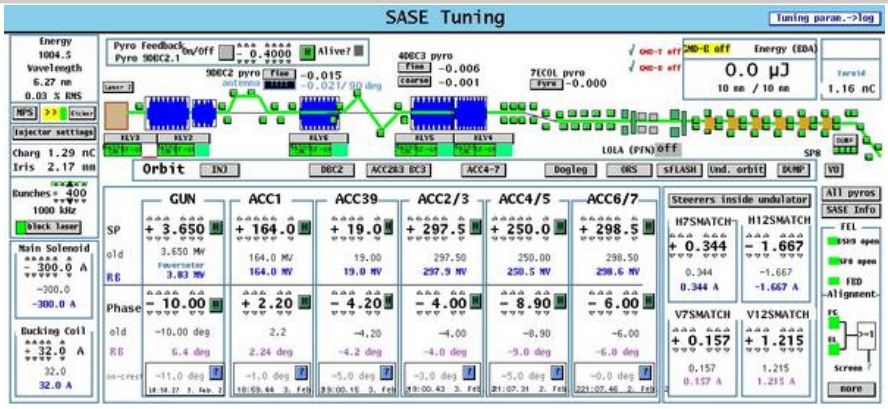
? 05.02.2011 07:02 oracle **Shift summary**

05.02.2011 07:10 ttflinac **ttflinac@:SASE_tuning**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:10:24-00.JPG

05.02.2011 07:11 ttflinac **SASE tuning parameters**

Misc. parameters

```
Energy / Wavelength: 1003.30 MeV / 6.2 nm
Charge:              1.24 nC
Main solenoid:       -300.0 A
Bucking coil:        +32.0 A
Dipoles BC2/BC3:     +73.1 A / +56.0 A
```

RF parameters

	GUN	ACC1	ACC39	ACC2/3	ACC4/5	ACC6/7
Power/Gradient	+3.650	+164.00	+19.00	+297.50	+250.00	+298.50
Readback	3.83	164.0	19.0	297.9	250.3	298.8
Phase	-10.00	+2.20	-4.20	-4.00	-8.90	-6.00
on-crest		-1.0		-3.0	-5.0	-0.0
Readback	6.3	2.2	-4.2	-4.0	-8.9	-6.0

Undulator steerers and aircoils

H7SMATCH	H12SMATCH
+0.344	**-1.667**

V7SMATCH	V12SMATCH
+0.157	**-1.667**

Intra-undulator steerers

H3UND1	H3UND2	H3UND3	H3UND4	H3UND5	H3UND6
-4.40	**-4.50**	**-4.80**	**-4.70**	**-4.80**	**-1.00**

05.02.2011 07:11 ttflinac **Main linac parameters**

shift documentation

Laser

```
Number of bunches ...... 400
Bunch frequency ........ 1000 kHz
Macropulse rep'rate .... 10.0 Hz
Pump time_3 ............ 0.0030 ms
Pump current_3 ......... 5.00 V
Pre-amp start time ..... 2.42 ms
Booster start time ..... 2.66 ms
Attenuator SP .......... 5.29
Iris diameter .......... 17184 steps
Iris diameter .......... 2.17 mm
```

