Weekly Report

2018-12-03

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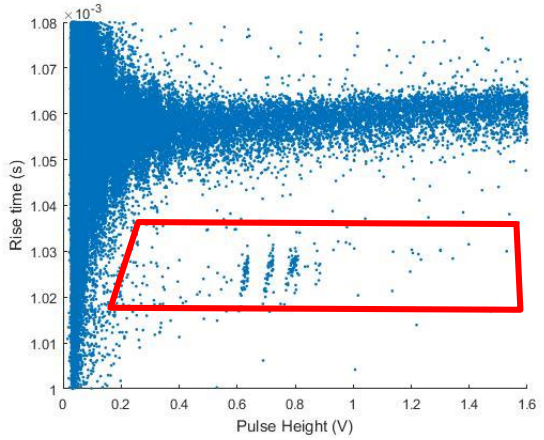
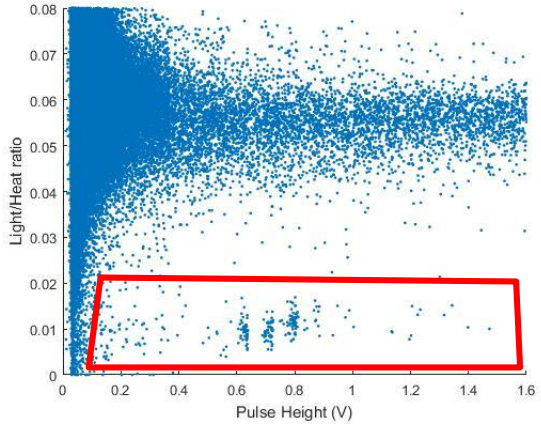
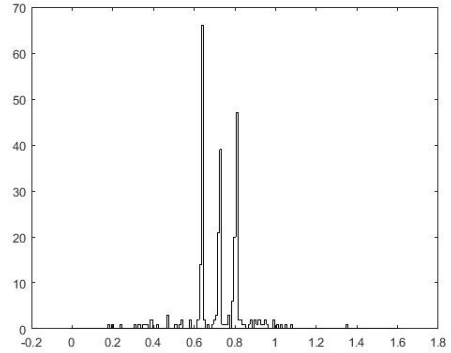
Last Presentation (181119):

- What I have done:
  - Template pulses, least square amplitudes for all 12 prms

- What I'm doing (studying) now:
  - Merging of alpha l.s. amplitude
  - Calibration (2nd order)

