

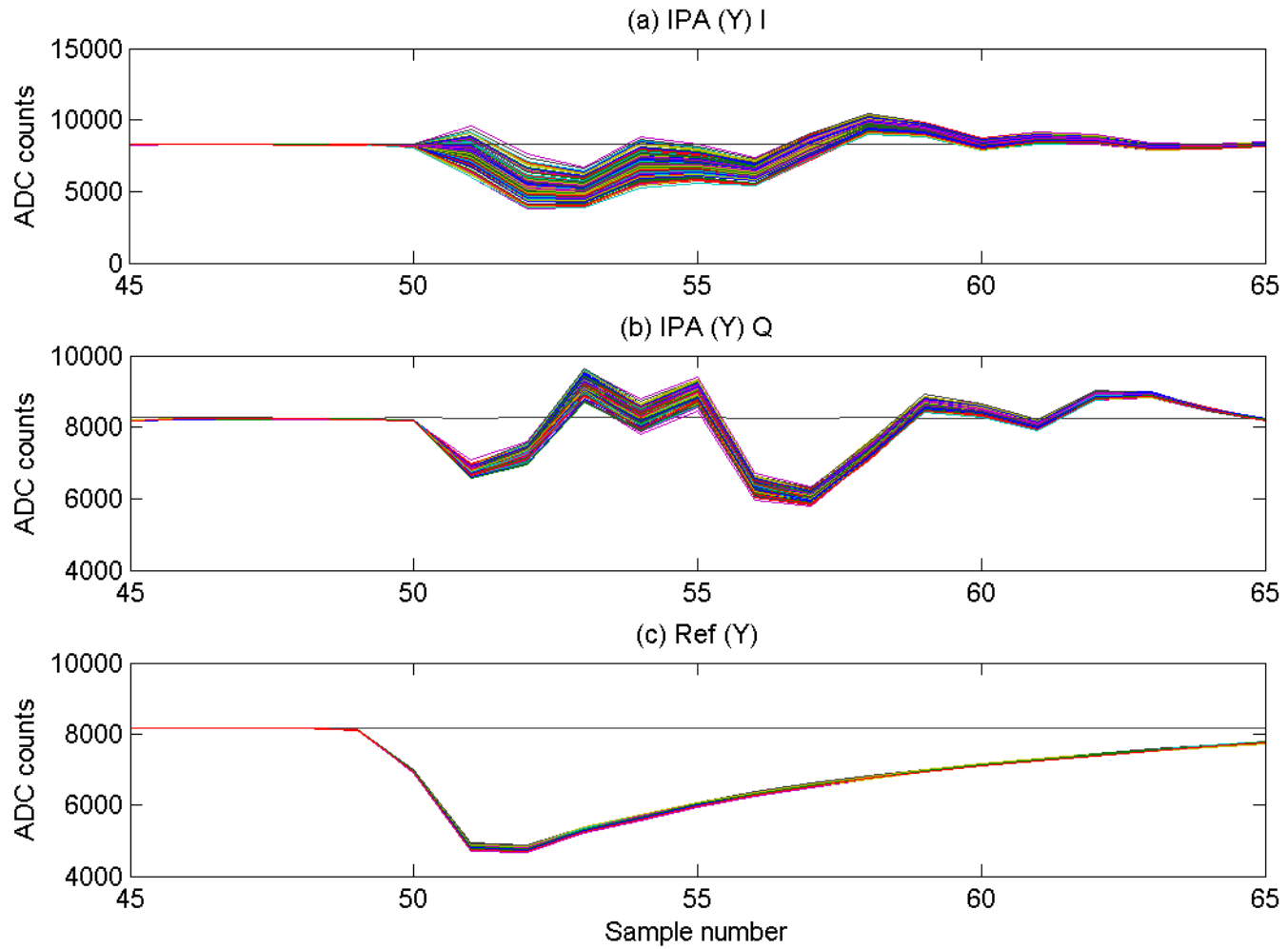
3-BPM resolution with single-point sampling

