

Emittance in ATF DR and EXT in 2013-2014

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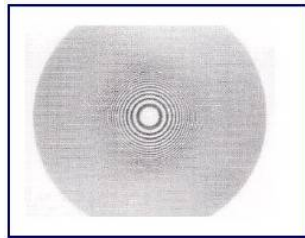
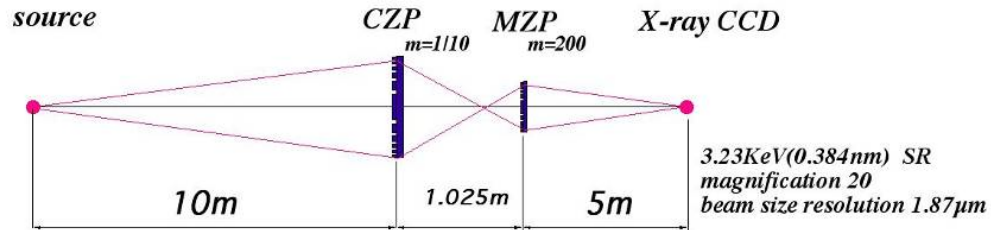
1. Emittance tuning in ATF DR
2. Emittance tuning in ATF EXT
3. Measured emittance in 2013-2014
4. Summary

Emittance Tuning in DR

- Usually done just after the start-up
- Routine emittance tuning
 - Dispersion correction
 - η_x in straight section is corrected by QM trim
 - η_y is corrected by correctors
 - Coupling correction
 - Correction of vertical leakage of the horizontal kicks by a couple of horizontal correctors.
 - Correction is done by Skew Q winding trim coil of SX.
- XSR monitor improvement --> Repot by T.Naito
- DR study --> Report by J.Pfingstner

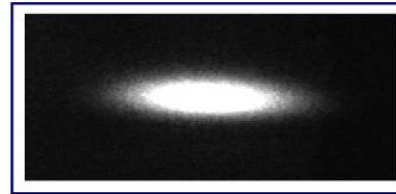
XSR Beam Size Monitor

X-ray SR monitor using zone plate (Tokyo Univ.)



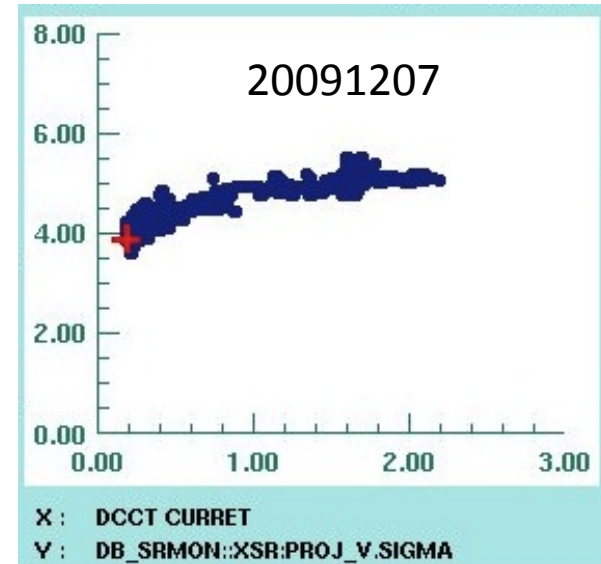
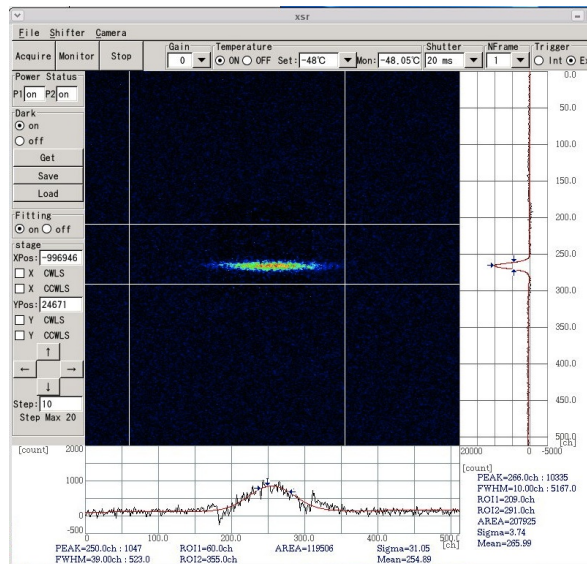
CZP : 3mm dia.
6497 zone rings
minimum zone width 108nm

