? 06.02.2011 07:00 oracle **Shift summary**

06.02.2011 07:00 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 ..... 2.68 ms
Attenuator SP 5.39
Iris diameter ..... 17072 steps
Iris diameter ..... 2.39 mm

Gun

Feedforward/Feedback ... on/on
FSM ..... on
Pfwd SP 3.64
VS ampl. 18.32
Phase SP ..... -10.00 deg
VS phase ..... 6.34 deg
Pfwd (peak) ..... 3.840 MW
Prefl (peak) ..... 2.935 MW
Pfwd sample point 700
Pfwd (at sample point) . 18.318 MW
Prefl sample point 720
Prefl (at sample point) 5.575 MW
Flat top ..... 460 us
Water temperature SP ... 72.75 deg C
Main solenoid (RBV) .... -301.03 A
Bucking coil (RBV) ..... 20.70 A
Gun dipole (RBV) ..... 0.000 A
Charge 3GUN(T1) ..... 1.52 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

Feedforward/Feedback ... on/on
Feedback gain 2.0
Pfwd SP 164.00
Pfwd RBV 164.03
Phase SP ..... 2.20 deg
Phase RBV ..... 2.20 deg
Pfwd C1.ACC1 ..... 188.2 kW
Pfwd C5.ACC1 ..... 179.0 kW
Flat top ..... 800 us
Dipole BC2 (RBV) ..... 73.11 A
Pyro 9DBC2.1 ..... -0.0421 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)

ACC39

Feedforward/Feedback ... on/on
Feedback gain 10.0
Pfwd SP 19.00
Phase SP ..... -4.20 deg
Pfwd C1.ACC39 ..... <error>
Flat top ..... 800 us

ACC2/3

Feedforward/Feedback ... on/on
Feedback gain 2.0
Pfwd SP 297.50
Pfwd RBV 297.79
Phase SP ..... -2.00 deg
Phase RBV ..... -2.02 deg
Pfwd C5.ACC2 ..... 126.01 kW
Pfwd C1.ACC3 ..... 218.56 kW
Flat top ..... 450 us
Dipole BC3 (RBV) ..... 56.00 A
Pyro 4DBC3.1 ..... -0.0097 V
Pyro 4DBC3.3 ..... 0.0017 V
Radiator 4DBC3 ..... out

ACC4/5

Feedforward/Feedback ... on/on
Feedback gain 40.0
Pfwd SP 250.00
Pfwd RBV 250.40
Phase SP ..... -8.90 deg
Phase RBV ..... -8.92 deg
Pfwd C1.ACC4 ..... 116.14 kW
Pfwd C2.ACC5 ..... 91.12 kW
Pfwd C1.ACC6 ..... 0.61 kW
Flat top ..... 800 us

ACC6/7

Feedforward/Feedback ... on/on
Feedback gain 50.0
Pfwd SP 276.50
Pfwd RBV 277.03
Phase SP ..... -4.00 deg
Phase RBV ..... -4.16 deg
Pfwd C1.ACC6 ..... 156.30 kW
Pfwd C1.ACC7 ..... 177.32 kW
Flat top ..... 800 us

Bypass

Dipole D1BYP (RBV) ..... 0.00 A
Energy bypass ..... 1211.4 MeV
RF vector sum ALL ..... 686.3 MeV
Charge 16BYP ..... -0.00 nC

Collimator

Dipole D1ECOL (RBV) .... 176.89 A
Energy dogleg ..... 995.3 MeV
Charge 7ORS ..... 1.55 nC

Undulator

1SFUND1 gap RBV ..... 220.0 mm
1SFUND2 gap RBV ..... 220.0 mm
1SFUND3 gap RBV ..... 220.0 mm
1SFUND4 gap RBV ..... 180.0 mm

Dump

Dipole D9SMATCH (RBV) .. 0.00 A
Dipole D1DUMP (RBV) .... 0.00 A
Dipole D6DUMP (RBV) .... 210.09 A
Rotator RD13DUMP (RBV) . 9.13 A
Charge 9DUMP ..... 1.42 nC

Feedbacks

Charge feedback gain ... <error>
Charge feedback SP ..... <error>
PTO feedback ..... on

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 2011-02-06T07_00_18+01
Orbit reference for the root tool saved in /home/ttflinac/measurements/xy_jitter/2011-02-06T070018
```

```
also in 'save and restore' files:
Magnets saved to: /home/ttflinac/save_restore/Magnets/autosaved/all_Magnets_20110206T070018.sr
uMovers saved to: /home/ttflinac/save_restore/Micromovers/autosaved/uMovers_20110206T070018.sr
from computer: flashbkr3.desy.de
```

06.02.2011 07:01 ttflinac **SASE tuning parameters**

Misc. parameters

