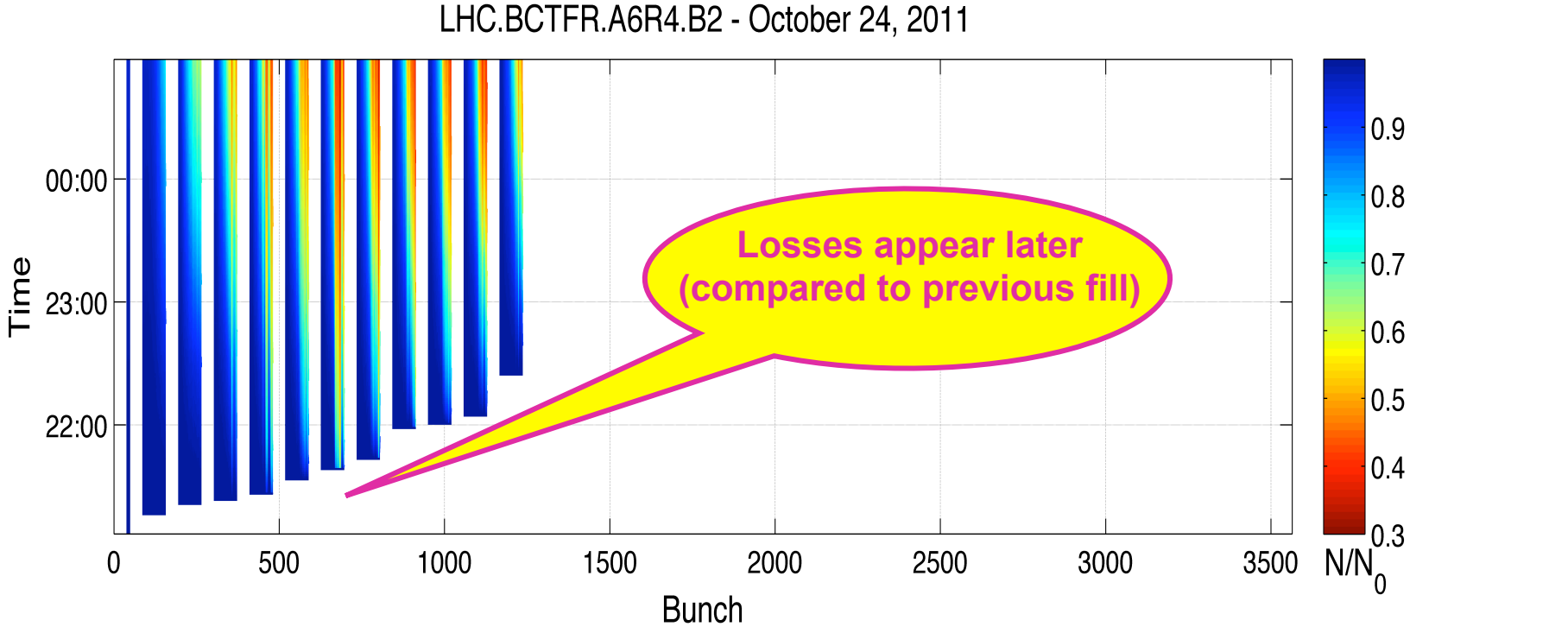




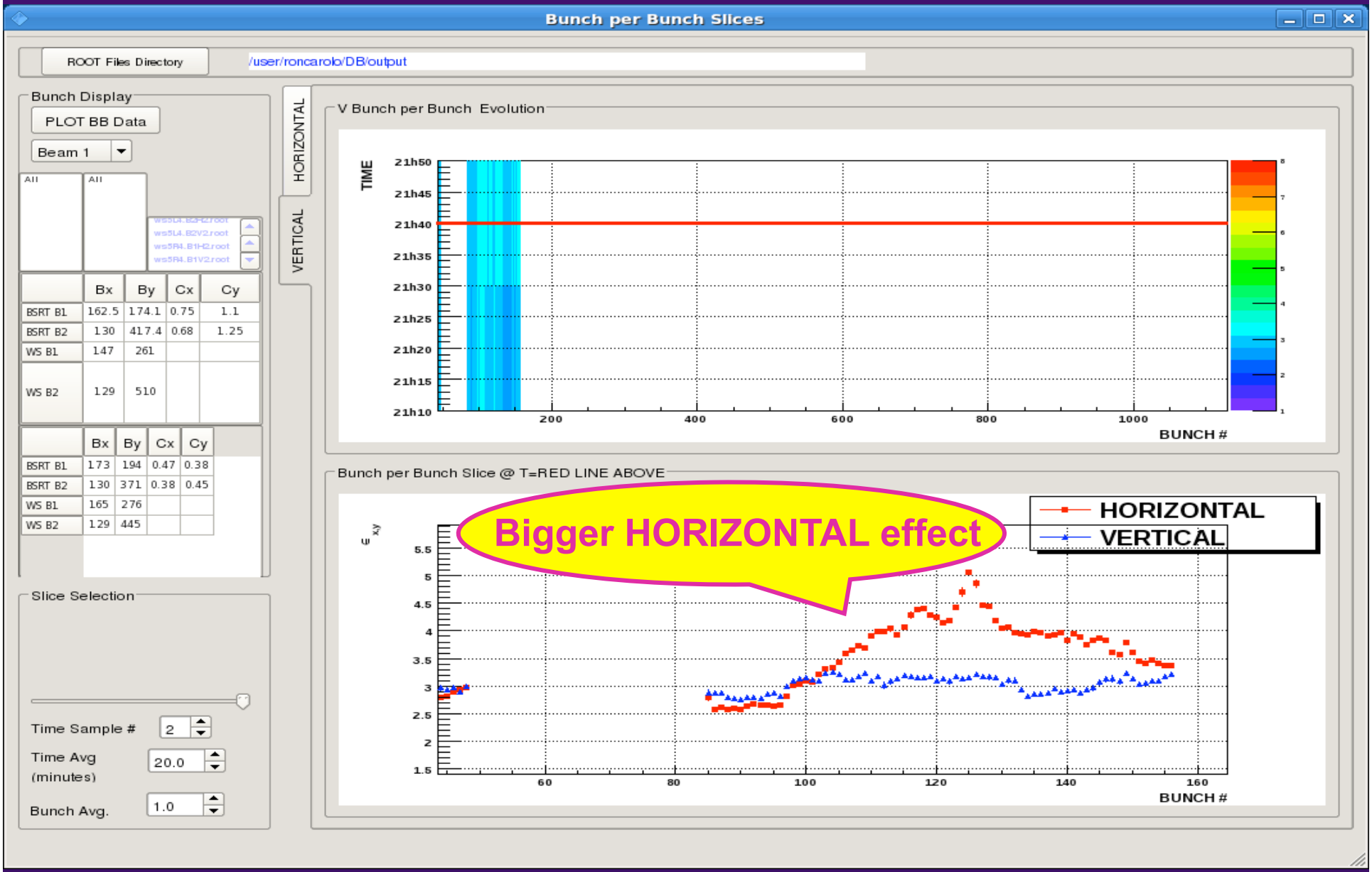
FILL #2250 (1/6)


LHC Fast BCT V0.6 - September
RBA: lhcop
Views
More
B1 Bunch intensitiies [25/10/11 00:50:47]
Acquisition time: Tue Oct 25 00:50:46 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 8.93
bunch intensities / nb. of charges
1.2E11
1E11
8E10
6E10
4E10
2E10
0E0
0
500
1000
1500
2000
2500
3000
3500
bunch number (Bl bucket = RF*10)
2096 bunches
B2 Bunch intensitiies [25/10/11 00:50:47]
Acquisition time: Tue Oct 25 00:50:46 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 7.16e+10
bunch intensities / nb. of charges
1E11
8E10
6E10
4E10
2E10
0E0
0
200
400
600
800
1000
1200
bunch number (Bl bucket = RF*10)
804 bunches
Already some scrubbing effect could be observed (even if injected later…)
R1
R2
System A: ONLINE ONLINE
System B: OFFLINE OFFLINE
Beam & avg. bunch intensities
B1: 1.88e+14 8.93e+10
B2: 5.76e+13 7.16e+10
Data Display for:
B1
B2
B1+B2
B1 & B2 Loss History
Rescale Loss Charts
Device Selection
manual
automatic
Ring - System A
Loss Reference
Set loss reference
Reference timestamp:
Tue Oct 25 00:19:08 2011
Autosave (SDDS)

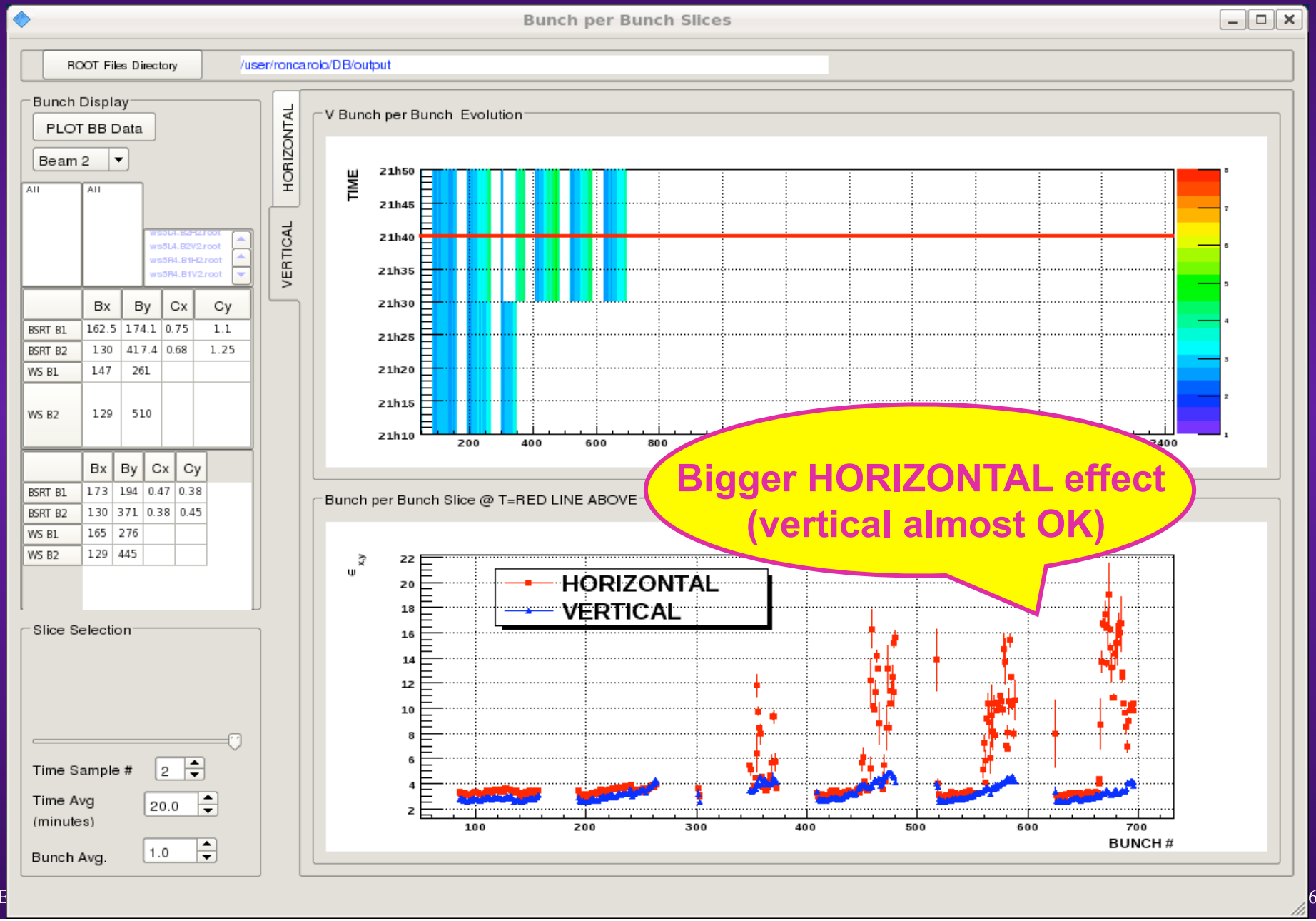

LHC.BCTFR.A6R4.B1 - October 24, 2011
Time
00:00
23:00
22:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
Hannes Bartosik
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0


