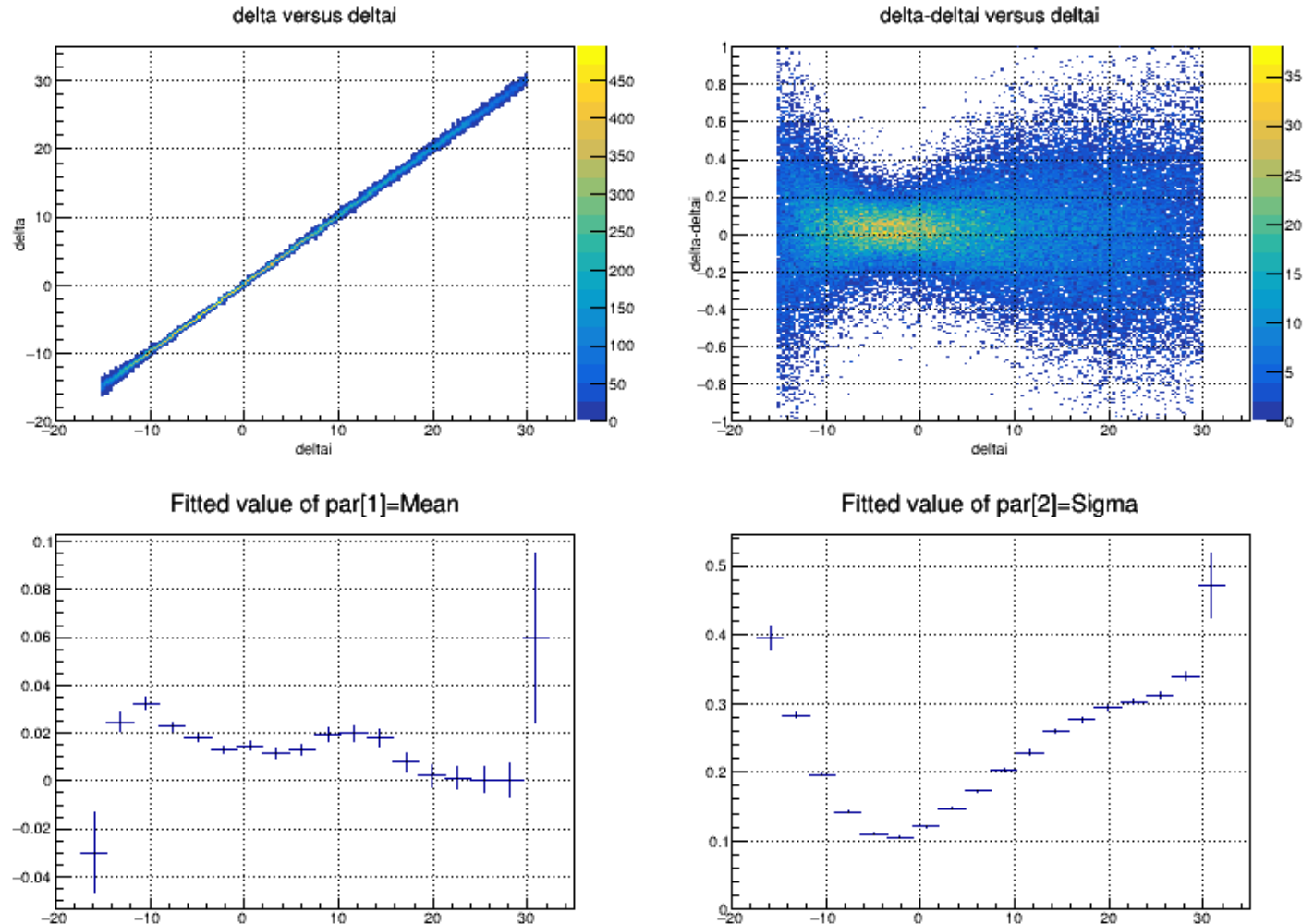


Resolution and Focal Plane Patterns in SHMS

Jure Bericic
May 12, 2016

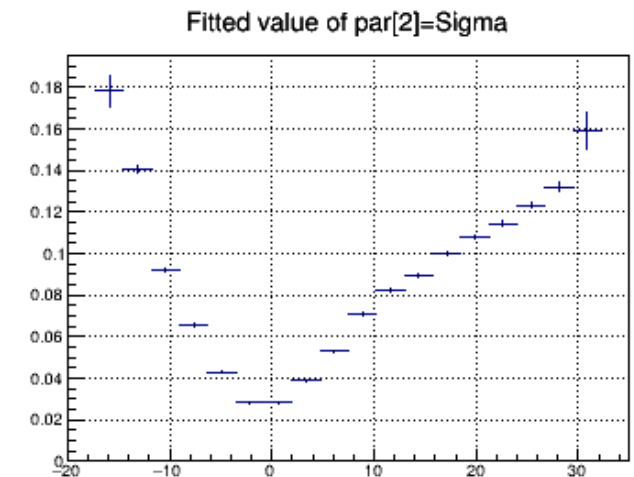
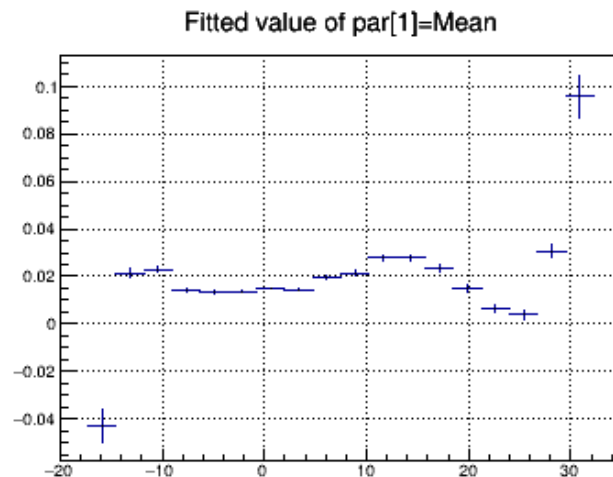
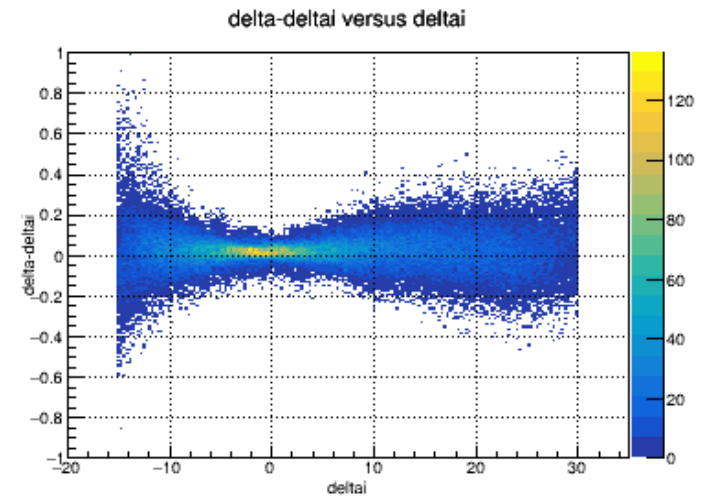
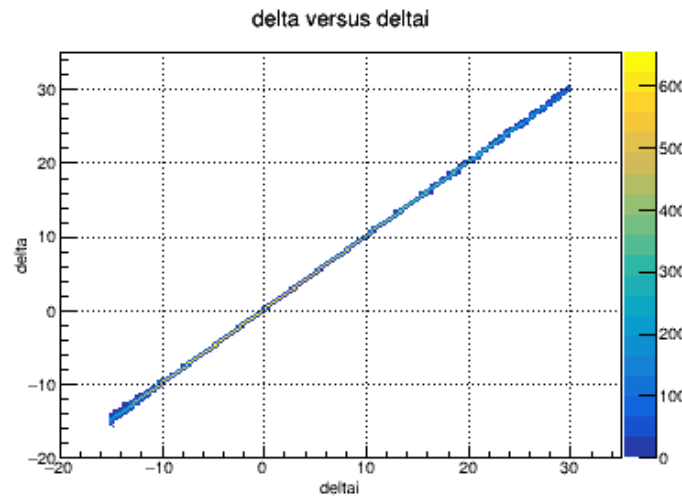
Reconstruction Resolution – 1a

