

IP BPM Measurement @ IP area

Young-Im Kim

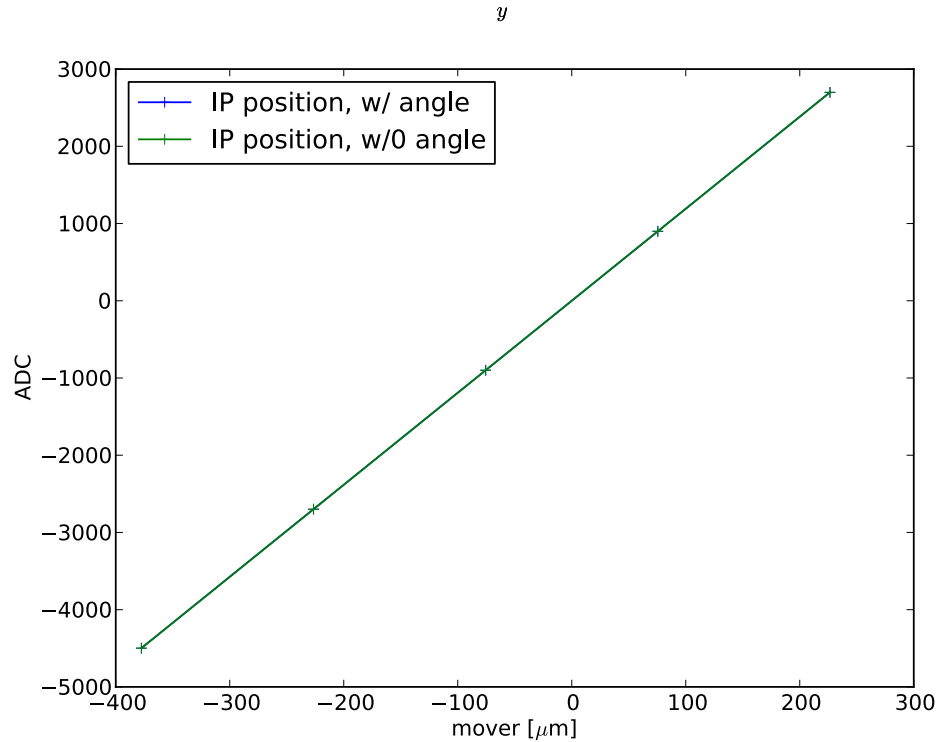
John Adams Institute – University of Oxford

FONT group

IPBPM calibration @ IP

- Moved QD0FF magnet mover position and took data at each magnet mover position
- When QD0FF magnet mover moves 10 μm , actual beam at IP moves 15.1 μm and 12.2 μrad
- Simulated calibration scale factor of calibration
 - Used IPBPM parameters : The cavity output voltage was calculated at different beam offset
 - Digitiser : digitised the cavity output with 14 bit digitiser
 - Electronics : no needed to use it for checking the calibration scale ratio between QD0FF magnet mover position and actual beam position
 - If we want to do detail study it is possible

