ATF2 December Shifts

R. Ramjiawan, D. Bett

Monday, 18th December 2017

Shift Outline

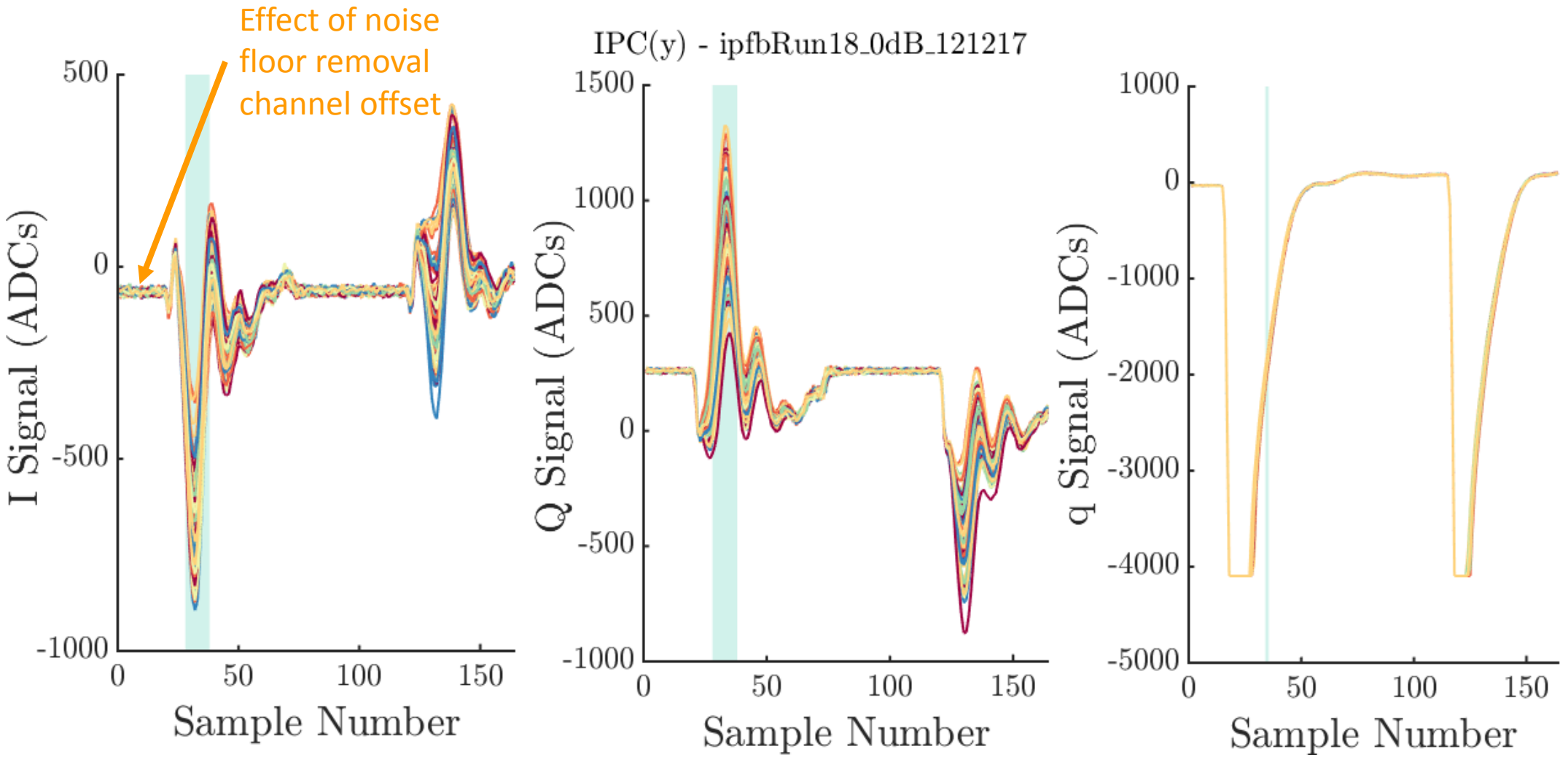
- 1-BPM feedback (Tuesday owl)
  - Nominal optics
  - 0dB,
  - 1-BPM feedback stabilising at IPC,
  - C-band BPFs in place,
  - Noise floor removal.
- 2-BPM feedback (Friday day and swing)
  - High beta optics,
  - 10dB,
  - 2-BPM feedback at IPB,
  - Noise floor removal.

1-BPM Feedback

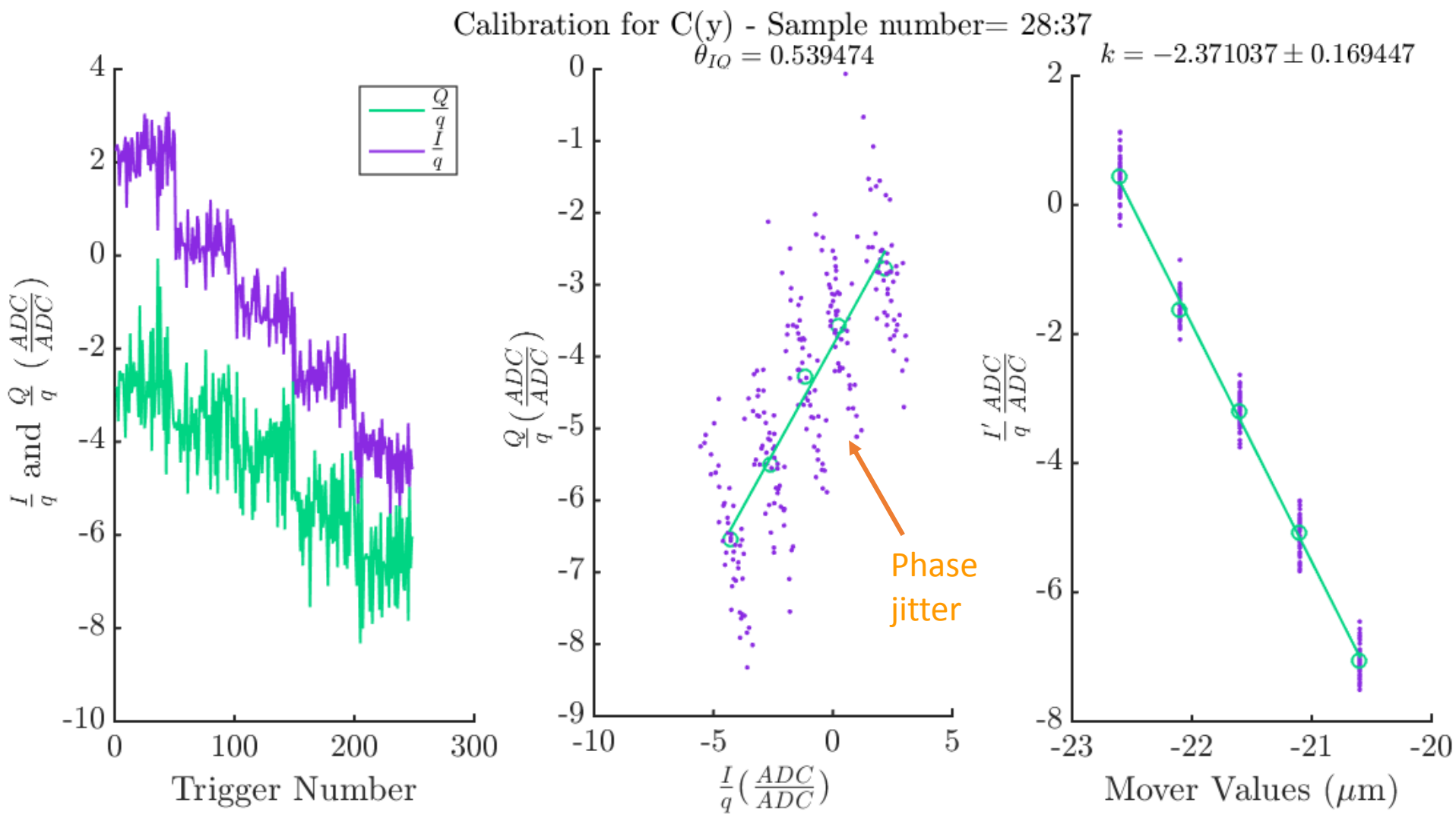
ipfbRun18

Calibration file: AQD0FFyScan1

Waveforms


Effect of noise floor removal channel offset
I Signal (ADCs)
Sample Number
IPC(y) - ipfbRun18_0dB_121217
Q Signal (ADCs)
Sample Number
q Signal (ADCs)
Sample Number

