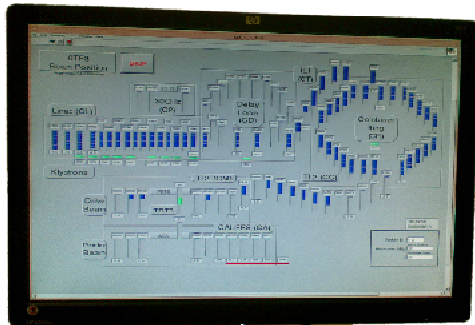




## Update on CTF3 Operations and schedule

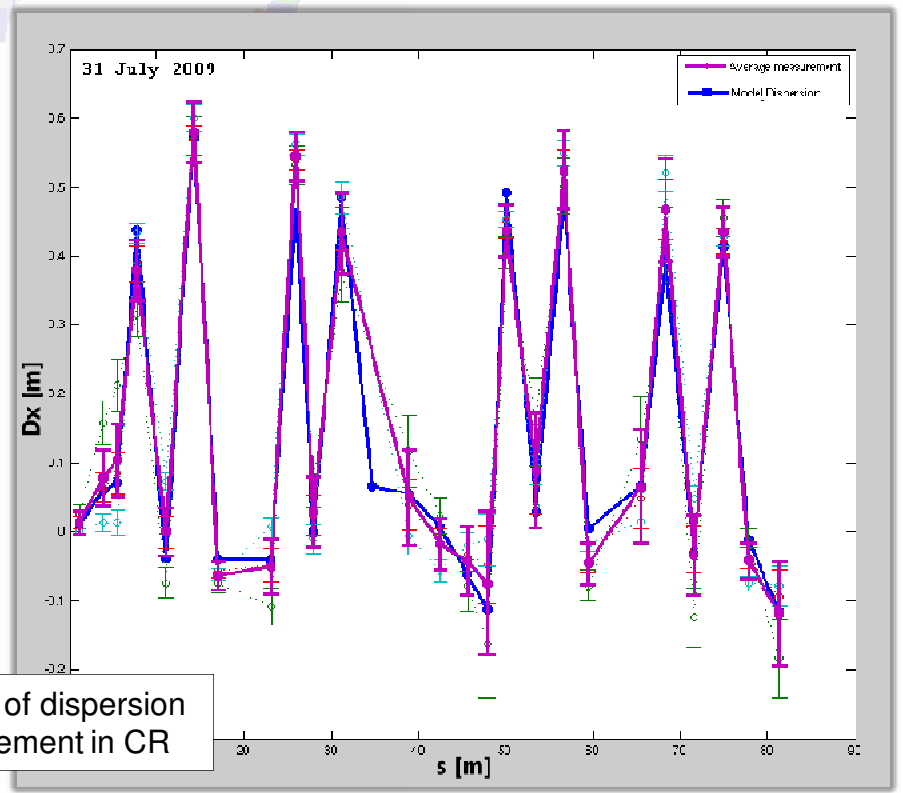
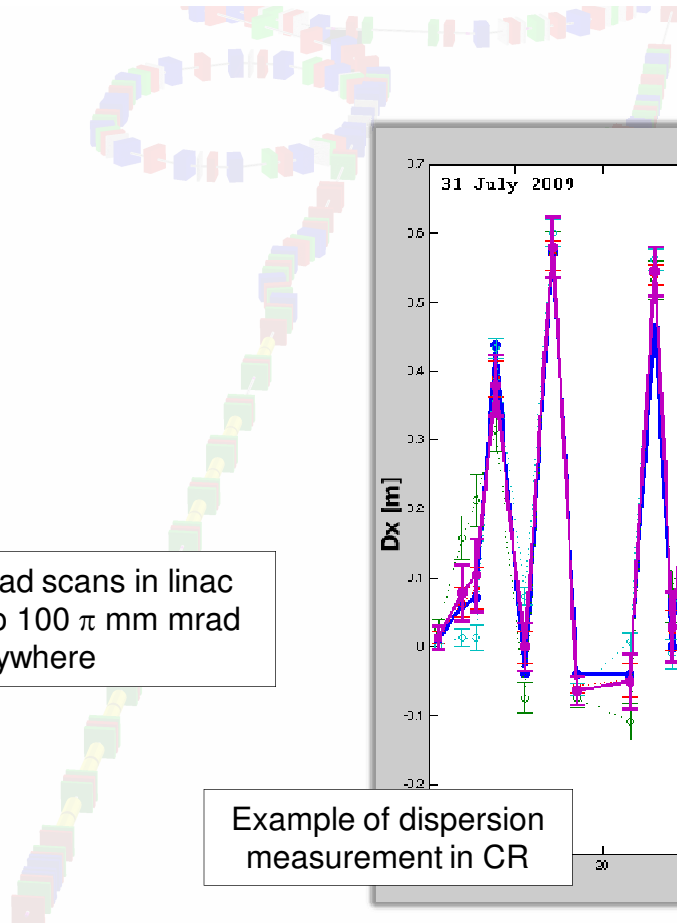
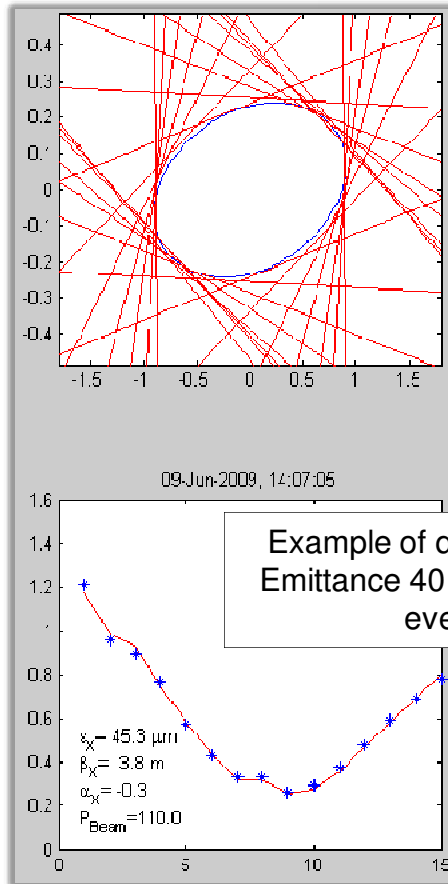


This time I will try to give a more complete update, not concentrating only on the last month



