

SDD Analysis Update

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SDD Event Centralized Trees

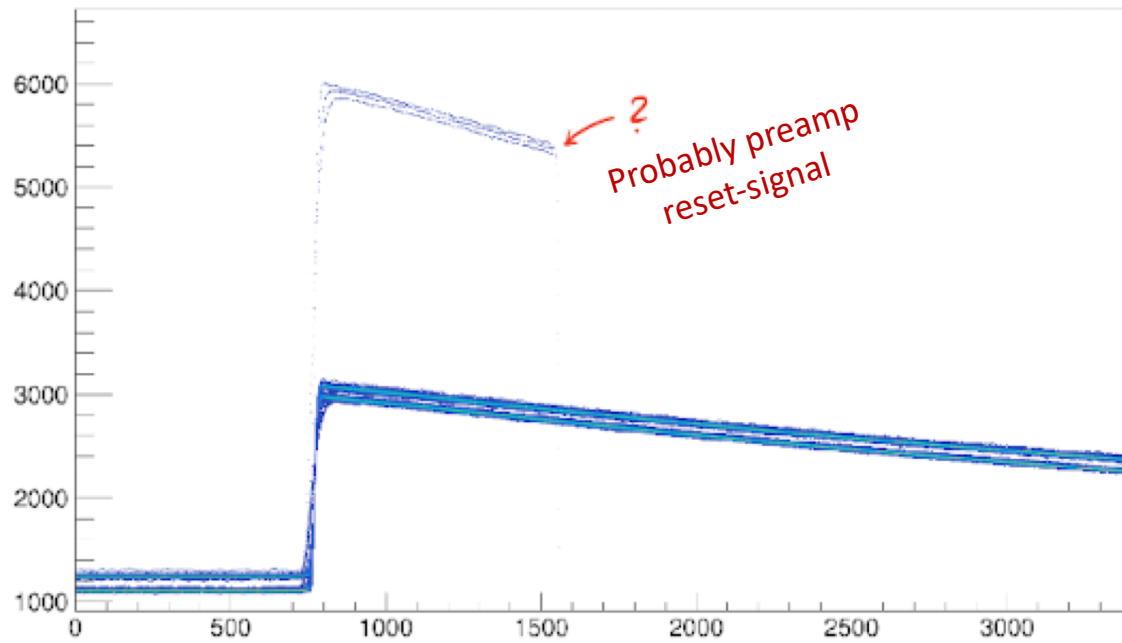
- Detector ID (channel) ✓
- Energy (keV & ADC) ✓
- Muon time (difference) ✓
- Waveform ✓
- Electron veto
- Rise time
- χ^2 from waveform fit