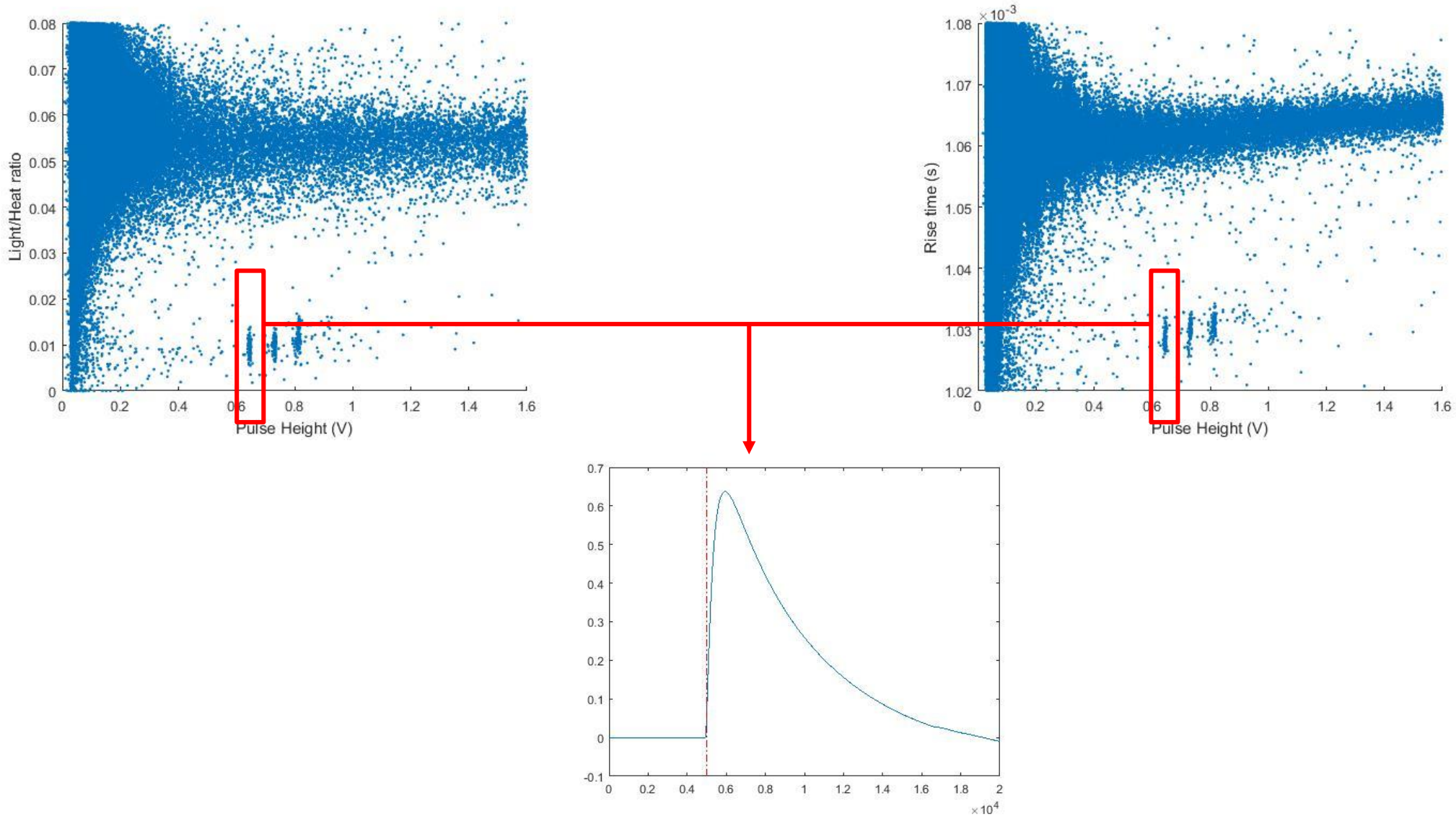






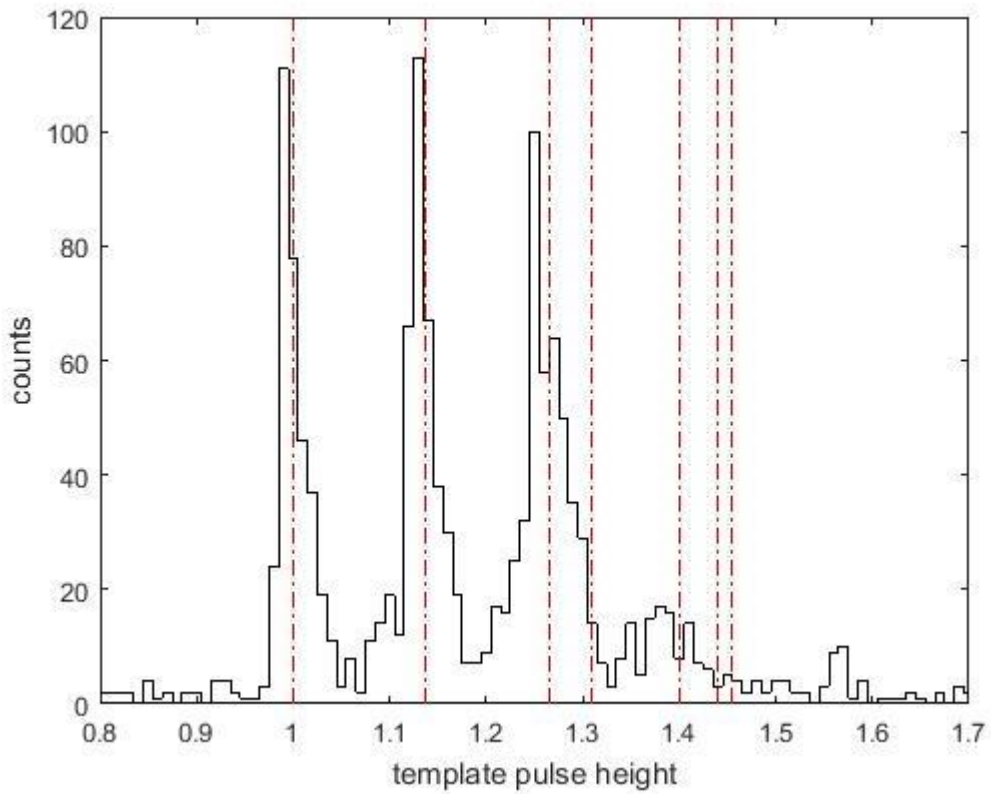
  - Energy spectrum

- Least Square Amplitude
  - Make Template