```
Energy / Wavelength: 995.33 MeV / 6.3 nm
Charge:              1.52 nC
Main solenoid:       -301.0 A
Bucking coil:        +20.7 A
Dipoles BC2/BC3:     +73.1 A / +56.0 A
```

RF parameters

	GUN	ACC1	ACC39	ACC2/3	ACC4/5	ACC6/7
Power/Gradient	+3.640	+164.00	+19.00	+297.50	+250.00	+276.50
Readback	3.84	164.0	19.0	297.8	250.2	276.8
Phase	-10.00	+2.20	-4.20	-2.00	-8.90	-4.00
on-crest		-1.0		-3.0	-5.0	-0.0
Readback	6.3	2.2	-4.2	-2.0	-8.9	-4.1

Undulator steerers and aircoils

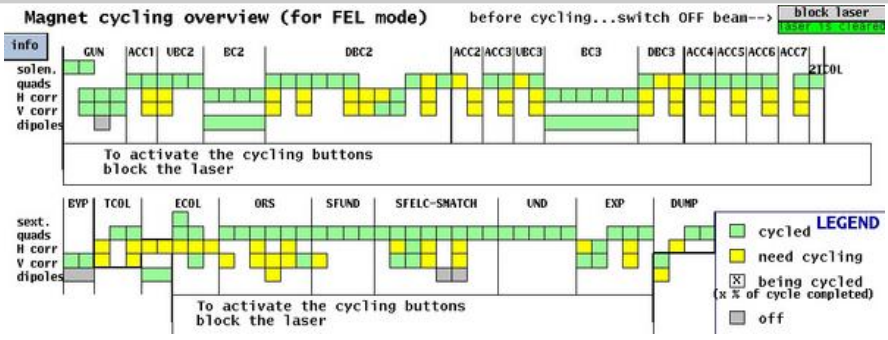
H7SMATCH	H12SMATCH
+0.254	**-1.928**

V7SMATCH	V12SMATCH
-0.233	**-1.928**

Intra-undulator steerers

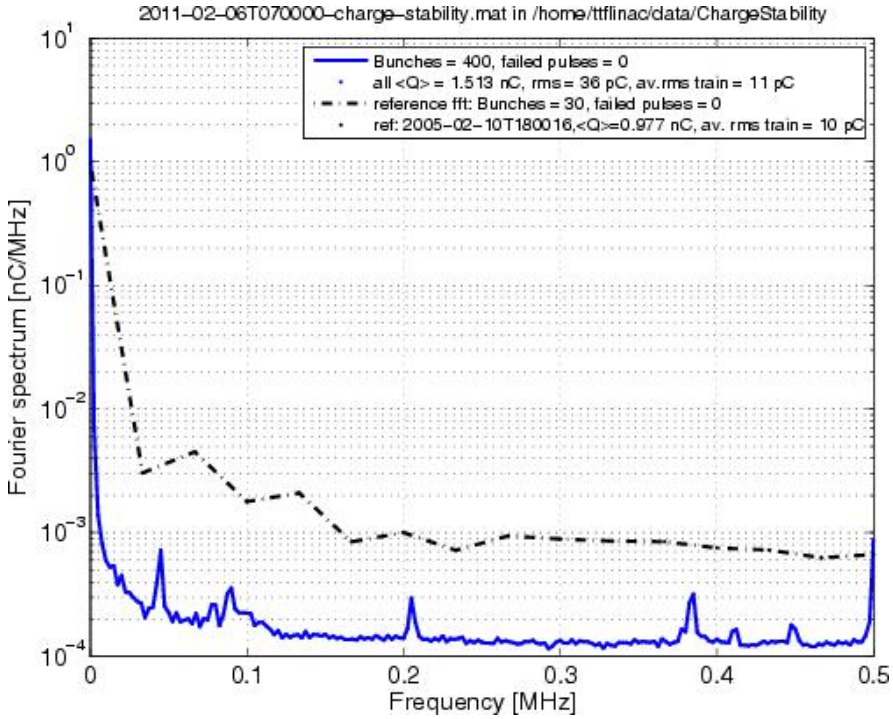
H3UND1	H3UND2	H3UND3	H3UND4	H3UND5	H3UND6
-4.40	**-4.80**	**-4.80**	**-4.70**	**-4.80**	**-5.00**

06.02.2011 07:01 ttflinac **ttflinac@:magnet_cycle_overview_fel**



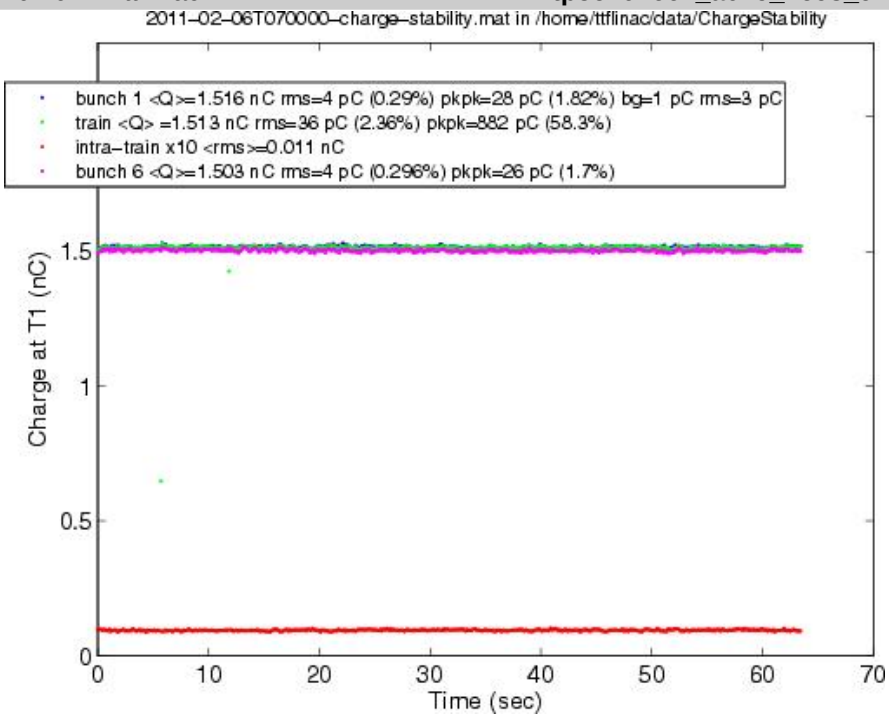
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:01:29-00.JPG

06.02.2011 07:01 ttflinac **tp049154d6_0e1d_49f8_a459_834136360ed8.ps**



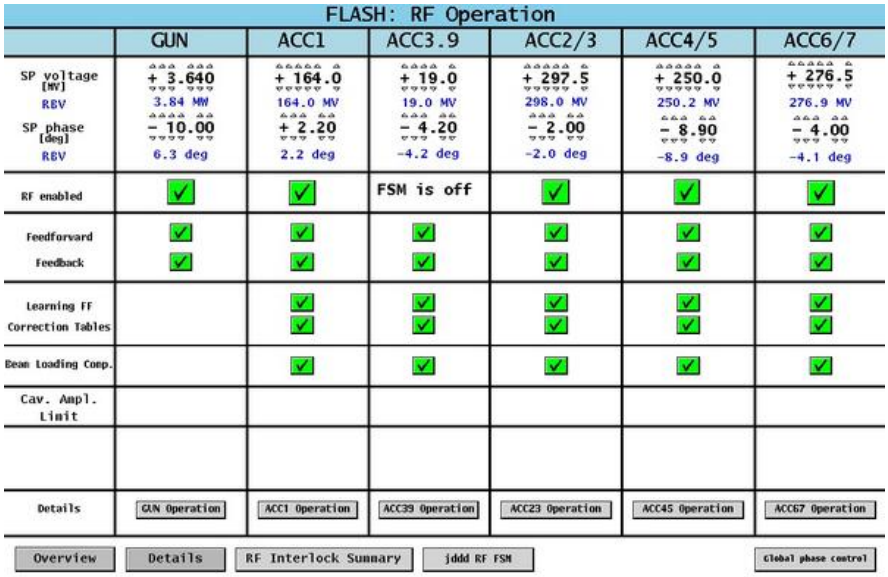
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:01:37-00.ps

06.02.2011 07:01 ttflinac **tp5c201662_a019_4e93_97a5_262ecc1ace43.ps**



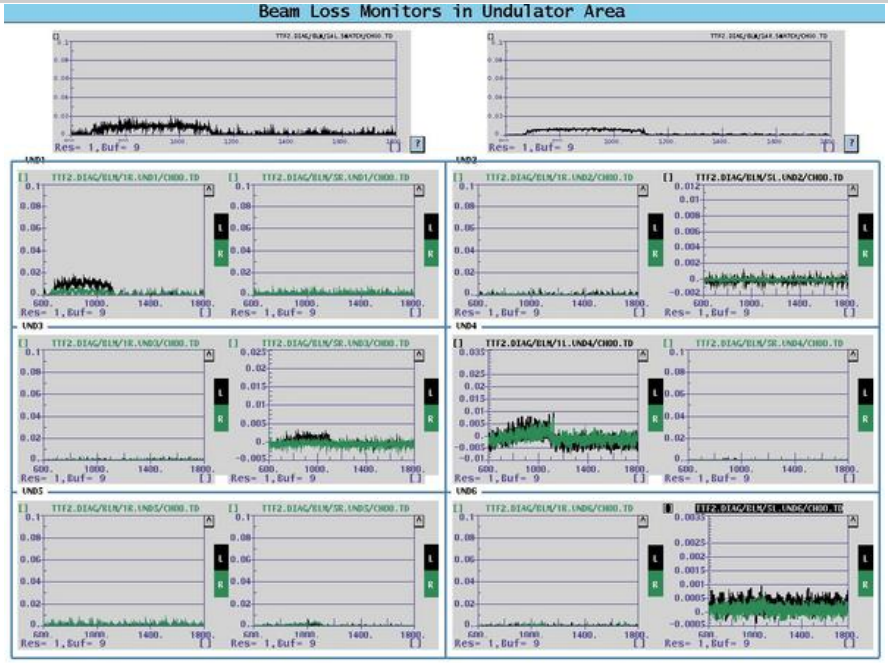
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:01:44-00.ps