Running but still being extended

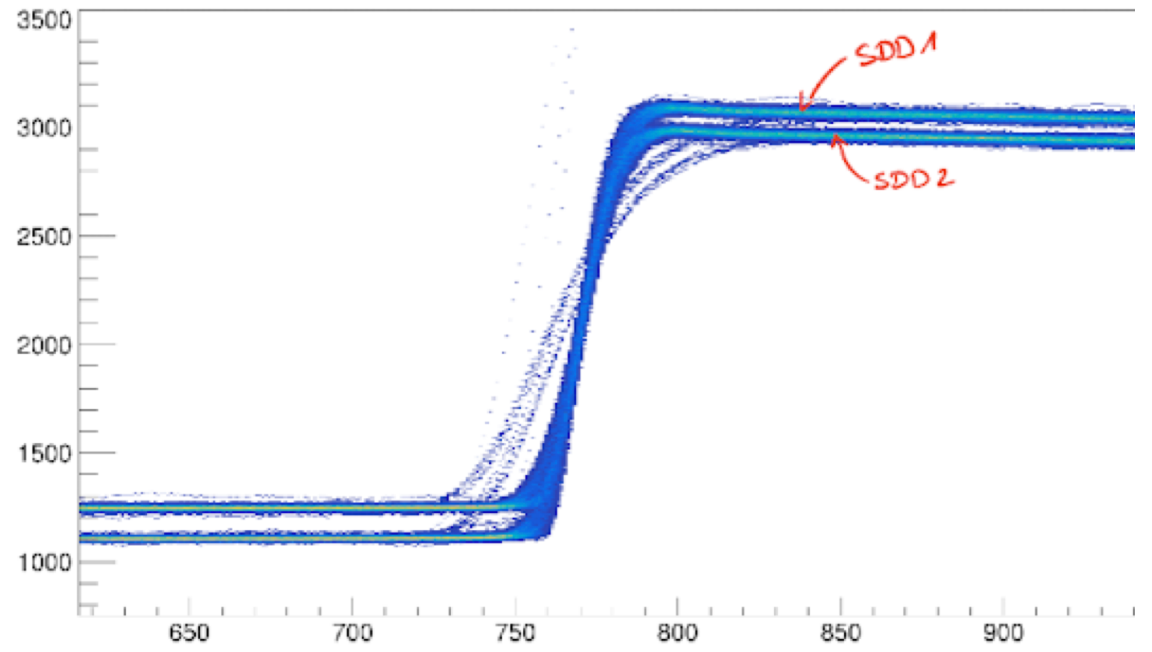
```
TFile**      treeRawSDD00367.root
TFile*       treeRawSDD00367.root
KEY: TTree   SDDTree;1      SDD events
KEY: TH1D    p;1           Clockticks Difference between Modules
[root [2] SDDTree->Show(1)
=====> EVENT:1
channel      = 10
energyADC    = 17586.7
energykeV    = 172.951
waveform     = (vector<unsigned short>*)0x555fef781000
SDDTime      = 1.40218e+08
MuonTime     = 1.40218e+08
tDiff        = 490.923
```

SDD Waveforms

Waveforms $\in (18.5, 19.0)$ keV



Zoom:

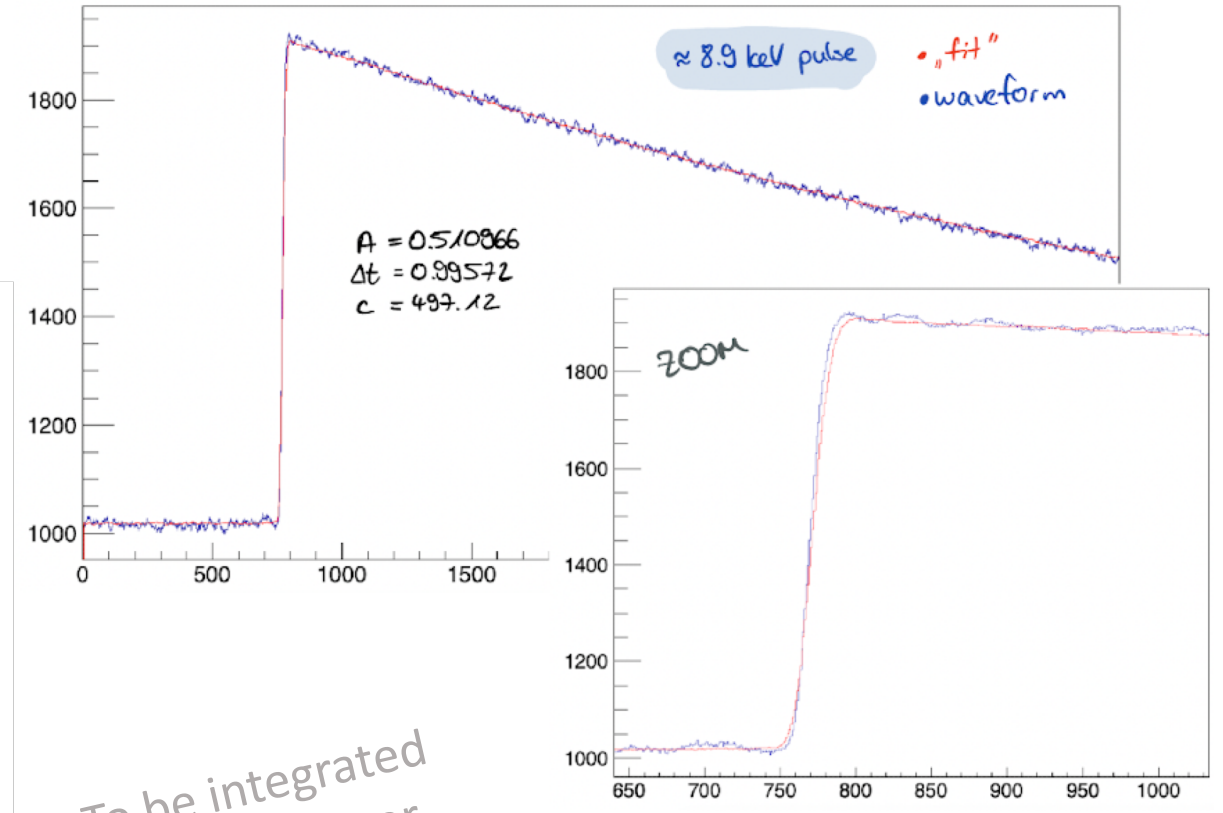
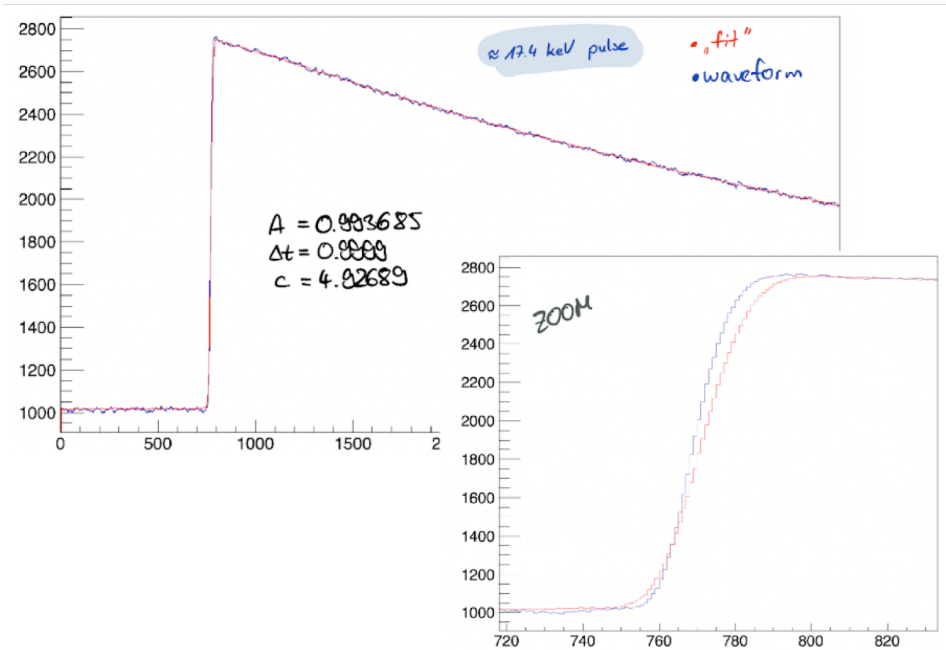


Waveform Fits (Work in Progress)

- ▷ generated template waveform from Mo K α pulses
- ▷ "fit" each template via minimizing Δf :