N. Blaskovic , G. Christian

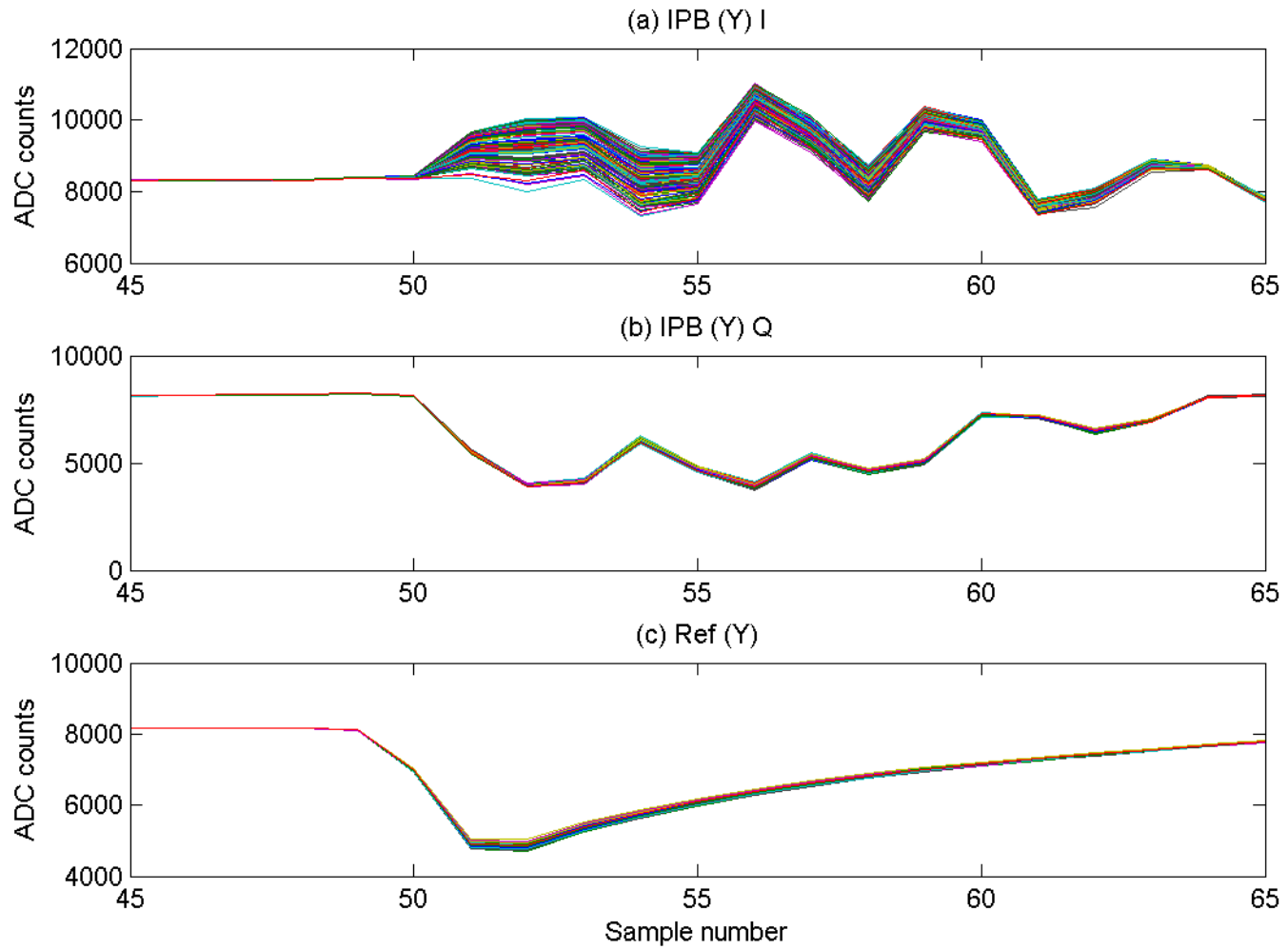
26/02/15

Three BPM run - 11 December 2014

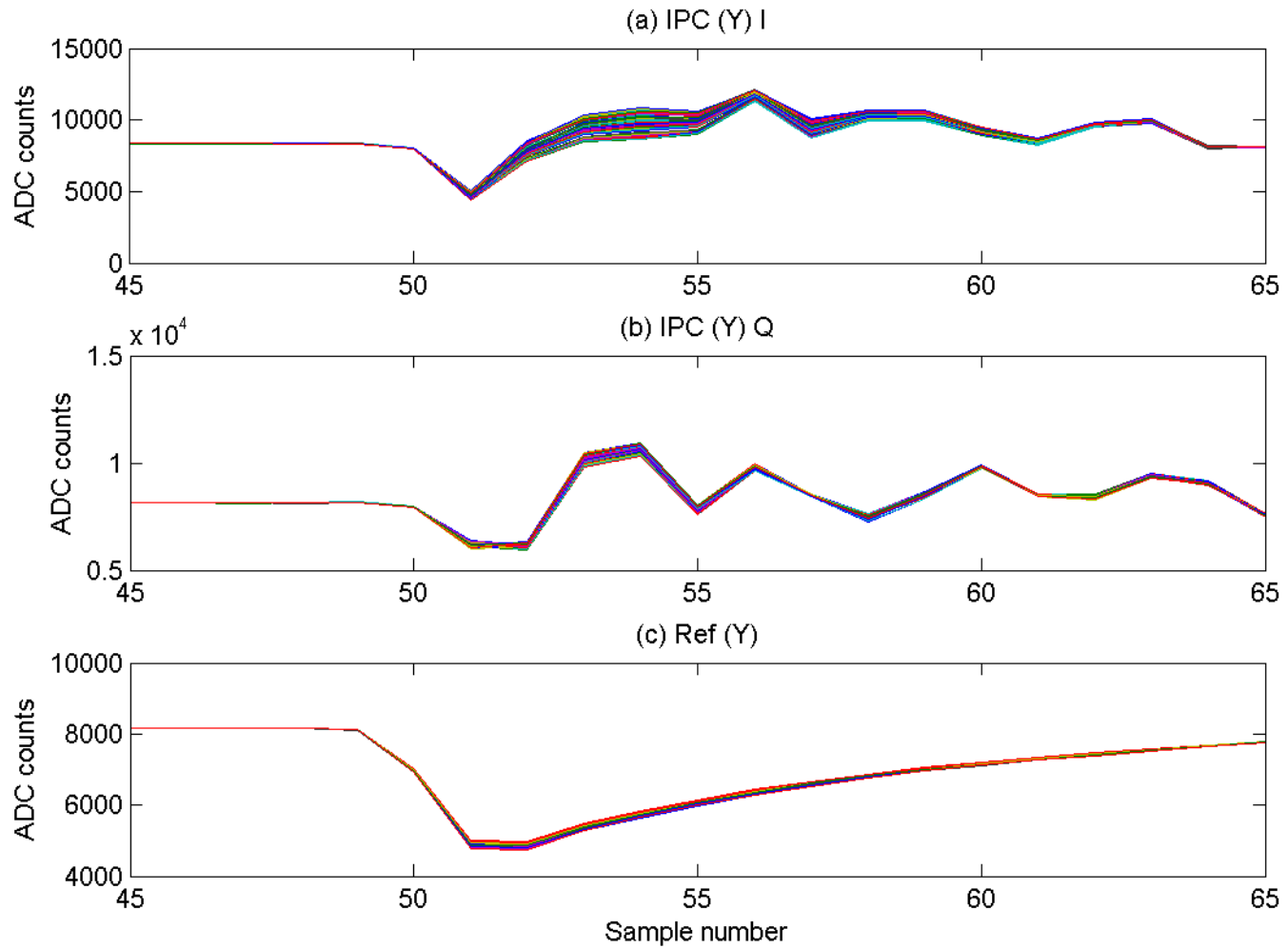
ADC waveforms for IPAyCal2_0dB_ipbpm_141211 on 111214



