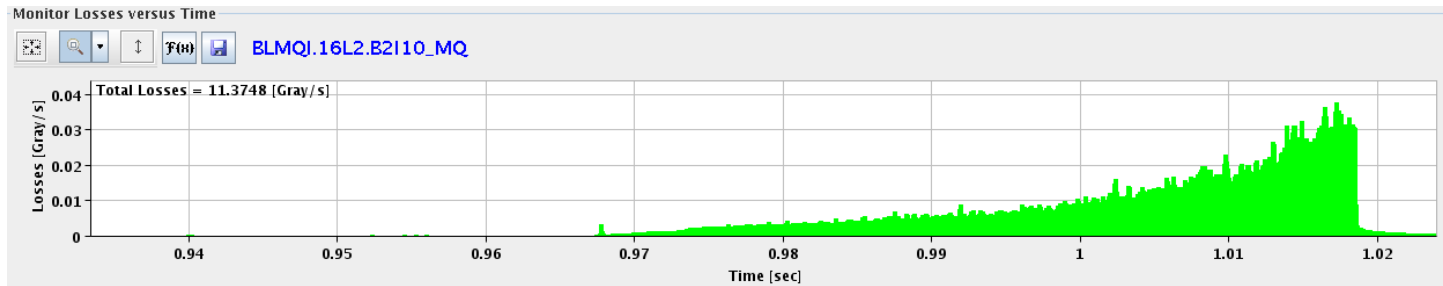


16L2 events during week 46

David, Xavier, Elias and Benoit thanks to saved ADTObsBox data

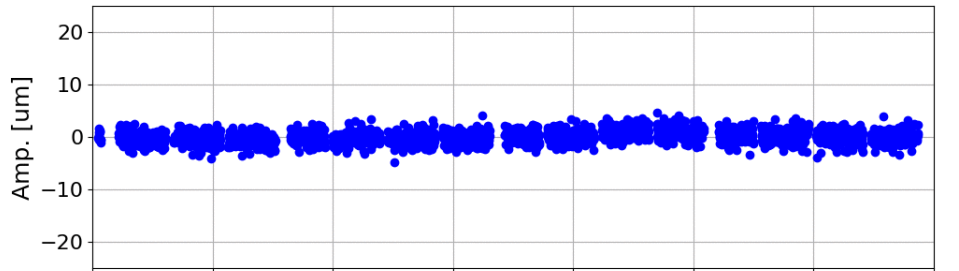
- 3 dumps on during the night of Tuesday 14 / Wednesday 15
 - Fill 6386: dump after 11h of stable beams
 - Fill 6387: dump in stable beam
 - Fill 6388: dump in stable beam
- 4 dumps during the evening of Thursday 16
 - Fill 6392: dump after 9h of stable beams
 - Fill 6393: dump during the ramp, at 1.48 TeV
 - Fill 6394: dump during the ramp, at 0.745 TeV
 - Fill 6395: dump during the ramp, at 0.979 TeV
- All dumps were on B2
- ADT post-mortem data only on B2 for fills 6386, 6387, 6388
- No head-tail monitor data for fills 6386, 6387, 6388
- Full data for fills 6392, 6393, 6394 and 6395
- Analysis results are stored in `/afs/cern.ch/work/l/lhcm/public/instabilityMonitoring/16L2`

1st dump: fill 6386 (50 ms from event to dump)

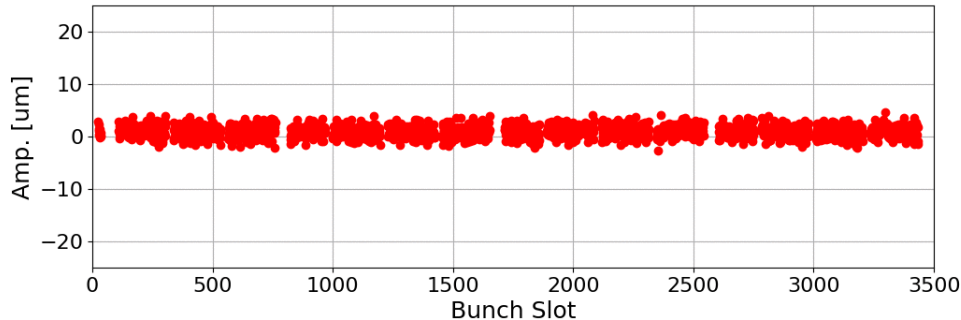


Fill: 6386, B2, Post Mortem, Turn before dump 100

Horizontal

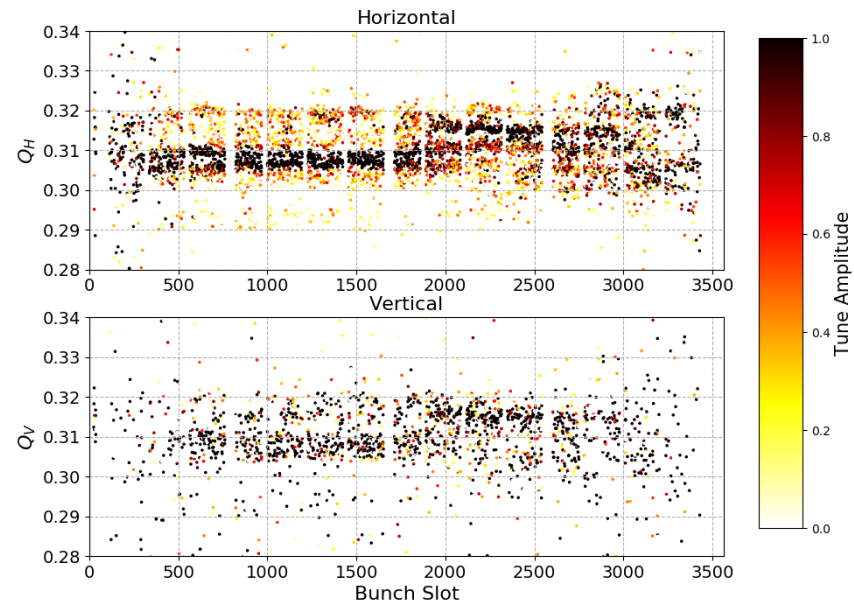


Vertical



Use the data from the last 200 turns to compute the tune

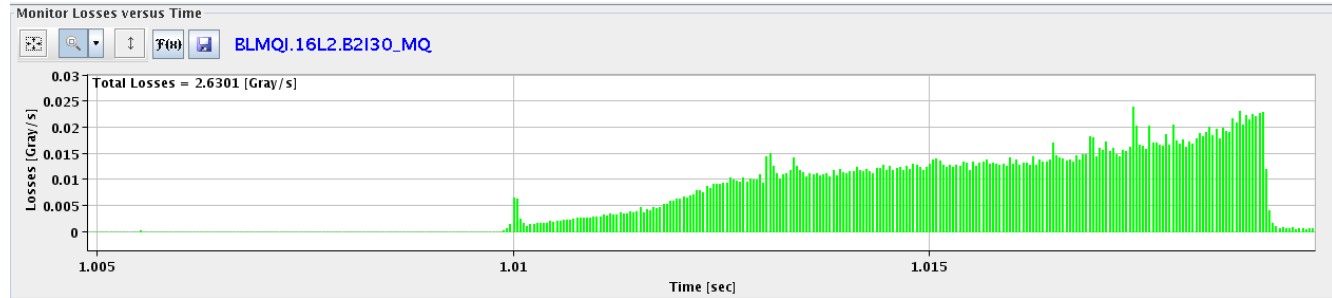
Tune from Turn 200 to 0 before dump
Fill 6386, B2



→ Standing wave coupling all bunches horizontally for beam 2

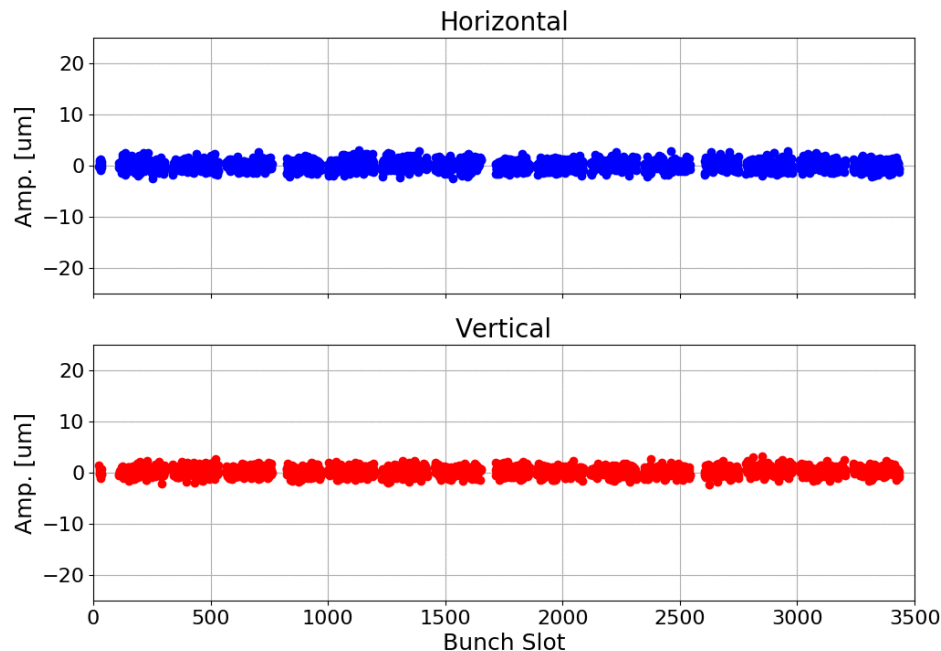
→ Positive tune shift for the higher frequency travelling wave around bunch slot 2000 to 2500

