

SIDIS GEM Digitization

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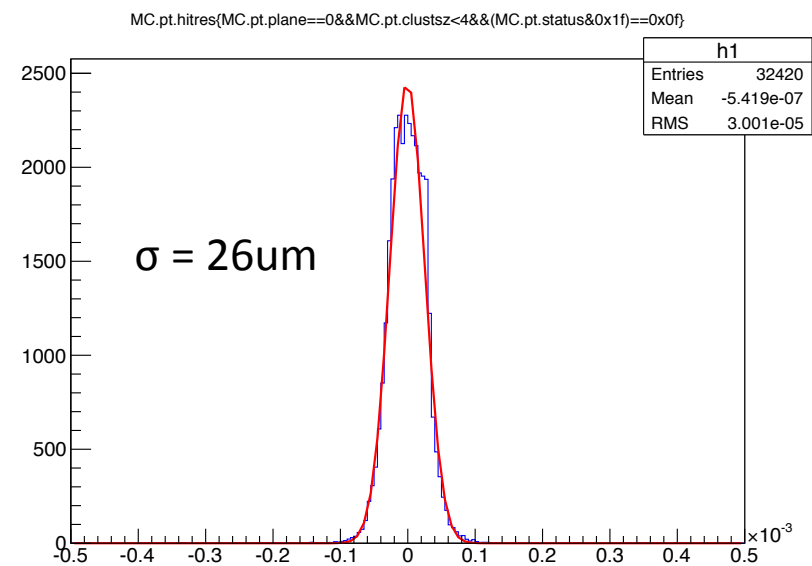