- Pulse Size Spectrum by least square amplitude

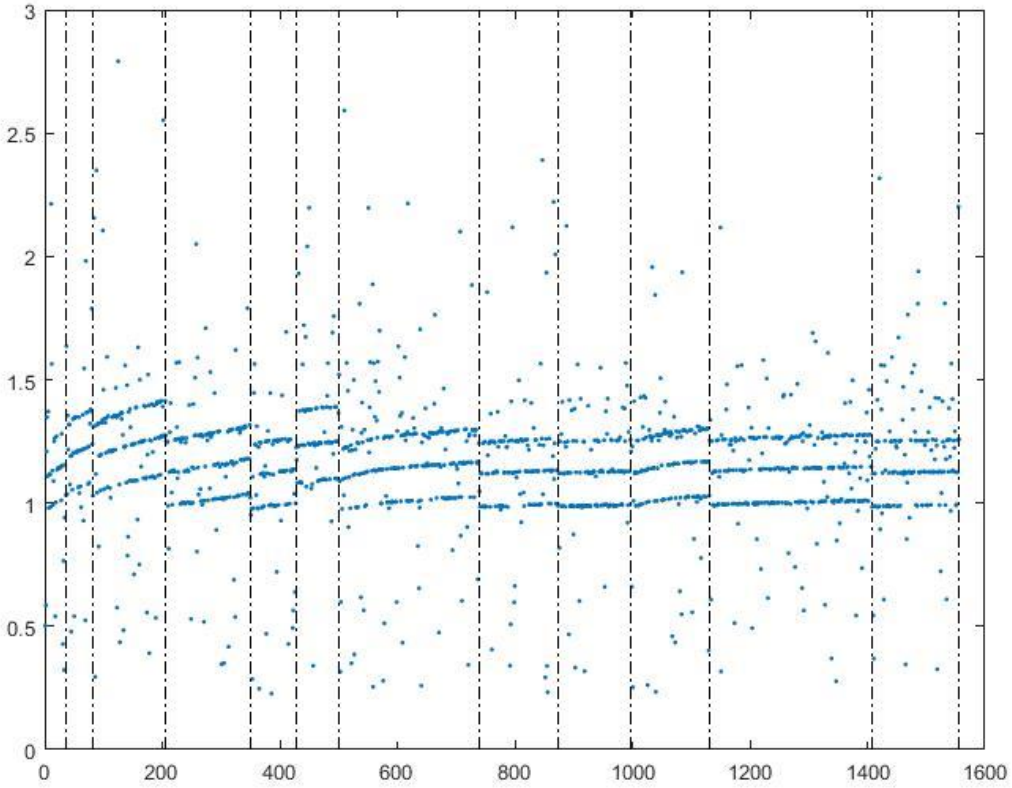
Sum of least square amplitude from 12 prms
: modification (there were overlapped prms)

