

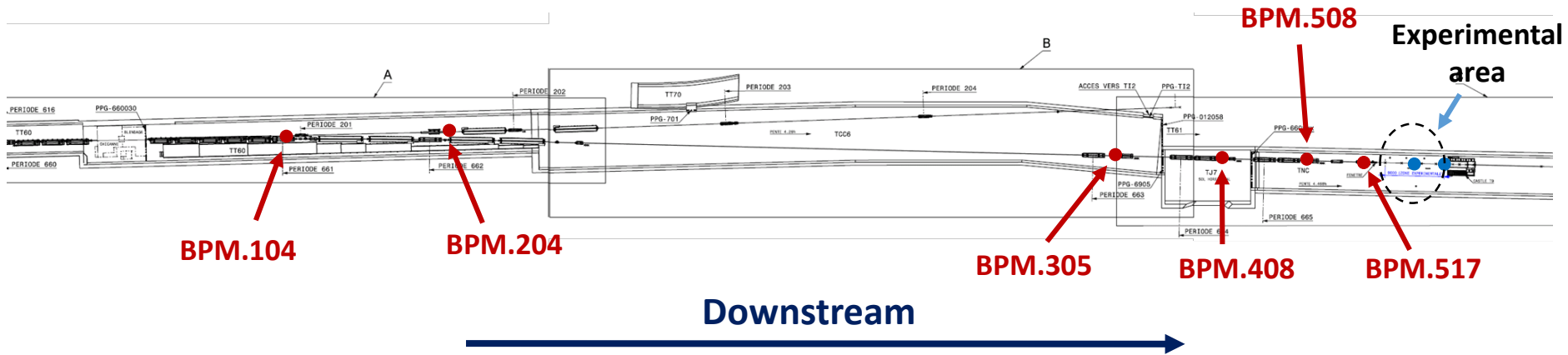


HighRadMat BPM System Update

Apostolos Sounas
On behalf of BE-BI-QP

- BPM System overview
- Accuracy
- Backscattering Issues & System Improvements
- Summary / Follow-Up

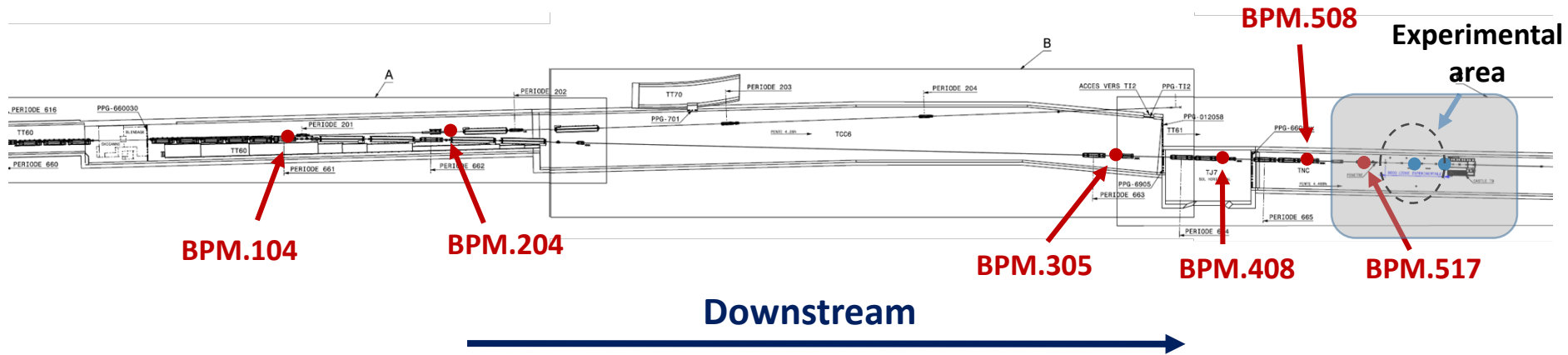
BPM Overview



8 Beam Position Monitors along the HRM line

- 6 in vacuum
- 1 before target
- 1 before dump (after target)

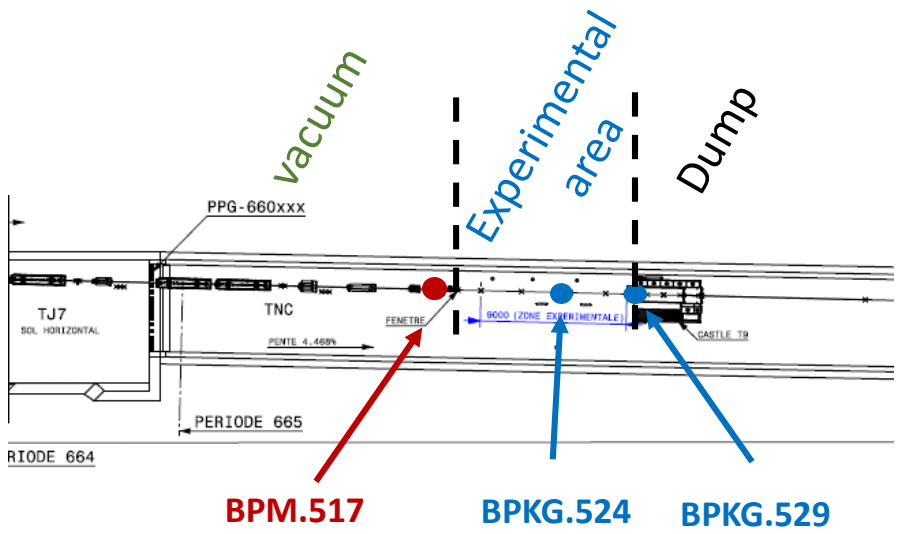
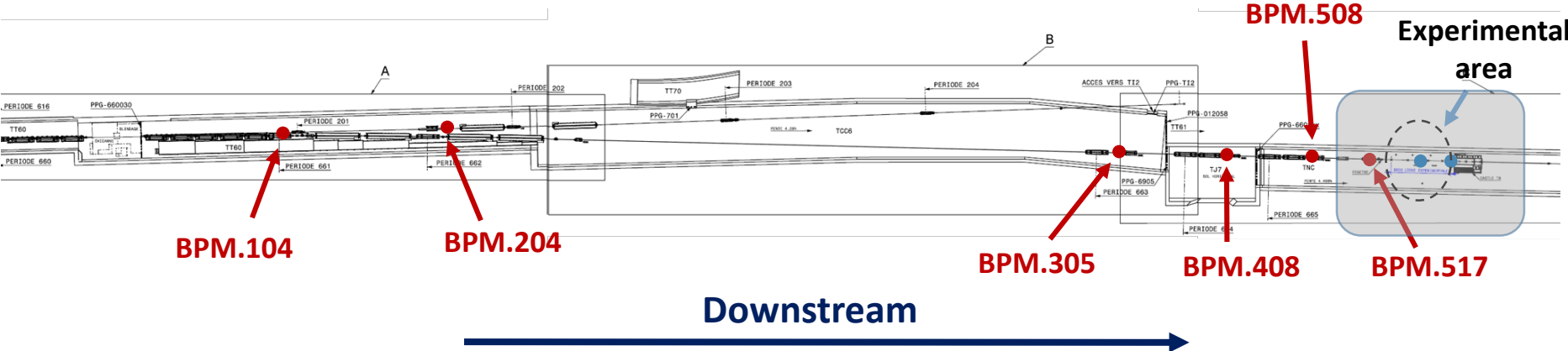
BPM Overview



