

# HISTWTP\_452\_45\_O\_1\_2\_1000000000\_A.ROOT

MuonSC8 Analysis Team

2019-10-09.19:17:48

## 1 Introduction

The following sections show plots from analysis of MuonSC8.

## 2 SC8 Raw Data

Configuration of the run since (06/28/2019):

Layer 0: (BB 0) 6 Channels, without cone, direct

Layer 0: (BB 1) 5 channels, without cone, direct

Layer 1: (BB 0) 6 Channels, with new holders, long cones

Layer 1: (BB 1) 4 Channels, with new holders, long cones

Layer 2: (BB 0) 6 channels, without Cone, direct

Layer 2: (BB 1) 5 channels, without Cone, direct

Layer 3: (BB 0) 6 channels, old holder, long cones

Layer 3: (BB 1) 5 Channels, old holder, long cones

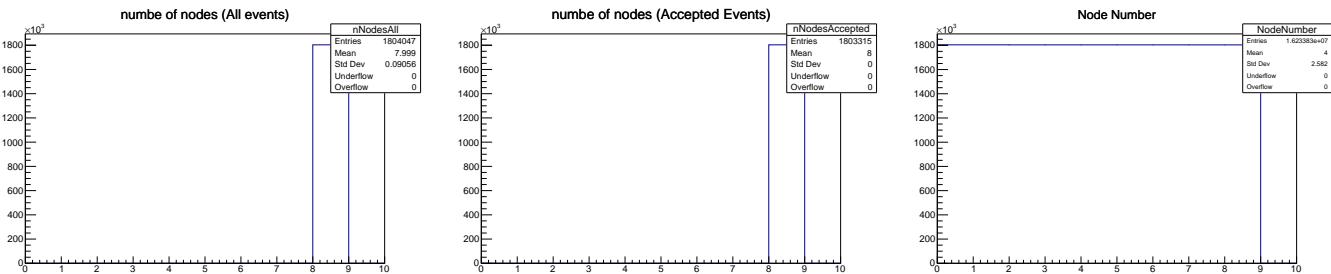


Figure 2.1: (a)numbe of nodes (All events) (b) numbe of nodes (Accepted Events) (c)Node Number

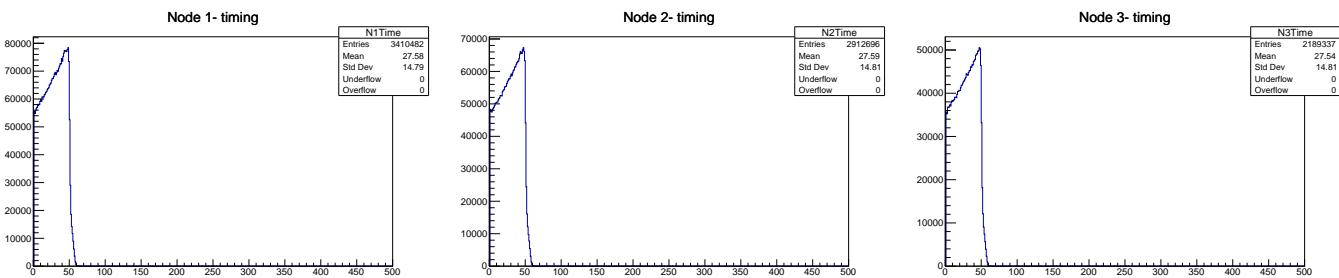


Figure 2.2: (a)Node 1- timing (b) Node 2- timing (c)Node 3- timing

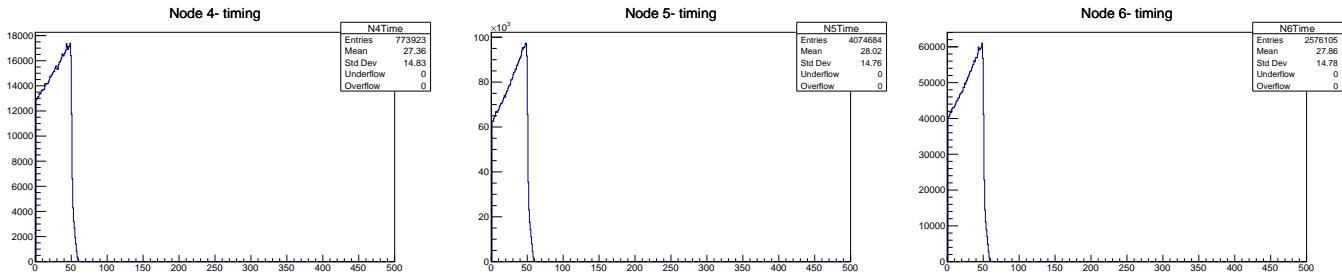


Figure 2.3: (a)Node 4- timing (b) Node 5- timing (c)Node 6- timing

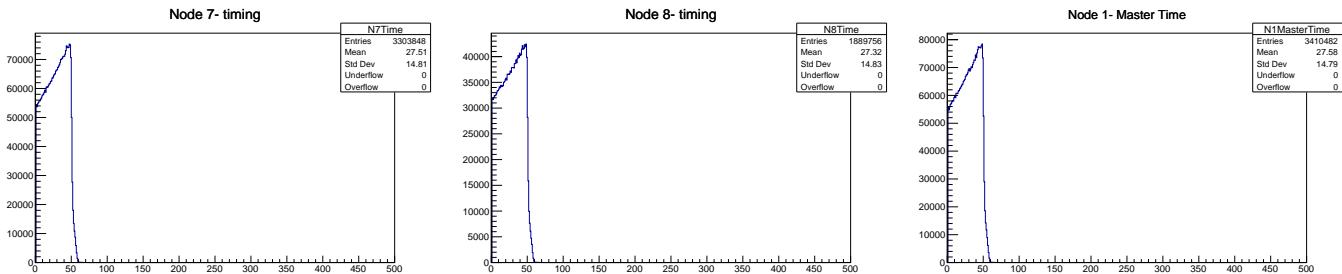


Figure 2.4: (a)Node 7- timing (b) Node 8- timing (c)Node 1- Master Time

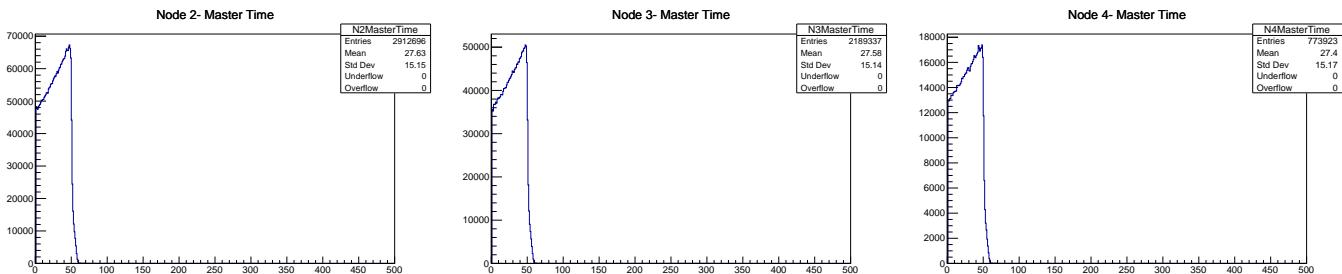


Figure 2.5: (a)Node 2- Master Time (b) Node 3- Master Time (c)Node 4- Master Time

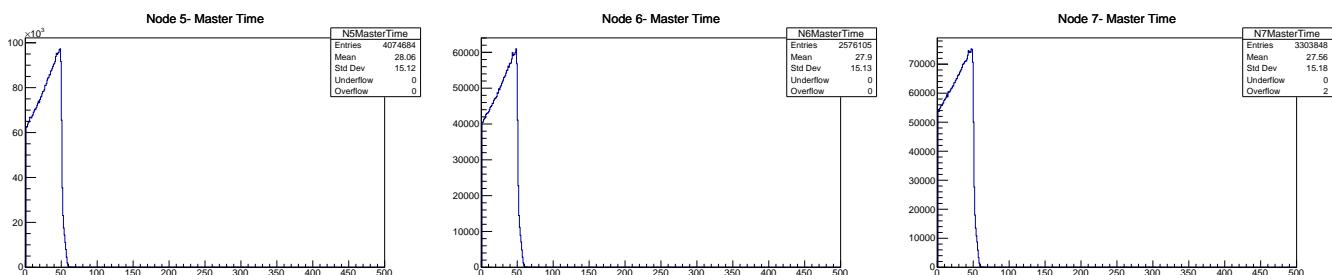


Figure 2.6: (a)Node 5- Master Time (b) Node 6- Master Time (c)Node 7- Master Time

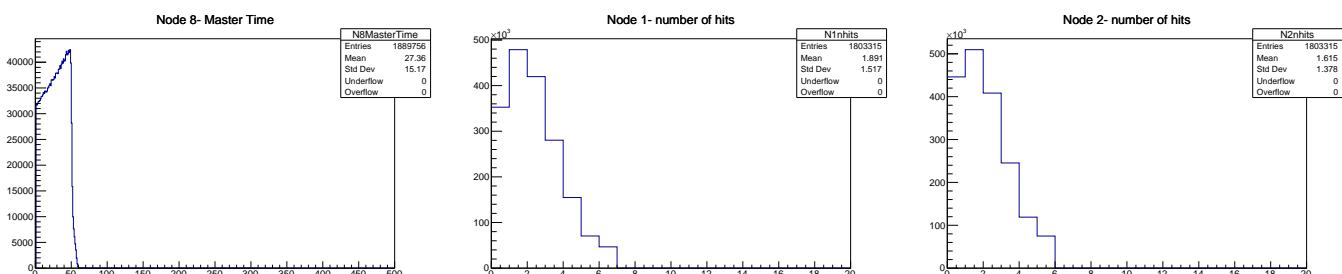


Figure 2.7: (a)Node 8- Master Time (b) Node 1- number of hits (c)Node 2- number of hits

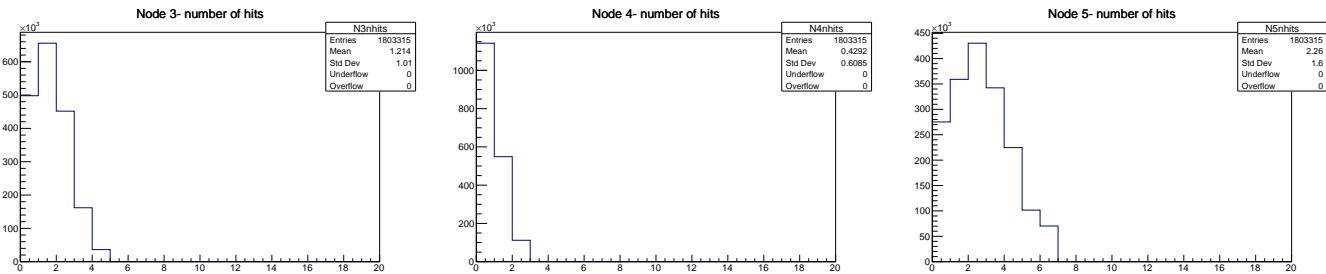


Figure 2.8: (a)Node 3- number of hits (b) Node 4- number of hits (c)Node 5- number of hits

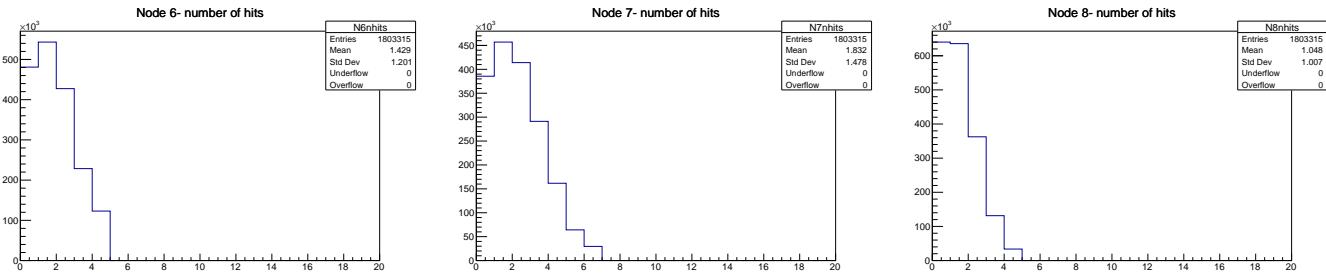


Figure 2.9: (a)Node 6- number of hits (b) Node 7- number of hits (c)Node 8- number of hits