LHC.BCTFR.A6R4.B2 - October 24, 2011
Time
00:00
23:00
22:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
Losses appear later
(compared to previous fill)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0

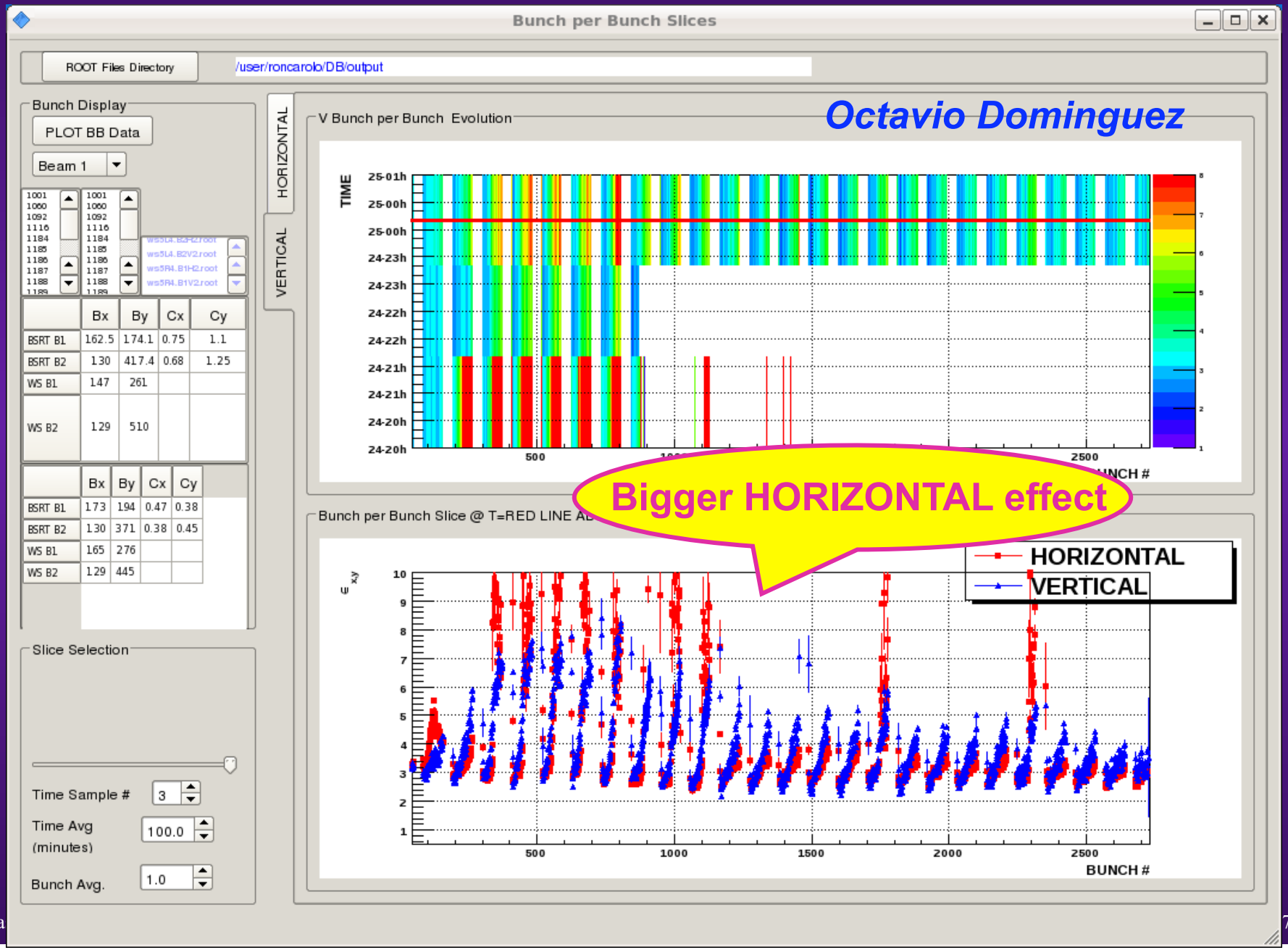
FILL #2250 (3/6)


Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 1
All
All
ws5L4.B2H2.root
ws5L4.B2V2.root
ws5R4.B1H2.root
ws5R4.B1V2.root
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Slice Selection
Time Sample # 2
Time Avg (minutes) 20.0
Bunch Avg. 1.0
HORIZONTAL
VERTICAL
V Bunch per Bunch Evolution
TIME
21h50
21h45
21h40
21h35
21h30
21h25
21h20
21h15
21h10
200
400
600
800
1000
BUNCH #
Bunch per Bunch Slice @ T=RED LINE ABOVE
Bigger HORIZONTAL effect
HORIZONTAL
VERTICAL
ε xy
5.5
5
4.5
4
3.5
3
2.5
2
1.5
60
80
100
120
140
160
BUNCH #

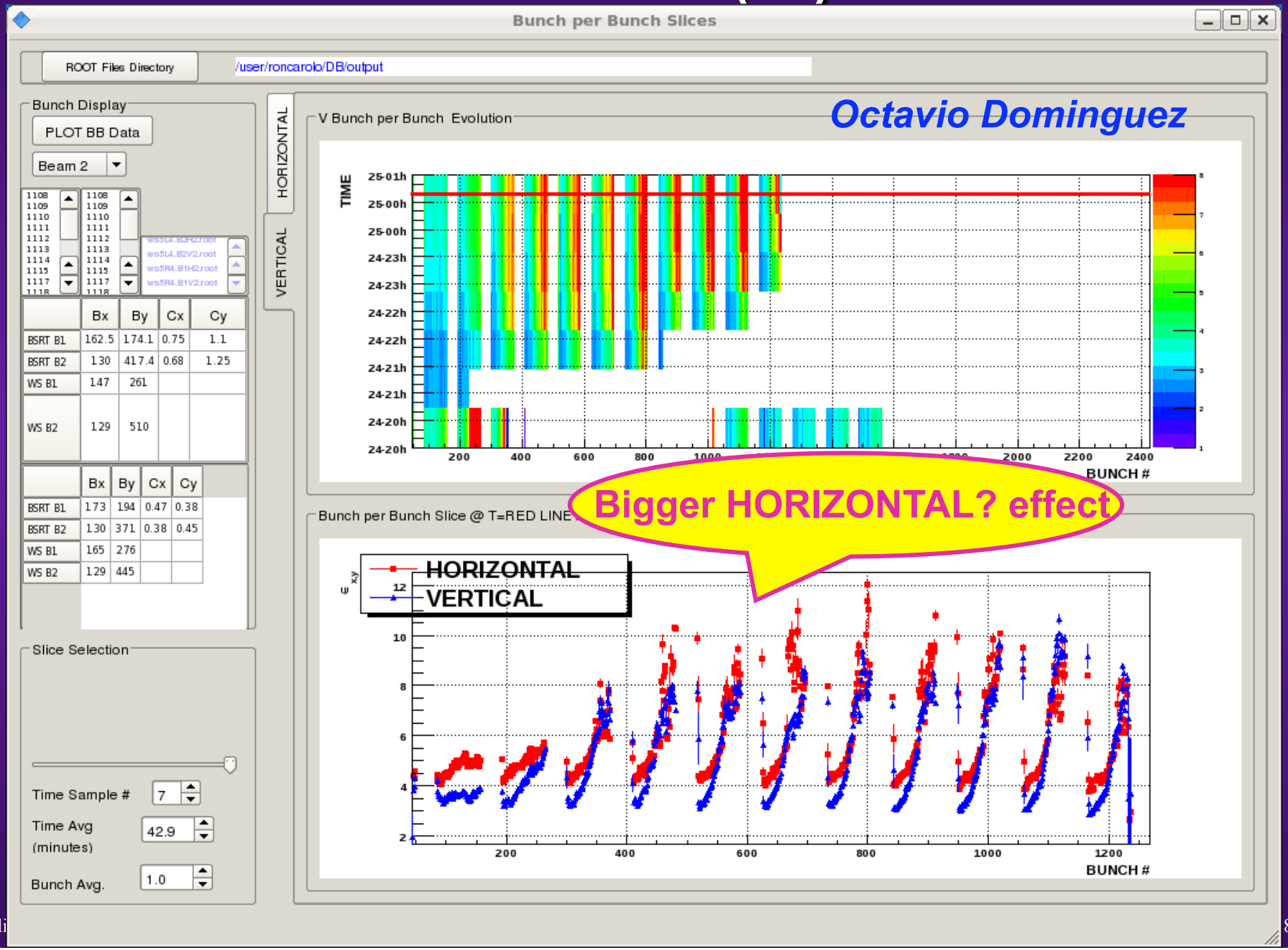
FILL #2250 (4/6)


Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 2
HORIZONTAL
VERTICAL
V Bunch per Bunch Evolution
TIME
21h50
21h45
21h40
21h35
21h30
21h25
21h20
21h15
21h10
200
400
600
800
2400
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Bigger HORIZONTAL effect
(vertical almost OK)
Bunch per Bunch Slice @ T=RED LINE ABOVE
HORIZONTAL
VERTICAL
BUNCH #
Slice Selection
Time Sample # 2
Time Avg (minutes) 20.0
Bunch Avg. 1.0

FILL #2250 (5/6)


Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 1
HORIZONTAL
VERTICAL
V Bunch per Bunch Evolution
Octavio Dominguez
TIME
25-01h
25-00h
24-23h
24-22h
24-21h
24-20h
500
2500
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Bigger HORIZONTAL effect
Bunch per Bunch Slice @ T=RED LINE
HORIZONTAL
VERTICAL
ε xy
1000
1500
2000
BUNCH #
Slice Selection
Time Sample # 3
Time Avg (minutes) 100.0
Bunch Avg. 1.0

FILL #2250 (6/6)

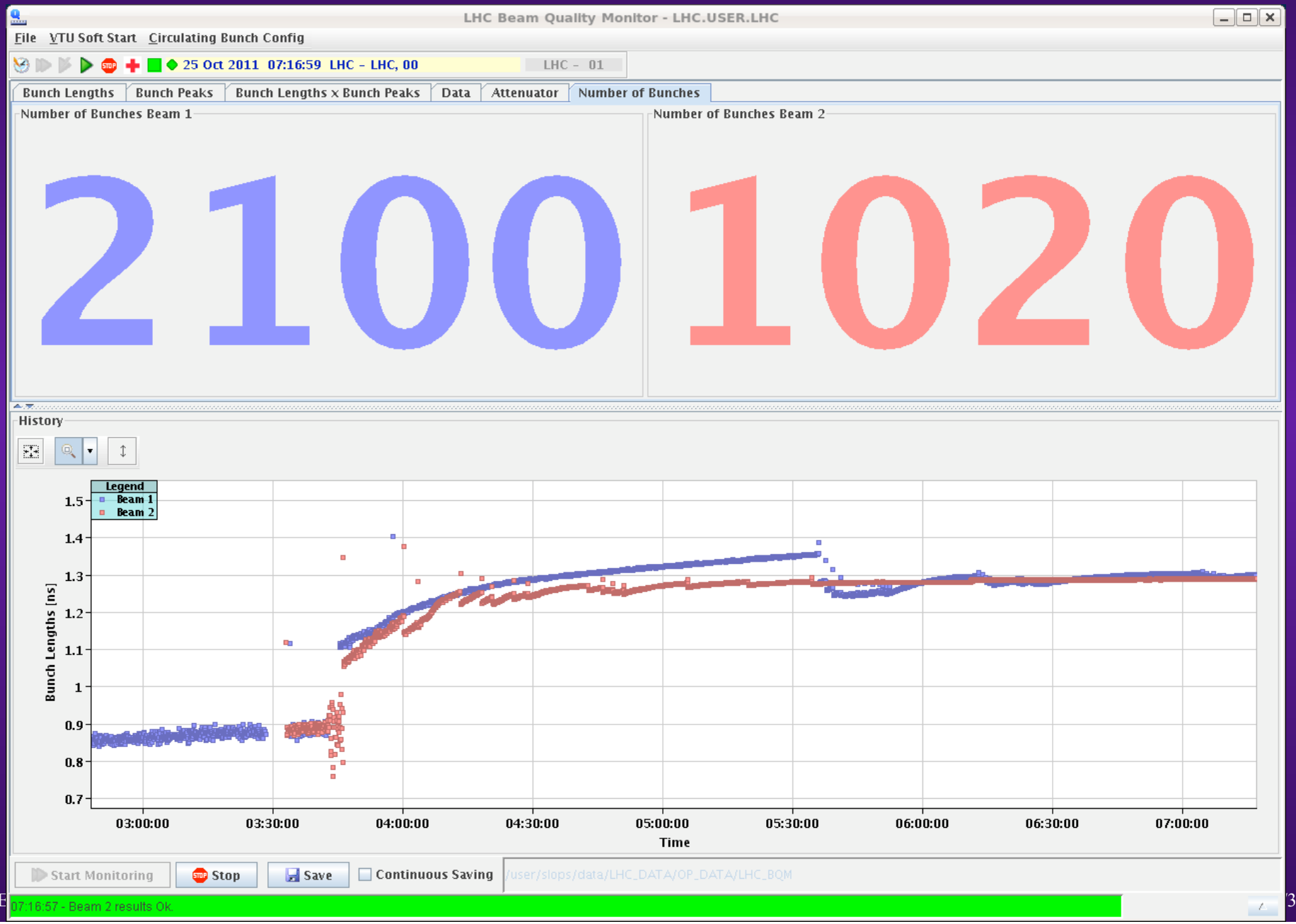

Bunch per Bunch Slices
ROOT Files Directory
/user/roncarolo/DB/output
Bunch Display
PLOT BB Data
Beam 2
HORIZONTAL
VERTICAL
Bx By Cx Cy
BSRT B1 162.5 174.1 0.75 1.1
BSRT B2 130 417.4 0.68 1.25
WS B1 147 261
WS B2 129 510
Bx By Cx Cy
BSRT B1 173 194 0.47 0.38
BSRT B2 130 371 0.38 0.45
WS B1 165 276
WS B2 129 445
Slice Selection
Time Sample # 7
Time Avg (minutes) 42.9
Bunch Avg. 1.0
V Bunch per Bunch Evolution
TIME
BUNCH #
Octavio Dominguez
Bigger HORIZONTAL? effect
Bunch per Bunch Slice @ T=RED LINE
HORIZONTAL
VERTICAL
BUNCH #

FILL #2251 (1/5)

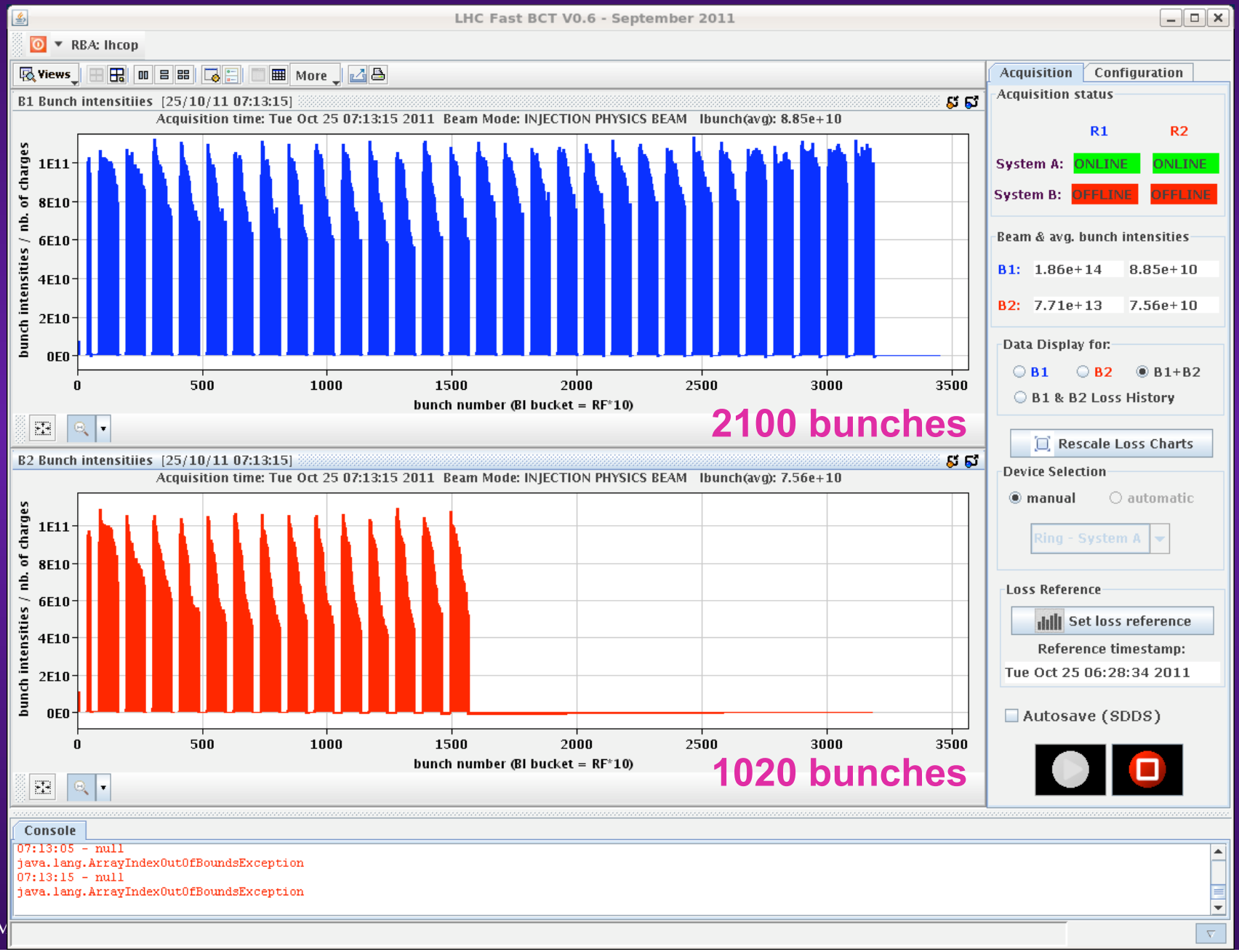
- **Some trims made for both beams:**
  - **Landau octupoles knob: from 0.5 to 1**
  - **Qprime: ~ 3.5 in H and ~ 14.5 in V (measured at ~ 03:40). Then + 1 unit for B2H only at 04:42 and for B1H only at 06:18**
  - **ADT H normalized gain: from 0.25 to 0.3**

  - **=> Some activity was then seen on the ADT and HEADTAIL monitor**

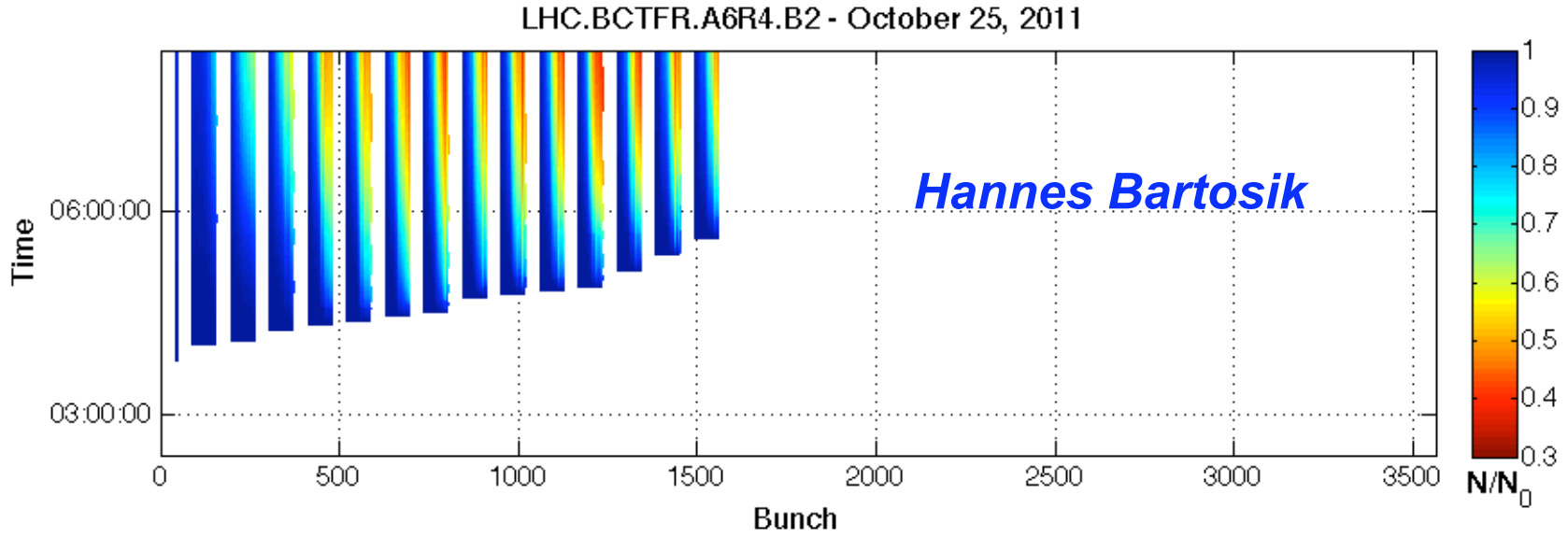
FILL #2251 (2/5)