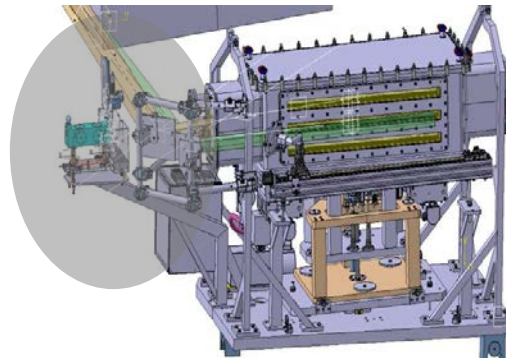
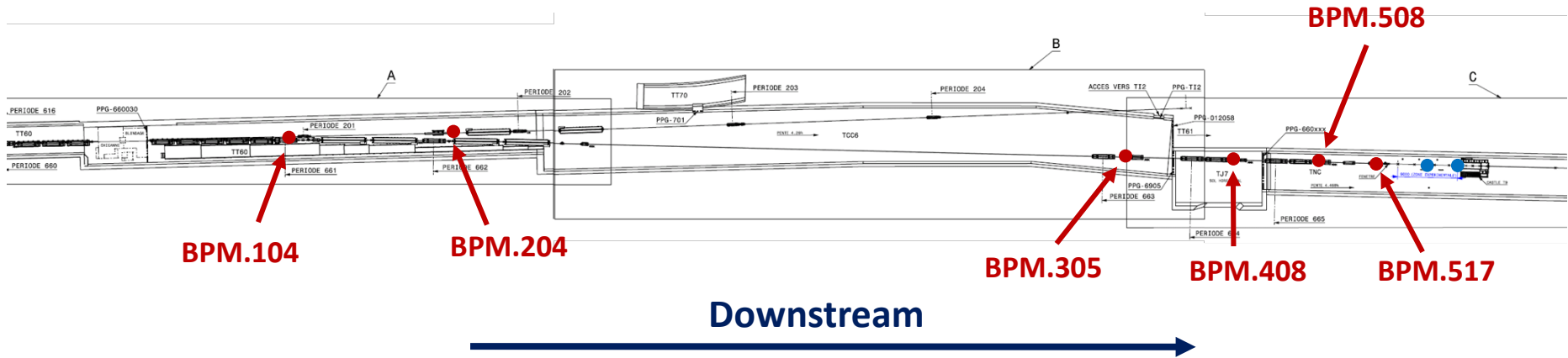
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BPM Overview



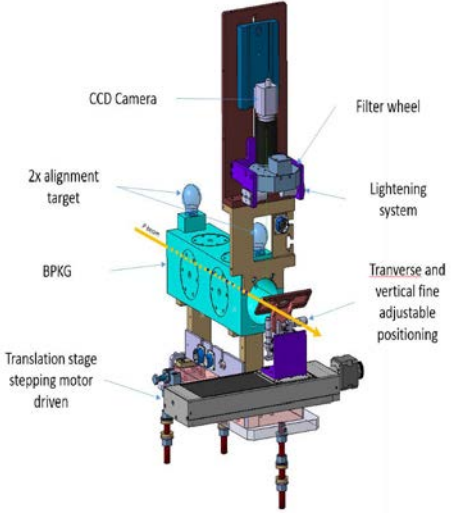
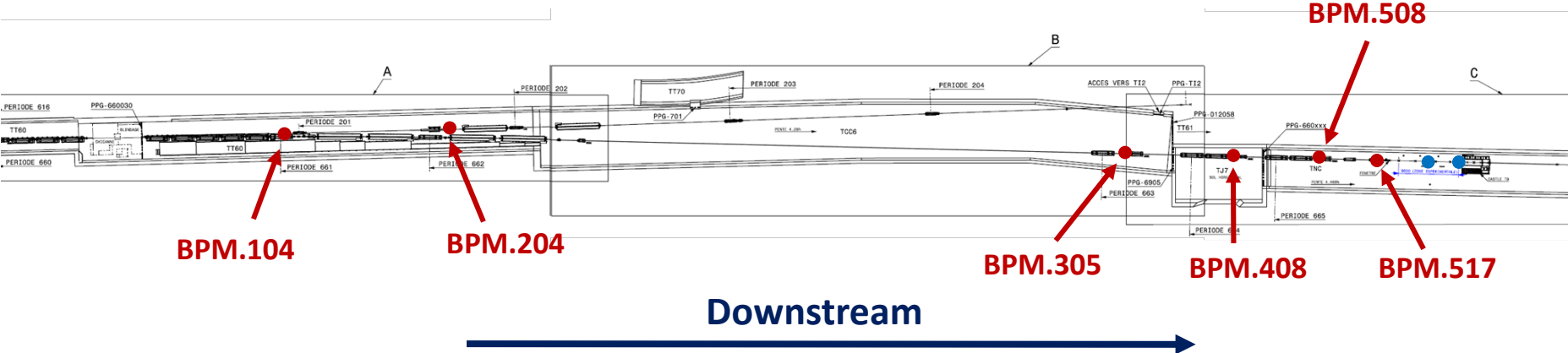
BPM Overview



