Laser-Neutron sources at DRACO

Stefan Scheuren
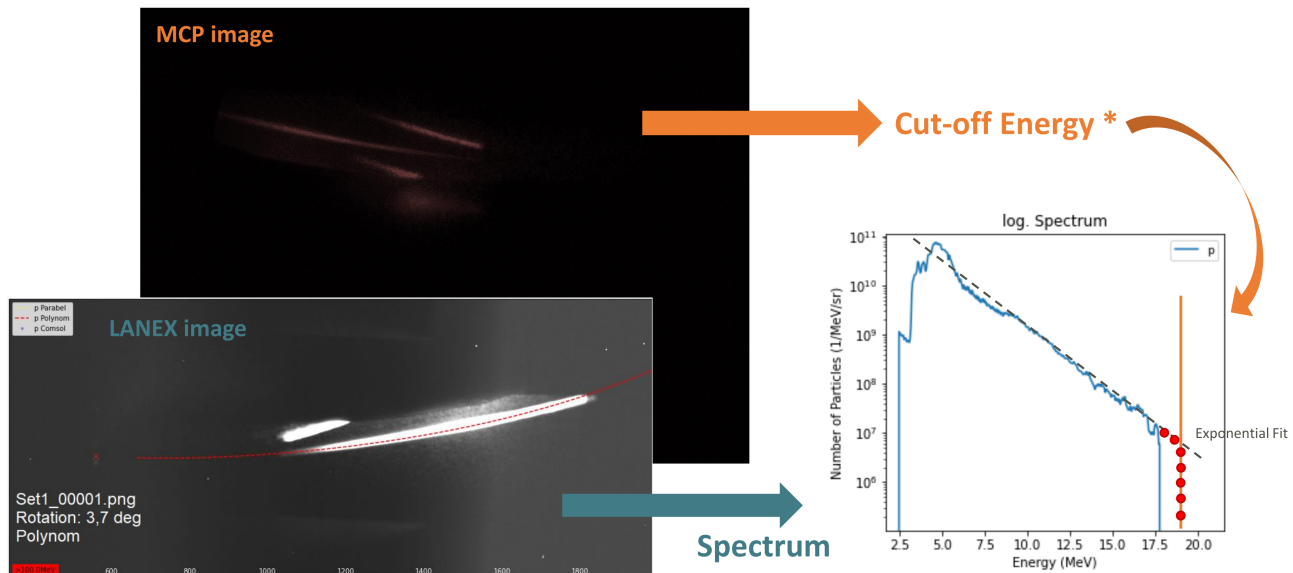
TECHNISCHE
UNIVERSITÄT
DARMSTADT