06.02.2011 07:01 ttflinac **ttflinac@:RF_OPERATION**



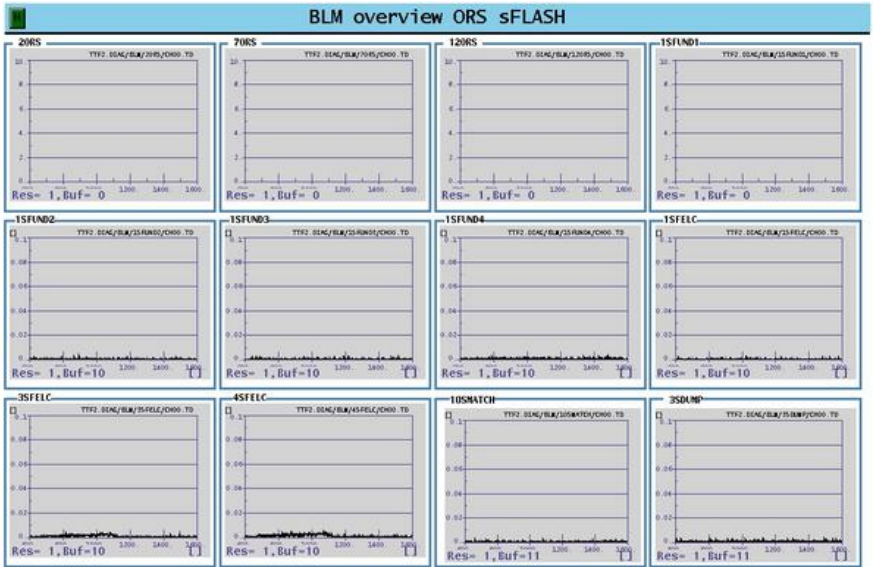
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:01:50-00.JPG

06.02.2011 07:02 ttflinac **ttflinac@:BLM_UNDULATORS**



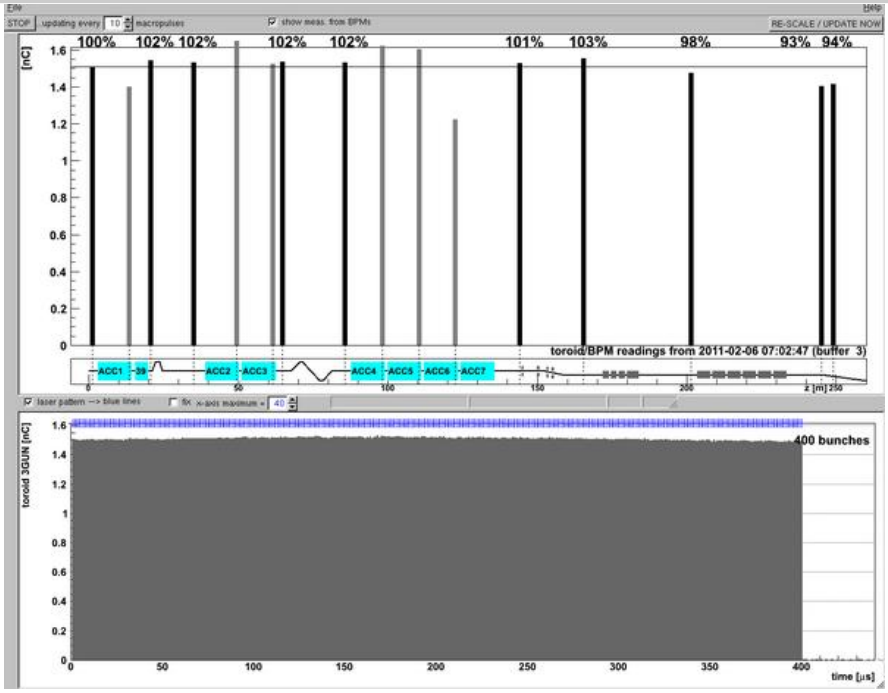
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:02:09-00.JPG

06.02.2011 07:02 ttflinac **ttflinac@:blm_overview_ORS**



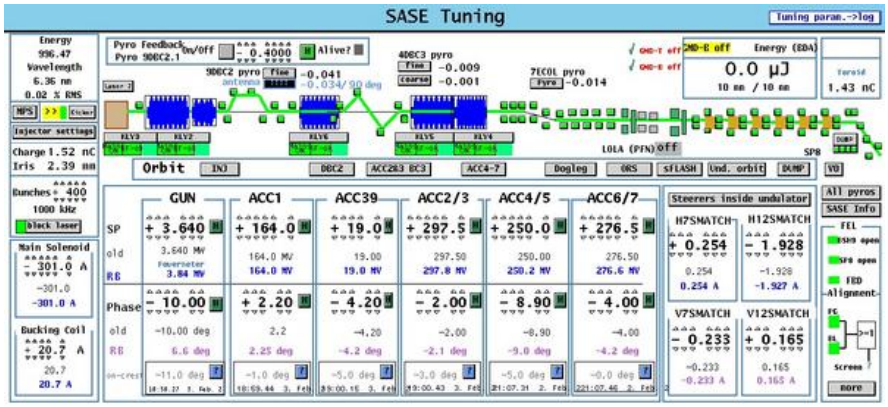
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:02:19-00.JPG

06.02.2011 07:03 ttflinac **toroid charge readings**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:03:08-00.ps

06.02.2011 07:03 ttflinac **ttflinac@:SASE_tuning**

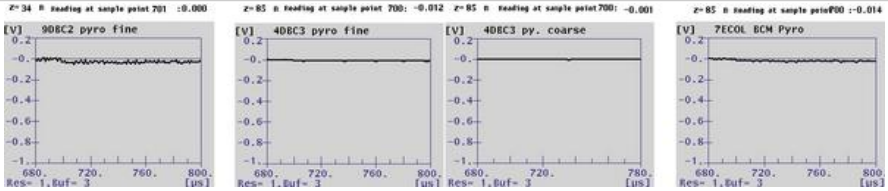


File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:03:34-00.JPG

06.02.2011 07:04 ttflinac **ttflinac@:dose_und**

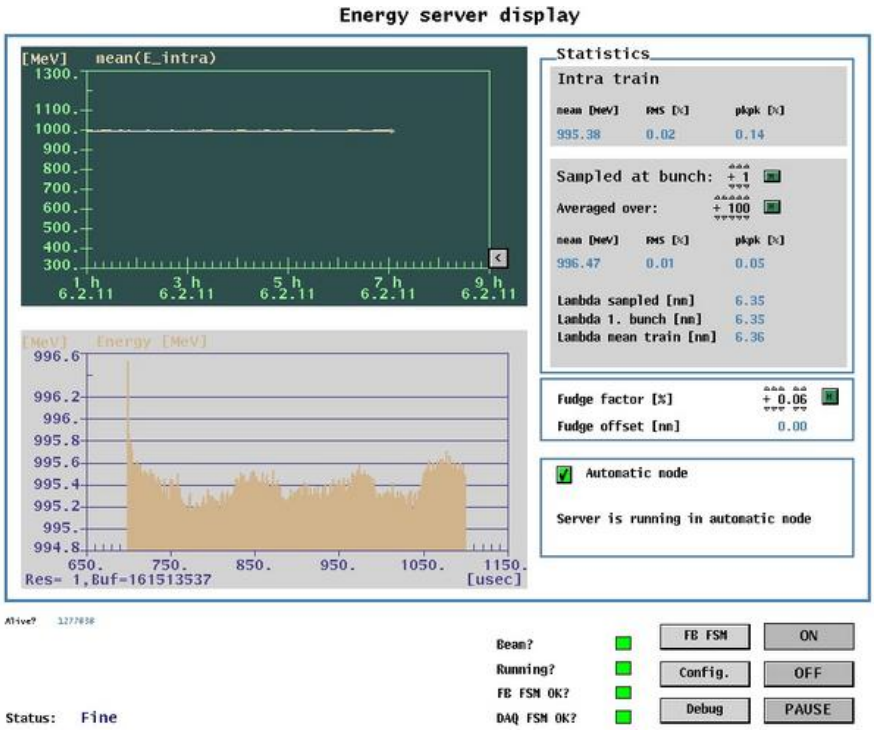
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:04:13-00.JPG

06.02.2011 07:04 ttflinac **ttflinac@:All_BCM**



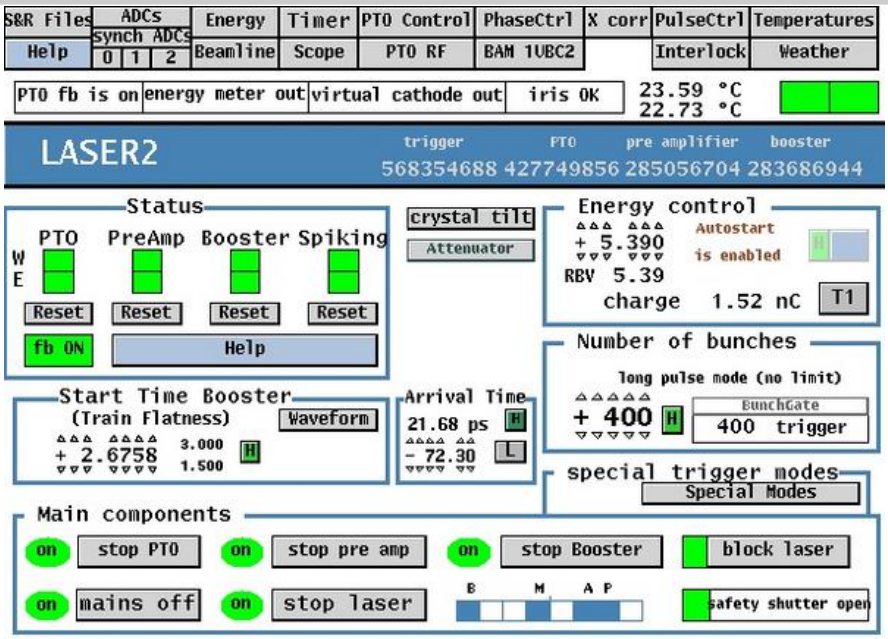
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:04:28-00.JPG

06.02.2011 07:05 ttflinac **ttflinac@:Energyfbm_display**



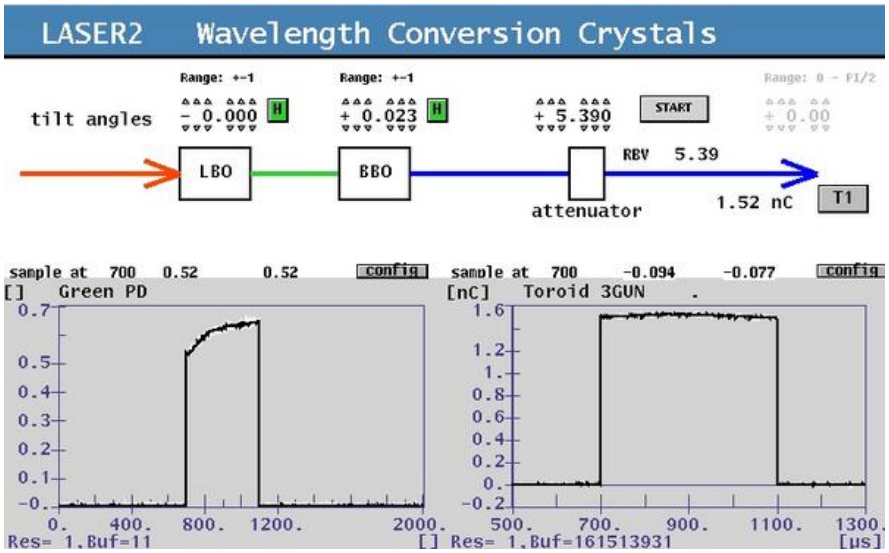
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:05:20-00.JPG

06.02.2011 07:05 ttflinac **ttflinac@:laser2_control**



