

# Goals at this meeting

1. Critical review of beam instrumentation and beam tuning status
2. Make a strategy to achieve the first goal by end of this 2012, planning & coordination and preparation for the second goal
3. Review the training process and suggestions to the dedicated run

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14th ATF2 Project Meeting, KEK, 6/26-28, 2012

# Parameters at ATF2

3.11 Earthquake



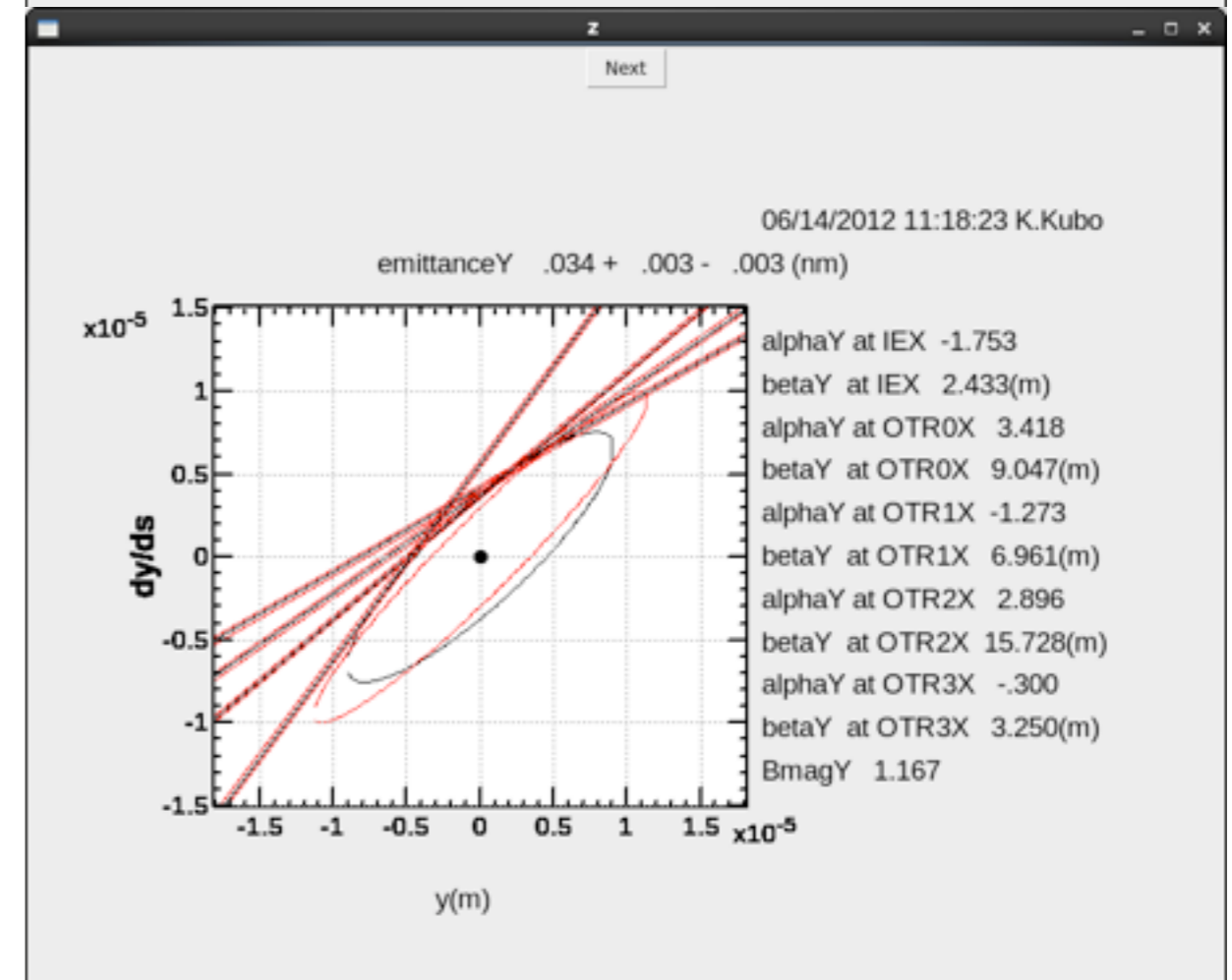
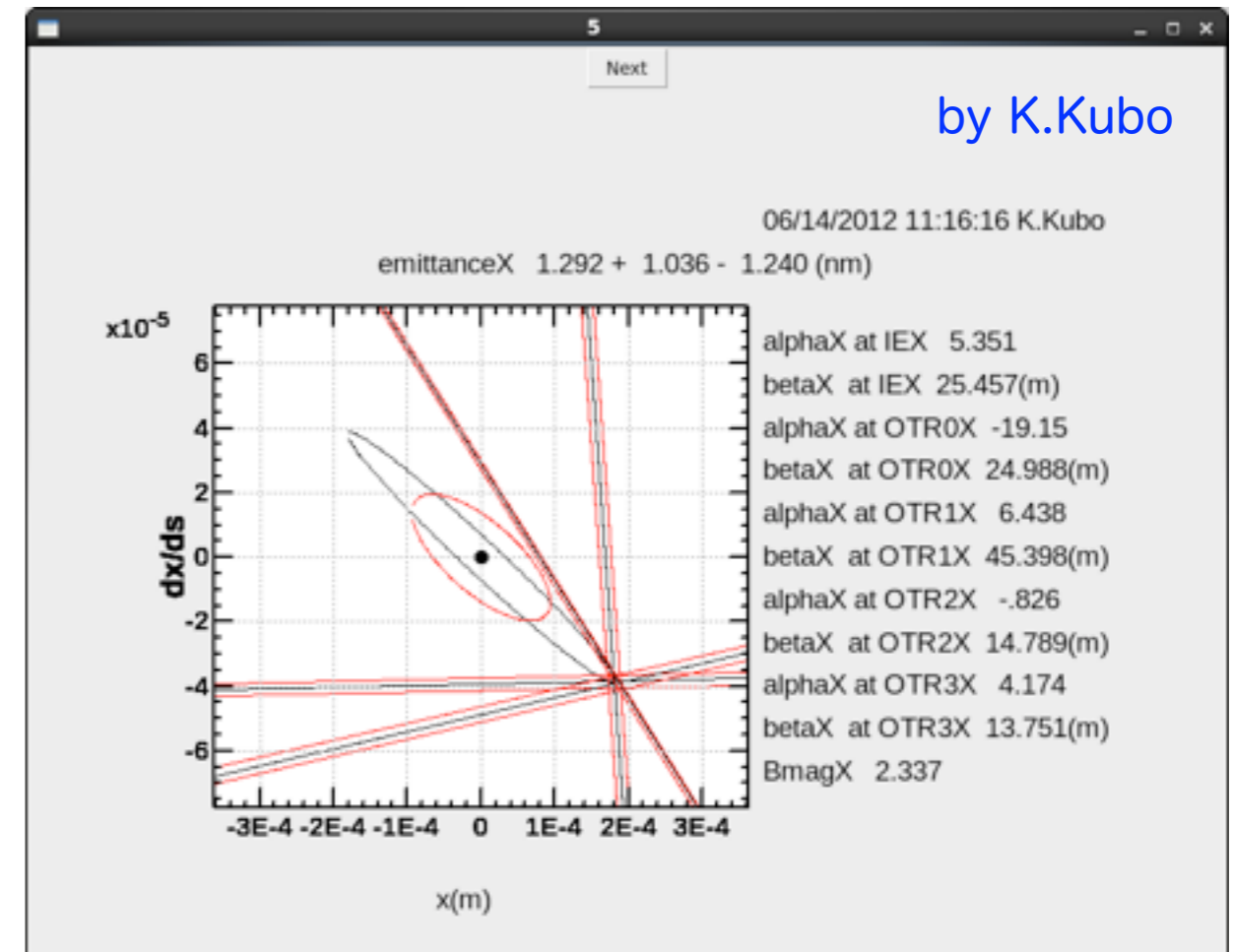
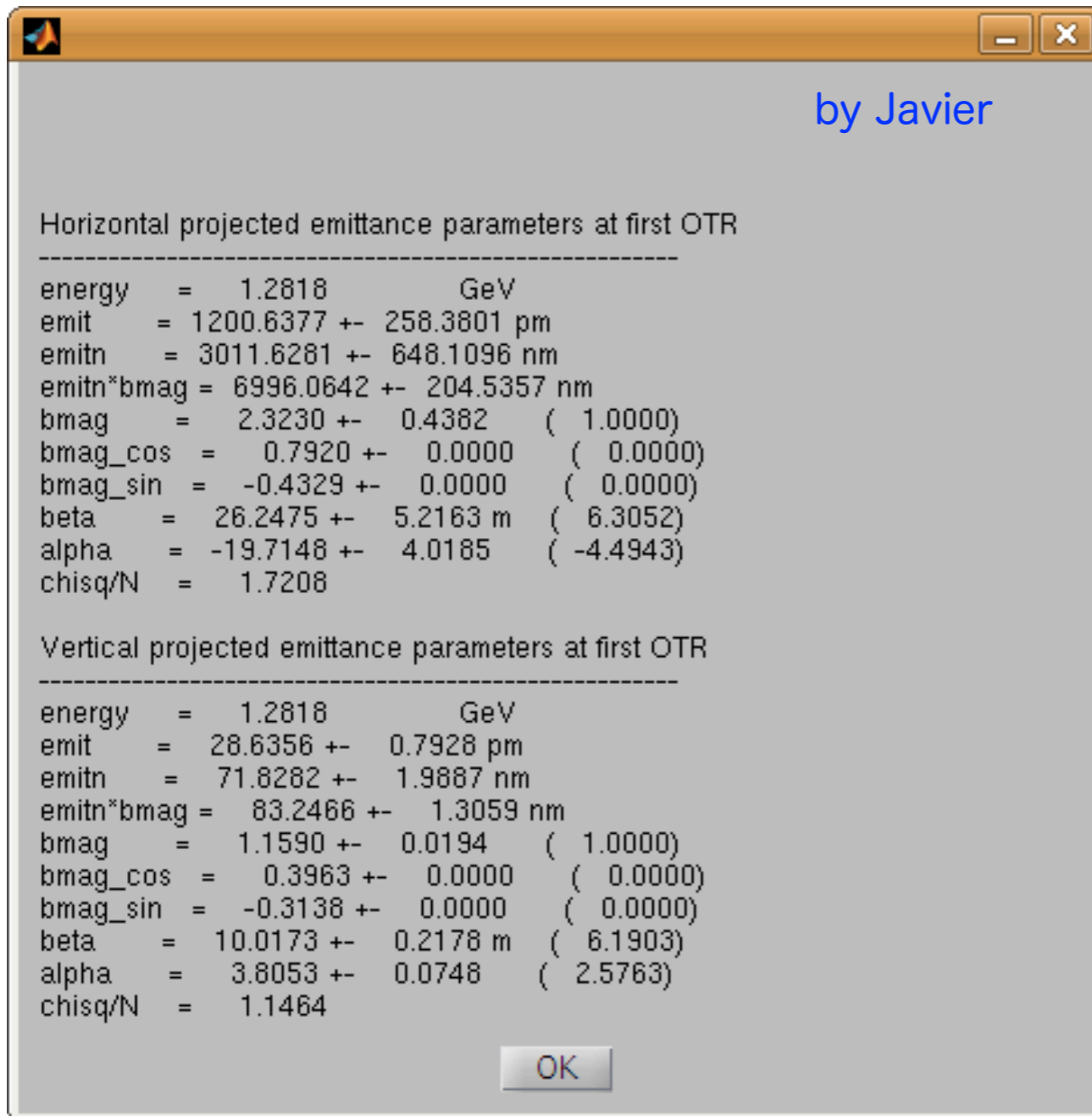
IP Parameter	nominal	May 2010	Feb 2011	Dec 2011	Feb 2012
Beam energy	1.3GeV	1.3GeV	1.3GeV	1.3GeV	1.3GeV
Emittance in x	2 nm	1.7nm	1.8-1.7nm	2nm	1.8nm
Emittance in y	12 pm	<10pm	27-28pm	~50 pm wakefield@mOTR	15.6 pm
Beta function in x	4 mm	4cm	10mm	1cm	4cm
Beta function in y	0.1mm	1mm	0.1mm	0.5mm	0.3mm
beam size in x	2.8 $\mu\text{m}$	~10 $\mu\text{m}$	-	9.2 $\mu\text{m}/2$	11.2 $\mu\text{m}$
beam size in y	35 nm	300 nm 8deg.mode	1.8um@PIP C-wire	850nm 5deg.mode	165nm 30deg.mode