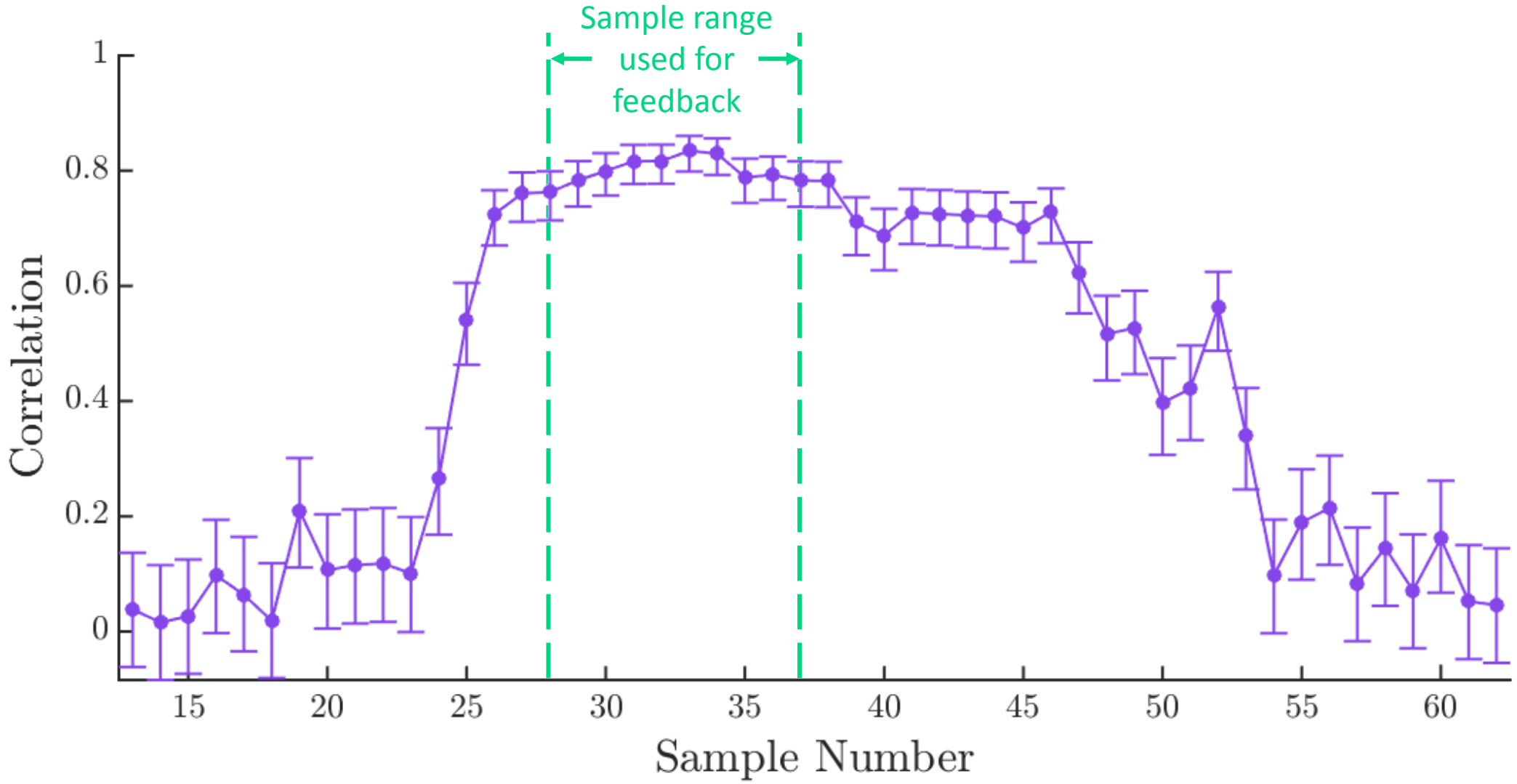
Calibration IPC



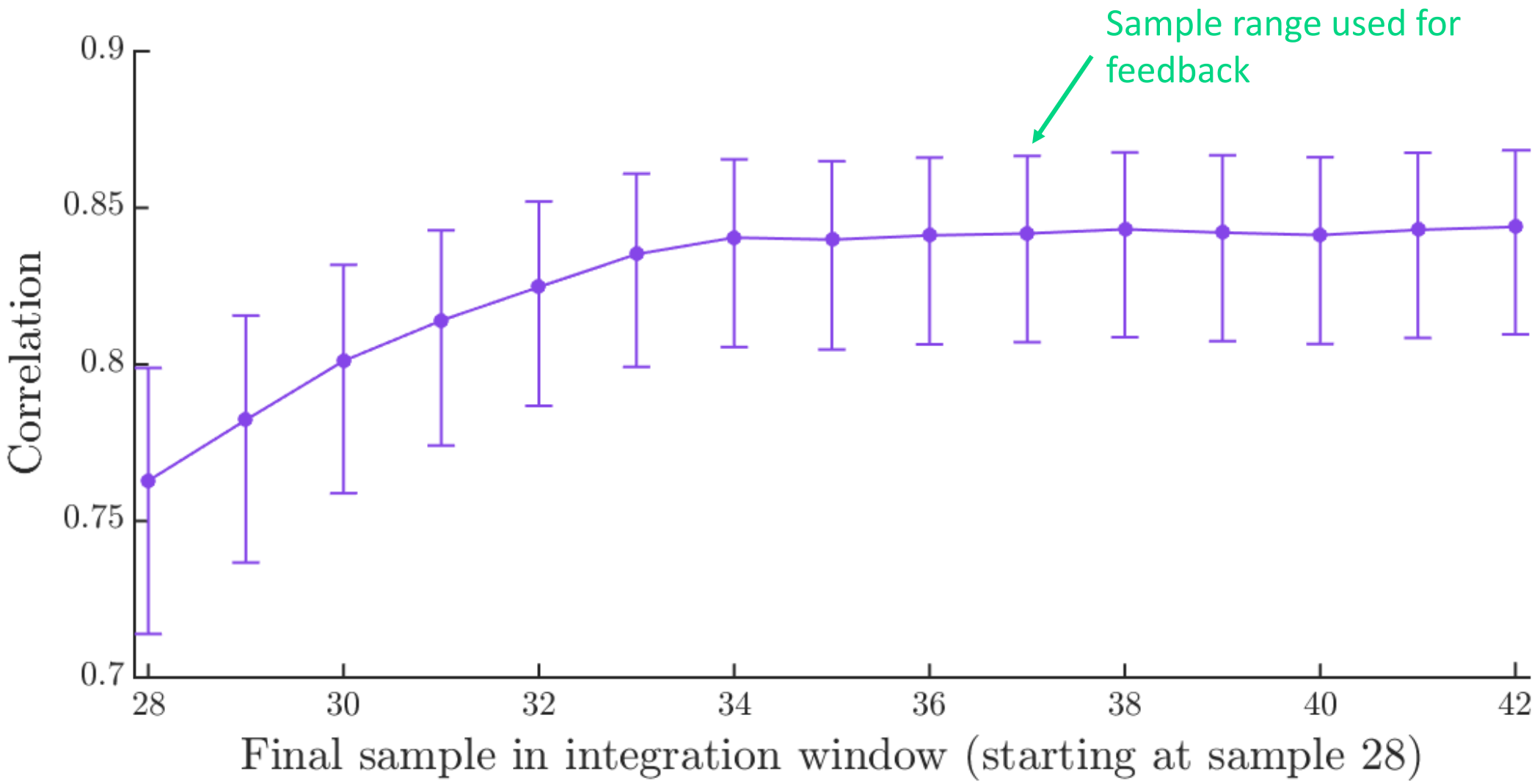
Scaled calibration constant:
k=-0.237

We tried to reduce Q' to reduce the effect of the phase jitter on the position measurement.

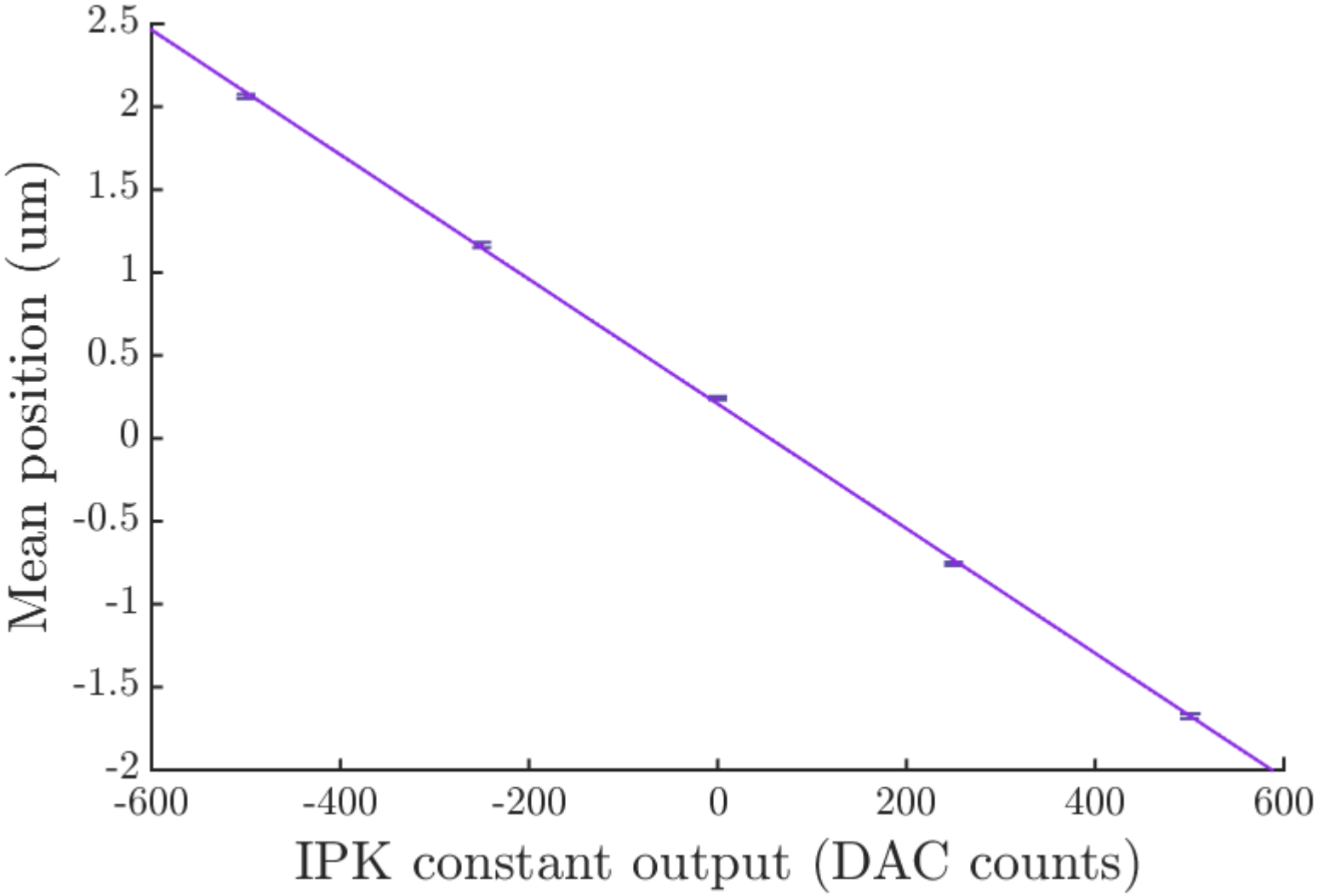
IPC Single Sample Correlation



Integrated Sample Correlation



Kicker Calibration IPC

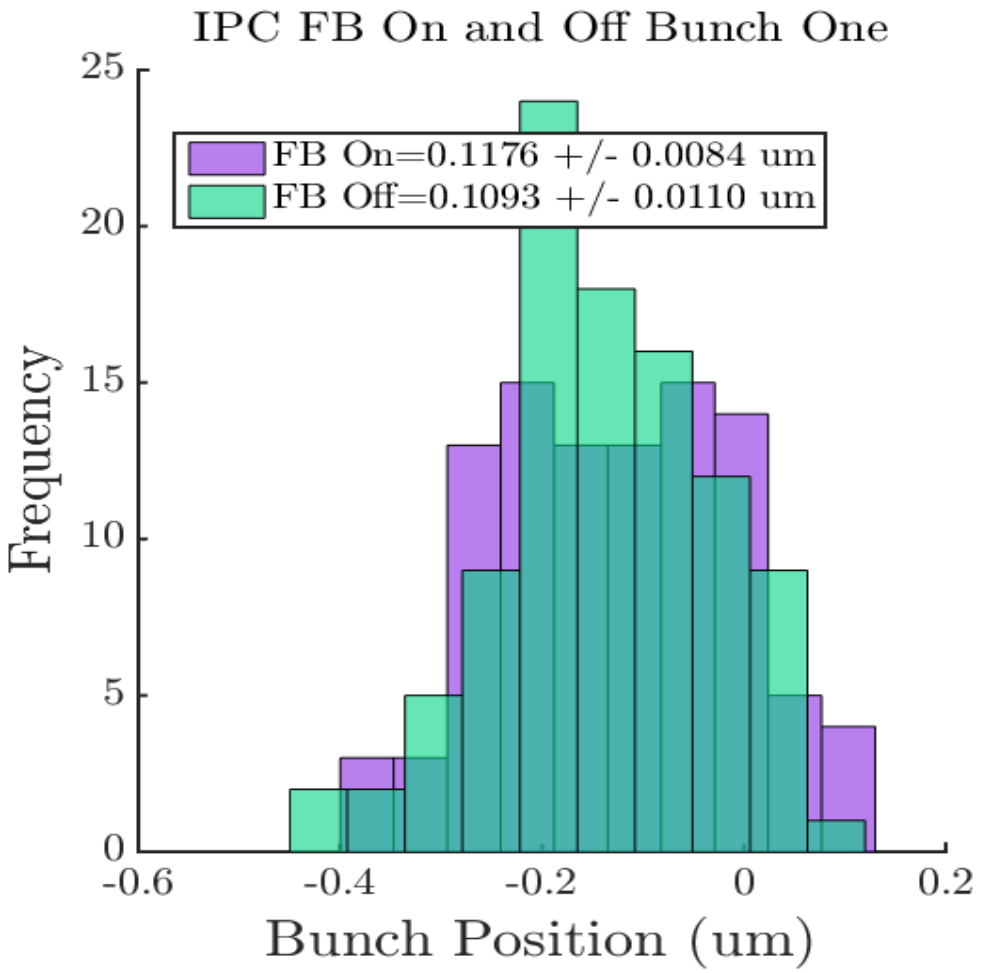


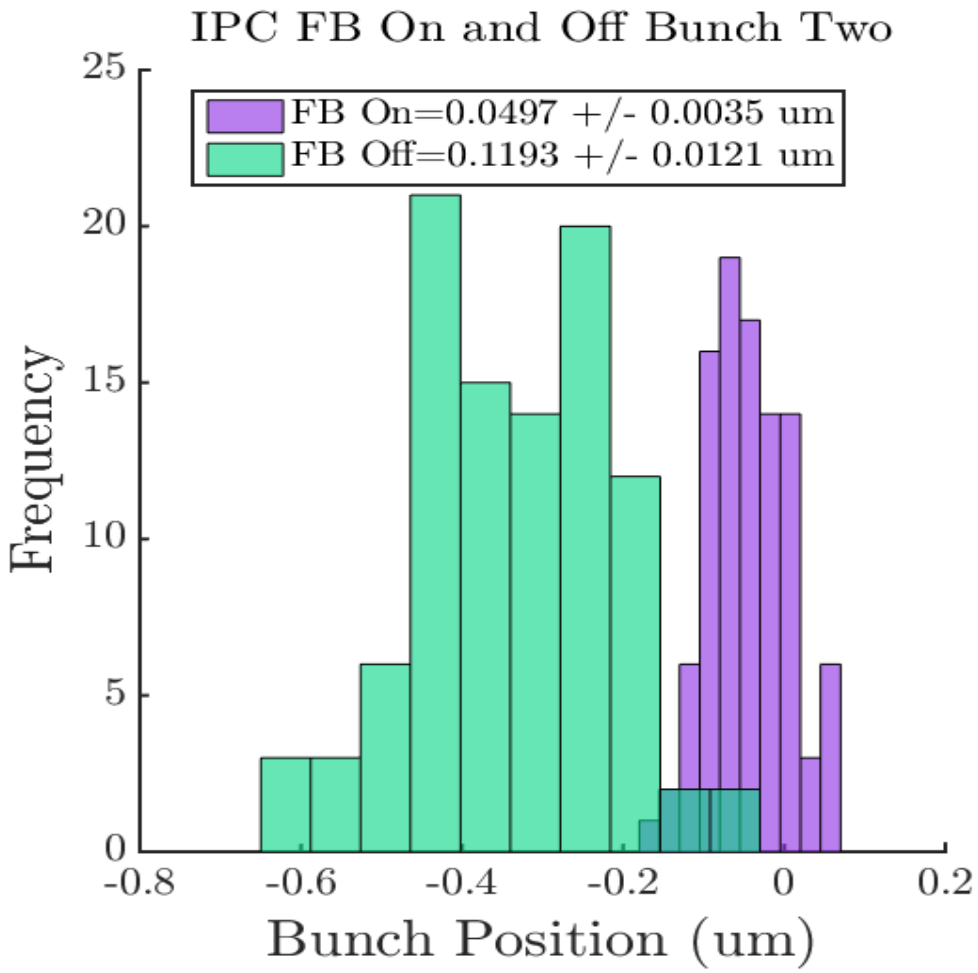
Gradient **-0.0038** (um/DACs)

R^2=0.99968

Standard errors given.

