

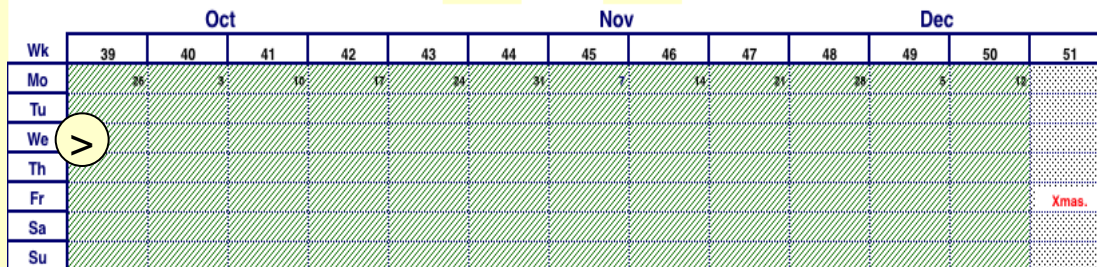
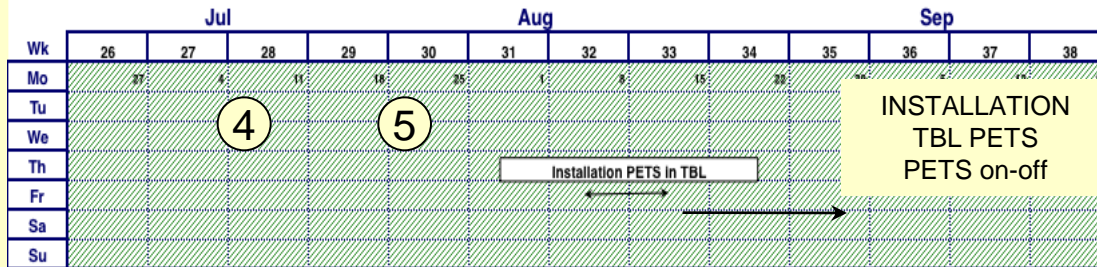
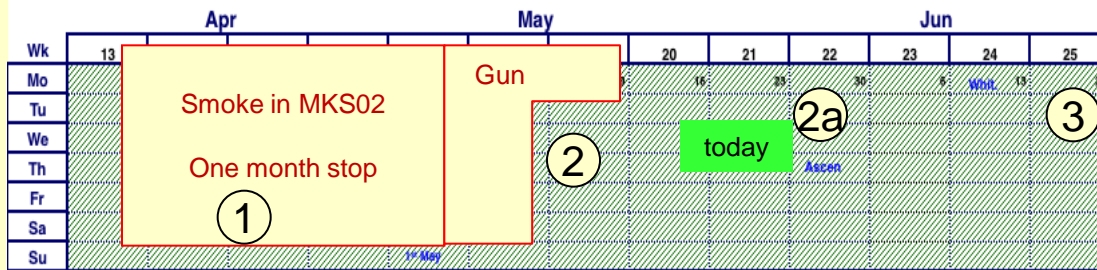
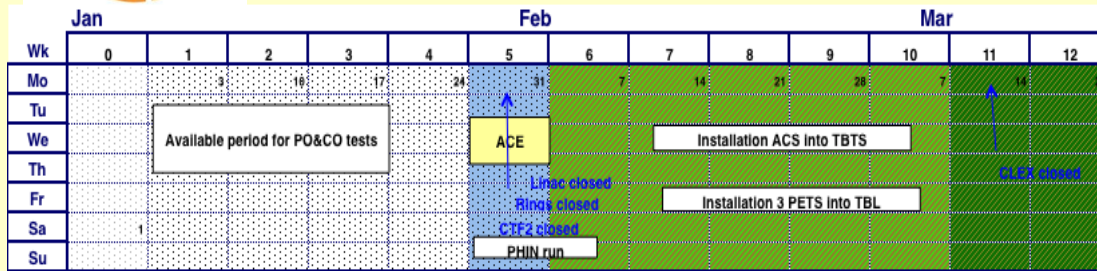


Status of CTF3 Operation, update of experimental program and schedule for 2011

- Highlights and problems
- Installation period in September
- Rest of the year program



Planning 2011



- ① 3 GHz beam setup to CR
initial beam to CLEX
CALIFES setup ✓
- ② CR x4 combination
emittance studies
combined beam to CLEX ✓
- ②a 1.5 GHz beam setup
x8 combination
(if TWT is available – only 1 operational) ✓
- ③ 100 MV/m acceleration
breakdown kicks
TBL deceleration
(1-2 days for DB beam studies) ✓
- ④ $\epsilon < 150$ mm mrad
longitudinal studies
stability x8 combination
(night running for BDR) ✓
- ⑤ breakdown rate measurements
PETS / ACS ✓
- > Test of new PETS on-off scheme
TBL deceleration up to 8 PETS

Beam phase
rep. rate / losses

CSR
night supervision ✓



Drive Beam preparation



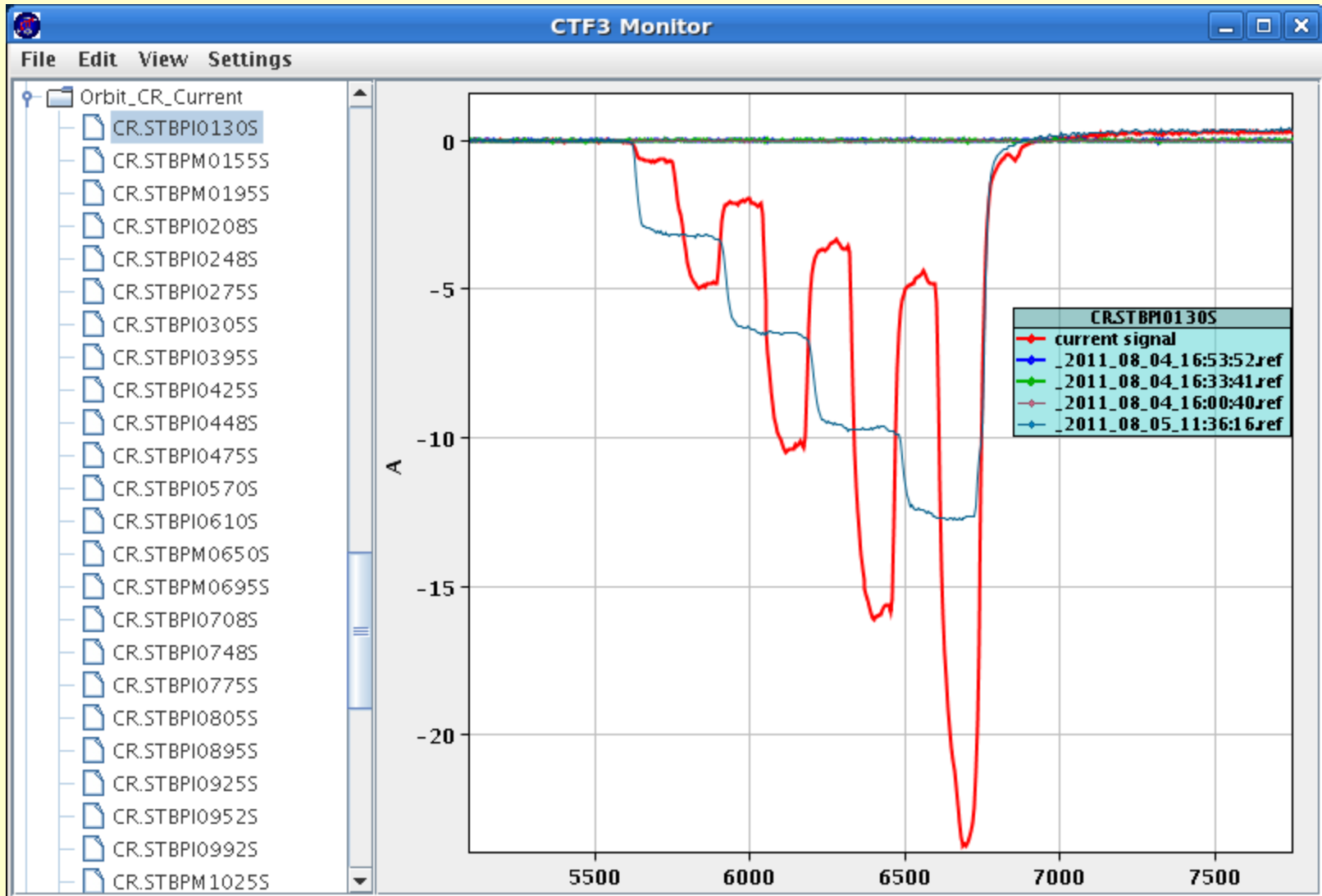
- Made use of excellent factor 4 beam, 3 GHz, up to 14 A in CLEX
- Bunch length measurements in CR and CLEX with consistent results as well compared to rf measurements
- Ring optics studies in delay loop and combiner ring
- Frequent over night operation with some success
- 1,5 GHz factor 8 set up with 1.5 TWT's, 19 A used in CLEX but clearly needs improvement. Got third TWT this week



