

CBPM sampling clock jitter

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CESR instrumentation meeting – Nov 15th, 2024

CBPM zero-crossing

Collected peak and zero-crossing TBT data. See [instr. elog 2374](#).

Message ID: 2374	Entry time: 2024-11-05, 15:22, Tuesday
Author:	Antoine T Chapelain
Subject:	Zero-crossing data collection
Category:	
Instrument:	CESR BPM
Sub-System:	CBPM_II
Shift Key:	20240105_1900

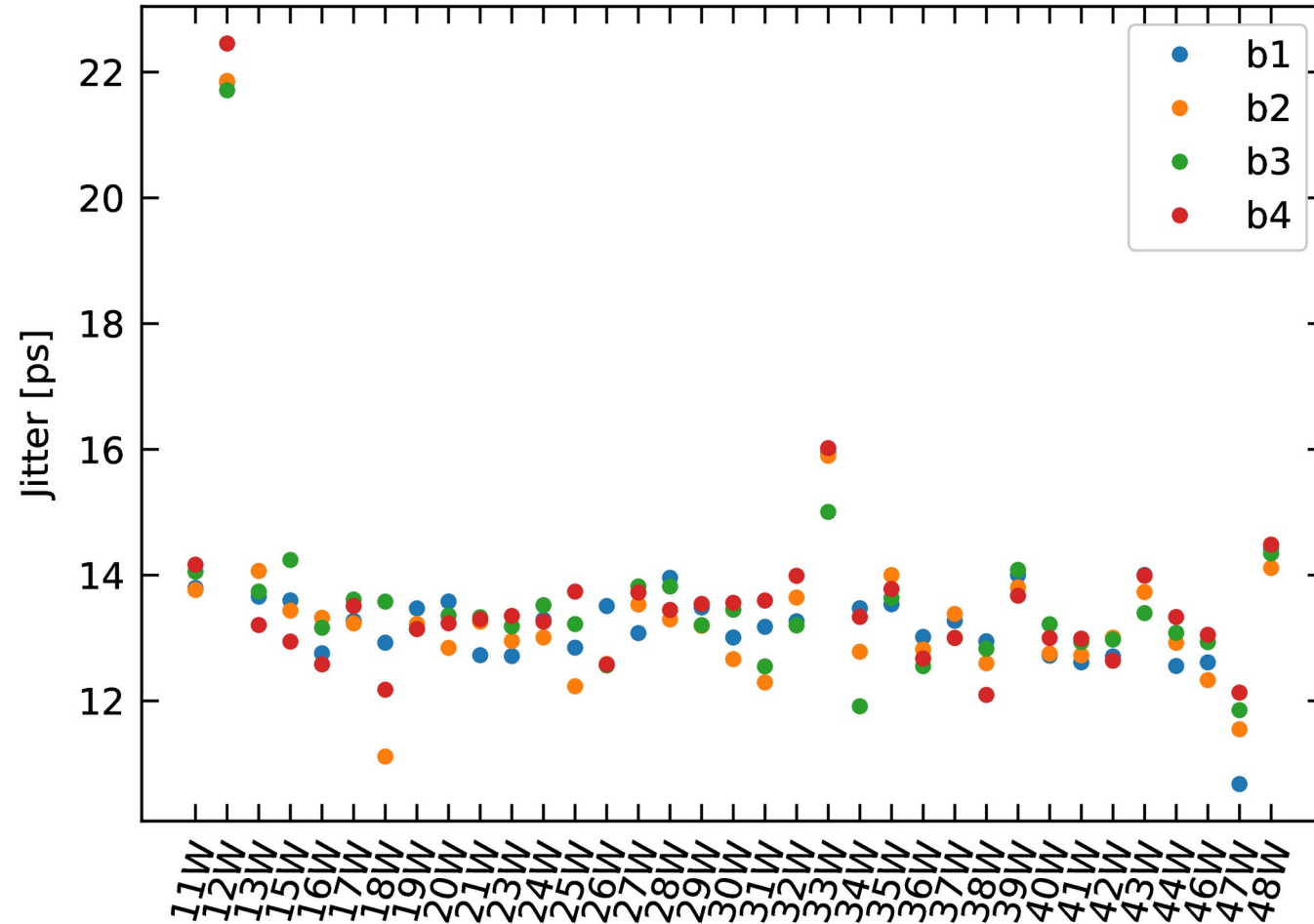
Good data for 11W to 48W:

- peak TBT: 474709/474710
- zero-crossing (+41 units) TBT: 474711/474712

South Arc BPMs in West server did not cooperate at all and we even bricked X4B.
Zero-crossing is a risky business.

