Summary of LEIR machine operation

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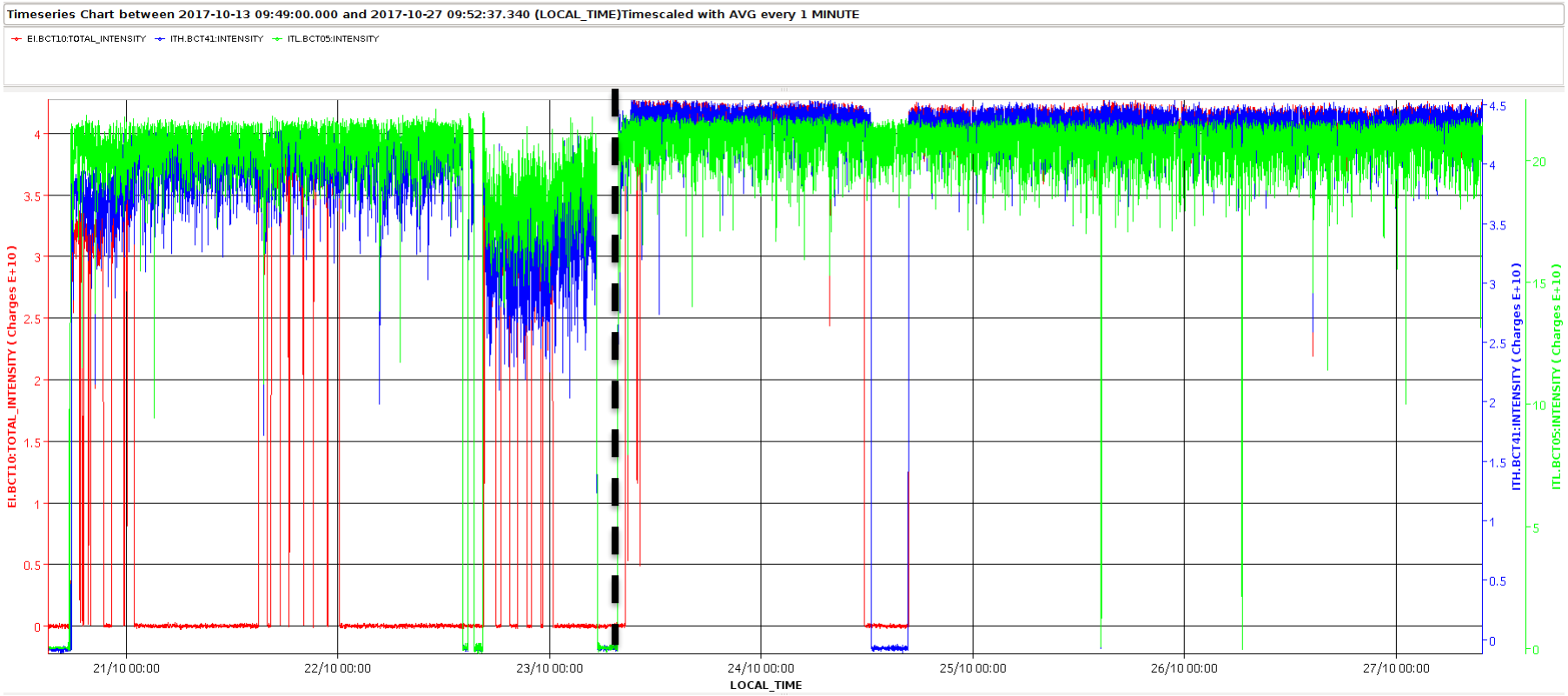
Acknowledgements: J.Cenede, A.Frassier

