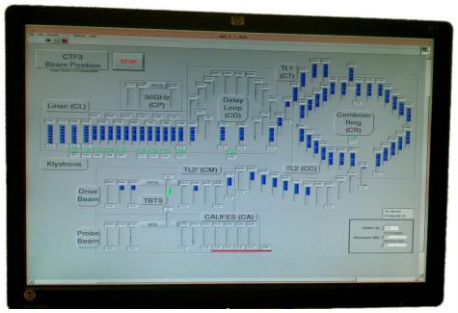


CTF3 Results

Update from last Project Meeting

R. Corsini for the CTF3 Team

Timeline & Organization

- First phase, next 3-4 weeks, focused on drive beam quality studies. Mainly 3 GHz beam. MDs from Monday to Thursday afternoon, then TBTS or TBL operation. Includes drive beam phase monitor commissioning and wake-field monitor tests with probe beam only.

- Second phase, following 2-3 weeks, mixed. Two days per week (+ nights and week-ends) for TBL and TBTS.
  First priority on TBL high current and factor 8 drive beam.
  Expect to condition TBTS structures up to nominal.

- Third phase, final 1-3 weeks, completion of planned studies. First priority on wake-field monitor studies with drive beam and any other high priority item still to be completed.

Main Issues

- Problem with water in compressed air system – lost 1-2 weeks
- Broken TWT – impossible to set-up 1.5 GHz beam for factor 8 combination

Drive beam quality

- Chicane & CT line (& DL): Comparisons of quad scan measurements in CT and CTS lines. Consolidate low R_{56} optics. Repeat bunch length measurements, using DL.
  1 week.

- CR: Precise measurement of transverse matching by quad scans. Closed orbit correction. Improve orbit closure (will profit by better understanding of BPI response). 1-2 weeks.

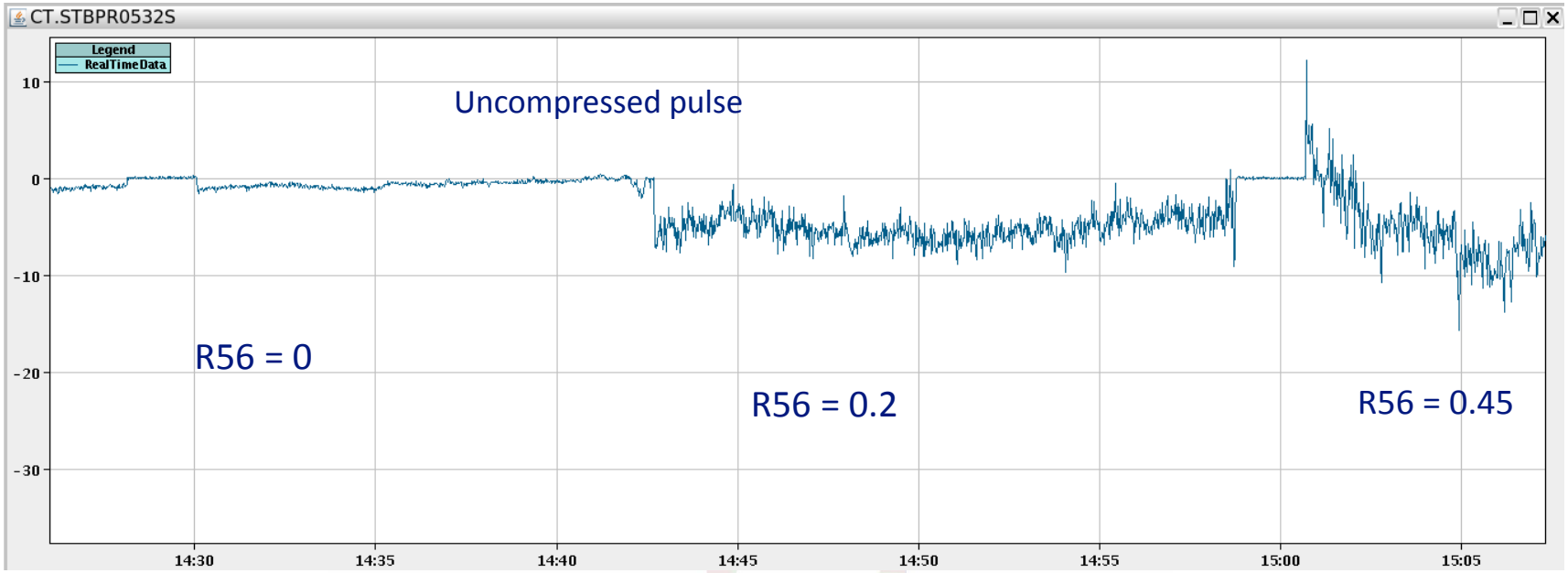
- TL2, CLEX beam lines: optics studies (kick studies, quad scans & re-matching).
  1 week.

- Set-up of combination factor 8 (2 TWTs).
  1-2 weeks.

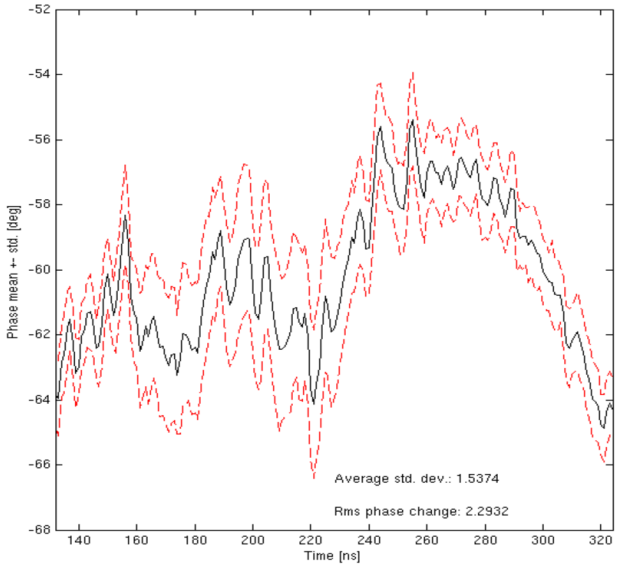
- First priority
- Total time 4-6 weeks
- Target goals:
  - control bunch length (to **1.5 mm rms in CLEX**)
  - Target emittance (**150 um**) in both planes for combination factor 4 (below 300 um for horizontal, factor 8)
  - Total losses from linac to CLEX **below 10%**
  - Factor 8 stability < 5 10^{-3} rms
  - Define & implement in control system nominal machine(s) (magnet strengths) for all beams

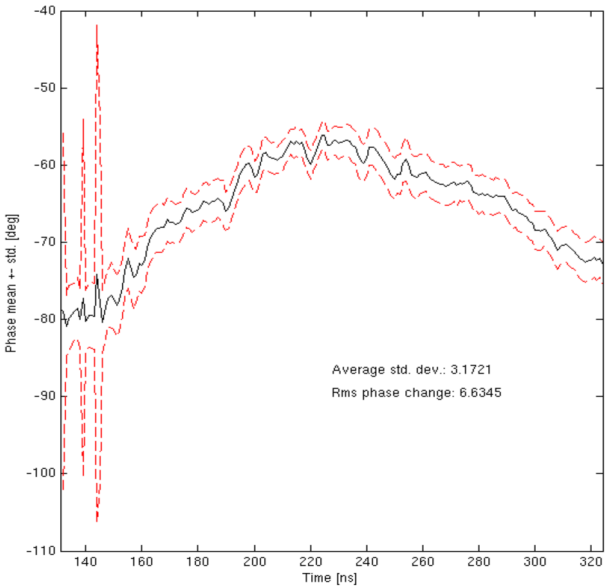
Drive Beam Phase

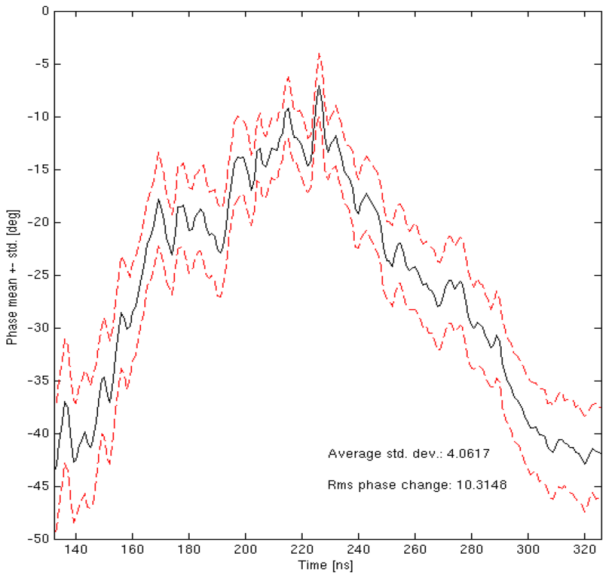
R. Corsini,
CLIC Project Meeting
December 11, 2012