1-BPM Feedback Performance





Feedback integration window: 28:37

Analysis integration window: 28:37

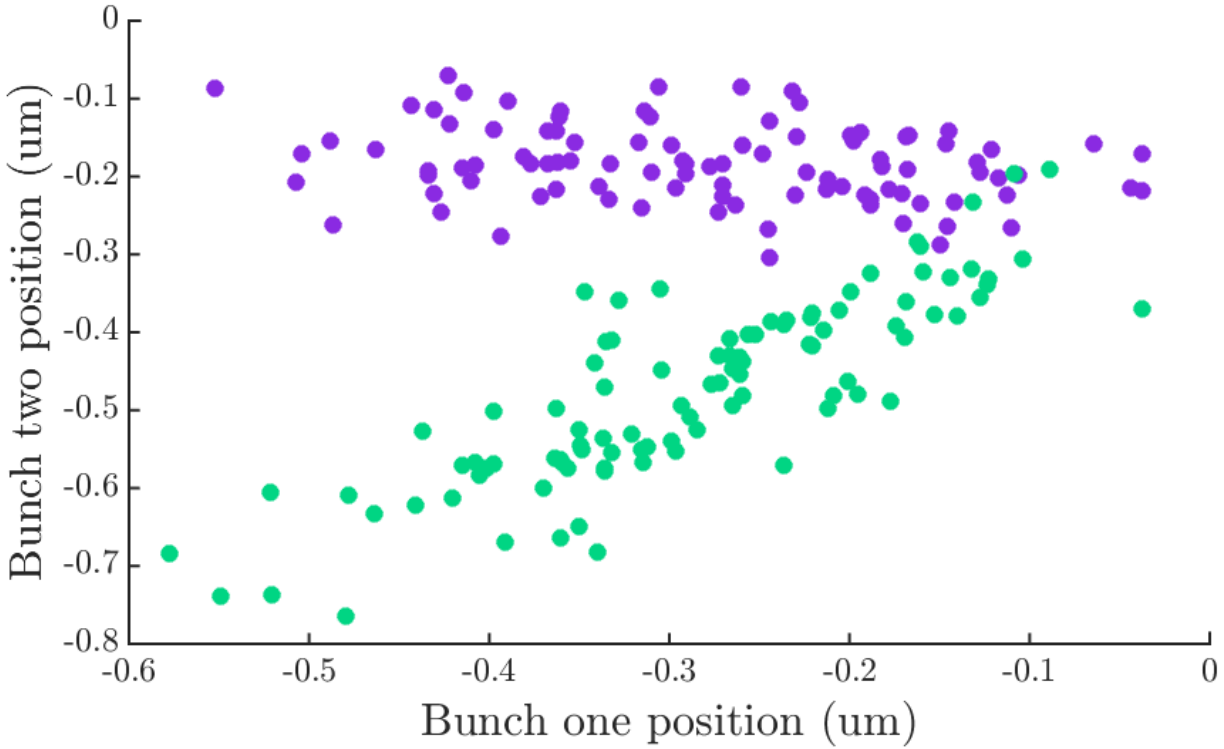
Triggers cut: 290 372

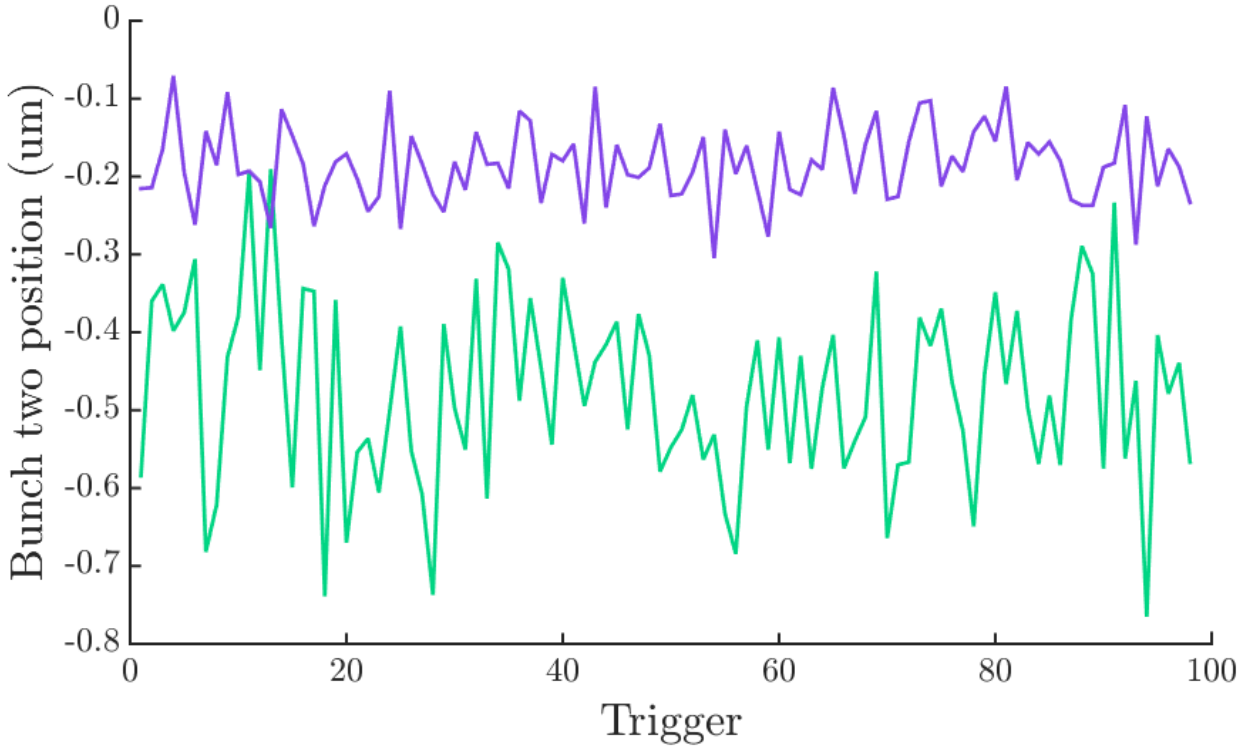
Feedback on jitter: **49.7 nm**

Feedback Performance

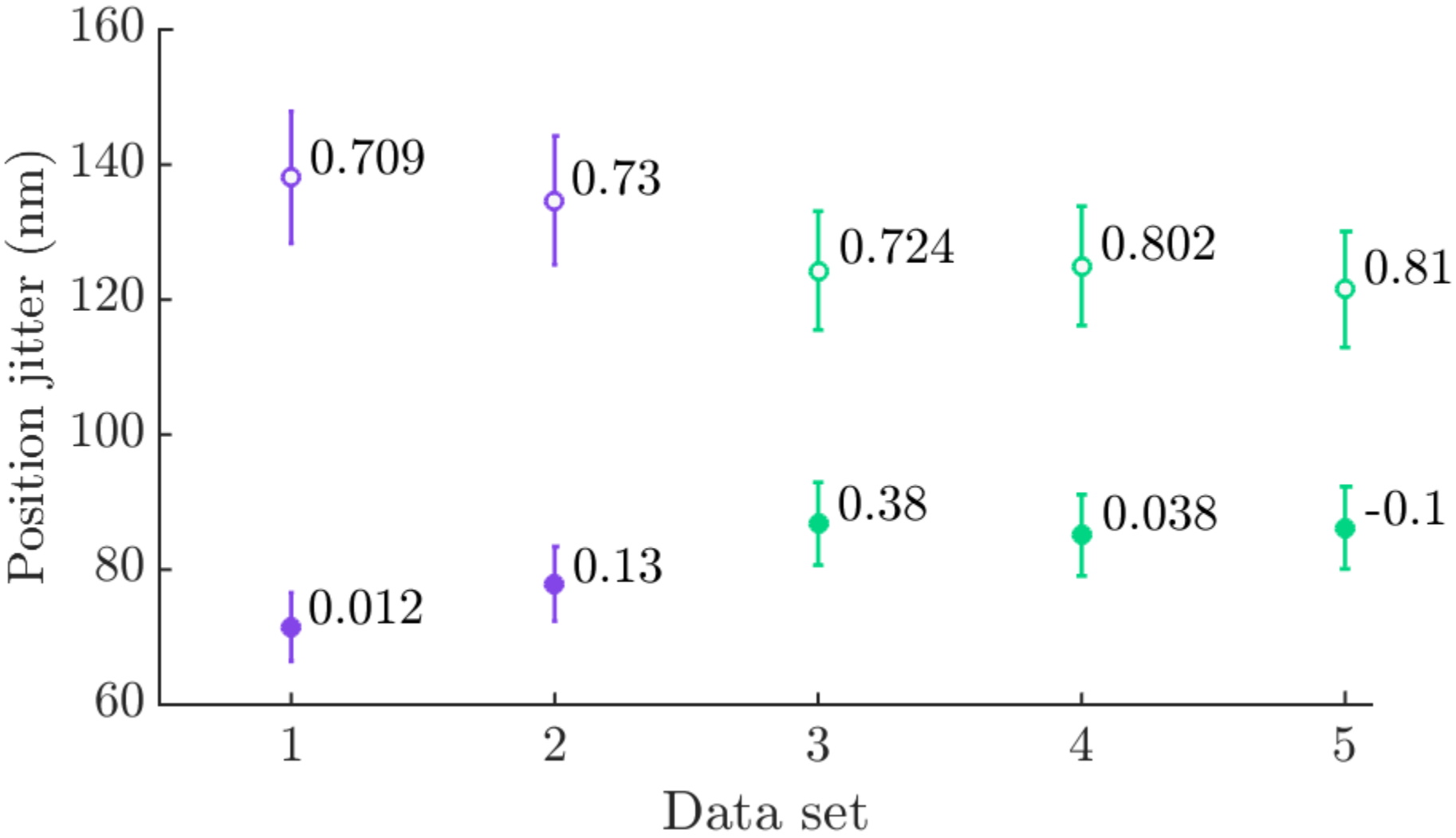
Correlation feedback on: **-26%**
Correlation feedback off: **84%**

Purple: FB on
Green: FB off





Noise Floor Removal (Channel Offset)



Purple: feedback performed with noise floor removal.
Green: feedback performed without noise floor removal.

Filled data points: feedback on.
Unfilled data points: feedback off.

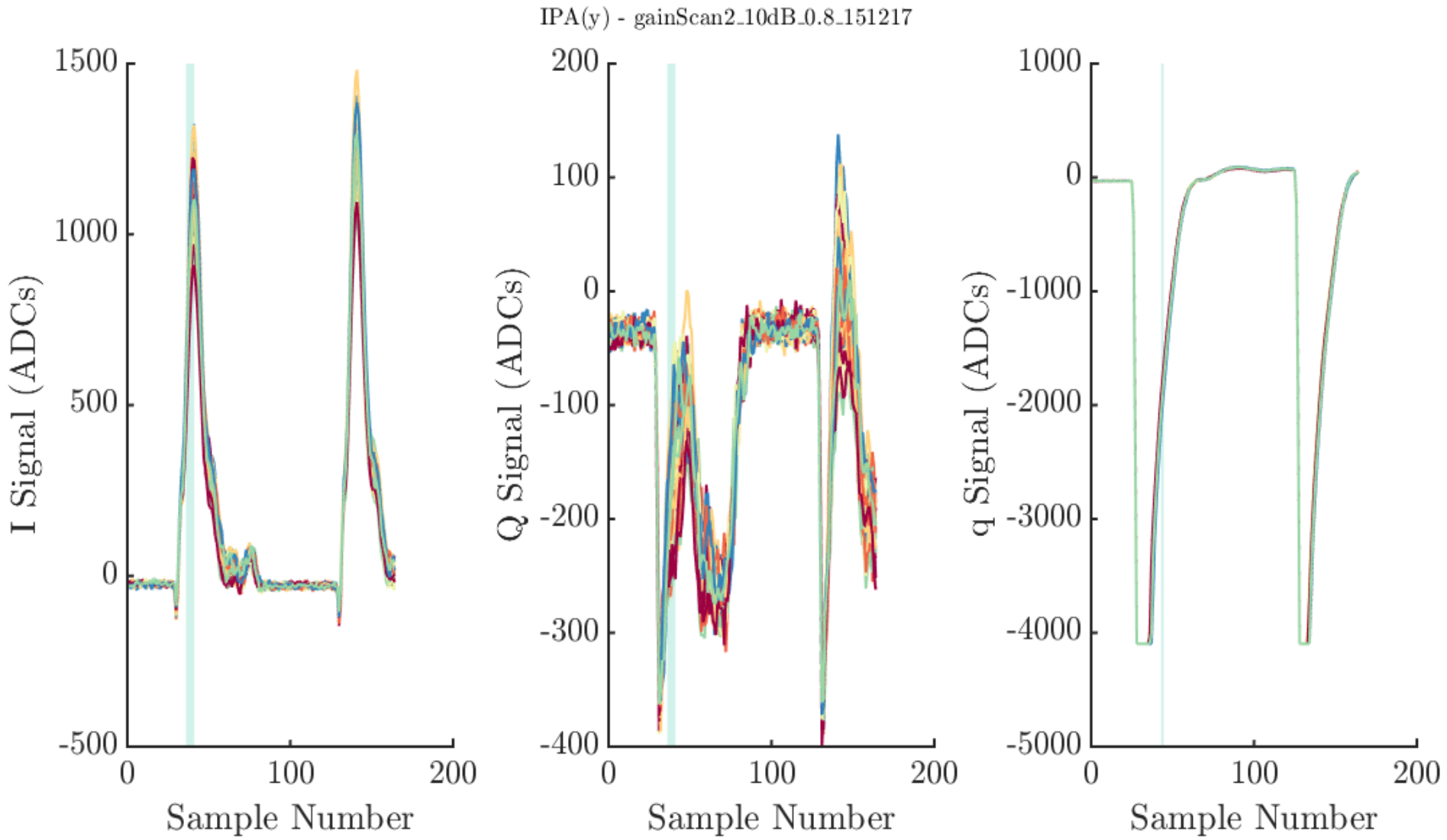
Position correlations shown as data labels.
(Data sets ipfbRun24:28)