Drive Beam preparation



1.5 GHz factor 8 combination

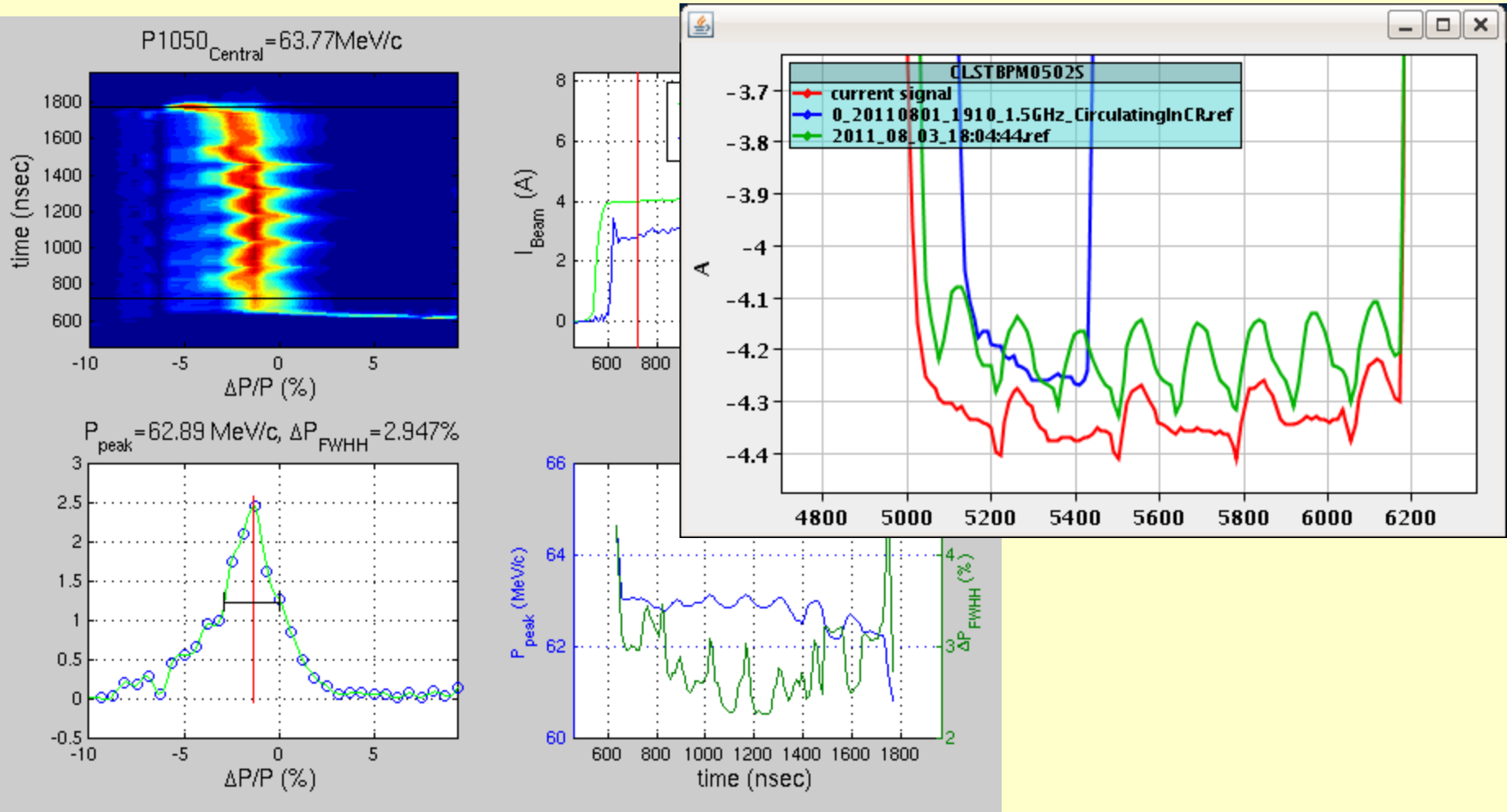




Drive Beam preparation



1.5 GHz factor 8 combination problems,
Response of phase switches to be investigated further

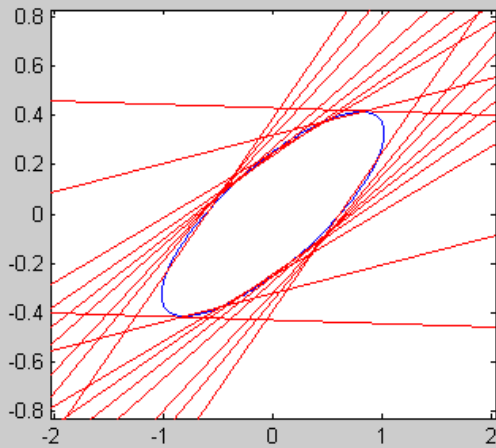




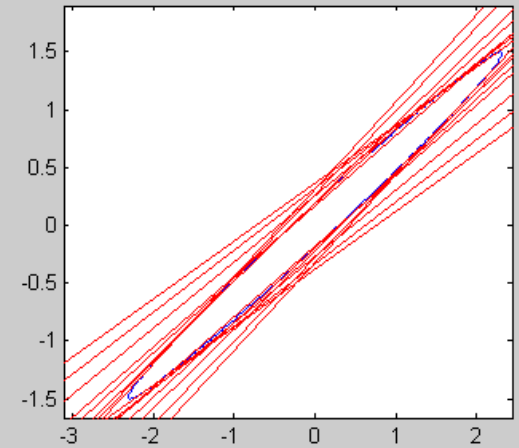
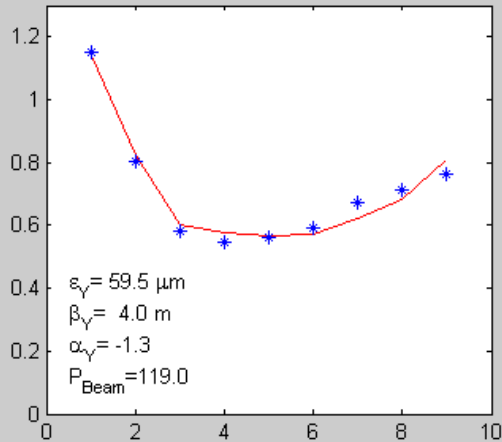
Drive Beam preparation



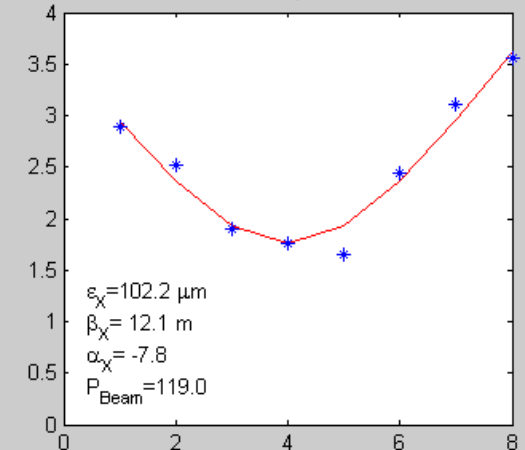
Emittance tuning:
Different turns are ok,
Some emittance increase
due to non perfect
Combination
Best results in CLEX
for factor 4:
Horizontal: 250 μm
Vertical: 150 μm