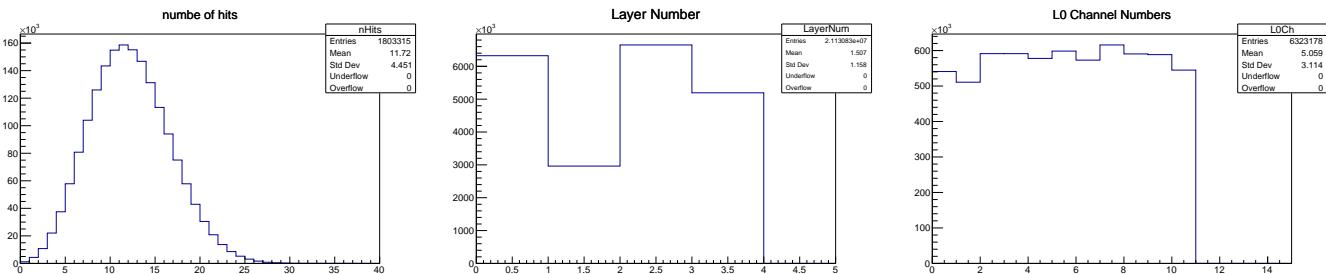


Figure 2.10: (a)numbe of hits (b) Layer Number (c)L0 Channel Numbers

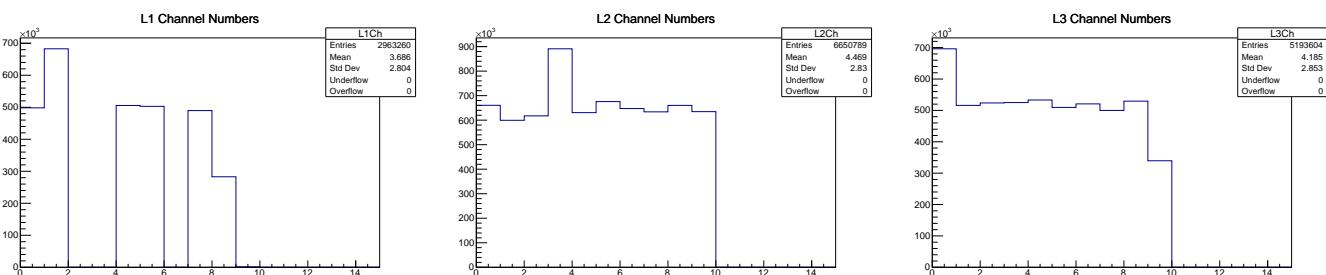


Figure 2.11: (a)L1 Channel Numbers (b) L2 Channel Numbers (c)L3 Channel Numbers

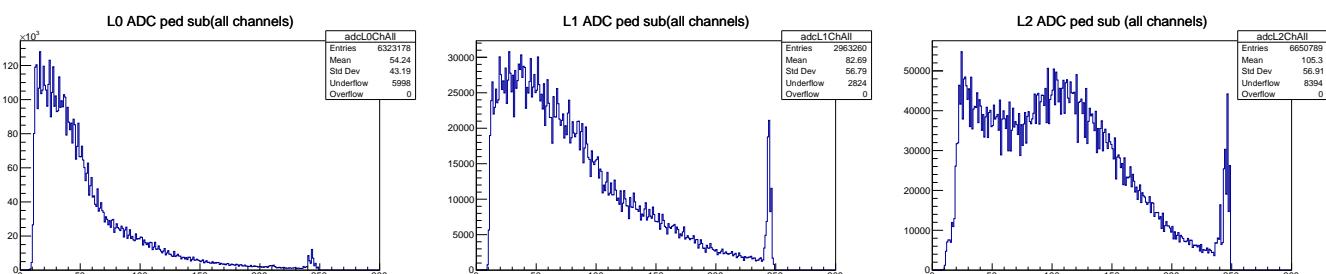


Figure 2.12: (a)L0 ADC ped sub(all channels) (b) L1 ADC ped sub(all channels) (c)L2 ADC ped sub (all channels)

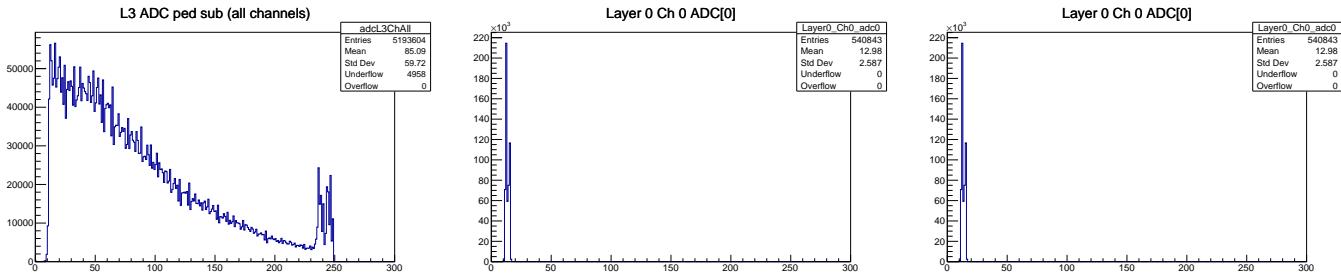


Figure 2.13: (a)L3 ADC ped sub (all channels) (b) Layer 0 Ch 0 ADC[0] (c)Layer 0 Ch 0 ADC[0]

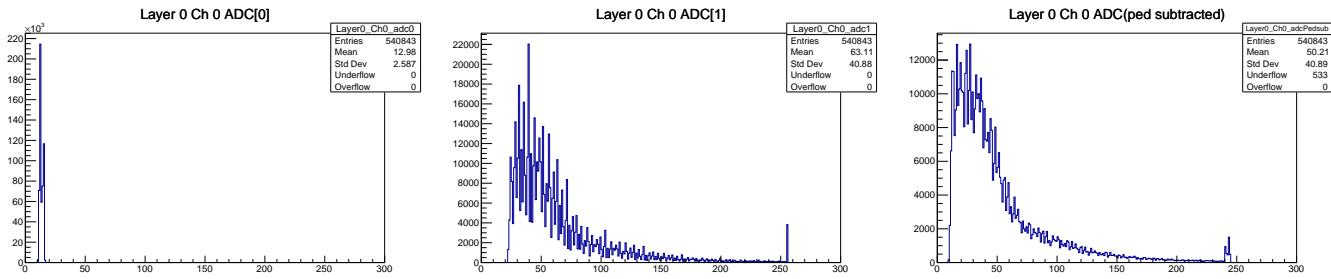


Figure 2.14: (a)Layer 0 Ch 0 ADC[0] (b) Layer 0 Ch 0 ADC[1] (c)Layer 0 Ch 0 ADC(ped subtracted)

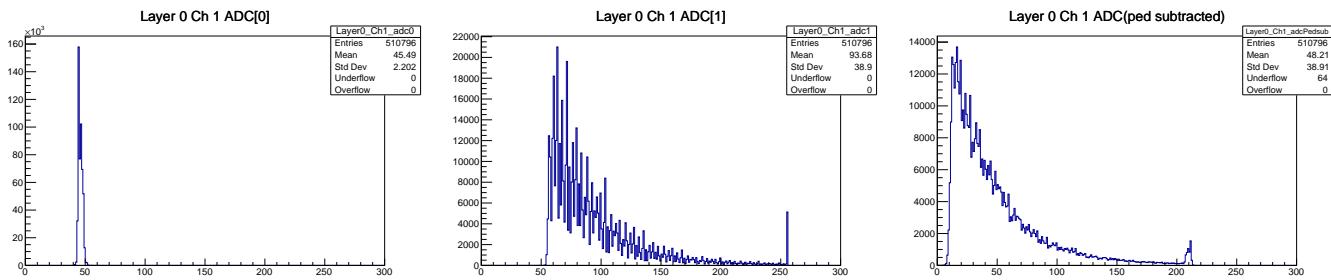


Figure 2.15: (a)Layer 0 Ch 1 ADC[0] (b) Layer 0 Ch 1 ADC[1] (c)Layer 0 Ch 1 ADC(ped subtracted)

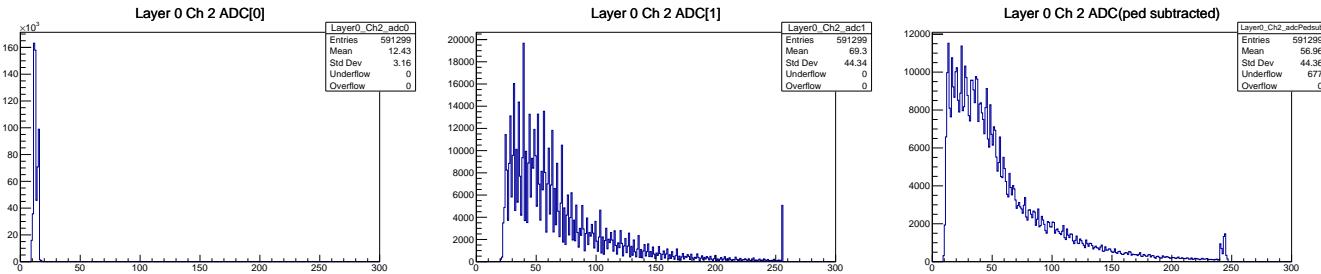


Figure 2.16: (a)Layer 0 Ch 2 ADC[0] (b) Layer 0 Ch 2 ADC[1] (c)Layer 0 Ch 2 ADC(ped subtracted)

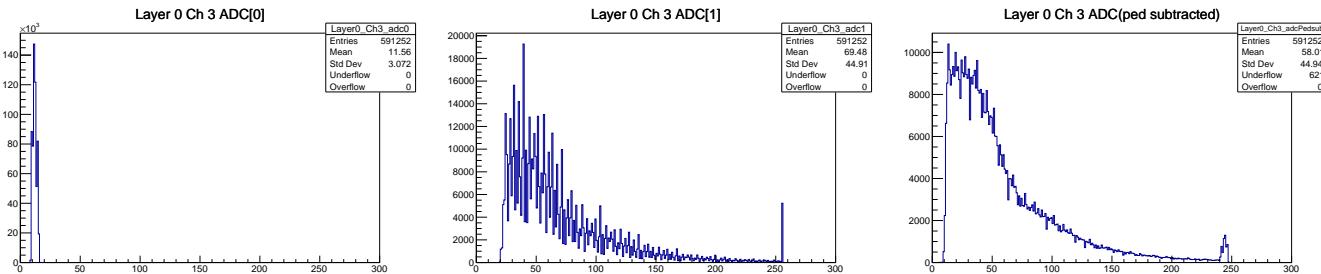


Figure 2.17: (a)Layer 0 Ch 3 ADC[0] (b) Layer 0 Ch 3 ADC[1] (c)Layer 0 Ch 3 ADC(ped subtracted)

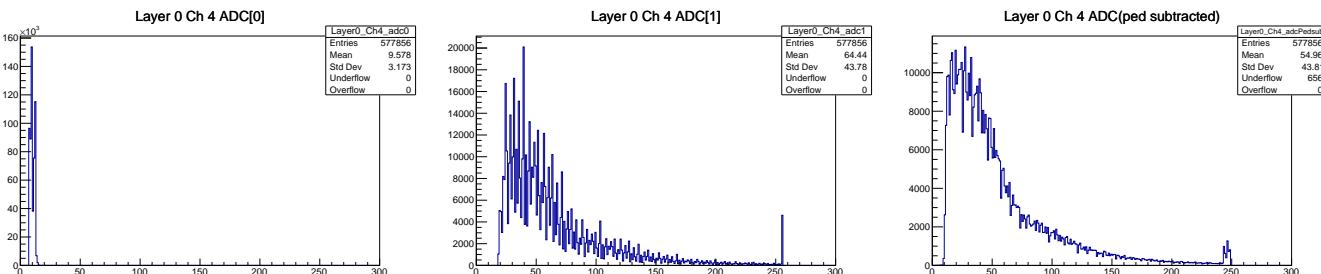


Figure 2.18: (a)Layer 0 Ch 4 ADC[0] (b) Layer 0 Ch 4 ADC[1] (c)Layer 0 Ch 4 ADC(ped subtracted)

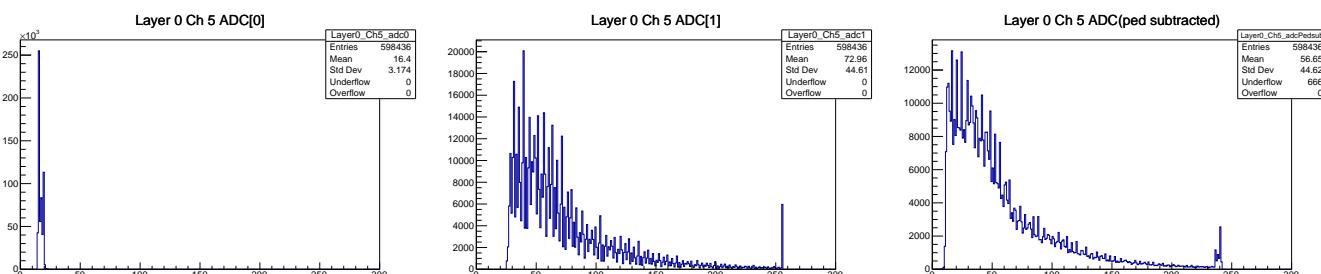


Figure 2.19: (a)Layer 0 Ch 5 ADC[0] (b) Layer 0 Ch 5 ADC[1] (c)Layer 0 Ch 5 ADC(ped subtracted)

