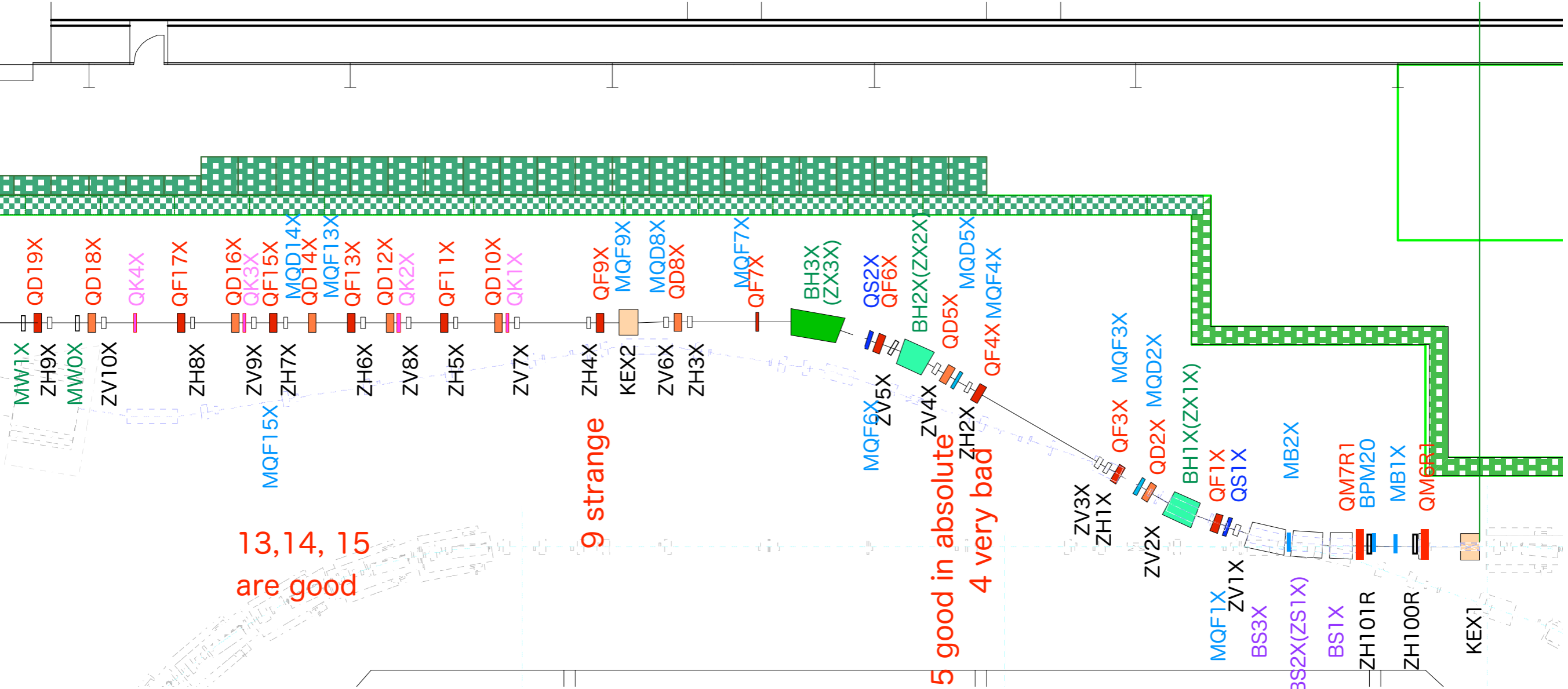


Stripline BPM issues

T. Tauchi, 17 June 2009



13,14, 15
are good

9 strange

5 good in absolute

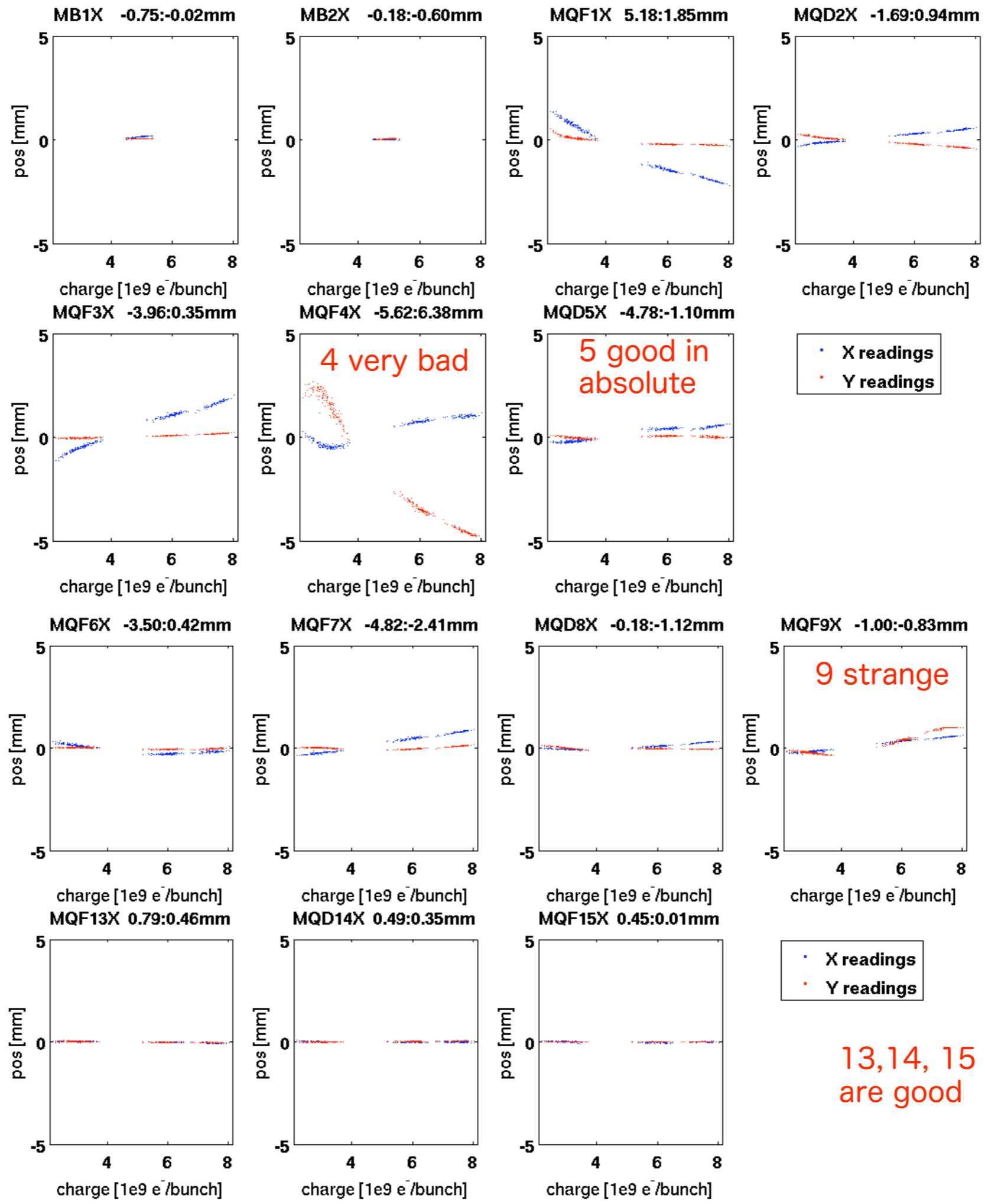
4 very bad

- MW1X, ZH9X, MW0X, ZV10X, QD19X, QD18X, QK4X, QF17X, ZH8X, QD16X, QK3X, QF15X, MQD14X, QD14X, MQF13X, QF13X, ZH6X, QD12X, QK2X, ZV8X, QF11X, ZH5X, QD10X, QK1X, ZV7X, ZH4X, QF9X, MQF9X, KEX2, MQD8X, ZV6X, QD8X, ZH3X, MQF7X, QF7X, BH3X (ZX3X), MQF6X, ZV5X, QS2X, QF6X, ZV4X, BH2X(ZX2X), QD5X, ZH2X, MQD5X, QF4X, MQF4X, ZV3X, ZH1X, QF3X, MQF3X, ZV2X, QD2X, MQD2X, BH1X(ZX1X), QF1X, ZV1X, QS1X, MB2X, MQF1X, BS3X, BS2X(ZS1X), BS1X, ZH101R, QM7R1, BPM20, MB1X, ZH100R, QM6R1, KEX1

