

Electron Cooling in ELENA

- an update

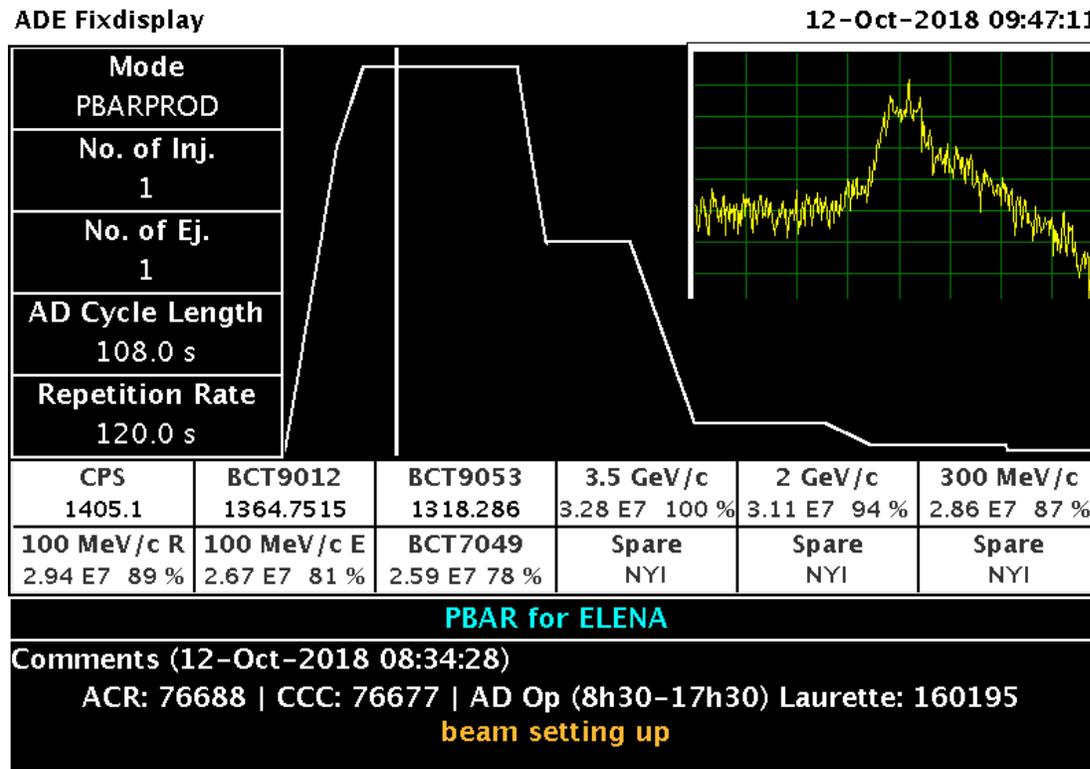
Lars V. Jørgensen, BE-BI-EA

Only 2.5 weeks of beam time since last update

- Update at last ECC meeting (13 Sept.).
- No pbars in ELENA from last update to 12 Oct. due to ecooler problem in AD.
- One of those weeks there was no pbars for ELENA.

Beam finally back in AD Oct. 12!

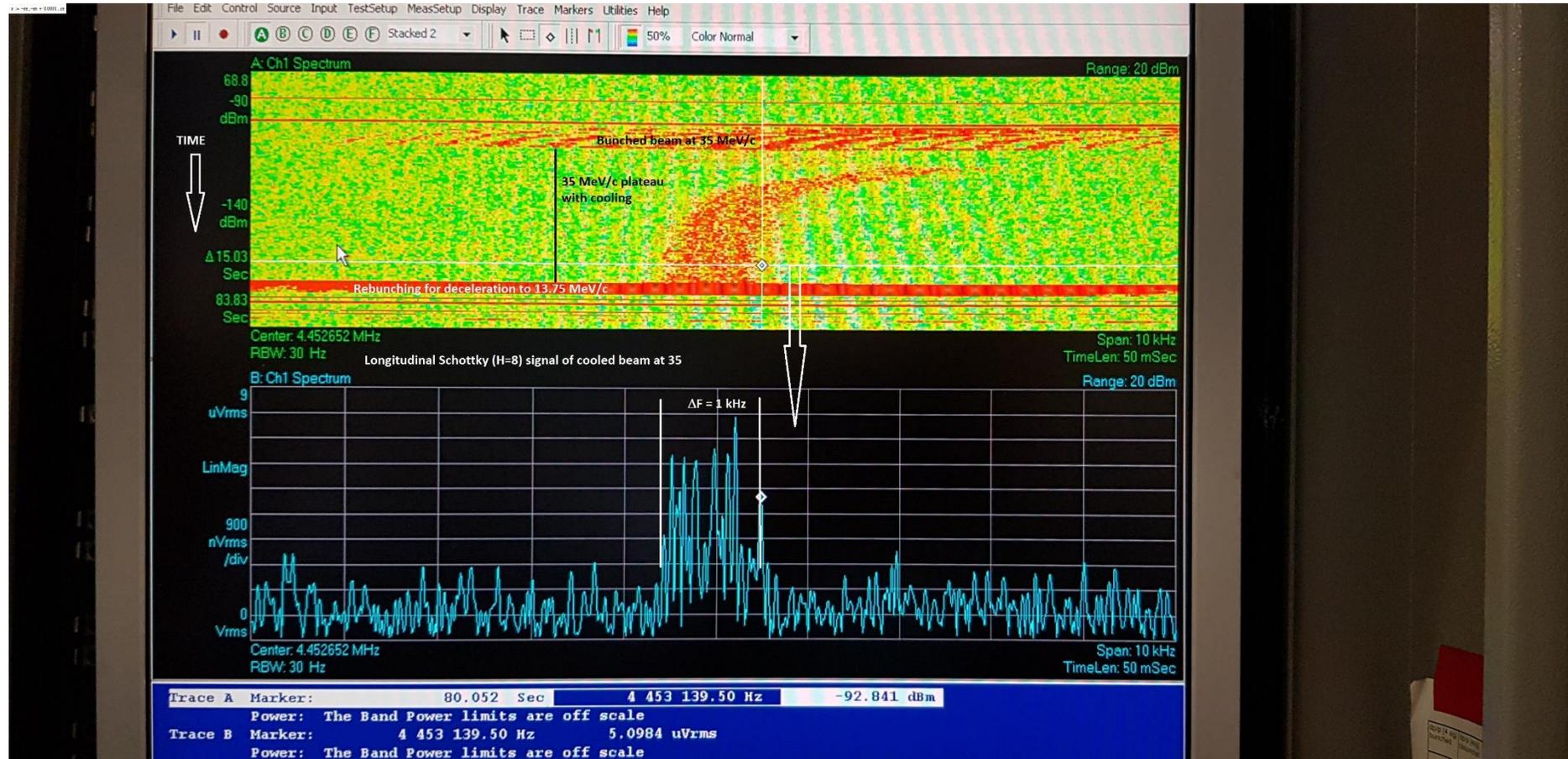
- ...and the same day beam in back in ELENA!