# Emittance reconstruction

good agreement with Javier and Kubo, 14 June, 2012

	Javier	Kubo
emitx	1.2nm	1.3nm
bmagx	2.32	2.34
emity	28.6pm	34pm
bmagy	1.16	1.17

by K.Kubo



1 2012						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Emittance growth study at the extraction line as a function of intensity, y' bumps around BS1X, w/ & w/o the 2nd kicker - strong intensity dependence observed  
 Beam Based Alignment (BBA) at FFS - found large offset (~1mm) at sextupoles

Re-alignment of septum's, especially septum-3 - 0.5mr vertical kick confirmed  
 - to correct it, the 1'st kicker rotated 60mr (counter-clockwise)

We found and confirmed the wakefield effects at the m-OTRs (1/25), i.e. resolved the large emittance growth and the ceiling of beam size of about 1um in December.  
 IPBSM : 420nm by 2-8 deg. mode

2 2012						
Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

Emittance growth by vertical bumps ( $\pm 0.5, 1\text{mm}$ ) at septums - no significant effect  
 FF Optics of  $10(\beta^*_x) \times 5(\beta^*_y)$  and  $10(\beta^*_x) \times 10(\beta^*_y)$  for IPBSM commissioning  
 IPBSM : first test with beam-lock (BeamLok, i.e. pointing lock) system,  
 the view-port window damaged

Trouble of DR cooling system - recovered by replacing the controller unit (2/14)  
 IPBSM : w/ reduced intensity by 60% to avoid destroying the viewport, mirrors  
 - large intensity imbalance if two laser beams - cured by replacing a damaged prism  
 - 3.89 to 7.32 to 30 deg. mode :  $M=0.402, 202\text{nm}$  (2/17)

Angular jitter (1st kicker) was measured to be  $3.5 \times 10^{-4}$  (2/20) w/o the 2nd kicker.

OTR3X has very large horizontal position dependence of beam size and intensity.

IPBSM : FF Optics of  $10(\beta^*_x) \times 3(\beta^*_y)$

- 3.89 to 8 to 30 deg. mode :  $M=0.522, 165\text{nm}$  (9 measurements, 2/23)
- beam size as a function of SK1FF strength for non-linear correction
- checked 174 deg. mode ; no modulation seen
- laser was not stable, so laser wire (LW) scan was frequently needed, i.e. once/hour

other R&Ds :  
 Cavity Compton (DR)

10x10 optics

### Laser wire scan (online)

2-8 mode, 30 mode wire

Crossing Angle 7.32 [degree] Prism Position -2.00

#### Upper patl

11:48:31 Laserwire range scan program fi

Center	Range	Step	Nread
11.3455	0.0100	0.0005	3

Mirror 1X: Original 11.3458  
Present 11.3455  
Fit peak 11.3455

Intensity Cut [e9] 5.000 <1 < 15.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120217\_114521.dat

#### Lower patl

11:43:41 Laserwire range scan program finished.

Center	Range	Step	Nread
8.9227	0.0100	0.0005	3

Mirror 2X: Original 8.8737  
Present 8.9227  
Fit peak 8.9227

Intensity Cut [e9] 5.000 <1 < 15.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120217\_114034.dat

7.32 deg.

### Laser wire scan (online)

2-8 mode, 30 mode wire

Crossing Angle 7.32 [degree] Prism Position -2.00

#### Upper patl

15:45:31 Laserwire range scan program fi

Center	Range	Step	Nread
11.0455	0.0200	0.0010	3

Mirror 1X: Original 11.0543  
Present 11.0566  
Fit peak 11.0566

Intensity Cut [e9] 1.000 <1 < 10.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120217\_154227.dat

#### Lower patl

15:52:49 Laserwire range scan program finished.

Center	Range	Step	Nread
7.4400	0.0200	0.0010	3

Mirror 2X: Original 7.4400  
Present 7.4319  
Fit peak 7.4319

Intensity Cut [e9] 1.000 <1 < 10.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120217\_154944.dat

30 deg.

### ATF2-IP Beam Size Monitor (Online)

Phase Scan Range

Min	Max	Step	Nav
1.00	20.00	1.00	2

Origin Phase Position 3.46  
Current Phase Position 3.56

Mirror 2Y Scan Range

Center	Range	Step
9.7849	0.0050	0.0010

Mirror 2Y Position 9.7845  
Origin 2Y Position 9.7849  
Fit peak 9.7845

Intensity Cut [e9] 5.000 <1 < 15.000

Fit Mode layer 1-5

Crossing Angle 7.32

7.32 deg.

