The HighNESS UCN/VCN workshop at ESS

https://indico.esss.lu.se/event/3195/timetable/#20230509

Last year we held a HighNESS/LENS UCN/VCN workshop at the https://indico.esss.lu.se/event/2810/ where experts from various laboratories and Universities have gathered to propose and discuss ideas and challenges for the development of these sources. At the workshop, experts provided previous inputs and ideas.
A book of proceedings has been prepared as a special issue of the Journal of Neutron Research has been published
The HighNESS UCN/VCN team has worked for this past year to develop these ideas in a conceptual design stage. The purpose of this follow-up workshop is to discuss the finalized ideas and receive feedback from the community. Additionally, based on the expected performance of the UCN and VCN sources at ESS, we would like to discuss in depth the possible applications. The first day will be dedicated to presentations of the designs, and discussions about applications, and the second half-day to feedback, outlook, and final discussions. In the afternoon of the second day, we plan to have a site visit to the ESS facility.
It will also be possible to follow the workshop via zoom however we would much like to prefer to see you at the ESS

Tuesday. May 9 : TN time 3:00 am-6:00 am and 7:00 am – 11:30 am + 6 hours in LUND
https://ess-eu.zoom.us/j/64441974634 zoom for the first day

Wednesday May, 10 : TN time 3:00 am – 6:30 am
https://ess-eu.zoom.us/j/62553154993 zoom for the second day

At the last ORNL Workshop April 27 we identified several topic for further study

1. TOF selection narrow-down (following M. Frost TOF spectra ratios)
2. In the ROI compare integrals of peak and background for data and simulations
3. How different will be F0 if we do not subtract the background?
4. Compare scattering for 6 PC sets with data and simulations
5. How different will be fit to F0 if we will subtract only 3D plane background?
6. Look what is contribution to F0 of the fitted plane and scattering background by fitting them to PC=0
7. Try to understand the σ_x and σ_y of fitted gaussian by checking across the simulations
8. Inspect the other runs with the same numbers of PC from Nov 2020
9. Region of Background takes most of chi^2 weights. Try to reduce this region in 6-parameter fit.

Pinhole files and the TOF interval selection

for November 2020 MAGREF data

Pinhole data in November 2020 run

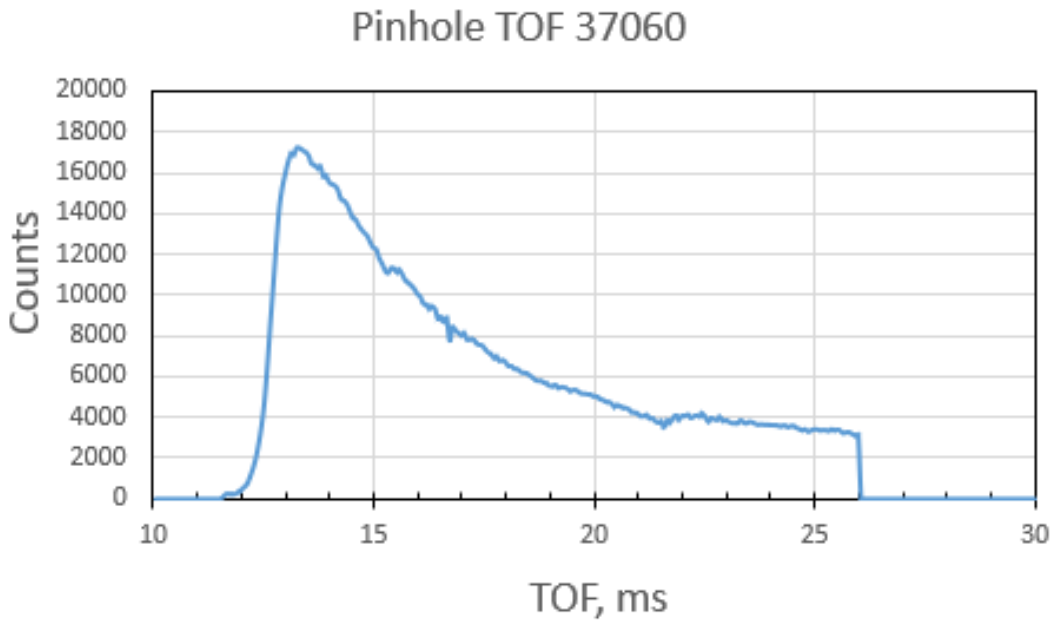
Run #	B, T	Title	equence II	Start Time	Duration	Counts
37064		pinhole downstream no endcap on B4C tube	37055	2020/11/20 15:49:16 EST	0:21:25	1.08E+06
37063		pinhole downstream no endcap on B4C tube	37055	2020/11/20 15:22:38 EST	0:21:44	1.23E+06
37062		pinhole bkgd no endcap on B4C tube	37055	2020/11/20 14:53:48 EST	0:21:51	9.06E+05
37061		Smallest pinhole no endcap on B4C tube few mm beam right	37055	2020/11/20 14:28:34 EST	0:20:13	1.24E+06
37060		Smallest pinhole no endcap on B4C tube 4mm lower	37055	2020/11/20 14:04:01 EST	0:18:27	1.61E+06
37059		Smallest pinhole no endcap on B4C tube	37055	2020/11/20 13:39:37 EST	0:19:22	9.61E+05

