



Update on the December/January running

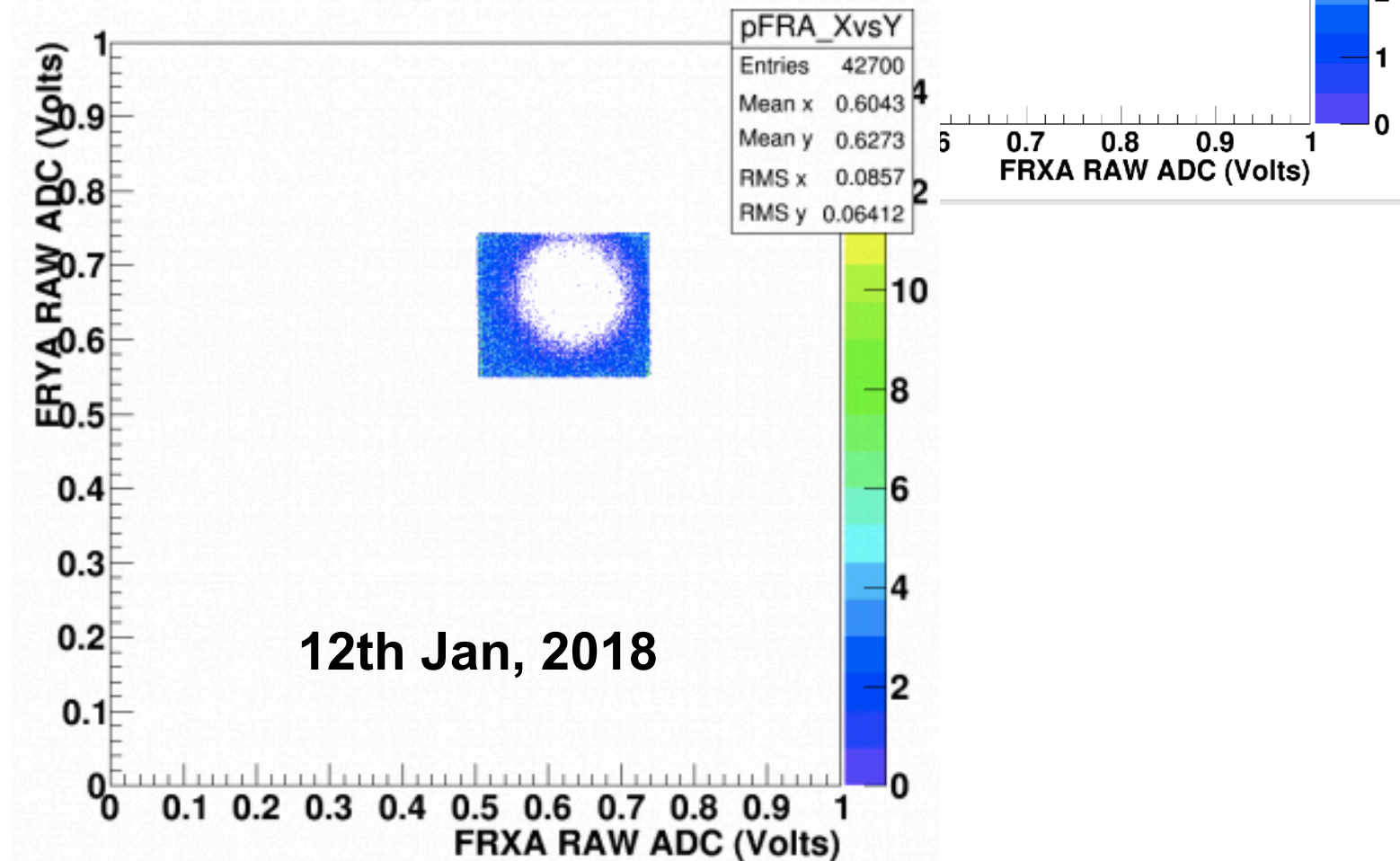
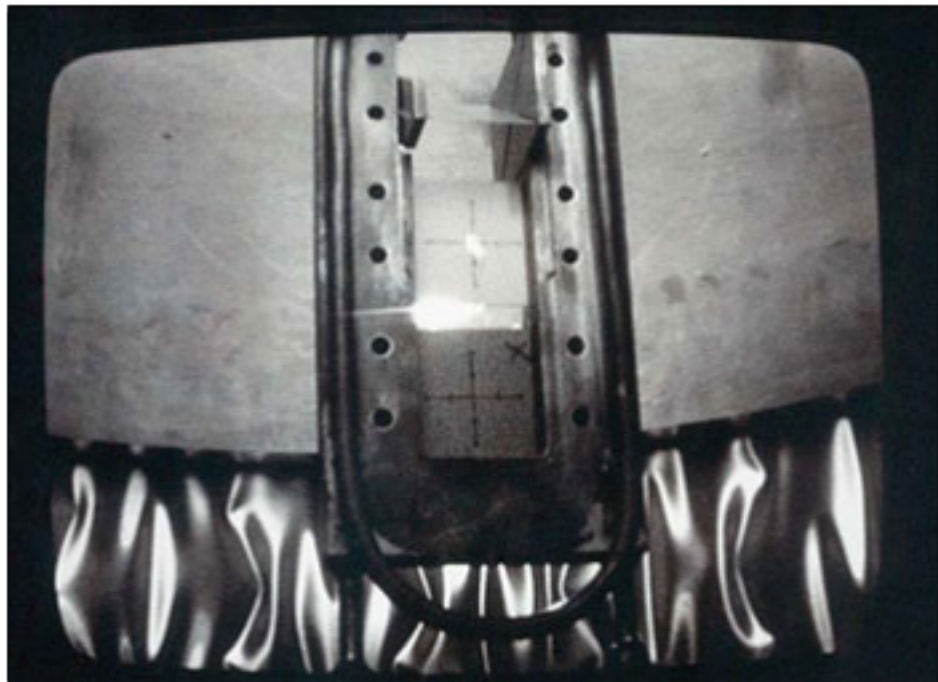
Dipangkar Dutta
Mississippi State
University

Hall C Commissionings have come a long way in 24 years.

1994



First beam enters Hall C.



A long and complex commissioning plan was laid out awaiting beam.

Hall C One pass commissioning plan

Contents [\[hide\]](#)

1 Initial conditions

2 Completed

- 2.1 Center beam on C-hole target
- 2.2 Initial HMS/SHMS Detector Checkout
- 2.3 Wire Chamber
 - 2.3.1 Shower Counter
 - 2.3.2 Scintillator
 - 2.3.3 Cerenkov
 - 2.3.4 Aerogel
- 2.4 Initial checkout of SHMS/HMS tune
- 2.5 Beam Energy Measurement
- 2.6 HMS delta scan with LH2
- 2.7 Inelastic on 1H at 21.95 degrees
- 2.8 Target boiling study
- 2.9 BCM Calibration
- 2.10 Inelastic on 1H at 42.5 degrees
- 2.11 SHMS Delta checkout with Carbon Elastic ground state
- 2.12 HMS Trigger Efficiency study
- 2.13 SHMS/HMS Delta Matrix calibration
- 2.14 SHMS Quartz bar gain matching
- 2.15 HMS Angle and position matrix optimization for large ytgt (partially completed)
- 2.16 1H(eep) Coincidence SHMS (proton) and HMS (electron)
- 2.17 1H(eep) Coincidence SHMS (electron) and HMS (proton)
- 2.18 SHMS Angle and Position Matrix Optimization