Angle sensitivity

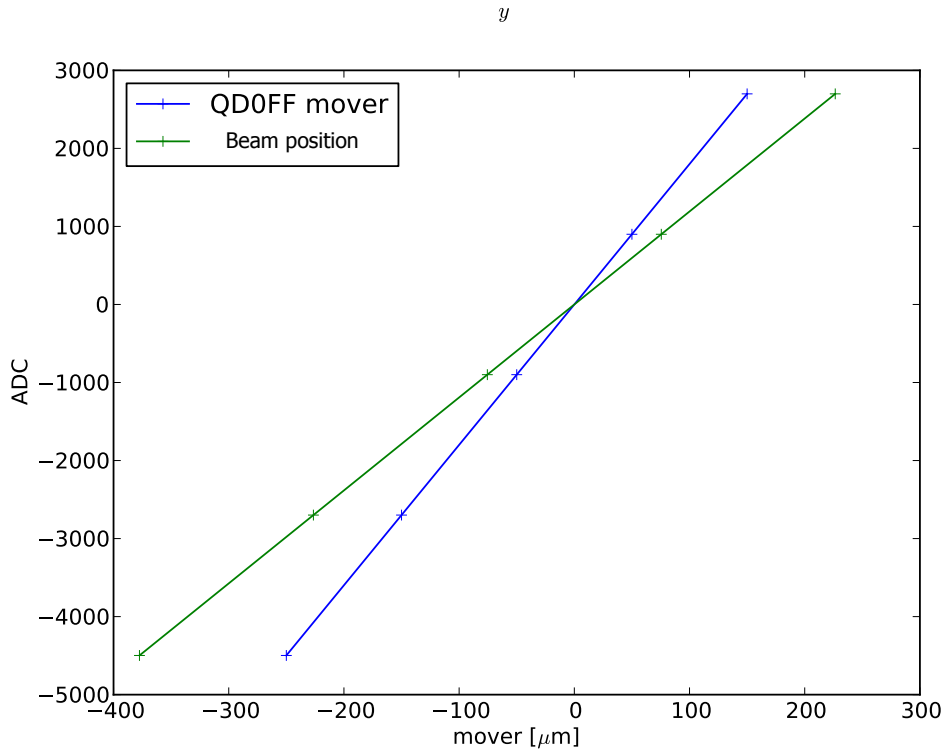


Check the angle effect on the calibration
IPBPM is **insensitive** to the beam angle
w/ angle : considered position and angle
movement
w/o angle : considered position movement

New IPBPM angle sensitivity?