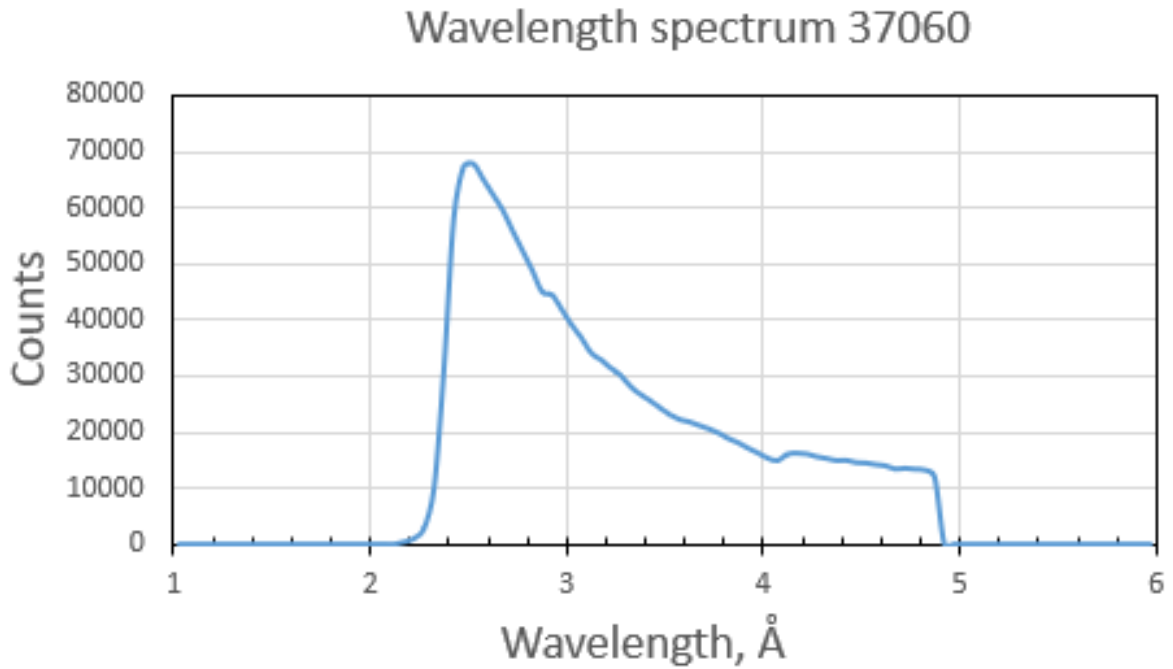
- Pinhole peak region in detector PHR: 135 < X < 183 , 101 < Y < 152
- All files have double peak in Y (37064 has second peak in X)
- 37060 is best, it has

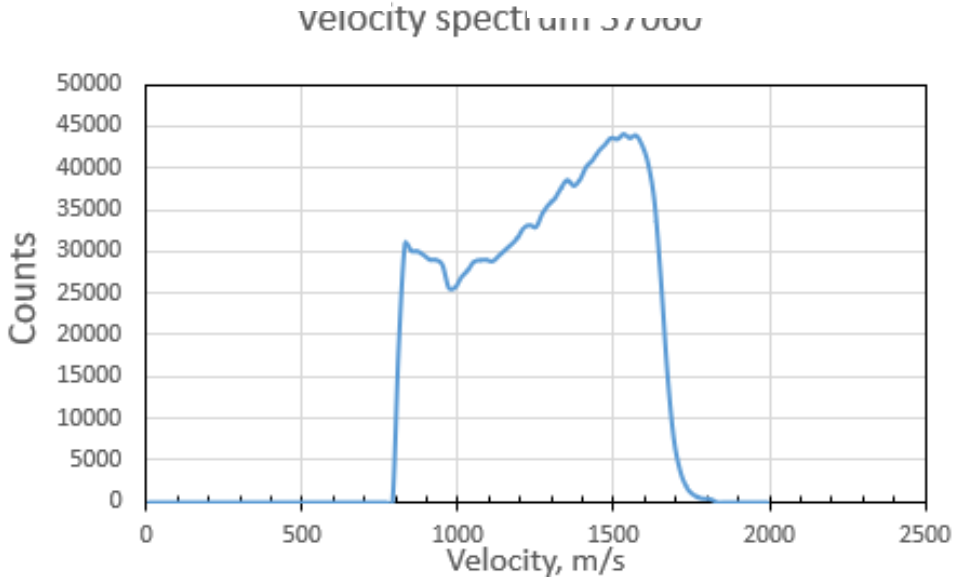
-> smallest rms : $\sigma x = 6.98\, pix \quad \sigma y = 7.40\, pix$ in PHR