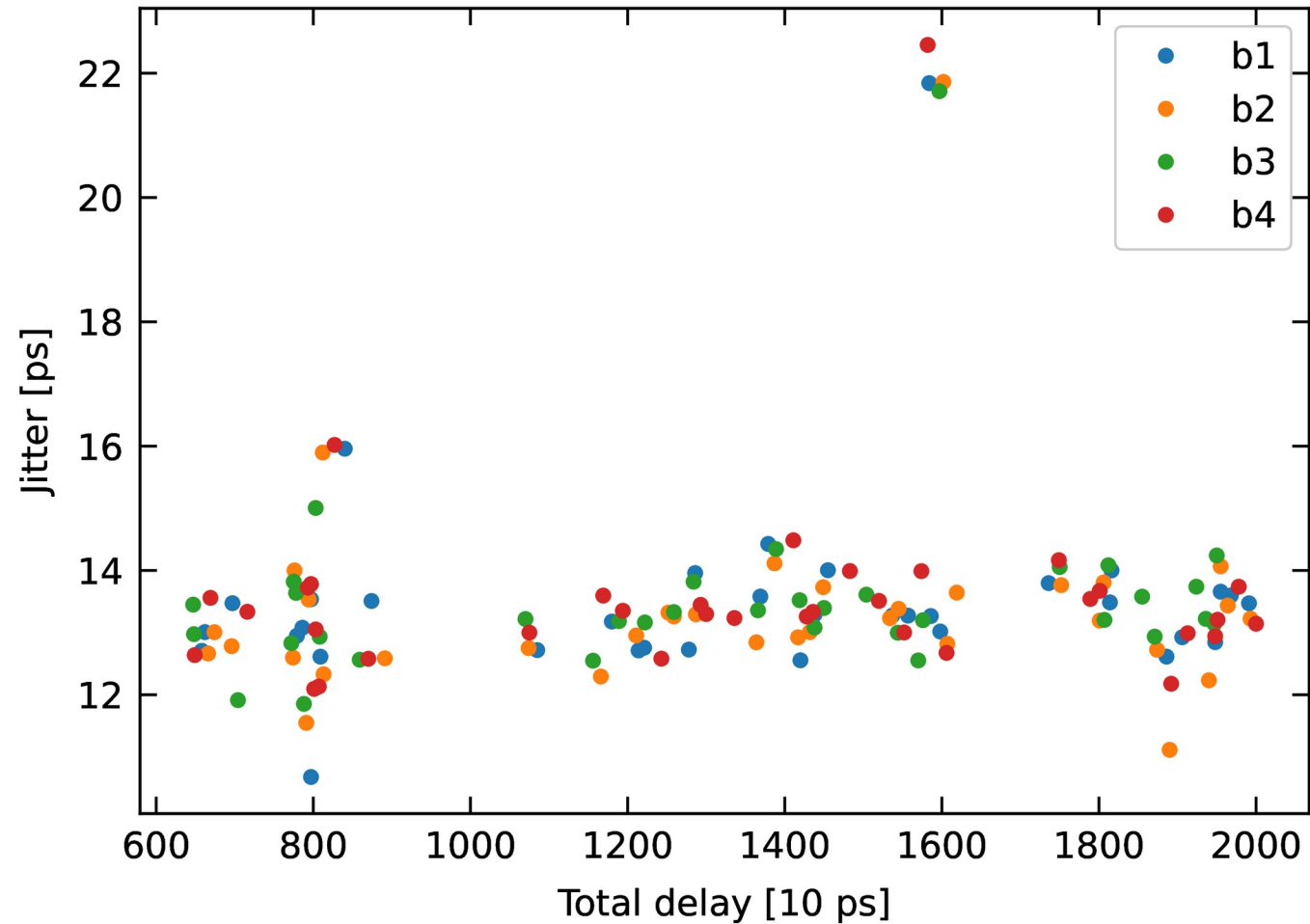
recap'

Sampling clock jitter



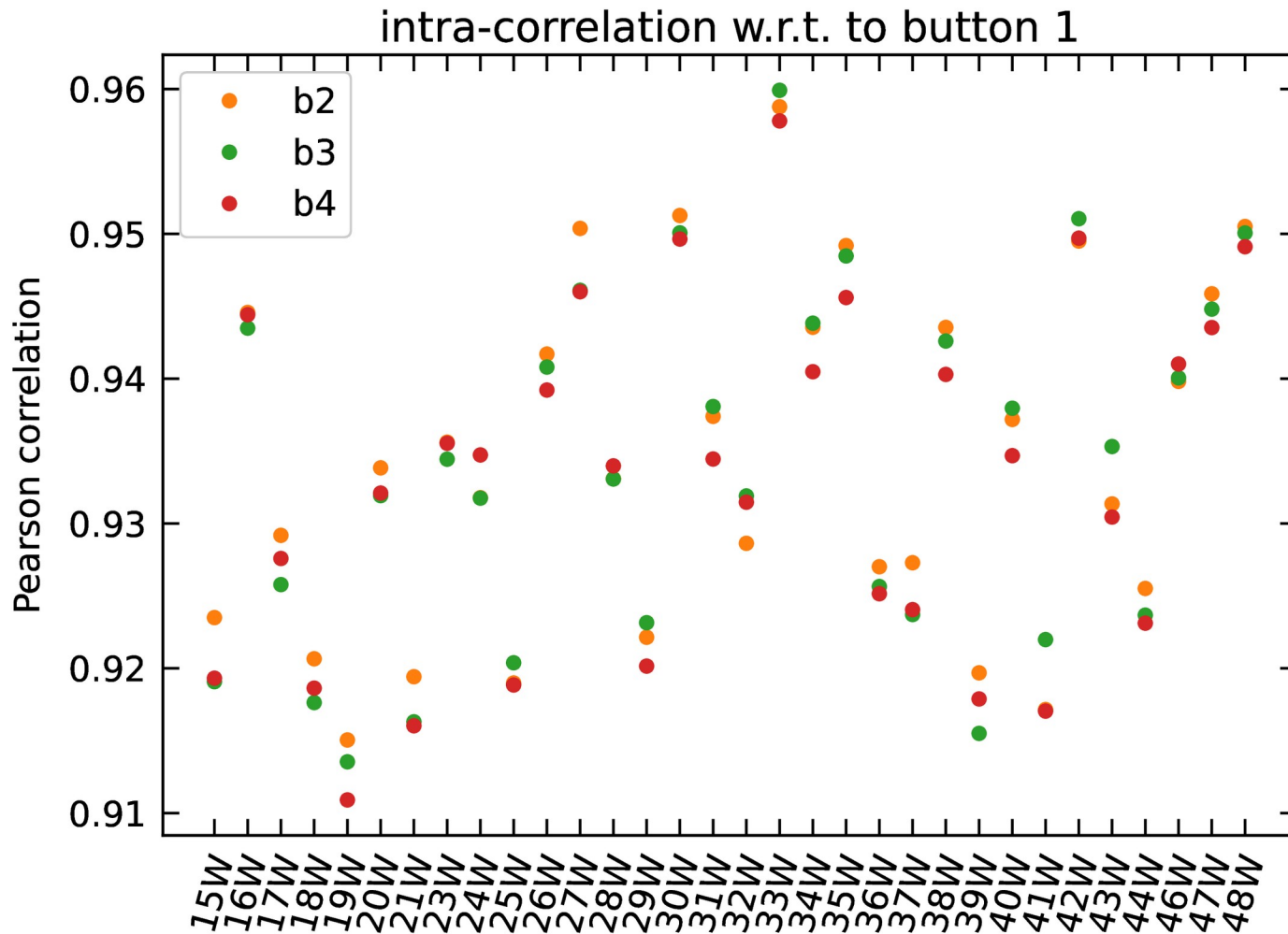
recap'