TPS 45º

ION SOURCE INFORMATION

* The values are taken from Florian's shotlists
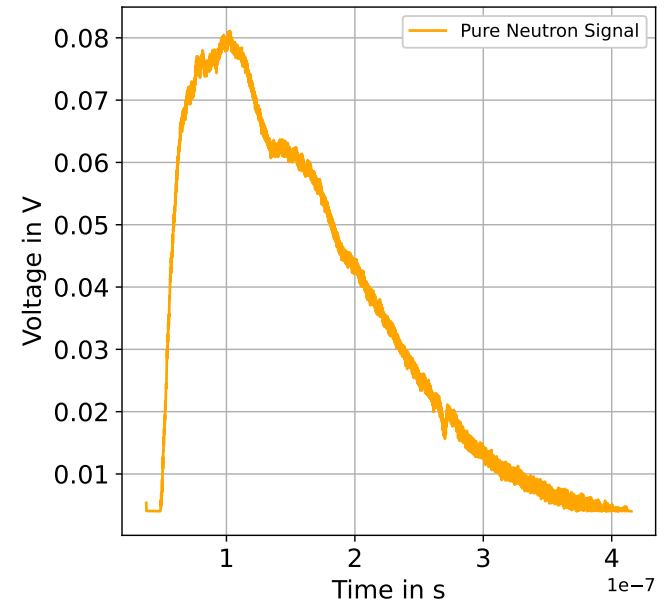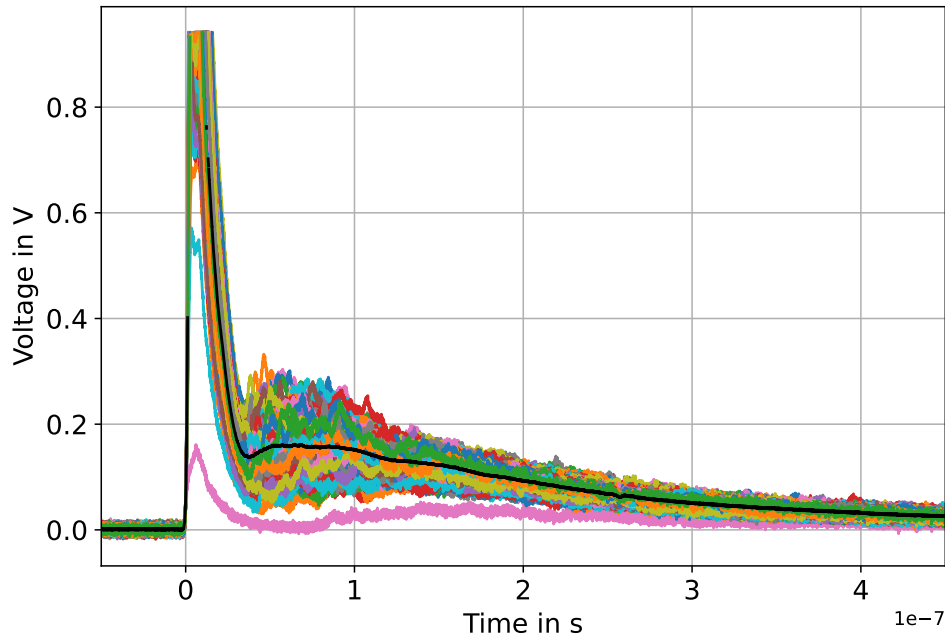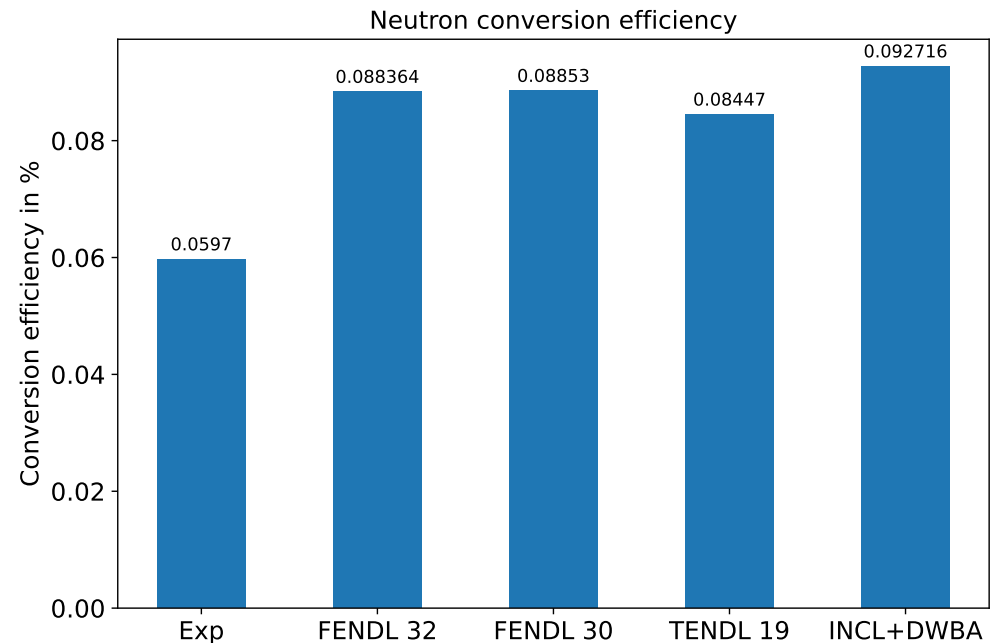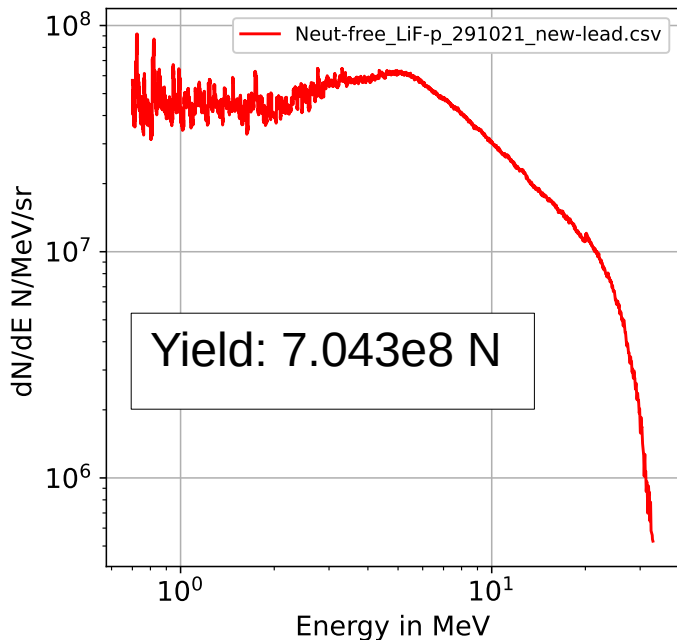
Neutron Yield 29.10.21