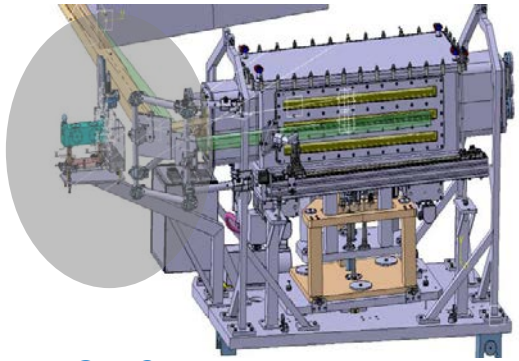
BPKG.524

HRM23, Jul.2015

BPM Overview



Combined Instrumentation
BPKG/BTV



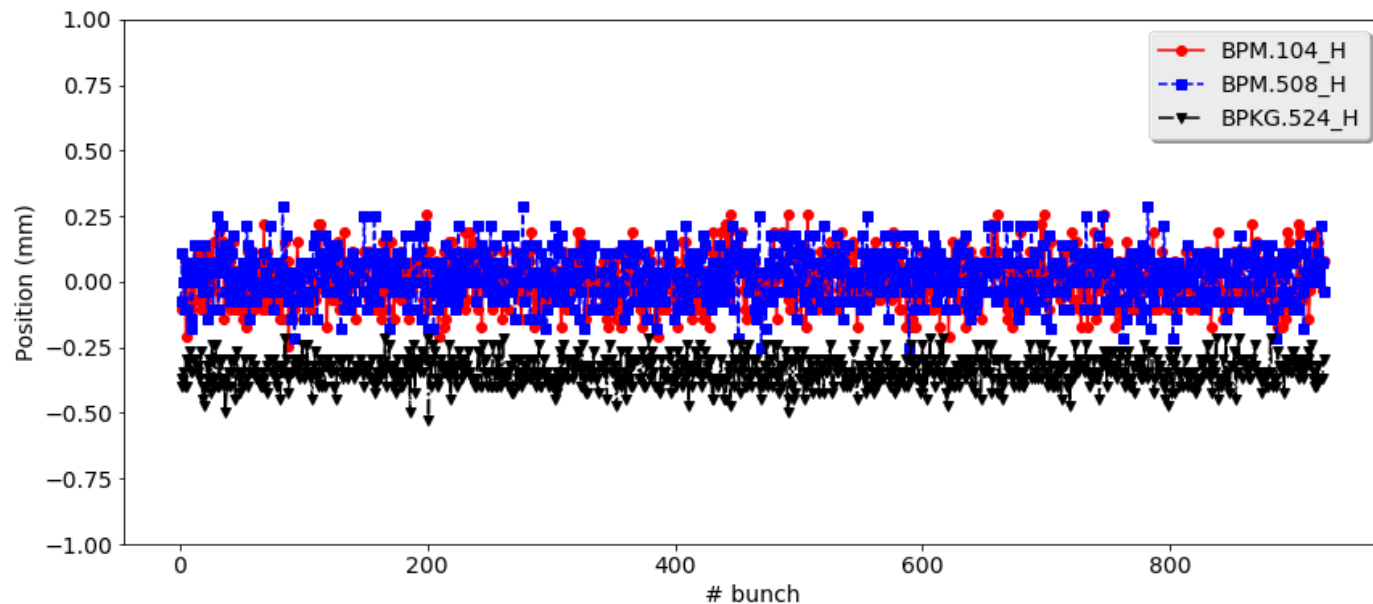
BPKG.524

from HRM23, Jul.2015

BPM Accuracy - Resolution

- BPM WBTN System (analog part as LHC)
- Bunch Position -> directly from input strobes

Resolution : < **80um**



BPM reading during calibration (13/06/2017, 13.45)

Extract Offsets:

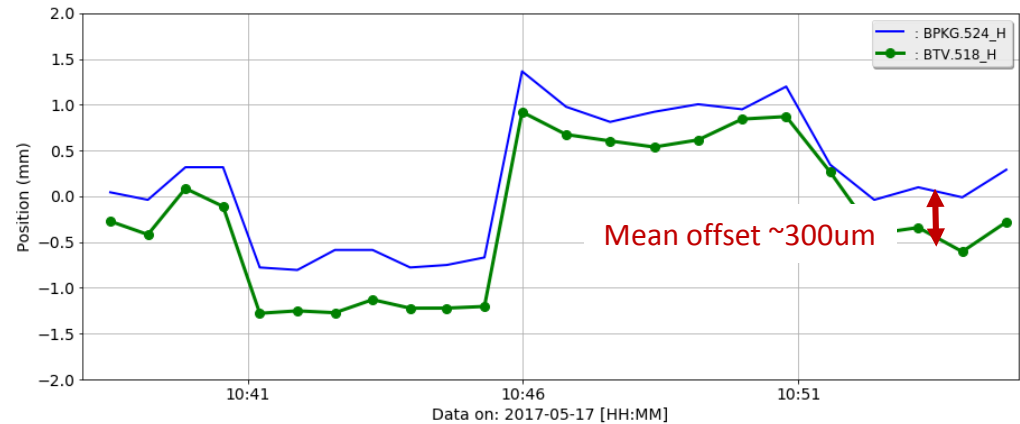
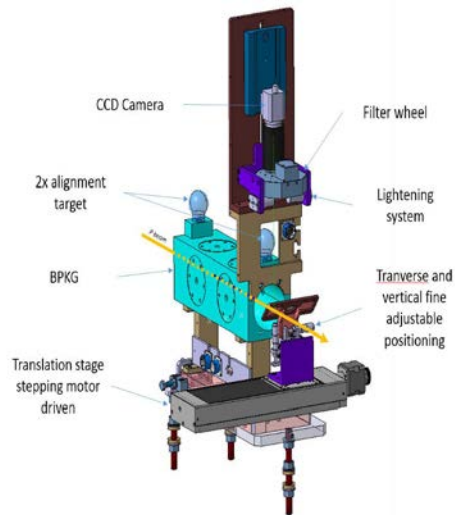
- 1) Electrical Offsets (e.g cabling assymetries)
- 2) Physical Offsets

BPKG/BTV Alignment

Extract Offsets:

1) Electrical Offsets (e.g cabling assymetries)

2) Physical Offsets



Commisioning HRM 42

Beam intensity restricted by BTV 518.