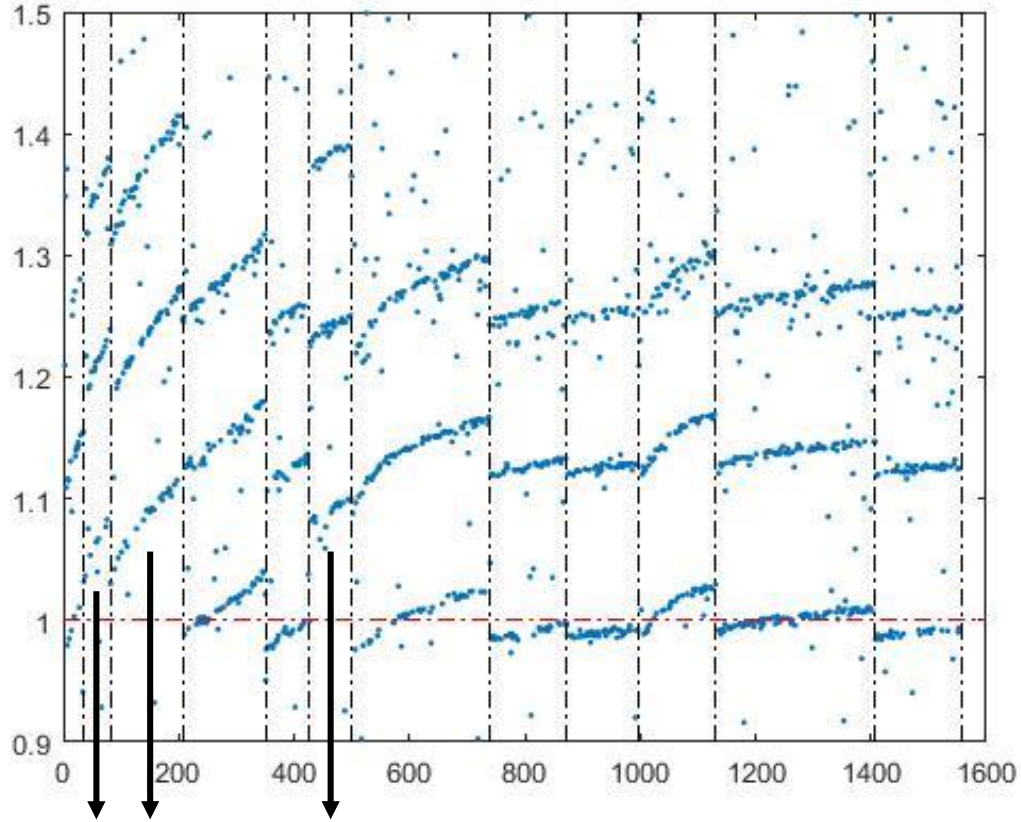


Assumed peak locations
(if linear)

For 2nd order calibration, find at least 4 alpha peaks

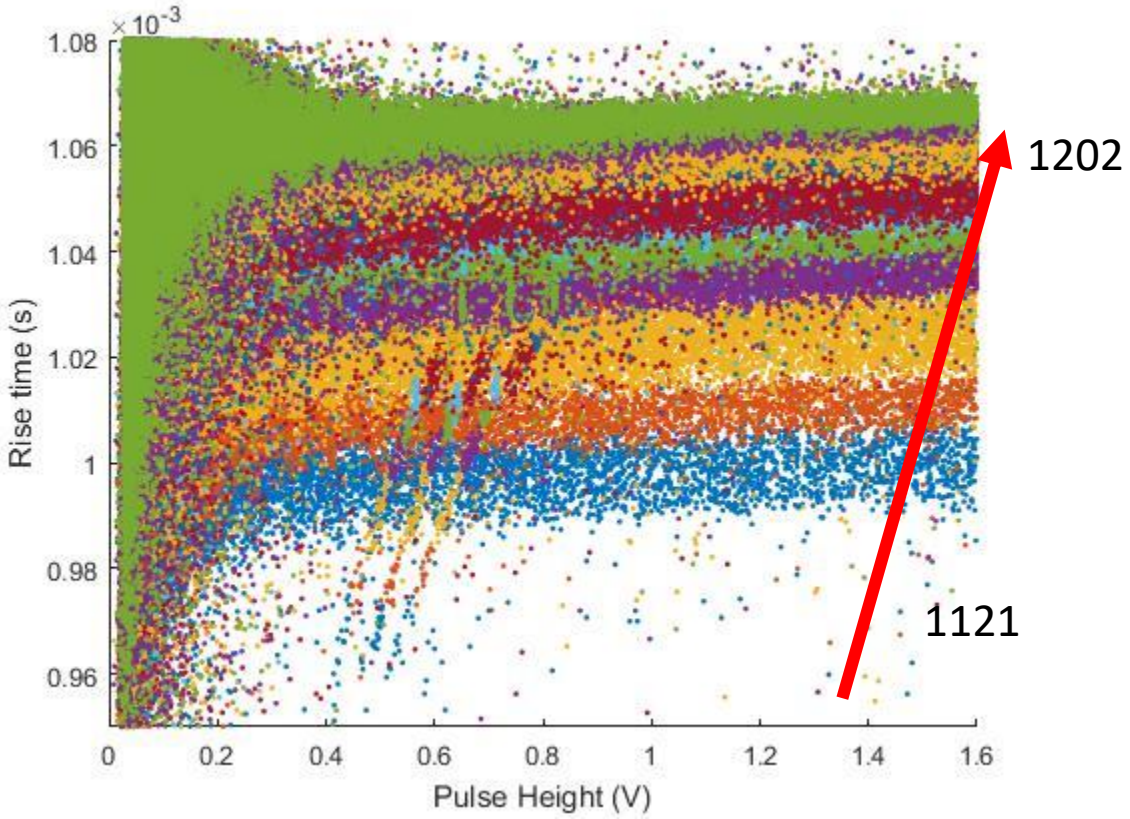
- Pulse Size Spectrum by least square amplitude