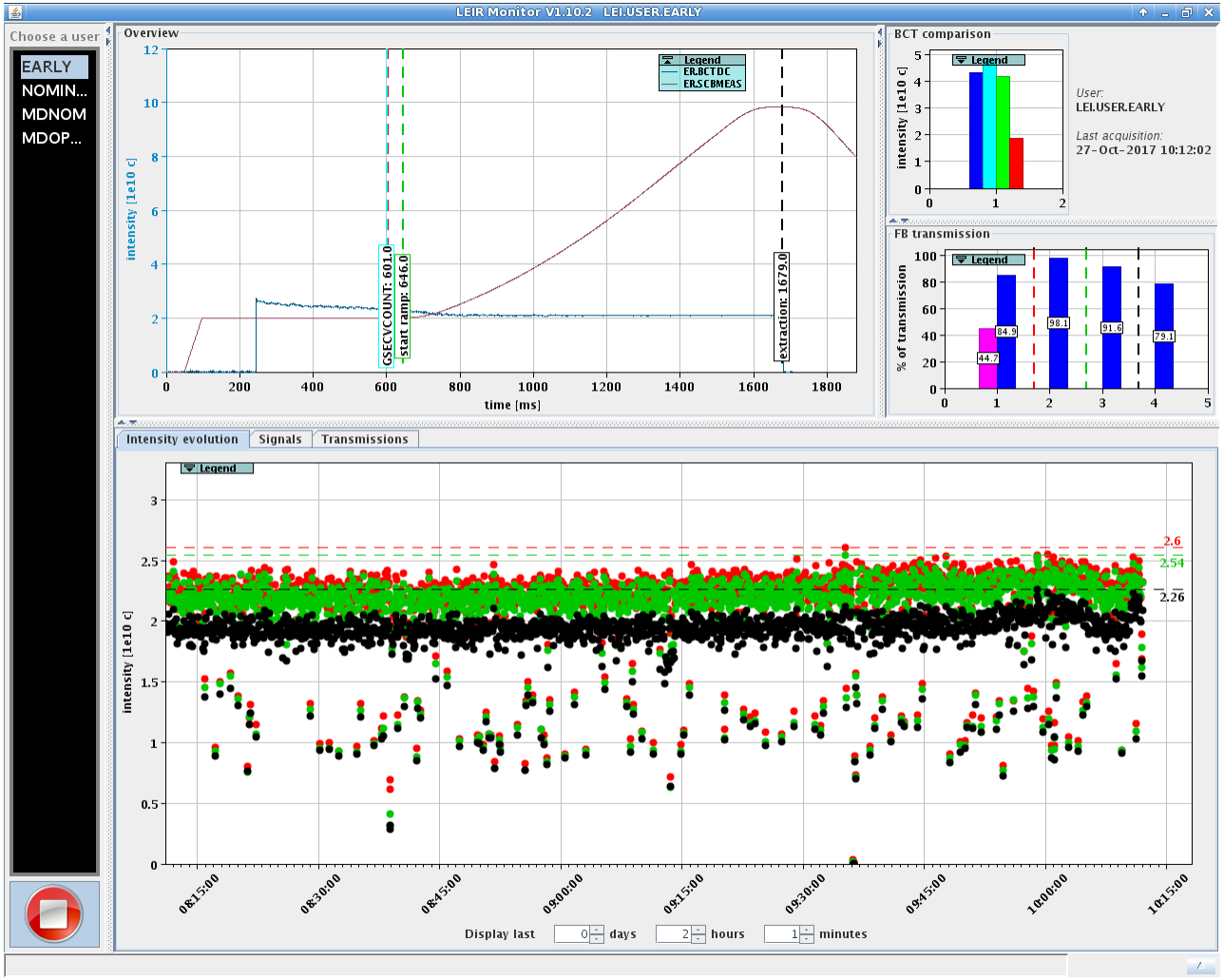
LINAC3



- Improved transmission towards LEIR (thanks Detlef!)
- Steadily delivered 4-4.5e10 p+