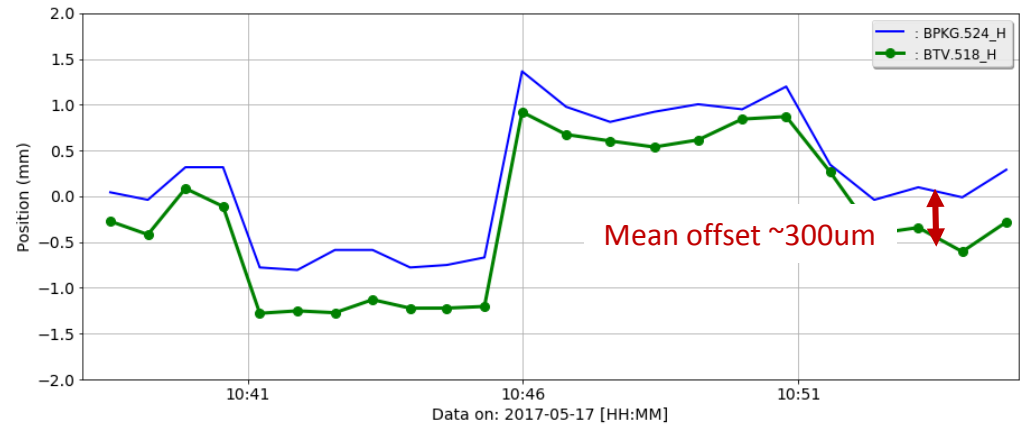
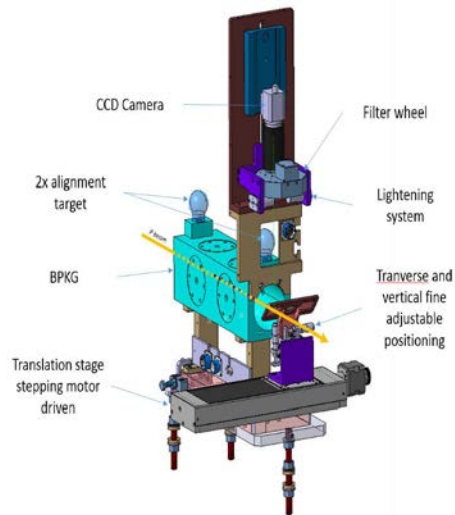
- Single bunch / 12 bunch train

BPKG/BTV Alignment

Extract Offsets:

1) Electrical Offsets (e.g cabling assymetries)

2) **Physical Offsets**



Commisioning HRM 42

Beam intensity restricted by BTV 518.

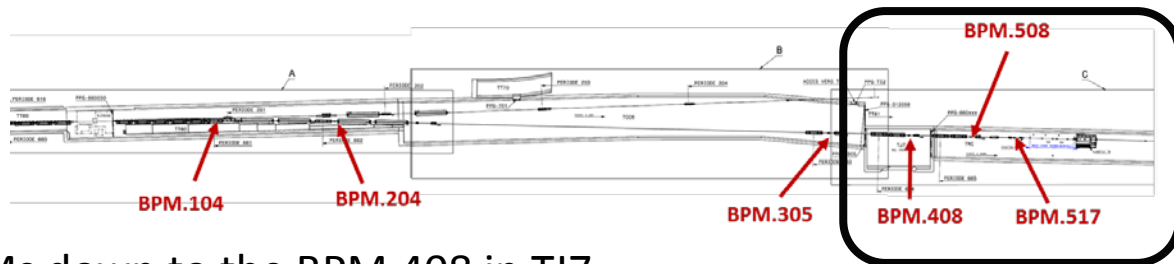
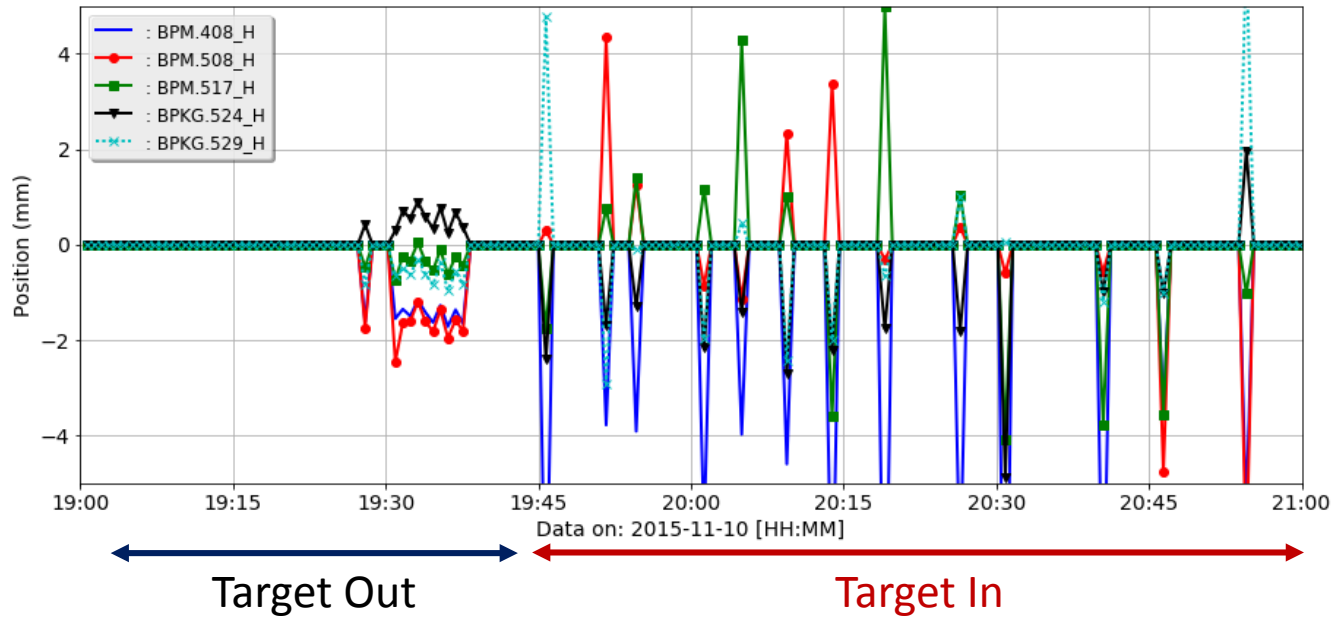
- Single bunch / 12 bunch train