### ATF2-IP Beam Size Monitor (Online)

Phase Scan Range

Min	Max	Step	Nav
1.00	20.00	1.00	2

Origin Phase Position 3.89  
Current Phase Position 4.23

Mirror 2Y Scan Range

Center	Range	Step
10.9026	0.0050	0.0010

Mirror 2Y Position 10.9026  
Origin 2Y Position 10.9026  
Fit peak 10.9026

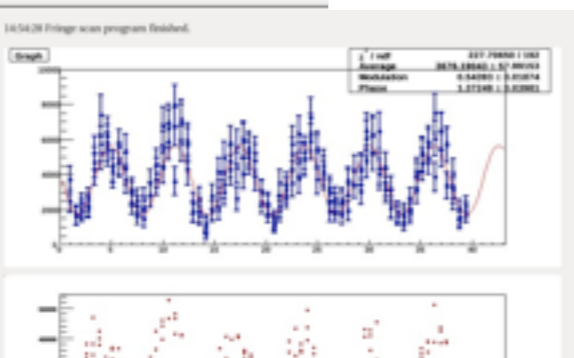
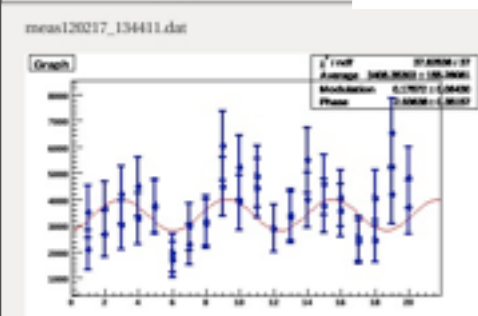
Intensity Cut [e9] 1.000 <1 < 10.000

Fit Mode layer 1-4

Crossing Angle 7.32

30 deg.

13:44:59 Z scan program finished.



Phase Scan Range

Min	Max	Step	Nav
1.00	40.00	0.40	5

Origin Phase Position 3.27  
Current Phase Position 3.46

Intensity Cut [e9] 5.000 <1 < 15.000

Fit Mode layer 1-5

Collision Angle 7.32

Modulation 0.544 +/- 0.019  
Beam Size 726.550 +/- 11.424  
Average 3676.19 +/- 57.992  
Phase 1.372 +/- 0.040

16:21:58 Z scan program finished.

2Y position

File	Value
meas120217_158010.dat	10.9776
meas120217_158011.dat	10.9776
meas120217_158012.dat	10.9776
meas120217_158013.dat	10.9776

M=0.4

### Fringe Scan 30 degrees

16:31:04 Fringe scan program finished.

Phase Scan Range

Min	Max	Step	Nav
1.00	40.00	0.40	5

Origin Phase Position 3.25  
Current Phase Position 3.46

Intensity Cut [e9] 1.000 <1 < 10.000

Fit Mode layer 1-4

Modulation 0.397 +/- 0.017  
Beam Size 204.400 +/- 2.542  
Average 2299.11 +/- 28.751  
Phase 2.573 +/- 0.043

# Laser wire scan (online)

2-8 mode, 30 mode wire

FileSelect

Crossing Angle 7.99 [degree] Prism Position -2.97

## Upper patl

10:20:52 Laserwire range scan program fi

Center	Range	Step	Nread
11.1407	0.0100	0.0005	3

Copy present position to center

Mirror 1X: Original	11.1404
Present	11.1407
Fit peak	11.1407

Copy fit peak to center

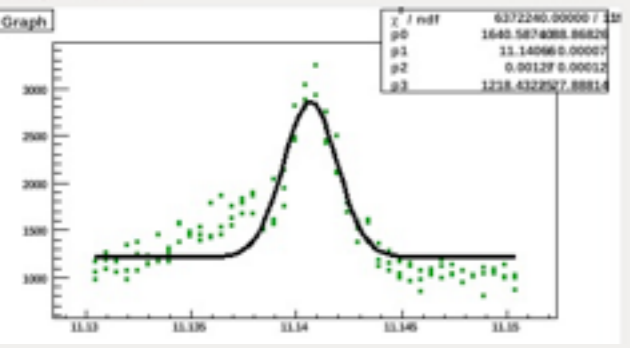
8 deg.

Intensity Cut [e9] 4.000 < I < 10.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120222\_101758.dat

### Energy deposit



## Lower patl

10:31:04 Laserwire range scan program finished

Center	Range	Step	Nread
9.1765	0.0100	0.0005	3

Copy present position to center

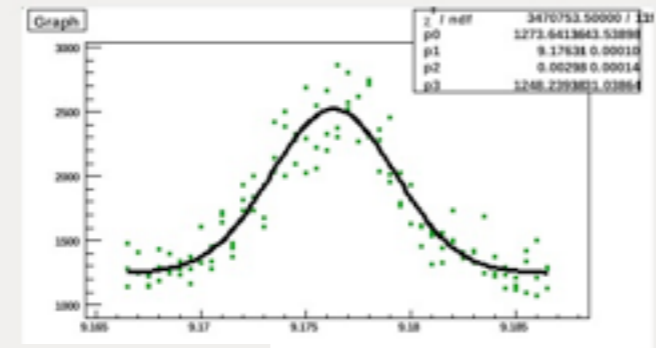
Mirror 2X: Original	9.1803
Present	9.1763
Fit peak	9.1763

Copy fit peak to center

Intensity Cut [e9] 1.000 < I < 10.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120222\_102810.dat



# 2012.2.22 Day Shift (online)

## Upper patl

14:08 Recalculated upper path.

Center	Range	Step	Nread
10.9187	0.0100	0.0005	3

Copy present position to center

Mirror 1X: Original	10.9172
Present	10.9187
Fit peak	10.9187

Copy fit peak to center

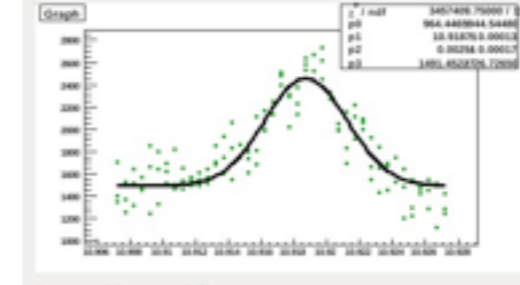
30 deg.

Intensity Cut [e9] 4.000 < I < 10.000

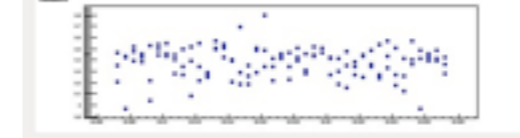
Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120222\_140513.dat

### Energy deposit



### Laser and Beam stability



Check Peak Position Start Stop

## Lower patl

14:15:03 Recalculated lower path.

Center	Range	Step	Nread
7.5923	0.0100	0.0005	3

Copy present position to center

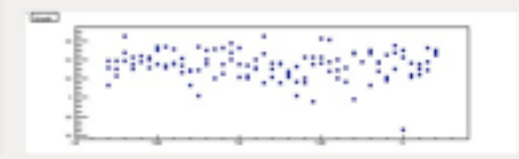
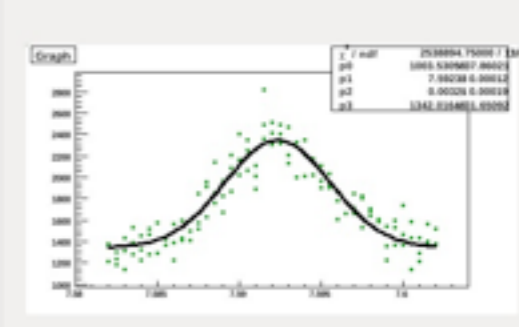
Mirror 2X: Original	7.5940
Present	7.5923
Fit peak	7.5923

Copy fit peak to center

Intensity Cut [e9] 4.000 < I < 10.000

Fit Mode layer 1-4 Recalculation

Saved: /atf/data/ipbsm/lwscan/ lwscan\_meas120222\_141157.dat



# ATF2-IP Beam Size Monitor (Online)

Phase Scan Range

Min	Max	Step	Nav
1.00	20.00	1.00	1

Origin Phase Position 7.36  
Current Phase Position 7.73

Intensity Cut [e9] 3.000 < I < 10.000

Fit Mode layer 1-4

Crossing Angle 7.99

8 deg.

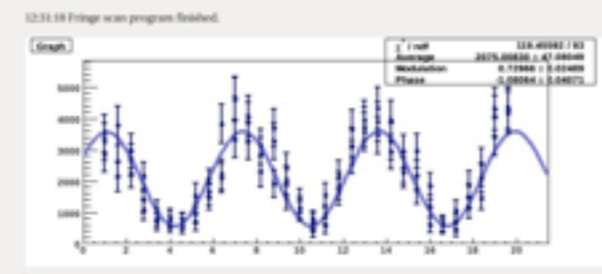
Mirror 2Y Scan Range

Center	Range	Step
9.9330	0.0200	0.0020

Copy present position to center

Mirror 2Y Position	9.9336
Origin 2Y Position	9.9352
Fit peak	9.9336

## Fringe Scan 2-8 degrees



Phase Scan Range

Min	Max	Step	Nav
1.00	20.00	1.00	3

Origin Phase Position 7.37  
Current Phase Position 7.82

Intensity Cut [e9] 4.000 < I < 10.000

Fit Mode layer 1-4

Collision Angle 7.99

Filename: /atf/data/ipbsm/lwscan/lwscan\_meas120222\_102810.dat

Modulation 0.730 +/- 0.025

Beam Size 474.6 +/- 19.5 mm

Average 2075.00 +/- 47.680

Phase -1.061 +/- 0.041

# ATF2-IP Beam Size Monitor (Online)

Phase Scan Range

Min	Max	Step	Nav
1.00	20.00	1.00	1

Origin Phase Position 7.74  
Current Phase Position 2.13

Intensity Cut [e9] 4.000 < I < 10.000

Fit Mode layer 1-4

Crossing Angle 7.99

30 deg.