Jitter v. total delay



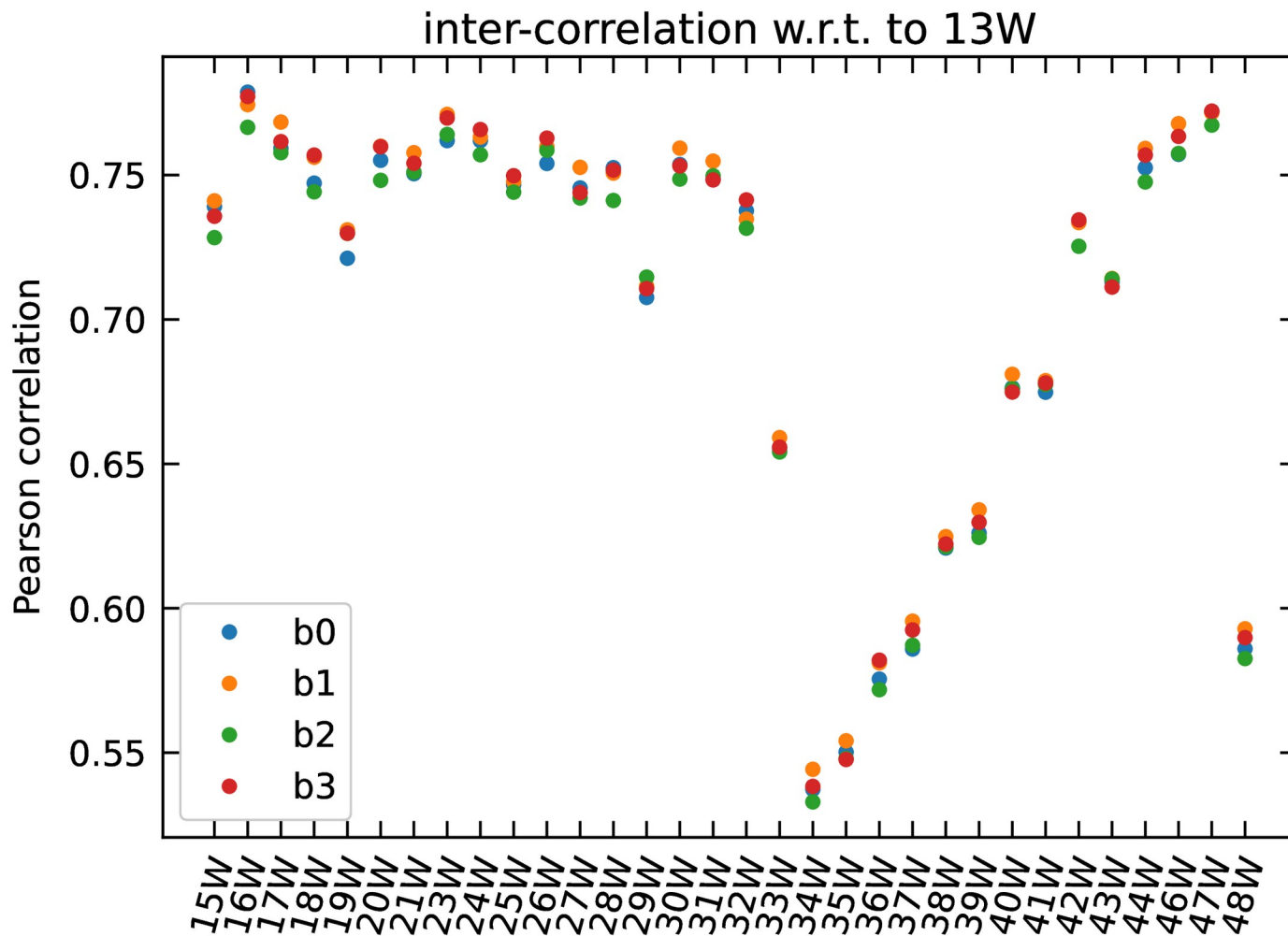
recap'

Intra-module Pearson correlation



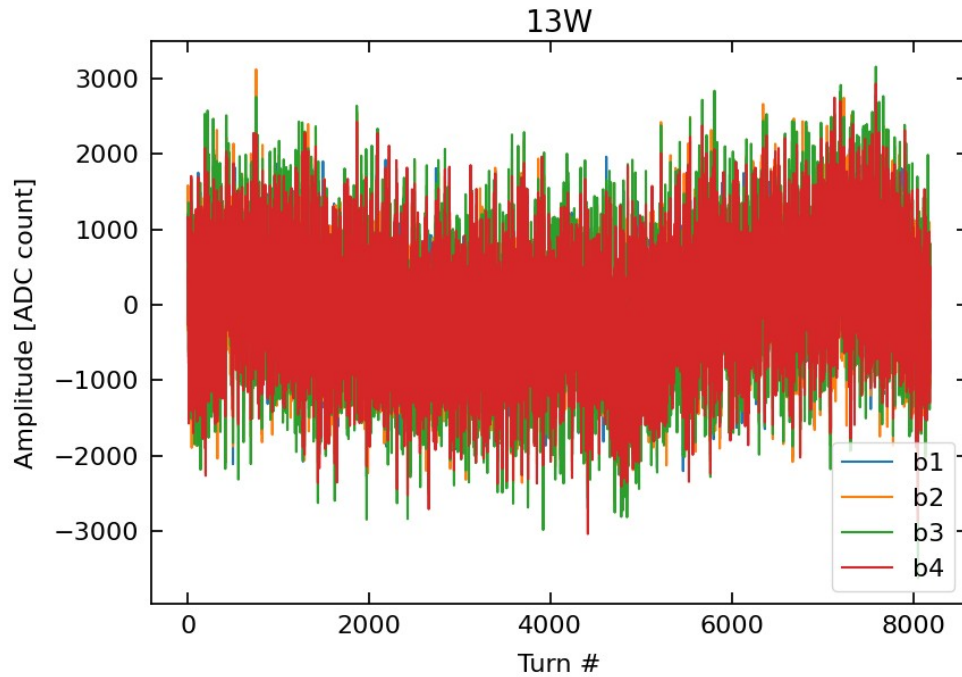
recap'