✓ *More statistics*

✓ *Callibration works better*

Backscattered Shower Perturbations

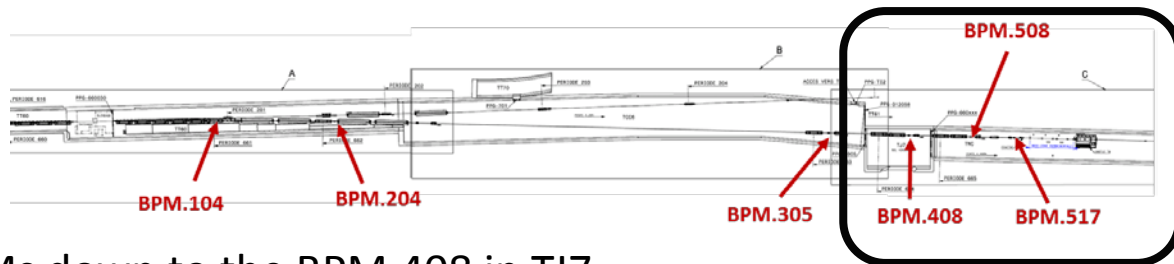
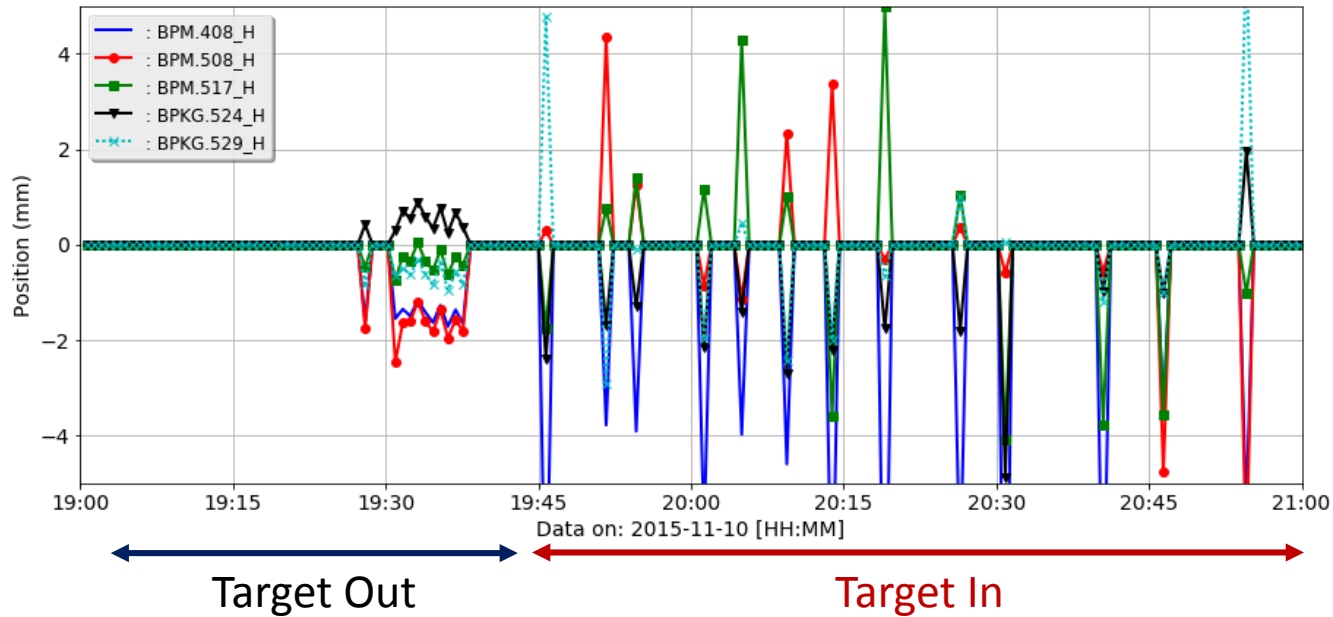
HRM 27
Rod Target