2nd dump: fill 6387 (10 ms from event to dump)



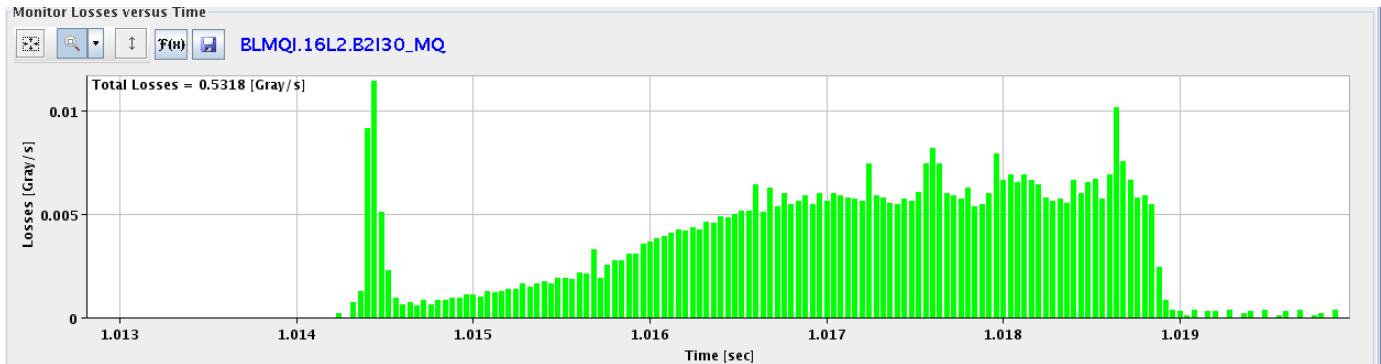
David, Xavier, Elias and Benoit thanks to saved ADTObsBox data on B2

Fill: 6387, B2, Post Mortem, Turn before dump 100

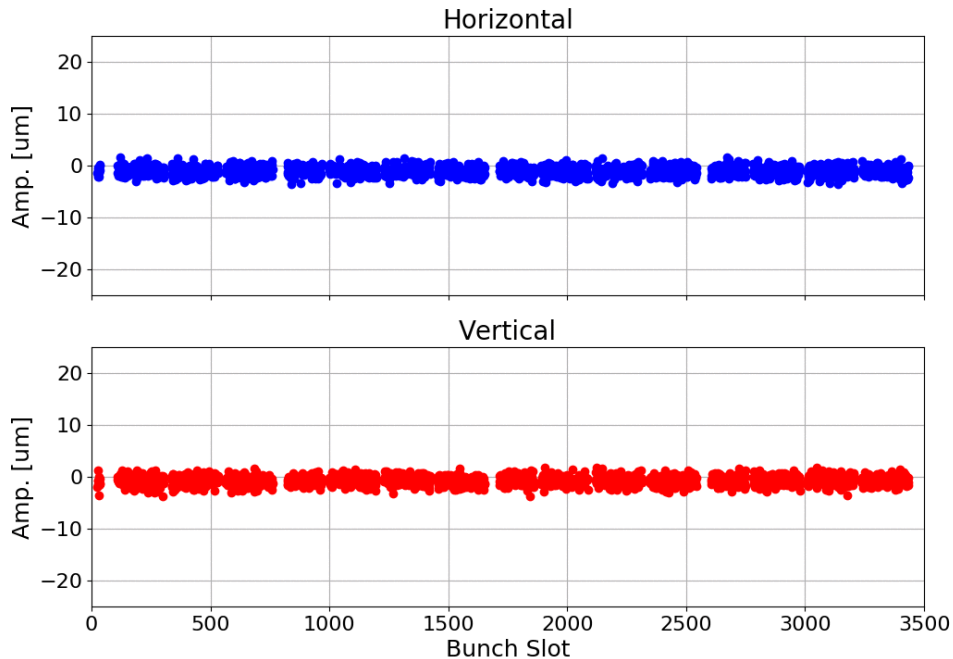


- Higher frequency and more travelling wave like horizontal motion for beam 2, with usual head of trains getting wild
- Not enough turns for clear tune shift, work ongoing

3rd dump: fill 6388 (5 ms from event to dump)

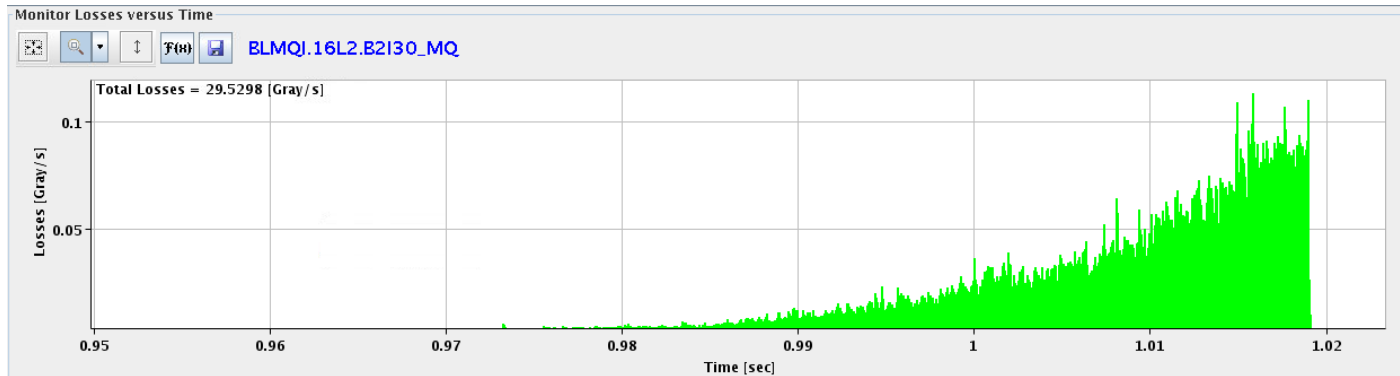


Fill: 6388, B2, Post Mortem, Turn before dump 100

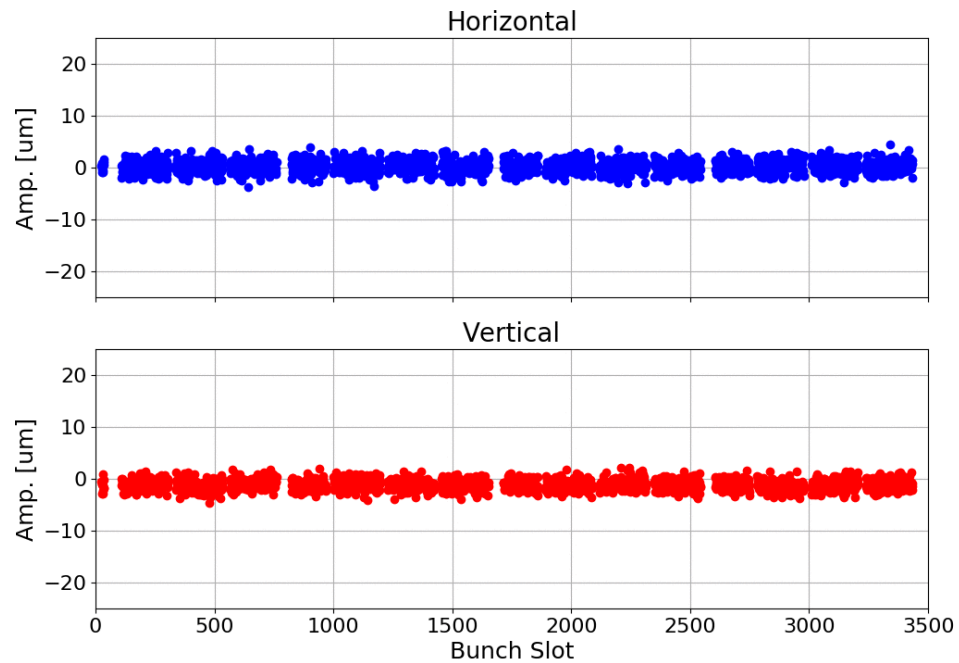


- All bunches seem to oscillate in phase, not much seen
- Not enough turns for clear tune shift, work ongoing