ADC waveforms for IPByCal2_0dB_ipbpm_141211 on 111214

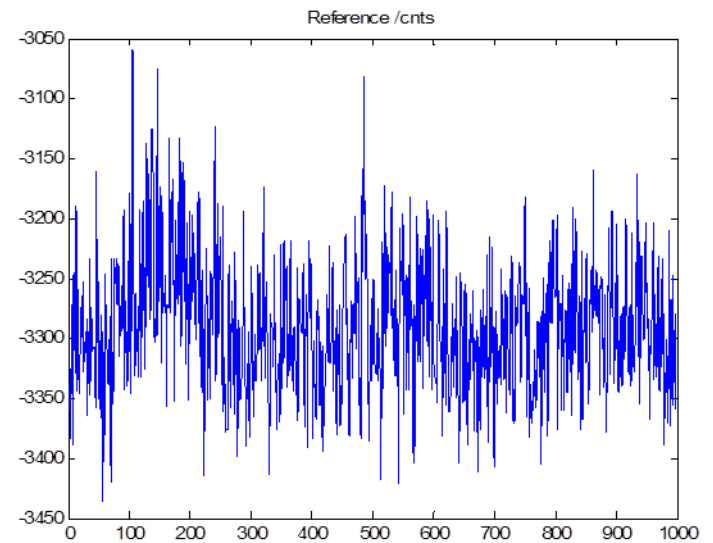
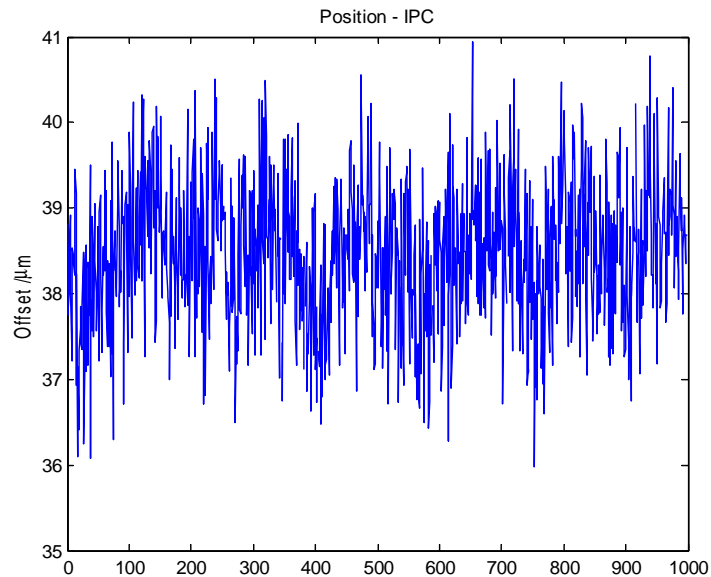
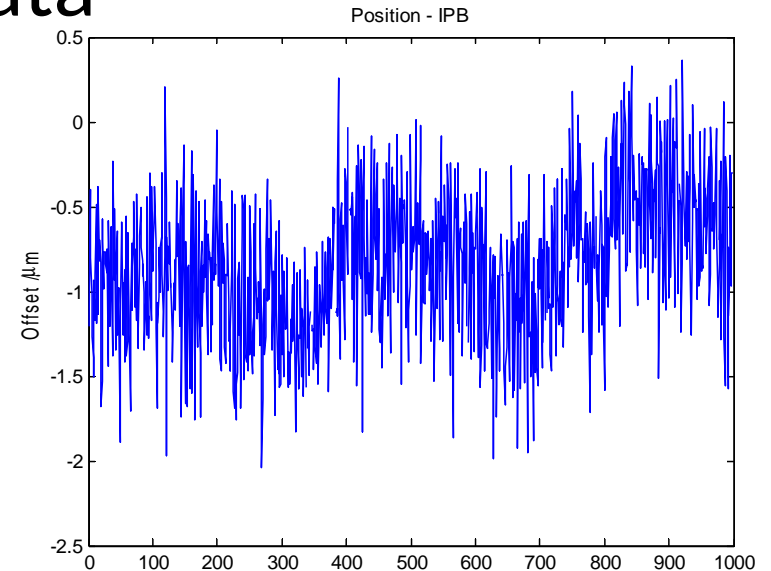
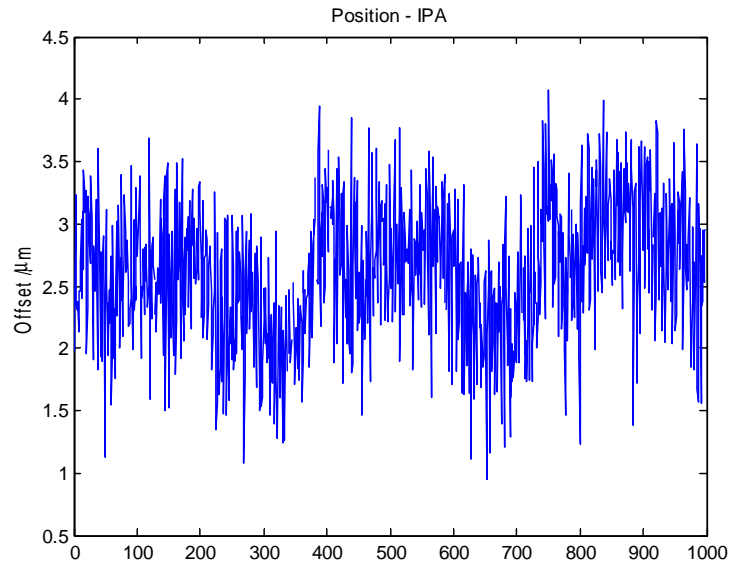


ADC waveforms for IPCyCal2b_0dB_ipbpm_141211 on 111214



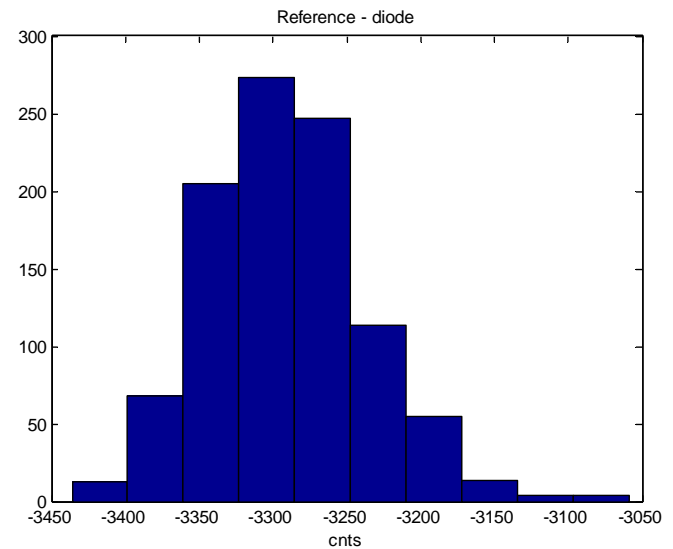
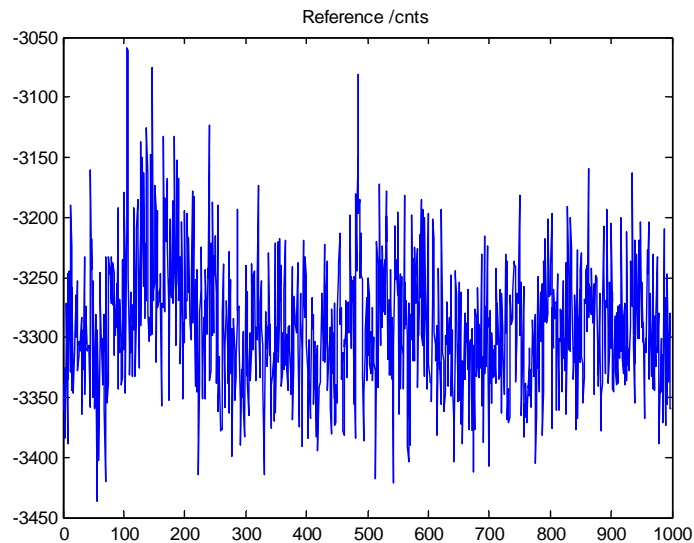
Single point analysis (sample 1/10)

All data



Single point analysis (sample 1/10)