2-BPM Feedback

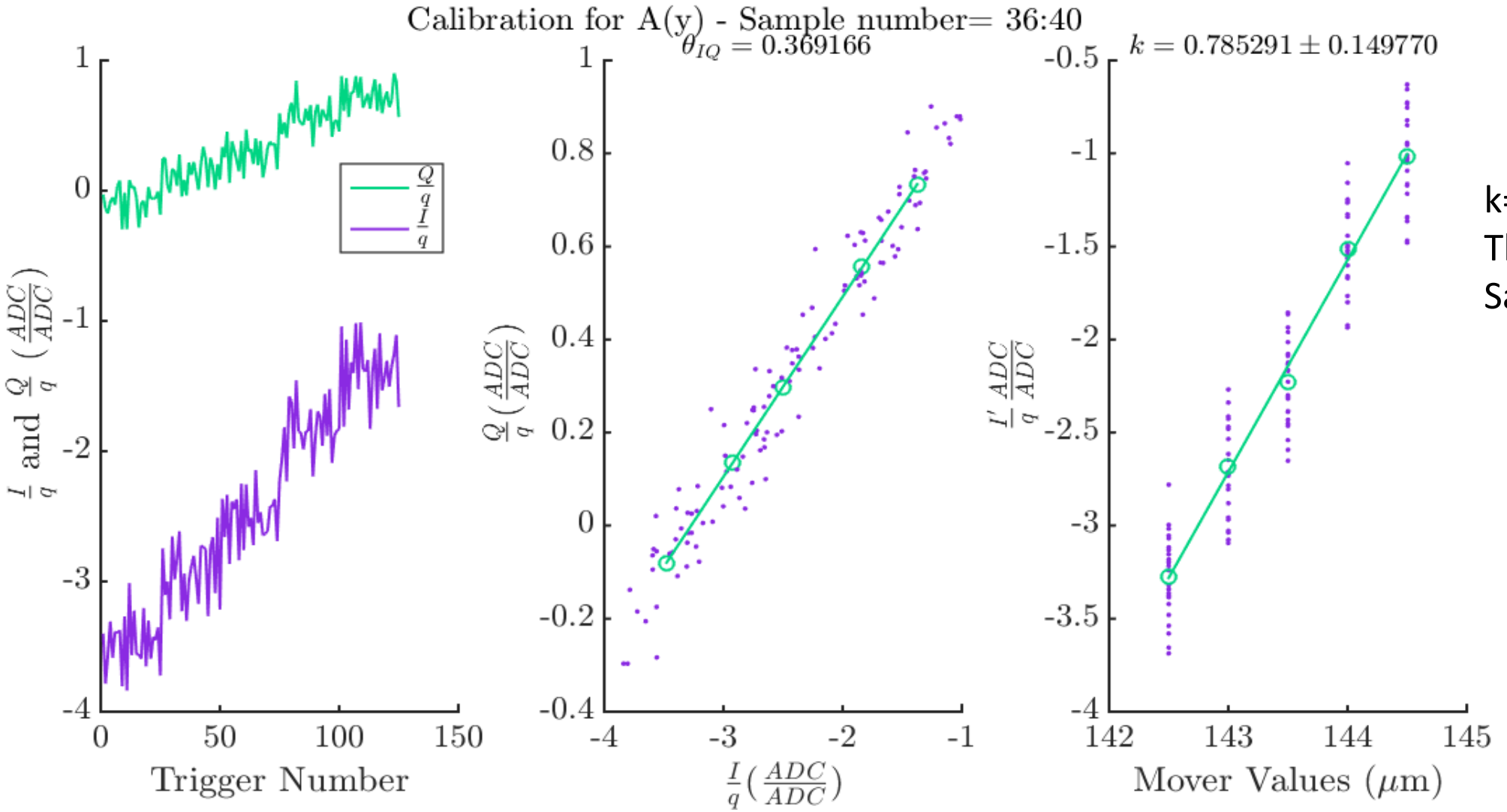
gainScan2_10dB_0.8

Calibration file: AQD0FFyScan7

IPA Waveforms

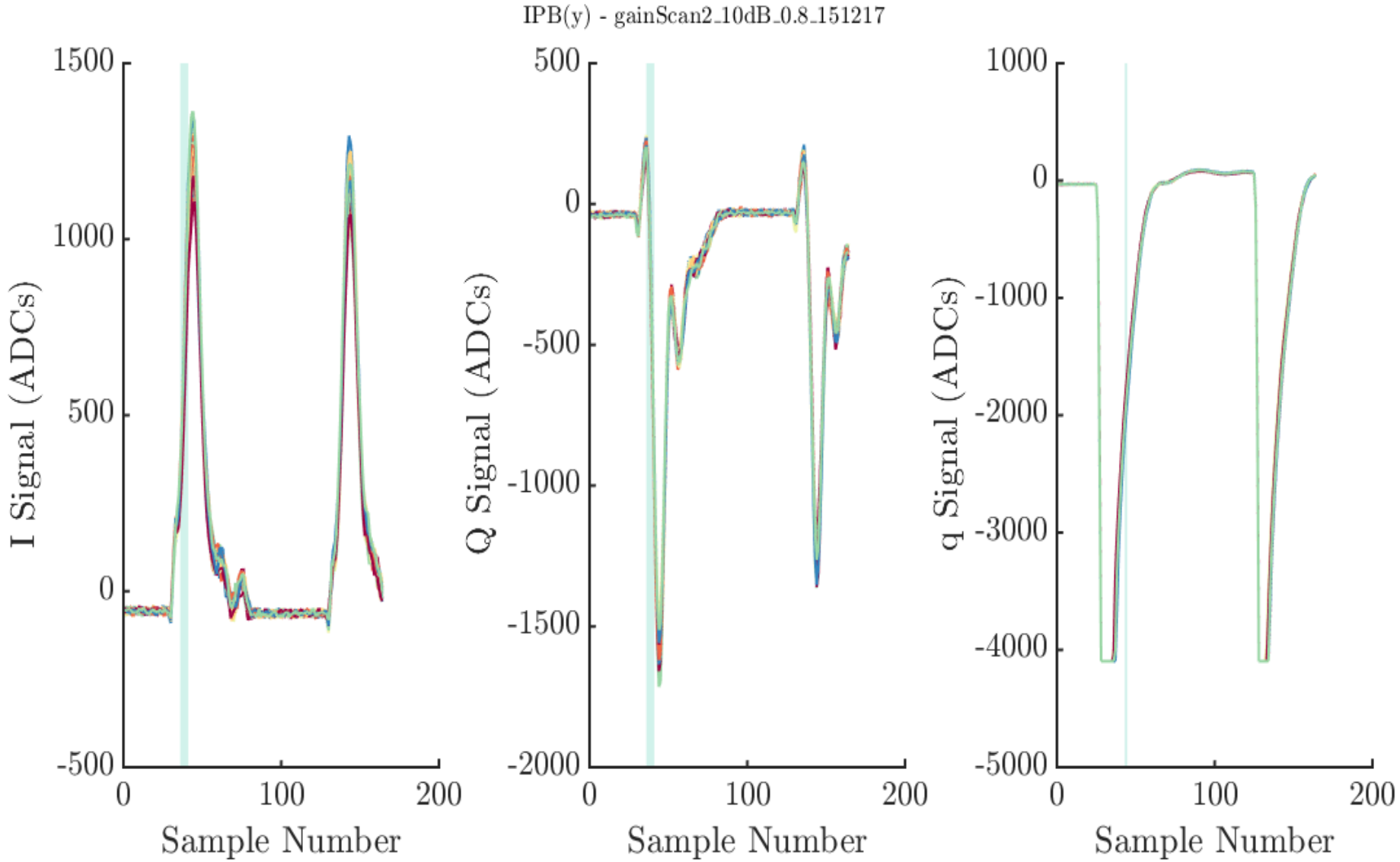


IPA Calibration

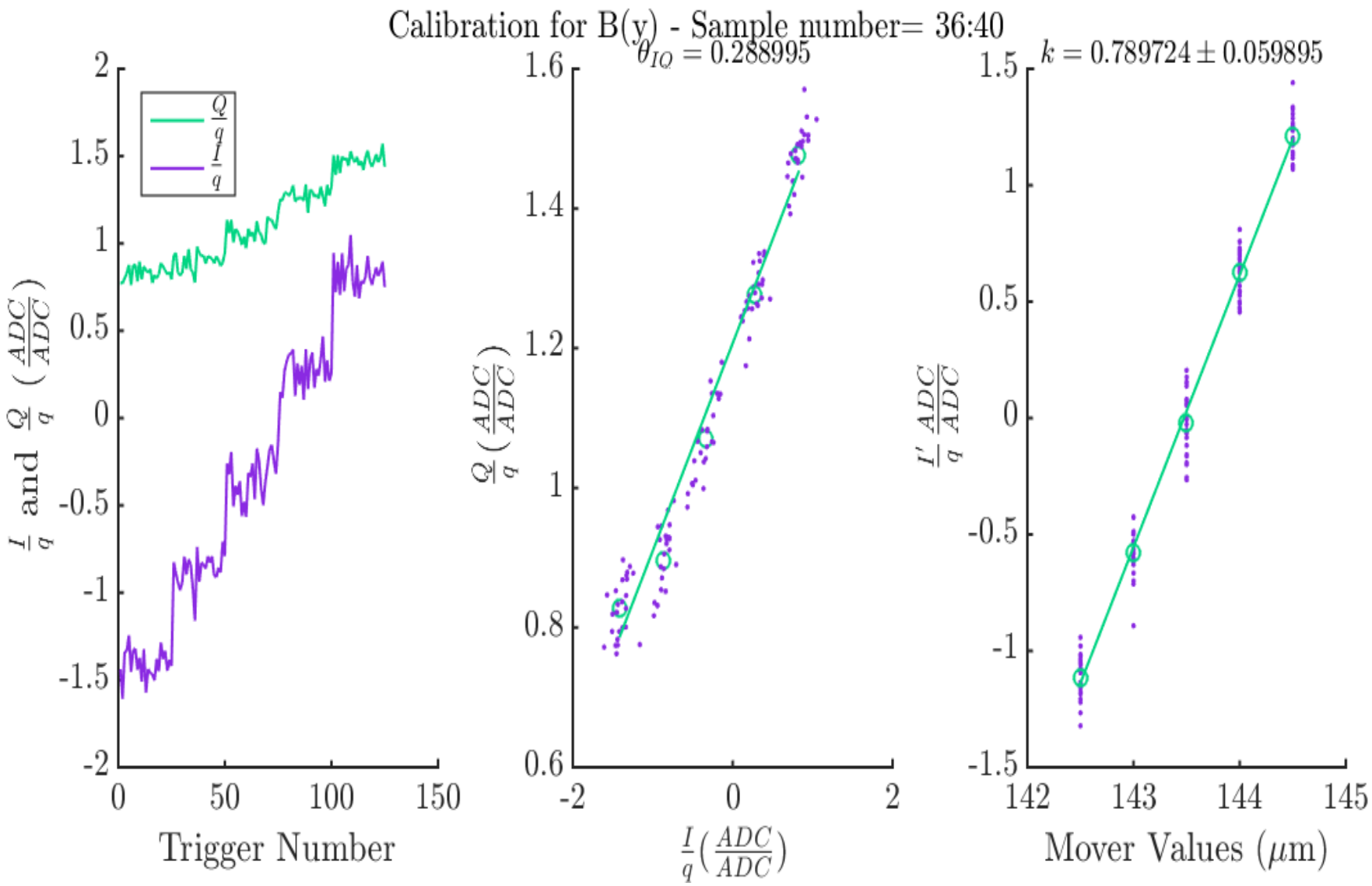


k=0.15706,
Theta=0.369
Samples 36:40

IPB Waveforms

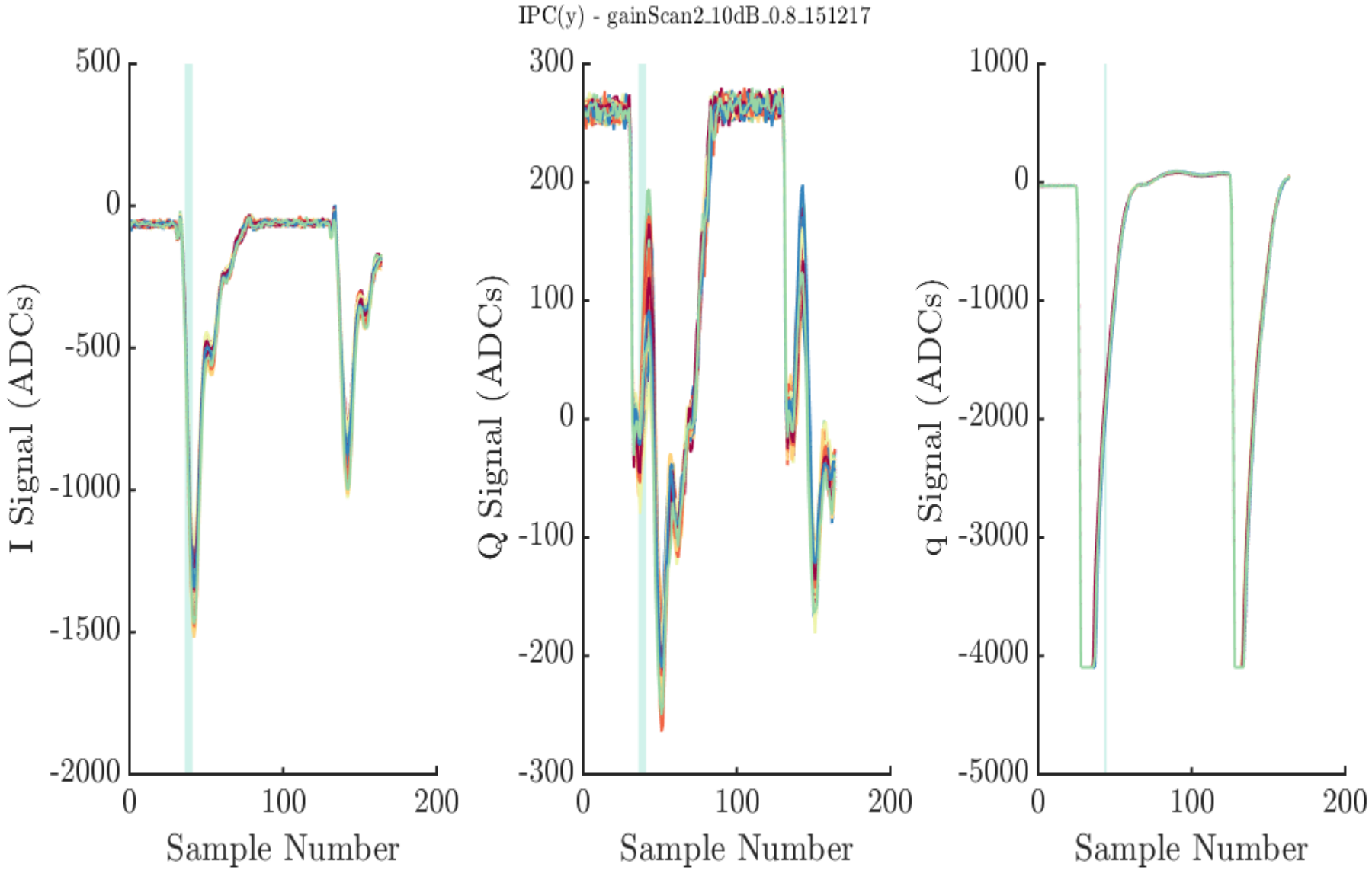