- pointtarg_20deg_2gev_wc_msct_cer_sieve
- delta



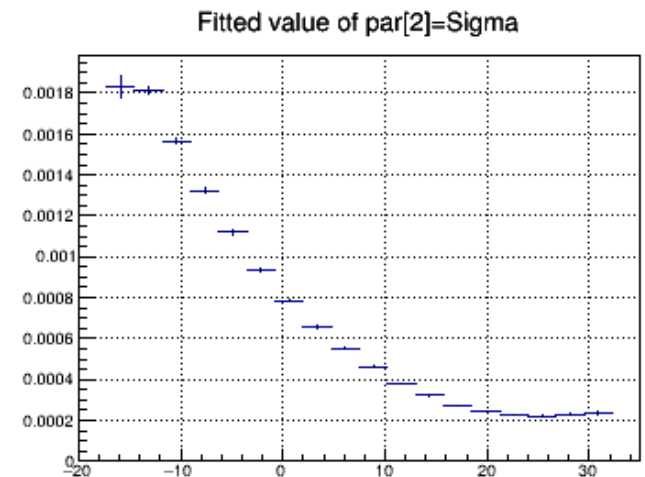
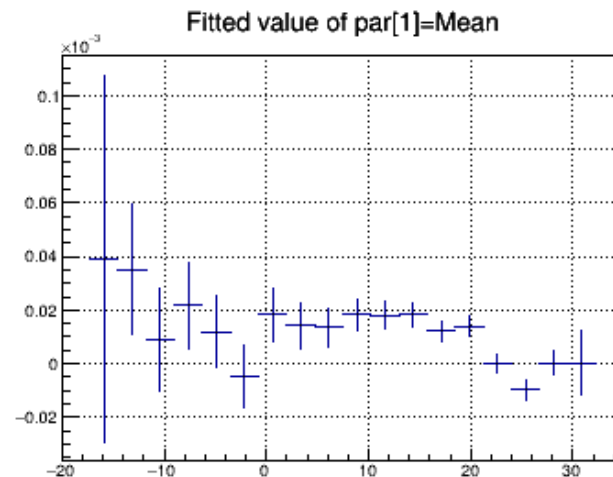
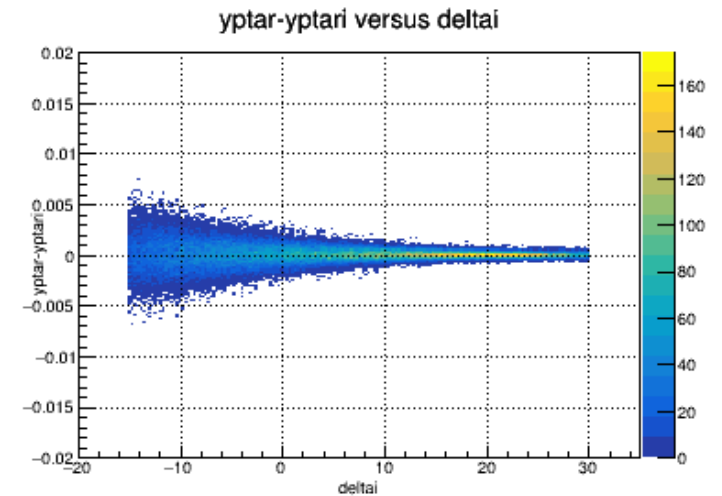
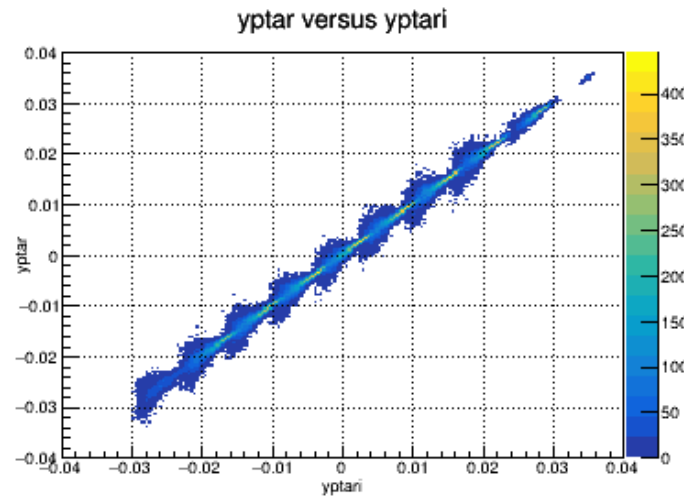
Reconstruction Resolution – 1b

- pointtarg_20deg_2gev_wc_msct_vac_sieve
- delta



Reconstruction Resolution – 2a

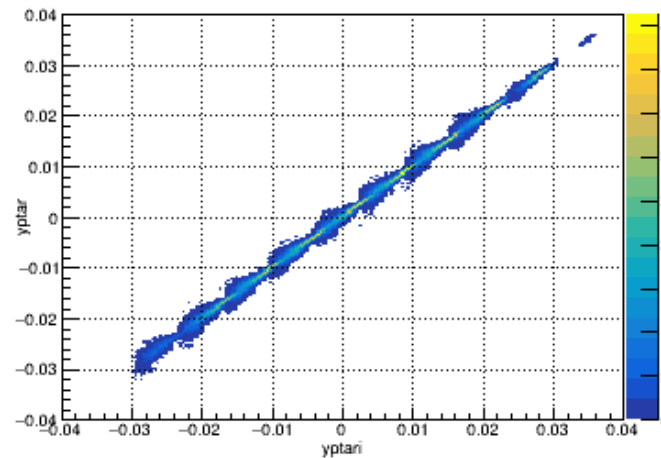
- pointtarg_20deg_6gev_wc_msct_cer_sieve
- xytar