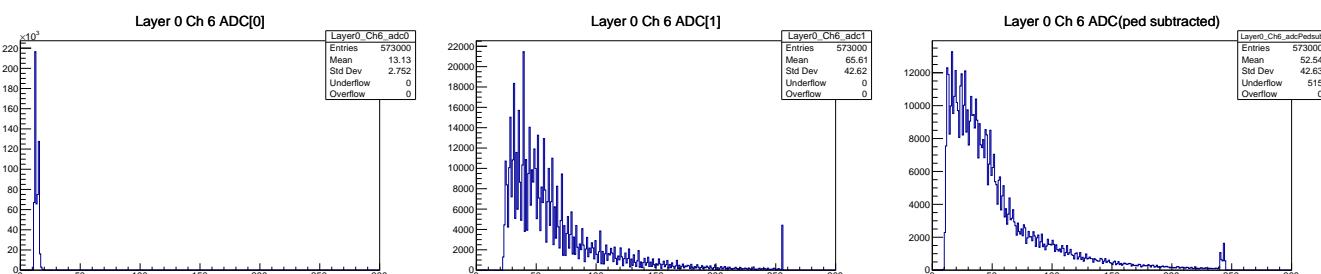


Figure 2.20: (a)Layer 0 Ch 6 ADC[0] (b) Layer 0 Ch 6 ADC[1] (c)Layer 0 Ch 6 ADC(ped subtracted)

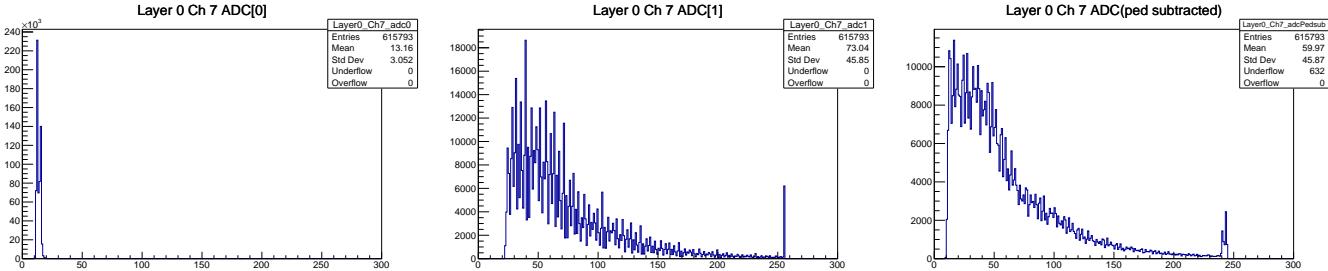


Figure 2.21: (a)Layer 0 Ch 7 ADC[0] (b) Layer 0 Ch 7 ADC[1] (c)Layer 0 Ch 7 ADC(ped subtracted)

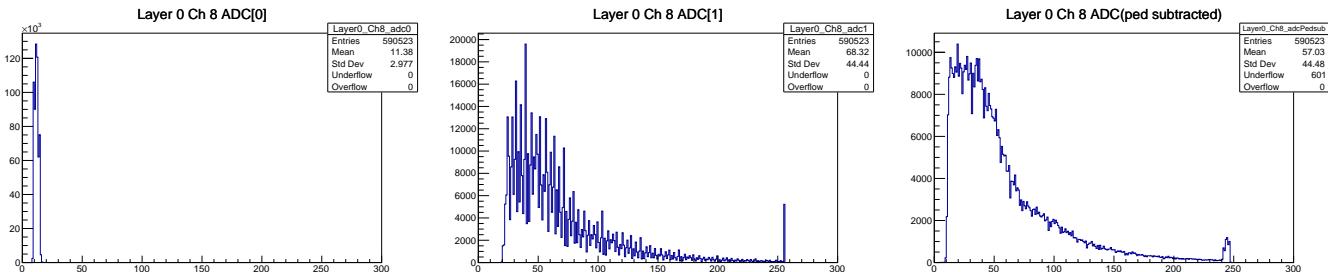


Figure 2.22: (a)Layer 0 Ch 8 ADC[0] (b) Layer 0 Ch 8 ADC[1] (c)Layer 0 Ch 8 ADC(ped subtracted)

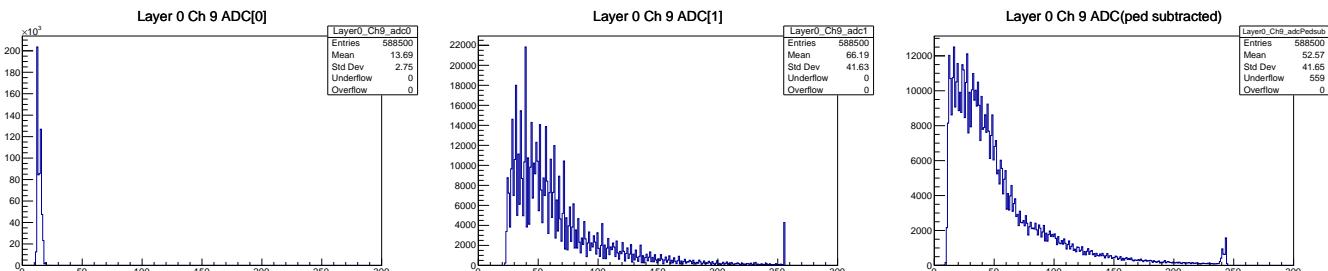


Figure 2.23: (a)Layer 0 Ch 9 ADC[0] (b) Layer 0 Ch 9 ADC[1] (c)Layer 0 Ch 9 ADC(ped subtracted)

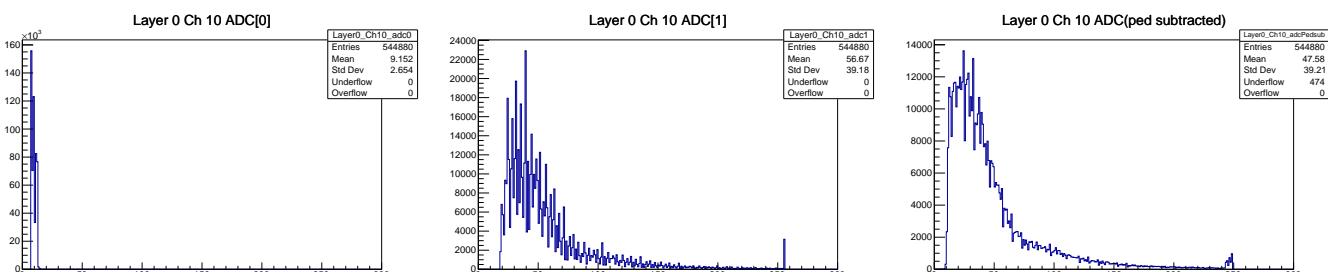


Figure 2.24: (a)Layer 0 Ch 10 ADC[0] (b) Layer 0 Ch 10 ADC[1] (c)Layer 0 Ch 10 ADC(ped subtracted)

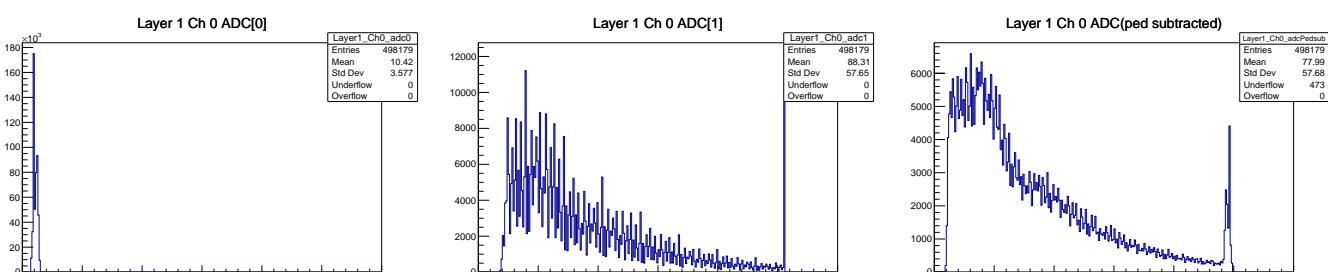


Figure 2.25: (a)Layer 1 Ch 0 ADC[0] (b) Layer 1 Ch 0 ADC[1] (c)Layer 1 Ch 0 ADC(ped subtracted)

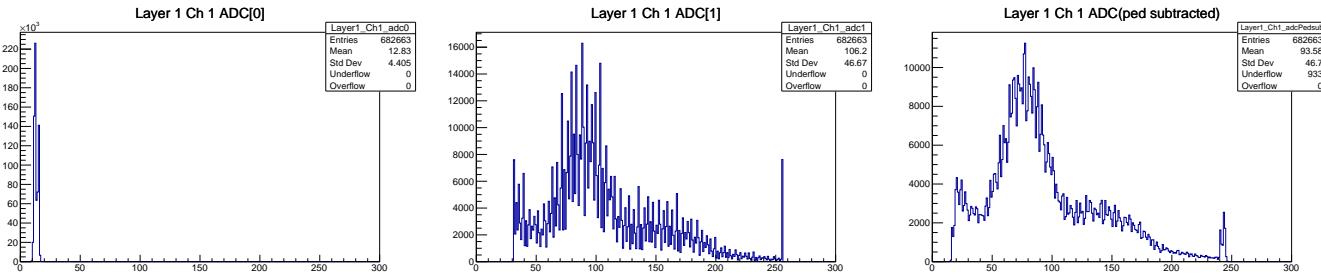


Figure 2.26: (a)Layer 1 Ch 1 ADC[0] (b) Layer 1 Ch 1 ADC[1] (c)Layer 1 Ch 1 ADC(ped subtracted)

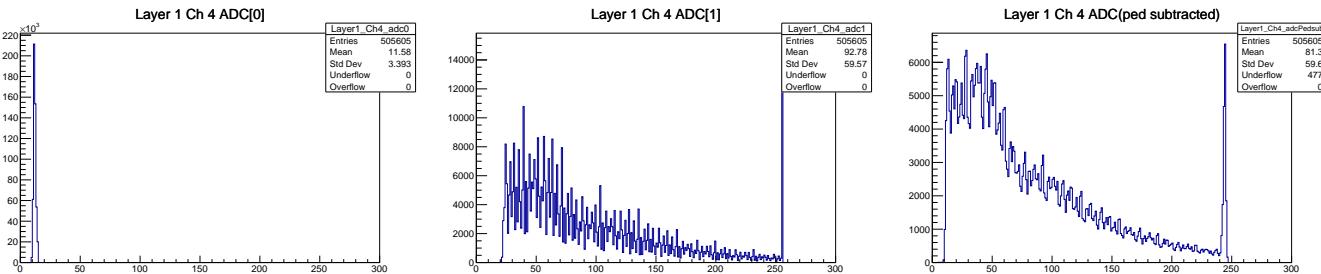


Figure 2.27: (a)Layer 1 Ch 4 ADC[0] (b) Layer 1 Ch 4 ADC[1] (c)Layer 1 Ch 4 ADC(ped subtracted)

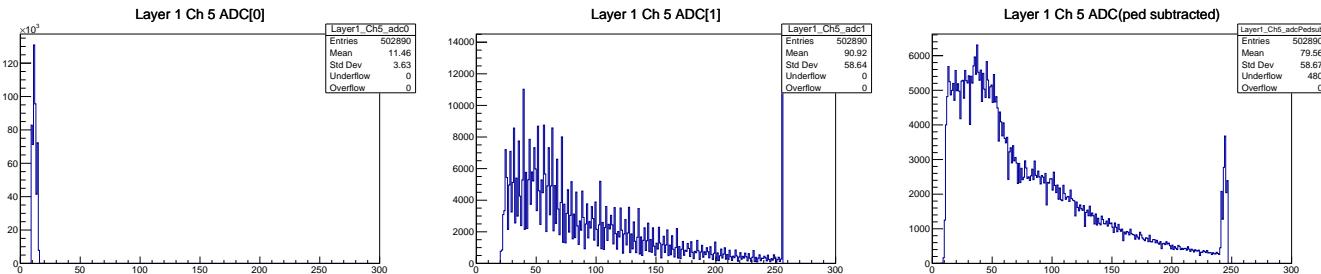


Figure 2.28: (a)Layer 1 Ch 5 ADC[0] (b) Layer 1 Ch 5 ADC[1] (c)Layer 1 Ch 5 ADC(ped subtracted)

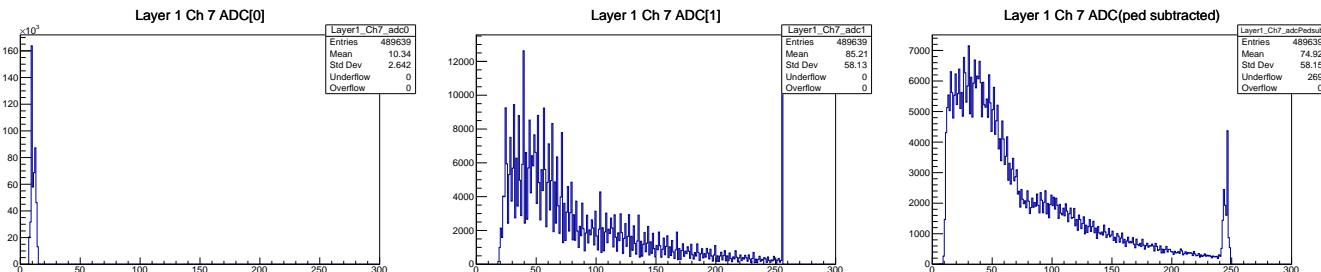


Figure 2.29: (a)Layer 1 Ch 7 ADC[0] (b) Layer 1 Ch 7 ADC[1] (c)Layer 1 Ch 7 ADC(ped subtracted)