Wide range

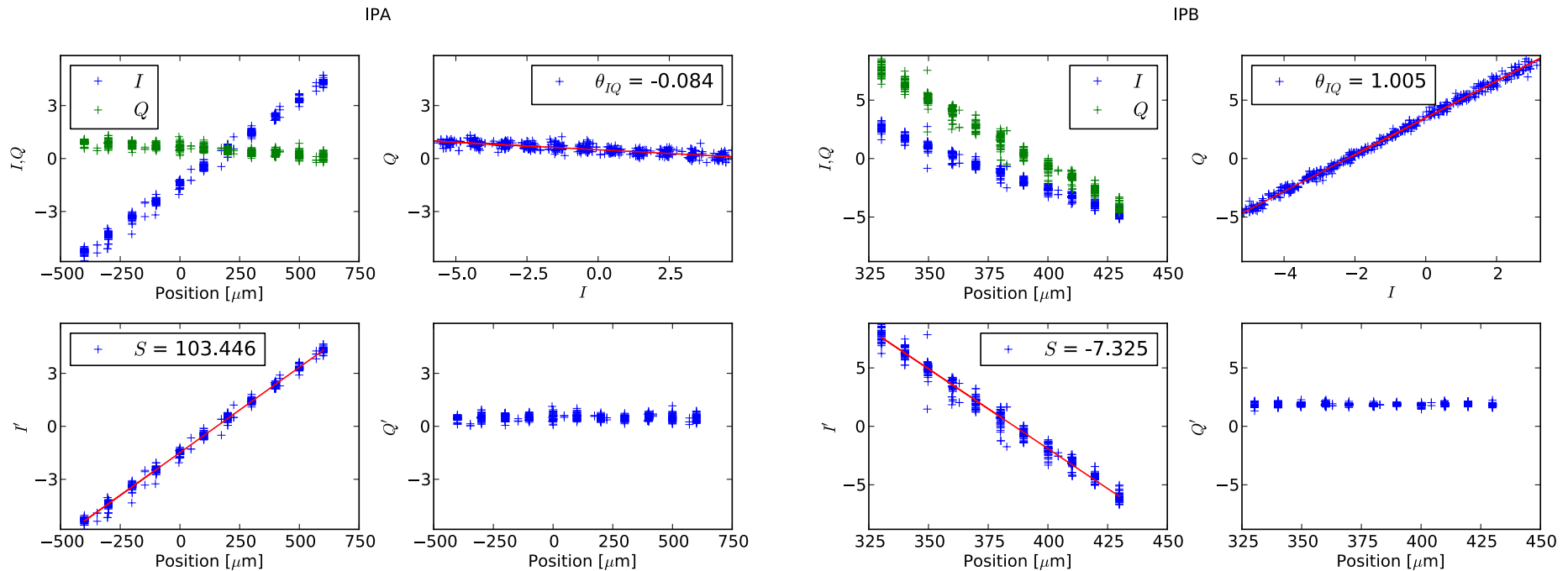
Calibration



Calibration scale factor can be different up to 51 %
Need to move the waist on one of IPBPM and do calibration

New IPBPM system might be easier to calibrate with mover?

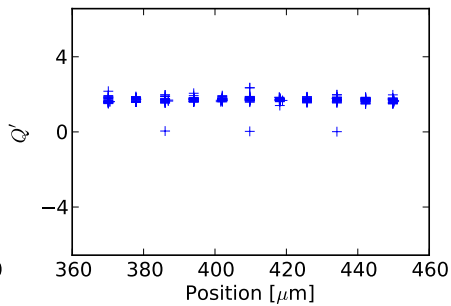
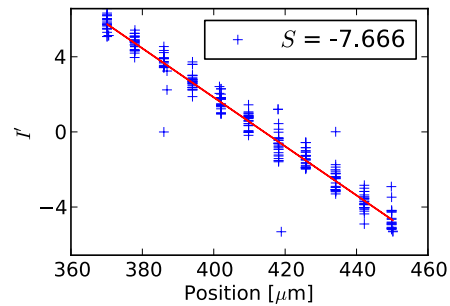
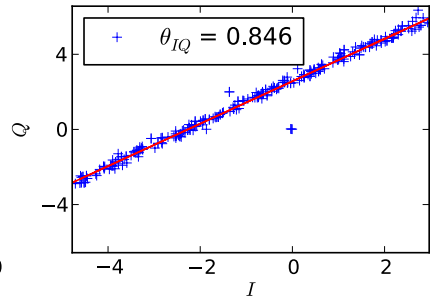
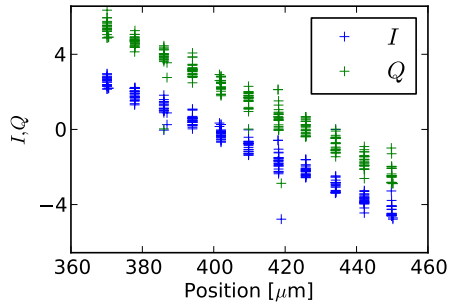
Single bunch calibration



Two bunches calibration

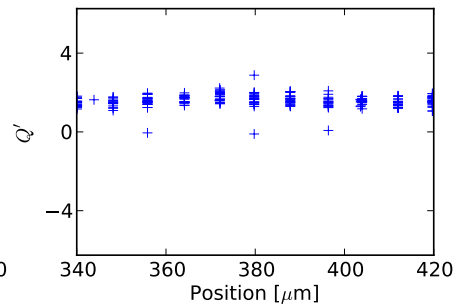
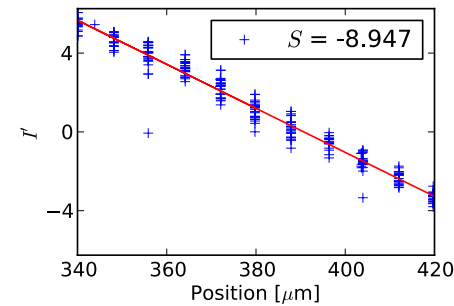
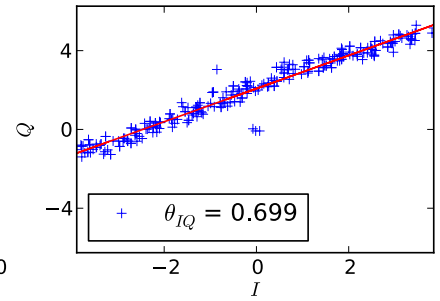
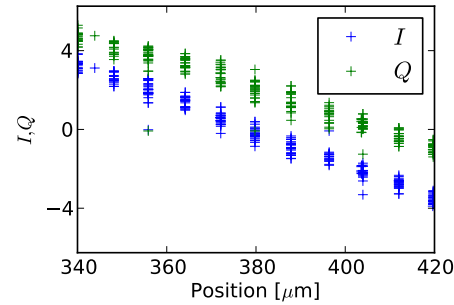
1st bunch