21-Jul-2011, 11:31:09



21-Jul-2011, 13:59:58





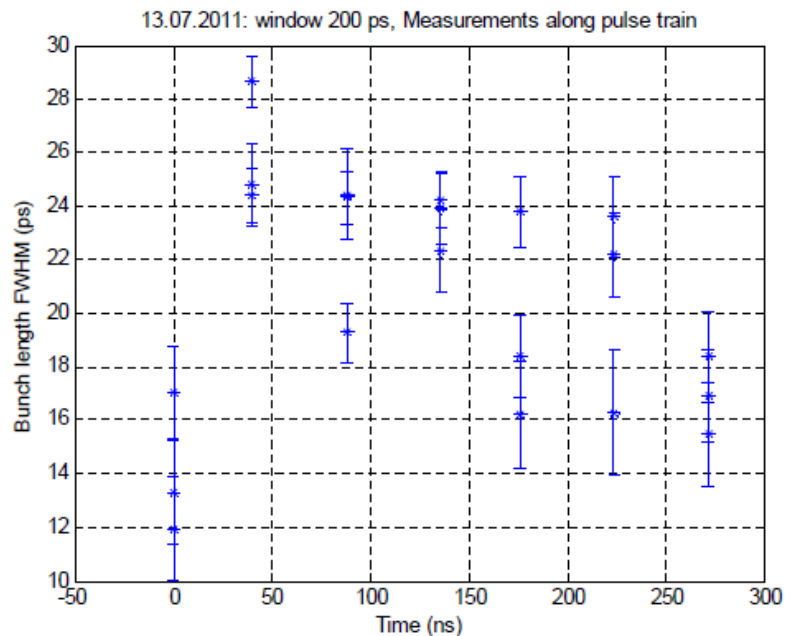
Drive Beam preparation



Bunch Length

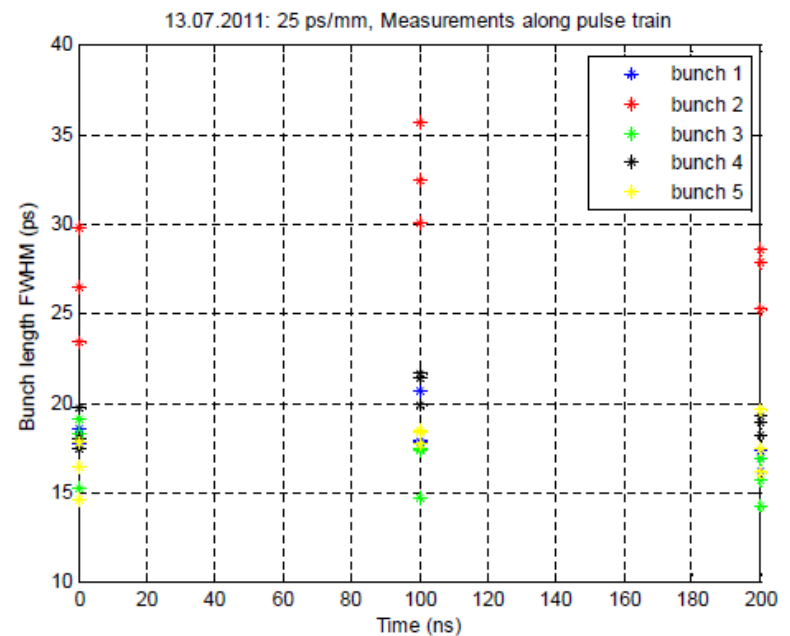
Combiner ring

turn 1, 3 data for each timing



CLEX

5 bunches per measurement, 3 data for each timing





TBTS results



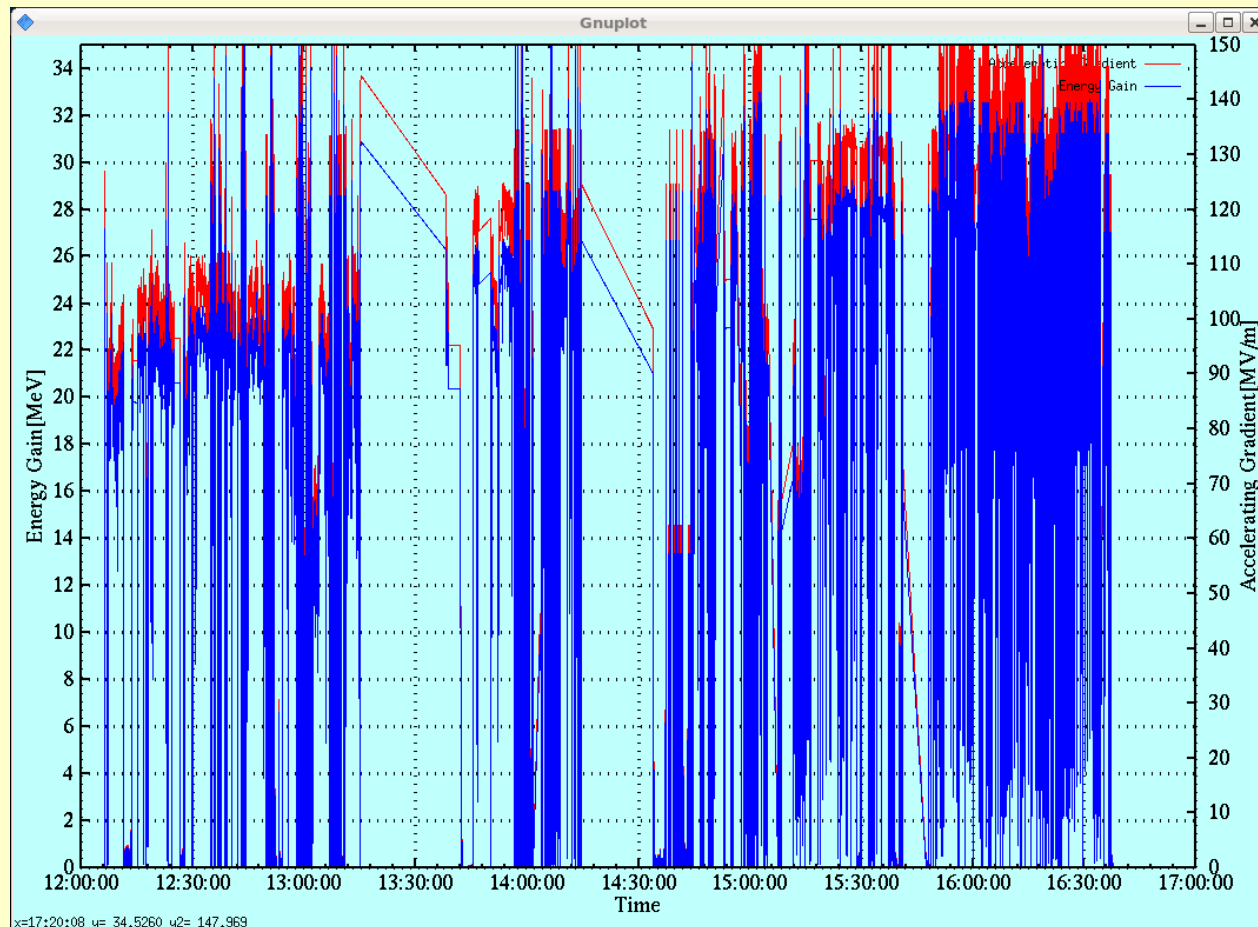
- Up to 150 MV/m two beam acceleration measured
- Consistency with power calibrations and acceleration
- Breakdown rate measurements established
- Breakdown kick measurements not yet successful
might be limited by probe beam BPM resolution
- FLASH box installed