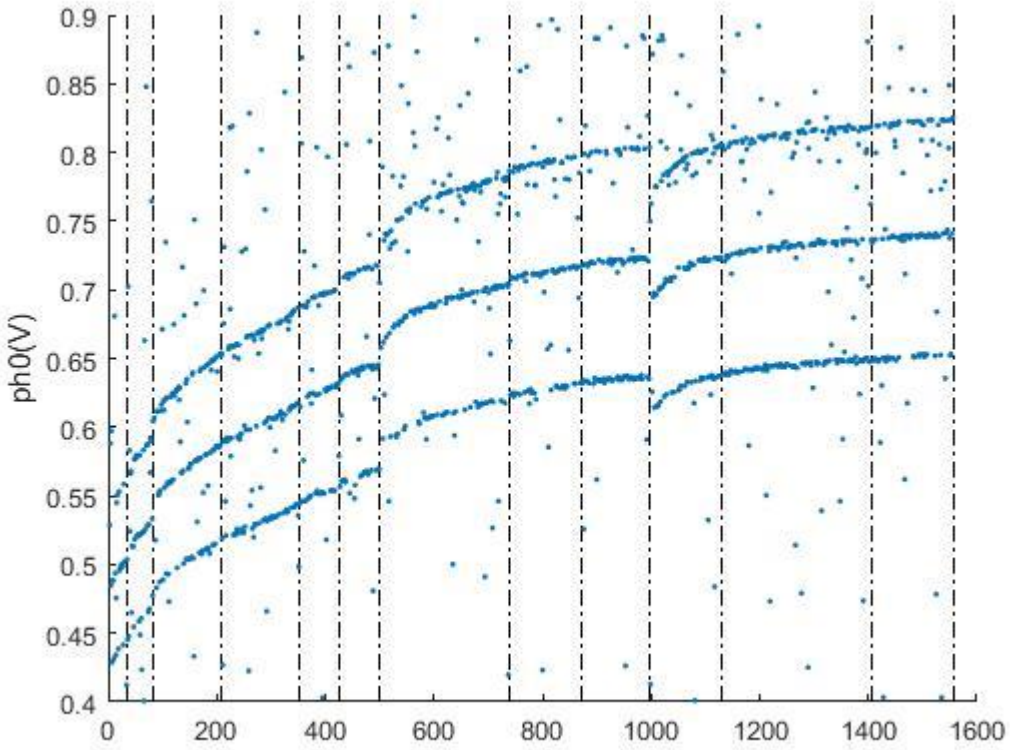




Some weird points

The measurement condition changed through the experiment

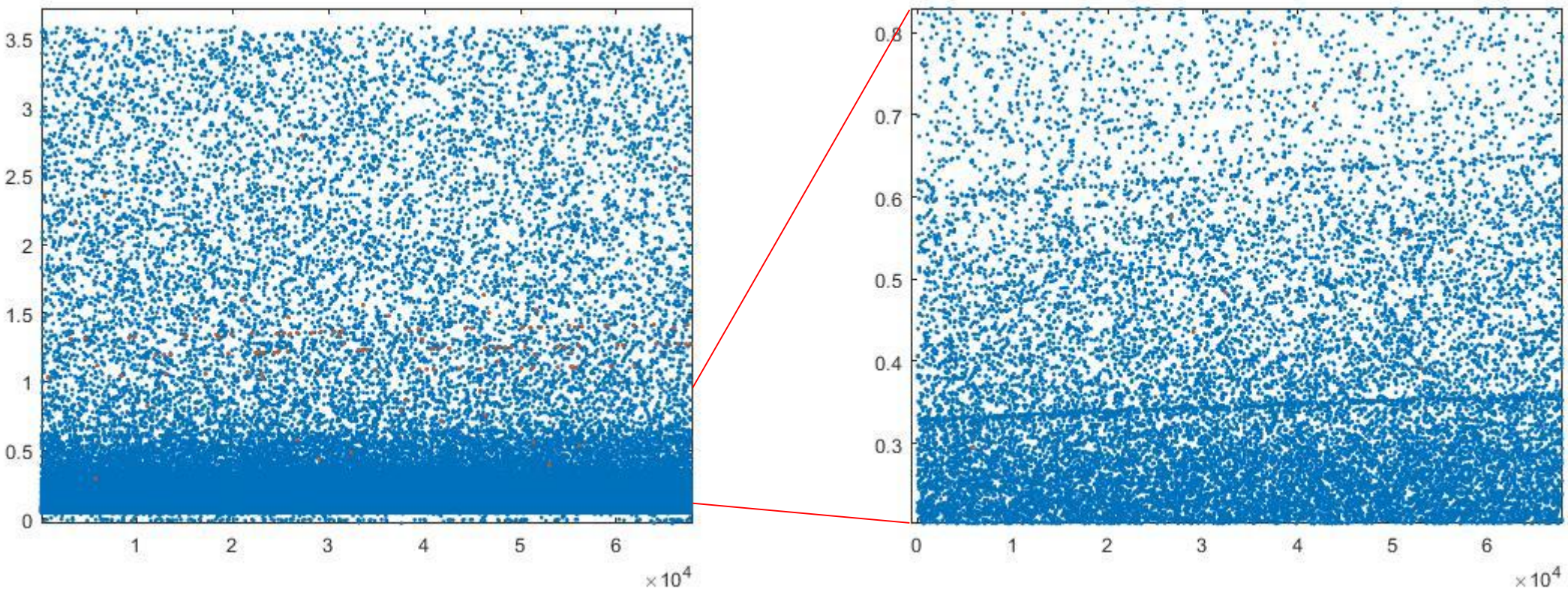




Not only for the whole period but also for each prm

Need drift correction

Drift Correction



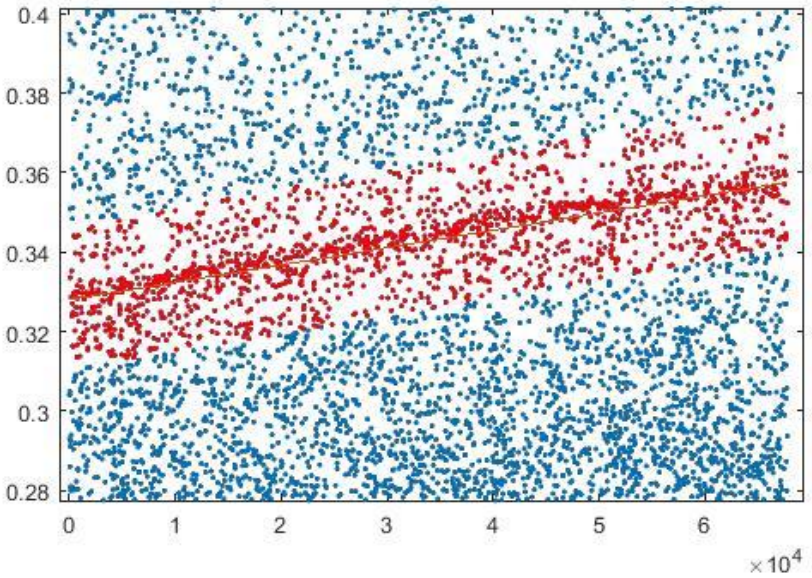
Gamma
K-40 (1460 keV)

- Choose a peak with a large number of signal
- and modify the whole set of data by fixing its slope and mean (or median)