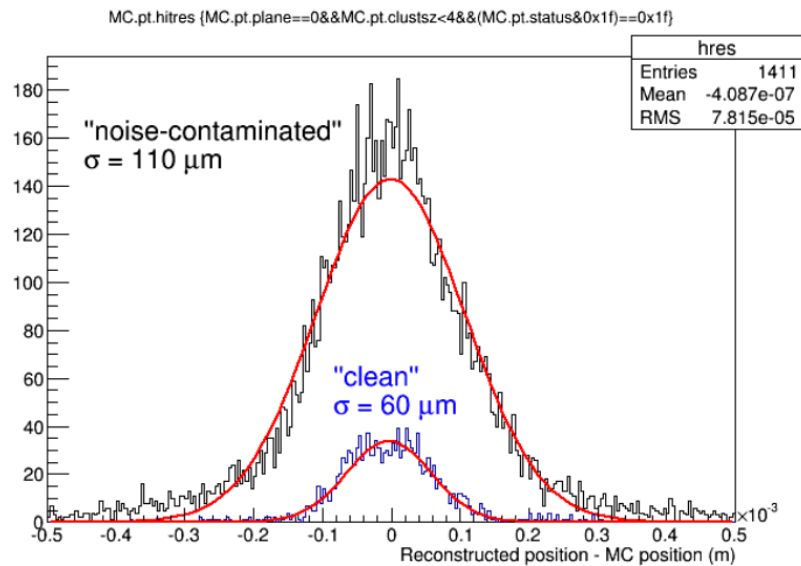
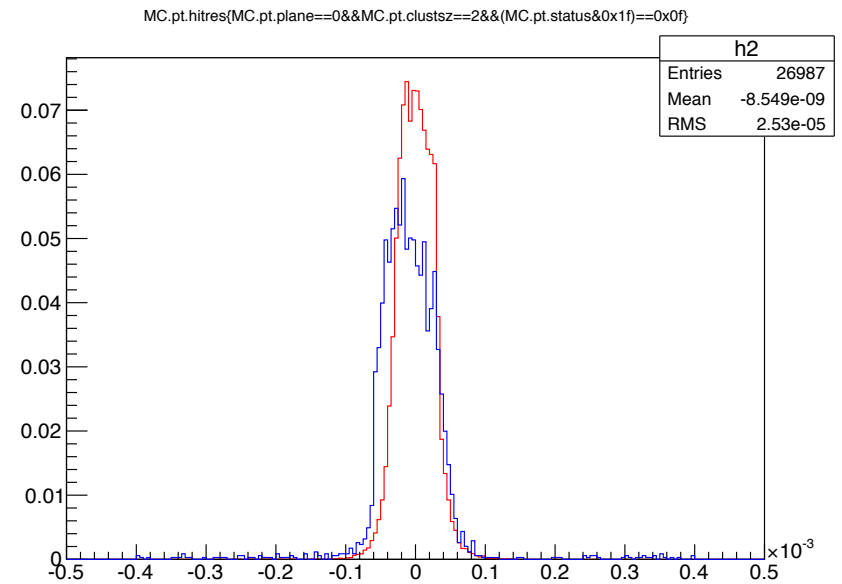
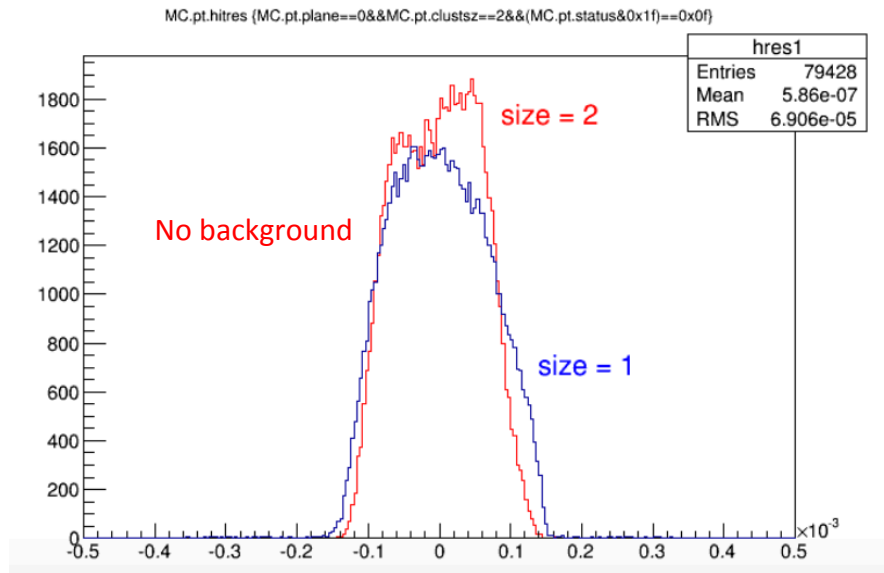
Current Status