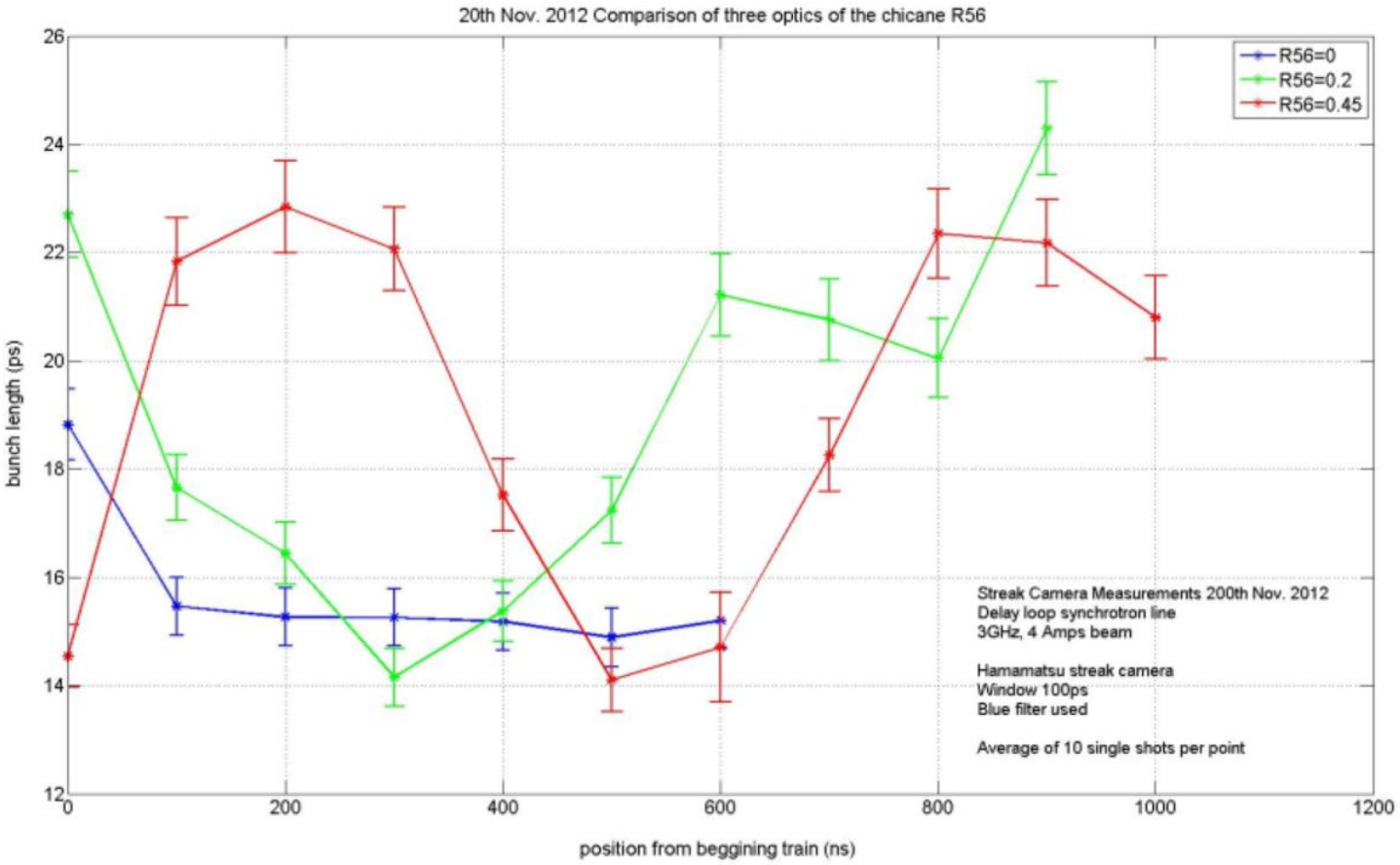
Compressed pulse



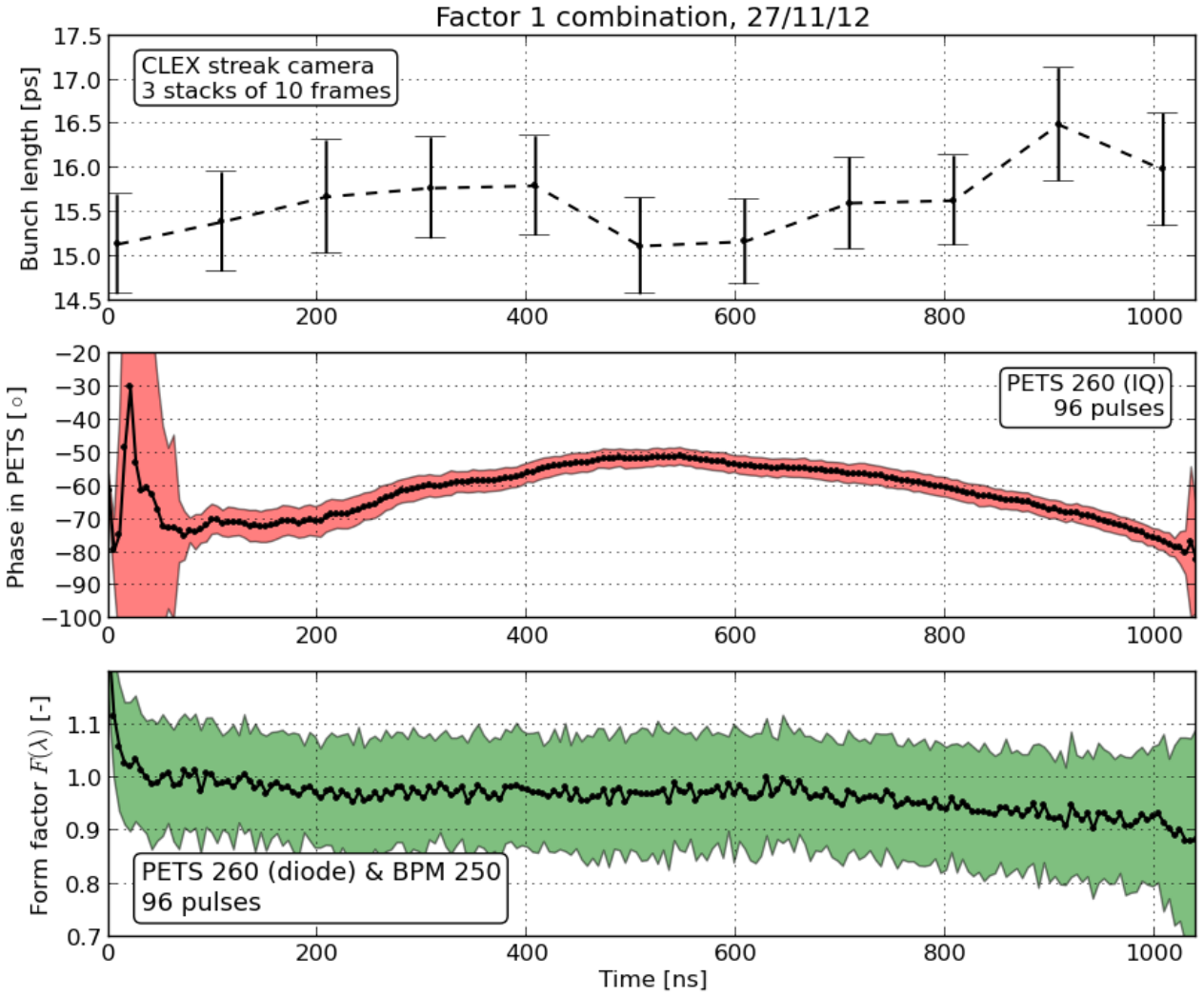




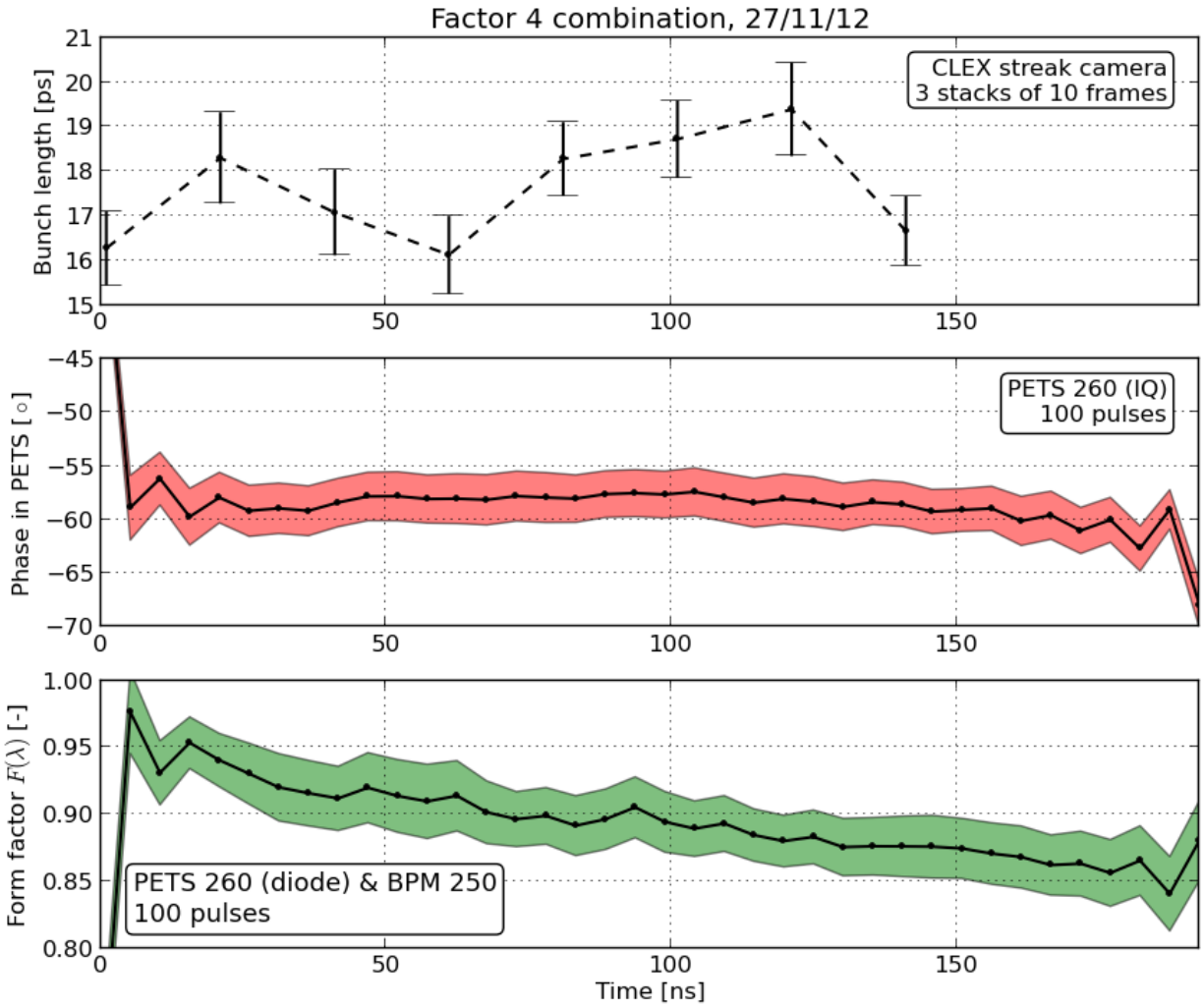
Bunch Length



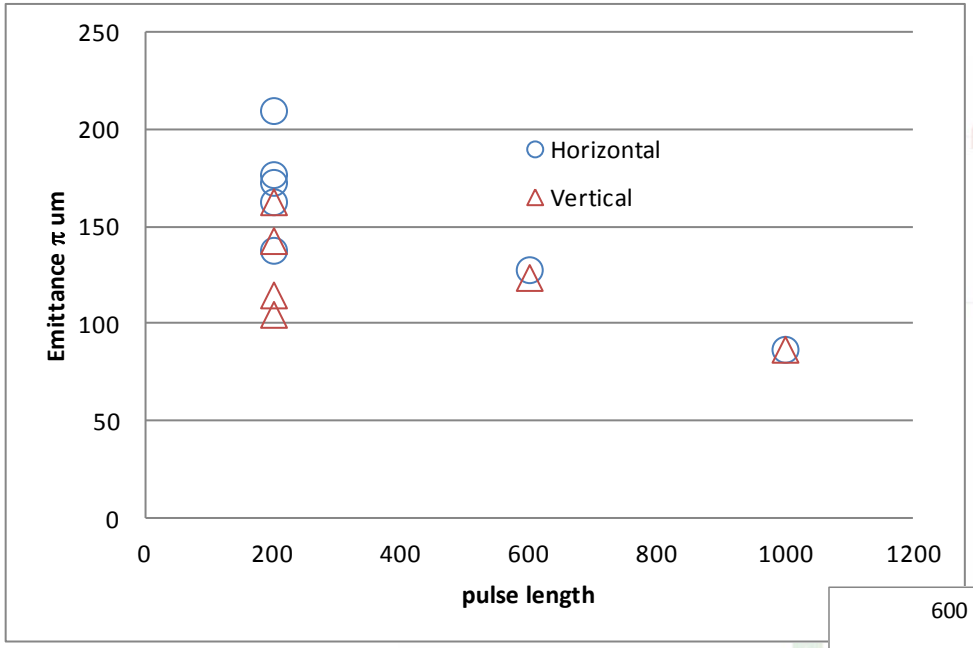
Bunch Length



Bunch Length