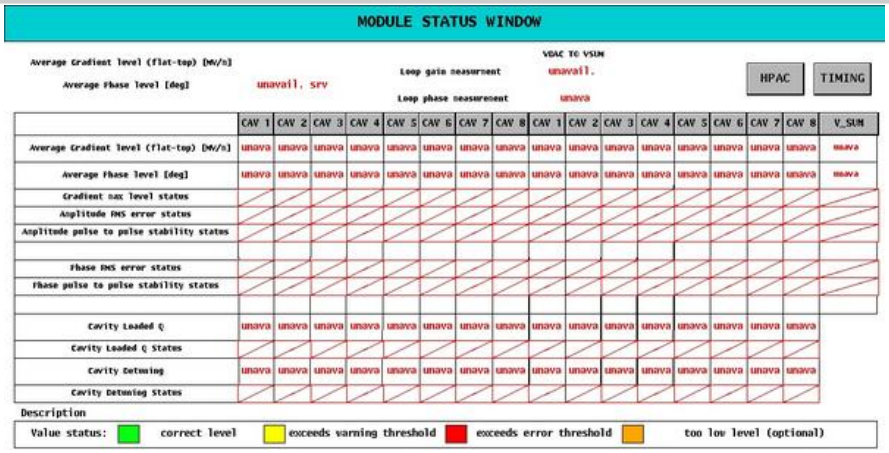
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:05:33-00.JPG

06.02.2011 07:05 ttflinac **End of shift documentation**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:05:58-00.JPG

06.02.2011 07:11 M.Grecki **LLRF diagnostic server has crashed**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T07:11:29-00.JPG

06.02.2011 08:46 schlarb **Summary BAM adjustment**

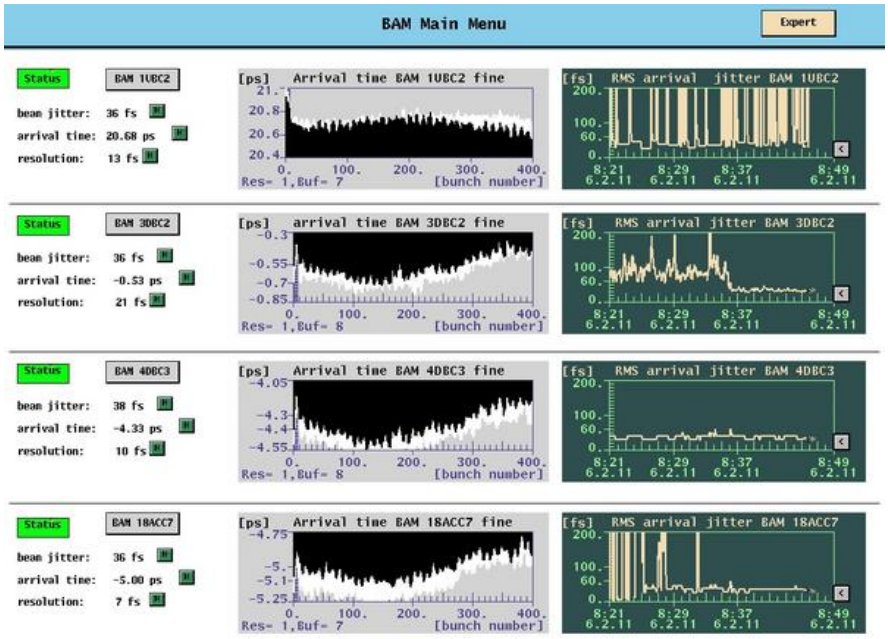
All BAMs are back in operation and calibrated.
Actions:

1UBC2
- adjust motor position for coarse channel
- recalibrate
- switched to fine&coarse M_FEEDBACK
- **remaining problem:** sometime electronic jumps (large jitter displayed)

3DBC2
- adjust motor position for coarse channel
- recalibrate
- no rapid motor movement visible anymore

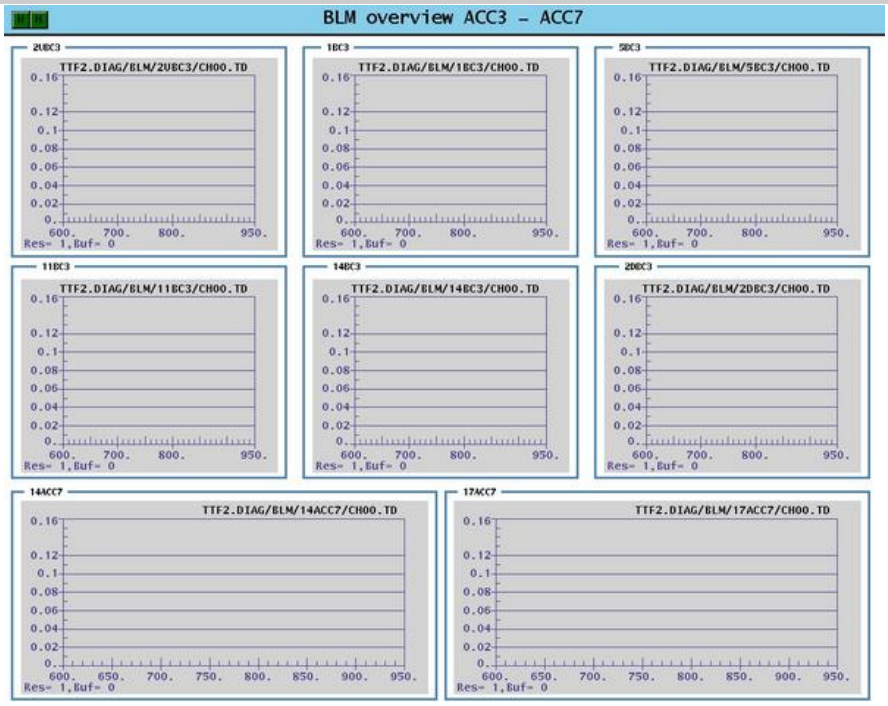
4DBC3
- optimized input polarization
- adjust motor position for coarse channel
- recalibrate

18ACC7
- changed sampling point
- put motor 1 back to proper measurement range
- adjust motor position for coarse channel
- recalibrate



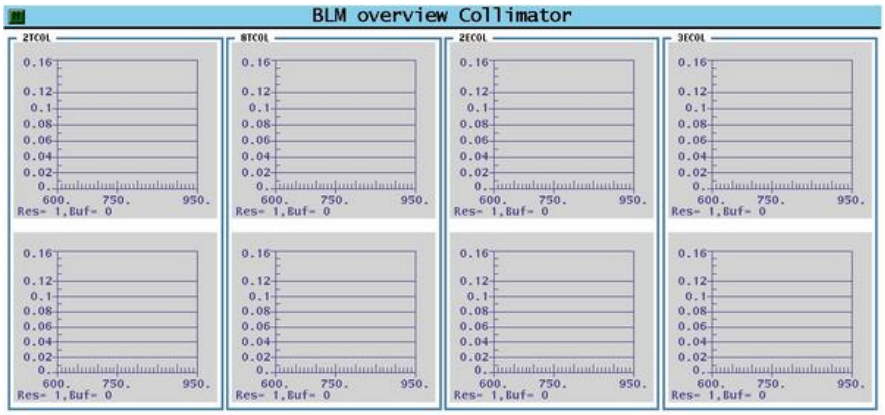
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:46:57-00.JPG

06.02.2011 08:56 schlarb **No Loss signal at BLM_ACC3_ACC7**



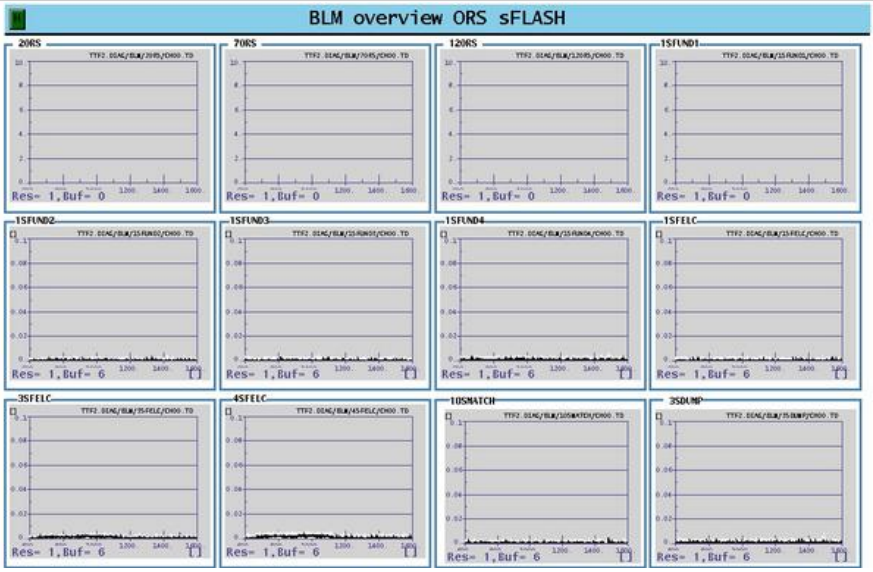