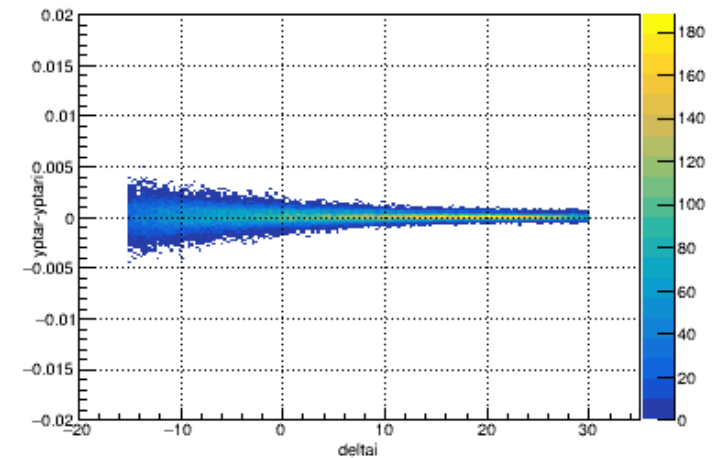
Reconstruction Resolution – 2b

- pointtarg_20deg_6gev_wc_msct_vac_sieve
- xytar

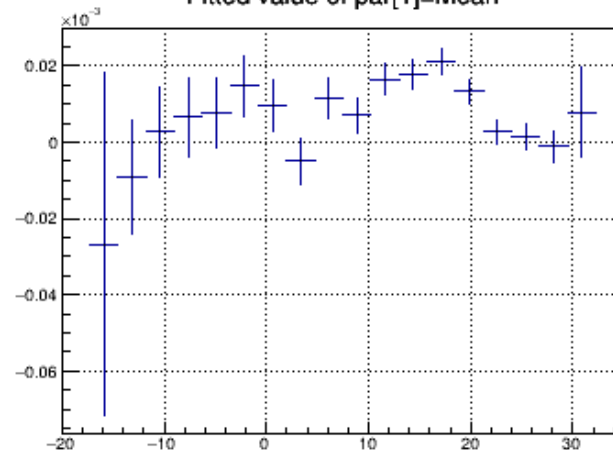
yptar versus yptari



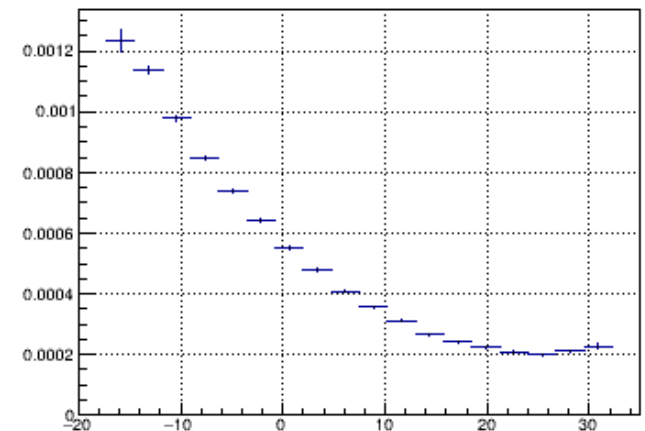
yptar-yptari versus delta_i



Fitted value of par[1]=Mean



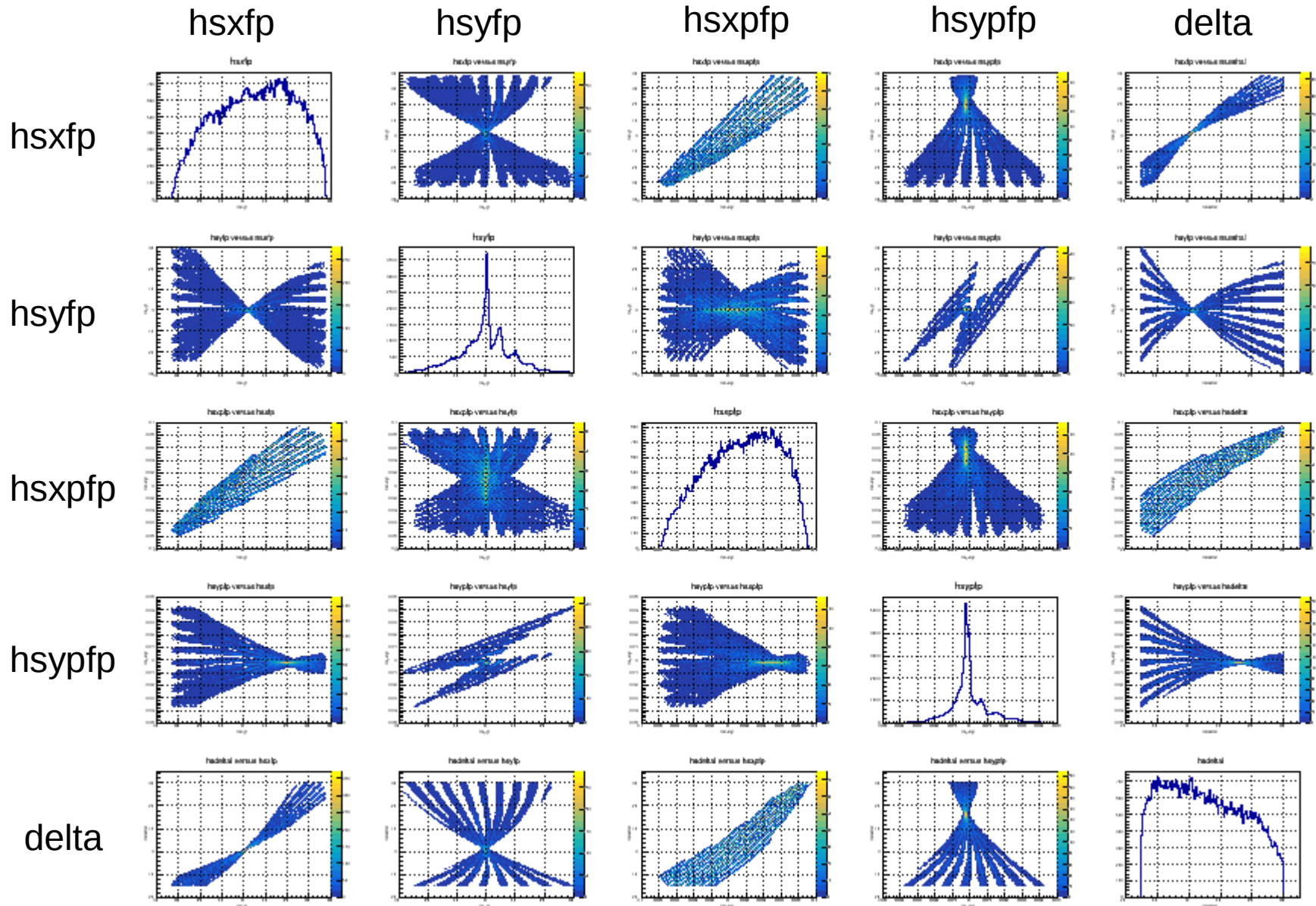
Fitted value of par[2]=Sigma



Focal Plane Patterns

- pointtarg_20deg_6gev_wc_msct_vac_sieve
- Study of the patterns in focal plane variables
- What can we expect?
- Can we use them for calibration?