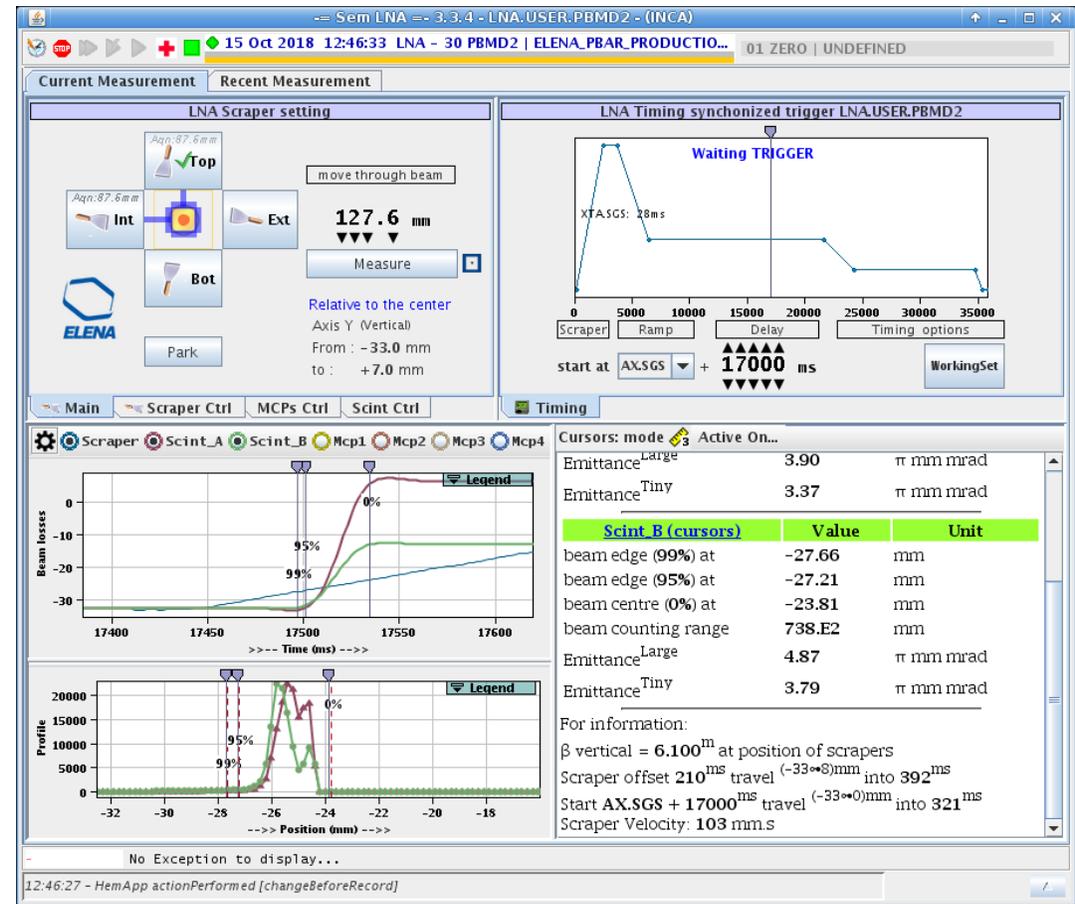
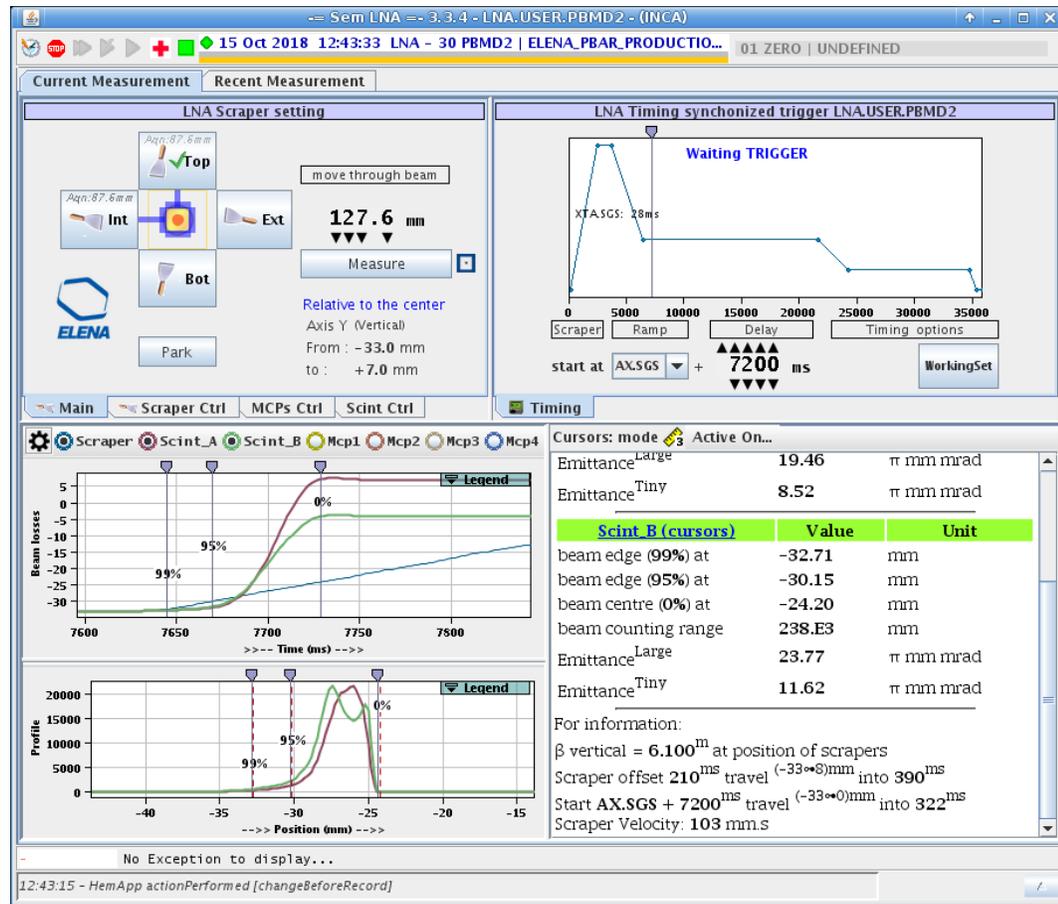
No Message