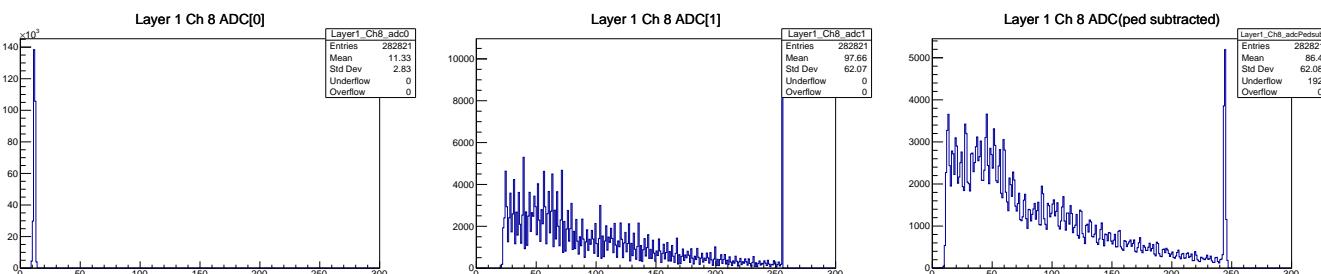
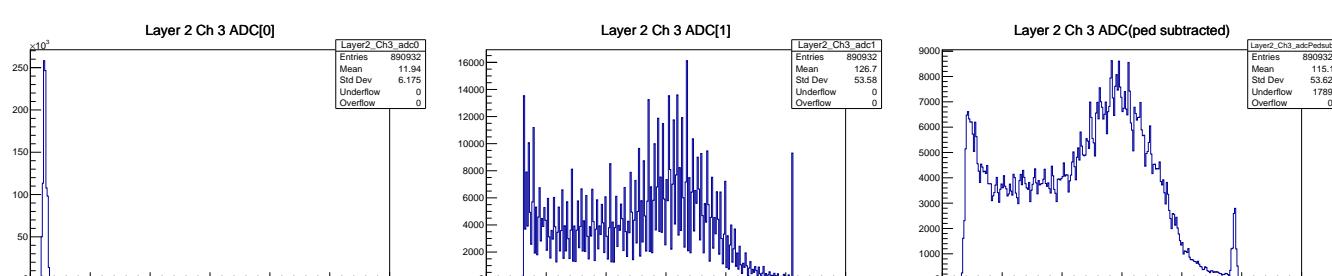
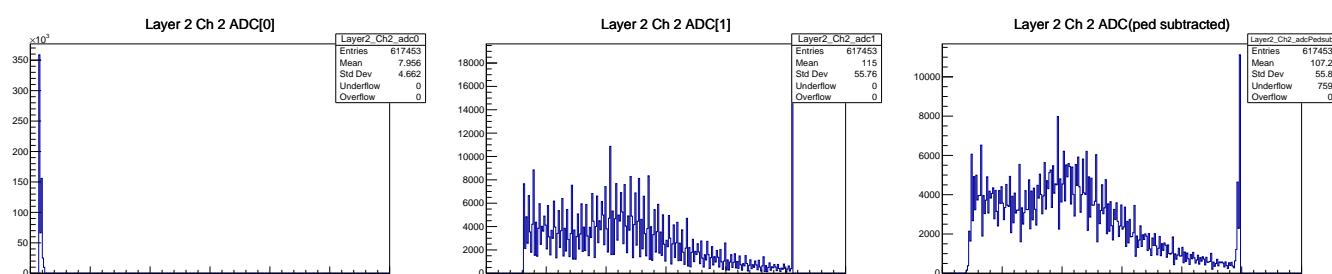
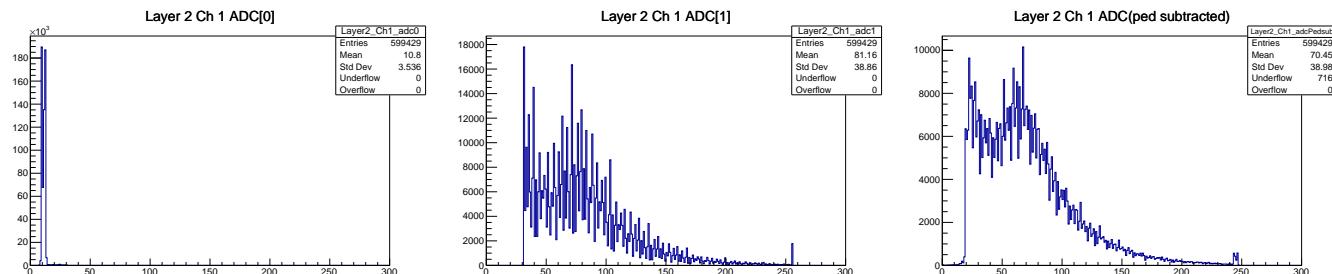
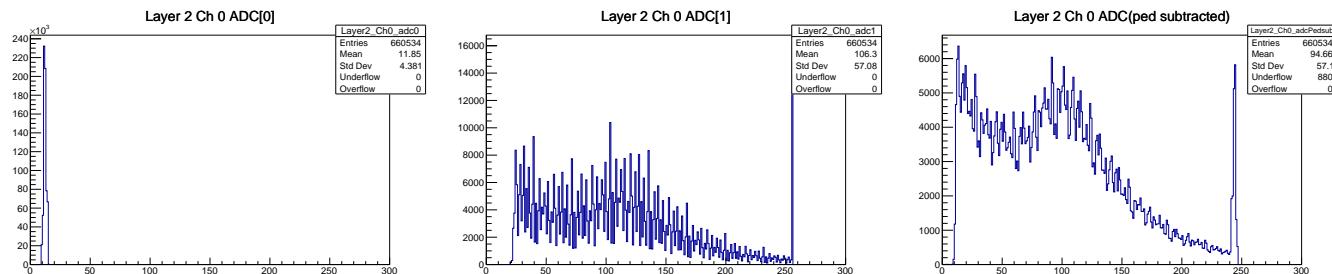
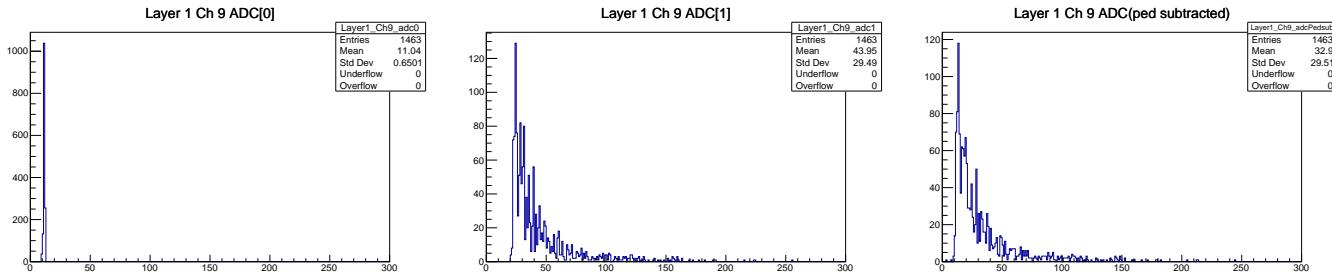


Figure 2.30: (a)Layer 1 Ch 8 ADC[0] (b) Layer 1 Ch 8 ADC[1] (c)Layer 1 Ch 8 ADC(ped subtracted)



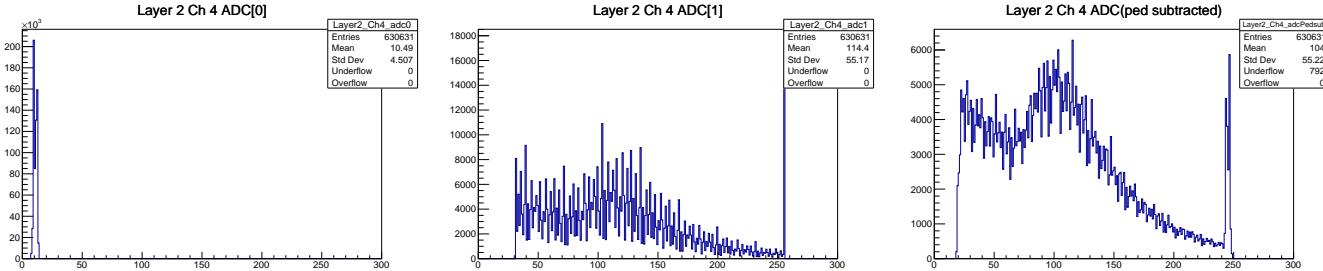


Figure 2.36: (a)Layer 2 Ch 4 ADC[0] (b) Layer 2 Ch 4 ADC[1] (c)Layer 2 Ch 4 ADC(ped subtracted)

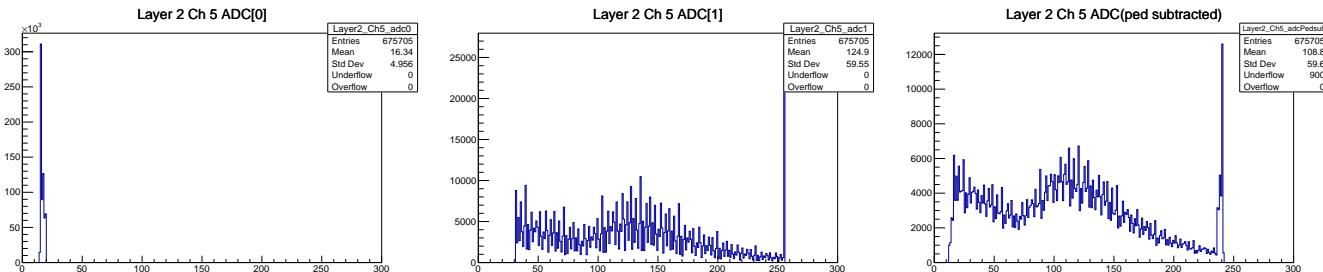


Figure 2.37: (a)Layer 2 Ch 5 ADC[0] (b) Layer 2 Ch 5 ADC[1] (c)Layer 2 Ch 5 ADC(ped subtracted)

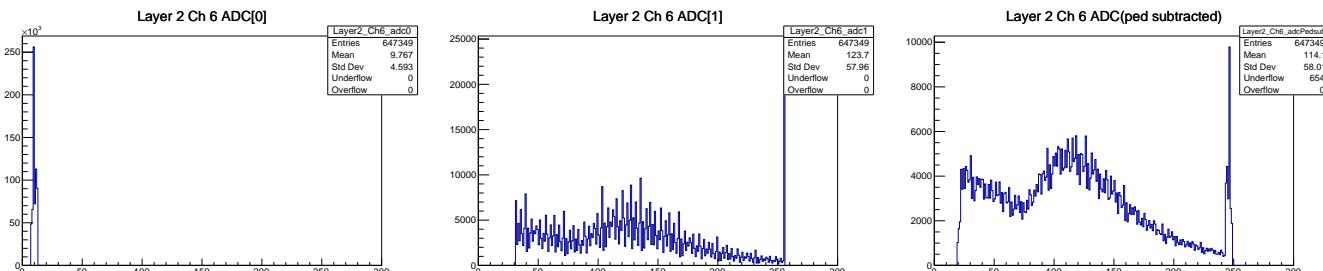


Figure 2.38: (a)Layer 2 Ch 6 ADC[0] (b) Layer 2 Ch 6 ADC[1] (c)Layer 2 Ch 6 ADC(ped subtracted)

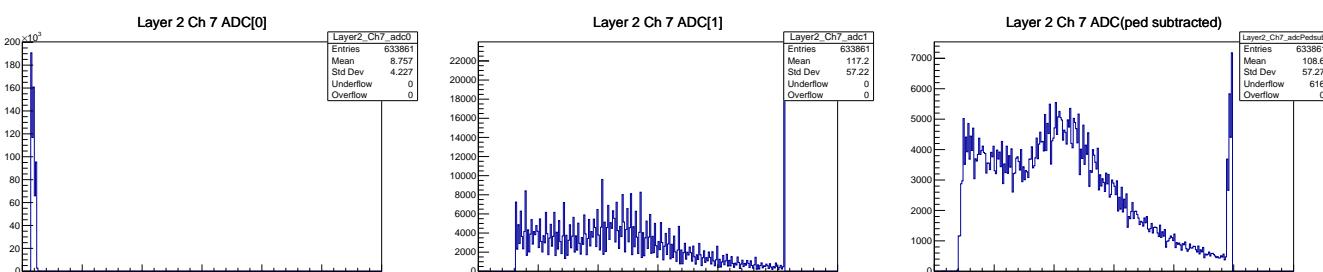


Figure 2.39: (a)Layer 2 Ch 7 ADC[0] (b) Layer 2 Ch 7 ADC[1] (c)Layer 2 Ch 7 ADC(ped subtracted)