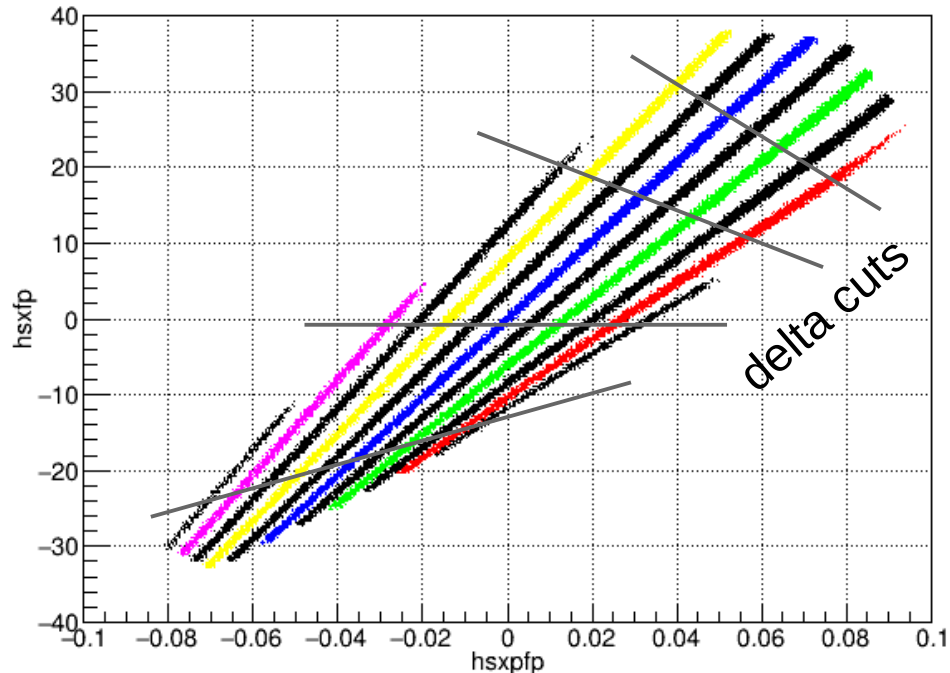
Overview



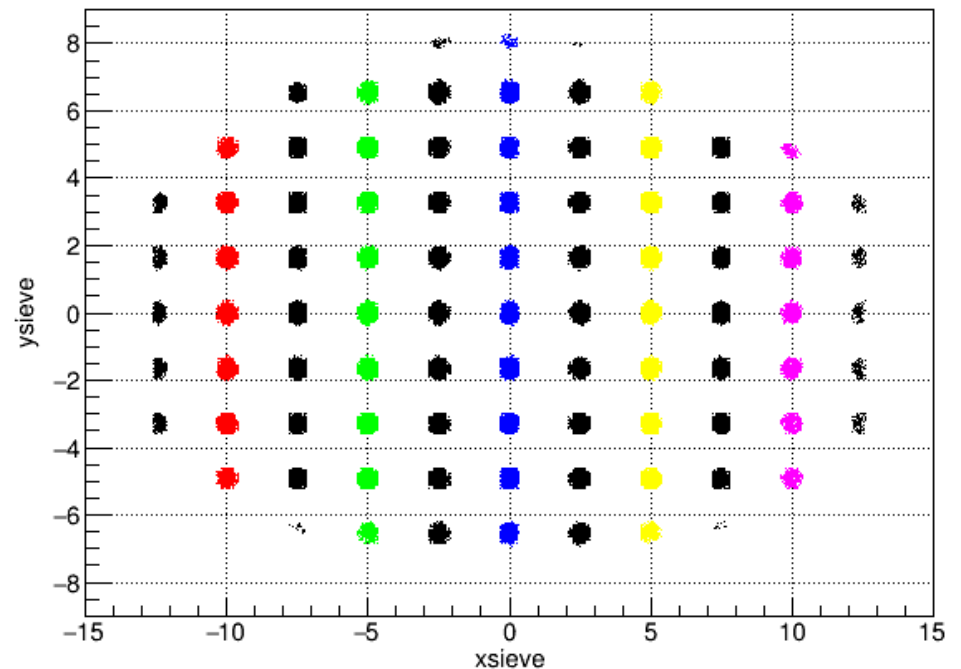
Sieve Holes – xsieve

- Select sieve columns with cuts on $hsx_{pfp} - hsx_{fp}$
- Optional cut on delta
- Not much difference if Cerenkov or vacuum

hsx_{fp} vs hsx_{pfp} cut on xsieve



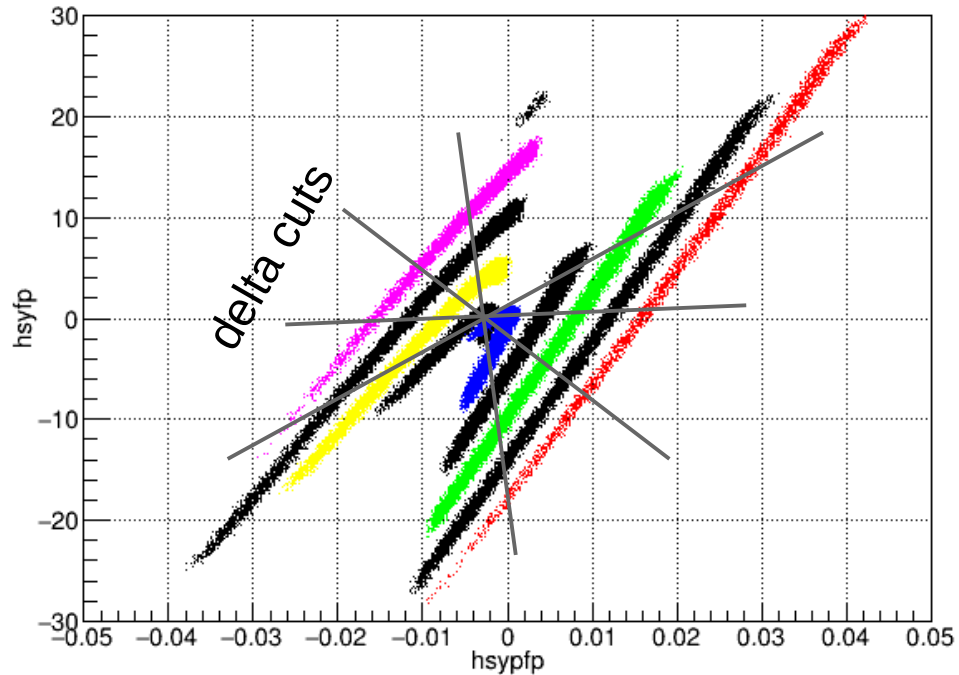
ysieve vs xsieve cut on xsieve



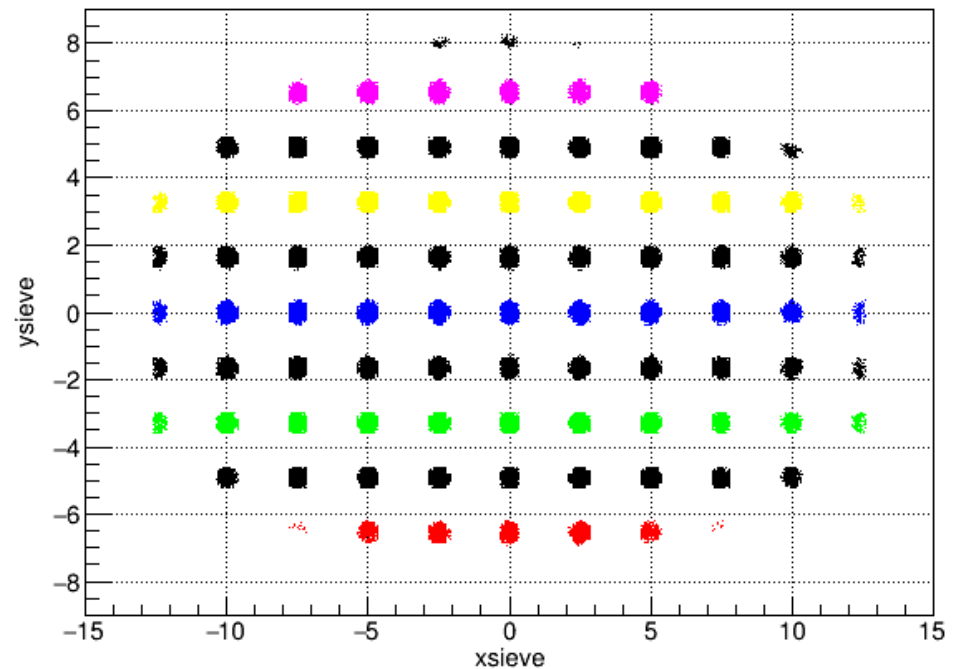
Sieve Holes – ysieve

- Select sieve rows with cuts on hsypfp-hsyfp
- Optional cut on delta
- Not much difference if Cerenkov or vacuum

hsyfp vs hsypfp cut on ysieve



ysieve vs xsieve cut on ysieve

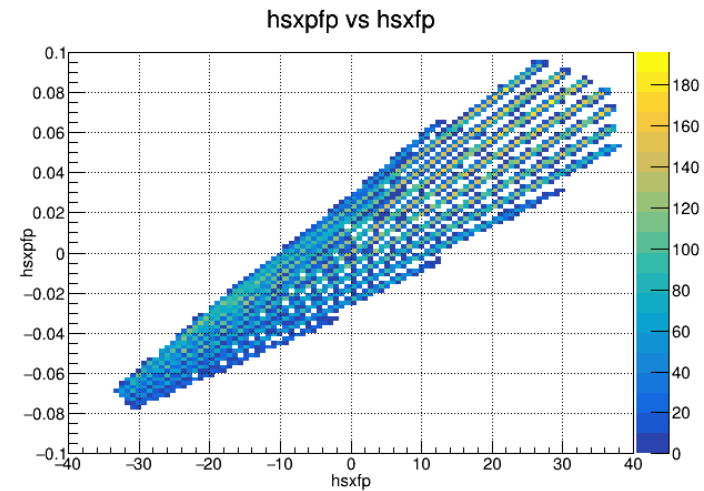
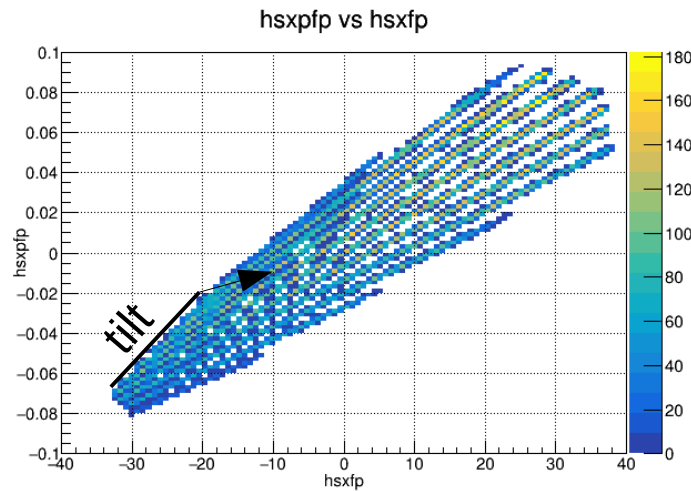
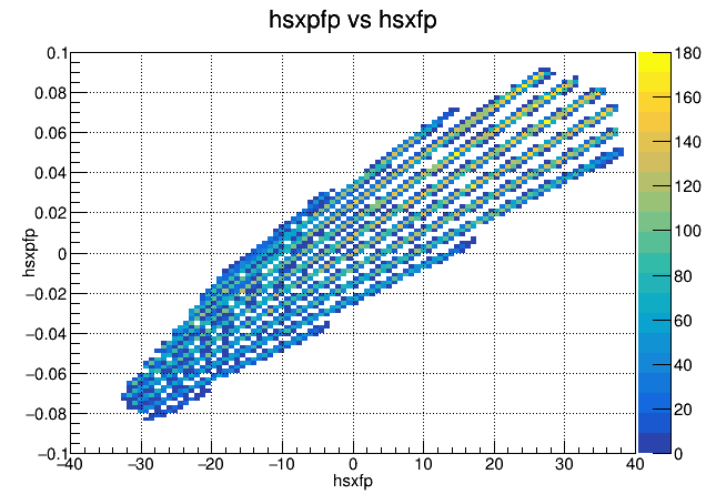


