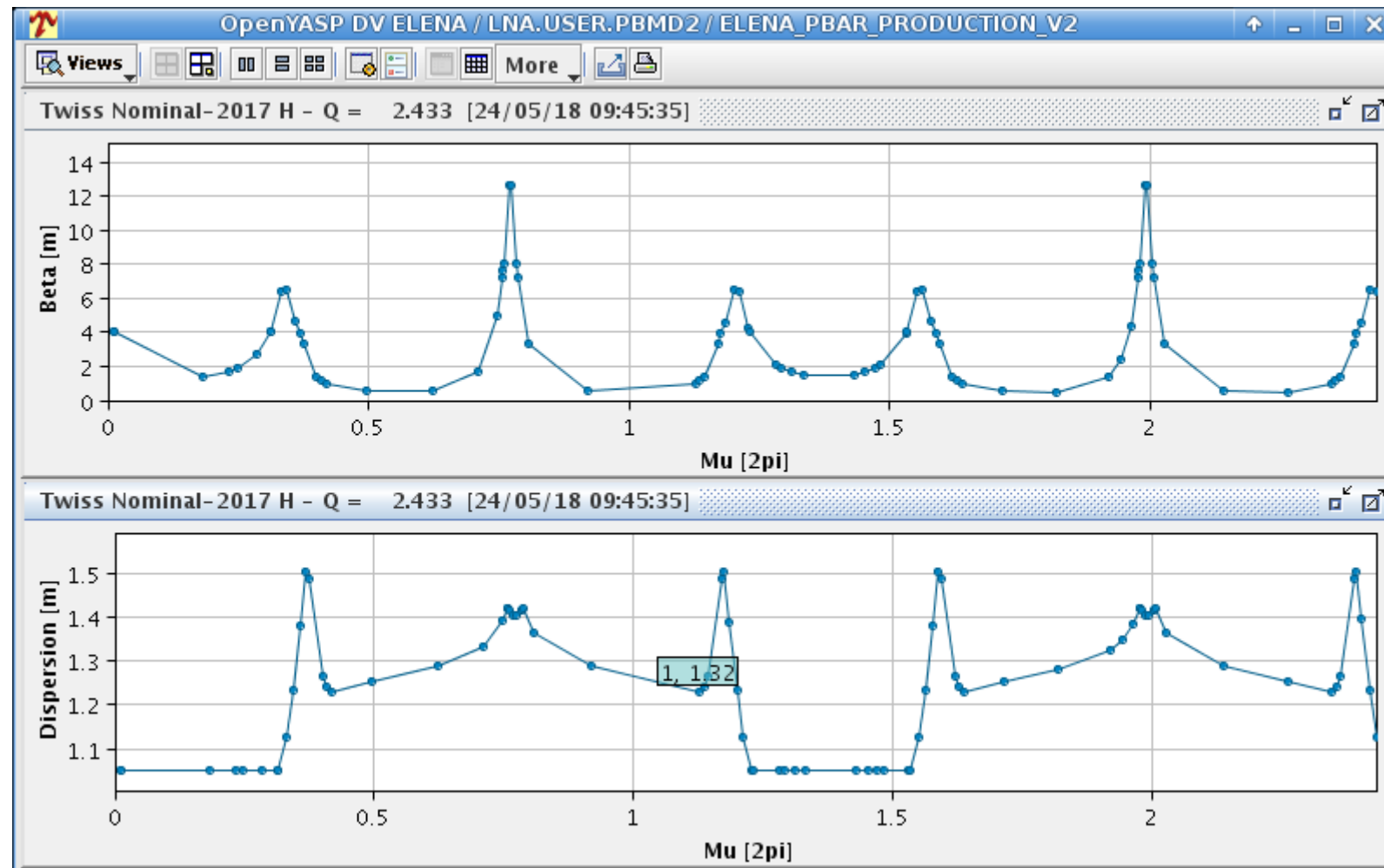




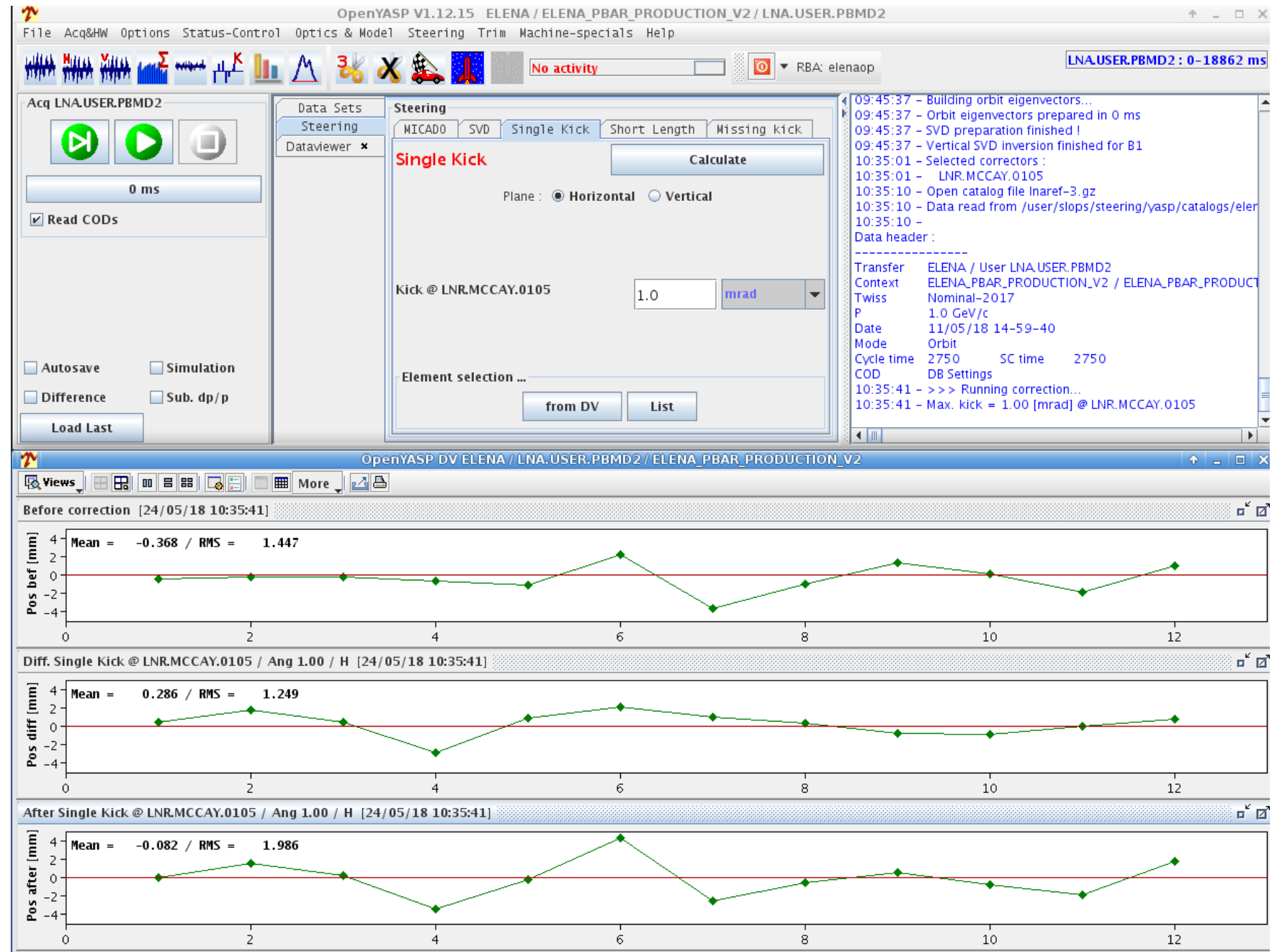
Orbit Correctors kick response checks

Tools and methodology

- 0 Goal was to verify sign convention between ELENA MADX model and what is implemented in the machine
- 0 YASP is using the MADX model implemented in LSA to calculate kick response, orbit correction...



- 0 From an acquired orbit, calculate response to a single kick:



acquired orbit →

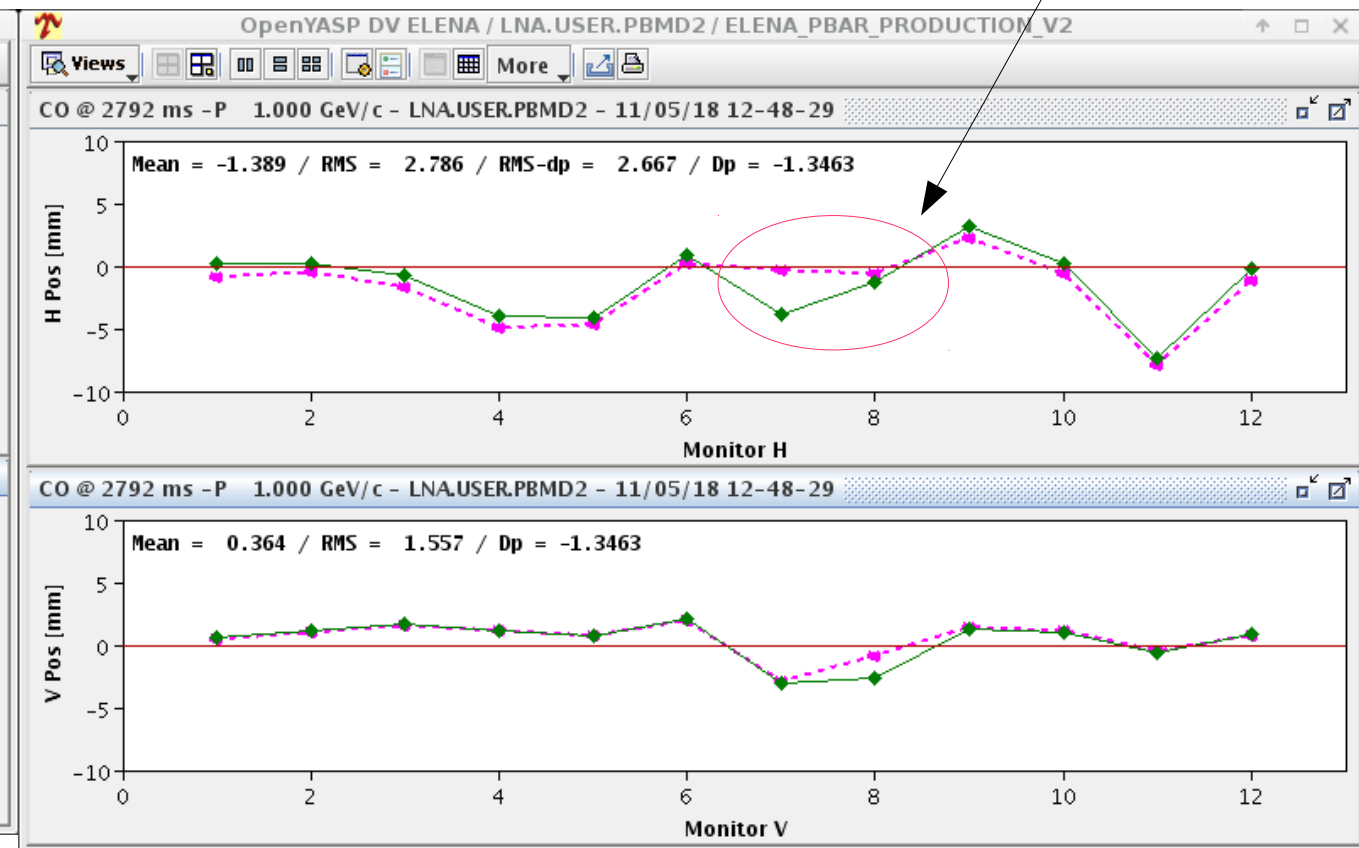
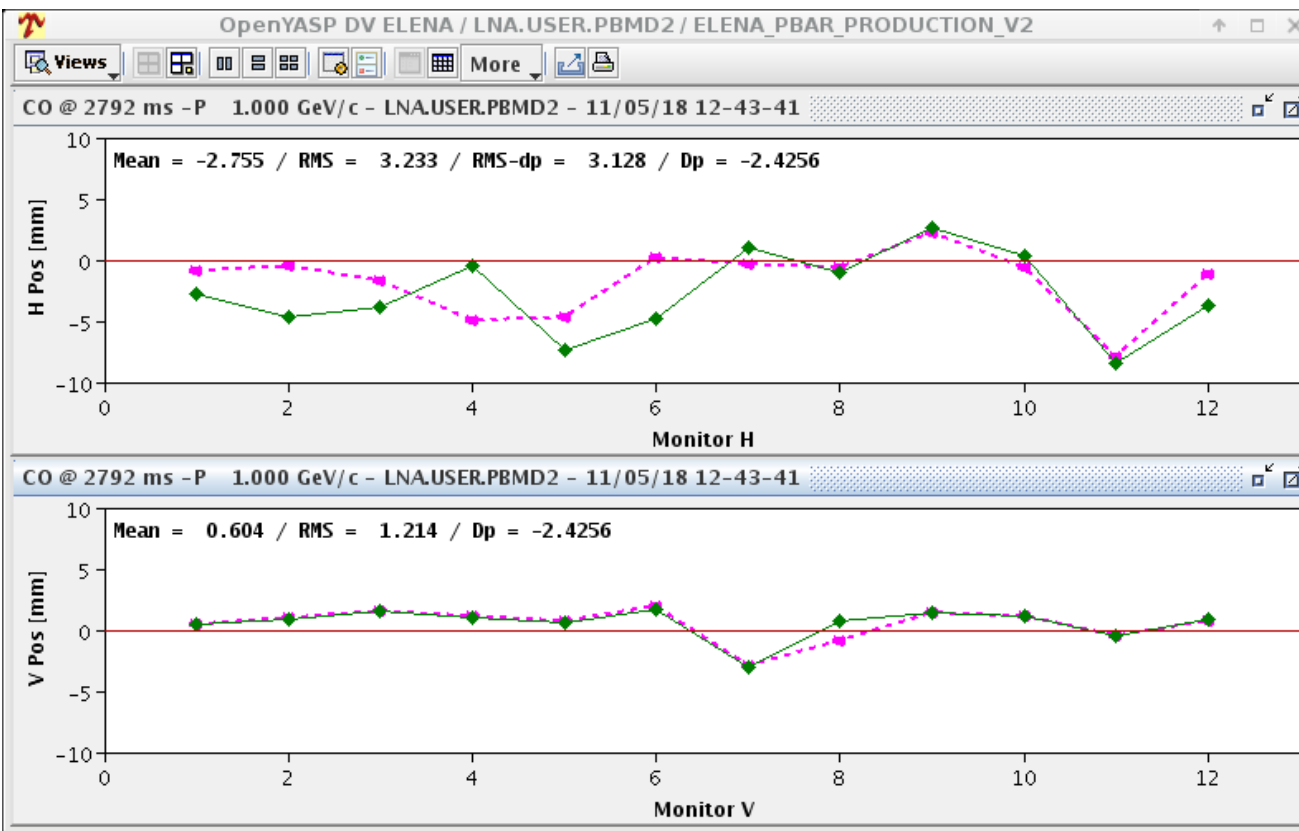
Expected orbit →

