

Log of DATA analysis from CRISP MB beam time

(PRELIMINARY)

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Run H – H₁

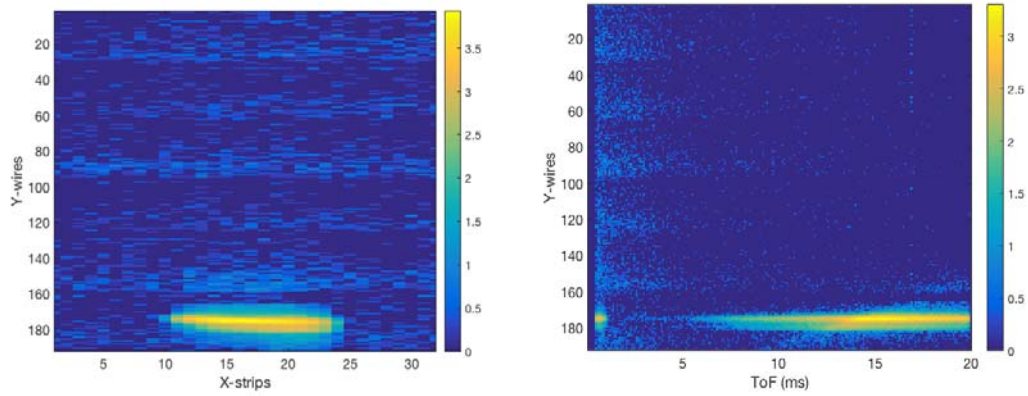
**Si sample, phi = 0.2deg, HV = 900V, 1000V, 1200V, 1300V
gamma, thermal and fast-n contributions and scattered n from blades**

Gammas are reduced with soft th.

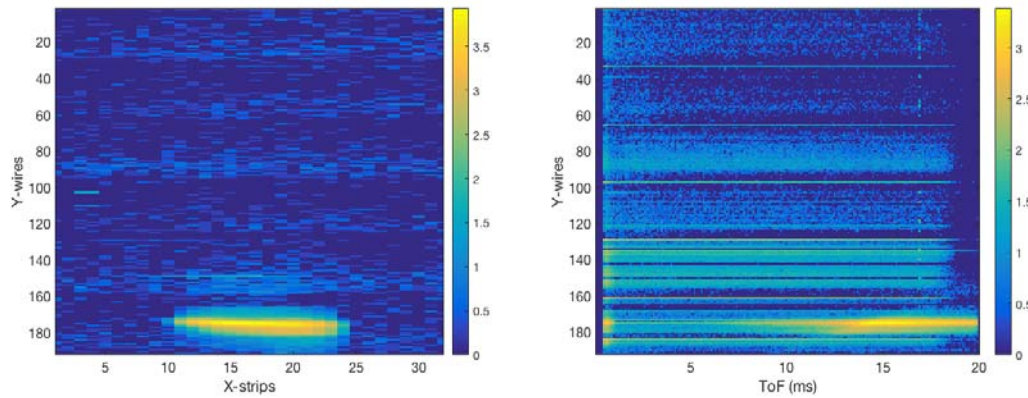
Fast-n <0.5A (anything below 1.7ms) is not affected by the thresholds.

Between 1200V and 1300V reached nominal eff without coincidence.
After soft th applied 900V 1% of coinc, 1000V 32% of coinc, 1200V 70%, 1300V 90%.

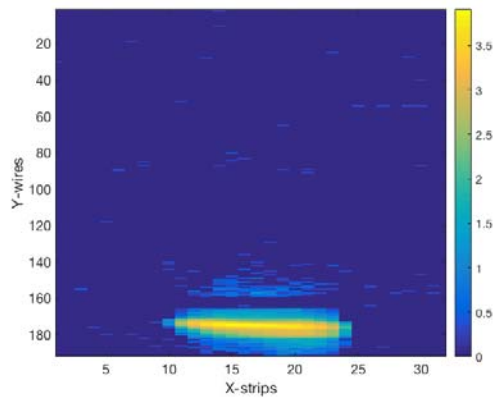
Th ON 1200V (scattered neutrons visible)



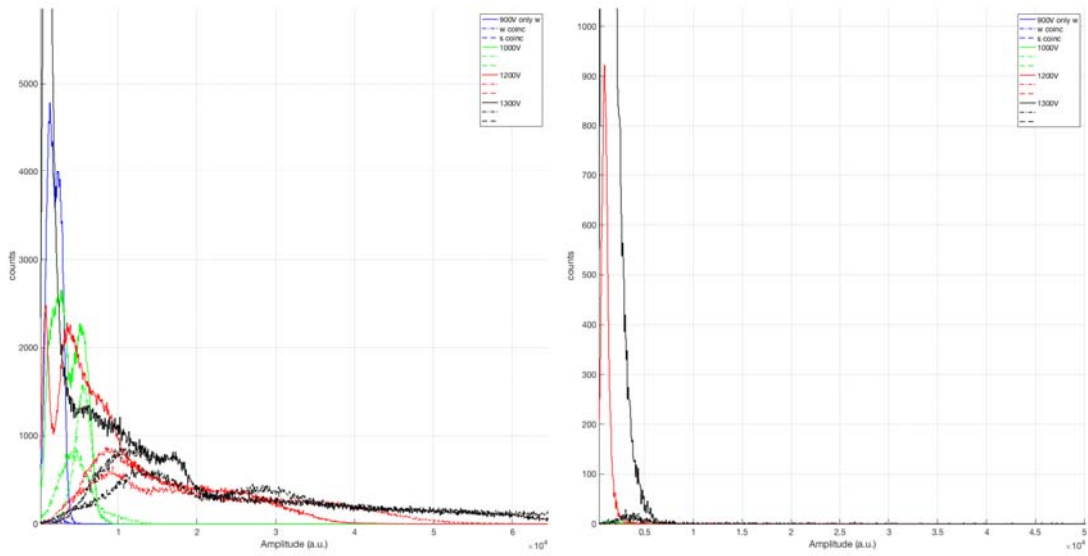
Th OFF 1200V



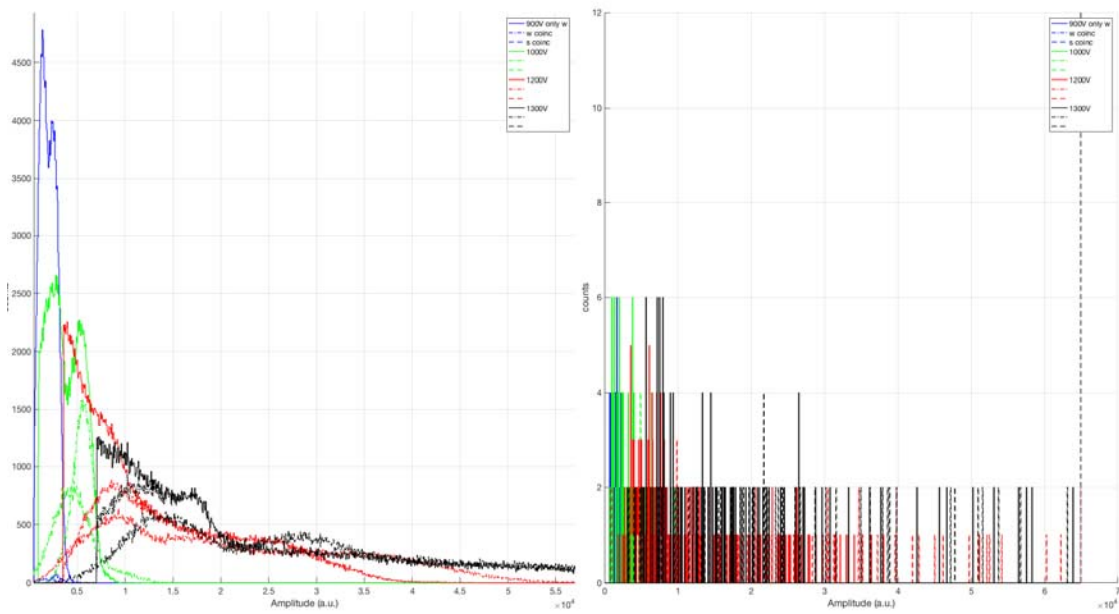
Th ON 1200V and gate ToF above 10ms (scattered neutrons suppressed)



PHS all wires and strips vs HV, left n beam, right cassette without direct beam. Th OFF



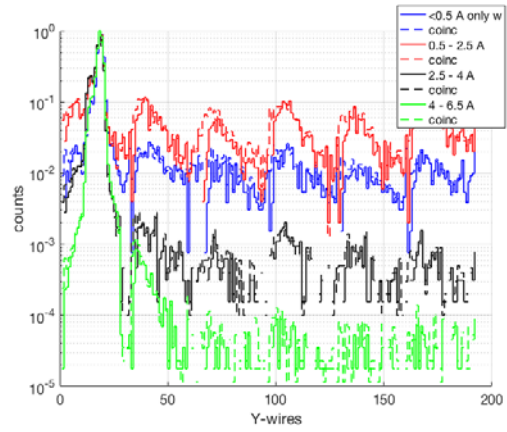
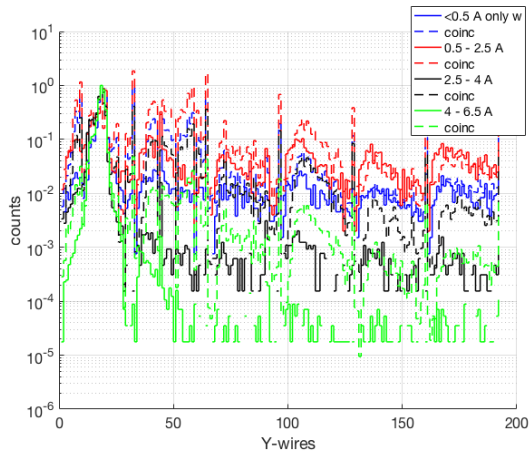
PHS all wires and strips vs HV, left n beam, right cassette without direct beam. Th ON



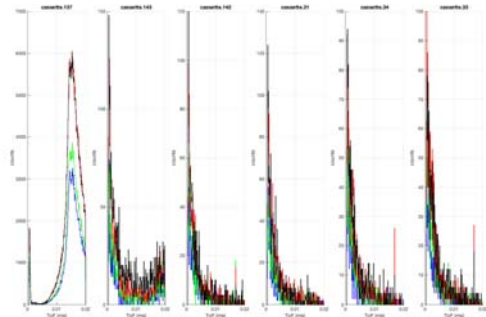
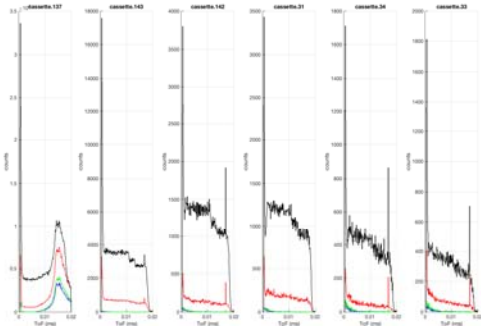
Th

```
sth(1) = 1500;
sth(2) = 1900;
sth(3) = 2300;
sth(4) = 2600;
sth(5) = 2900;
sth(6) = 3200;
sth(7:31) = 3500;
sth(32) = 7000;
```

Fast-n below 1.7ms do not change with the th (blue). Th OFF left, Th ON right. More gammas are detected in coinc???, dashed lines. Red is thermal neutrons crossing the coating and scattered.



ToF all cassettes Th OFF, Th ON as a function of HV, 1200V and 1300V same without coinc.