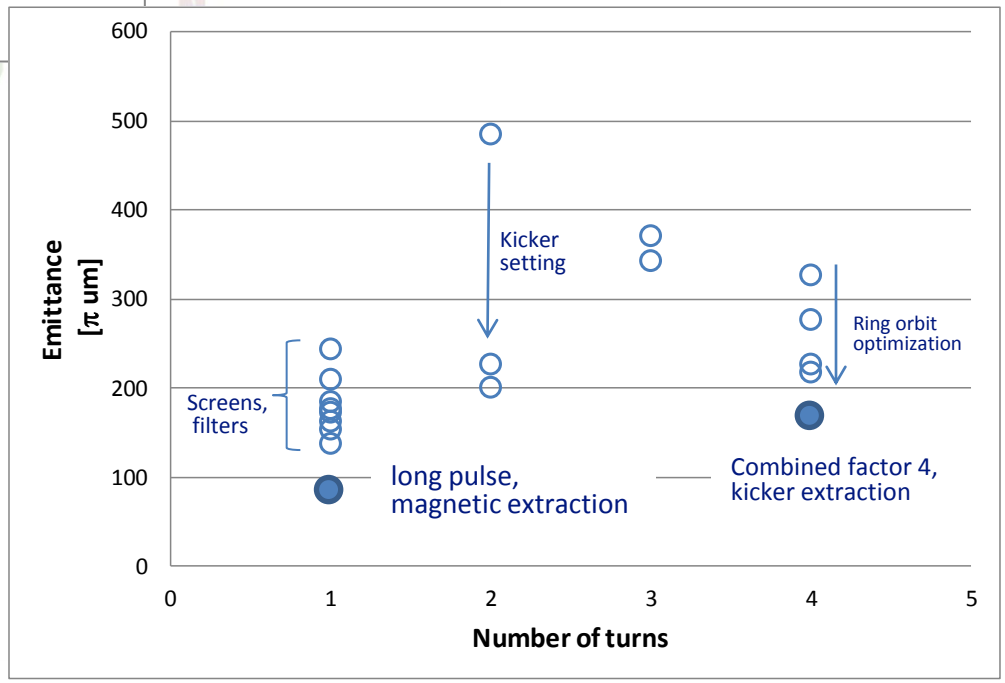
Emittance studies



Uncombined beam,
magnetic extraction

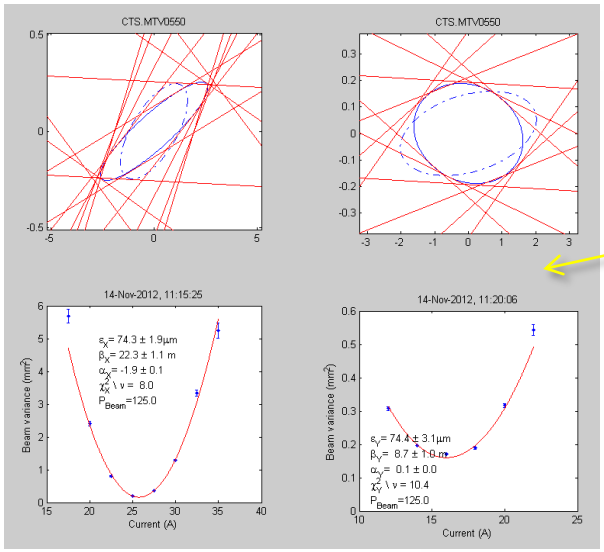
Short pulse,
magnetic and kicker
extraction

Horizontal Emittance

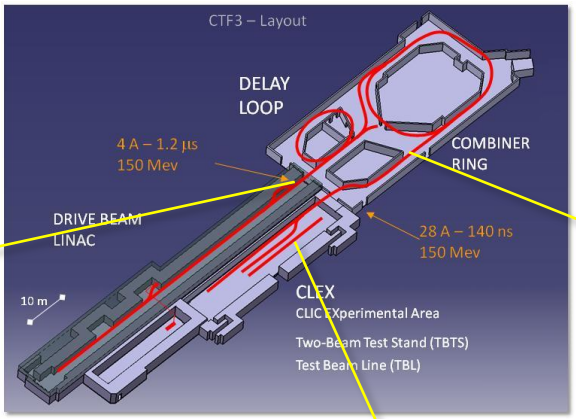