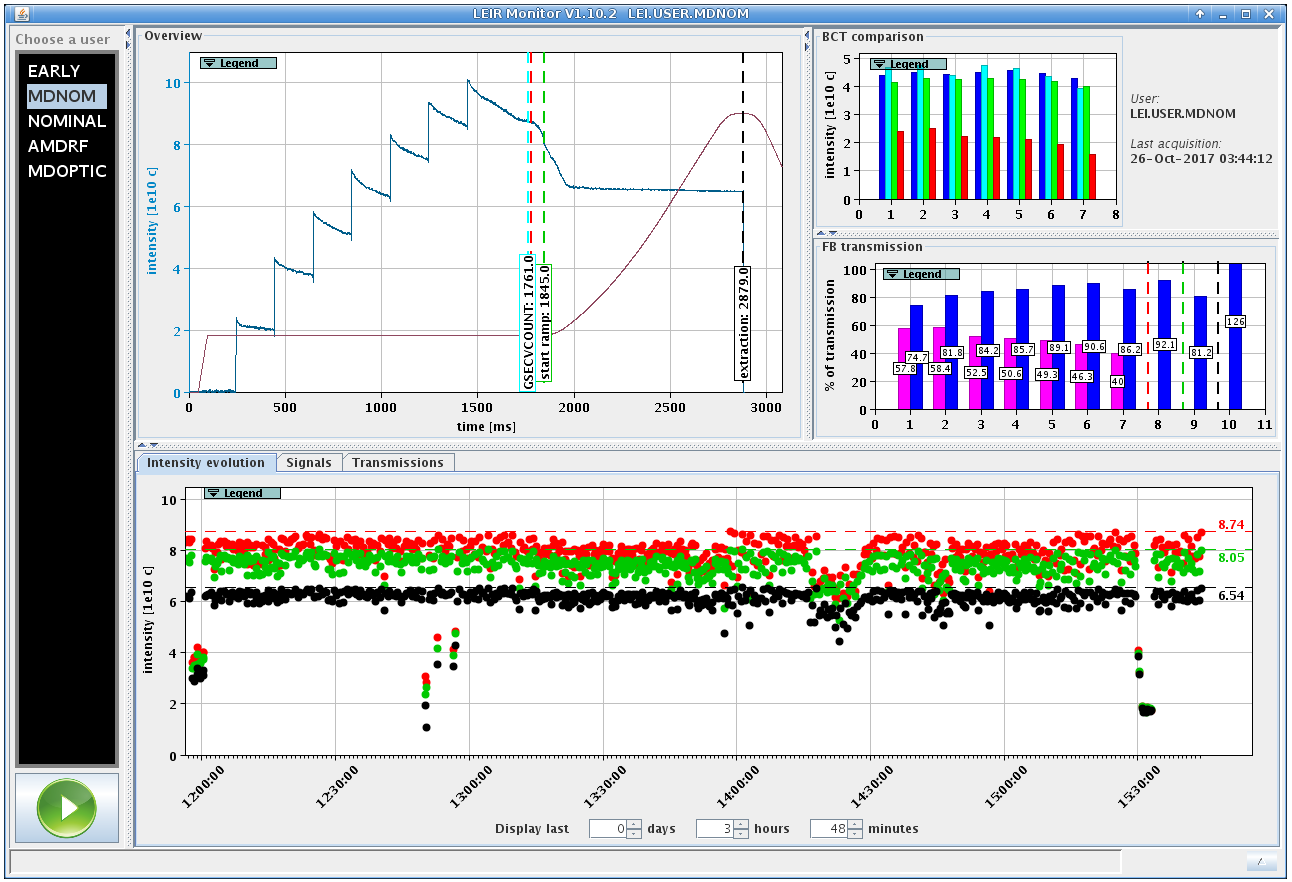
EARLY

- Very stable operation
- Steadily delivered 2-2.2e10 p+
- Compensated IPM kick for more stable performance.



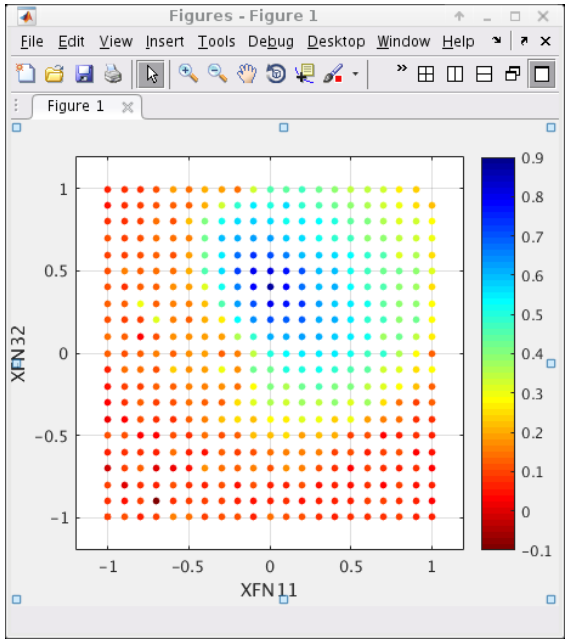
NOMINAL-type cycles

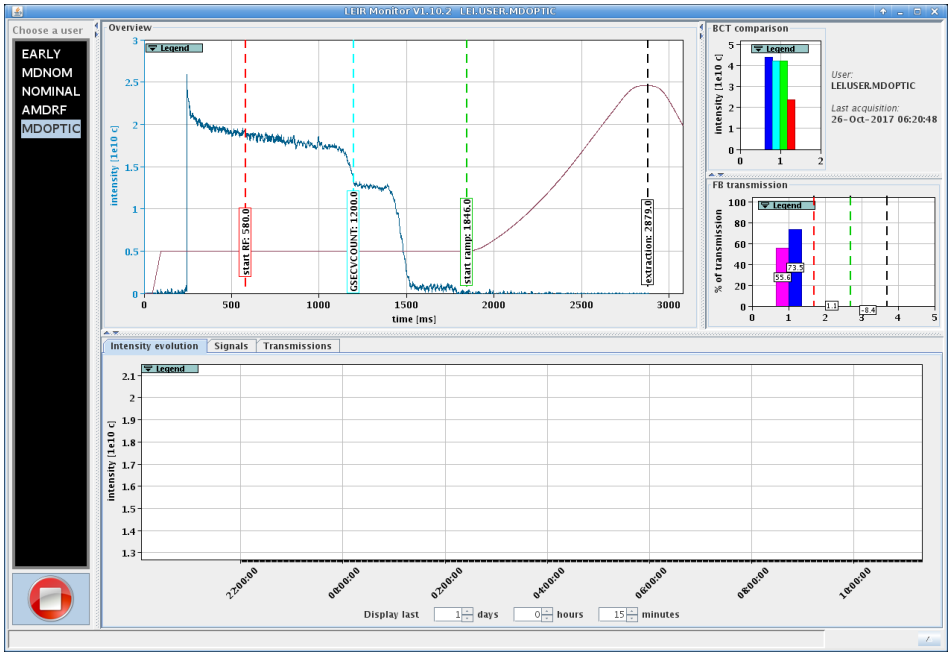
- Very stable operation
- Exported progress done in MDNOM and (A)MDRF into the NOMINAL cycle.
- Up to 10e10 p+ circulating, ~6.5e10 extracted.
- Applied modulated capture -> Improvement in extraction (~0.5e10 more).
- Compensated IPM kick for more stable performance.