4th dump: fill 6392

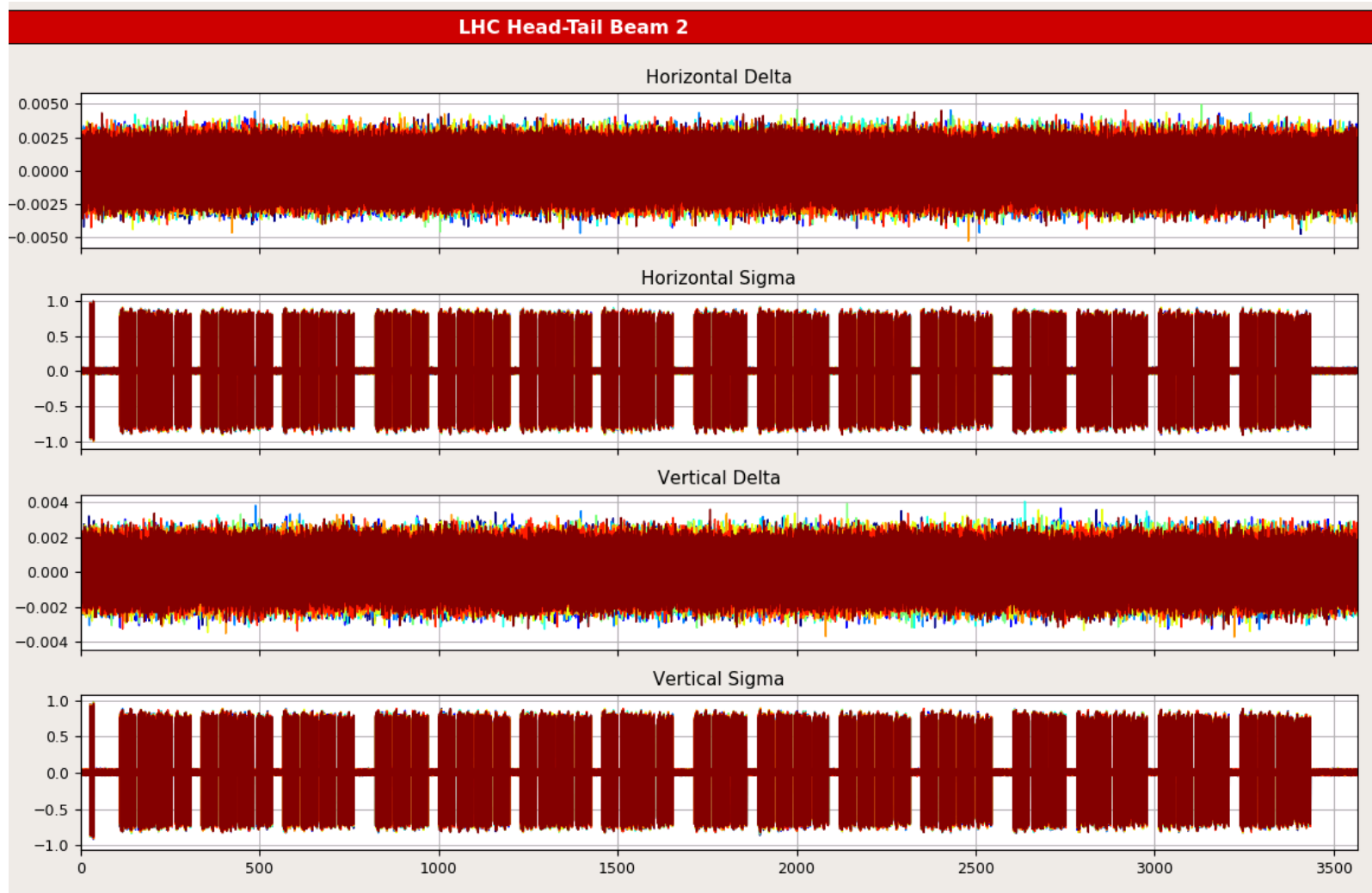


Fill: 6392, B2, Post Mortem, Turn before dump 100



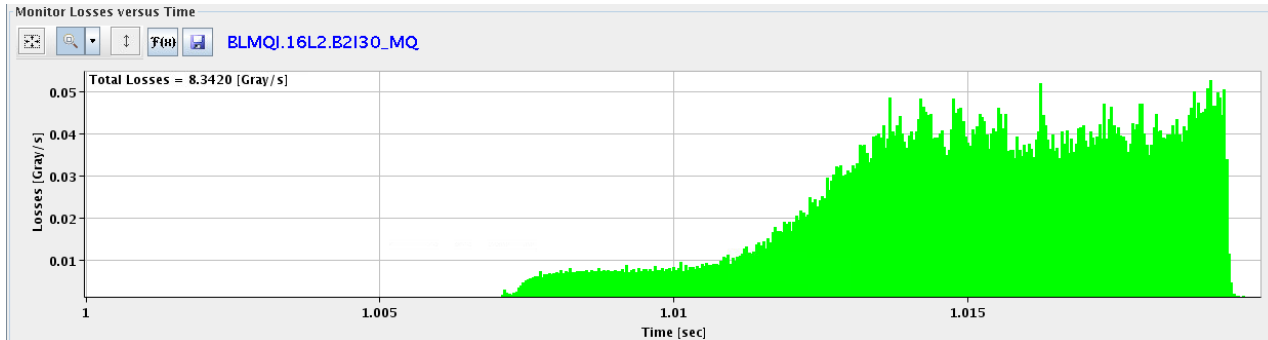
→ Small horizontal shift of the whole beam but no clear motion

4th dump: fill 6392 → HT monitor put back to work

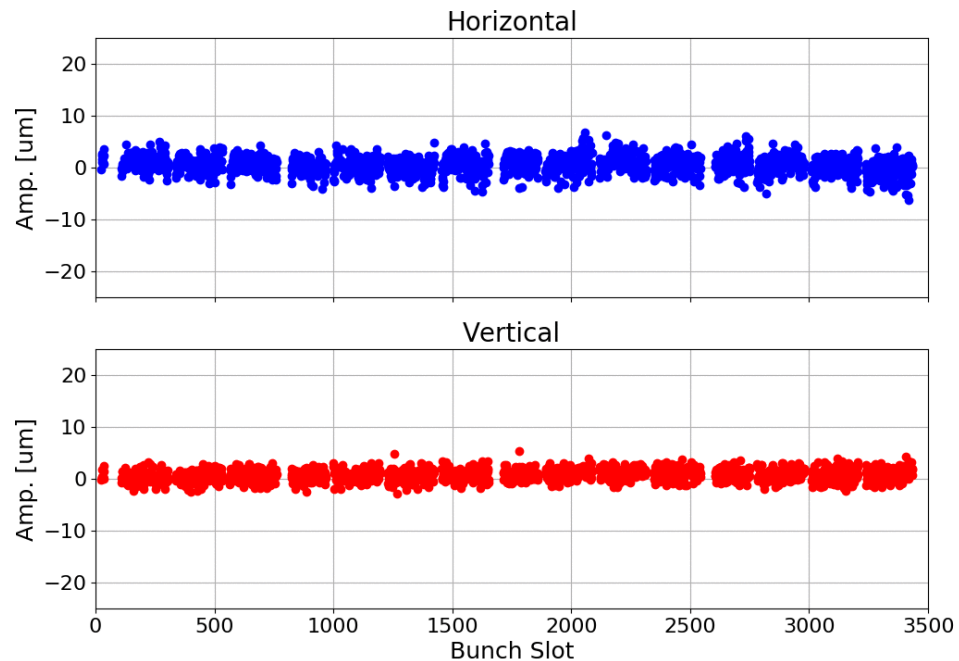


→ Not much seen

5th dump: fill 6393



Fill: 6393, B2, Post Mortem, Turn before dump 100



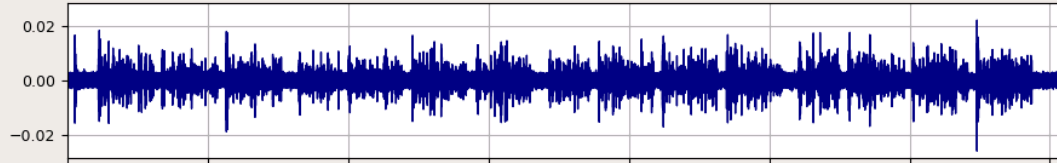
- Higher frequency and more travelling wave like horizontal motion for beam 2
- Head of trains getting wild

5th dump: fill 6393

LHC Head-Tail Beam 2

- Options:
- Load
 - Scale Y
 - Show FS
 - Repeat
 - Baseline
 - 2D Plot
 - Fixed Colours
 - Compensation

Horizontal Delta

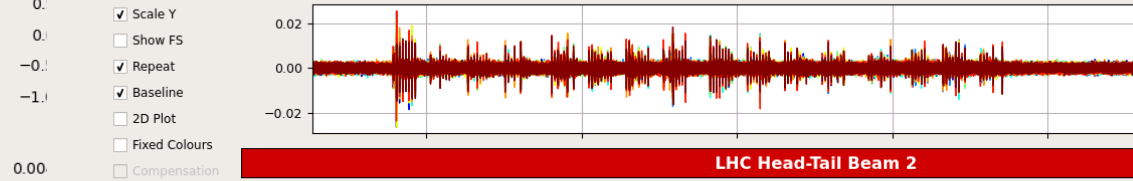


LHC Head-Tail Beam 2

- Offset: 0.0
- Repeat: 88924.5084
- Start: 1
- Num: 1
- Inc: 1

- Options:
- Load
 - Scale Y
 - Show FS
 - Repeat
 - Baseline
 - 2D Plot
 - Fixed Colours
 - Compensation