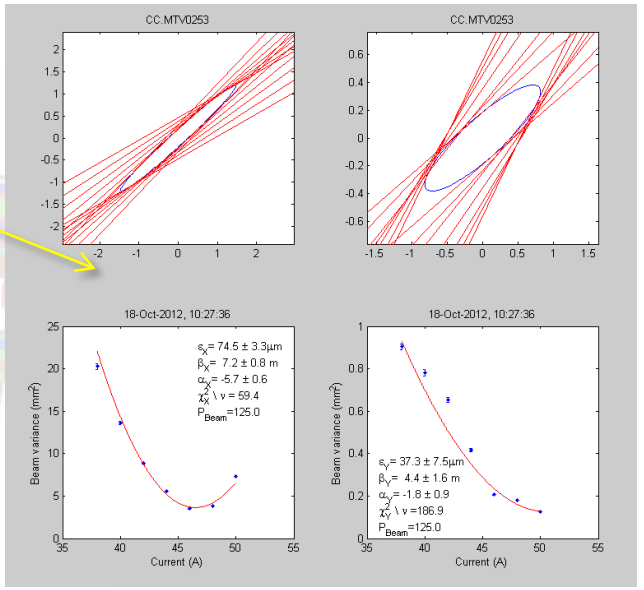
Emittance studies

R. Corsini,
CLIC Project Meeting
December 11, 2012

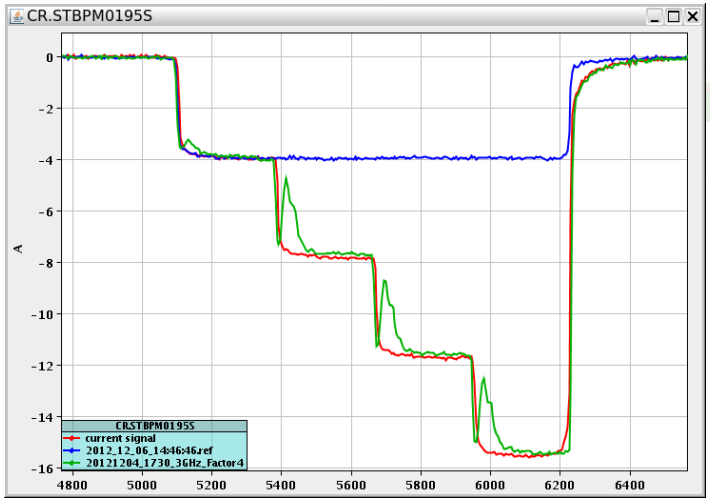


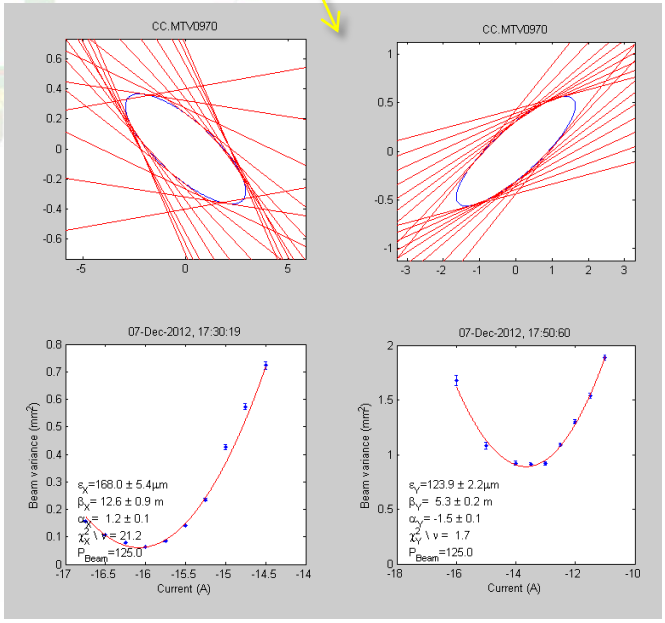
74 um both planes





74 um horizontal ?,
37 um vertical ?

