

EMCAL Second Position Scan Analysis

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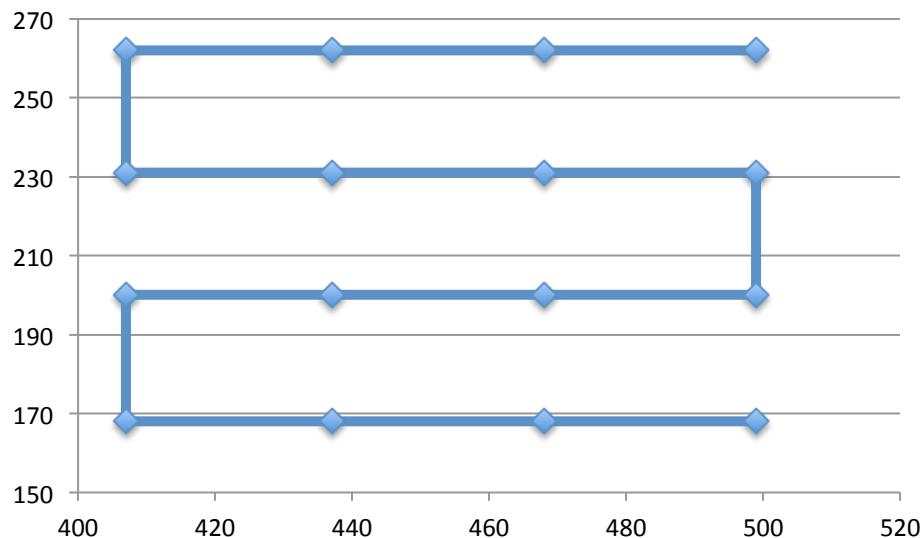
Brief Summary

- The datasets we study are position scans for sPHENIX rotation (preview 4 by 4 scan and the actual 9 by 9 scan) and dual channel (9 by 9 scan).
- The beam setup for the second position scan is 5 GeV electron beam
- We found a problem in for the run vs position and fix it
- We will present the hodoscope correction, energy spectra for a few positions, the final energy vs position, and the 1-D projection plots for our position energy scan analysis
- The calibration method are all used: clus_5x5_recalib.sum_E with a scaling factor of 0.13. The clus_5x5_prod.sum_E are show in the backup slides

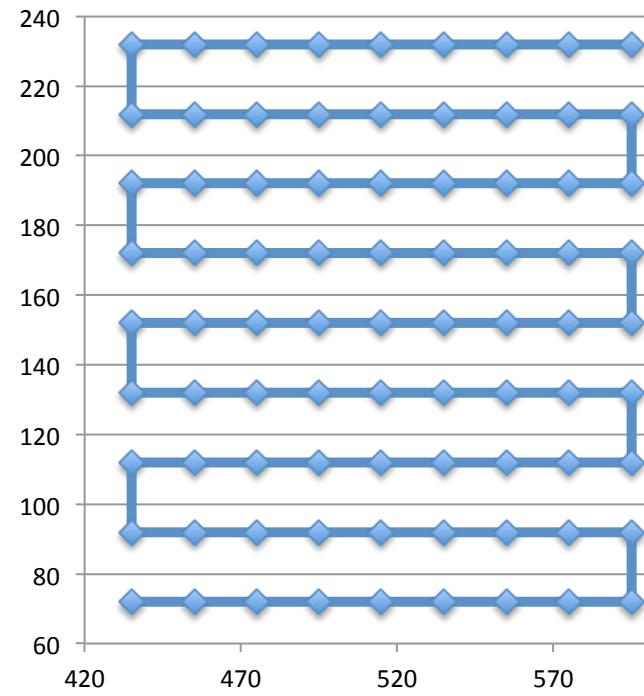
Tower Scan Scheme

- sPHENIX Preview Run: Scan 4 by 4 with a step of 23 mm
- Actual Position Scan Runs: Scan 9 by 9 with a step of 20 mm

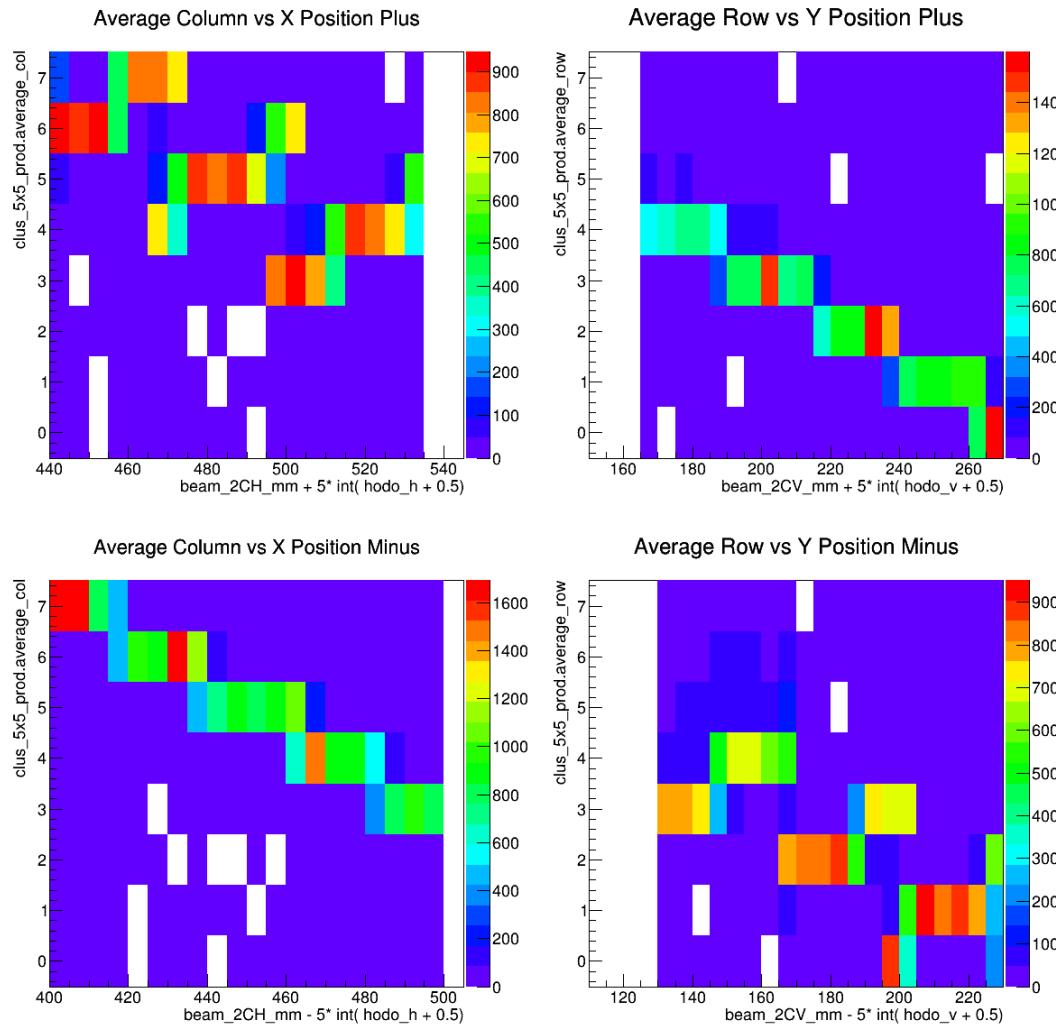
4 by 4 Tower Scan



9 by 9 Tower Scan



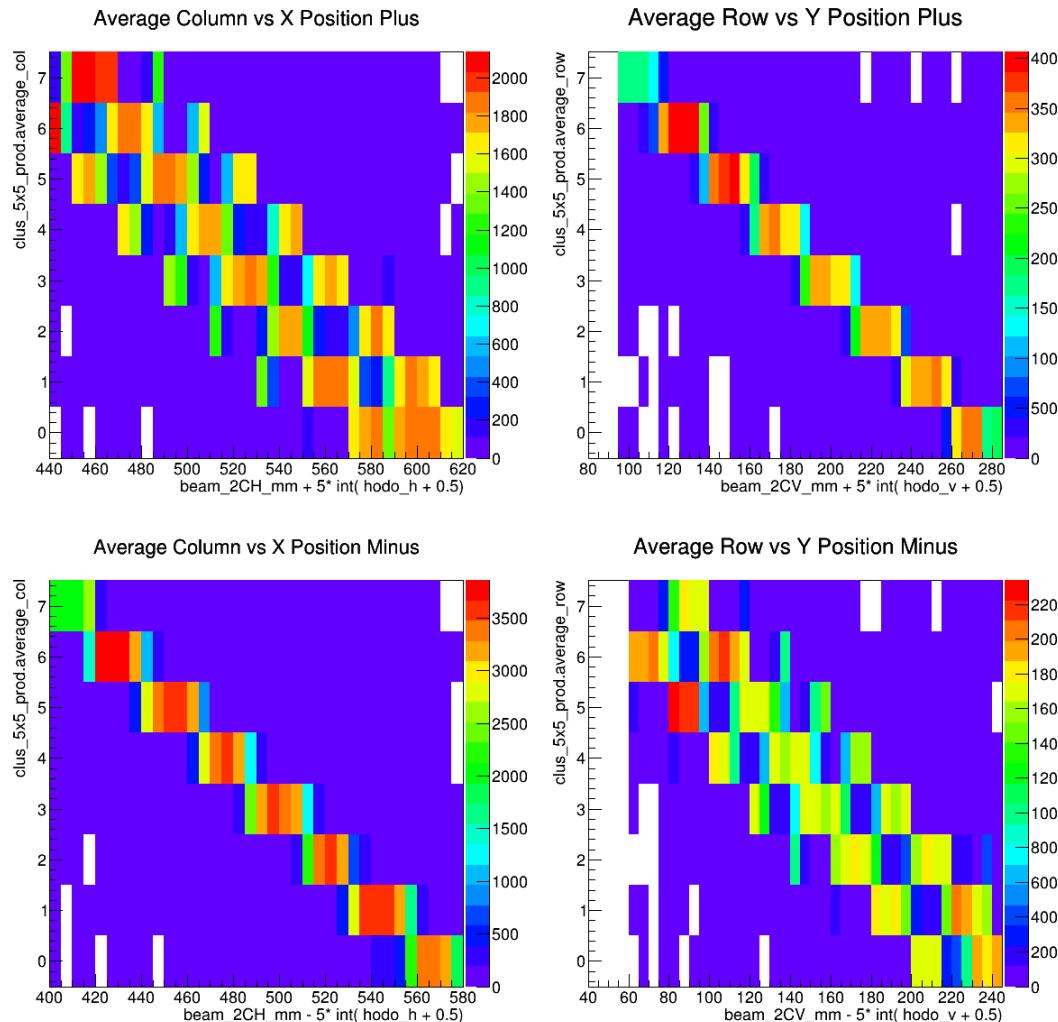
Hodoscope Corrections for sPHENIX Rotation Preview Scan



So we can see that the hodoscope correction for the x-axis is - and y-axis is +.



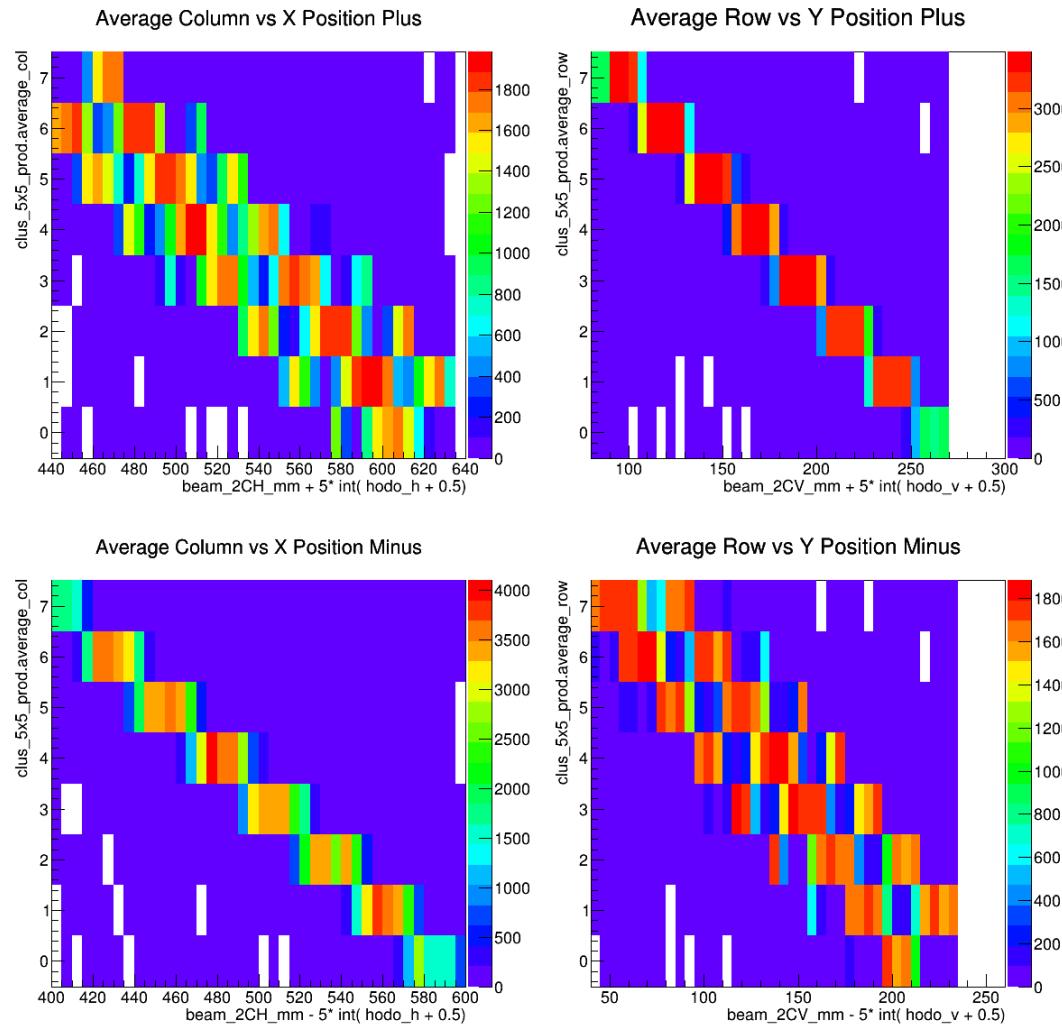
Hodoscope Corrections for sPHENIX Rotation Full Detector Scan



So we can see that the hodoscope correction for the x-axis is - and y-axis is +.

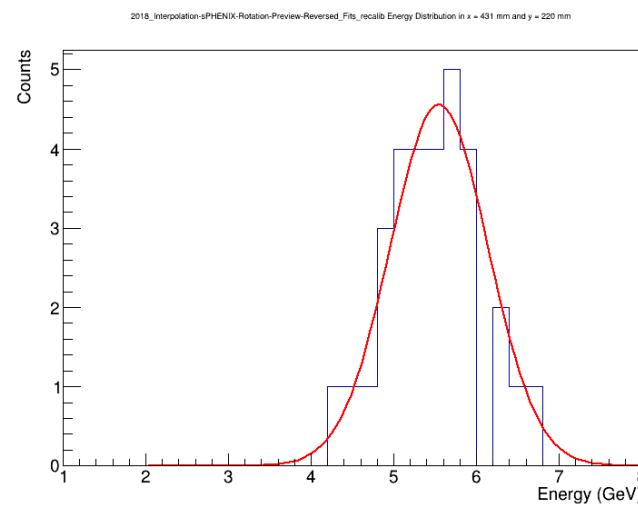
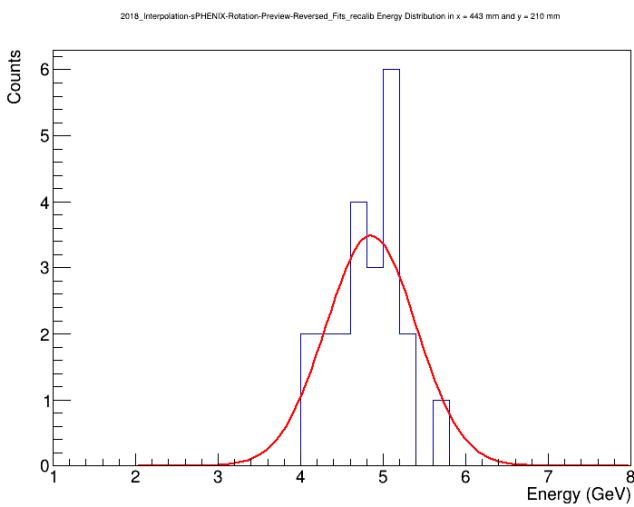
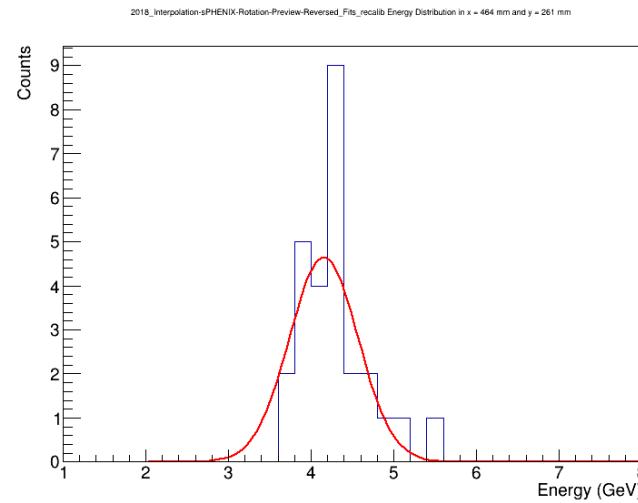
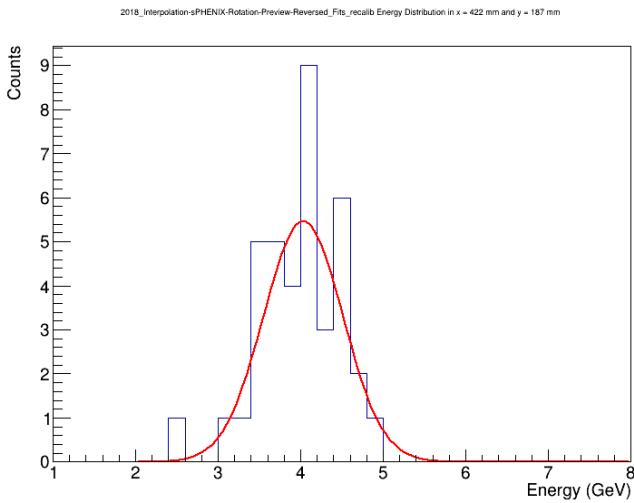


Hodoscope Corrections for Dual Channel Full Detector Scan



So we can see that the hodoscope correction for the x-axis is - and y-axis is +.

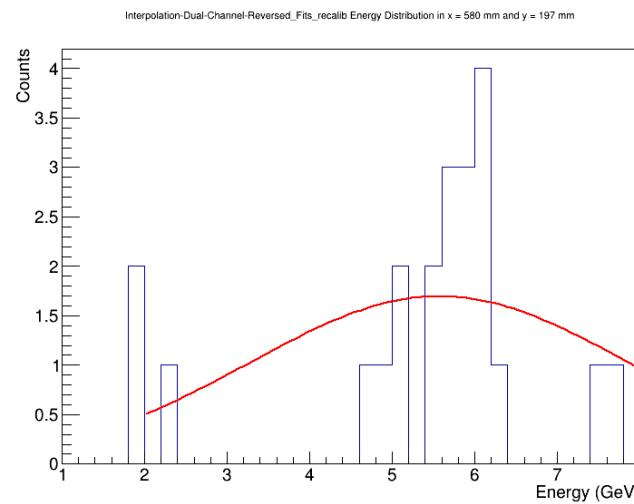
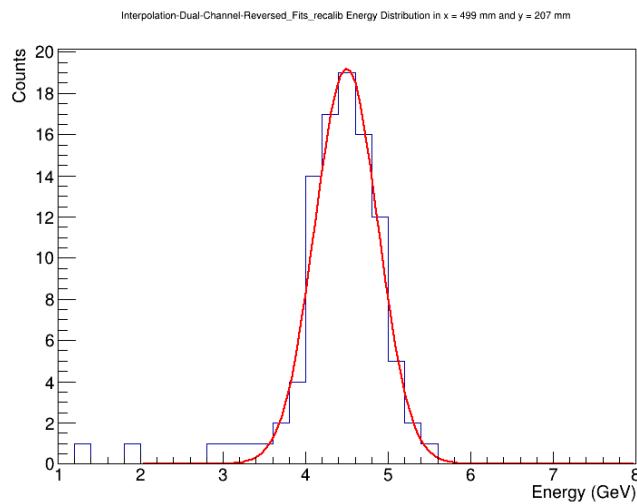
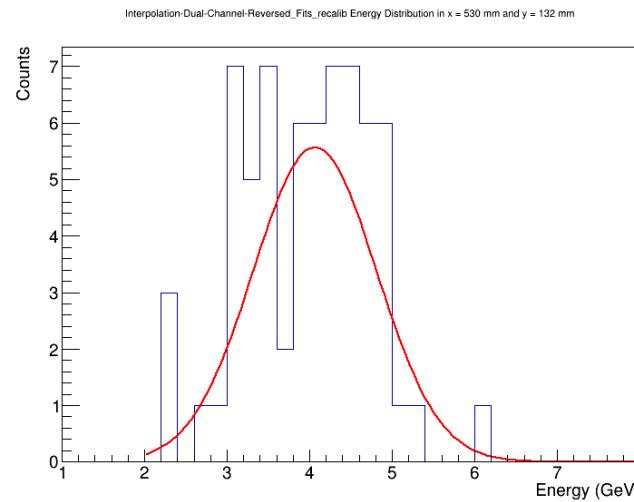
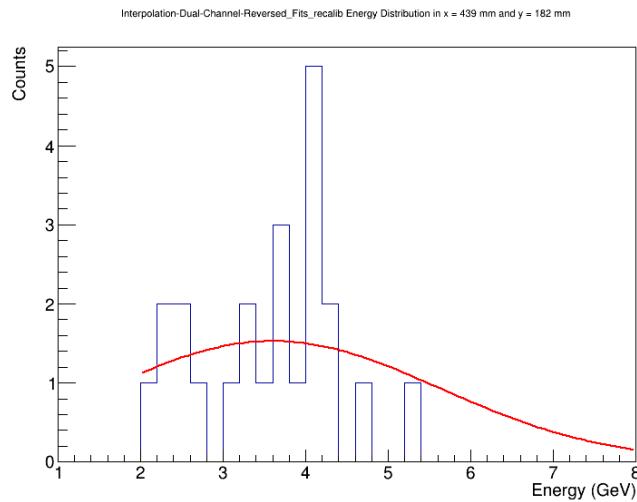
sPHENIX Rotation Preview Scan Energy Spectra



The fits look reasonable from the plots above.



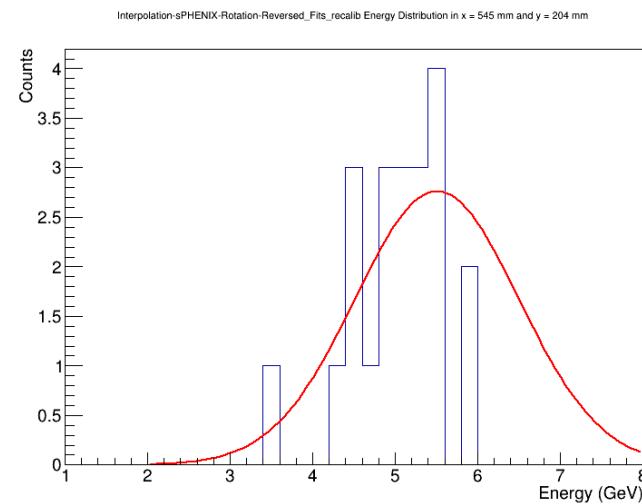
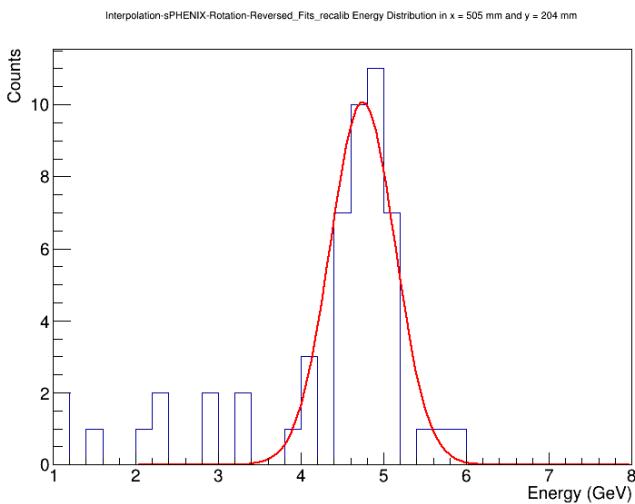
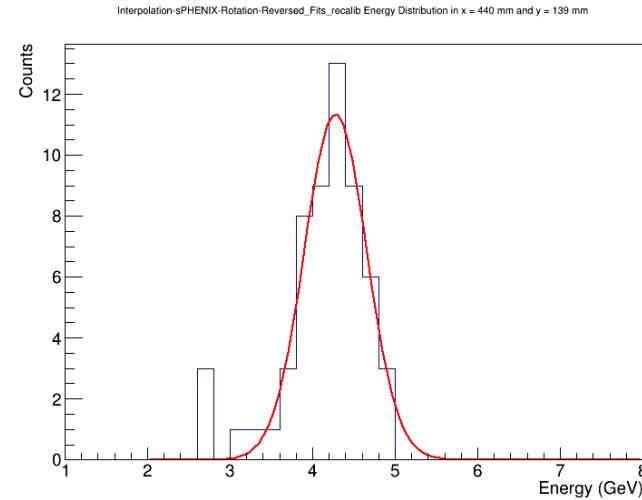
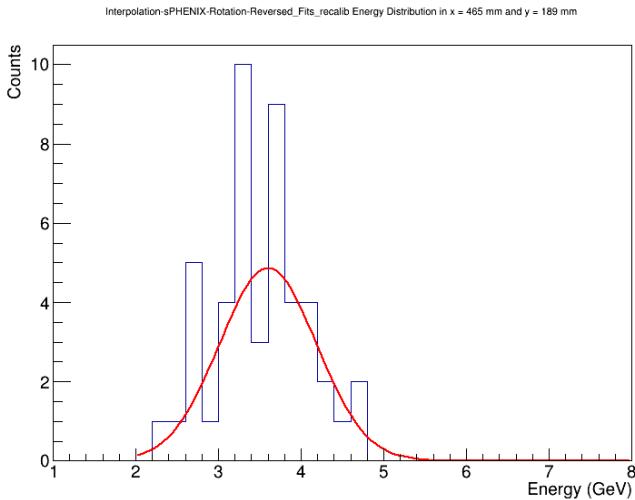
sPHENIX Rotation Full Detector Scan Energy Spectra



The fits look reasonable from the plots above.