Horizontal Delta



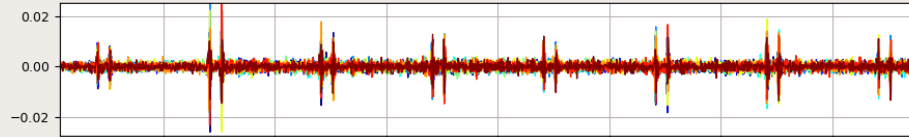
LHC Head-Tail Beam 2

- From: 1
- To: 3564
- All
- Bunch: # 26, # 27, # 28, # 29, # 30, # 31

- Offset: 0.0
- Repeat: 88924.5084
- Start: 1
- Num: 9
- Inc: 1
- From: 1

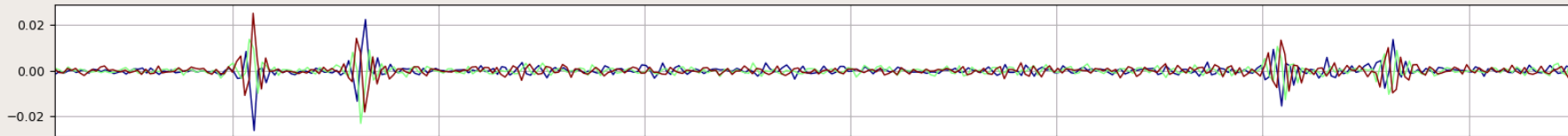
- Options:
- Load
 - Scale Y
 - Show FS
 - Repeat
 - Baseline
 - 2D Plot
 - Fixed Colours
 - Compensation

Horizontal Delta

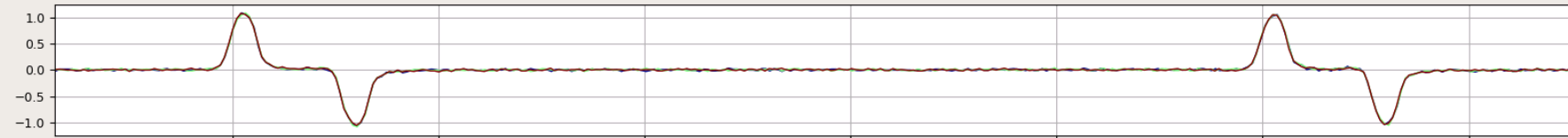


Horizontal Delta

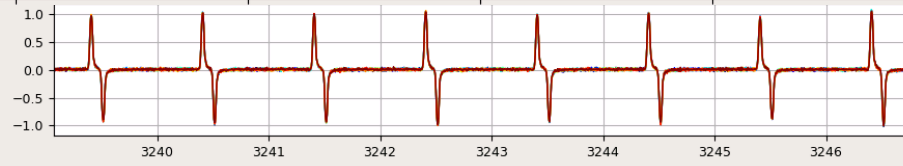
Horizontal Sigma



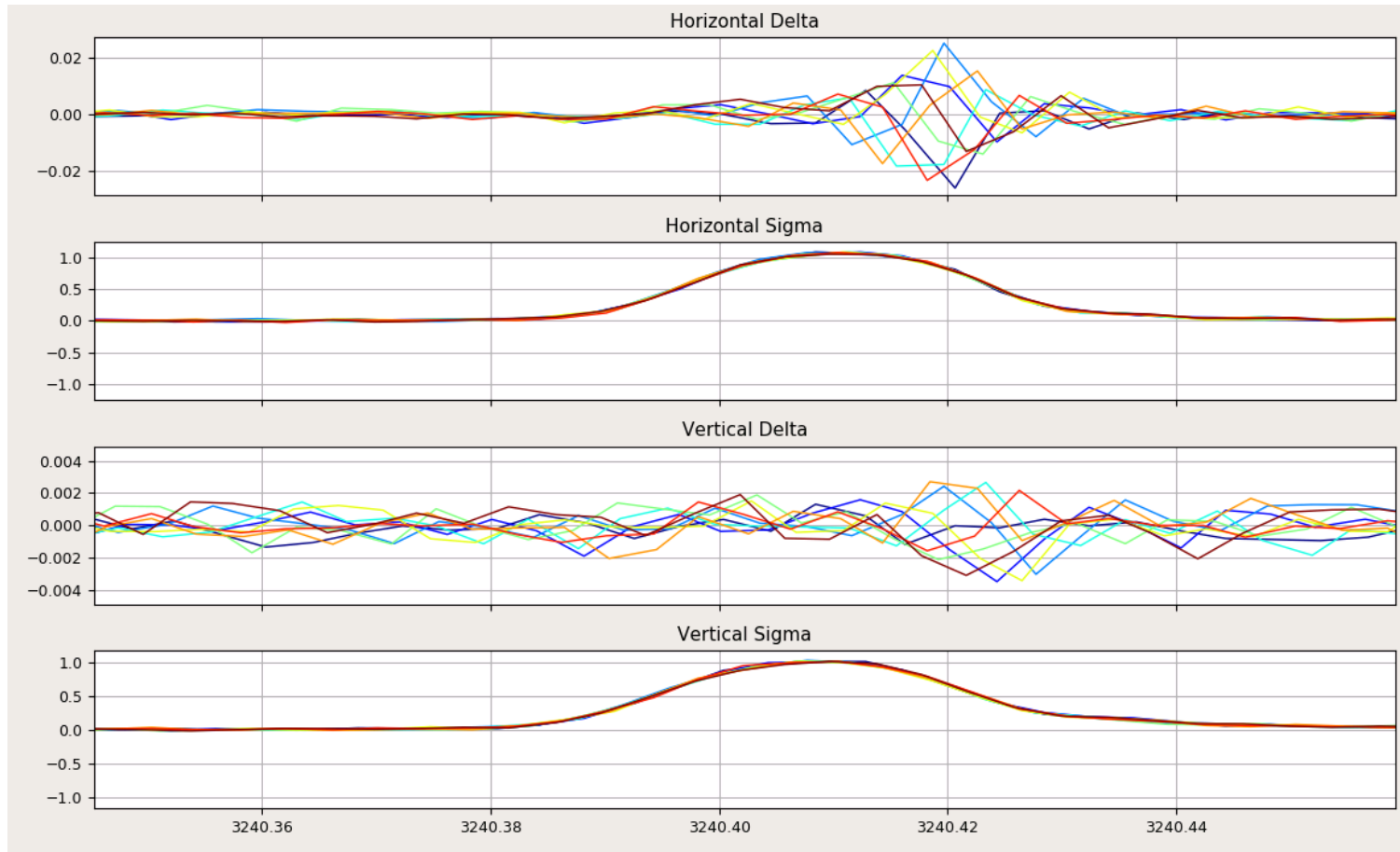
Horizontal Sigma



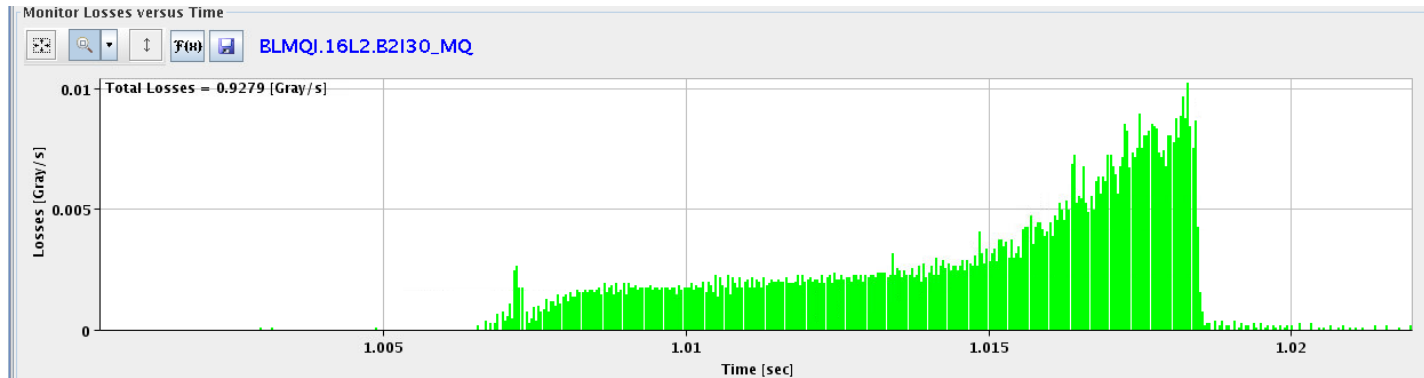
- Bunch: # 31, # 32, # 33, # 34, # 35, # 36, # 37, # 110, # 111, # 112, # 113