- Modified libsolgem for running current SIDIS GEMC simulation
 - Update data base
 - Small changes for new detector ID, units...
- Current geometry
 - 30 sectors for each GEM plane (**should use 20 instead?**), no dead area, 12° stereo angle readout strips.
 - No overlapping sectors (need the simulation to do this first)
- Have digitized and decoded some SIDIS pion events, checking the result to see if there is any bugs

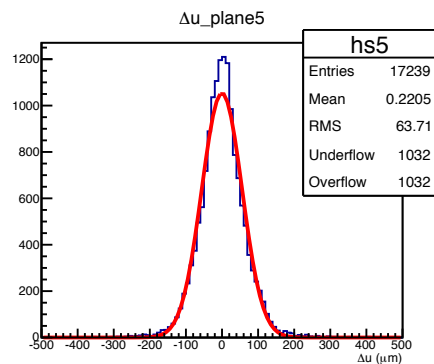
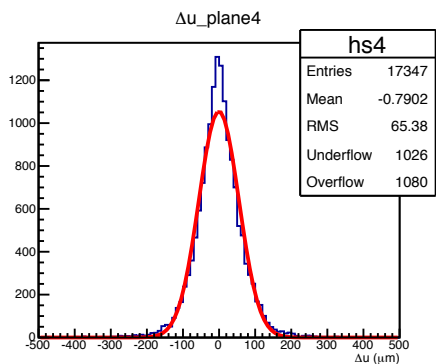
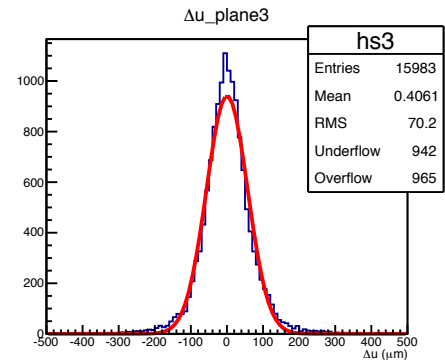
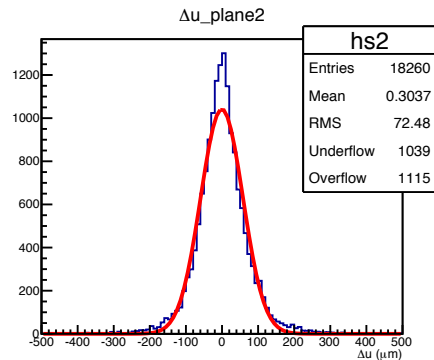
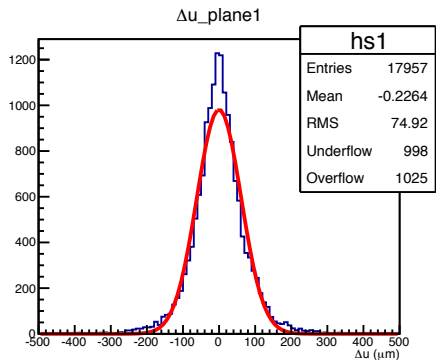
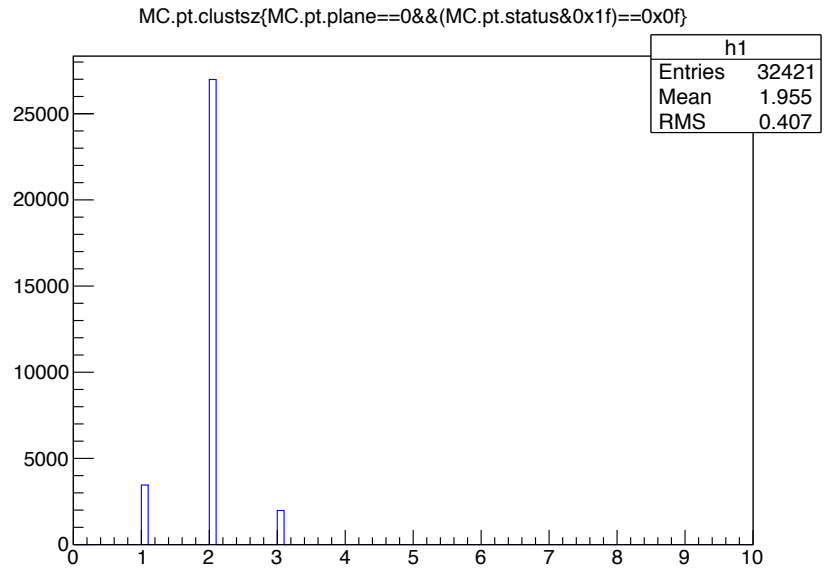
Hit Position Resolution – PVDIS (muon no field)

From Collaboration meeting 11/08/2014

My current result



Cluster size (PVDIS)



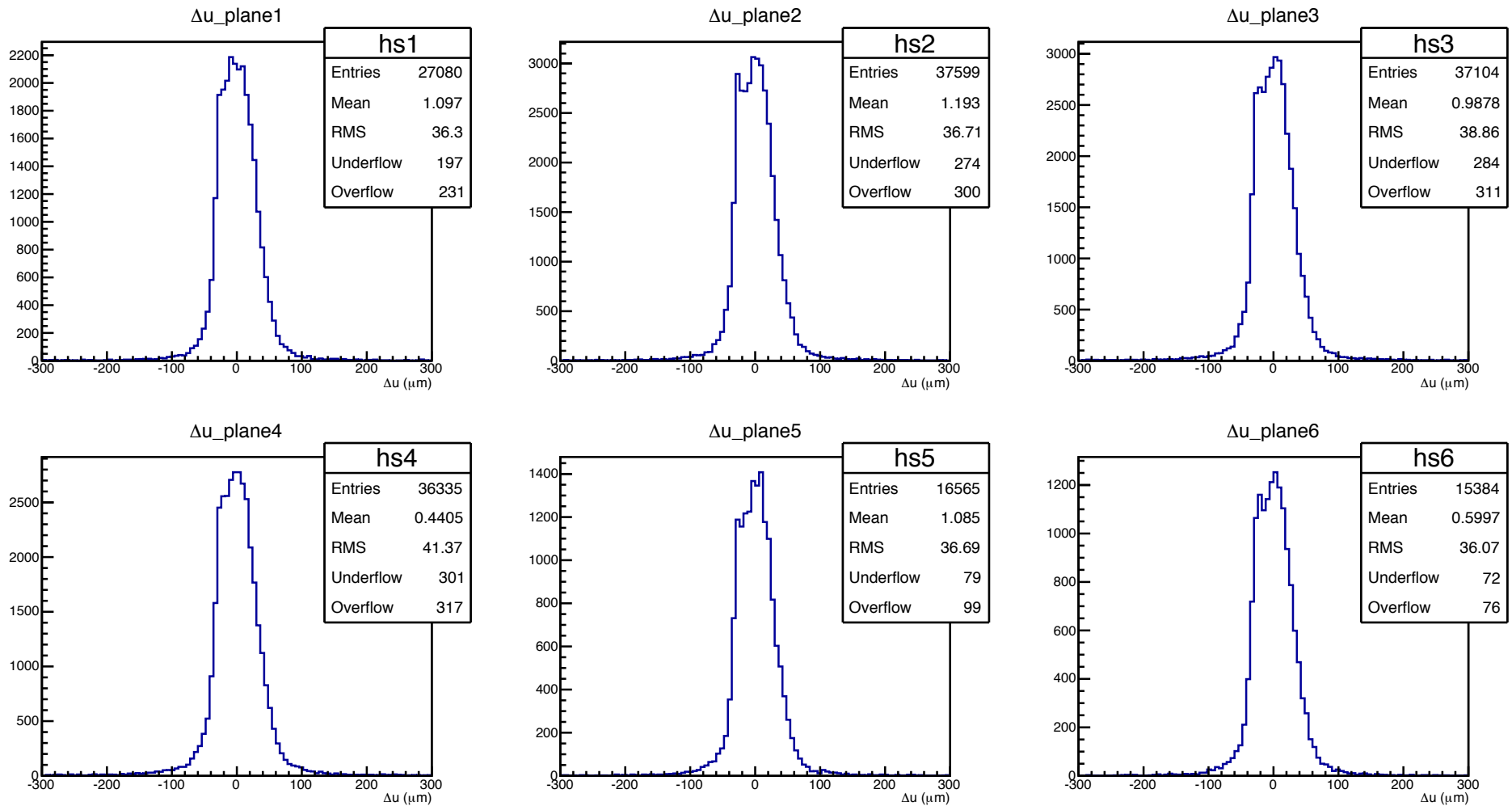
Can get to 60μm, but only after tuning some parameters:
Gasdiffusion: 45000 -> 30000 mm²/s
Pulsenoisesigma: 0 -> 30