-> largest statistics

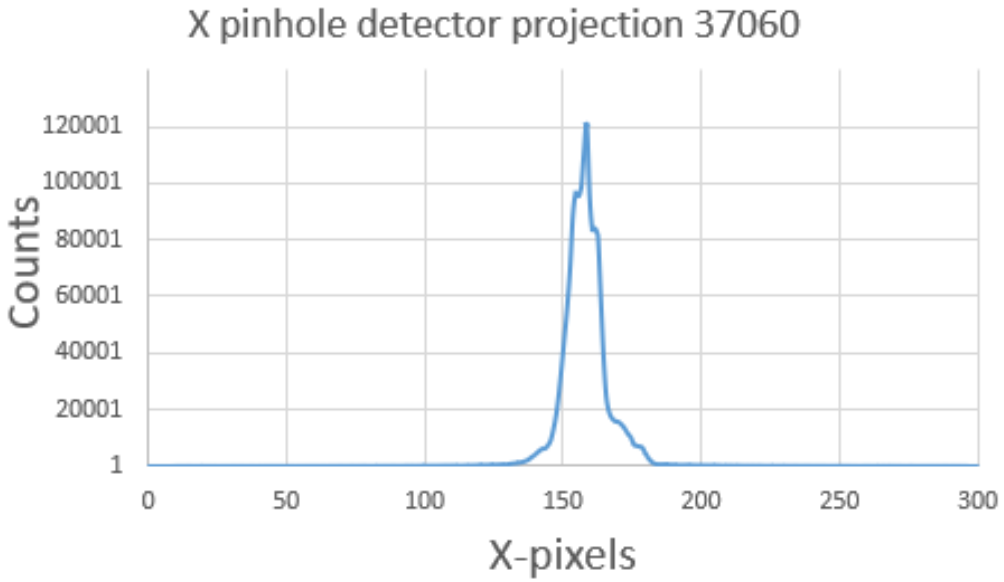
Pinhole 37060 distributions

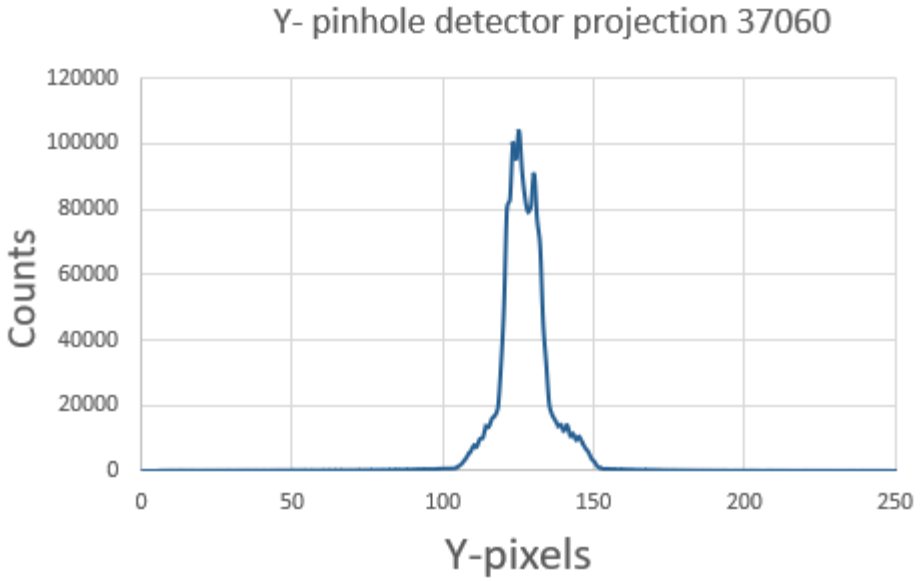




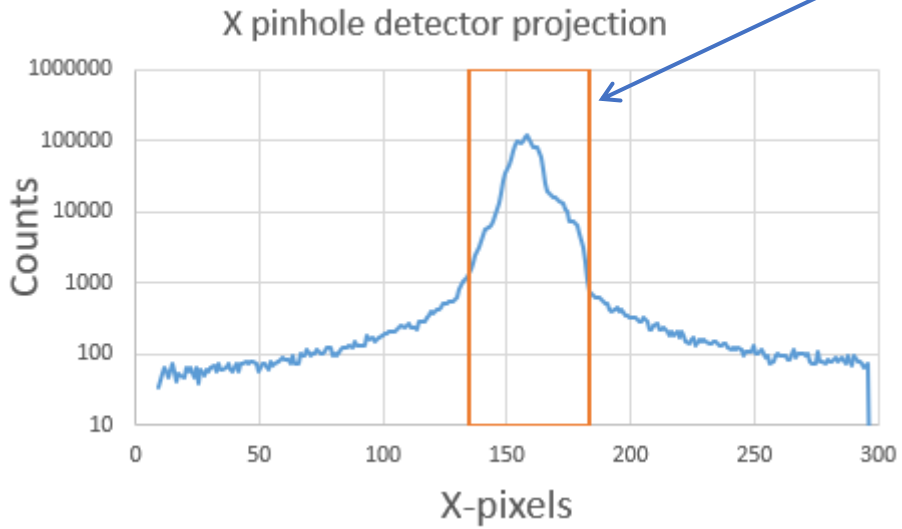


