Characterization of F5 Quad Module at Cornell

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UIC Logo maybe

OSU Logo maybe

Joseph Grassi

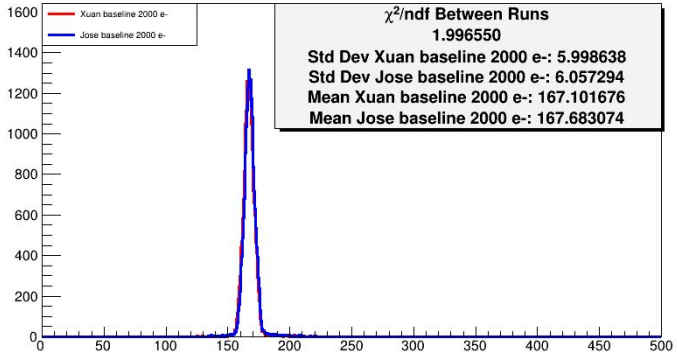
- **Consistency comparison**
  - Do separate runs behave in sufficiently similar fashion
  - χ^2 as arbitrary figure of merit

- Equivalent runs behave consistently, with the exception of chip 7 which is a little erratic.

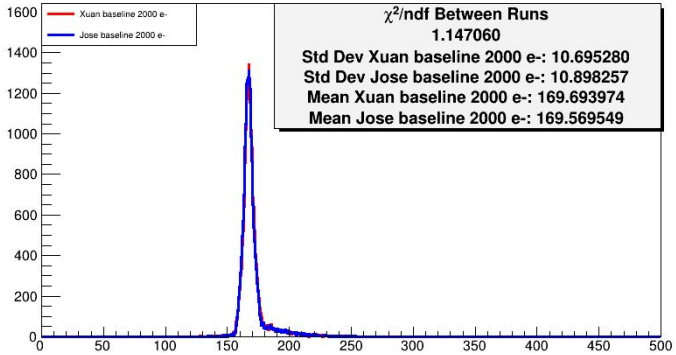
Consistency Comparison

Joseph Grassi

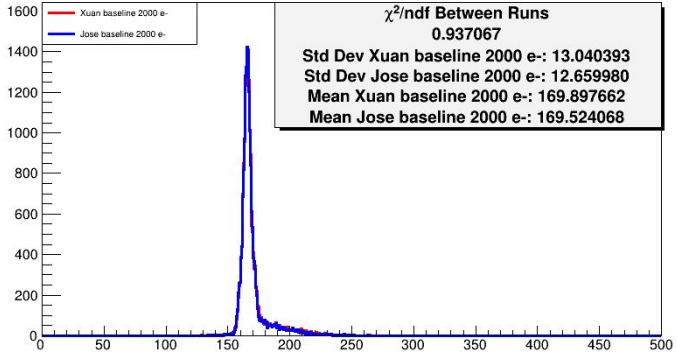
Chip 4



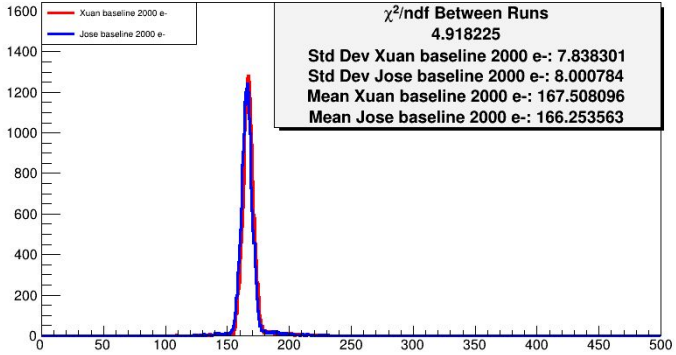
Chip 5



Chip 6



Chip 7



Consistency Comparison

Joseph Grassi

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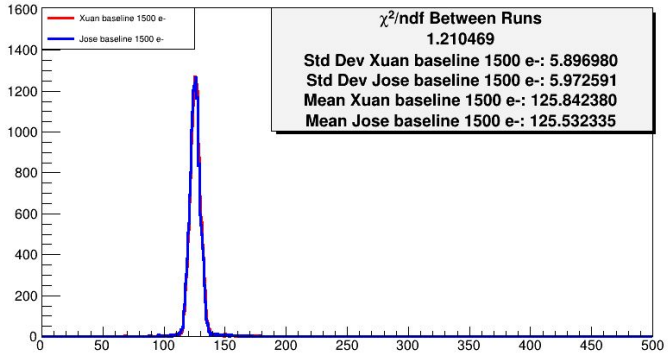

