

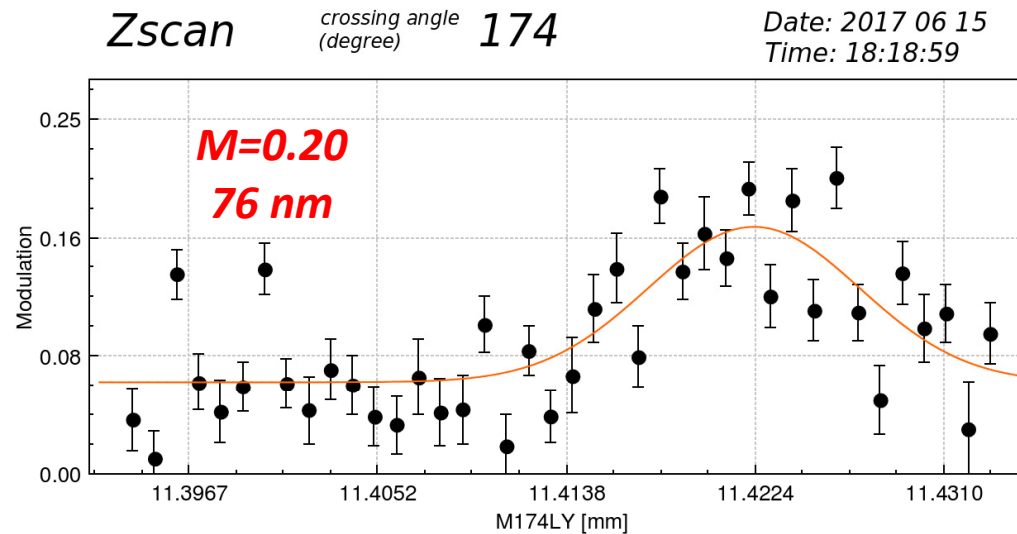
Tentative plan of ATF2 Goal 1 study 2017 Autumn operation

Presented at topical meeting of ATF2 goal 1 at 2017/10/05.

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2017/10/24
LCWS2017, Strasburg (France)

Short summary of 2017 spring run

Final IP Beam Size (2017/06/15)



**We observed the IP-BSM modulation in 174degree mode.
But, the modulation was too small.**

The candidates of the reason

- Is optics mismatch; βY^* large ??

* Since IP divergence was agreed with the model, was $\langle x'y' \rangle$ large ??

* We should confirm the $\langle x'y' \rangle$ with QK coupling knob.

- Is IP beam tilt ($\langle xy \rangle$) large ??

* We should confirm the $\langle xy \rangle$ with QK coupling knob and IP-BSM tilt scan.

- Is Nonlinear aberration large ??

* We should apply the nonlinear knob scan.

- Is IP-BSM systematic error large ??

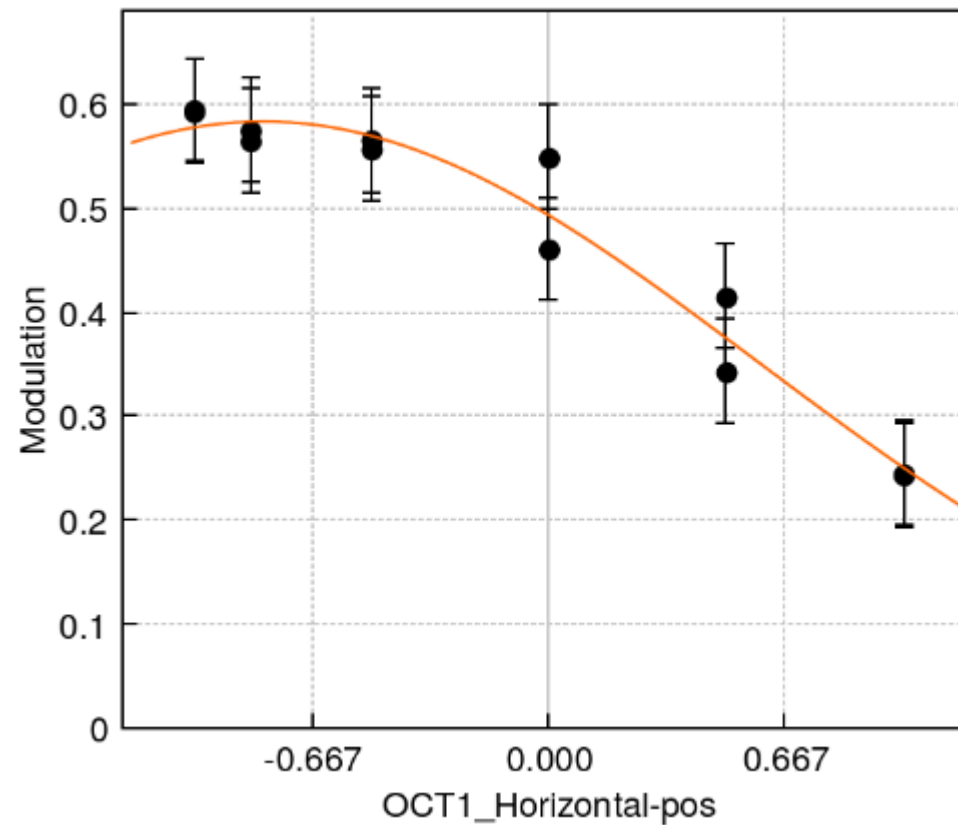
When we put the horizontal offset to octupole, the IP beam size has minimum beam size.