IPB Calibration

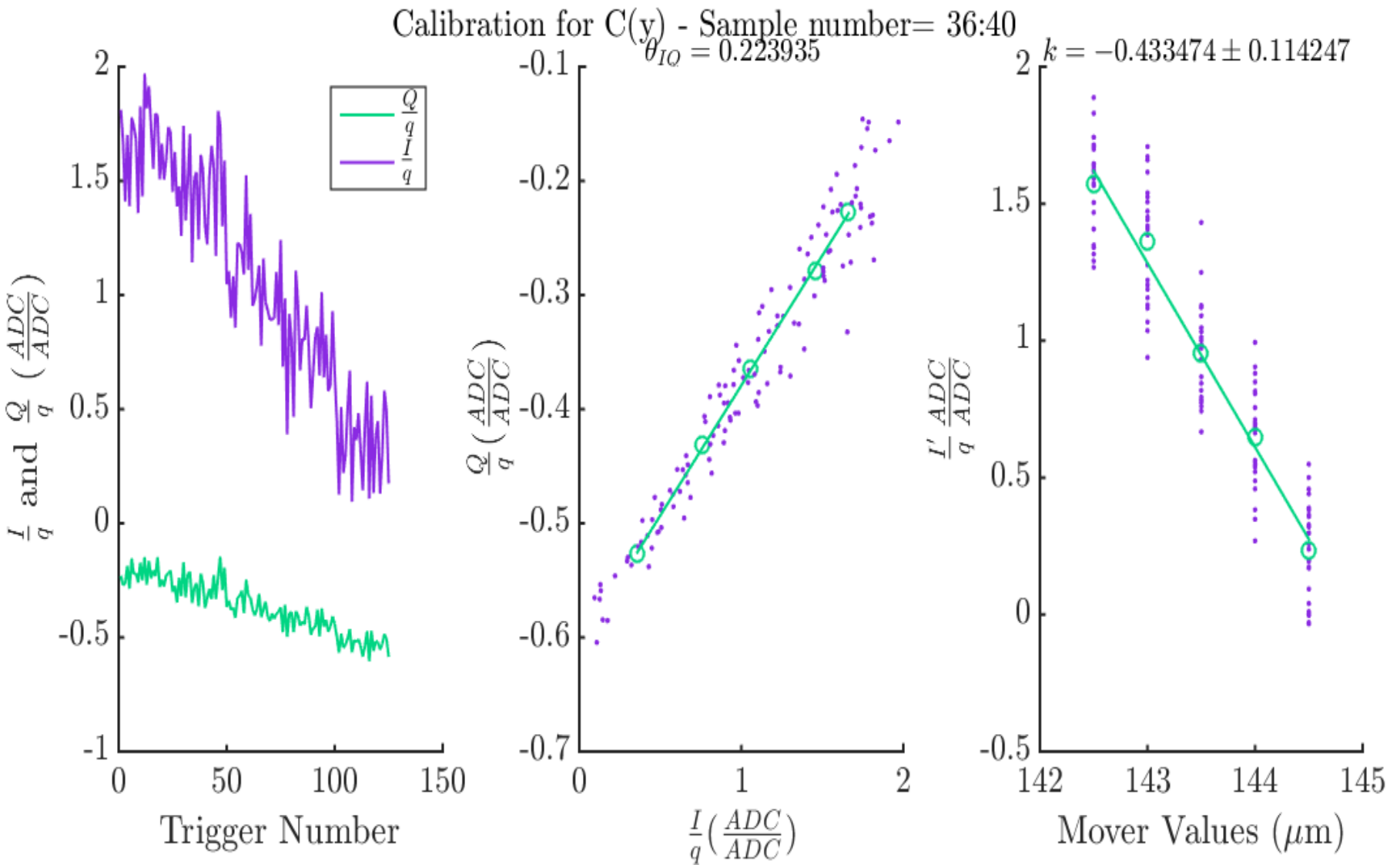


k=0.15794,
Theta=0.289
Samples 36:40

IPC Waveforms



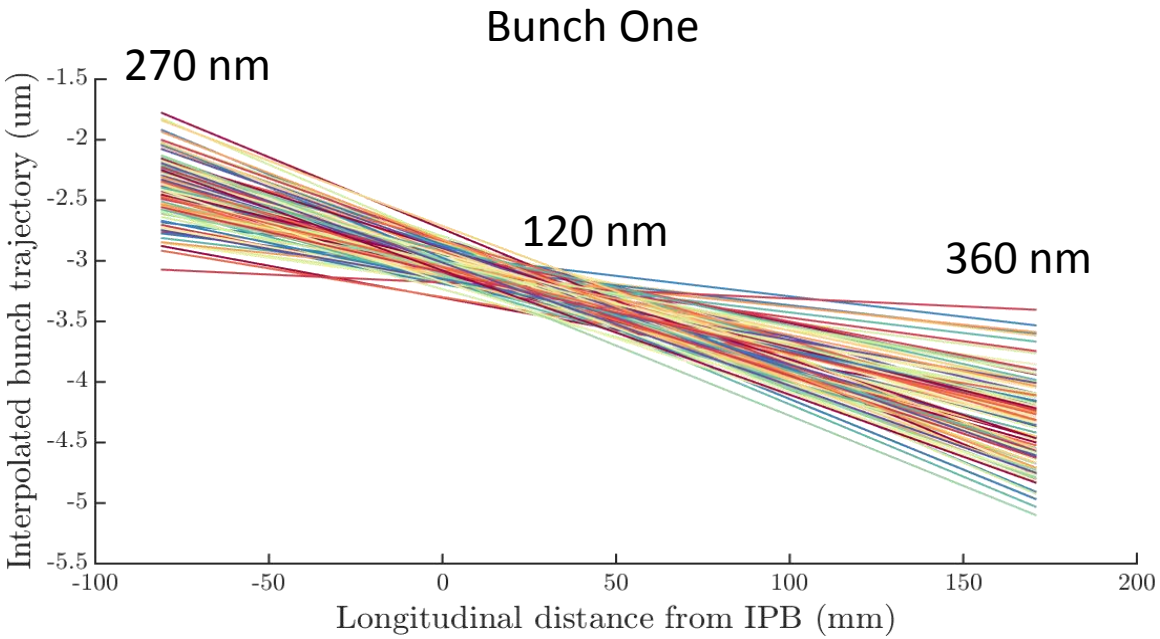
IPC Calibration

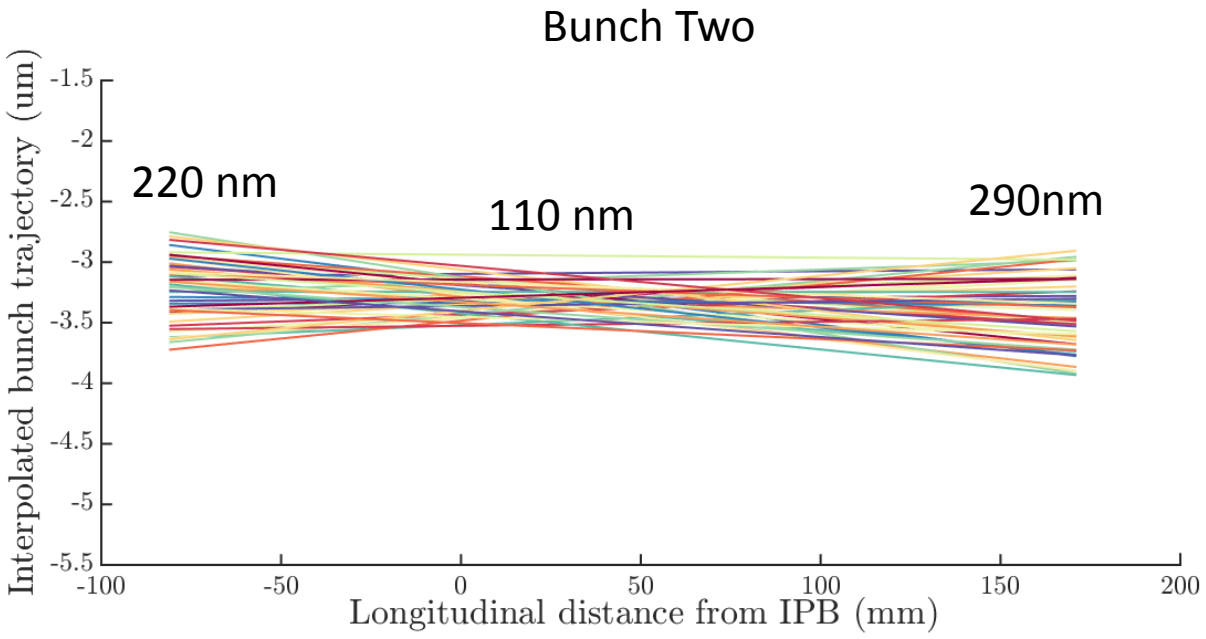


k=-0.086695,
Theta=0.2239
Samples 36:40

High beta optics