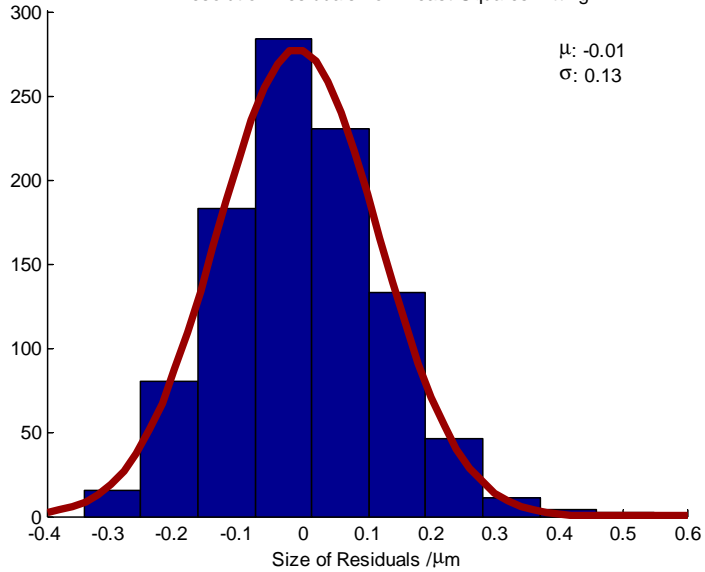
All data - charge



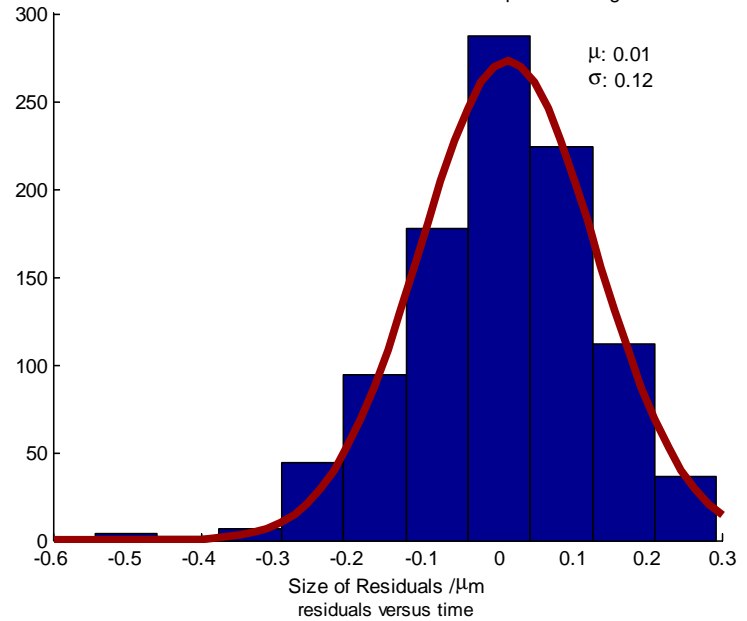
Mean = 3290 , Sigma = 50

Resolution Residuals (fitting)

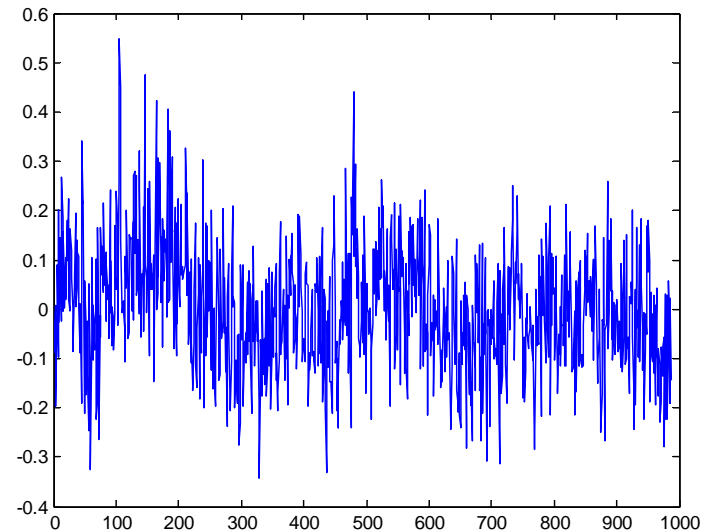
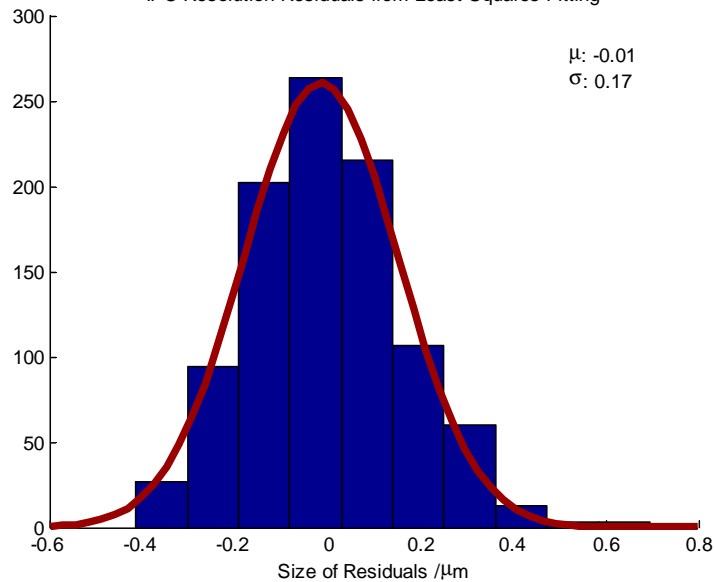
IPA Resolution Residuals from Least Squares Fitting