MZP : 75 μ m dia.
584 zone rings
minimum zone width 127nm



Beam image (x:46.2, y:10.2 μ m)

microscope image of zone plate



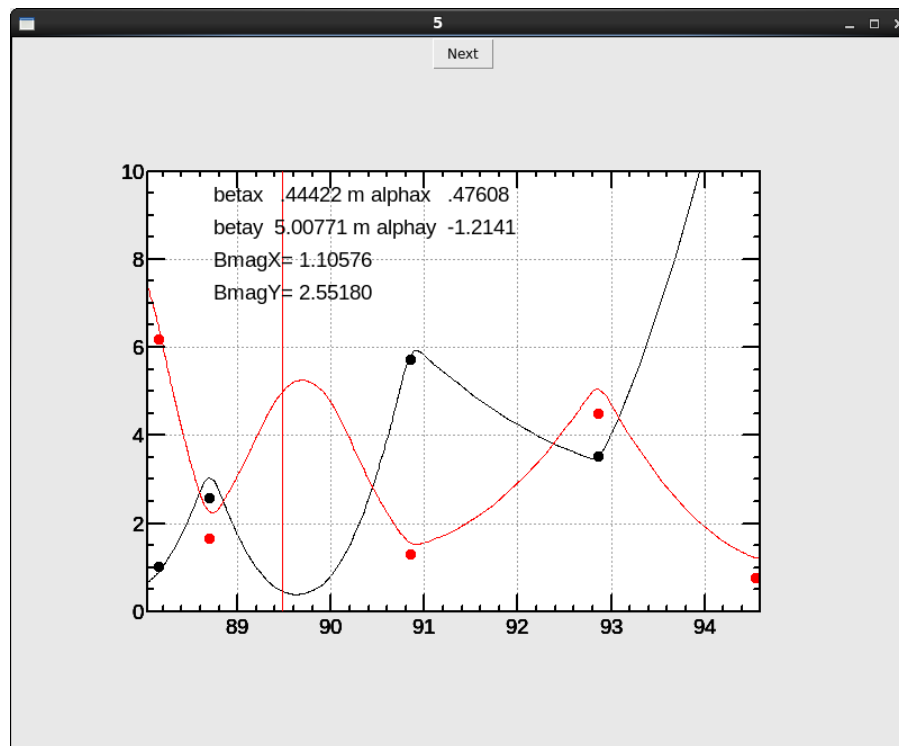
Beta Measurement

- Emittance is calculated by the formula;

$$\sigma_y^2 = \beta_y \varepsilon_y$$

β is calculated by fitting the β s at near Qs, which are measured by tune slope.

ex.)->



/atf/op/beta/current/VD_NOTSV_BETA_F

EXIT DR Beta function fit

Qmag NAME	Bx	By
Qmag NAME(1)		
<input type="checkbox"/> USE	QM3R.2	1.0302 6.1808
Qmag NAME(2)		
<input type="checkbox"/> USE	QM4R.2	2.5680 1.6457
Qmag NAME(3)		
<input type="checkbox"/> USE	QM5R.2	5.7168 1.3072
Qmag NAME(4)		
<input type="checkbox"/> USE	QM6R.2	3.5189 4.5021
Qmag NAME(5)		
<input type="checkbox"/> USE	QM7R.2	15.3215 0.7536

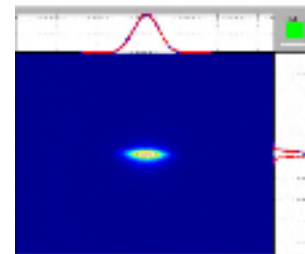
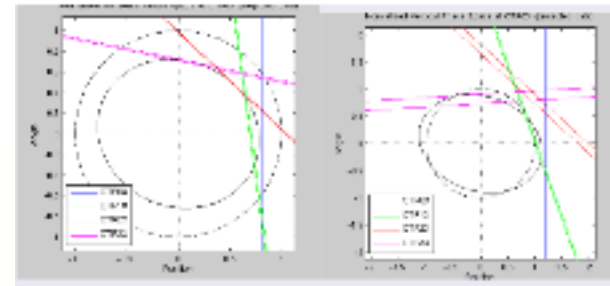
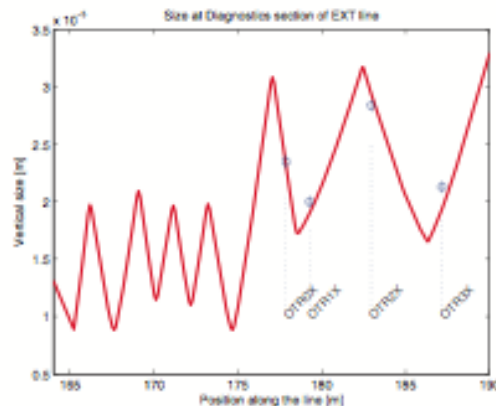
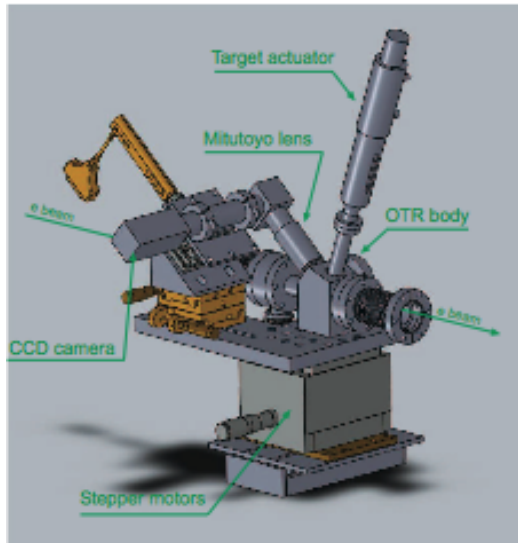
09:26:06 Load data finished.