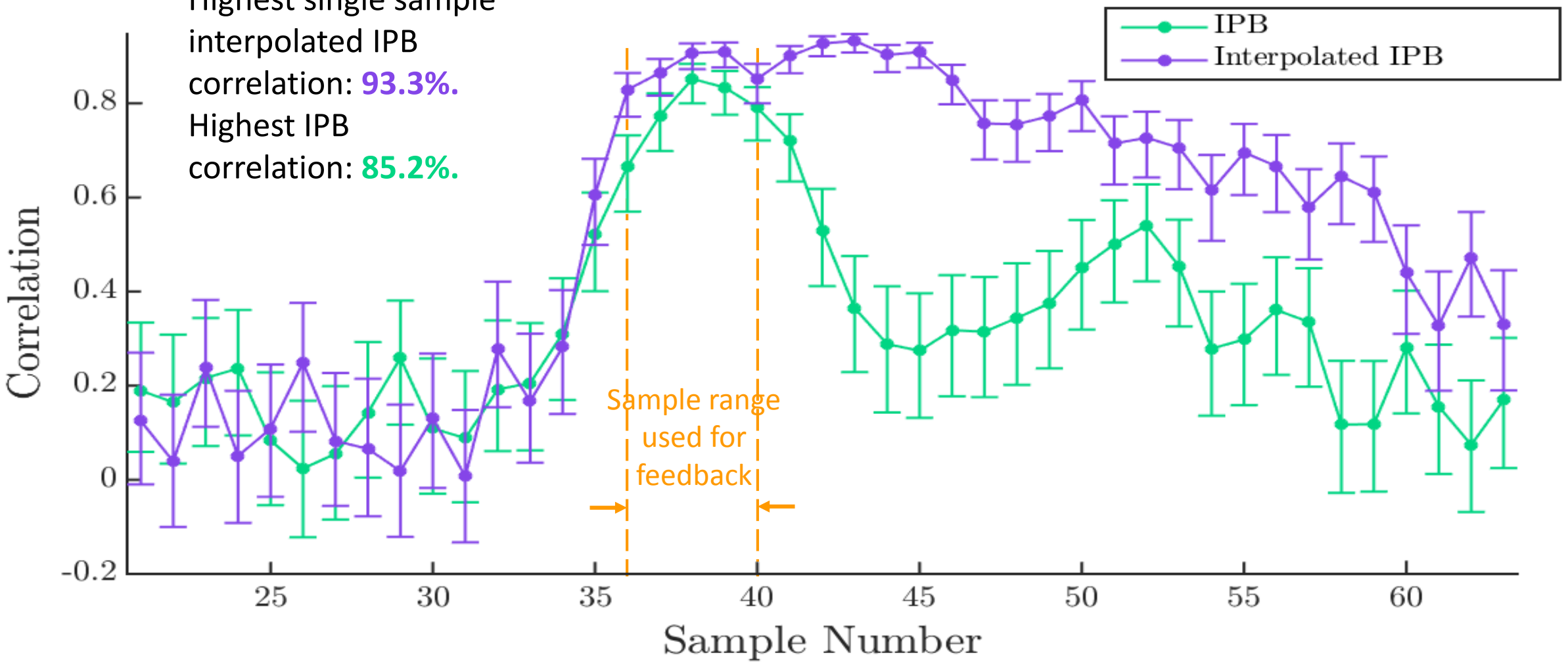
Bunch trajectory interpolated between IPA and IPC.
Feedback off bunch jitters shown as data labels.



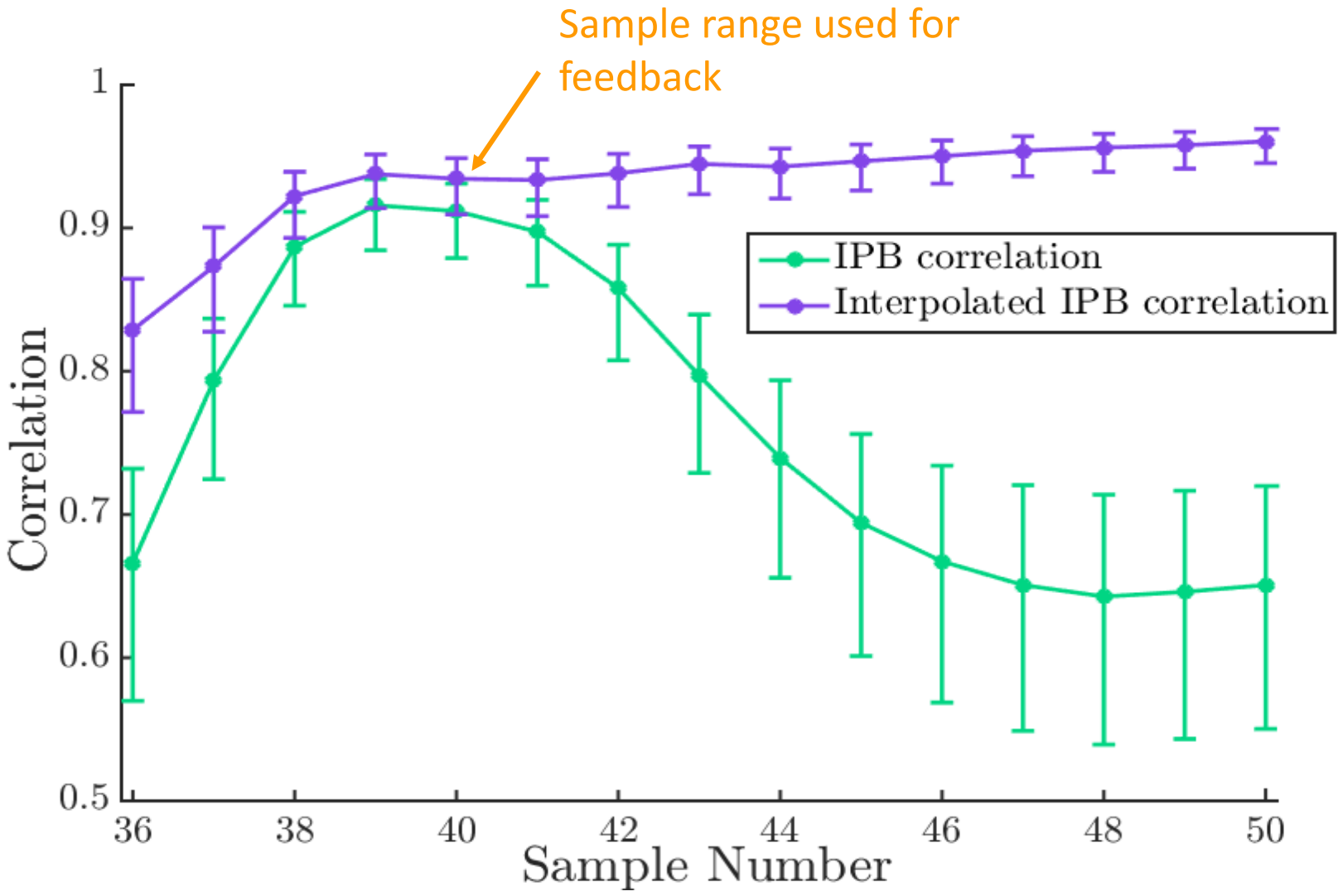


IPB Single Sample Correlation

Highest single sample interpolated IPB correlation: **93.3%.**
Highest IPB correlation: **85.2%.**