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:56:21-00.JPG

06.02.2011 08:56 schlarb, grecki **No Loss signal at :blm_overview_COL**



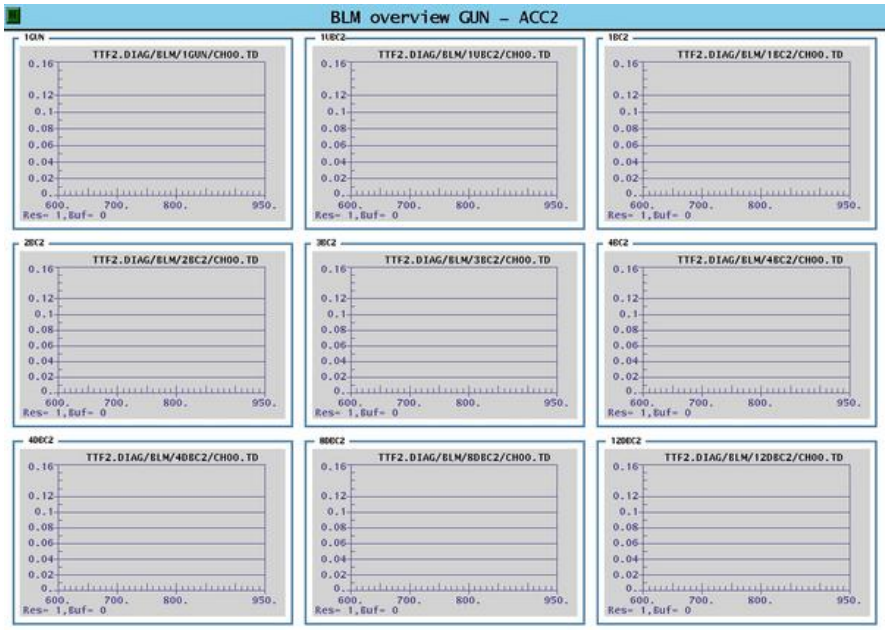
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:56:31-00.JPG

06.02.2011 08:56 schlarb, grecki **Only partically signals at :blm_overview_ORS**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:56:39-00.JPG

06.02.2011 08:56 schlarb, grecki **Signals available at :blm_overview_from_GUN_to_ACC2**

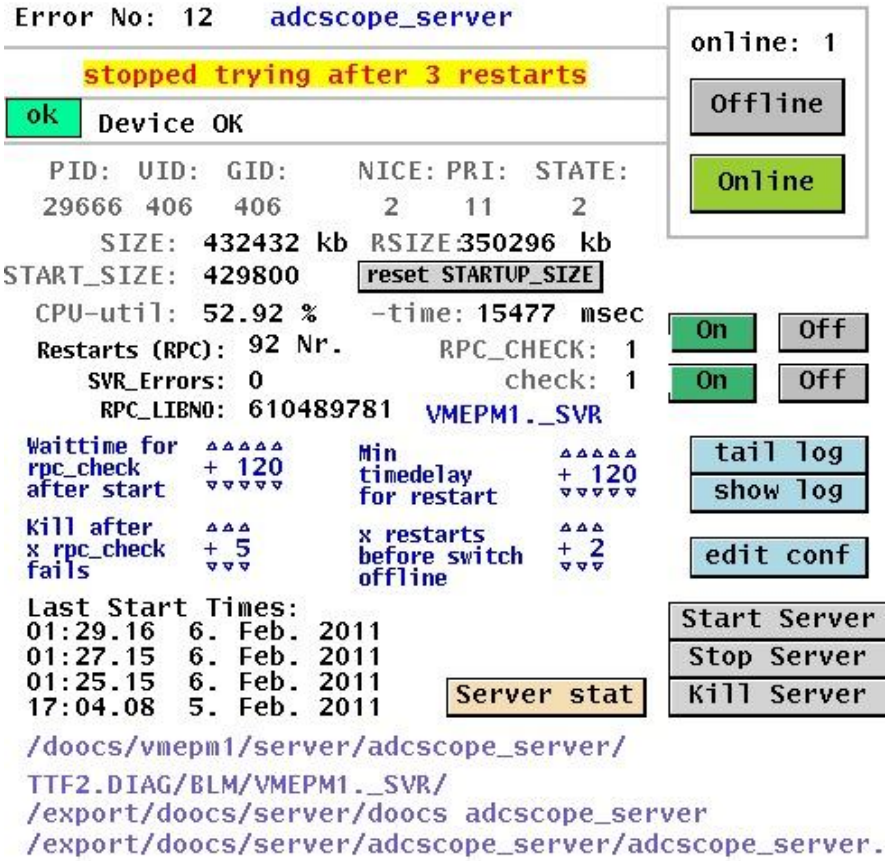


File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:56:47-00.JPG

06.02.2011 08:57 schlarb, grecki **adcscope server down at VMEPM1 displaying first half of accelerator losses**

this is particular bad presently, since the losses shown at the pandora F-004 (68m BC3 tunnel wall left) would cause to shutdown the accelerator in 1 hour from now. We expect that there are losses at the entrance or exit of the BC3 which need to be tuned based in the PM signals.

Started the adcscope_server without TINE thread and saved the core file to core-TINE.
A brief look into the core shows a problem with TINE, probably too early start of the thread.
Olaf Hensler
This elogbook entry was sent to following experts:
Aghababyan Rehlich

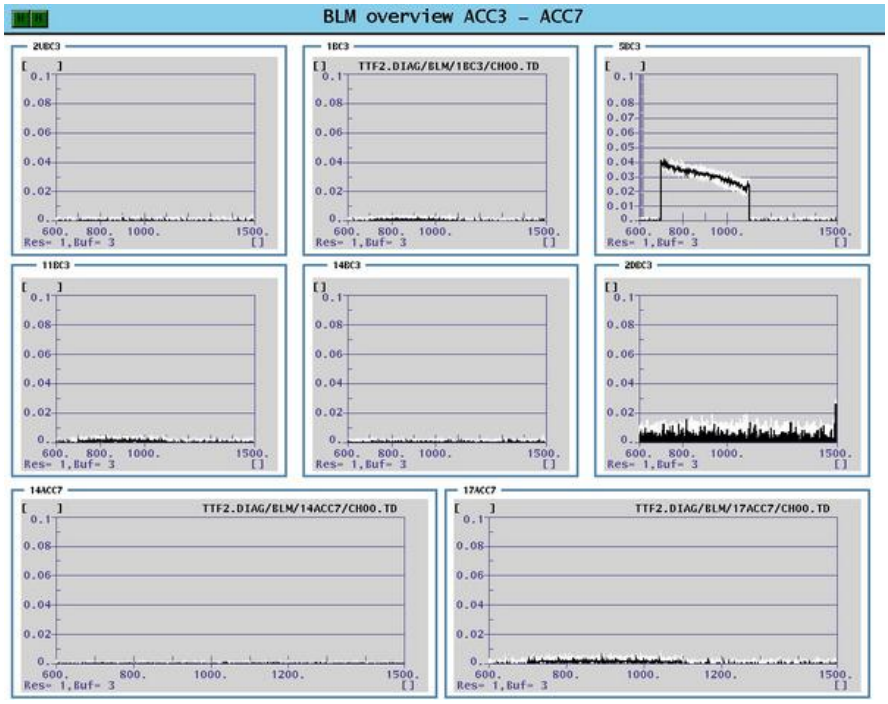


File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T08:57:20-00.JPG