SR_Betafit
OPTICS NAME SR_Betafit
09:26:11 preparing sad input file.

Name SR1
Offset 0.000

Emittance Tuning in EXT

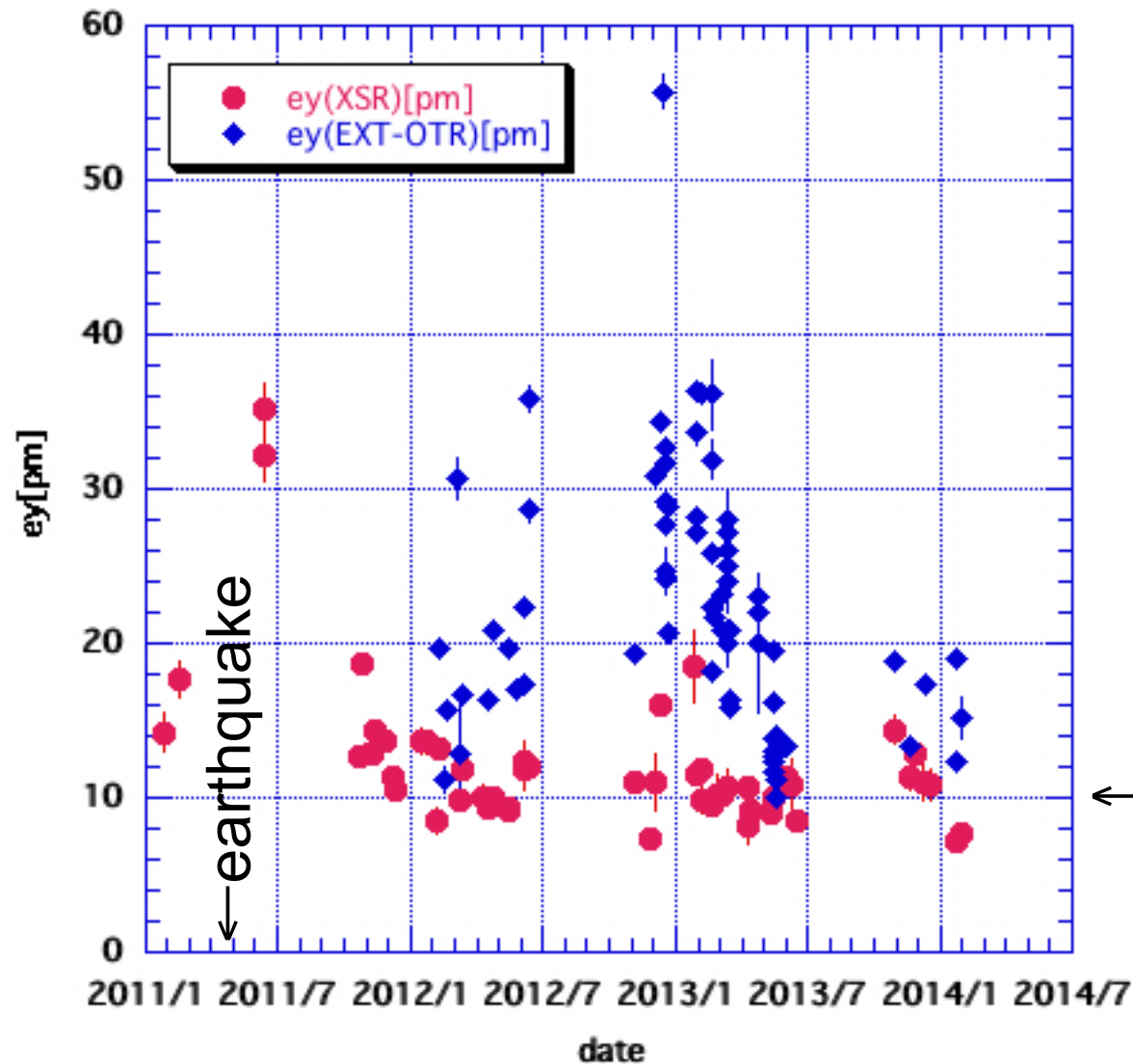
- Dispersion correction
 - η_x is corrected by QF1X & QF6X
 - η_y is corrected by QS sum knob
- Coupling correction
 - QK or QS+orbit bump or both
- Emittance measurement by mOTR