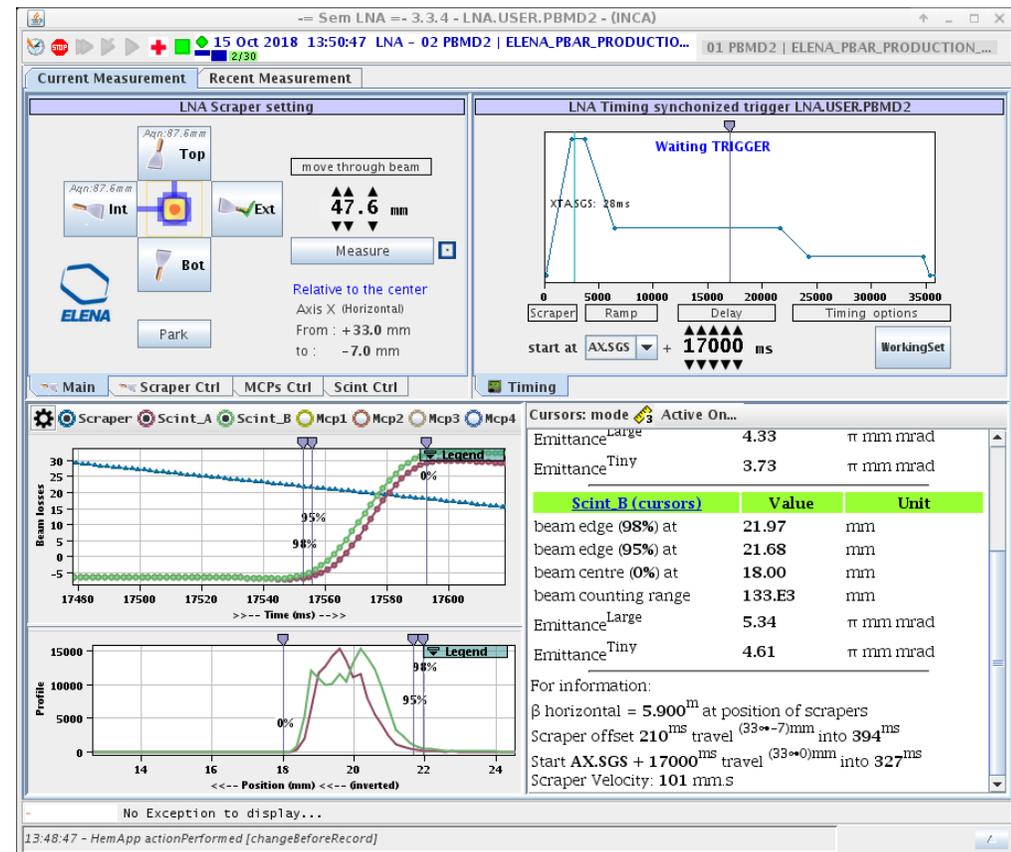
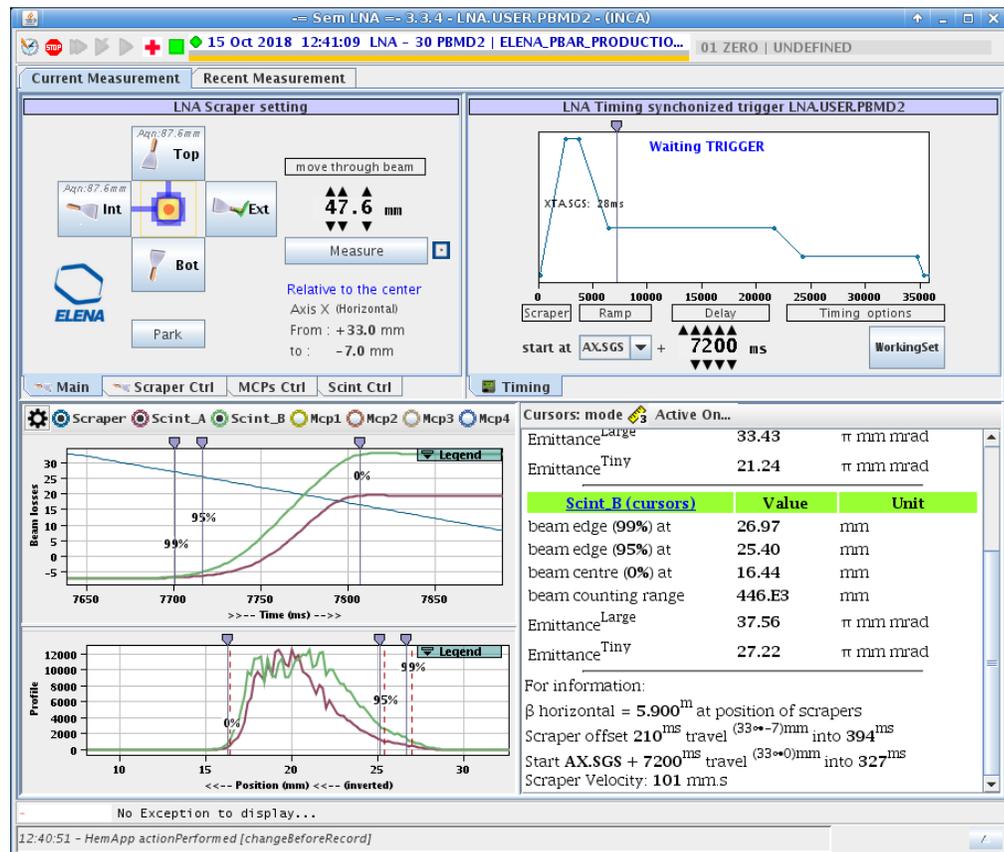
Electron cooling at intermediate plateau