TBTS results



Two beam acceleration measured with the probe beam (CALIFES) up to 150 MV/m, ~ 50 ns pulse length

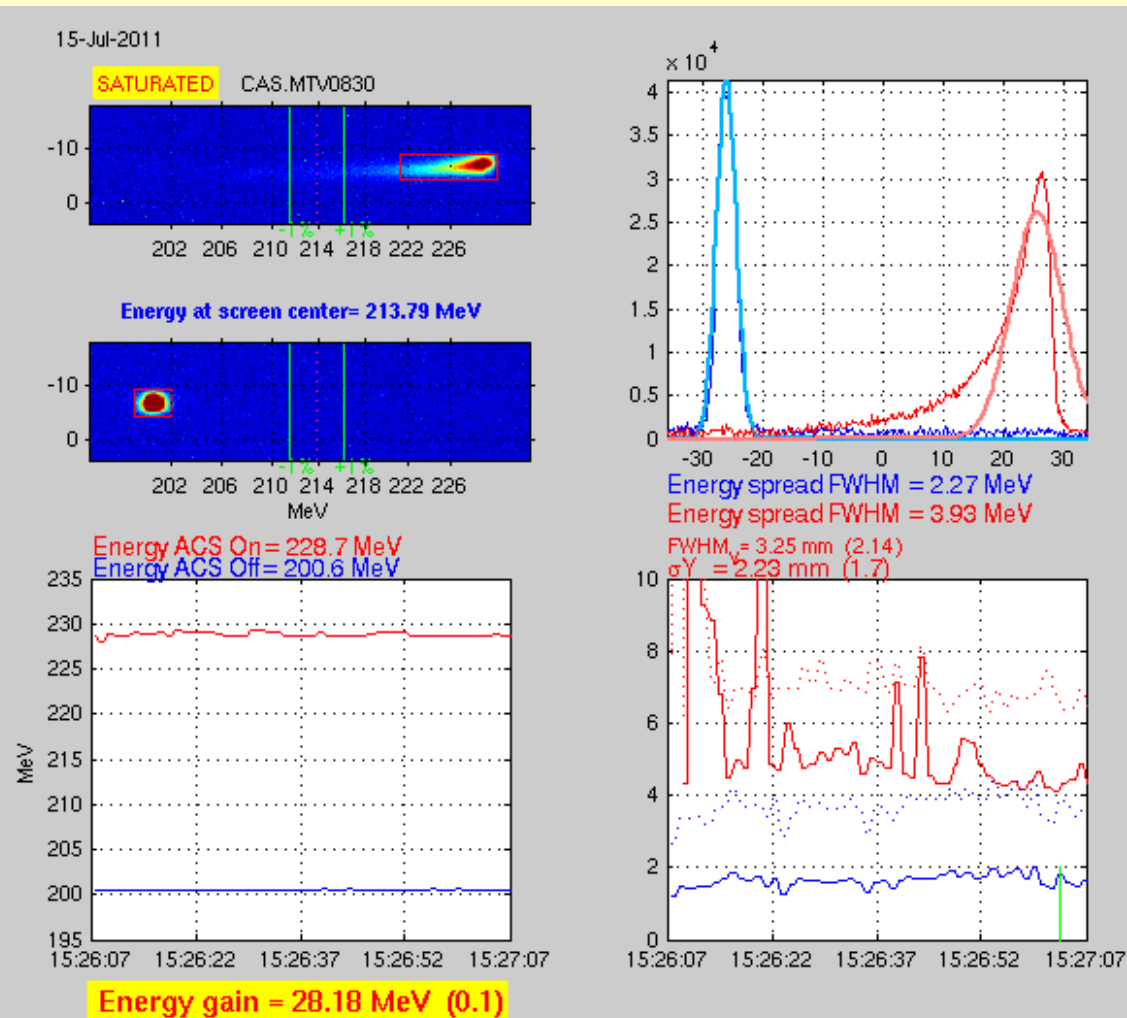




TBTS results



Example of a two beam acceleration measurement
(probe beam at 2 Hz and drive beam at 1 Hz)

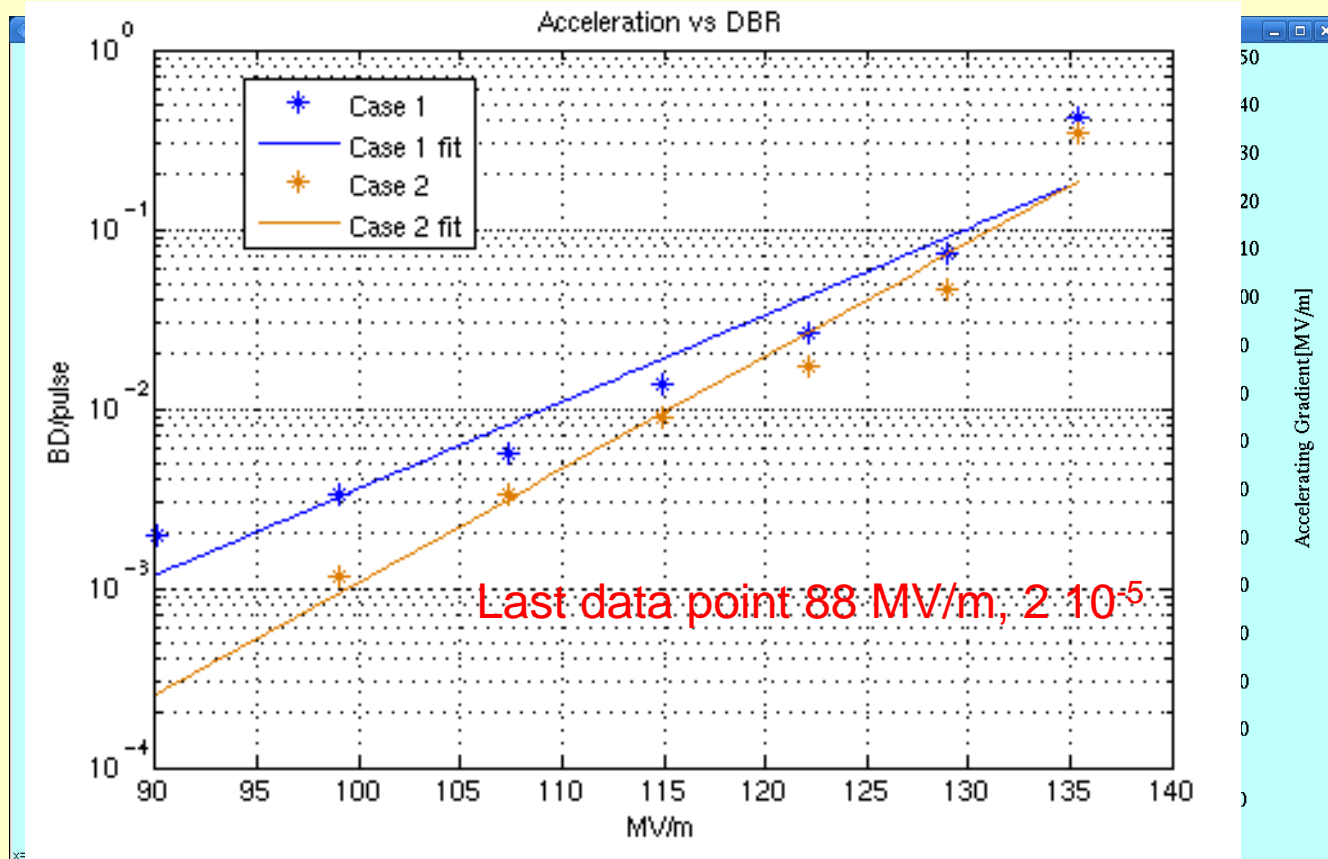




TBTS results



- Well established two beam acceleration experiments
- Calibration converging, structure correctly tuned
- Interesting breakdown studies started