Other cycles

- MDOPTIC

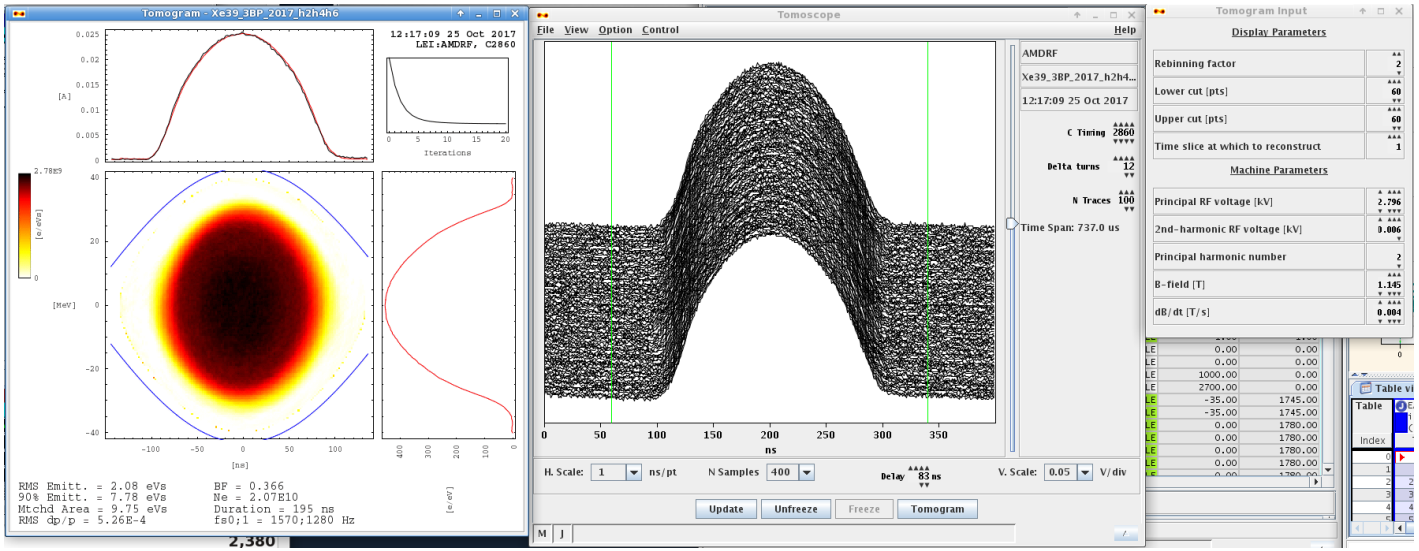




- Investigating possible resonance compensation with XFN11 and XFN32
- Possible additional improvement to be transferred to NOMINAL