Phase Scan Range

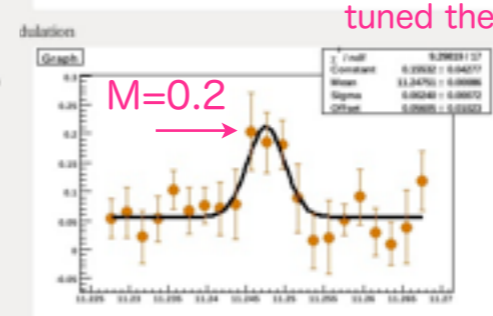
Min	Max	Step	Nav
1.00	20.00	1.00	1

Origin Phase Position 8.29  
Current Phase Position 8.47

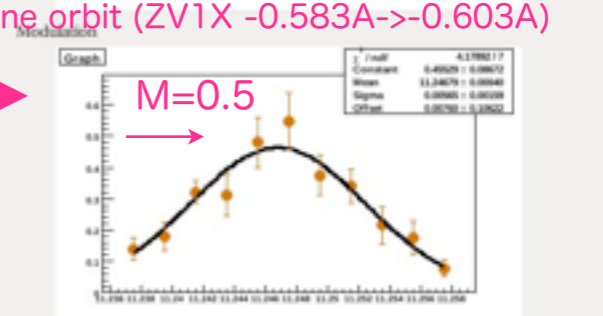
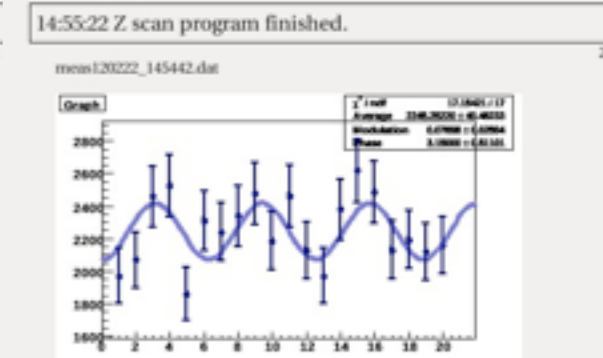
Intensity Cut [e9] 4.000 < I < 10.000

Fit Mode layer 1-4

Crossing Angle 7.99



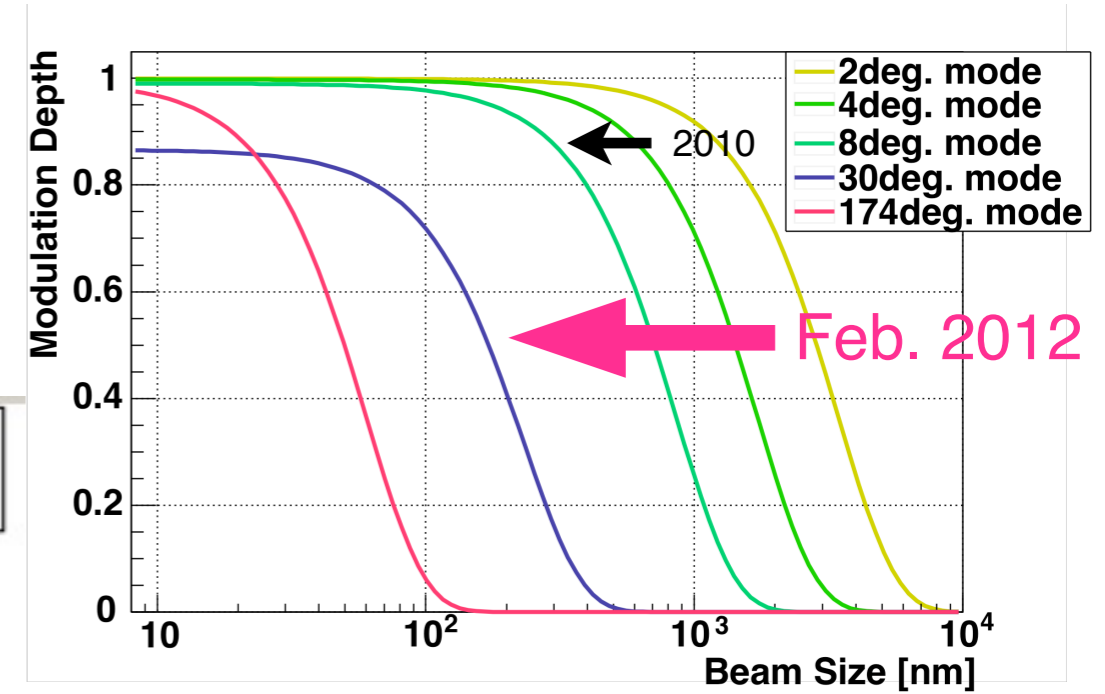
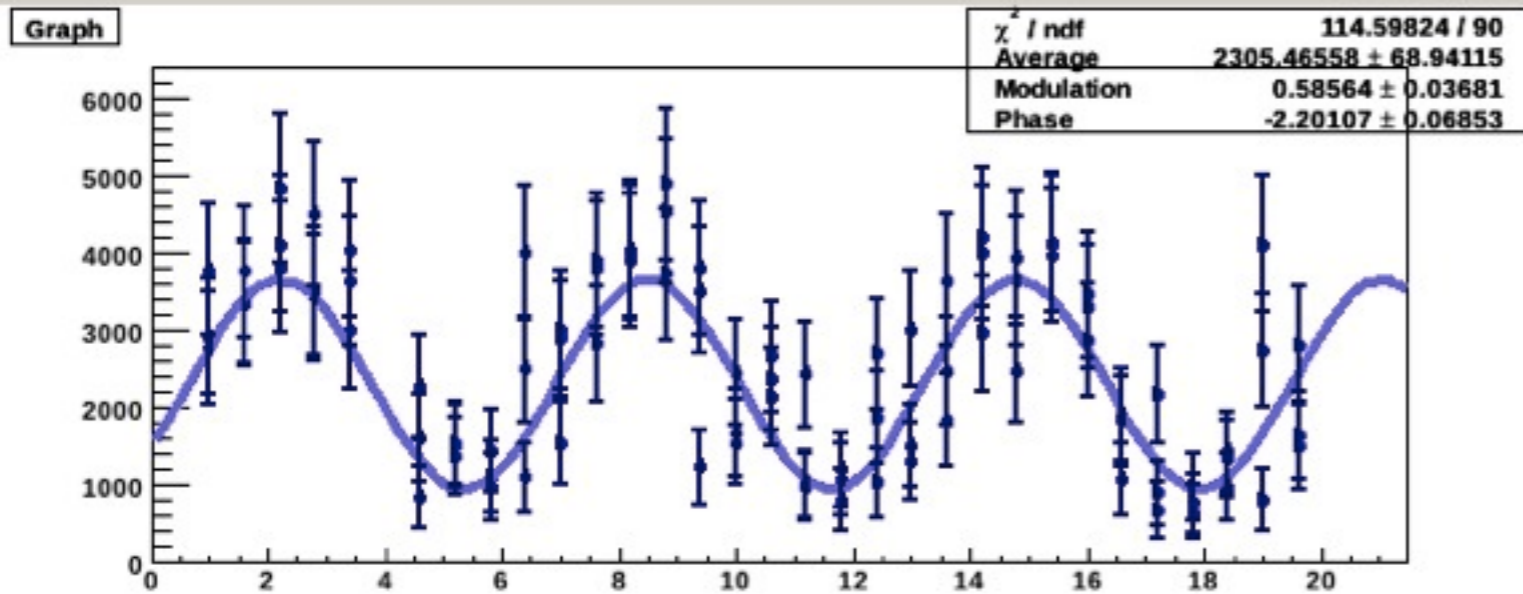
M=0.2



M=0.5

tuned the FF line orbit (ZV1X -0.583A->-0.603A)

# 30 deg mode fringe scan on Feb 23, 2012



$$M = 0.52 \pm 0.010 \text{ (stat)}$$

$$\sigma_y^* = 167.9 \pm 1.8 \text{ (stat) [nm]}$$

2/23: 30 deg	$M$	$\Delta M$	$\sigma_y^*$	$\Delta \sigma_y^*$	avg $E_{sig}$ / beam current [GeV / $10^9 e$ ]
13:12	0.583	0.032	145.55	6.77	2227
13:16	0.480	0.032	177.73	5.55	2293
13:20	0.543	0.037	157.93	7.16	2285
13:22	0.463	0.040	182.91	6.72	2222
13:26	0.586	0.037	144.69	7.86	2306
13:29	0.520	0.040	165.23	7.44	2301
13:32	0.521	0.037	164.86	6.97	2318
13:35	0.532	0.021	159.99	4.024	2198
13:42	0.472	0.021	180.333	3.53	2121