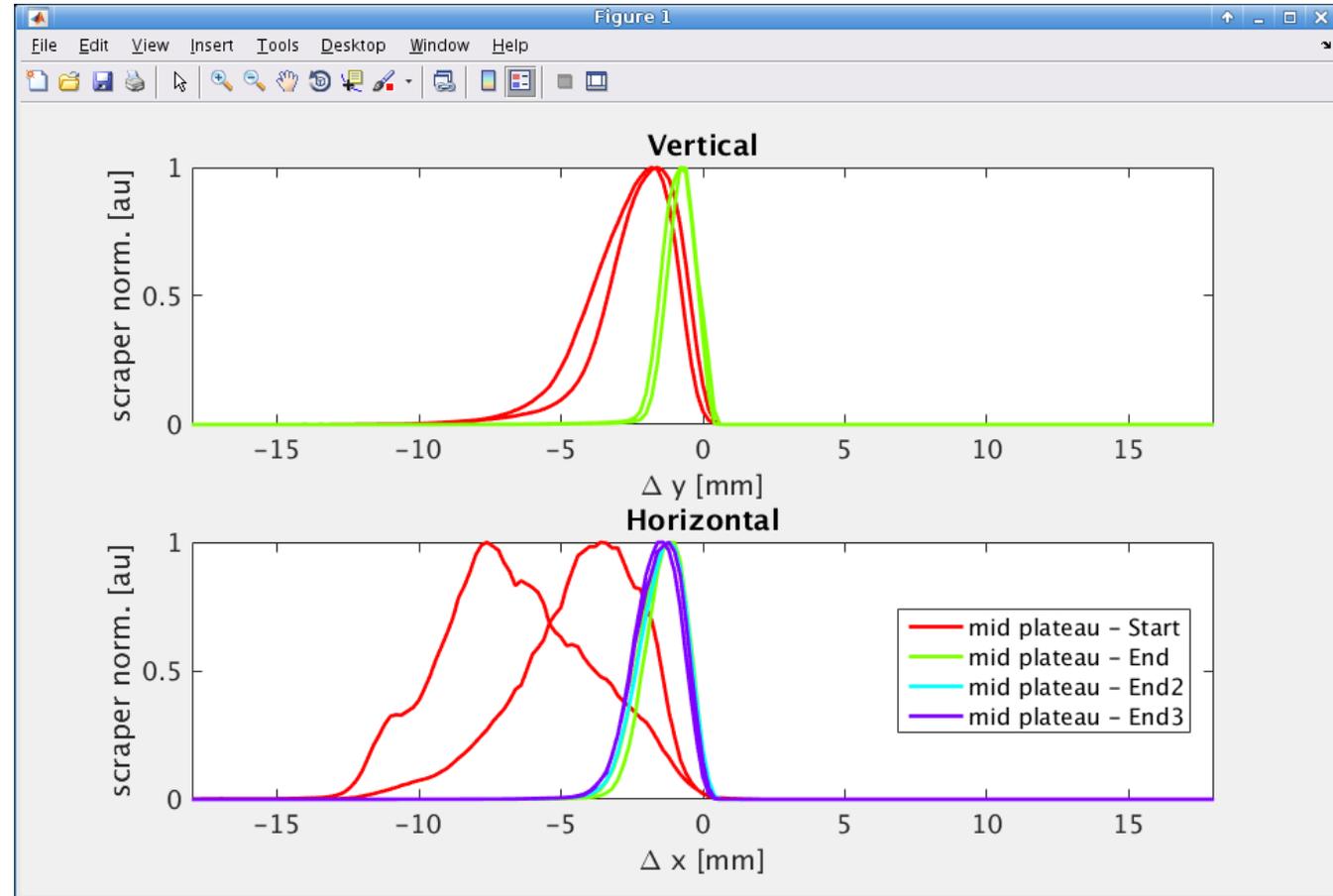
Vertical emittance – intermediate plateau