## Optics, DL, Ring, measurements

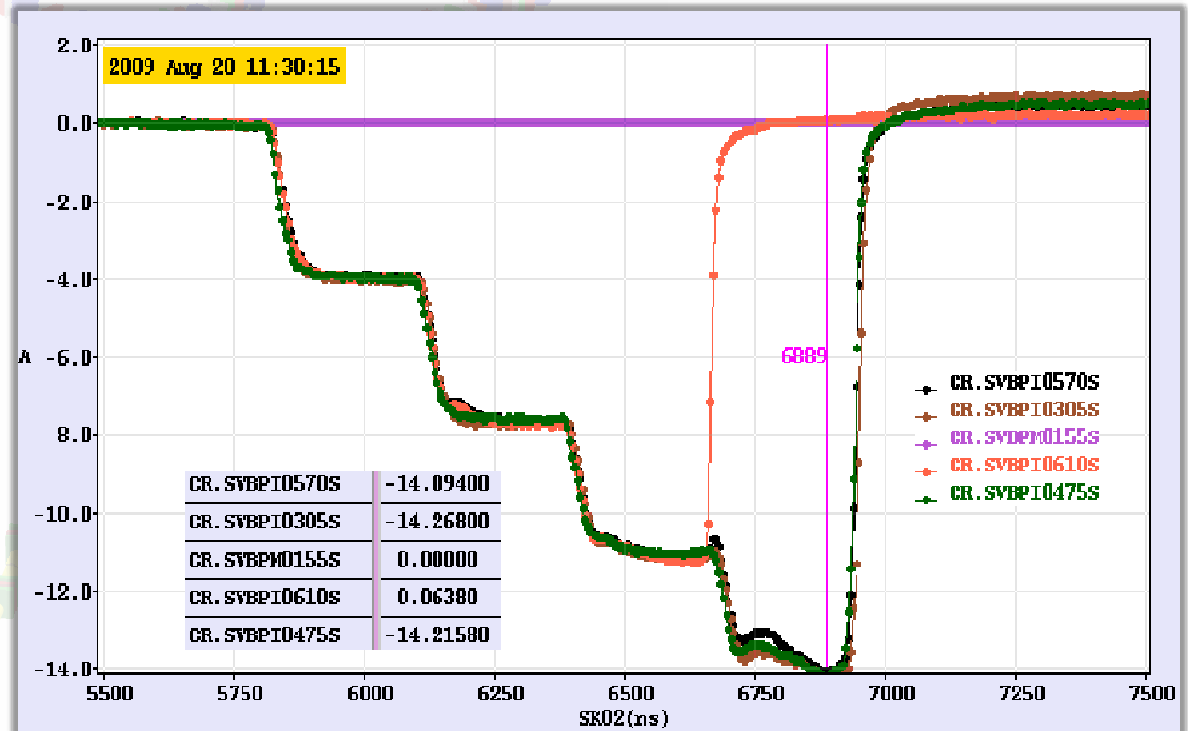
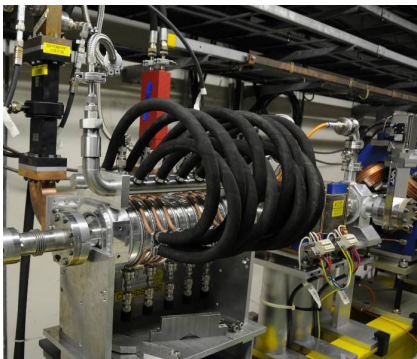
- Emittance & Twiss parameters with quad scans: well established & coherent (up to TL2)
- Kick measurements, tune and dispersion coherent with model (up to TL2, some recent doubts on DL)
- Ring length, closed orbit and combination procedure also well under control
- Still work needed for bunch length control and TL2 optics (see later)





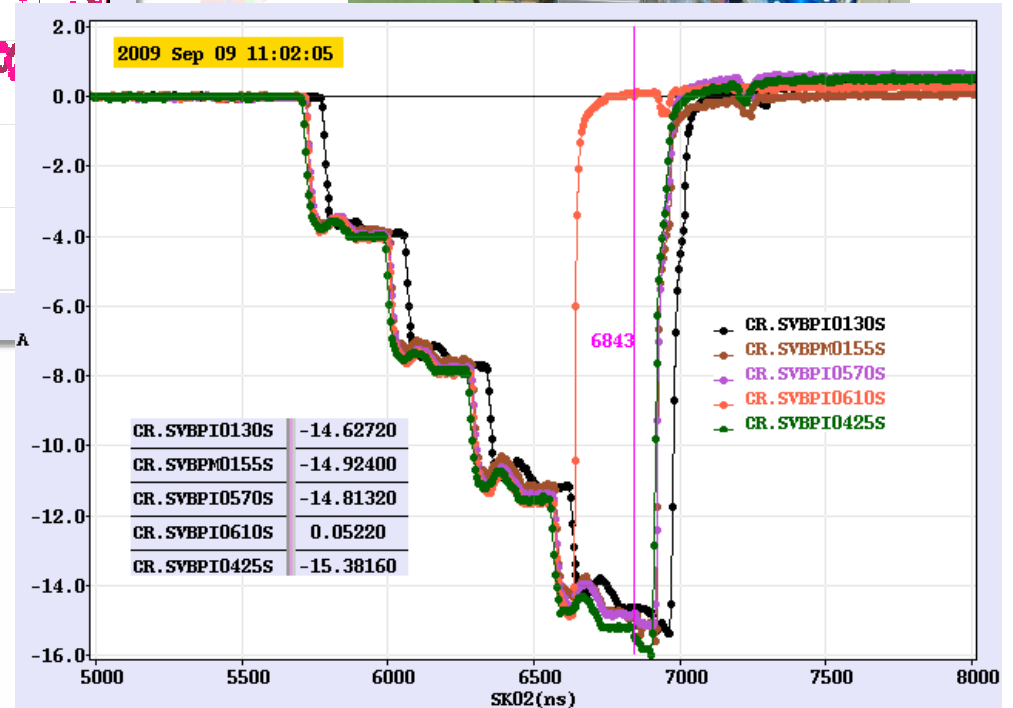
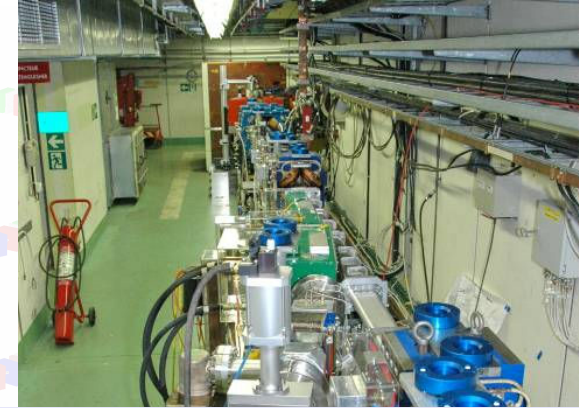
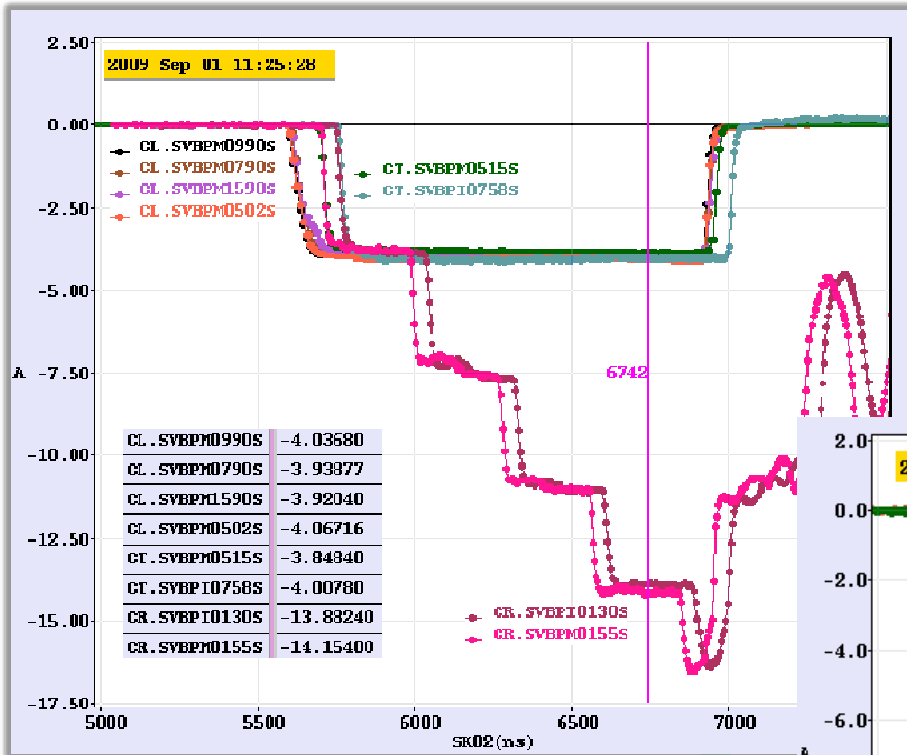
## Combination, x 4 in CR