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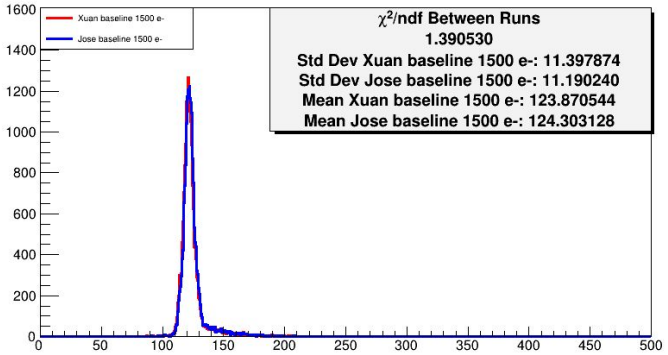

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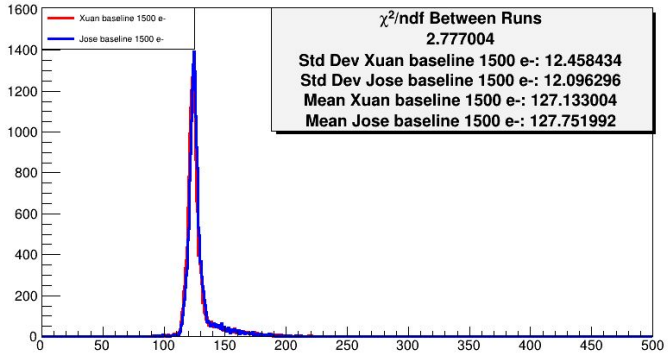

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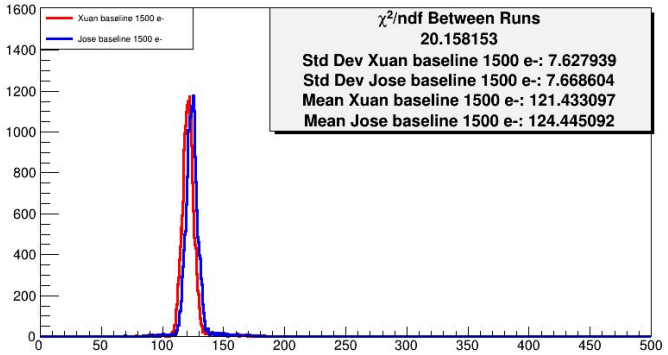
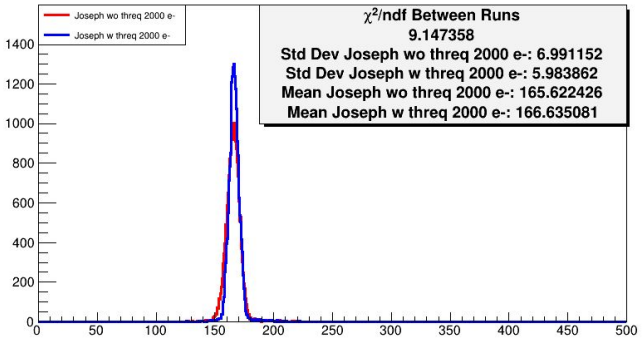


- **Comparison with and without threqu after thradj**
  - Significantly worse S curves result without threqu step
  - Threqu step is quick and could to be included, but could also be skipped I think

Threqu requirements

Joseph Grassi

Chip 4



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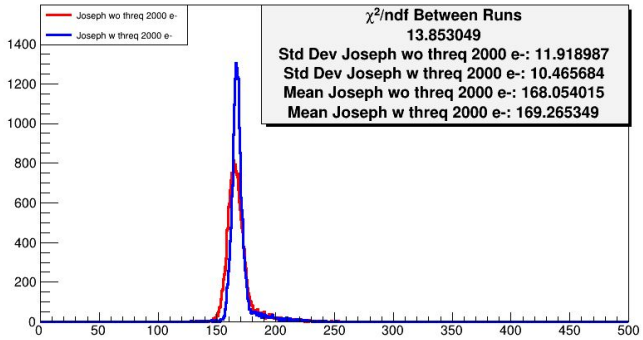

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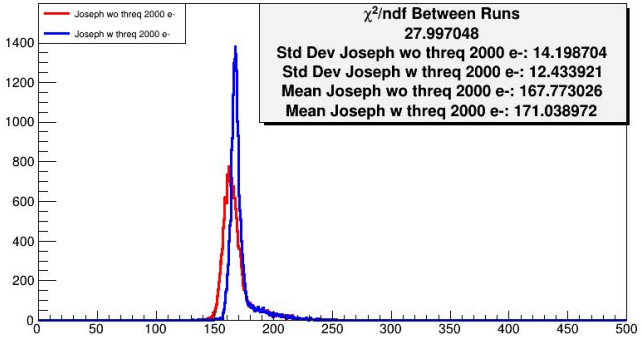