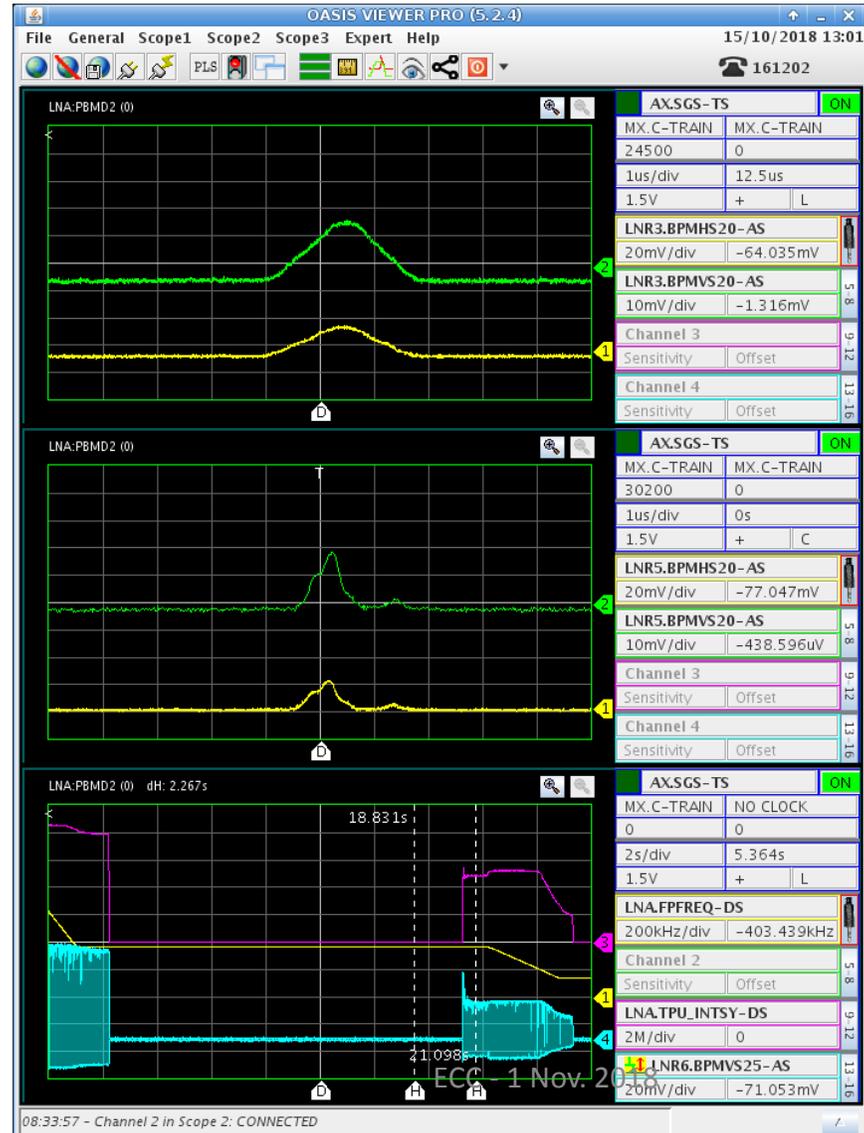
Horizontal emittance – intermediate plateau