- Combination factor four in CR established for both 3 GHz and 1.5 GHz beam
- Peak current about 15 A
- Routinely obtained above 12 A (from a few minutes to a couple hours set-up)
- Still work needed on remaining losses and reproducibility/fluctuations





## Combination, x 4 in CR

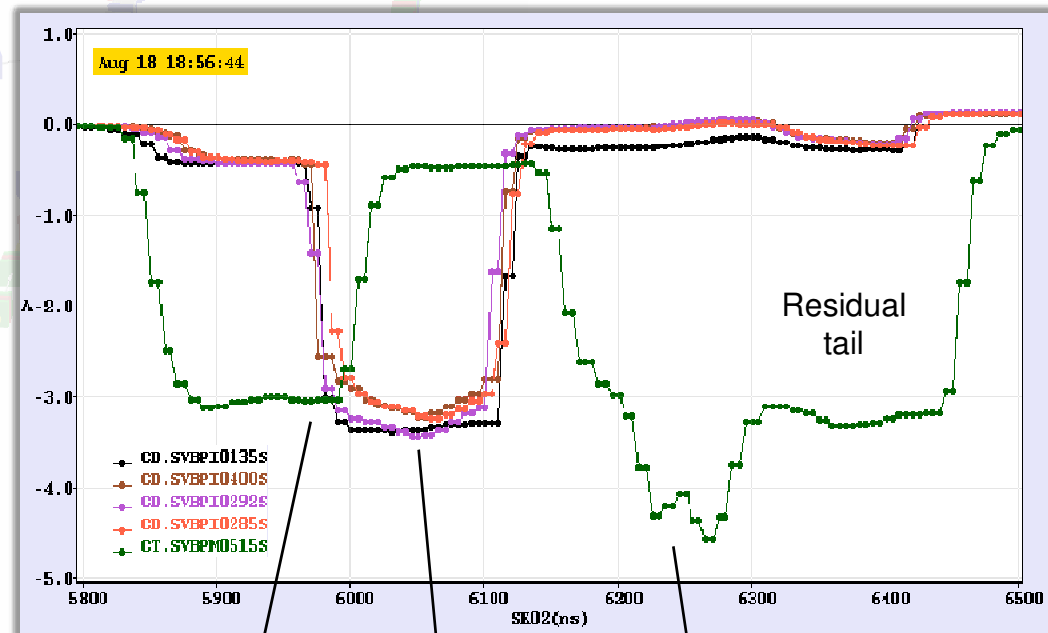
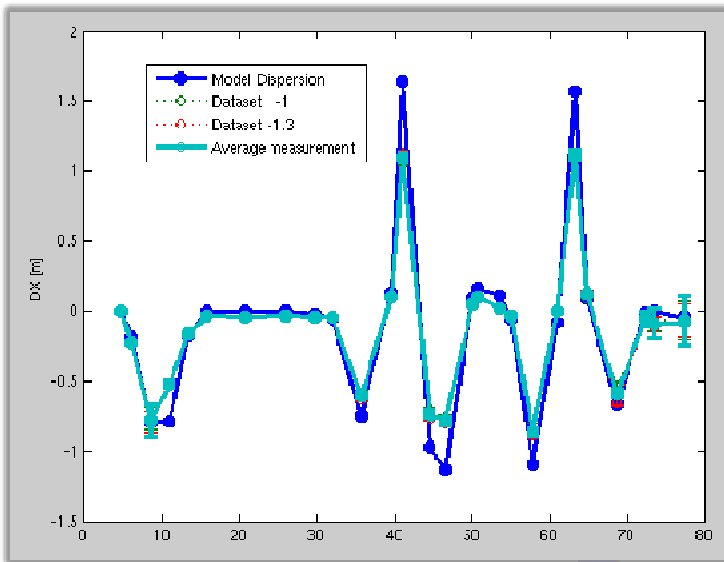




## Combination, x 2 in DL



- Beam re-established in DL after 2 years
- Optics and transport in DL under control – but yesterday...
- Problems with extraction - test interrupted due to hardware failures (MKL02 and TWTs)



Beam through by-pass

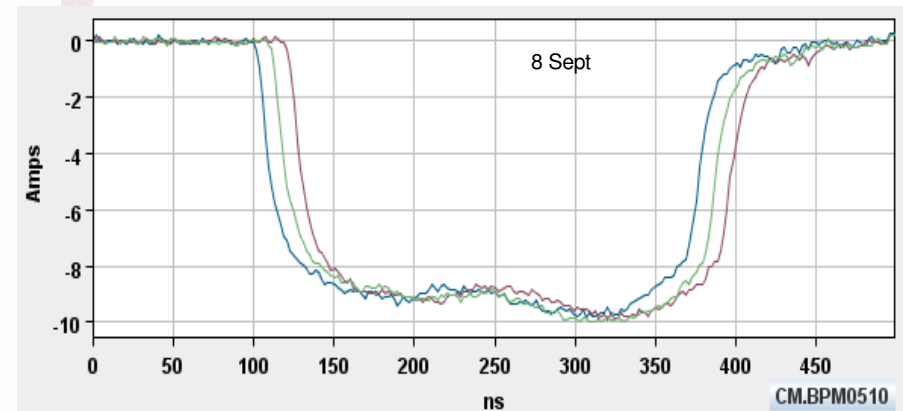
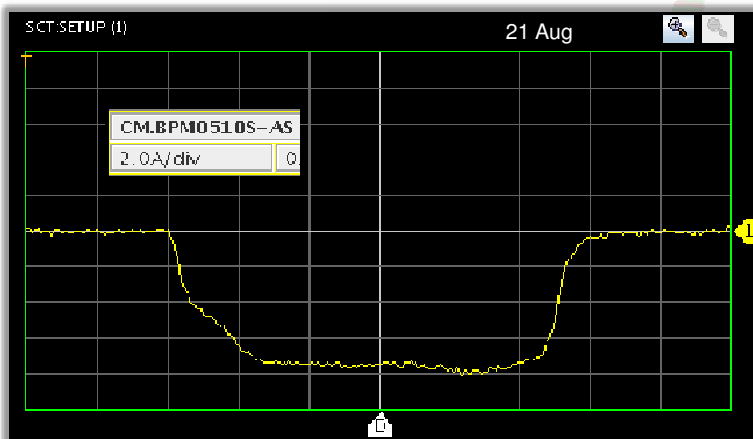
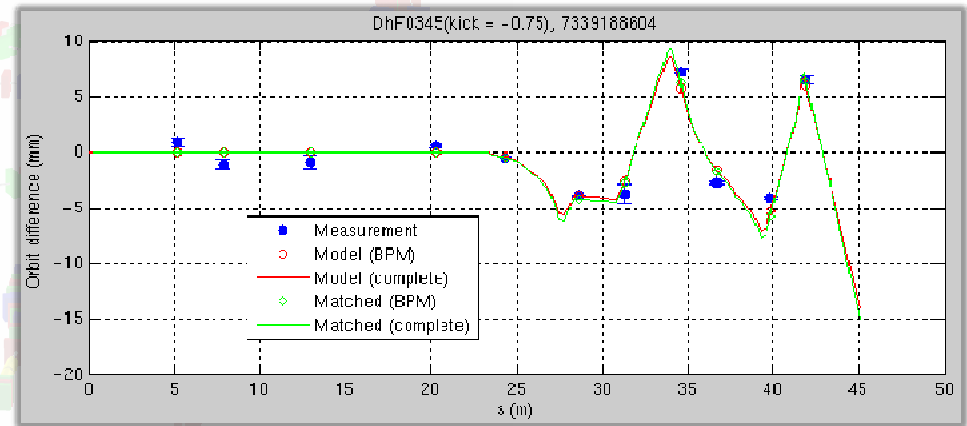
Beam in DL

