

Comments on Beam Tuning training and the Autumn Run

14th ATF2 Project Meeting

June 26, 2012

KEK, Tsukuba

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**Comments
and
Suggestions**

Comments on Training (April ~ June, 2012)

Experience

(1) Injection , DR (Kuroda-san, Kubo-san)

(2) BPM (Stewart)

enabled deeper understanding of factors that affect my own(IPBSM) shifts

(3) EXT , FFS tuning (Glen, Okugi-san) :

participated simultaneously with IPBSM shifts

even gave some of my own multiknob scan “lessons”

- **helpful cooperation during continuous FF beam size tuning** (esp. last 2 weeks)
- working together **prevent human errors**

Suggestions

- Many unexpected beam tuning issues, change of plans
→ sometimes **difficult to arrange schedule**
- should have enough **“practice” opportunities**
- **Bigger screens (projector?) for showing**
- Operation manuals **need more “pictures “** for each procedure

Training Materials

Links to training manuals

Beam Size/profile Monitors

X-SR	DR LW	EXT-LW	Screens	Multi-OTR System	ATF2 Laserwire system	Wire Scanners	IP-BSM, Shintake Monitor
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Power Supplies

[High Availability PS](#) (ATF2 FFS Quad, Sext, Bends)

Magnet Movers

- [General magnet mover wiki page](#)
- [XPS FAQ](#)

EPICS

[IOC info](#)

[Training](#)

Meetings

- [ATF2 Strategy](#)

Duplicates of Jackie 's personal manuals / notes are also found in IPBSM place


In ATF wiki : GO TO **“TRAINING”**

operation manuals are found here in each category

Introduction Manuals by Experts

- [Overview of software/control system by N.Terunuma](#)
- [ATF startup/DR emittance meas. by S.Kuroda](#)
- [DR emittance tuning by K.Kubo](#)
- [Extraction line matching by M.Woodley](#)
- [EXT+FFS tuning \(G.White\)](#)
- [ATF2 Flight Simulator \(G.White\)](#)
- [IPBSM operation by T.Okugi](#)
- [Cavity BPMs operation by S.Boogert](#)
- [Magnet movers by J.Nelson](#)
- [Electronic Log Eitiquette](#)
- [IPBSM operation by Jacqueline Yan](#) FF beam size tuning using IPBSM + manual for status monitors

Operation manuals, training materials by **teachers**



[ATF/ATF2 Manual](#) : extras

Operation Manuals and Notes (post training)

create your own notes from experience and try them out

Educated students : if you like, please add to these:

It is good practice!!

Jacqueline's beam tuning link notes from (1) FF tuning during IPBSM shifts (2) dedicated training sessions (April ~ June 2012)

[FFS tuning before IPBSM usage](#) :

- disp tuning, beam size tuning on MWIP
- multi-knob tuning
- trouble shooting tips for unstable beam current or orbit

Experts :

please check and provide feedback!!

[more notes on multiknob scan](#) : linear knob scan using IPBSM

[Start up tuning](#) : startup + DR tuning

[BPM](#) : BPM related tuning & study notes

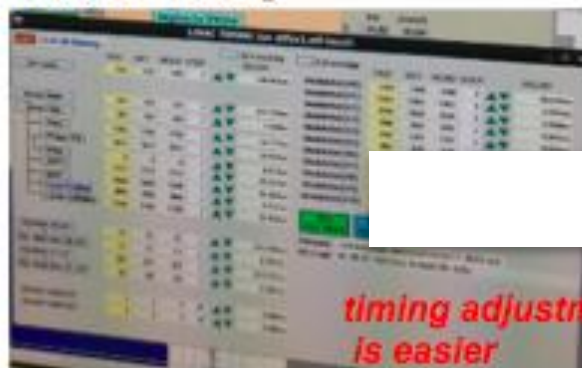
Example of “student notes”

How to treat low and/or unsteady beam intensity

- ◆ adjust RF klystron mainly mod#8

since #8 is the last one, that adjusts beam energy

- First RF timing



timing adjustment is easier

- Then RF phase

If beam fluctuation is too serious, adjust other RF modulators phase, not just #8



Alternative:
adjust injection gun phase

From actual experience during IPBSM shifts and /or from observation of ATF tuning experts

IPBSM manuals

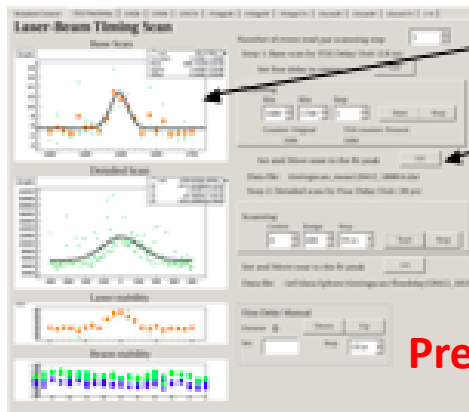
most updated IPBSM operation guide using new scan panels by Jackie (May, 2012)

[IPBSM_manual.pdf](#)

[IPBSM_checklist.pdf](#)