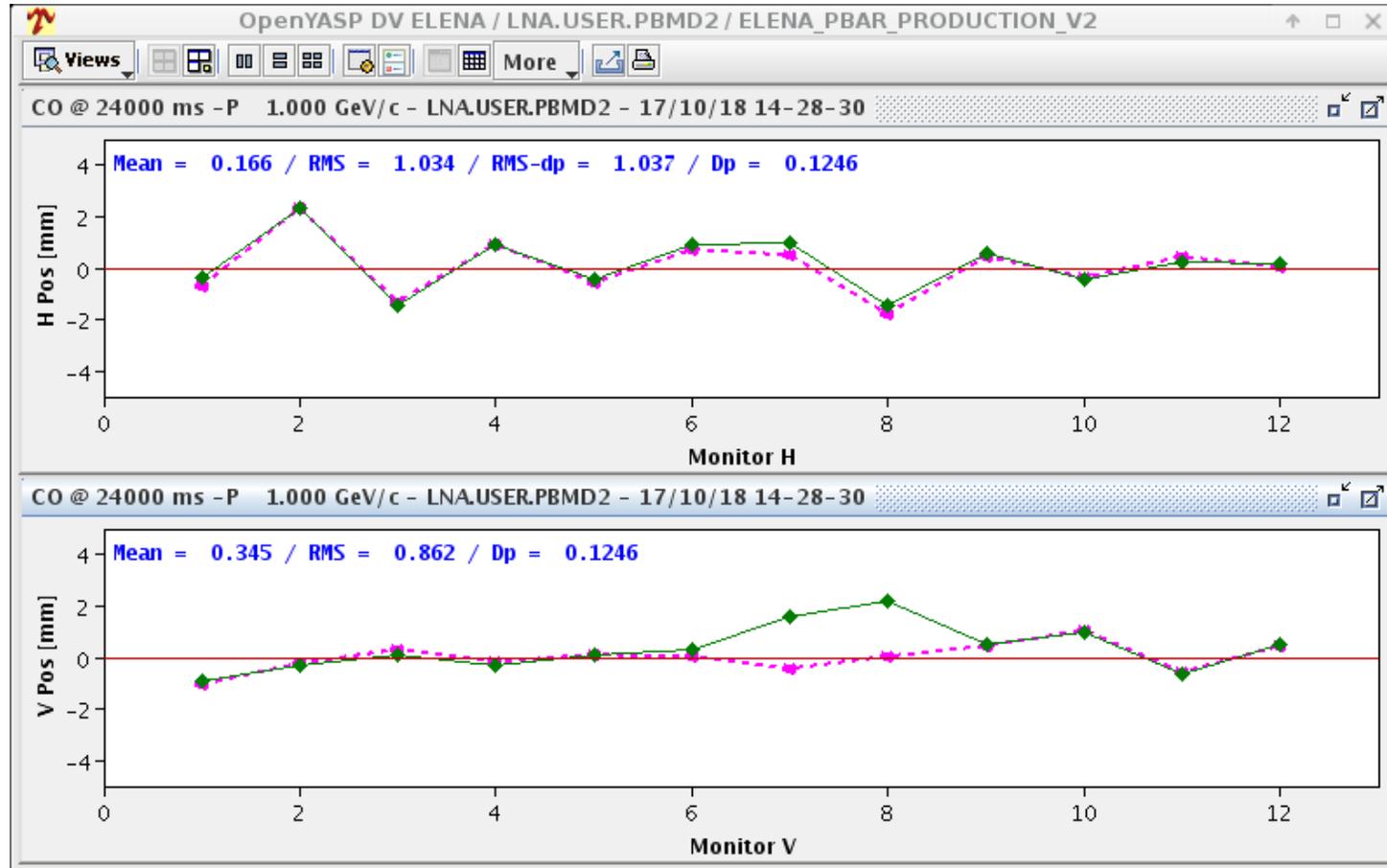
Beam profiles



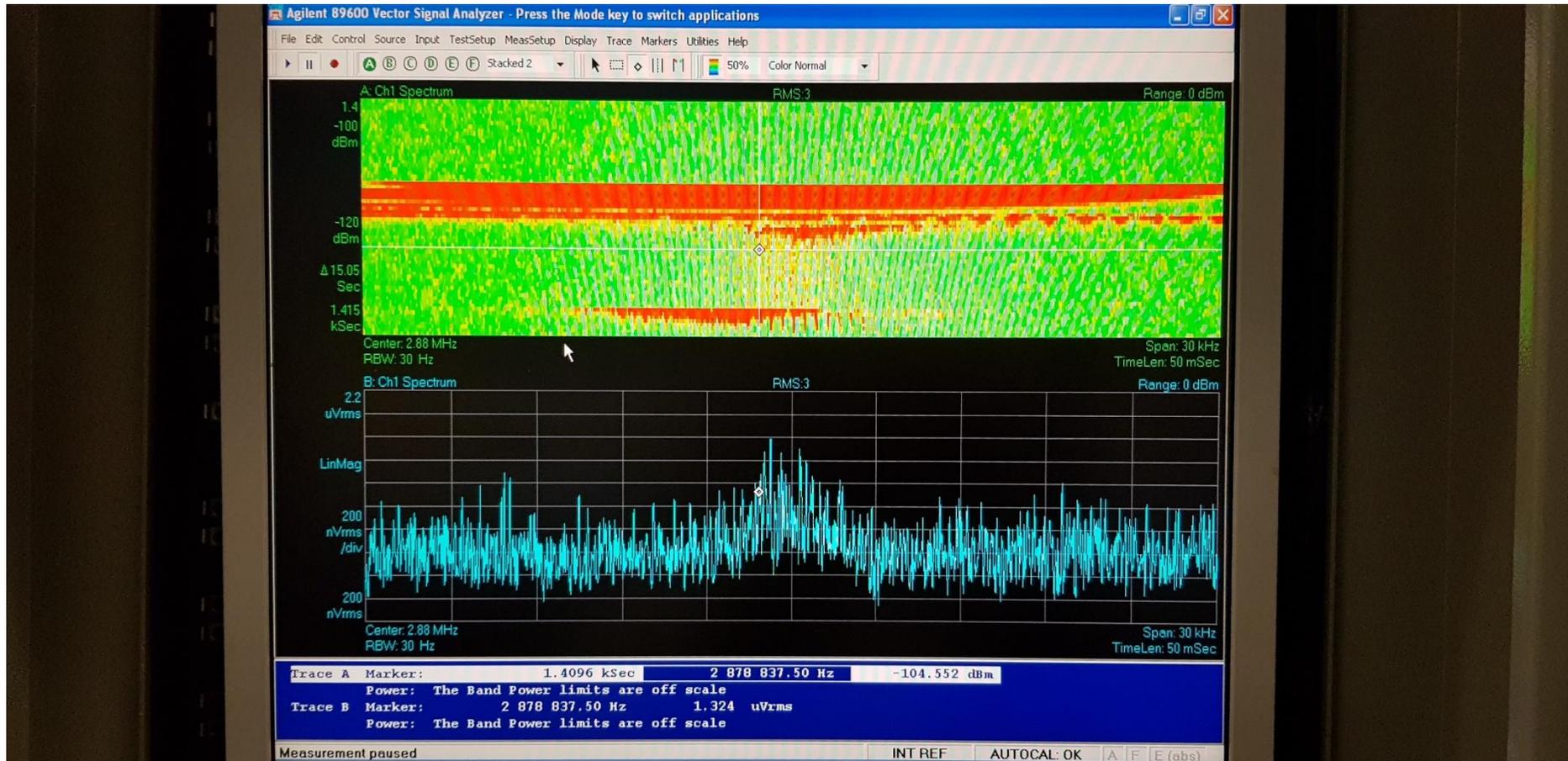
Longitudinal cooling



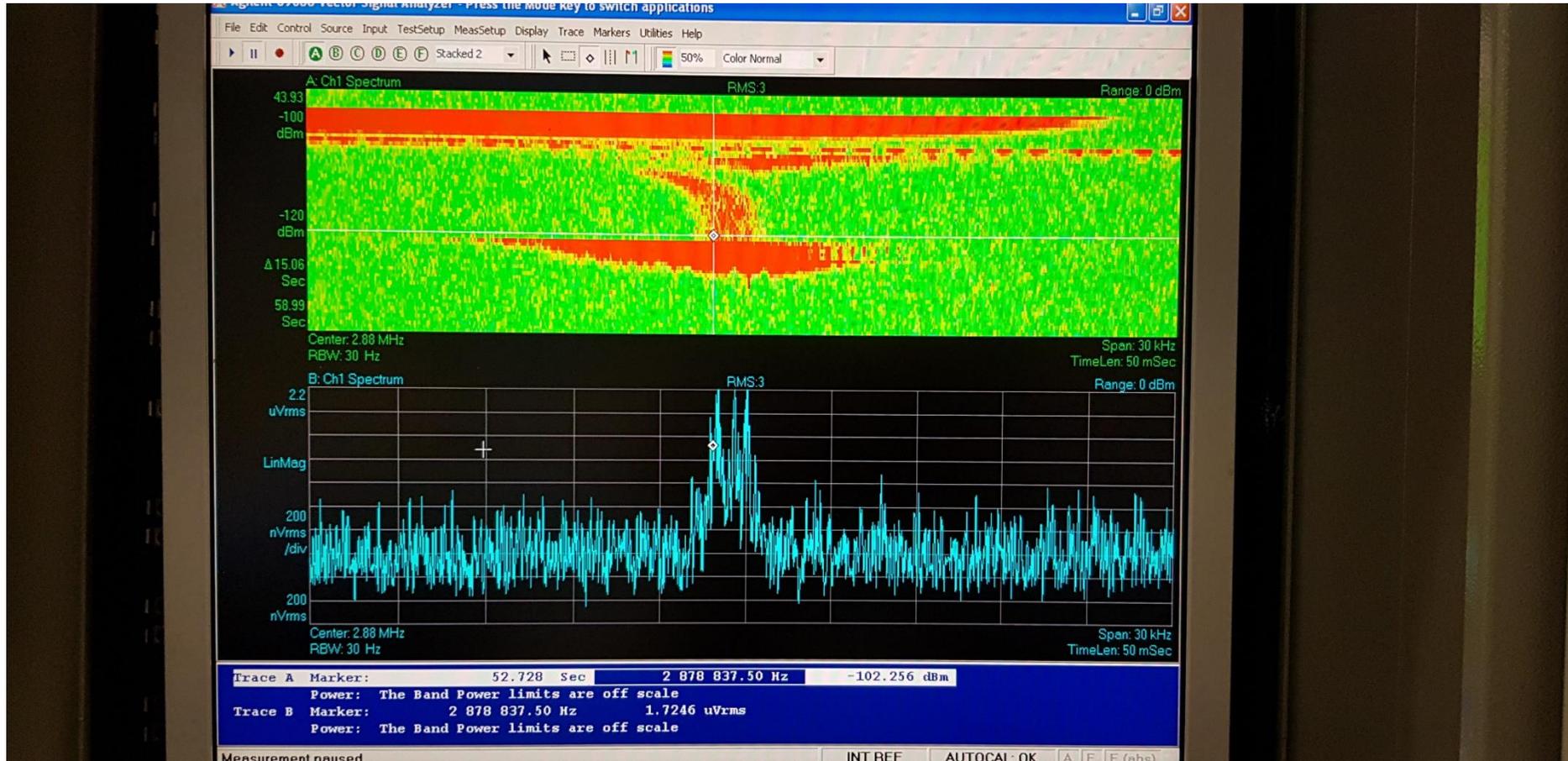