Quad Strength and Focal Plane Patterns

- Can we use focal plane patterns to calibrate strengths of quadrupole magnets?
- Calculated new transport matrices with COSY for different strengths of quads
- Ran mc_shmh_single with new matrices

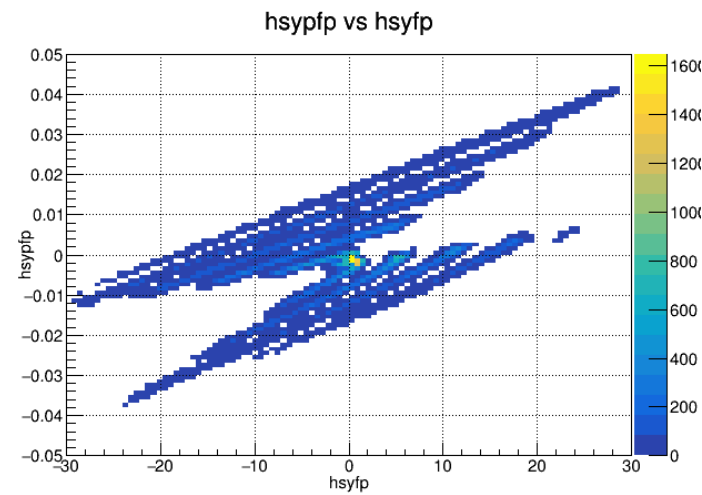
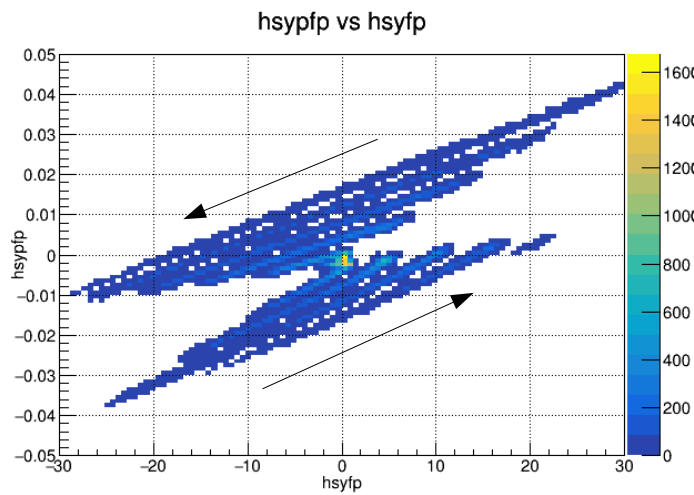
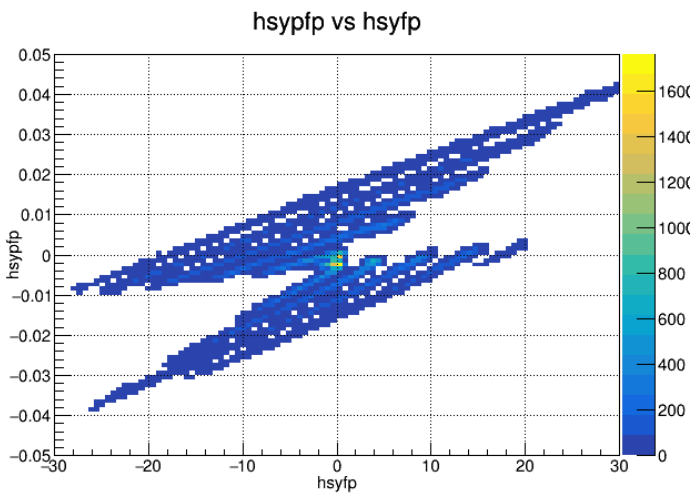
Q1 Strength Variation – 1

- Q2, Q3 on nominal strength
- Q1 [$*0.95$, $*1.00$, $*1.05$] nominal strength



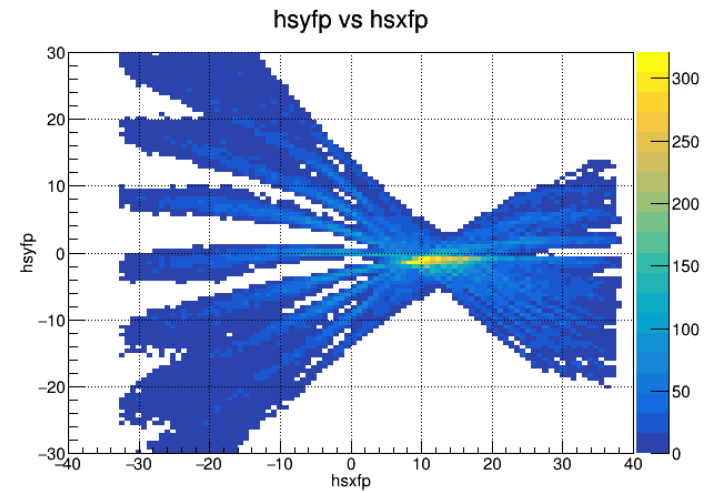
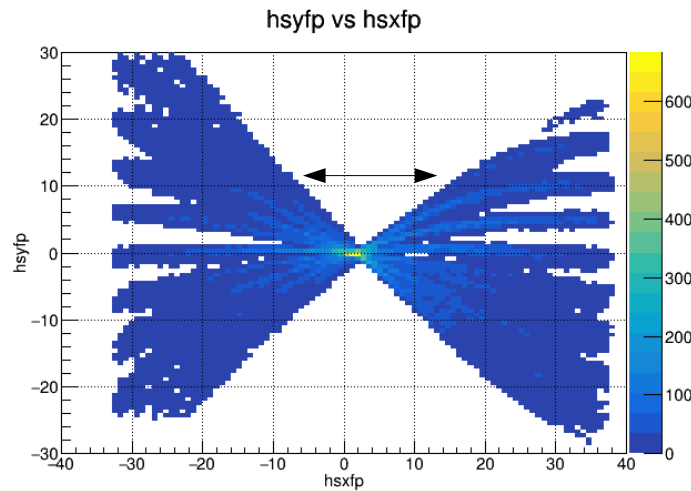
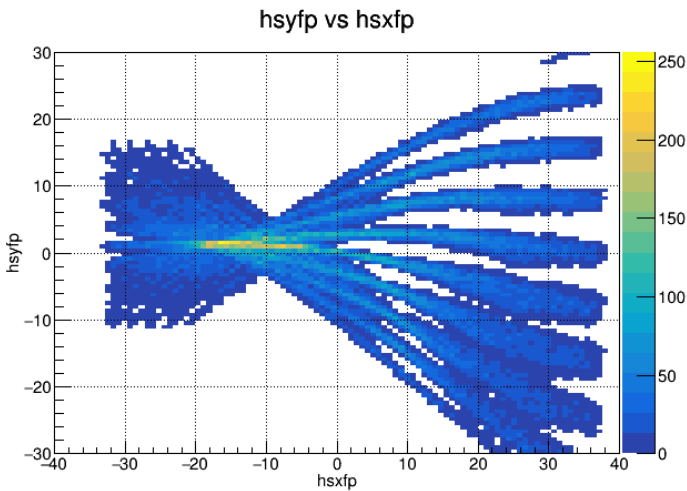
Q1 Strength Variation – 2