Dual Channel Full Detector Scan Energy Spectra

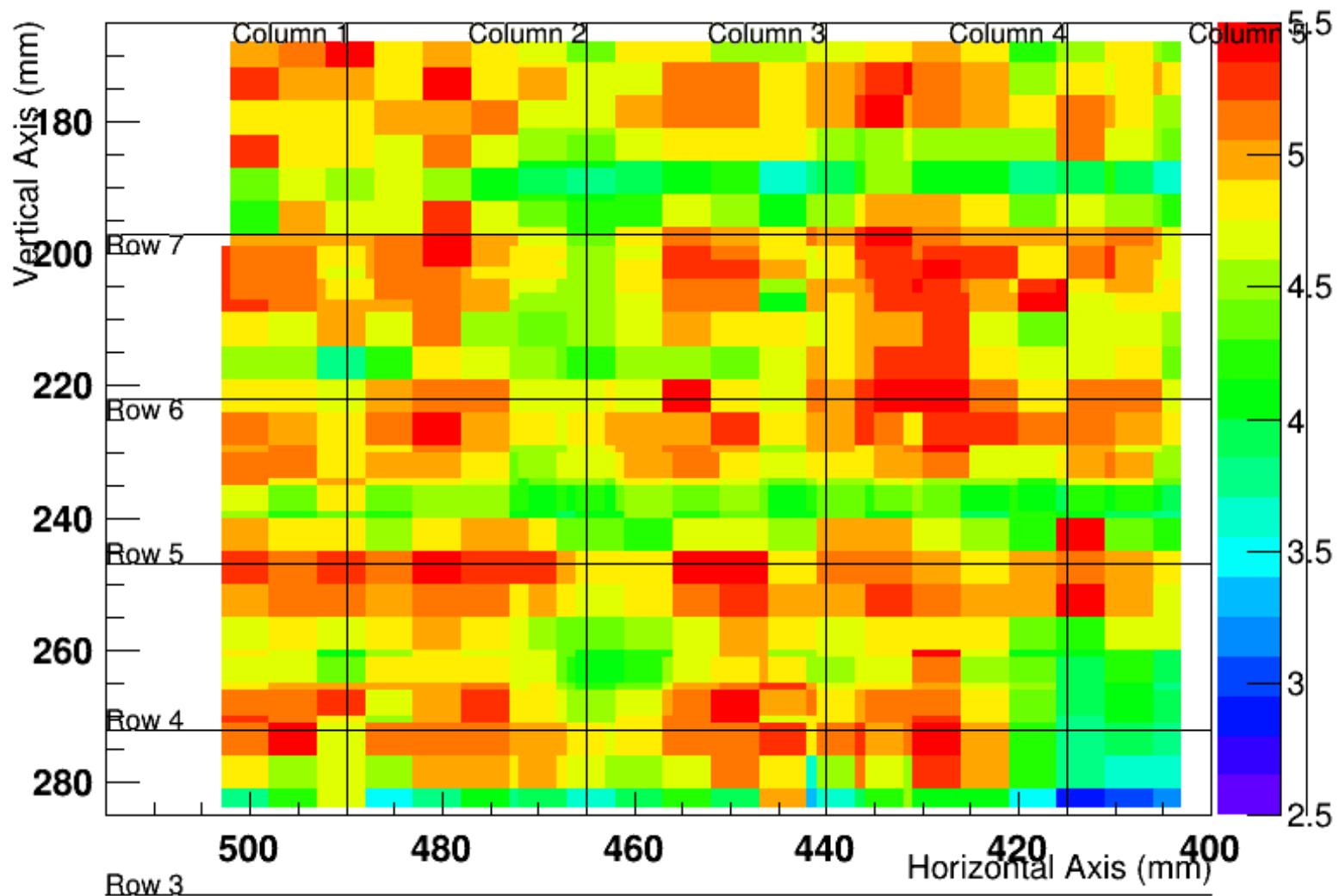


The fits look reasonable from the plots above.

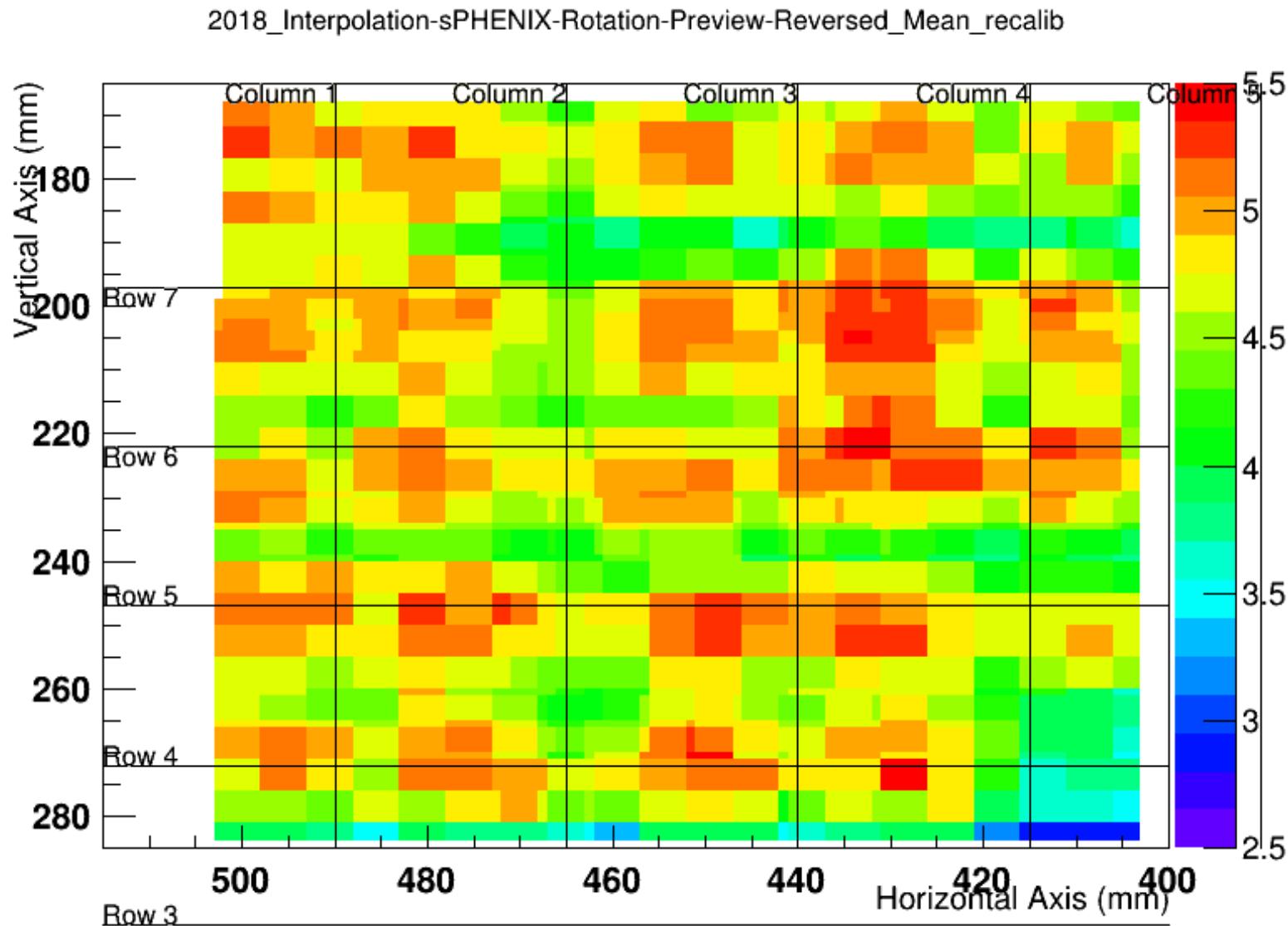


Energy vs X-Y Position for sPHENIX Rotation Preview Scan (Mean Method)

2018_Interpolation-sPHENIX-Rotation-Preview-Reversed_Fits_recalib

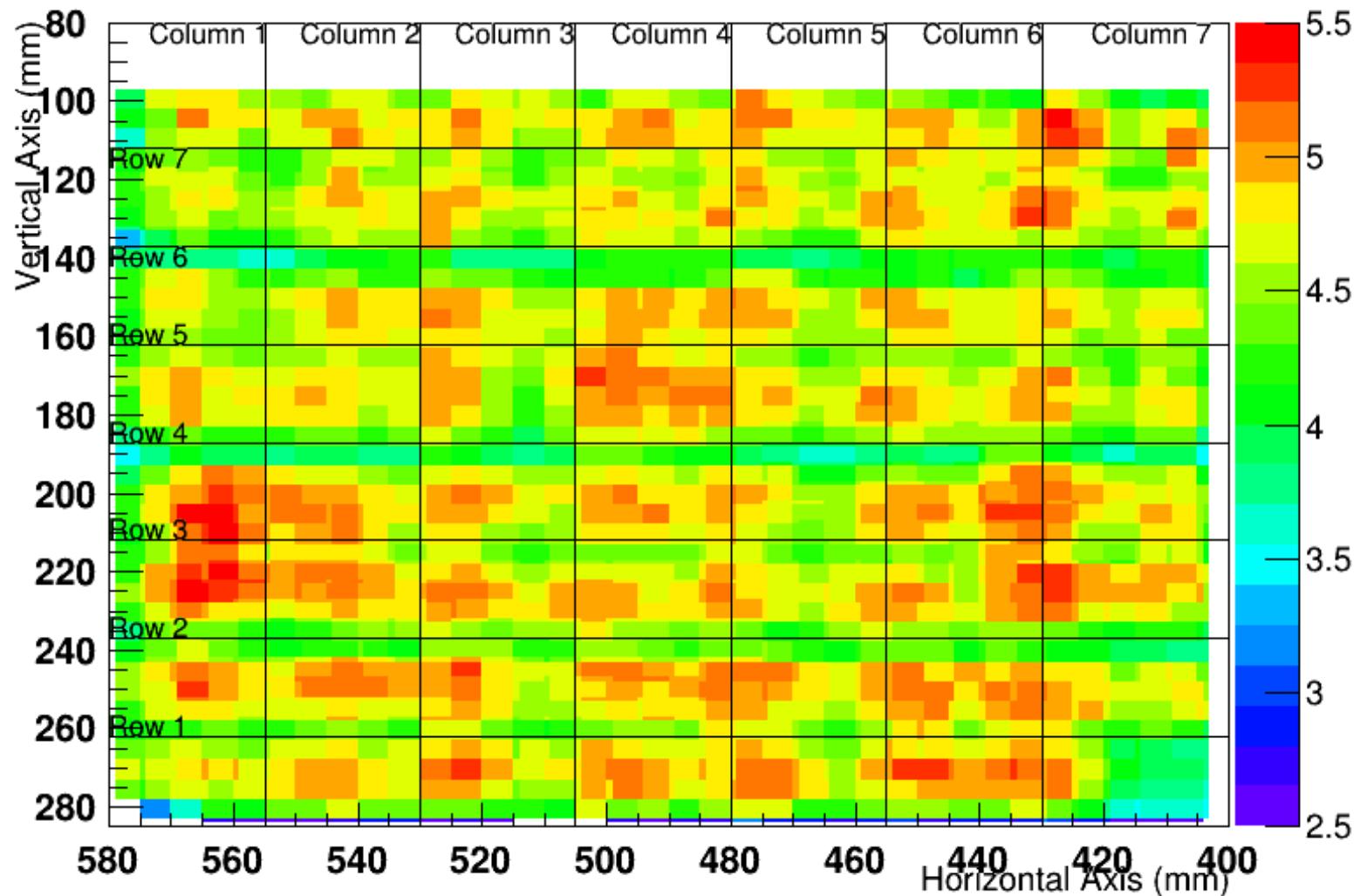


Energy vs X-Y Position for sPHENIX Rotation Preview Scan (Fits Method)



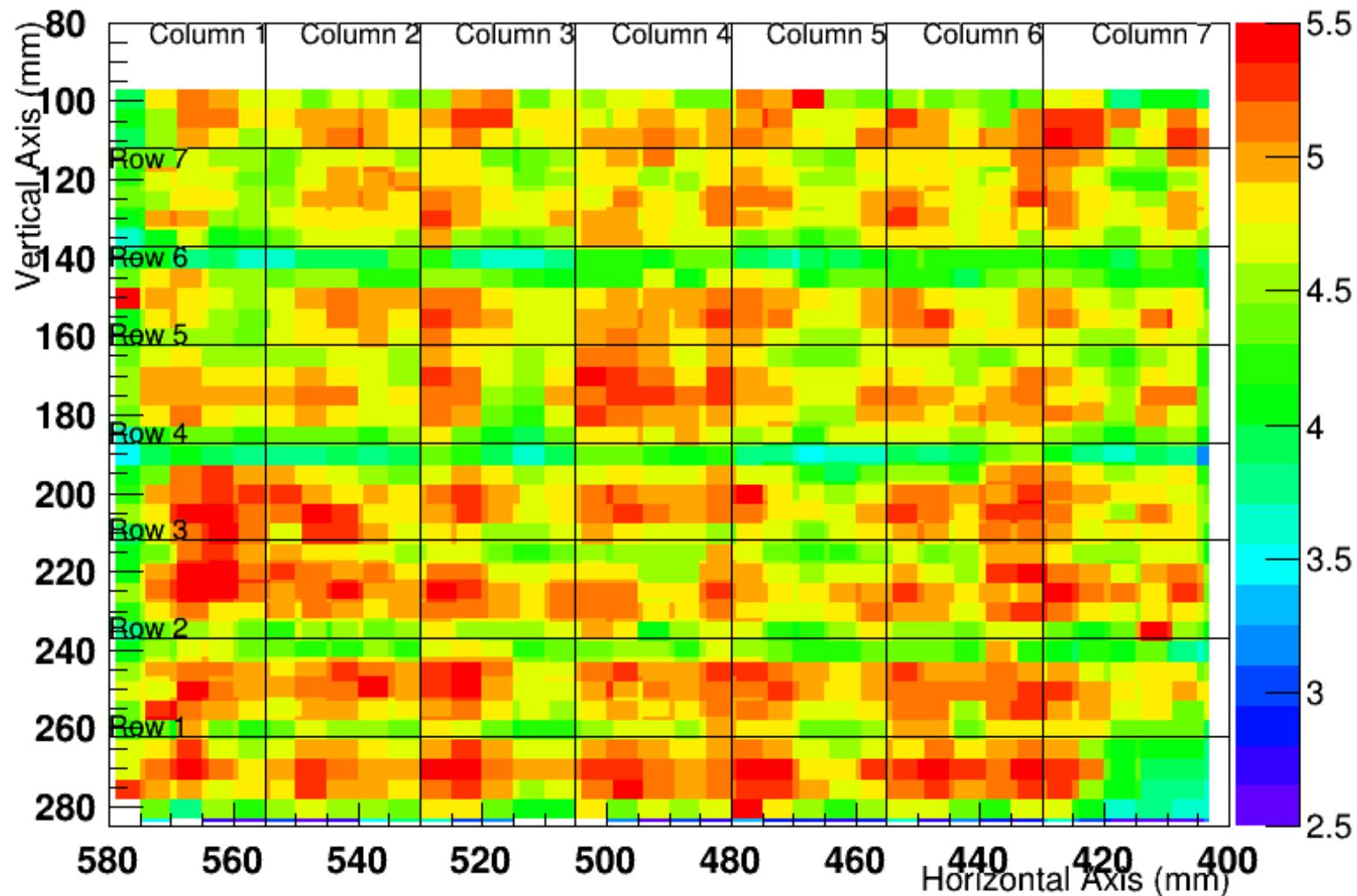
Energy vs X-Y Position for sPHENIX Rotation Full Detector Scan (Mean Method)

Interpolation-sPHENIX-Rotation-Reversed_Mean_recalib



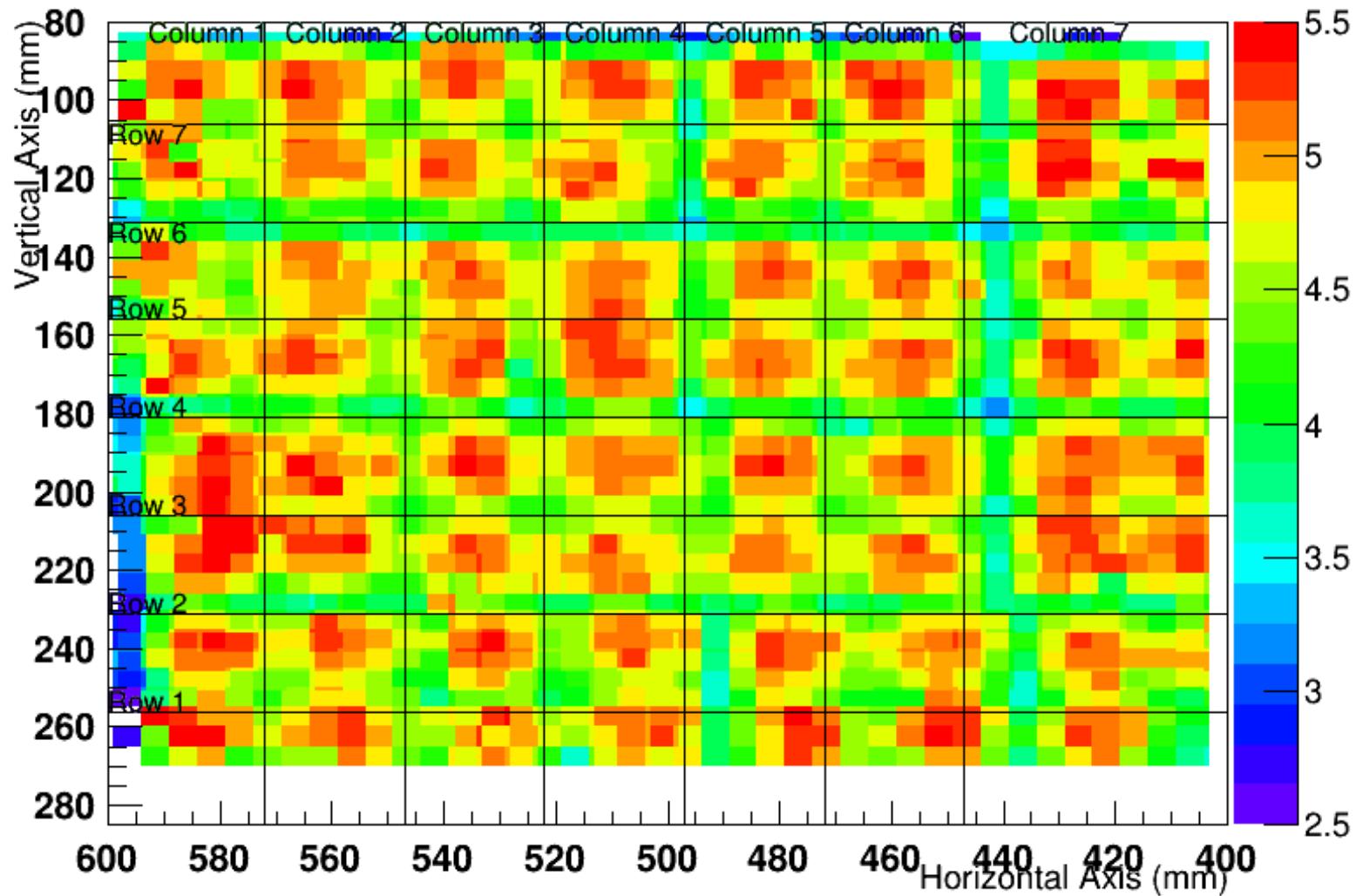
Energy vs X-Y Position for sPHENIX Rotation Full Detector Scan (Fits Method)

Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib



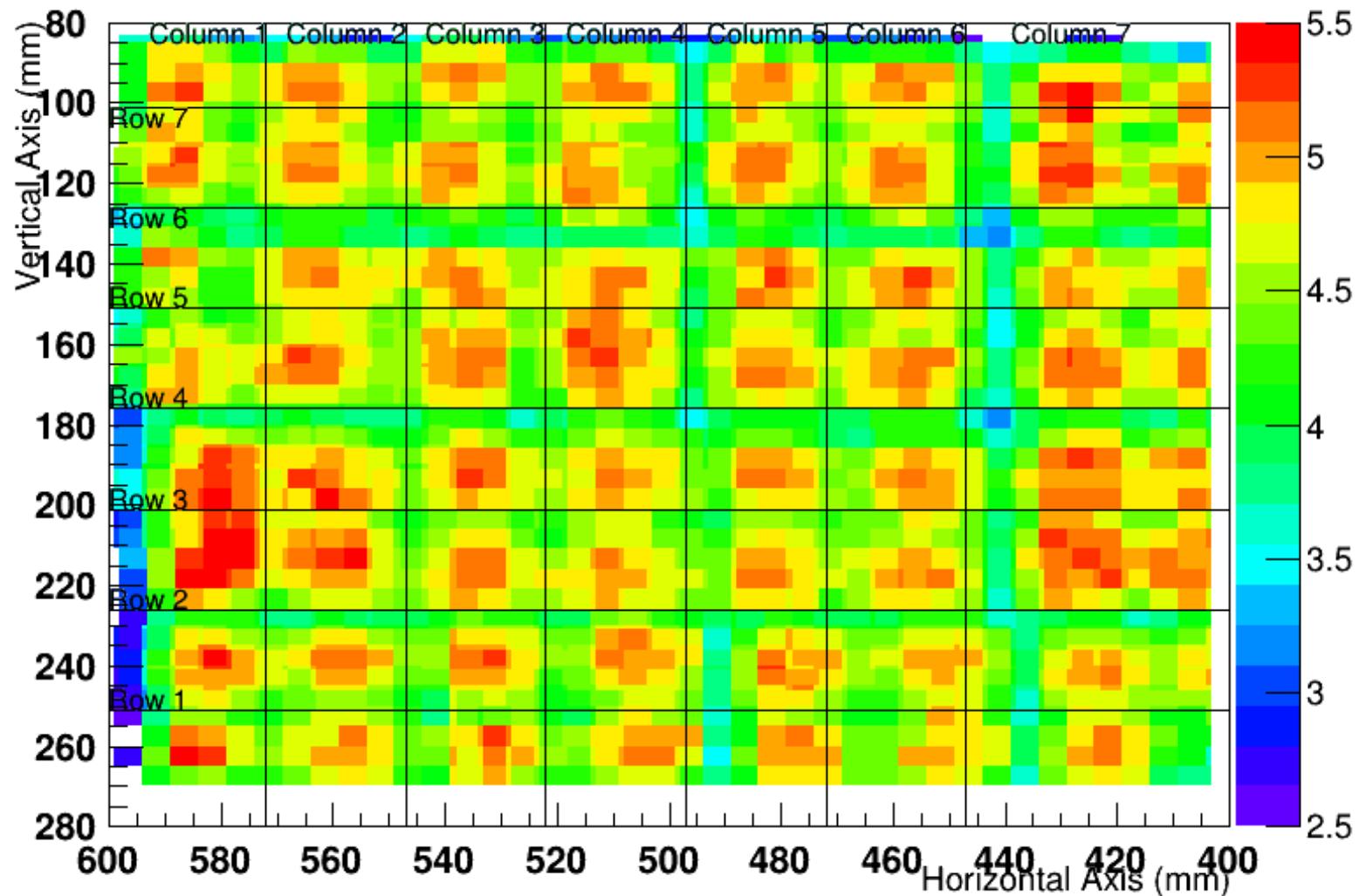
Energy vs X-Y Position for Dual Channel Preview Scan (Fits Method)