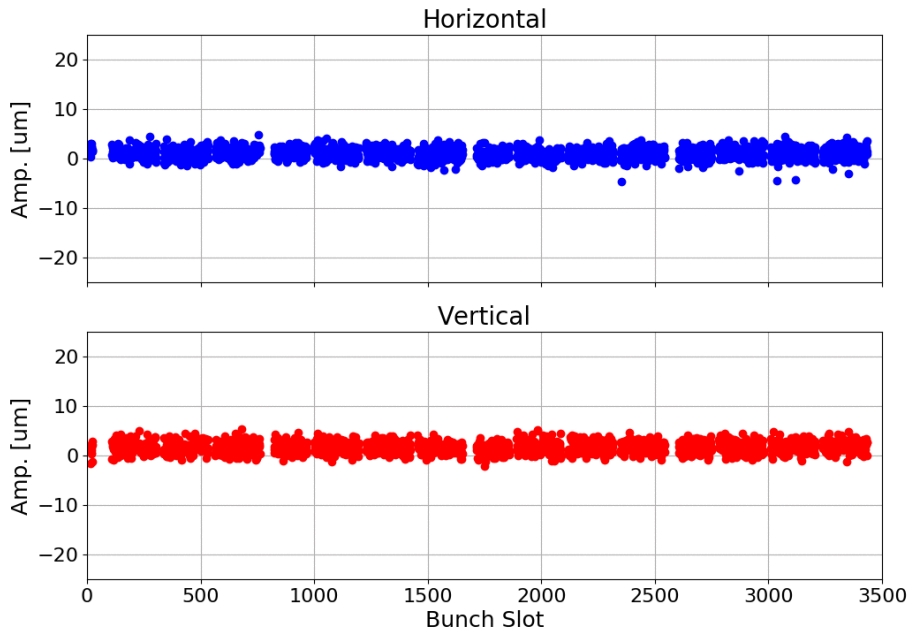
Zoom on the bunch



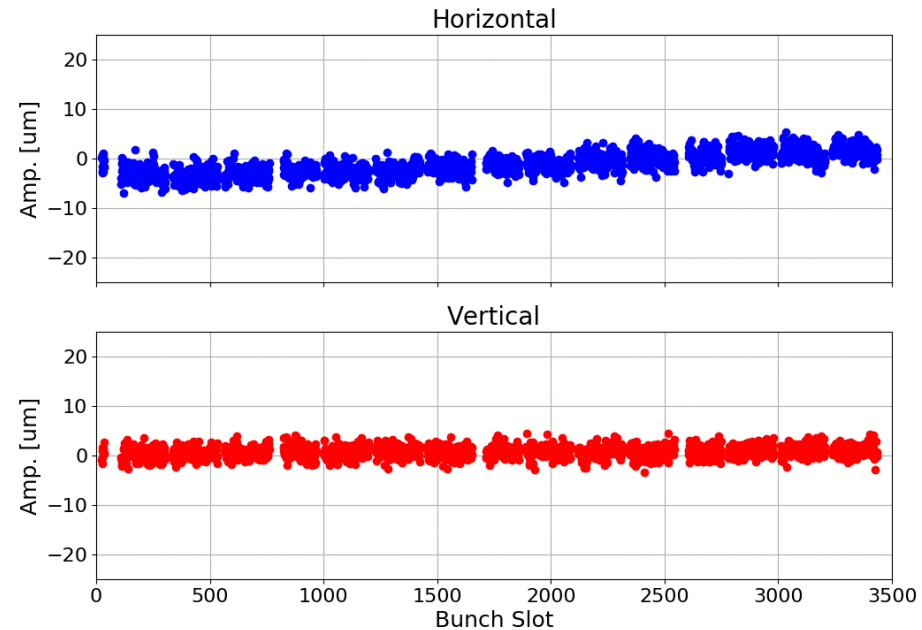
6th dump: fill 6394



Fill: 6394, B1, Post Mortem, Turn before dump 100



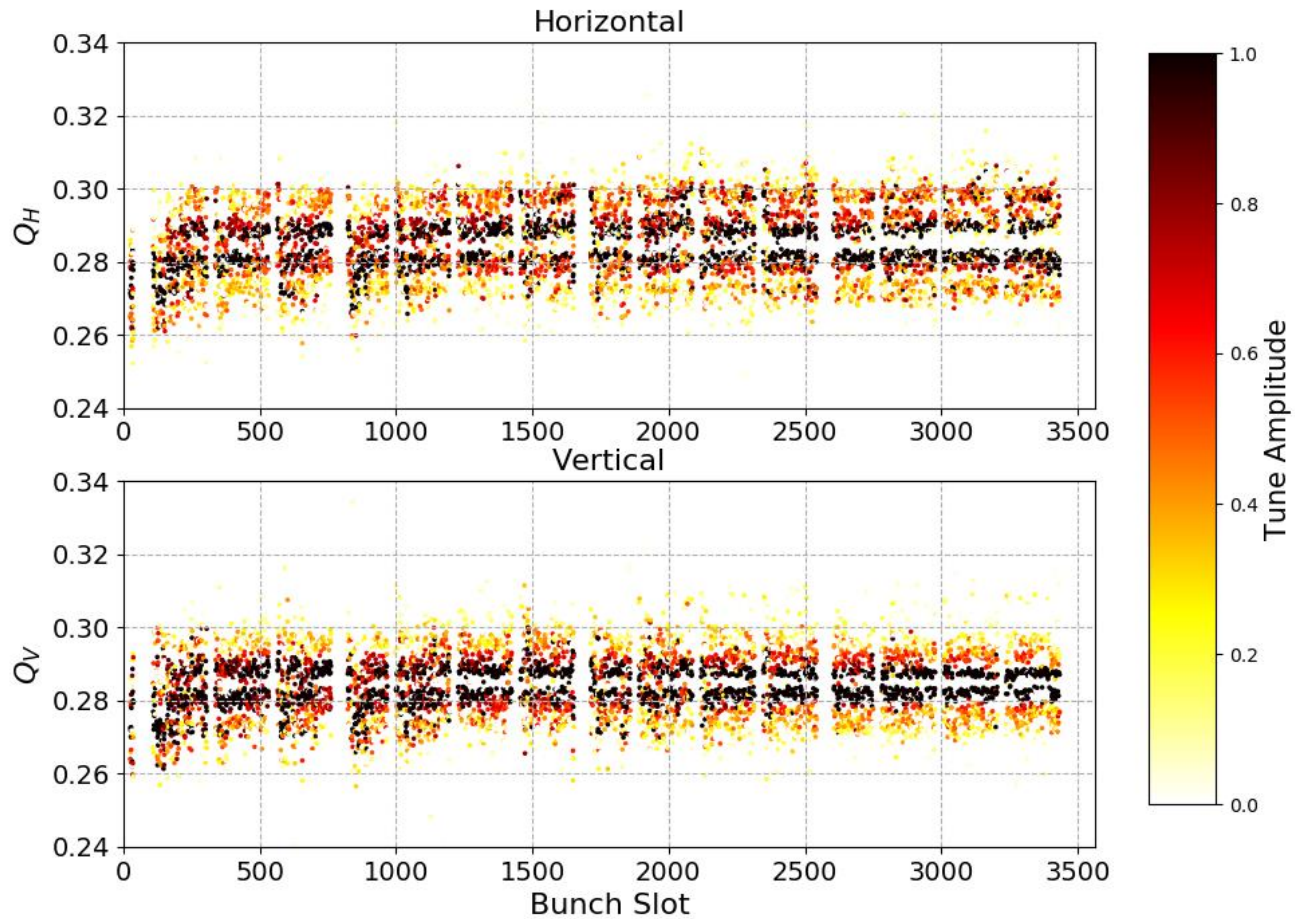
Fill: 6394, B2, Post Mortem, Turn before dump 100



- High amplitude oscillations on B2H, travelling wave motion on the whole beam
- All bunches getting unstable as well