Inter-module Pearson correlation

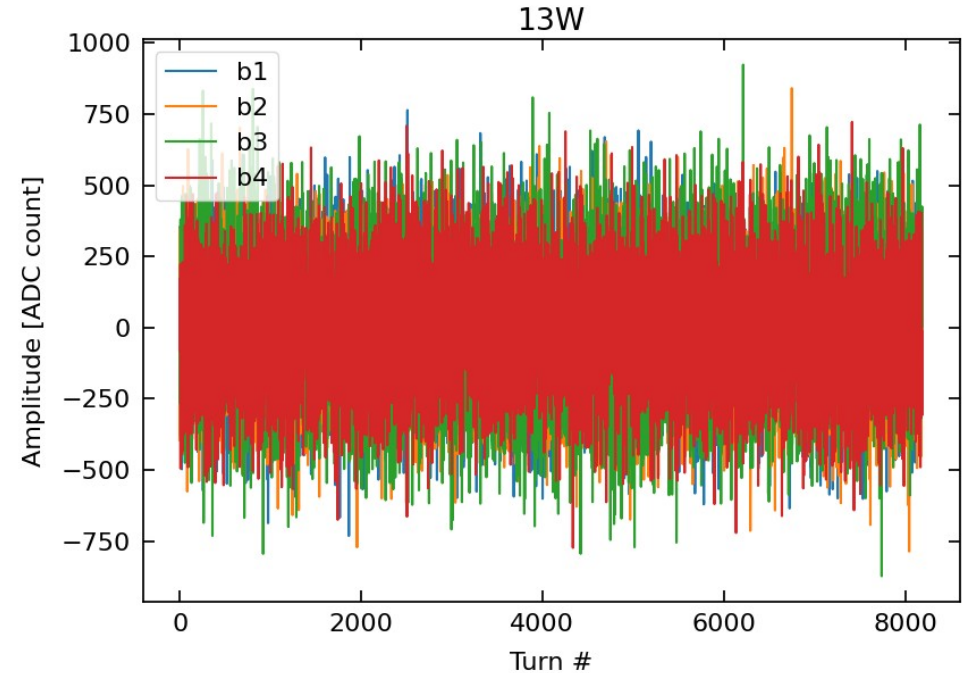


Let's get rid of the overall correlation

Subtract from each channel time series the averaged time series of the 4 buttons



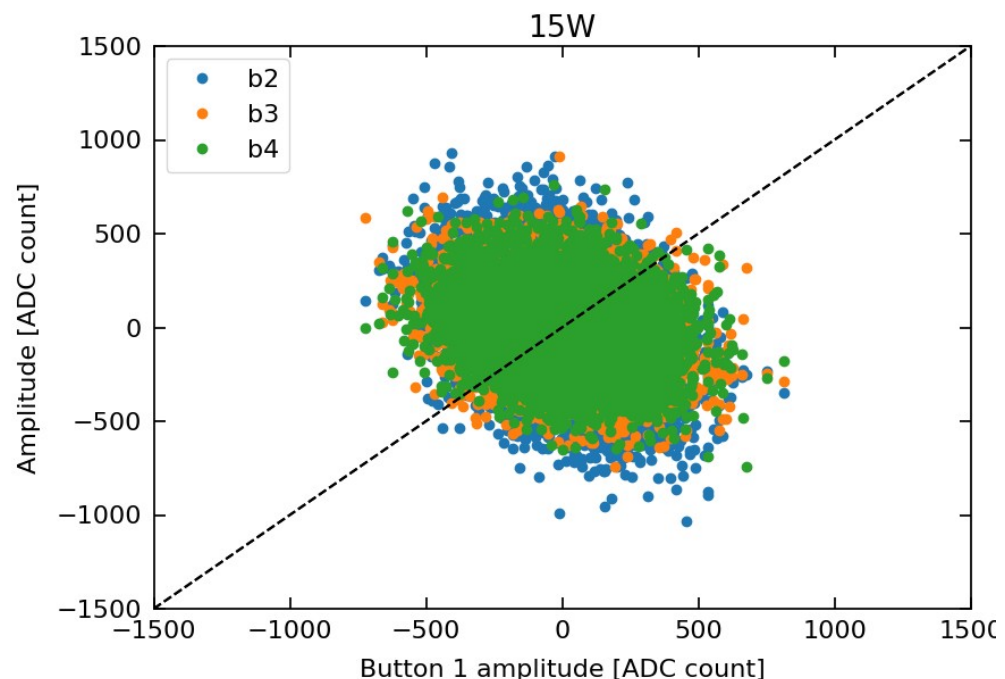
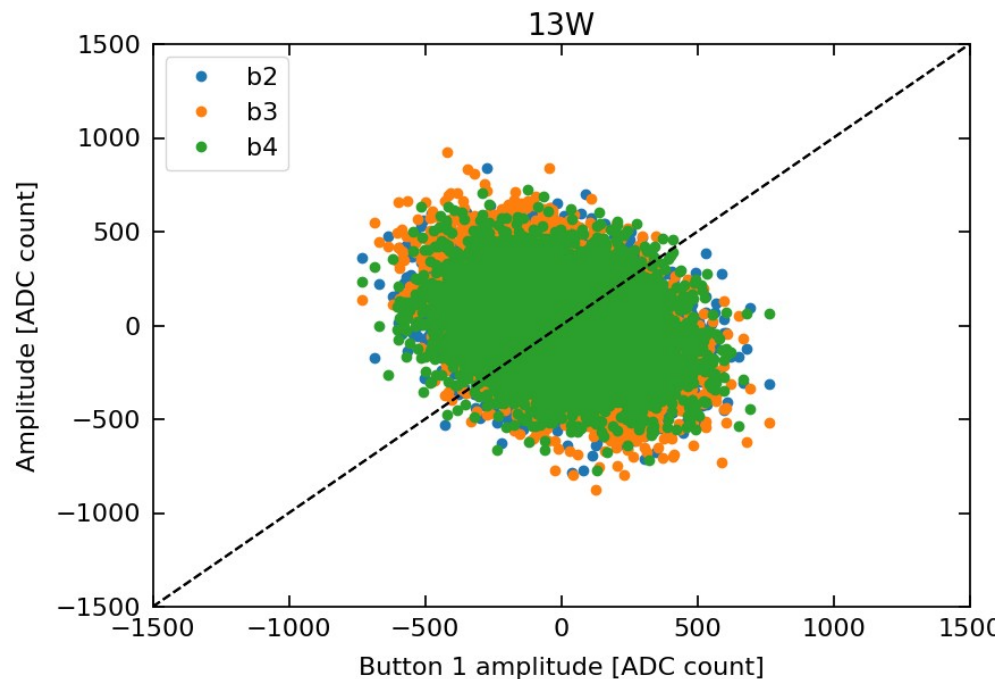
before subtraction