- Q2, Q3 on nominal strength
- Q1 [$\times 0.95$, $\times 1.00$, $\times 1.05$] nominal strength



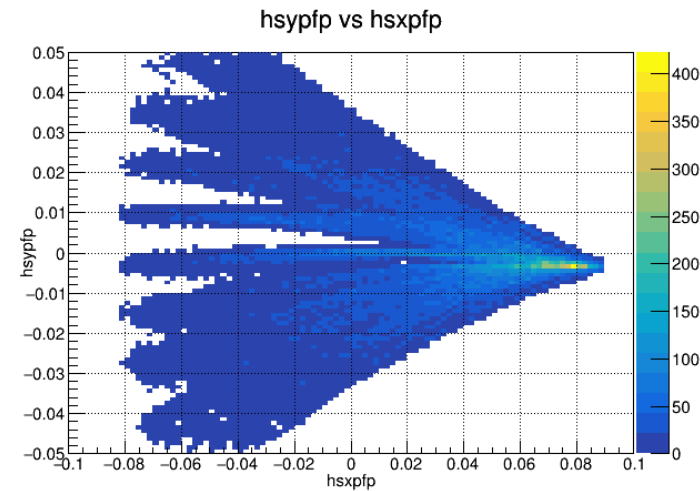
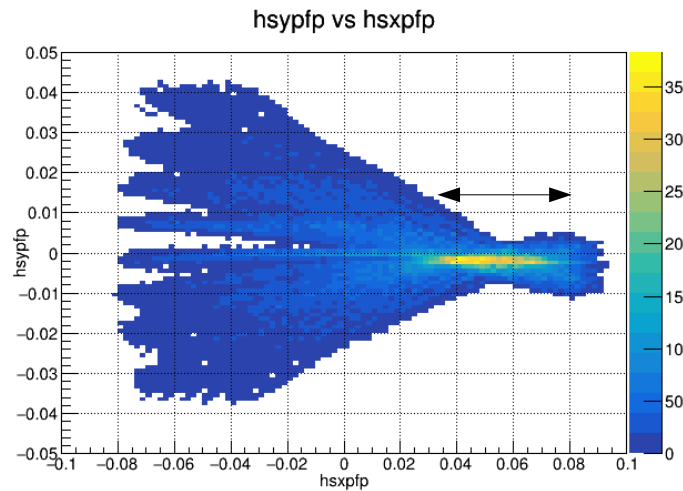
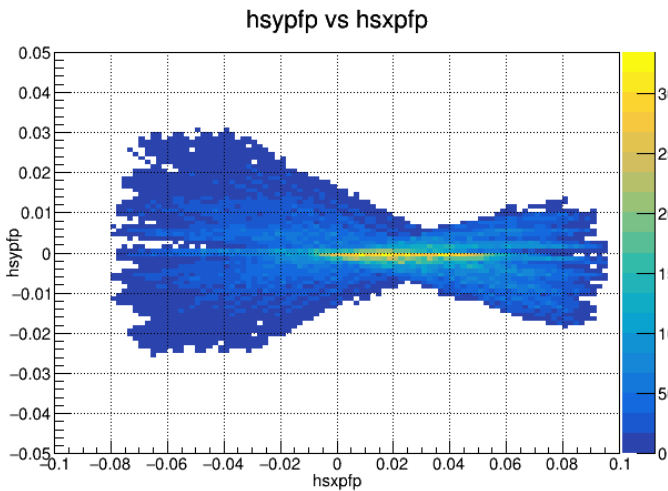
Q2 Strength Variation – 1

- Q1, Q3 on nominal strength
- Q2 [$*0.95$, $*1.00$, $*1.05$] nominal strength



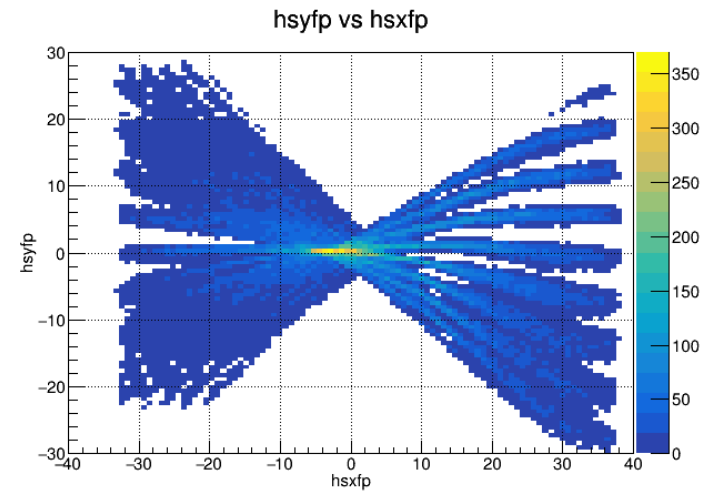
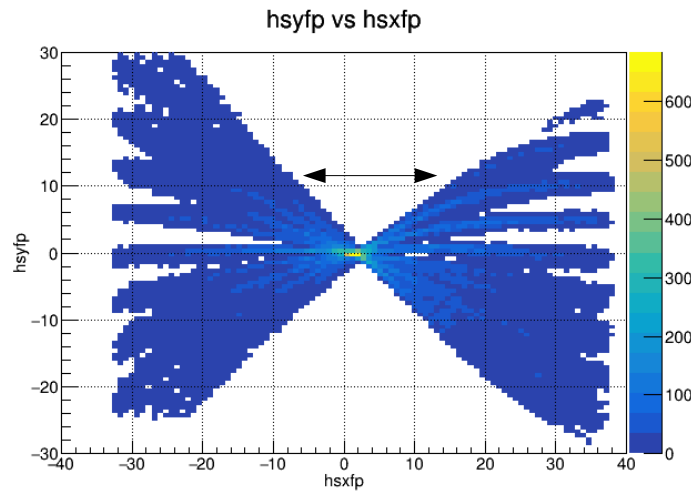
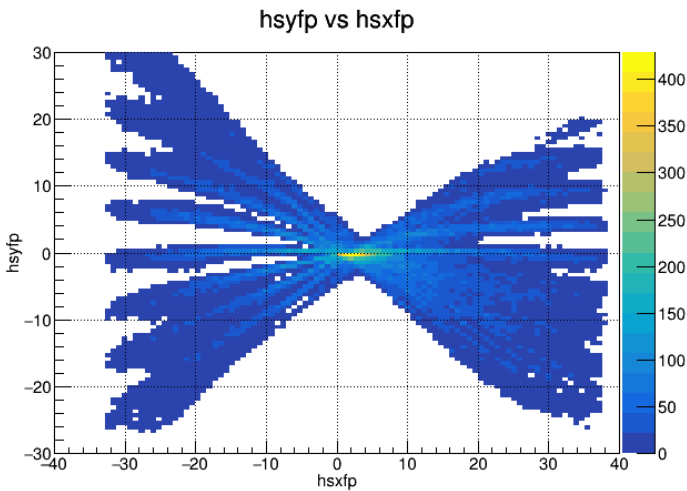
Q2 Strength Variation – 2