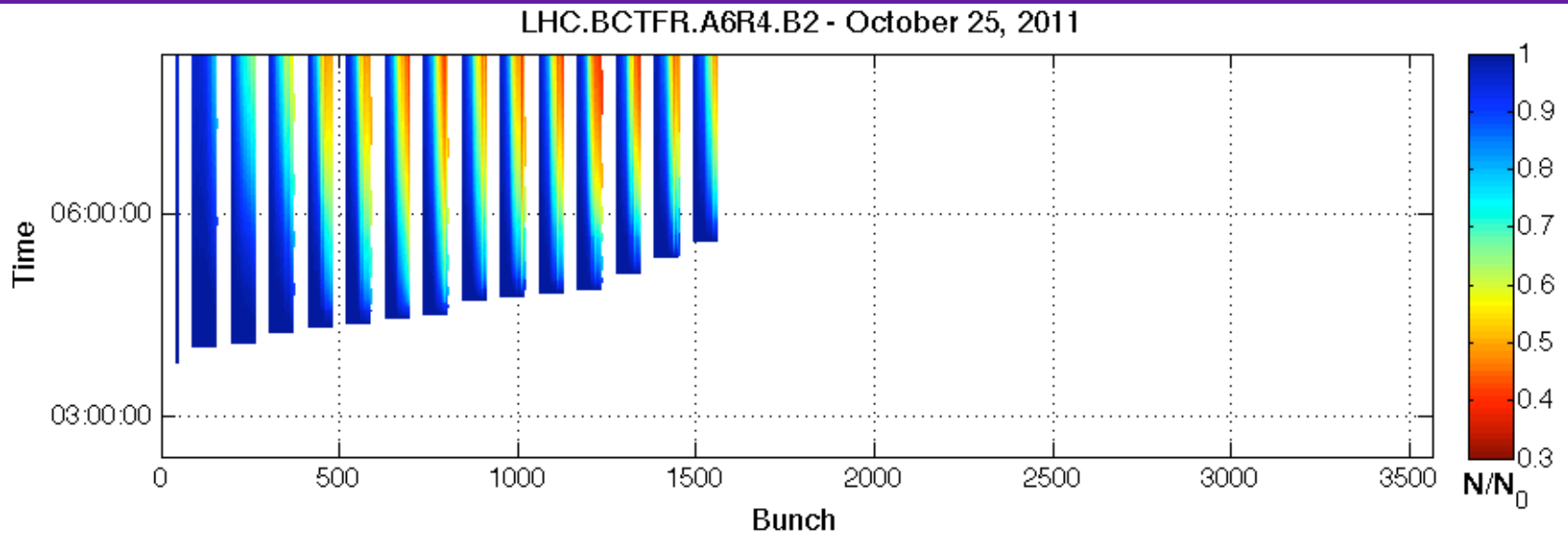

LHC Beam Quality Monitor - LHC.USER.LHC
File
VTU Soft Start
Circulating Bunch Config
25 Oct 2011 07:16:59 LHC - LHC, 00
LHC - 01
Bunch Lengths
Bunch Peaks
Bunch Lengths x Bunch Peaks
Data
Attenuator
Number of Bunches
Number of Bunches Beam 1
2100
Number of Bunches Beam 2
1020
History
Legend
Beam 1
Beam 2
Bunch Lengths [ns]
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
03:00:00
03:30:00
04:00:00
04:30:00
05:00:00
05:30:00
06:00:00
06:30:00
07:00:00
Time
Start Monitoring
Stop
Save
Continuous Saving
/user/slops/data/LHC_DATA/OP_DATA/LHC_BQM
07:16:57 - Beam 2 results Ok

FILL #2251 (3/5)

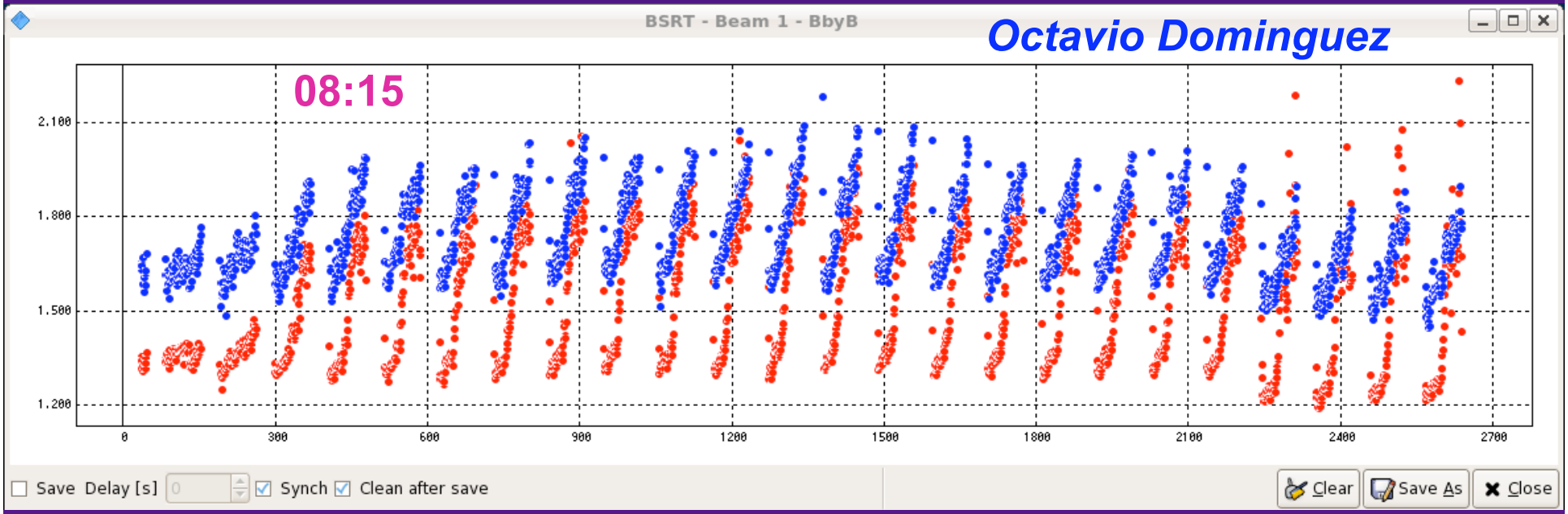

LHC Fast BCT V0.6 - September 2011
RBA: lhcop
Views
More
Acquisition
Configuration
B1 Bunch intensities [25/10/11 07:13:15]
Acquisition time: Tue Oct 25 07:13:15 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 8.85e+10
bunch intensities / nb. of charges
1E11
8E10
6E10
4E10
2E10
0E0
0
500
1000
1500
2000
2500
3000
3500
bunch number (BI bucket = RF*10)
2100 bunches
B2 Bunch intensities [25/10/11 07:13:15]
Acquisition time: Tue Oct 25 07:13:15 2011 Beam Mode: INJECTION PHYSICS BEAM Ibunch(avg): 7.56e+10
bunch intensities / nb. of charges
bunch number (BI bucket = RF*10)
1020 bunches
Acquisition status
R1
R2
System A: ONLINE ONLINE
System B: OFFLINE OFFLINE
Beam & avg. bunch intensities
B1: 1.86e+14 8.85e+10
B2: 7.71e+13 7.56e+10
Data Display for:
B1
B2
B1+B2
B1 & B2 Loss History
Rescale Loss Charts
Device Selection
manual
automatic
Ring - System A
Loss Reference
Set loss reference
Reference timestamp:
Tue Oct 25 06:28:34 2011
Autosave (SDDS)
Console
07:13:05 - null
java.lang.ArrayIndexOutOfBoundsException
07:13:15 - null
java.lang.ArrayIndexOutOfBoundsException

FILL #2251 (4/5)