- Using big EJ232Q detector

- Average over 155 shots; protons on LiF
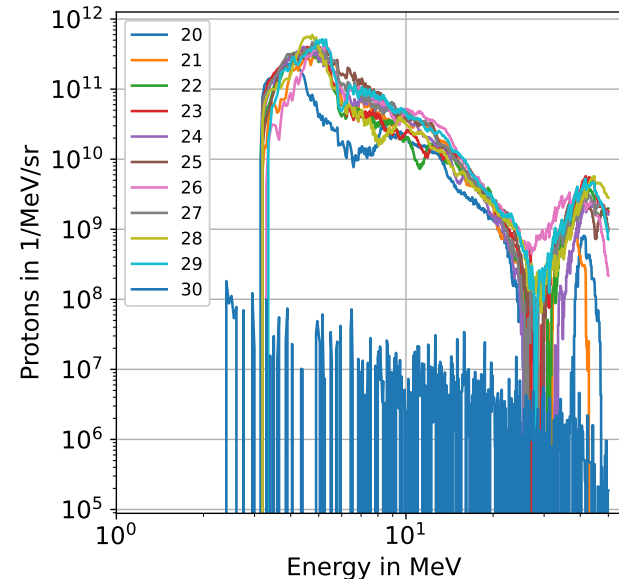
- Comparison to simulated yield
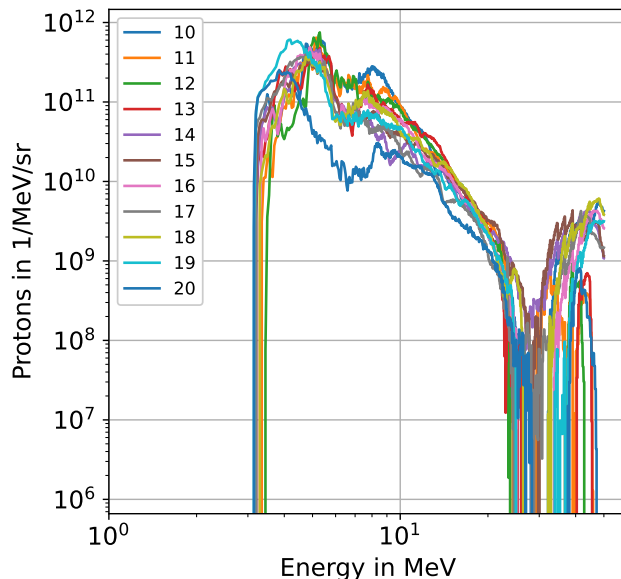
Neutron Yield 29.10.21

- Simulations used TNSA spectrum with 48.3 MeV cutoff

- Different nuclear data libraries used

- Comparison of conversion efficiency from p → n

Strange "behavior" for Protons

- Proton spectra look odd

- All spectra show dips to 0 between ~22MeV and ~35MeV

- Cutoff energies don't really match with shoot book

- Perhaps a problem in the data evaluation?