- $10 \beta_x^* \times 3 \beta_y^*$  optics
- S/N  $\sim 1$
- Signal jitter  $\sim 22\%$
- BG fluctuation  $\sim 10\%$

Table 1.2:  $M$  and  $\sigma_y^*$  measured from 9 consecutive stable interference scans at 30 deg mode. Errors are from fitting using a new automated scan software at ATF2 that uses energy deposit from the 4 front detector layers and ON/OFF method

### 3 2012

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

other R&Ds :  
LW OTR (EXT)  
m-OTRs (EXT)  
Low-Q IPBPM (LINAC)  
FONT (EXT)  
Cavity Compton (DR)

### 4 2012

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

other R&Ds :  
LW OTR (EXT)  
UK-BPM (EXT)  
LW (EXT)  
FONT(EXT)  
Cavity Compton (DR)

Slow orbit feedback installed in order to make a flat orbit in both directions at FF

- successfully tested by using ZH8X, ZH9X, ZV9X, ZV10X

IPBSM : laser was too unstable to be use the beam size measurement. (3/7)

- frequently failed to seed the laser, but checked at 6 and 30 deg. modes

IPBSM : half mirror, viewport window were broken - replaced them (vacuum break)

- changed the reducer 2nd lens ( $f=-250\text{mm}$ ) for large spot at viewport window(3/15)
- very large signal fluctuation, so adjusted the rear mirror to align a seeding laser
- 5.72 deg mode;  $M=0.348$ ,  $1.23\mu\text{m}$ ; 30 degree mode checked by LW scan

Repetition rate of all LINAC modulators was changed from 12.5 to 6.25Hz ( 3/16).

- expect good stability of beam at LINAC ( the RF power reduced by half)

The training program was started at orbit tuning at EXT and FF since this April.

IPBSM : rear mirror was exchanged for good profile (3/26)

- first, we could not be operated due to the seeding problem;  $10(\beta^*_x) \times 5(\beta^*_y)$

OTR3 mechanical adjustment was done by  $-\pi$  rotation of mirror for CCD camera.

Change RF frequency (-7kHz) for adjusting to Ring circumference (4/19,9:25)

IPBSM : Seeder was exchanged for good BUT (4/19);  $10(\beta^*_x) \times 1(\beta^*_y)$

- 6 deg. mode,  $M=0.46$ ,  $1\mu\text{m}$ , turning on the slow orbit feedback
- 30 deg. mode : failed the z-scan, i.e. no modulation detected

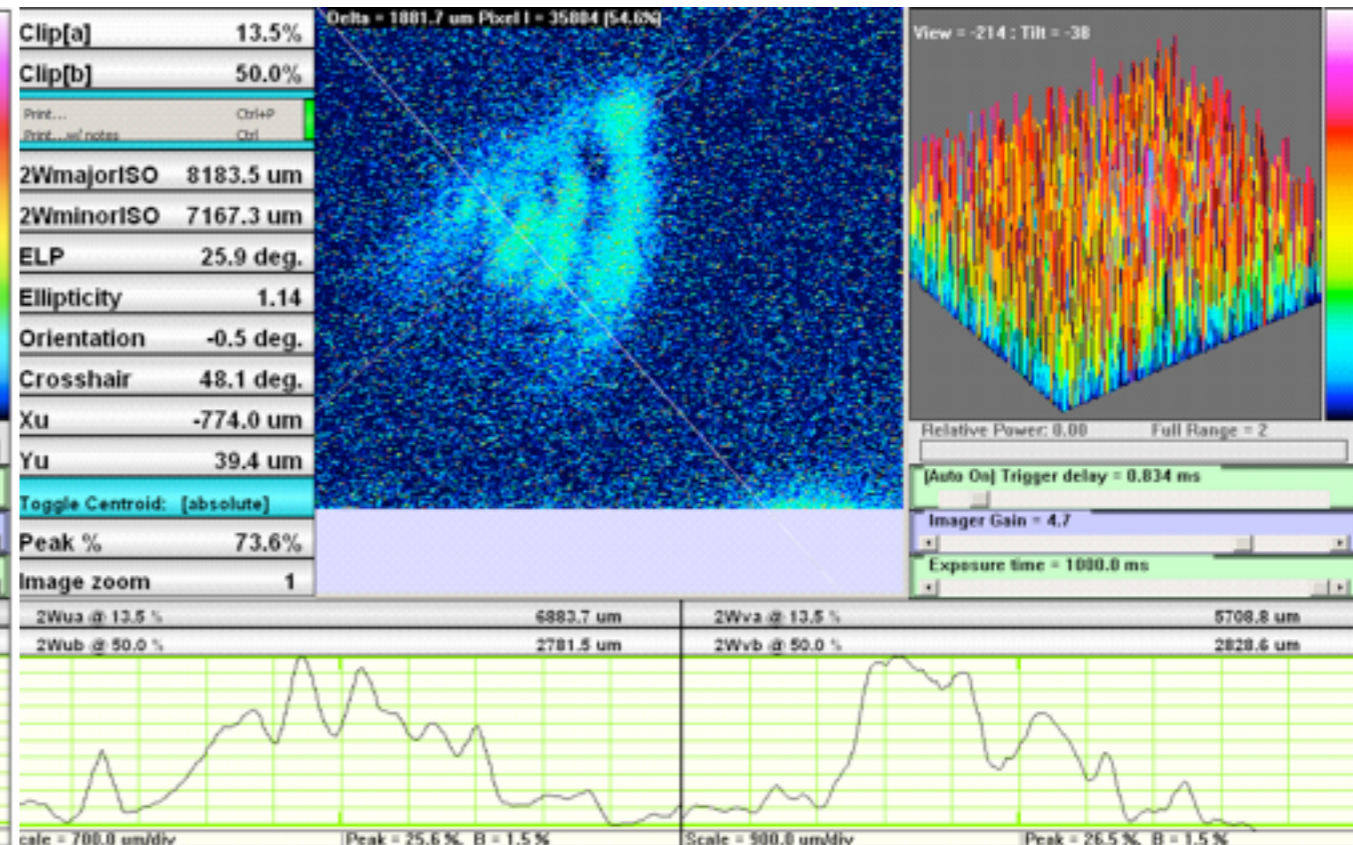
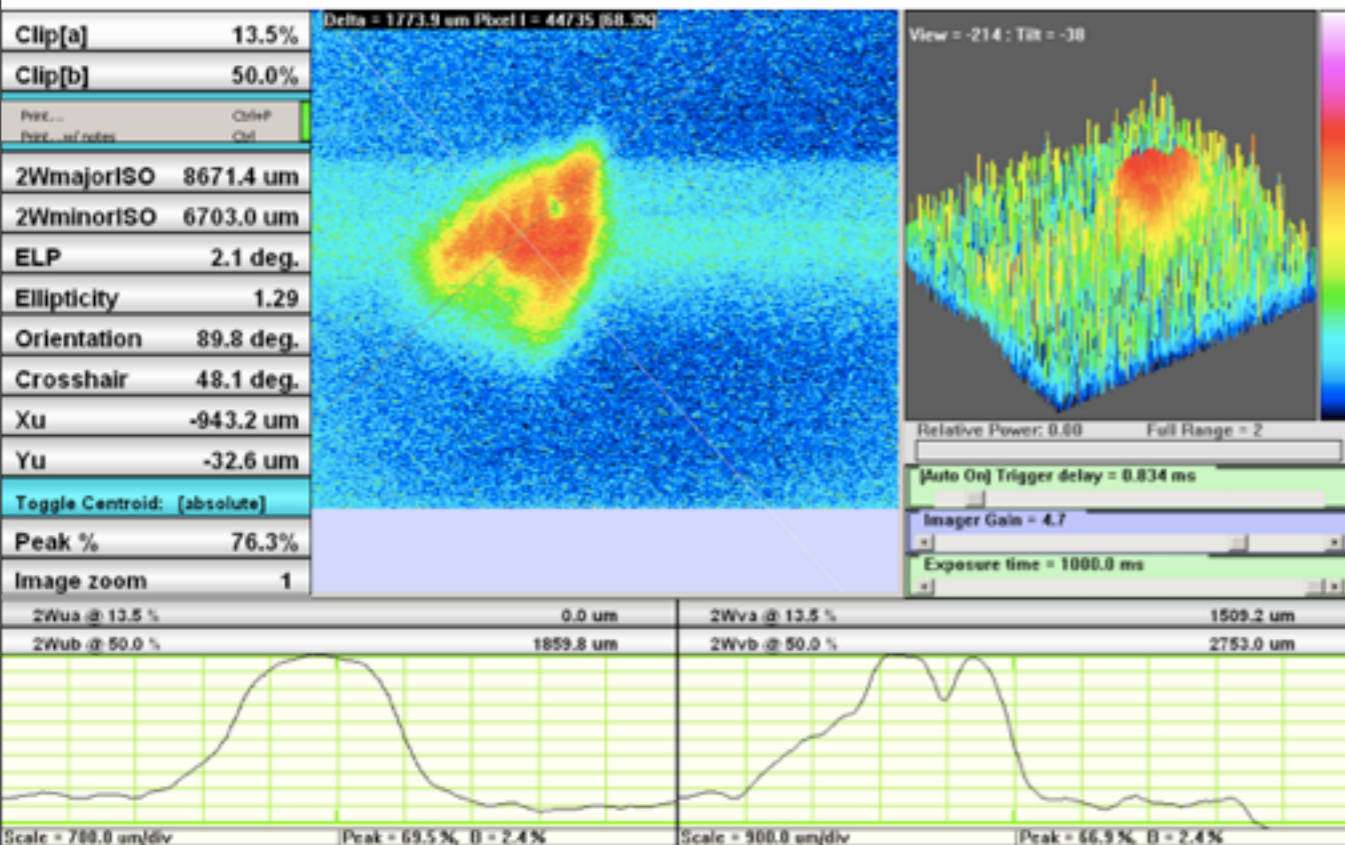
IPBSM : FF Optics of  $10(\beta^*_x) \times 1(\beta^*_y)$  and vertical emittance= $20\text{pm}$  by m-OTR