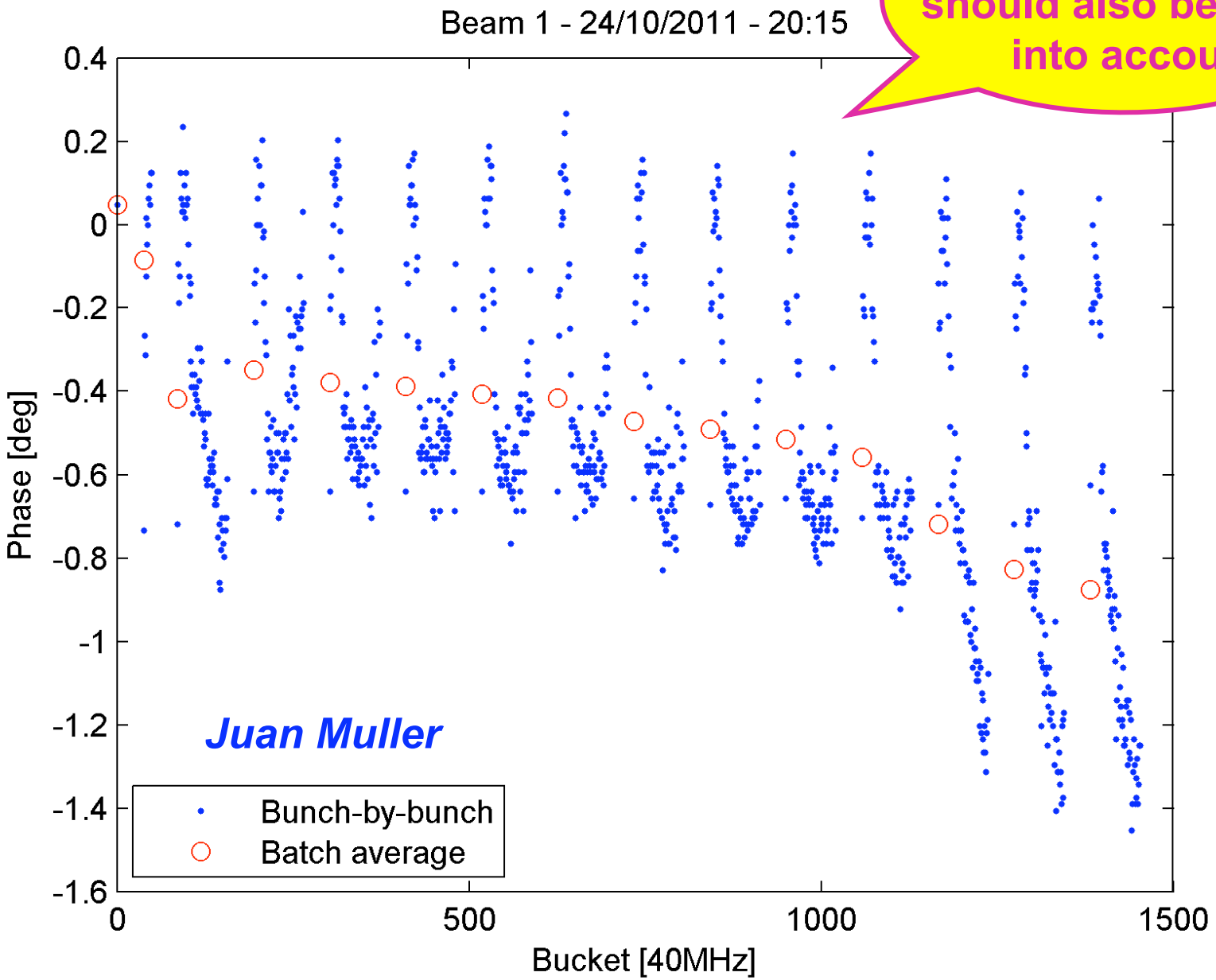

LHC.BCTFR.A6R4.B2 - October 25, 2011
Hannes Bartosik
Time
06:00:00
03:00:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0


LHC.BCTFR.A6R4.B2 - October 25, 2011
Time
06:00:00
03:00:00
0
500
1000
1500
2000
2500
3000
3500
Bunch
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
N/N0

FILL #2251 (5/5)

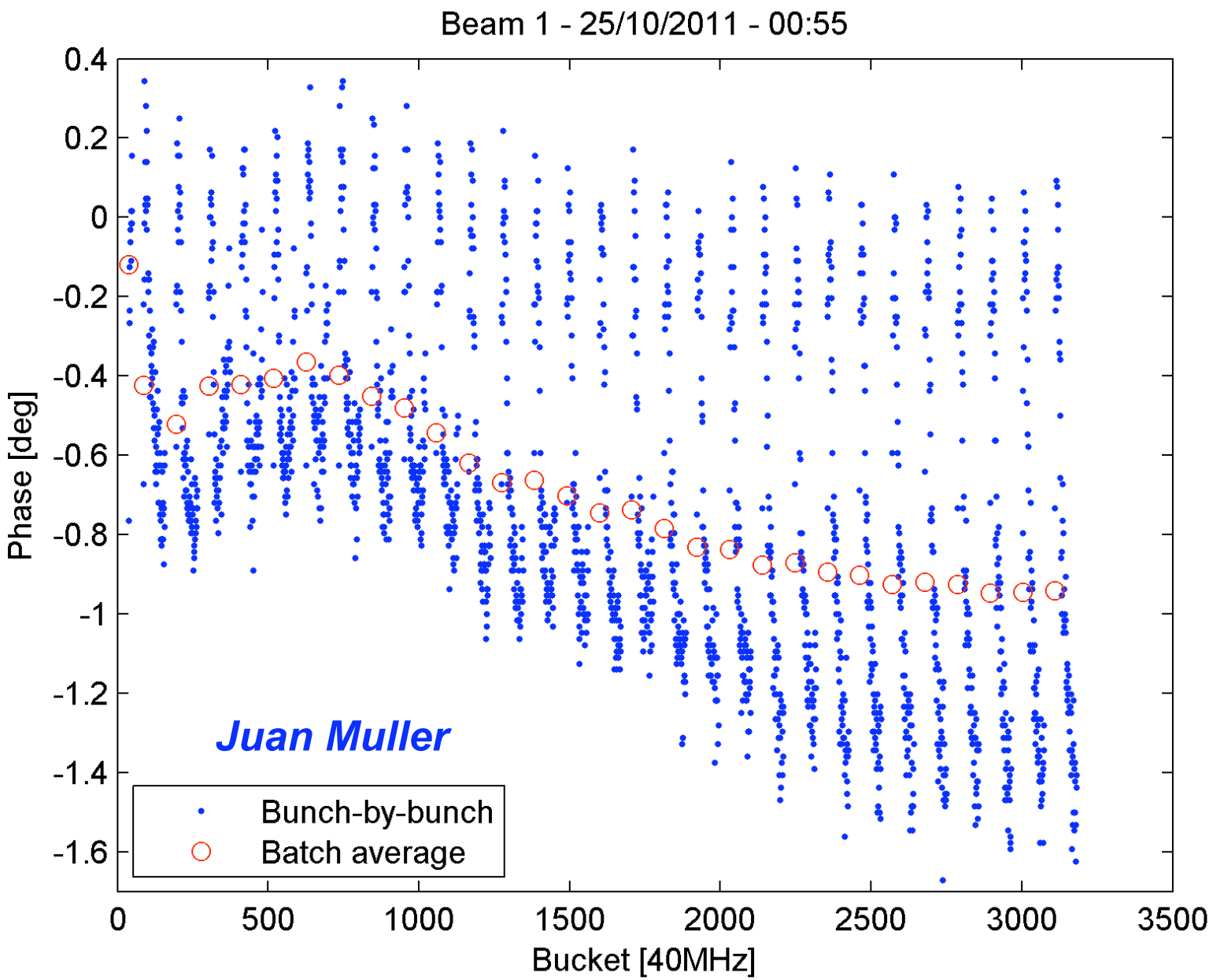

BSRT - Beam 1 - BbyB
Octavio Dominguez
08:15
2.100
1.800
1.500
1.200
0
300
600
900
1200
1500
1800
2100
2400
2700
Save Delay [s]
0
Synch
Clean after save
Clear
Save As
Close

RF stable phase (1/3)

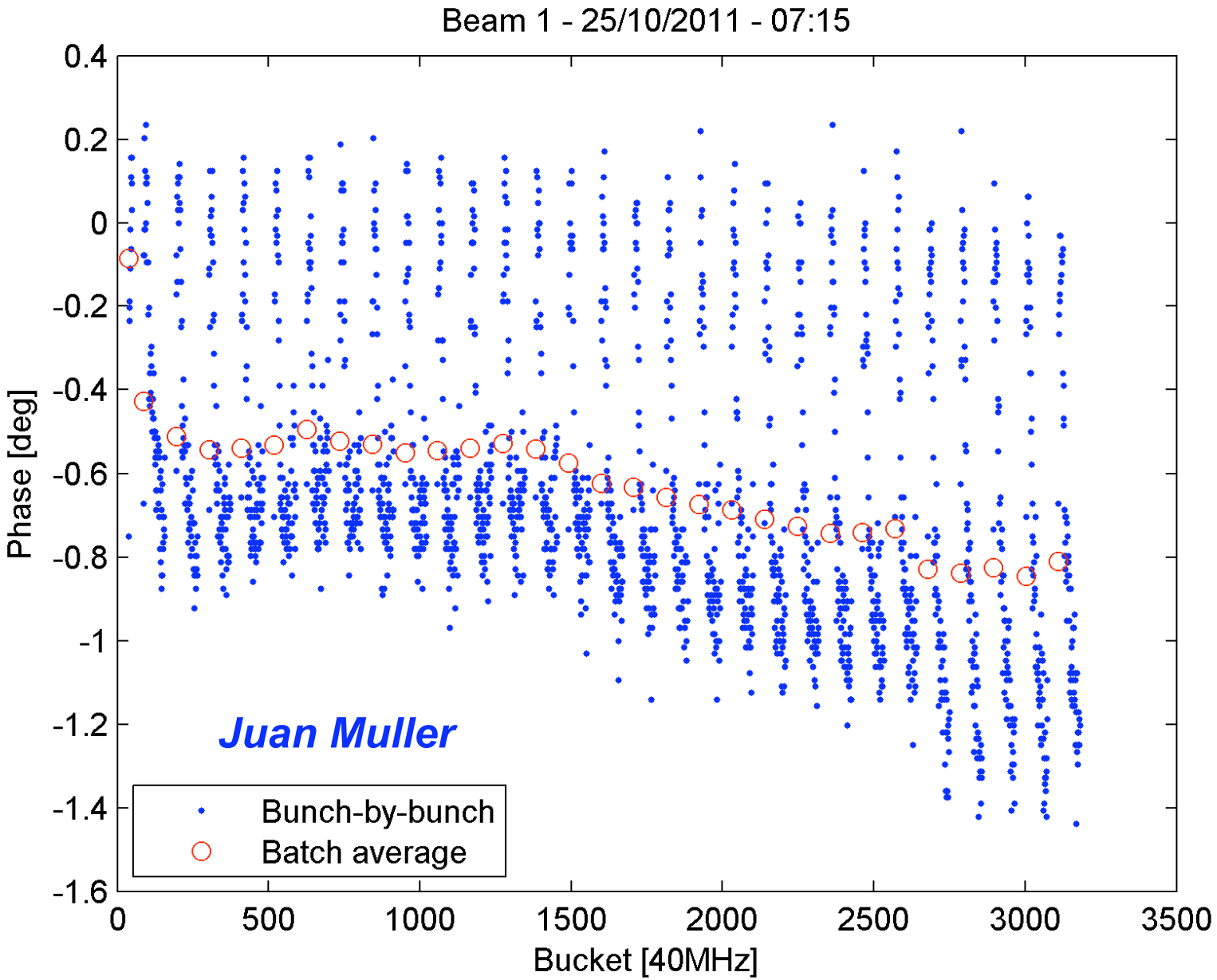


Intensity variations should also be taken into account

RF stable phase (2/3)