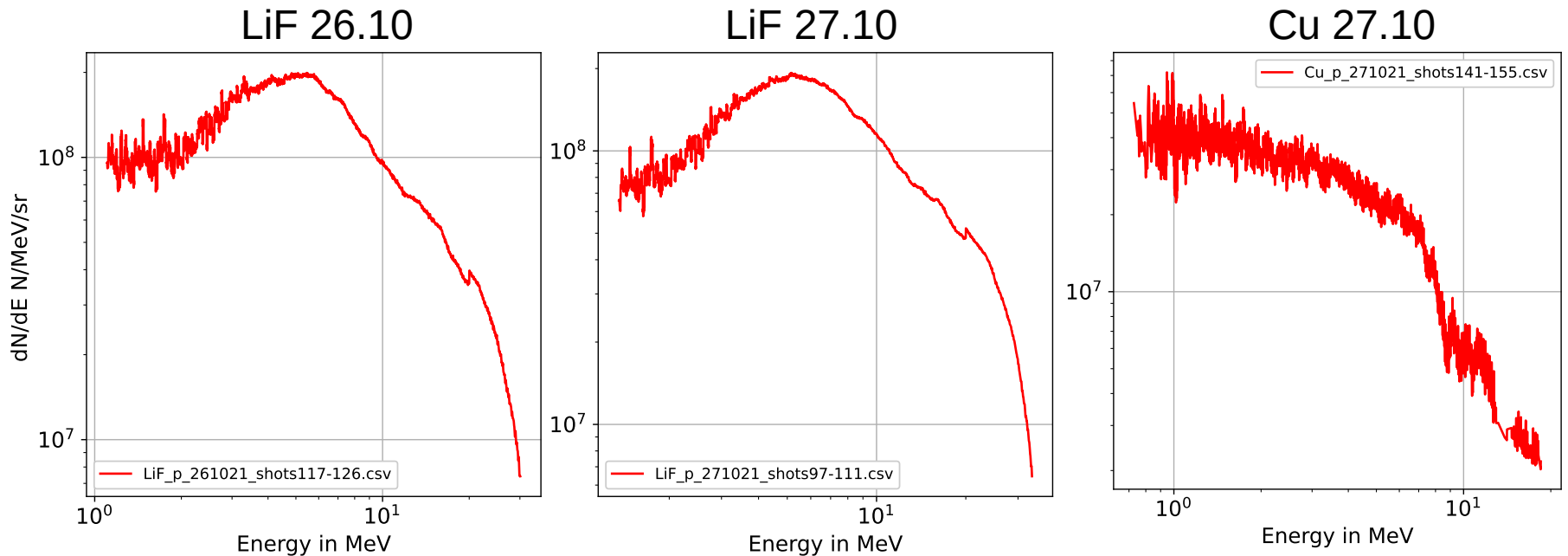# Neutron Yield Comparisons

- Comparison of neutron yield from scintillator and bubbles

- For different catchers (LiF, Cu, Poly) **deuterons**

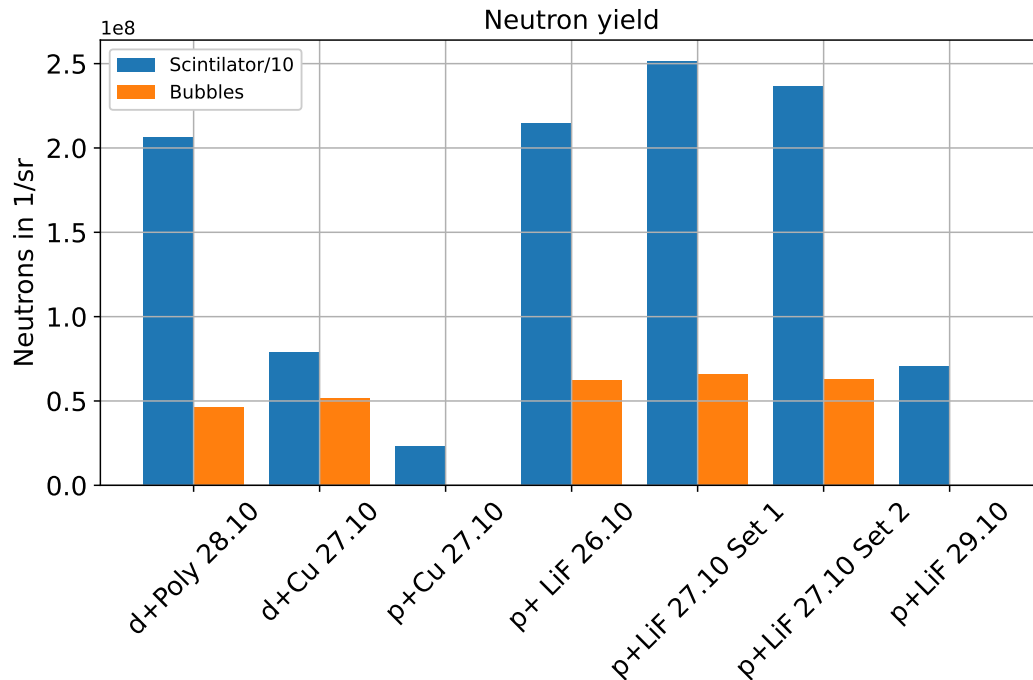- Scintillator shows different yield for each catcher