IPB Resolution Residuals from Least Squares Fitting

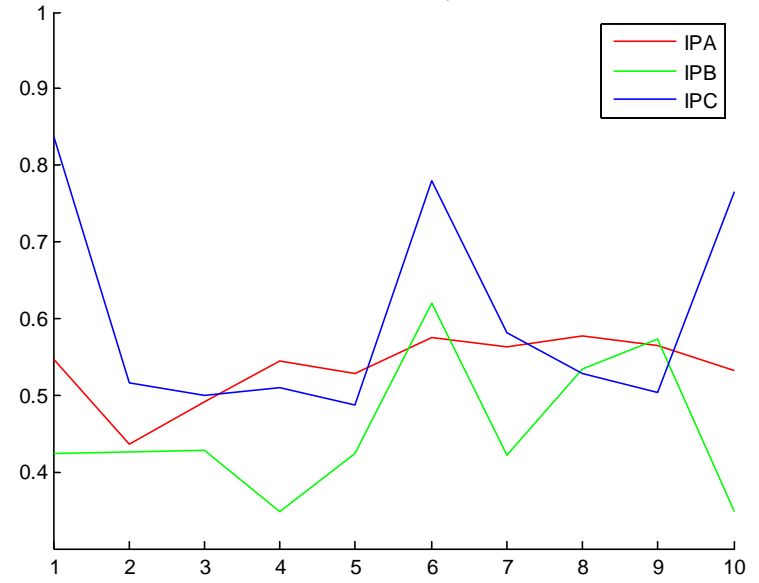


IPC Resolution Residuals from Least Squares Fitting

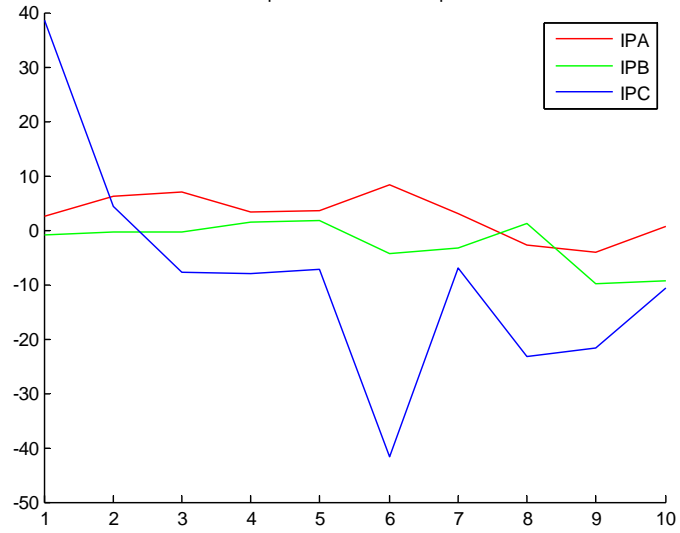


Sigma	#uncut	Position /um	Jitter /um	BPM Cor R vlaue	Res (fit) /nm	Res (geom)
All	988	2.61+/-0.02 -0.84+/-0.01 38.47 +/-0.03	0.55+/-0.01 0.42+/-0.01 0.84+/-0.02	0.86 (1,2) -0.31 (1,3) 0.06 (2,3)	126+/-3 124+/-3 170+/-4	178
1	707	2.61+/-0.02 -0.84+/-0.02 38.45 +/-0.03	0.54+/-0.01 0.42+/-0.01 0.81+/-0.02	0.87 -0.36 0.09	78+/-2 77+/-2 86+/-2	133
0.5	394	2.61+/-0.03 -0.84+/-0.02 38.48 +/-0.04	0.55+/-0.02 0.42+/-0.02 0.79+/-0.03	0.88 -0.42 0.05	52+/-2 52+/-2 54+/-2	116
0.1	76	2.60+/-0.06 -0.86+/-0.04 38.4 +/-0.1	0.52+/-0.04 0.38+/-0.03 0.85+/-0.07	0.83 -0.49 0.07	35+/-3 35+/-3 36+/-3	104
0.05	47	2.57+/-0.07 -0.90+/-0.05 38.4 +/-0.1	0.49+/-0.05 0.31+/-0.03 0.91+/-0.09	0.77 -0.64 -0.03	35+/-4 35+/-4 36+/-4	105
0.01	9	2.4+/-0.2 -0.80+/-0.09 39.1 +/-0.2	0.5+/-0.1 0.28+/-0.7 0.6+/-0.1	0.95 -0.90 -0.74	29+/-7 29+/-7 31+/-7	79