2 Beam energy of 6.4 GeV

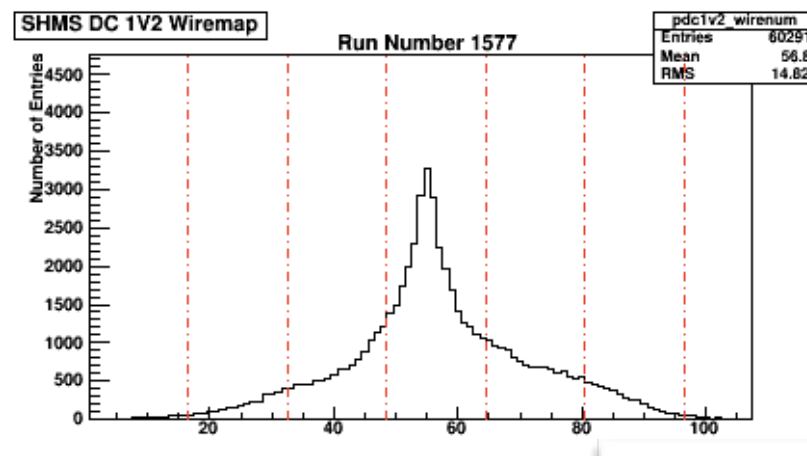
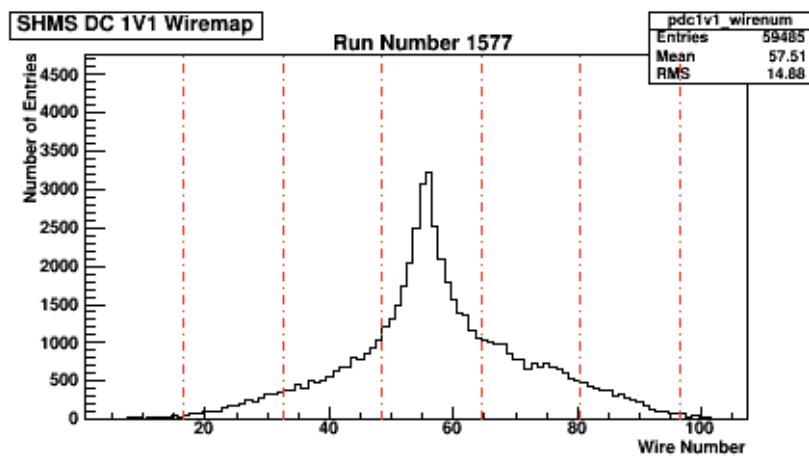
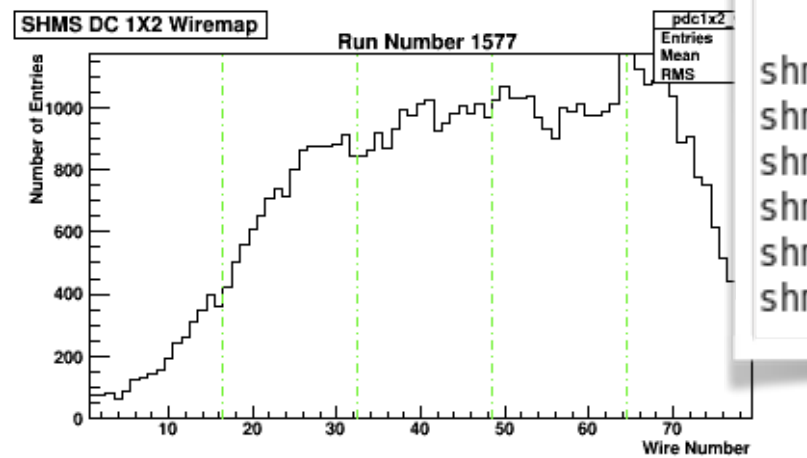
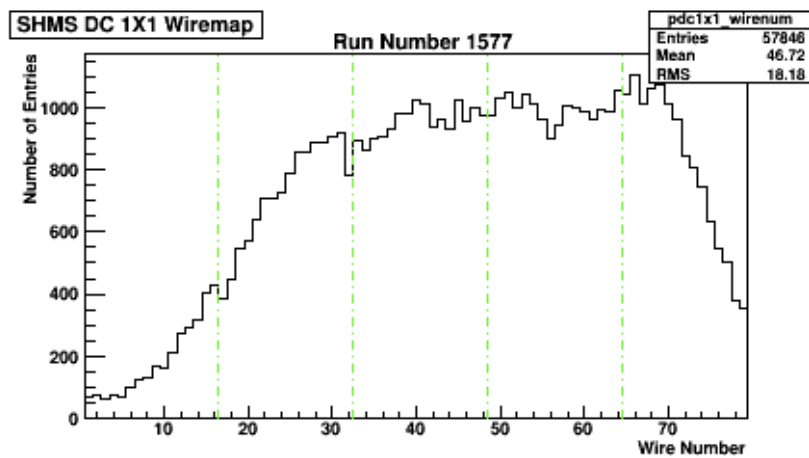
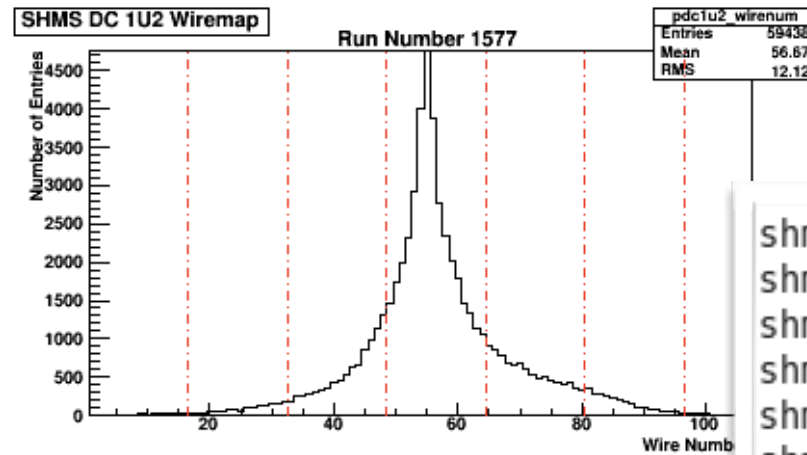
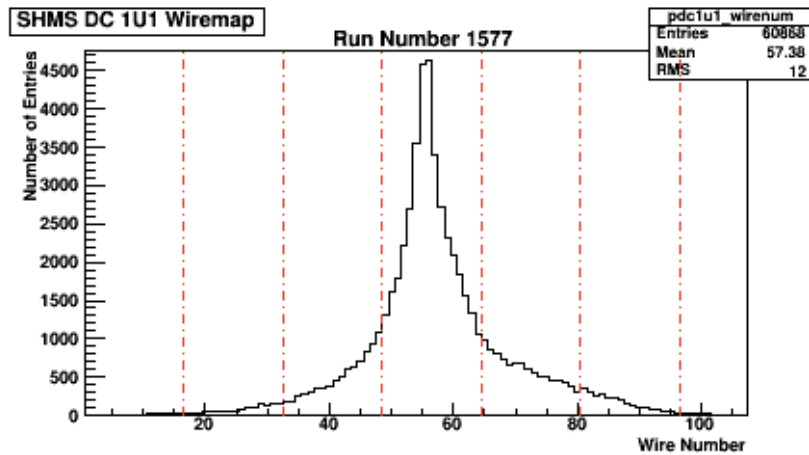
- 2.1 Initial conditions
- 2.2 Beam Checkout with Superharps and Beam Position Monitors (3 hours)
- 2.3 Center beam on C-hole target (1 hour)
- 2.4 Detailed Detector Checkout (2 hour)
 - 2.4.1 Trigger
 - 2.4.2 Cerenkov
- 2.5 Checkout of SHMS/HMS focal plane tune (1 hour)
- 2.6 Different Pi/e ratios (1.5 hour)
- 2.7 Defocused Tune for SHMS/HMS (1 hour)
- 2.8 Elastic p(ep) Checkout Small angle (2 hours)
- 2.9 HMS/SHMS Angle and Position Matrix Optimization (5 hours)
- 2.10 Large Ytar: HMS/SHMS Angle and Position Matrix Optimization (9 hours)
- 2.11 Check of ELREAL/ELCLEAN Trigger (1.5 hour)
- 2.12 Coincidence Checkout [9 hrs]
- 2.13 Additional Large Ytar: HMS/SHMS Angle and Position Matrix Optimization (6 hours)
- 2.14 Additional Coincidence Checkout [3 hr]
- 2.15 Beam Energy Measurement (3 hours)
- 2.16 CT Physics [53 hrs]
- 2.17 Target LH2/LD2 boiling study
- 2.18 F2 Physics
- 2.19 Program with SHMS during F2 HMS data taking
 - 2.19.1 Final Checkout of SHMS ELREAL/ELCLEAN Trigger (3 hour)
 - 2.19.2 Use GEM to check out SHMS optics
 - 2.19.3 SHMS Elastic Single arm Checkout Additional angles (4 hours)
- 2.20 Lower priority
 - 2.20.1 BCM Calibration (1 hour)
 - 2.20.2 1H or 12C(e, e' n) [2 hr]
 - 2.20.3 1H(e'K) and 1H(e, e'K) [3 hr]

Highlights:

First beam (12/09, swing shift)
10 uA current (12/10, day shift)
20 uA current (12/12, swing shift)

Beam restored (01/12, swing shift)
40 uA current (01/15, day shift)
65 uA current (01/16, day shift)

SHMS & HMS Drift Chambers are performing well and as expected.