Re-combined beam



## TL2, TL2', TBTS beamlines

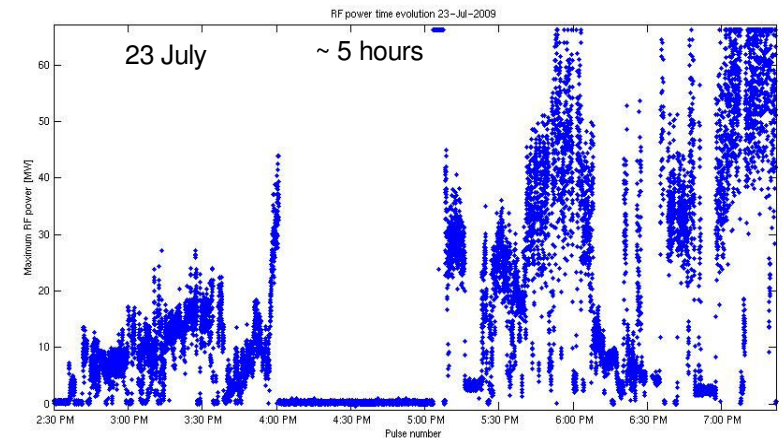
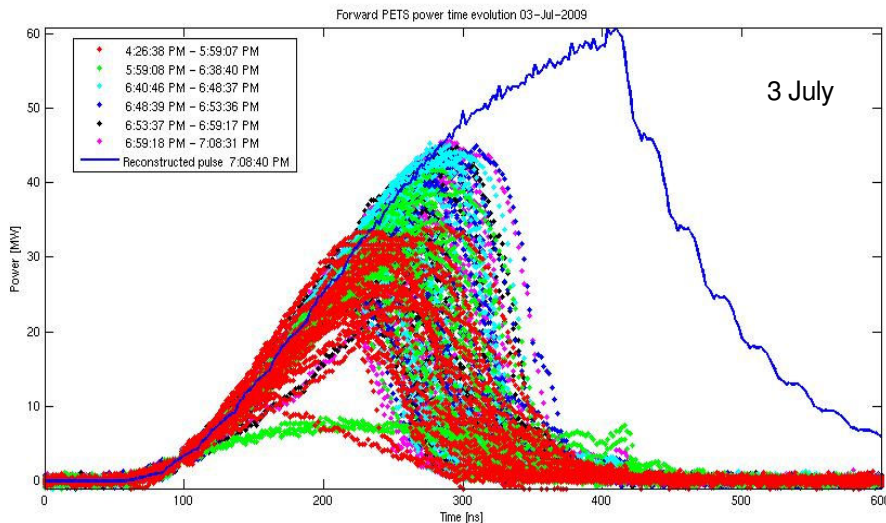
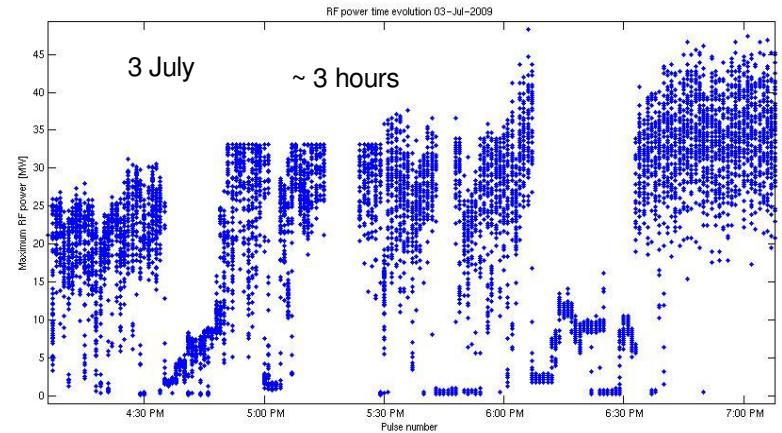
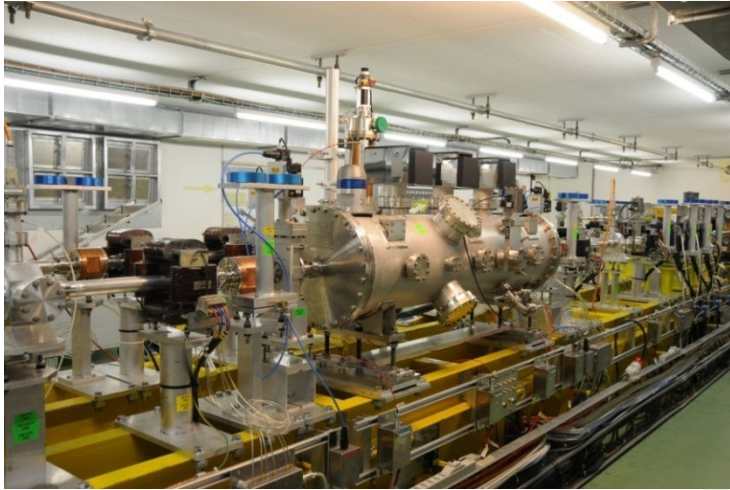
- Line optics looks about OK (kick measurements) but difficult matching – recently identified one possible error (20% strength in one quad, under investigation)
- Non-combined beam transported to TBTS and through PETS with small losses (less than 10%)
- Combined beam transported to TBTS with some losses (from 12 A to about 10 A - no local losses in PETS)