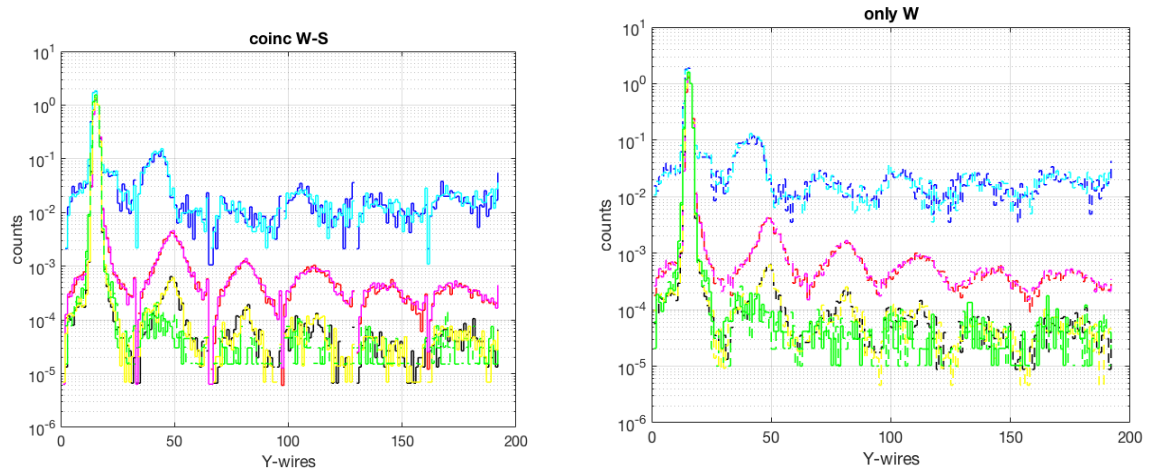


Run B – C

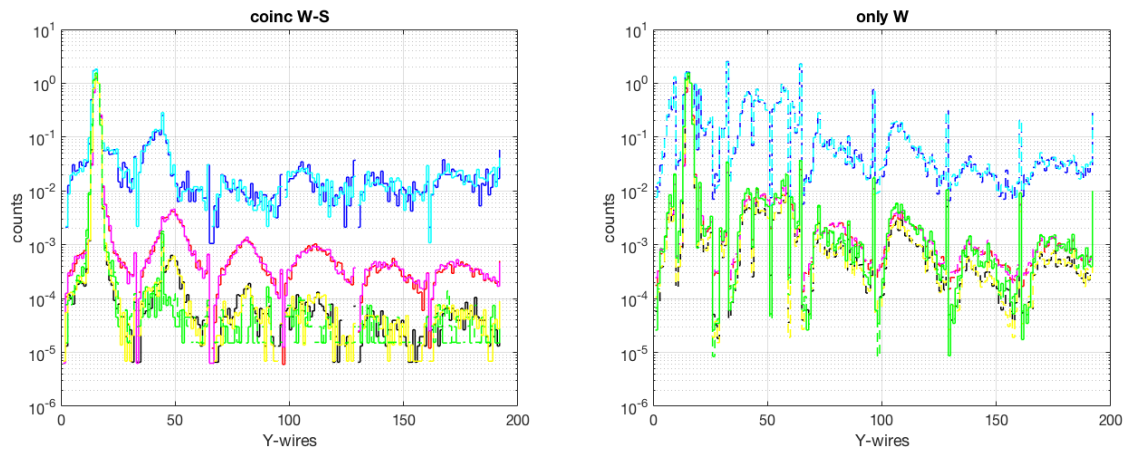
Direct beam, with 1mm Al window and 5+1mm window, HV =1200V
 gamma, thermal and fast-n contributions and scattered n from blades

No difference with the thicker Al window.

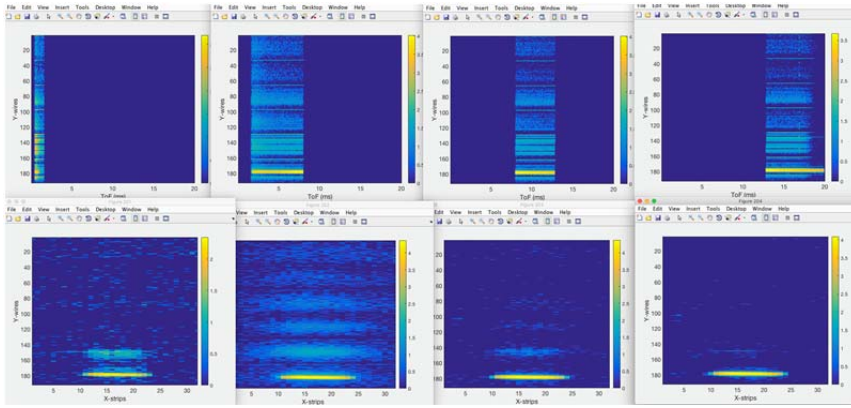
Th ON, gated in ToF from 0 to 0.5A, 0.5-2.5A, 2.5-4A, 4-6.5A, light colors, pink, 6mm Al, red 1mm Al



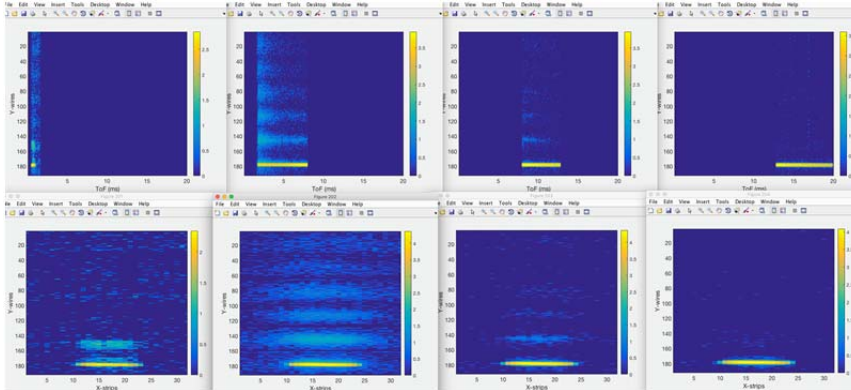
Th OFF, gated in ToF from 0 to 0.5A, 0.5-2.5A, 2.5-4A, 4-6.5A



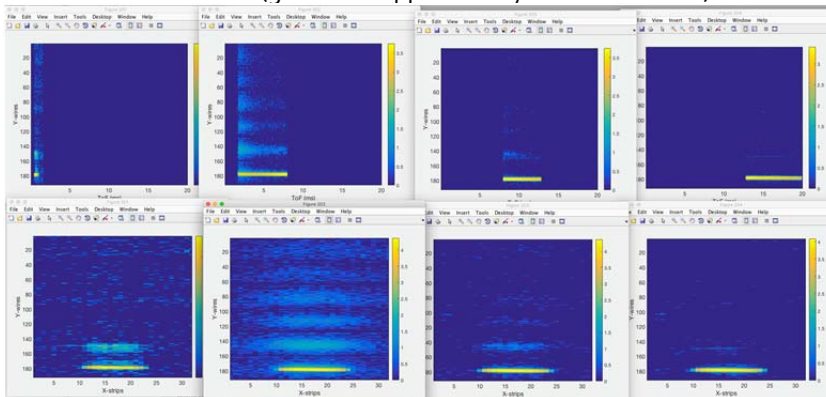
gate in ToF from 0 to 0.5A, 0.5-2.5A, 2.5-4A, 4-6.5A
w-s coinc OFF – Th OFF (scattered thermal neutrons and gammas)



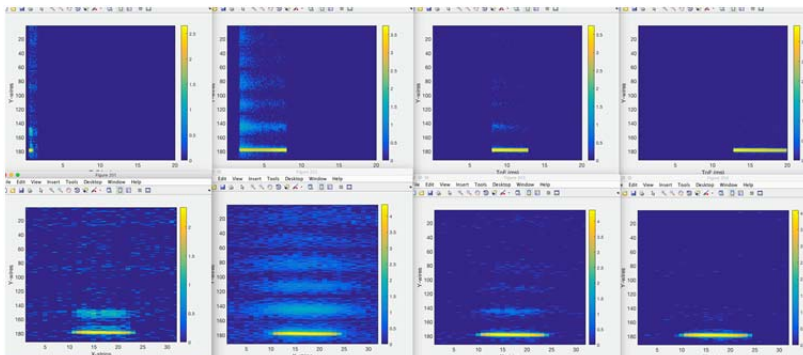
w-s coinc OFF – Th ON (scattered thermal neutrons, gammas suppressed)



w-s coinc ON – Th OFF (gammas suppressed by the coincidence)



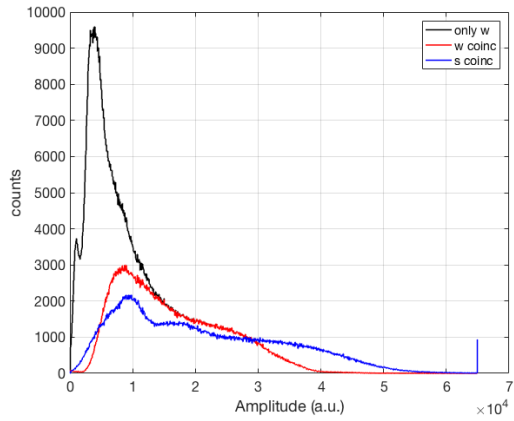
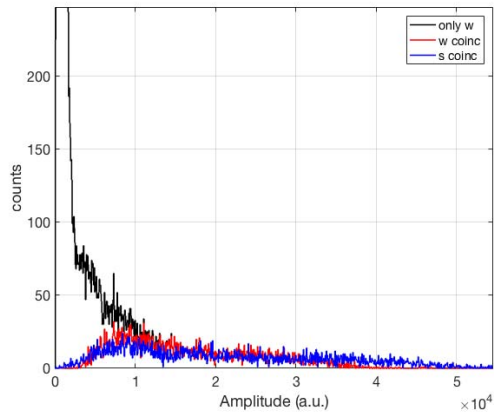
w-s coinc ON – Th ON



PHS all 32 w sum, no real change if first wires excluded. HV = 1200V.

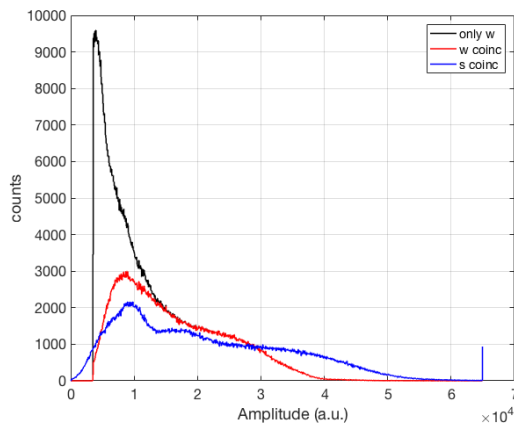
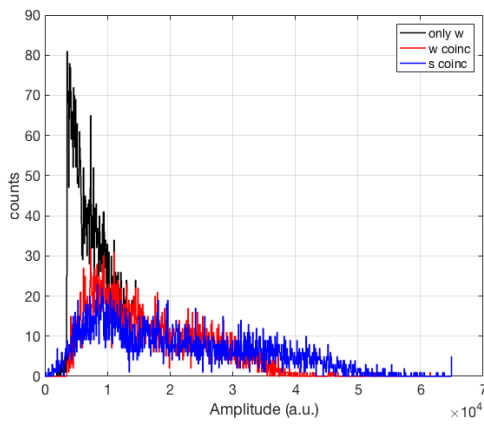
PHS Th OFF, ToF < 1.7ms, prompt