- laser path drifted on the vertical table due to BeamLok issue, but the profile is OK
- 7.96 deg. mode,  $M=0.758$ ,  $446\text{nm}$  (4/26)
- 30 deg. mode : very small modulation ( $M<0.1$ )
- BeamLok was recovered by adjustment of mirrors downstream of HG;  $M=0.13$  (4/26)
- Large vertical dispersion was found, i.e.  $\max \eta_y=0.2\text{m}$ , due to the slow orbit FB by ZV9X and ZV10X with large vertical orbit at the EXT entrance (4/27)
- Max  $\eta_y=5\text{cm}$  by correction by ZV1X, ZV2X; multiknob responses were reproduced.

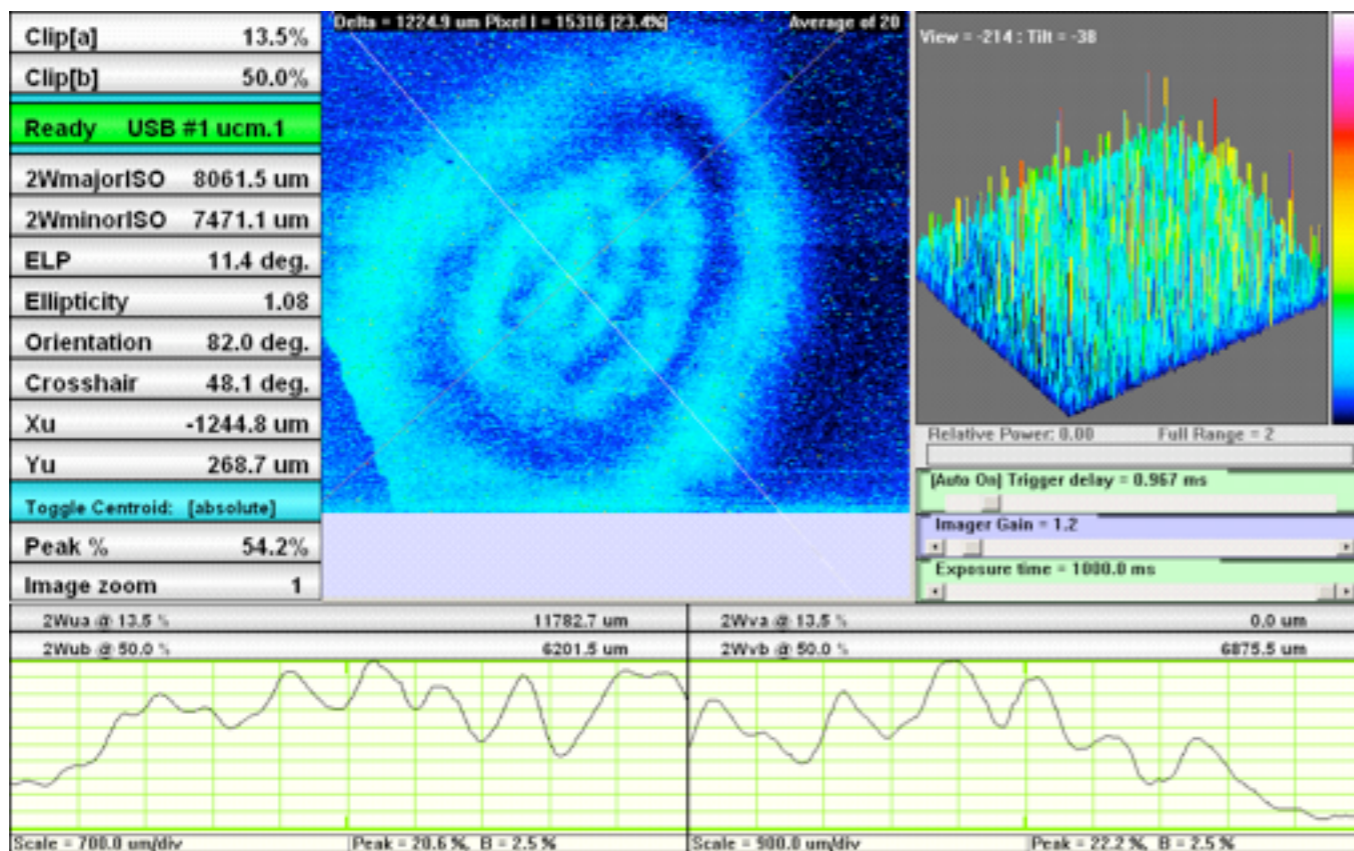


Original reducer 2nd lens (f=-175mm), 3/9

Changed the reducer 2nd lens (f=-250mm), 3/15



Rear mirror was exchanged , 3/26 , at present  
 , i.e. the curvature radius from 5m to 6m



After the exchange:  
**rounder-like profile,**  
 much less "spots"

## 5 2012

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

other R&Ds :  
LW/OTR (EXT)  
FONT (EXT)  
Cavity Compton (DR)

## 6 2012

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

other R&Ds :  
LW/OTR (EXT)  
FONT(EXT)  
Cavity Compton (DR)

weekend  
operation  
for 6/8-11

## DR tuning and DR training (5/15)

During FONT shift, vacuum leak at bellows at downstream of QM11FF(5/16, Owl)

10 x 1 Optics and  $dE/E=0.0008$  calculated by DR-COD

IPBSM :M=0.5 with 4.1 deg. to M=0.5 with 5.95 deg. (5/16. Swing)

- 7.32deg. mode (5/17) beam condition too unstable, orbit fluctuating

- M=0.44 w/ 7.32deg. 847nm; reducer scan d=11.5 to 14mm (5/17)

IPBSM :M=0.22 with 4.58 deg. for too small w/ 7.32 deg. (5/22. Swing)

During FONT shift, vacuum leak again (5/23, Owl)

Beam storage is very bad for the DR tune on the resonance ( 5/23, Swing)

Linac 1428.011MHz->1428.005 & temp. 29.15->29.40->29.35 deg.C (5/24, day)

Training for IP tuning (5/24, day) ; EXT/FF optics check by M-OTR ,IP carbon wire

Extraction kicker strength scan : set to 44000, emitx,  $y=2.7\text{nm}$ , 21pm (6/6, Day)

emitx=3.4nm,  $\text{betax}^*=36\text{mm}$  by QF1FF scan,

$\text{betay}^*=0.17\text{mm}$  assuming  $\text{emiy}=22\text{pm}$ ,  $Ey^*=0.7\text{mm}$  by QD0FF scan (6/6, Swing)

BBA was done for 5 FF sextupoles(6/6, Swing);SD4FF moved in y(858.6um) (6/7,Day)

IPBSM : commissioned w/ 10x1 optics (6/7, Swing)

- M = 0.899 , beam size : 338.5nm w/ 6.41deg.