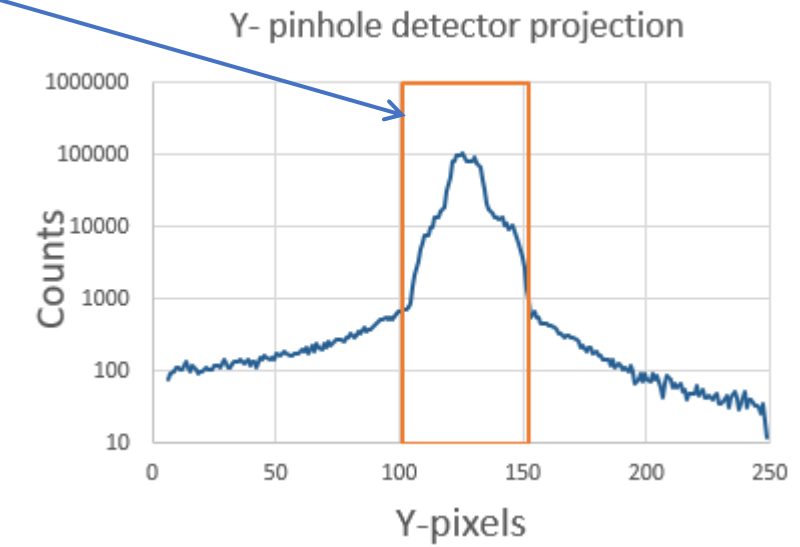
Pinhole 37060 distributions



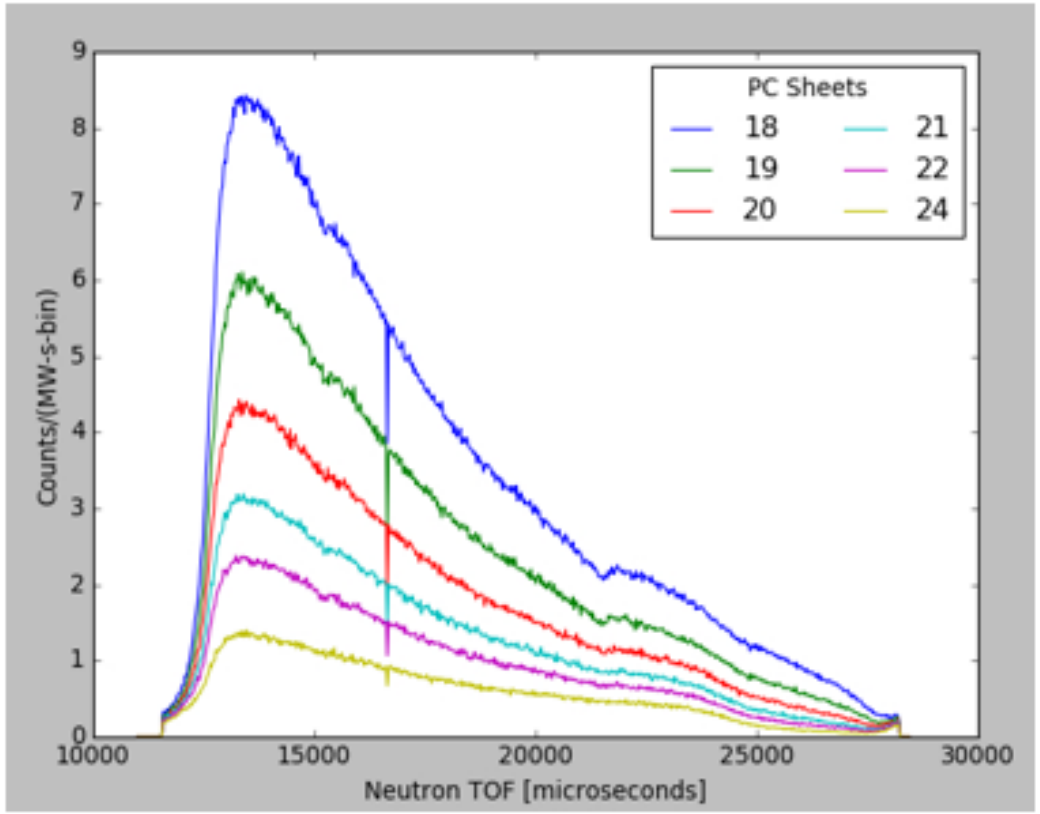


Region of pinhole Used for the comparison of RMS of pinhole files