## TBTS, PETS conditioning

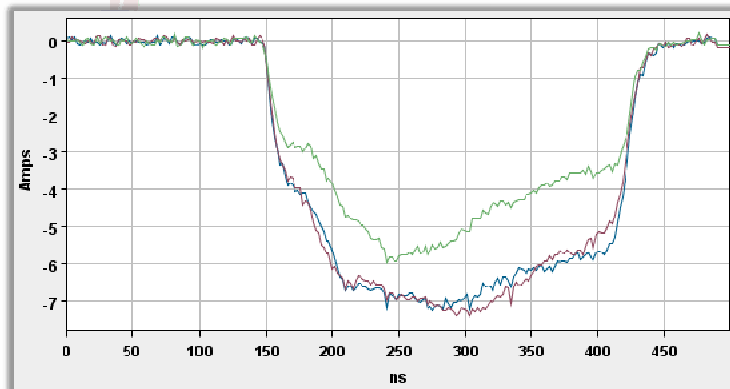
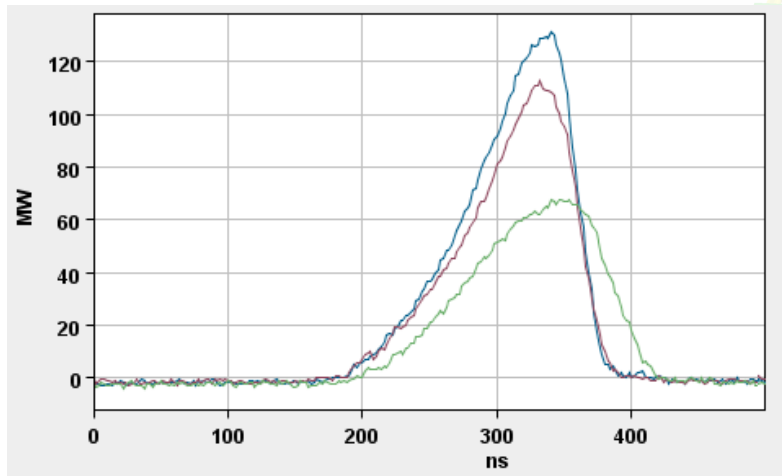
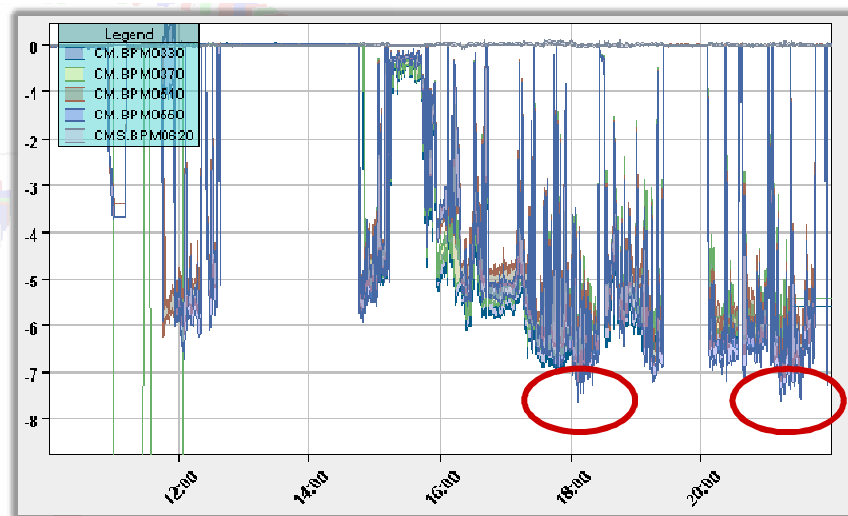
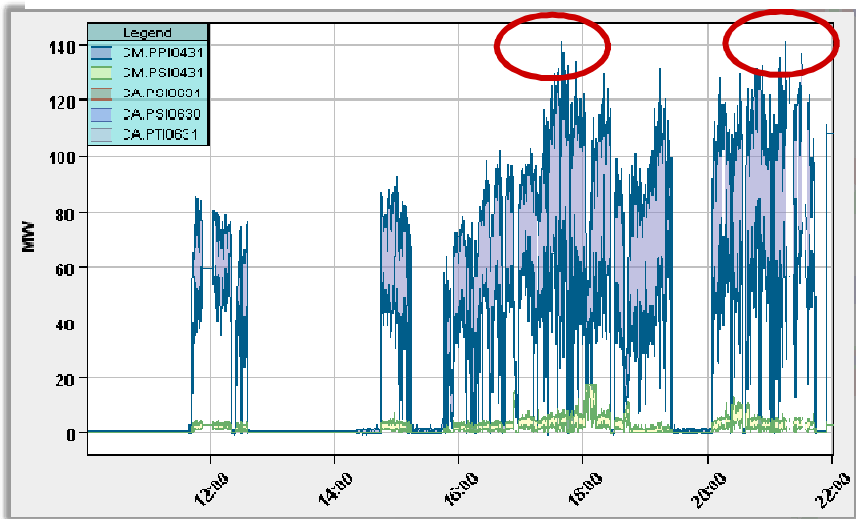
- Lots of breakdowns (pulse shortening) – most likely variable power splitter (outside PETS)
- Rapid (if a bit aggressive) conditioning – possibly limited by beam availability & current



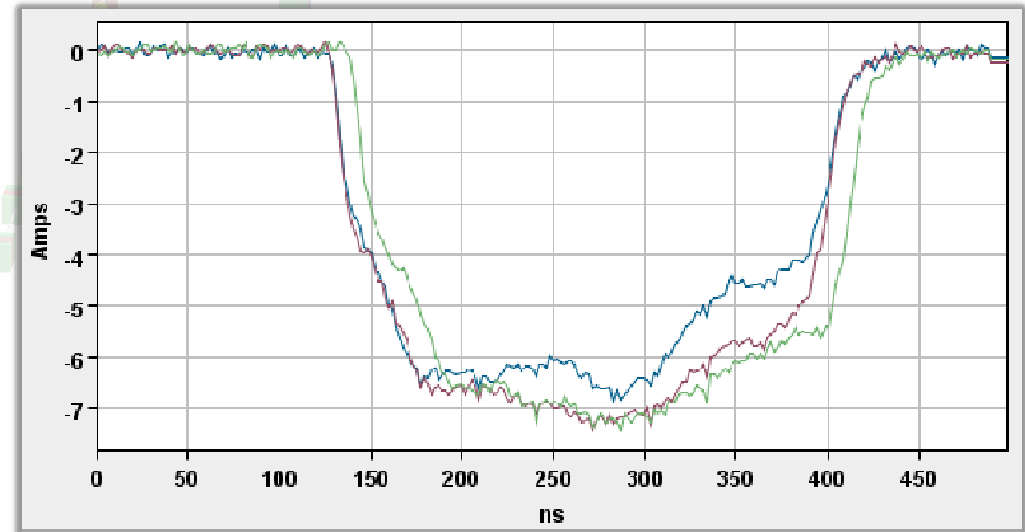
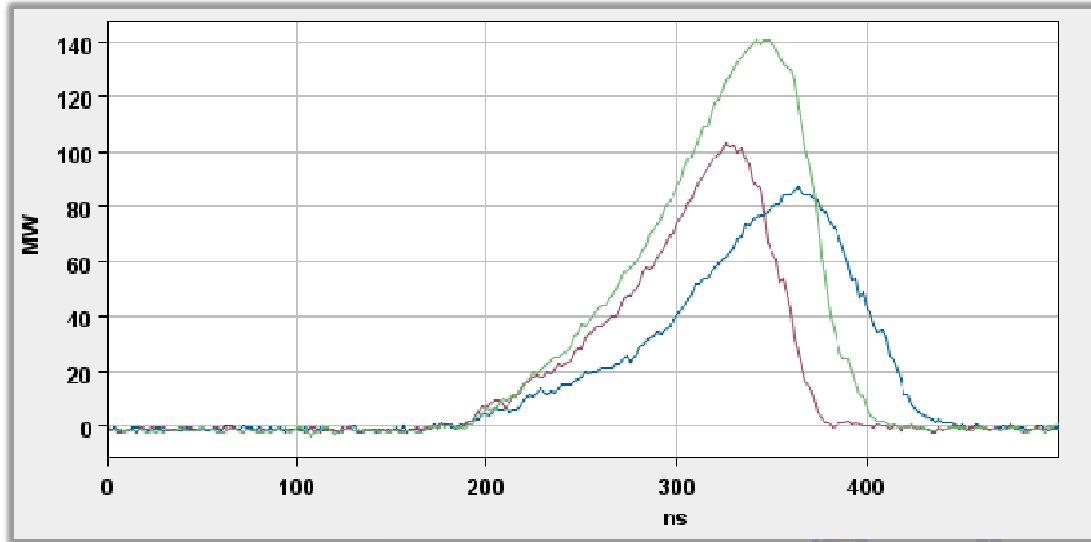