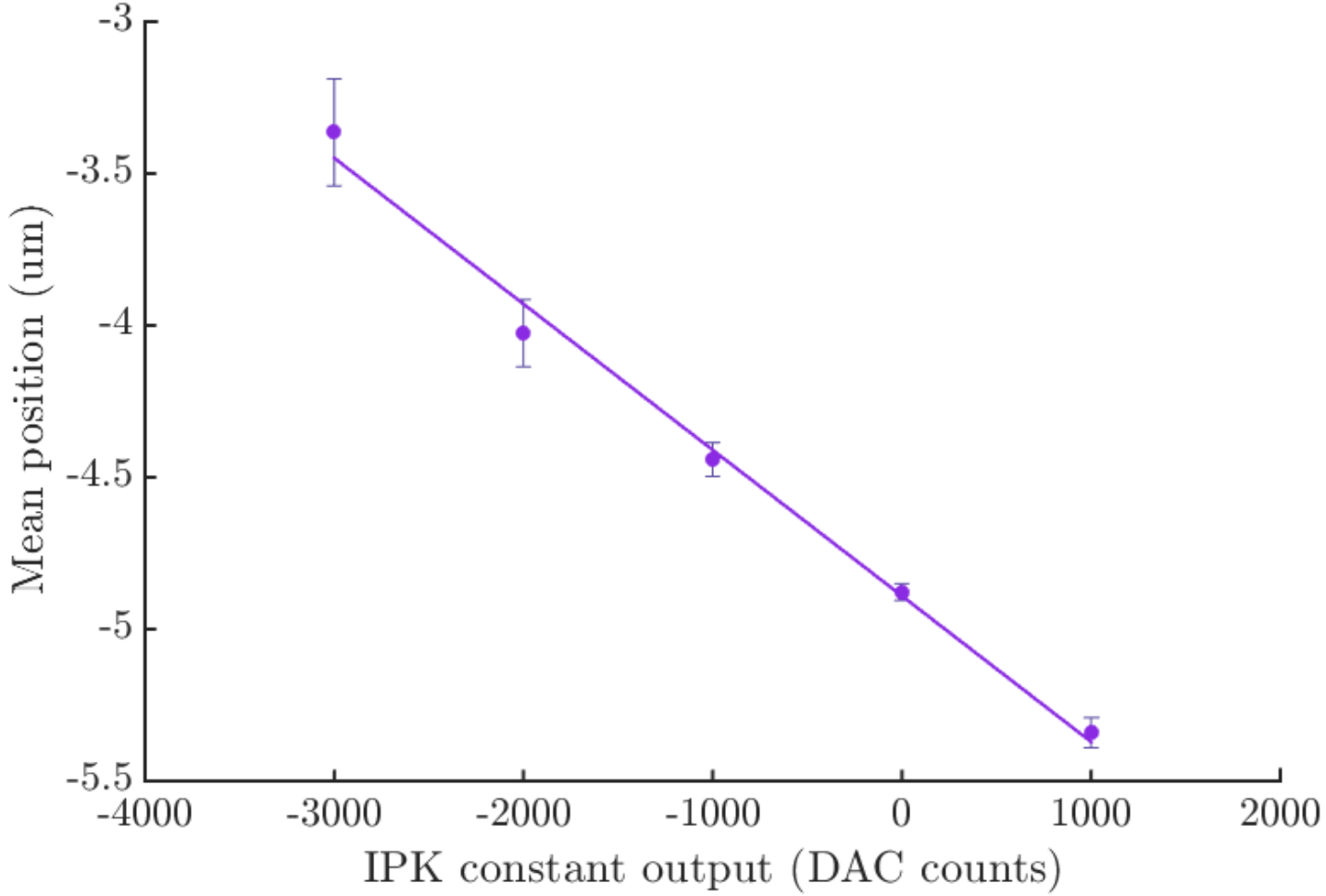


IPB Integrated Sample Correlation



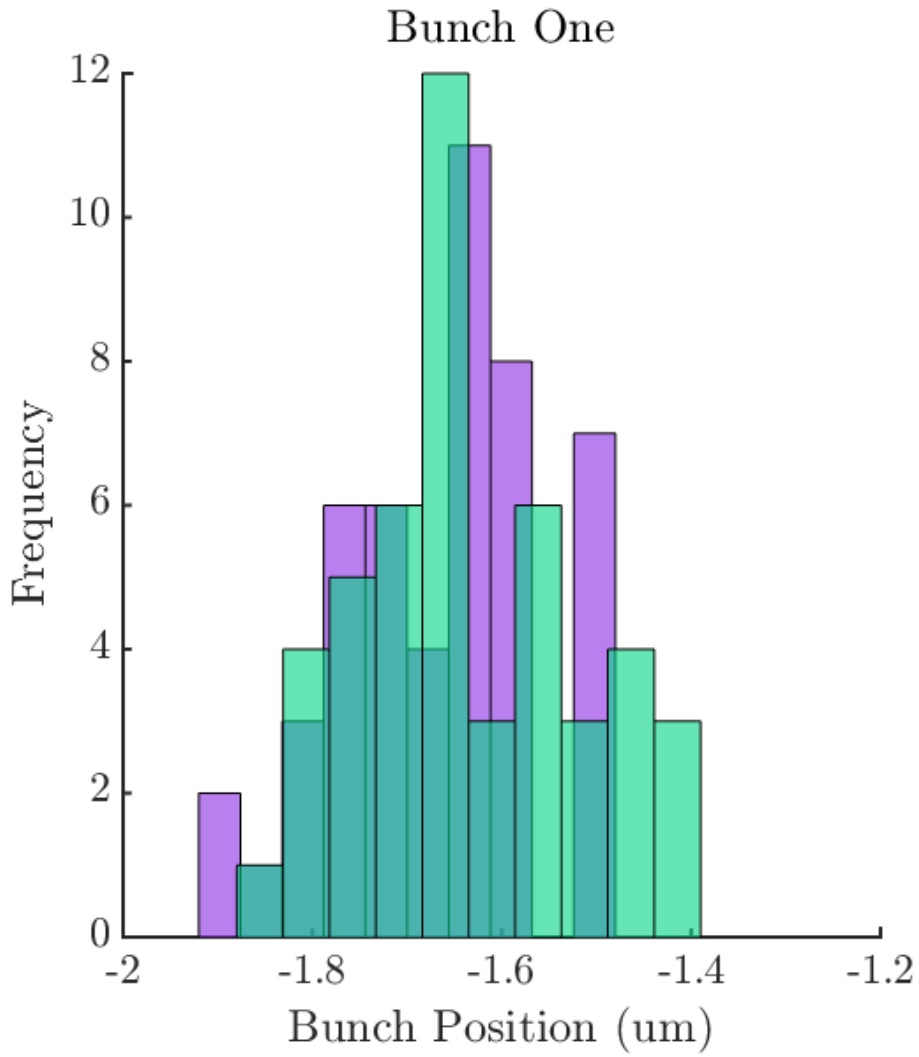
Highest single sample interpolated IPB correlation: **96.1%.**
Highest IPB correlation: **91.6%.**

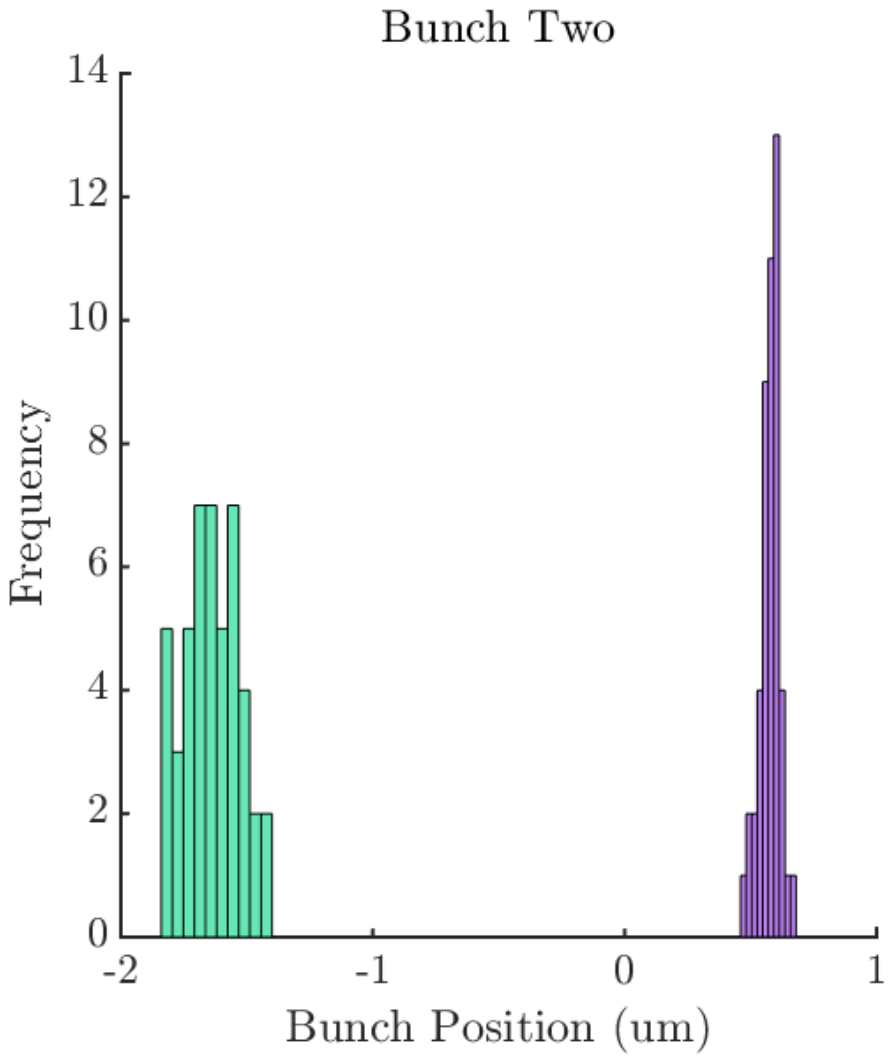
Kicker Calibration



- Interpolated kicker scan.
- Gradient = **-0.00048** (um/DAC).
- R^2 value = 0.99206.
- Propagated standard errors given.

Filename: gainScan2_10dB_0.8





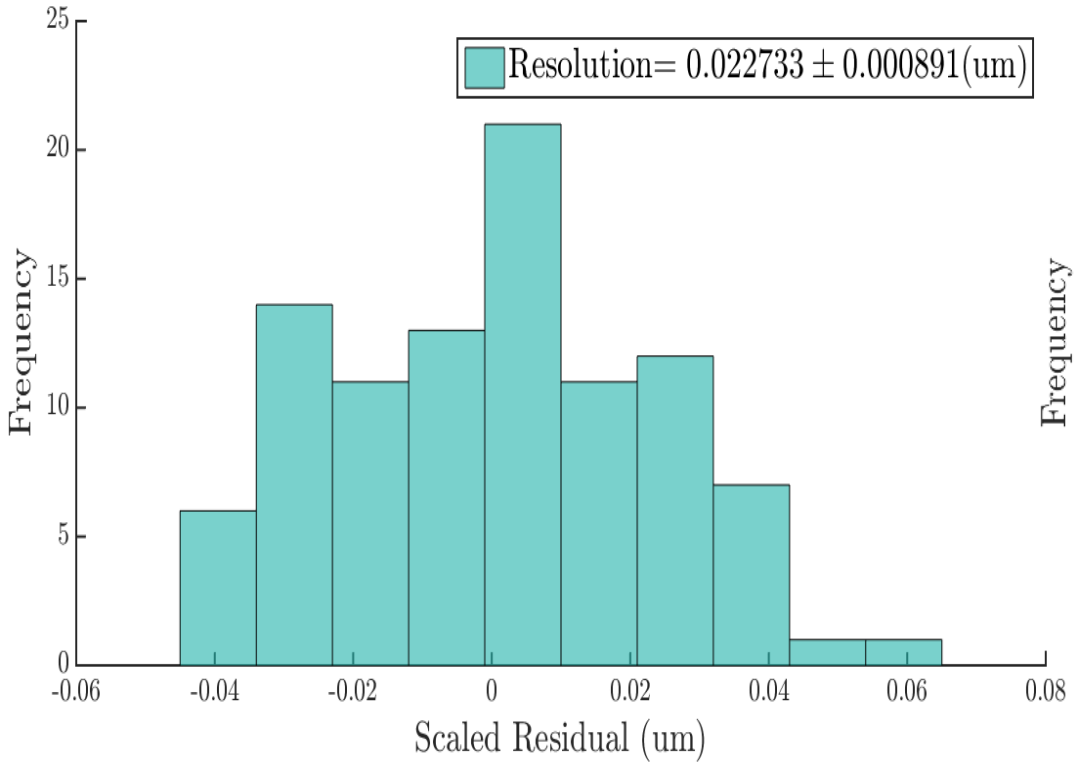
Purple: FB on
Green: FB off

Bunch One:
FB Off: **115.1** nm
FB On: **104.5** nm

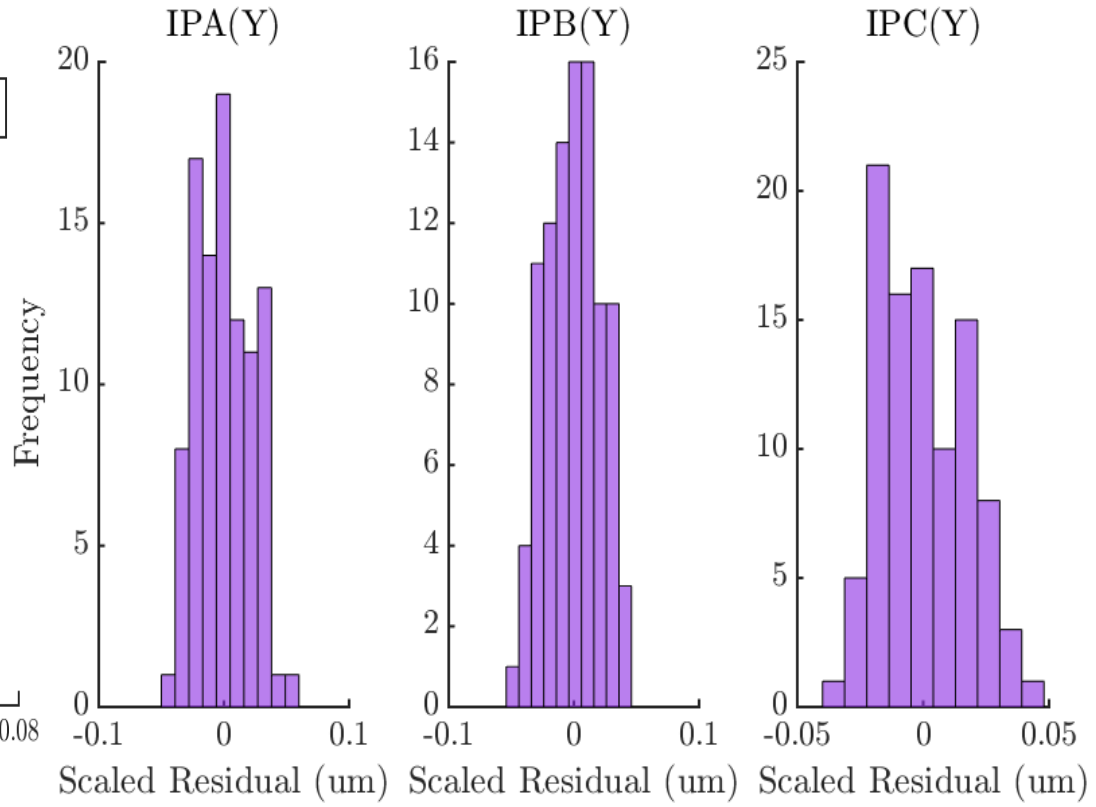
Bunch Two:
FB Off: **107.9** nm
FB On: **40.9** nm

Resolution

Resolution results for 41 nm feedback run (gainScan2_10dB)