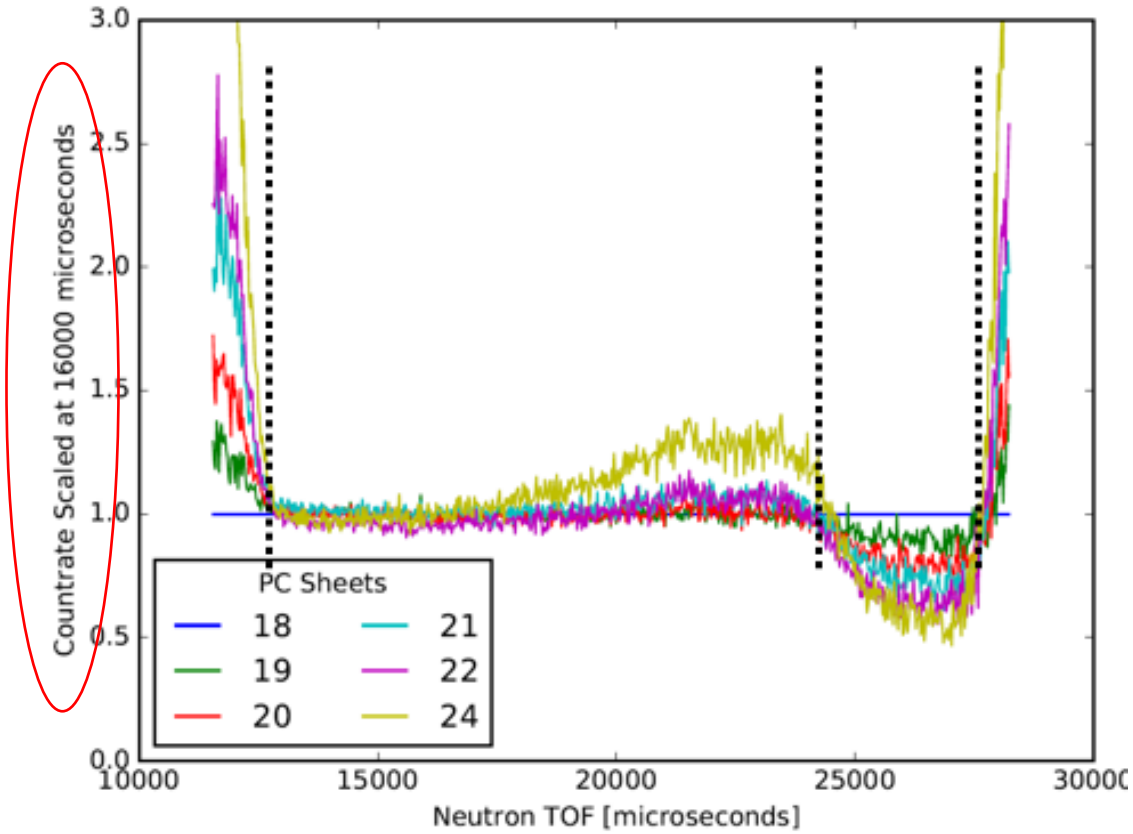




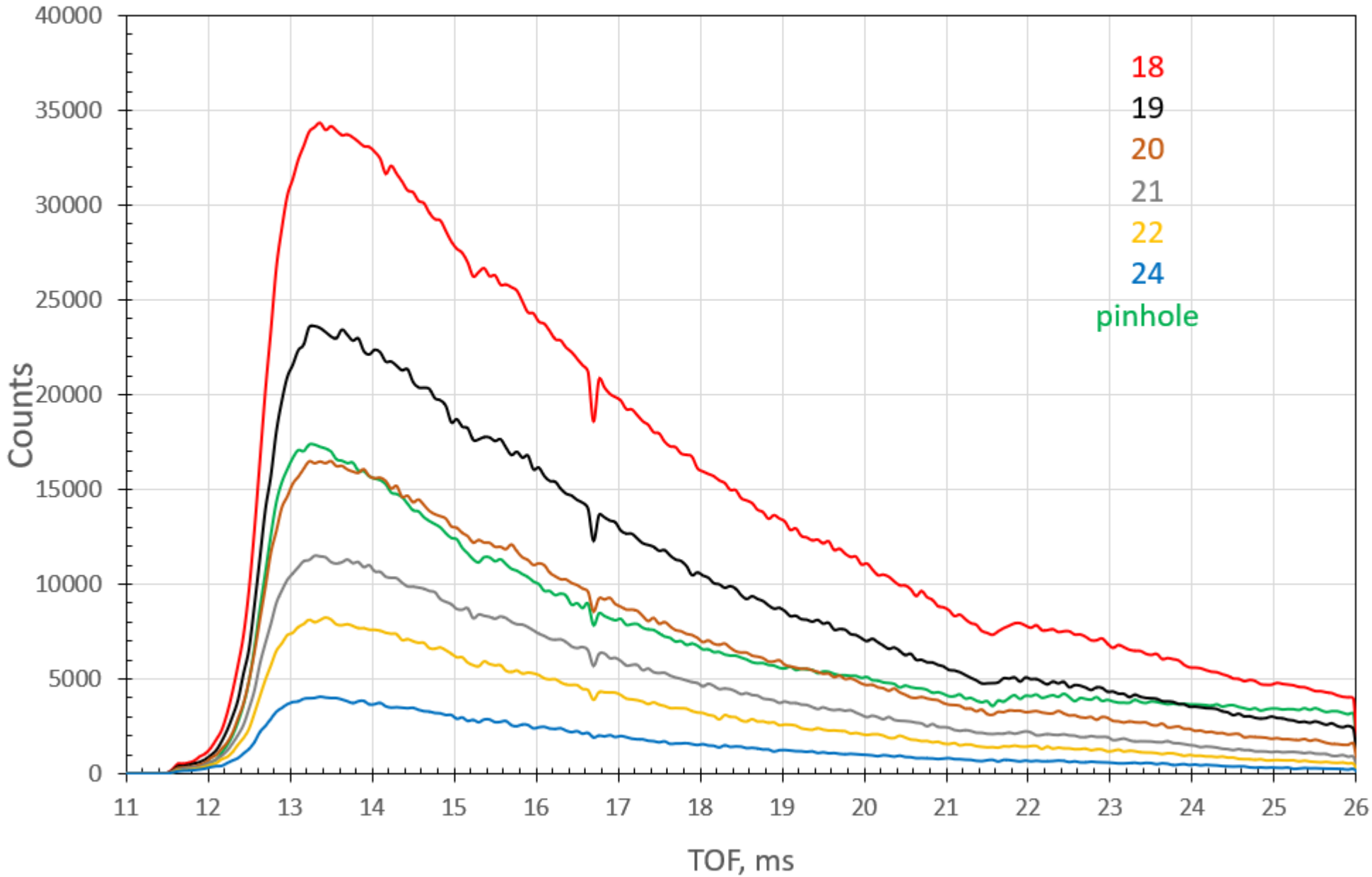
Matt's Frost (Dec 2020) TOF spectra without coordinate selection