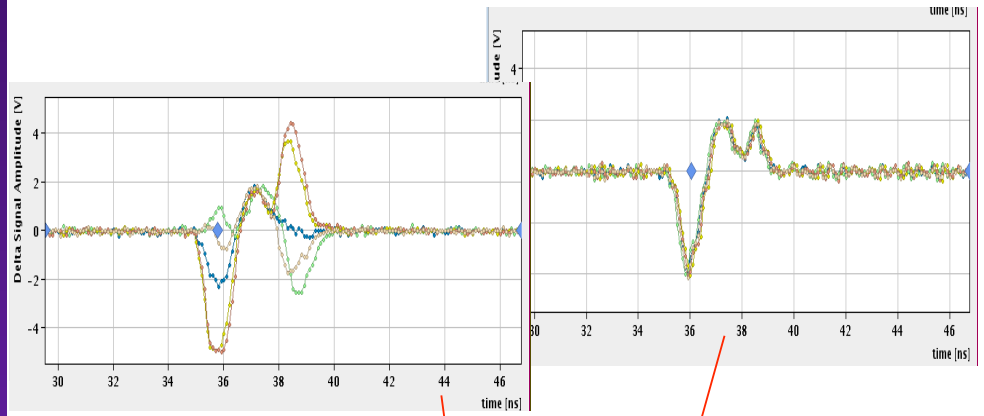
RF stable phase (3/3)

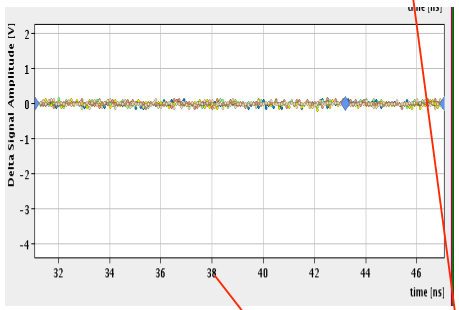


ADT and HEADTAIL monitor (1/2)

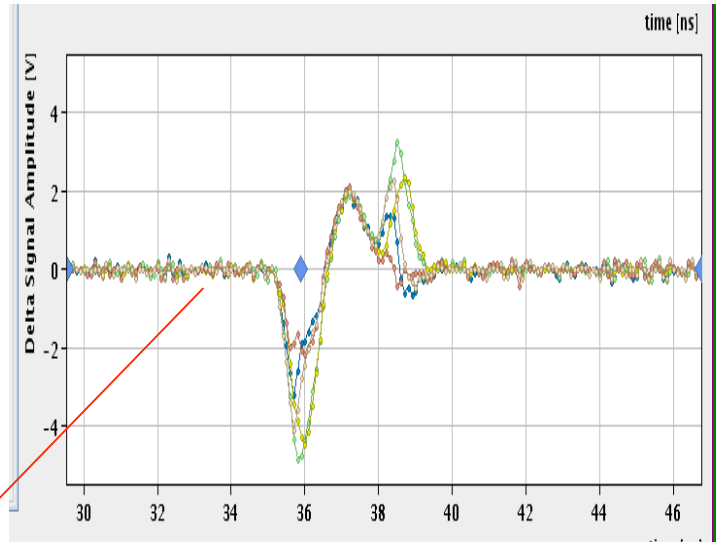
- Some pictures taken (Hannes Bartosik, Stephane Bart Pedersen, Nicolo Biancacci, Xavier Buffat, Fabio Follin, Verena Kain, Giovanni Rumolo, Ralph Steinhagen etc.) for the last fill 2251 with lower horizontal chromaticity
- => To be correctly interpreted (calibration factors etc.) with Wolfgang Hofle, Verena Kain etc. (discussions ongoing)
- Current understanding:
  - Decreasing QprimeH from ~ 13 to ~ 3.5 generated significant coherent instabilities in H-plane for B1 and B2
  - Increasing Qprime H by 1 unit helped reducing the growth rate of these instabilities
  - Intrabunch mode and interbunch mode is not 100% clear from the Headtail monitor motion
  - The most unstable bunches are usually not the last bunches of the batch => To be crosschecked with the BSRT and FBCT data

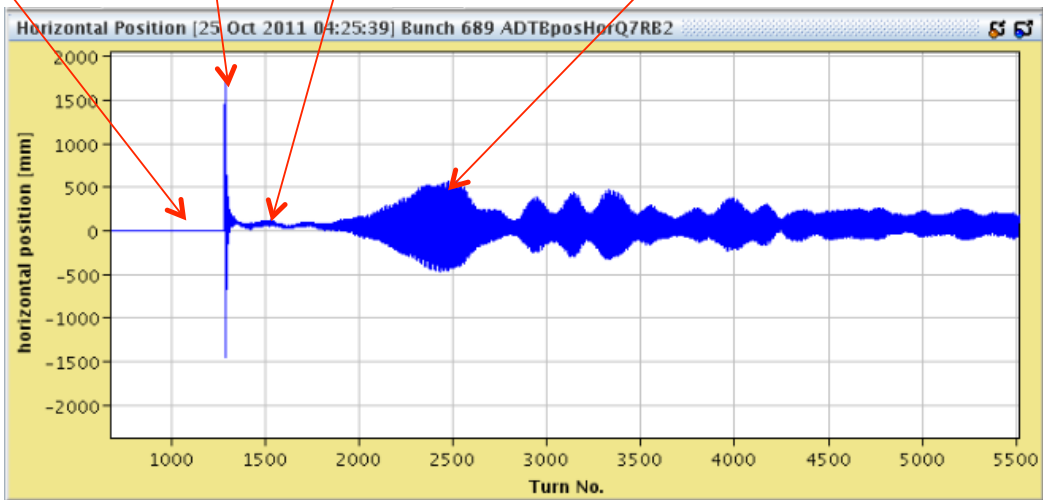
ADT and HEADTAIL monitor (2/2)