Bumping pbars in electron cooler



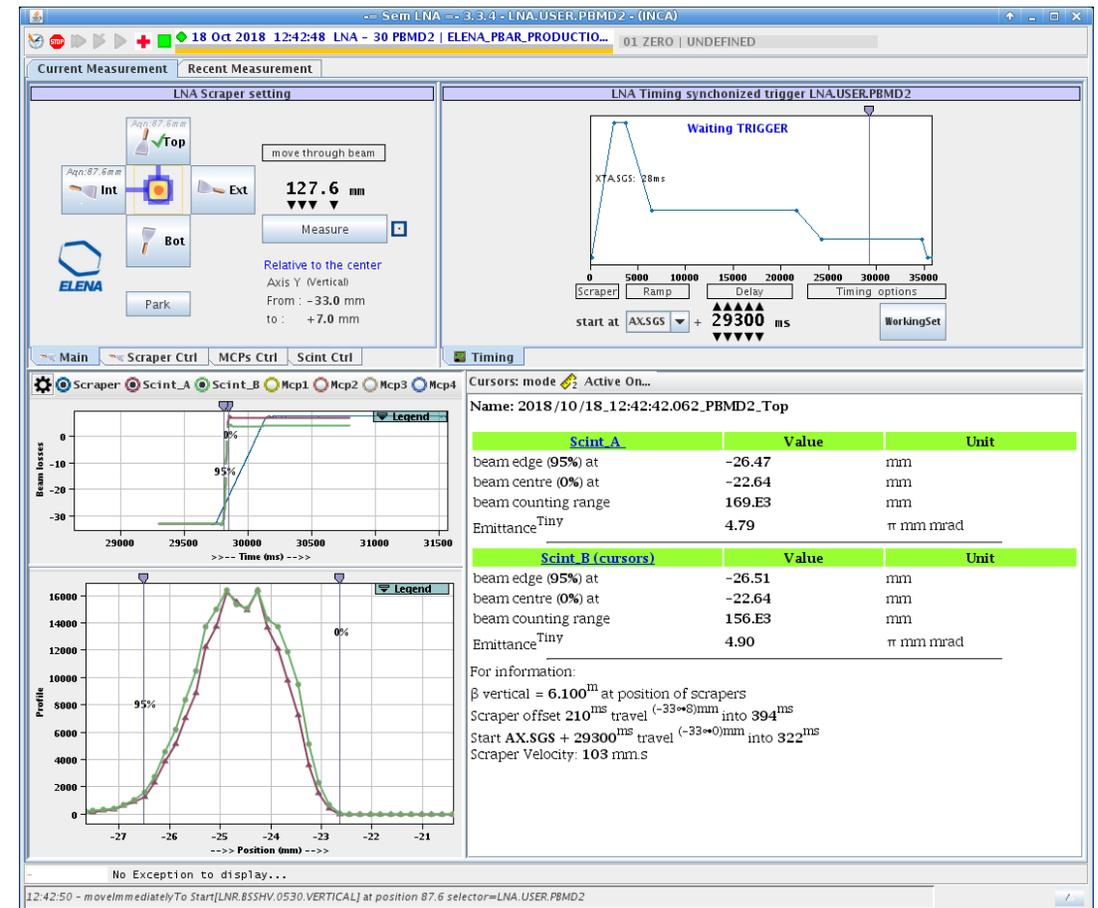
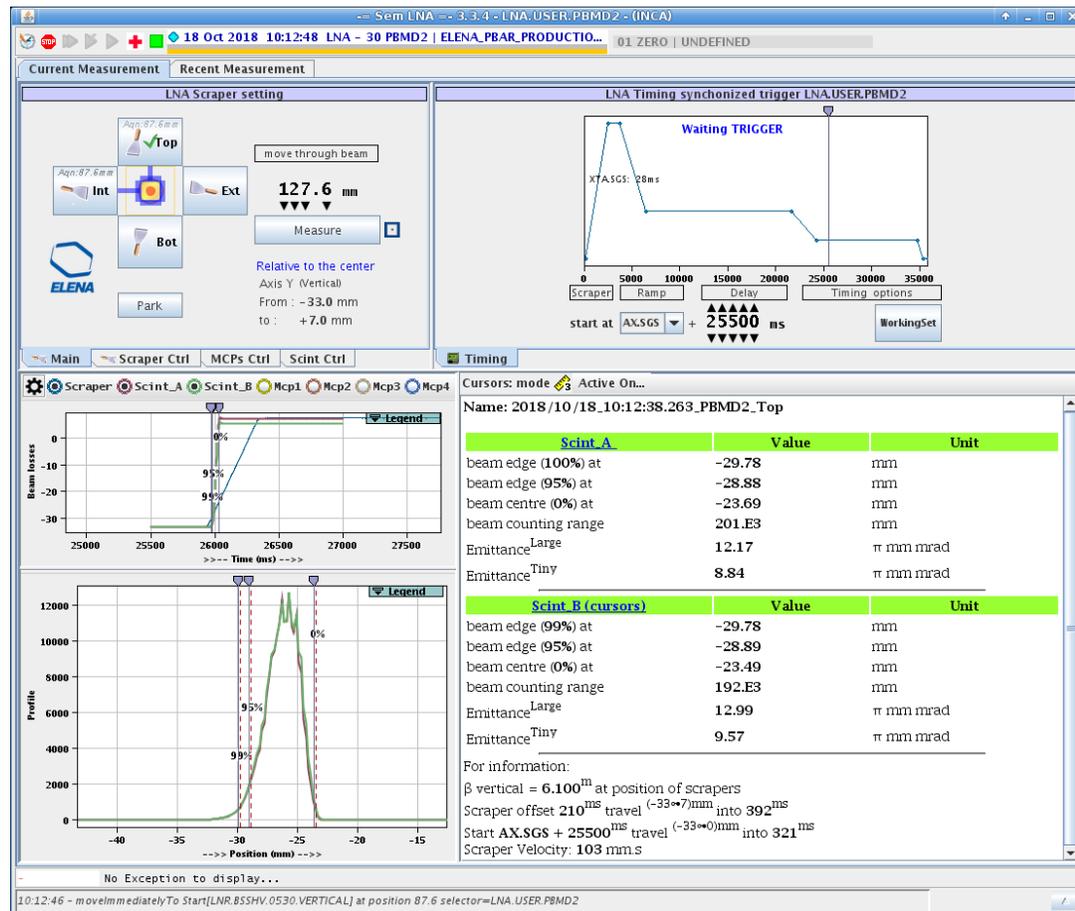
No electron cooling 100 keV