IPB



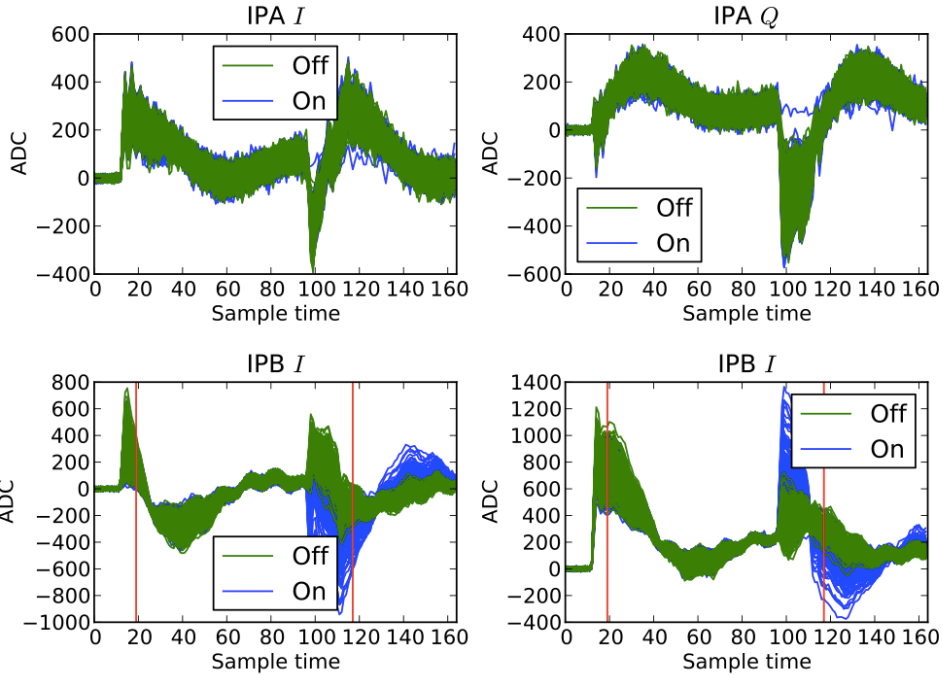
2nd bunch

IPB

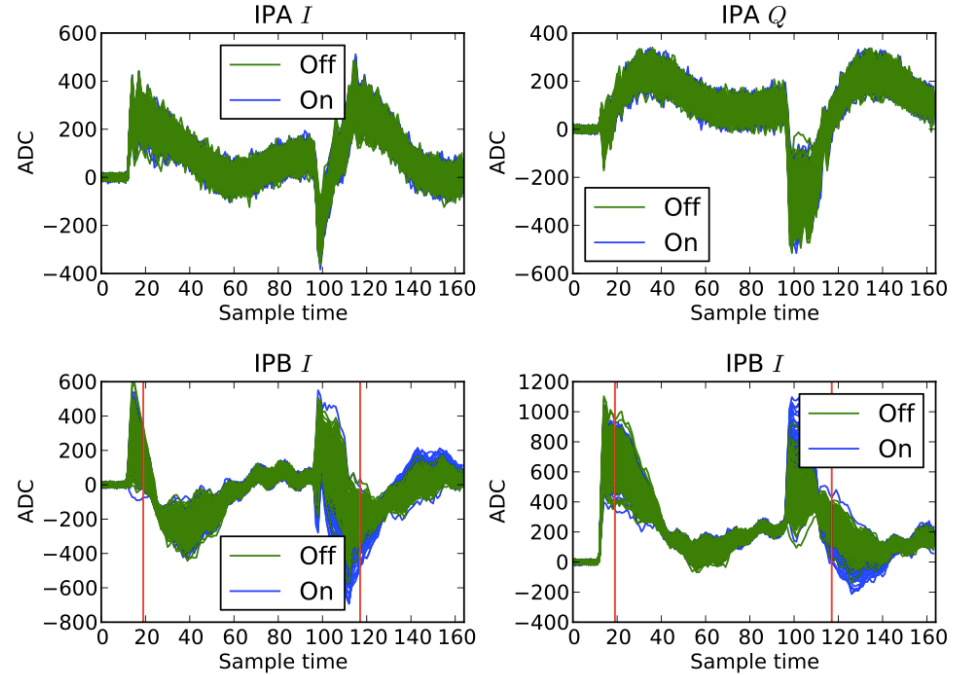


Feed Back @ FONT area

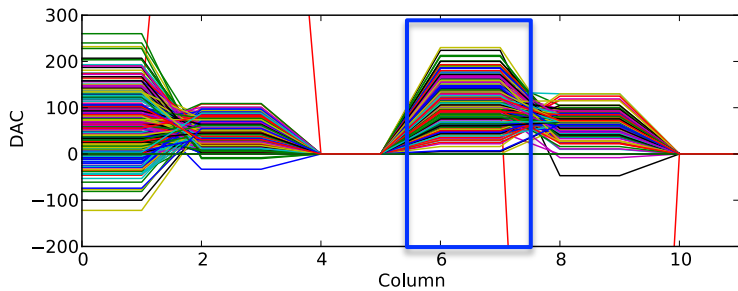
fbRun1_270113



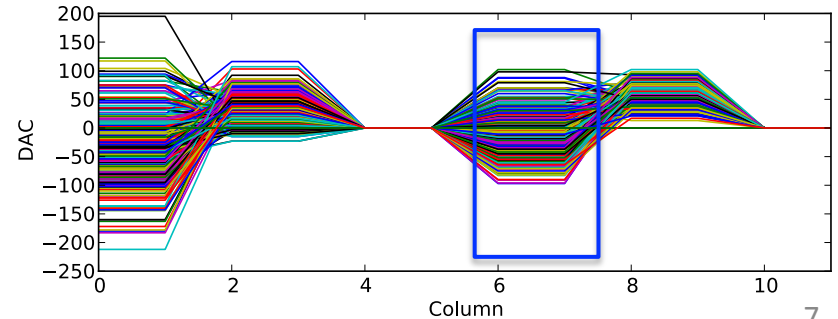
fbRun4_270113



fbRun1_270113

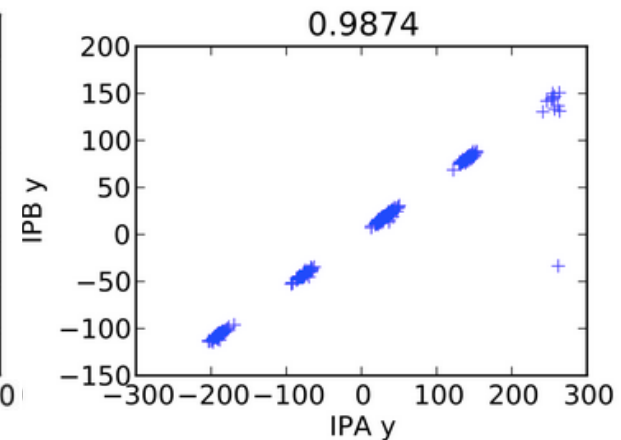
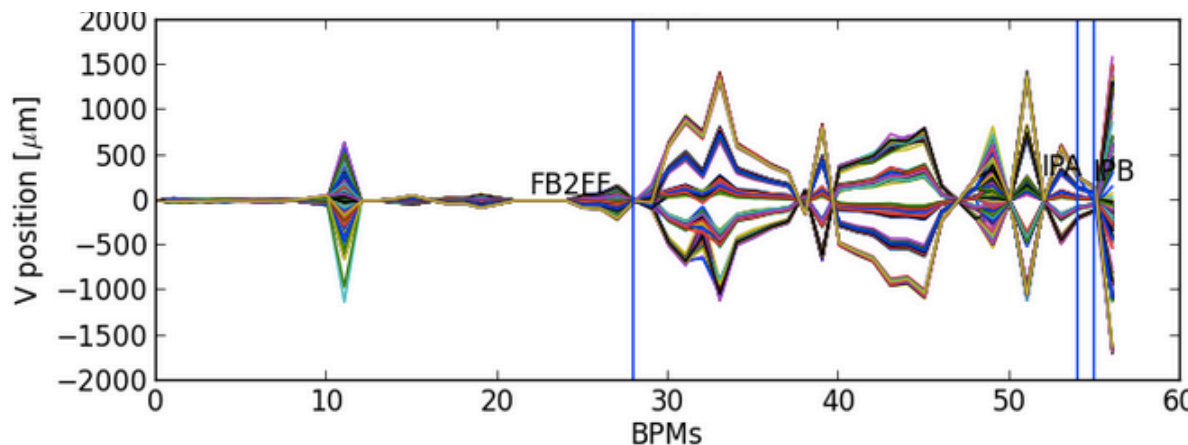


fbRun4_270113



Summary & Plan (FONT)

- Kicked the beam, some effect on the IP area
- There are some effects on the IP from upstream kicker
- The effect is too small @ IP area? When DAC is small?
 - More than 15 μm : we can see the effect
 - Less than 10 μm : Difficult to see...
- Could be dispersion/coupling at EXT?