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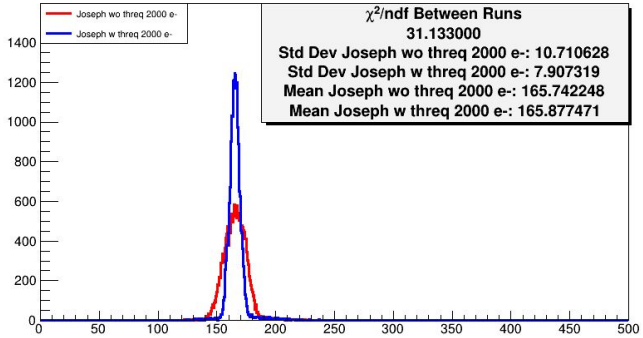

Threqu requirements

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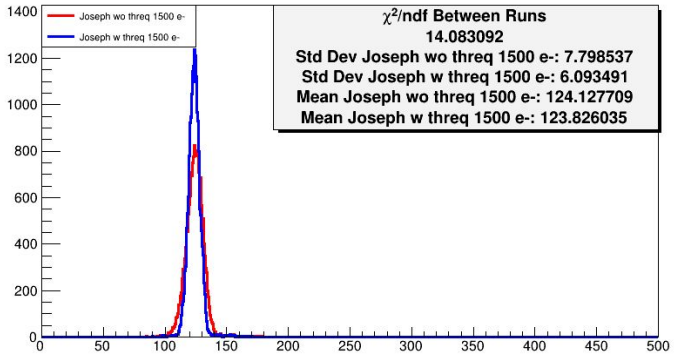

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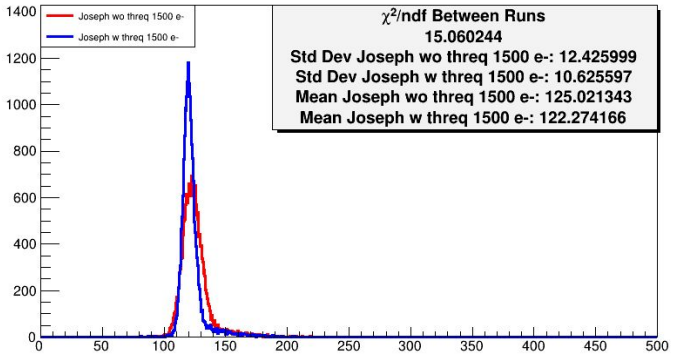

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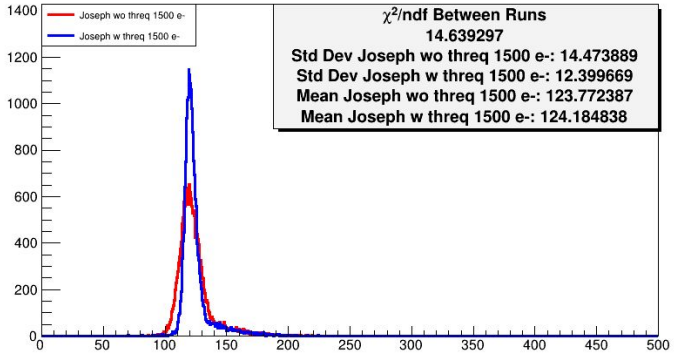

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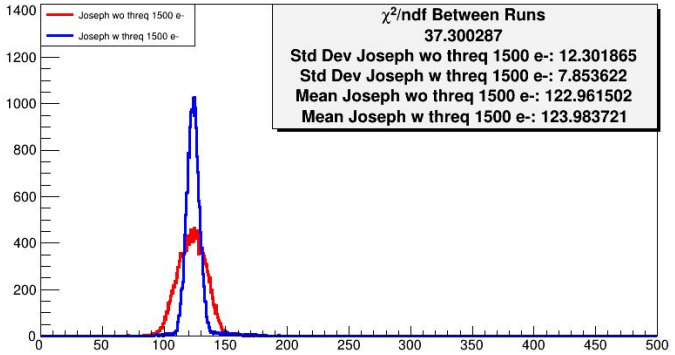