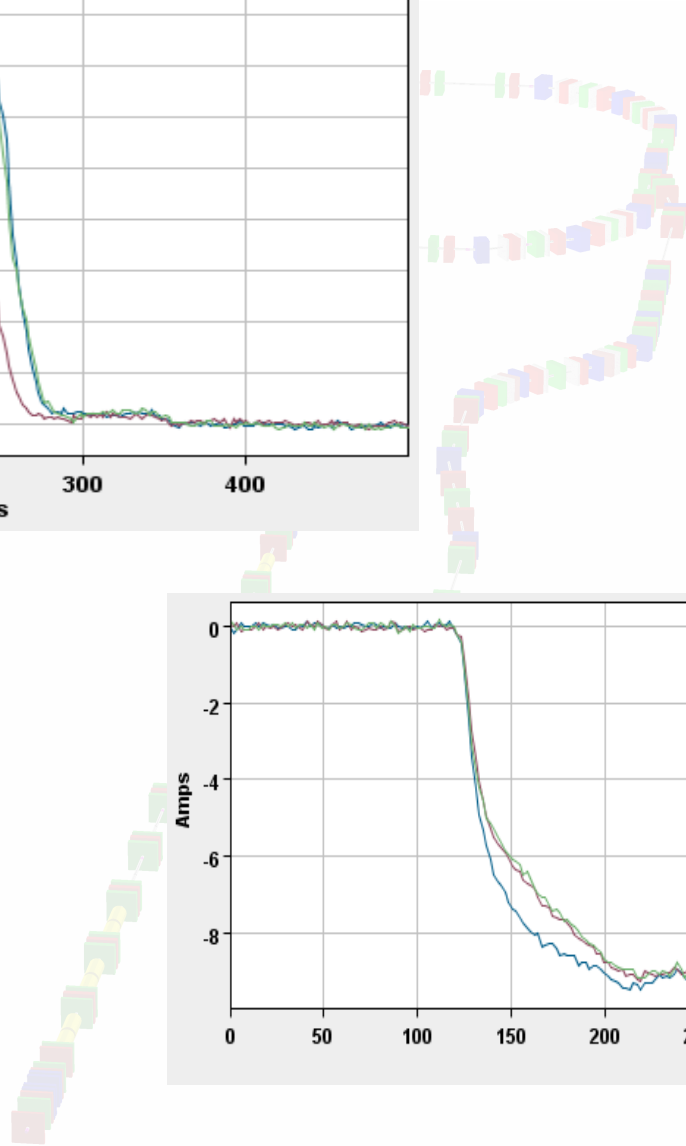
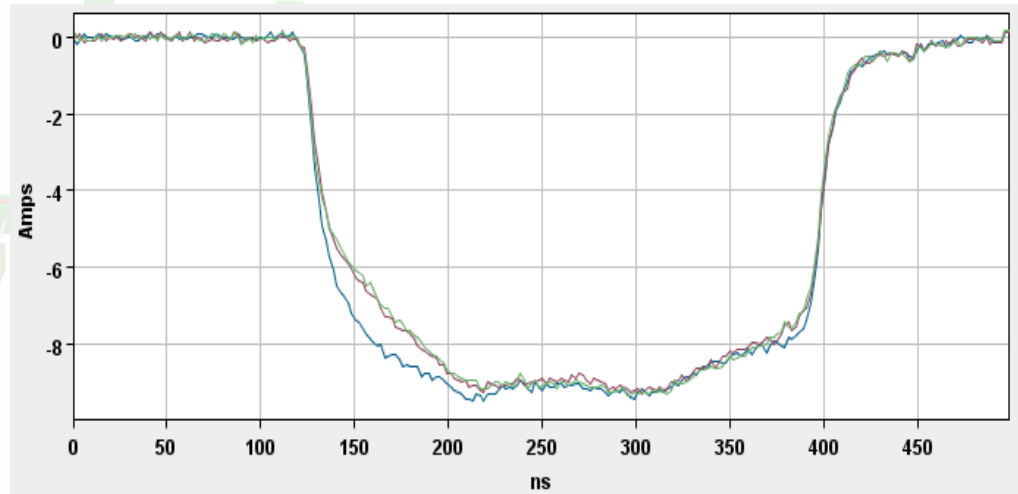
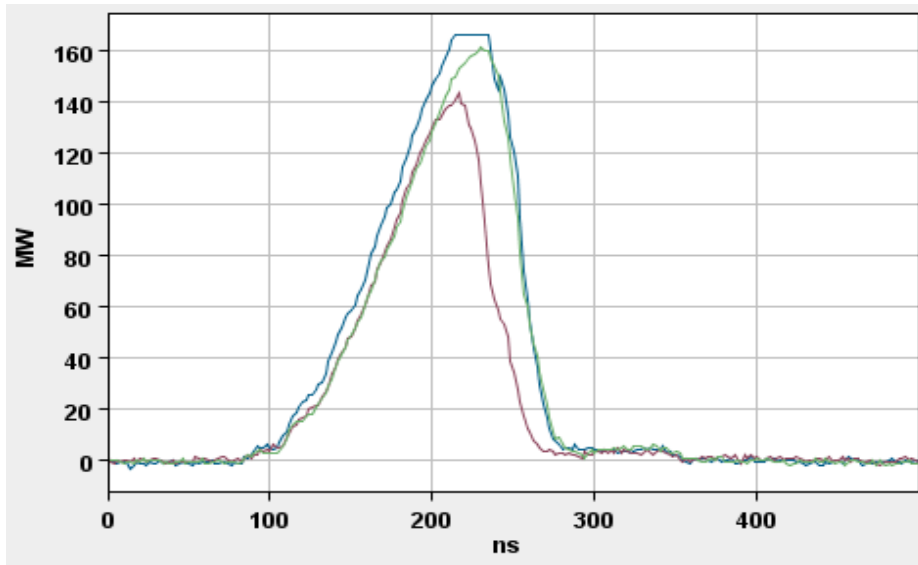
## TBTS, PETS conditioning

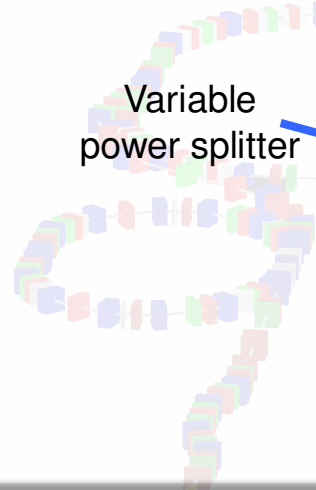
- Max power reached >160 MW (peak) – total pulse length about 200 ns – no flat top
- Power decrease – explained by bunch length – later recovered