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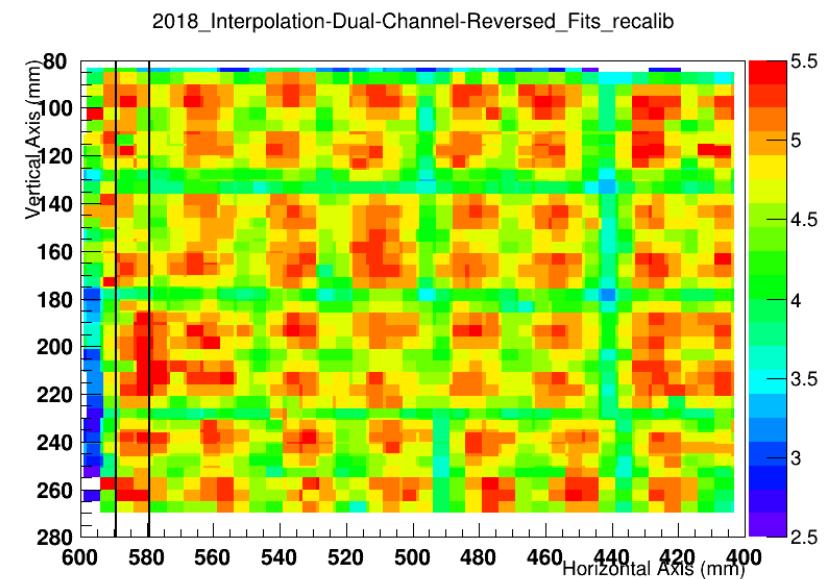
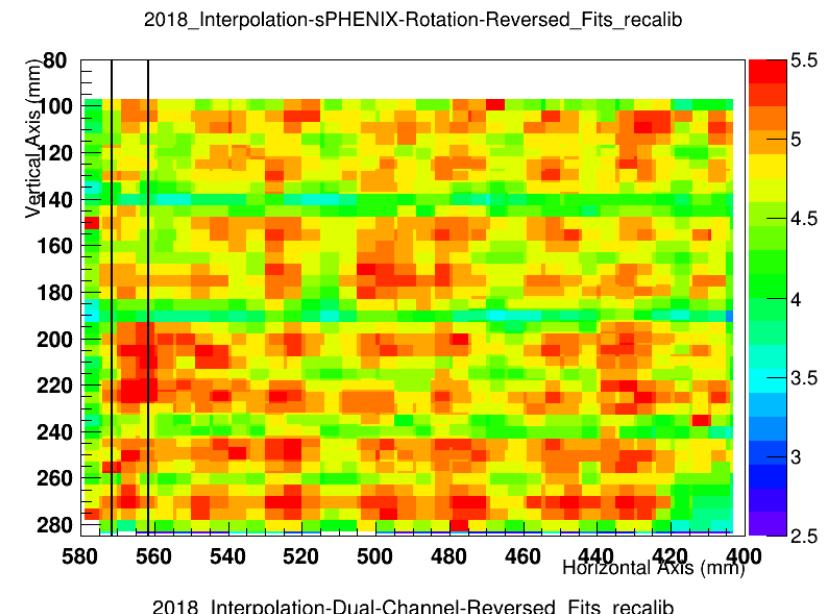
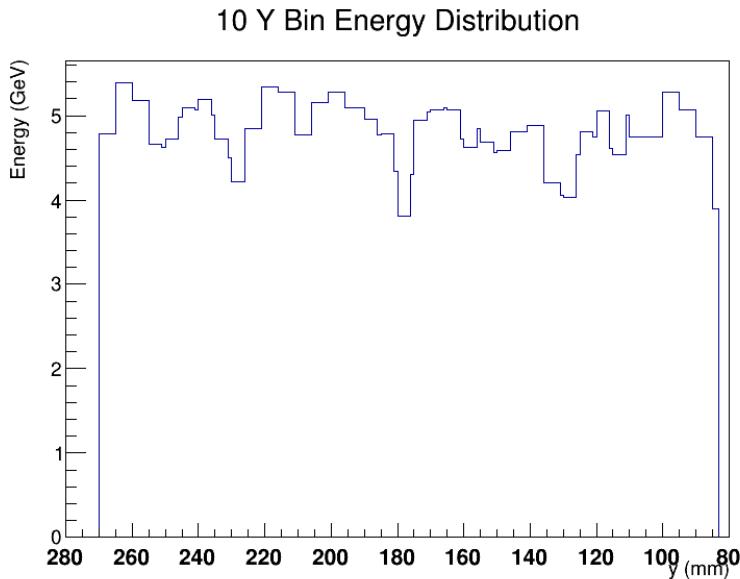
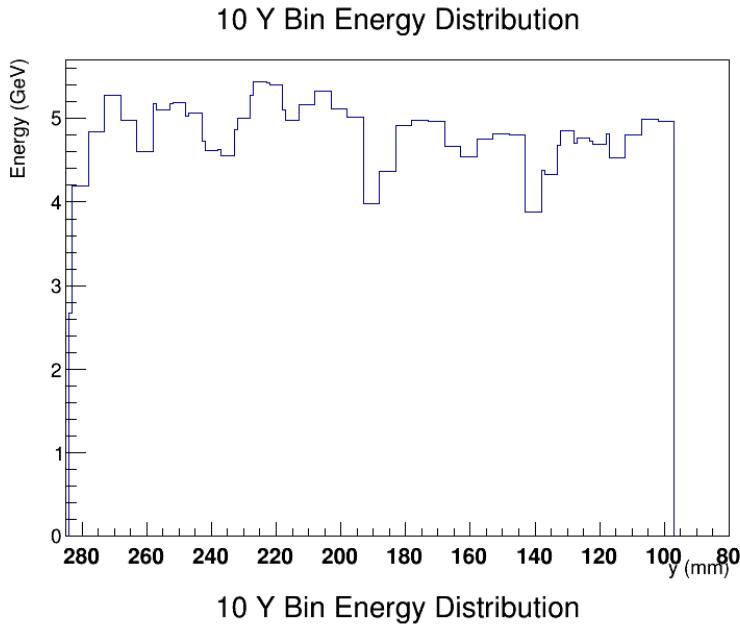


Energy vs X-Y Position for Dual Channel Preview Scan (Mean Method)

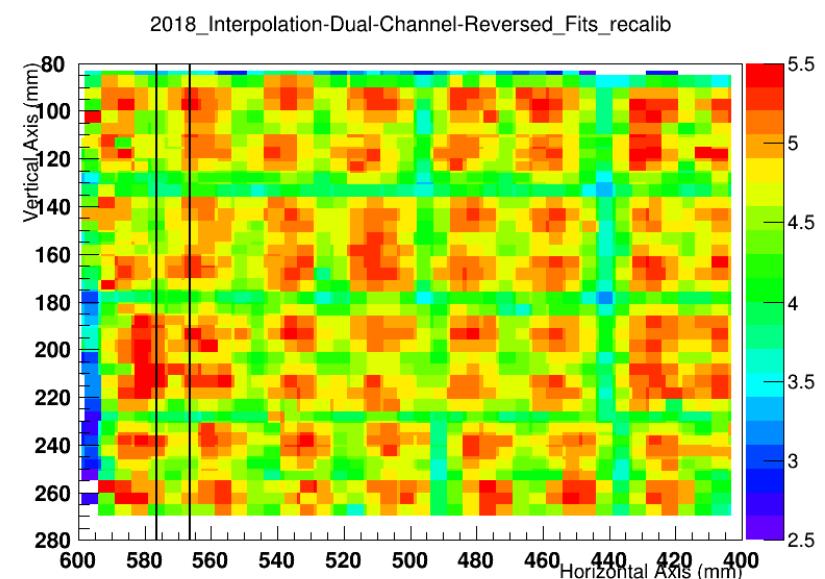
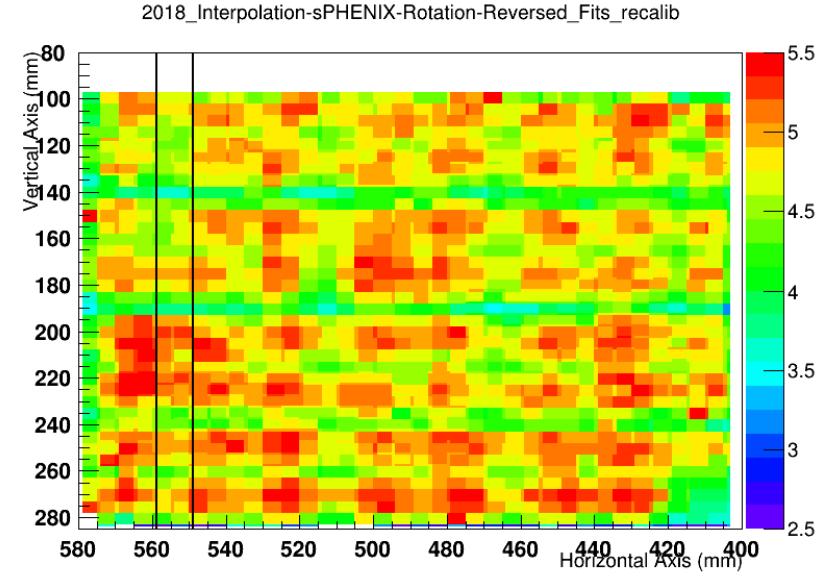
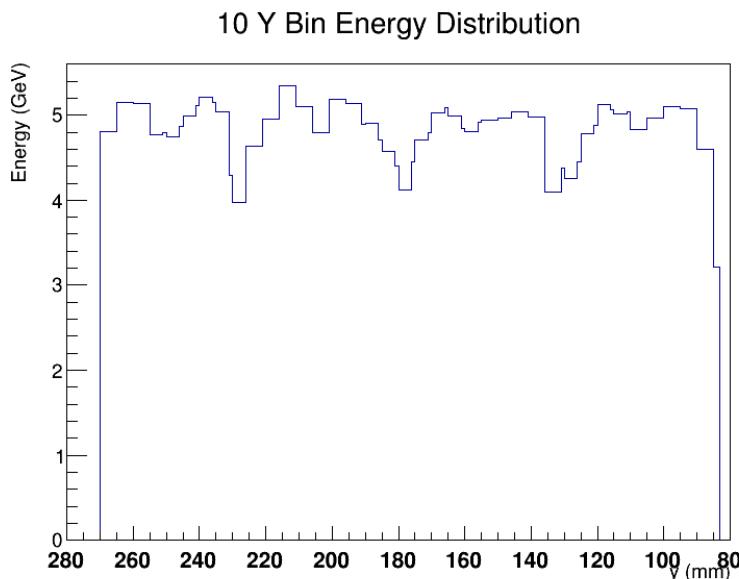
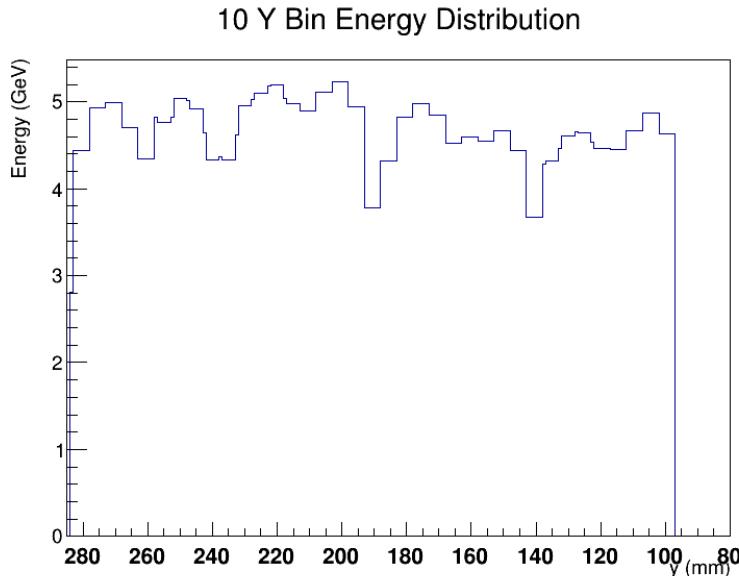
2018_Interpolation-Dual-Channel-Reversed_Mean_recalib



1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

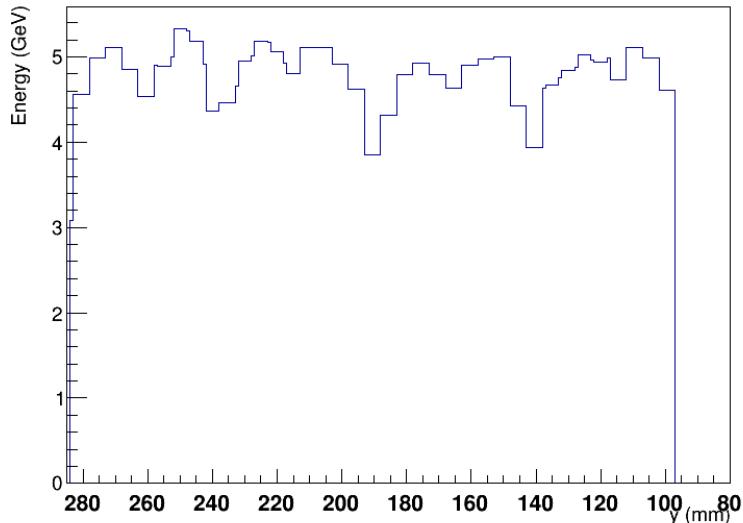


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

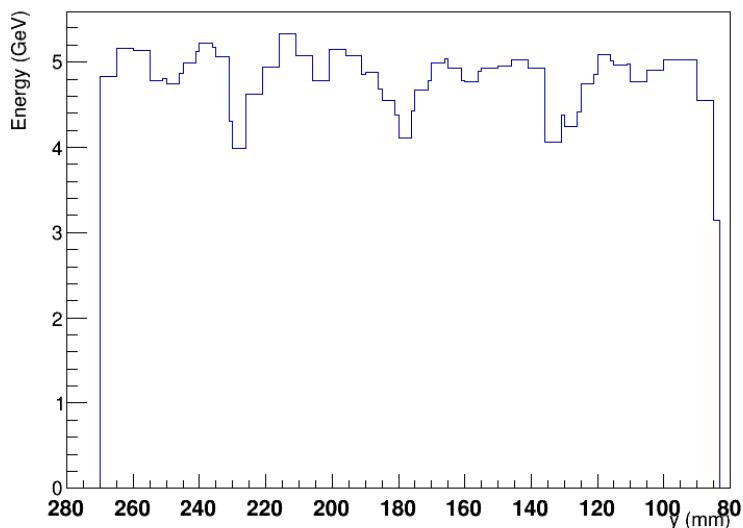


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

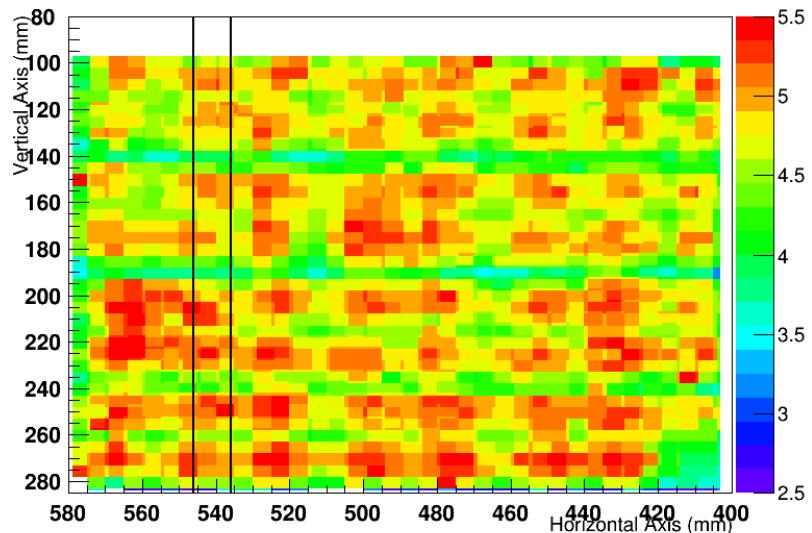
10 Y Bin Energy Distribution



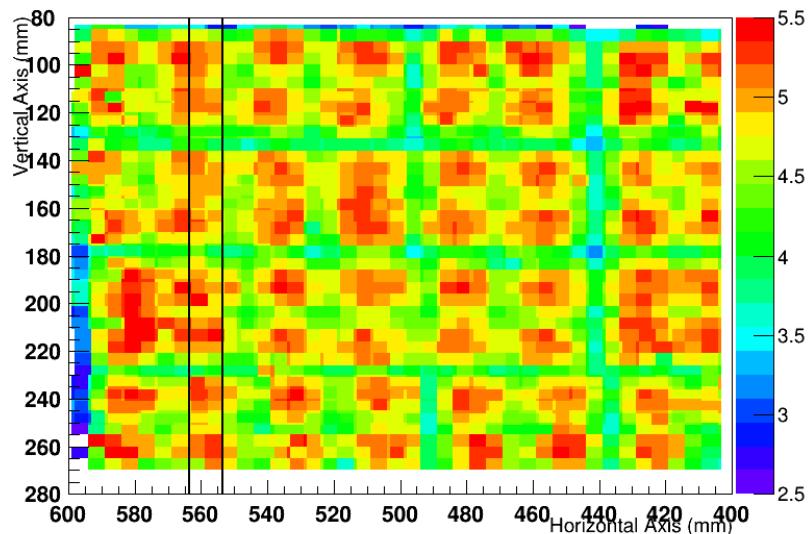
10 Y Bin Energy Distribution



2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

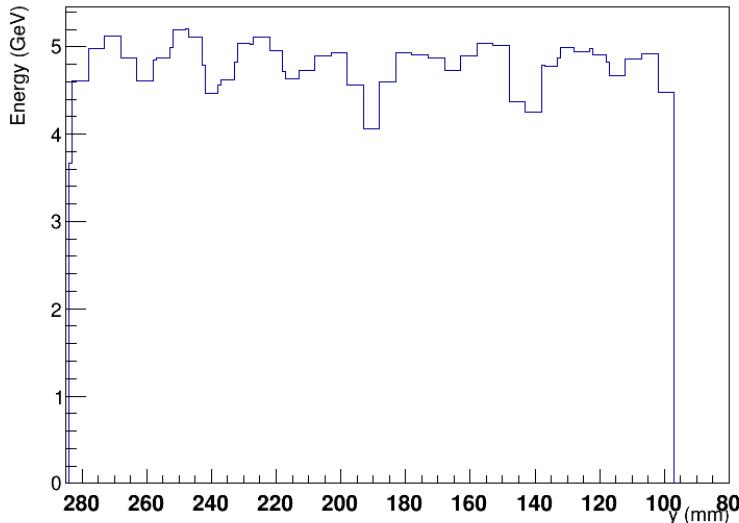


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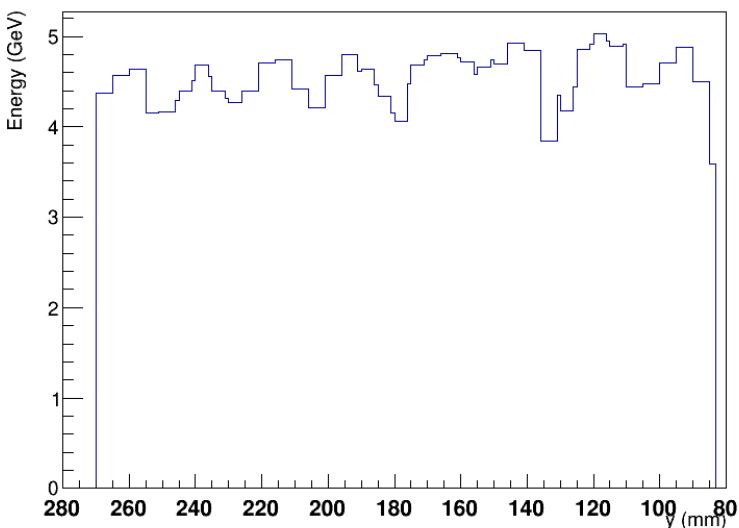


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

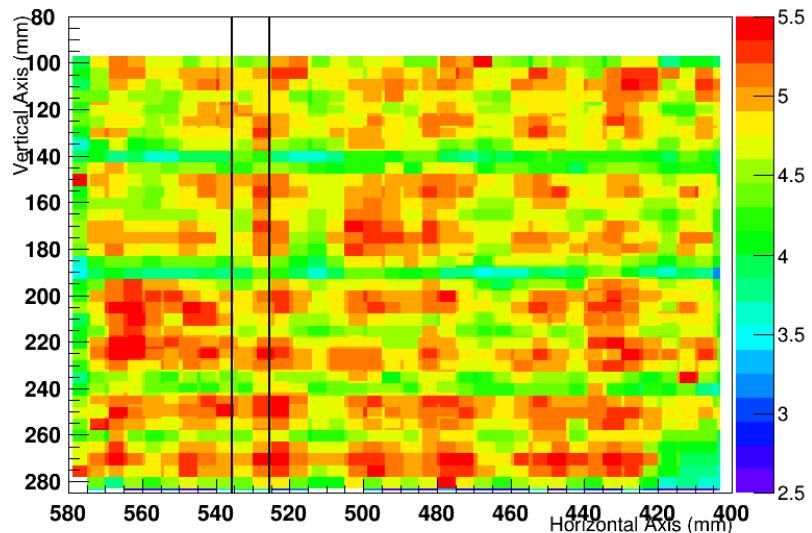
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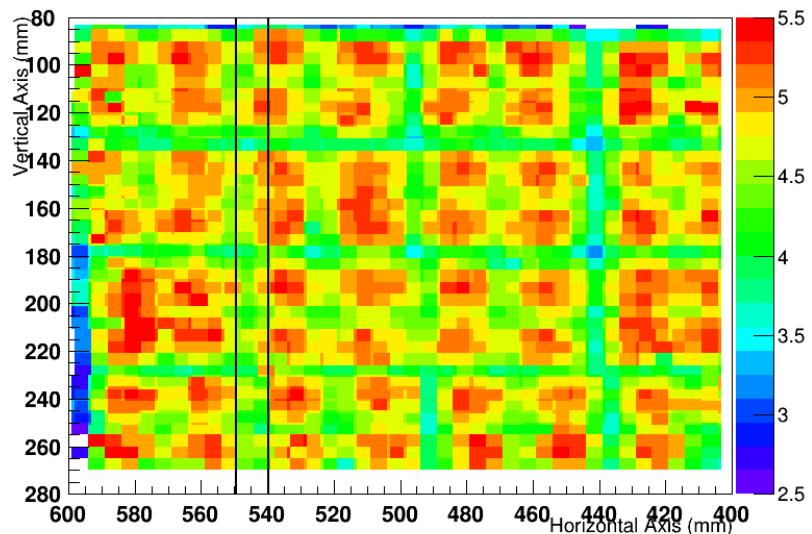
10 Y Bin Energy Distribution



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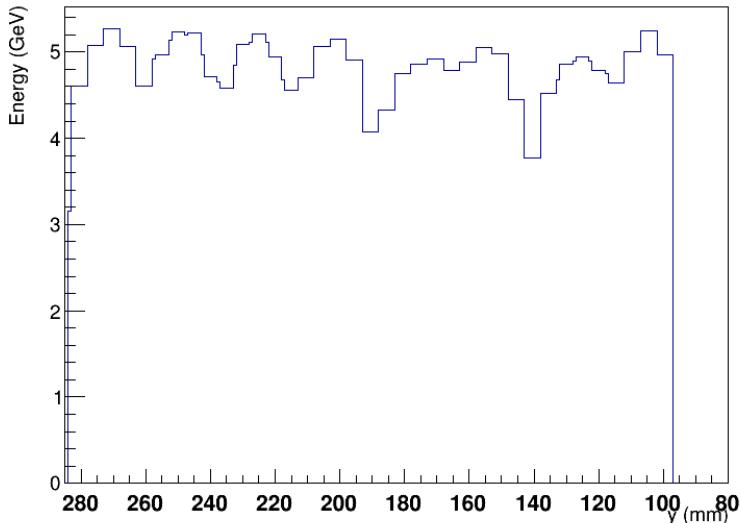


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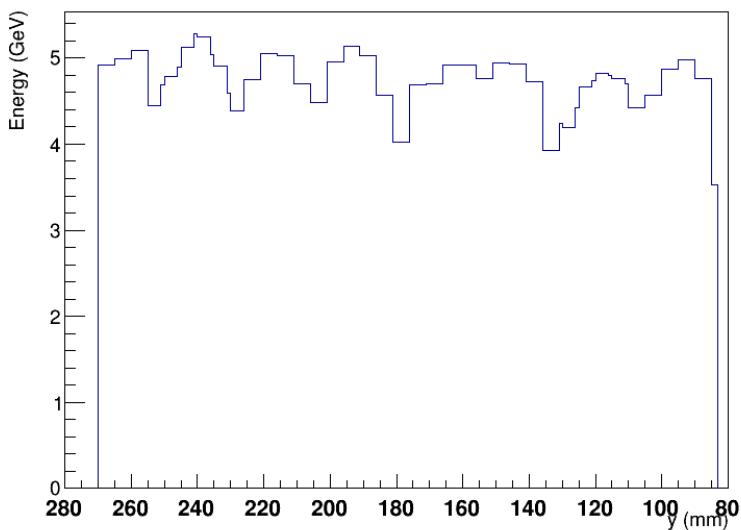


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

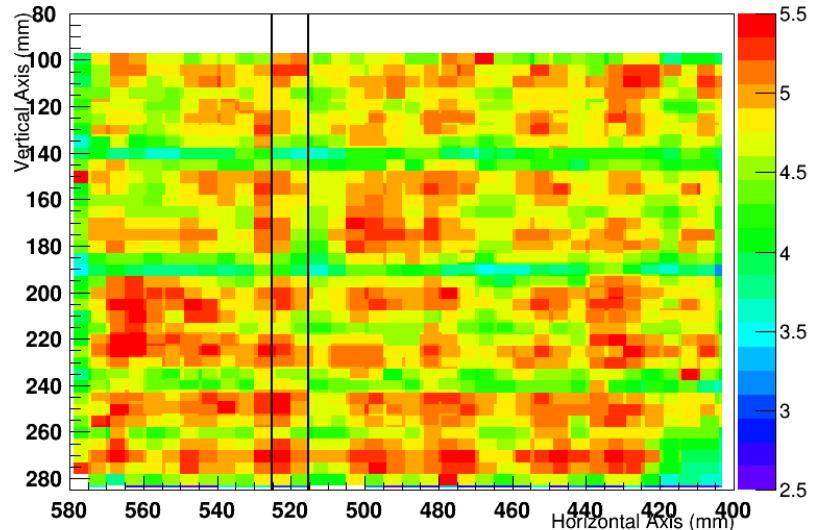
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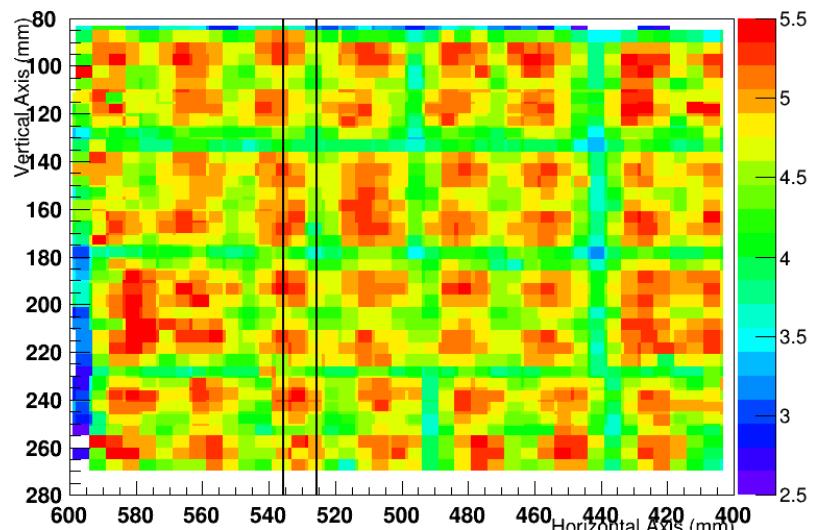
10 Y Bin Energy Distribution