- Seen on all BPMs down to the BPM.408 in TJ7

Backscattered Shower Perturbations

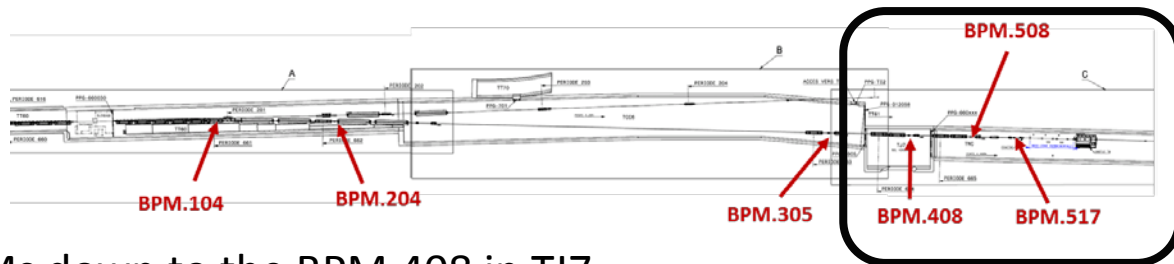
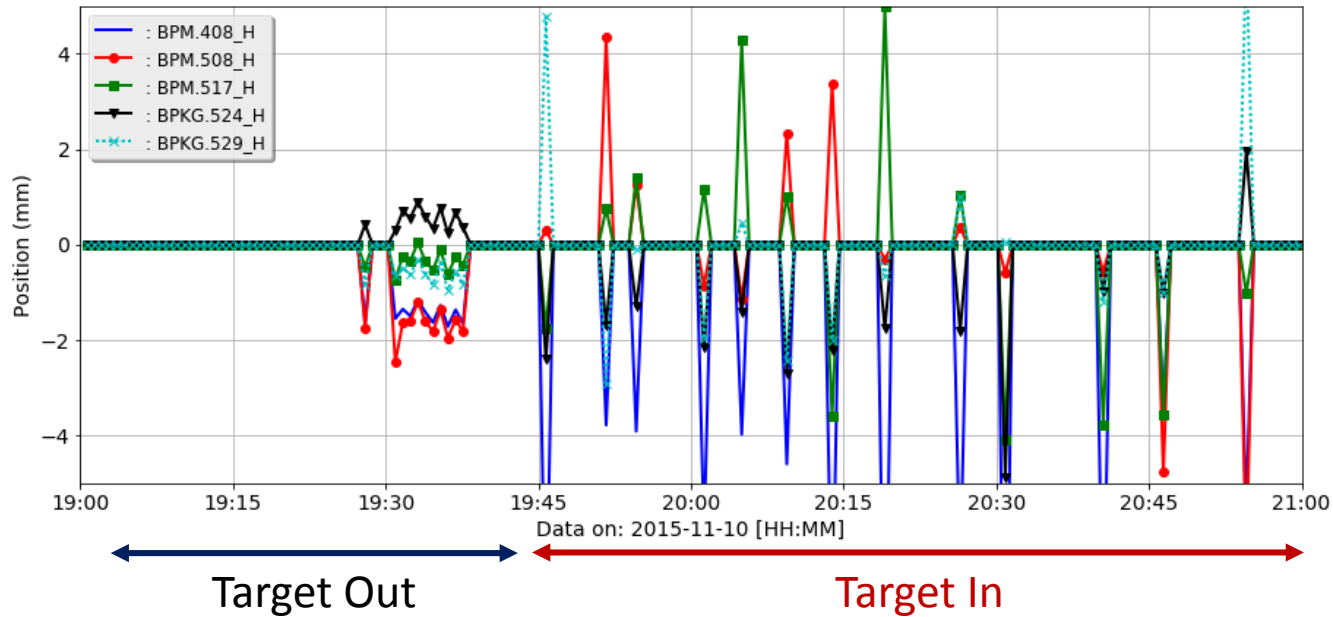
HRM 27
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- Seen on all BPMs down to the BPM.408 in TJ7
- *Remove the electronics (rack) to a more protected area*

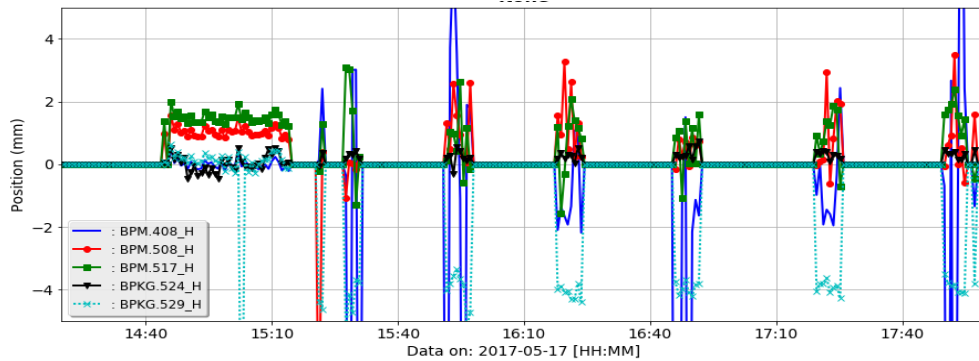
Backscattered Shower Perturbations

HRM 27
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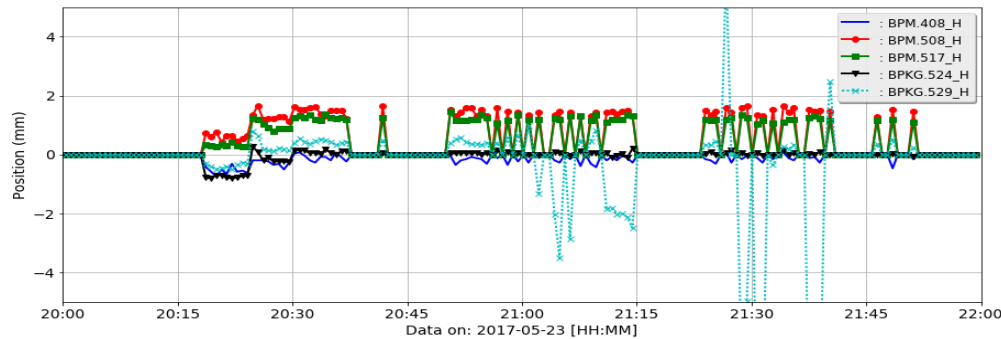


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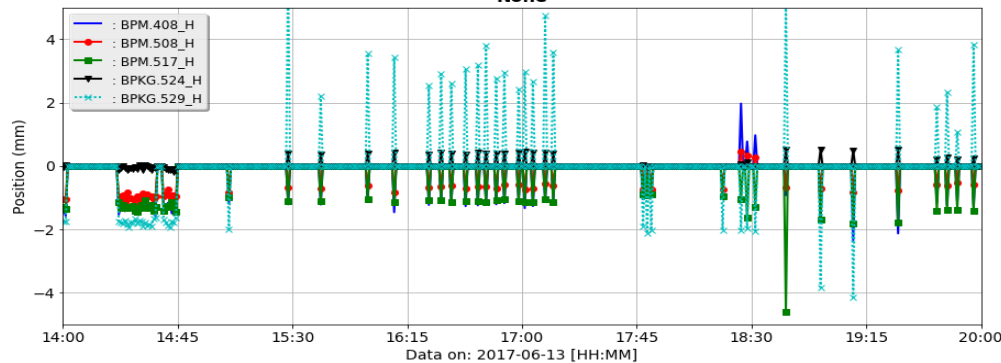
Backscattered Shower Perturbations