⚠ 06.02.2011	09:08	schlarb, grecki	**Losses at BC3 will cause the machine operation to be stopped unless tuning reduces the radiation outside the accelerator tunel**

File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T09:08:44-00.JPG

06.02.2011	09:32	ttflinac	**ttflinac@:BLM_ACC3_ACC7**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T09:32:55-00.JPG

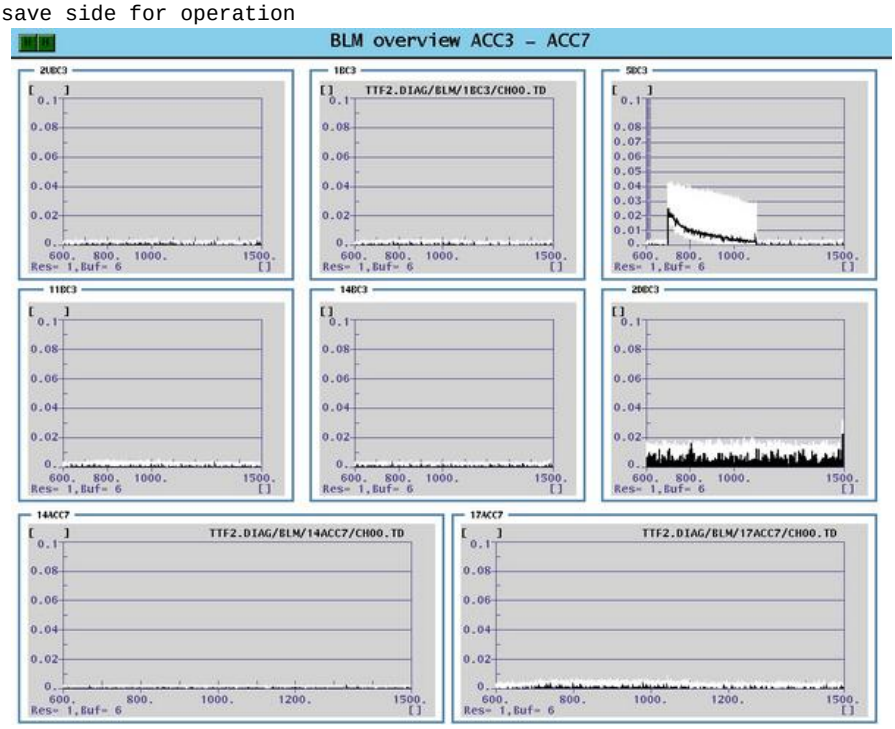
06.02.2011 09:38 schlarb, grecki **Losses at 5BC3 reduced significantly**

reduce losses at 5BC3 and pandora.

Actions:

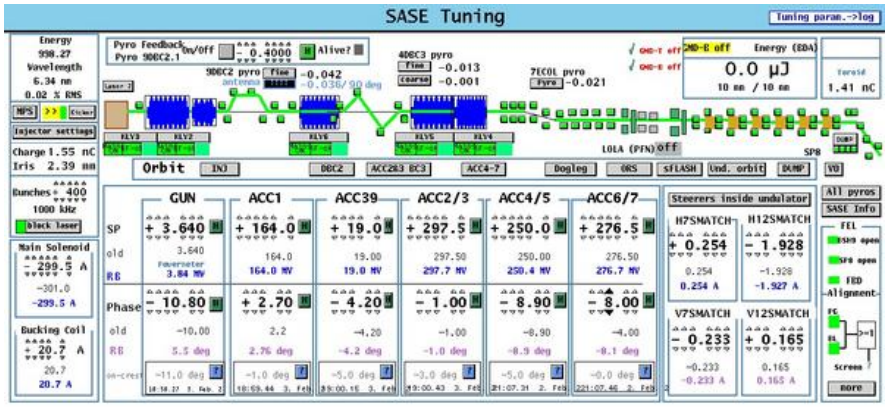
- Solenoid current from -301A to -299.5A
- Gun phase from -10.2deg do -10.8deg
- ACC1 phase from +2.2deg to +2.7 deg
- ACC67 phase from -4deg to -8 deg to reduce sFLASH losses

Pandora now on save side for operation



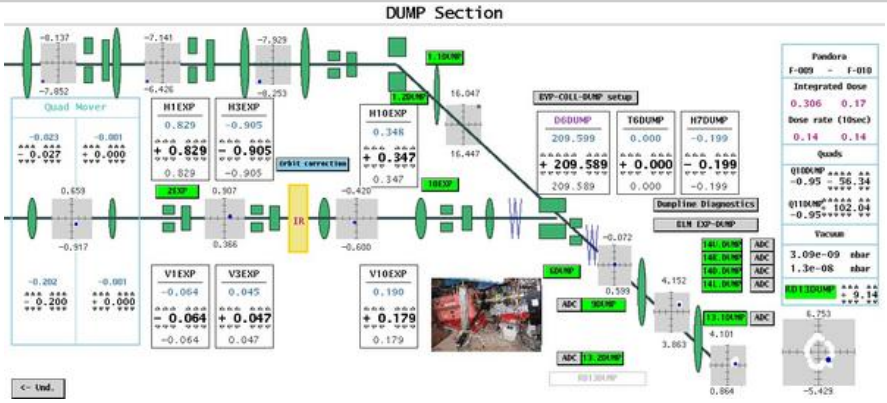
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T09:38:47-00.JPG

06.02.2011 09:38 ttflinac **ttflinac@:SASE_tuning**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T09:38:59-00.JPG

06.02.2011	09:45	ttflinac	**ttflinac@:orbit_corr_dump**

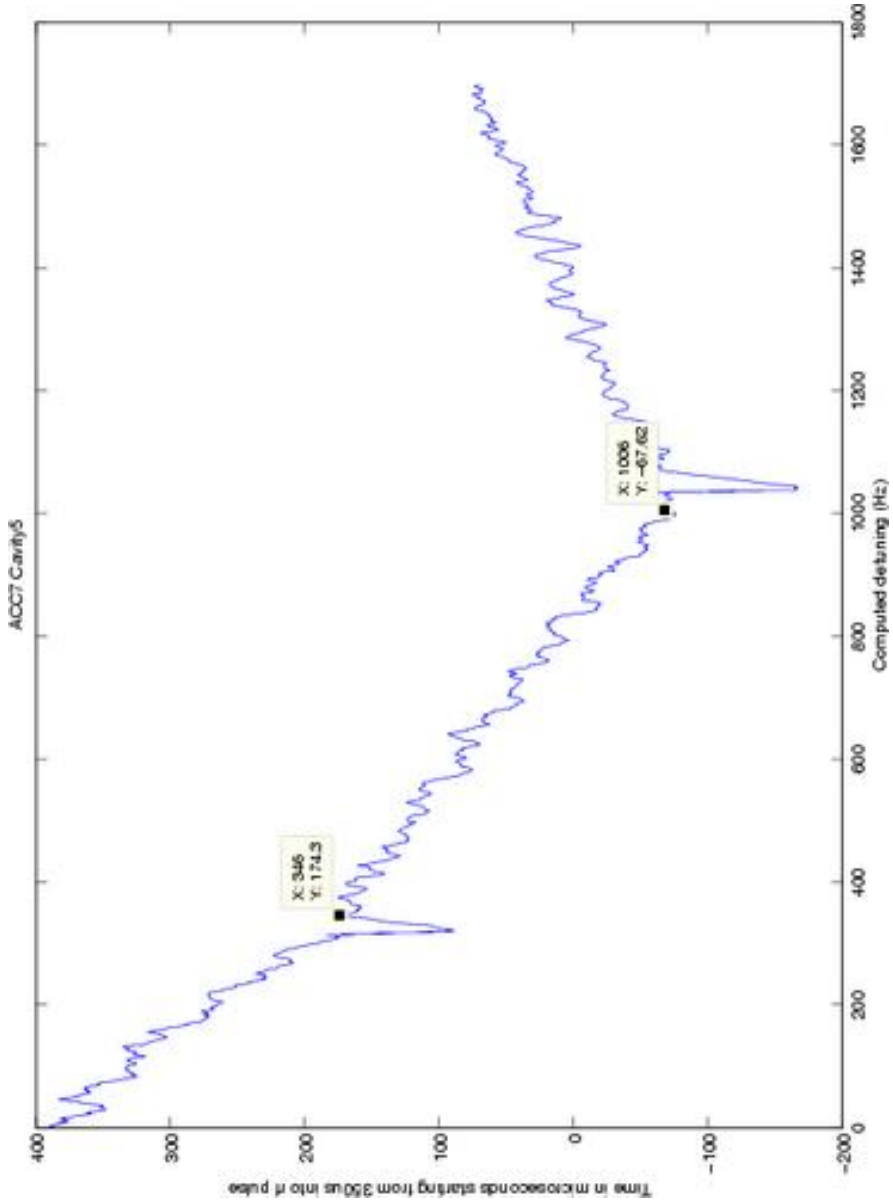


File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T09:45:32-00.JPG

06.02.2011	11:01	M.Grecki, J.Carwardine	**Detuning measured by detuning calculation server**