It generated the normal sextupole field.



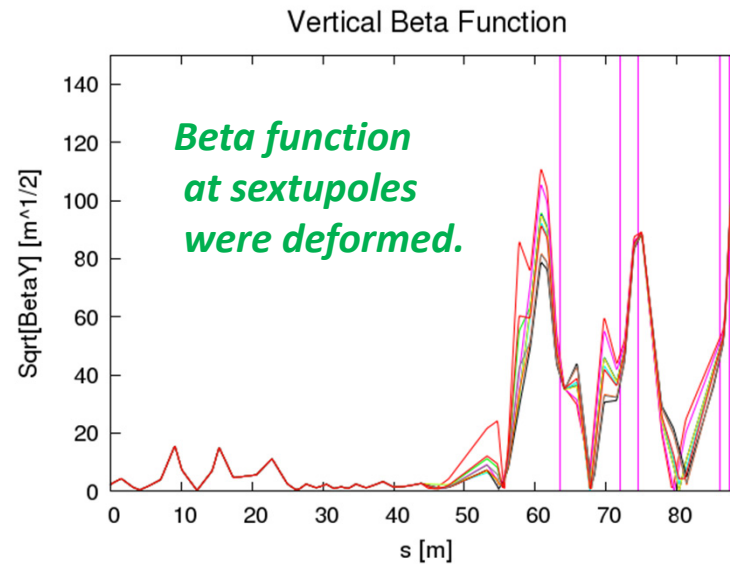
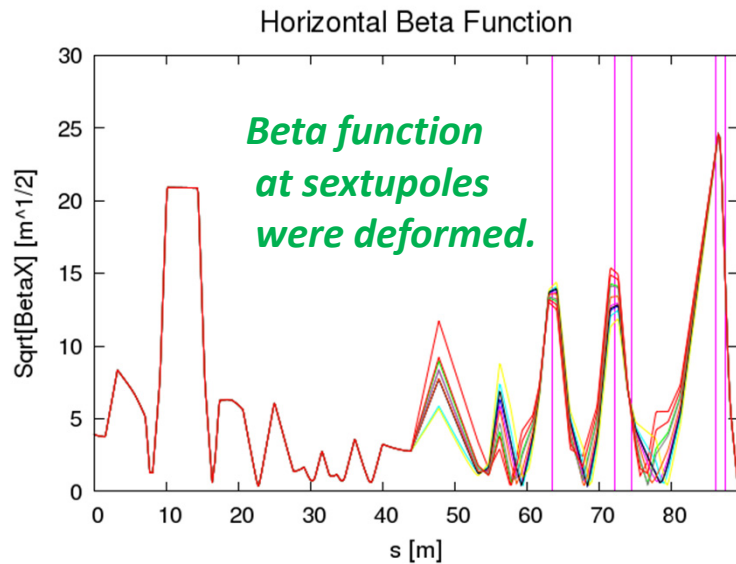
The normal sextupole setting was not optimized.



presented by Fabien Plassard at ATF operation meeting at 2017/06/23

IP beam size simulation with FD errors

- Initial optics was assumed to 10x1 optics.
- 1% of FD strength errors were assumed.
- IP Twiss parameters were matched by changing the matching quads.



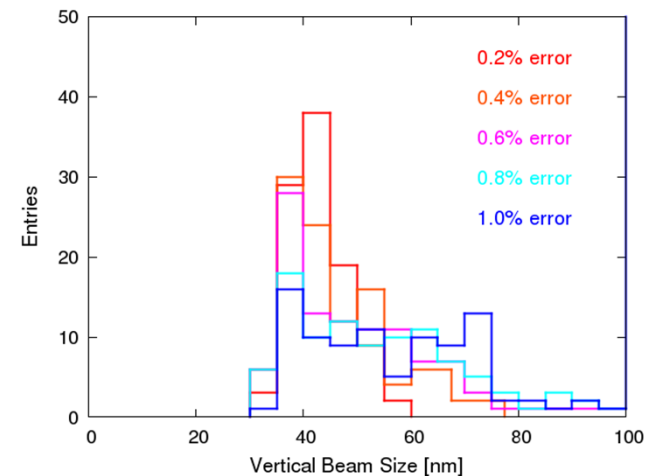
Betas at sextupoles were deformed.