Threqu requirements

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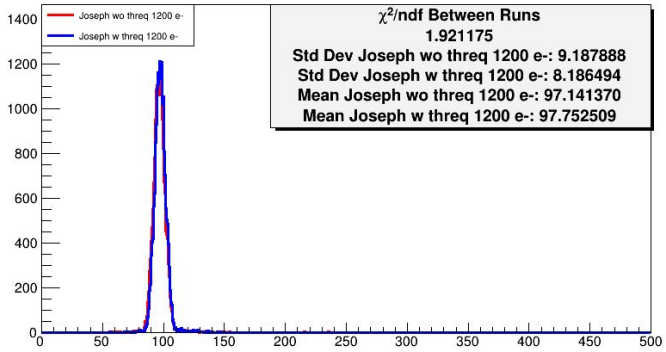

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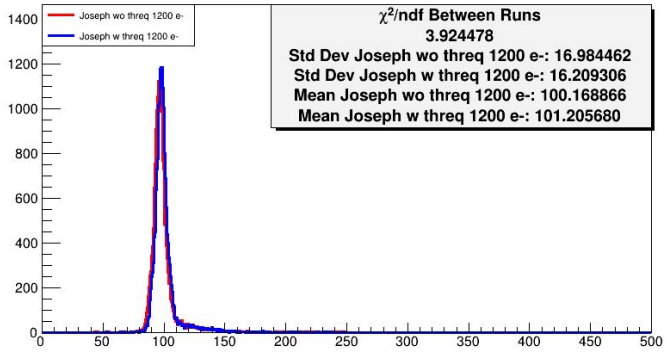

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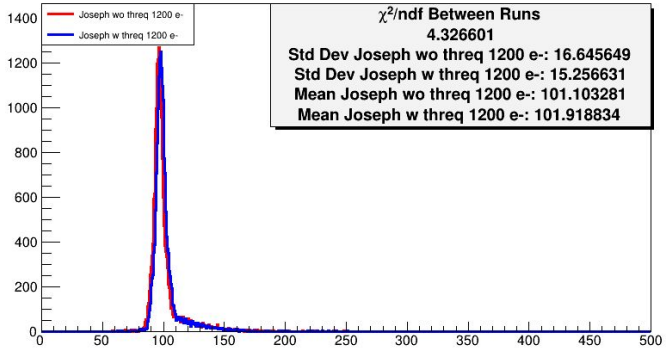

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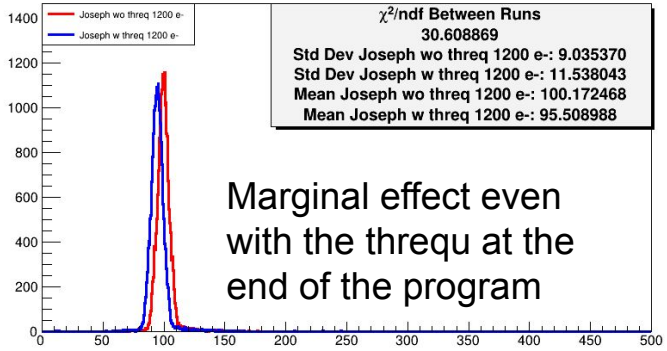


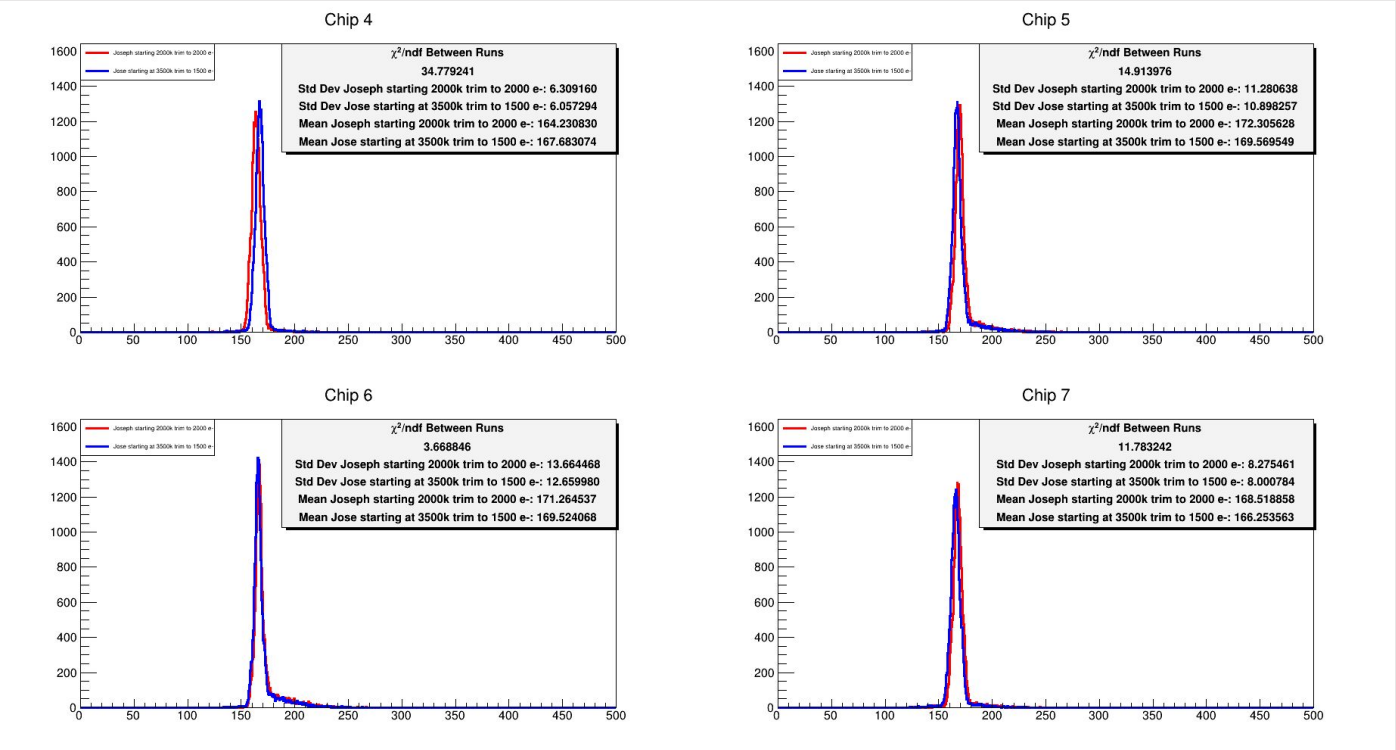
Marginal effect even with the threqu at the end of the program