GEM Digitization–SIDIS (pion field on)

- Apparently the same thing happens for SIDIS, need to find out why
- Digitized 50k SIDIS pion events
- Hit rate for the primary particles in the GEM chamber:
 - 26910 | 37359 | 36907 | 36143 | 16526 | 15386
 - Actual number of digitized hits due to primary particles slightly **higher** than this (due to splitting of over sized cluster?)
- I am only showing hits due to primary particles so
(solid.tracker.%i.u%i.hit.mctrk)==1

GEM Digitization–SIDIS (pion field on)

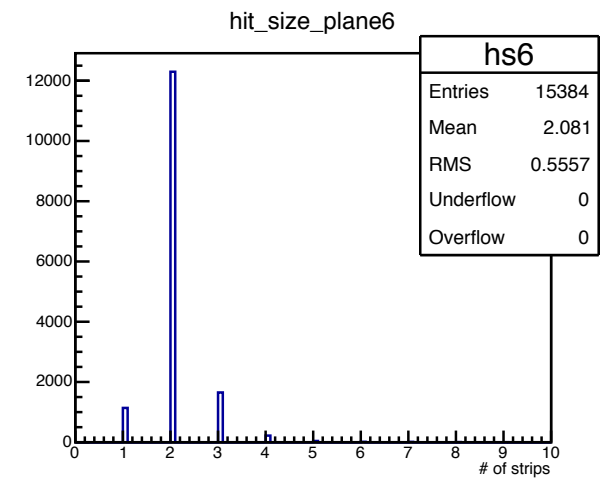
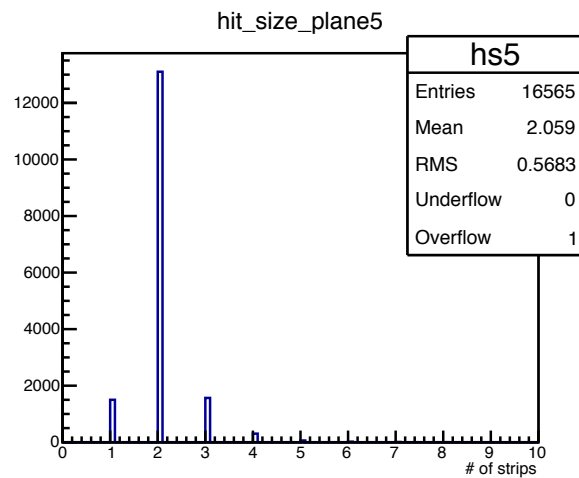
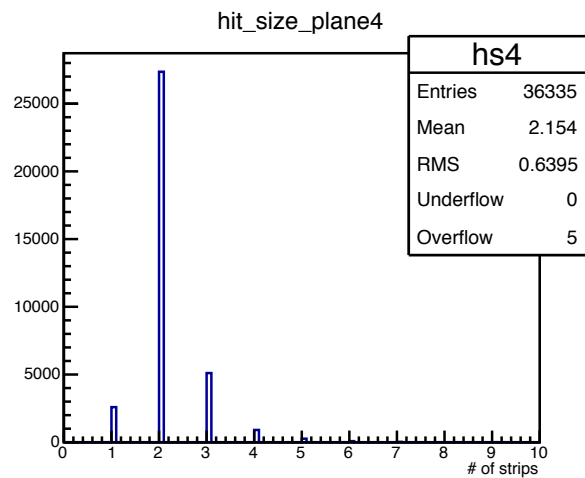
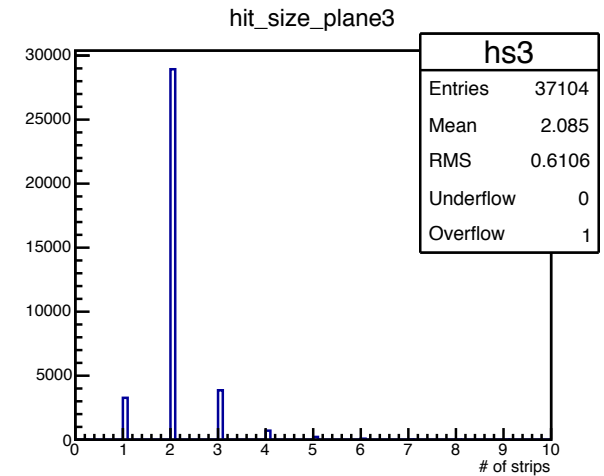
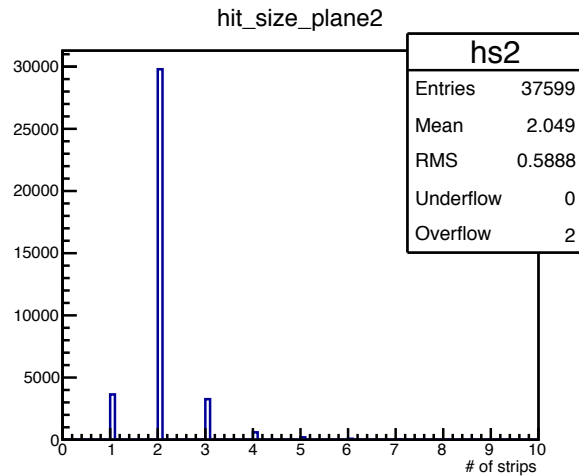
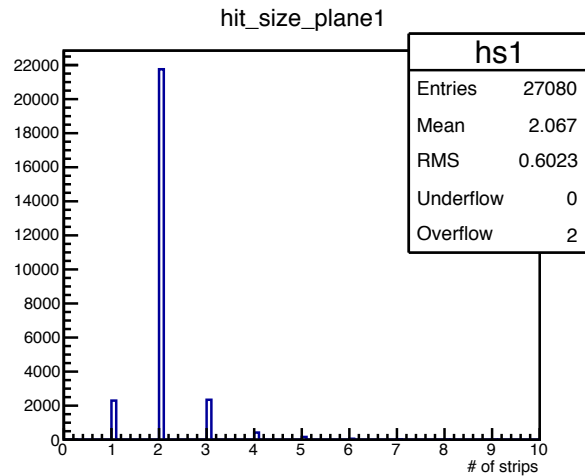
Hit residual for u coordinate



Use 3 samples deconvolution, same as PVDIS

GEM Digitization–SIDIS (pion field on)