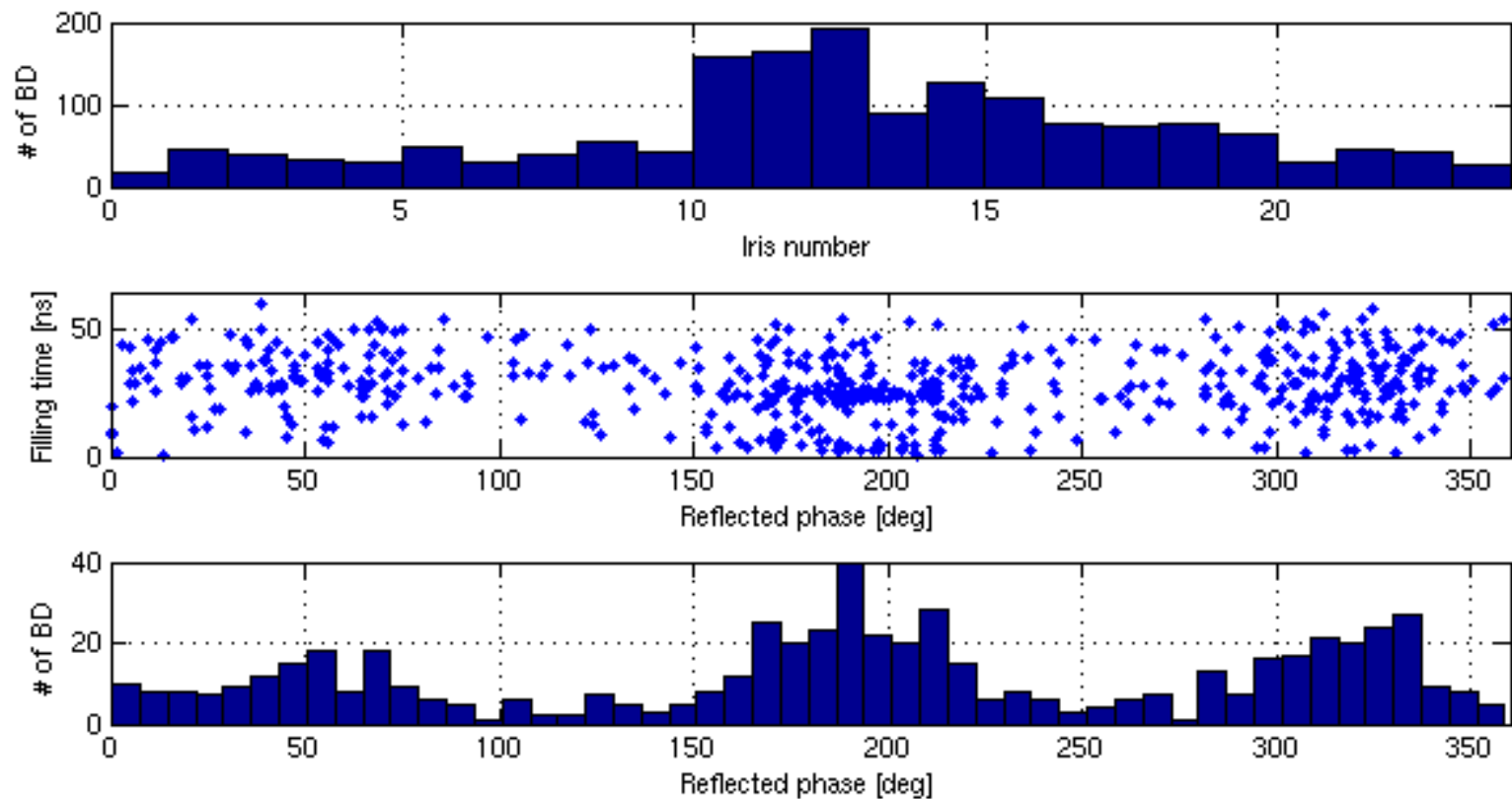




TBTS results

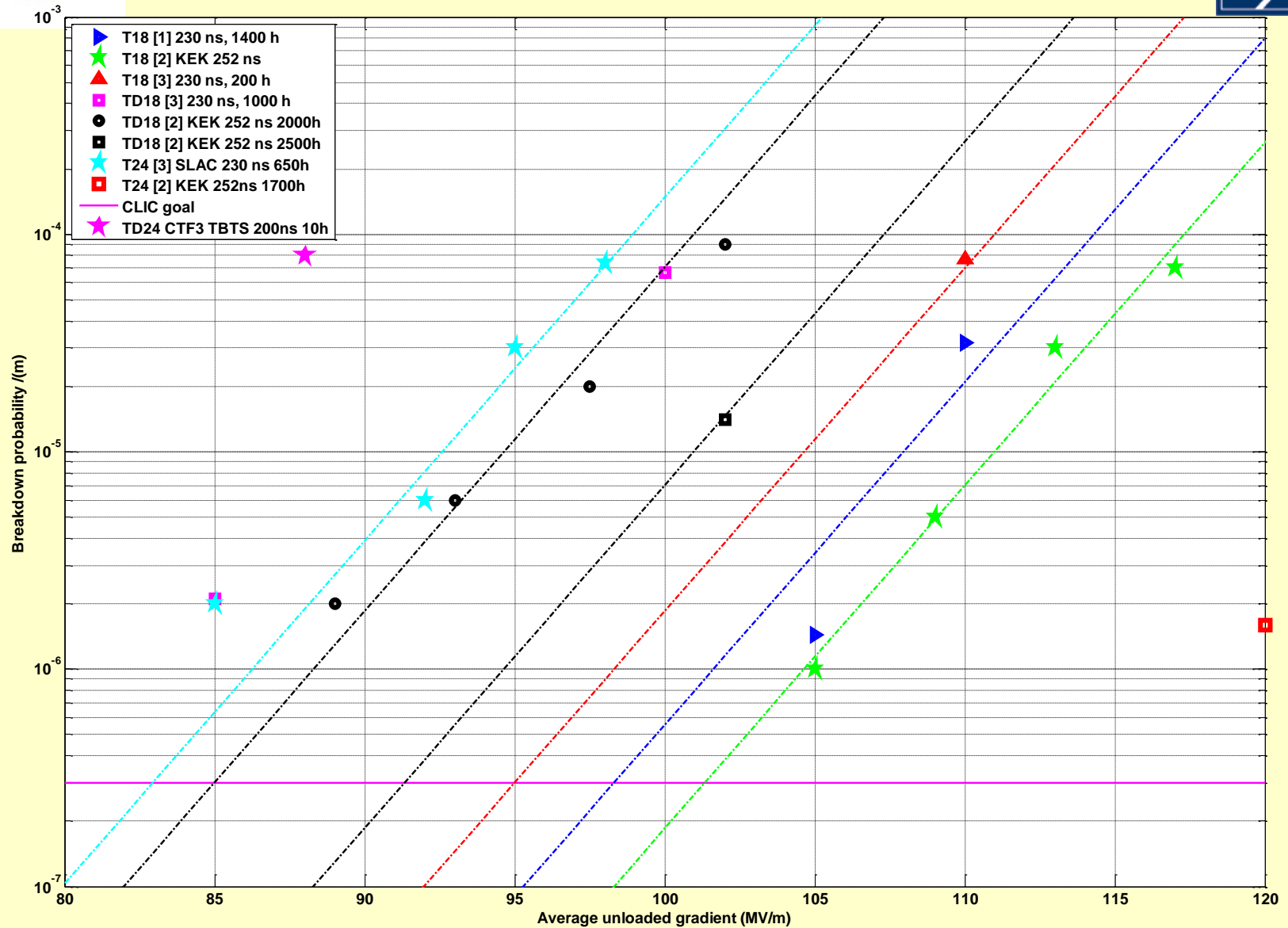


Breakdown location in the structure, Alexey





TBTS results



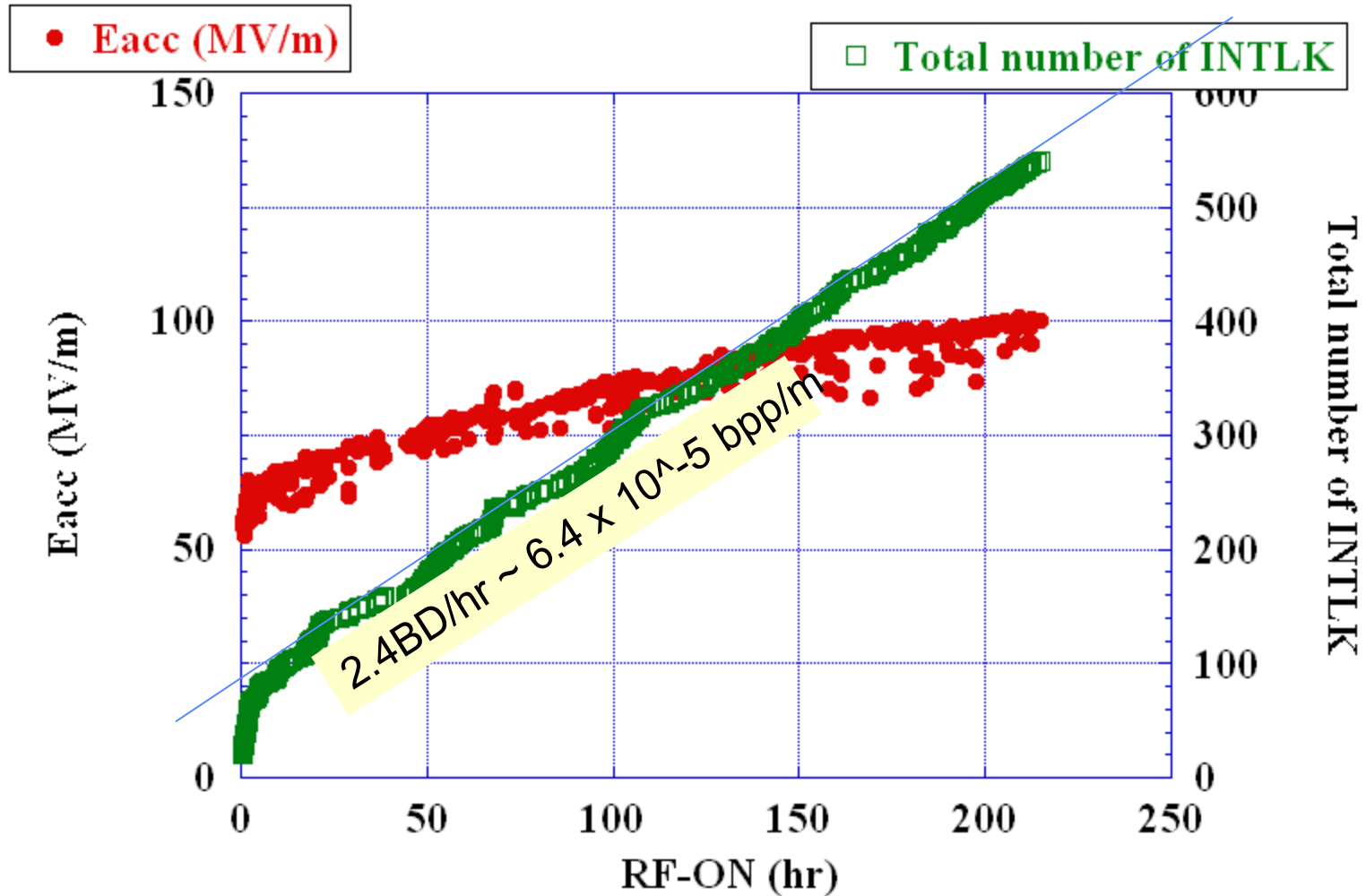


Comparison with T24_KEK



101215

T24_Disk_#3 tested at Nextef



Mostly the ACC related BD's.



TBL results



- Deceleration measurements at 14 A and 19 A with nicely consistent results