0 Kick response with DHZ30

E-cool BPM

Calibration factor 1

Calibration factor -1



Purple curve is calculated correction, green is the measured orbit

- o Consistent sign inversion between implementation and model: not possible to distinguish with this method who has adopted a different convention
- o Both planes, all correctors have the same behaviour:
 - Corrected in the calibration files within YASP

Detailed Corrector Status & Control

Editable: OP Enable & Calibration | Filter: | Horizontal | Freeze | |

Index	Name	Strength	No	Kick	Calibration	Max Kick	HW St	OP St	Lock	Status	HW Status Inf
0	LNR.MCCAY.0105	logical.LNR1.DHZ05	1	909.40190	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1	LNR.MCCAY.0130	logical.LNR1.DHZ30	1	-563.46830	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	LNR.MCCAY.0230	logical.LNR2.DHZ30	1	990.85170	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	LNR.MCCAY.0330	logical.LNR3.DHZ30	1	597.31441	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	LNR.MCCAY.0405	logical.LNR4.DHZ05	1	-70.81370	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	LNR.MCCAY.0420	logical.LNR4.DHZ20	1	1691.57670	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	LNR.MCCAY.0440	logical.LNR4.DHZ40	1	-320.11080	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	LNR.MCCAY.0460	logical.LNR4.DHZ60	1	-172.60500	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	LNR.MCCAY.0535	logical.LNR5.DHZ35	1	177.83630	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	LNR.MCCAY.0615	logical.LNR6.DHZ15	1	938.86210	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