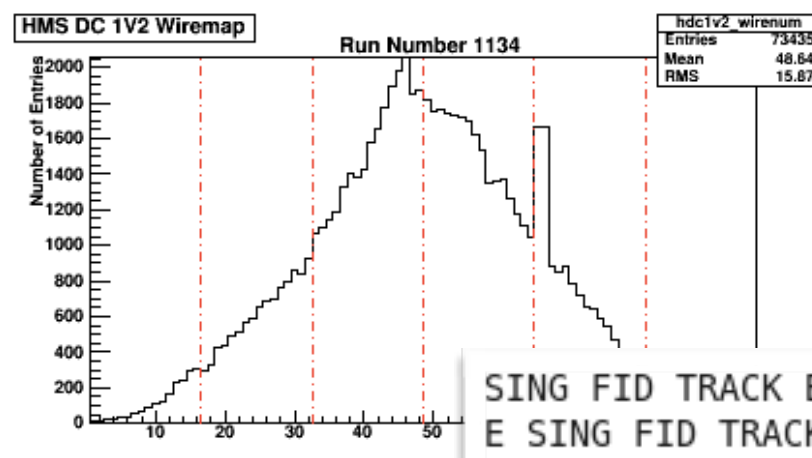
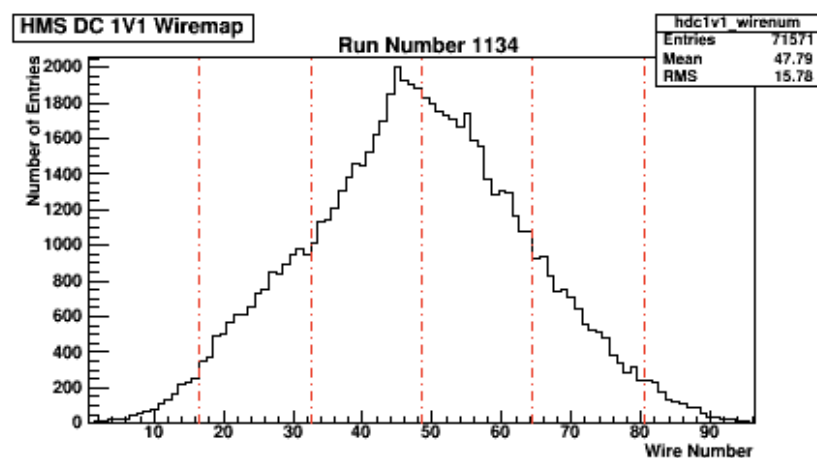
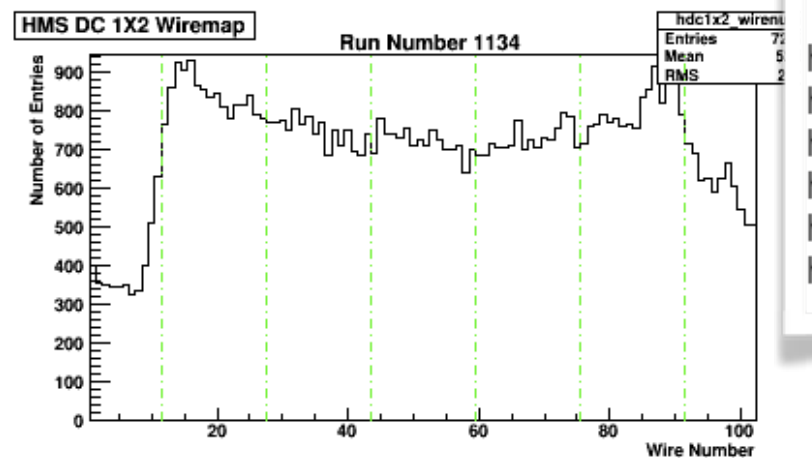
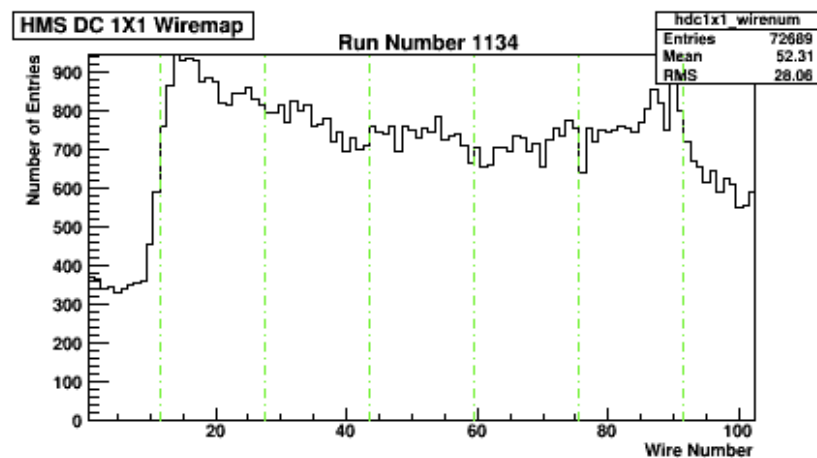
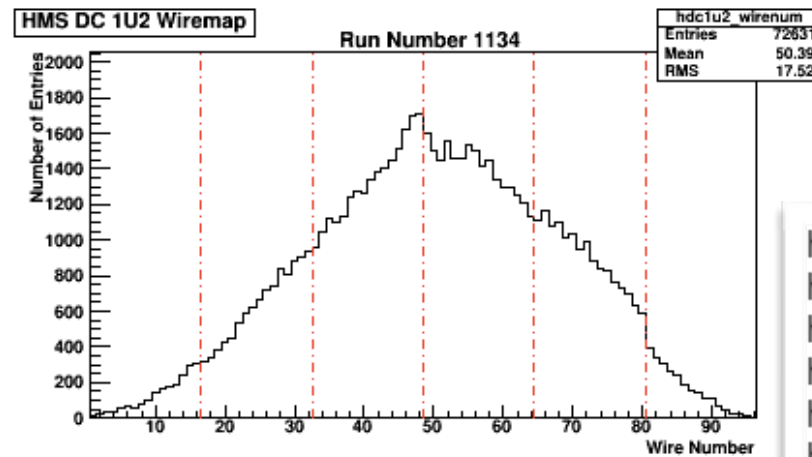
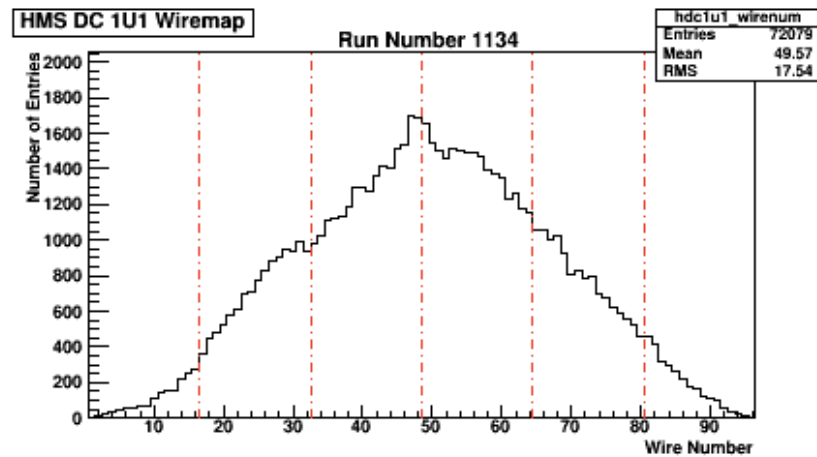
shmsDC1x1Planes5	Counts: 29334	eff : 0.998636
shmsDC1u1Planes5	Counts: 30039	eff : 0.999567
shmsDC1u2Planes5	Counts: 29740	eff : 0.996032
shmsDC1v1Planes5	Counts: 29614	eff : 0.999325
shmsDC1v2Planes5	Counts: 29828	eff : 0.999799
shmsDC1x2Planes5	Counts: 29562	eff : 0.999696

shmsDC2x1Planes5	Counts: 27979	eff : 0.996676
shmsDC2u1Planes5	Counts: 28200	eff : 0.999291
shmsDC2u2Planes5	Counts: 28088	eff : 0.999359
shmsDC2v1Planes5	Counts: 28309	eff : 0.988802
shmsDC2v2Planes5	Counts: 28145	eff : 0.999005
shmsDC2x2Planes5	Counts: 28369	eff : 0.984102

E SING FID TRACK EFFIC	:	0.9542 +- 0.0071
HADRON SING FID TRACK EFFIC	:	0.9349 +- 0.0119

plots from H. Fenker

SHMS & HMS Drift Chambers are performing well and as expected.