Other cycles

- (A)MDRF

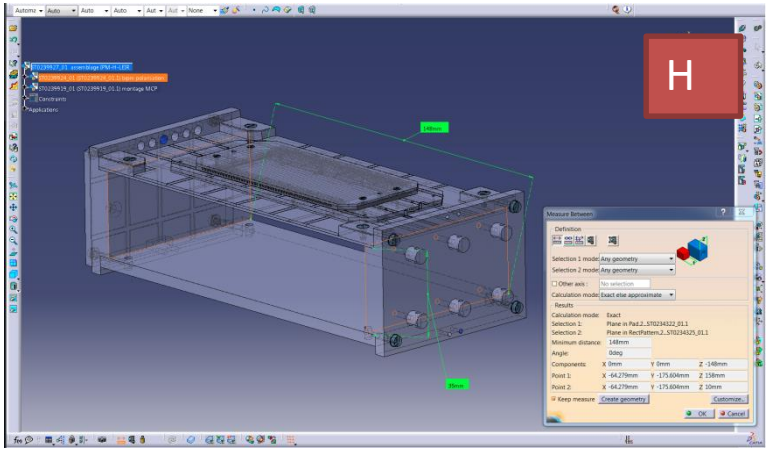


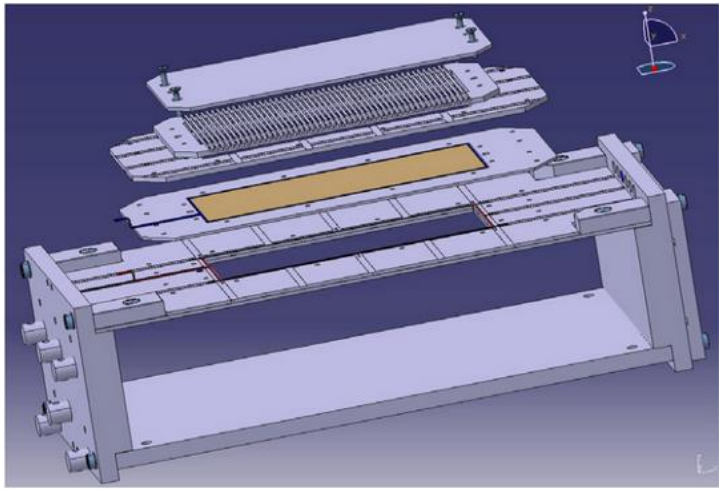
- H=2+4+6 being investigated for improving bunch profile flattness
- Already good results with 2+4 implemented in NOMINAL

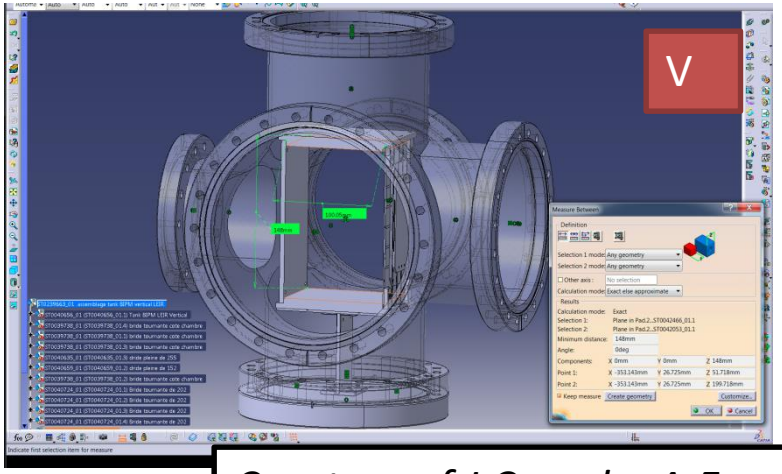
IPM kick

- Two IPMs present in LEIR: H and V plane.
- H placed in BHN40
- V placed just before (close to DHV42 corrector)
- Strong (>5kV) voltage across beam chamber.
- Calculated kick from the IPM as 500urad.
- Largest effect from IPM-V during operation.