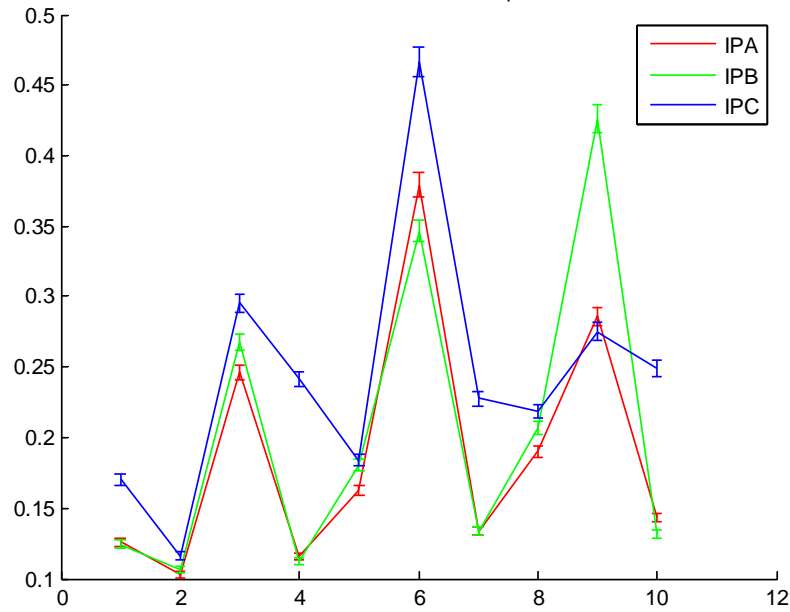
Jitter as fn of sample no



Mean position as fn of sample no

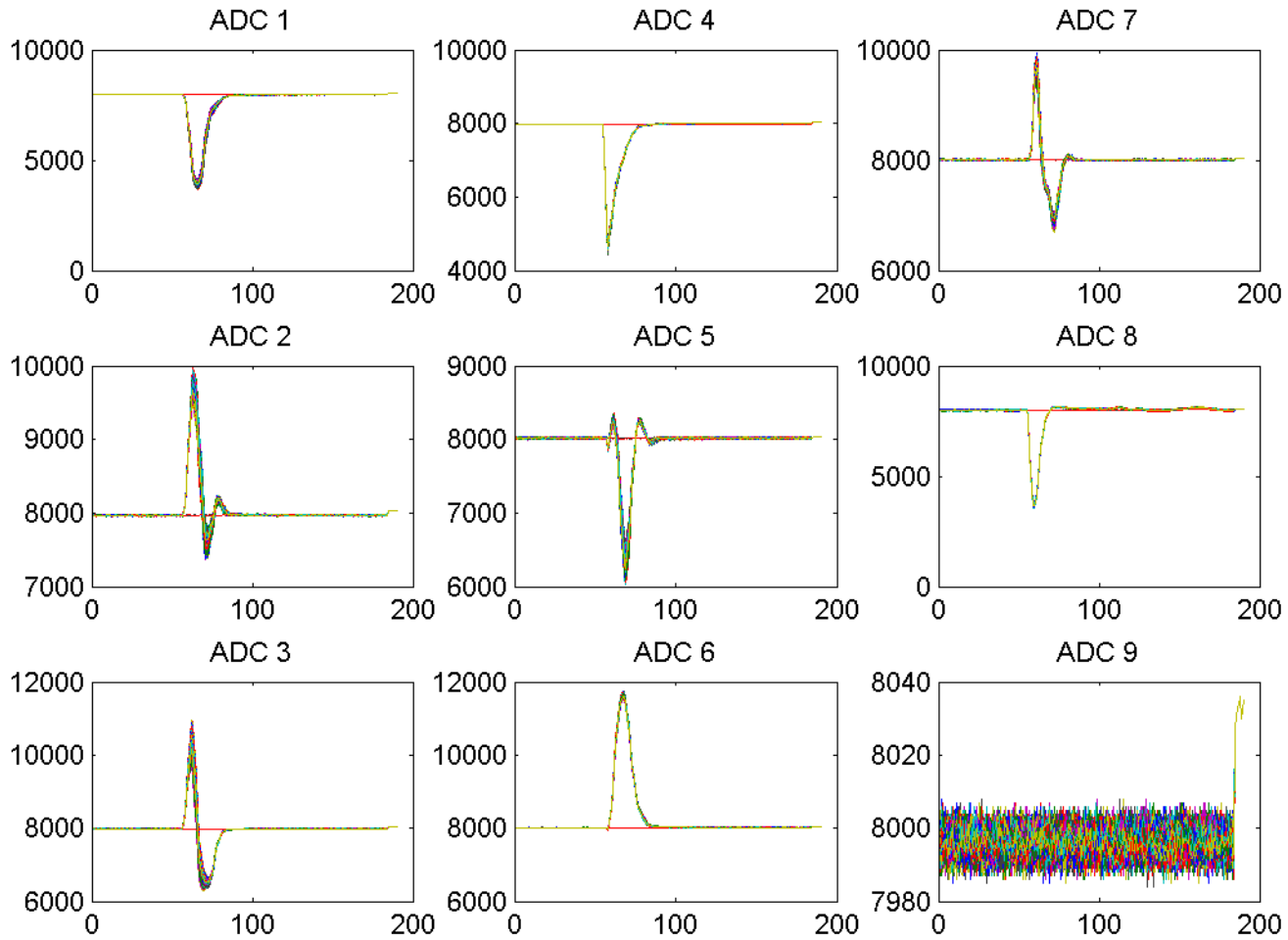


Resolution as fn of sample #

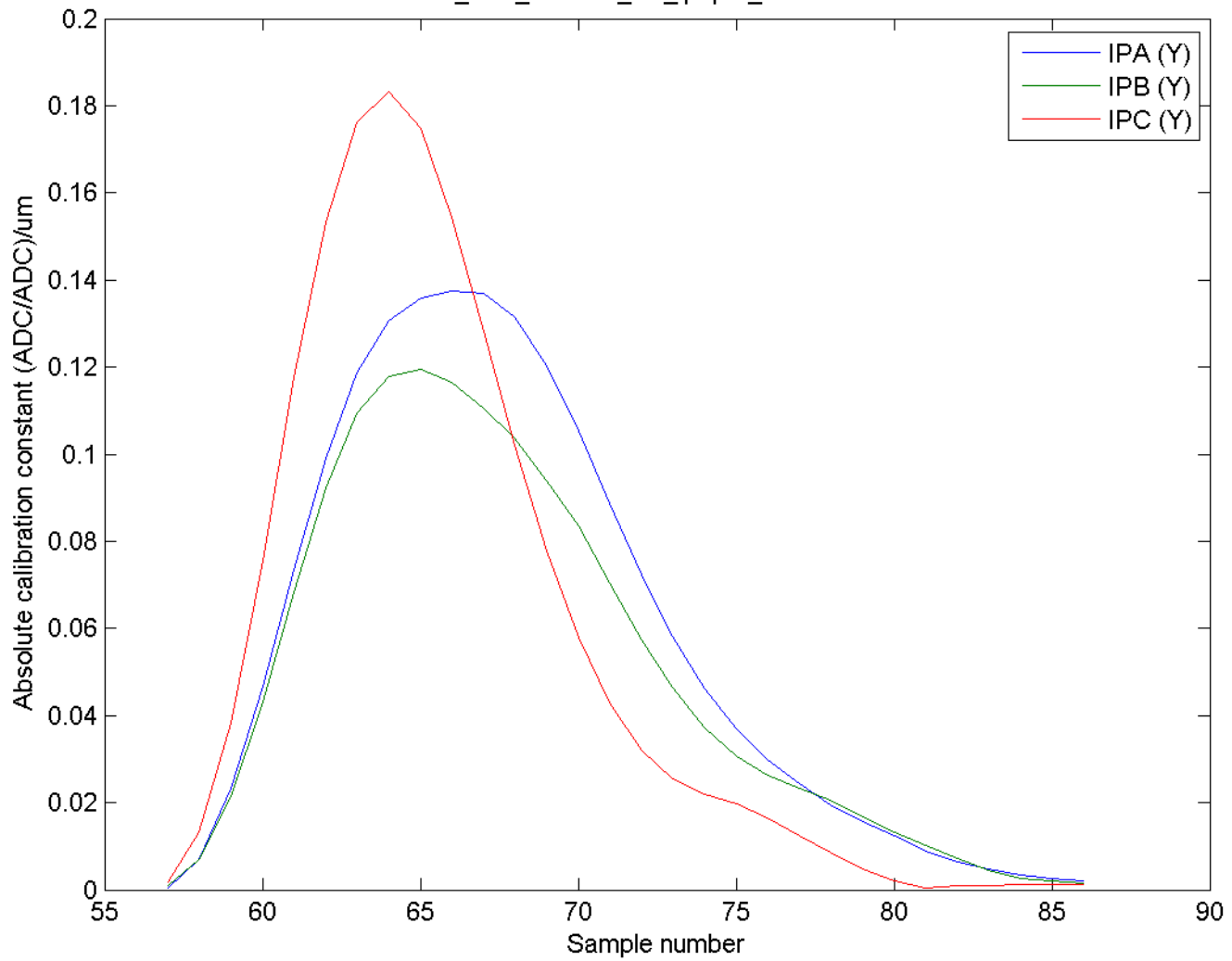


20/12/14 0dB dataset
Resol8 (ATF2 FB OFF)

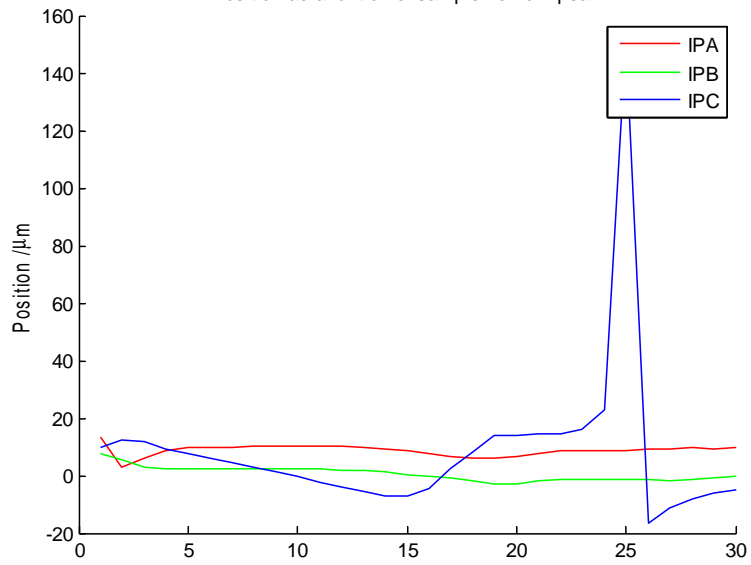
ADC waveforms for resol_0dB_8_FB_off_ipbpm_141220 on 201214



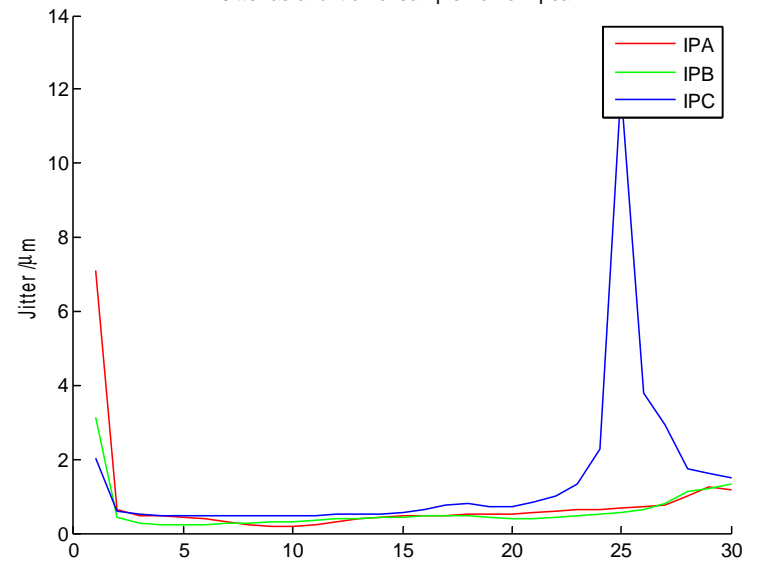
Absolute calibration constant vs. sample number
for IPABC_0dB_recheck_cal_ipbpm_141220 on 201214