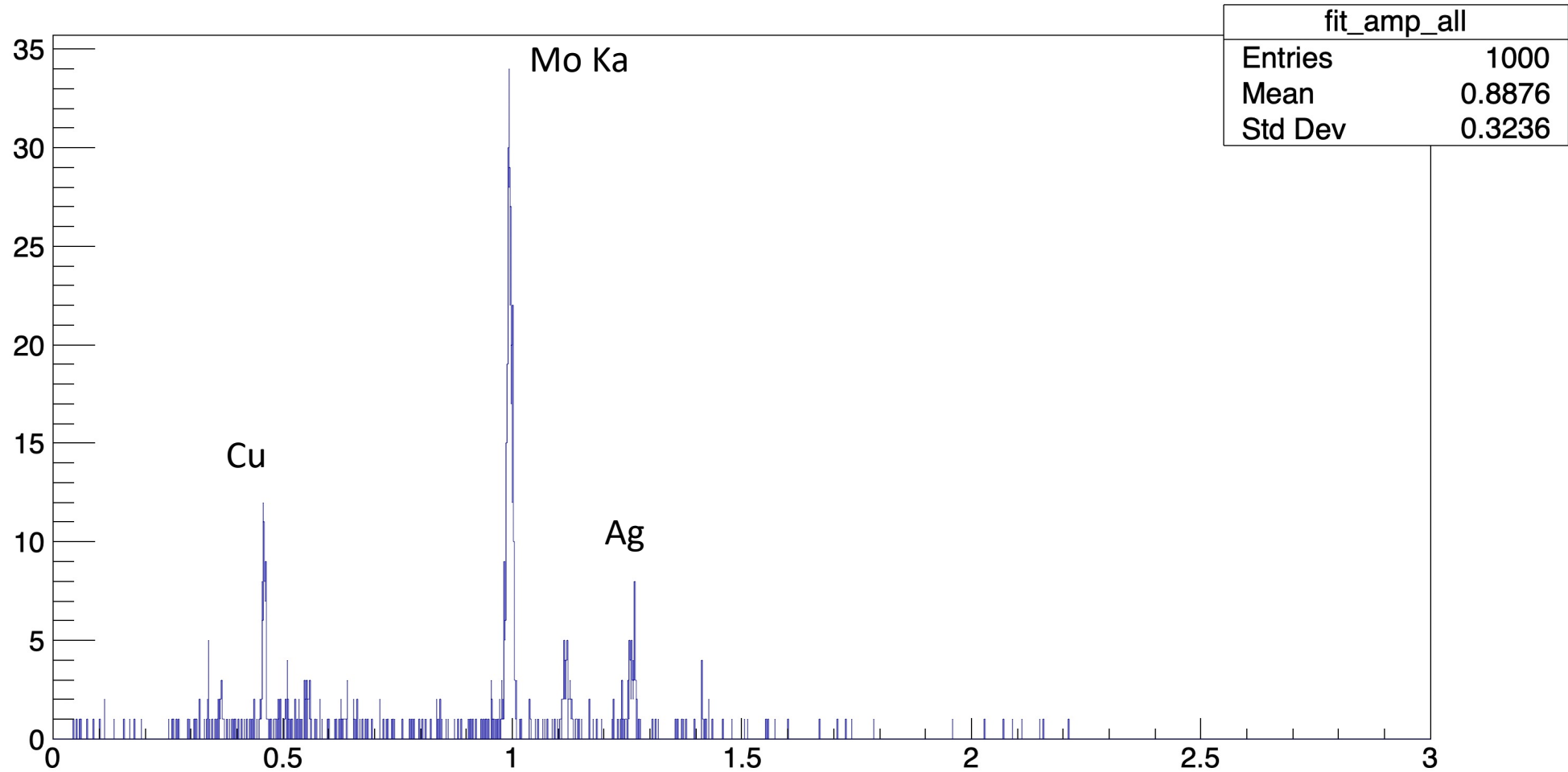
$$\Delta f(A, \Delta t, c) = \sum_{i=1}^N \left(f[i] - \left(A \cdot f[i - \Delta t] + c \right) \right)^2$$