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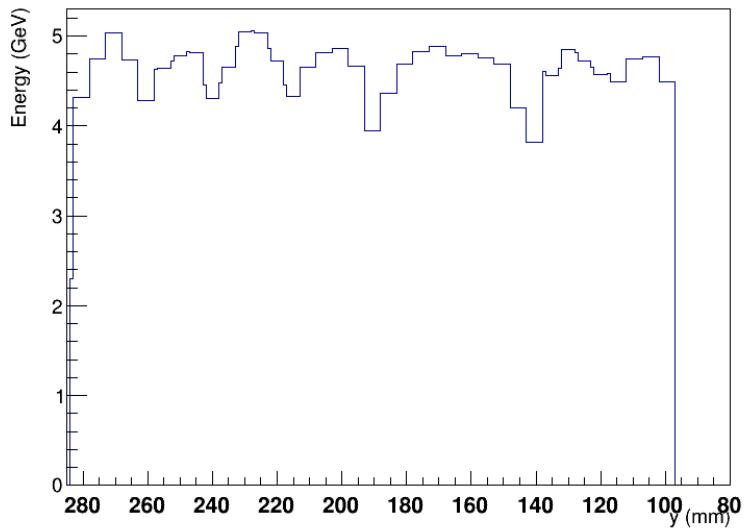


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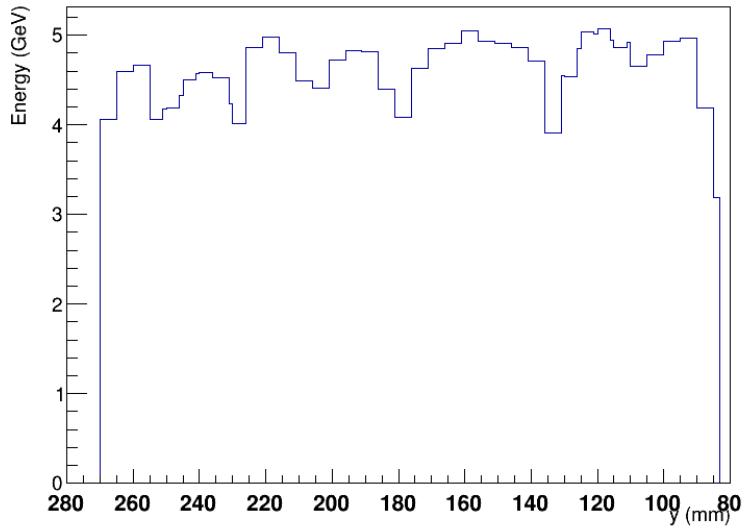


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

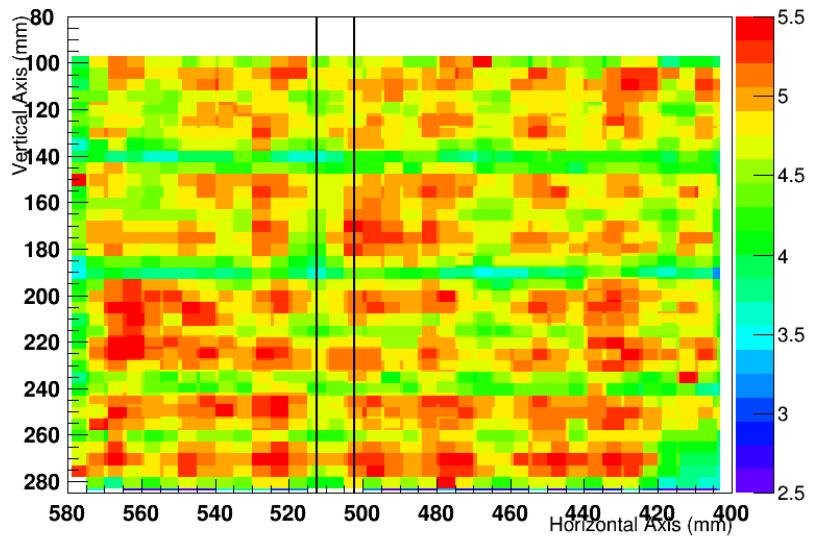
10 Y Bin Energy Distribution



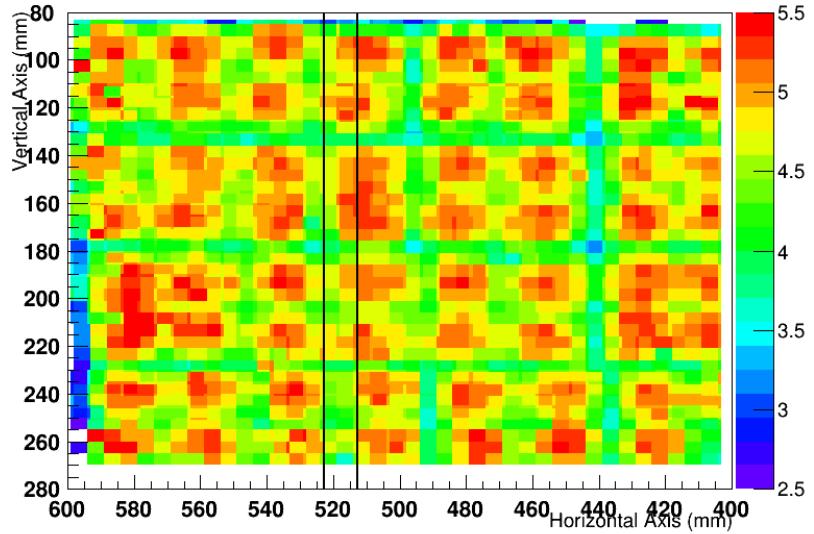
10 Y Bin Energy Distribution



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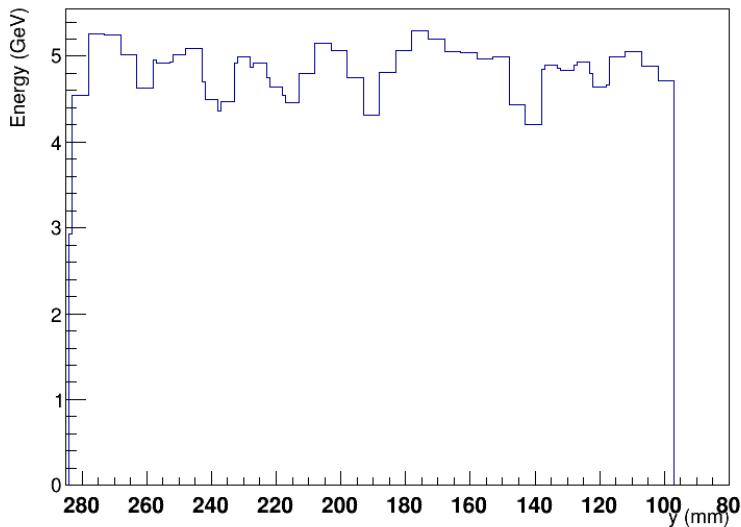


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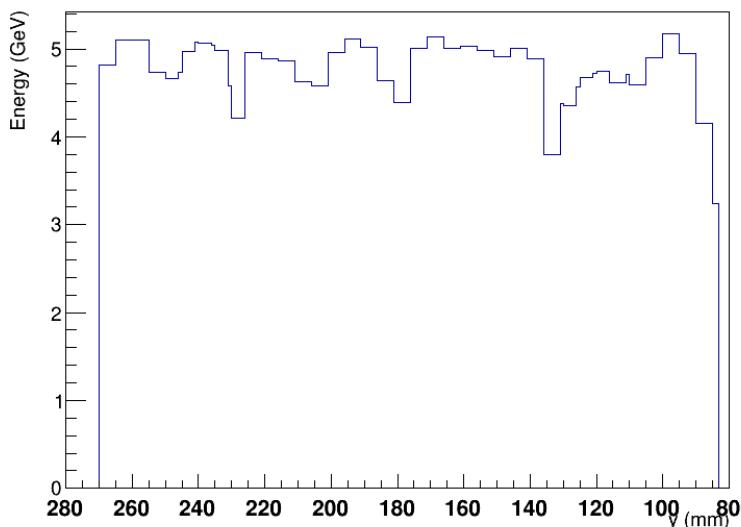


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

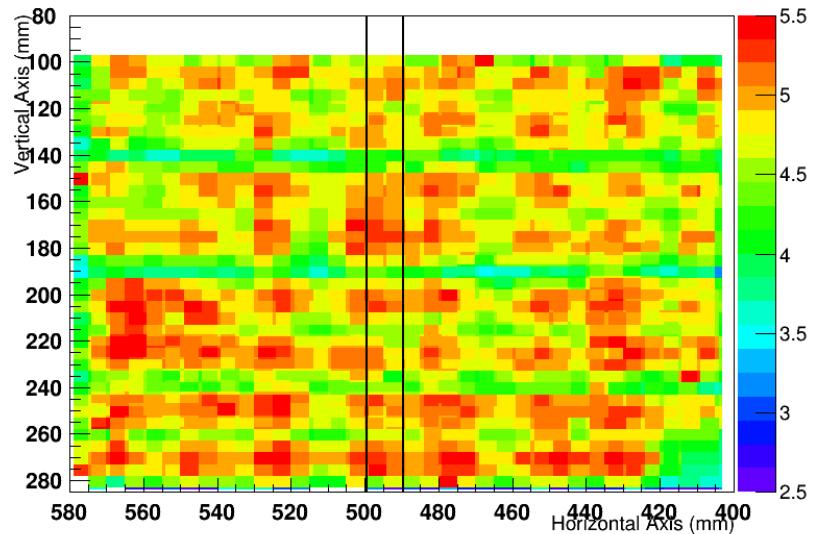
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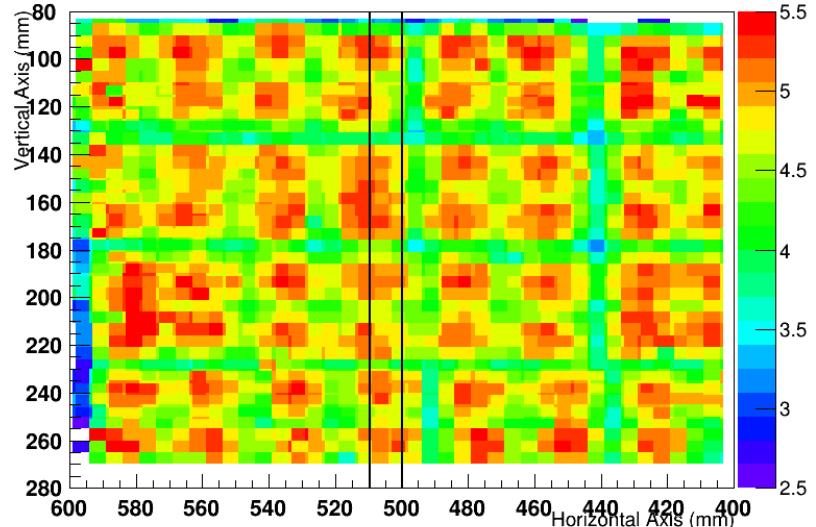
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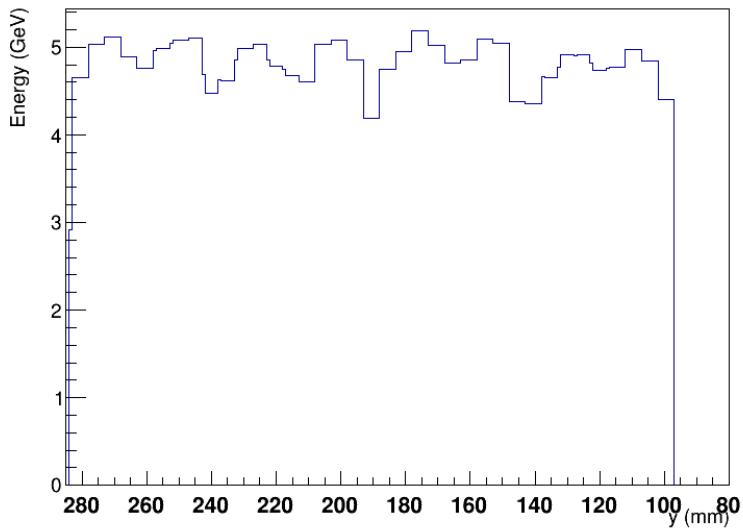


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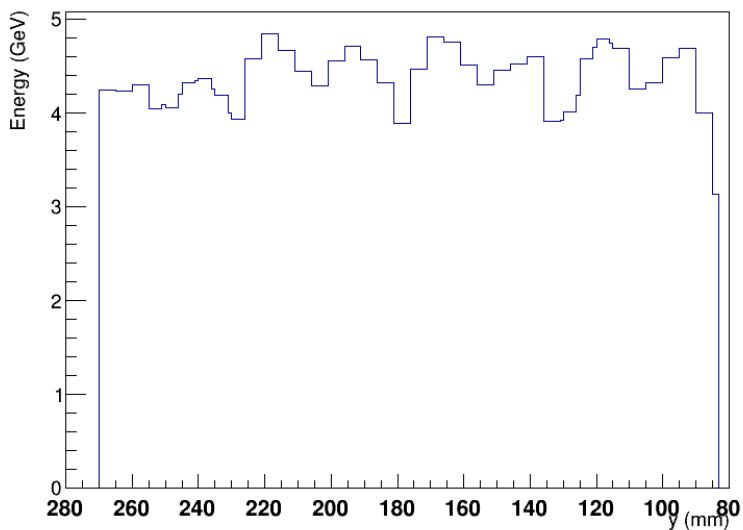


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

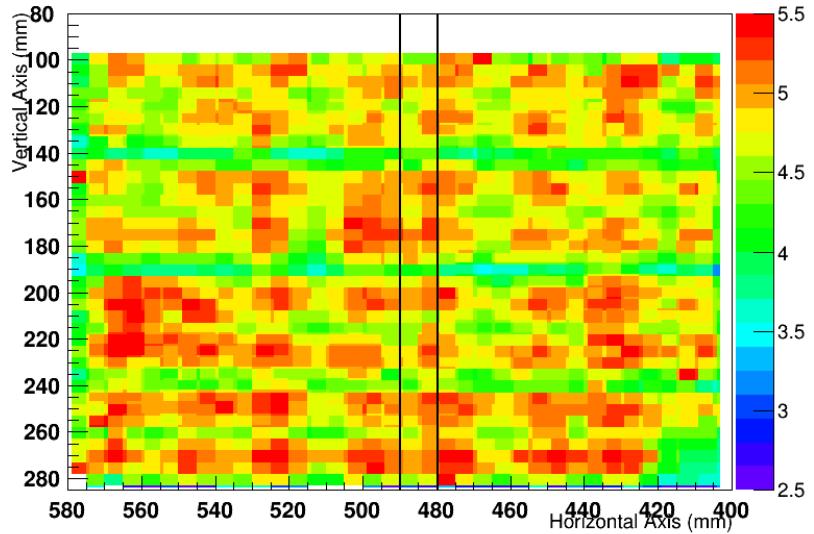
10 Y Bin Energy Distribution



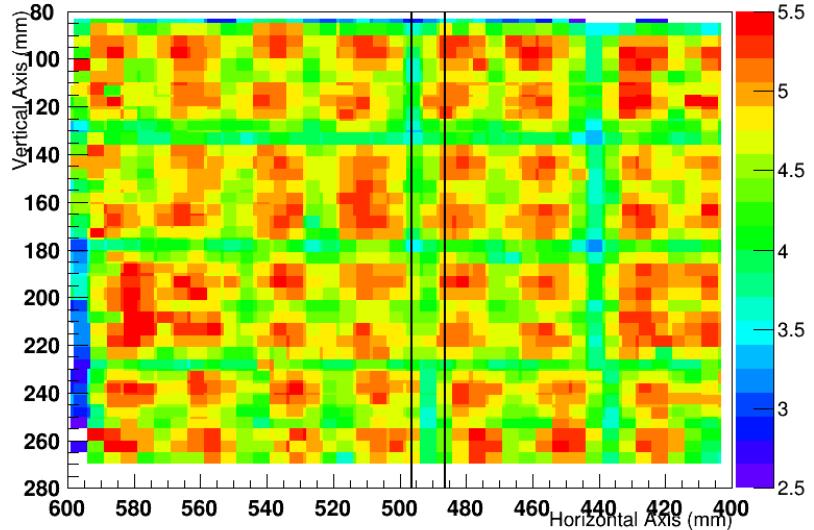
10 Y Bin Energy Distribution



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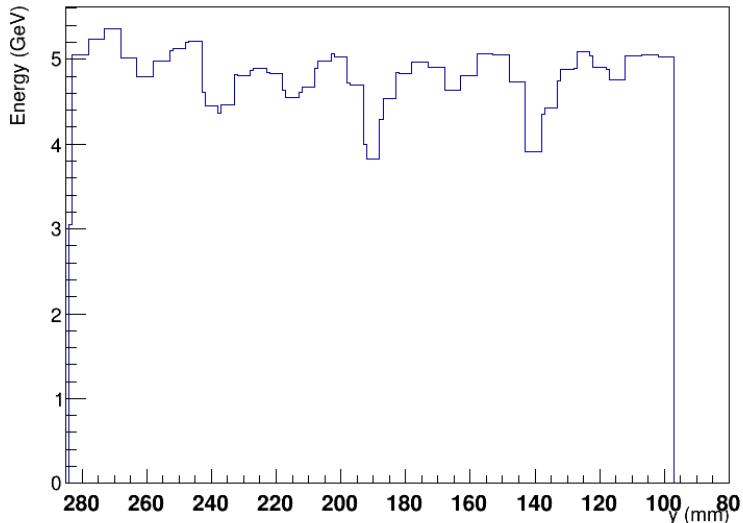


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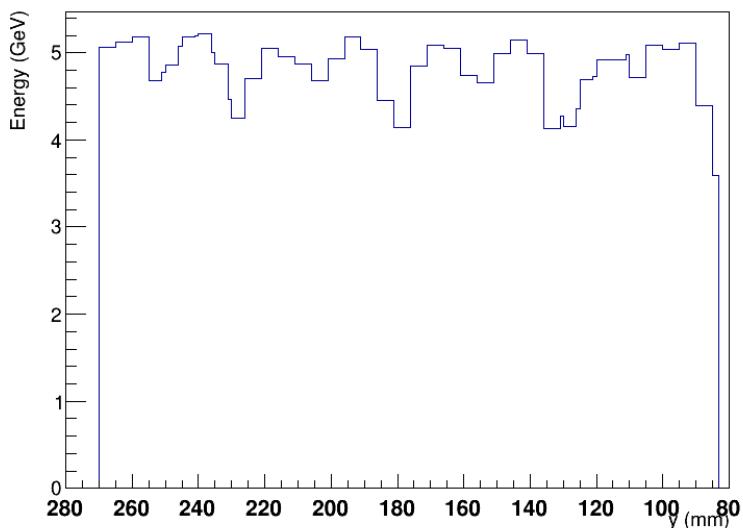


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

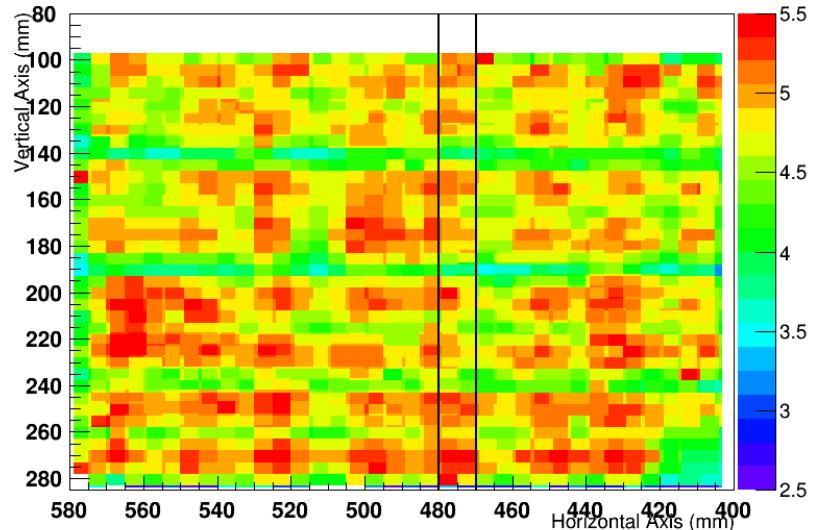
10 Y Bin Energy Distribution



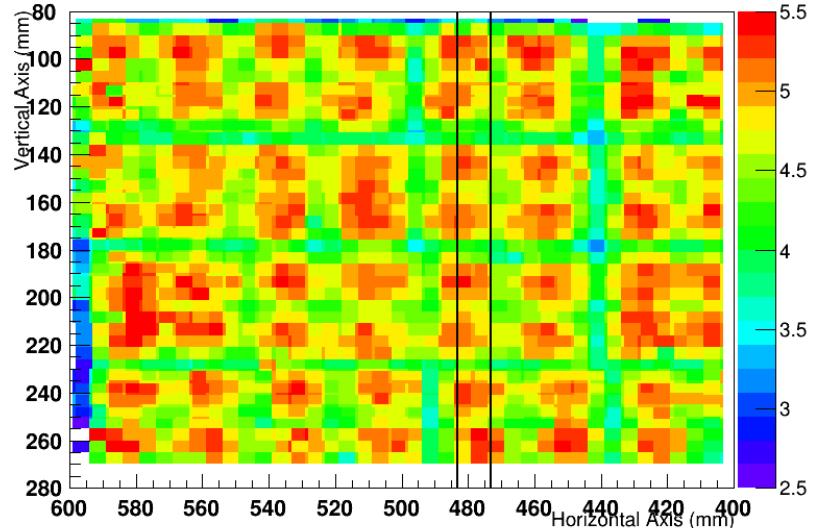
10 Y Bin Energy Distribution



2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

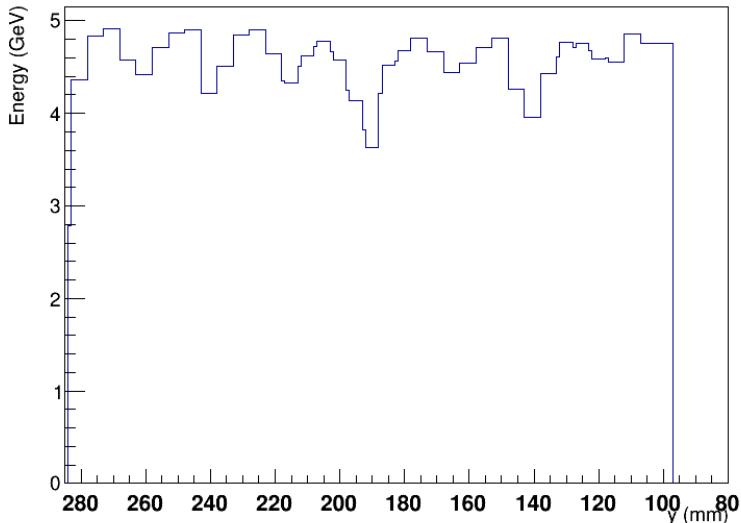


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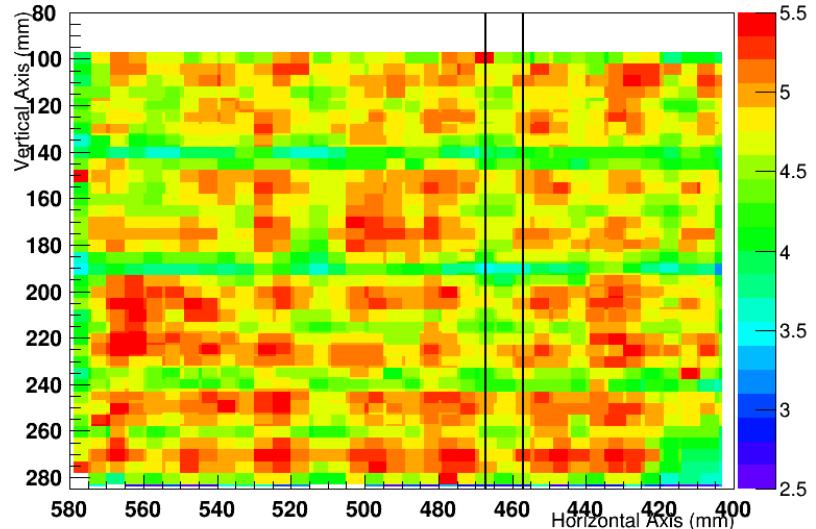