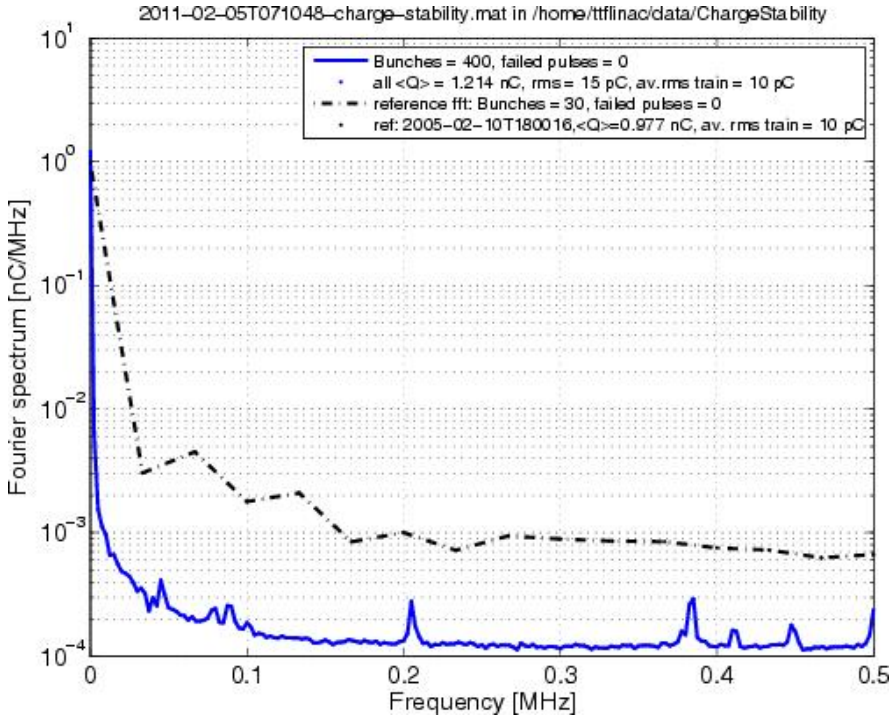
Gun

```
Feedforward/Feedback ... on/on
FSM .................... on
Pfwd SP ................ 3.65
VS ampl. ............... 18.33
Phase SP ............... -10.00 deg
VS phase ............... 6.33 deg
Pfwd (peak) ............ 3.832 MW
Prefl (peak) ........... 2.916 MW
Pfwd sample point ...... 700
Pfwd (at sample point) . 18.334 MW
Prefl sample point ..... 720
Prefl (at sample point)  5.699 MW
Flat top ............... 460 us
Water temperature SP ... 72.75 deg C
Main solenoid (RBV) .... -300.04 A
Bucking coil (RBV) ..... 32.00 A
Gun dipole (RBV) ....... 0.000 A
Charge 3GUN(T1) ........ 1.22 nC
DC kicker delay ........ 6.80 ms
DC kicker HV ........... not local
DC kicker HV ........... disabled
DC kicker HV ........... off
DC kicker SP ........... 60.00 V
```

```
                                                DC kicker start ........ 124.00 ns
ACC1                                            ACC39
Feedforward/Feedback ... on/on                  Feedforward/Feedback ... on/on
Feedback gain .......... 2.0                    Feedback gain .......... 10.0
Pfwd SP ................ 164.00                 Pfwd SP ................ 19.00
Pfwd RBV ............... 164.01                Phase SP ............... -4.20 deg
Phase SP ............... 2.20 deg              Pfwd C1.ACC39 .......... <error>
Phase RBV .............. 2.25 deg              Flat top ............... 800 us
Pfwd C1.ACC1 ........... 187.8 kW
Pfwd C5.ACC1 ........... 179.0 kW
Flat top ............... 800 us
Dipole BC2 (RBV) ....... 73.11 A
Pyro 9DBC2.1 ........... -0.0168 V
Radiator 9DBC2 ......... out
Slow phase feedback .... off
Slow ph. FB target/gain  -0.400/-0.1
Slow ph. FB pyrodet.used Pyro 9DBC2.1 (fine, old ADC)
ACC2/3                                          ACC4/5
Feedforward/Feedback ... on/on                  Feedforward/Feedback ... on/on
Feedback gain .......... 2.0                    Feedback gain .......... 40.0
Pfwd SP ................ 297.50                 Pfwd SP ................ 250.00
Pfwd RBV ............... 298.03                 Pfwd RBV ............... 250.24
Phase SP ............... -4.00 deg              Phase SP ............... -8.90 deg
Phase RBV .............. -4.08 deg              Phase RBV .............. -8.94 deg
Pfwd C5.ACC2 ........... 126.01 kW              Pfwd C1.ACC4 ........... 126.52 kW
Pfwd C1.ACC3 ........... 218.78 kW              Pfwd C2.ACC5 ........... 115.37 kW
Flat top ............... 450 us                 Pfwd C1.ACC6 ........... 0.61 kW
Dipole BC3 (RBV) ....... 56.00 A                Flat top ............... 800 us
Pyro 4DBC3.1 ........... -0.0042 V
Pyro 4DBC3.3 ........... 0.0017 V
Radiator 4DBC3 ......... out
ACC6/7                                          Bypass
Feedforward/Feedback ... on/on                  Dipole D1BYP (RBV) ..... 0.00 A
Feedback gain .......... 50.0                   Energy bypass .......... 1211.4 MeV
Pfwd SP ................ 298.50                 RF vector sum ALL ...... 686.4 MeV
Pfwd RBV ............... 298.62                 Charge 16BYP ........... -0.00 nC
Phase SP ............... -6.00 deg
Phase RBV .............. -6.02 deg
Pfwd C1.ACC6 ........... 193.05 kW
Pfwd C1.ACC7 ........... 222.92 kW
Flat top ............... 800 us
Collimator                                      Undulator
Dipole D1ECOL (RBV) .... 176.89 A               1SFUND1 gap RBV ........ 220.0 mm
Energy dogleg .......... 1003.2 MeV             1SFUND2 gap RBV ........ 220.0 mm
Charge 7ORS ............ 1.21 nC                1SFUND3 gap RBV ........ 220.0 mm
                                                1SFUND4 gap RBV ........ 180.0 mm
Dump                                            Feedbacks
Dipole D9SMATCH (RBV) .. 0.00 A                 Charge feedback gain ... <error>
Dipole D1DUMP (RBV) .... 0.00 A                 Charge feedback SP ..... <error>
Dipole D6DUMP (RBV) .... 213.09 A               PTO feedback ........... on
Rotator RD13DUMP (RBV) . 9.13 A
Charge 9DUMP ........... 1.11 nC
Photon beamline
Aperture 1 ............ 10 mm
Offset h/v ............ 0/-1 mm
Aperture 2 ............ 10 mm
Offset h/v ............ 1/0 mm
```

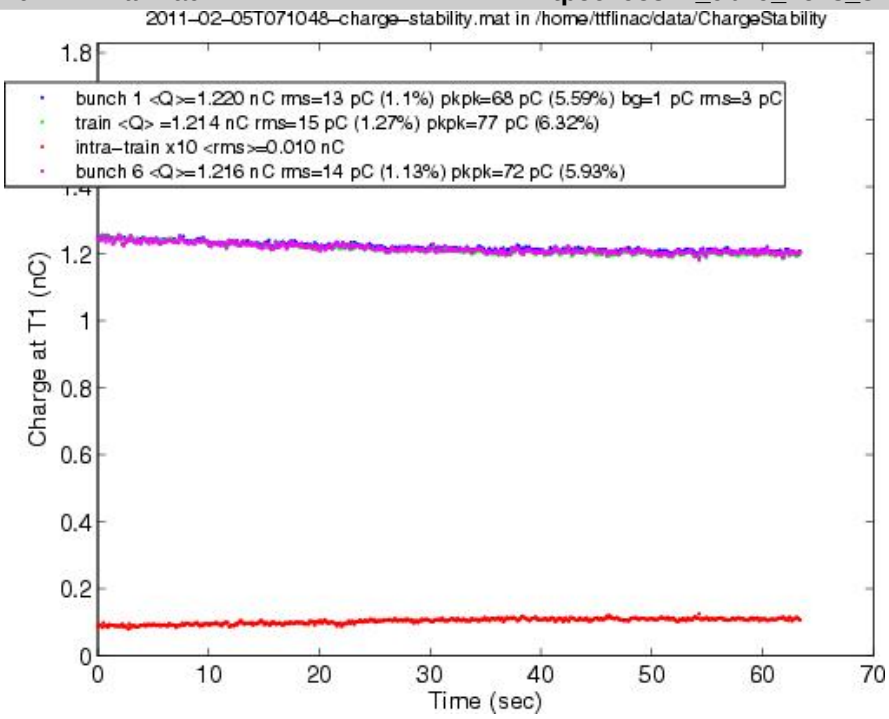
```
Status saved in machine file 2011-02-05T07_11_00+01
Orbit reference for the root tool saved in /home/ttflinac/measurements/xy_jitter/2011-02-05T071100
```

```
also in 'save and restore' files:
Magnets saved to: /home/ttflinac/save_restore/Magnets/autosaved/all_Magnets_20110205T071100.sr
uMovers saved to: /home/ttflinac/save_restore/Micromovers/autosaved/uMovers_20110205T071100.sr
from computer: flashbkr2.desy.de
```