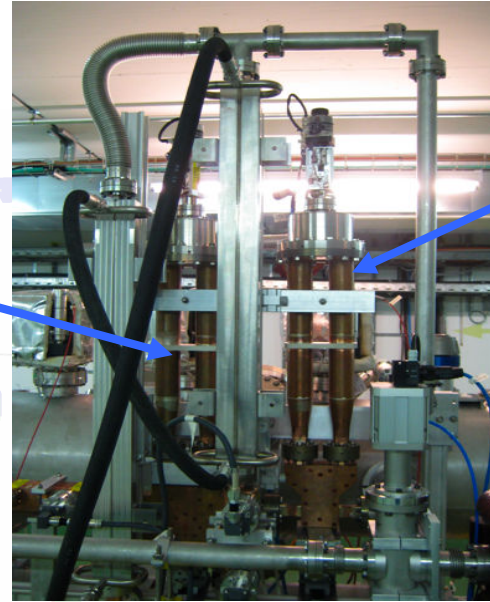




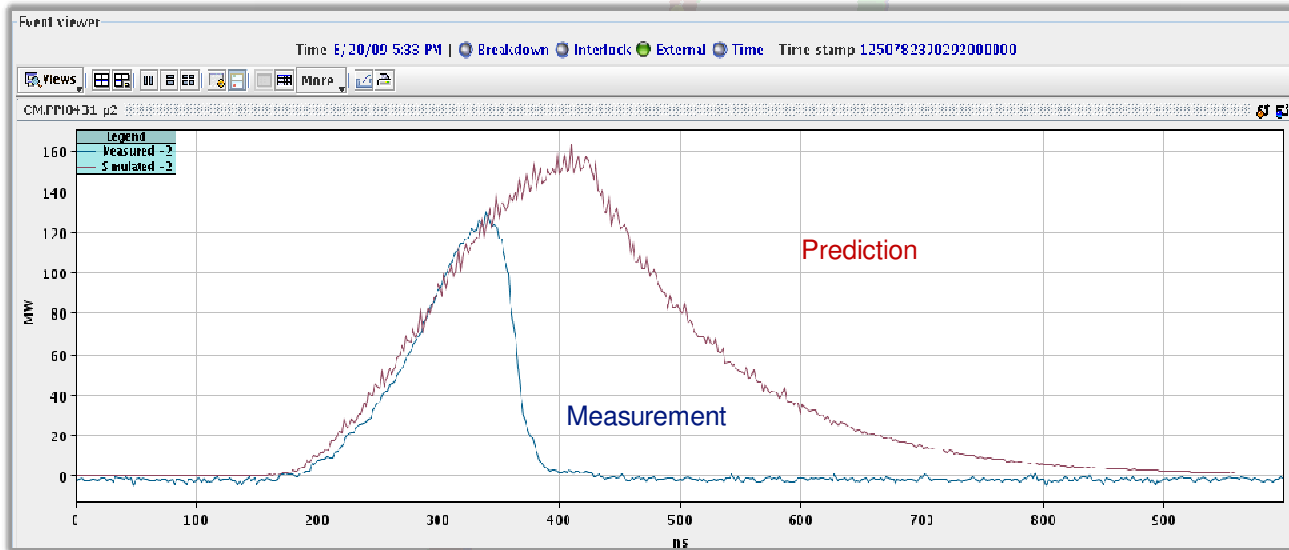




Variable power splitter



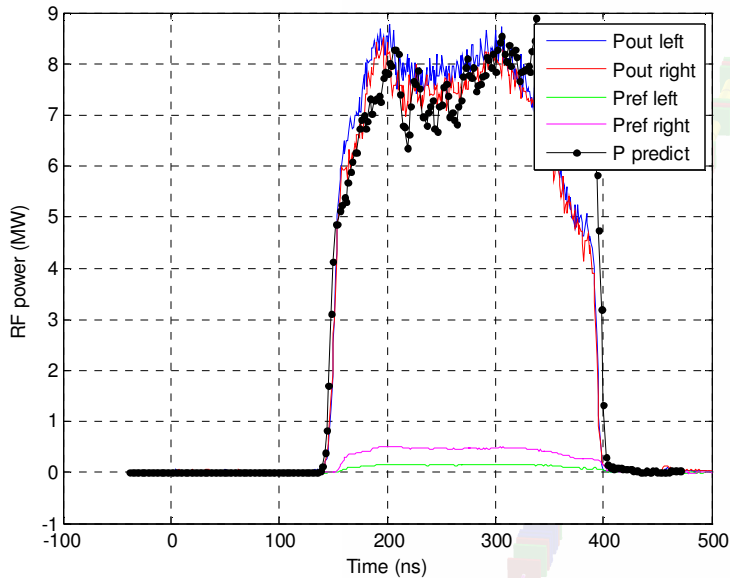
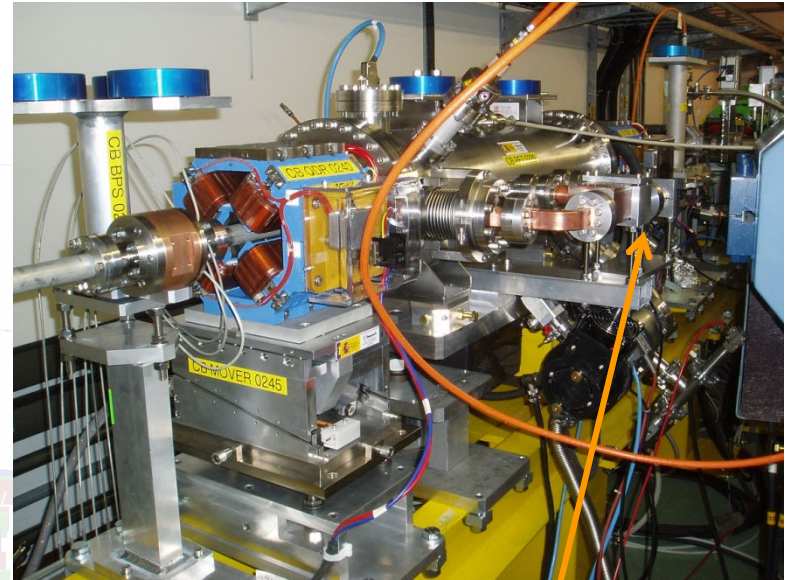
Variable phase shifter



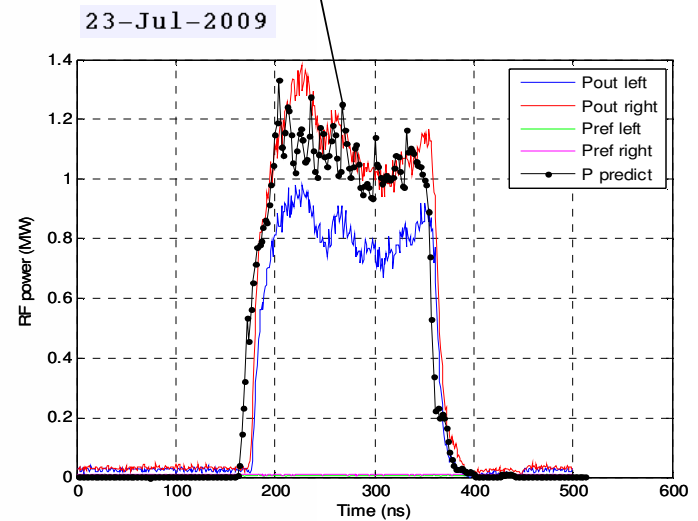


## TBL status

- A few tests done in the (short) TBL
- Initial test (3.5 A to 10 A) good agreement with expectations