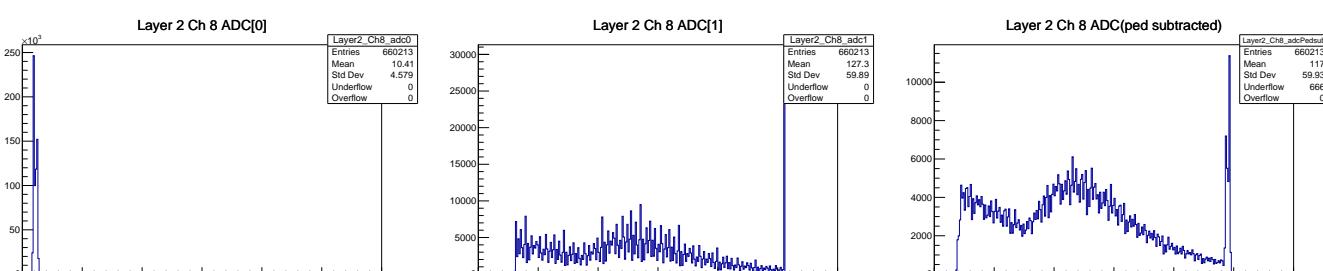


Figure 2.40: (a)Layer 2 Ch 8 ADC[0] (b) Layer 2 Ch 8 ADC[1] (c)Layer 2 Ch 8 ADC(ped subtracted)

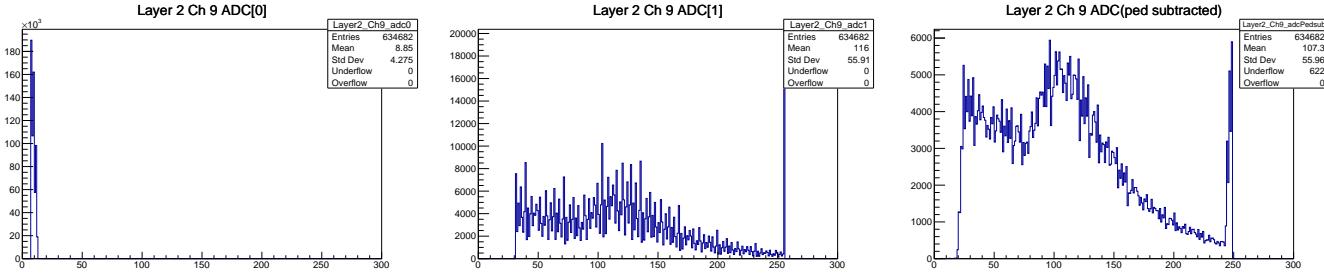


Figure 2.41: (a)Layer 2 Ch 9 ADC[0] (b) Layer 2 Ch 9 ADC[1] (c)Layer 2 Ch 9 ADC(ped subtracted)

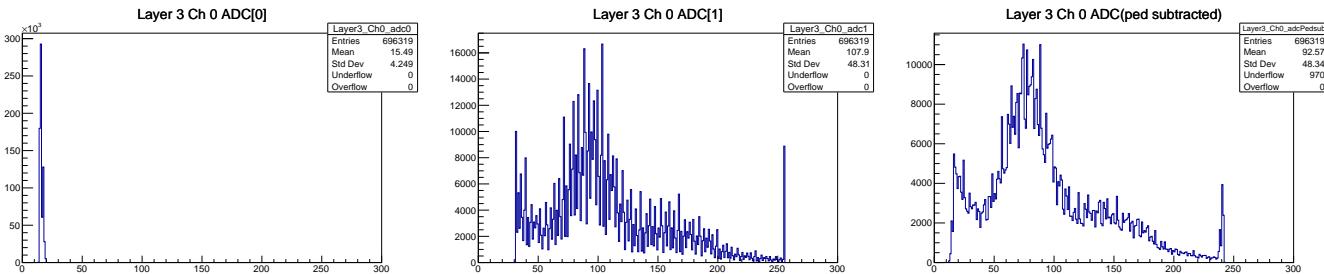


Figure 2.42: (a)Layer 3 Ch 0 ADC[0] (b) Layer 3 Ch 0 ADC[1] (c)Layer 3 Ch 0 ADC(ped subtracted)

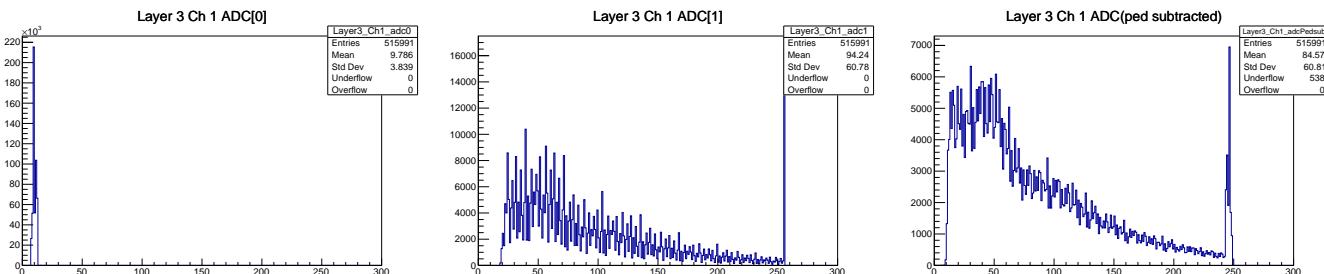


Figure 2.43: (a)Layer 3 Ch 1 ADC[0] (b) Layer 3 Ch 1 ADC[1] (c)Layer 3 Ch 1 ADC(ped subtracted)

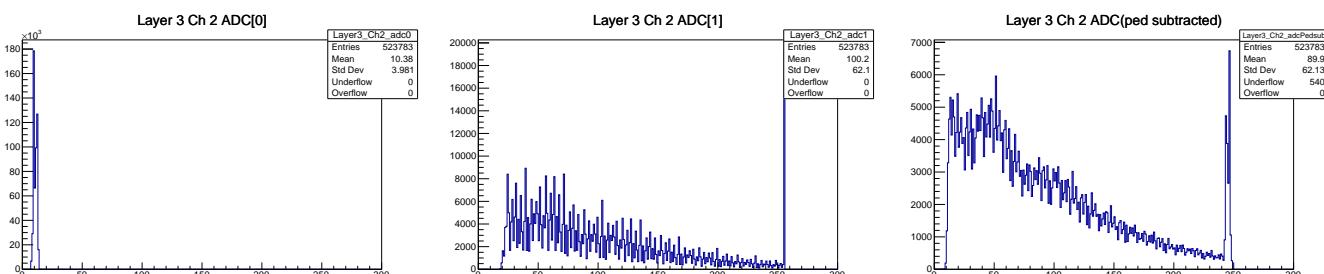


Figure 2.44: (a)Layer 3 Ch 2 ADC[0] (b) Layer 3 Ch 2 ADC[1] (c)Layer 3 Ch 2 ADC(ped subtracted)

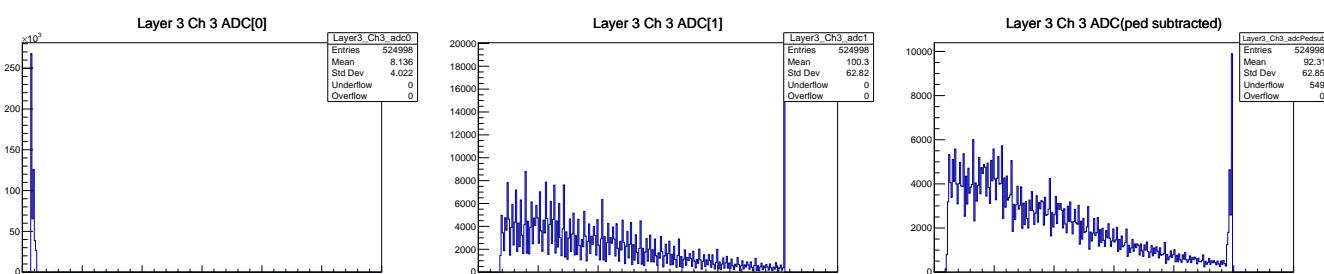


Figure 2.45: (a)Layer 3 Ch 3 ADC[0] (b) Layer 3 Ch 3 ADC[1] (c)Layer 3 Ch 3 ADC(ped subtracted)

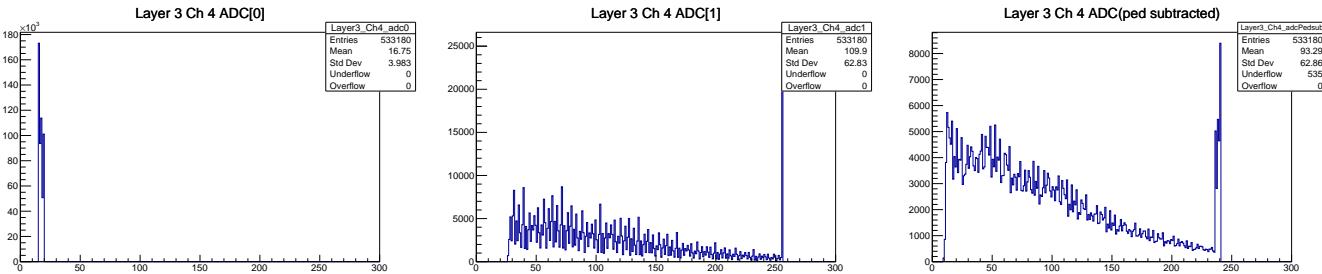


Figure 2.46: (a)Layer 3 Ch 4 ADC[0] (b) Layer 3 Ch 4 ADC[1] (c)Layer 3 Ch 4 ADC(ped subtracted)

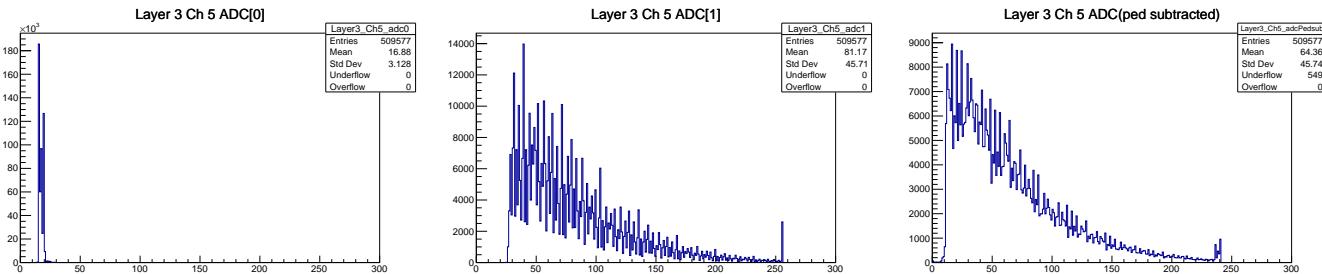


Figure 2.47: (a)Layer 3 Ch 5 ADC[0] (b) Layer 3 Ch 5 ADC[1] (c)Layer 3 Ch 5 ADC(ped subtracted)

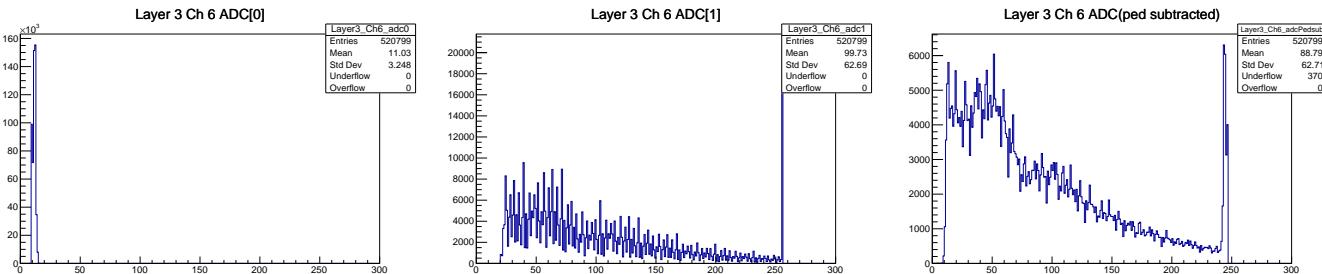


Figure 2.48: (a)Layer 3 Ch 6 ADC[0] (b) Layer 3 Ch 6 ADC[1] (c)Layer 3 Ch 6 ADC(ped subtracted)

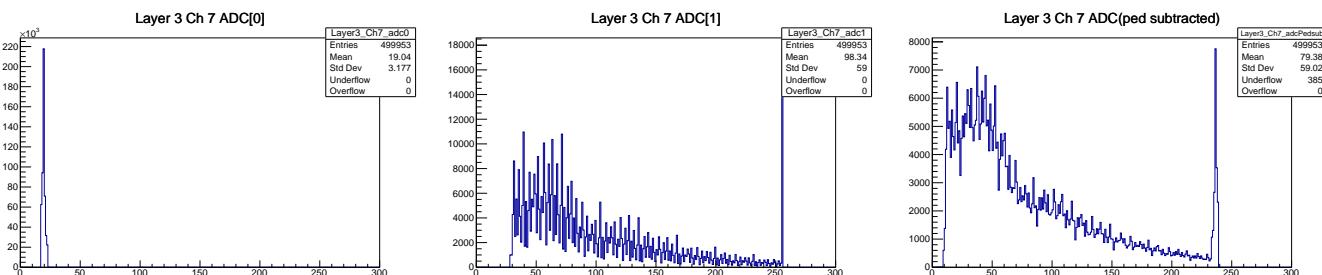


Figure 2.49: (a)Layer 3 Ch 7 ADC[0] (b) Layer 3 Ch 7 ADC[1] (c)Layer 3 Ch 7 ADC(ped subtracted)