- **Comparison with starting at 3500 e- vs 2000 e-**
  - Threshold spread is comparable, location of threshold slightly changes
  - As long as standardized, don't see issue with starting at 2000 e-
  -

Comparison: jdg start at 3500 e- vs start at 2000 e-

April 3, 2023

2000 e- SCurve Compare

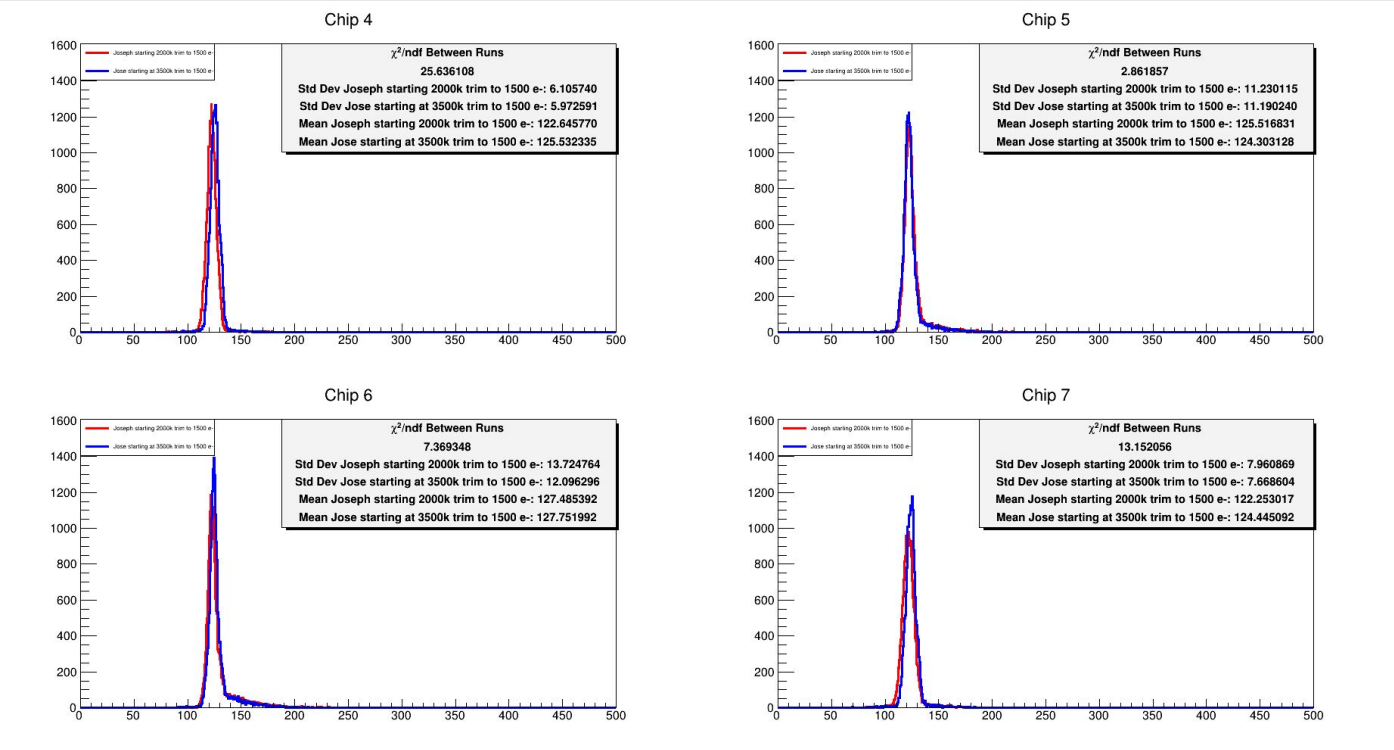


const char file_dir_1[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/jdg_quad_v11_maxTrim/Results/Run000004_SCurve.root";