- when switched to 30 deg.,mirror rotation stage(upper path) was broken (6/7 Swing)

- it was "cured" by slowing down the rotating speed (6/8 Day)

- M=0.4 w/ 6.4 deg. , changing to 30 deg. no modulation seen ( M<0.1, 6/8 Swing)

Linac 1428.005MHz->1428.000 & temp. 29.3->29.7 deg.C (6/9,Swing)

- M=0.54 (690nm) w/ 7.78deg., M=0.34 w/ 30deg. , i.e. 225nm (6/10, Day)

emitx=2.99nm,  $\text{betax}^*=26\text{mm}$  by QF1FF scan,

$\text{betay}^*=0.16\text{mm}$  assuming  $\text{emiy}=20\text{pm}$  by QD0FF scan (6/11, Swing)

emitx=1.6nm,  $\text{bmagx}=2.27$ ,  $\text{emity}=35.9\text{pm}$ ,  $\text{bmagy}=1.13$  by M-OTR ( 6/12,Day)

FF sexupole alignment (FFTB method)

IPBSM : M=0.6 w/ 6.3 deg. and M=0.9 w/ 4 deg., i.e.  $\text{sigmay}=583\text{nm}$  (6/14,Swing)

- M=0.35 w/ 30deg. ,  $\text{sigmay}=220\text{nm}$  (6/14,Swing)

2012.6.14 Swing Shift 10x1 optics

Rotation Control | TD2 FineDelay | LW28 | LW30 | LW174 | Fringe28 | Fringe30 | Fringe174 | Zscan28 | Zscan30 | Zscan174 | 2-8

Laser Bulbup 3.003

Laser Beam Timing 201

Cal Energy 12524.801

Laser shutter

Laser attenuator

Gamma shutter

Gamma detector

ON 498.90 V

500.00 V

Reducer 17.00 mm

Present	Set	Step
IX 10.4077	0.0001	Down Up
IY 9.0917	0.0001	Down Up
IX 9.0918	0.0001	Down Up
IY 8.83524	0.0001	Down Up
IX 3.8000	0.0001	Down Up
IX 4.7000	0.0001	Down Up

4 deg. .01 [degree] Prism Position 6.00

Save present position of mirror IX and ZX, as references Reference: IX: 10.4080 ZX: 9.0914

Upper path

Intensity Cut [eV] 2.000 < 1 < 20.000 3.250

Signal Type layer 1-4 Recalculation

Move lower laser; reference ZX + 0.1 Target: 9.19144

Copy present value of ZX to the scanning center 10.4077

Select range and step

Center	Range	Step	Nread	Present
10.4077	0.0200	0.0010	10	10.4077
Rough	0.0200	0.0010		
Fine	0.0100	0.0005		

Scanning

Saved: /atf/data/ipbss/hwscan/hwscan\_meas120614\_233826.dat

Set the fit peak value to the scanning center and move there 10.4077

Move mirror ZX to the reference Target: 9.0914

Lower path

Intensity Cut [eV] 2.000 < 1 < 20.000 3.417

Signal Type layer 1-4 Recalculation

Insert upper shutter to the close upper path Laser shutter is ejected

Copy present value of ZX to the scanning center 9.09182

Select range and step

Center	Range	Step	Nread	Present
9.0918	0.0200	0.0010	10	9.0918
Rough	0.0200	0.0010		
Fine	0.0100	0.0005		

Scanning

Saved: /atf/data/ipbss/hwscan/hwscan\_meas120614\_233826.dat

Set the fit peak value to the scanning center and move there 9.0918

Eject laser shutter from the upper path Laser shutter is ejected

g2 = 0.0602517 +/- 0.000249517  
g3 = 862.48 +/- 12.3002  
Back to move original position: -0.02 + 9.07144  
Back to move original position: + 9.09144

Rotation Control | TD2 FineDelay | LW28 | LW30 | LW174 | Fringe28 | Fringe30 | Fringe174 | Zscan28 | Zscan30 | Zscan174 | 2-8

Laser Bulbup 3.003

Laser Beam Timing 201

Cal Energy 29488.432

Laser shutter

Laser attenuator

Gamma shutter

Gamma detector

ON 498.90 V

500.00 V

Reducer 19.00 mm

Present	Set	Step
IX 11.8300	0.0001	Down Up
IY 10.2800	0.0001	Down Up
ZX 7.5849	0.0001	Down Up
ZY 9.94	0.0001	Down Up
SX 3.8000	0.0001	Down Up

30 deg. 30.0 [degree] 6.00

Save present position of mirror IX and ZX, as references Reference: IX: 11.8300 ZX: 7.5849

Upper path

Intensity Cut [eV] 2.000 < 1 < 20.000 3.252

Signal Type layer 1-4 Recalculation

Move lower laser; reference ZX + 0.1 Target: 7.6911

Copy present value of ZX to the scanning center 11.8300

Select range and step

Center	Range	Step	Nread	Present
11.8278	0.0200	0.0010	3	11.8300
Rough	0.0200	0.0010		
Fine	0.0100	0.0005		

Scanning

Saved: /atf/data/ipbss/hwscan/hwscan\_meas120615\_001936.dat

Set the fit peak value to the scanning center and move there 11.8278

Move mirror ZX to the reference Target: 7.5910

Lower path

Intensity Cut [eV] 2.000 < 1 < 20.000 3.282

Signal Type layer 1-4 Recalculation

Insert upper shutter to the close upper path Laser shutter is ejected

Copy present value of ZX to the scanning center 7.5849

Select range and step

Center	Range	Step	Nread	Present
7.5849	0.0200	0.0010	3	7.5849
Rough	0.0200	0.0010		
Fine	0.0100	0.0005		

Scanning

Saved: /atf/data/ipbss/hwscan/hwscan\_meas120615\_002231.dat

Set the fit peak value to the scanning center and move there 7.5849

Eject laser shutter from the upper path Laser shutter is ejected

Wait update mean data.  
Get update mean data.

Rotation Control | TD2 FineDelay | LW28 | LW30 | LW174 | Fringe28 | Fringe30 | Fringe174 | Zscan28 | Zscan30 | Zscan174 | 2-8

Laser Bulbup 3.005

Laser Beam Timing 198

Cal Energy 20249.282

Laser shutter

Laser attenuator

Gamma shutter

Gamma detector

ON 498.90 V

500.00 V

Reducer 17.00 mm

Present	Set	Step
IX 10.4380	0.0001	Down Up
IY 9.0917	0.0001	Down Up
ZX 9.0914	0.0001	Down Up
ZY 8.83524	0.0001	Down Up
SX 3.8000	0.0001	Down Up
6X 4.7000	0.0001	Down Up

Zscan 2-8 degrees 4 deg.

Phase Scan Range

Min	Max	Step	Naverage
1.00	20.00	0.40	3

Origin Phase Position 1.2609

Current Phase Position 1.2728

Fit Mode layer 1-4

/atf/data/ipbss/interfere/meas120614\_215411

Graph

Modulation  $M > 0.8$

Energy

Phase

Laser shutter

Laser attenuator

Gamma shutter

Gamma detector

ON 498.90 V

500.00 V

Reducer 19.00 mm

Present	Set	Step
IX 10.4380	0.0001	Down Up
IY 9.0917	0.0001	Down Up
ZX 9.0914	0.0001	Down Up
ZY 8.83524	0.0001	Down Up
SX 3.8000	0.0001	Down Up

Zscan 30 degrees 30 deg.

Phase Scan Range

Min	Max	Step	Naverage
1.00	20.00	0.40	2

Origin Phase Position 1.23711

Current Phase Position 1.2609

Fit Mode layer 1-4

/atf/data/ipbss/interfere/meas120615\_004649

Graph

Modulation  $M = 0.3$

Energy

Phase

Laser shutter

Laser attenuator

Gamma shutter

Gamma detector

ON 498.90 V

500.00 V

Reducer 19.00 mm

Present	Set	Step
IX 11.8300	0.0001	Down Up
IY 10.2800	0.0001	Down Up
ZX 7.5849	0.0001	Down Up
ZY 9.93311	0.0001	Down Up
SX 3.8000	0.0001	Down Up

Fringe Scan 30 degrees

Phase Scan Range

Min	Max	Step	Naverage
1.00	20.00	0.40	3

Origin Phase Position

Current Phase Position

Intensity Cut [eV] 2.000

Fit Mode layer 1-4

Collision Angle 4.00907

Fiberless

Modulation 0.354

Beam Size 218.8

Average 2508.020

Phase 0.930

# Major issues at the 13th ATF2 project meeting

## 1. Commissioning of the 30 degree mode at IPBSM

good collaborate between beam tuning and Tokyo groups

signal, i.e. laser focus is a key issue **done**

background control is a key issue **done**

## 2. Choice of optics, i.e. $\beta^*_x = 1$ cm and $\beta^*_y = 0.1$ mm

background in IPBSM - 2nd collimator in the chamber, **installed**

jitters of incoming beam monitored by BPM system with IPBPMs

## 3. Vertical emittance growth in EXT

DR to EXT ?, e.g. monitoring the orbit and re-reproducibility

## 4. Large coupling correction needed at IP

rotation of IPBSM fringes ? **Alignment of optics system will be checked.**

## 5. Effect of the Multipole components in the FF

especially important for beam with  $\sigma^*_y < 100$  nm

mitigation by 2.5 times nominal horizontal beta function at IP

Just reminder ;