amplitude time shift baseline offset

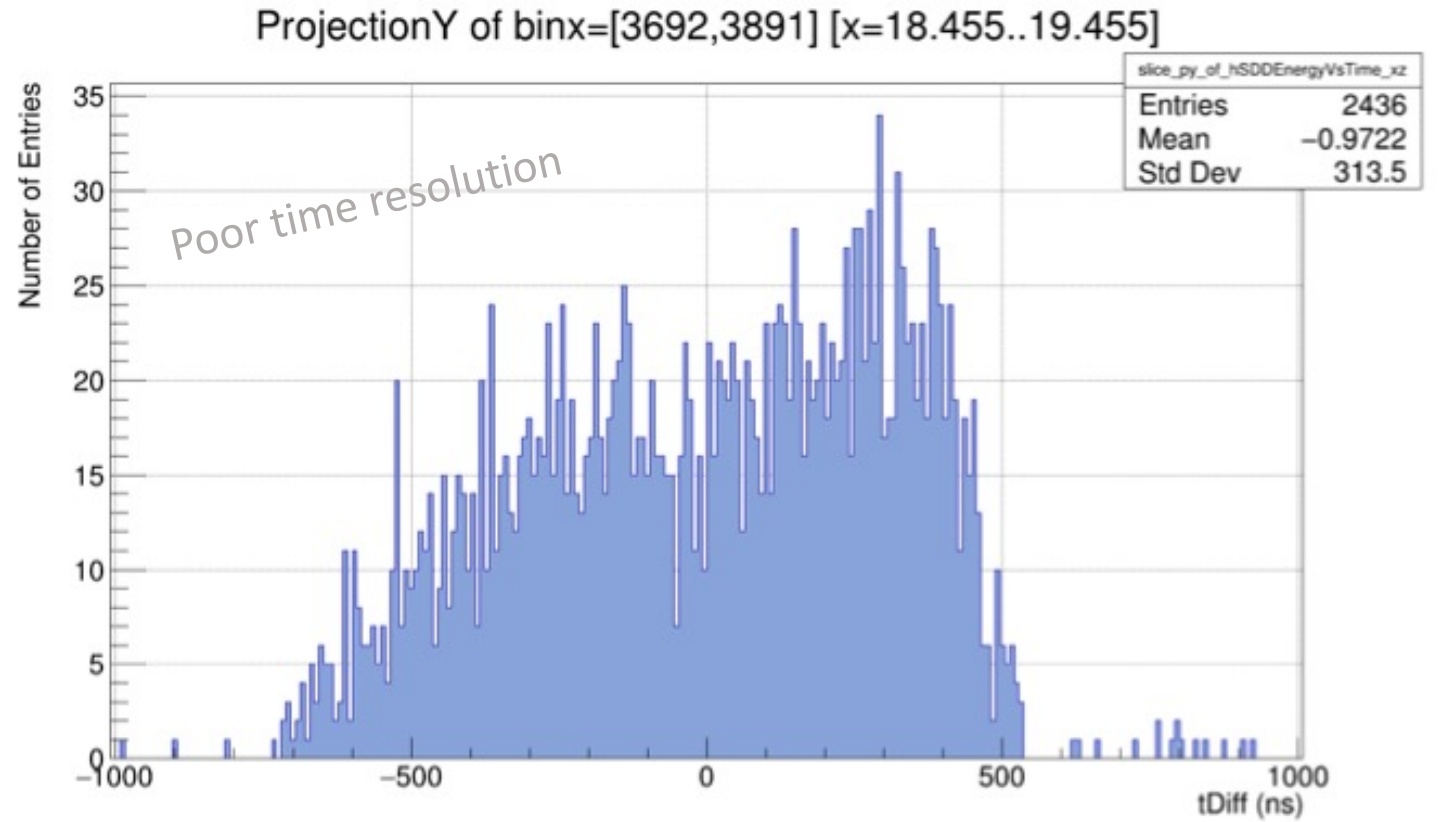
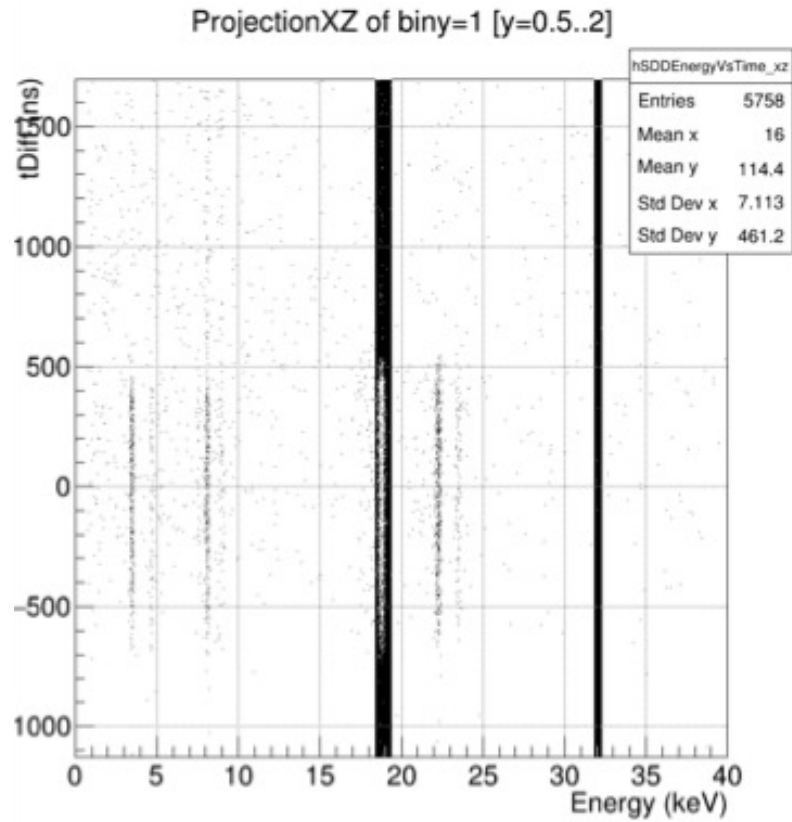