Use these
two as a set

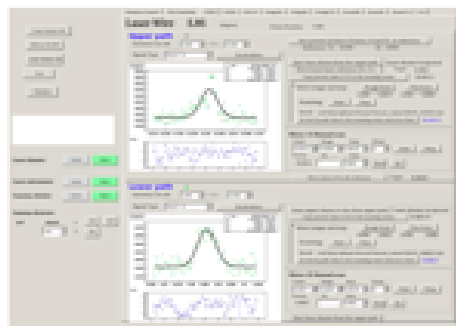
placed to monitor closely when using IPBSM for FF beam



Preliminary
alignment

- Conduct Timing Scan after detection by **laser-wise** mode
- Set to new aligned timing
- Conduct timing scan from time to time throughout shift

scan start:

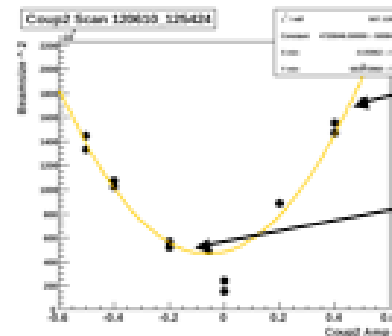


- follow all buttons on scan panel fr
- Warning: don't do copy or peak to center* if scan failed

Multiknob scan using Fringe scan

- select knob scan setting wisely according to watching parabolic response

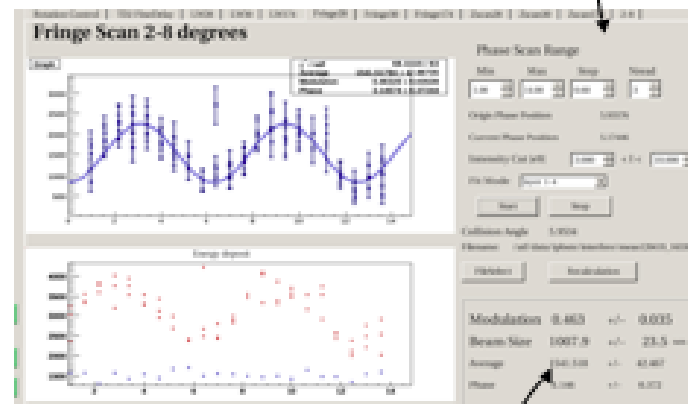
M = 0.5 or so (at best setting) is best for viewing **multiknob** response



Fringe scans for
multi-knob tuning

- Select correct choice of **fringe scan** range: 100 rad, 0.4 or 1.0 rad step, **Step = 3**

(otherwise either doesn't work or will take long time)



- Always watch out average energy is not too low (should be above 1500)

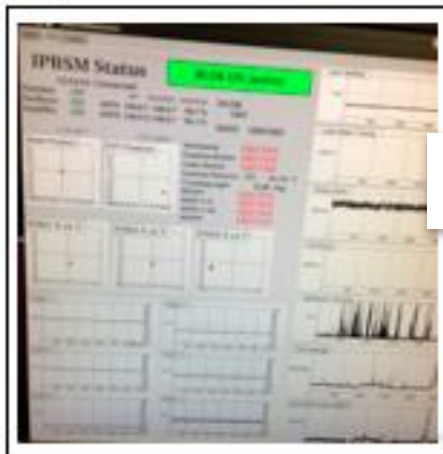
What to pay attention to when using IPBSM

(refer to IPBSM Beam time Operation Manual)

June 12, 2012

Jacqueline Yan ~~Q~~ of Tokyo, IPBSM

Need to pay attention to at all times:



Check laser condition on IPBSM Status Monitor

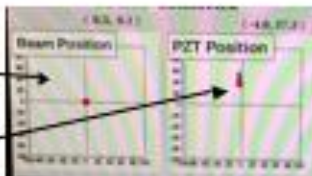
Warning if values exceed tolerance
 (Detailed explanation below)

Beamlok

Beam position should not move from around (0,0)

PET must not go too near edge

PET should be close to center, but not always so...



Beamlok,



Build-up timing
 Laser beam timing
 Laser intensity on

Buildup timing,



PSD 1 (downstream of reducer)
 ±X: 0.5 ± 0.1 [mm]
 ±Y: 0.5 ± 0.1 [mm]
 PSD1 flash yellow
 if exceed by ± 0.5 mm

PSD 5 (upstream of reducer)
 ±X: 7.8 ± 0.1 [mm]
 ±Y: 2.6 ± 0.1 [mm]
 PSD5 flash yellow
 if exceed by ± 1 mm

PSD2 is not currently in use



Beam orbit and current stable??
 ICT should not go below 4.5×10^8

beam current

Towards the Autumn Run

for dedicated ATF2 studies, we need

- **Well arranged shift schedules**

(original experts, operators trained in spring run, new trainees in Autumn)

- **Steady and responsible information sharing**

clear records in wiki logbook, internal reports on progress, ect.....

Request from IPBSM group:

- **We have provided detailed manuals** to use IPBSM for FF beam size tuning

(will be updated after new optics upgrades)

Including which status monitors to beware of

- **We need the same for beam conditions !!**

e.g. Beam orbit, current, RF modulator phase, timing, emittance, dispersion
which BPMs along beamline should we pay attention to especially?

- **clearly written manuals / posters** with pictures for non-experts

- **This will improve tuning efficiency and prevent time loss / waste**

BACKUP