$$\Delta y' = \frac{Z}{A\,\beta^2 E}\int F\,dl$$



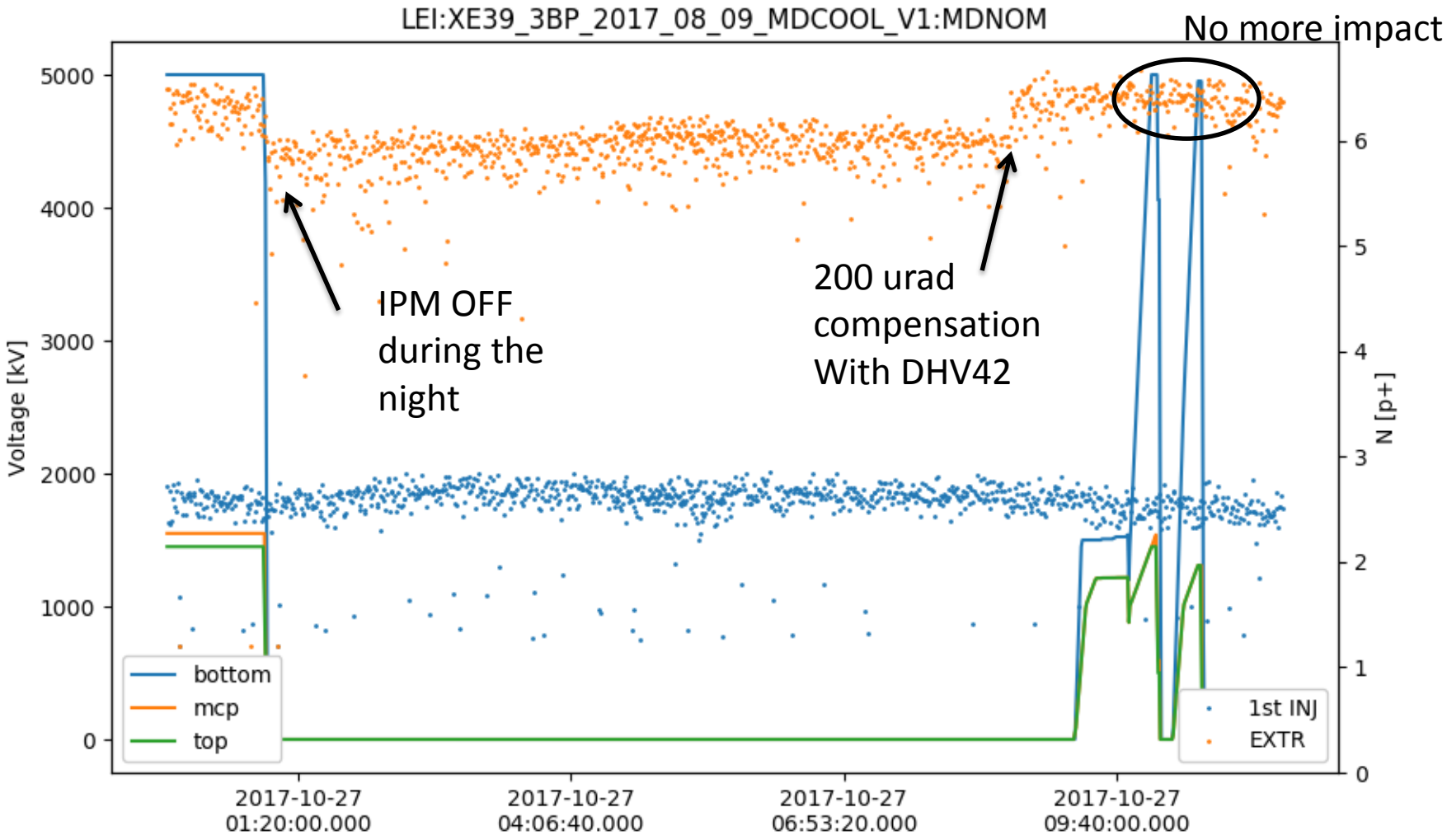