Summary table

BPM name	type	X/Y resolution w/o correction	X/Y resolution with correction	remarks
MQF1X	short, large aperture.	100/50	45/35	
MQD2X		40/15	30/10	
MQF3X		55/25	45/15	
MQF4X		80/500	60/170	very bad
MQD5X		90/35	90/30	good in absolute
MQF6X	short, small aperture.	20/20	20/15	
MQF7X		60/75	50/25	
MQD8X		15/50	15/25	
MQF9X	long, small aperture.	150/80	35/20	strange
MQF13X		35/30	35/30	no intensity dependen
MQD14X		20/15	20/15	no intensity dependen
MQF15X		35/10	30/10	no intensity dependen





$$x = \alpha \times \{ (l_1+l_3)-(l_2+l_4) \} / (l_1+l_2+l_3+l_4)$$

$$y = \alpha \times \{ (l_1+l_2)-(l_3+l_4) \} / (l_1+l_2+l_3+l_4)$$

$$p_x = \alpha \times \{ (p_1-p_2)+(p_3-p_4) \} / (p_1+p_2+p_3+p_4)$$

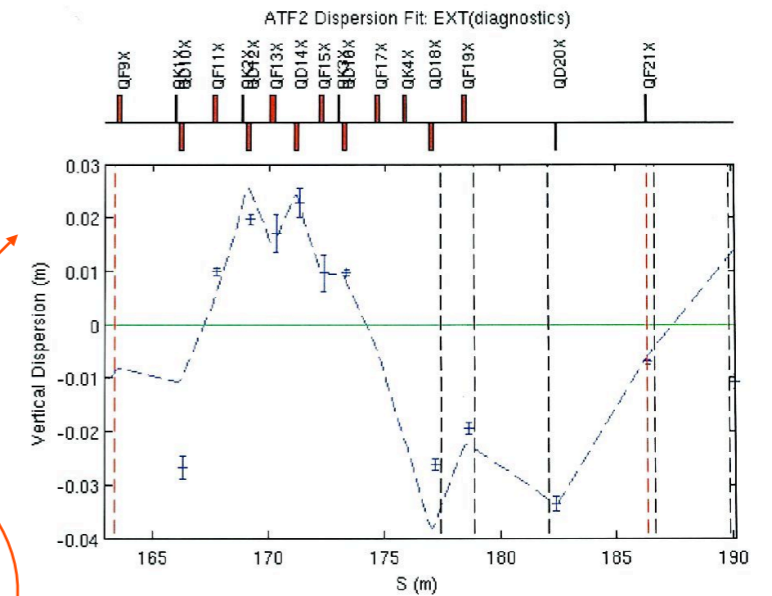
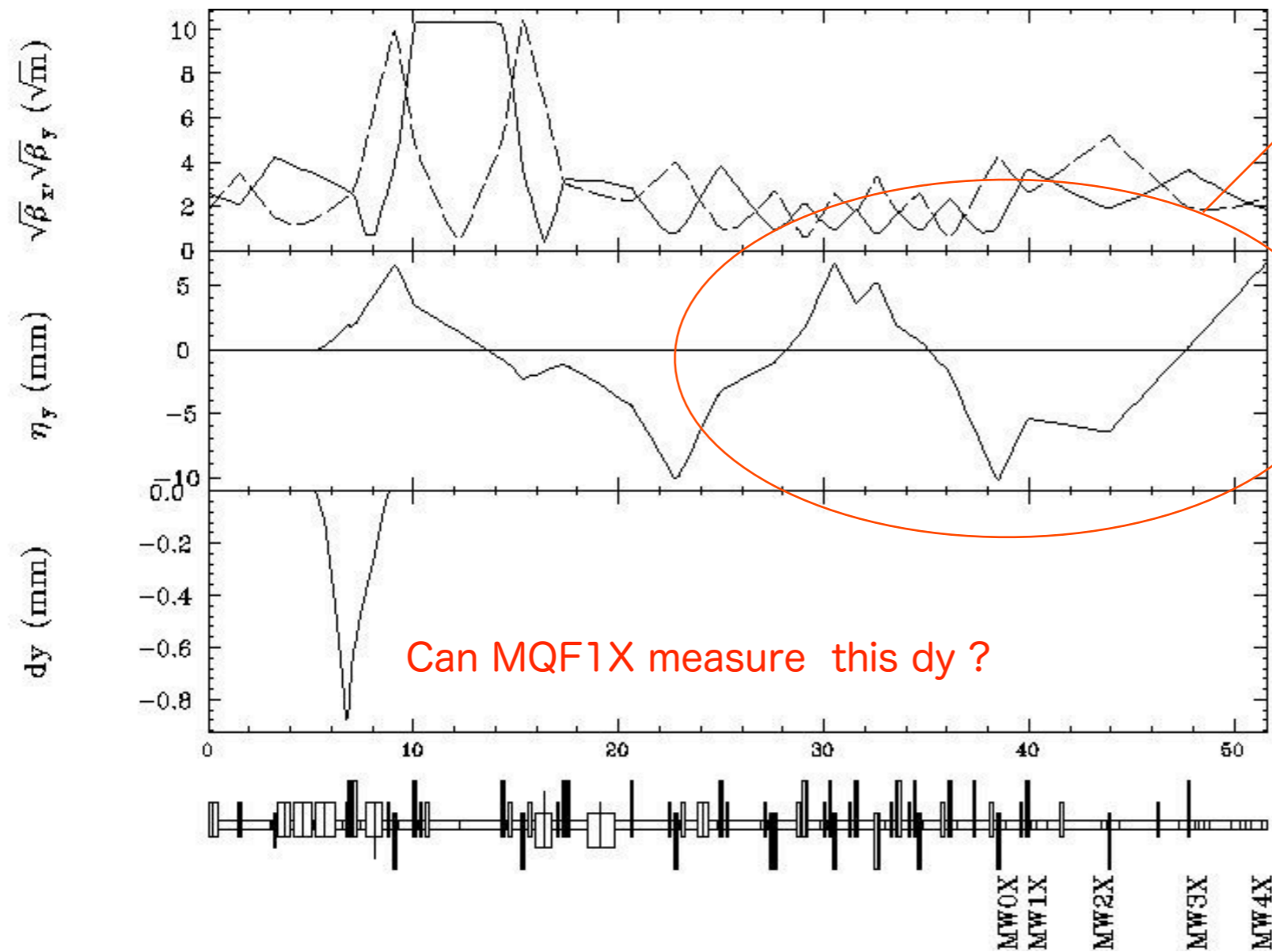
$$p_y = \alpha \times \{ (p_1+p_2)-(p_3+p_4) \} / (p_1+p_2+p_3+p_4)$$