- BPM resolution measurements, visit from Juanjo and Gabriel
- Beam stability measurements
- Big effort on beam based alignment studies
- All 4 PETS produce power according to expectations up to 60 MW

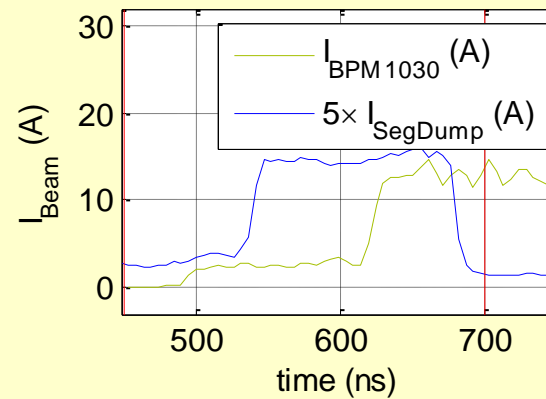
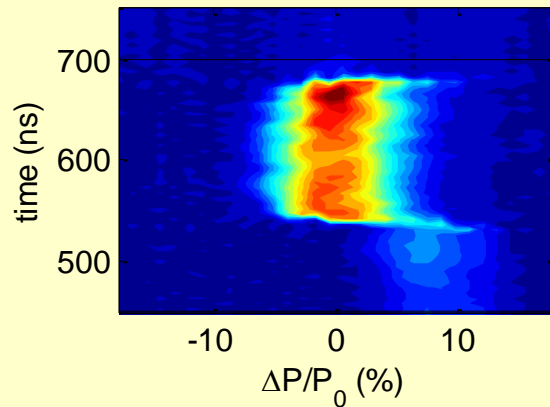


TBL results

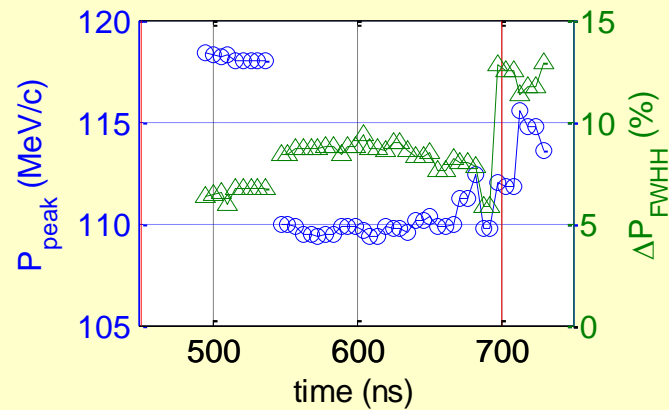
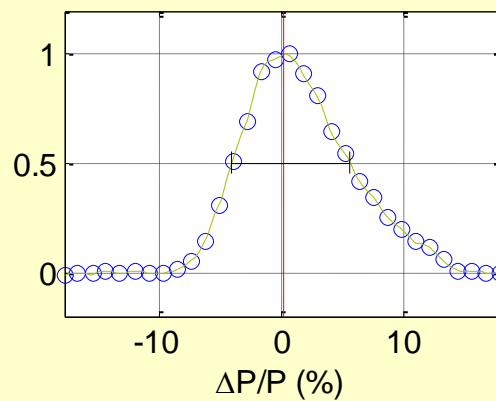