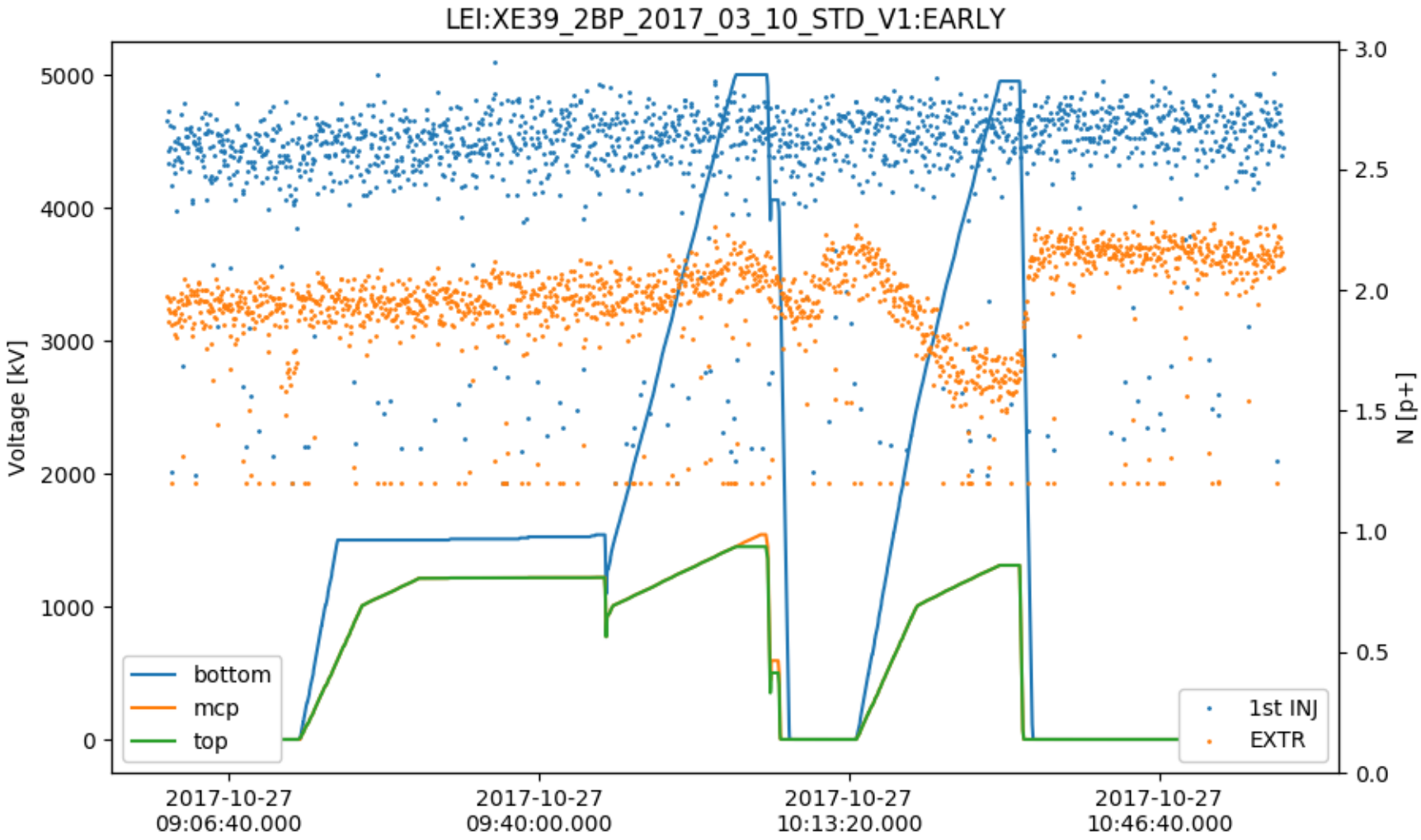
Courtesy of J.Cenede, A.Frassier

IPM kick

- Calculated kick from the IPM as 500urad.