PHS Th OFF, ToF > 8ms, cold neutrons

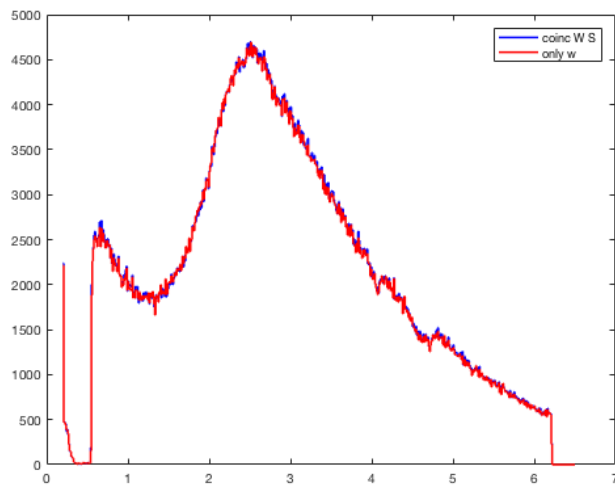


PHS Th ON, ToF < 1.7ms, prompt

PHS Th OFF, ToF > 8ms, cold neutrons

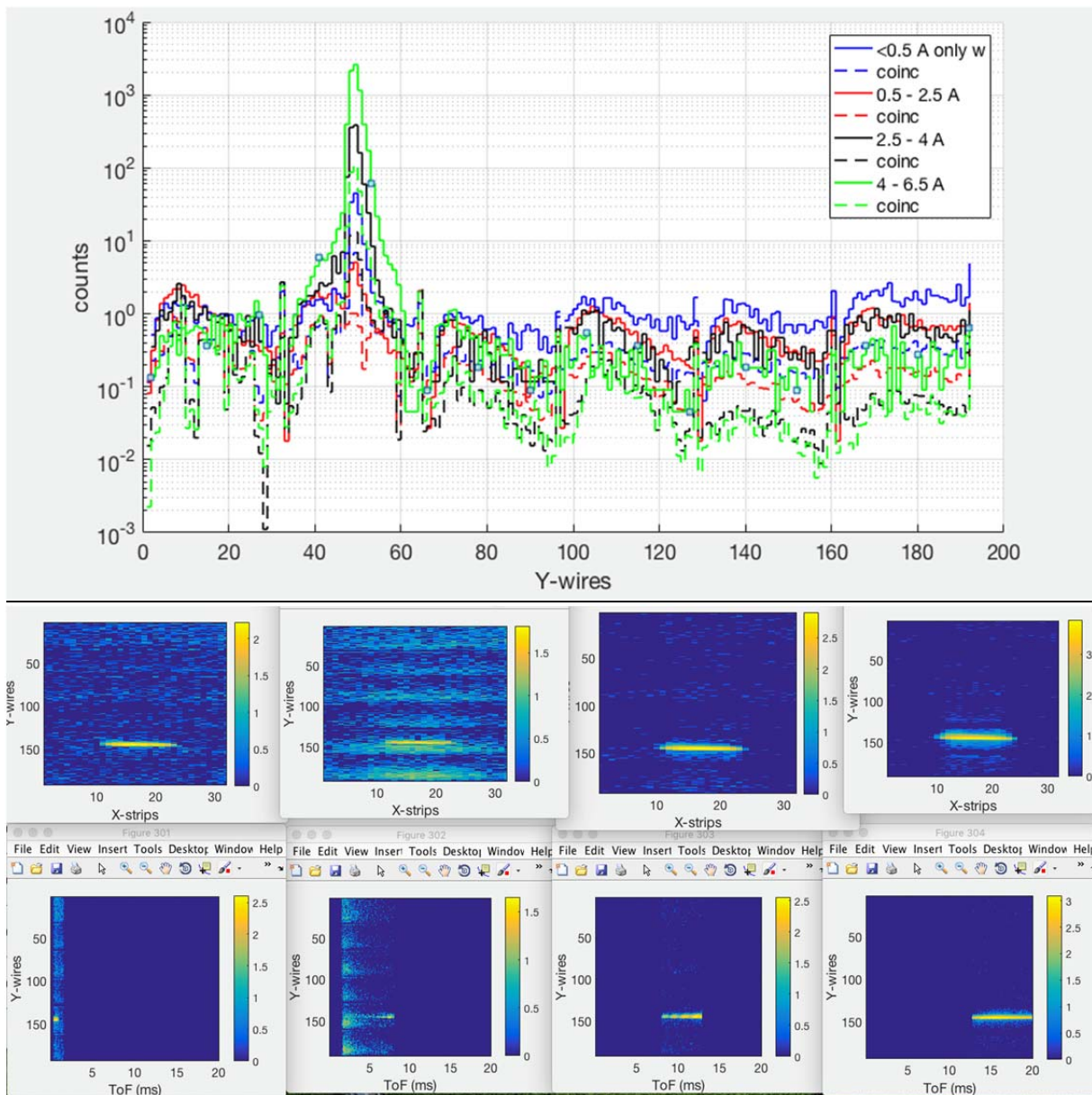


Direct Beam from B lambda distribution in cassette 137 with Th ON and gated pixels [10 24 9 26] ([y y x x]); still 70% of coincidences.

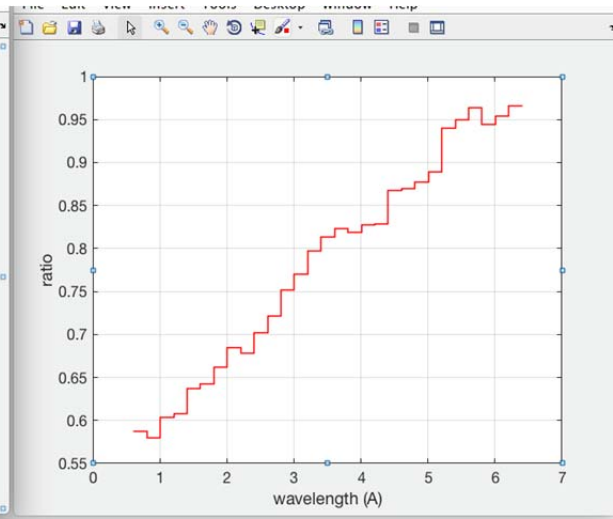
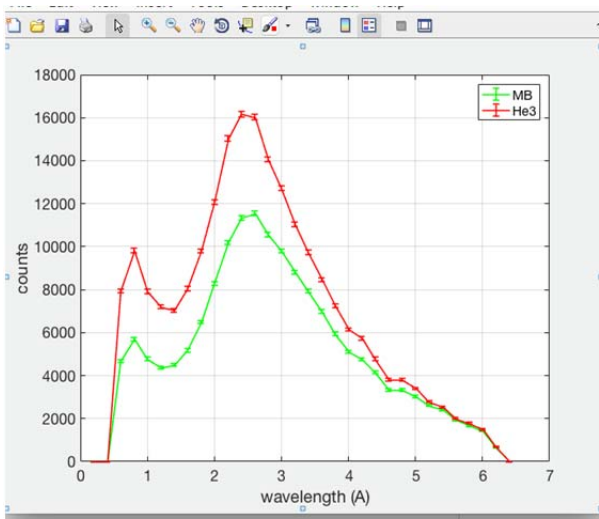
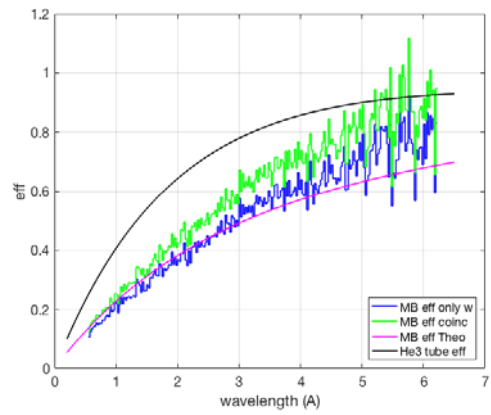
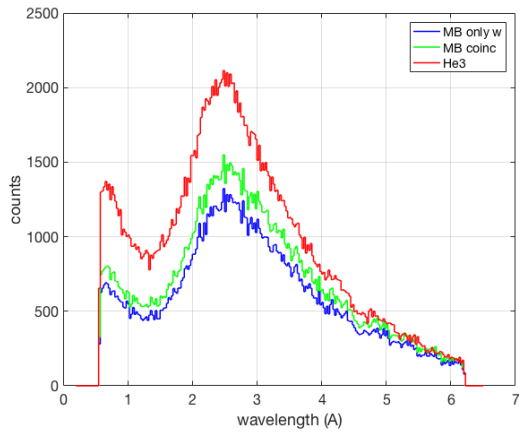


Run A

Ni sample, HV =1200V

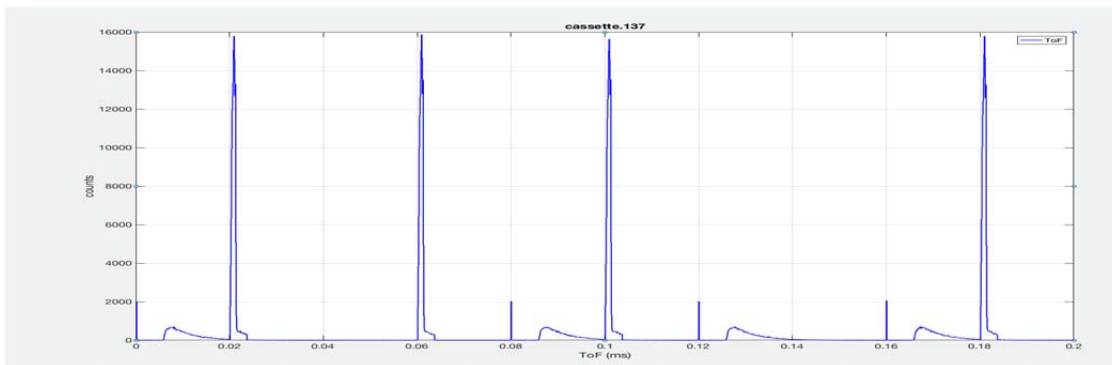


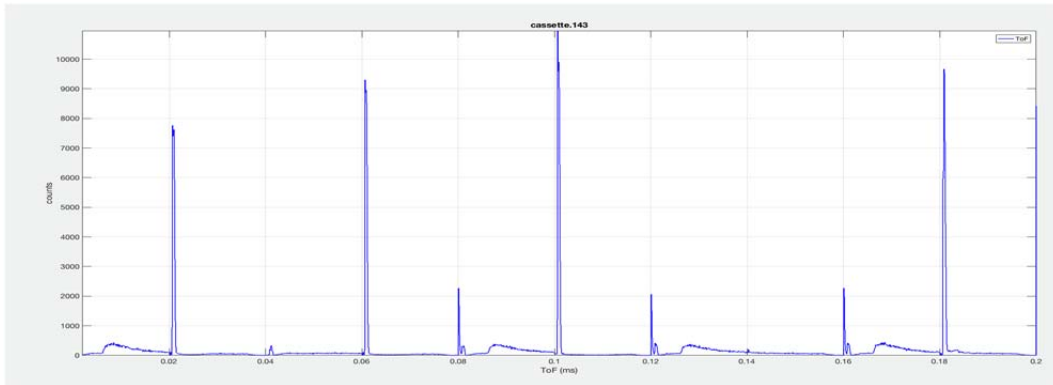
Run R
 Efficiency compared to He3 tube, HV =1200V



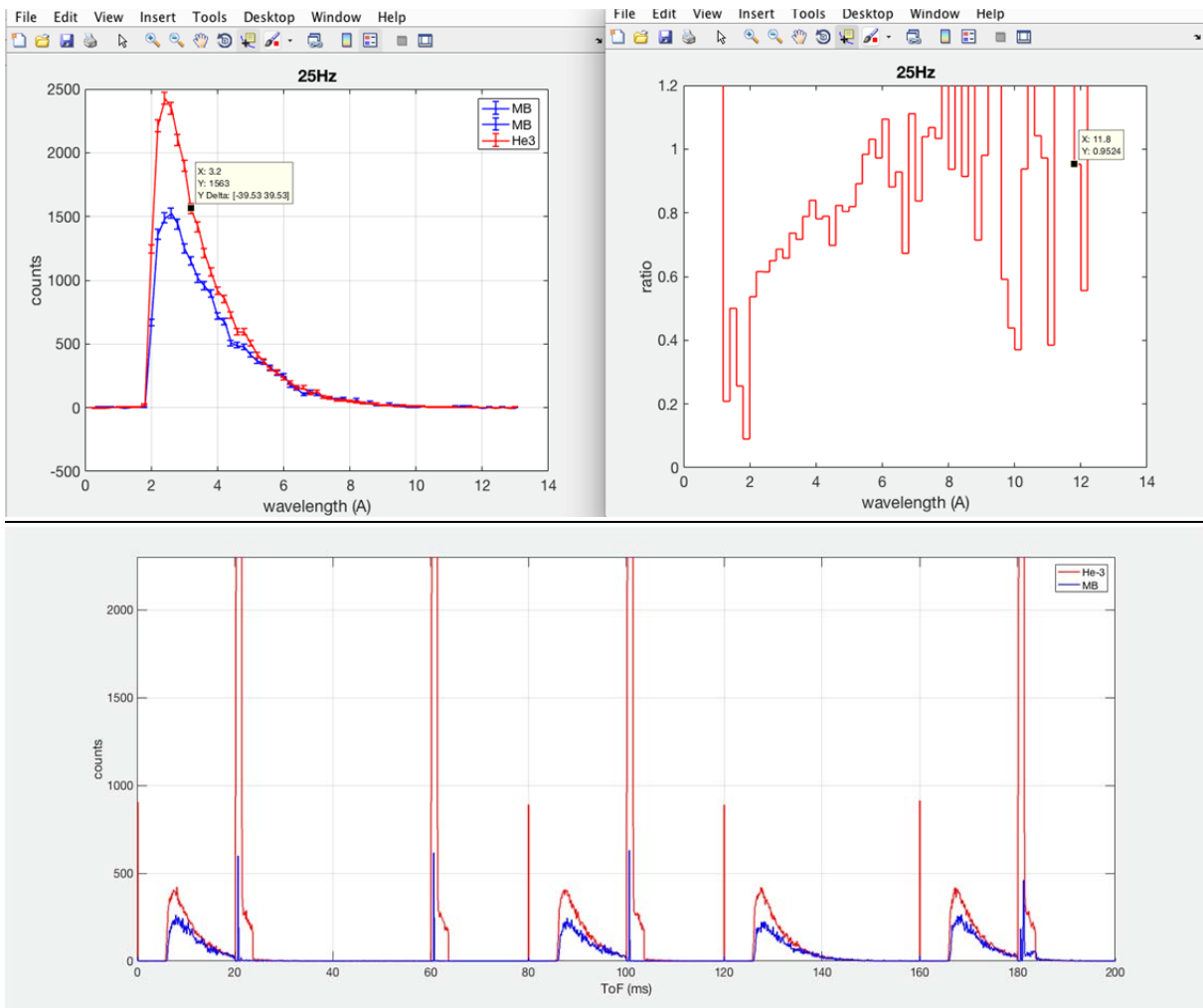
Run R1

Efficiency compared to He3 tube - chopper 25Hz, HV =1200V





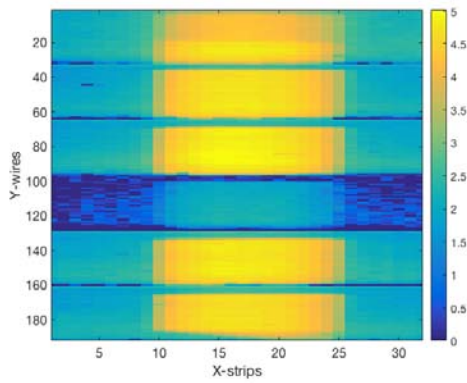
He3 top, MB bottom. zooms ToF, chopper spins at 25Hz and cycles at 40ms: opens at 0, 40, 80 ... and proton pulse comes every 20ms. Spikes at 0, (40), 80, 120, 160 are prompt pulses, 40ms is missing because the bunch is going to TS2 (4 to TS1, 1 to TS2). Spikes at 20, 60, 100, (140) 180ms is when the neutron pulse hits the chopper which is closed (140ms is missing because the pulse is going to TS2).