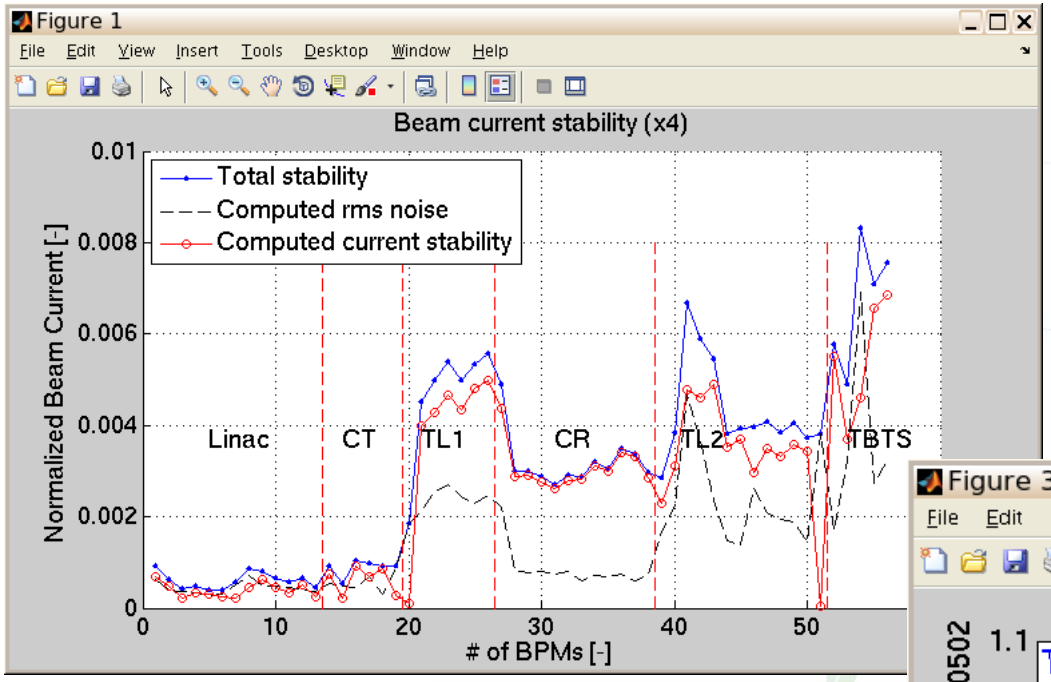


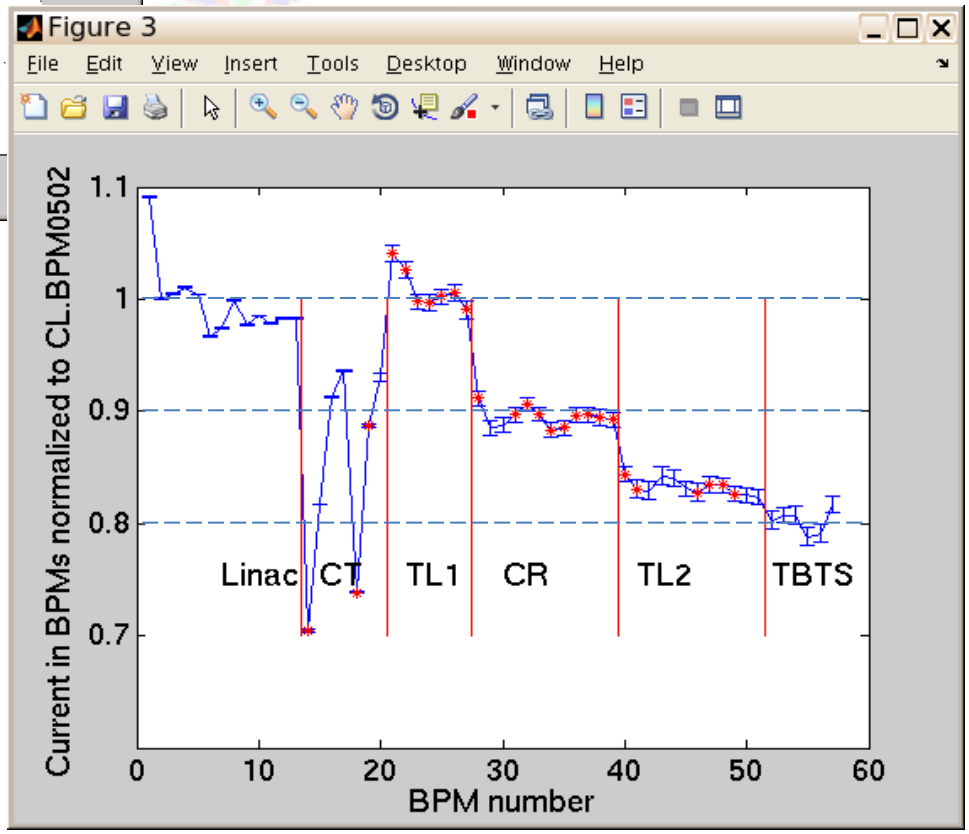


168 um horizontal,
124 um vertical

Stability and losses

R. Corsini,
CLIC Project Meeting
December 11, 2012



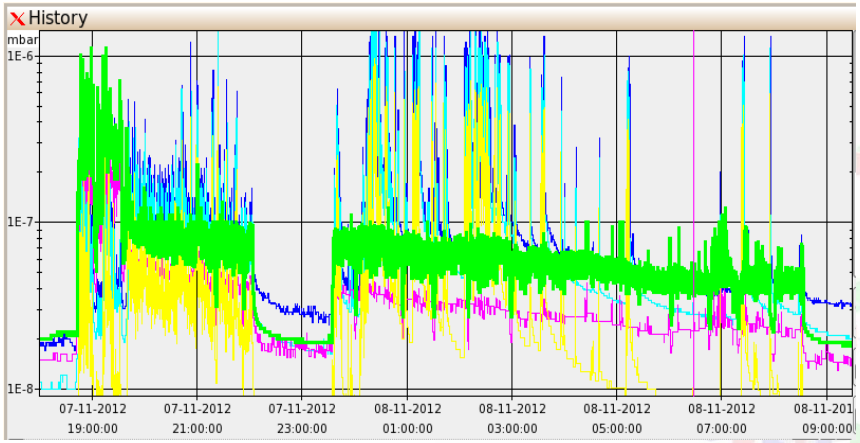


TBTS

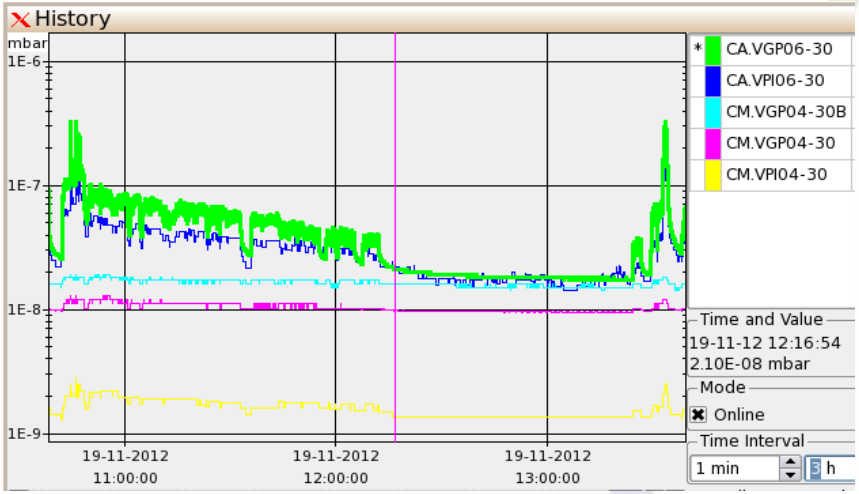
- Structures conditioning: careful conditioning, take BD rate measurement and collect flash-box signals in parallel. Standard operation with factor 4 + recirculation @ 2.5 Hz.
  Mainly during night and week-ends, at least for the next month.