Drift Correction

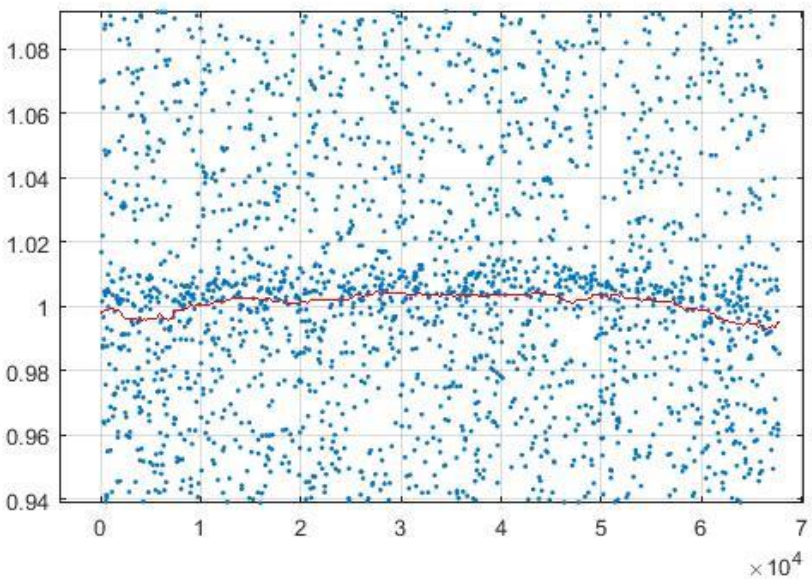
Custom function at Matlab

1. fix_slope: make the slope of the chosen peak flat and set the value to 1

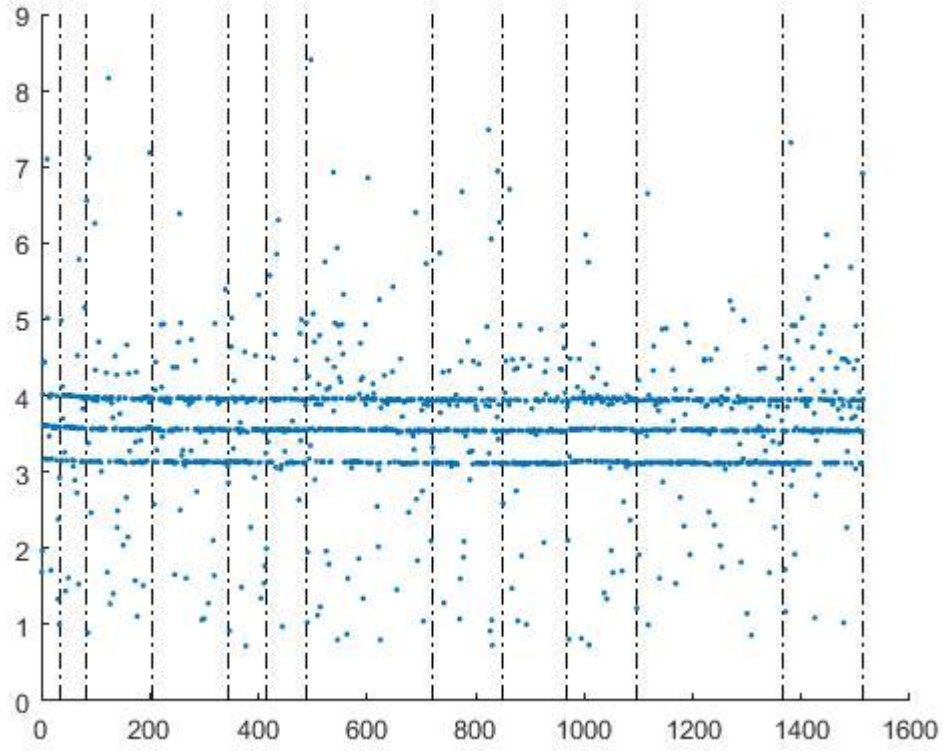


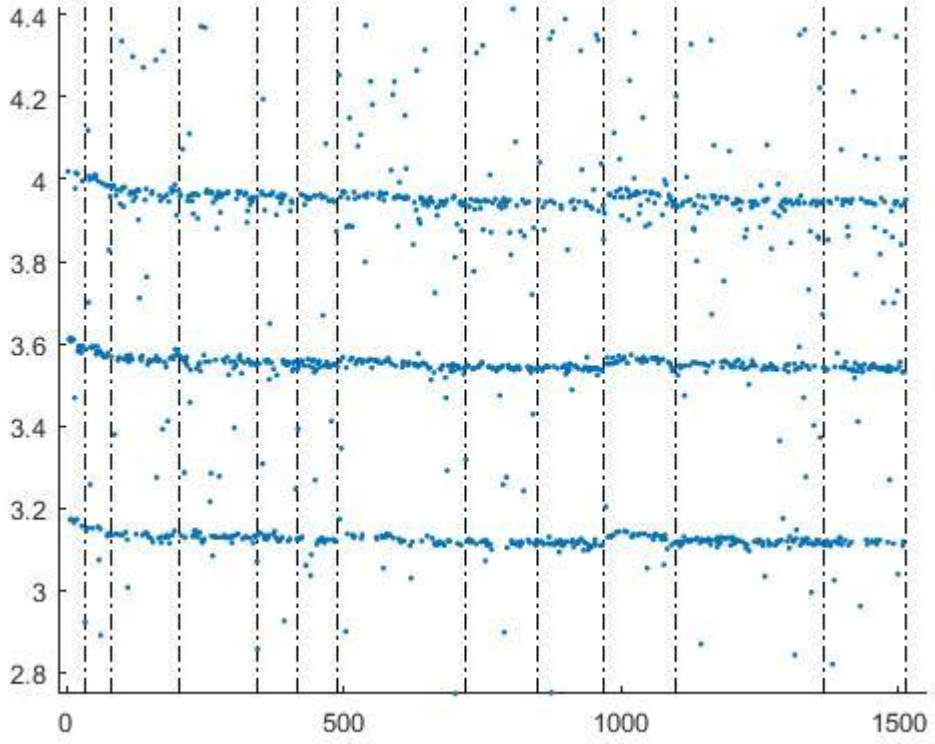
Gamma
K-40 (1460 keV)

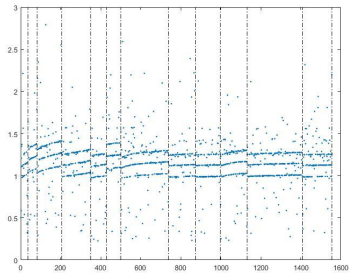
2. median_filter: find the median of amplitudes of signals near 1 and modify the amplitudes of all signals