Run L

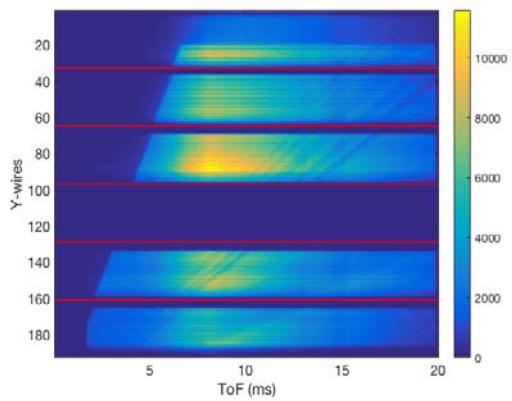
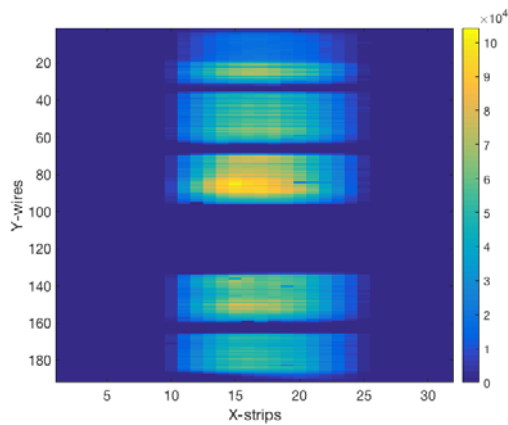
Off-specular form supermirror, Uniformity, HV =1200V

Log scale

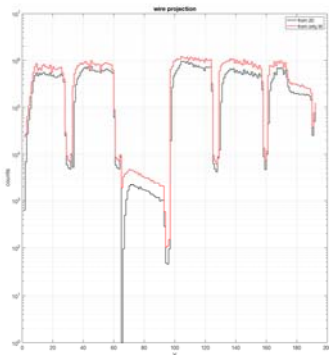


Scan is 0.01deg in sample angle, so 0.02deg step in detector angle, which at 2.33m corresponds to 0.81mm on the detector. Between 1 or 2 pixels, so the image has horizontal lines.

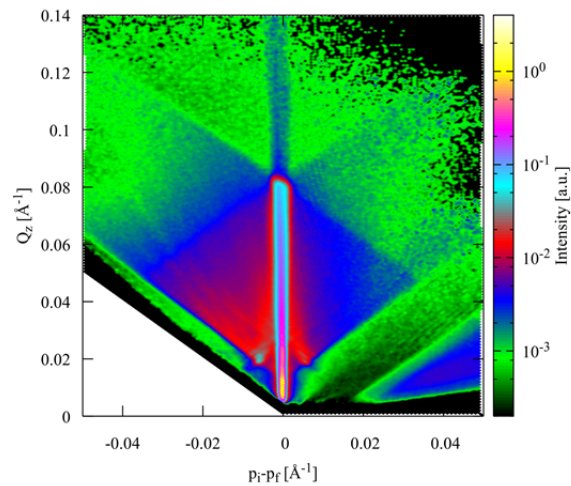
No log scale



1D projection



Off-specular scattering from Fe/Si supermirror

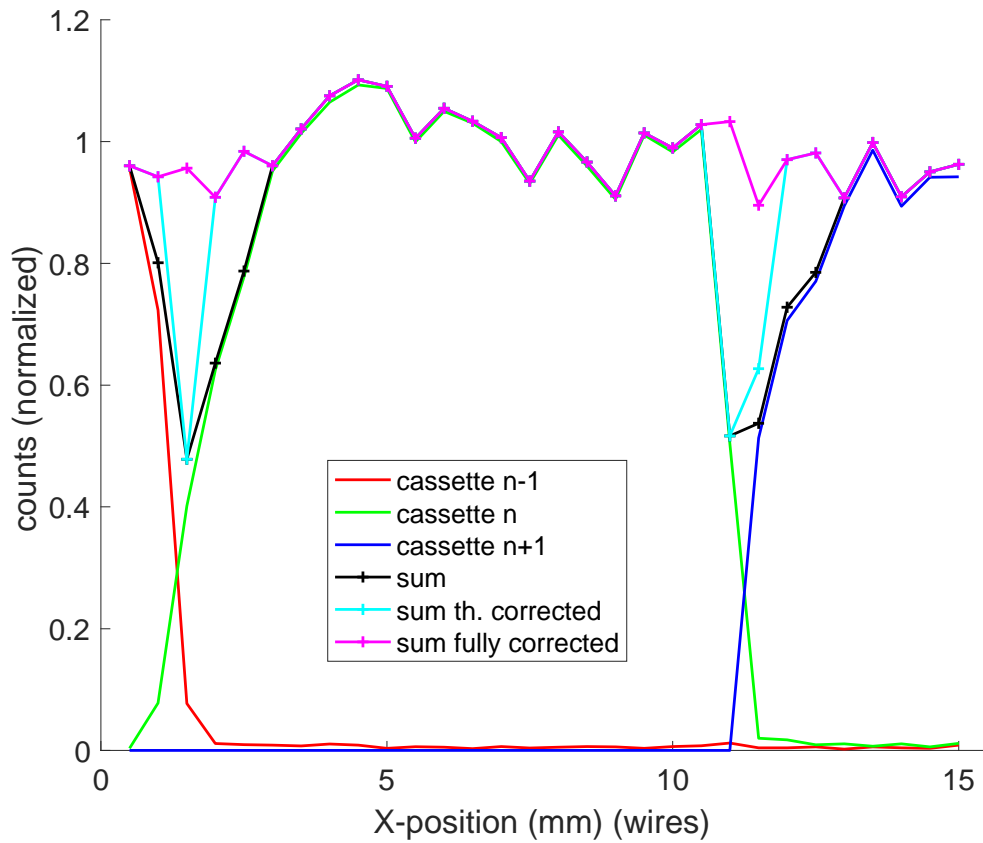


1D projection with Off-spec background below and with cut around blades

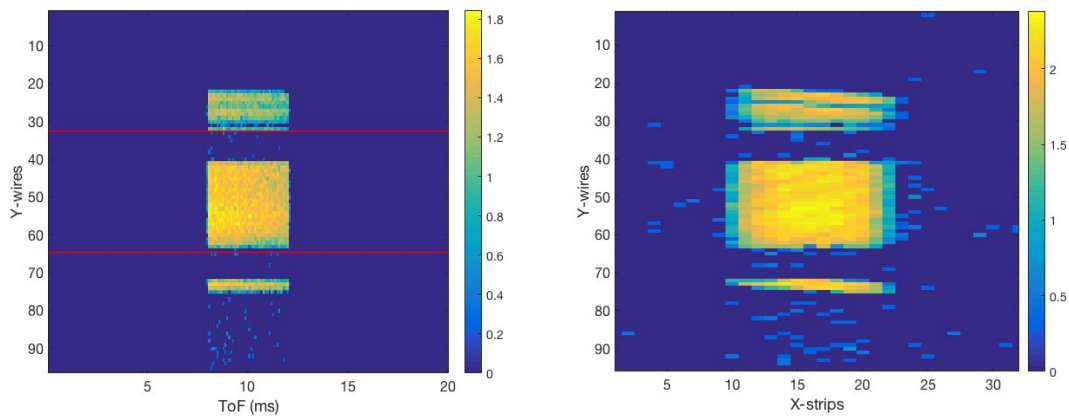
Run N

Scan on wires, HV =1200V

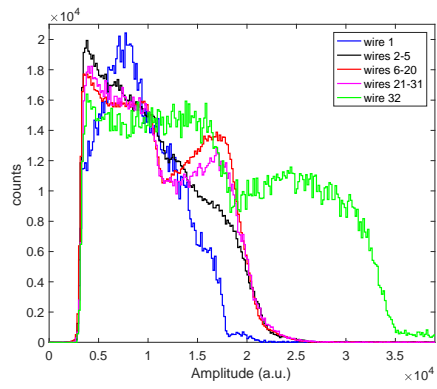
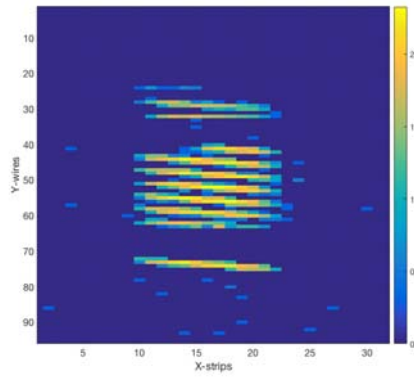
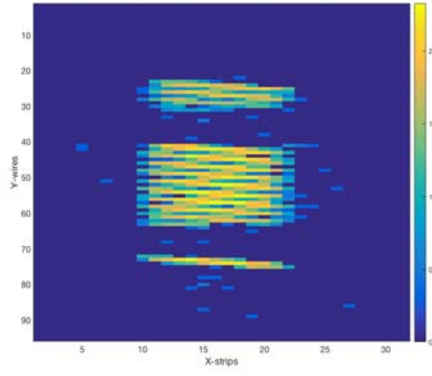
Scan on wires on 3 cassettes, gate in ToF and soft th applied. Diamonds as crosses, circles as plus.



ToF and 2D image, step 0.5mm

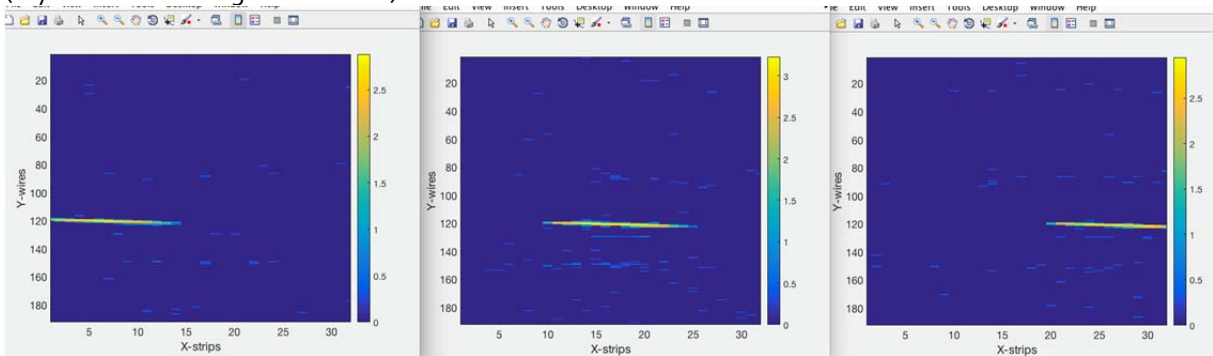


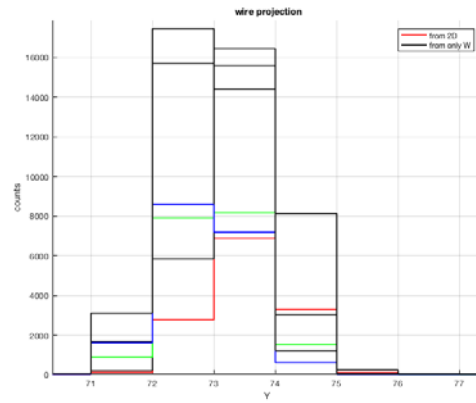
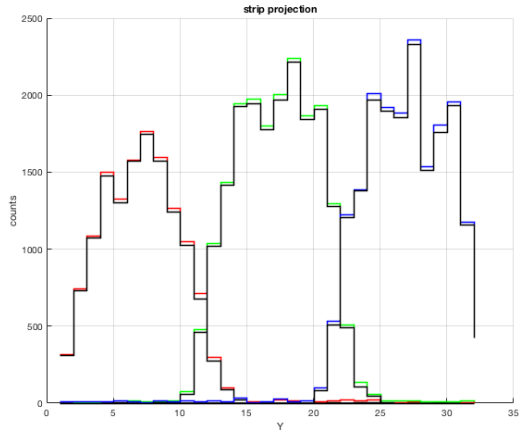
2D image, step 1mm and step 1.5mm