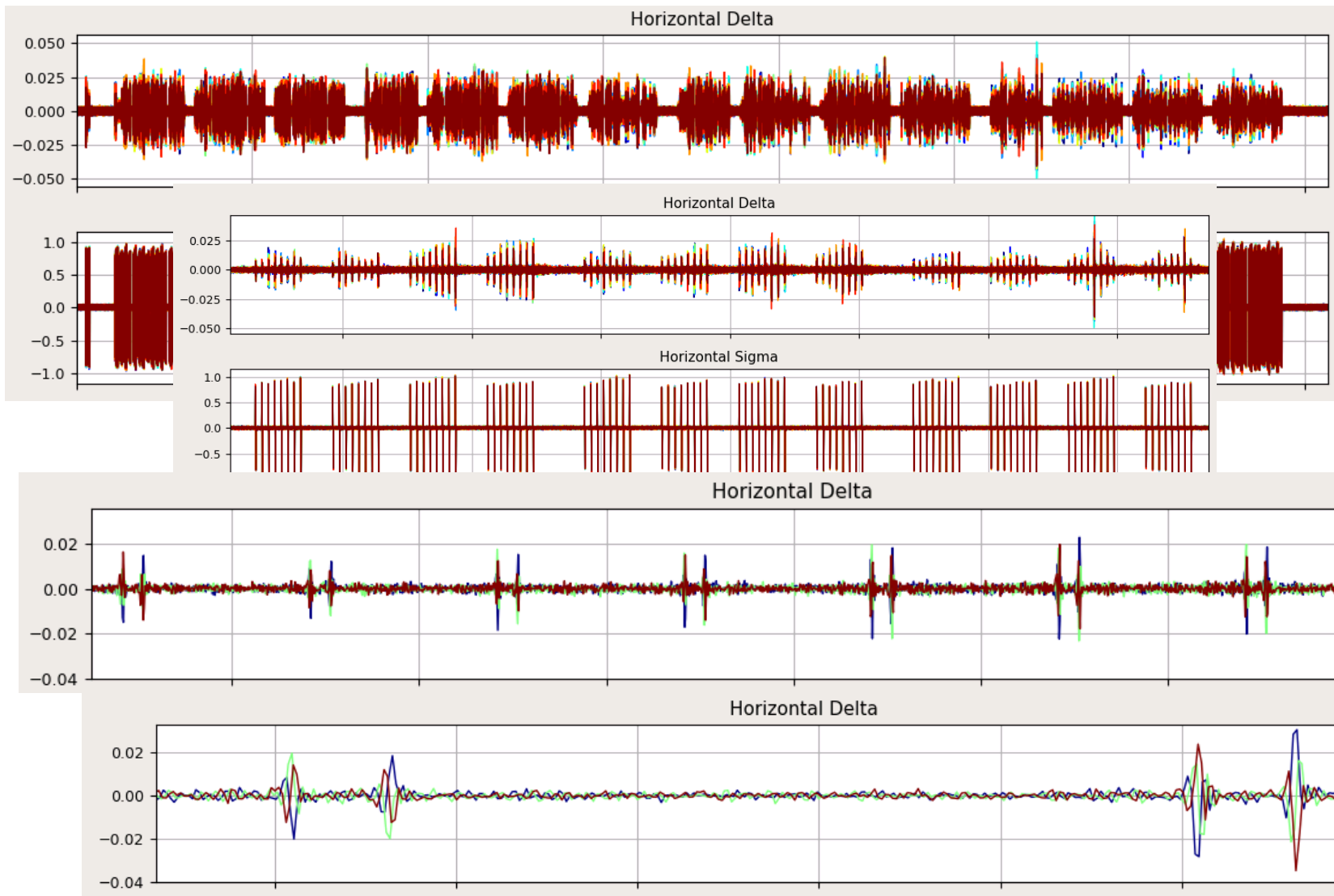
6th dump: fill 6394

Tune from Turn 100 to 0 before dump
Fill 6394, B2

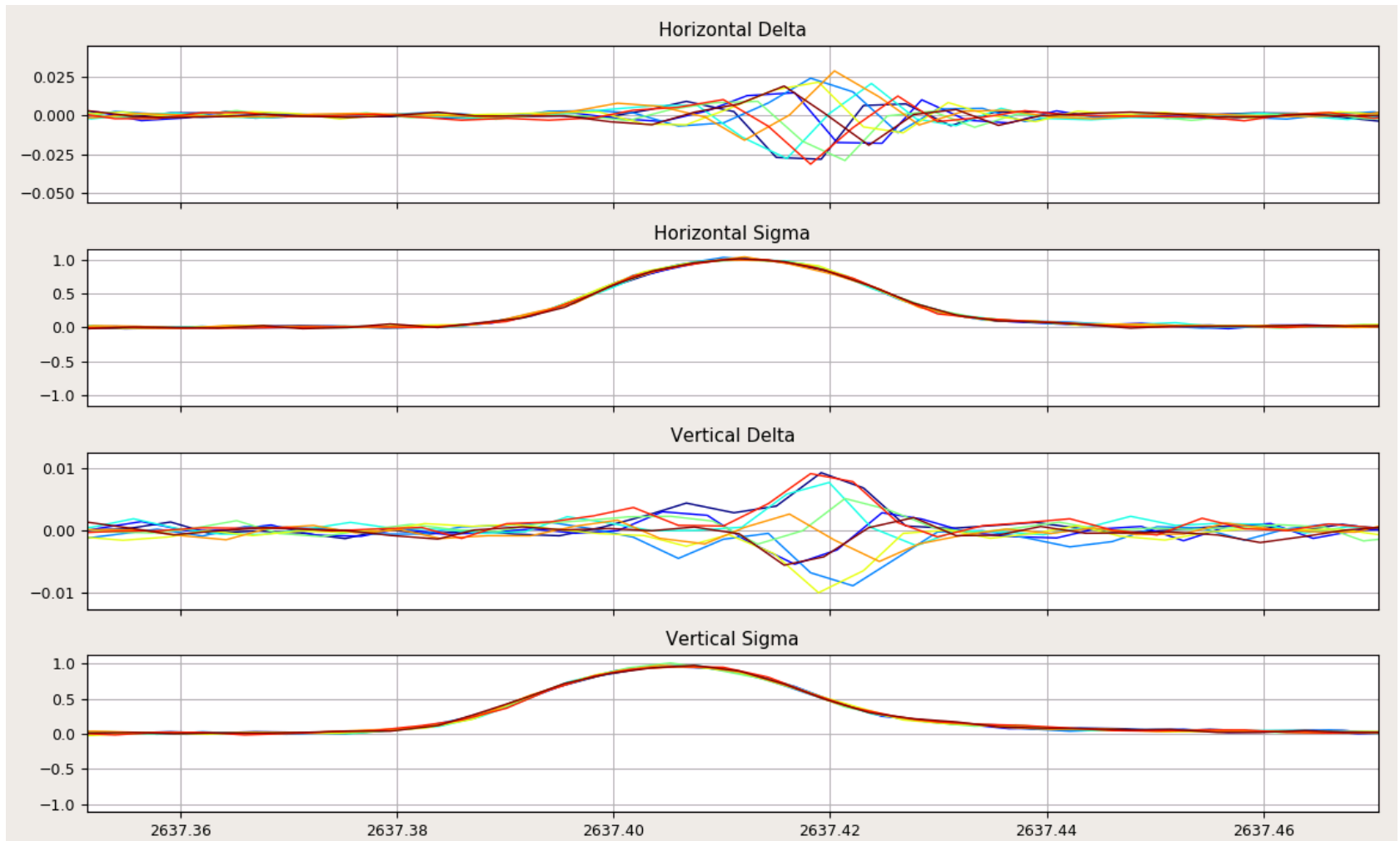


→ Positive tune shift on all the bunches except the first ~100

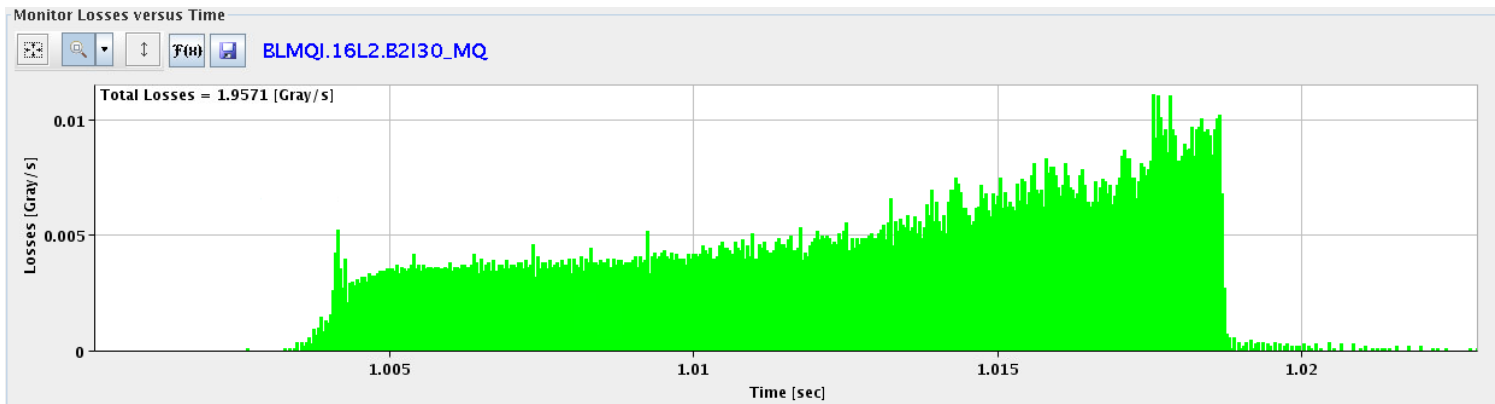
6th dump: fill 6394



6th dump: fill 6394

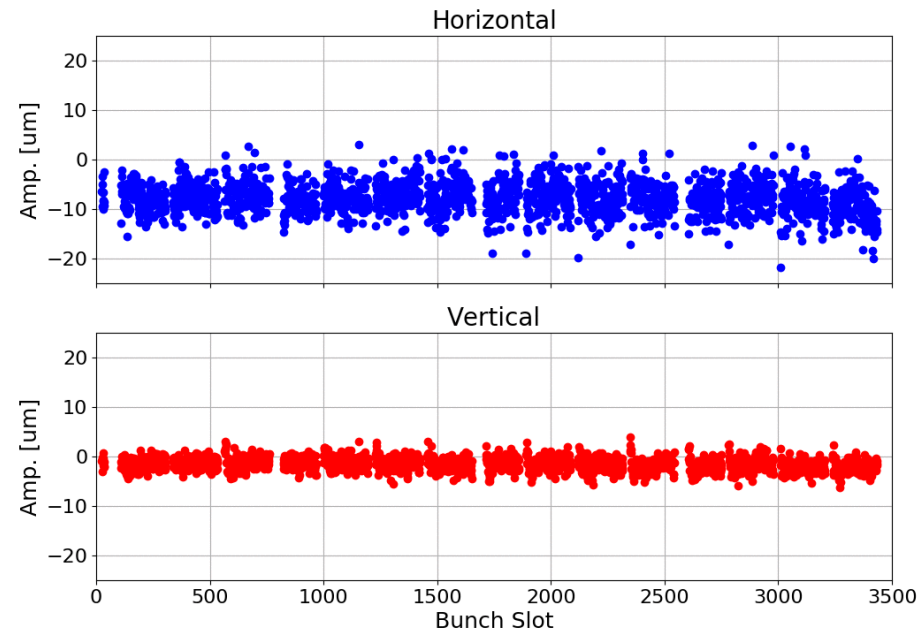