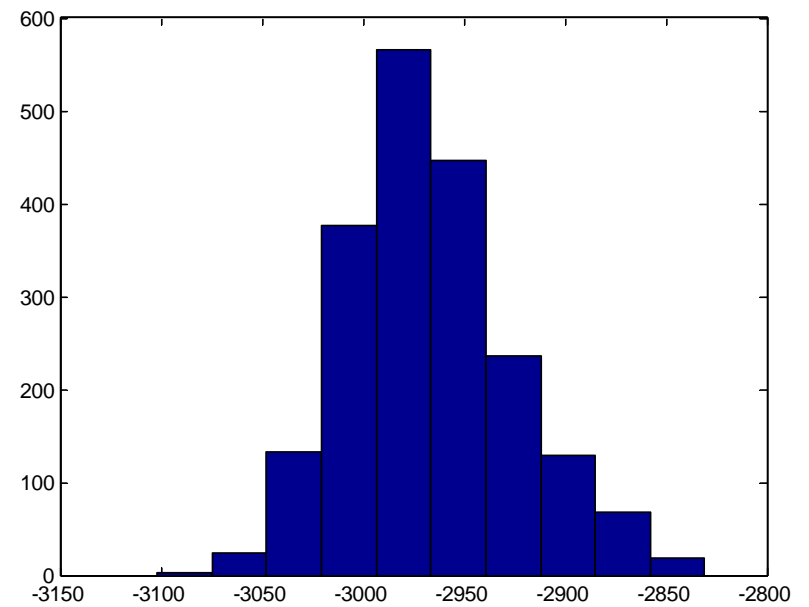
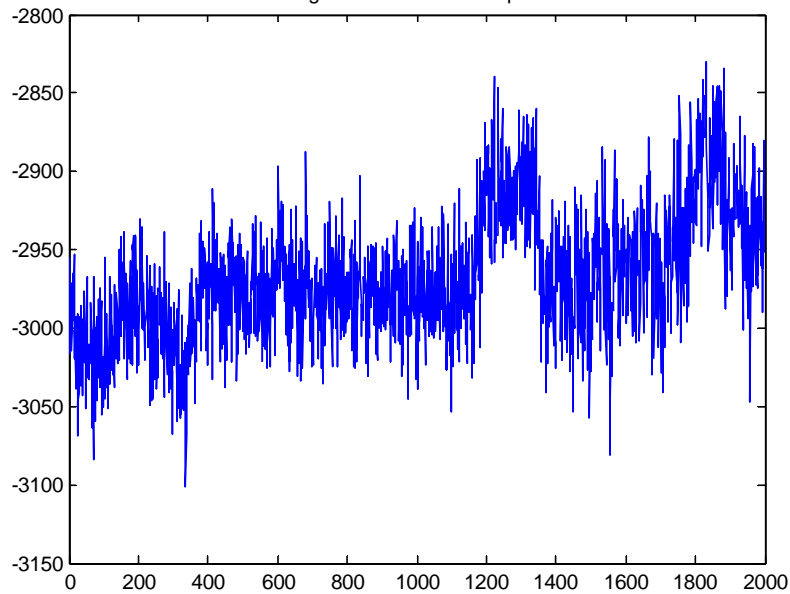
Position as a function of sample no from peak



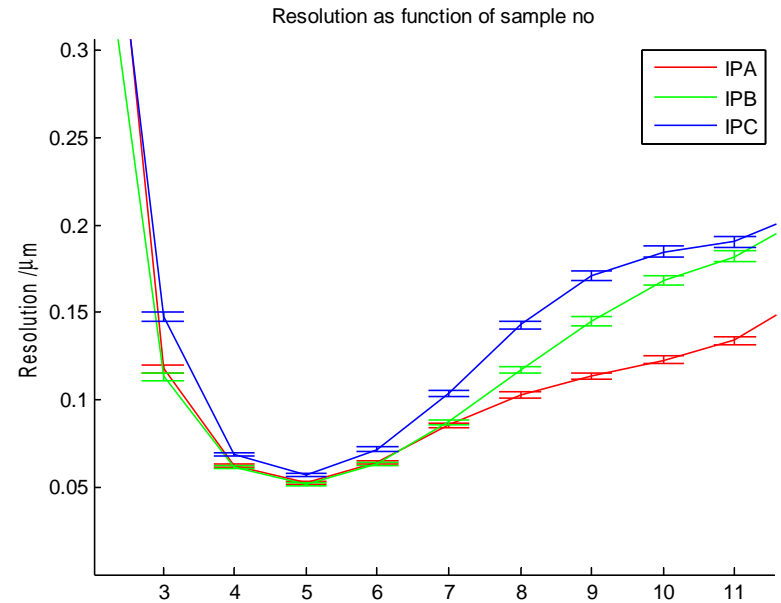
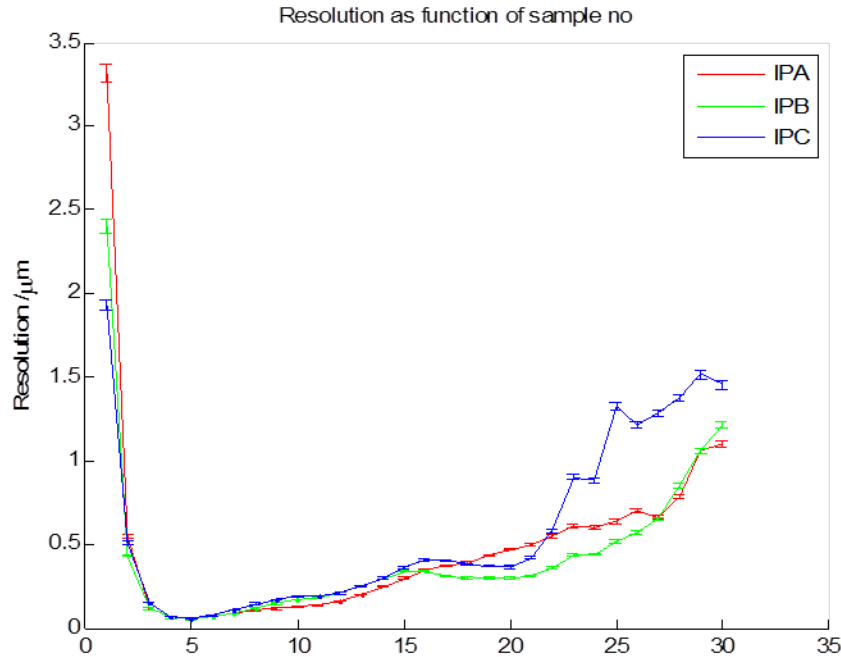
Jitter as a function of sample no from peak