Run O N₁
HV =1200V

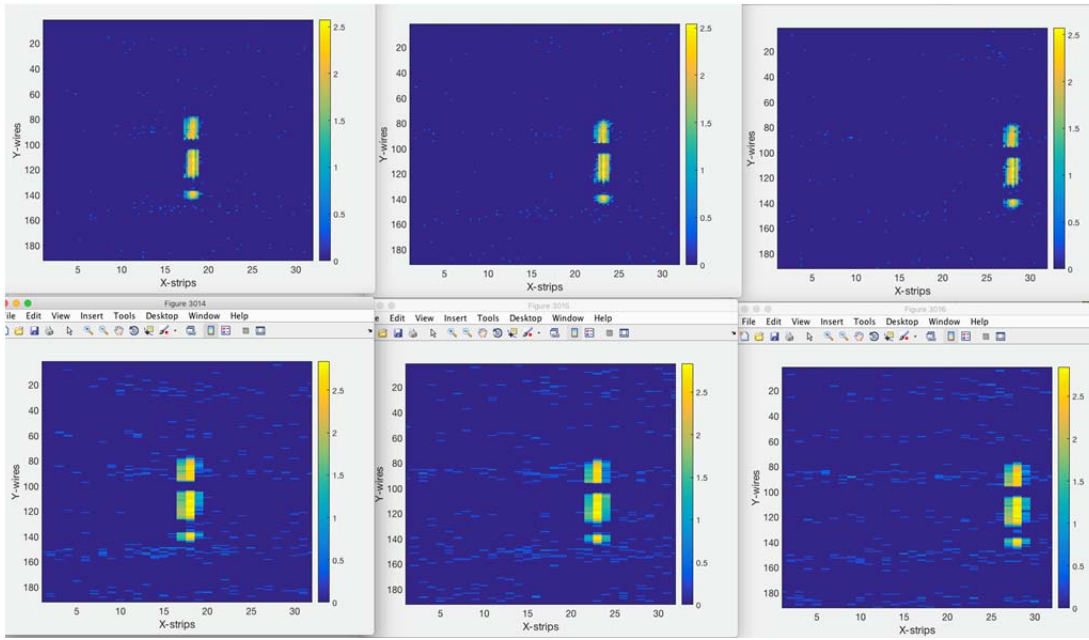
(Try also over-binning 128bins on Y)



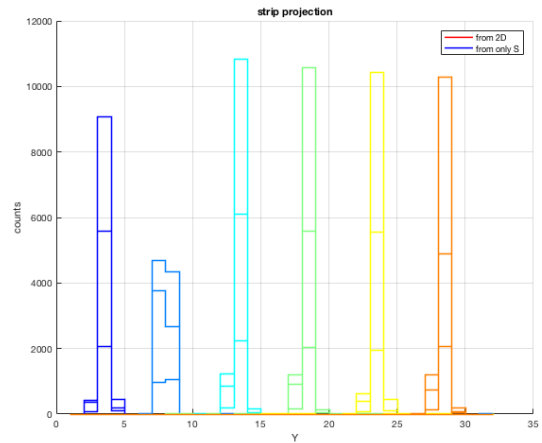
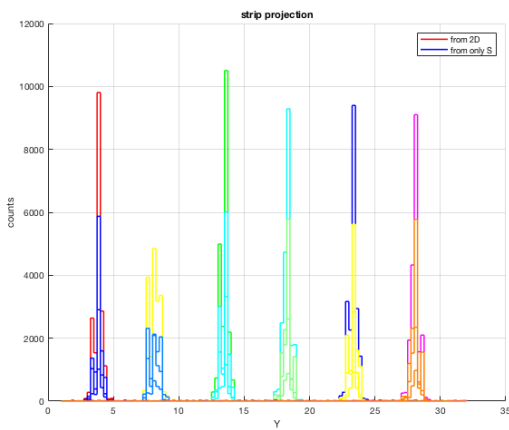


Run O1
Resolution Strips, HV=1200V

Each step is ~20mm apart, -60, -40, -20, 0, 20, 40mm
 top with 128bins bottom with 32bins on strips only, wires always with 32bins.

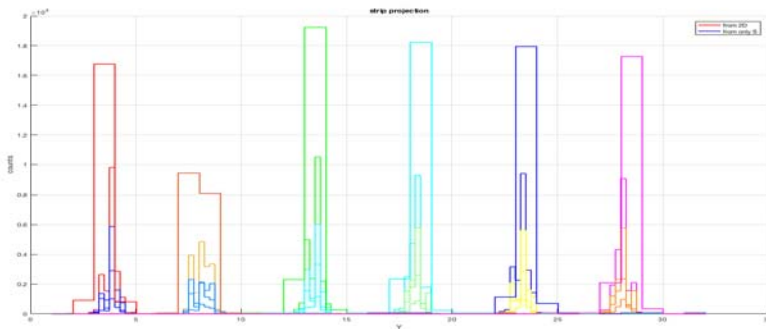


128 bins VS 32 bins projection on strips

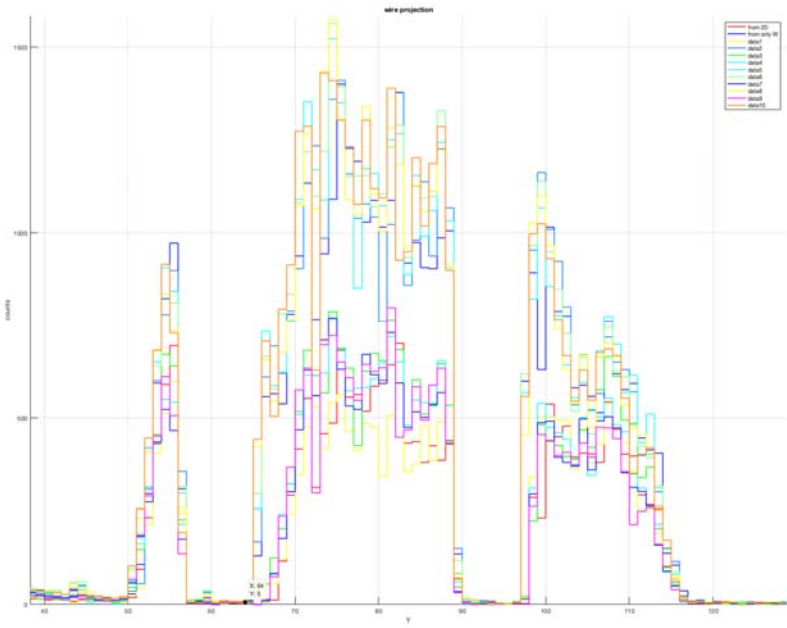


peaks positions: difference always 5 bins -> 20mm

128bins: 3.75 8 13.5 18.25 23.25 28
 32bins 3 8 13 18 23 28



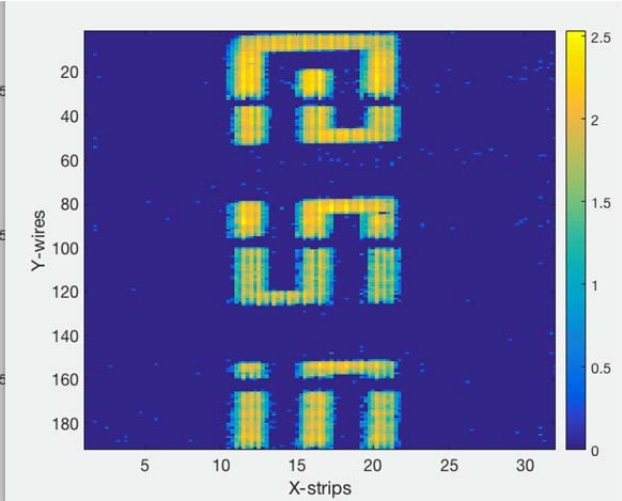
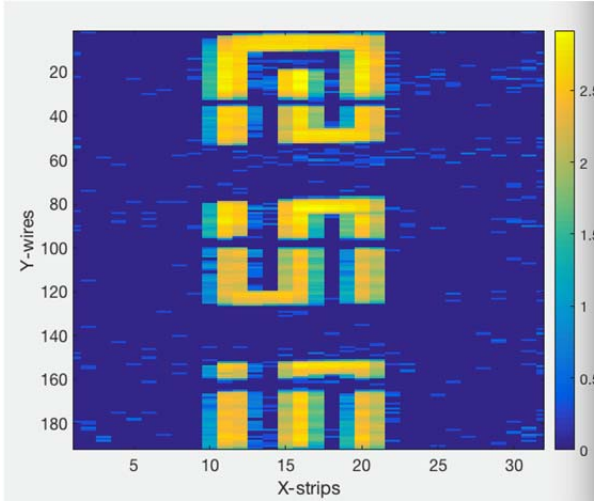
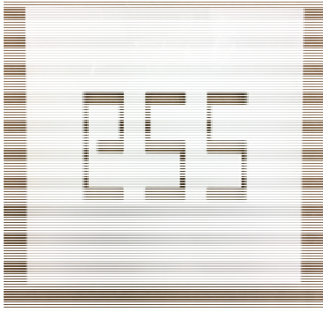
Projection on w, still with Th On, first 4/5 wires less counts as in Run L



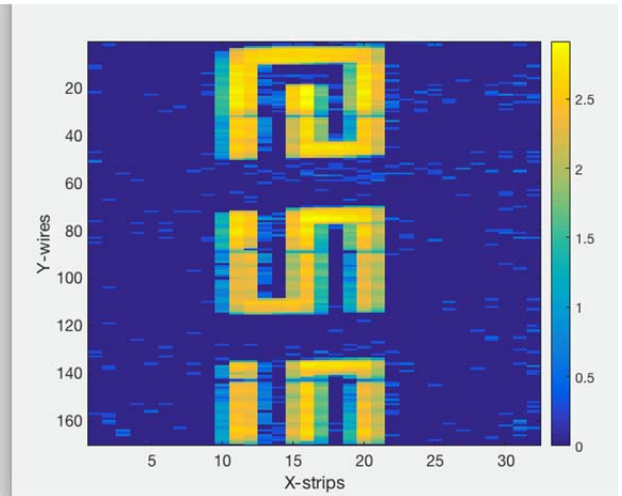
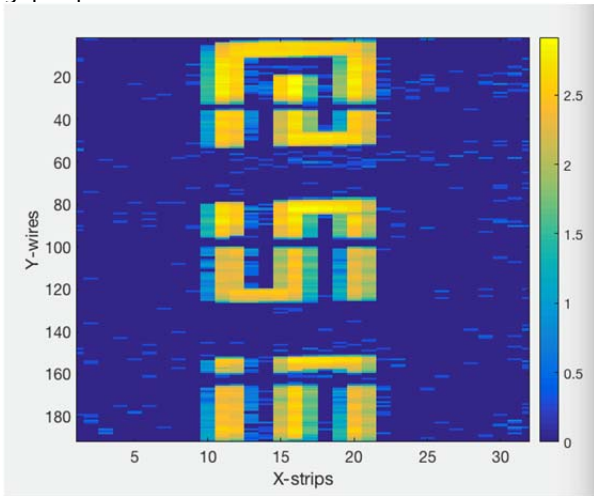
Run P
BN masks, HV=1200V

Left 32 bins on Strips, Right 128 bins on Strips, always 32 bins on wires.