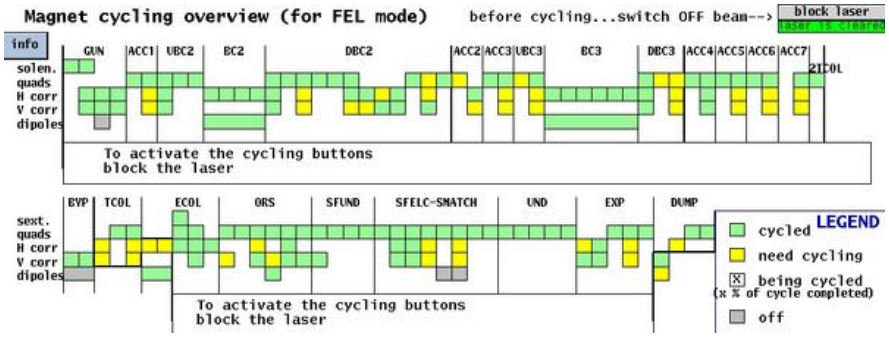
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:12:22-00.ps

05.02.2011 07:12 ttflinac **tp56195877_9b29_4c23_8750_51e382a5c9d3.ps**



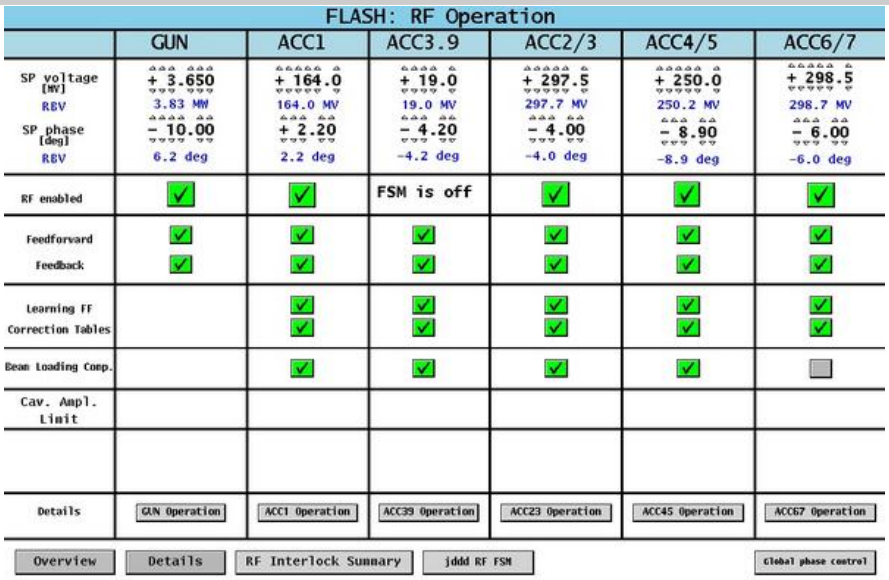
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:12:28-00.ps

05.02.2011 07:12 ttflinac **ttflinac@:magnet_cycle_overview_fel**



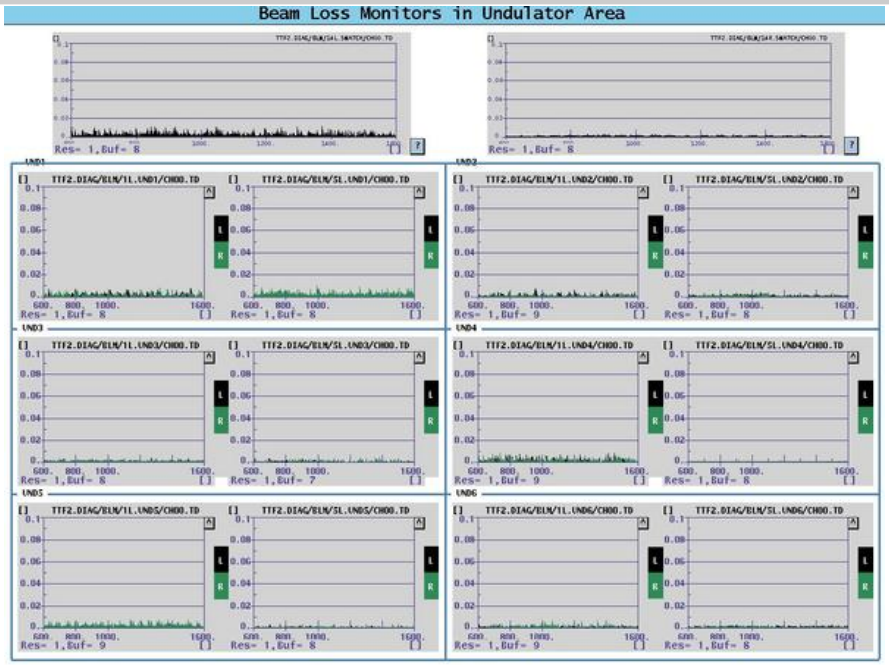
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:12:50-00.JPG

05.02.2011 07:13 ttflinac **ttflinac@:RF_OPERATION**



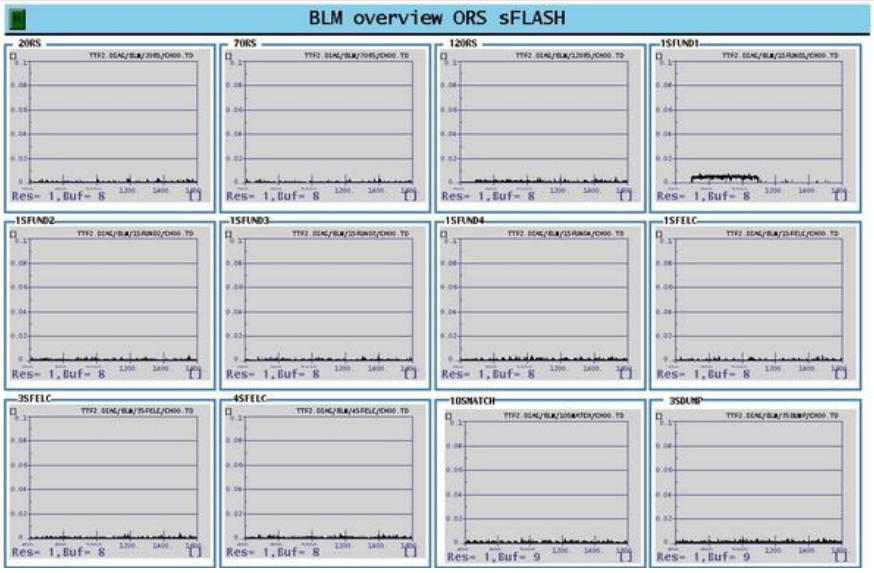
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:13:12-00.JPG