- Wake-field monitor tests. Both without drive beam and with.
  2-3 weeks total. High priority.

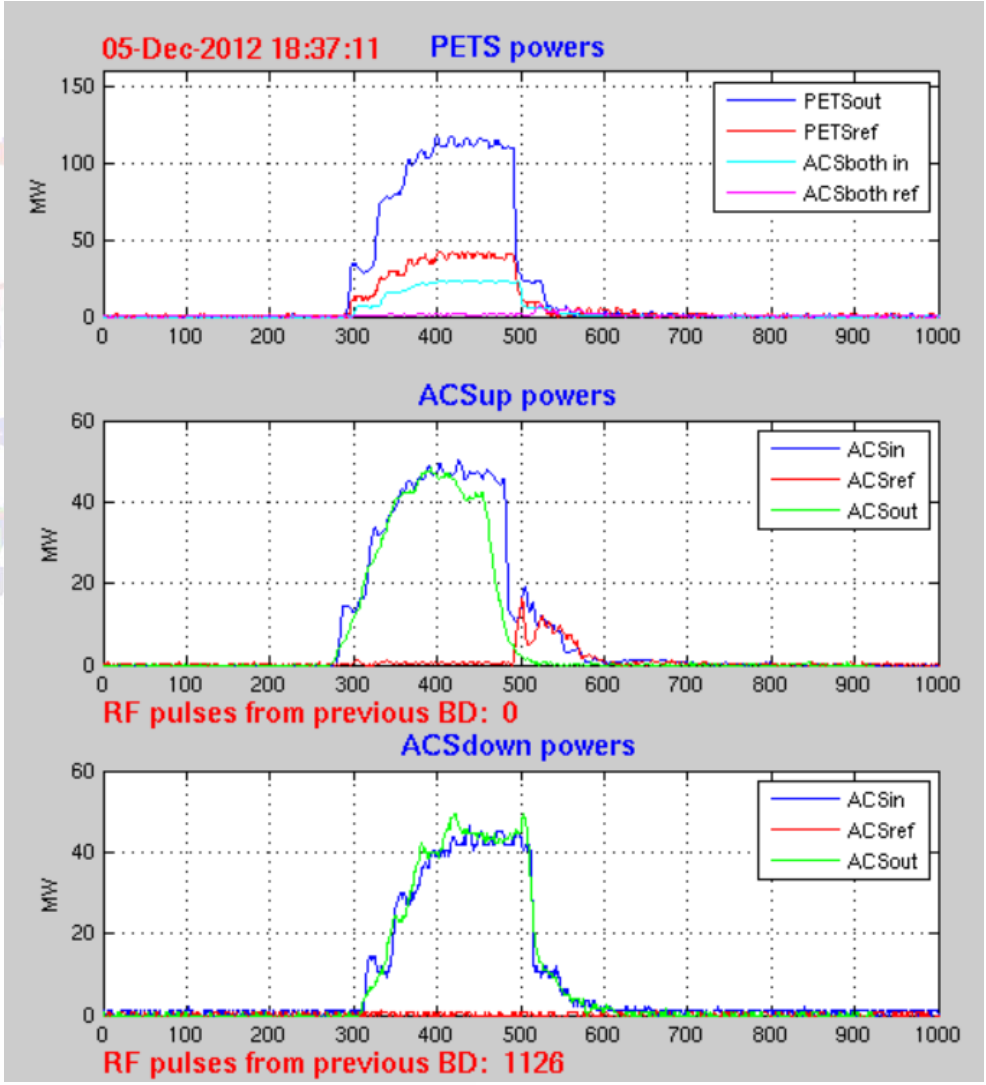
TBTS



At the beginning : many BDs in the waveguide/phase shifter

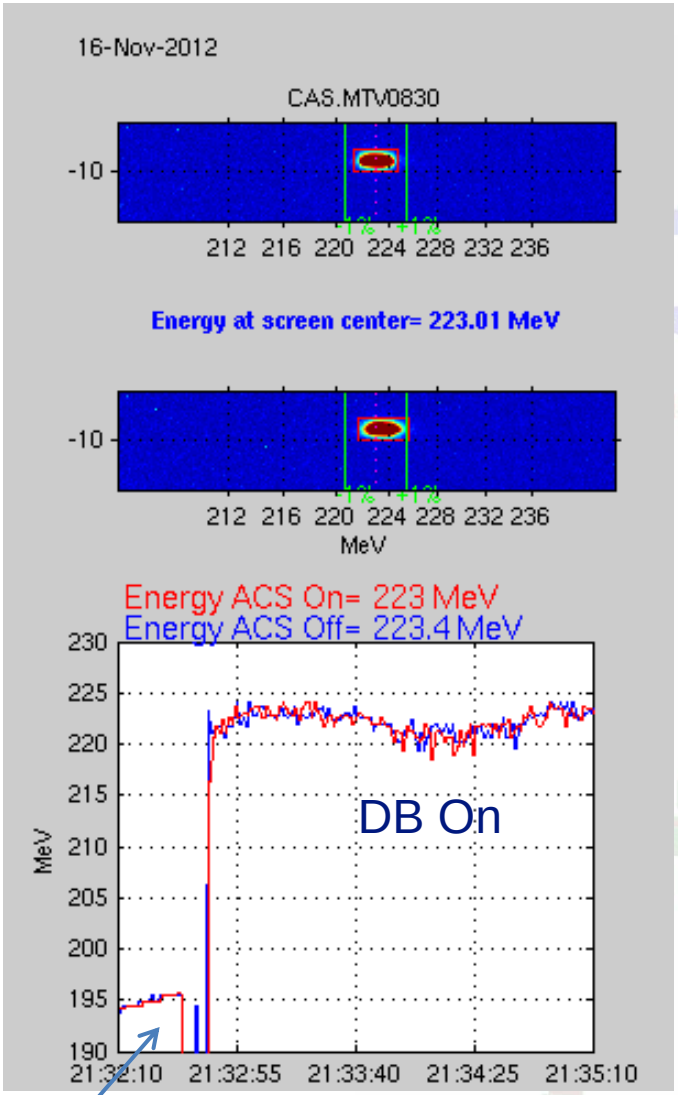


Then out gazing of the ACS

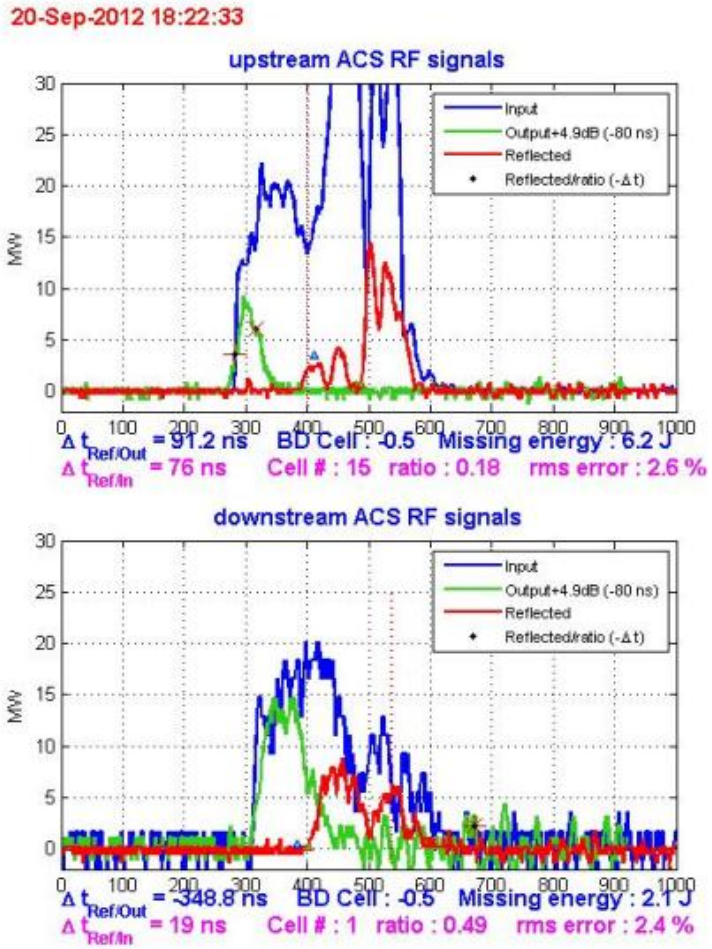


Present status - 50 MW range

TBTS



DB Off



There are occurrences of BDs in the 2 ACS during the same RF pulse (RF reflected ?)