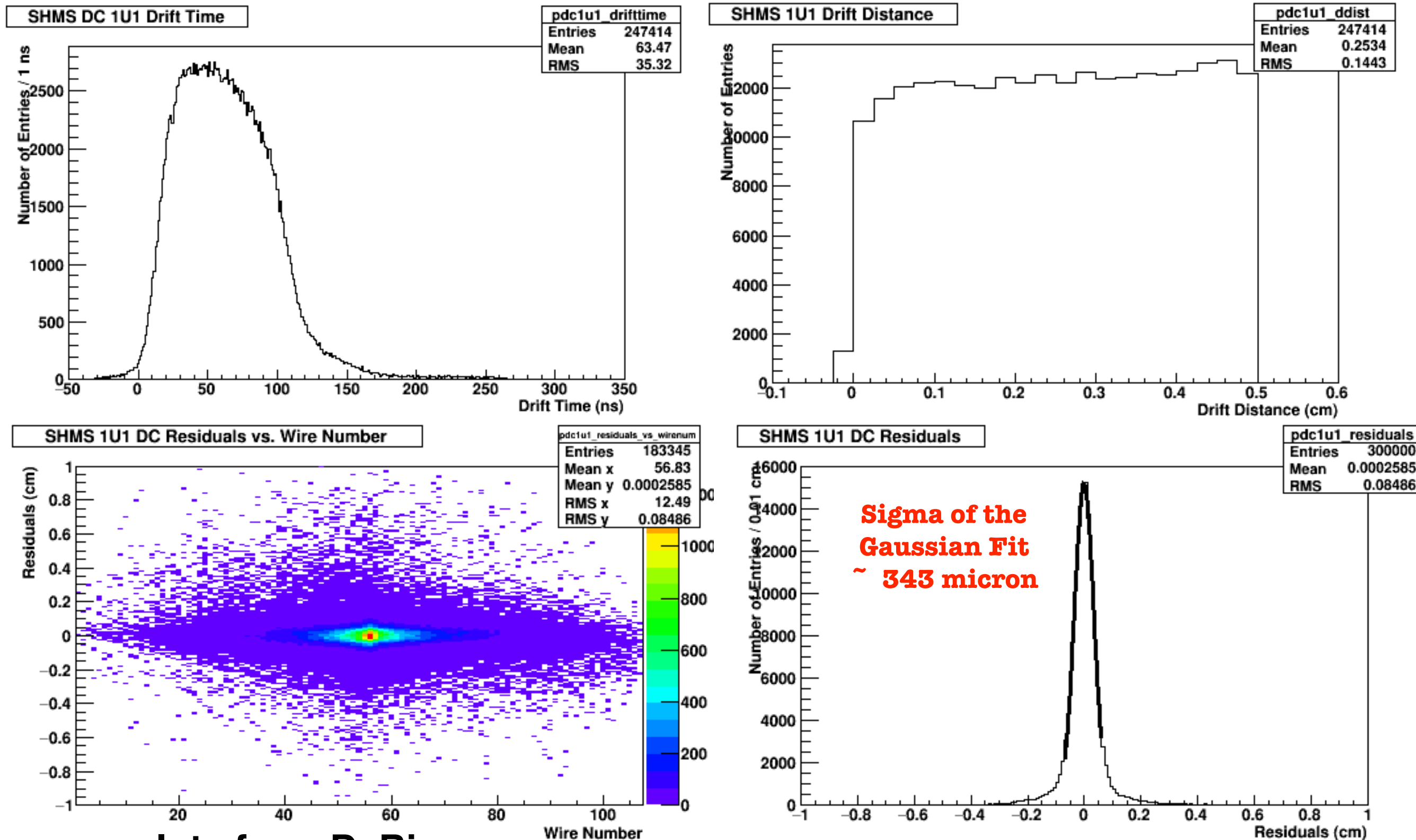
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hmsDC1u1Planes5	Counts:	35129	eff :	0.999146
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hmsDC1v1Planes5	Counts:	35180	eff :	0.998607
hmsDC1v2Planes5	Counts:	36063	eff :	0.997698
hmsDC1x2Planes5	Counts:	35340	eff :	0.999123

hmsDC2x1Planes5	Counts:	36650	eff :	0.999345
hmsDC2u1Planes5	Counts:	36515	eff :	0.998850
hmsDC2u2Planes5	Counts:	36527	eff :	0.998795
hmsDC2v1Planes5	Counts:	36573	eff :	0.999207
hmsDC2v2Planes5	Counts:	36708	eff :	0.999428
hmsDC2x2Planes5	Counts:	36751	eff :	0.999782

SING FID TRACK EFFIC	:	0.9563	+-	0.0014
E SING FID TRACK EFFIC	:	0.9595	+-	0.0021
HADRON SING FID TRACK EFFIC	:	0.9601	+-	0.0027

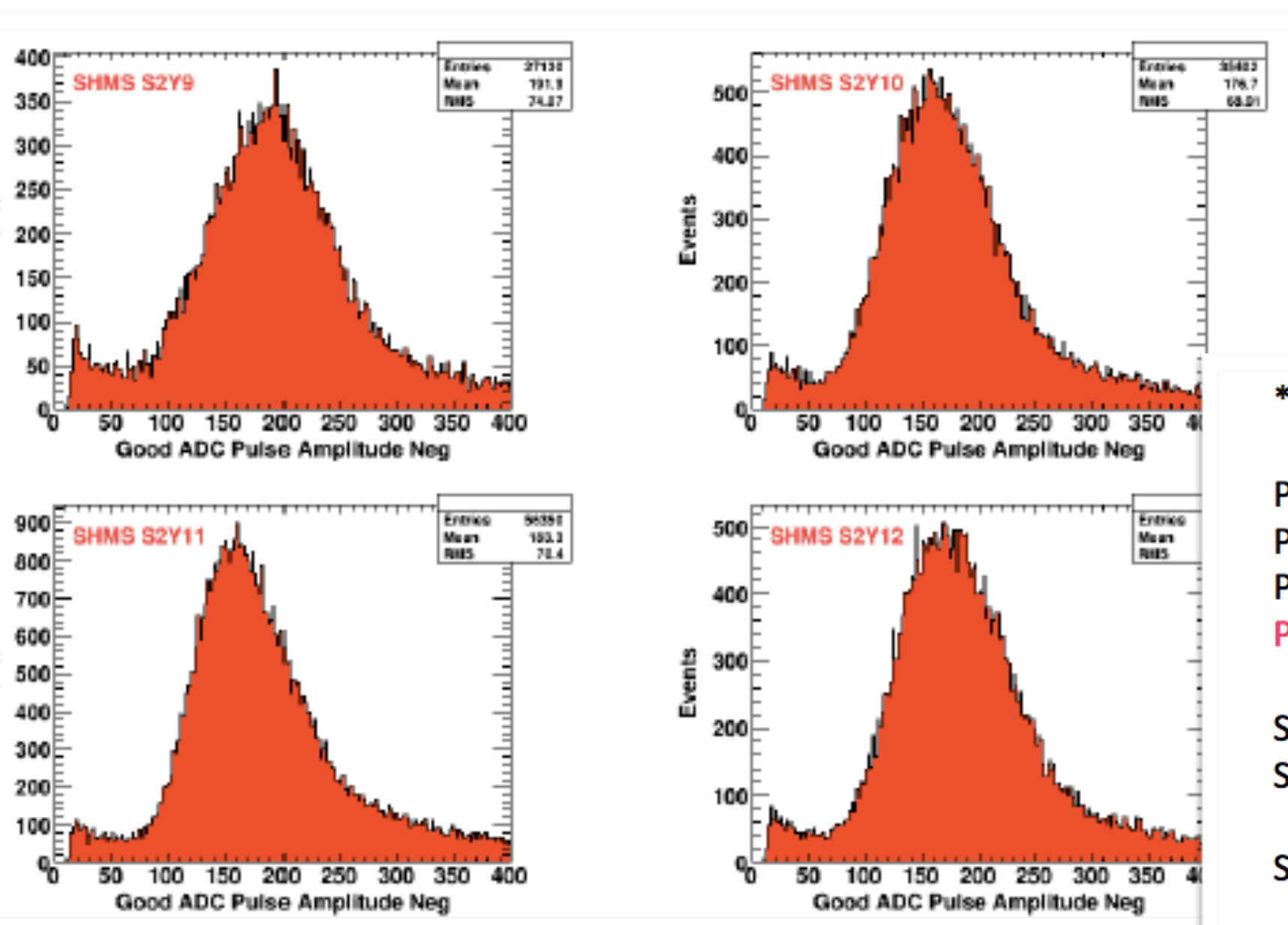
plots from H. Fenker

Drift Chambers in both spectrometers have been calibrated and are ready for production.



plots from D. Biswas

SHMS Hodoscope works great and has good efficiency.