 - This might reduce the kicker effect from upstream to IP?
- Jitter source between upstream and IP ?



IP BPM calibration

	IPA γ				IPB γ			
	1 st bunch		2 nd bunch		1 st bunch		2 nd bunch	
	θ_{IQ}	S	θ_{IQ}	S	θ_{IQ}	S	θ_{IQ}	S
File 1 (S)	0.049	96.540	-	-	0.954	-6.656	-	-
File 2 (S)	-0.084	103.446	-	-	0.860	-7.256	-	-
File 3 (S)	-0.033	109.273	-	-	0.915	-7.433	-	-
File 4 (M)	-0.089	103.496	-0.287	118.523	0.840	-20.114	0.656	-22.911
File 5 (M)	0.035	106.114	-0.121	134.352	0.846	-7.667	0.649	-8.870
File 6 (M)	0.047	142.082	0.005	132.211	0.912	-7.570	0.699	-8.947
File 7 (M)	0.219	100.090	0.116	101.662	0.923	-7.460	0.710	-8.600

IP BPM calibration

Scale factor between IPA and IPB : 13 times different (20 dB attenuation at IPA)

	IPA y				IPB y			
	1 st bunch		2 nd bunch		1 st bunch		2 nd bunch	
	θ_{IQ}	S	θ_{IQ}	S	θ_{IQ}	S	θ_{IQ}	S
File 1 Generally not good	0.049	96.540	-	-	0.954	-6.656	-	-
File 2 For IPA	-0.084	103.446	-	-	0.860	-7.256	-	-
File 3 For IPB	-0.033	109.273	-	-	0.915	-7.433	-	-
File 4 For IPA	-0.089	103.496	-0.287	118.523	0.840	-20.114	0.656	-22.911
File 5 For IPB	0.035	106.114	-0.121	134.352	0.846	-7.667	0.649	-8.870
File 6 For IPB	0.047	142.082	0.005	132.211	0.912	-7.570	0.699	-8.947
File 7 For IPB	0.219	100.090	0.116	101.662	0.923	-7.460	0.710	-8.600