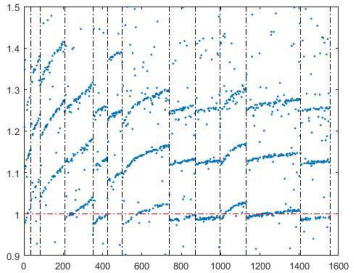


- Drift Correction

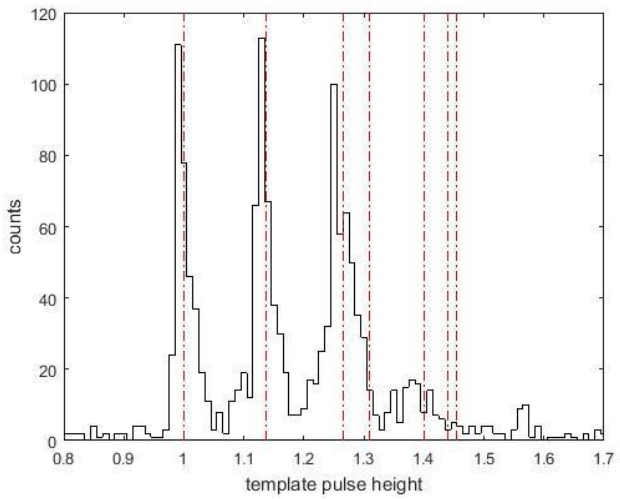


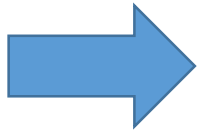


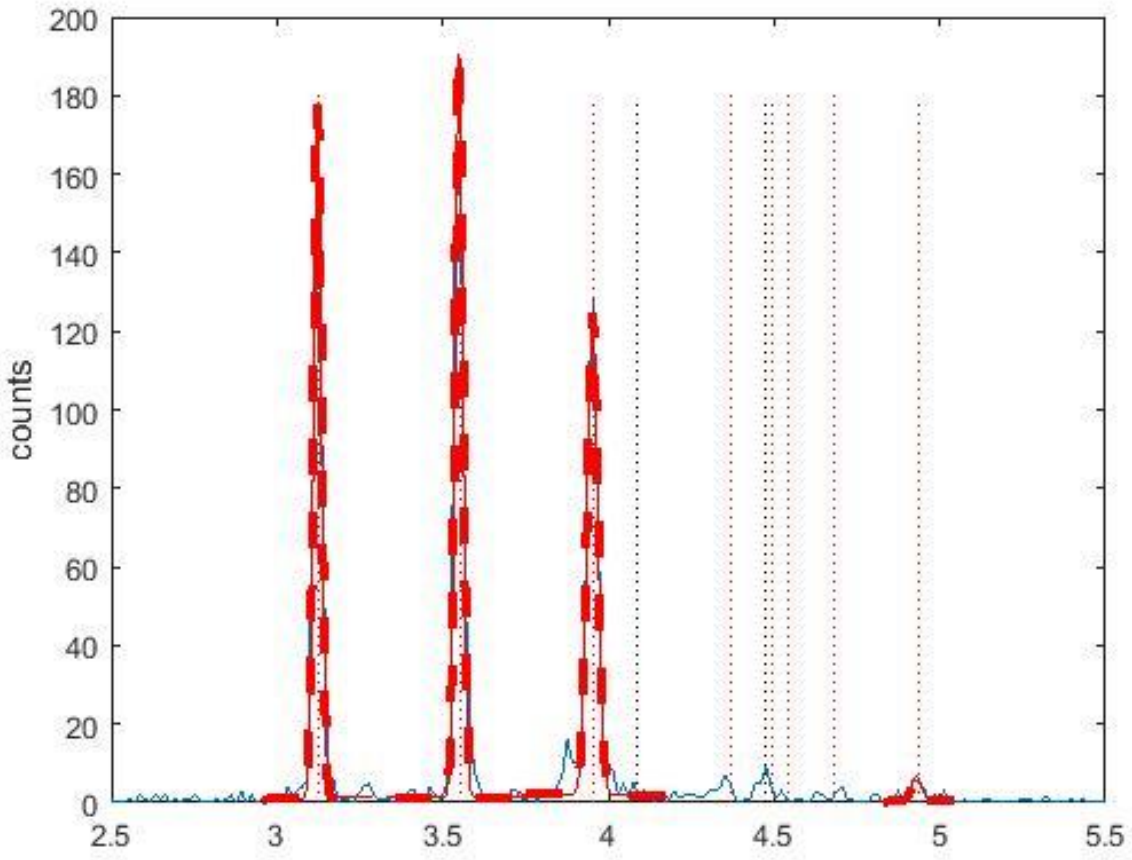




- Drift Correction





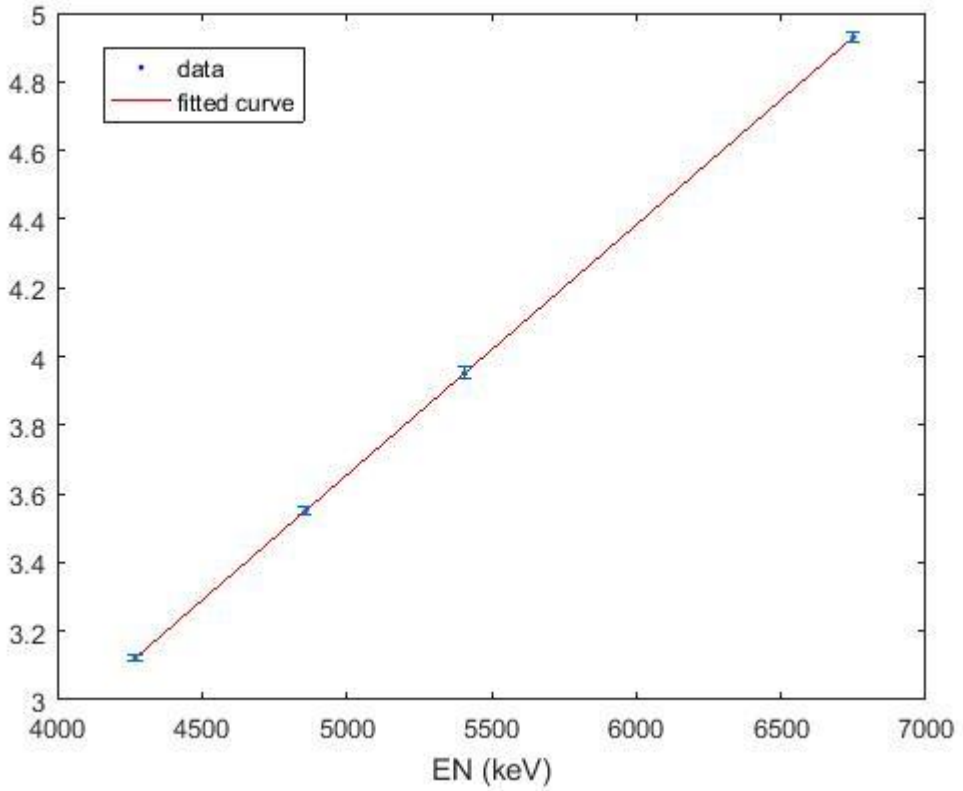


Gaussian fitting:

[3.1226, 3.5493, 3.9520, 4.9301] corresponding to [4269.7, 4857.7, 5407.45, 6750.33] keV

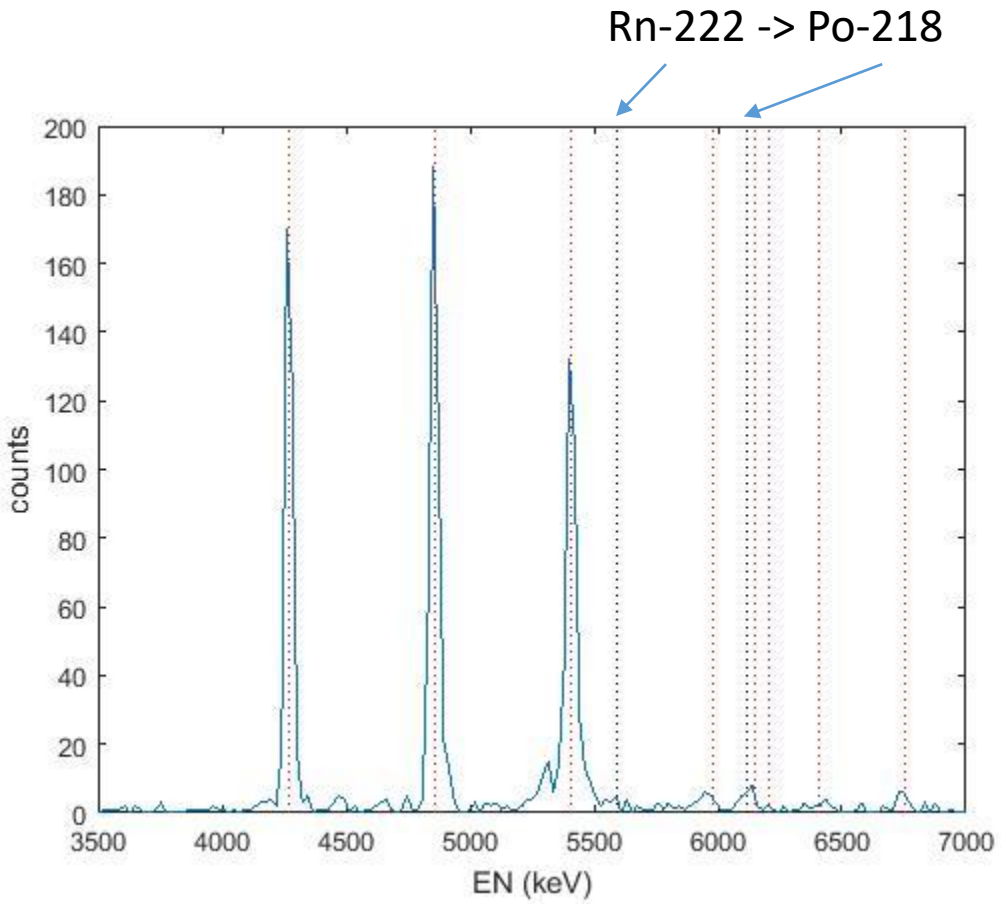
(U-238, U-234, Po-210, Bi-211)

- Calibration (2nd order polynomial)



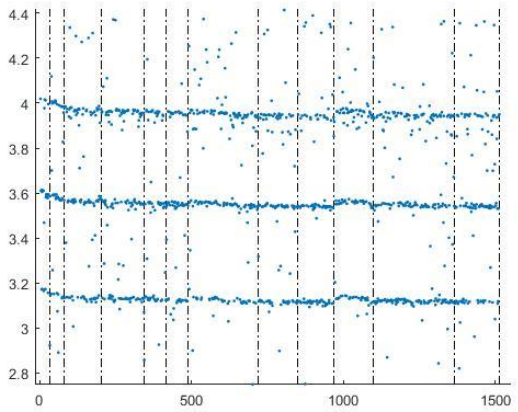
General model:
amp2EN(x) = a*x^2+b*x
Coefficients (with 95% confidence bounds):
a = -3.18e-10 (-8.23e-10, 1.871e-10)
b = 0.0007325 (0.0007296, 0.0007354)

- Calibration (2nd order polynomial)

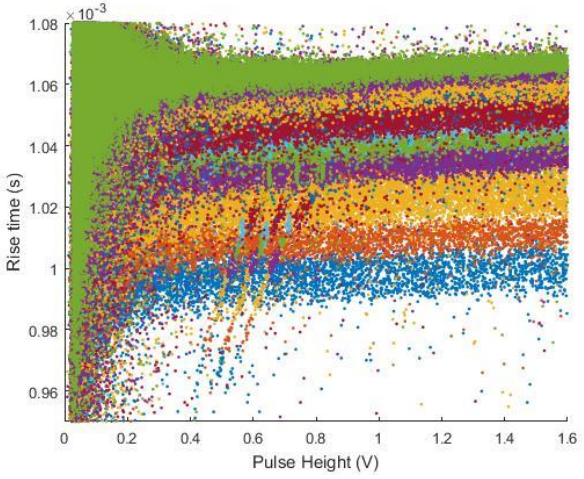


Alpha spectrum

- More…



1. The resolution can still be improved by more drift correction.



2. The alternation of condition is too huge to see the position dependence.
(Need another ‘good’ set of data)