Neutron Yield Comparisons

- Comparison of neutron yield from scintillator and bubbles

- For different catchers (LiF, Cu, Poly) **protons**

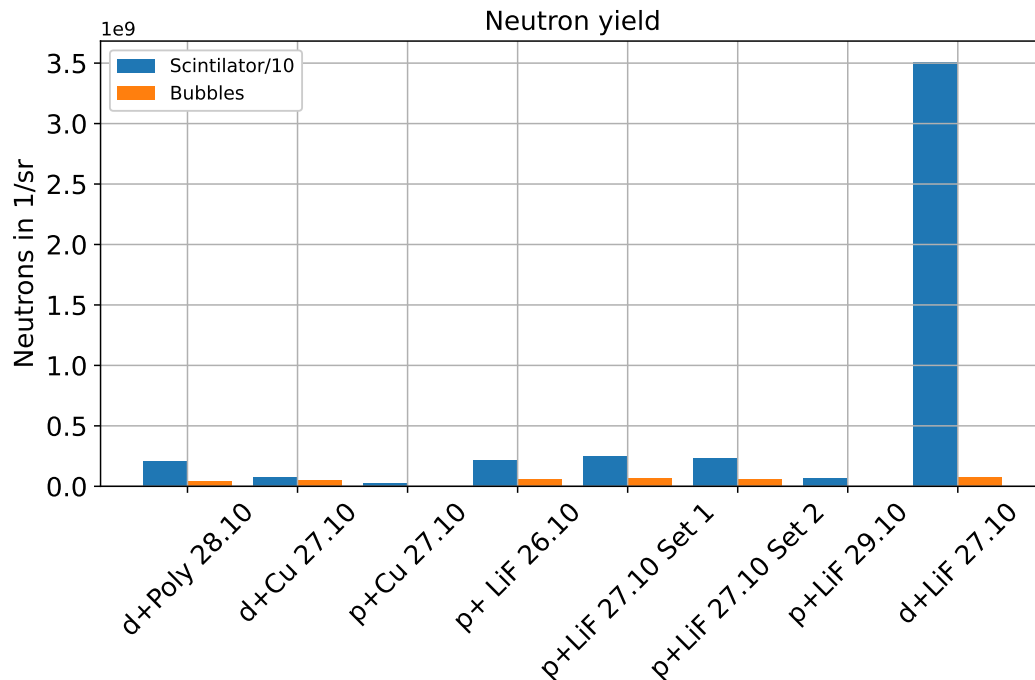- Scintillator shows different yield for each catcher

Neutron Yield Comparisons

- Comparison of neutron yield from scintillator and bubbles

- Bubbles show almost no difference between catchers

- Large discrepancy bubbles vs. scintillator, ~one order of magn.