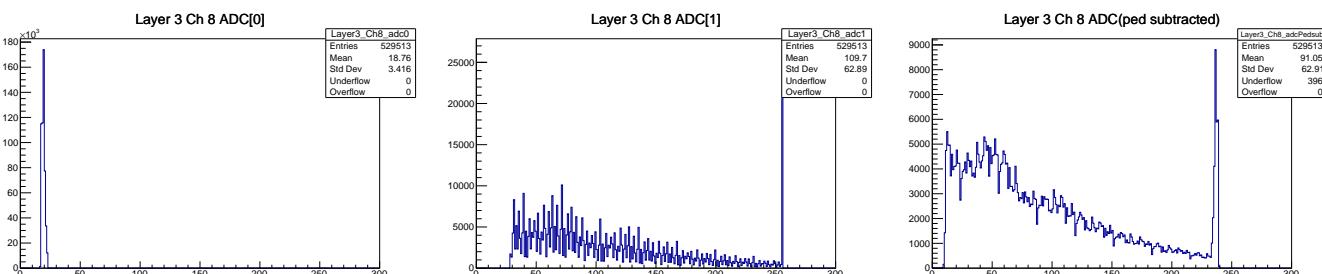


Figure 2.50: (a)Layer 3 Ch 8 ADC[0] (b) Layer 3 Ch 8 ADC[1] (c)Layer 3 Ch 8 ADC(ped subtracted)

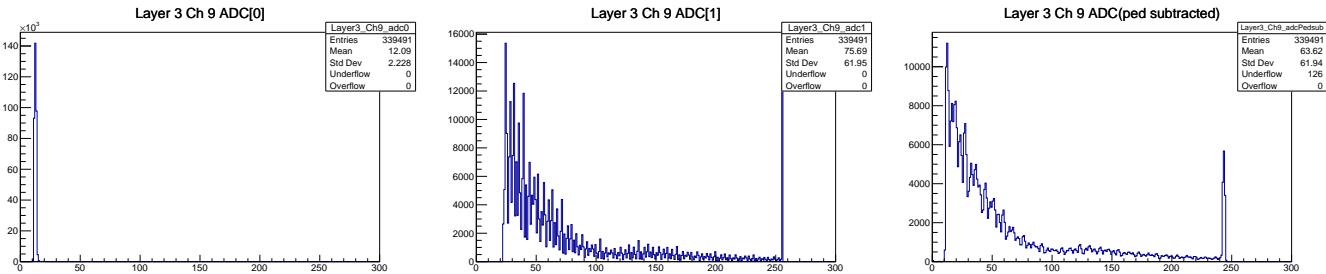


Figure 2.51: (a)Layer 3 Ch 9 ADC[0] (b) Layer 3 Ch 9 ADC[1] (c)Layer 3 Ch 9 ADC(ped subtracted)

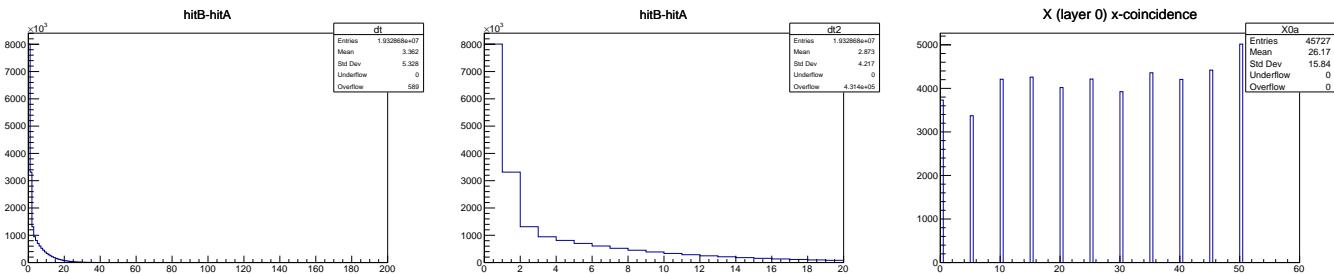


Figure 2.52: (a)hitB-hitA (b) hitB-hitA (c)X (layer 0) x-coincidence

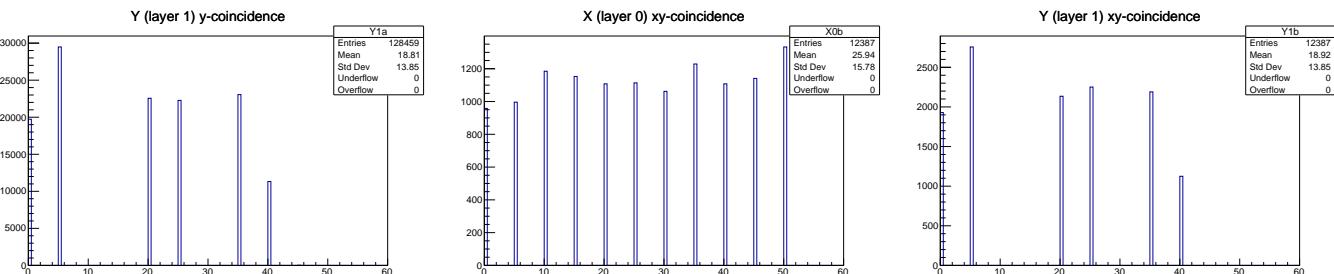


Figure 2.53: (a)Y (layer 1) y-coincidence (b) X (layer 0) xy-coincidence (c)Y (layer 1) xy-coincidence

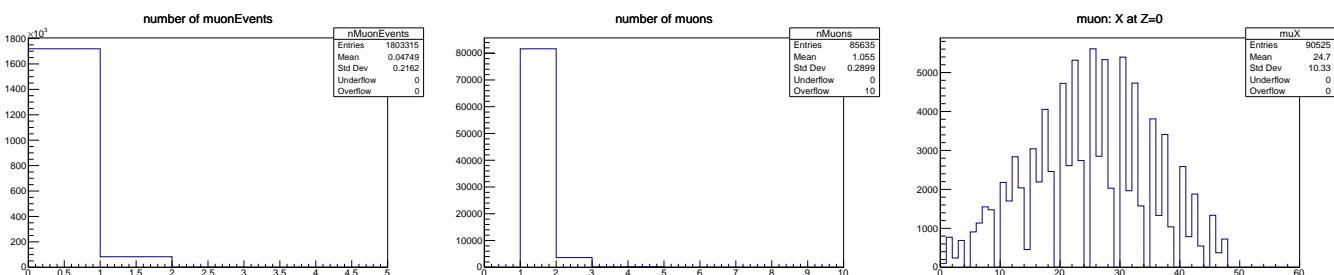


Figure 2.54: (a)number of muonEvents (b) number of muons (c)muon: X at Z=0

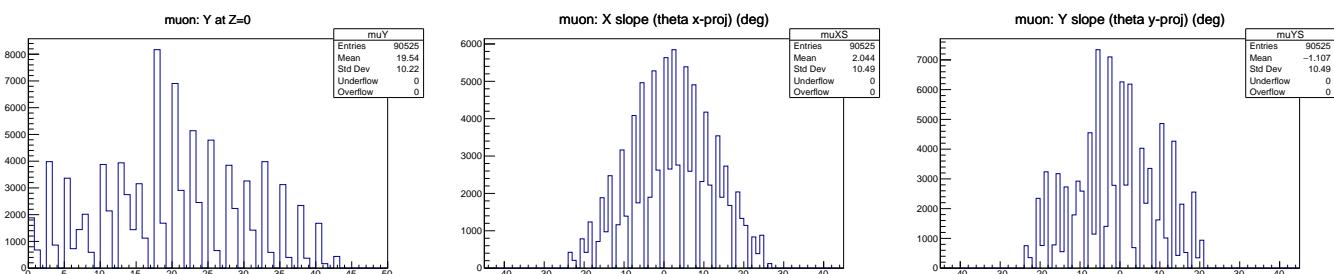


Figure 2.55: (a)muon: Y at Z=0 (b) muon: X slope (theta x-proj) (deg) (c)muon: Y slope (theta y-proj) (deg)

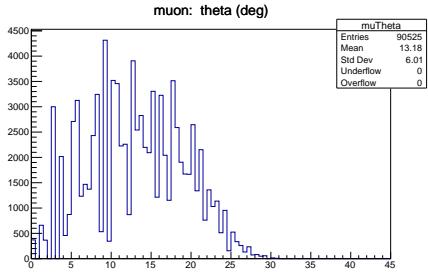


Figure 2.56: (a)muon: theta (deg)

### 3 Hit Cluster Analysis

Clusters of hits in global time frame.

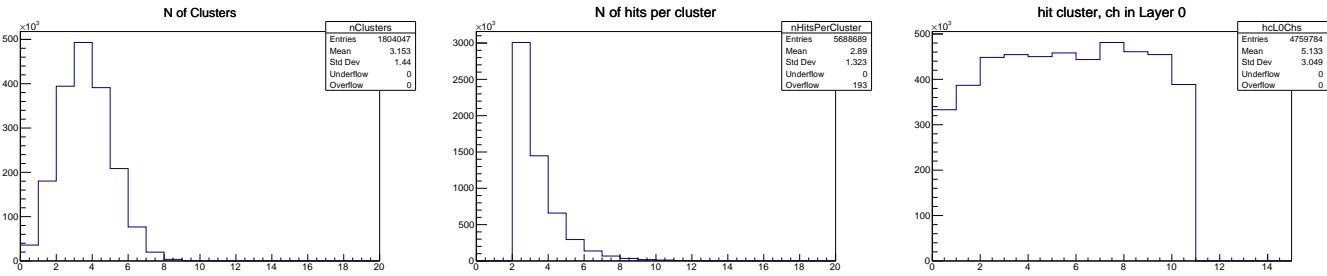


Figure 3.1: (a)N of Clusters (b) N of hits per cluster (c)hit cluster, ch in Layer 0

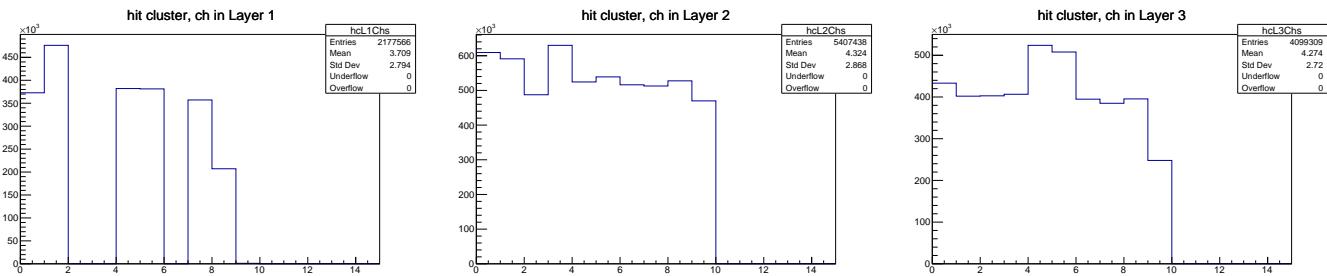


Figure 3.2: (a)hit cluster, ch in Layer 1 (b) hit cluster, ch in Layer 2 (c)hit cluster, ch in Layer 3

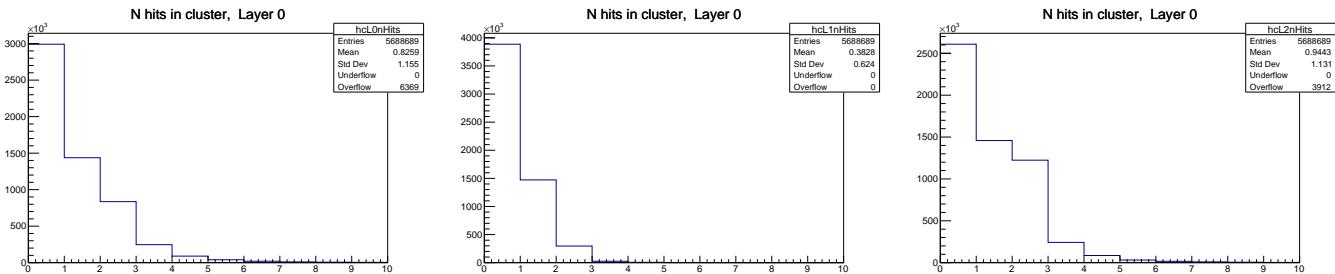


Figure 3.3: (a)N hits in cluster, Layer 0 (b) N hits in cluster, Layer 0 (c)N hits in cluster, Layer 0

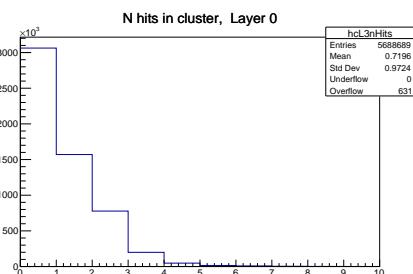


Figure 3.4: (a)N hits in cluster, Layer 0

## 4 Muon Track Analysis

Four layer coincidence.