Typical ADC spectra
plots from S. Malace

See Simona's talk in the afternoon for more details

***** Hodoscope Efficiency *****

Plane 1: 1
Plane 2: 0.999197
Plane 3: 0.995680
Plane 4: 0.988807

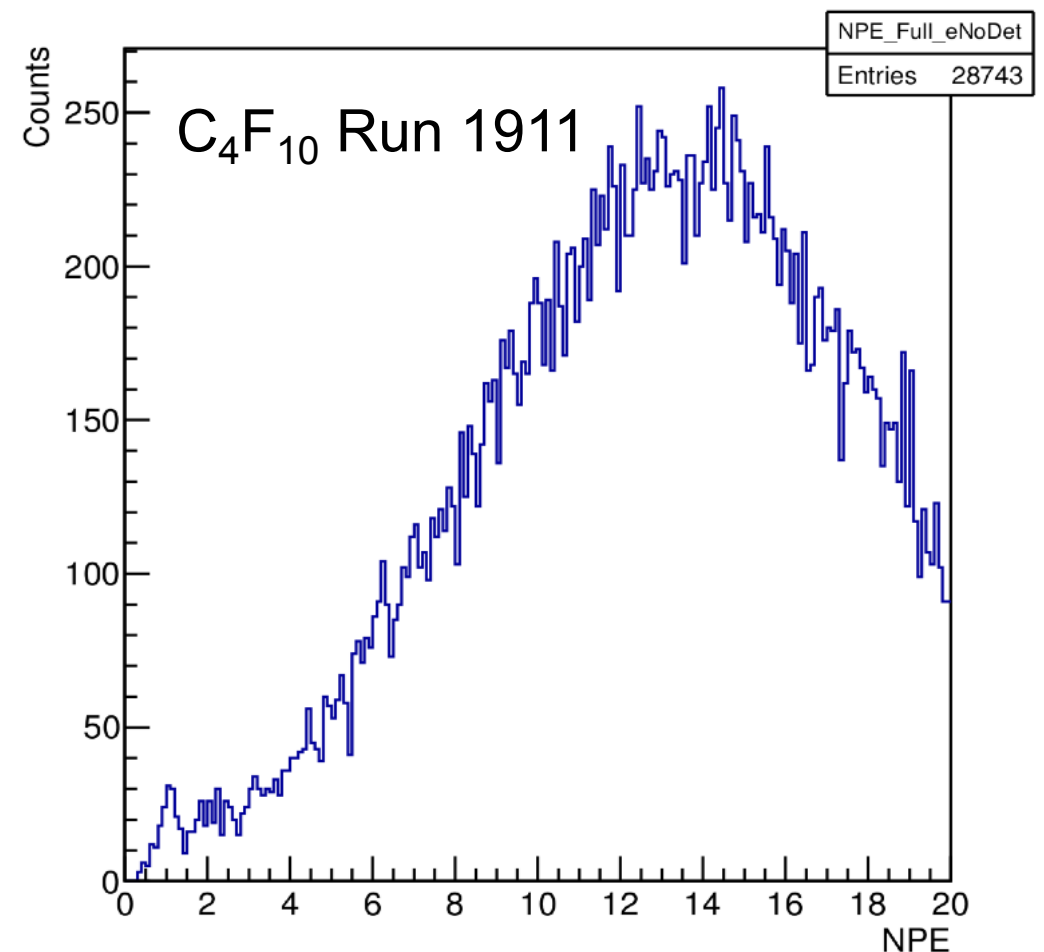
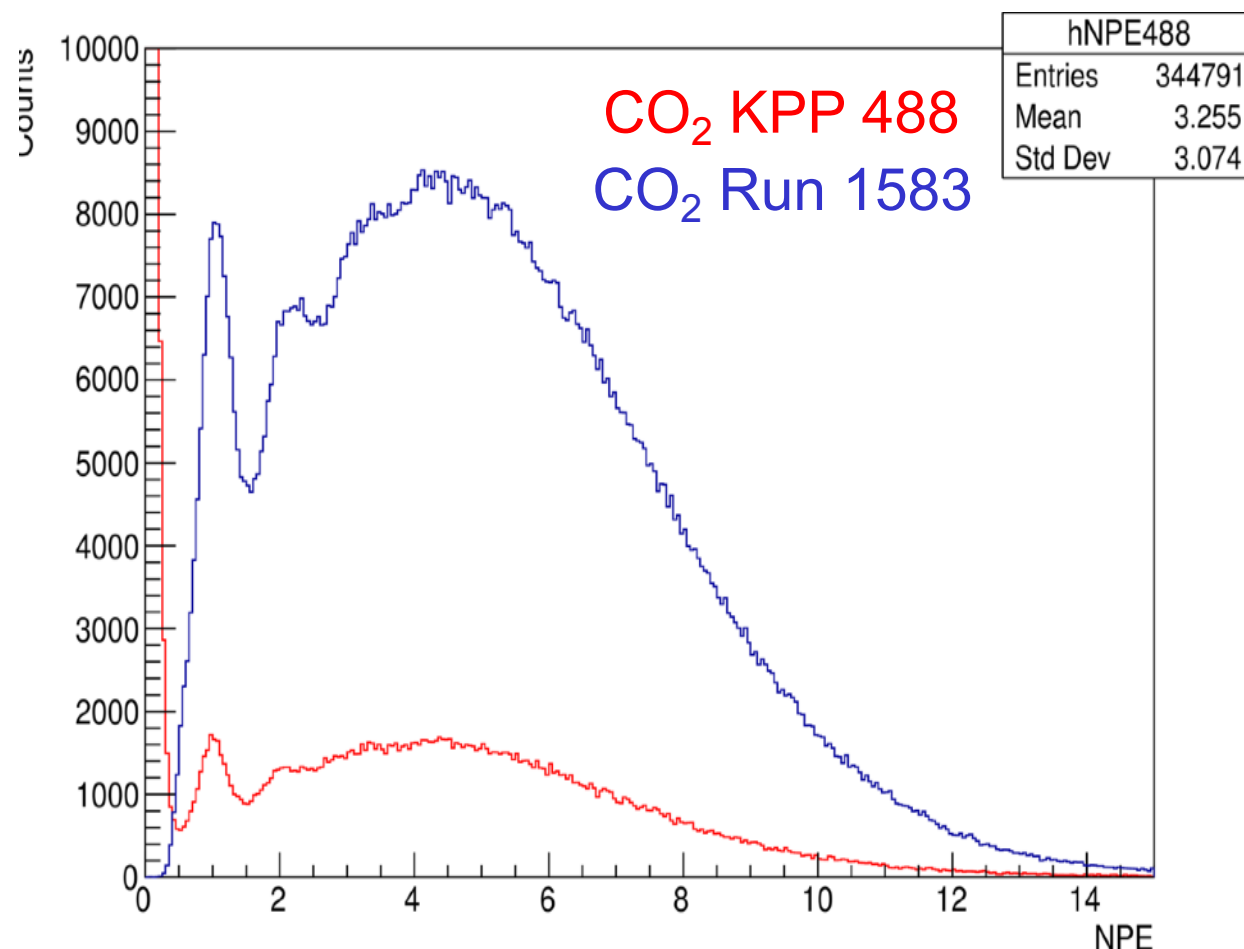
S1XY : 1
S2XY : 0.999952