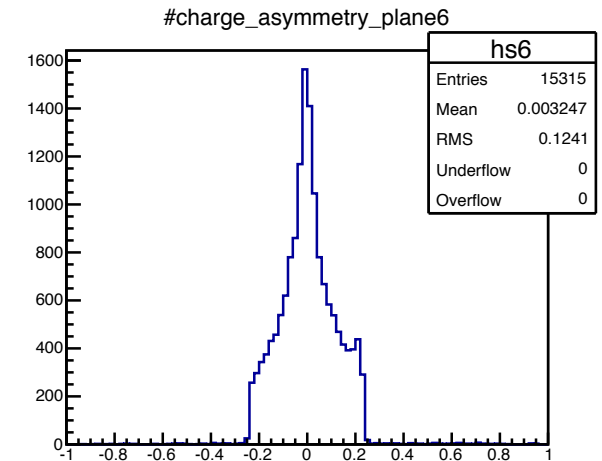
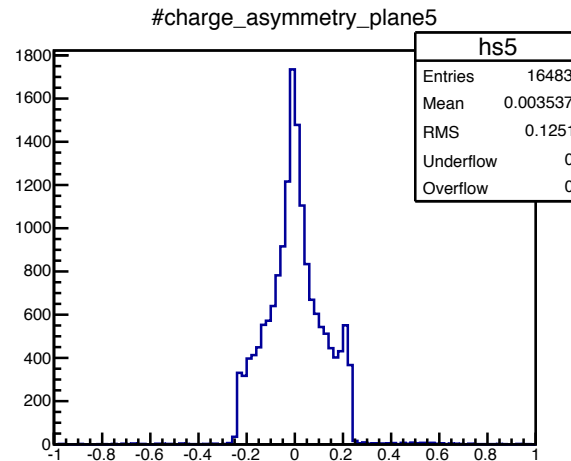
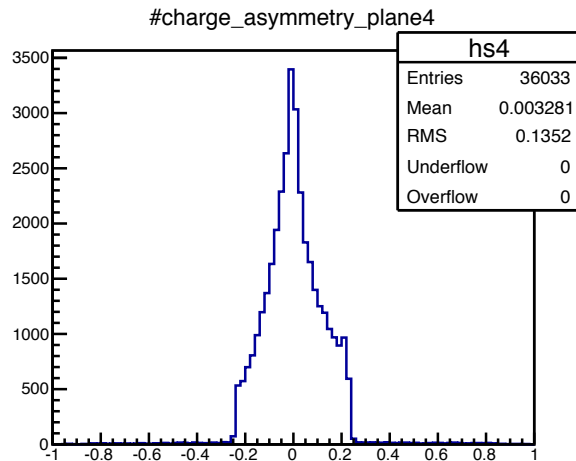
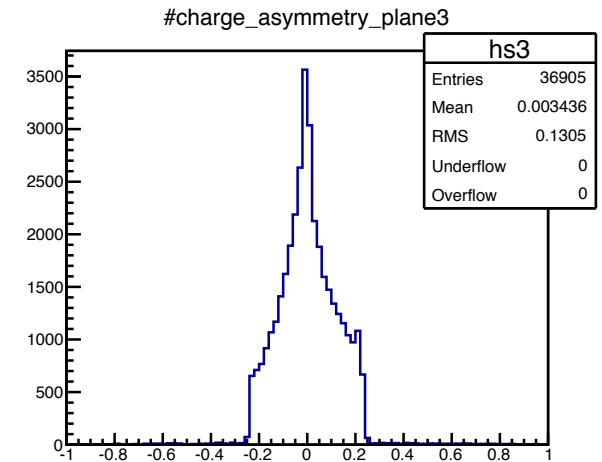
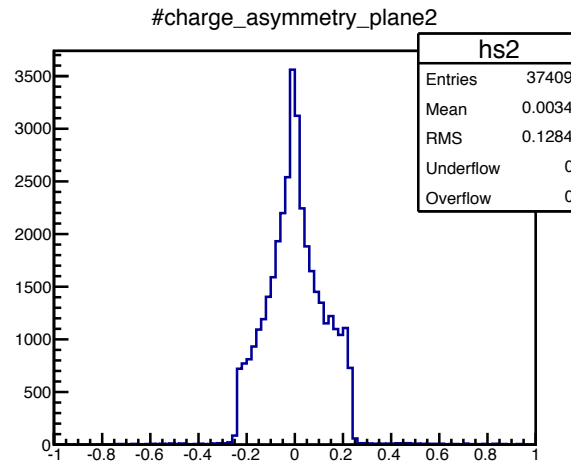
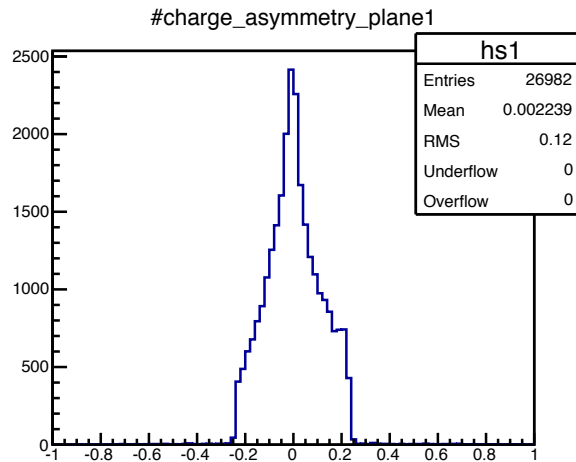
Cluster size on u coordinate