To be integrated
in the analyzer.

Waveform Fits (Amplitude Histogram)

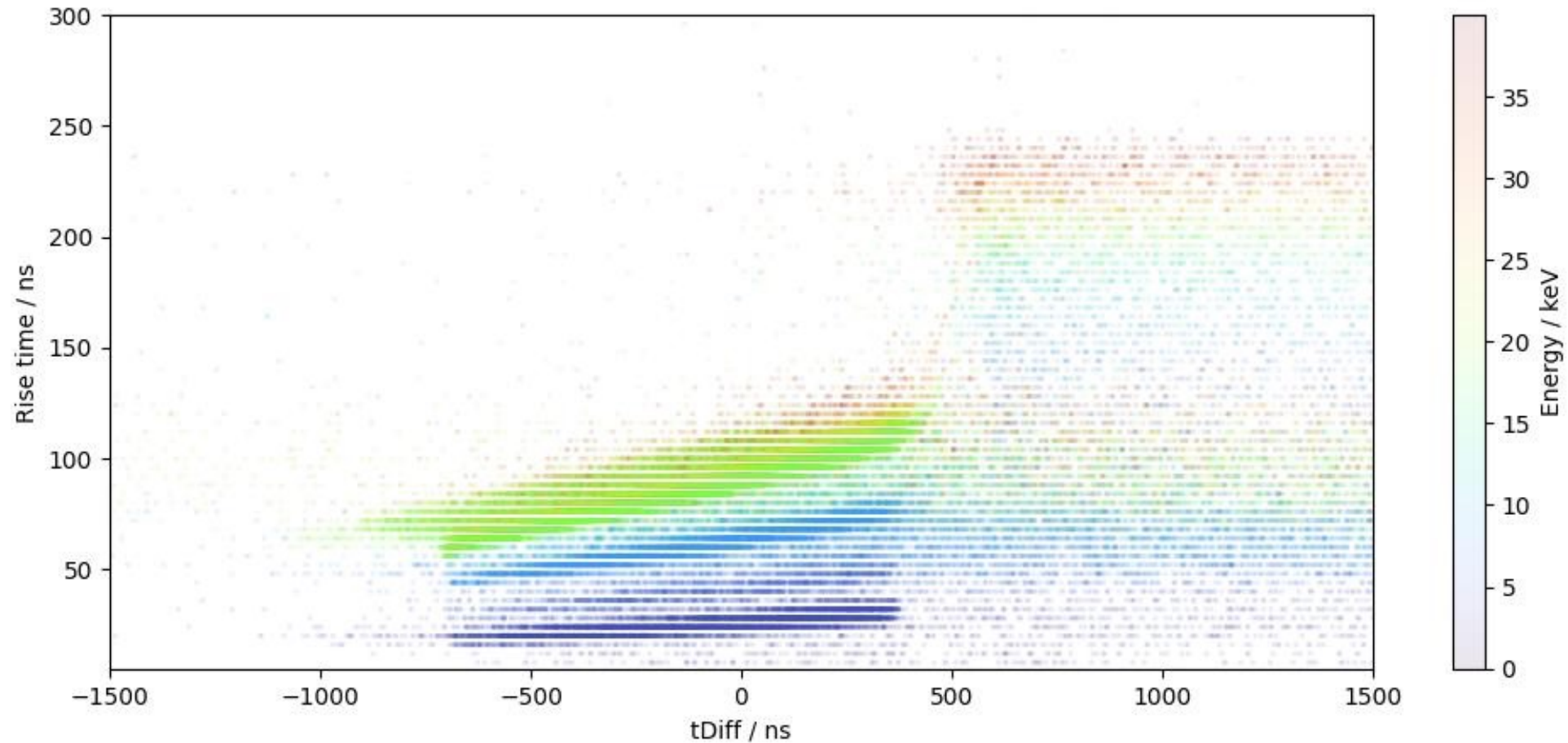


Timing

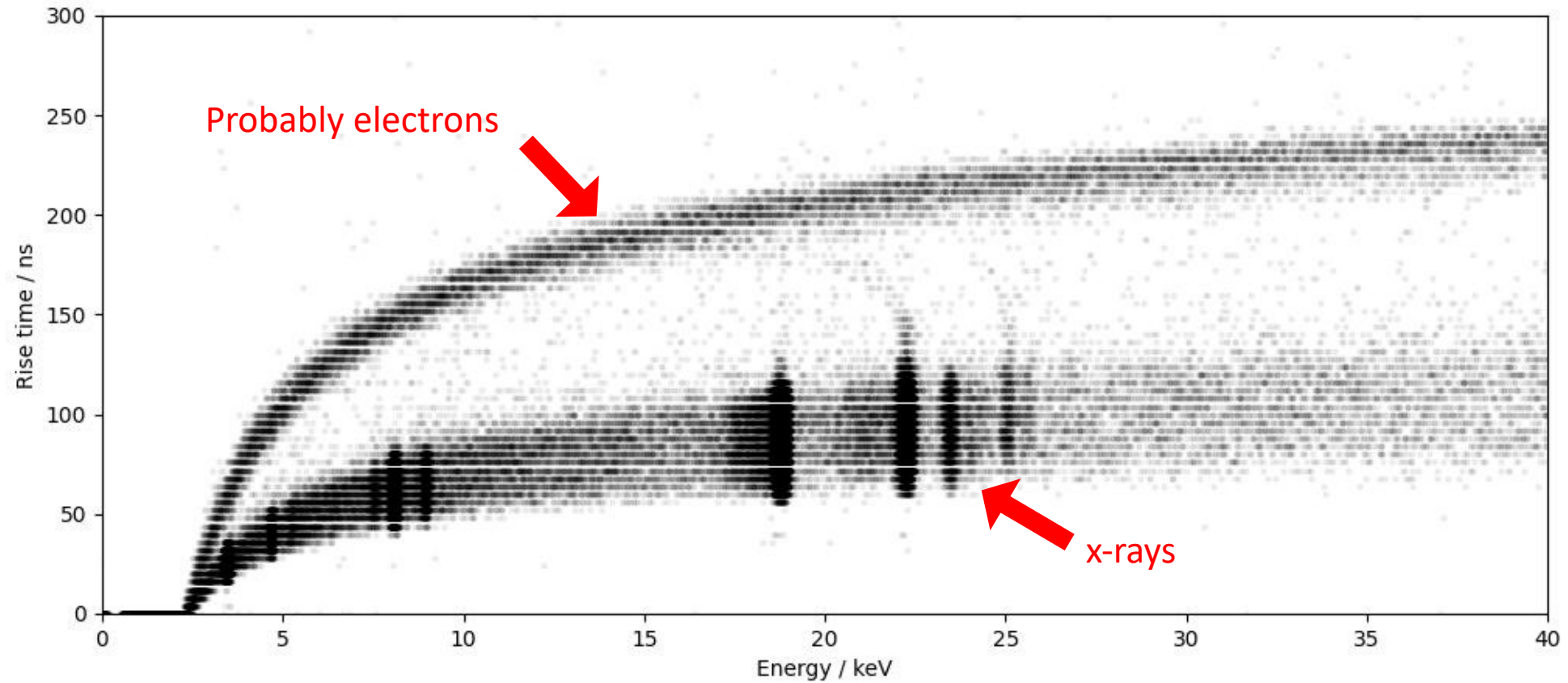


Signal Trigger Time vs. Rise Time