after subtraction

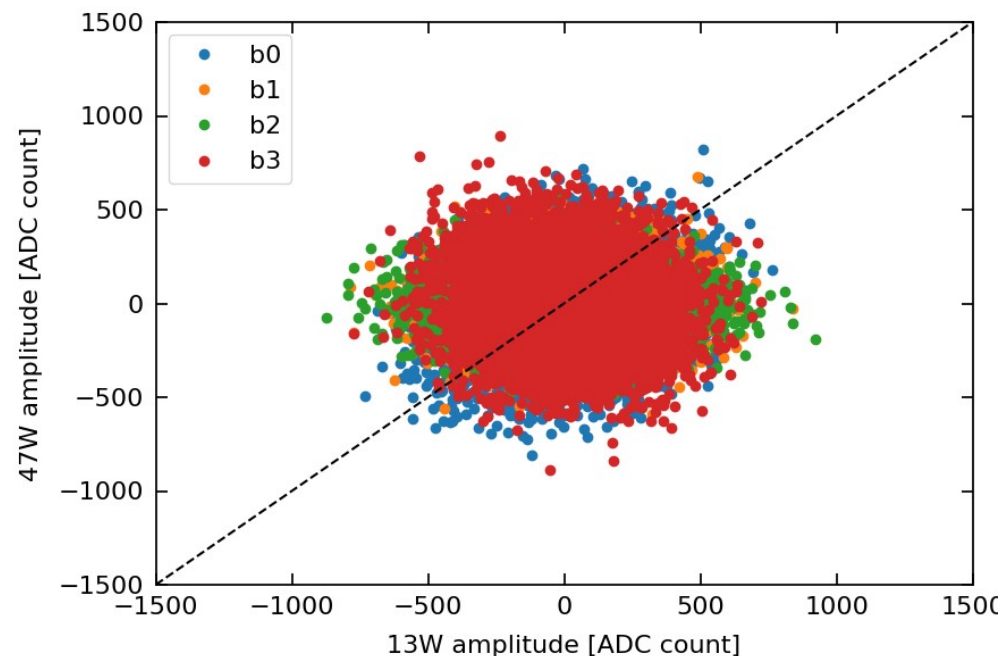
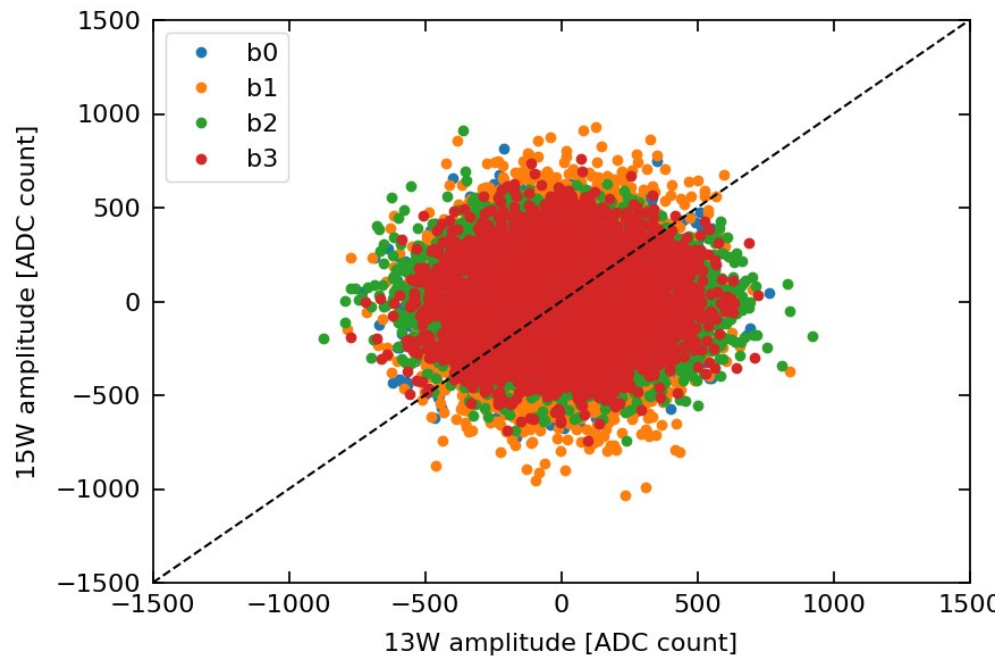
Intra-module correlation

Intra-module correlation from scatter plots, e.g.:

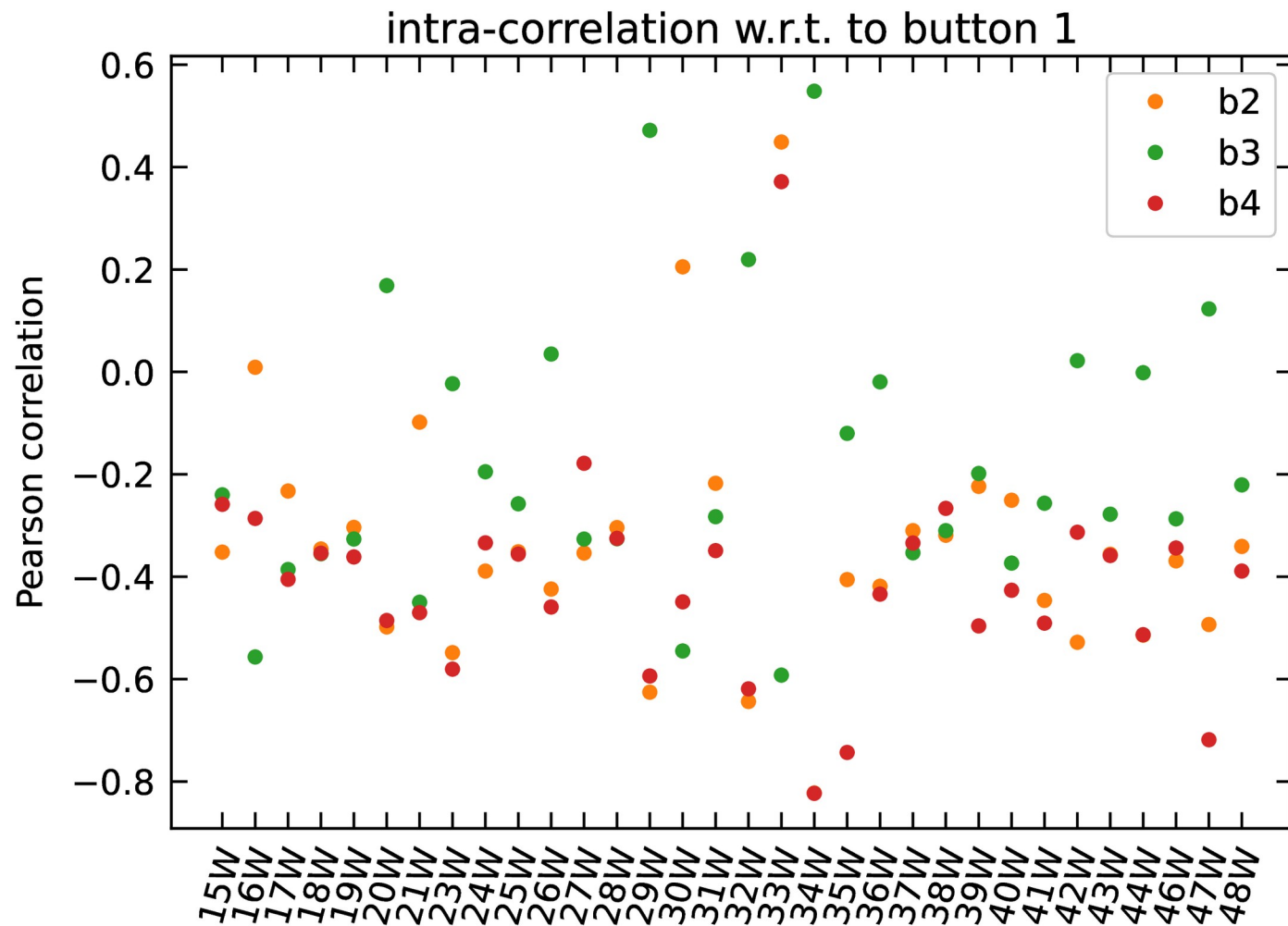


Inter-module correlation

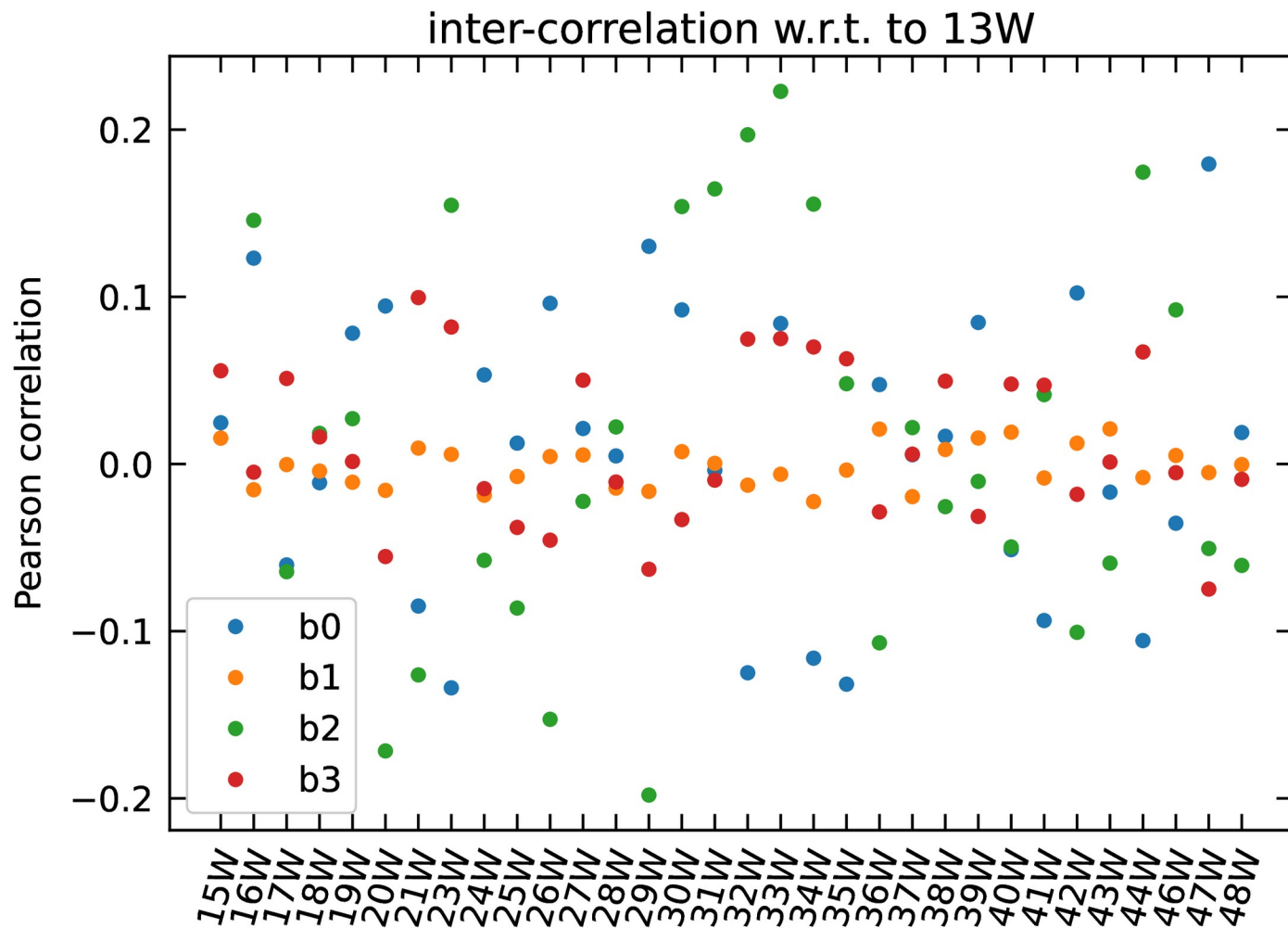
Inter-module correlation from scatter plots, e.g.:



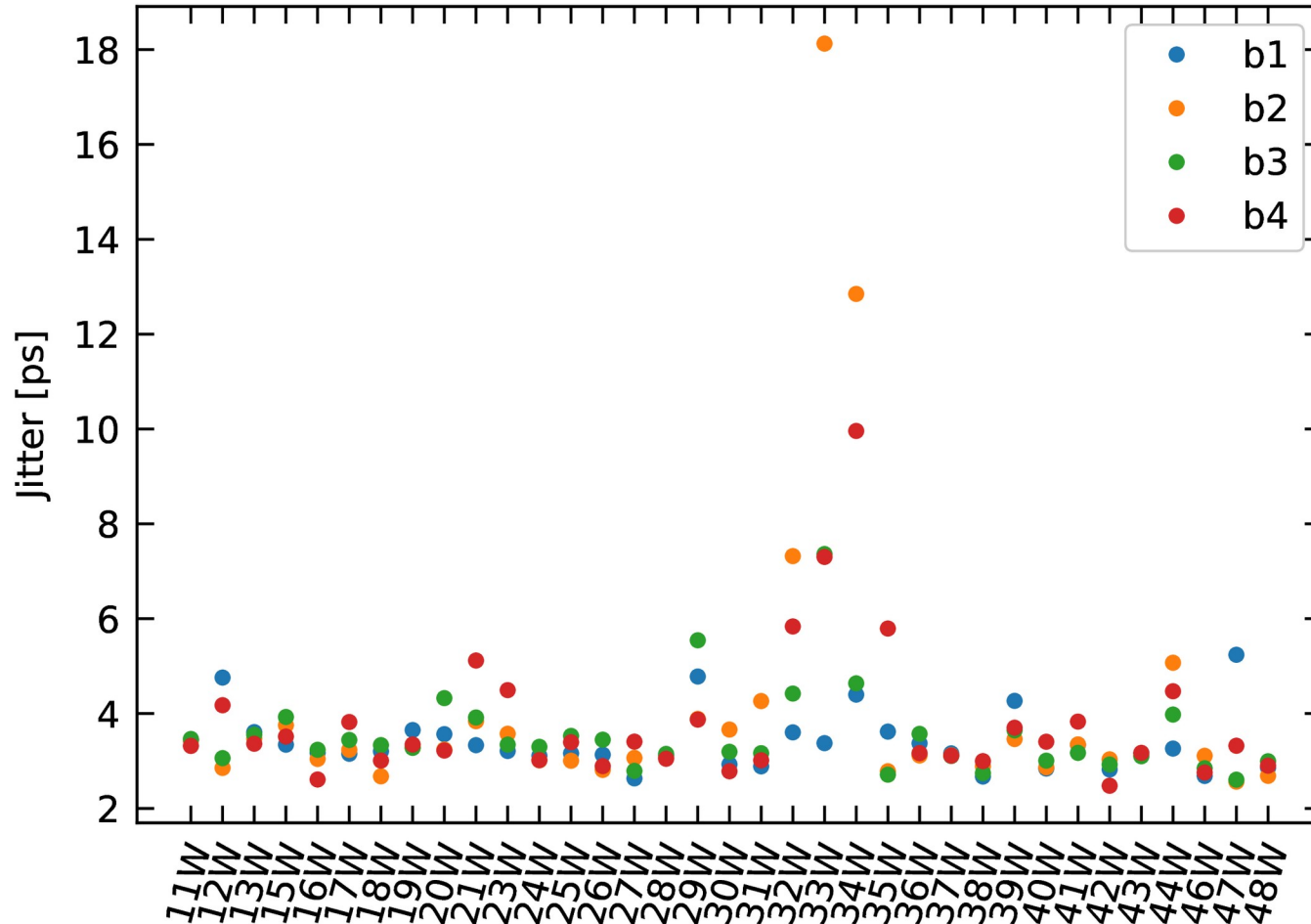
Intra-module Pearson correlation



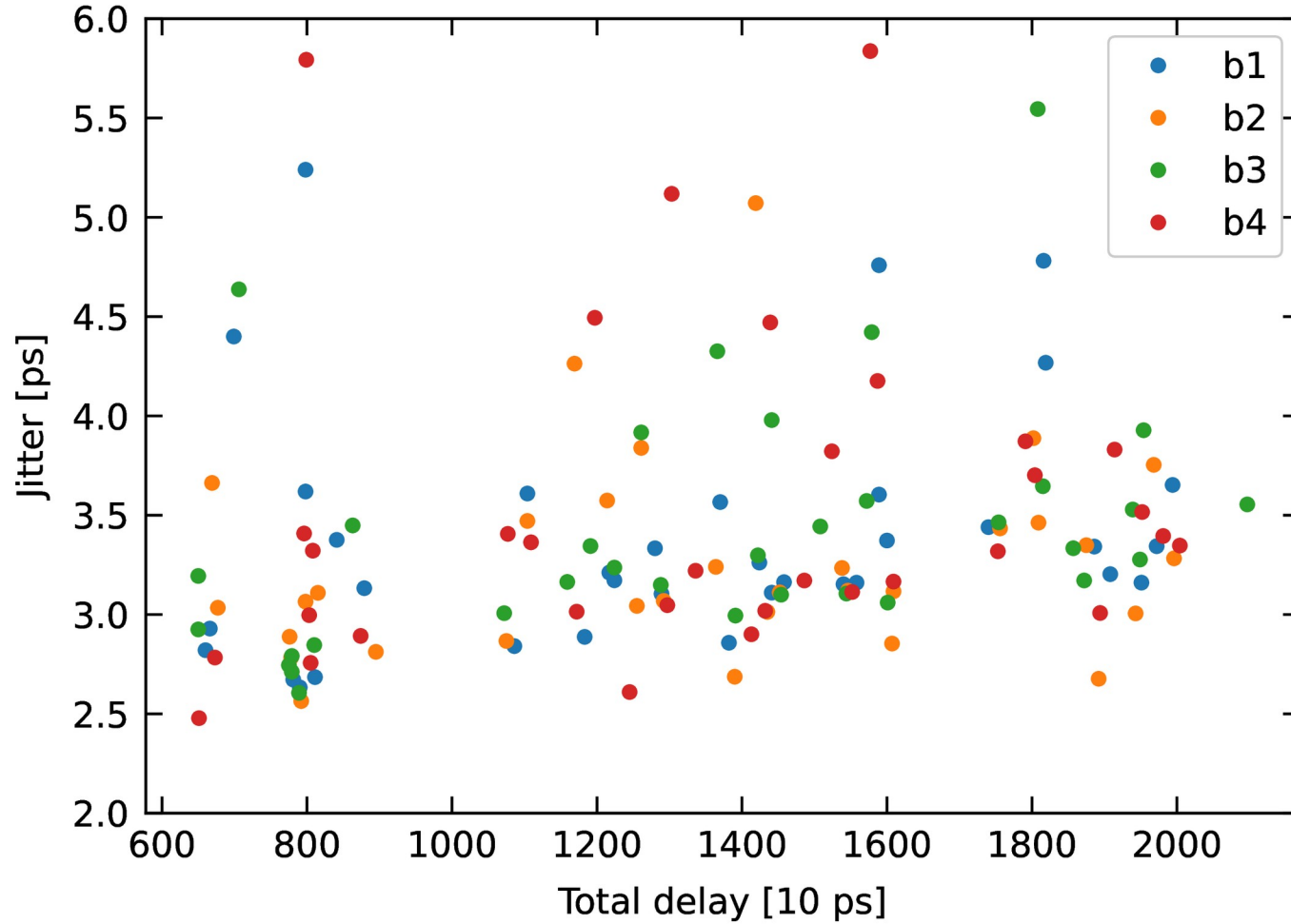
Inter-module Pearson correlation