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

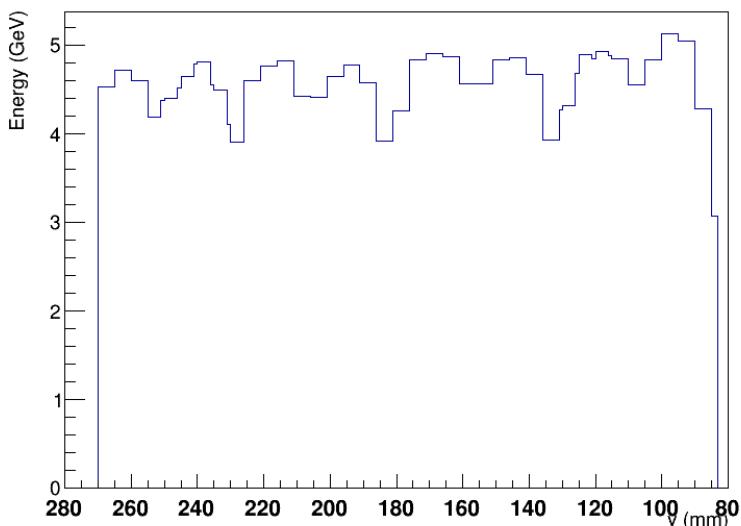
10 Y Bin Energy Distribution



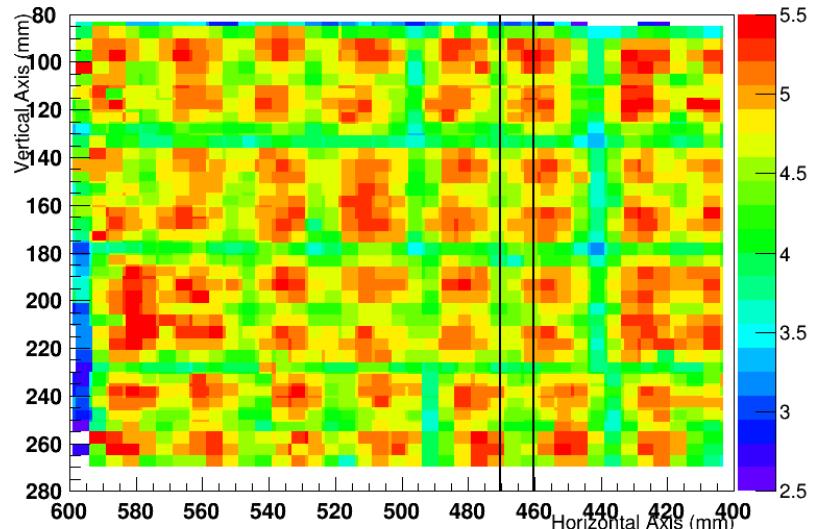
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10 Y Bin Energy Distribution

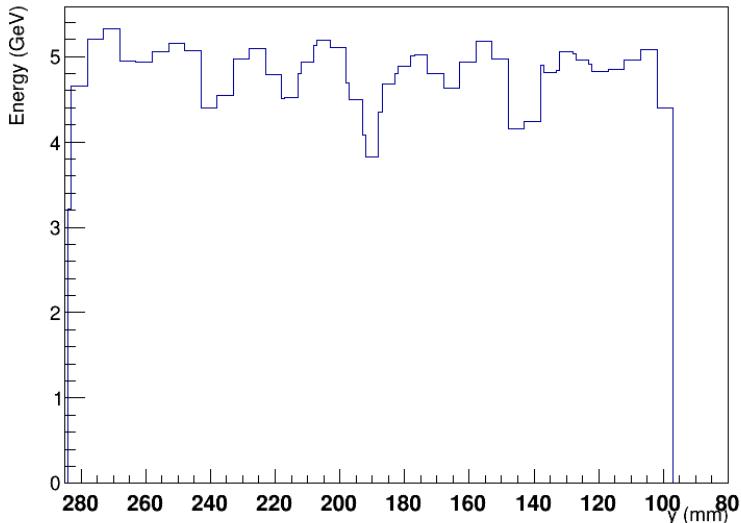


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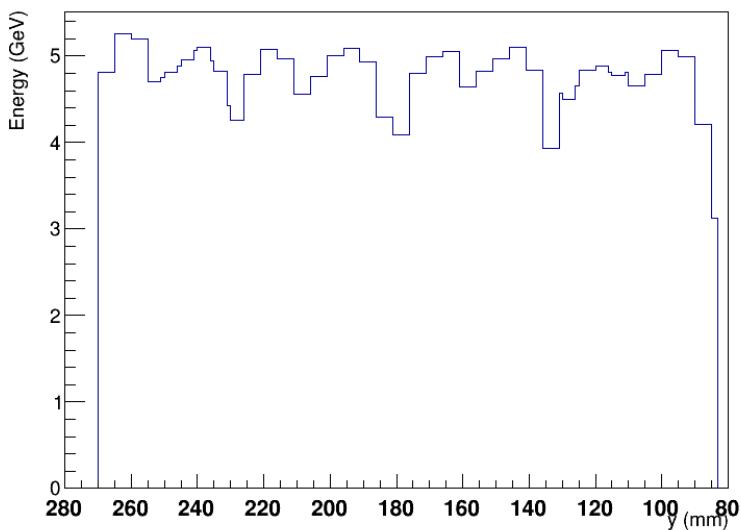


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

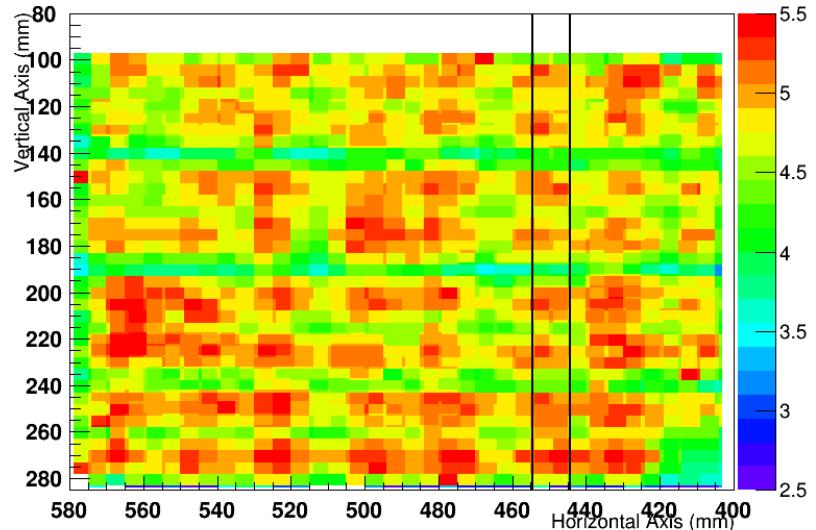
10 Y Bin Energy Distribution



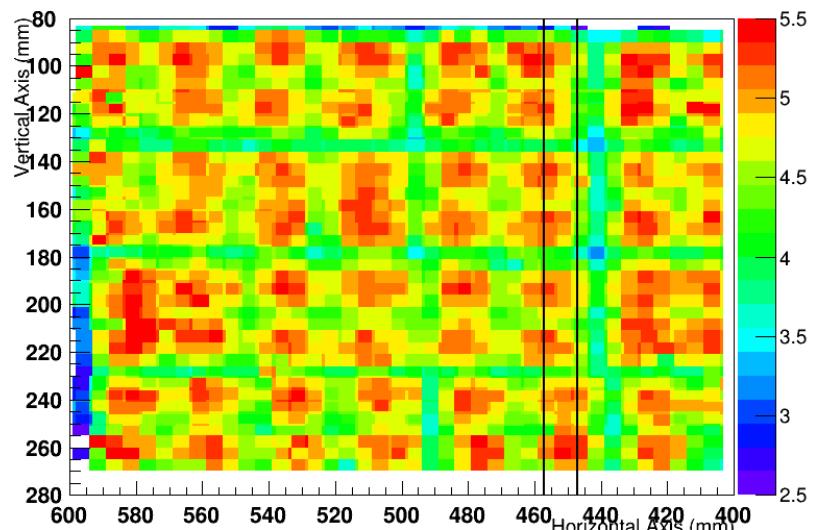
10 Y Bin Energy Distribution



2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

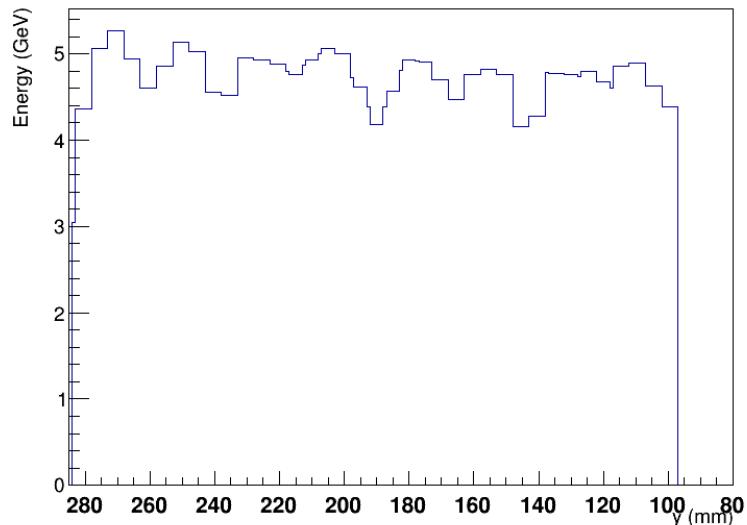


2018_Interpolation-Dual-Channel-Reversed_Fits_recalib

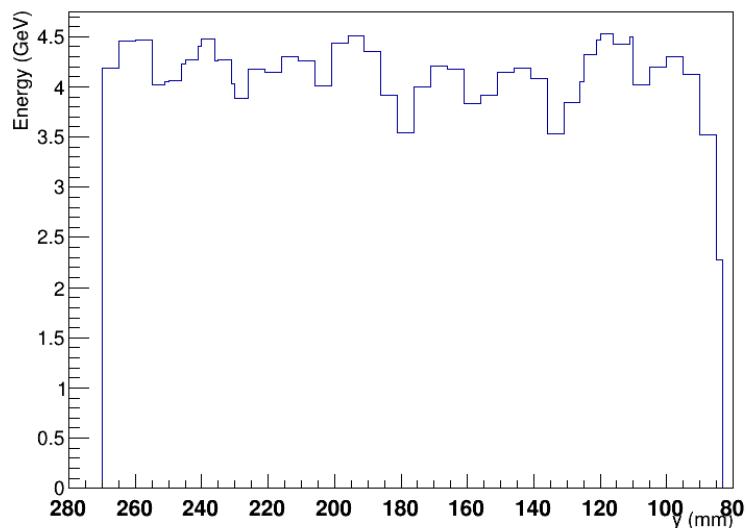


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

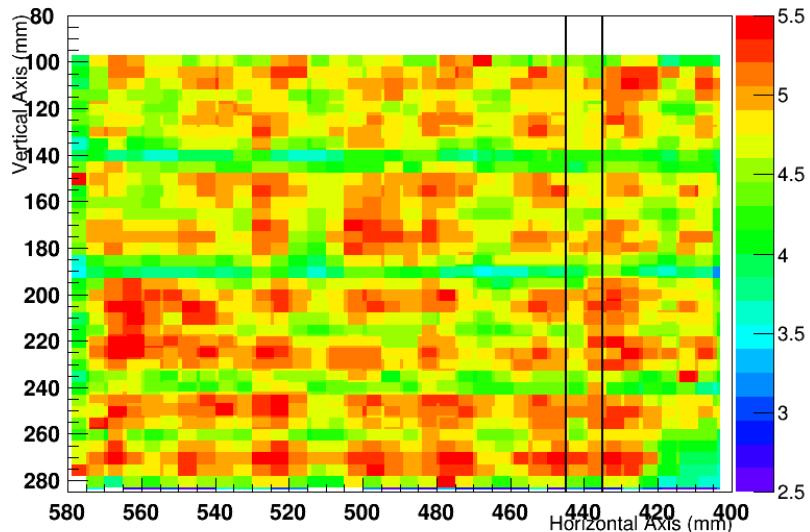
10 Y Bin Energy Distribution



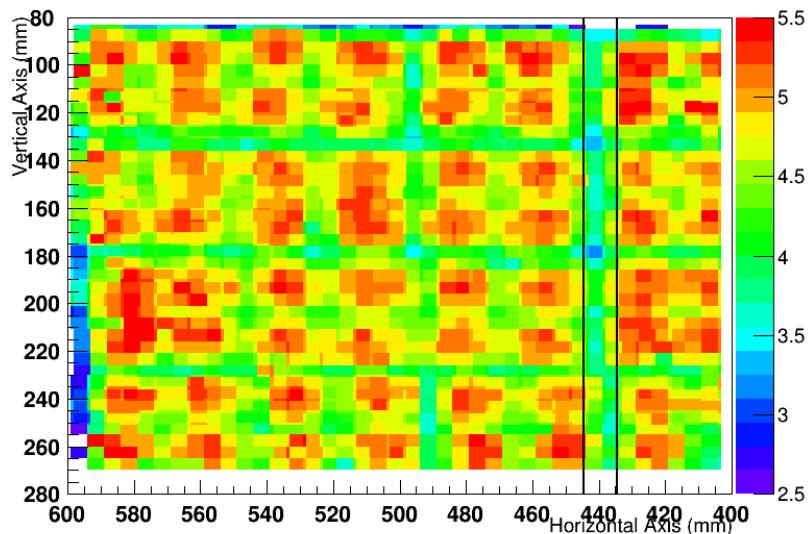
10 Y Bin Energy Distribution



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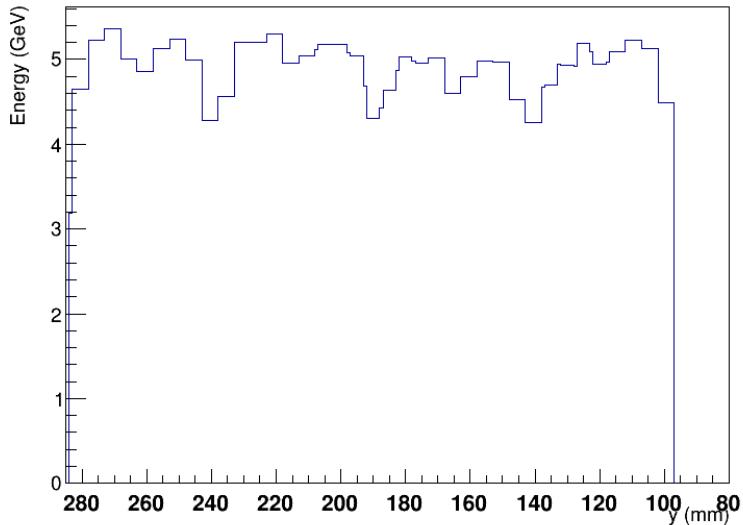


2018_Interpolation-Dual-Channel-Reversed_Fits_recalib

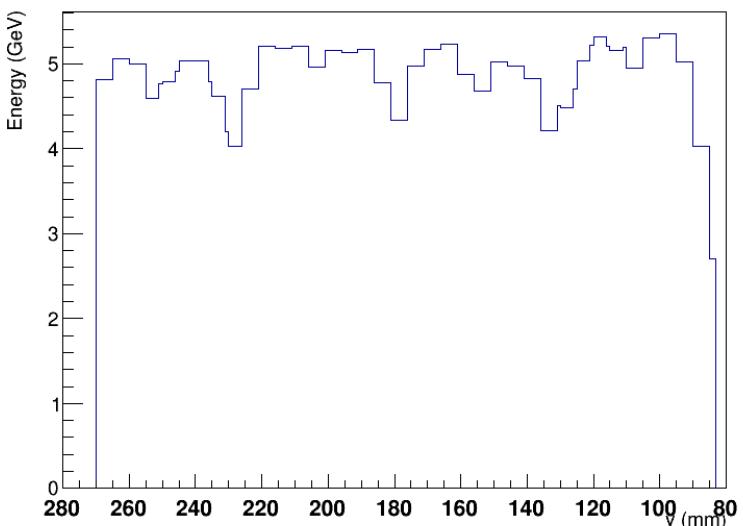


1D Projections Horizontal – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

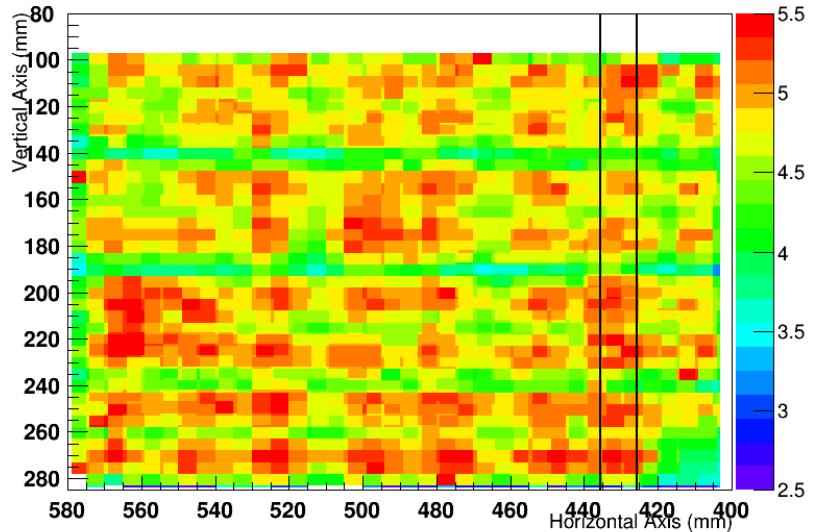
10 Y Bin Energy Distribution



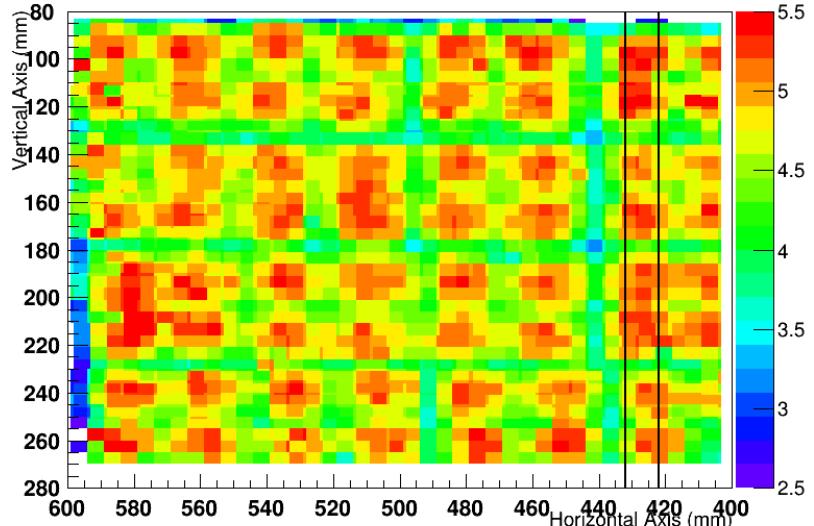
10 Y Bin Energy Distribution



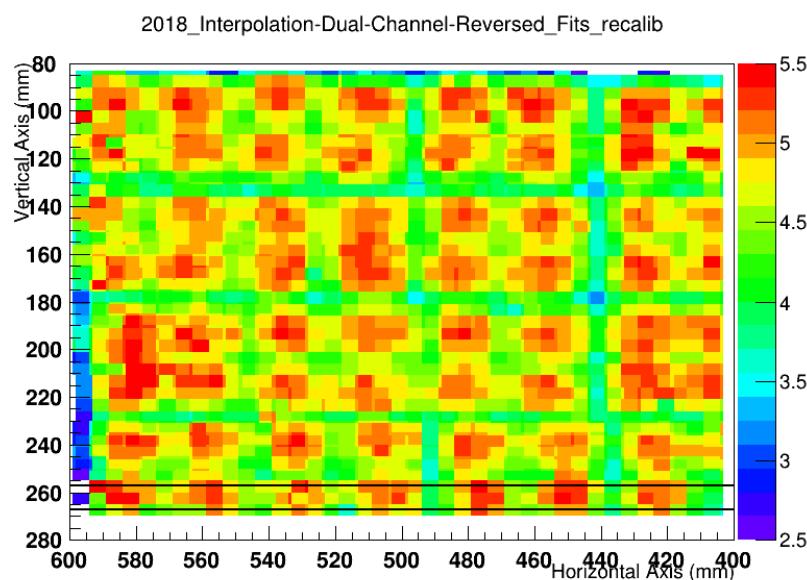
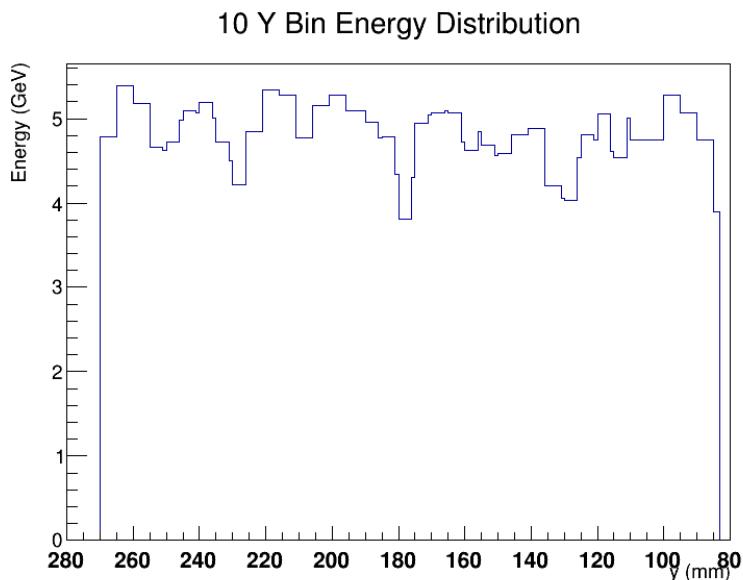
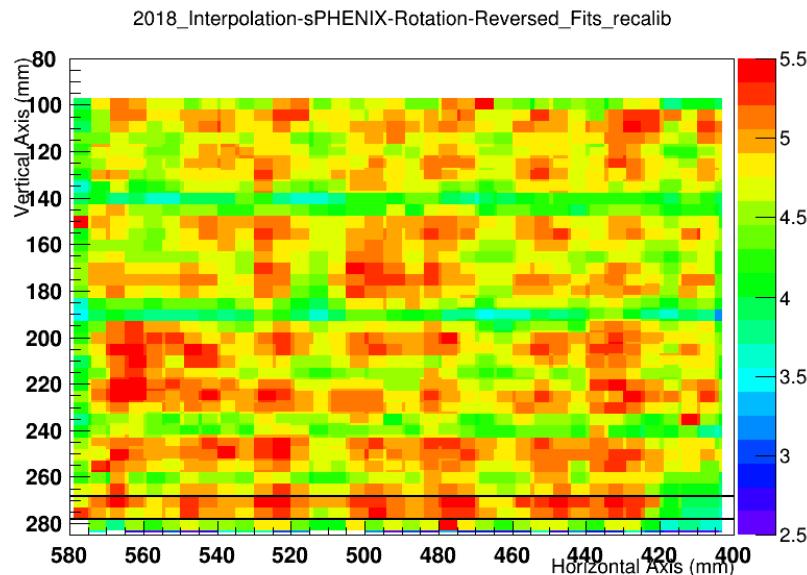
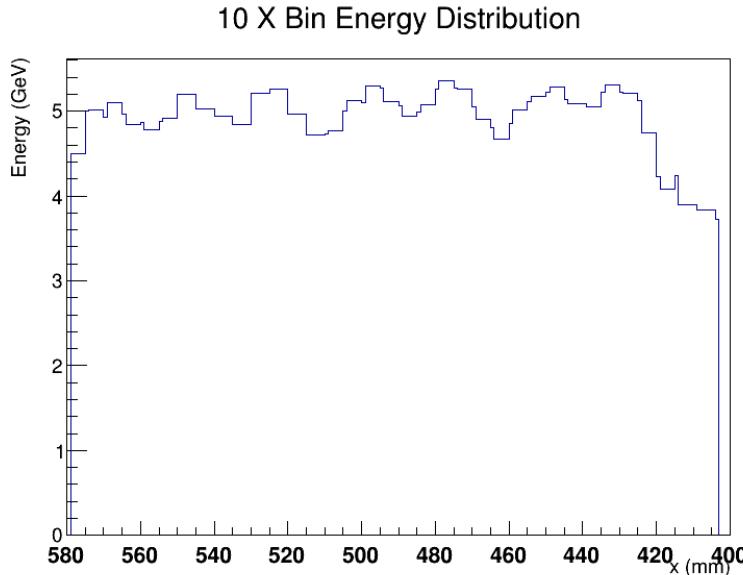
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2018_Interpolation-Dual-Channel-Reversed_Fits_recalib