const char file_dir_2[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/033023/Results/Run000008_SCurve.root";

Comparison: jdg start at 3500 e- vs start at 2000 e-

April 3, 2023

1500 e- SCurve Compare

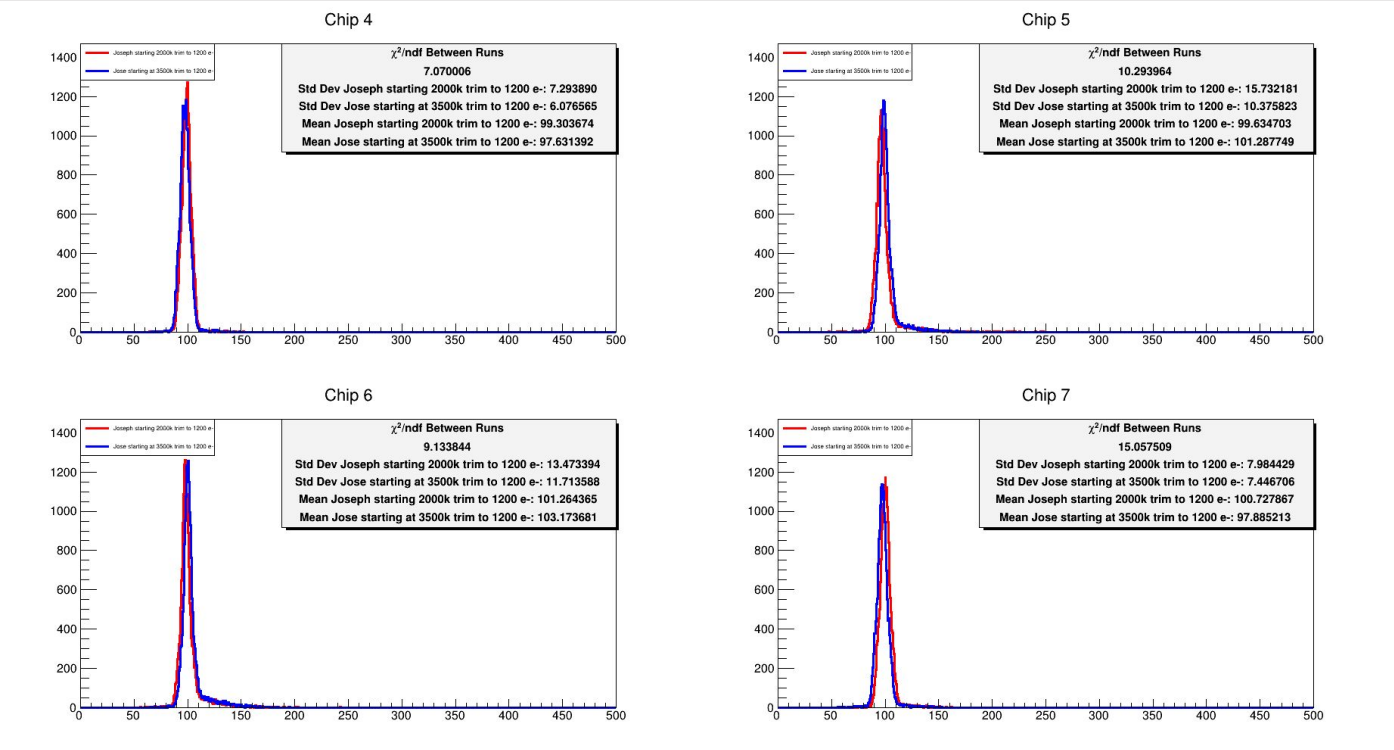


const char file_dir_1[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/jdg_quad_v11_maxTrim/Results/Run000007_SCurve.root";
const char file_dir_2[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/033023/Results/Run000012_SCurve.root";