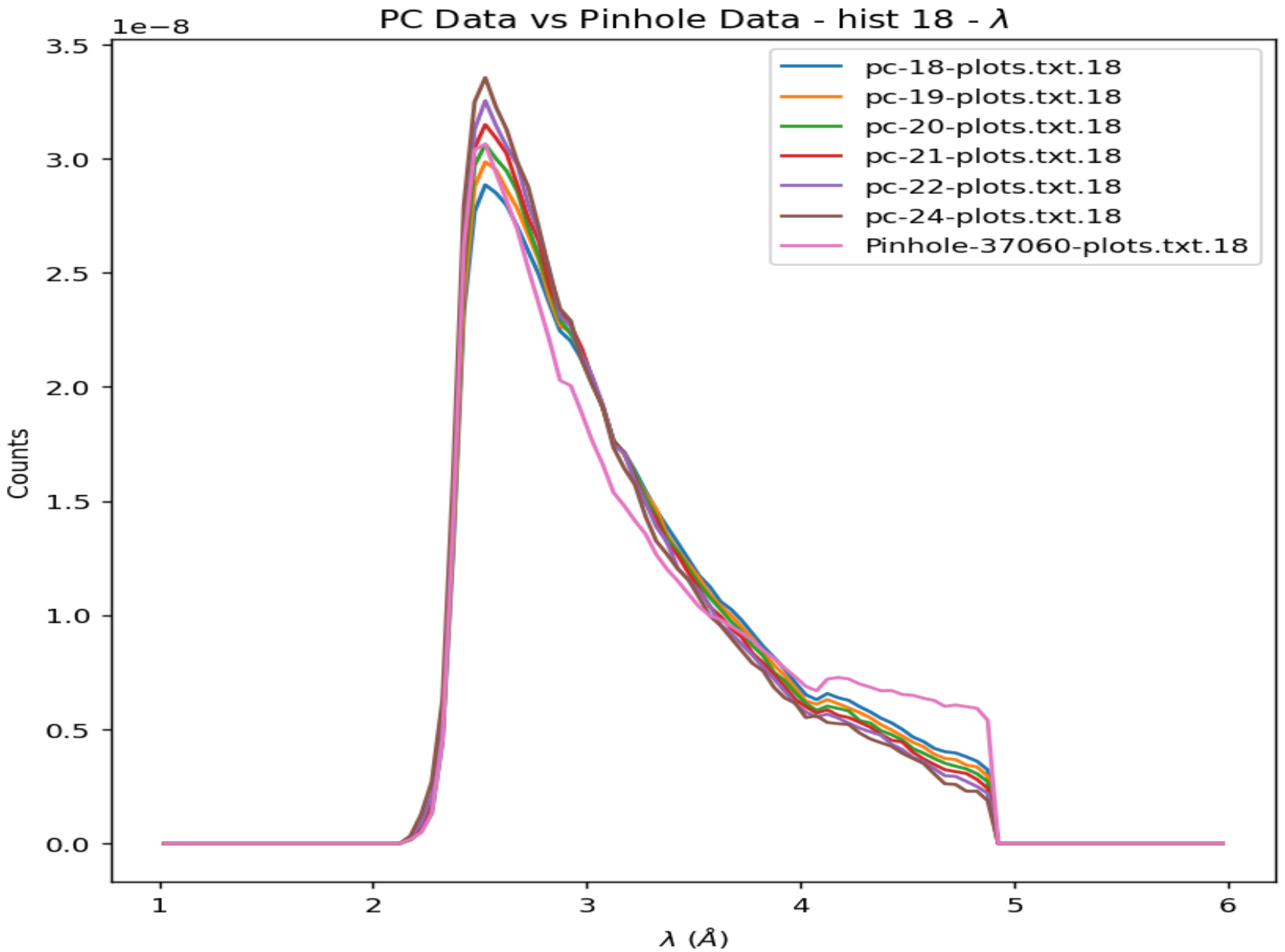


PC-*i* spectrum / PC-18

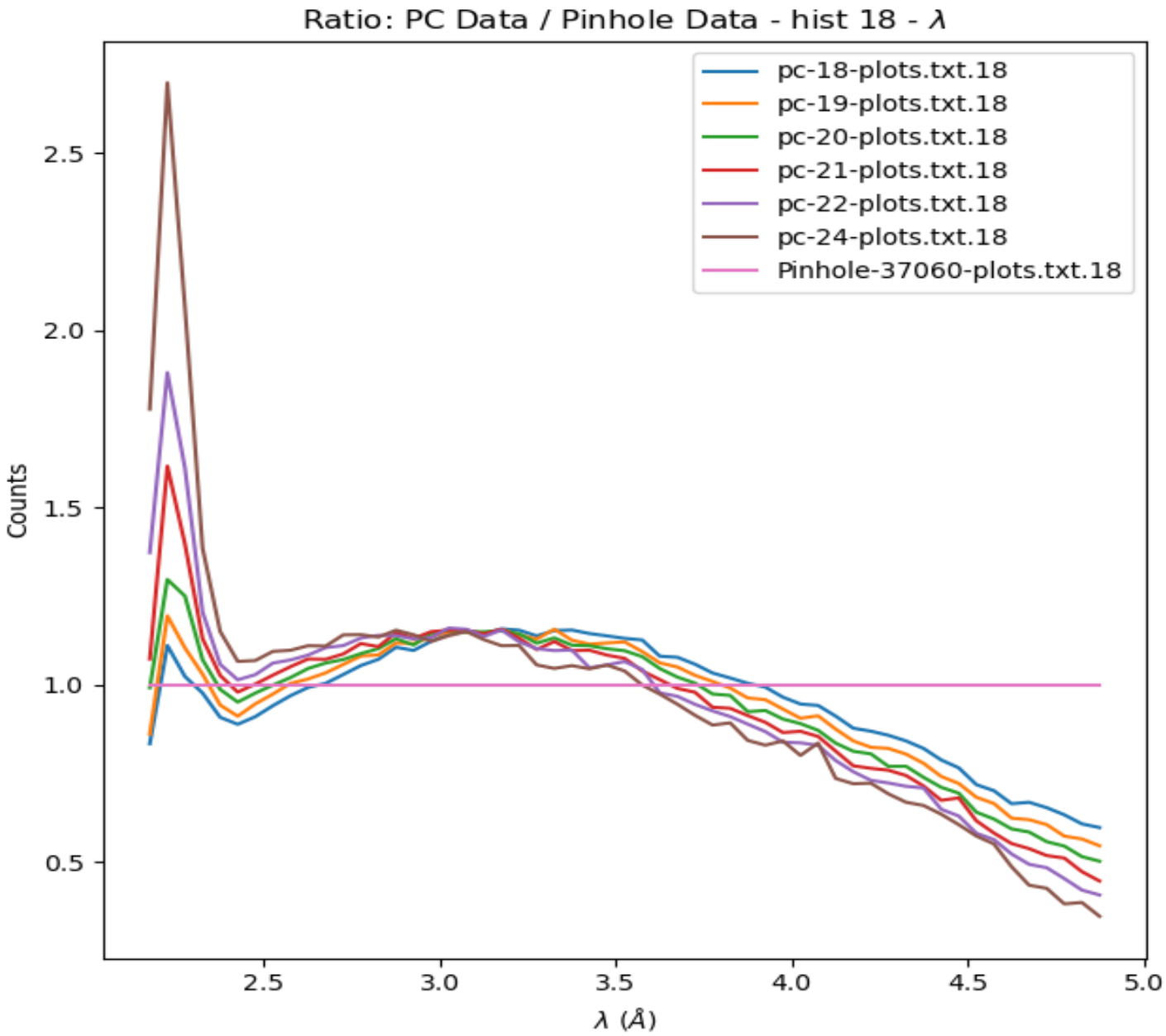


PC TOF spectra inside region of peak (X:128-184 Y: 104-168 inclusive)