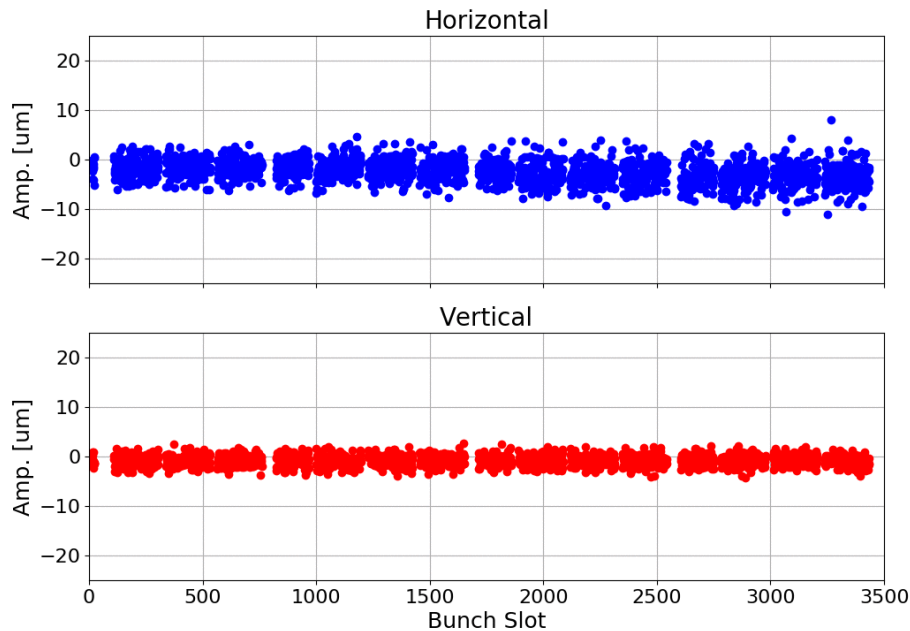


7th dump: fill 6395



Fill: 6395, B1, Post Mortem, Turn before dump 100

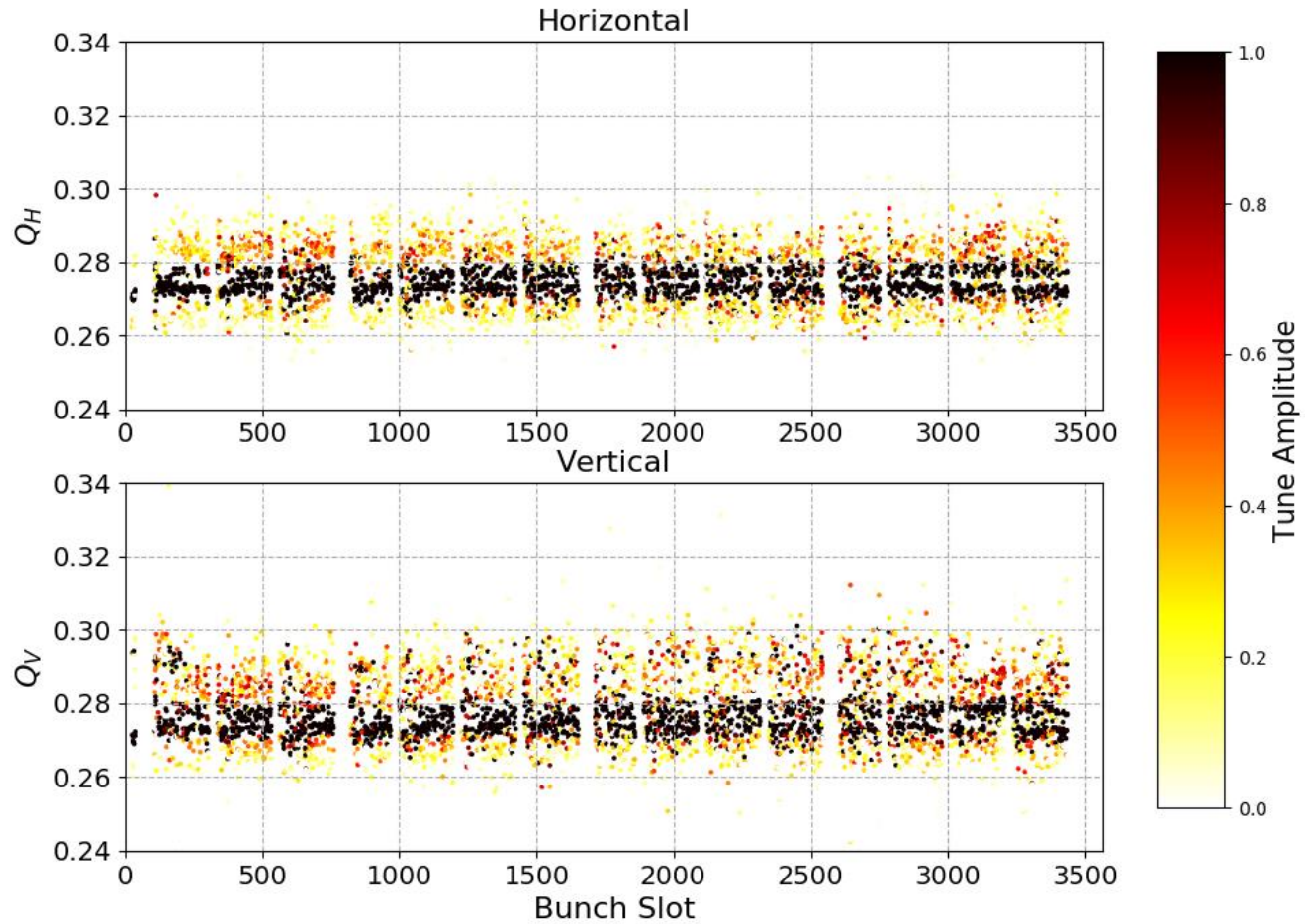
Fill: 6395, B2, Post Mortem, Turn before dump 100



→ High amplitude oscillations on B2H (standing wave and head of trains), some motion on B1 in the last turns