```
Energy gain: 276.5MeV
         dynamic      static    curvature
          [Hz]         [Hz]       [a.u]
ACC6:
cav 1:     -92.8986  141.0428    26.7244
cav 2:    -150.4138  172.4219    24.1579
cav 3:    -209.9381  116.2834    39.7507
cav 4:    -185.5784   79.6682    51.5929
cav 5:     -57.6859   98.6078    20.6551
cav 6:     -80.2096  104.4903    -4.8785
cav 7:    -101.0656  150.6124     5.0228
cav 8:    -114.6038  142.0817     7.1554
ACC7:
cav 1:    -124.4364  138.4929    21.9938
cav 2:    -141.6974  174.9173    60.9176
cav 3:    -196.8345  162.0303    17.3326
cav 4:    -199.1682  175.2691    48.4710
cav 5:    -219.7465  187.3569    30.8075
cav 6:    -190.9593  193.0751   -18.6354
cav 7:    -137.5067  156.6173    17.8630
cav 8:    -100.9530  157.9704    25.0272
```

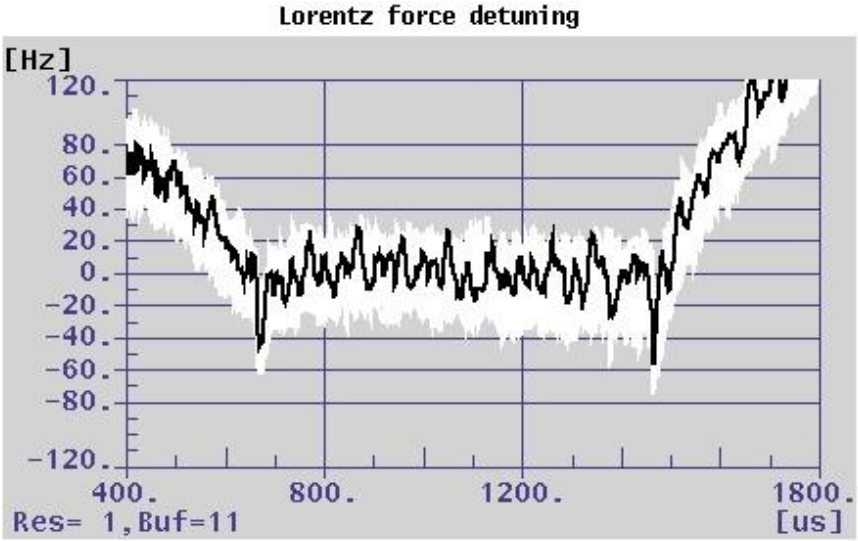
06.02.2011	11:24	ttflinac	**tpd3cadb93_8403_4652_b4f4_0a8ba0dfac1f.ps**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T11:24:41-00.ps

06.02.2011 11:38 ttflinac **ACC7 Cav5 - cavity well tuned**

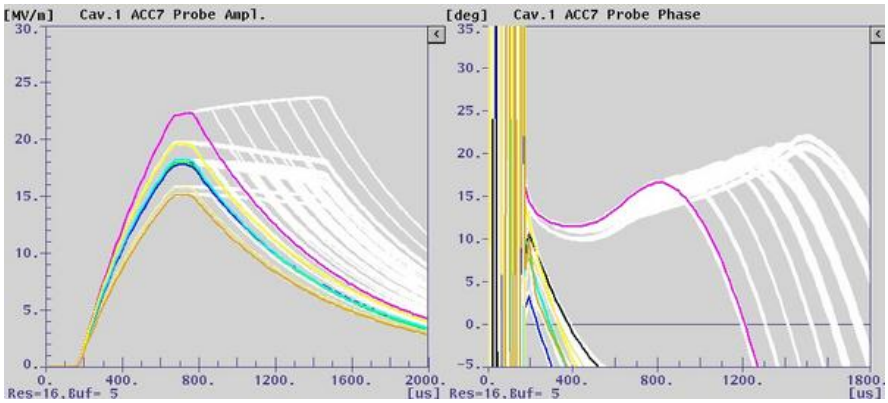
```
if we believe detuning calculation
```



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T11:38:42-00.JPG

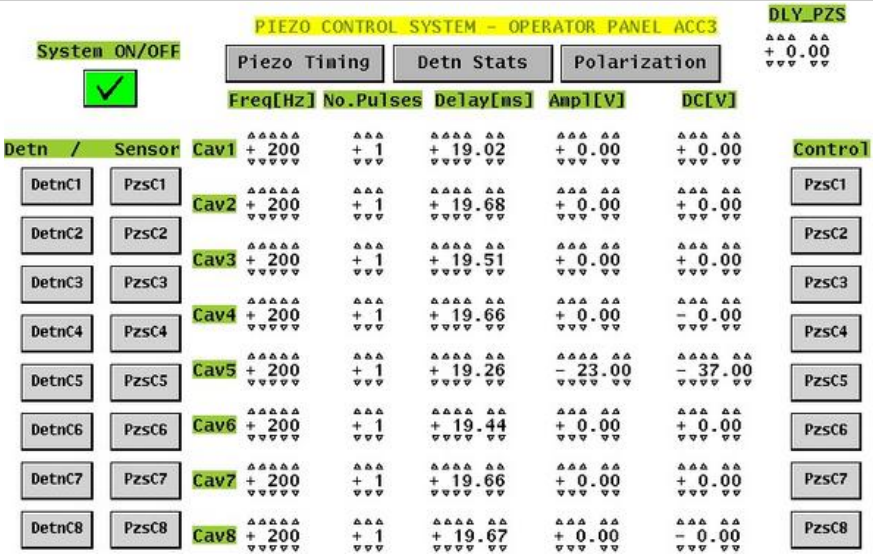
06.02.2011 11:48 M.Grecki, J.Carwardine **Shortening of the RF pulse - ACC7 Cav.5**

the derivative of phase at the end of the pulse is always close to 0 as expected in a well tuned cavity



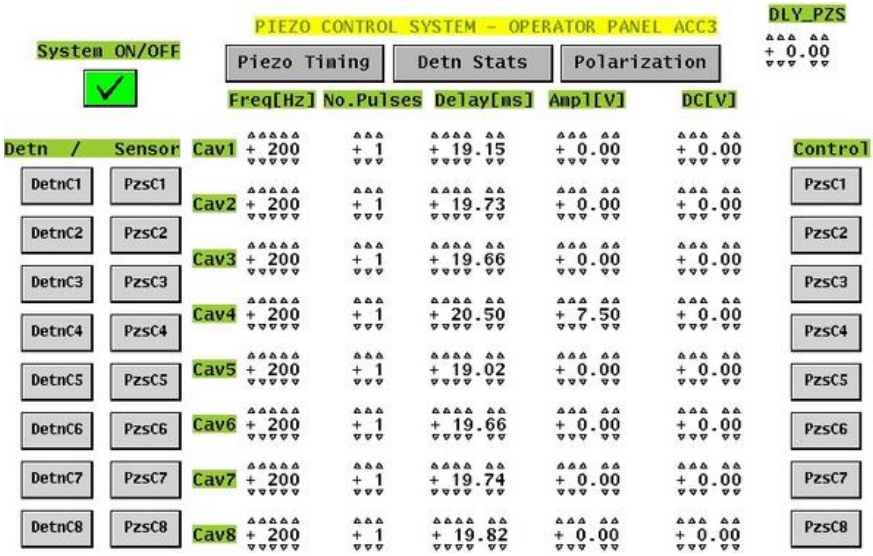
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T11:48:02-00.JPG

06.02.2011 11:51 ttflinac **ttflinac@:piezo_ctl_acc**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T11:51:59-00.JPG

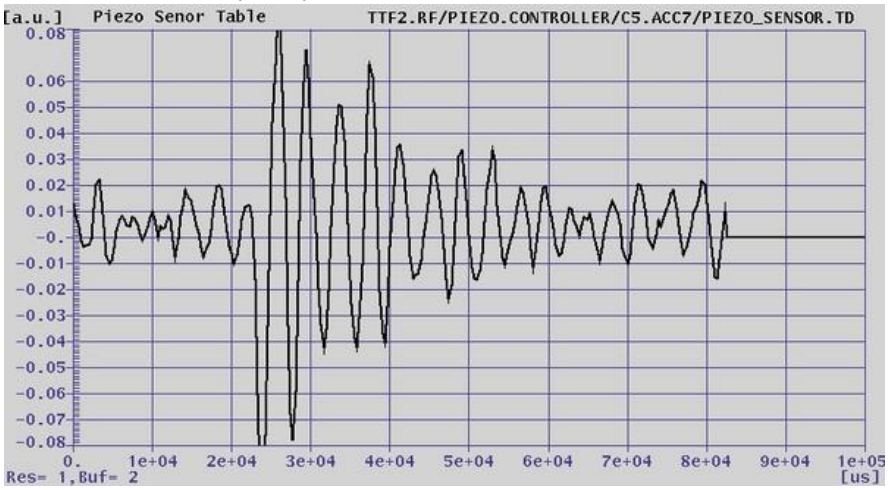
06.02.2011 11:52 ttflinac **ttflinac@:piezo_ctl_acc**



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T11:52:24-00.JPG

06.02.2011	12:16	Carwardine, Grecki	**Piezo sensor readback on ACC7 cavity 5 with rf only (piezo disabled)**

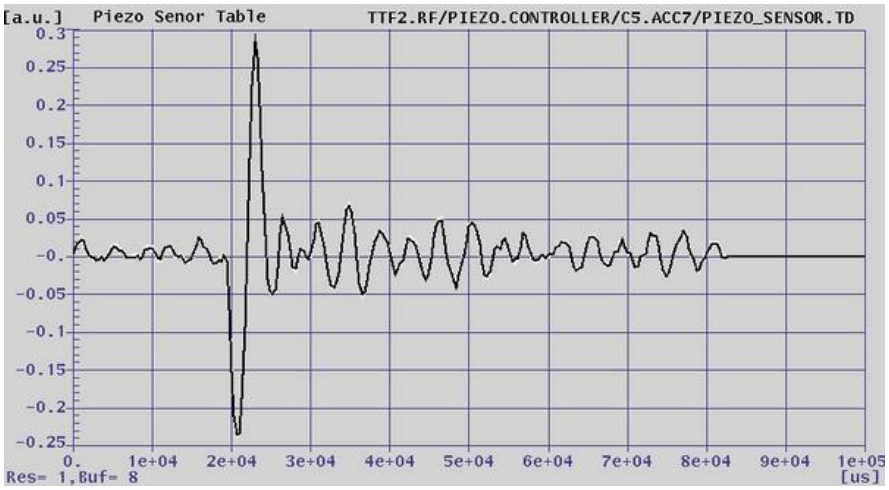
Corresponds to vibration induced by rf pulse



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T12:16:49-00.JPG

06.02.2011	12:17	Carwardine, Grecki	**Piezo sensor readback on ACC7 cavity 5 with rf only (piezo enabled)**

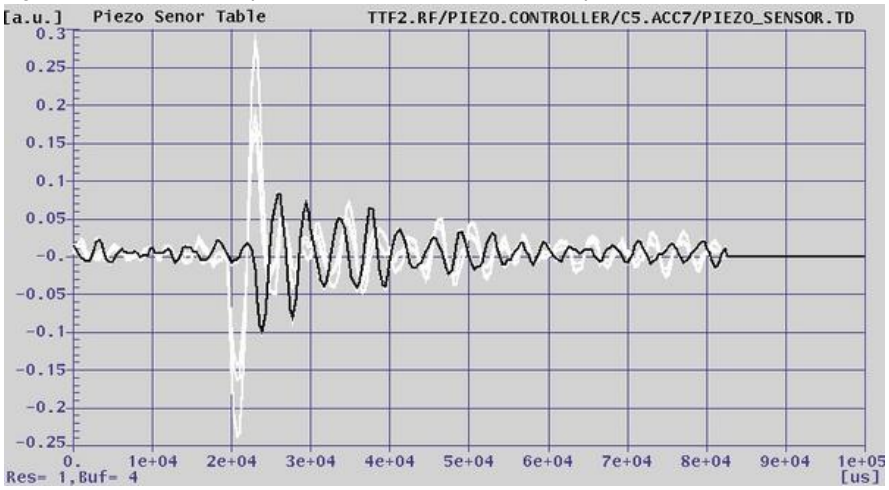
Corresponds to vibration induced by rf pulse compensated by piezo tuner
Amplitude = -23v
Trigger delay = 19.26ms starting at 20ms before rf pulse, ie 740us before RF pulse)
DC voltage = -37v
This is compensated to zero detuning according to the detuning computed online by the piezo server
See previous elog entry here:
http://ttfinfo.desy.de/TTFelog/show.jsp?dir=/2011/05/06.02_M&pos=2011-02-06T11:38:42



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T12:17:28-00.JPG

06.02.2011	12:19	Carwardine, Grecki	**Piezo sensor readback on ACC7 cavity 5 comparison of rf only and piezo enabled)**