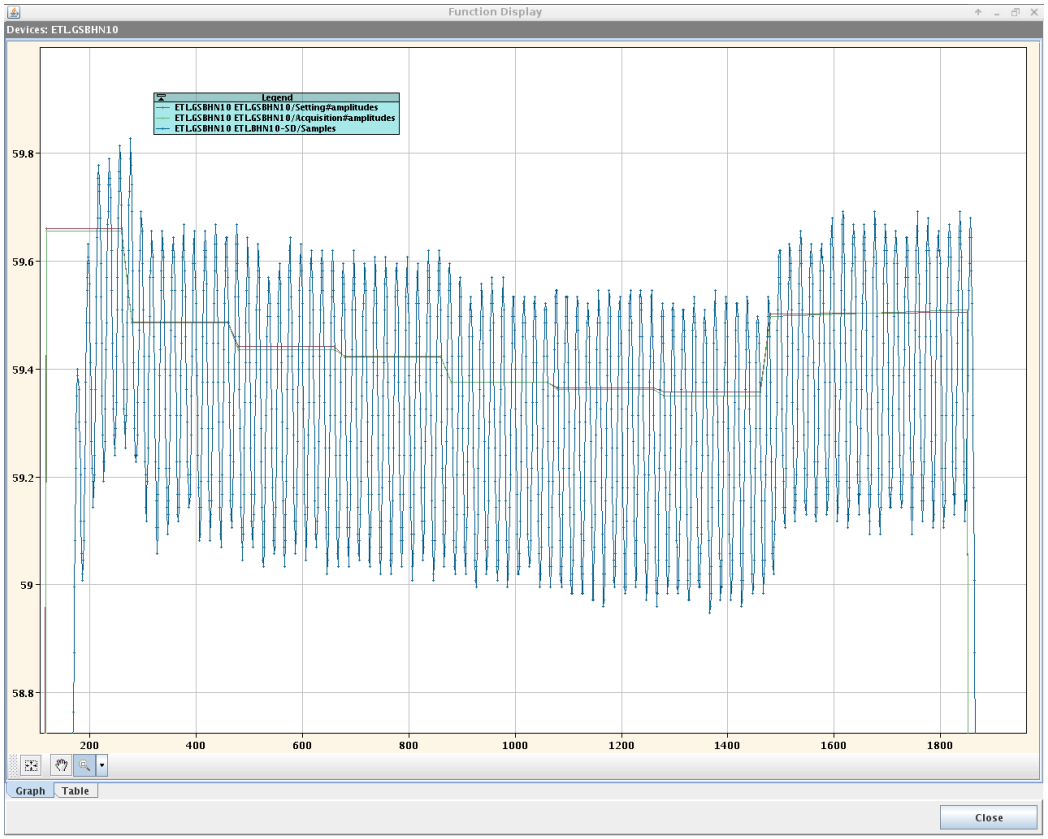


IPM kick

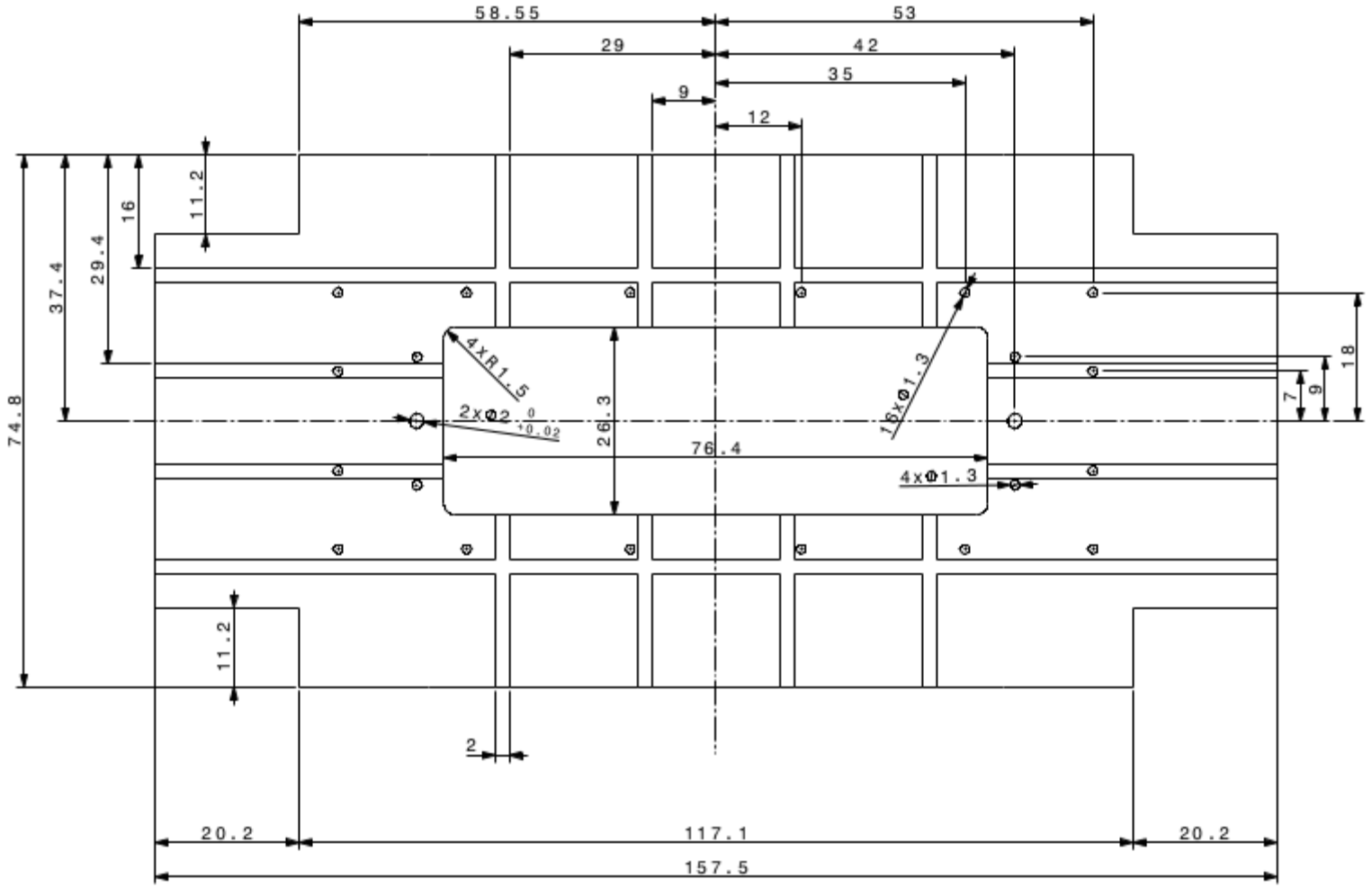

LEI:XE39_2BP_2017_03_10_STD_V1:EARLY
Voltage [kV]
N [p+]
5000
4000
3000
2000
1000
0
3.0
2.5
2.0
1.5
1.0
0.5
0.0
bottom
mcp
top
1st INJ
EXTR
2017-10-27
09:06:40.000
2017-10-27
09:40:00.000
2017-10-27
10:13:20.000
2017-10-27
10:46:40.000

Outstanding issues

- BHN10 optimization



Backup


58.55
53
29
42
35
9
12
11.2
16
29.4
37.4
74.8
4xR1.5
2xØ2 +0.02 0
26.3
76.4
16xØ1.3
4xØ1.3
7
9
18
11.2
2
20.2
117.1
20.2
157.5