STOF: 0.999952

3_of_4 EFF : 0.999939
4_of_4 EFF : 0.983745

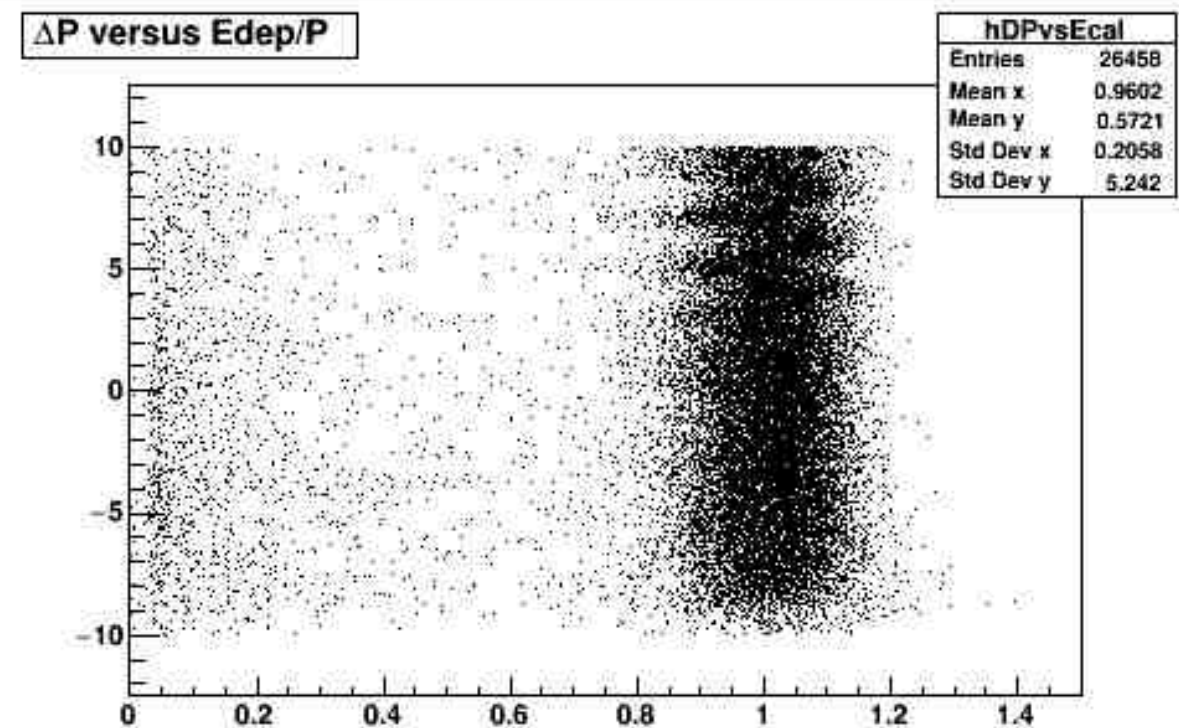
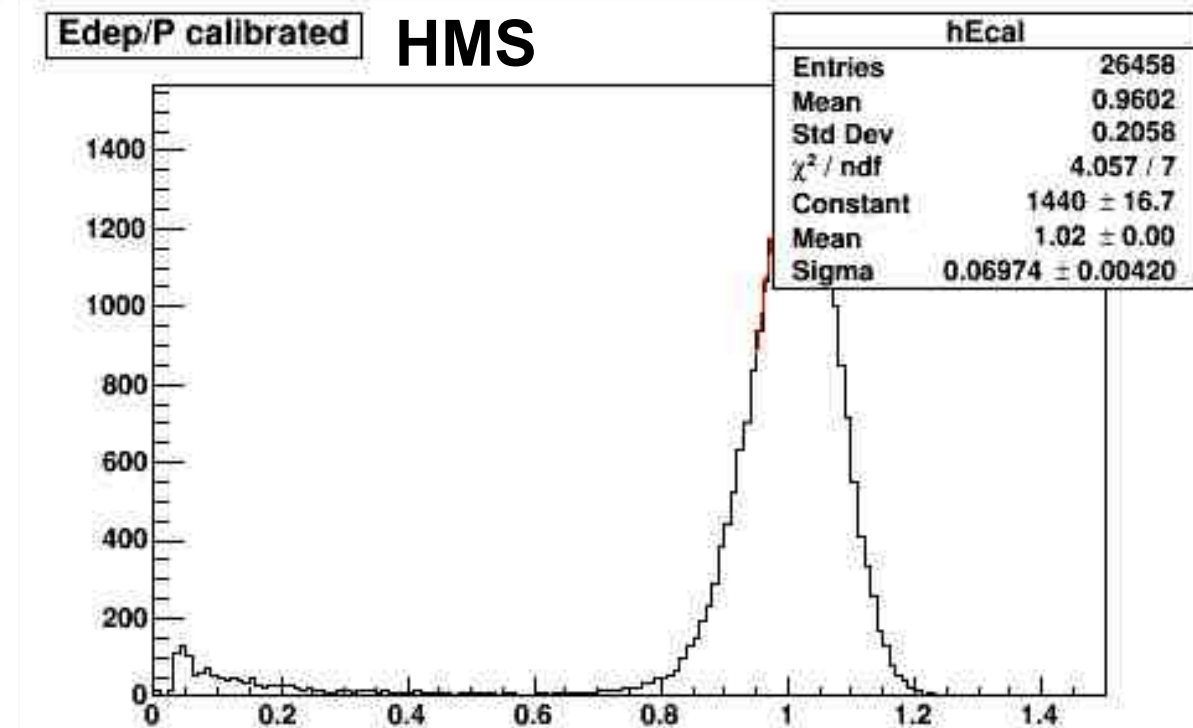
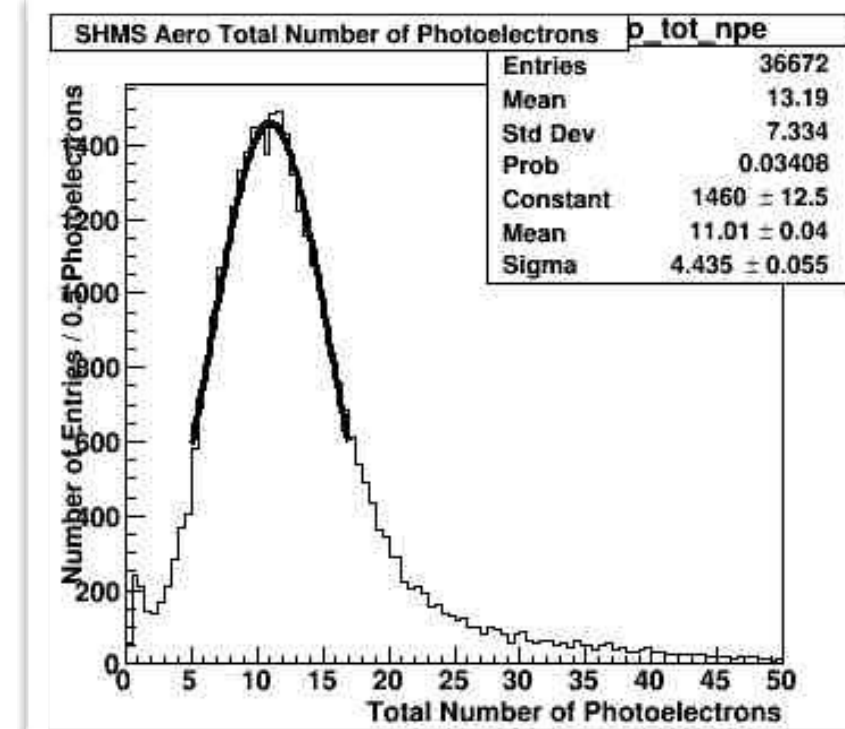
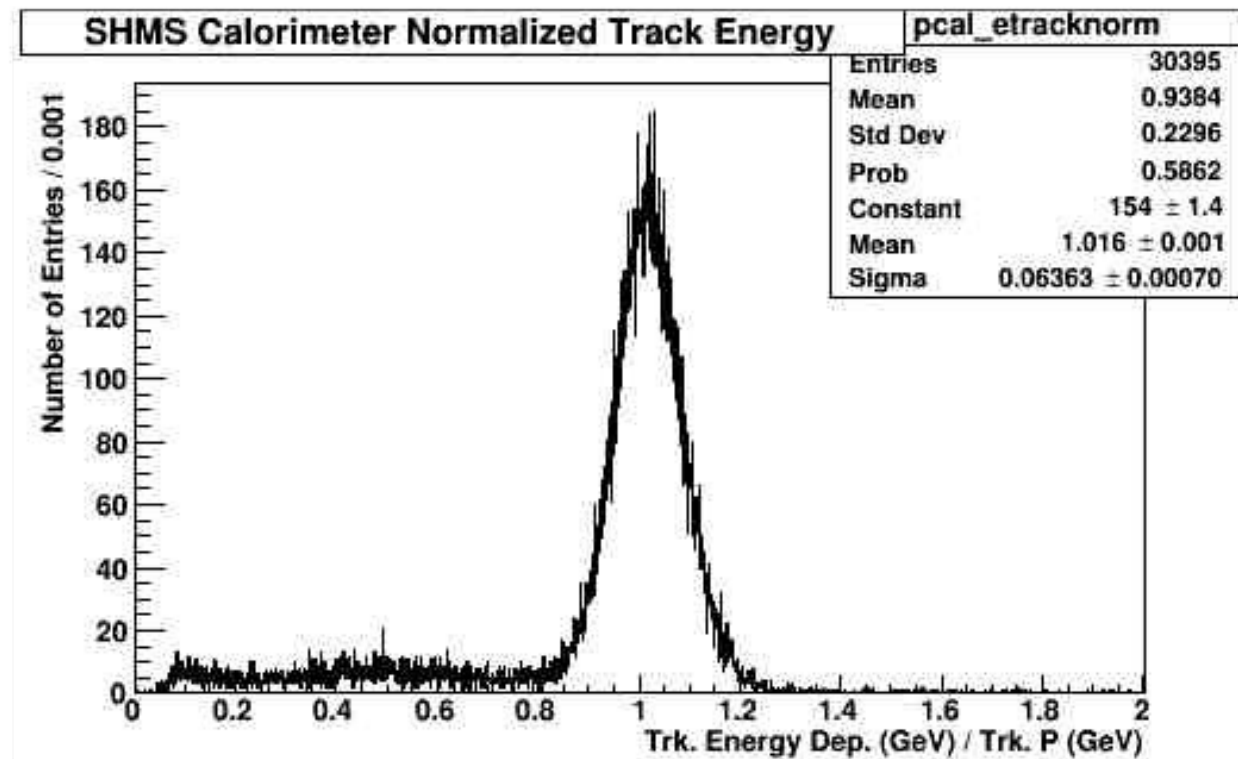
SHMS – HGC Update

- W.Li & Brad S. removed optical grease from PMTs 1,2 in November.
 - Small performance improvement seen, due to reduced UV absorption.
 - **Further HGC improvements are planned after completion of winter run.**
- PMT gain matching improved by Ryan Ambrose in December.
 - For 1atm CO₂, 99.95% electron efficiency for npe>0.5 cut (run 1583).
 - **For more details, please see: HallC-doc-937**
- Brad S. switched HGC gas to 1atm C₄F₁₀ in early January.
 - Average npe increased from ~5 to ~13. Further analysis in progress.