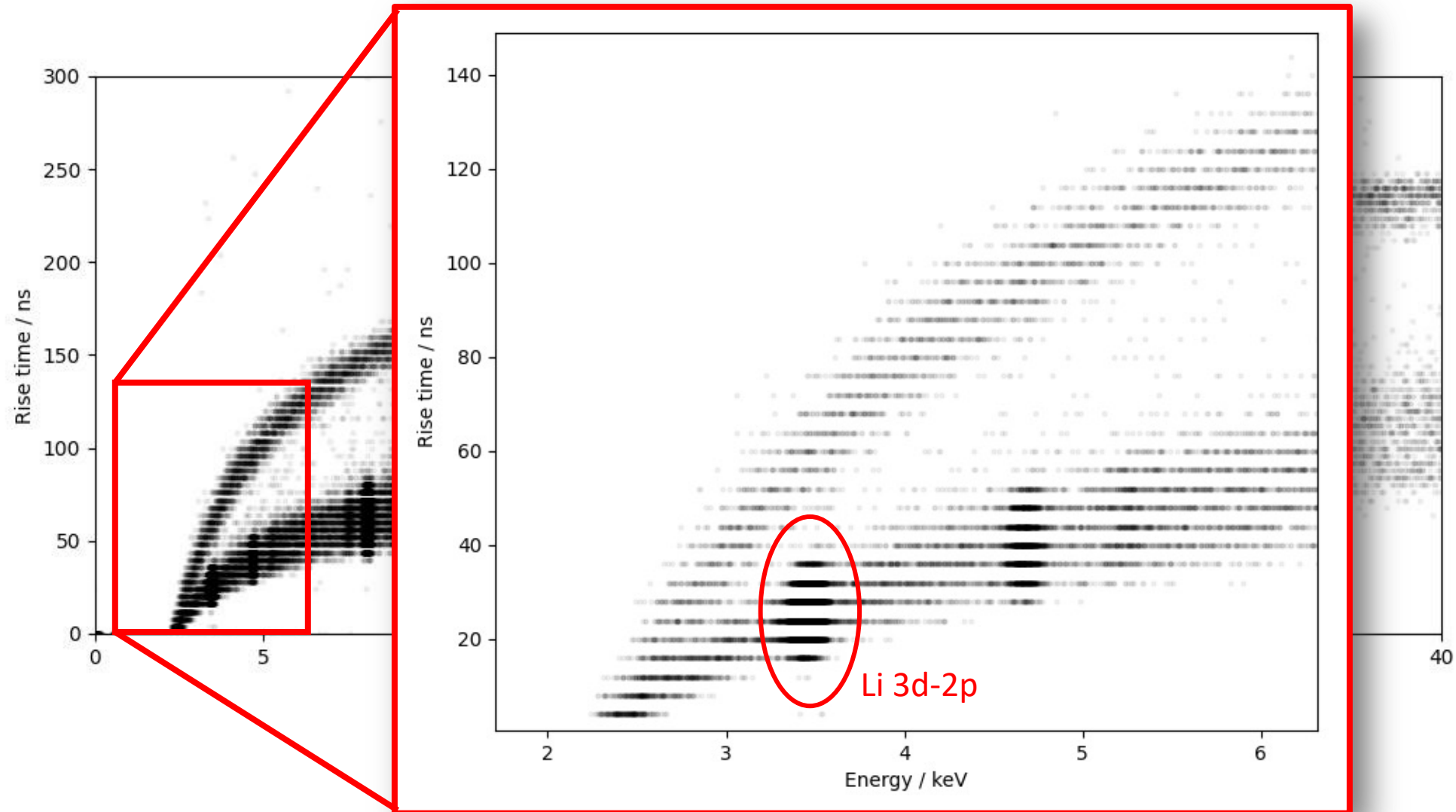
Limiting factor for
time resolution: long
drift time in the SDD
medium



Signal Rise Time vs. Energy



Signal Rise Time vs. Energy



Next Steps

1. Implement waveform fitting in analyzer
2. Complete Tree-Writer:
 1. Fitted amplitudes + χ^2
 2. Signal rise times
 3. ...
3. Testing χ^2 -cut to clean-up the spectra
4. Check SDD stability over time
5. Proper calibration
6. ...