Deceleration with 18 A, segmented dump measurement

TBL: $P_0 = 109.7 \text{ MeV/c}$



$P_{\text{peak}} = 109.9 \text{ MeV/c}$, $\Delta P_{\text{FWHH}} = 9.628\%$

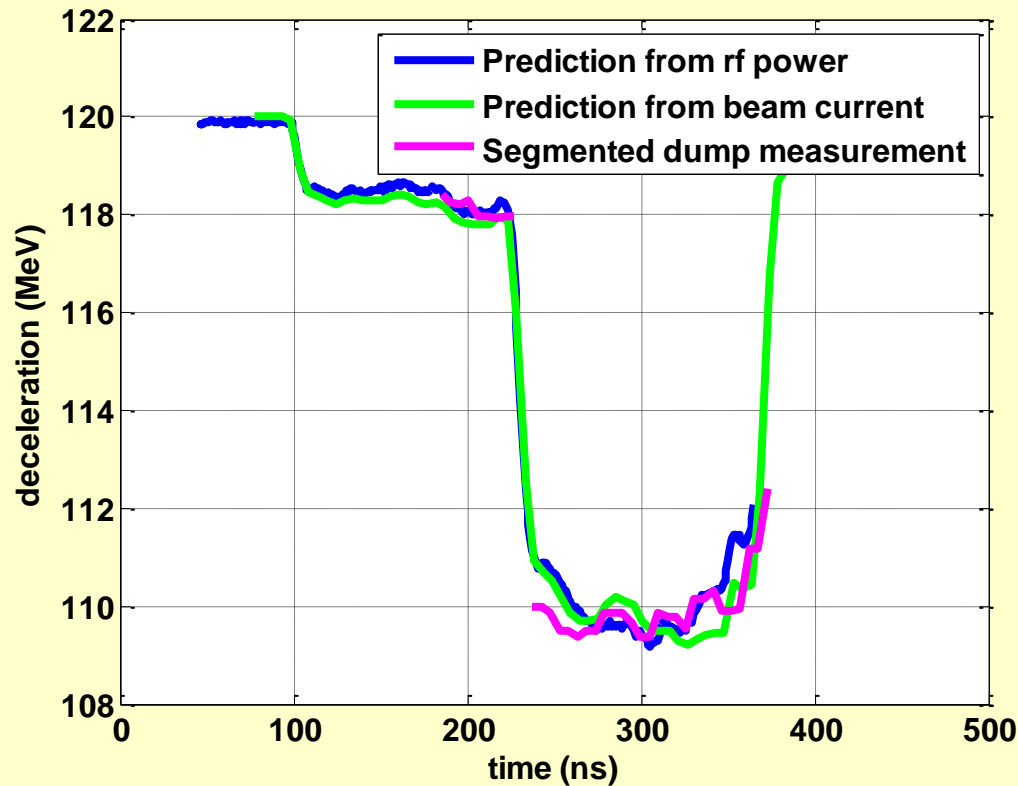




TBL results



Factor 8 combination ~ 18 A, form factor 0.85, 10% power calibration error

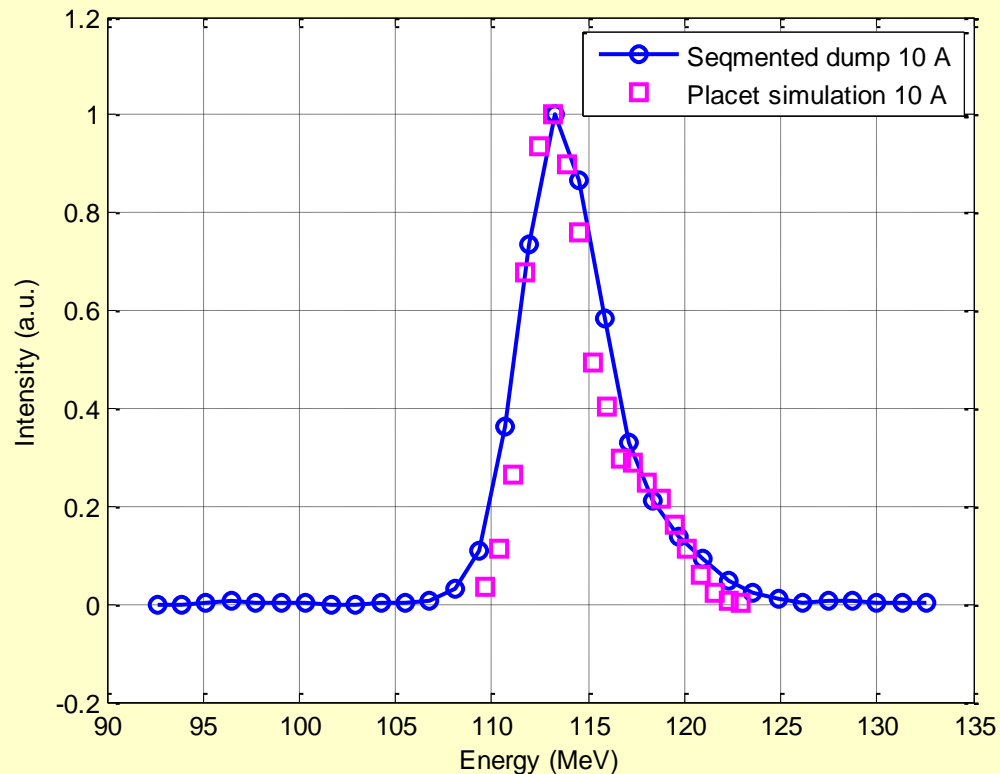




TBL results

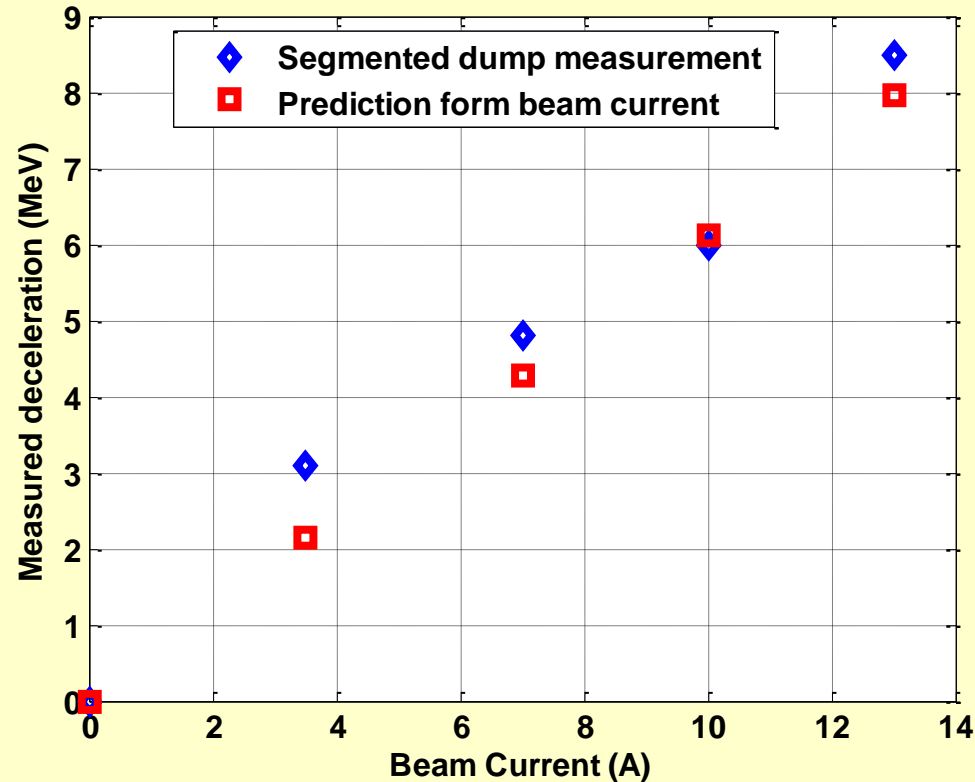


10A three turns segmented dump,
Compared to placet simulations, center energy shifted by 1 MeV
Luck shot ? In general we measure to high energy spread (combination error)