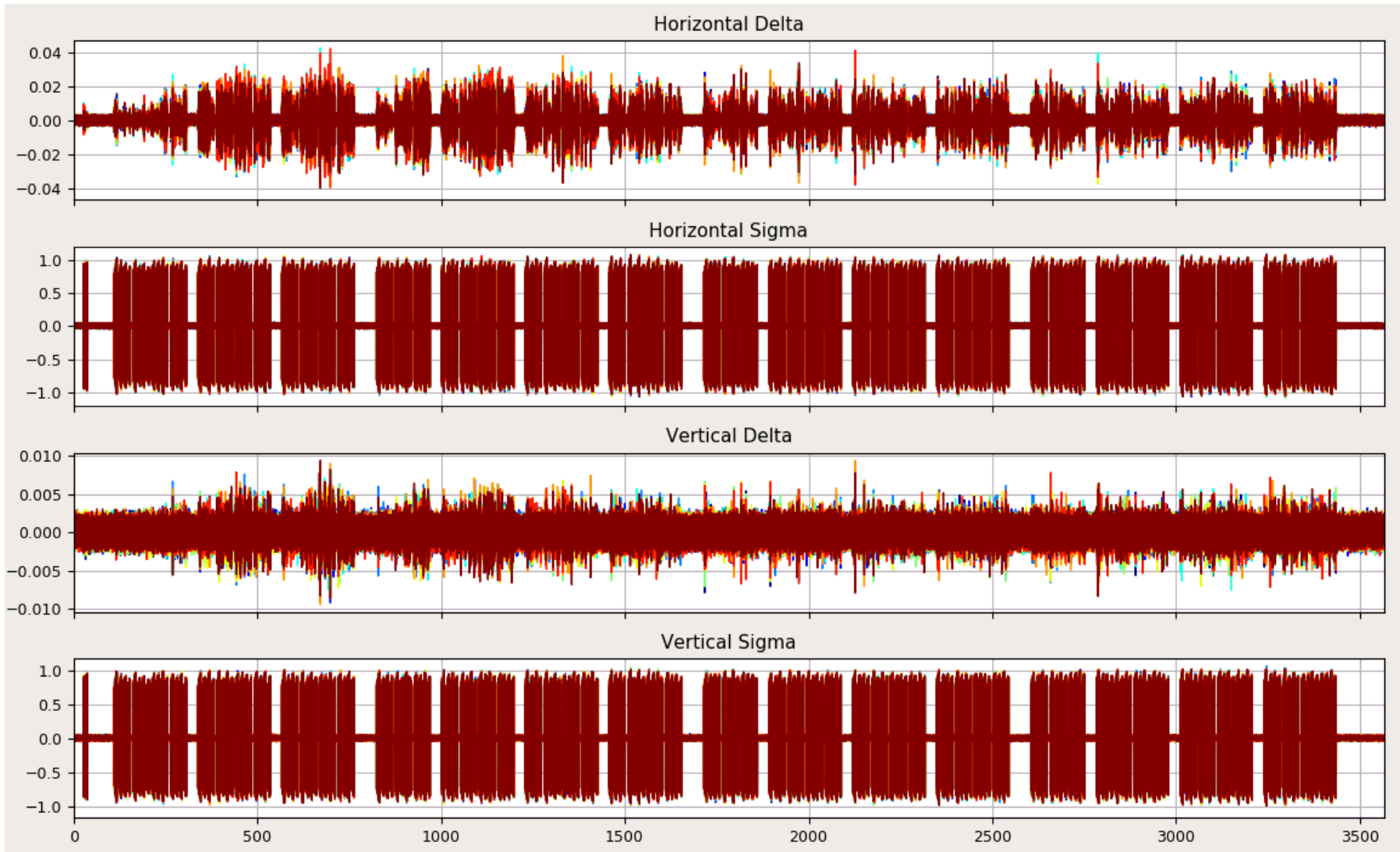
7th dump: fill 6395

Tune from Turn 100 to 0 before dump
Fill 6395, B2

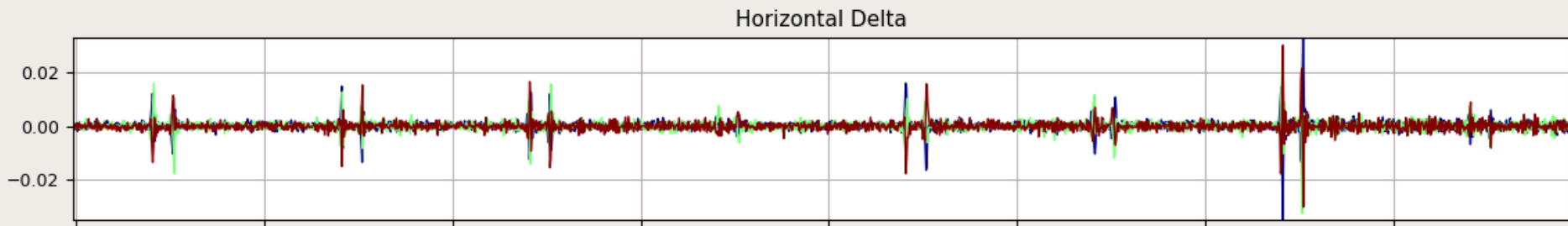
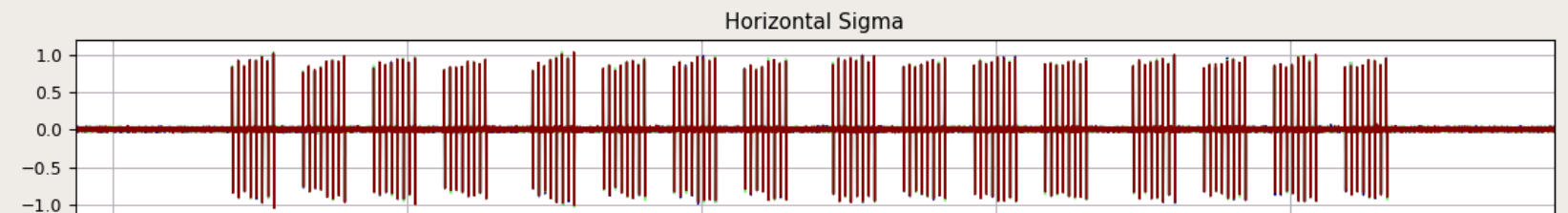
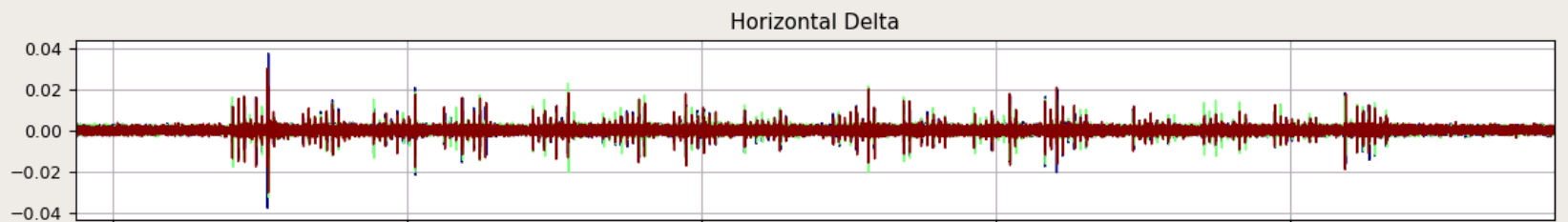


→ No clear tune shift

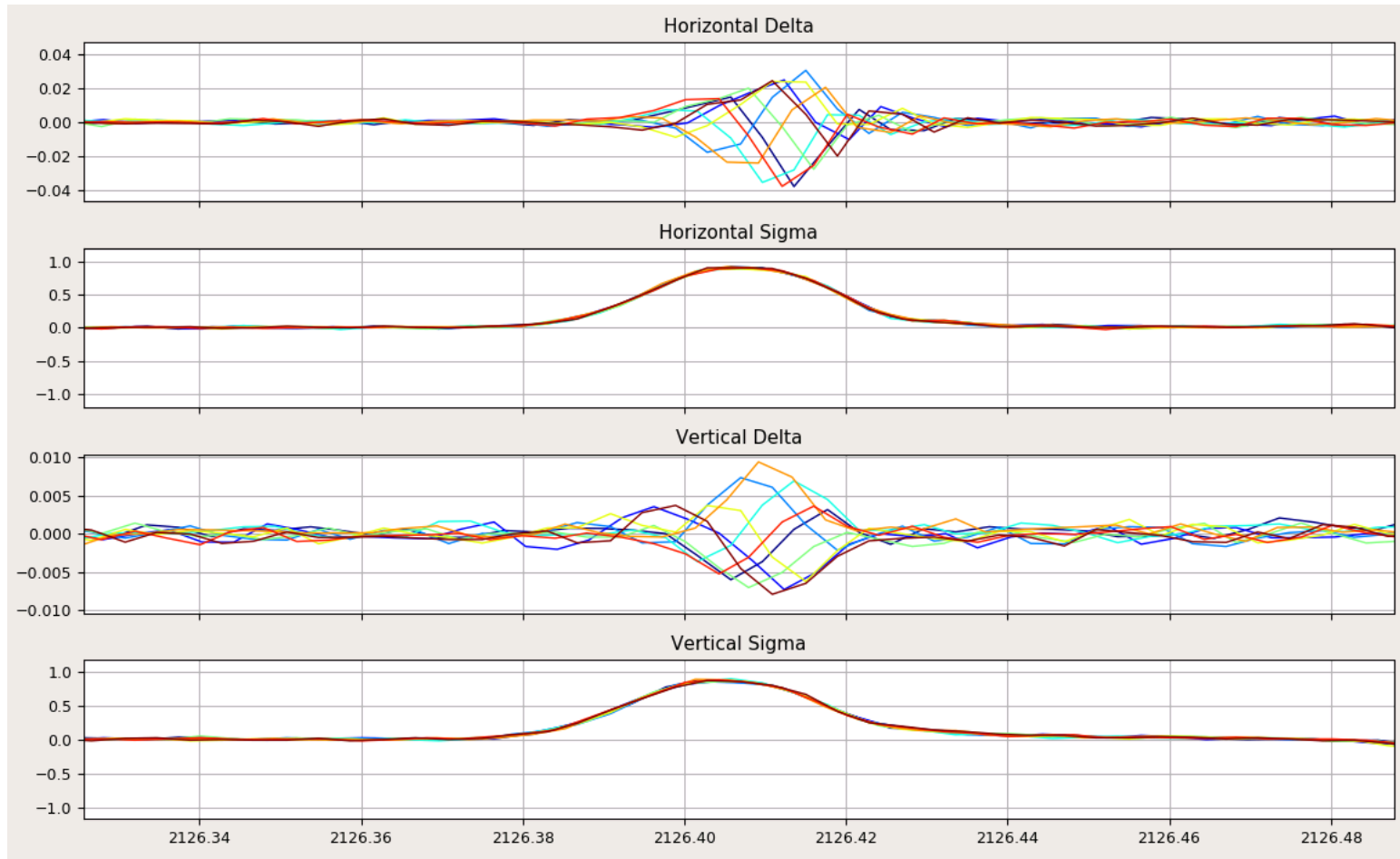
7th dump: fill 6395



7th dump: fill 6395



7th dump: fill 6395



→ Interesting to compare ADT data and HT for these bunches and these turns

→ A lot of data to analyse

Some comments

- Heavy analysis acquisition tools tend to stop, and OP should warn when such events occur to check that all monitoring is ON (HT monitor B2 was off, ADTObsBox B1 was off, dBLMs were off).
- Will check how the coupling extends between bunches