```
As shown in the previous two plots, the piezo drive to compensate the lorentz-force detuning
generates
 a much larger signal on the sense piezo than that of the rf pulse itself.
```



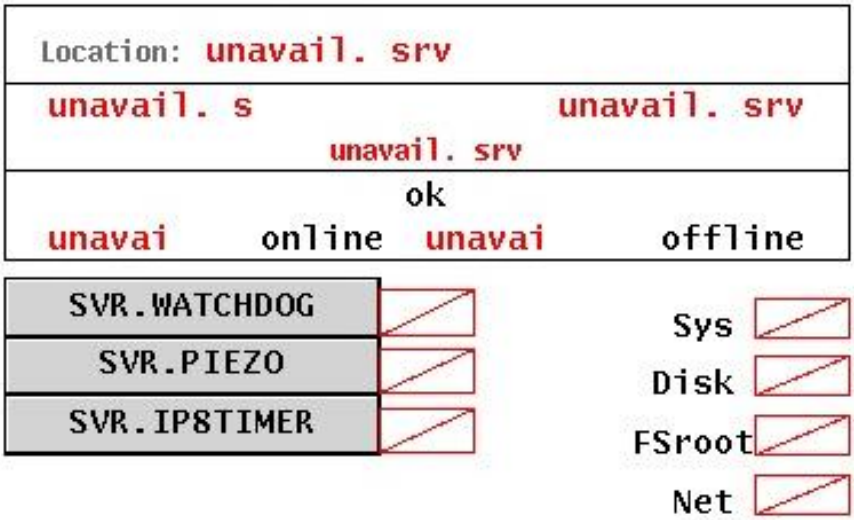
File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T12:19:08-00.JPG

06.02.2011	13:31	Carwardine	**Performed scan of frequency of piezo drive on ACC7 Cavity 5**

```
Attempting to match the drive frequency to the mechanical resonance of the cavity
From 200Hz to 300Hz
FFT analysis of the measured piezo sensor shows the mechanical resonance is around 275Hz.
```

06.02.2011	14:53	ttflinac	**piezo control server has crashed**

```
and was retarded by watchdog
```



File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T14:53:39-00.JPG

06.02.2011 15:05 Carwardine **Using piezo tuners to reduce curvature in gradient flattops of ACC7 Cavity 5**

Attempted to use the piezos to cancel second-order lorentz-force detuning during flat-top. Scanned piezo delay from 17.80ms to 19.10ms (corresponds to 2.2ms to 0.9ms before the rf pulse)
Piezo drive frequency: 275Hz
Piezo drive amplitude: 4.5v
Left plot shows the gradient flattop for ACC7/Cavity 5 for different delays together with corresponding linear fits.
Right plot shows the residuals from the linear fits for three of the five cases

File: http://ttfinfo.desy.de/TTFelog/data/2011/05/06.02_M/2011-02-06T23:12:43-01.pdf