Electron cooling at 100 keV



Vertical – ejection plateau



Horizontal – Ejection plateau

18 Oct 2018 10:10:48 LNA - 30 PBMD2 | ELENA_PBAR_PRODUCTION... 01 ZERO | UNDEFINED

Current Measurement Recent Measurement

LNA Scrapper setting

Top
47.6 mm
move through beam
Measure

Bot
Park

Relative to the center
Axis X (Horizontal)
From : +33.0 mm
to : -7.0 mm

LNA Timing synchronized trigger LNA.USER.PBMD2

Waiting TRIGGER

XTASGS: 28ms

start at AX.SGS + 25500 ms

Scrapper Ramp Delay Timing options WorkingSet

Scrapper Scint_A Scint_B Mcp1 Mcp2 Mcp3 Mcp4

Name: 2018/10/18_10:10:38.262_PBMD2_Ext

Scint_A	Value	Unit
beam edge (100%) at	22.85	mm
beam edge (95%) at	21.96	mm
beam centre (0%) at	16.89	mm
beam counting range	130.E3	mm
Emittance ^{Large}	12.03	π mm mrad
Emittance ^{Tiny}	8.72	π mm mrad

Scint_B (cursors)	Value	Unit
beam edge (99%) at	23.05	mm
beam edge (95%) at	22.23	mm
beam centre (0%) at	16.69	mm
beam counting range	242.E3	mm
Emittance ^{Large}	13.69	π mm mrad
Emittance ^{Tiny}	10.41	π mm mrad

For information:
 β horizontal = 5.900^m at position of scrapers
 Scrapper offset 210^{ms} travel (33 \rightarrow -7)mm into 394^{ms}
 Start AX.SGS + 25500^{ms} travel (33 \rightarrow 0)mm into 327^{ms}
 Scrapper Velocity: 101 mm.s

No Exception to display...

10:10:54 - HemApp actionPerformed [changeBeforeRecord]

18 Oct 2018 10:22:48 LNA - 30 PBMD2 | ELENA_PBAR_PRODUCTION... 01 ZERO | UNDEFINED

Current Measurement Recent Measurement

LNA Scrapper setting

Top
47.6 mm
move through beam
Measure

Bot
Park

Relative to the center
Axis X (Horizontal)
From : +33.0 mm
to : -7.0 mm

LNA Timing synchronized trigger LNA.USER.PBMD2

Waiting TRIGGER

XTASGS: 28ms

start at AX.SGS + 29300 ms

Scrapper Ramp Delay Timing options WorkingSet

Scrapper Scint_A Scint_B Mcp1 Mcp2 Mcp3 Mcp4

Name: 2018/10/18_10:22:42.063_PBMD2_Ext

Scint_A	Value	Unit
beam edge (100%) at	21.52	mm
beam edge (95%) at	21.03	mm
beam centre (0%) at	17.15	mm
beam counting range	954.E2	mm
Emittance ^{Large}	6.47	π mm mrad
Emittance ^{Tiny}	5.12	π mm mrad

Scint_B (cursors)	Value	Unit
beam edge (99%) at	21.71	mm
beam edge (95%) at	21.28	mm
beam centre (0%) at	17.15	mm
beam counting range	158.E3	mm
Emittance ^{Large}	7.07	π mm mrad
Emittance ^{Tiny}	5.78	π mm mrad

For information:
 β horizontal = 5.900^m at position of scrapers
 Scrapper offset 210^{ms} travel (33 \rightarrow -7)mm into 392^{ms}
 Start AX.SGS + 29300^{ms} travel (33 \rightarrow 0)mm into 326^{ms}
 Scrapper Velocity: 101 mm.s

No Exception to display...

10:22:50 - HemApp actionPerformed [changeBeforeRecord]