Use 3 samples deconvolution, same as PVDIS

GEM Digitization–SIDIS (pion field on)

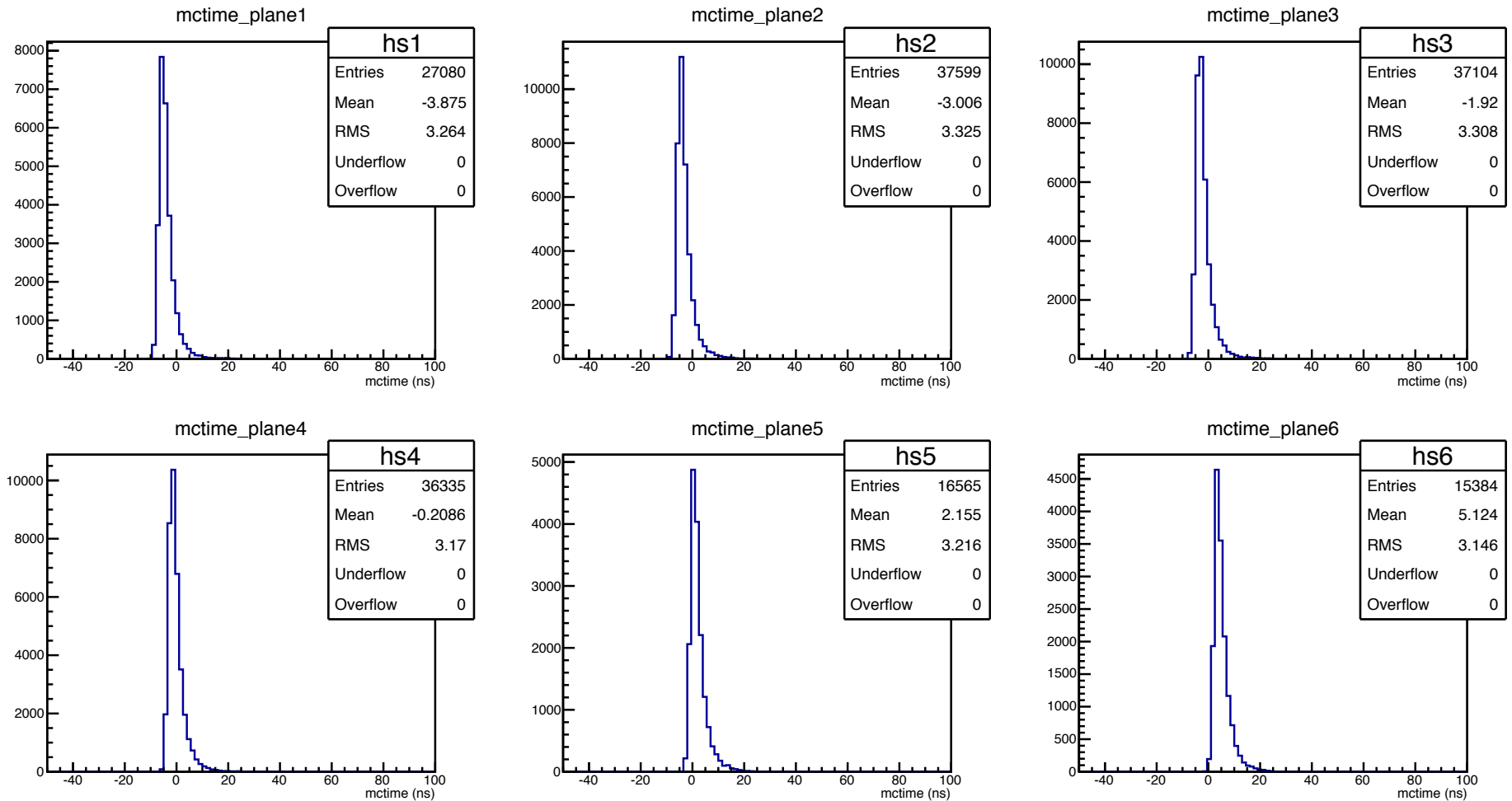
Charge asymmetry: $(q_u - q_v) / (q_u + q_v)$