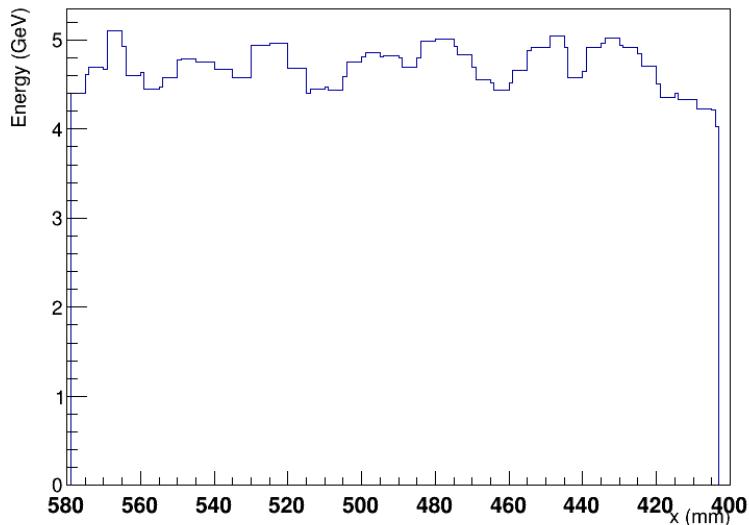


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

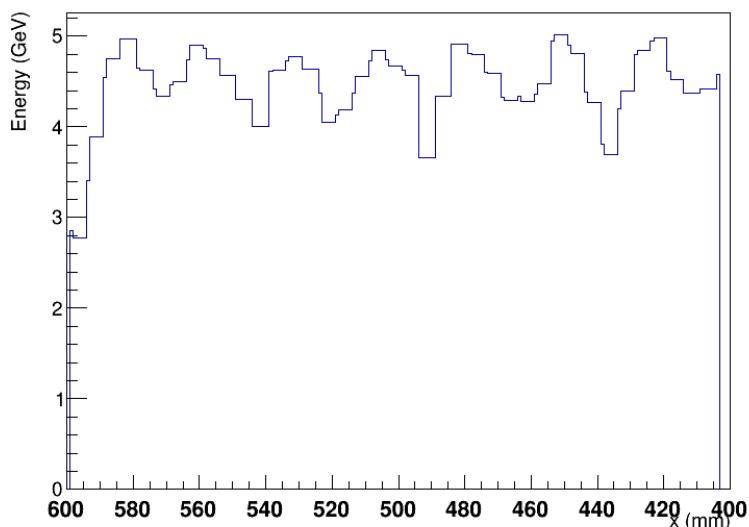


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

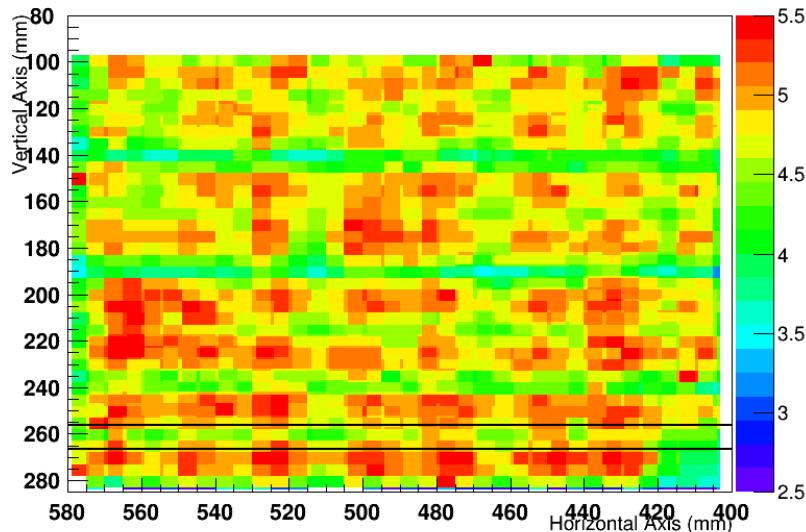
10 X Bin Energy Distribution



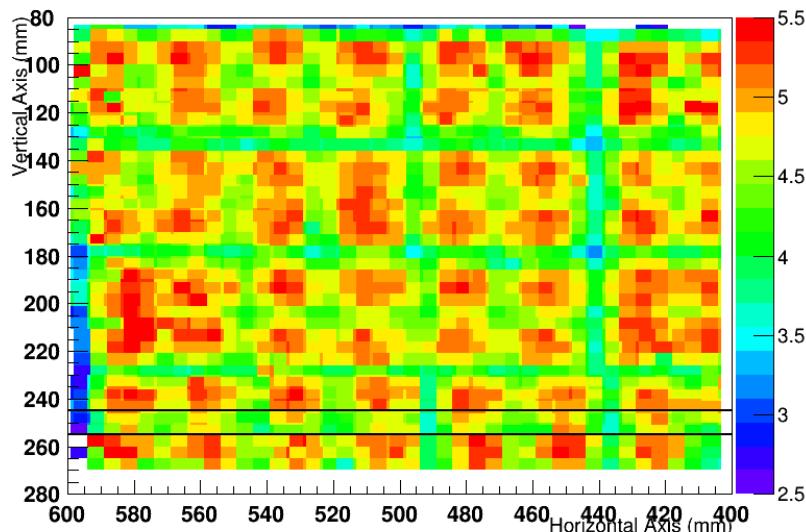
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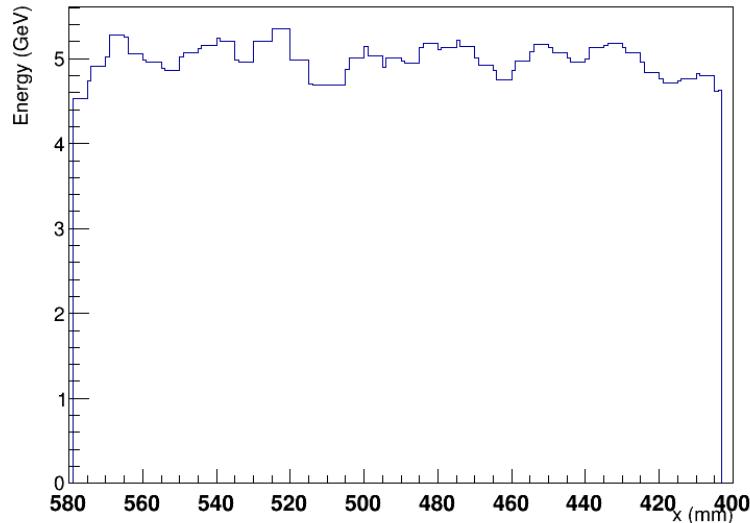


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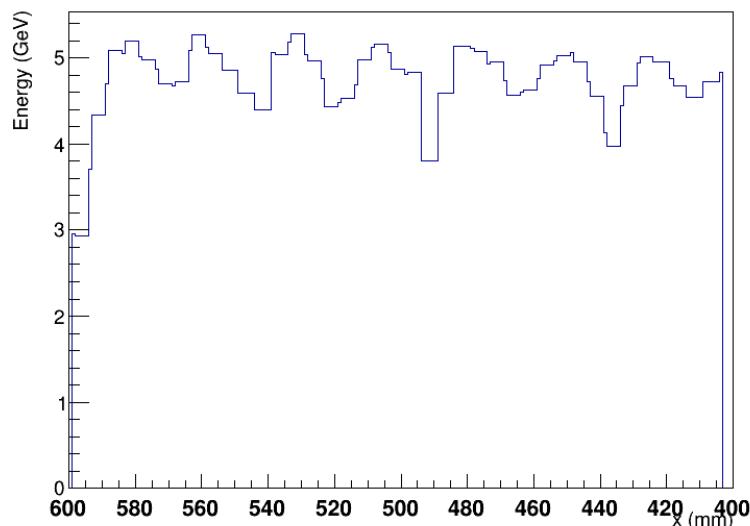


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

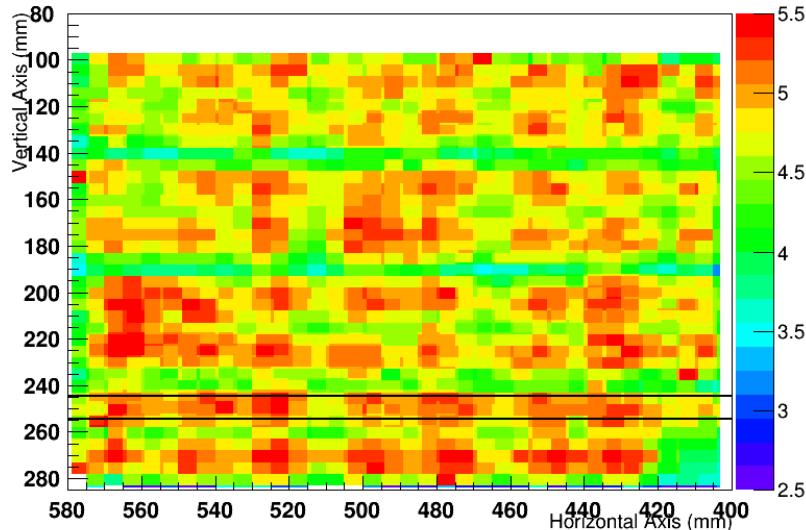
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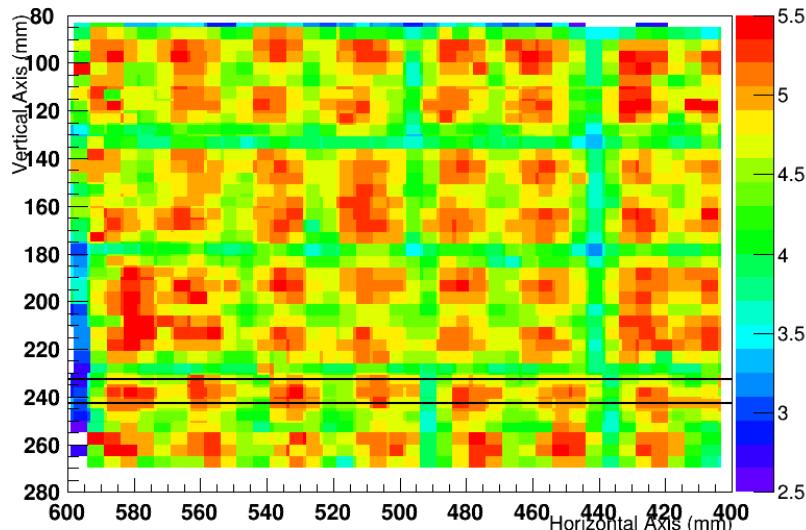
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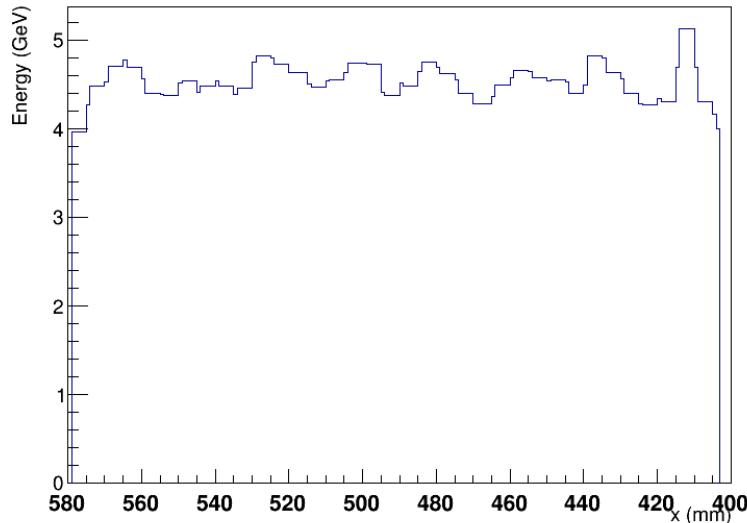


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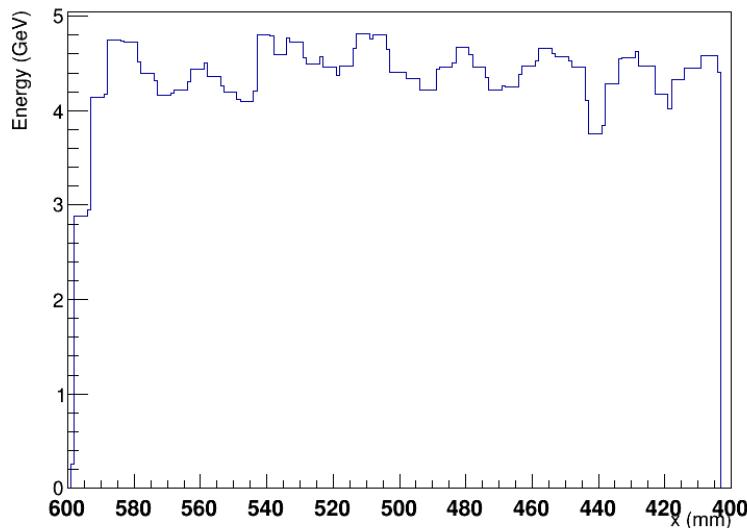


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

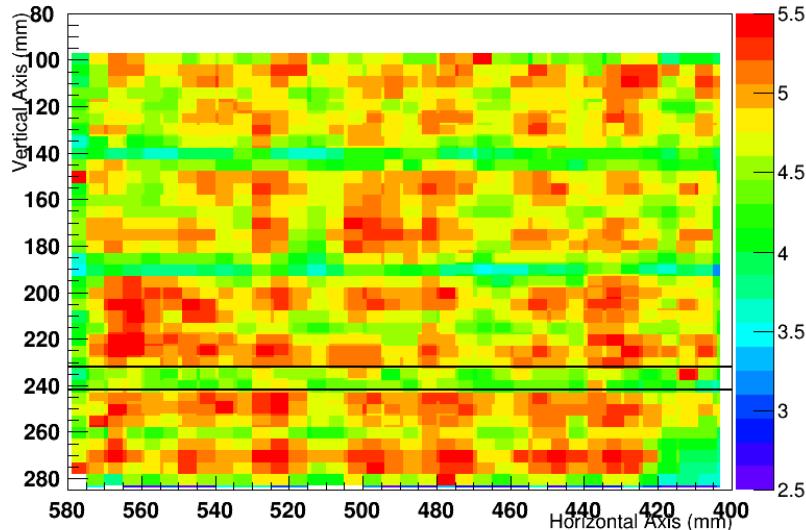
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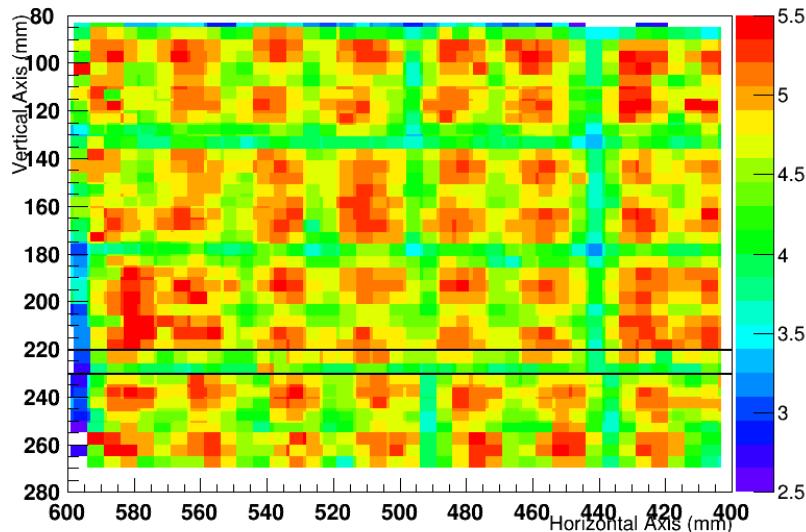
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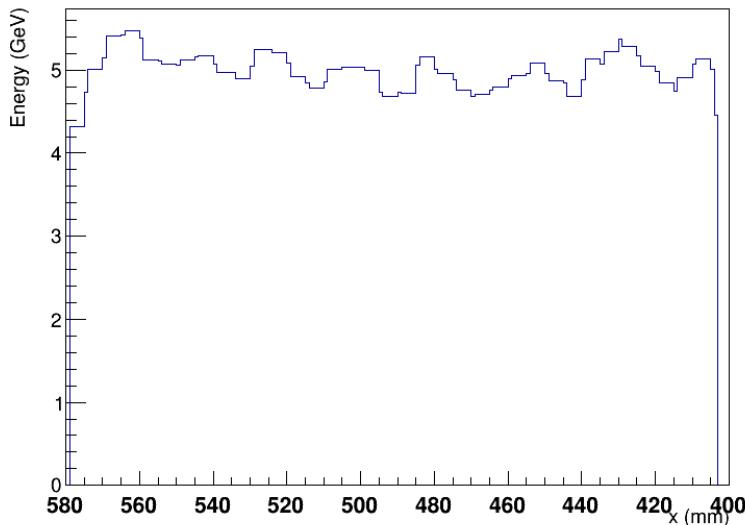


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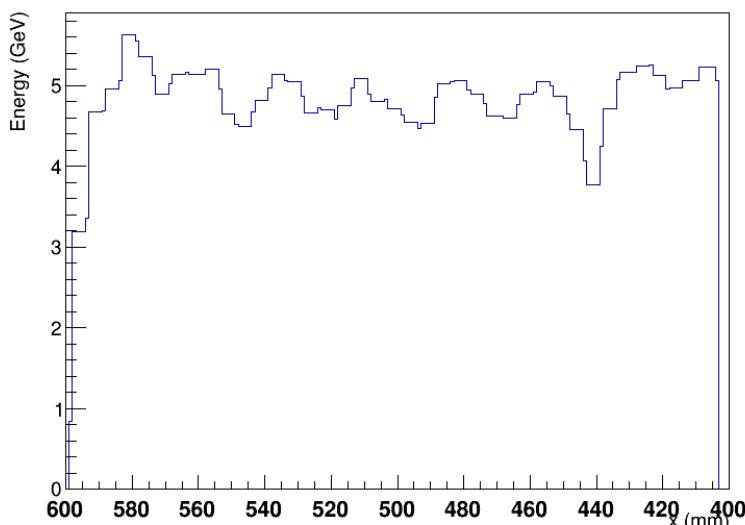


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

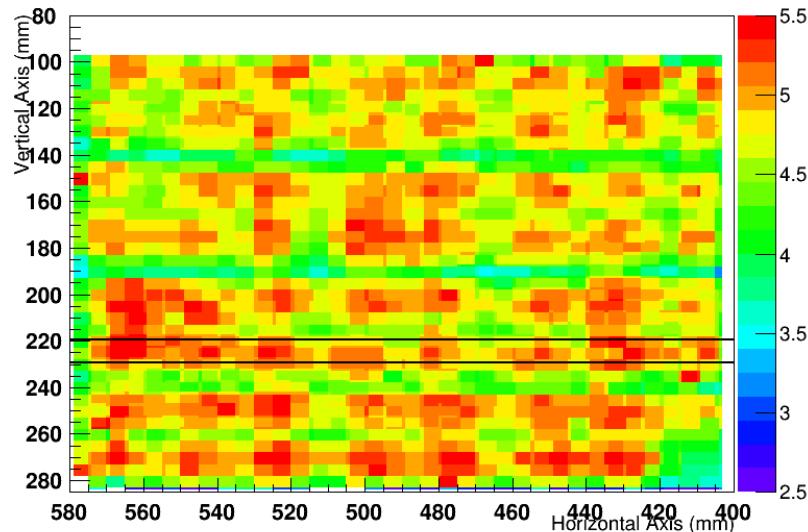
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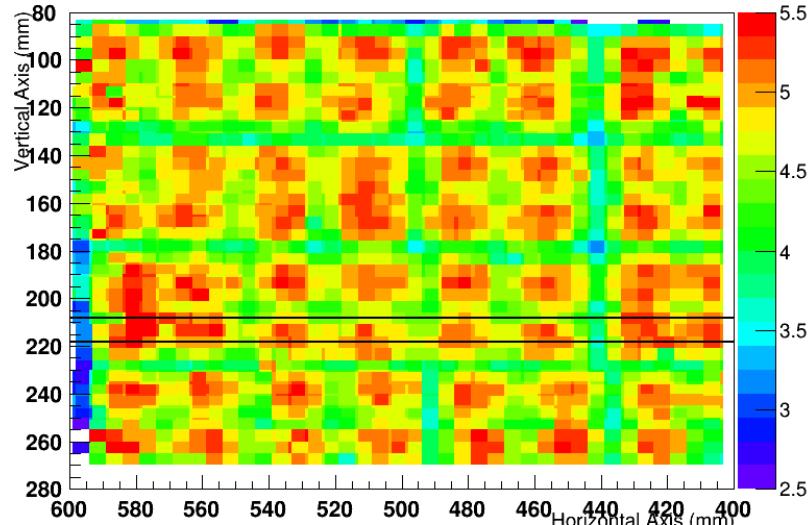
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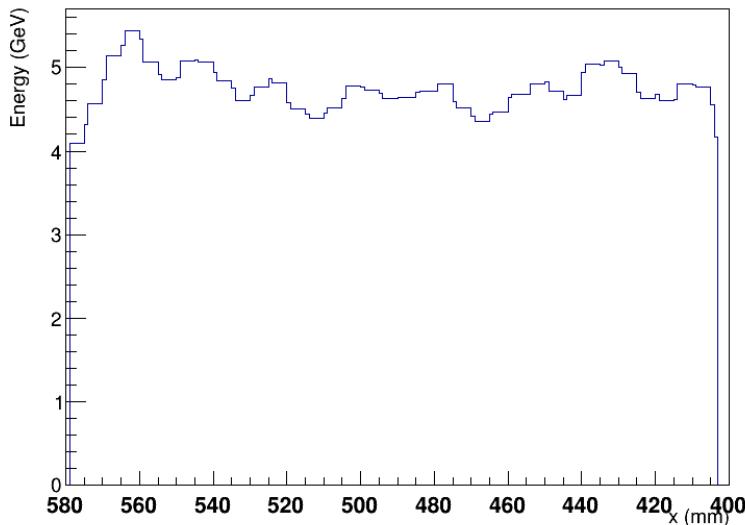


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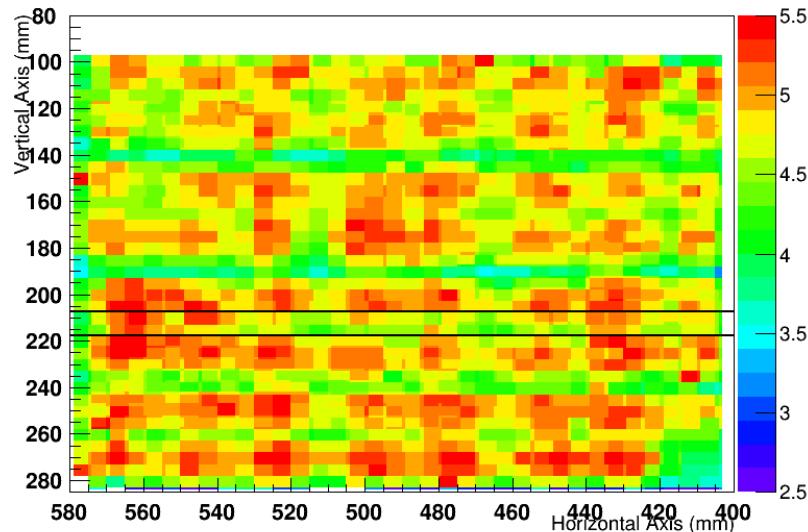


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

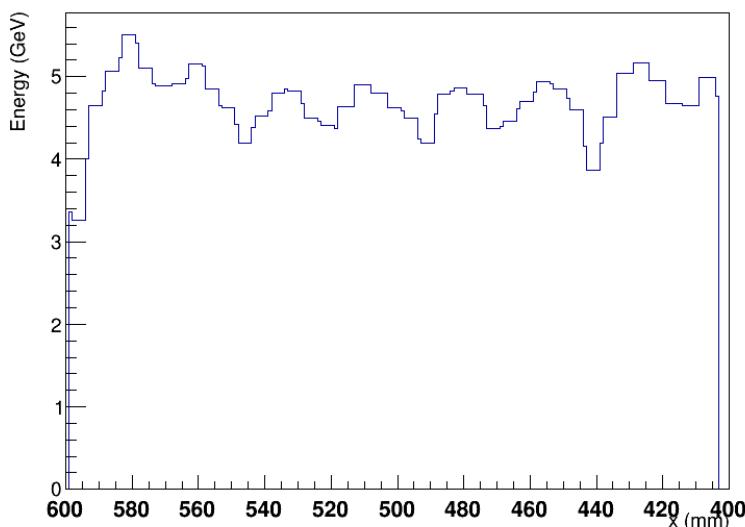
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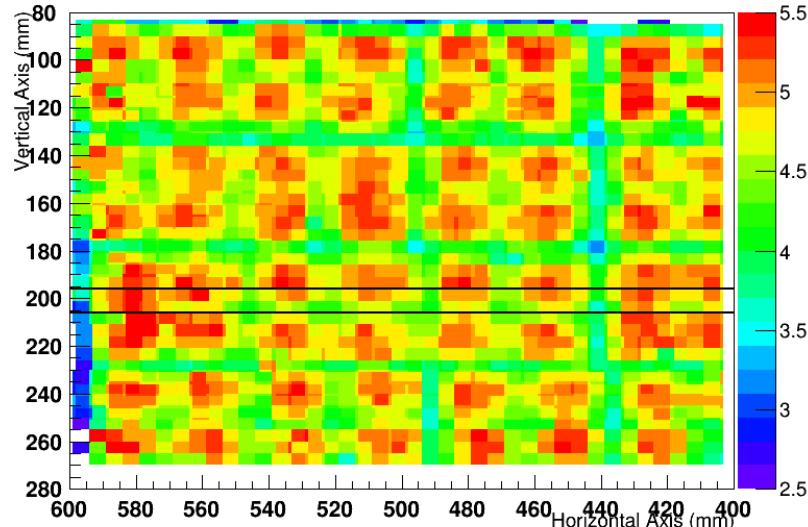
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10 X Bin Energy Distribution

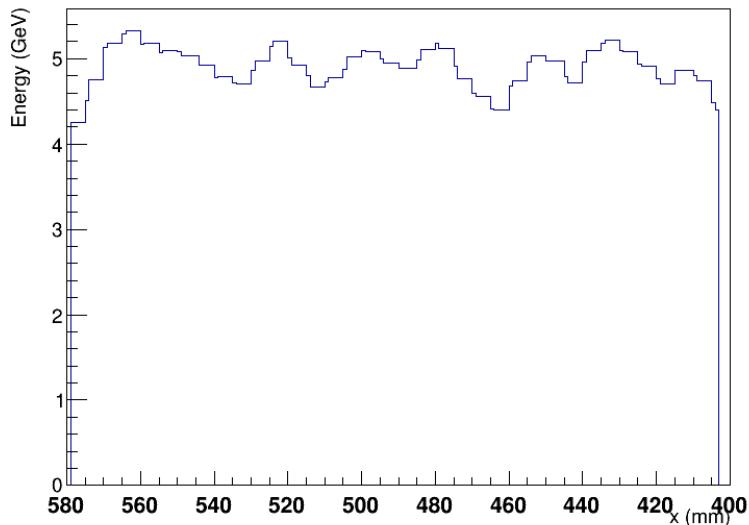


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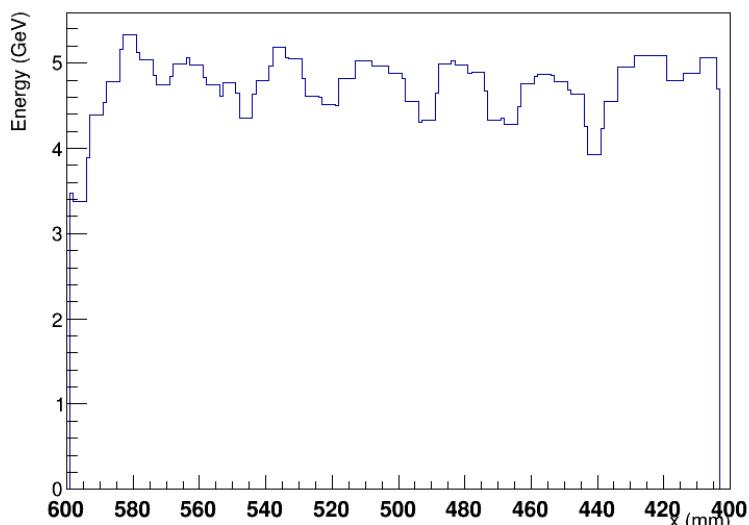