- Q1, Q3 on nominal strength
- Q2 [$*0.95$, $*1.00$, $*1.05$] nominal strength



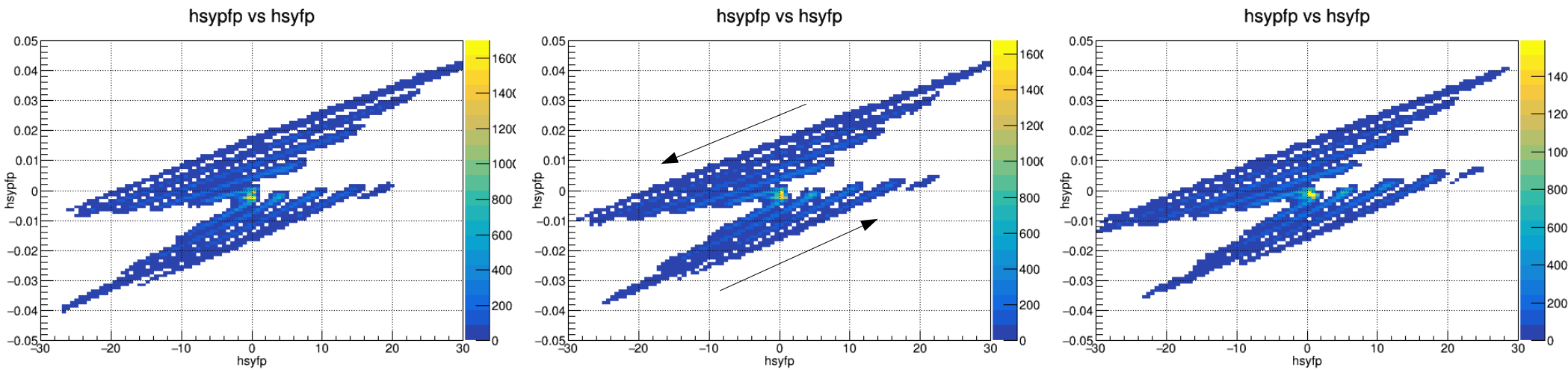
Q3 Strength Variation – 1

- Q1, Q2 on nominal strength
- Q3 [*0.95, *1.00, *1.05] nominal strength



Q3 Strength Variation – 2

- Q1, Q2 on nominal strength
- Q3 [$*0.95$, $*1.00$, $*1.05$] nominal strength



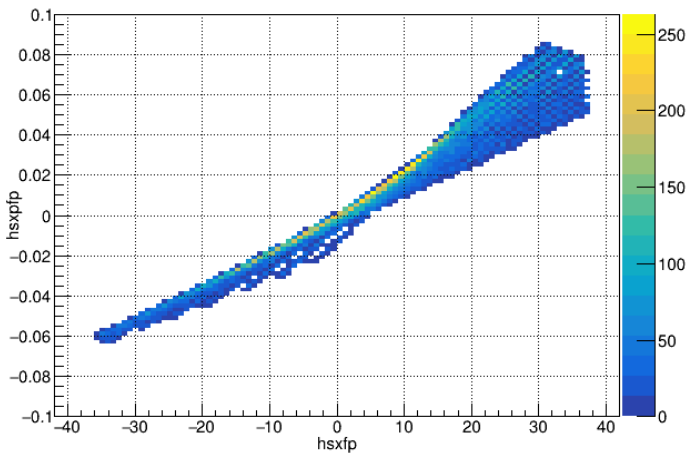
Overview

- Patterns not very sensitive to Q1 and Q3
- High sensitivity to Q2
- Hard to disentangle effect of single quad from others
 - All have similar effects on the patterns
 - In first order increasing strength of Q2 is the same as lowering strength of Q1 and Q3
 - Focus in one defocus in other direction
- Try patterns with only single quad powered