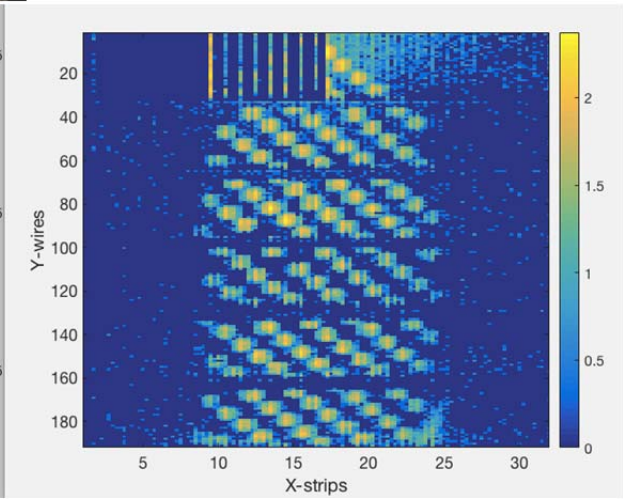
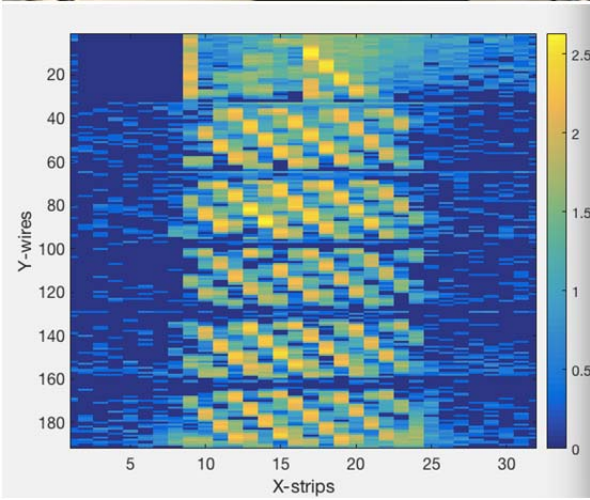
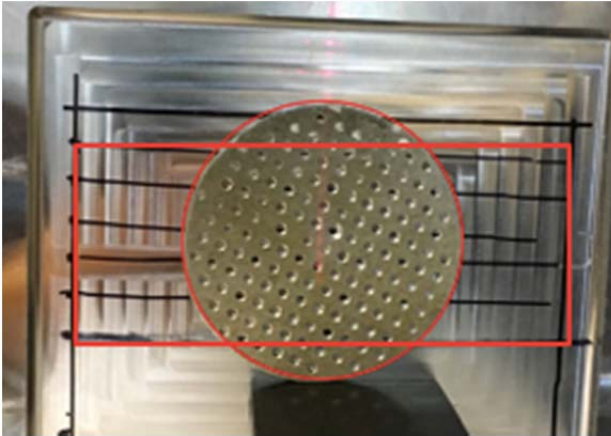
Mask 2 ESS



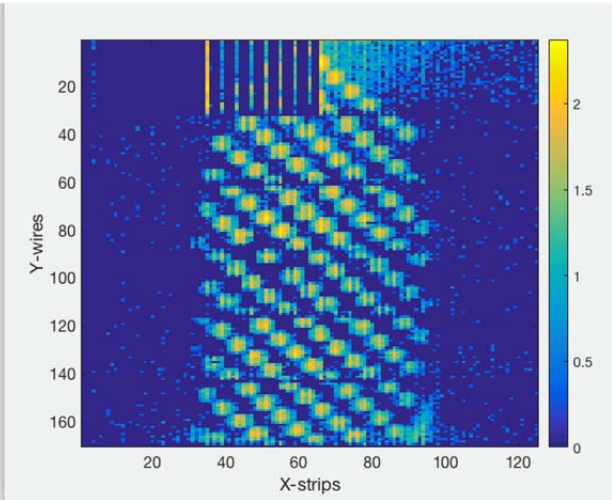
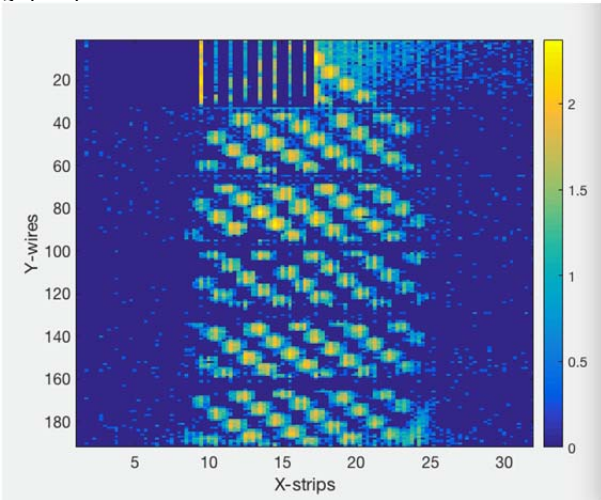
gaps open and closed



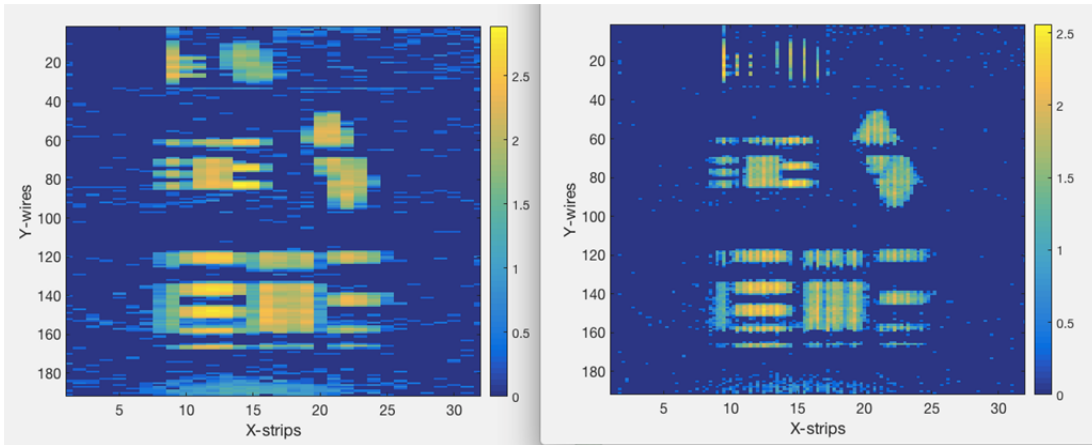
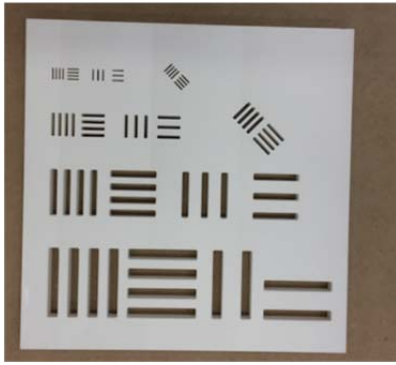
Mask ISIS



gaps open and closed

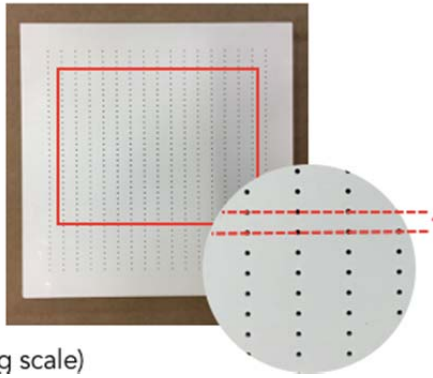


Mask 1



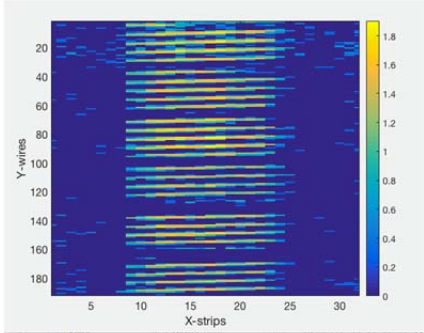
The resolution is improved with the over-binning on strips.

Mask 3
0.5mm holes, spacing 2mm x 5mm

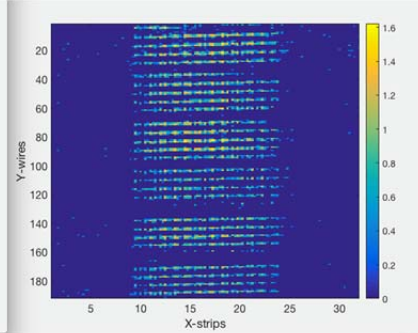


(Log scale)

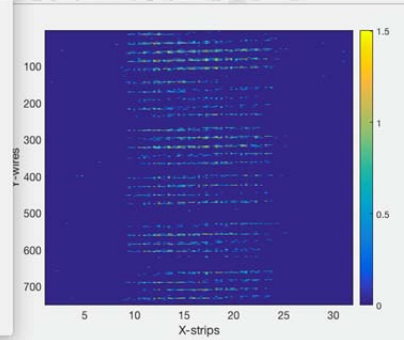
32 x 32



32x128

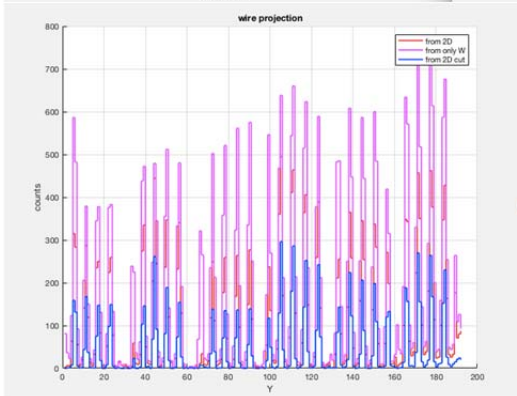
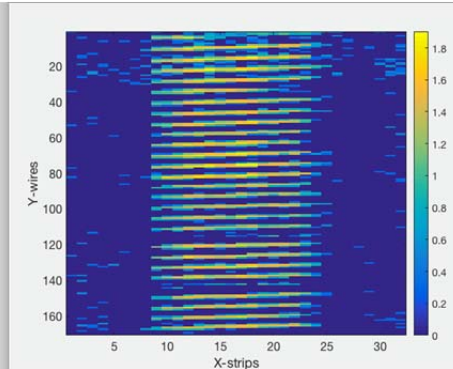
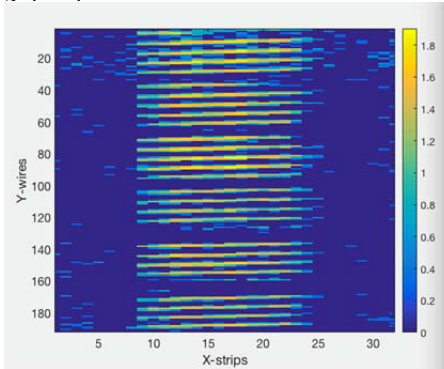


128x 128



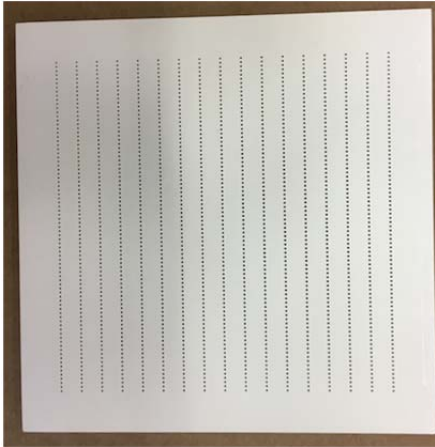
(with the CoG on strips you start to see the separation)

gaps open and closed

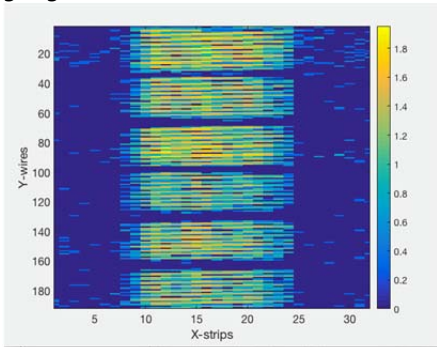


Mask 4

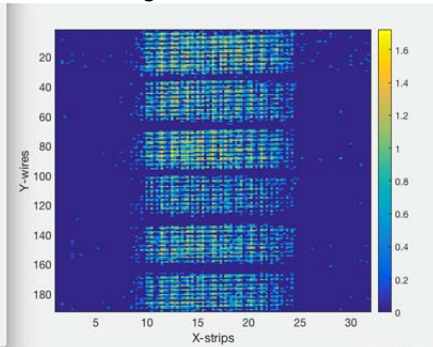
0.5mm holes, spacing 1mm x 5mm



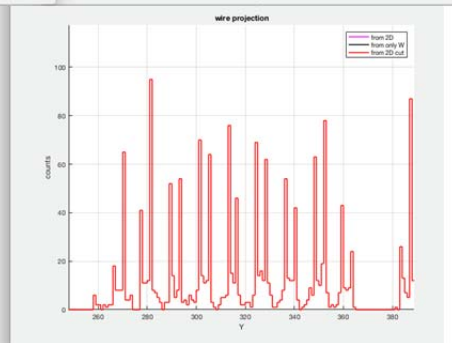
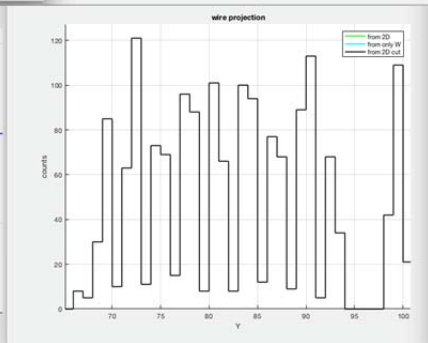
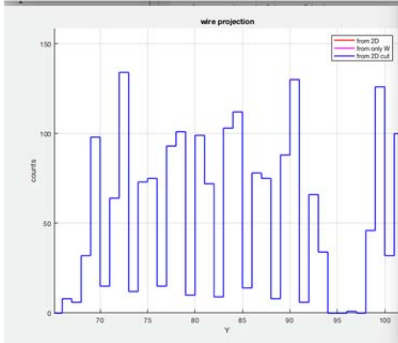
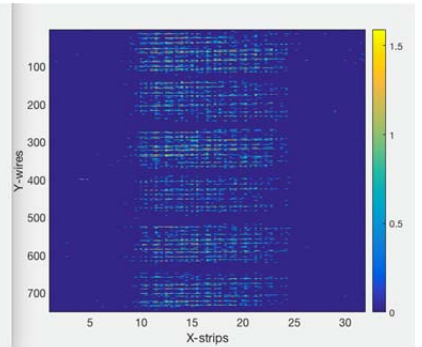
32 X32