4 unknown parameters of p_1, p_2, p_3, p_4 , which should be very small for good calibration.

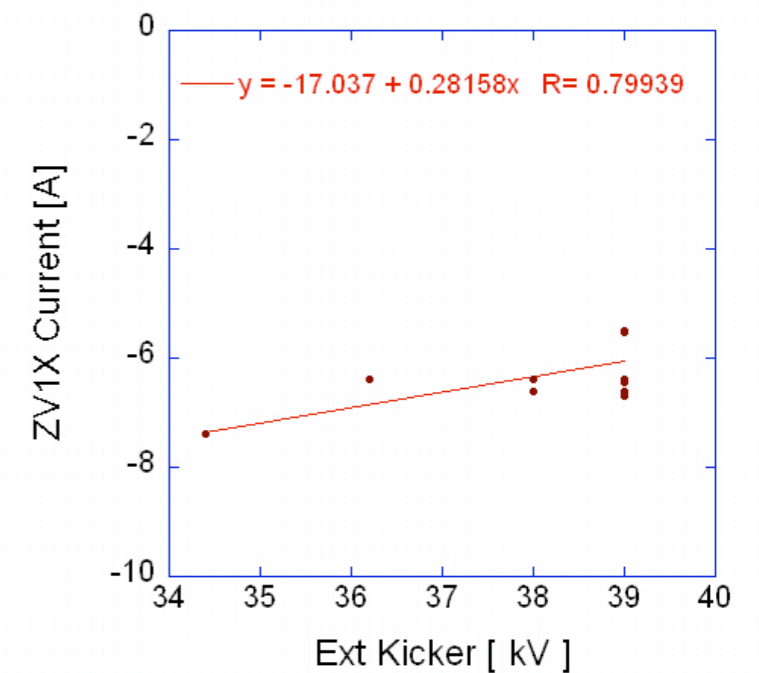
Can we calculate them by measurements, assuming the orbits are stable ?