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

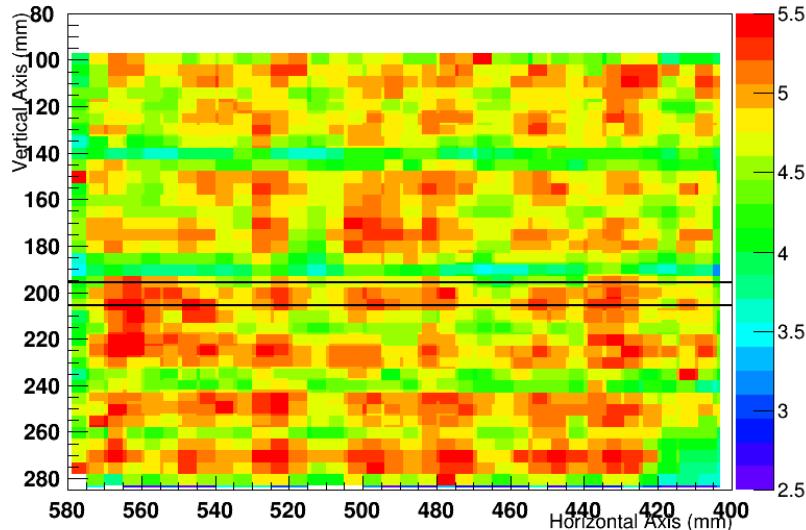
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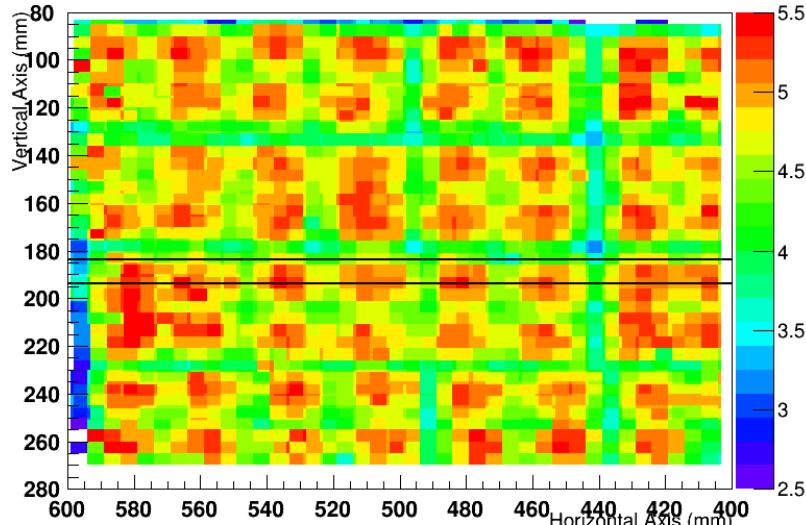
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2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

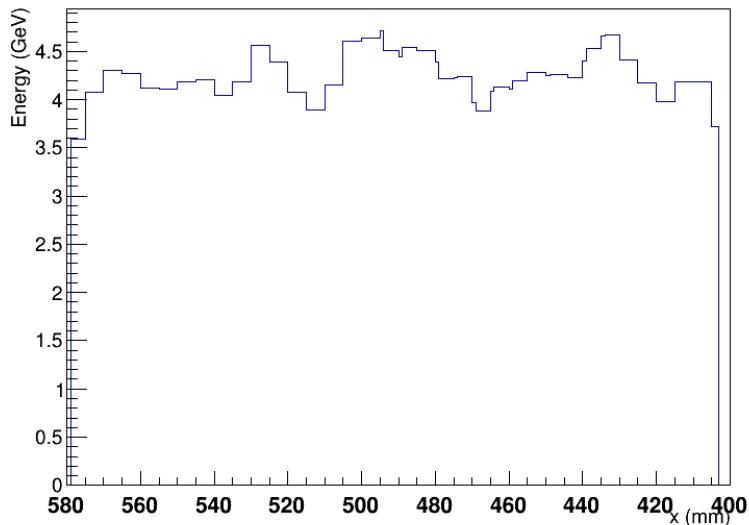


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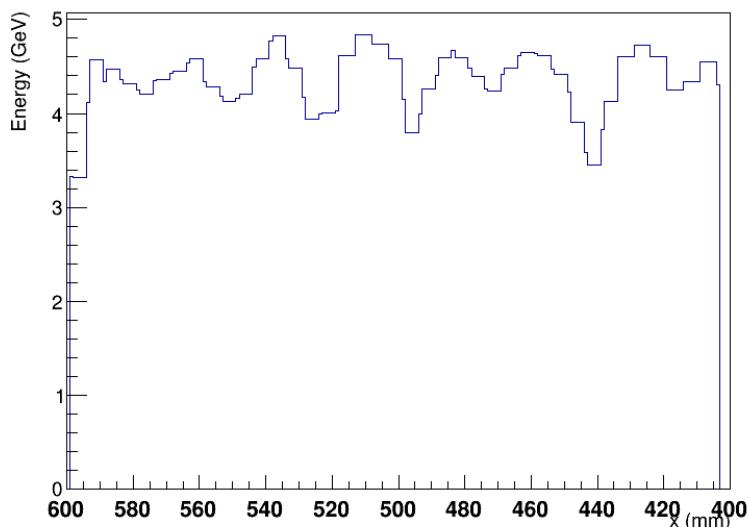


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

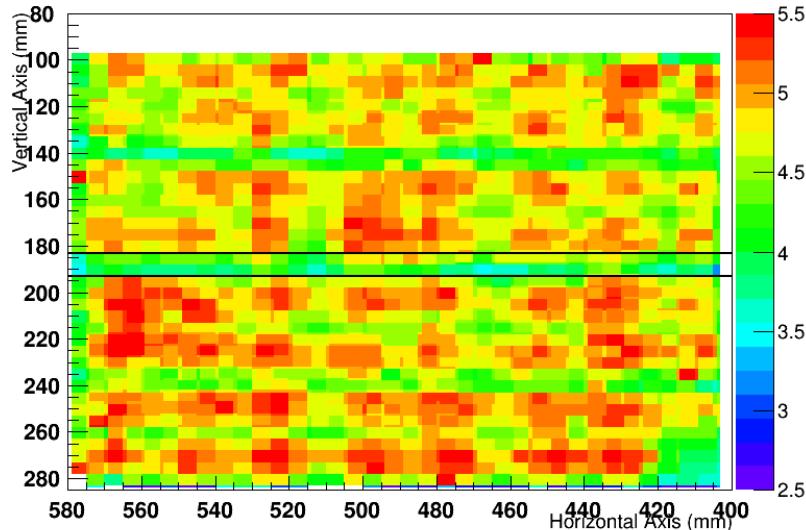
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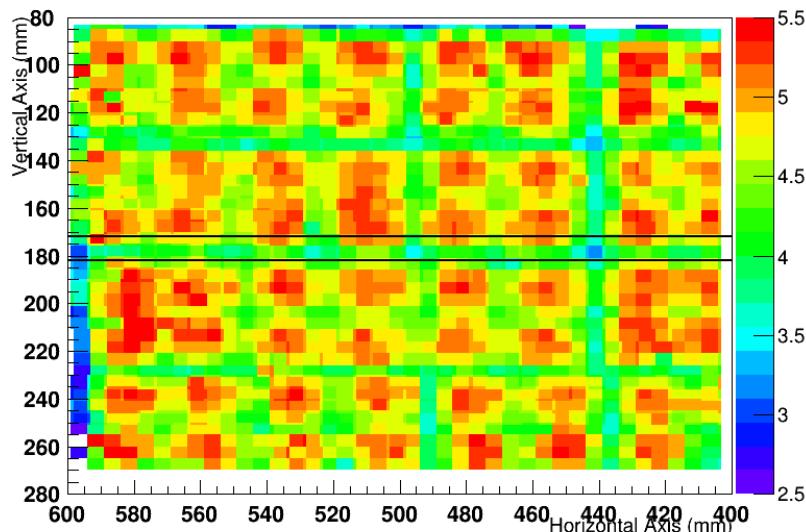
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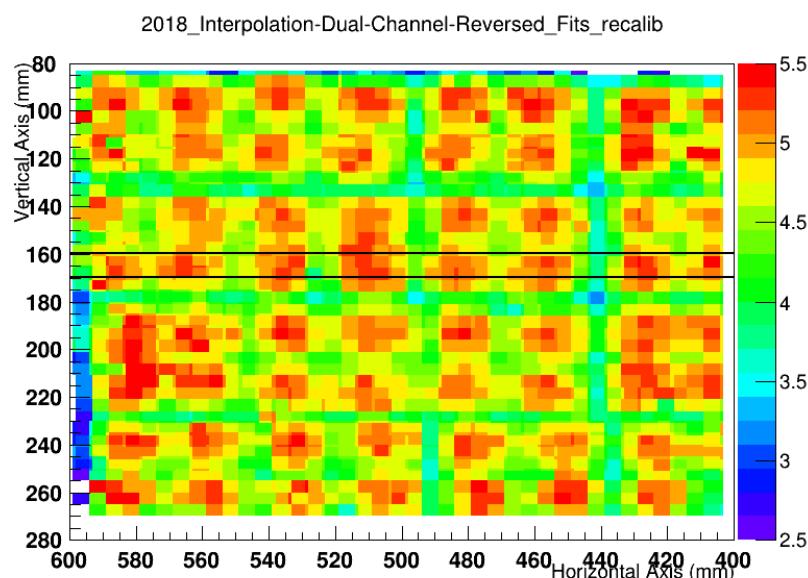
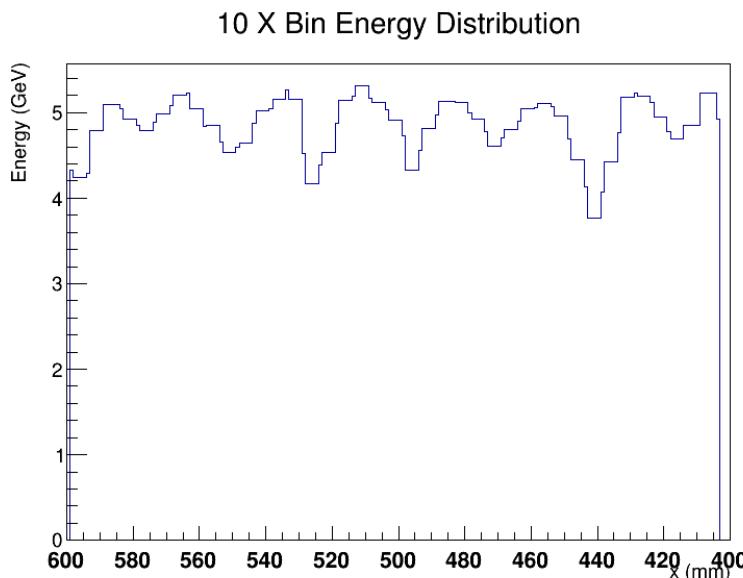
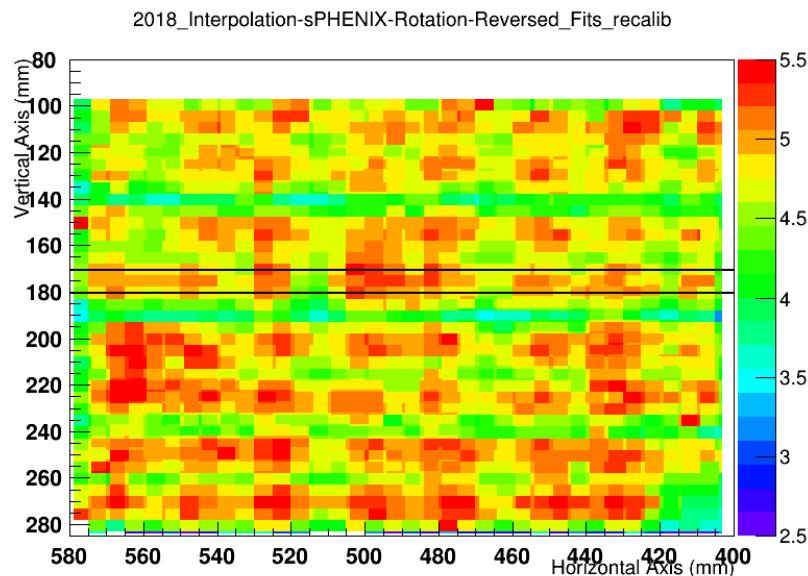
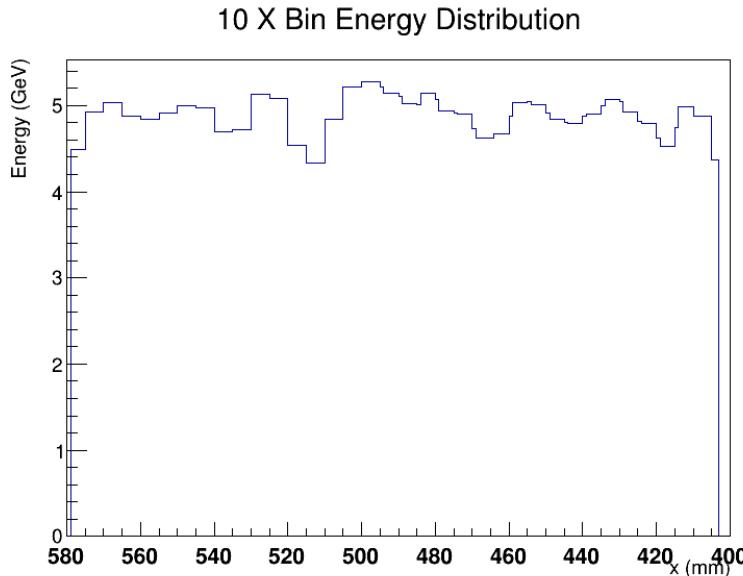
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2018_Interpolation-Dual-Channel-Reversed_Fits_recalib

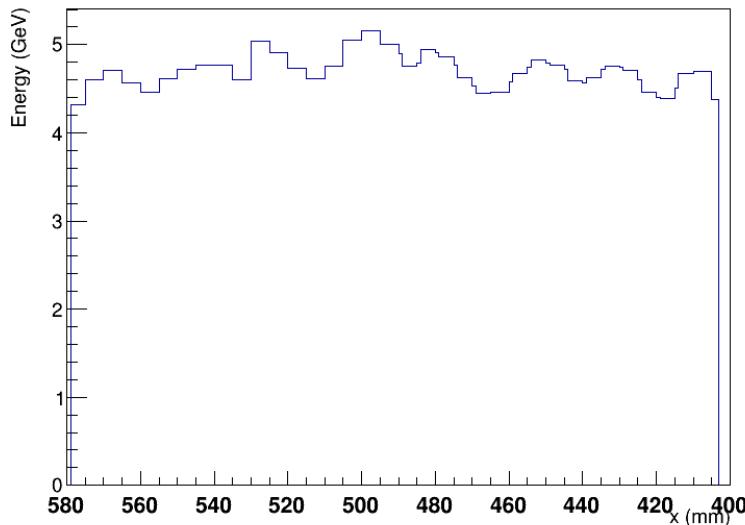


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

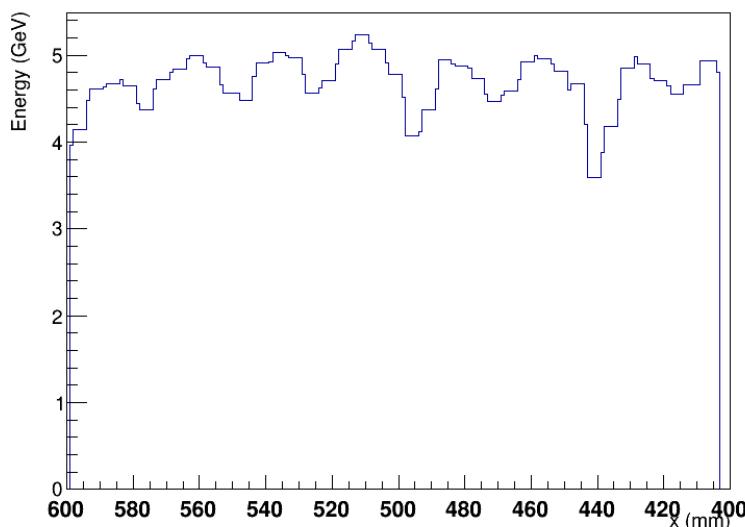


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

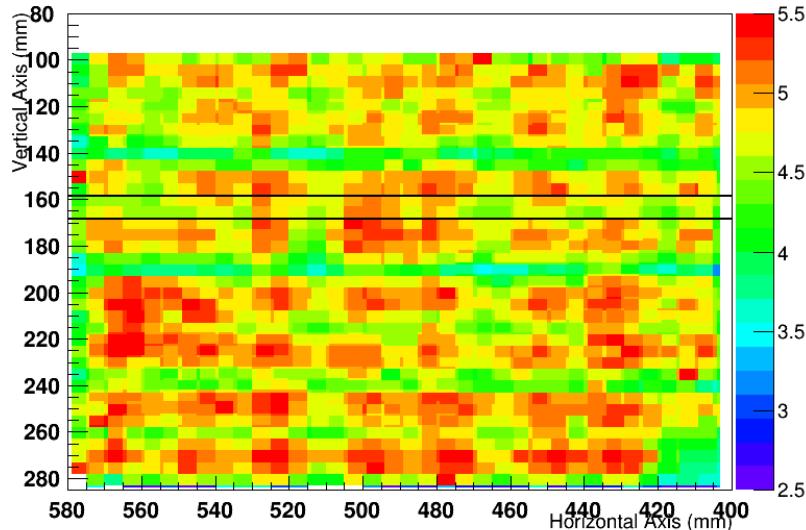
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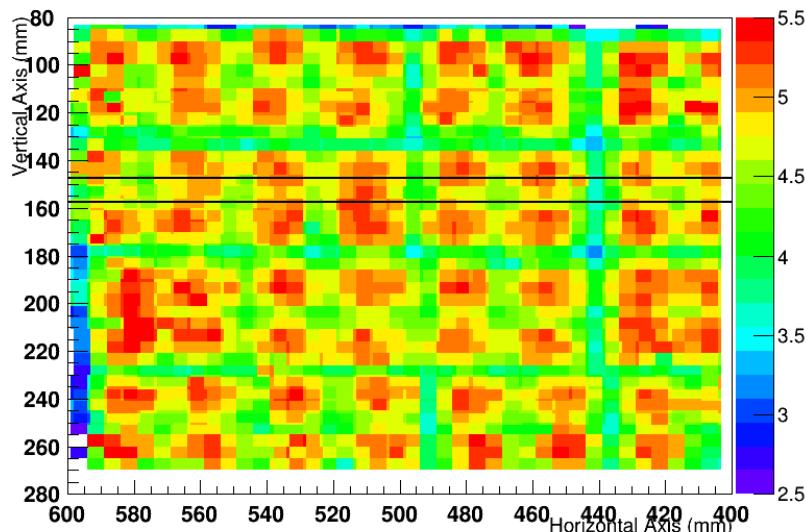
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2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

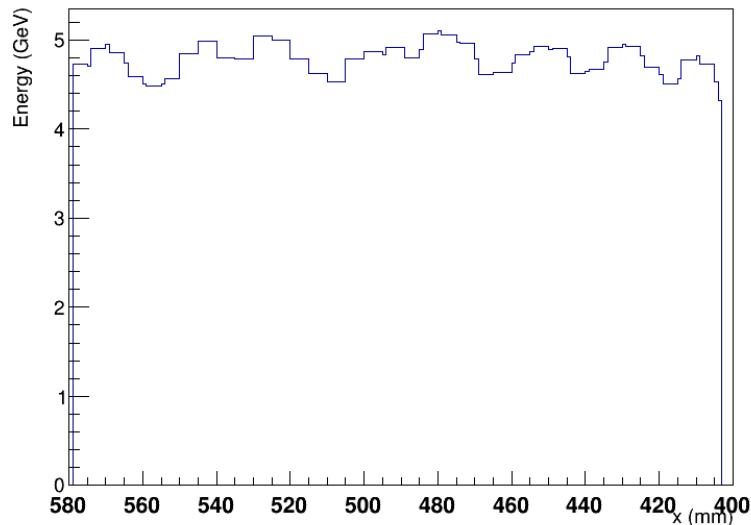


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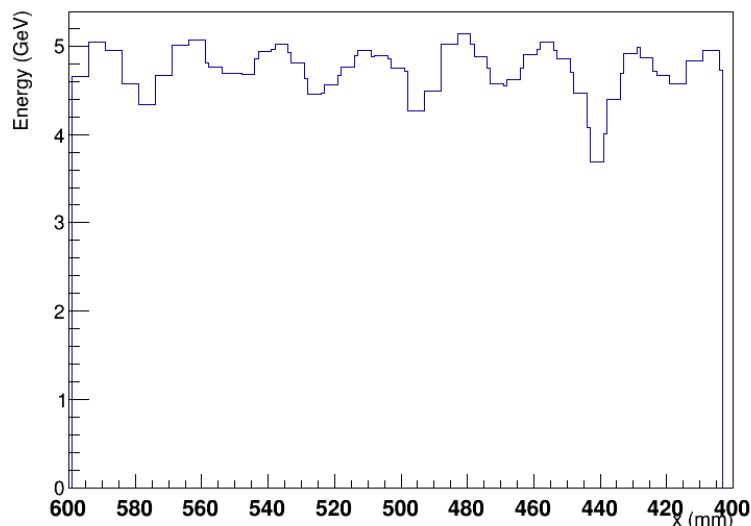


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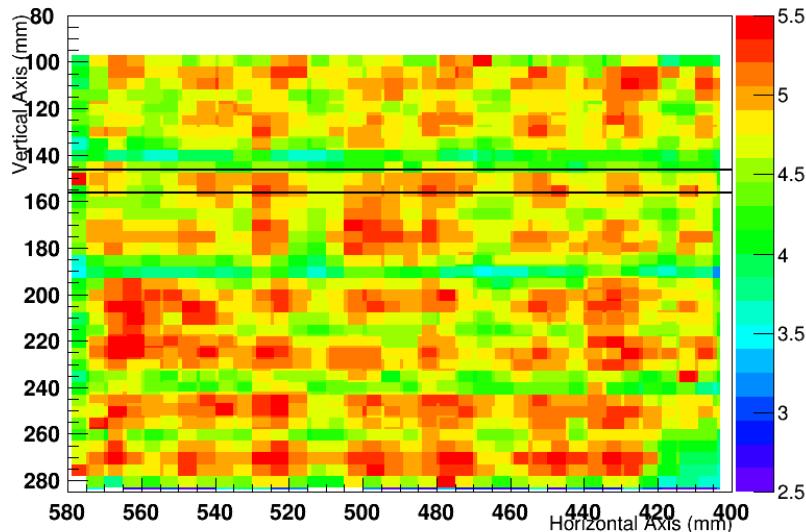
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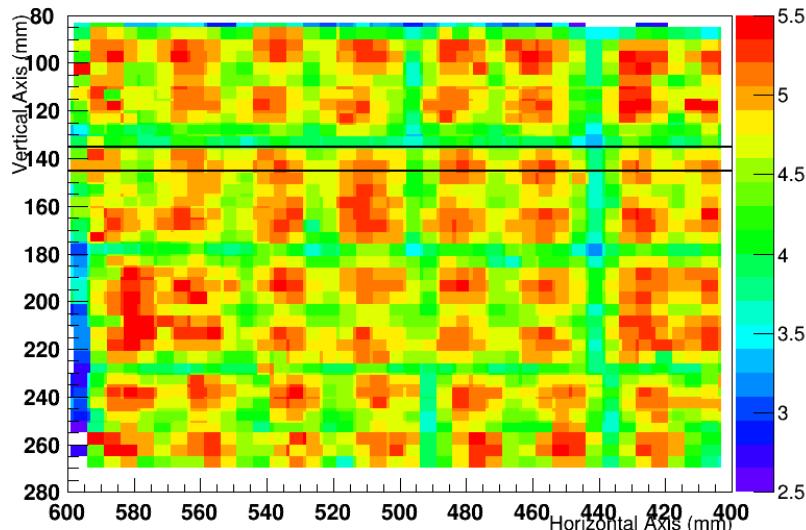
10 X Bin Energy Distribution



2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib

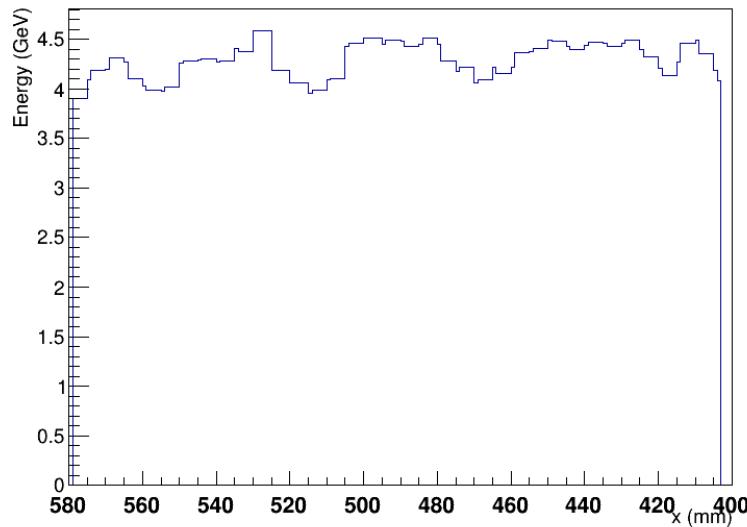


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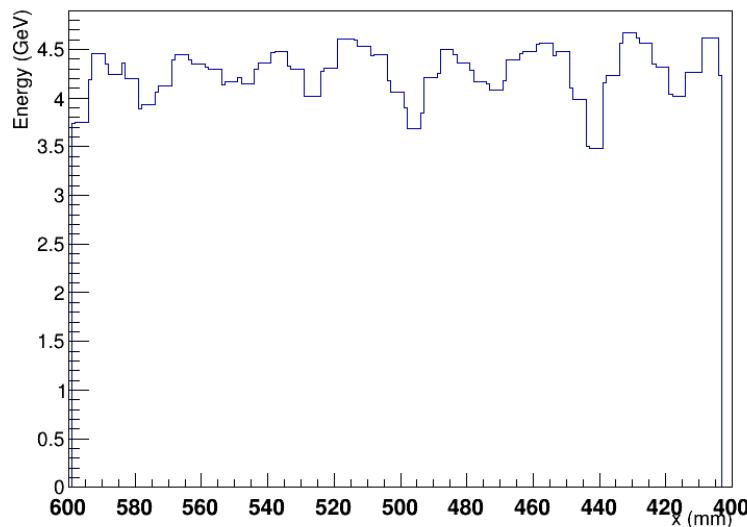