The number of hits on muon track = 1 hit per layer

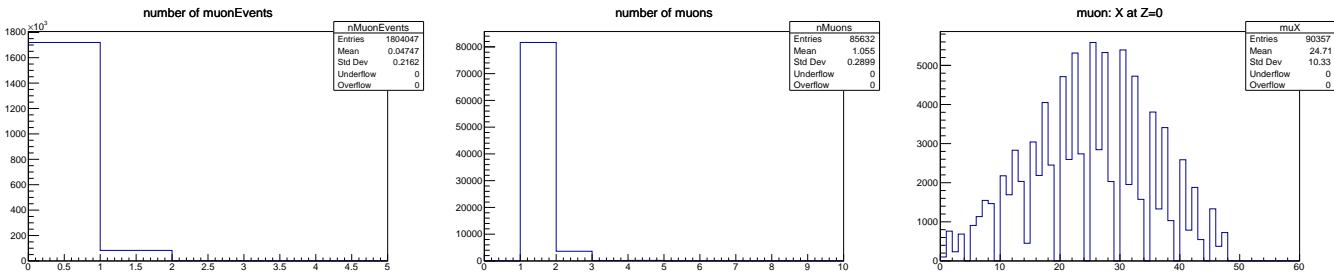


Figure 4.1: (a)number of muonEvents (b) number of muons (c)muon: X at Z=0

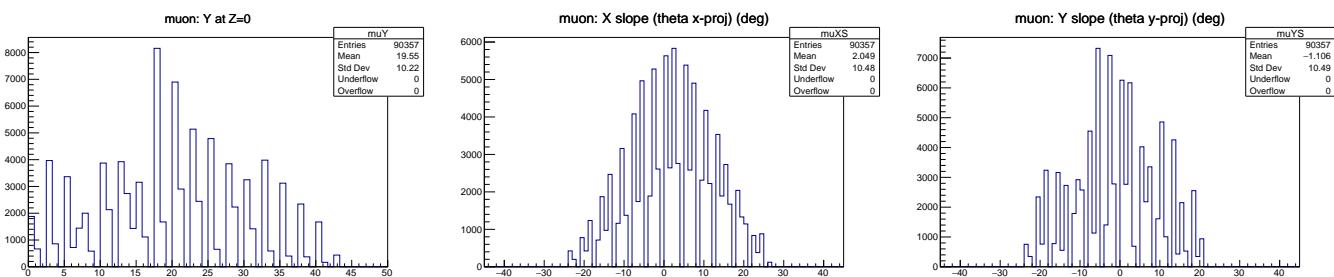


Figure 4.2: (a)muon: Y at Z=0 (b) muon: X slope (theta x-proj) (deg) (c)muon: Y slope (theta y-proj) (deg)

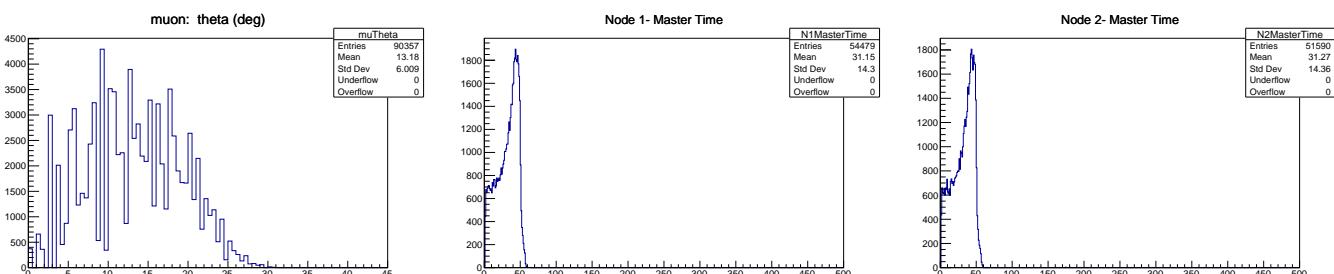


Figure 4.3: (a)muon: theta (deg) (b) Node 1- Master Time (c)Node 2- Master Time

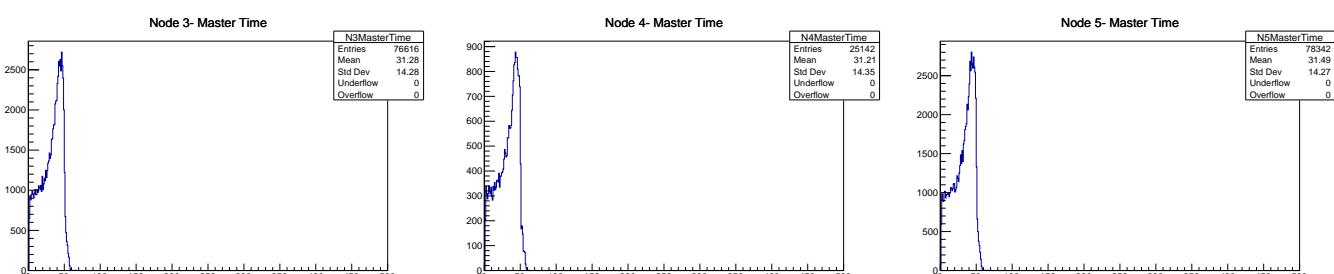


Figure 4.4: (a)Node 3- Master Time (b) Node 4- Master Time (c)Node 5- Master Time

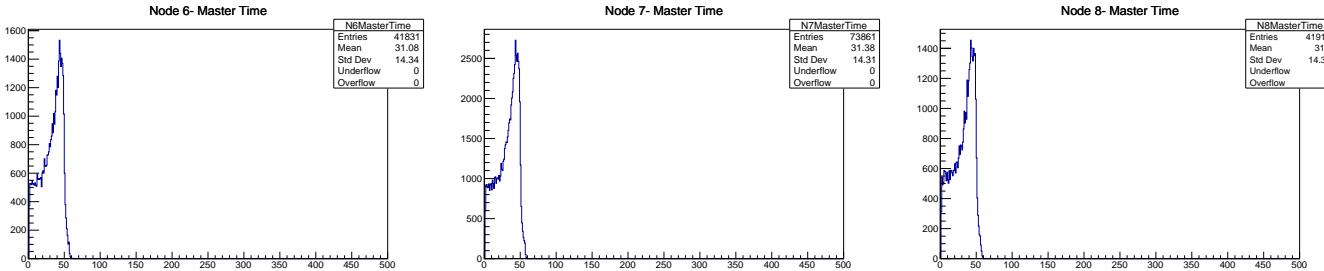


Figure 4.5: (a)Node 6- Master Time (b) Node 7- Master Time (c)Node 8- Master Time

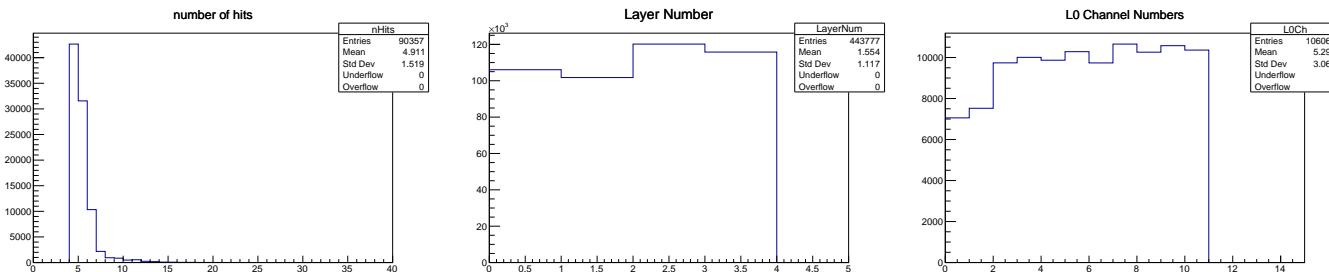


Figure 4.6: (a)number of hits (b) Layer Number (c)L0 Channel Numbers

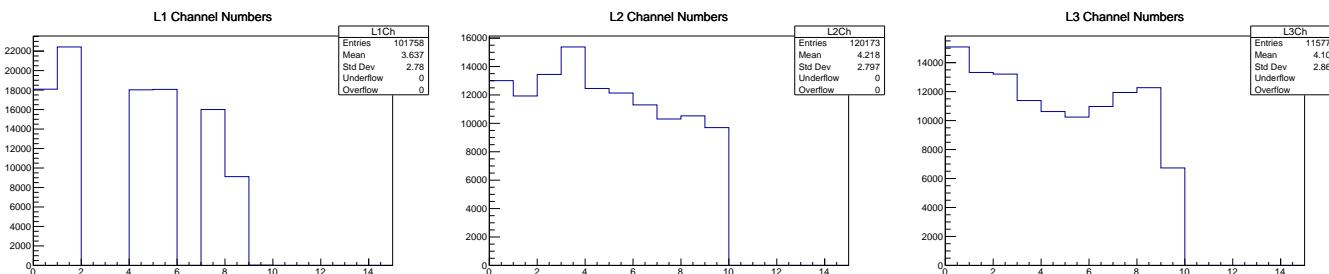


Figure 4.7: (a)L1 Channel Numbers (b) L2 Channel Numbers (c)L3 Channel Numbers

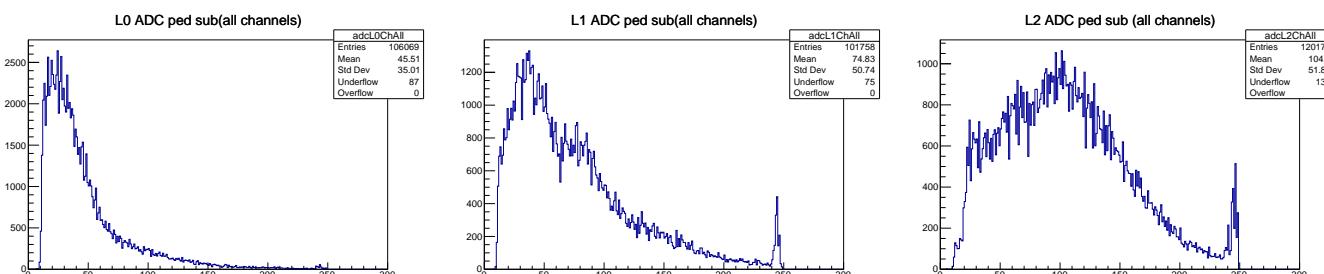


Figure 4.8: (a)L0 ADC ped sub(all channels) (b) L1 ADC ped sub(all channels) (c)L2 ADC ped sub (all channels)

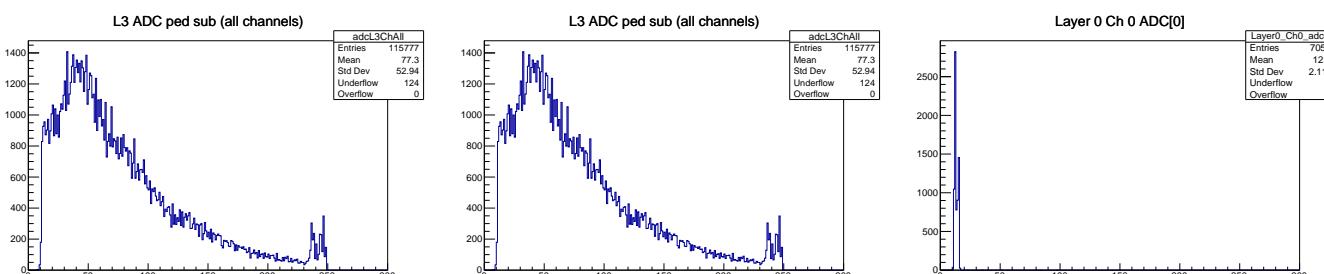


Figure 4.9: (a)L3 ADC ped sub (all channels) (b) L3 ADC ped sub (all channels) (c)Layer 0 Ch 0 ADC[0]

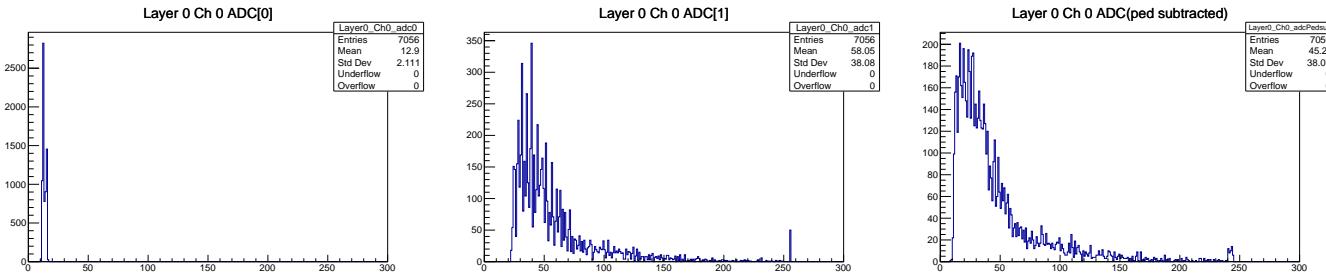


Figure 4.10: (a)Layer 0 Ch 0 ADC[0] (b) Layer 0 Ch 0 ADC[1] (c)Layer 0 Ch 0 ADC(ped subtracted)