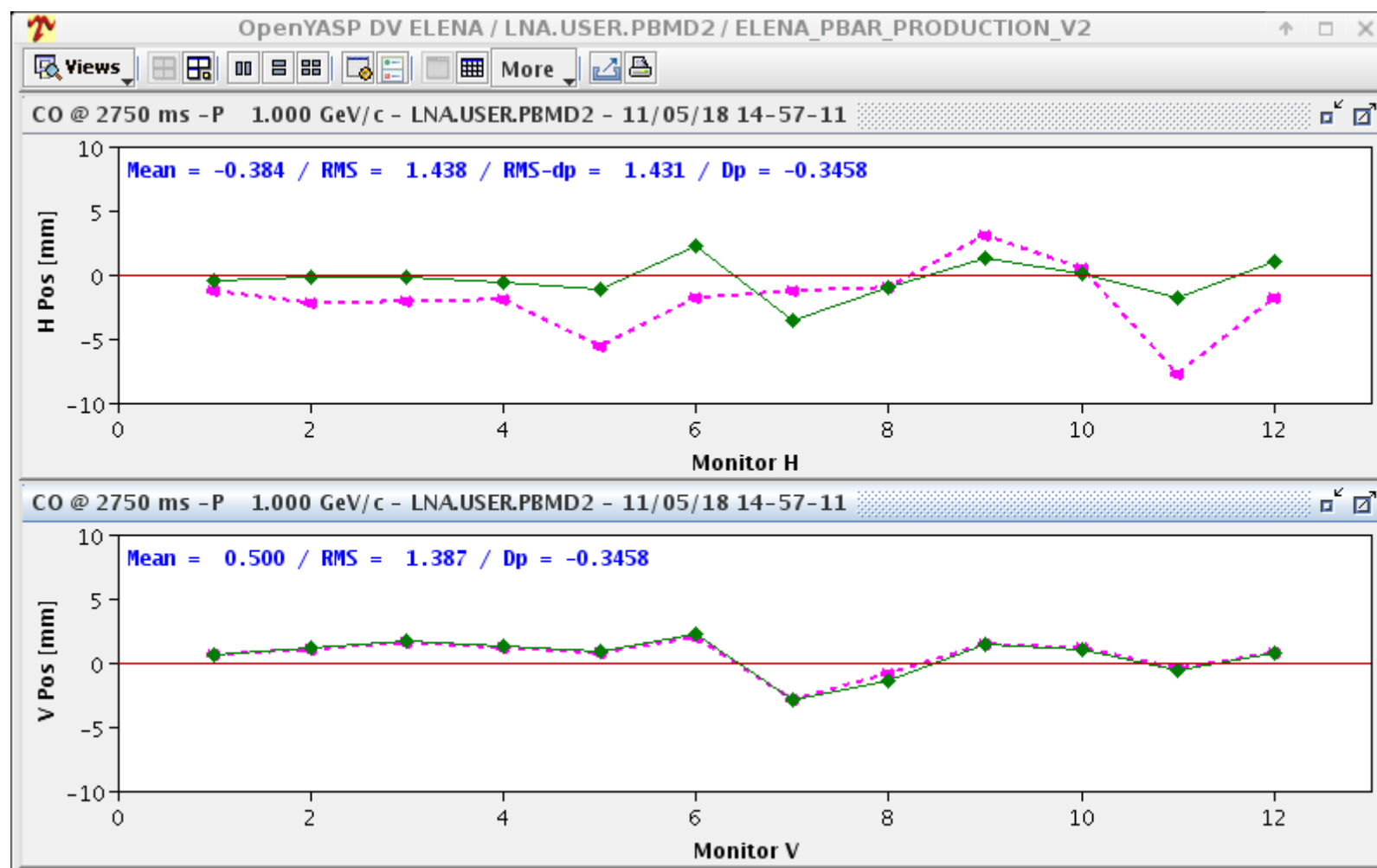
Detailed Corrector Status & Control

Editable: OP Enable & Calibration | Filter: | Vertical | Freeze | |

Index	Name	Strength	No	Kick	Calibration	Max Kick	HW St	OP St	Lock	Status	HW Status Inf
0	LNR.MCCAY.0105	logical.LNR1.DVT05	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
1	LNR.MCCAY.0130	logical.LNR1.DVT30	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	LNR.MCCAY.0230	logical.LNR2.DVT30	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	LNR.MCCAY.0330	logical.LNR3.DVT30	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	LNR.MCCAY.0405	logical.LNR4.DVT05	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	LNR.MCCAY.0420	logical.LNR4.DVT20	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	LNR.MCCAY.0440	logical.LNR4.DVT40	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	LNR.MCCAY.0460	logical.LNR4.DVT60	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	LNR.MCCAY.0535	logical.LNR5.DVT35	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	LNR.MCCAY.0615	logical.LNR6.DVT15	1	-0.00000	-1.000	0.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

- o With this inversion, check orbit correction response:
- o Test of orbit correction with YASP in H plane at injection with pBar:
 - o different algorithms (MICADO or SVD), different number of correctors
 - o Sent 1 correction (SVD 6 correctors) to check convergence:

Purple curve is the measured orbit before correction, green is the measured orbit after correction





Conclusions



- 0 Kick response checks done for all orbit correctors to validate sign convention inversion (and check no extra polarity inversion)
 - All data in e-logbook (14/05/2018)
- 0 YASP calibration files updated → orbit correction algorithm validated
- 0 Started to acquire orbit along the cycle, we can start more systematic corrections
- 0 BPM in e-cooler inserted in YASP (not taken into account for correction YET)