05.02.2011 07:13 ttflinac **ttflinac@:BLM_UNDULATORS**



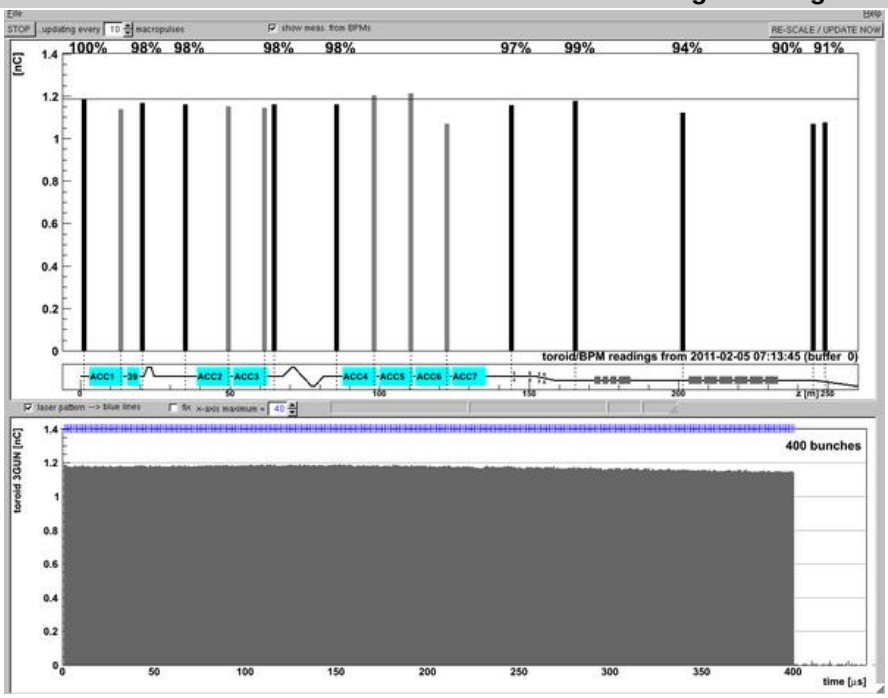
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:13:20-00.JPG

05.02.2011 07:13 ttflinac **ttflinac@:blm_overview_ORS**



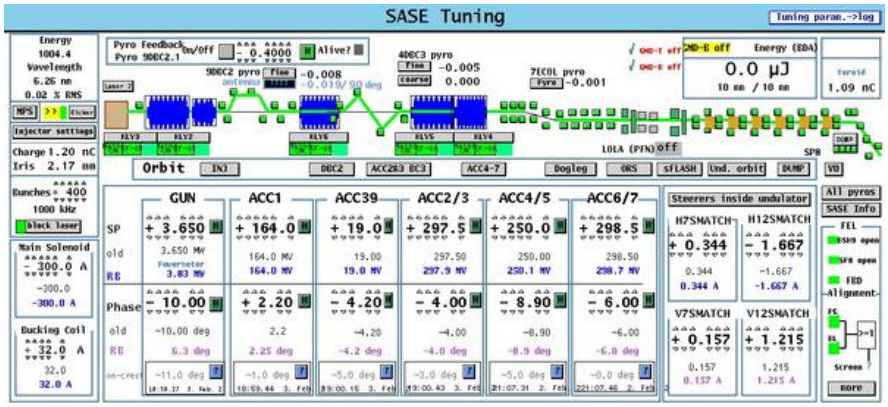
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:13:31-00.JPG

05.02.2011 07:14 ttflinac **toroid charge readings**



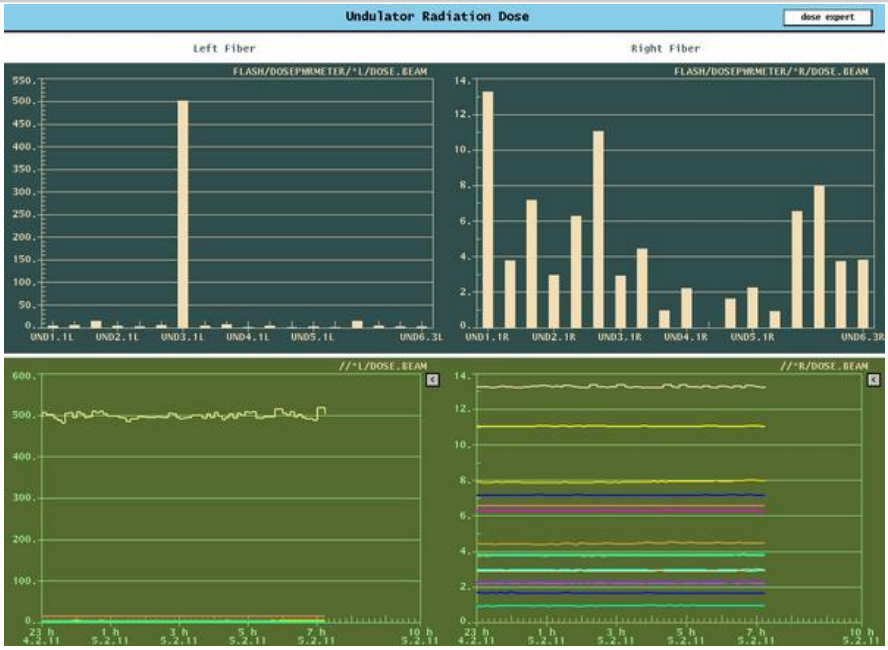
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:14:03-00.ps

05.02.2011 07:14 ttflinac **ttflinac@:SASE_tuning**



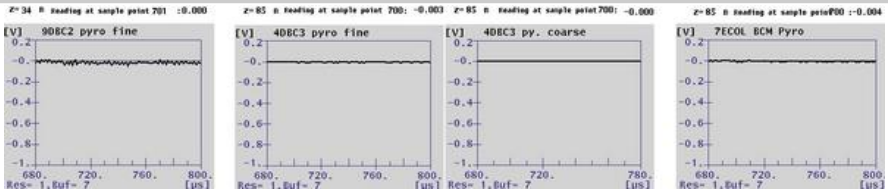
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:14:28-00.JPG