Candidate of the incoming dispersion source

- ZV1X must be apply huge field to pass the beam.
- When we assumed the vertical kick at septum and ZV1X and ZV2X, we can simulate the residual vertical dispersion.



Measured dispersion



Vertical kick at septum was smaller for higher kicker voltage

Finally, we have 6 QBPMs as spares !
In principle, they are available if the electronics is provided.

Note : In general, QBPM is more robust against the kicker noise for the resonance cavity and digital circuit.

Component	Sub-component	Number	Comments	Status	Present	New	2007	plan in
Magnet	Quadrupole	28	with QD0,QF1	production	27	1	1	0
	Sextupole	5	4 with 50mm aperture and 2 with 32mm aperture	design	0	5	5	0
	Octupole	0			0	0	0	0
	Bend	3	FF-bends =3	production	0	3	3	0
	H. Steering	4	horizontal with 5A bipolar PS	1 added in v3.7	4	0	0	0
	V. Steering	2	vertical with 5A bipolar PS		2	0	0	0
	Skew Q	2	QK2X, QK3X	v3.7 optics	0	2	0	2
	Cable of ext.kicker	2	re-location of two kickers is alternative solution		0	2	0	2
Magnet Support	Movers	27	20Q-magnets, QD0,QF1 and 5 sextupoles	SLAC	27	0	0	0
	Base (Qs)	23	for each magnet except for the FD support	production	0	23	24	-1
	Bends	3	support system (3 bases and 3 interface plates)	design ?	0	3	3	0
	FD support	1	stable tables for QD0,QF1,SD0,SF1	CERN/LAPP	1	0	0	0
Power Supply	HA system	38	8(ExtQ), 6(MatQ), 5(Sext), 0(Oct), 16(FFQ), 3(B) ; 6 bipolar for QM11FF - QM16FF.	production		38	38	0
	Bipolar PS	2	bipolar and 20A for QK1X, QK2X	v3.7 optics		2	0	2
Vacuum	Beam pipe (m)	93.154	ATF extraction line at present and ATF2 beam line (50.613m)	production	0	93.154	46.577	46.58
BPM	Q-BPM for Q & Sext.	33	QD10-12X,16-17X,QD18-21X, IHEP-Qs in FF	production	39	-6	0	-6
	Q-BPM (s-band)	4	with larger diameter (40mm) ,final doublet system	design	0	4	0	4
	stripline	14	for commissioning and at extraction line	production	14	0	0	0
	IP-BPM	3	2nm resolution for position jitter at IP (production/prototype	0	3	2	1
Wire scanner	Metal wire	5	exsit at the extraction line - relocation	existing	5	0	0	0
	Laserwire	5	upgrade of the metal wire scanners	R&D	0	5	0	1
IP - BSM	Shintake monitor	1	upgrade of the FFTB monitor, 532nm laser: 35-350nm	upgrade/ new design	1	0	0	0
	BSM-support	1	rigid and independent support	design	0	1	1	0
	Urakawa monitor	1	laser cavity type	R&D	0	1	0	0
Fast orbit correction	Feedforward	1	from DR to extraction line	R&D, design	0	1	1	0
	Feedback	1	intra-train fast feedback based on digital circuit	R&D	0	1	1	0
Pulse to pulse feedback	V and H correctors	4	orbit correction at the extraction line	proposed	0	4	0	4
	1um BPMs	4	orbit correction at the extraction line	proposed	0	4	0	4
Commissioning tools	Screen monitor	4		KEK	4	0	0	0
	Carbon wire scanner	1	beam size monitor at IP : up to 1um	SLAC	1	0	0	0
	Honda monitor	1	beam size monitor at IP : 350nm - 1um	proposed	0	1	0	1
	PLIC loss monitor	1	fiber with PMT readout	proposed	0	1	0	1
ICT	beam loss	2	beam current monitor		1	1	0	1
Beam dump	ATF2 Beam dump	1	design is the same as the ATF one		0	1	1	0