Use 3 samples deconvolution, same as PVDIS

GEM Digitization–SIDIS (pion field on)

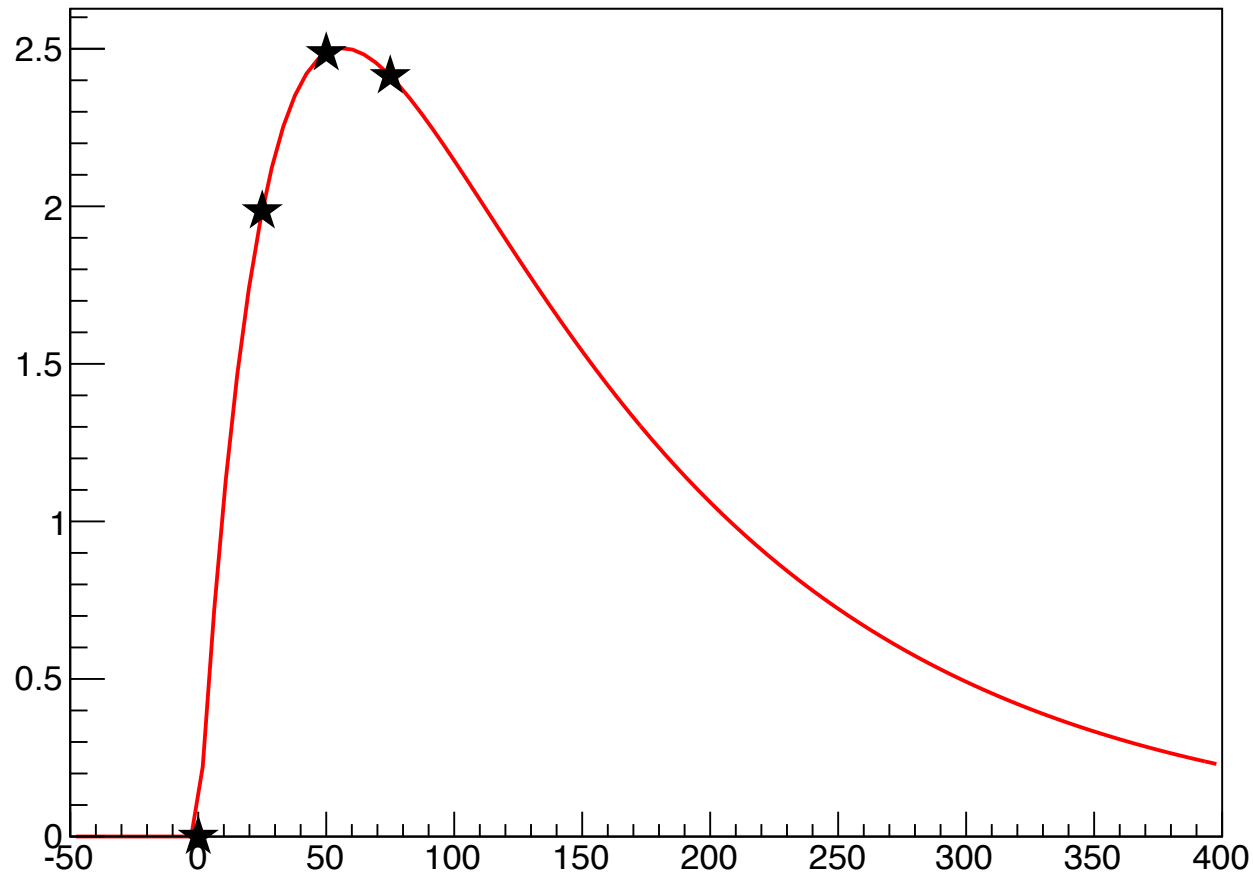
Arrival time at electronics



Use 3 samples deconvolution, same as PVDIS

GEM Digitization–SIDIS (pion field on)

pulseShape



- Maximum appears at around 50ns
- If the signal arrive at around 0ns, we should take the third point if we are collecting only one sample
- Also tune down the ADC cut (500 -> 100) for the case of one sample

GEM Digitization–SIDIS (pion field on)