- RF power production: 12-13 PETS tanks, from 20 A to 30 A, deceleration in the 30%-50% range.
  High priority, 1-2 weeks.

- Dispersion free steering, optics studies – also extend to high current/large deceleration. Reduced resources at present. Mid priority, possibly postponed to next year.

- Possibly, a new PETS prototype for TBL+ to be tested before the end of the year (input coupler, mini-tank, PETS On/Off).
  Postponed to next year.

Drive Beam feed-forward and feedback (CTF3-002)

- Test of drive beam phase monitors.
  High priority, < 1 week.

TBL graphical user interface

UI panels

Optics, matching and steering

PETS measurements

Power and energy budget

Energy measurements

Energy at CCS.DUM0995 [MeV]: 126.50

Energy at spectrometer [MeV]: 110.00

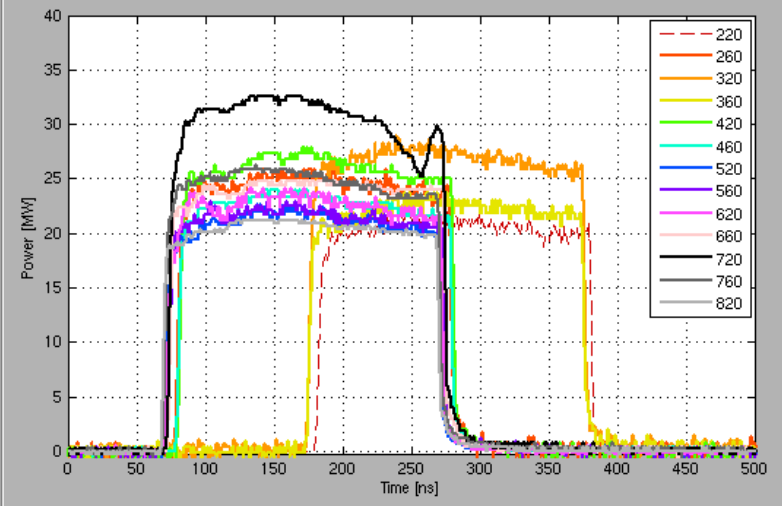
Predicted deceleration

Field form factor [-]: 0.97

PETS 1, current [A]:	-12.43	Detuning [MHz]:	0	Predicted power [MW]:	27.17
PETS 2, current [A]:	-12.19	Detuning [MHz]:	0	Predicted power [MW]:	26.15
PETS 3, current [A]:	-12.02	Detuning [MHz]:	0	Predicted power [MW]:	25.42
PETS 4, current [A]:	-12.10	Detuning [MHz]:	0	Predicted power [MW]:	25.77
PETS 5, current [A]:	-12.06	Detuning [MHz]:	0	Predicted power [MW]:	25.61
PETS 2, current [A]:	-11.71	Detuning [MHz]:	0	Predicted power [MW]:	24.14
PETS 7, current [A]:	-11.53	Detuning [MHz]:	0	Predicted power [MW]:	23.39
PETS 8, current [A]:	-11.51	Detuning [MHz]:	0	Predicted power [MW]:	23.29
PETS 9, current [A]:	-11.53	Detuning [MHz]:	0	Predicted power [MW]:	23.39
PETS 10, current [A]:	-11.80	Detuning [MHz]:	0	Predicted power [MW]:	24.51
PETS 11, current [A]:	-11.46	Detuning [MHz]:	0	Predicted power [MW]:	23.10
PETS 12, current [A]:	-11.52	Detuning [MHz]:	0	Predicted power [MW]:	23.36
PETS 13, current [A]:	-11.52	Detuning [MHz]:	0	Predicted power [MW]:	23.34
PETS 14, current [A]:	-11.81	Detuning [MHz]:	0	Predicted power [MW]:	0.00
PETS 15, current [A]:	-11.69	Detuning [MHz]:	0	Predicted power [MW]:	0.00
PETS 16, current [A]:	-11.58	Detuning [MHz]:	0	Predicted power [MW]:	0.00

Total predicted deceleration [MeV]: 25.28

Measured PETS output power



Power in PETS 1 [MW]:	20.98	Power in PETS 2 [MW]:	25.01
Power in PETS 3 [MW]:	27.31	Power in PETS 4 [MW]:	22.63
Power in PETS 5 [MW]:	26.64	Power in PETS 6 [MW]:	23.22
Power in PETS 7 [MW]:	21.66	Power in PETS 8 [MW]:	21.87
Power in PETS 9 [MW]:	23.16	Power in PETS 10 [MW]:	24.56
Power in PETS 11 [MW]:	31.75	Power in PETS 12 [MW]:	25.26
Power in PETS 13 [MW]:	20.86	Power in PETS 14 [MW]:	0.00
Power in PETS 15 [MW]:	0.00	Power in PETS 16 [MW]:	0.00

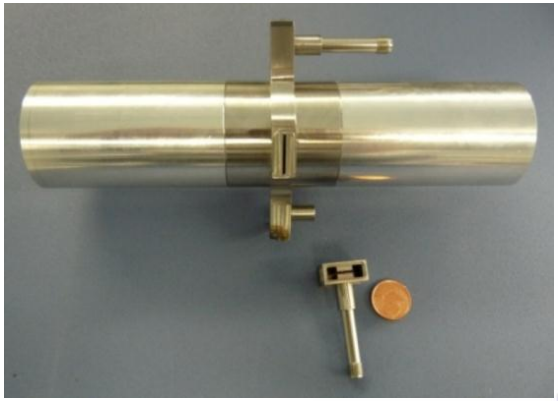
Total extracted power [MW]: 293.9

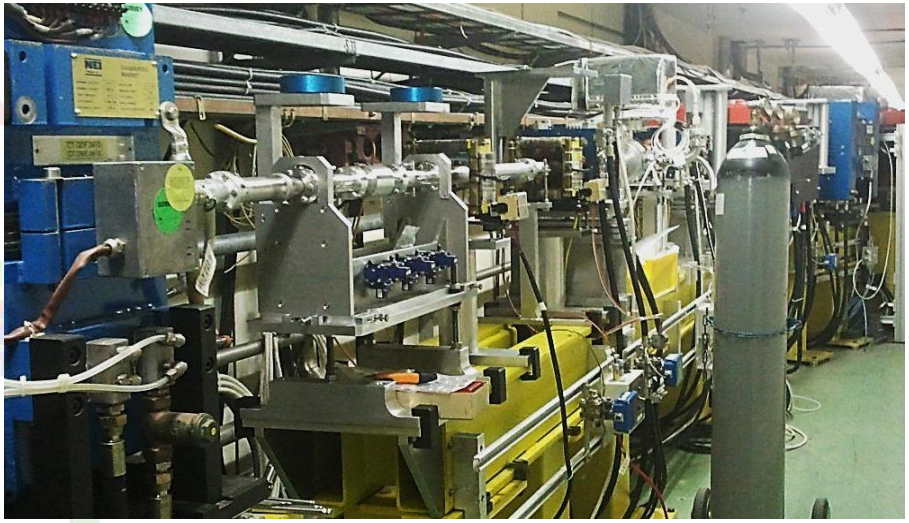
Total expected deceleration [MeV]: 25.35