22.7 nm



21.8 nm

21.2 nm

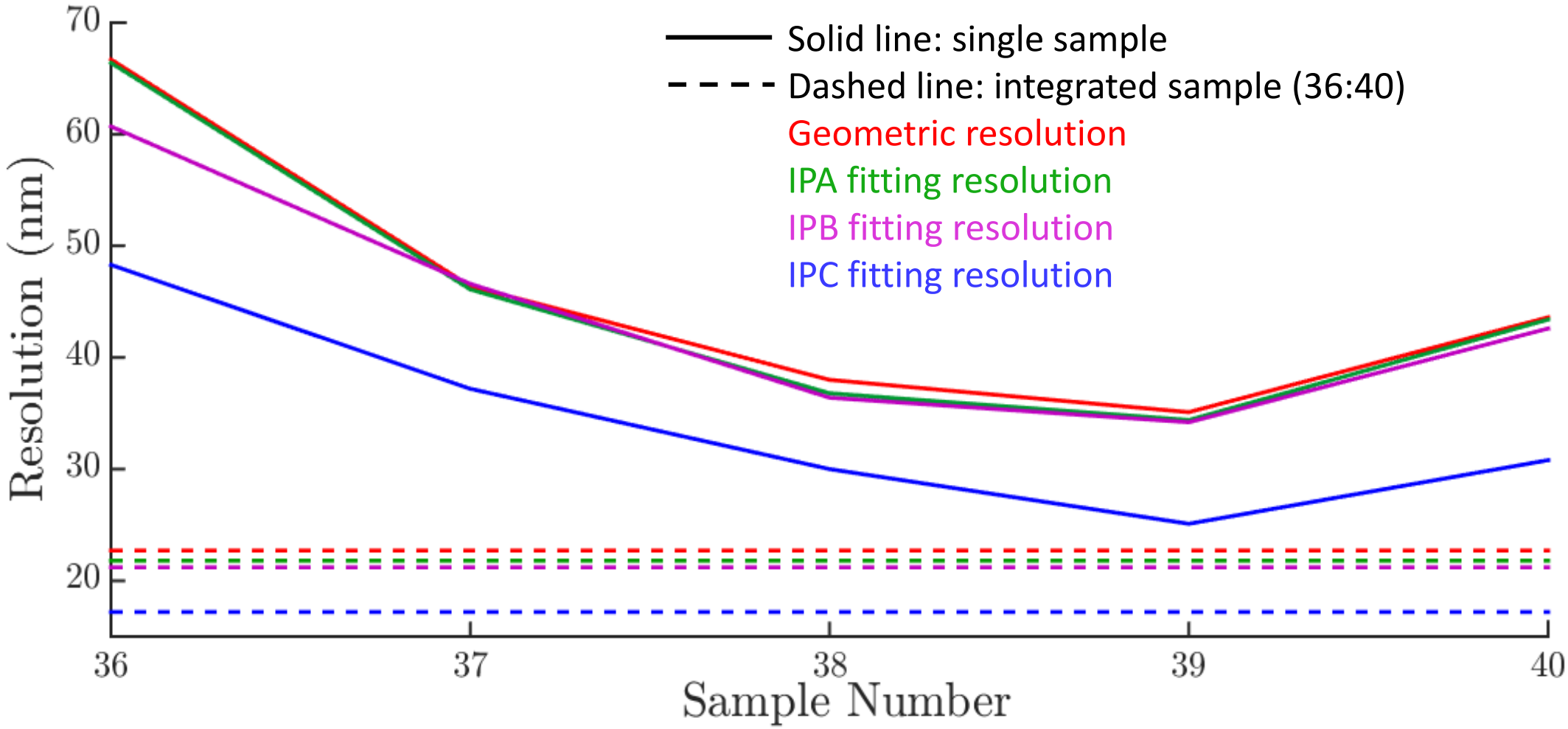
17.2 nm

Mixed Fitting to:
IPrime/q and 1/q

Filename:
gainScan2_10dB_0.8_151217,

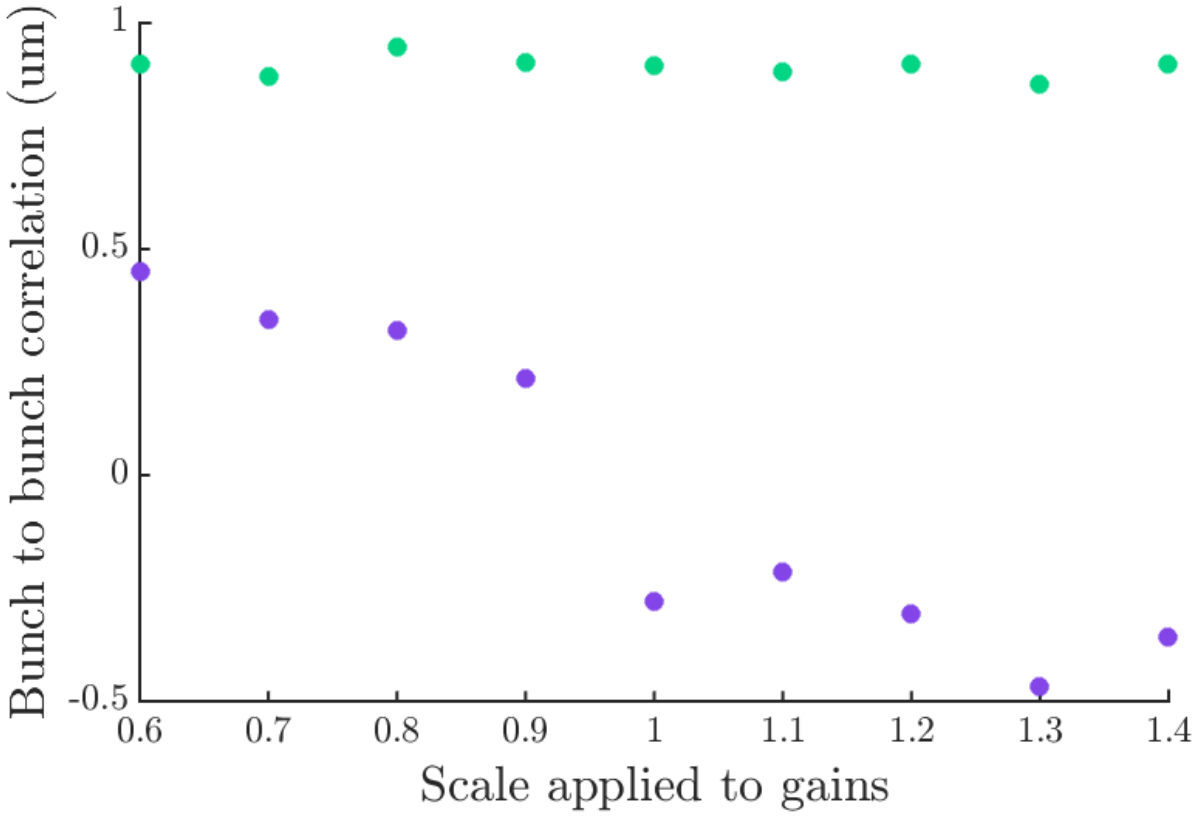
Resolution:
0.0218+/-0.0044 um
0.0212+/-0.0022 um
0.0172+/-0.0047 um

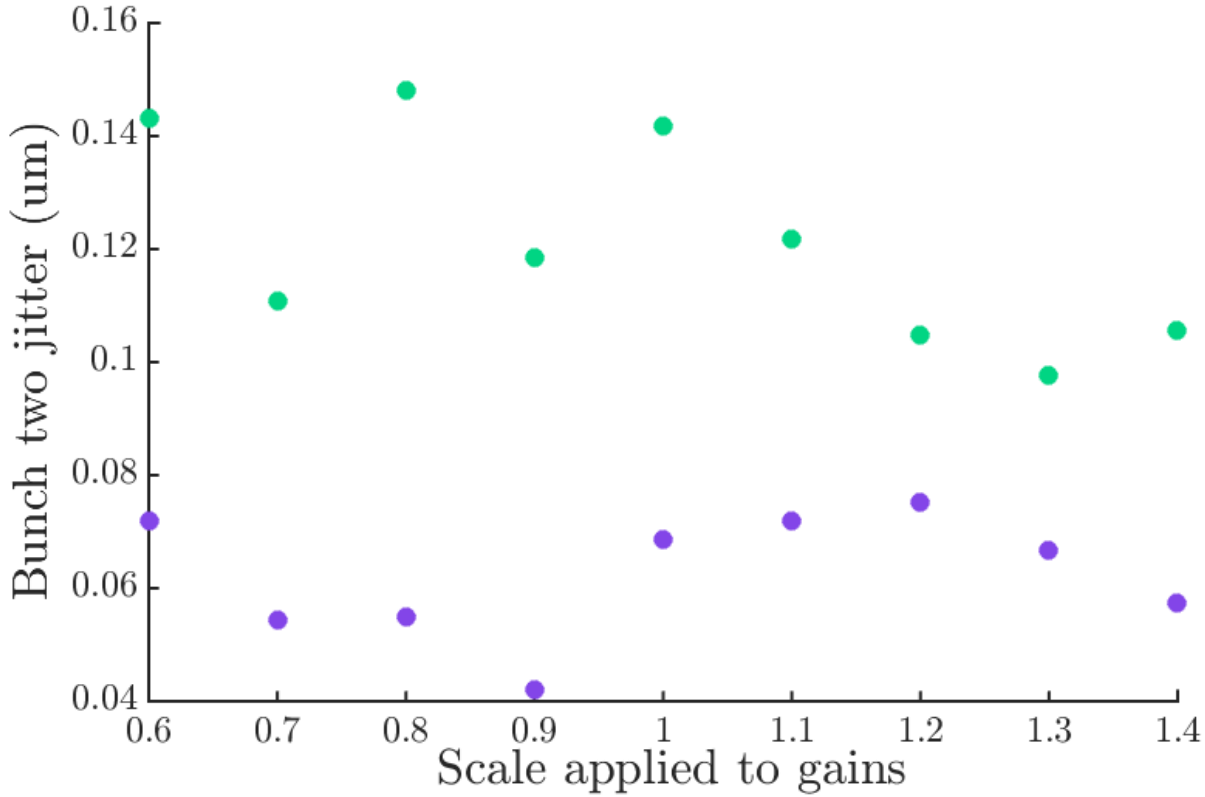
Single Sample vs. Integrated Resolution



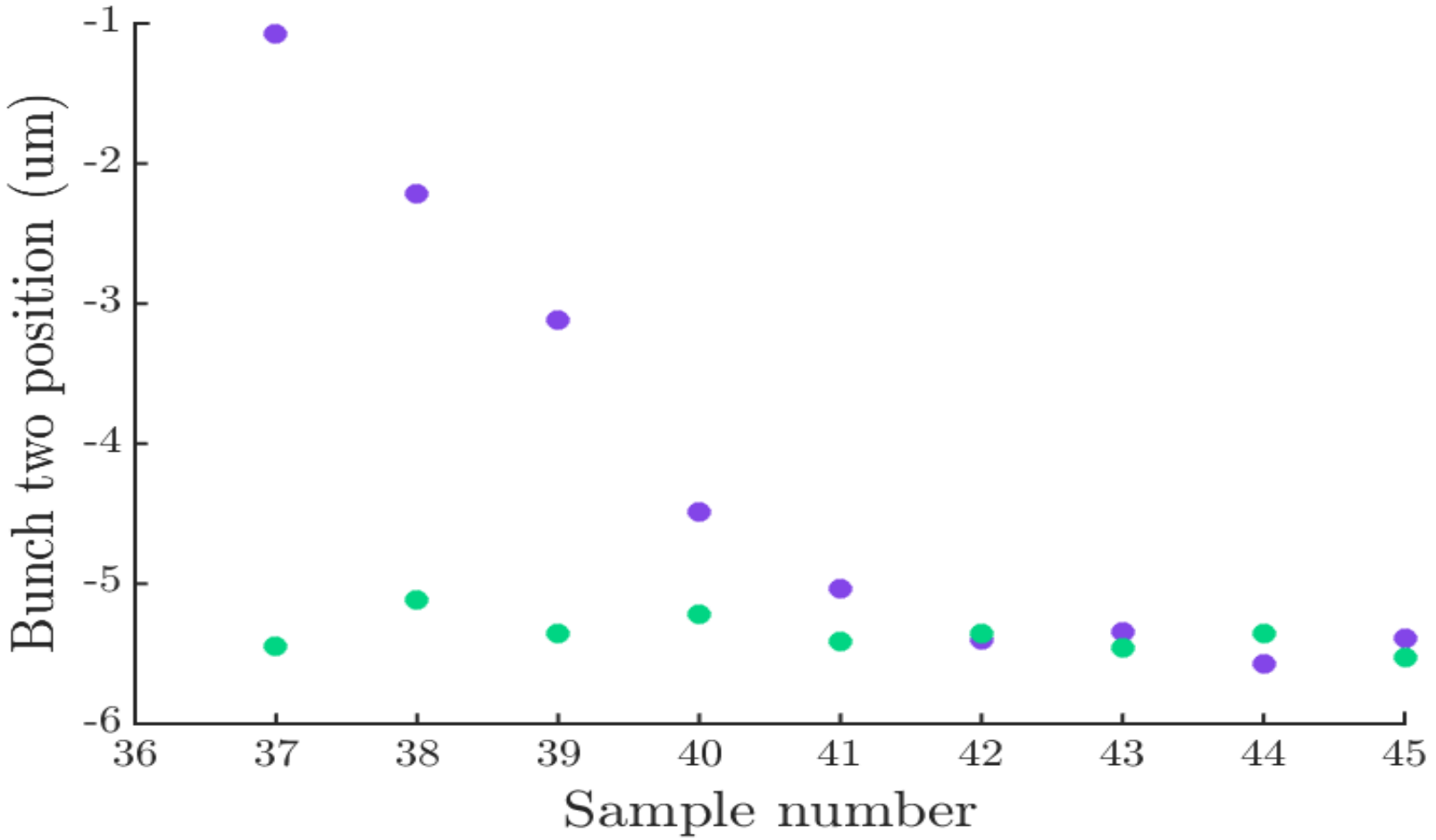
Gain Scan

gainScan4_10dB: scaling magnitude of all four gains.
Gain scans of ratio of pairs of gains still to be analysed.





Latency Scan



We should have gone to earlier sample numbers.

Feedback has 22 samples latency, excluding the kicker rise time.

Shift Outline

- 1-BPM feedback (Tuesday owl)
  - 50 nm stabilisation at IPC.
  - 21 nm resolution.
  - Noise floor removal appears to offer some improvement to feedback performance.
- 2-BPM feedback (Friday day and swing)
  - 41 nm stabilisation at IPB.
  - Better resolution through integration.