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

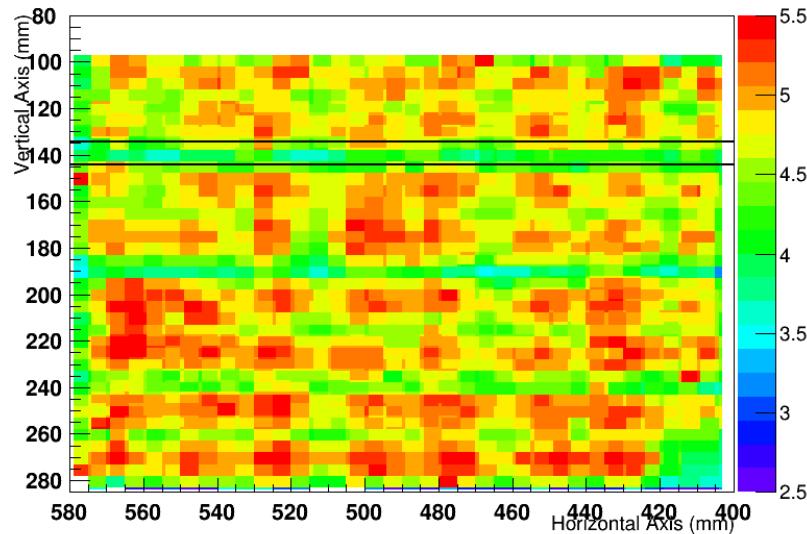
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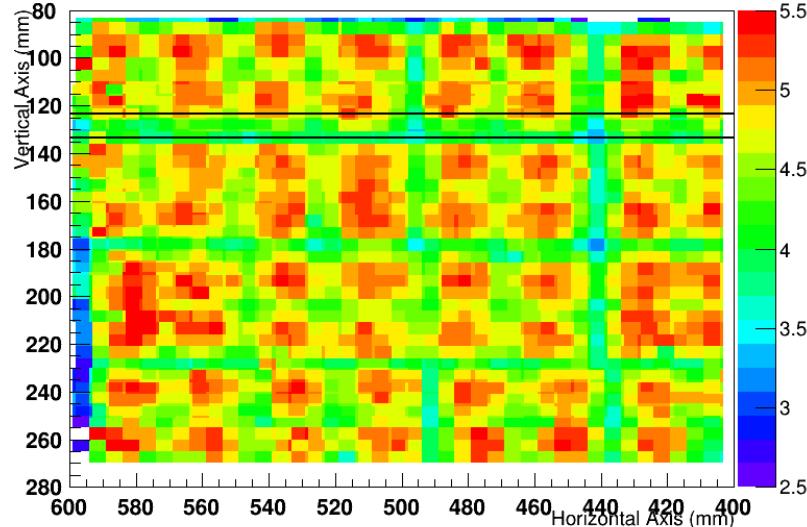
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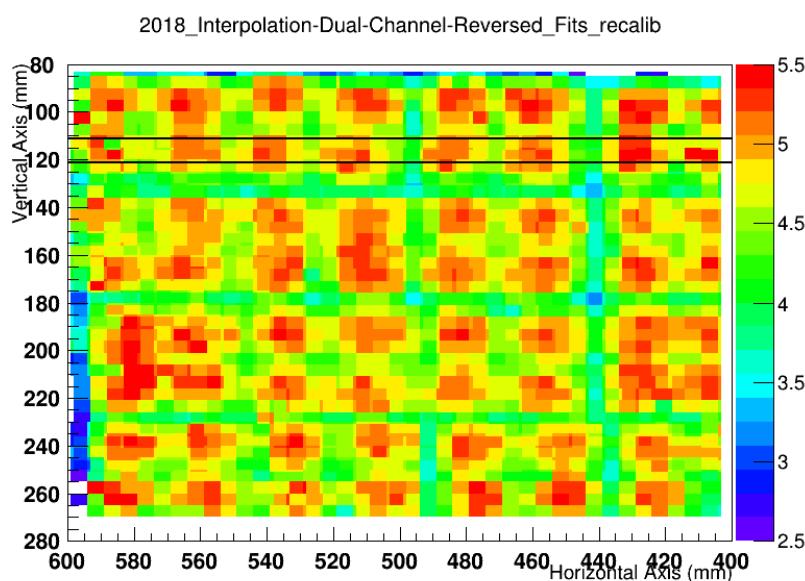
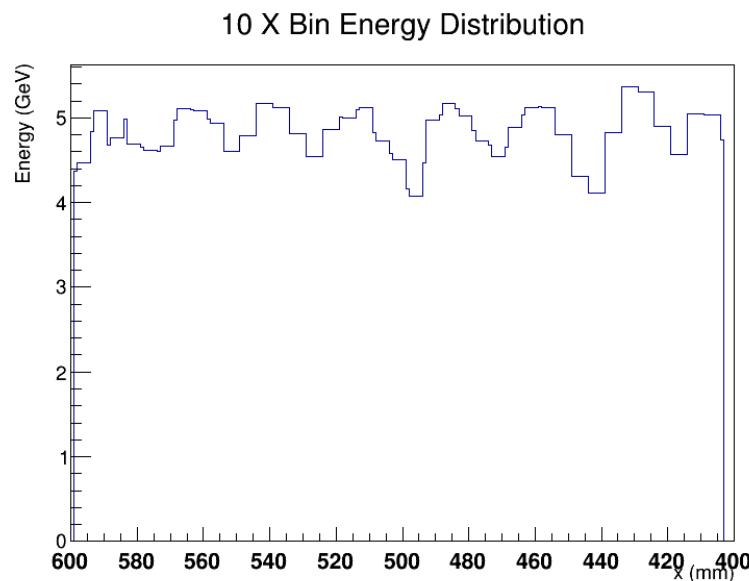
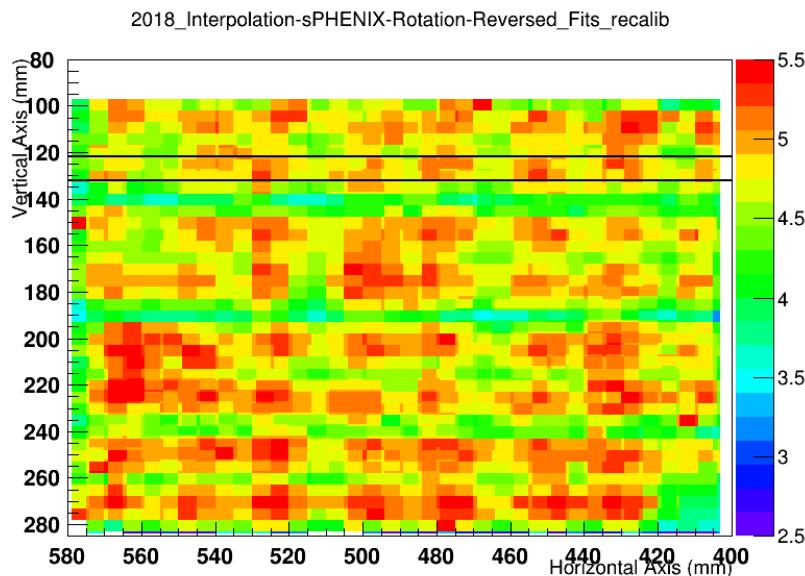
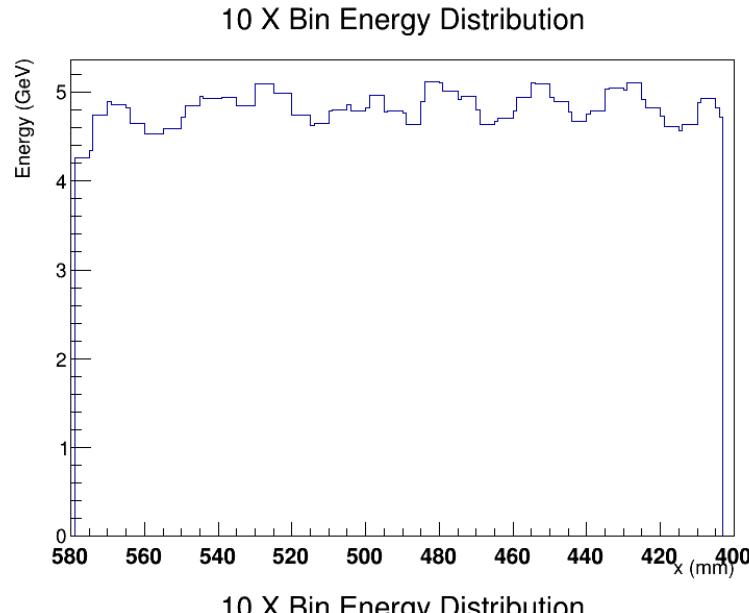
2018_Interpolation-sPHENIX-Rotation-Reversed_Fits_recalib



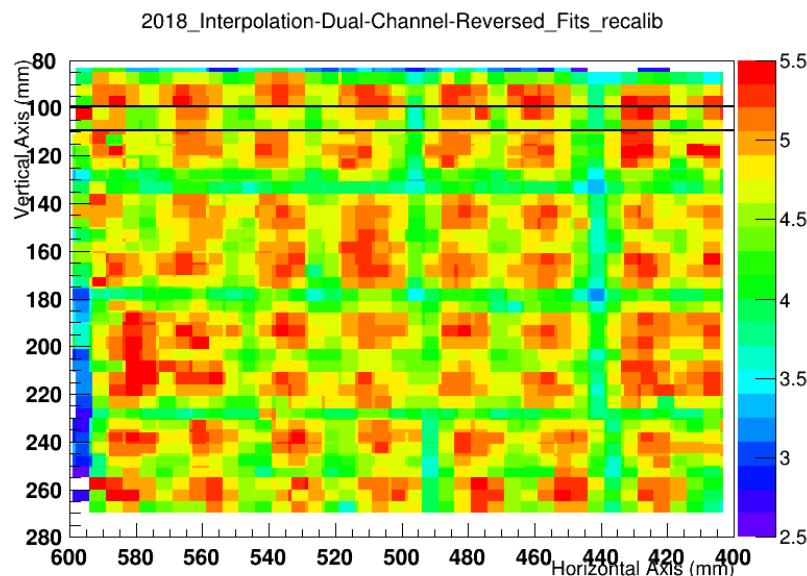
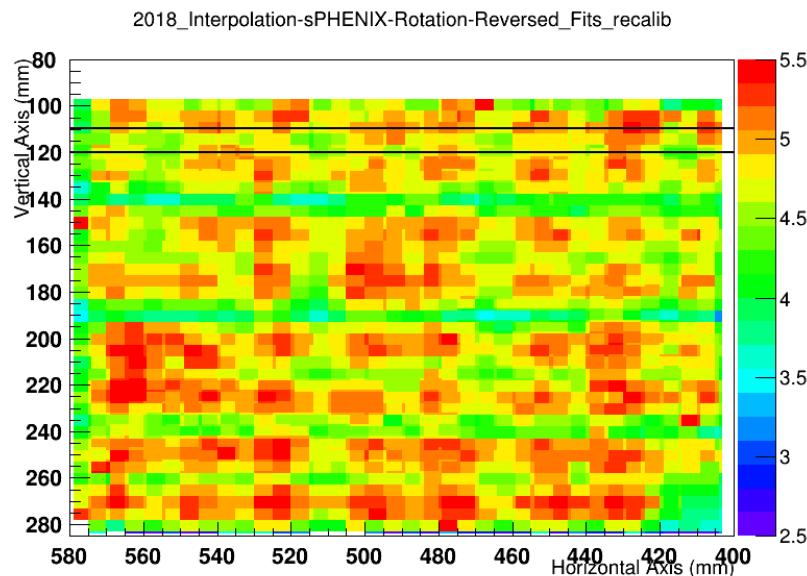
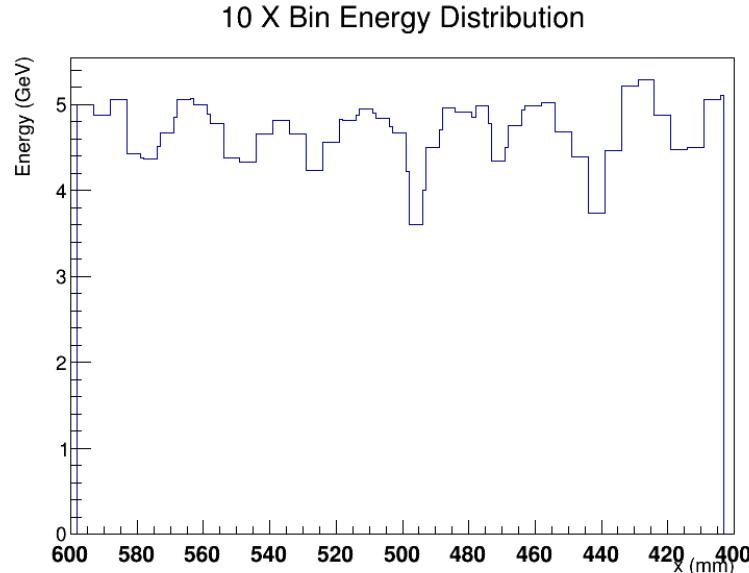
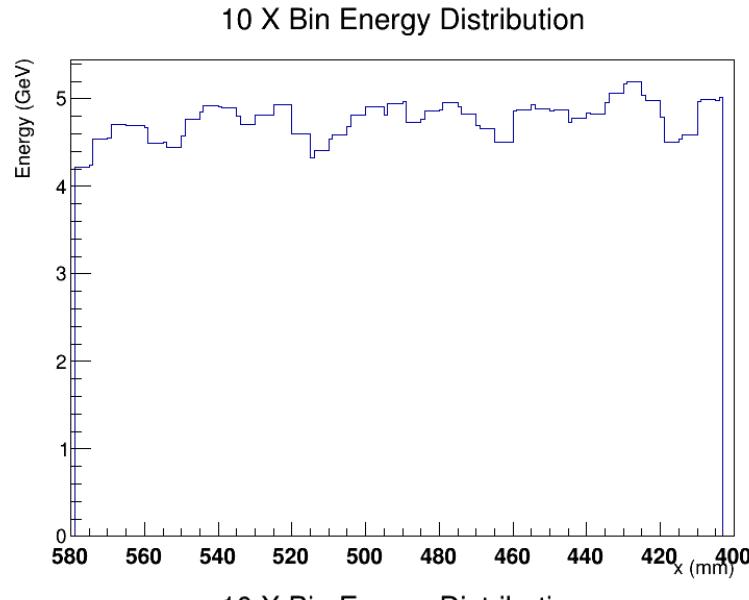
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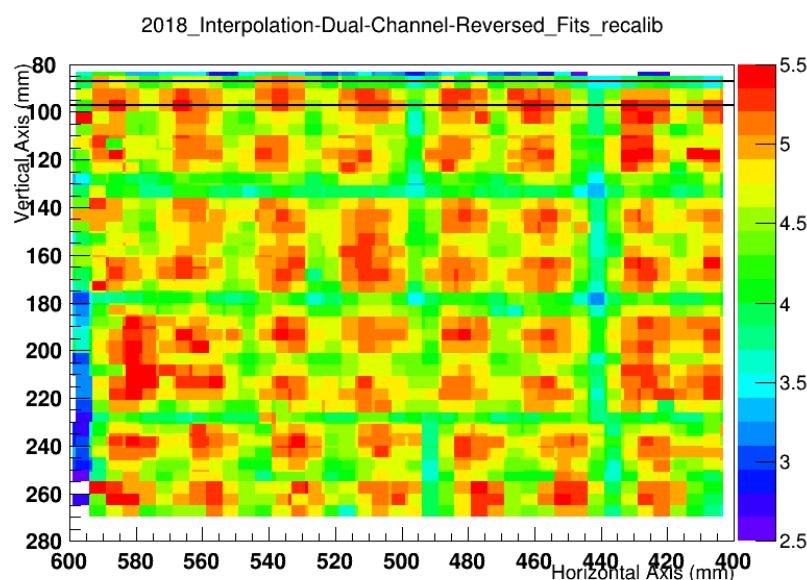
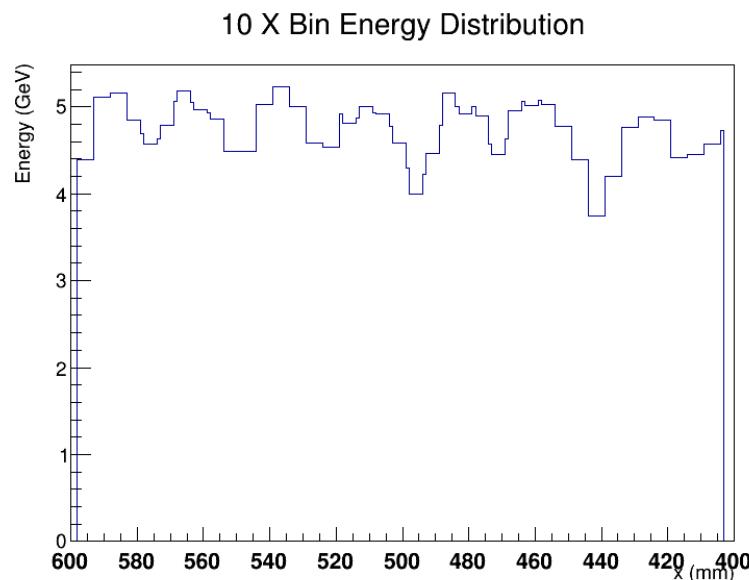
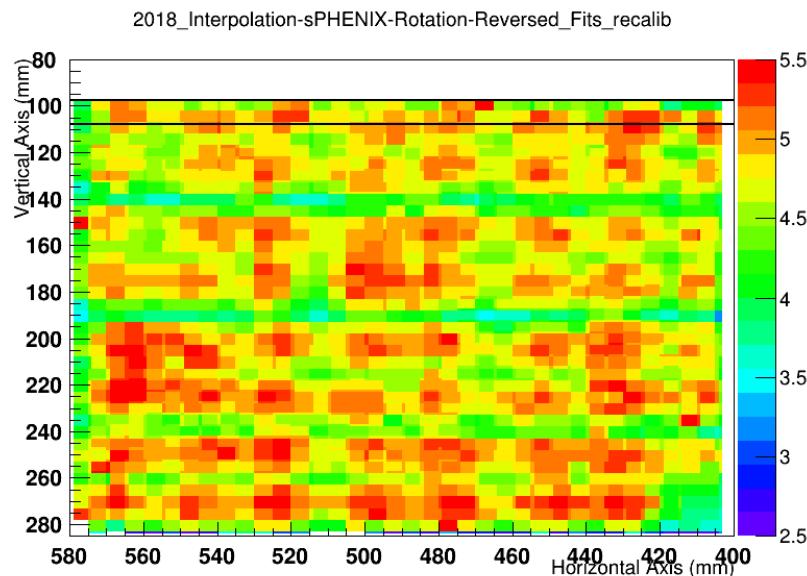
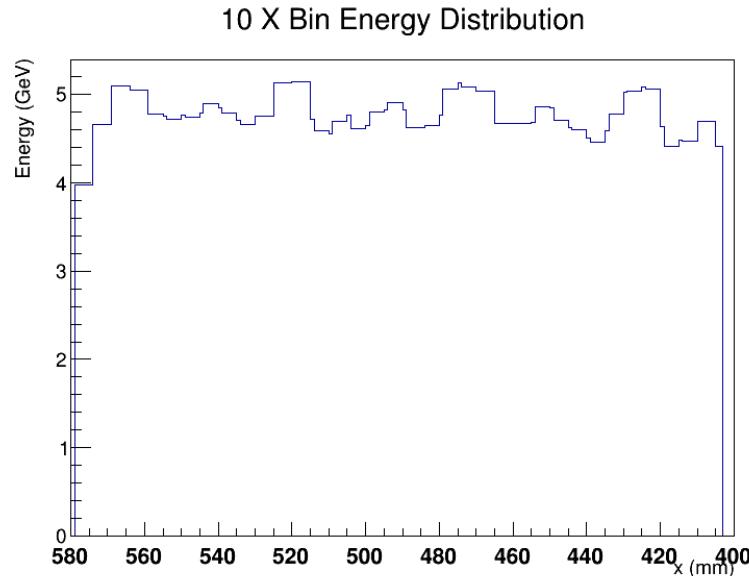
1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method



1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

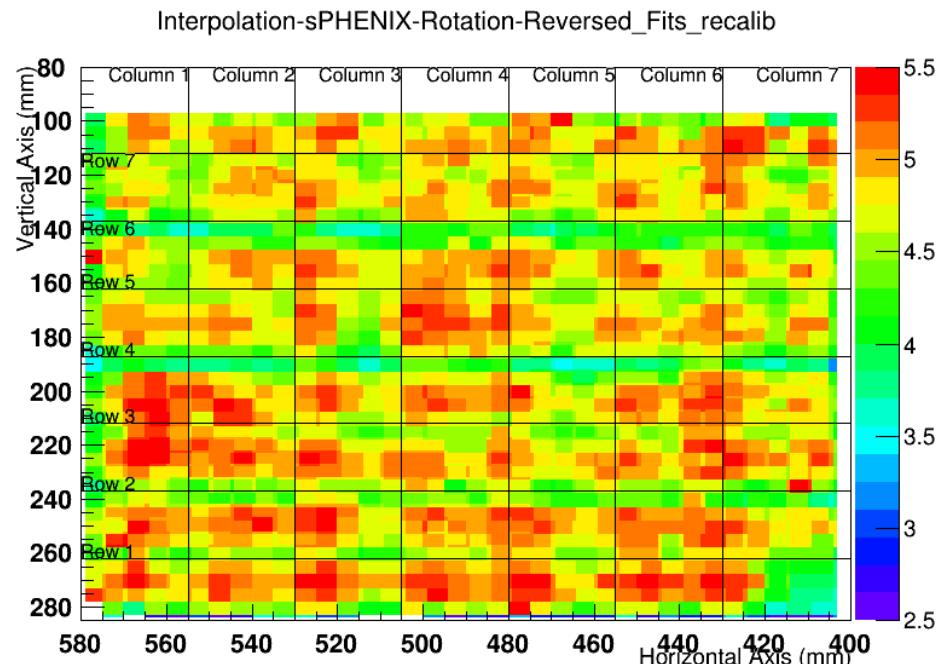


1D Projections Vertical – sPHENIX Rotation Full Detector Scan vs Dual Channel Full Detector Scan Fits Method

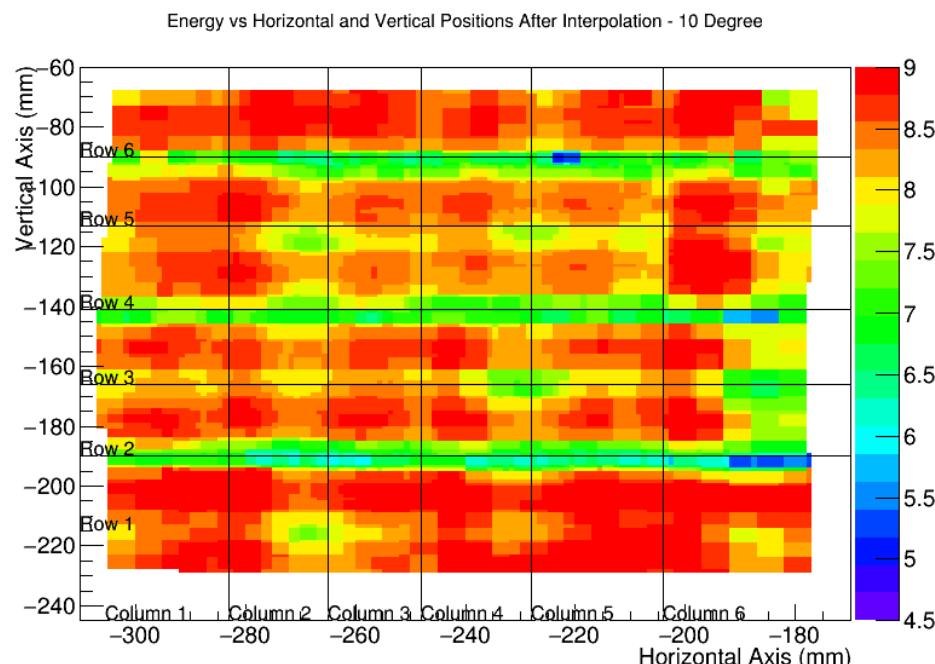


Comparison of the 2018 teat beam to the 2017 results (Normalized to 1)

2018 sPHENIX Rotation Scan



2017 10 Degree Tilted Scan



It looks like the uniformity vertically are comparable while the horizontal seems to be

Summary and Conclusion

- The hodoscope correction is good after position fixing
- The energy spectra are within our expectation for 5 GeV electron beams
- The sPHENIX rotation has better uniformity than the Dual channel position. However, the horizontal between blocks is still significantly lower than on the enter of the towers
- The energy of 1D projection horizontal for the sPHENIX rotation scan is approximately (4.8 ± 0.2) GeV and (4.6 ± 0.4) GeV vertical . Therefore, we have about 95.8% horizontal uniformity and 9.13% vertical uniformity
- The 2018 sPHENIX rotation position scan results have similar uniformity as the 2017 10 degree tilted scan results