TBL results



Have to assume 119 MeV initial energy, 117.5 measured \rightarrow 1% error

Form factor for predictions with current $F=0.8$ used

To make the prediction from power fit, need to assume 10% calibration error

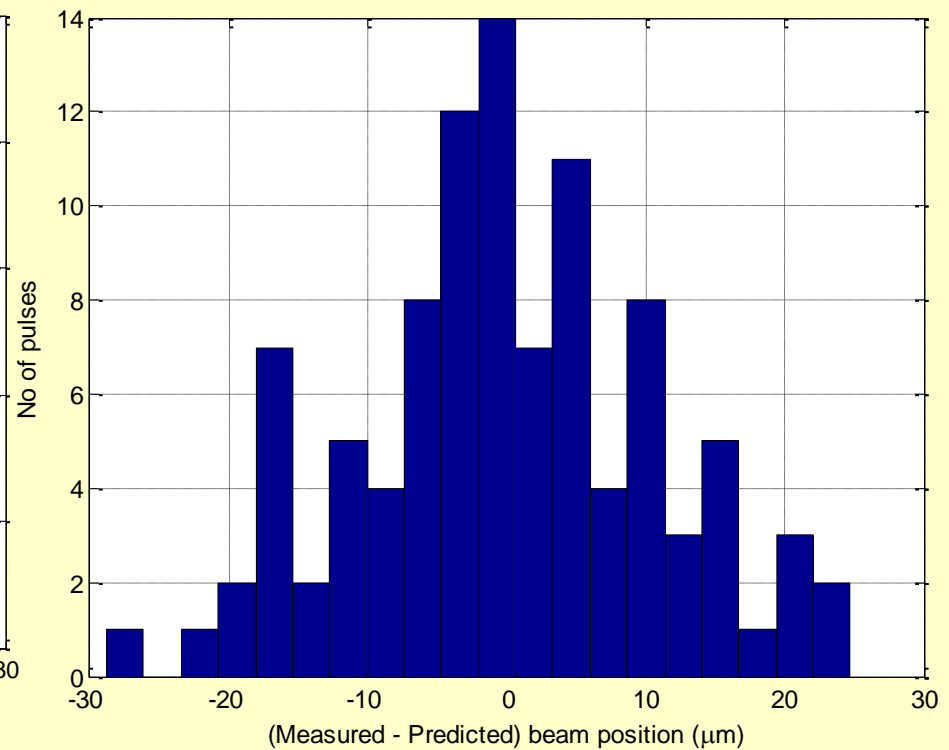
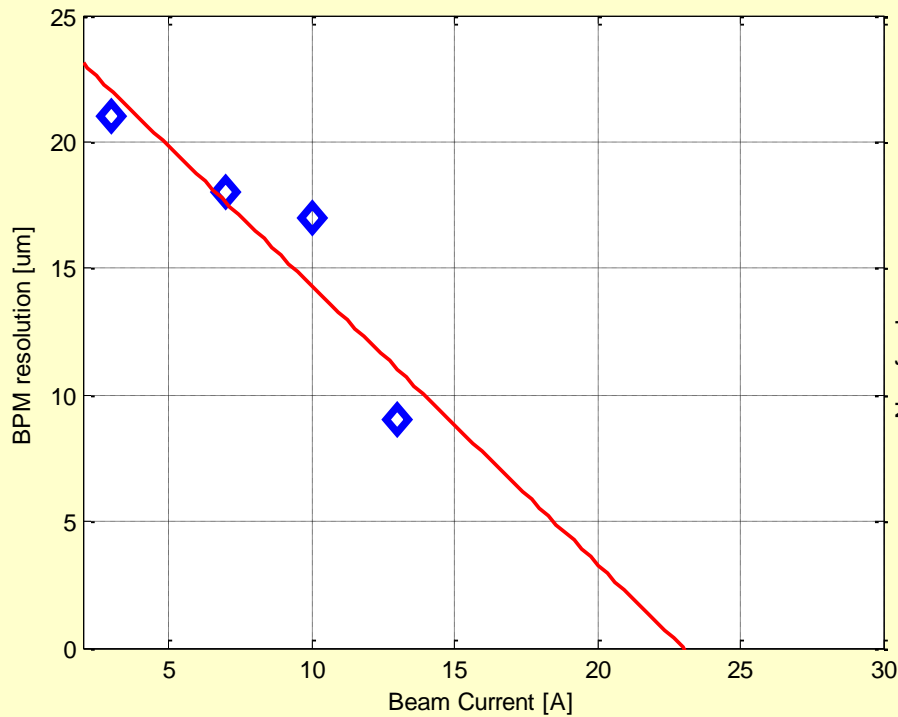
Pretty good agreement !



TBL results



BPS resolution study together with Junajo (IFIC) and Gabriel (UPC)
Vertical resolution, 13 A, BPS0510, 8.7 μm



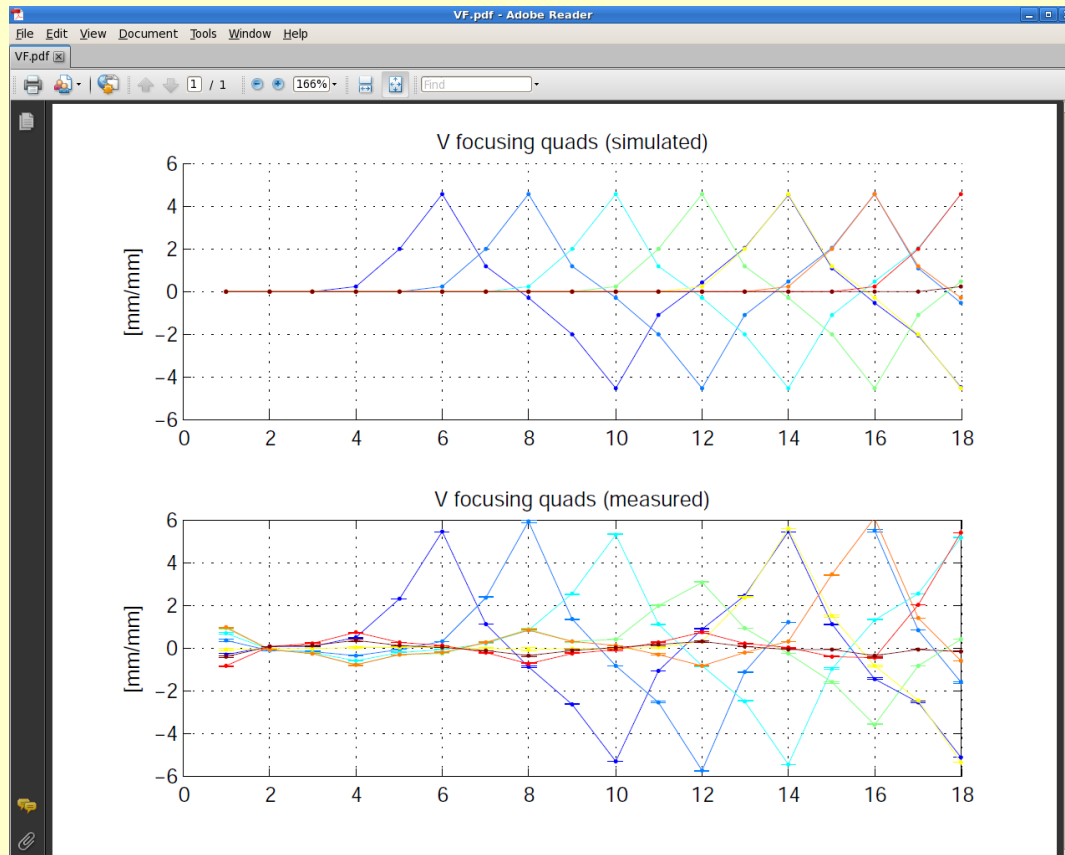


TBL results



Sophisticated Beam based alignment studies by Guido and Eduardo

- Quadrupole center and its movement, use Quad movers and change strength
- One to one steering, response matrix measurements
- BPM and Quad misalignment using different phase advance optics





Program towards the rest of the year



- PHIN run
- Terra experiment
- Improve 1.5 GHz factor 8 beam
- TBL deceleration with 8 PETS for CDR
- Beam stability measurements at 3 GHz and 1.5 GHz
- Emittance and bunch length control
- Breakdown kick measurements
- Beam loading compensation for main beam



Conclusion



- Pretty good progress
- 1.5 GHz will need more time to be optimized
- CALIFES, available when needed, nice two beam measurements
- Installations in September planned
- Intense run period October-December to get final results for CDR