05.02.2011 07:14 ttflinac **ttflinac@:dose_und**



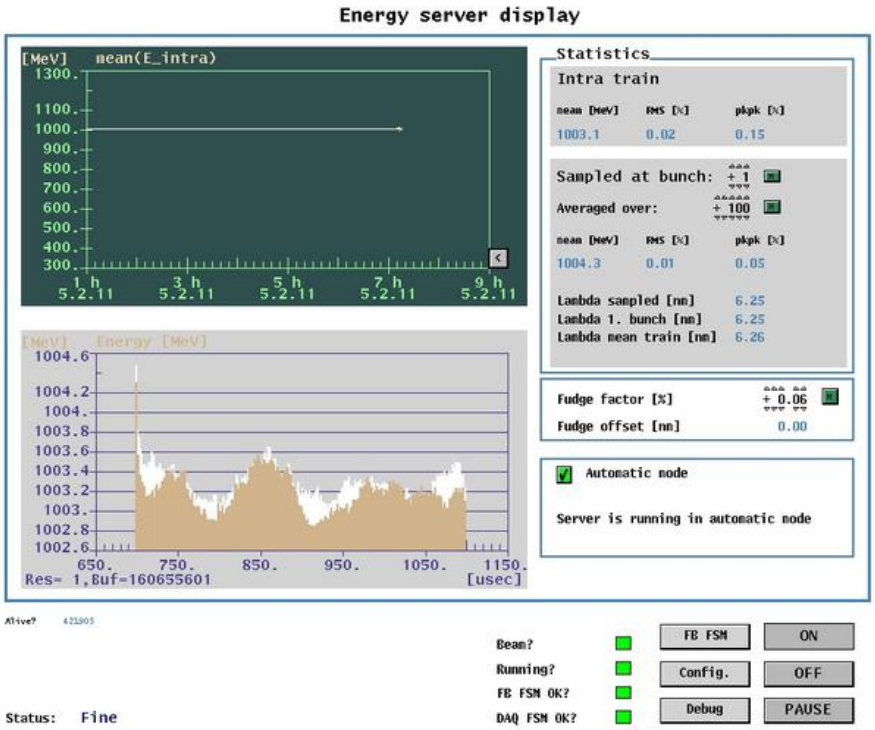
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:14:36-00.JPG

05.02.2011 07:14 ttflinac **ttflinac@:All_BCM**



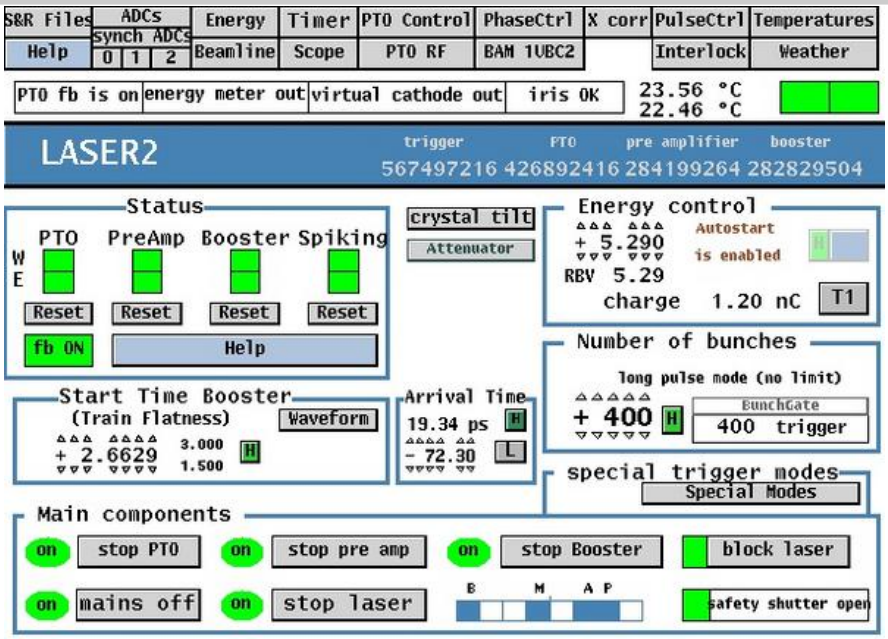
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:14:46-00.JPG

05.02.2011 07:15 ttflinac **ttflinac@:Energyfbm_display**



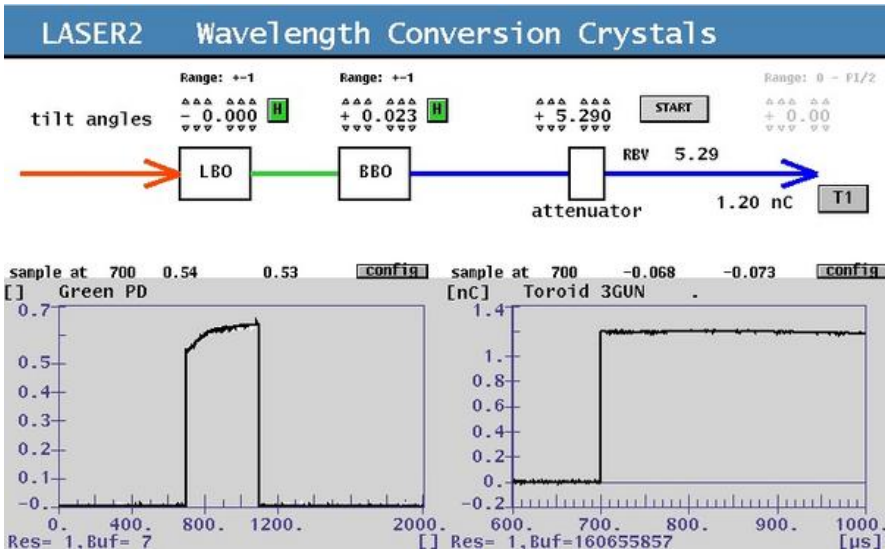
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:15:19-00.JPG