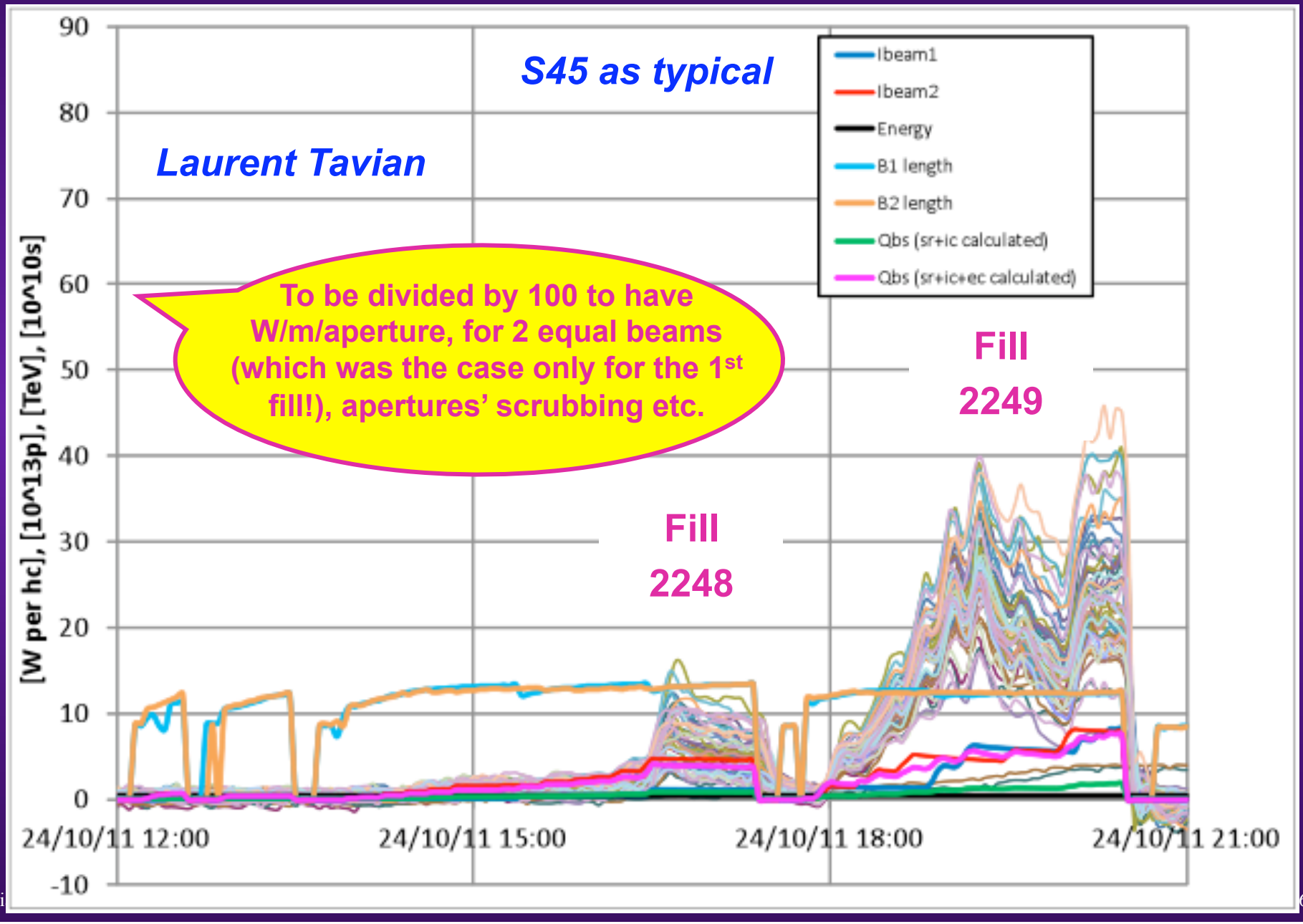
B2H at 04:25am



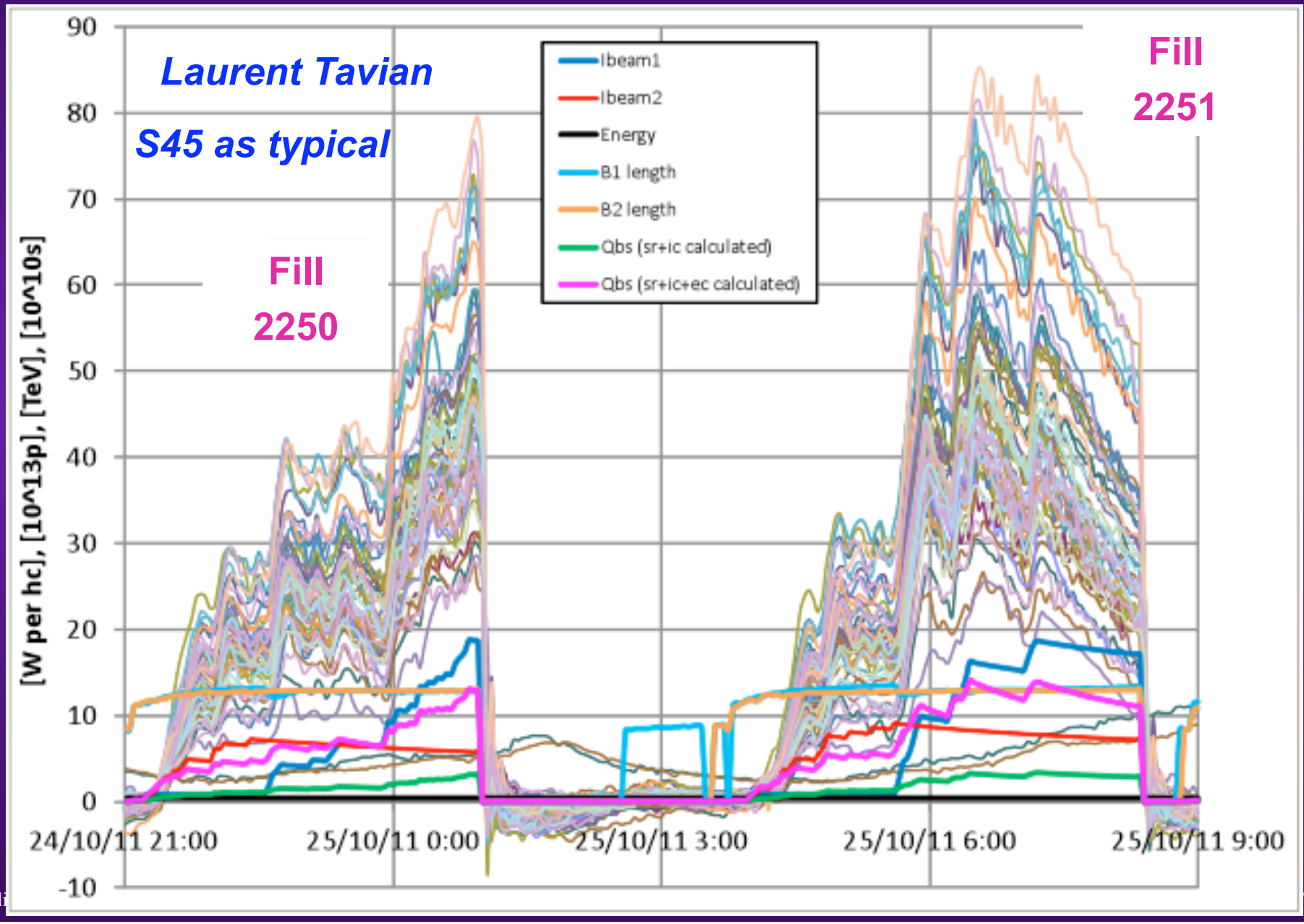


Benoit Salvant et al.

BEAM-INDUCED HEATING ON ARC BEAM SCREENS (1/3)

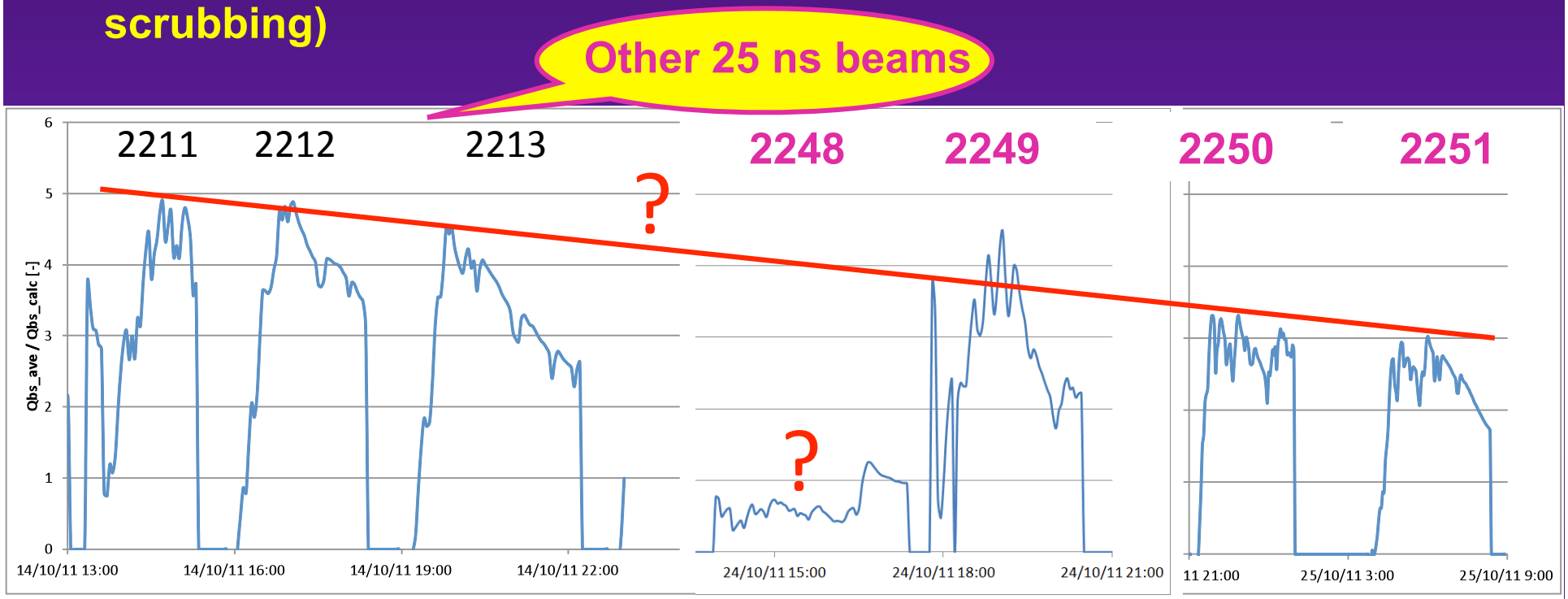


BEAM-INDUCED HEATING ON ARC BEAM SCREENS (2/3)



BEAM-INDUCED HEATING ON ARC BEAM SCREENS (3/3)

- **Scrubbing indicator?: Ratio between the average measured heating and the heating scaled from Design Report (after beam cleaning / scrubbing)**



Laurent Tavian

~2 kW per sector for the two last fills (2249 & 2250):
Global assessment from RF and/or cryoplants will be a good validation of the method !