charge as function of sample no

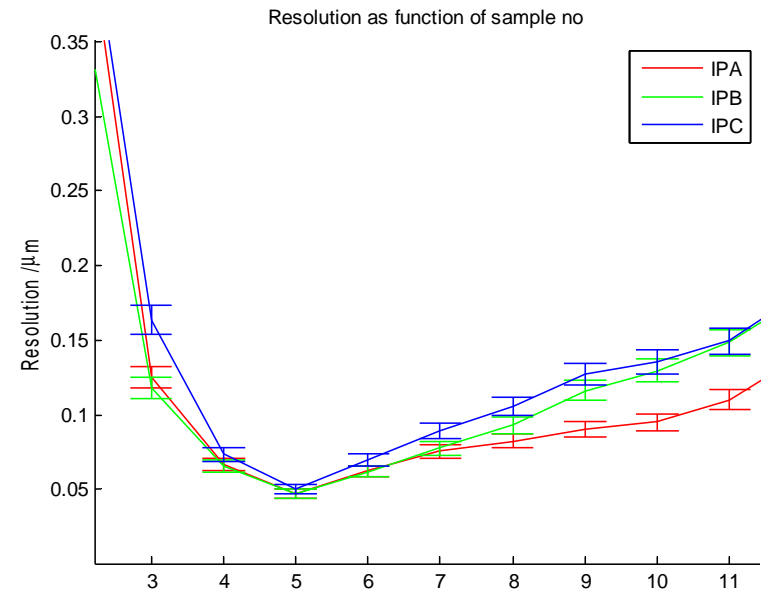
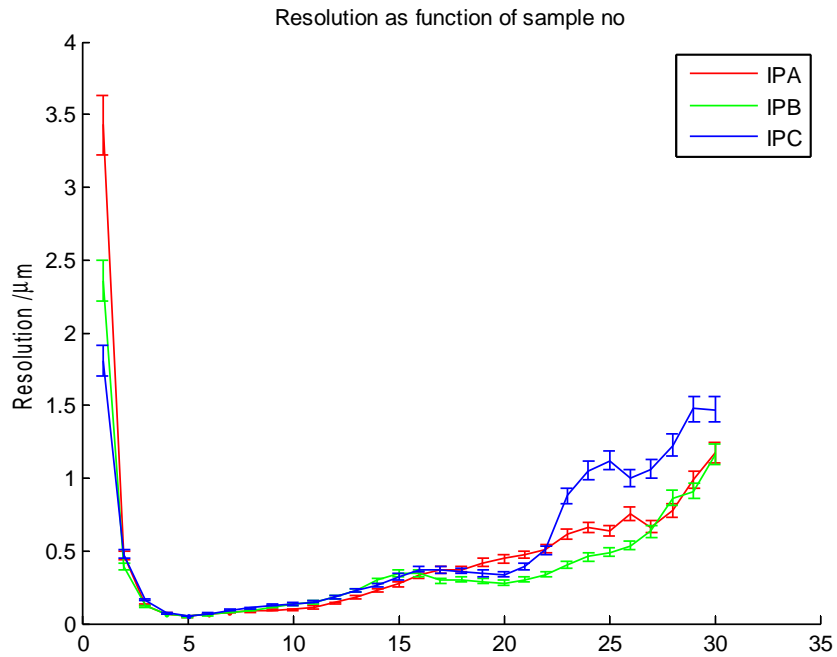


Resolution - all charge data



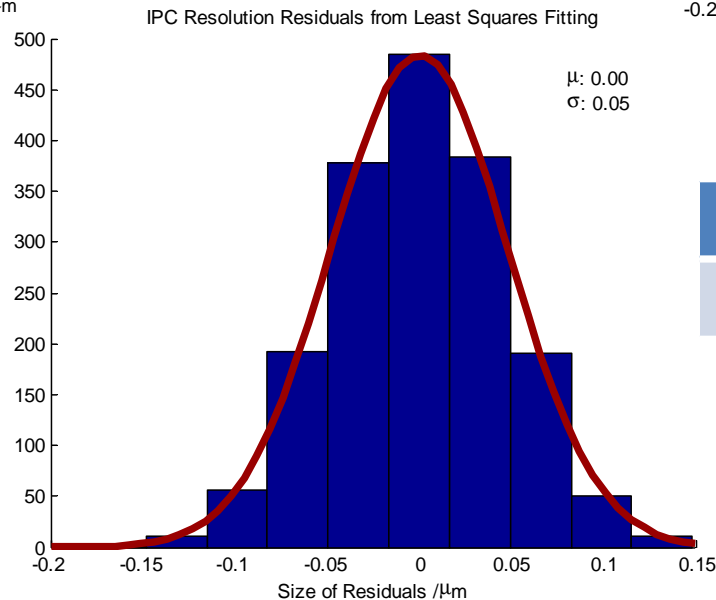
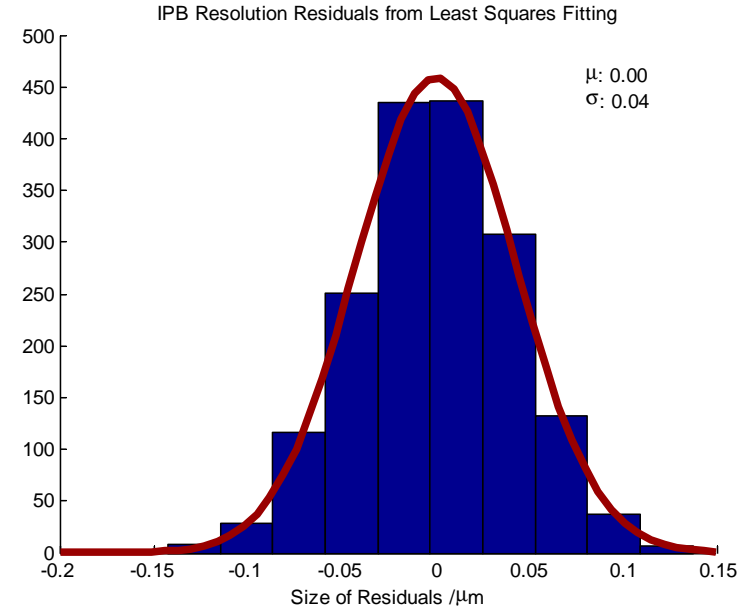
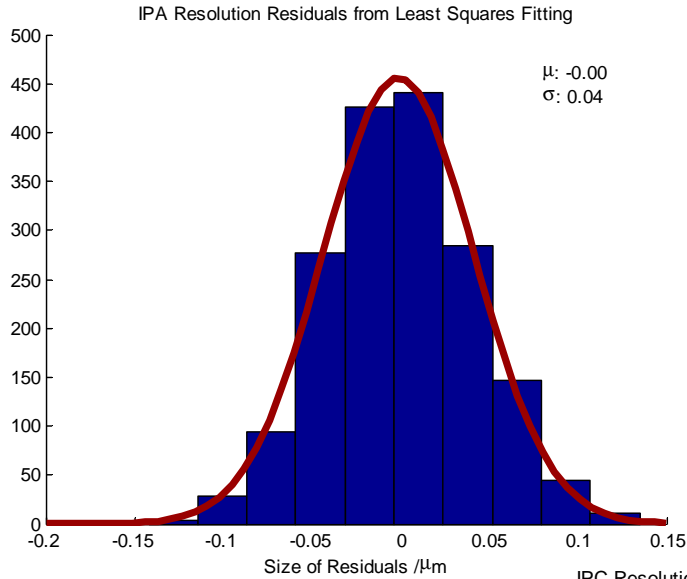
Fitting			Geom
52nm	52nm	57nm	54nm

Resolution - 0.1 sigma cut on charge (163/2001 pulses remaining)



Fitting			Geom
47nm	47nm	51nm	51nm

Resolution – all charge, mean of samples 3-10



Fitting			Geom
42nm	42nm	47nm	55nm

0.1 sigma cut + averaging

Fitting			Geom
42nm	42nm	46nm	59nm

Questions/ points for discussion

- IPC waveforms
 - better with filtering but still residual differences in response of IPC wrt IPA, IPB.
 - Faulty cable/ loose connection?
 - Unlikely to have large effect, minimum measured jitter \sim measured resolution
- Permanent inclusion of 714 +/- 10 MHz BP filters?
 - Although waveforms look cleaner using filters, could have detrimental effects
 - Better to fix static oscillations etc at source?
 - Detailed comparison with/without filters ...
 - Digital filtering in hardware (FPGA)/software (post analysis)?
 - Same effect as analog hardware filter, but retain raw (unfiltered) data.
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