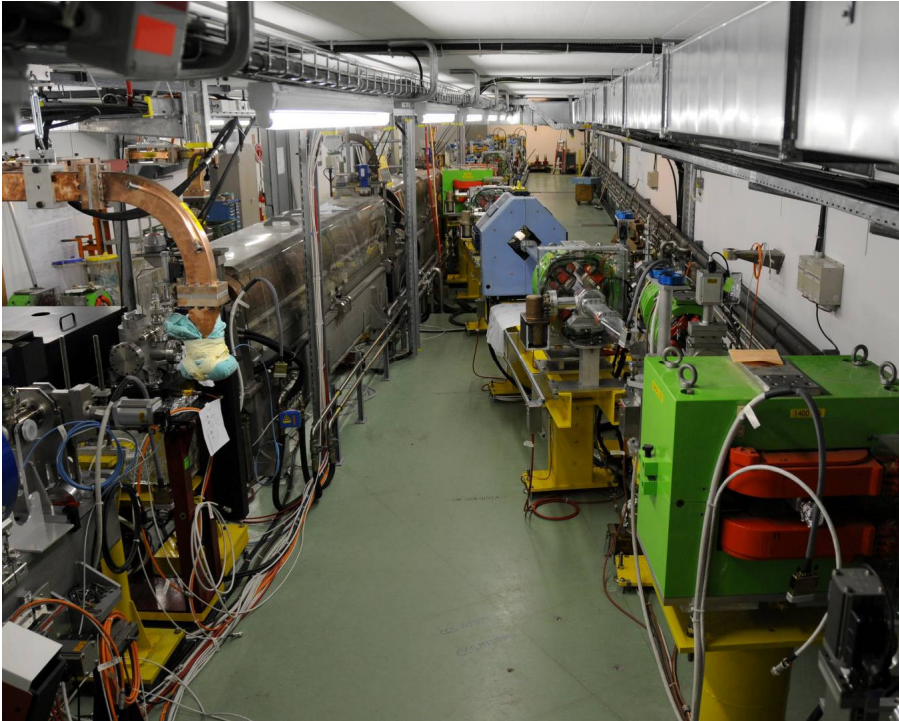


Prediction based on BPS 210





## CALIFES status



- CALIFES back in operation, beam in the final spectrometer, some moderate losses
  - First optics checks in TBTS OK
  - Reached  $\sim 120$  MeV, 0.2 nC / bunch, 100 ns
  - Beam emittance optimization under way
- (Initial measurements @ 90 MeV 120-160  $\pi$  mm mrad)

### Specifications

Energy  $\sim 200$  MeV

Emittance  $< 20 \pi$ .mm.mrad

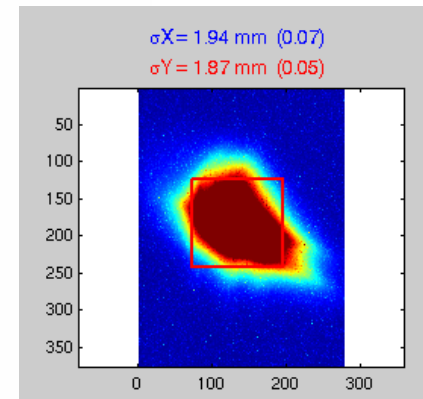
Charge per bunch : 0.6 nC

Energy spread  $< 2\%$

Number of bunches : 1 to 226

Bunch length (rms) : 0.75ps

Bunch spacing : 667ps

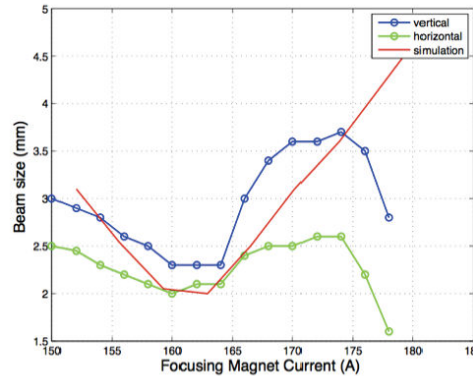




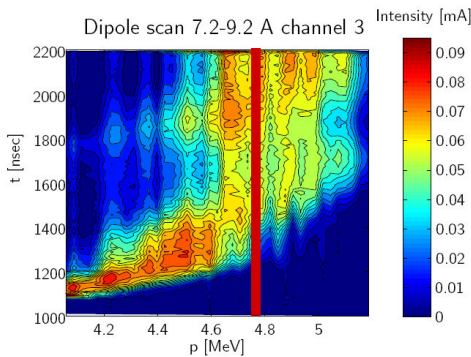
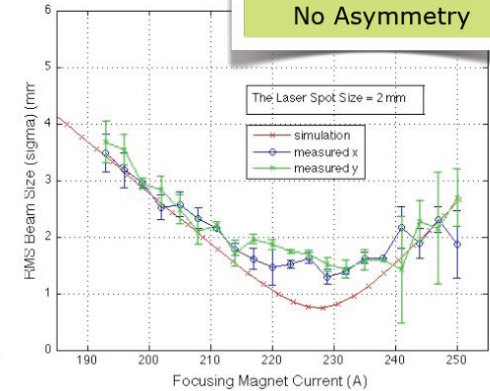
## PHIN status

- First run in 2009 very successful
- Bunch charge up to 2.5 nC, above nominal
- Beam energy  $\sim 5-6$  MeV
- Emittance measured  $\sim 7 \pi$  mm mrad
- Very good agreement with simulations
- Several potential improvements identified, will be implemented for next run
- Aims for next run: stability (short and long term)

### Nov. 2008



### Mar. 2009

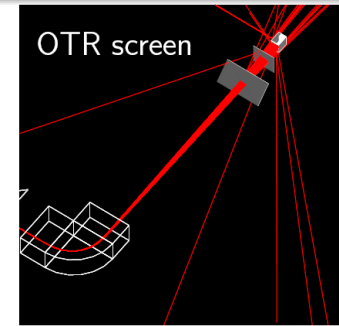
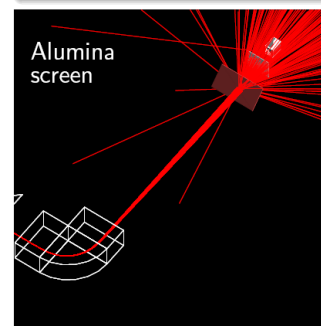


- Pulse length  $\sim 1.2 \mu s$
- High energy main part
- Low energy head due to over compensated beam loading

Expectation from simulation: constant energy spread  $\Delta E/E \leq 1\%$

### How to improve the measurements?

- Replace the 1 mm thick Alumina Screen with a 25  $\mu m$  thick aluminium OTR screen (and install intensified camera).





## 2009 CTF3 experimental program

### Goals

- 30 GHz: One structure test (TM02) + breakdown studies
- PHIN Beam characterization, reach  $\frac{1}{2}$  of nominal bunch charge ?
- CALIFES Beam characterization, beam to TBTS (most likely still reduced current)
- Delay Loop Back in operation, retrieve combination x 2 ( $\sim 7$  A)
- Combiner Ring Final optics checks, isochronicity, put together with DL ( $> 24$  A)
- TL2 Complete commissioning (tail clipper), bunch length control,  $> 20$  A to users
- TBTS PETS to nominal power/pulse length (15 A, recirculation)  
Beam commissioning of probe beam line  
First accelerating structure tests (one structure ? – CLIC G)  
Two-beam studies (deceleration/acceleration), initial breakdown kicks studies
- TBL PETS validation (100 MW, need  $> 20$  A), beam line studies (2-3 PETS ?)
- Others CDR studies in CRM, beam dynamics benchmarking, stability studies, control of beam losses...



## Schedule end 2009

	Jul					Aug					Sep			
Wk	27	28	29	30	31	32	33	34	35	36	37	38	39	
Mo	29	6	13	20	27	3	10	17	24			14	21	
Tu											CALIFES Opt. + TBTS			
We														
Th											Jeune G. Today			
Fr														
Sa										DL & high current TBTS				
Su														

	Oct					Nov					Dec		
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
Mo	28	5		7	14	21	28	4	11	30	7	14	21
Tu	DL & CR – full combination ?				High current to TBTS check PETS			DL & CR – further studies				CTF3 SHUTDOWN	
We			CLIC work shop		Running in TBL line			Two beam tests?					
Th					CALIFES opt.			CALIFES TBTS + struct?					
Fr	PHIN, 2 <sup>nd</sup> run												Xmas.
Sa													
Su													

All accelerators stop

CTF3 stop

Installations in TBTS and TBL lines

Optional week.

CLEX closed