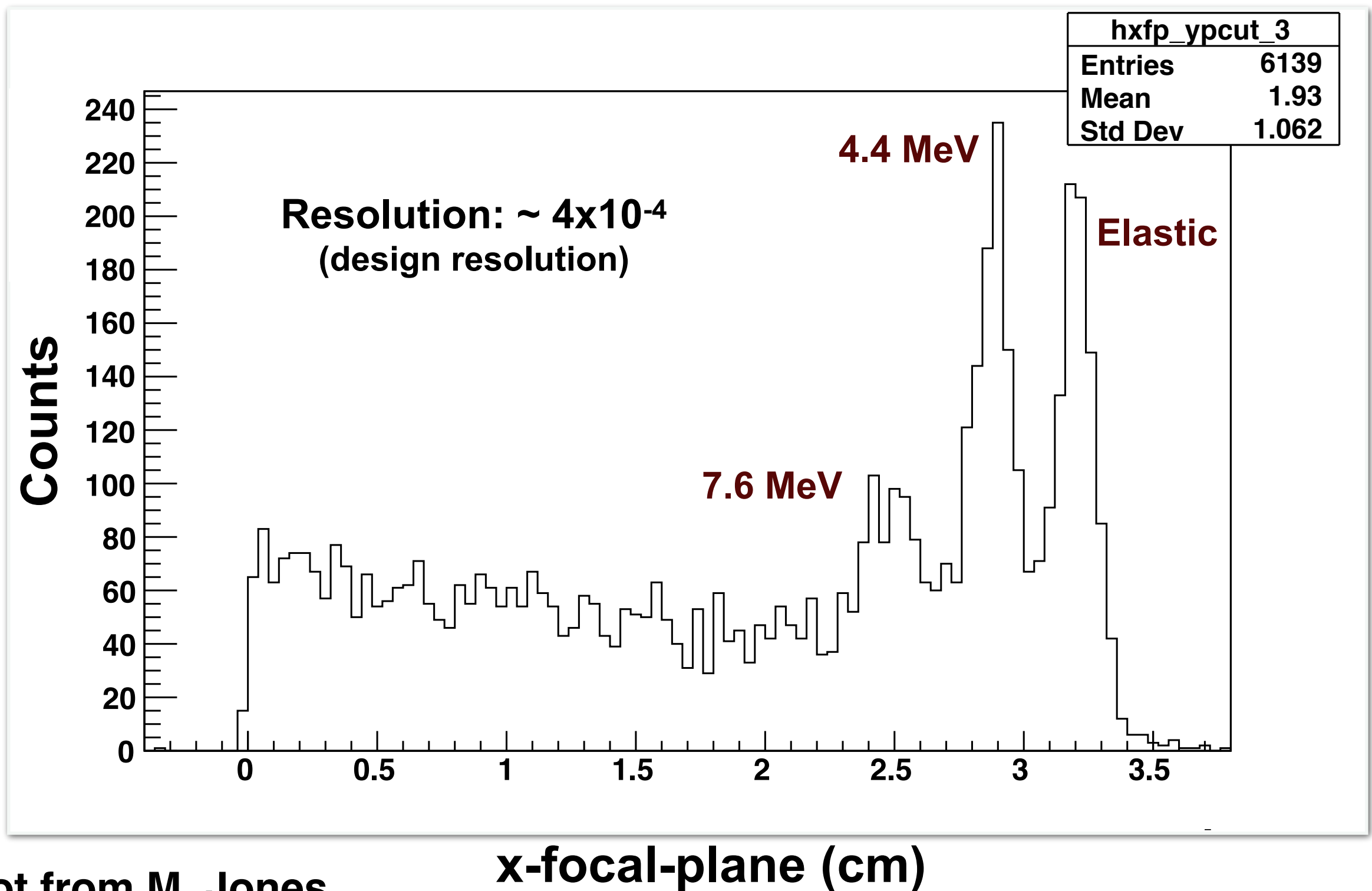
slide from G. Huber

Both Calorimeter have been calibrated and are ready for production.



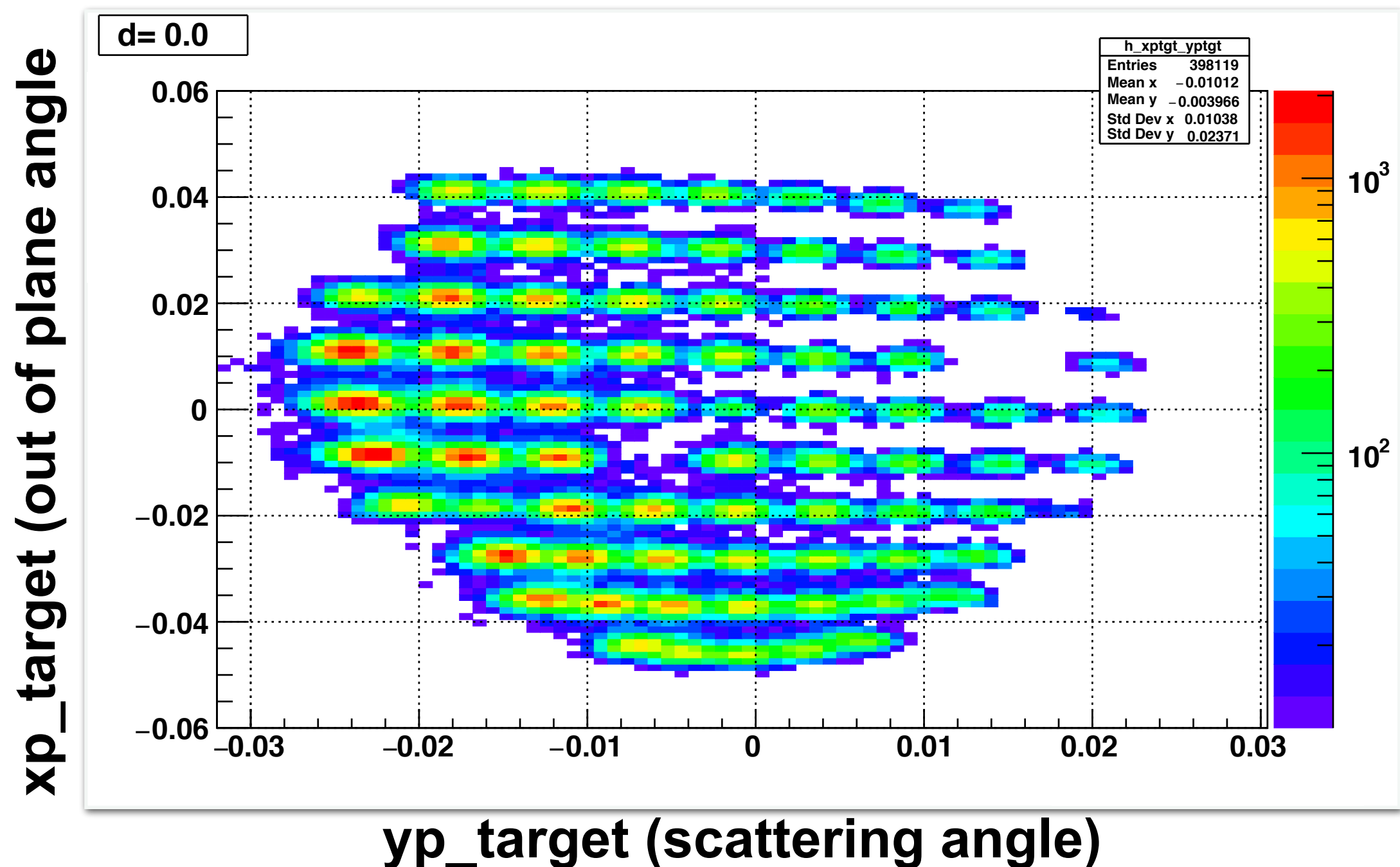
plots from H. Mkrtchyan

Carbon elastic spectrum from the SHMS



plot from M. Jones

Reconstruction of the sieve slit in the SHMS

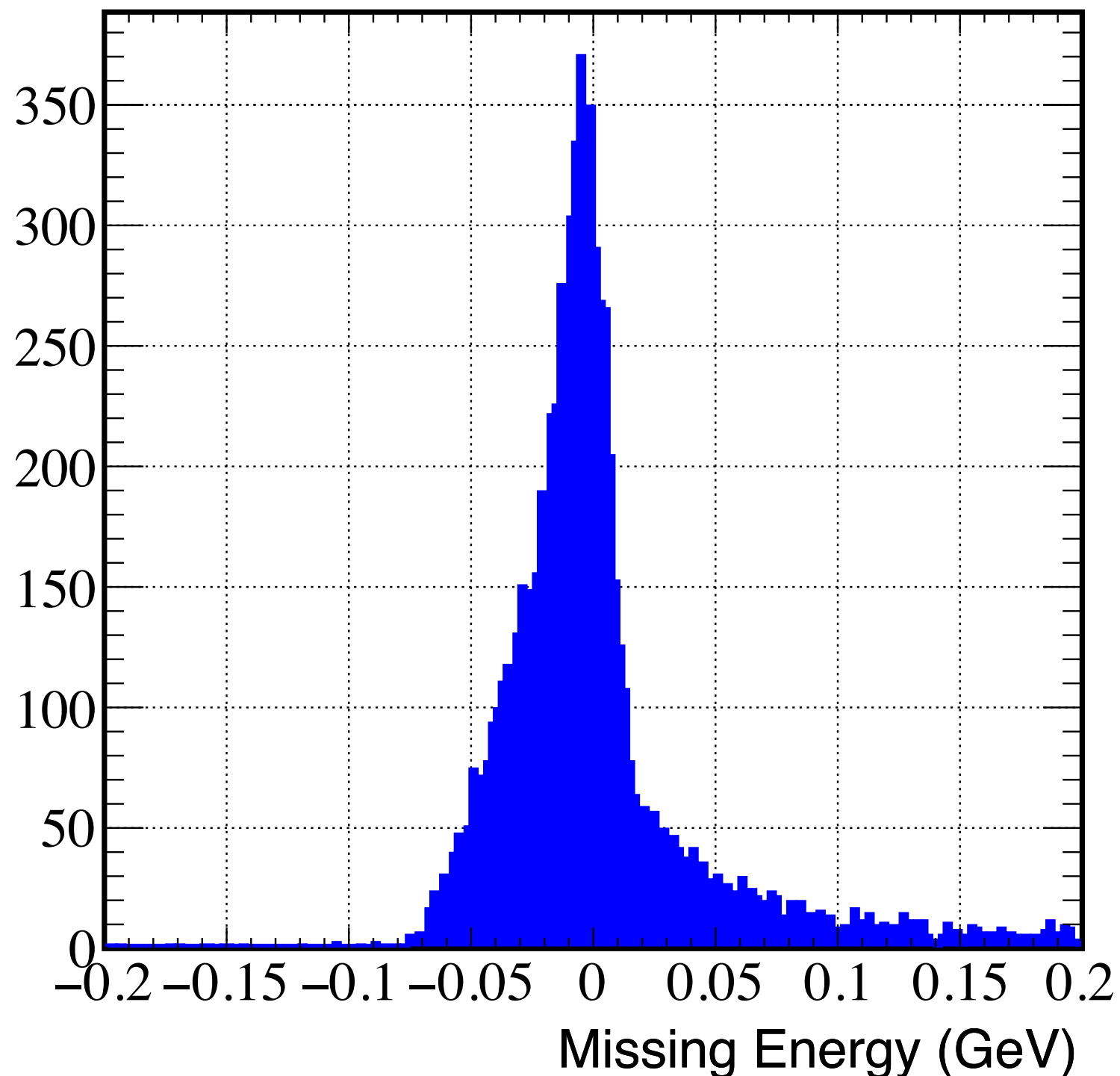


using COSY matrix elements without any optimization

plot from M. Jones, see next talk by H. Szumila-Vance for details

Production on LH2 target at 3-pass completed for the CT Experiment (E1206107)