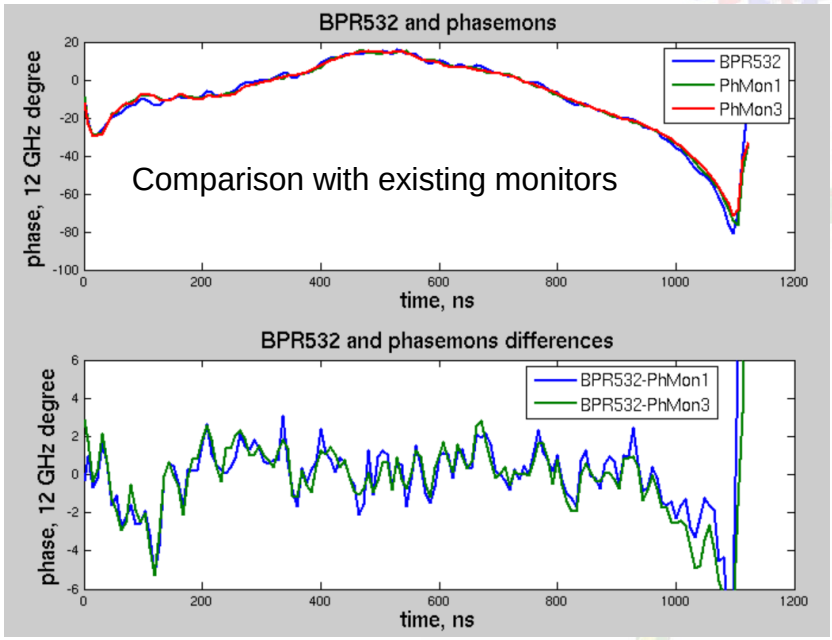
X

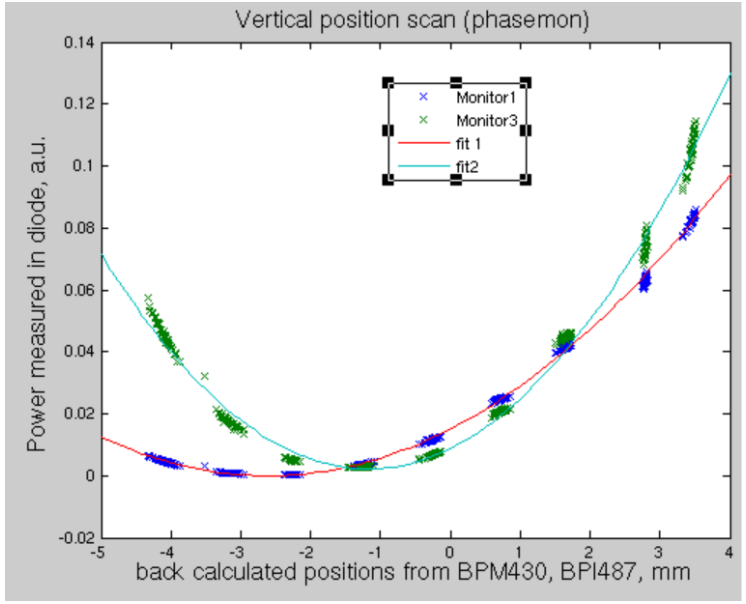
Commissioning of INFN Phase monitors

R. Corsini,
CLIC Project Meeting
December 11, 2012





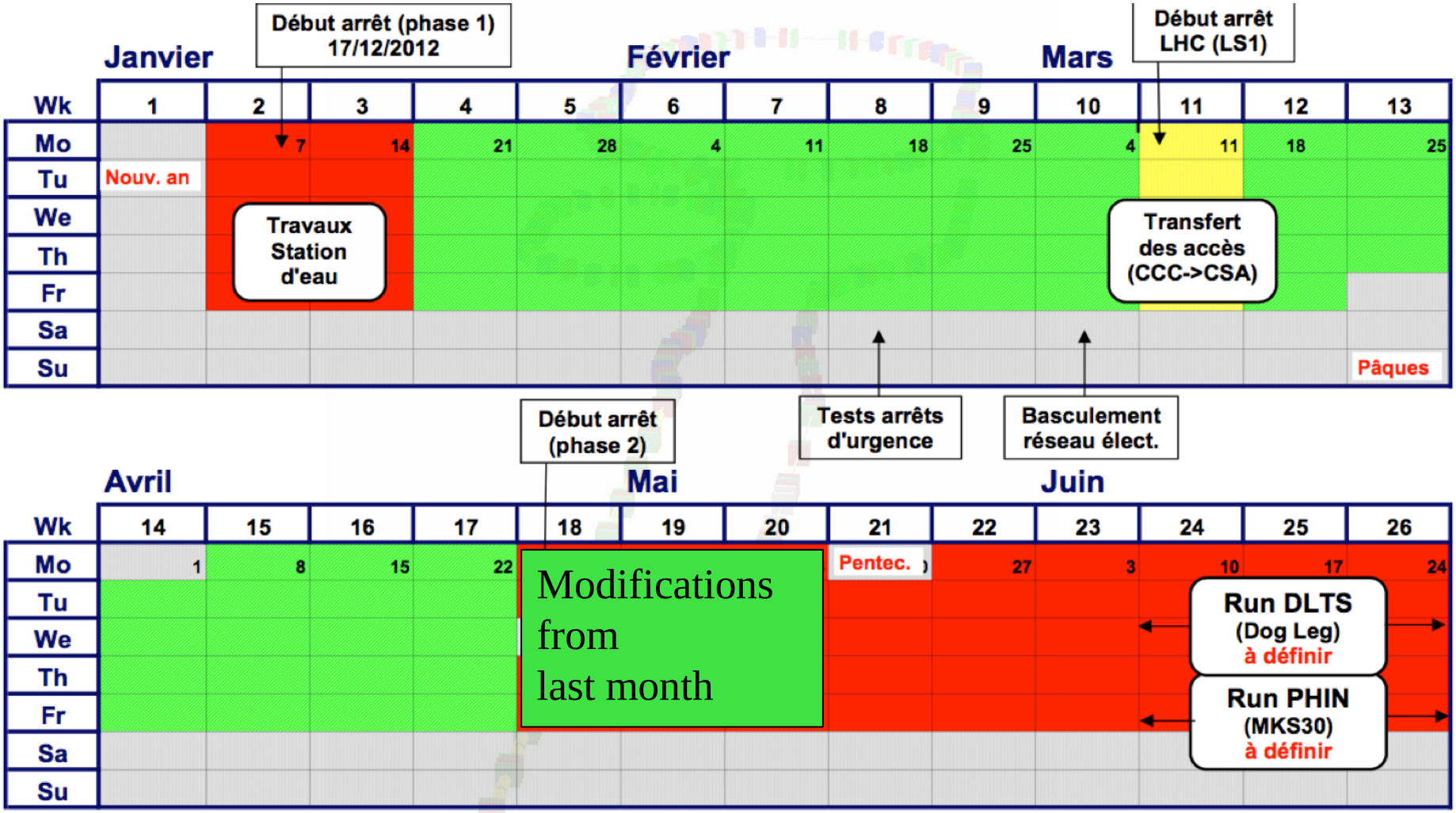




Final values for phase monitors looks good.
Around 0.08 degrees (12 GHz) per 1 mm vertical offset in monitor 3, 0.05 degrees for monitor 1. (AA)

Schedule 2013

(as of September)



Schedule 2013

(as of September)