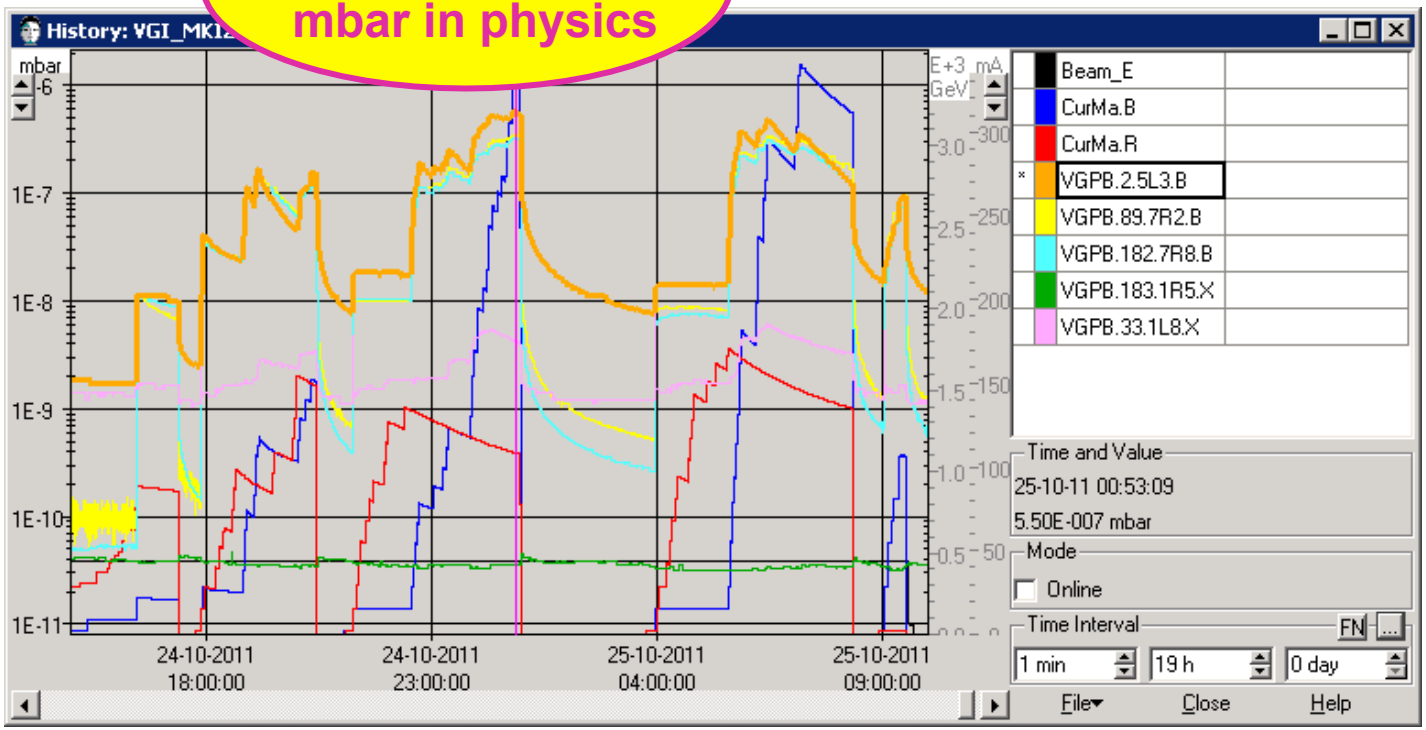
Highest-lowest pressures

Vincent Baglin

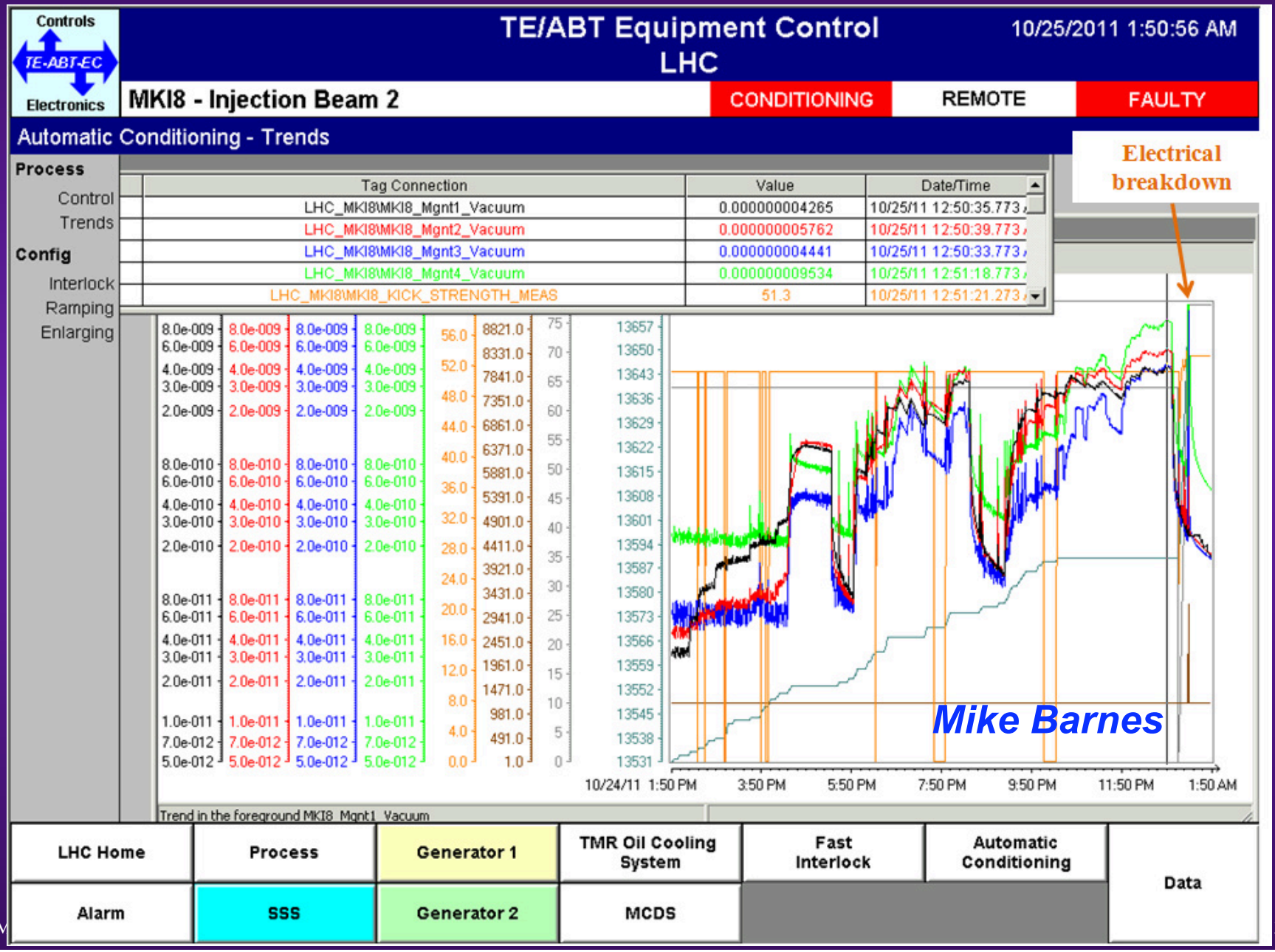
- Pressures increase just above interlock threshold 5.5 10^{-7} mbar at VGPB.2.5L3.B
- Many gauges beside cold elements
- Pressure increase ~ 5 10^{-8} mbar/72b
- CMS 18m, right is one of the lowest pressure !

	j	Temp	Type	Selec	Device	Use	Sector	State	Value
1	3	RT	NEG	b	VGPB.2.5L3.B	Y	A4L3.B	INT	3.40E-07
2	6	RT	NEG	c	VGI.216.5L6.B	Y	C5L6.B	MKD	3.30E-07
3	3	CRYO	ARC	h	VGPB.89.7R2.B	Y	ARC2-3.B	INT	3.00E-07
4	3	RT	NEG	b	VGPB.4.5L3.B	Y	A5L3.B	INT	2.90E-07
5	1	CRYO	ARC	h	VGPB.182.7R8.B	Y	ARC8-1.B	INT	2.70E-07
6	3	CRYO	Q6	i	VGPB.414.6R3.B	Y	A6R3.B	INT	2.50E-07
7	4	CRYO	ARC	h	VGPB.518.7R3.B	Y	ARC3-4.B	INT	2.50E-07
8	7	RT	NEG	b	VGPB.4.5L7.B	Y	A5L7.B	INT	2.50E-07
9	7	CRYO	ARC	h	VGPB.233.7R7.B	Y	ARC7-8.B	INT	2.40E-07
10	7	RT	NEG	b	VGPB.2.5L7.B	Y	A4L7.B	INT	2.30E-07
11	1	CRYO	ARC	h	VGPB.236.7L1.B	Y	ARC8-1.B	INT	2.30E-07
12	6	RT	NEG	c	VGPB.177.5L6.B	Y	B5L6.B	INT	2.20E-07
13	5	CRYO	Q5	i	VGPB.198.5R5.B	Y	B5R5.B	ON	2.10E-07
14	7	RT	NEG	b	VGPB.2.5R7.B	Y	A4R7.B	INT	2.00E-07
15	8	RT	NEG	a	VGPB.192.5L8.B	Y	A5L8.B	INT	2.00E-07
16	8	RT	NEG	a	VGPB.4.5L8.B	Y	A5L8.B	ON	2.00E-07
17	7	RT	NEG	b	VGPB.4.5R7.R	Y	A5R7.R	INT	1.80E-07
18	3	RT	NEG	b	VGPB.412.6R3.B	Y	B5R3.B	ON	1.70E-07
19	5	CRYO	ARC	h	VGPB.242.7L5.B	Y	ARC4-5.B	ON	1.70E-07
20	5	CRYO	Q6	i	VGPB.235.6R5.B	Y	B6R5.B	INT	1.70E-07
21	1	CRYO	D2Q4	i	VGPB.938.4L1.B	Y	B4L1.B	ON	1.60E-07

Reach 1E-7 or 1E-6 mbar in physics



MKI (1/2)


Controls
TE-ABT-EC
Electronics
TE/ABT Equipment Control
LHC
10/25/2011 1:50:56 AM
MKI8 - Injection Beam 2
CONDITIONING
REMOTE
FAULTY
Automatic Conditioning - Trends
Process
Control
Trends
Config
Interlock
Ramping
Enlarging
Tag Connection
Value
Date/Time
LHC_MKI8\MKI8_Mgnt1_Vacuum
0.000000004265
10/25/11 12:50:35.773
LHC_MKI8\MKI8_Mgnt2_Vacuum
0.000000005762
10/25/11 12:50:39.773
LHC_MKI8\MKI8_Mgnt3_Vacuum
0.000000004441
10/25/11 12:50:33.773
LHC_MKI8\MKI8_Mgnt4_Vacuum
0.000000009534
10/25/11 12:51:18.773
LHC_MKI8\MKI8_KICK_STRENGTH_MEAS
51.3
10/25/11 12:51:21.273
Electrical breakdown
Mike Barnes
10/24/11 1:50 PM
3:50 PM
5:50 PM
7:50 PM
9:50 PM
11:50 PM
1:50 AM
Trend in the foreground MKI8_Mgnt1_Vacuum
LHC Home
Process
Generator 1
TMR Oil Cooling System
Fast Interlock
Automatic Conditioning
Data
Alarm
SSS
Generator 2
MCDS

MKI (2/2)

- Electrical breakdown in MKI8-D kicker magnet during SoftStart (54.3kV, 1200ns) – see attachment. This followed an extended period of 25ns beam and vacuum of ~9E-9mbar in the MKI8 tanks as well as high pressure in the nearby beam pipes. ALL electron cloud solenoids were turned off around the MKI8 kickers resulting in the high pressure
- The above electrical breakdown, after some time with a pressure of 9E-9mbar in the MKI8 tanks, demonstrates the de-conditioning of the MKIs by high pressure (as per 17 April 2011). This also reinforces the importance of the SIS MKI vacuum interlock (normally set to 2E-9 mbar, but relaxed to 2.5E-9 mbar for the 25ns MD). Extended SoftStart run was run to re-condition MKI8 kickers
- *** ECLOUD CIRCUIT VIESA.193.5R8.C MUST *NOT* BE TURNED-OFF, EVEN DURING SCRUBBING, AS THESE SOLENOIDS ARE ON THE INTERCONNECTS BETWEEN SOME OF THE MKI8 KICKER MAGNETS ***
- *** ECLOUD CIRCUIT VIESA.3.6R8.C CAN BE TURNED-OFF FOR SCRUBBING. THESE SOLENOIDS ARE ON THE MKI SIDES OF Q4 & Q5, but are not extremely close to the MKIs ***

CONCLUSION (1/2)

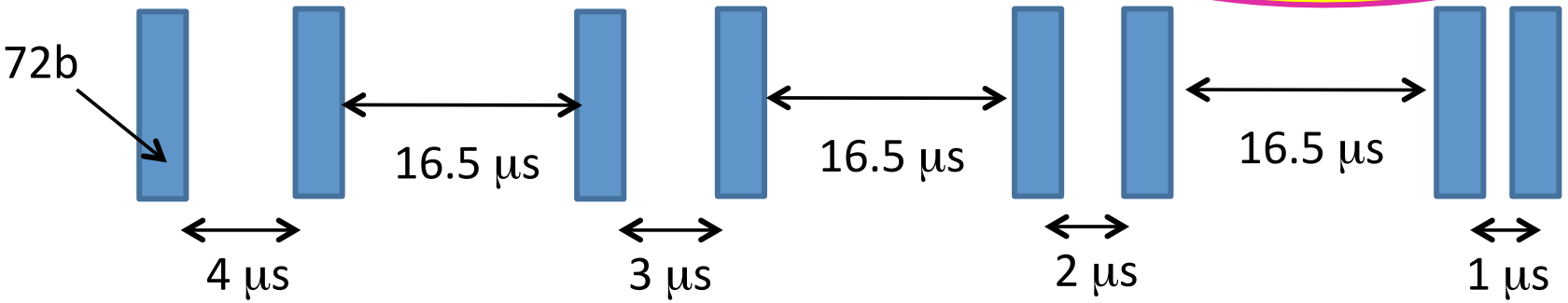
- 3 fills (# 2249-2250-2251) with 25 ns beam (72 b spaced by 925 ns)
- Finally reached 2100 bunches (on B1 only) and a bit less than 2E14 p (i.e. ~ the intensity currently used in physics with 50 ns)
- During 1st fill => Vertical blow-up larger
- During 2nd fill => Horizontal blow-up larger => Another ecloud regime
- During 3rd fill => Decreasing QprimeH from ~ 13 to ~ 3.5 generated coherent instabilities for B1 and B2. Increasing QprimeH by 1 unit helped
- Many measurements made => In summary: very promising results! To be continued…
- Main limitations to do more & faster: MKIs vacuum interlock thresholds for the injection at 2.5E-9 mbar (already increased from 2E-9 mbar) + Injection issues (could start the MD only at ~ 17:30)
- Parasitic result: the RF 1 turn feedback with high local intensity beam has been commissioned (Philippe Baudrenghien)

CONCLUSION (2/2)

Batch spacing dependence experiment: 9h00 – 9h30

Should allow to estimate the SEY and R we reached after this scrubbing. Data being analyzed…

- Filling scheme:



- The pressure decrease after every injection is not any more observed
- Some more time would be good to achieve steady state pressure after every two injections, but the results look quite promising
- It is a (relatively) fast measurement

Octavio Dominguez