Neutron Yield Comparisons

- Comparison of neutron yield from scintillator and bubbles

- Bubble detectors show almost no difference between catchers

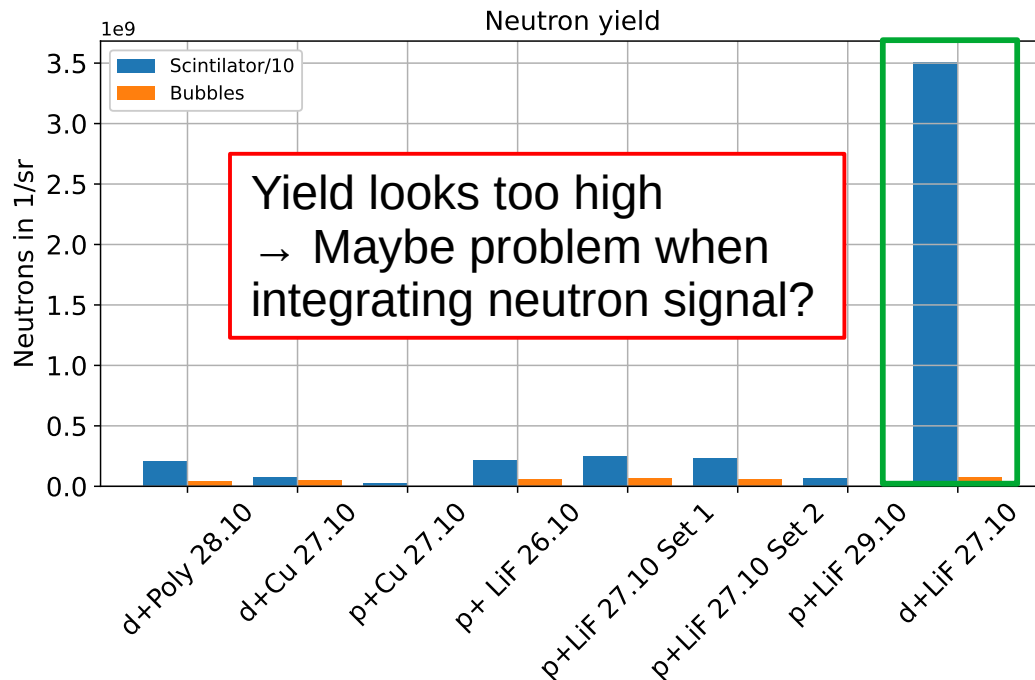- Large discrepancy between bubble detectors and scintillator

Neutron Yield Comparisons

- Comparison of neutron yield from scintillator and bubbles

- Bubble detectors show almost no difference between catchers

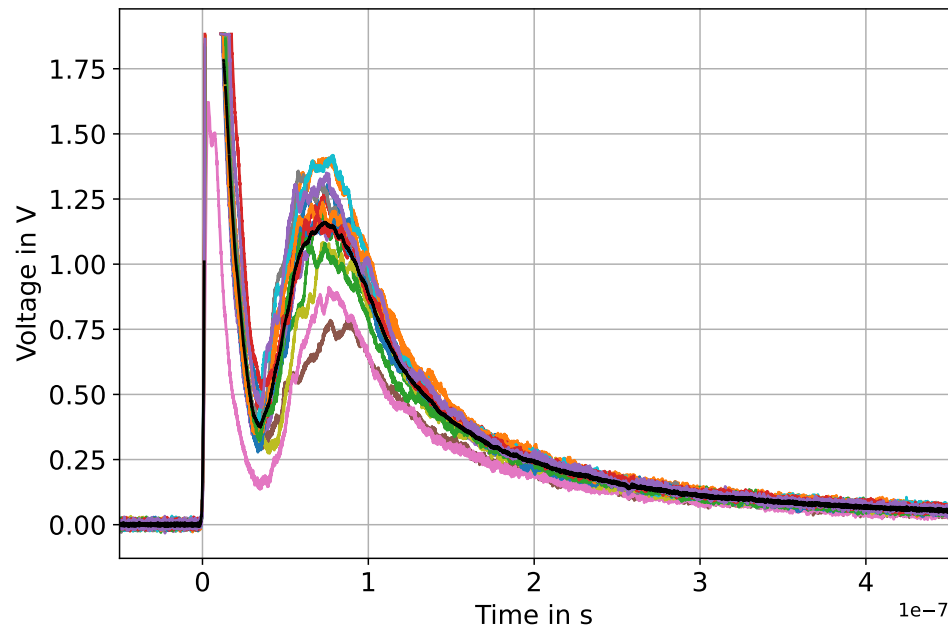- Large discrepancy between bubble detectors and scintillator

Upcoming Work

- Validate bubble detector data and conversion from bubbles to neutrons

- Investigate possible issue with integration of neutron traces

- Use larger data sets to calculate neutron yield

- Look at yield from the other scintillators

- Monte Carlo input is ready → start running full simulations

Back up slides

d+LiF 27.10

- Big EJ232Q scintillator

- Average over 15 shots

- Deuterated target and LiF catcher

d+LiF 27.10

- Fit Function to falling edge of Gamma-Flash

  – "Decay constant" of fit does not match with data sheet

  Fit: 1.118e8 1/s   Data sheet: 14.29e8 1/s

- Subtract Gamma-Flash from Signal