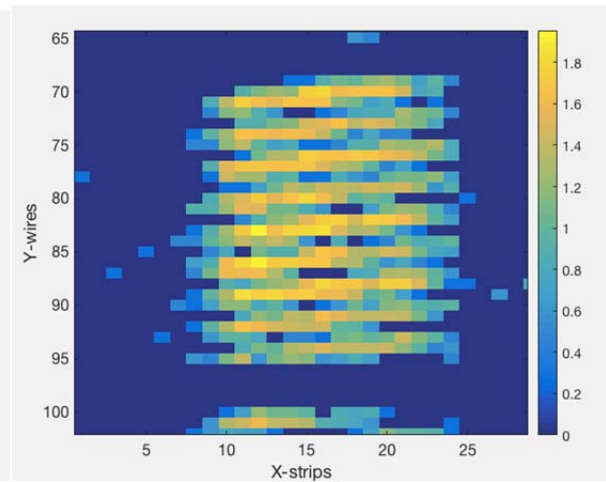
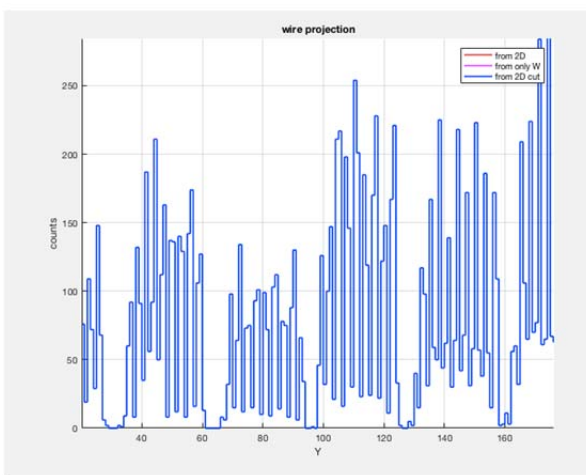
32x128



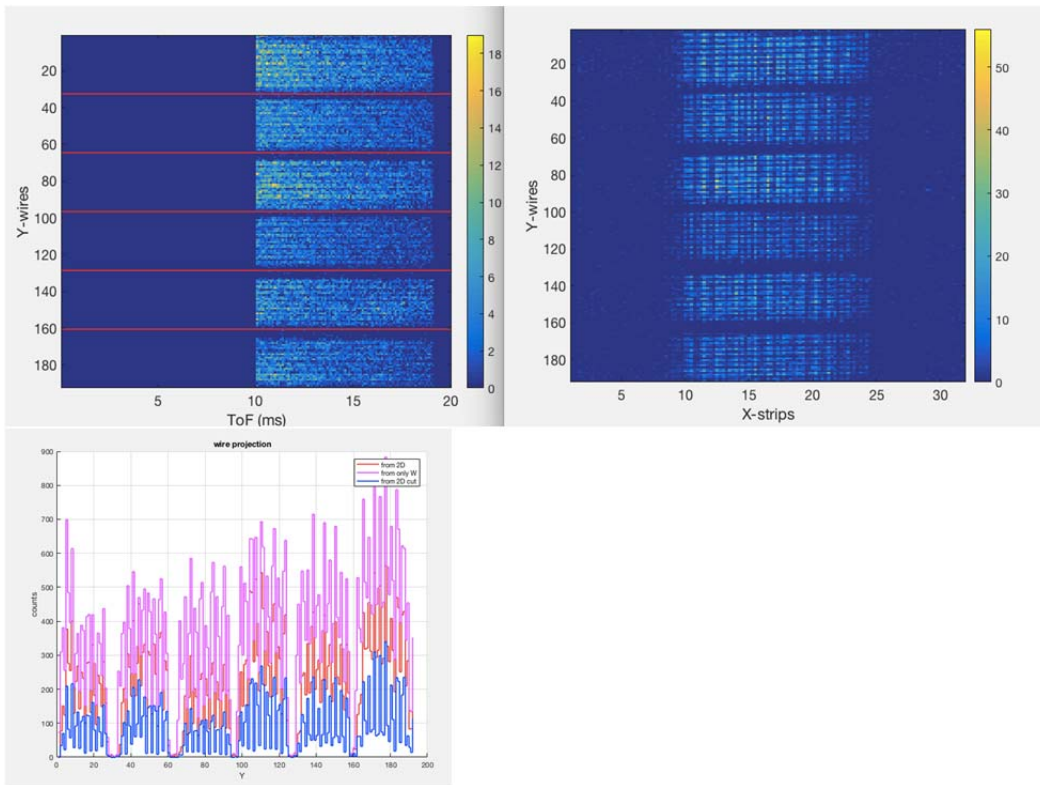
128x 128



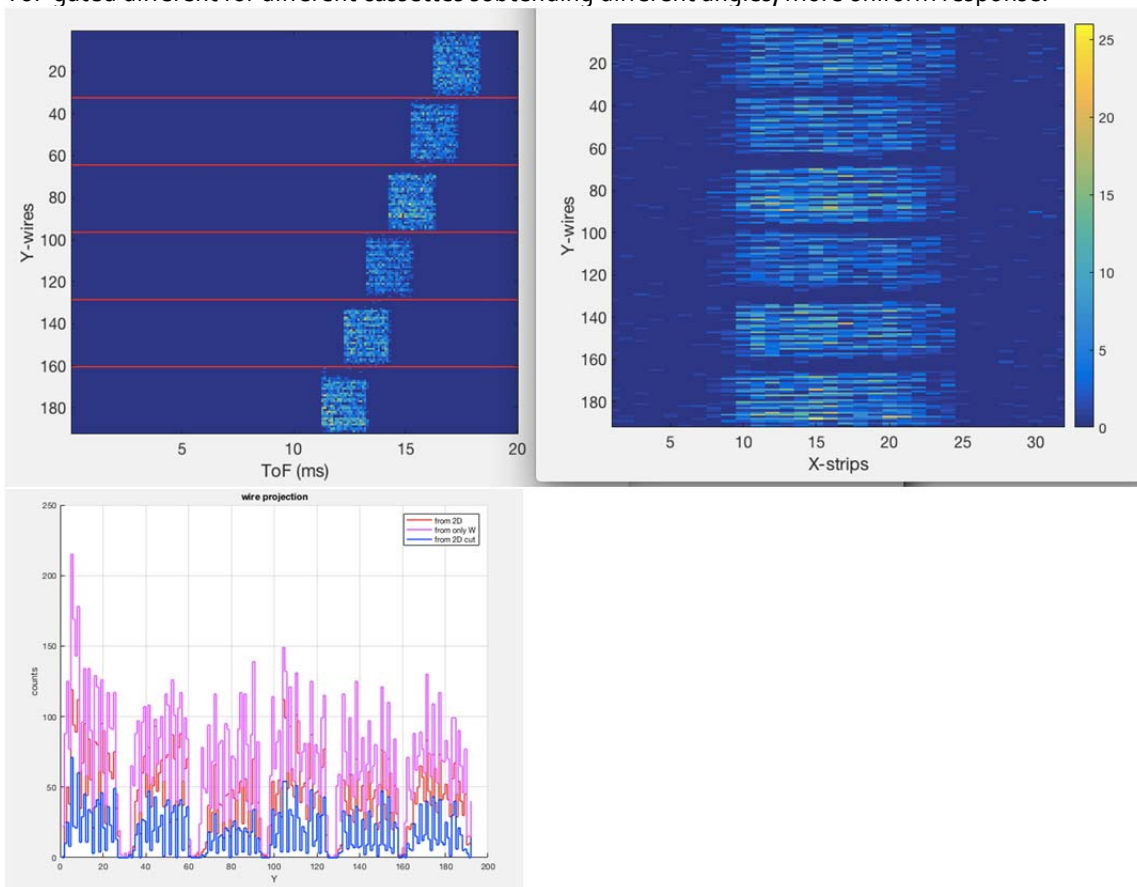
(with the CoG on strips you start to see the separation)



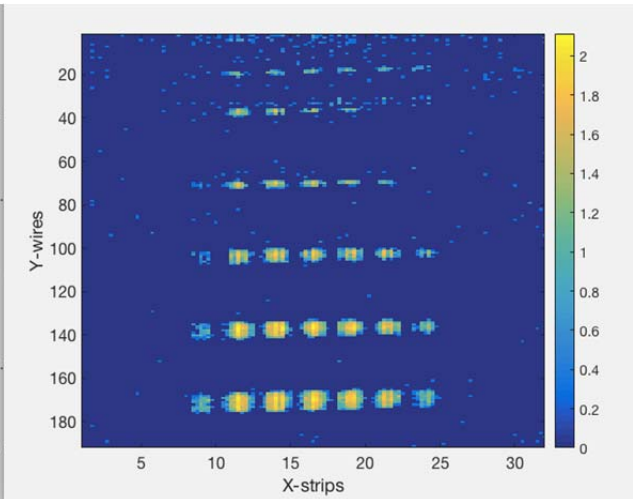
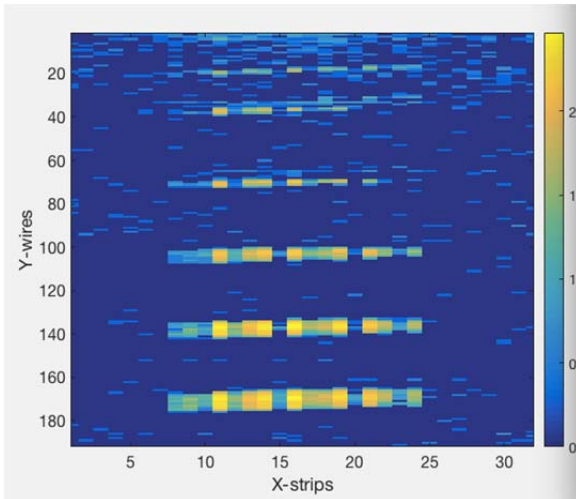
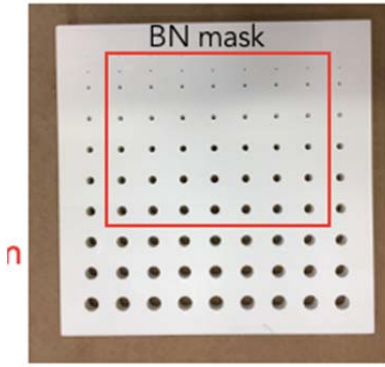
Note: the supermirror has a constant reflection for a given q not θ nor λ , so the gate in ToF must be done in for a constant q to have a uniform beam.
Same gate for all cassettes:



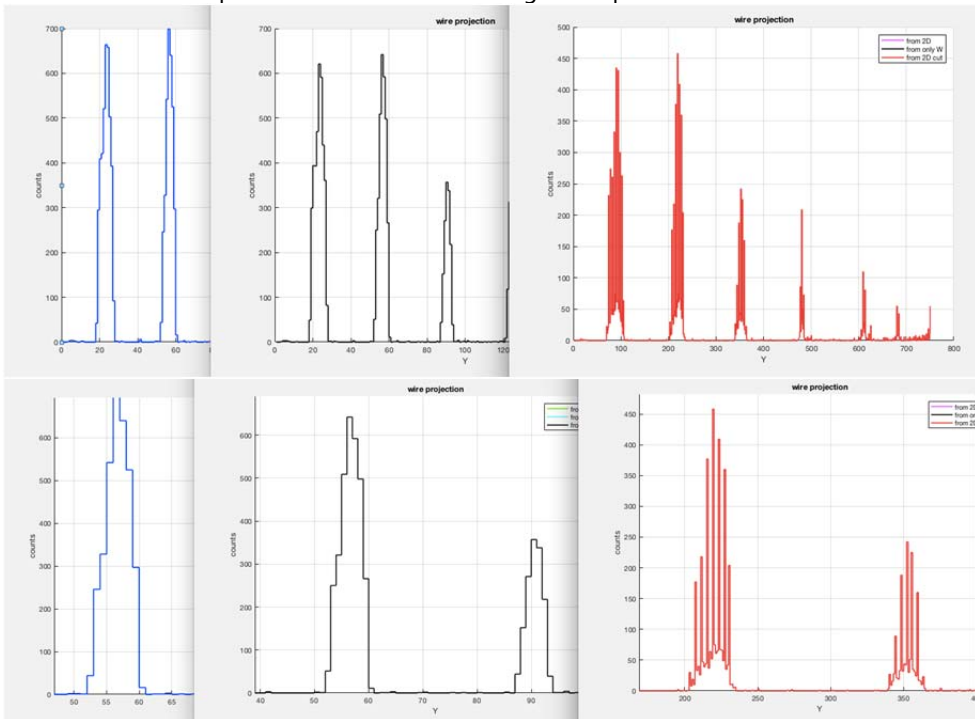
ToF gated different for different cassettes subtending different angles, more uniform response:



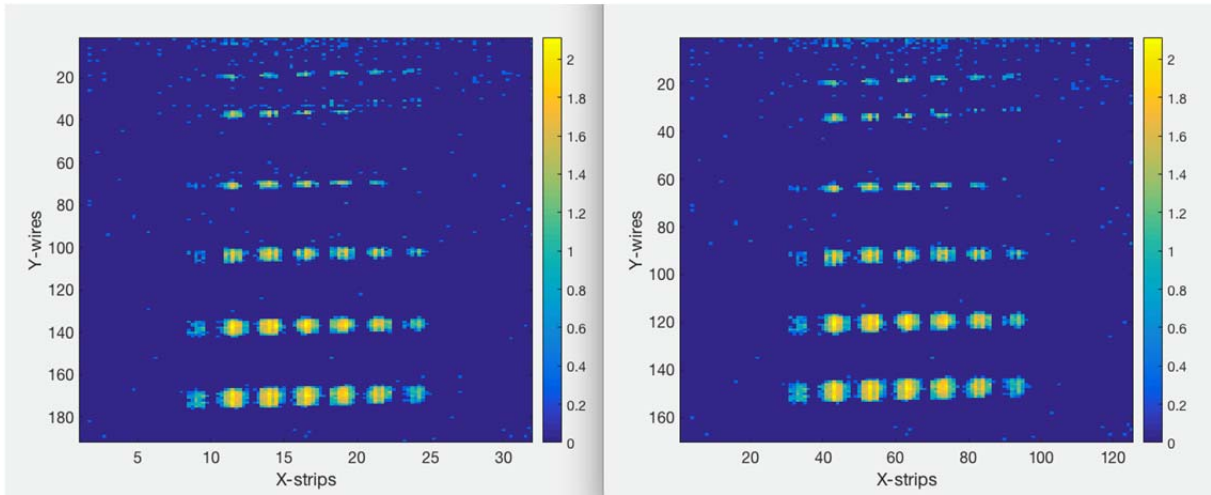
Mask 5
Holes pattern, 10mm spacing (horizontally)



The resolution is improved with the over-binning on strips.



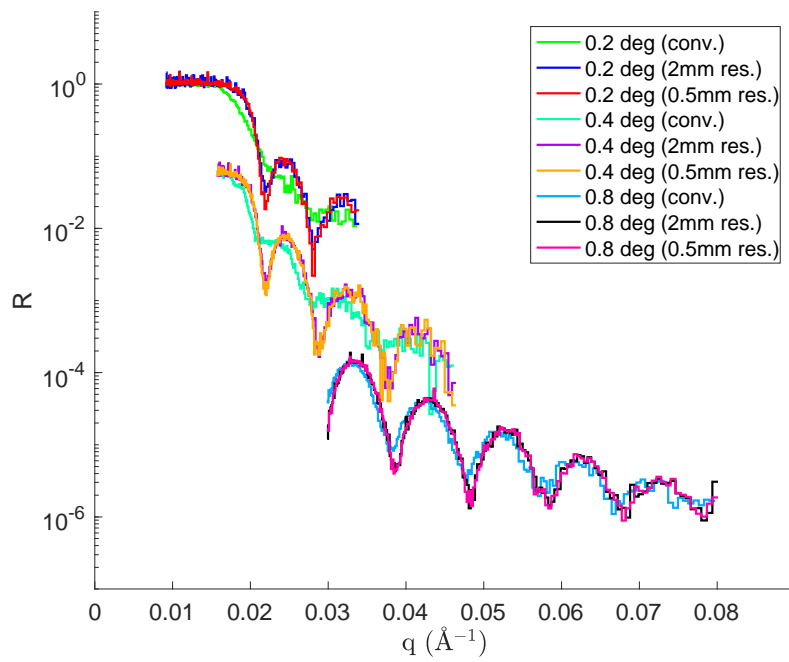
gaps open and closed



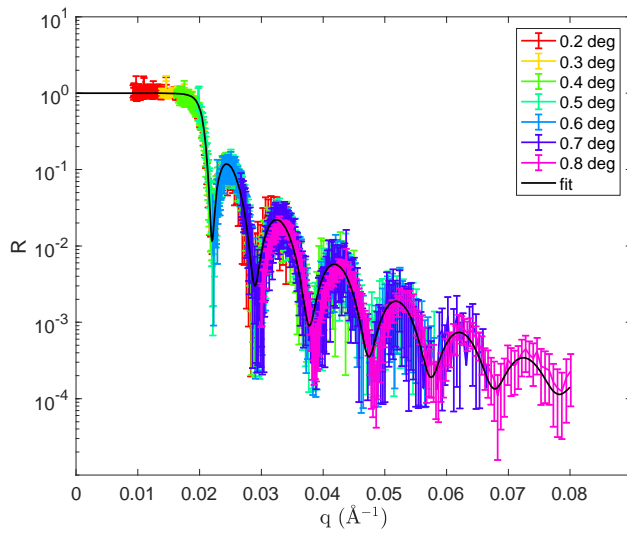
Run E E1

Ir sample on Si, 60nm, HV=1200V

Comparison: Conventional vs Corr. Res 0.5mm and Corr. Res 0.5mm vs Corr. Res 2mm.



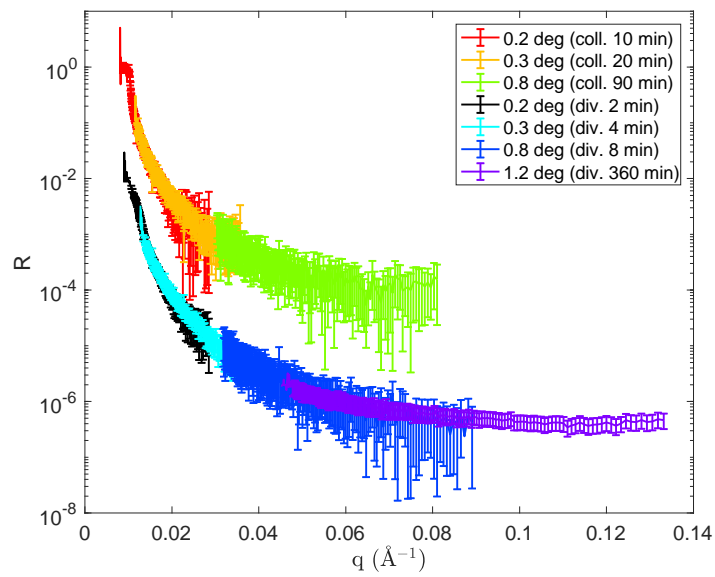
Theoretical Reflectivity on Iridium (0.6 nm) red line and measured data with Corr. Res 0.5mm analysis.



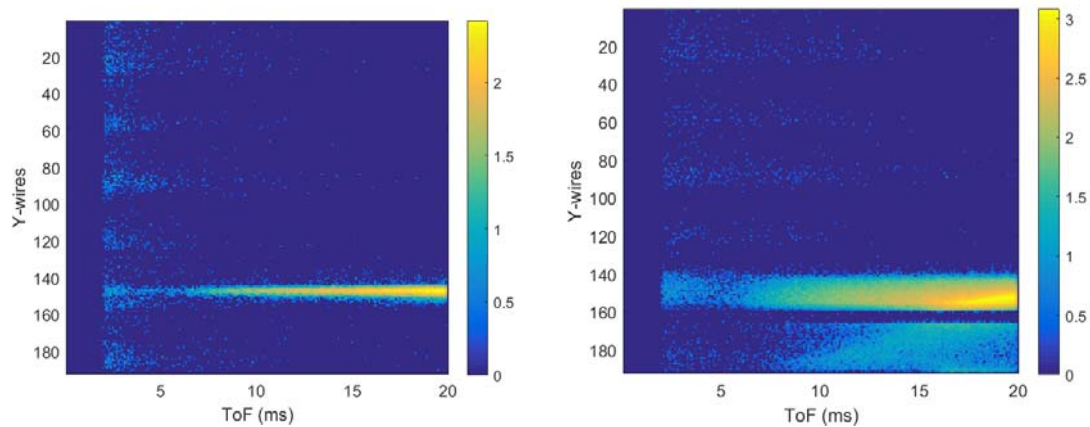
Run H I2 Q

Si sample, HV=1200V

Measured Silicon with collimated beam, 120 mins total time of acquisition and divergent beam 14 mins total time of acquisition.



ToF Collimated vs Divergent beam:

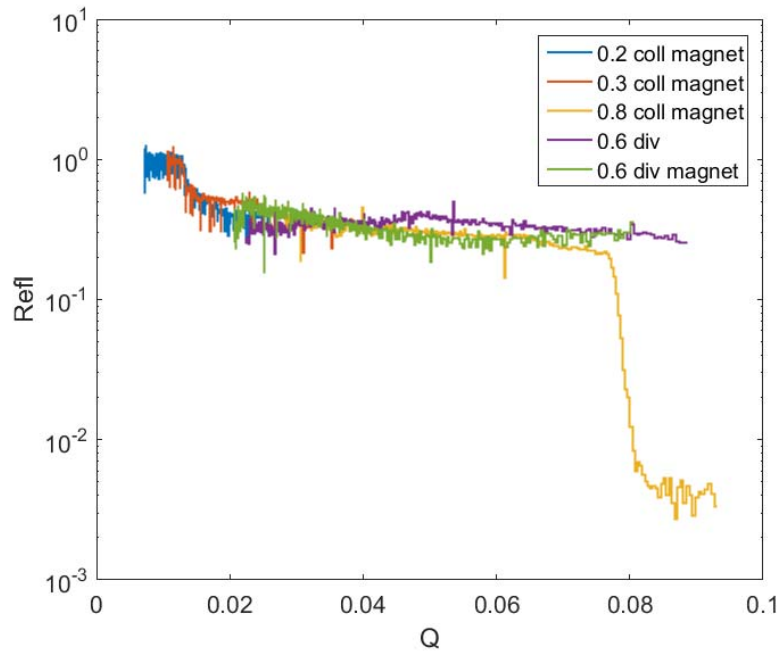


Lambda-Theta of reflected beam collimated vs divergent:

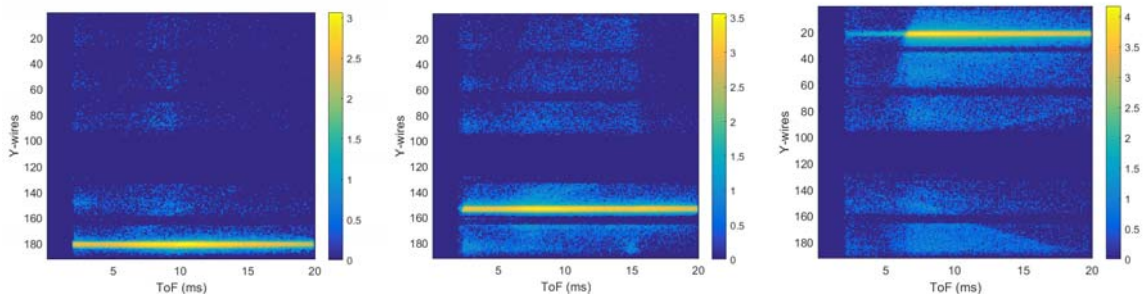
Run I I₁ M

FeSi supermirror m=3.8, HV=1200V

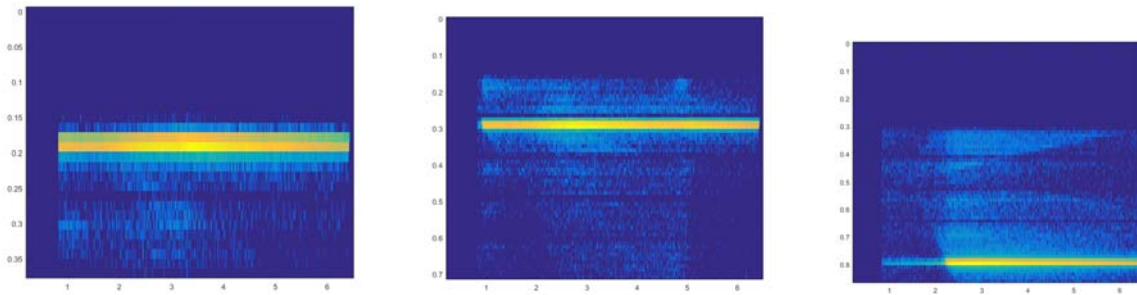
Scan in angle (0.2 0.3 0.8 deg) with collimated beam and magnet on top of the sample. Comparison between reflectivities with divergent beam with and w/o magnet on top of the sample (theta=0.6deg).



FeSi collimated theta 0.2 FeSi coll theta 0.3, and 0.8deg



Lambda-Theta of reflected beam collimated



FeSi divergent with and without magnet