05.02.2011 07:15 ttflinac **ttflinac@:laser2_control**



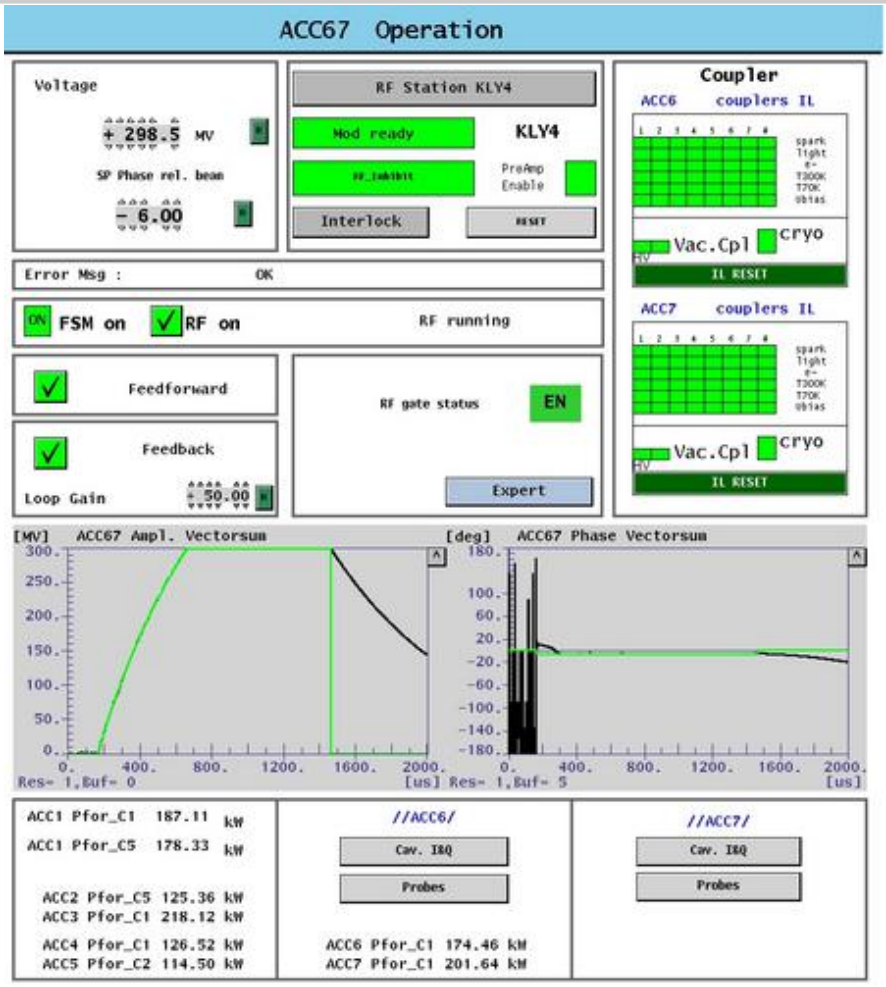
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:15:37-00.JPG

05.02.2011 07:15 ttflinac **End of shift documentation**



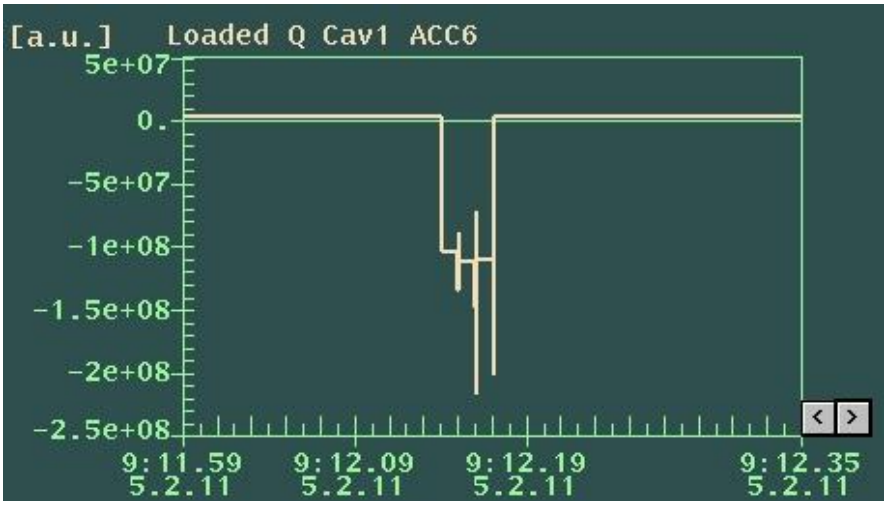
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:15:49-00.JPG

05.02.2011 07:17 ttflinac **ttflinac@:SIMCON_Operation**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T07:17:34-00.JPG

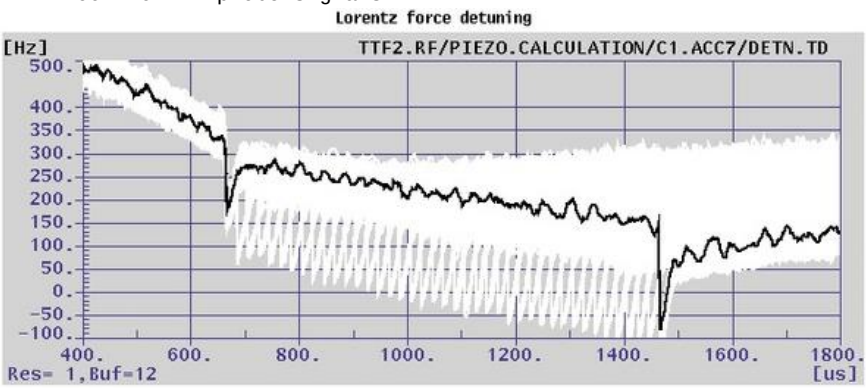
05.02.2011 09:14 ttflinac **ttflinac@ttfbkr6:Plot_hist**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T09:14:40-00.JPG

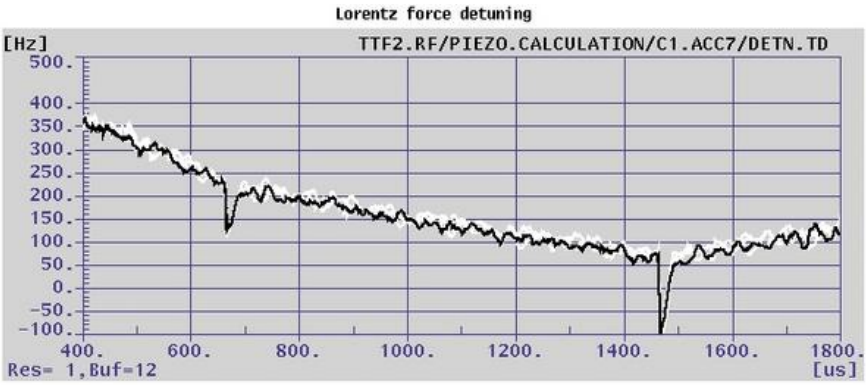
05.02.2011	10:13	Carwardine, Grecki	**Scanning ACC67 flat-top length to measure detuning**