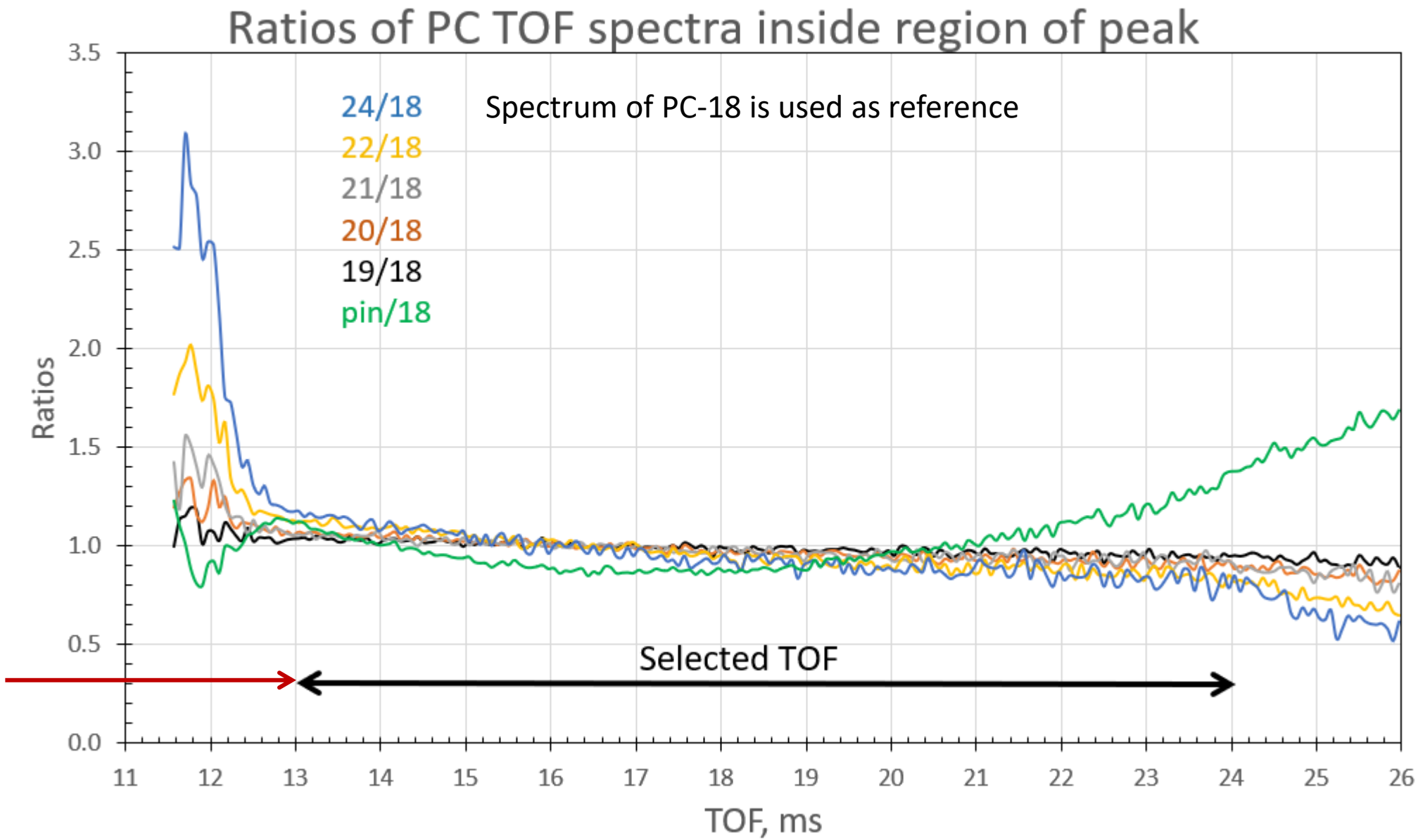




Cary: all λ spectra normalized to equal area. All spectra are within region of peak



Cary: pinhole spectrum as a reference.
PC-i area-normalized spectra are divided by one of pinhole.
All spectra are within region of peak



No TOF bkgr for blocked beam Run 37112

Selection Limits (common for Intensity and Frank's)

- Proton charge per frame < 23 μC rejected
- Prompts rejected between 16661-16711 μs
- TOR range accepted 13 – 24 ms

  ---- with that the tables for background fit are generated (Cary) ----
- ROI (for final background subtraction)

  X: 120-190 inclusive Y: 100-170 inclusive