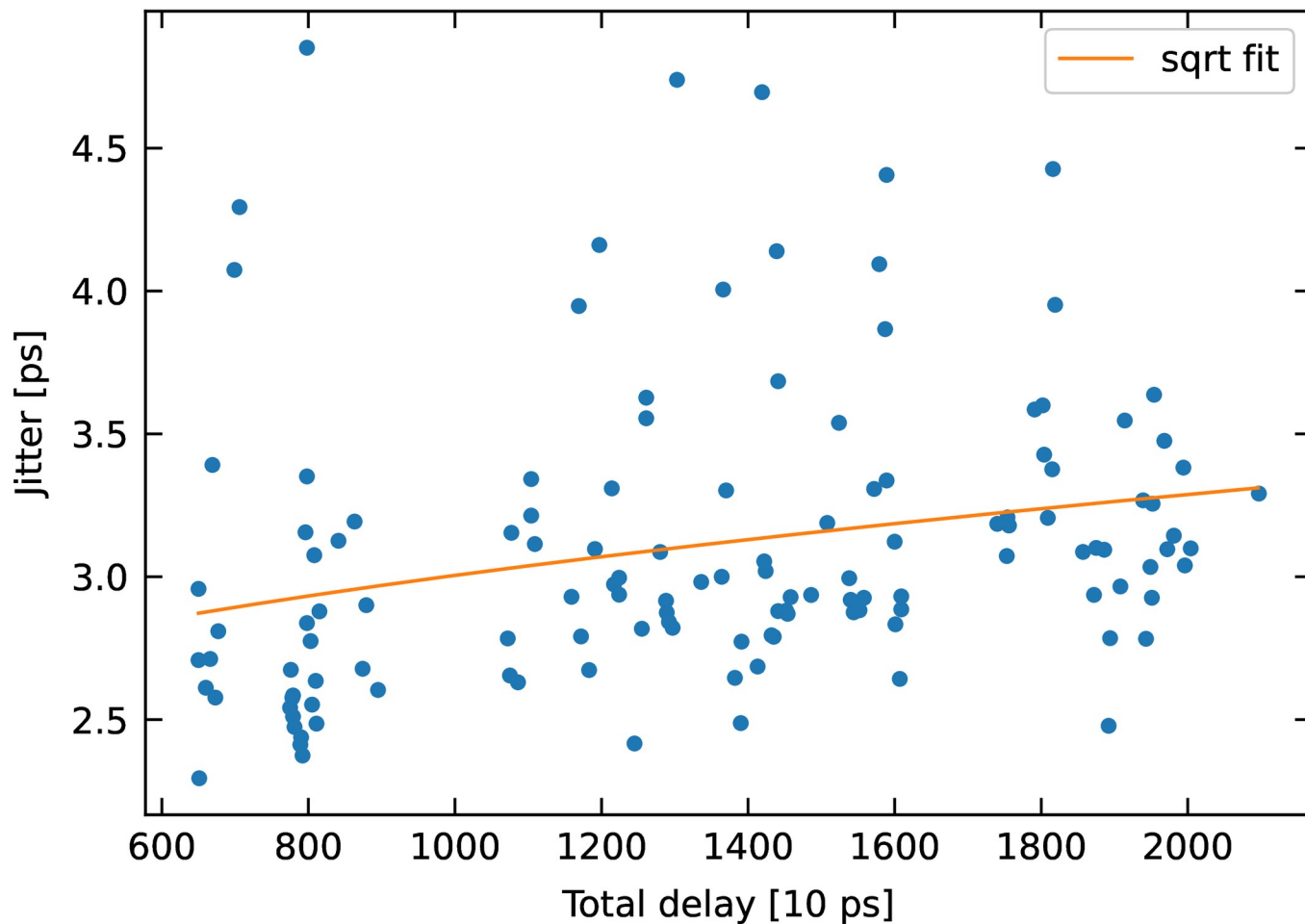
Sampling clock jitter



Jitter v. total delay



Square root fit to ± 1 SD data



3 ps
consistent
with on-semi
delay chip
device specs

Extras