Comparison: jdg start at 3500 e- vs start at 2000 e-

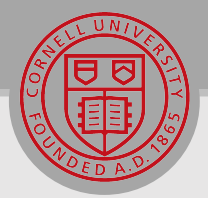
April 3, 2023

1200 e- SCurve Compare



const char file_dir_1[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/jdg_quad_v11_maxTrim/Results/Run000027_SCurve.root";
const char file_dir_2[200] = "/home/joseph/Documents/Cornell/CMS/TFPX/Electronics_Readout/F5_comparisons/033023/Results/Run000018_SCurve.root";

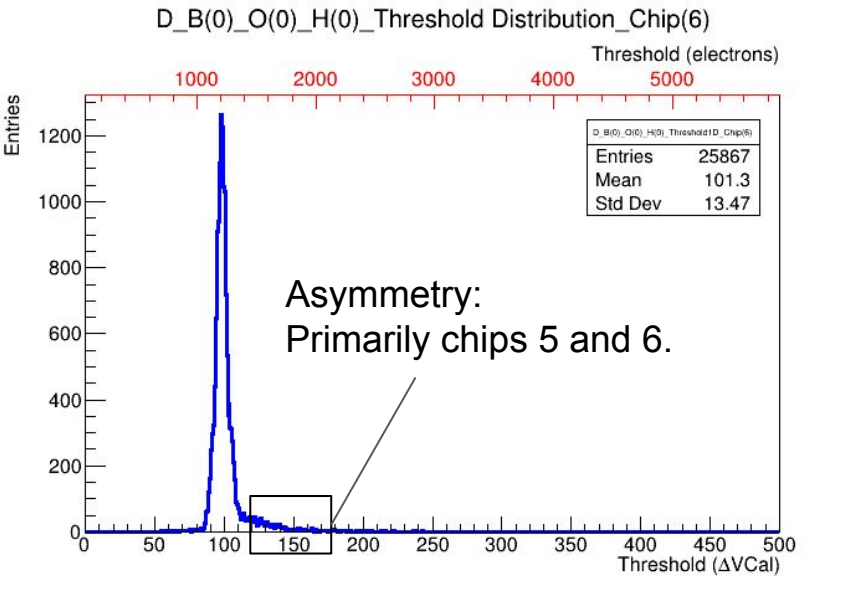
- **Maximum trims obtained:**
  - 1200 e- before too many masked pixels for Jose and Joseph.
    - Some chips had as many as 1000 noisy pixels, but some far lower. (Chip 6 misbehaves and has nearly a thousand noisy pixels at this level). Chip 4 and 7 have noise 146, 197 masked pixels.
  - 1000 achieved by Xuan, with (I think) 600 noisy pixels per chip
- Which should I show?



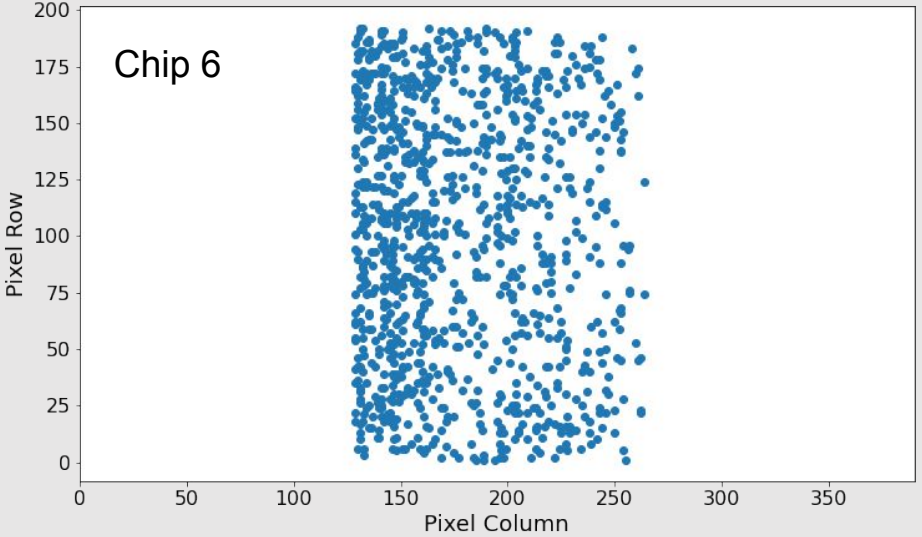
Overview of F5 Quad Module explorations

Joseph Grassi

- **Investigations of the tails in thresholds**
  - Appears at multiple trim values (2000,1500,1200)