Commissioning completed on 01/20 and production began during owl shift

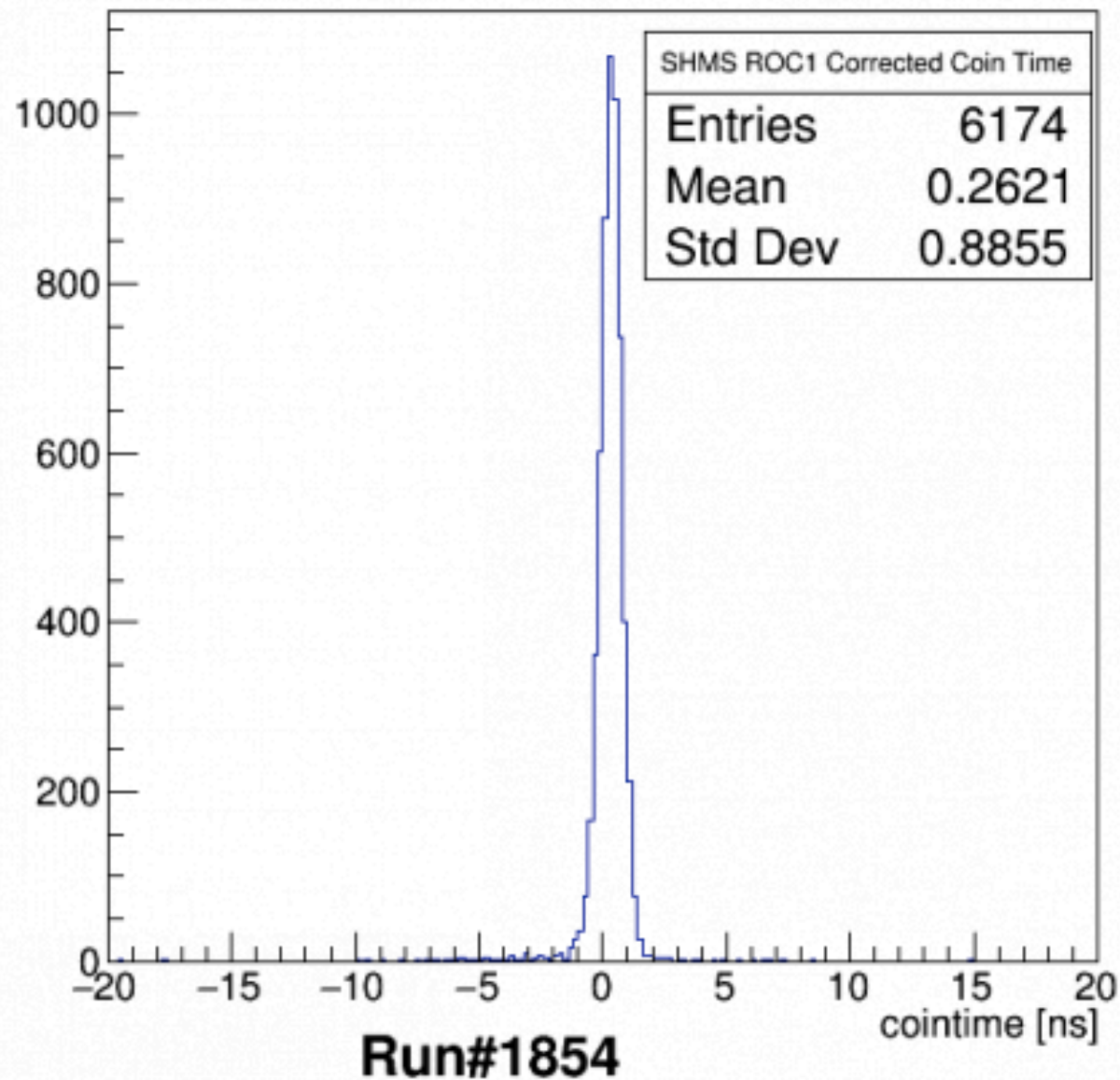


10000 good coincidence events collected

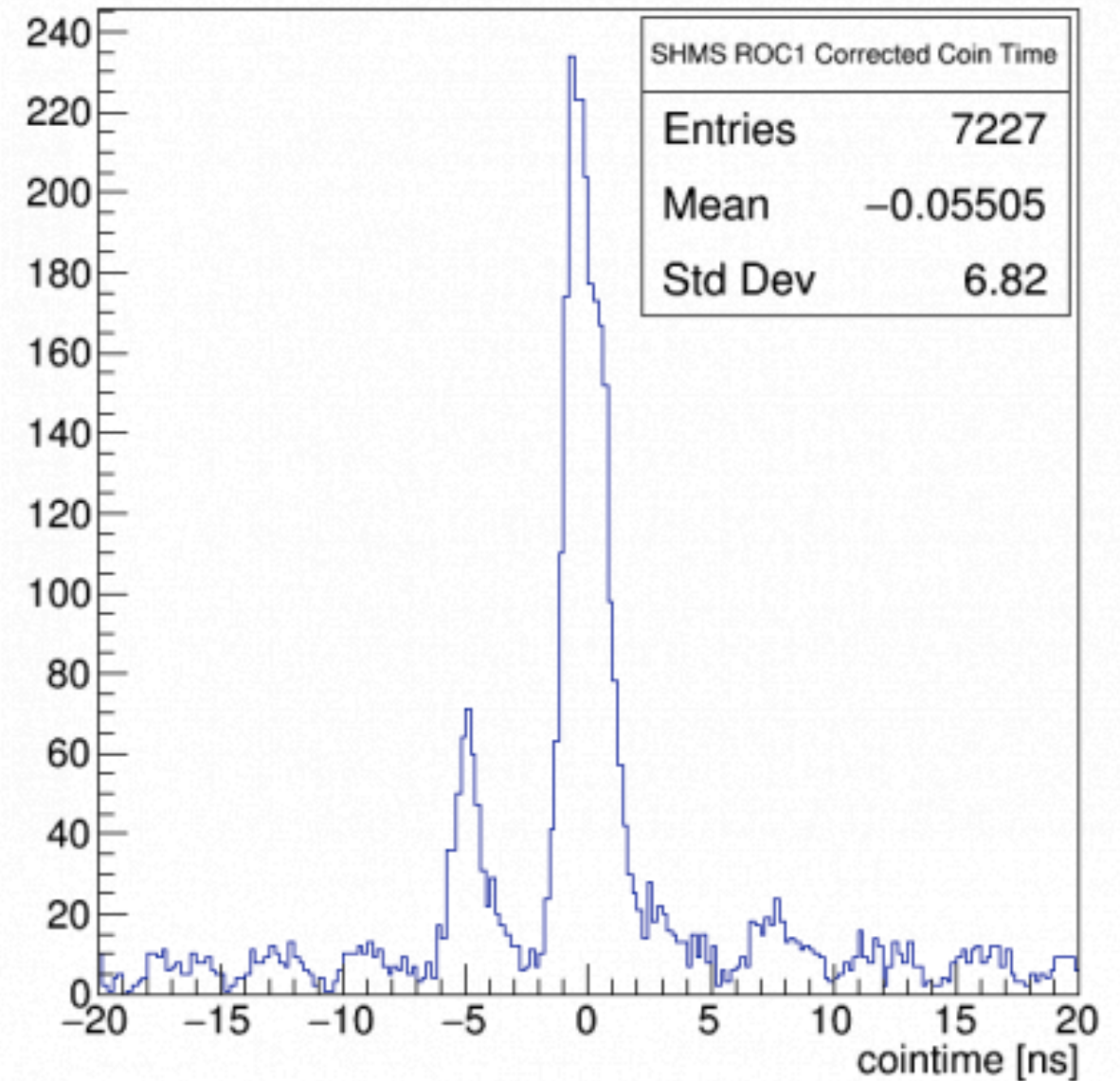
very little background from target cell walls

Preliminary coincidence time spectrum

SHMS ROC1 Corrected Coin Time



SHMS ROC1 Corrected Coin Time



plot from L. Kabir see talk by Latif on the CT experiment

Summary

- 1. 1-pass and 3-pass commissioning program was successfully completed over the Dec and Jan. running periods.**
- 2. All detectors in both spectrometer are performing well and have been calibrated and ready for production.**
- 3. Production for experiment E1206107 has begun and 3-pass data collection on LH2 has been completed.**
- 4. Production on carbon coming soon**

Program to continue after target repairs, followed by pass change to 5-pass beam to complete the rest of the experiment.