all in vertical direction

$$(\Delta \sigma)^2 = (\eta \delta)^2 + (\xi \delta \sigma_0)^2 + \dots$$

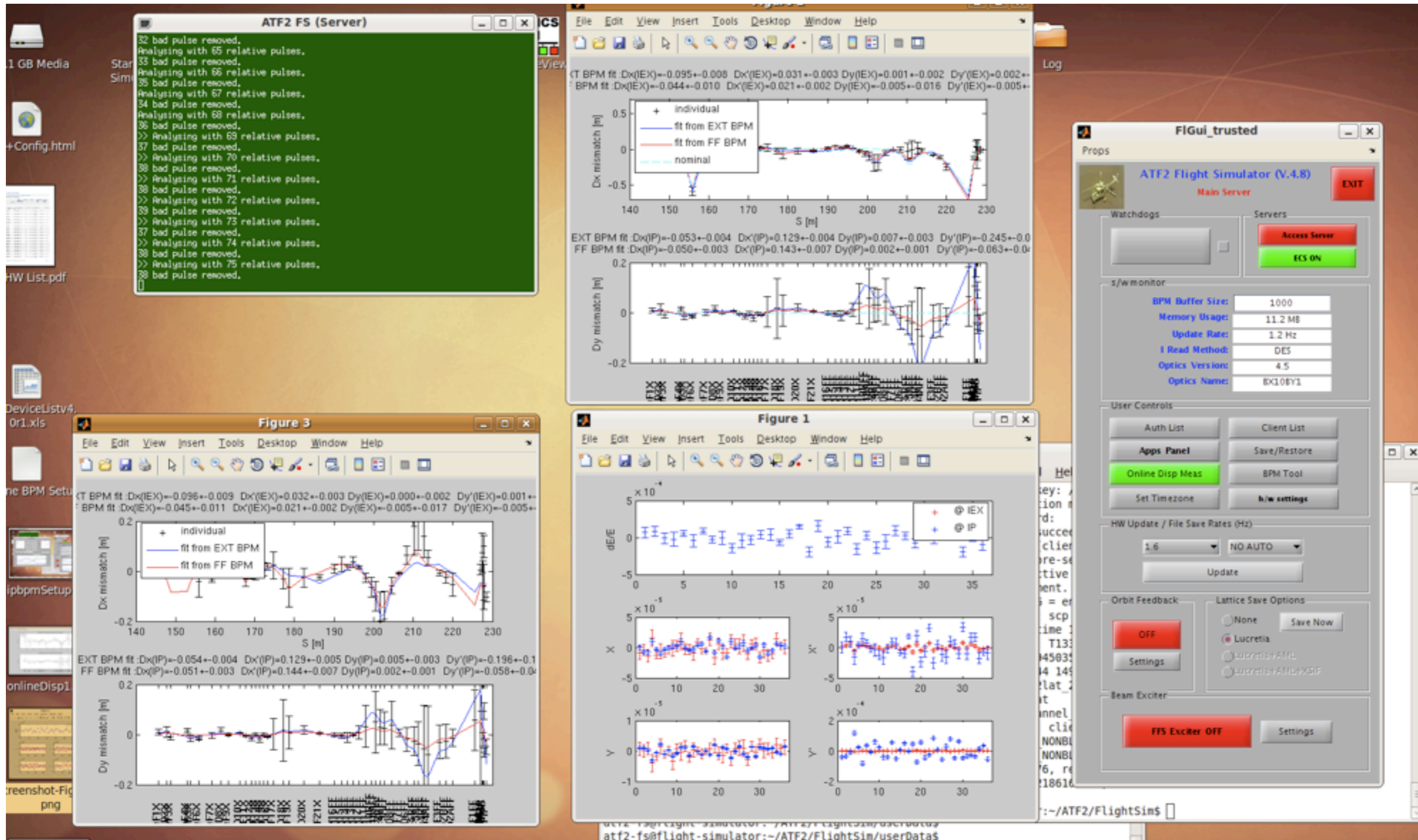
$$\sigma_0 = 37\text{nm} \quad \text{and} \quad \delta (\text{energy spread}) = 0.0008$$

when  $\sigma < 100\text{nm}$ ,

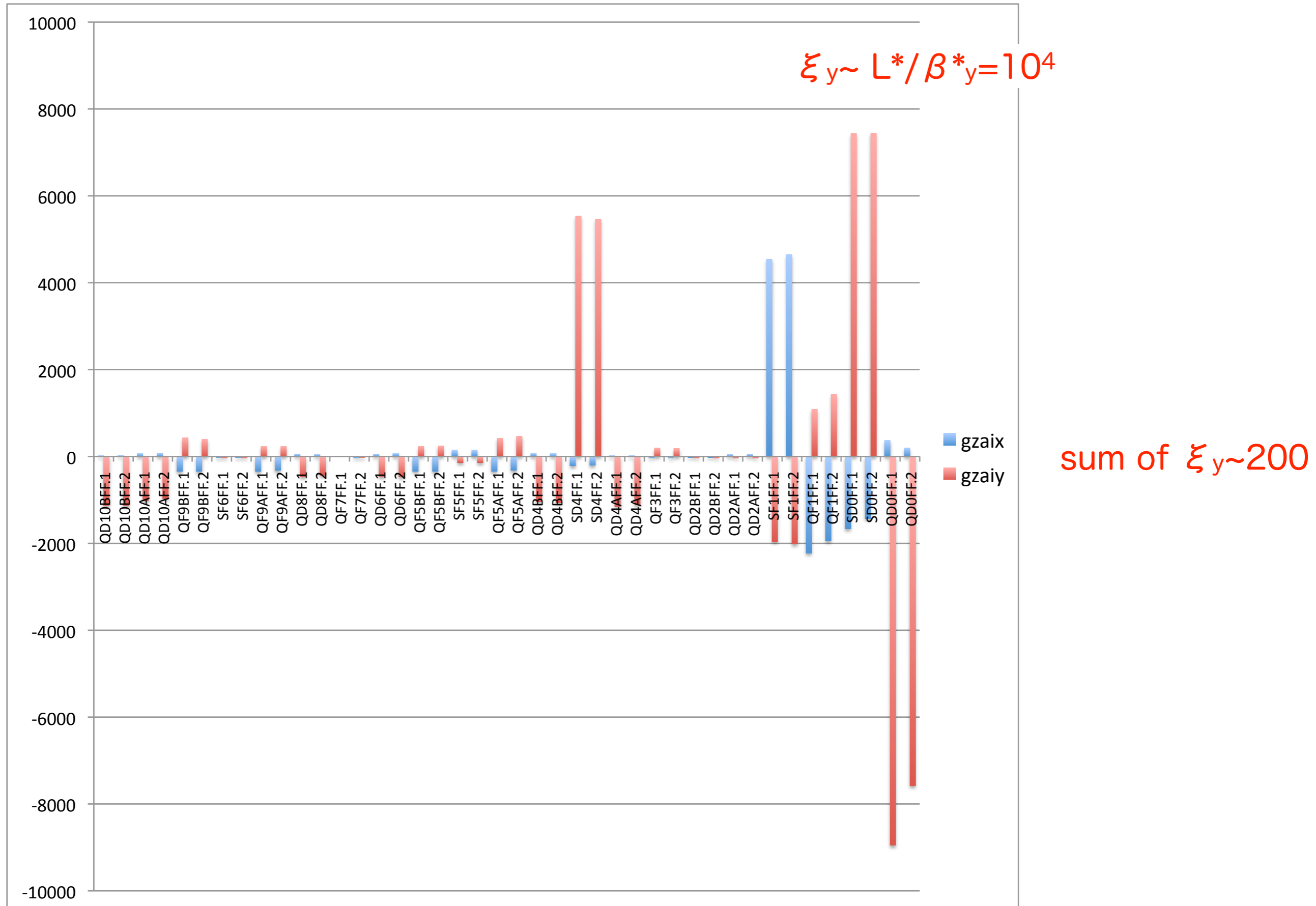
$$\eta < 116 \mu\text{m}$$

$$\xi < 3,125$$

# Online Dispersion Monitoring



# Chromaticity at quadrupole and sextupole magnets at ATF2



# Session Organization

14th Mtg.	26th June, 2012 Tuesday	27th June, 2012 Wednesday	28th June, 2012 Thursday
<p>9:00</p> <p>12:00</p>	<p><b>Introduction</b> greeting, goal at this meeting</p> <p><b>Alignment&amp;DR status</b> circumference change, 3Hz operation, optics, emittance alignment at all beam lines</p>	<p><b>Future prospect</b> IIFA and discussion</p> <p><b>Beam Tuning</b> EXT - IP tuning and discussion</p>	<p><b>Discussion : 1st goal</b> with TB discussions; plan in summer shutdown plan in the dedicated run coordination in the dedicated run etc.</p>
<p>13:30</p> <p>18:00</p>	<p><b>Instrumentation-1</b> IPBPM, M-OTR, BPM system and FONT</p> <p><b>Instrumentation-2</b> IPBSM</p> <p><b>Training experiences</b> comments from all students and discussion</p>	<p><b>14th TB/SGC Meeting</b> Opening and status reports of the KEK/LAL Compton, EXT-LW/OTR, ATF2 status and new proposals of ; CLIC-DR kicker, Feedforward (GM sensors), and new final doublet</p> <p><b>18:30 - Banquet</b></p>	<p><b>Discussion : 2nd goal</b> IPBPM : electronics, design, production, IP new chamber, FONT for IP feedback and milestones/schedule until the installation</p> <p><b>Summary</b></p>