E. Marin

Summary of ε_y of ATF-DR 2011-2014

EmityDREXT2011-14.KG3.5



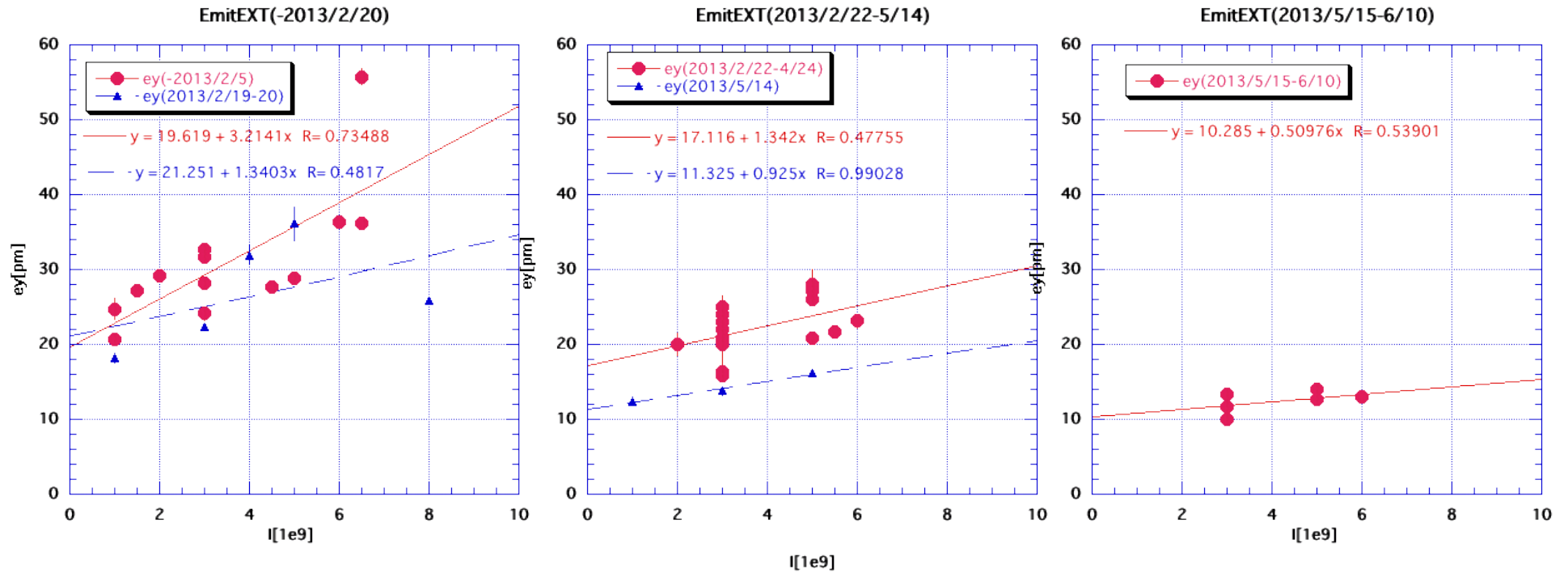
Emittance in the DR was measured with $N \approx 5e9$, while in the EXT, measurement was done with various intensity.

Works in ATF-EXT 2012-2013

Date	mOTR Monitor	Coupling Correction	General
		QK	
2012/Dec.			1.Remove possible wake sources ¹⁾ 2.Ref.cav on mover for wake effect correction
-2013/Jan.	OTR3 not well-tuned		
2013/2/18		QS ²⁾	
2013/2/20	New target system		
2013/5/9			Almost all bellows with shield
2013/5/15	OTR tuned ³⁾	QS+QK	

- 1) <http://atf.kek.jp/twiki/bin/view/ATFlogbook/Log20121212m>
- 2) QS magnets are used independently, and QKs are set to 0.
- 3) Report by G.White in ATF operation meeting 2013/5/17

Summary of ε_y of ATF-EXT 2012-2013



- -2012/2/20 large ε_y and strong I dep.
- Monitor tuning and coupling correction made ε_y closer to DR one.

Summary

- Vertical emittance in the ATF DR is close to 10 pm stably.
- In the ATF EXT, vertical emittance has become closer to the DR one. But still small emittance growth is observed.

Back-up