HRM 42 TaScat

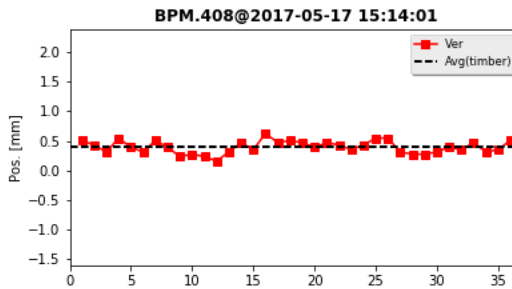
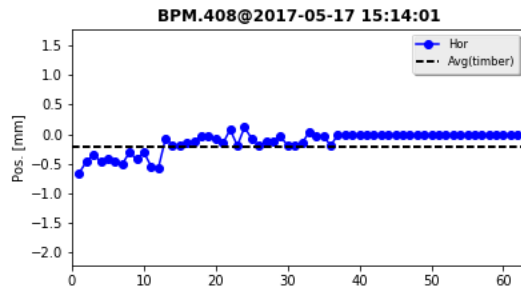


HRM 18 CRY

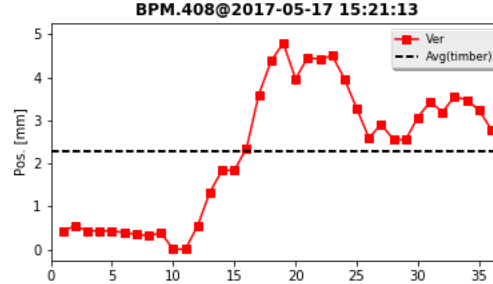
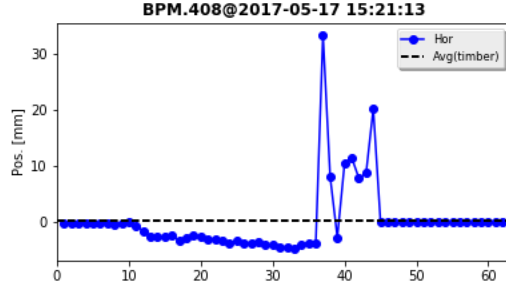


HRM 28 TCDI

Spikes with Target IN

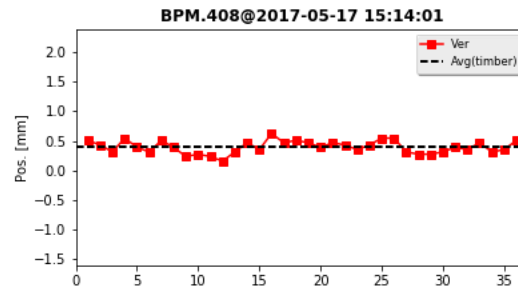
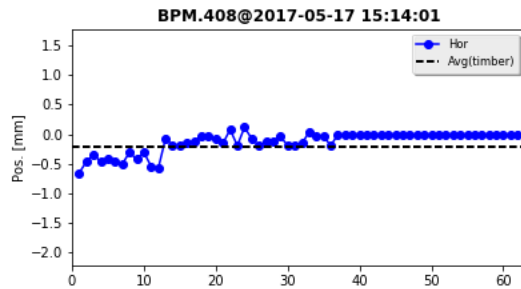


No Target

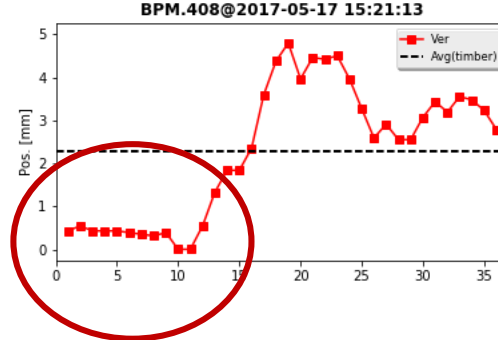
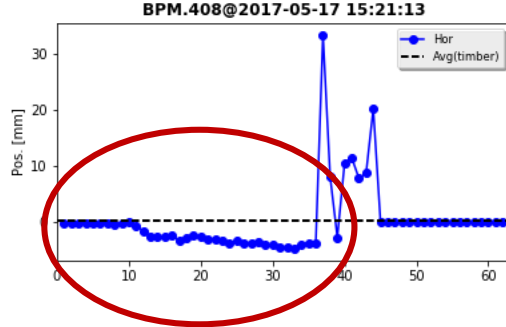