This shows the detuning for ACC7 C1 computed online by the piezo server. History traces show the flat-tops being shortened.
Timestamps of scan:
Start: 10:09:34
End: 10:12:16
Flat-top pulse length was scanned from 800us to 20us in 20us steps.
[JC followup note: Piezos were off in ACC7 but not in ACC6}
Note the large step in the computed detuning at the end of the flat top just before 1500us. The detuning after the step corresponds to that calculated during the decay when the forward power is zero. Just before the step, the detuning should be identical. The discrepancy of some 75Hz corresponds to a relative calibration error in the forward/reflected power signals.
Mariusz ran a calibration script for the detuning calculation. The result is shown in the subsequent plot.
Note that the calibration factors for the detuning calculations are only used internally by the piezo server. Note also that the piezo server is using the LLRF.MONITORING probe signals rather than the LLRF.CONTROLLER probe signals.



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T10:13:16-00.JPG

05.02.2011	10:15	Carwardine, Grecki	**Detuning calculation for ACC7 C1 after running the internal detuning calibration script (see previous entry)**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T10:24:26-00.JPG

05.02.2011	10:41	M.Grecki	**Calibration of monitoring forward and reflected signals for detuning calculation performed**

```
for all the modules (ACC1, ACC3, ACC5, ACC6, ACC7)
```

05.02.2011	10:53	M.Grecki	**Calibration coefficient for ACC7 (for detuning calculation)**

```
Old values:
cav1 calibrated ... b =   0.0120 + 0.0113i
cav2 calibrated ... b =   0.0062 + 0.0079i
cav3 calibrated ... b =   0.0352 - 0.0046i
cav4 calibrated ... b =   0.0442 + 0.0218i
cav5 calibrated ... b =   0.0503 + 0.0218i
cav6 calibrated ... b =   0.0600 + 0.0105i
cav7 calibrated ... b =   0.0023 + 0.0086i
cav8 calibrated ... b =   0.0132 + 0.0098i
New values:
cav1 calibrated ... b =   0.0108 + 0.0073i
cav2 calibrated ... b =   0.0147 + 0.0058i
cav3 calibrated ... b =   0.0327 - 0.0006i
cav4 calibrated ... b =   0.0373 + 0.0105i
cav5 calibrated ... b =   0.0447 + 0.0120i
cav6 calibrated ... b =   0.0497 + 0.0075i
cav7 calibrated ... b =   0.0246 + 0.0010i
cav8 calibrated ... b =   0.0249 + 0.0002i
```

05.02.2011	10:55	Carwardine, Grecki	**Dropping gradient on ACC67 for another scan of the detuning**

```
Before dropping gradient, the SP voltage was 298.5MV.
Cavity gradient ranges: ~12MV/m to ~23MV/m
Dropped setpoint to 198.5MV
```

05.02.2011	11:14	Carwardine, Grecki	**Another detuning scan of ACC67**

```
All piezos are off, voltage SP is 198.5
Scanning flat-top length from 800us to 20us in 20us steps
Timestamp start: 11:13:59
Timestamp end: 11:16:41
Calculated detuning waveforms and other parameters are stored in:
/home/ttflinac/user/carwar/9mA_studies_Feb2011/matlab/data/flattop_scan_20110205T111359.mat
We're relying on the DAQ for other raw data
```

05.02.2011	11:19	Carwardine, Grecki	**Dropped ACC67 voltage SP to 98.5 for new scan**

```
All piezos are off, voltage SP is 98.5
Scanning flat-top length from 800us to 20us in 20us steps
Timestamp start: 11:20:23
Timestamp end: 11:23:05
Calculated detuning waveforms and other parameters are stored in:
/home/ttflinac/user/carwar/9mA_studies_Feb2011/matlab/data/flattop_scan_20110205T112023.mat
We're relying on the DAQ for other raw data
```

05.02.2011	11:25	Carwardine, Grecki	**Starting another detuning scan on ACC67 at Voltage SP of 148.5**

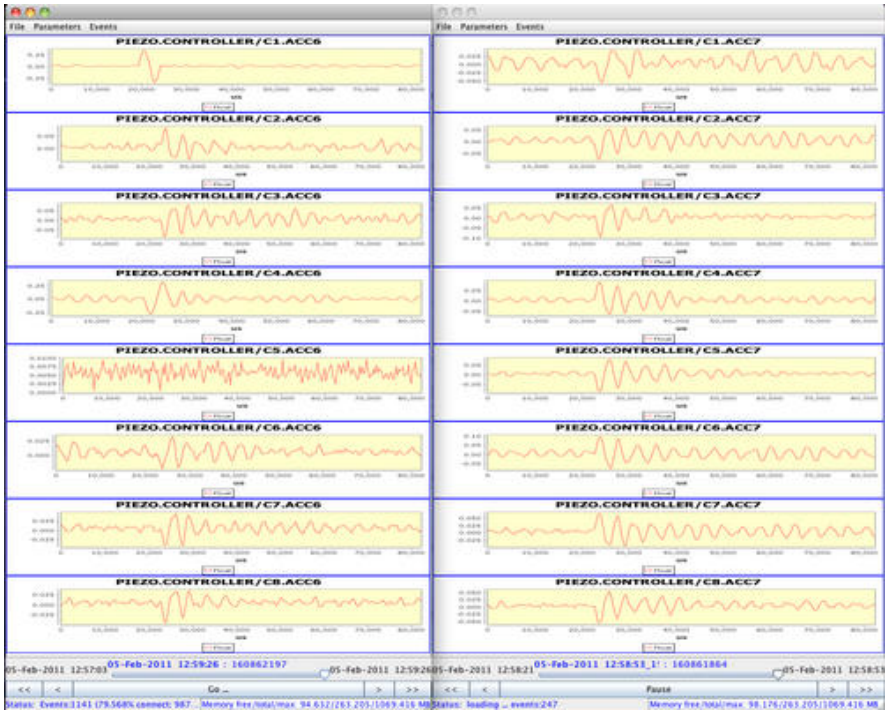
```
Timestamp Start: 11:24:56
Timestamp End: 11:27:39
```