Nonlinear aberration was generated.



IP beam size was good for abnormal sextupole settings.



Tentative plan of ATF2 Goal 1 study

The 3rd operation week of December is special week for ultra-low beta study.

We must proceed the following 3 study items effectively.

- 1) Small beam size tuning at IP*
- 2) IP-BSM setup and systematic study*
- 3) Preparation of ultra-low beta study (Octupole magnet etc.)*

Nov 1st Operation Week

No IP tuning in this week

	1:00 – 9:00	9:00 – 17:00	17:00 – 25:00
Mon		Start	Start
Tue	Tuning	Tuning	FONT
Wed	Ground Motion	Halo	FONT
Thu	Cav. BPM	ATF2/Goal1	ATF2/Goal1
Fri	FONT	FONT	Halo

Tentative Plan of ATF2/Goal1 shift (1 + 2 shifts)

- 0) Cavity BPM calibration*
- 1) Optics matching by using orbit jitter (Cavity BPM)*
- 2) Skew sextupole BBA and orbit tuning (post-IP BPM)*

We will match the not only IP twiss parameters, but also FF optics by utilizing the beam jitter information.

Nov 2nd Operation Week

No time to do the IP beam size tuning in 174 degree mode

	1:00 – 9:00	9:00 – 17:00	17:00 – 25:00
Mon		Start/Tuning	ODR
Tue	CavityBPM	ATF2/Goal1	ATF2/Goal1
Wed	ATF2/Goal1	ATF2/Goal1	ATF2/Goal1
Thu	ATF2/Goal1	ATF2/Goal1	ODR
Fri	ODR Halo	Halo	

Tentative Plan of ATF2/Goal1 shift (7 shifts)

- 1) IP beam size tuning with IP carbon wire scanner & matching
- 2) IP beam size tuning with IP-BSM (linear knob scan)
- 3) IP beam size tuning with IP-BSM (30degree mode ; ref. cav; Y24,Y46; individual SF,SD)
- 4) IP beam size tuning with IP-BSM (174degree mode; tilt, pitch etc.)
- 5) IP-BSM study (30 degree mode)
- 6) IP-BSM study (30 degree mode)
- 7) Octupole

IP-BSM study

Modulation confirmation
after vertical table rearrangement.

Dec 1st Operation Week

**IP beam size tuning in 174 degree mode will be started.
The tuning of IP-BSM for 174 degree mode will be done.**

	1:00 – 9:00	9:00 – 17:00	17:00 – 25:00
Mon		Start	Start
Tue	Tuning	ODR	Ground Motion
Wed	Halo	Halo	ATF2/Goal1
Thu	ATF2/Goal1	ATF2/Goal1	ATF2/Goal1
Fri	ATF2/Goal1	ATF2/Goal1	Cavity BPM

Tentative Plan of ATF2/Goal1 shift (6 shifts)

- 1) IP beam size tuning with IP carbon wire scanner & matching
- 2) IP beam size tuning with IP-BSM (linear knob scan; -> 174 degree mode)
- 3) IP beam size tuning with IP-BSM (Non-linear knob scan at 174 degree mod)
--- Minimum IP beam size achieved (shortest scenario)
- 4) IP-BSM study (174degree mode)
- 5) IP-BSM study (174degree mode) / Octupole study
- 6) Octupole study

IP-BSM study

Optical setting for 174degree mode

Dec 2nd Operation Week

	1:00 – 9:00	9:00 – 17:00	17:00 – 25:00
Mon		Start	Tuning
Tue	Ground Motion	ATF2/Goal1	ATF2/Goal1
Wed	ATF2/Goal1	ATF2/Goal1	ATF2/Goal1
Thu	ATF2/Goal1	ATF2/Goal1	ODR
Fri	ODR	Halo or Cavity BPM	Cavity BPM or Halo

Tentative Plan of ATF2/Goal1 shift (7 shifts)

- 1) IP beam size tuning with IP carbon wire scanner & matching
- 2) IP beam size tuning with IP-BSM
- 3) IP beam size tuning with IP-BSM -- If IP beam size will be achieved,
- 4) IP beam size tuning with IP-BSM intensity dependence study will be done,
- 5) IP-BSM study else IP beam size tuning will be continued.
- 6) IP-BSM study / Octupole
- 7) Octupole)

IP-BSM study

IP-BSM modulation maximization
after the IP tuning

Summary of beam time for ultra-low beta study by Dec 2nd operation week

1st week of November ; no time

2nd week of November ; 1.0 shift (IP tuning; 30degree mode)

1st week of December ; 1.5 shifts (IP tuning; 174degree mode, but not finished)

2nd week of December ; 1.5 shifts (IP tuning; finished)

Dec 3rd operation week

Concentrate to ultra-low beta study with octupoles