Location of pixels with unusually high thresholds



Overview of F5 Quad Module explorations

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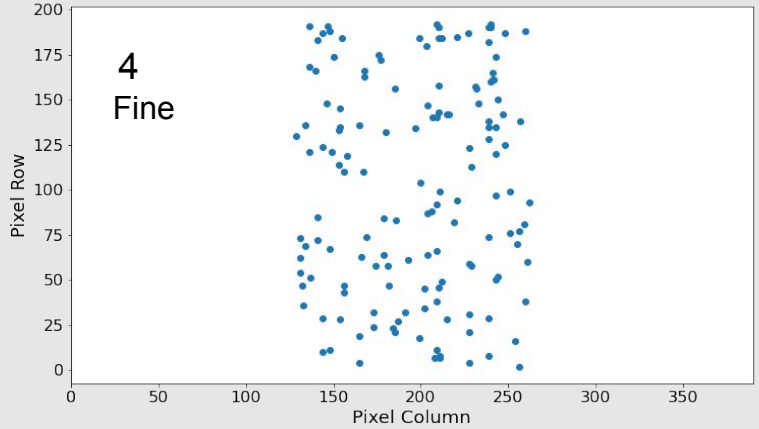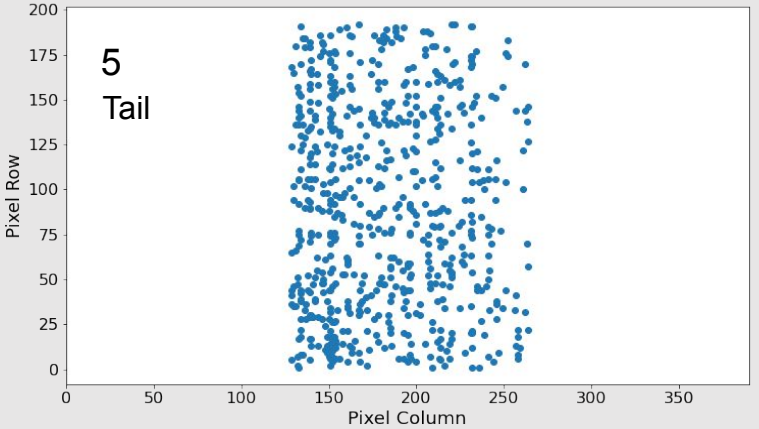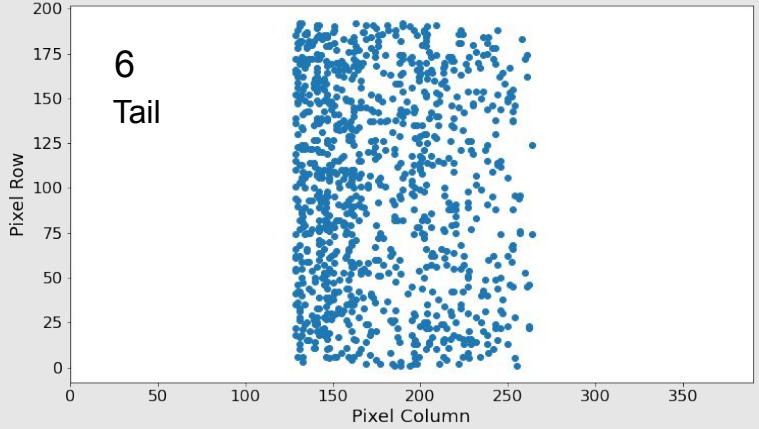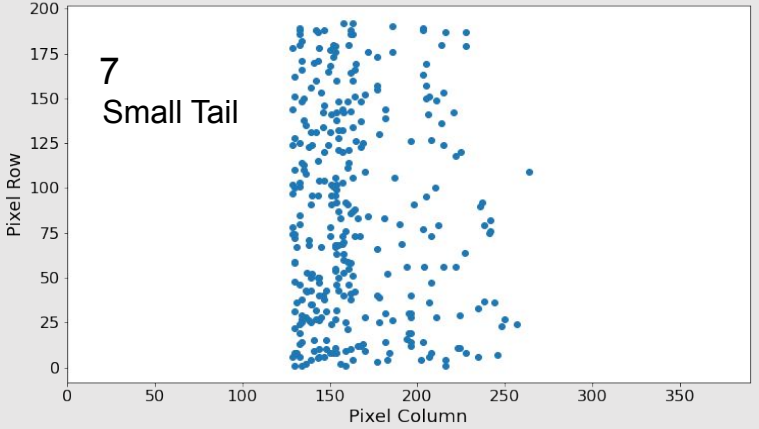
Pixels with high thresholds