Target IN

Spikes with Target IN



No Target

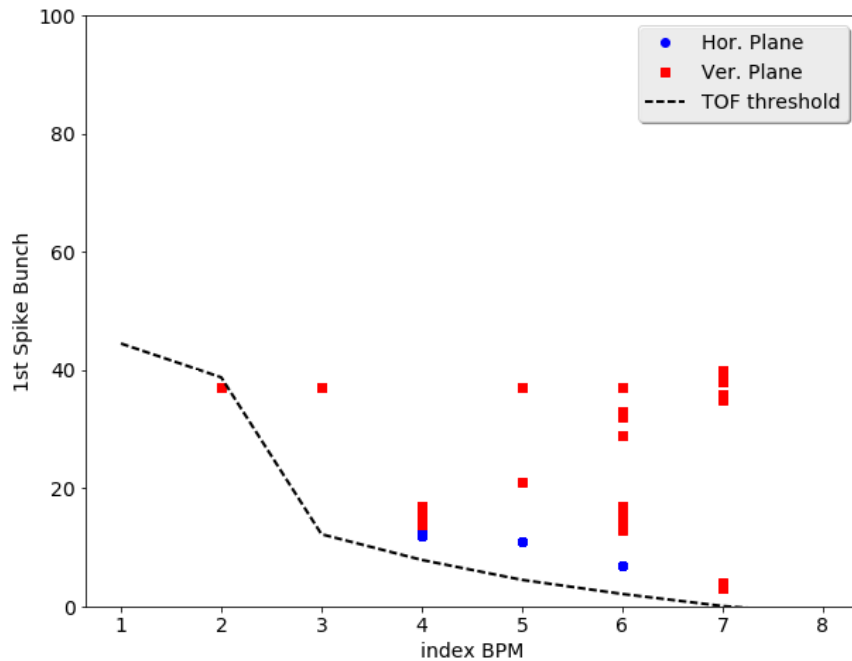


Target IN

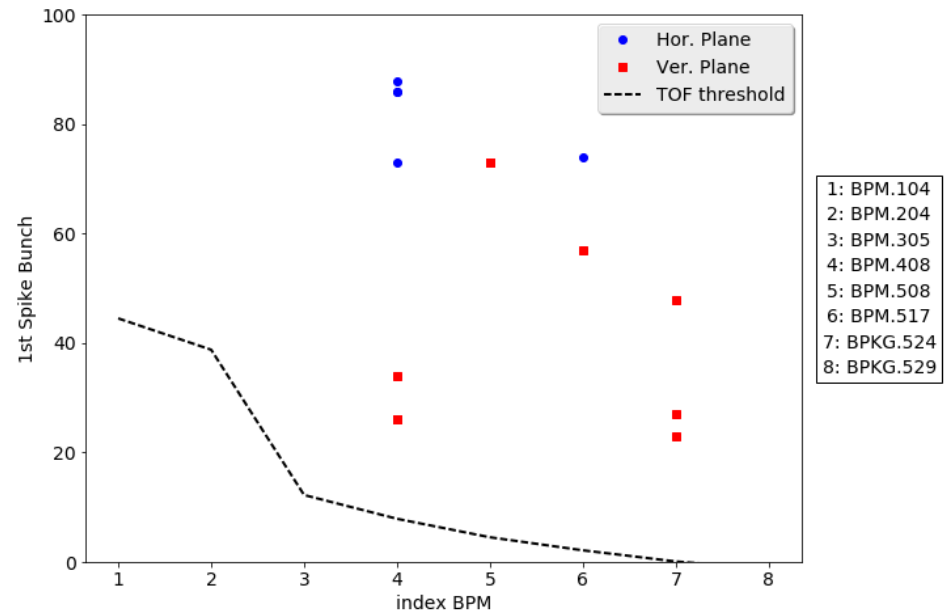
Not affected bunches

Spikes with Target IN

Spike on HRM42



Spike on HRM28 (1st day)



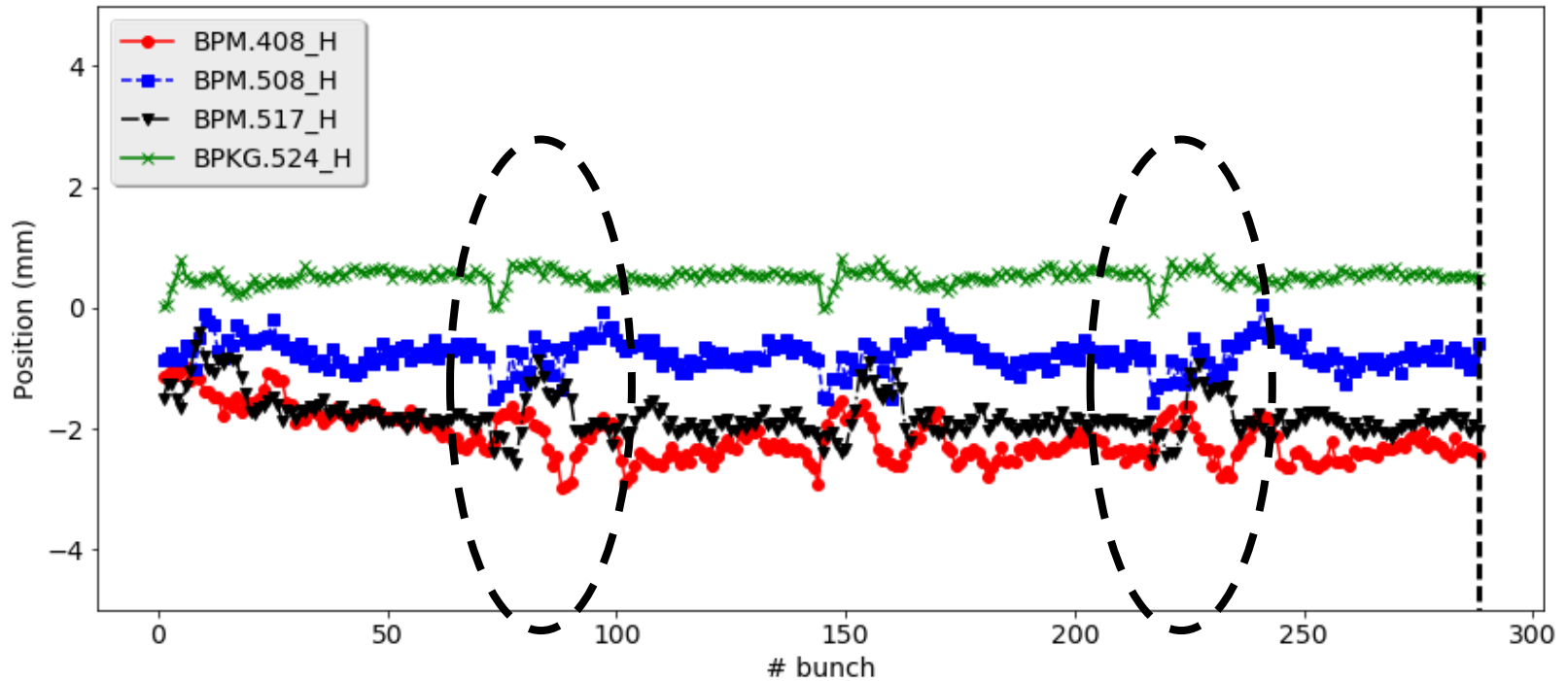
- 1: BPM.104
- 2: BPM.204
- 3: BPM.305
- 4: BPM.408
- 5: BPM.508
- 6: BPM.517
- 7: BPKG.524
- 8: BPKG.529

TOF threshold:

Time that the 1st bunch needs to arrive to the rack



Dispersion of Bunch Train Beggining



- **BPKG/BTV alignment works good**
 - up to 80um discrepancies due to BPM resolution
 - discrepancies due to 'bad' calibration settings (single bunch / 25 ns train)

- **Backscattering Spikes**
 - Reduced number of spikes after relocation of the rack
 - Still some disturbances for certain experiments (e.g High -Z materials)
 - Offline orbit correction accounting only 'safe' bunches.

- **Further Studies on Dispersion of bunch trains**
 - Study if the orbit per bunch is consistent with optics dispersion