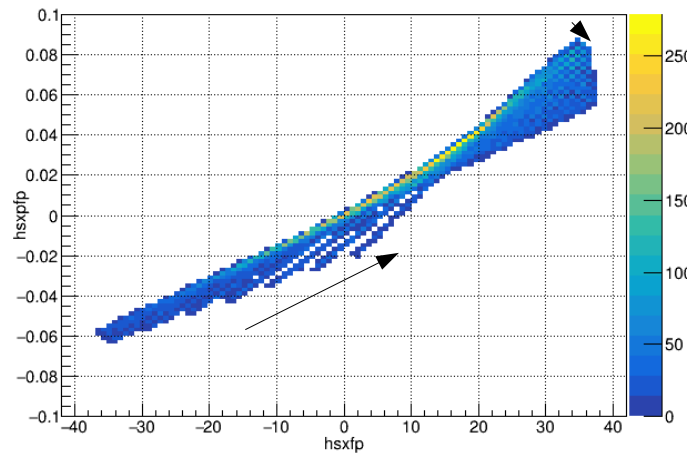
Q1 Single Strength Variation – 1

- Q2, Q3 turned off
- Q1 [*0.95, *1.00, *1.05] nominal strength

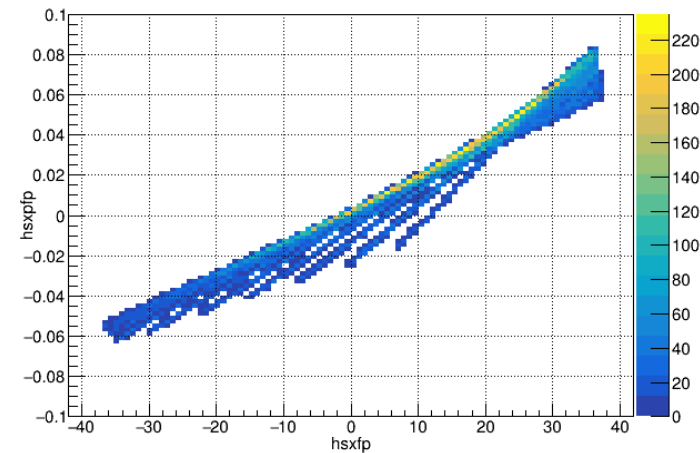
hsxftp vs hsxfp



hsxftp vs hsxfp



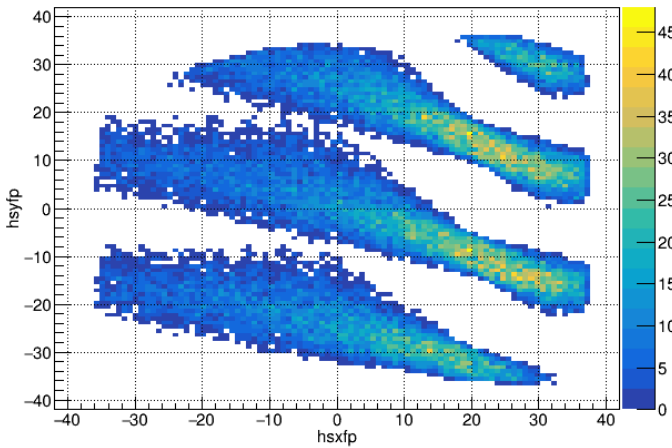
hsxftp vs hsxfp



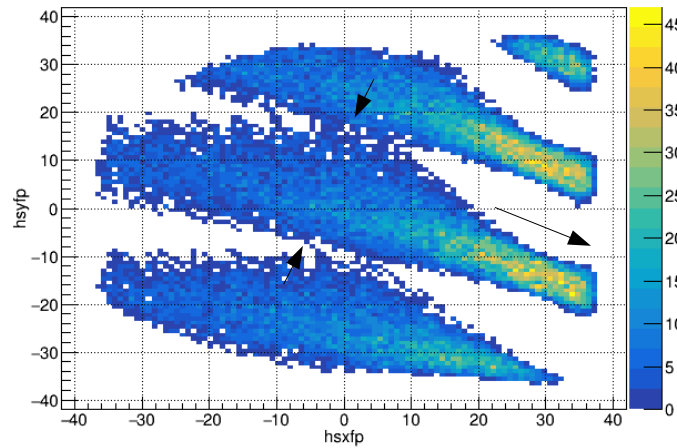
Q1 Single Strength Variation – 2

- Q2, Q3 turned off
- Q1 [*0.95, *1.00, *1.05] nominal strength

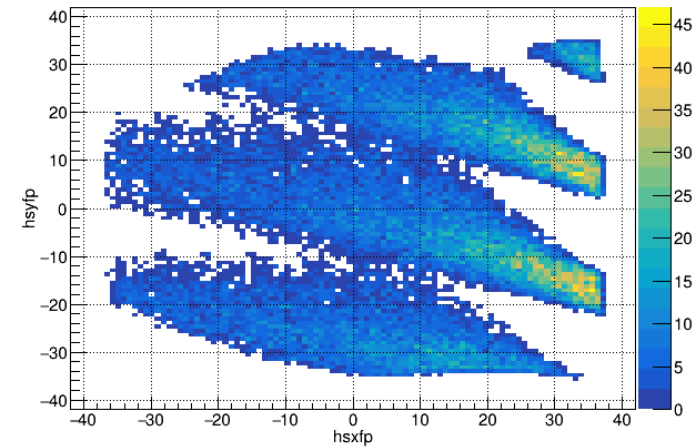
hsyfp vs hsxfp



hsyfp vs hsxfp



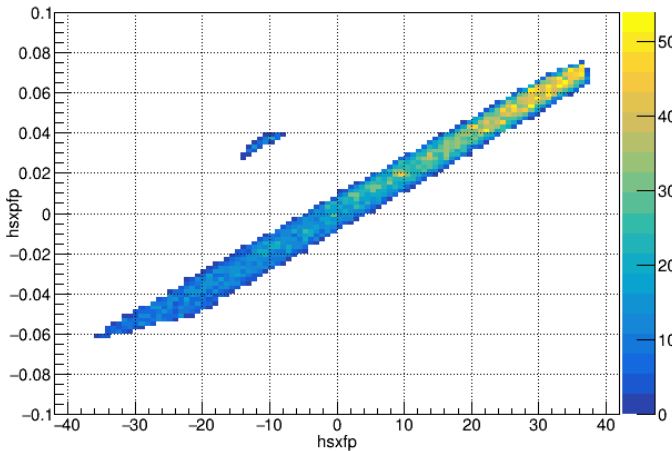
hsyfp vs hsxfp



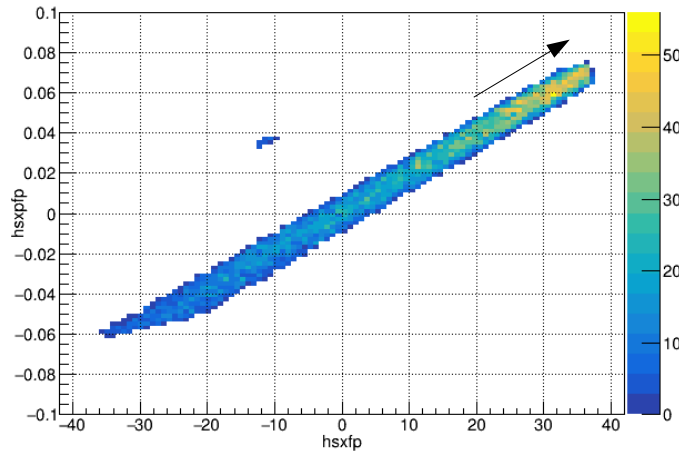
Q2 Single Strength Variation – 1

- Q1, Q3 turned off
- Q2 [*0.95, *1.00, *1.05] nominal strength

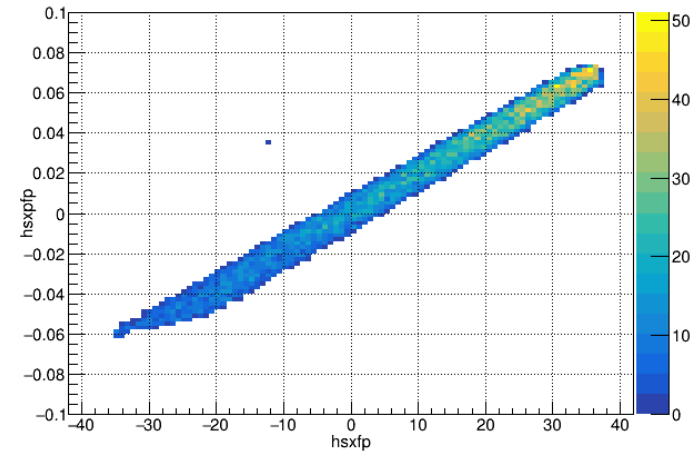
hsxpfp vs hsxfp



hsxpfp vs hsxfp



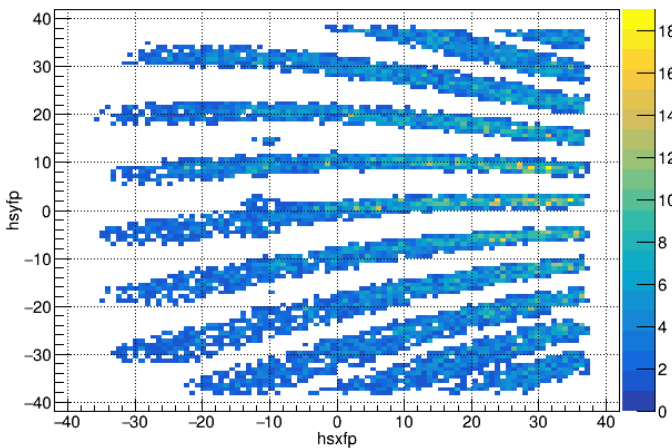
hsxpfp vs hsxfp



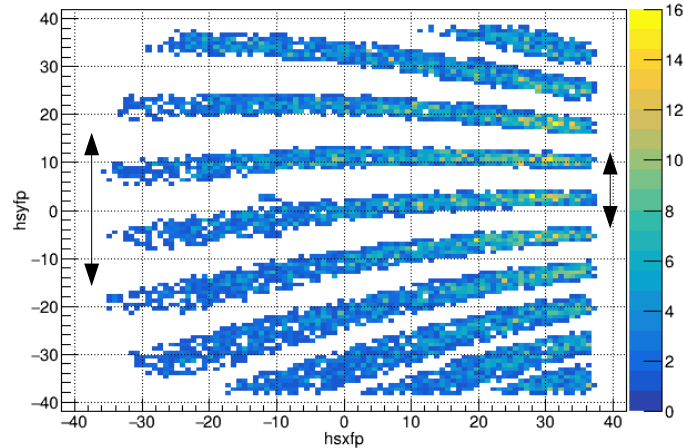
Q2 Single Strength Variation – 2

- Q1, Q3 turned off
- Q2 [*0.95, *1.00, *1.05] nominal strength

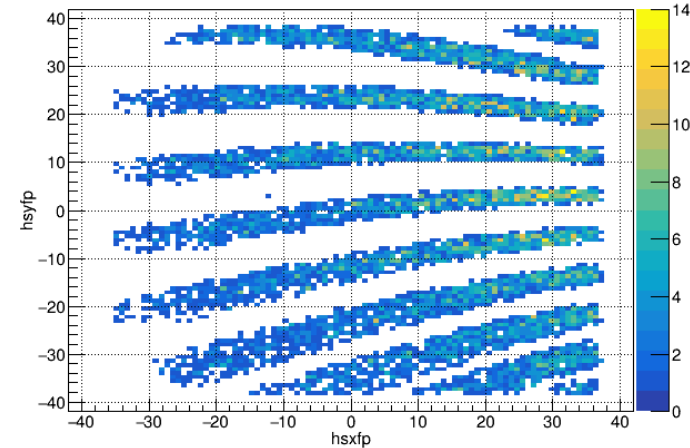
hsyfp vs hsxfp



hsyfp vs hsxfp



hsyfp vs hsxfp



Q3 Single Strength Variation

- Q1, Q2 turned off
- Q3 [$\times 0.95$, $\times 1.00$, $\times 1.05$] nominal strength
- $0 < \text{delta} < 15$