05.02.2011	11:29	Carwardine, Grecki	**Starting another ACC67 detuning scan at SP Voltage of 248.5**

```
11:29:12
11:31:54
```

05.02.2011	11:31	O.Hensler	**PIEZO.CONTROLLER**

```
After a reboot of vmepiezo1, the DAQ sender location was missing.
I restored the .conf filefrom backup.
Sending to the DAQ needs to be checked !
This elogbook entry was sent to following experts:
Wilksen Rybnikov
---
Data seems to be there as of now (1 :05 pm). Piezo signal for C5 in ACC6 seems to have only noise.
This elogbook entry was sent to following experts:
Hensler Rybnikov Wilksen Grecki
```



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T11:31:23-01.png

05.02.2011	11:33	Carwardine, Grecki	**Starting another ACC67 detuning scan at Voltage SP = 298.5**

```
11:33:29
11:36:11
```

05.02.2011	11:36	Carwardine, Grecki	**Starting detuning scan of ACC67 at 348.5**

```
11:37:42
11:40:25
```

05.02.2011	11:41	Carwardine, Grecki	**Changed power ratio on ACC67 from 1.0 to 0.86**

```
To flatten the vector sum
```

05.02.2011	11:50	Carwardine, Grecki	**Increased VS Setpoint to just before the gradient limit thresholds (SP Voltage of 388.5)**

```
Forward power ratio was reduced to 0.76
Scan of detuning:
Start time:11:51:51
End time:11:54:34
```

05.02.2011	11:55	Carwardine, Grecki	**Returning to nominal voltage setpoint of 298.5**

```
Returned power ratio back to 1.0
```

05.02.2011	12:04	Carwardine, Grecki	**Setting up to scan the piezo tuner drive parameters**

As a first experiment, we'll take ACC6 cavity 4
We plan to scan the timing delay of the sinusoid drive over roughly half a cycle of the 200Hz (ie ~2-3ms). Keep the amplitude constant.
The goal here is to try to correct the linearity of the cavity gradient

05.02.2011	13:20	Grecki, Carwardine	**Timing scan of piezo drive trigger**

Starting scan of piezo timedelay scan on C4 ACC6
Starts at delay of 11ms and up to 20ms, steps of 100us, roughly every 5 seconds
Start timestamp: 13:20
End timestamp 13:32
Piezo sinusoid amplitude is 20V, fred=200Hz, DC = 0v
Optimum value for detuning is about 19.5ms after 20ms trigger (0.5ms before RF pulse) - Per Mariusz
We will do an amplitude scan at this point.

05.02.2011	13:45	Grecki, Carwardine	**Starting amplitude scan of piezo driver on ACC6 Cav 4**

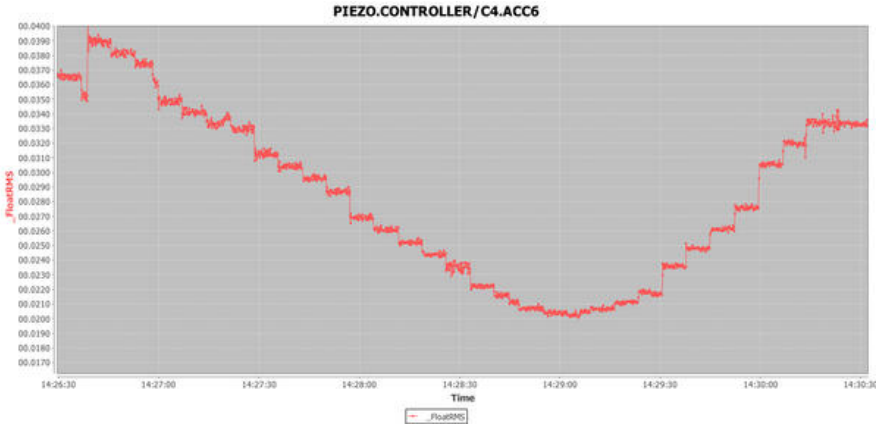
0 to 30v with 0.5v steps
(Trigger time is 19.5ms (equals 0.5ms before RF pulse)

05.02.2011	13:57	Grecki, Carwardine	**Started new scan of the piezo drive amplitude on C4 ACC6**

This time we started with the piezo driver set to zero amplitude (last time it was at 20v at the time the scan began.

05.02.2011	14:24	Grecki, Carwardine	**Plot of rms piezo sensor signal vs time during the timing scan**

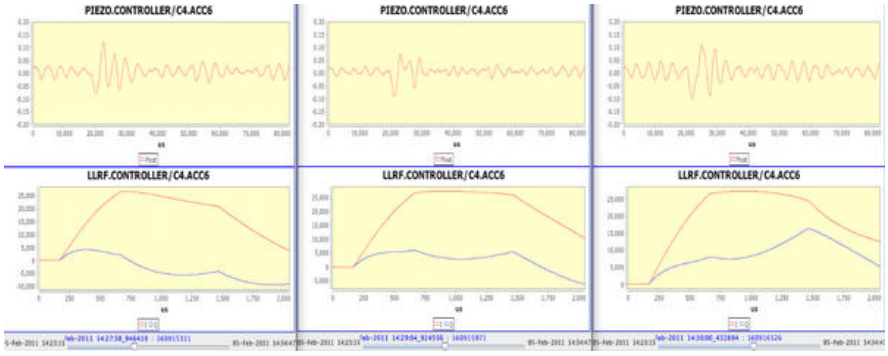
This figure shows the rms of the piezo sensor signal over the duration of the scan. The minimum rms value is clearly seen at around 14:29:00



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-06T02:23:42-00.png

05.02.2011	14:24	Grecki, Carwardine	**Scanning timing of C4 ACC6 piezo timing with lower voltage**

Picked voltage of 7.5V (a little more than required to give minimum rms vibration.
Scanning time delay from 17,5 to 20.5 ms (2.5ms before the rf pulse to 0.5ms after the rf pulse)
The observation is that at the point when the piezo sensor signal rms is minimized (minimum vibration),
the cavity detuning across the flat-top is also minimized.
This figure shows the piezo sensor signal and the probe I&Q signals for three places in time in the scan, with the middle plot corresponding to the time of the minimum rms piezo signal. One minute before and one minute after the optimum are shown left and right.



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/05.02_M/2011-02-05T14:24:51-02.tiff