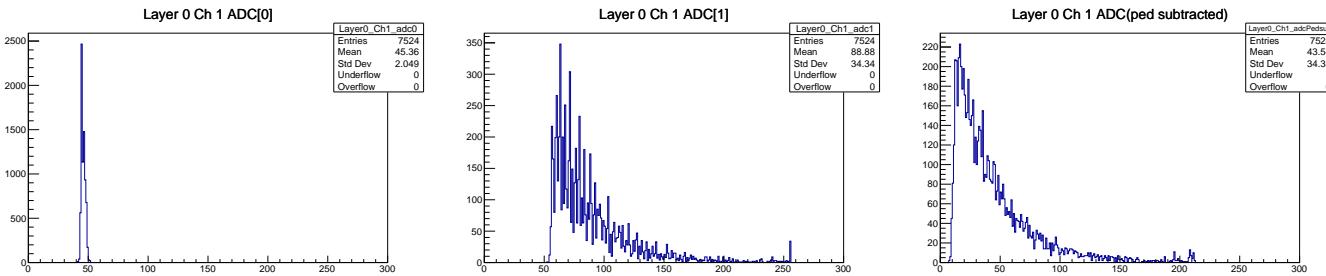


Figure 4.11: (a)Layer 0 Ch 1 ADC[0] (b) Layer 0 Ch 1 ADC[1] (c)Layer 0 Ch 1 ADC(ped subtracted)

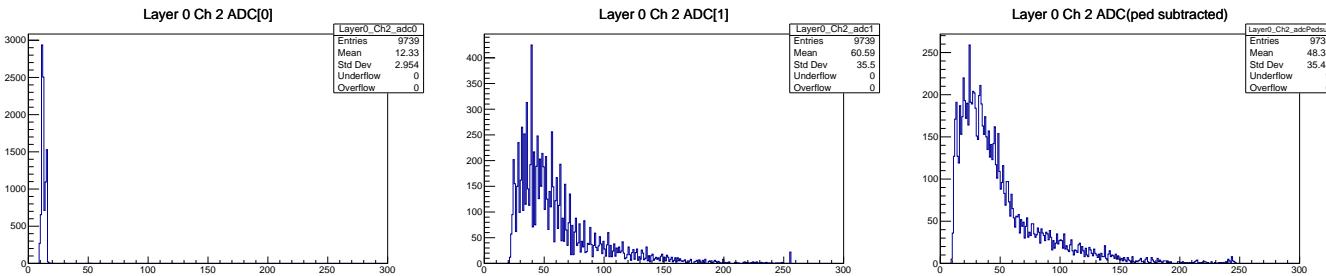


Figure 4.12: (a)Layer 0 Ch 2 ADC[0] (b) Layer 0 Ch 2 ADC[1] (c)Layer 0 Ch 2 ADC(ped subtracted)

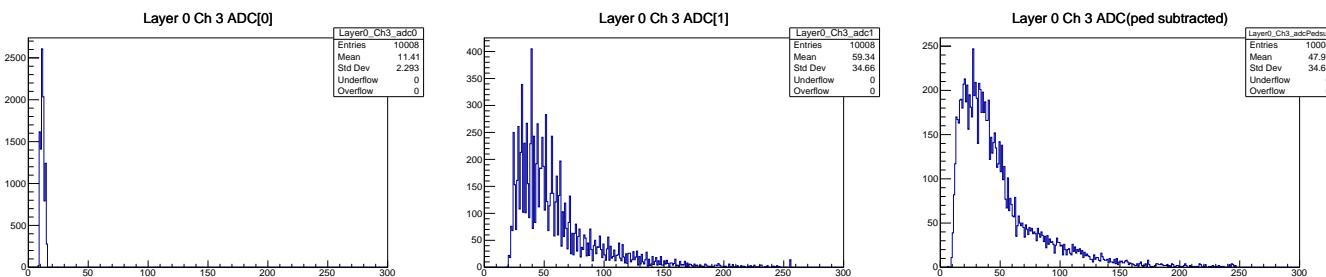


Figure 4.13: (a)Layer 0 Ch 3 ADC[0] (b) Layer 0 Ch 3 ADC[1] (c)Layer 0 Ch 3 ADC(ped subtracted)

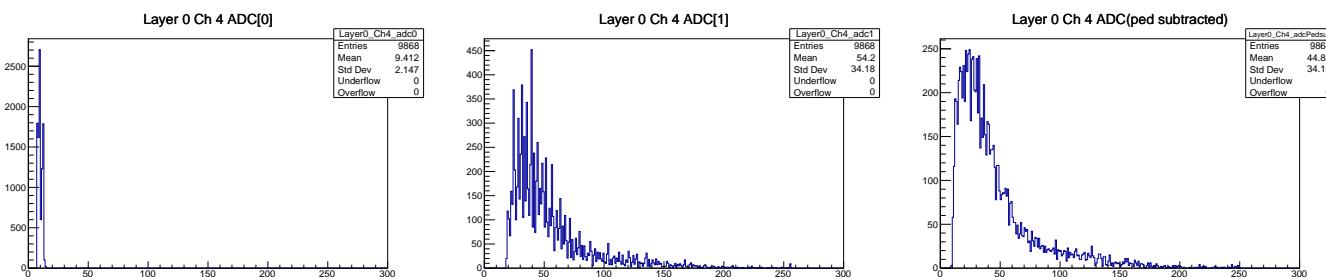


Figure 4.14: (a)Layer 0 Ch 4 ADC[0] (b) Layer 0 Ch 4 ADC[1] (c)Layer 0 Ch 4 ADC(ped subtracted)

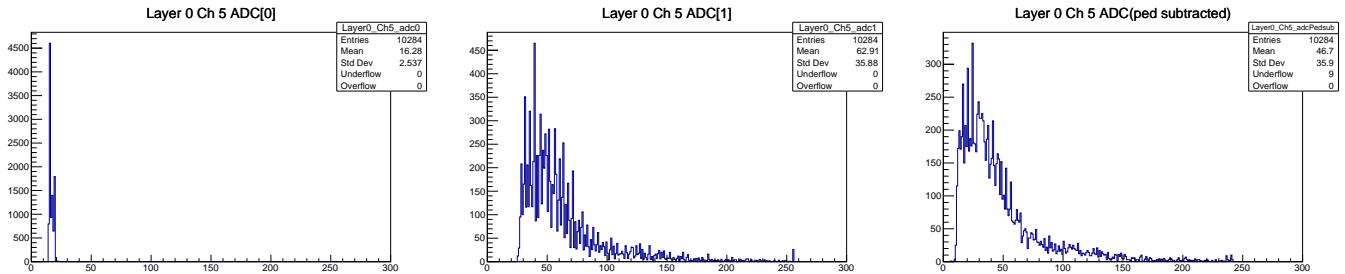


Figure 4.15: (a)Layer 0 Ch 5 ADC[0] (b) Layer 0 Ch 5 ADC[1] (c)Layer 0 Ch 5 ADC(ped subtracted)

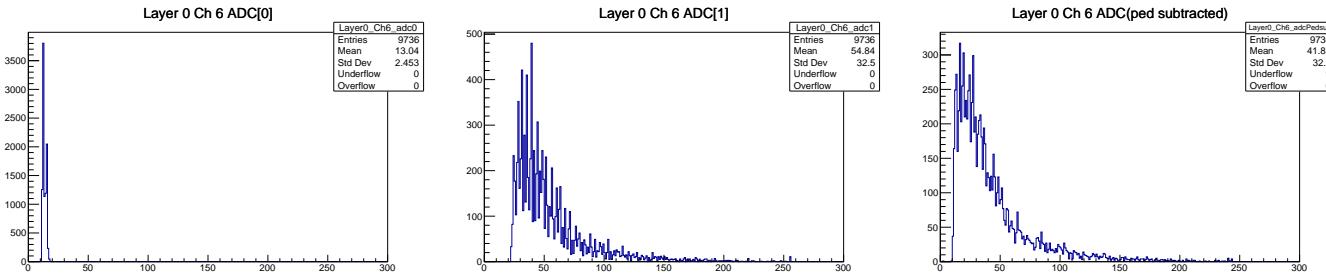


Figure 4.16: (a)Layer 0 Ch 6 ADC[0] (b) Layer 0 Ch 6 ADC[1] (c)Layer 0 Ch 6 ADC(ped subtracted)

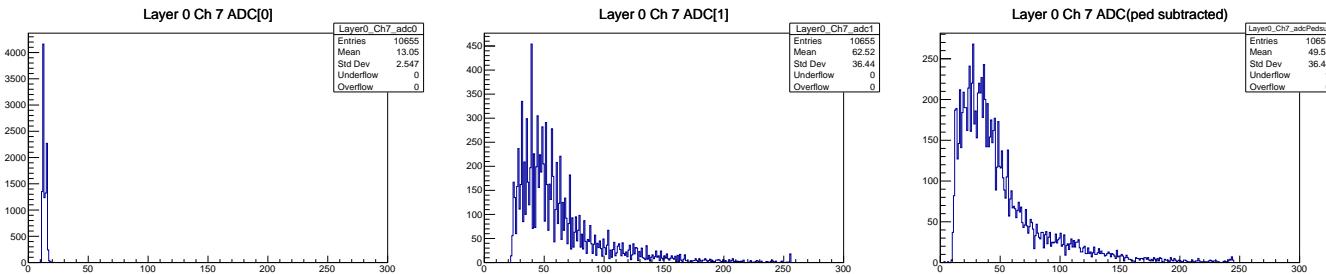


Figure 4.17: (a)Layer 0 Ch 7 ADC[0] (b) Layer 0 Ch 7 ADC[1] (c)Layer 0 Ch 7 ADC(ped subtracted)

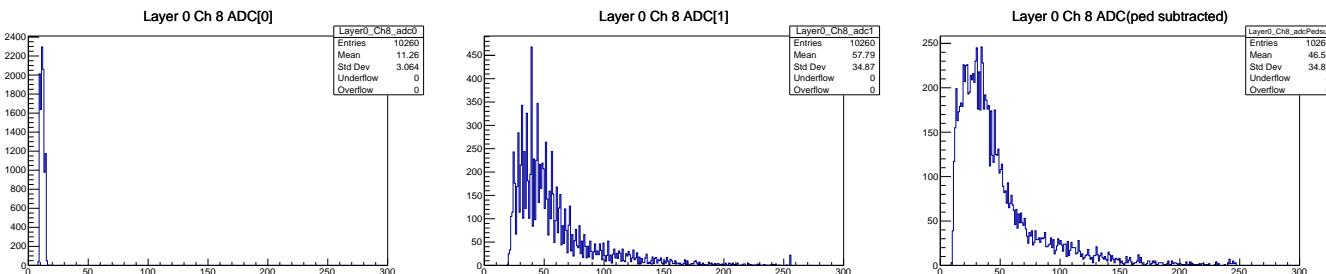


Figure 4.18: (a)Layer 0 Ch 8 ADC[0] (b) Layer 0 Ch 8 ADC[1] (c)Layer 0 Ch 8 ADC(ped subtracted)

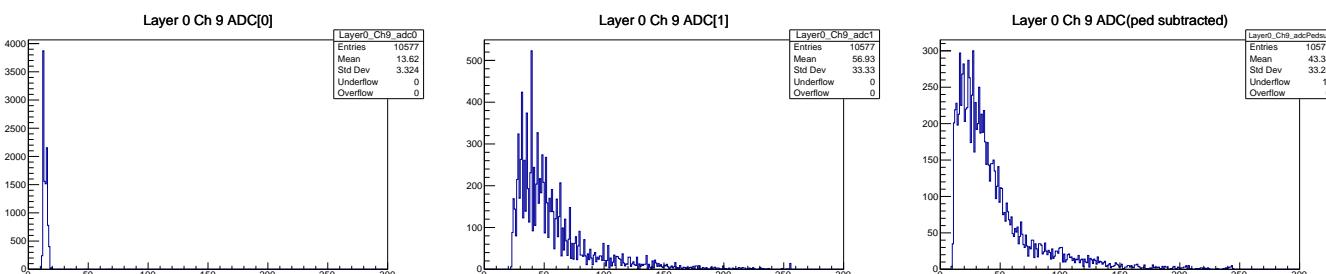


Figure 4.19: (a)Layer 0 Ch 9 ADC[0] (b) Layer 0 Ch 9 ADC[1] (c)Layer 0 Ch 9 ADC(ped subtracted)

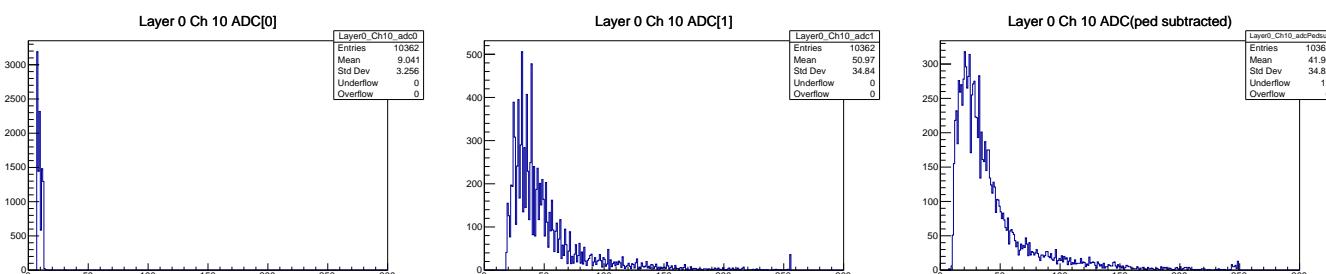


Figure 4.20: (a)Layer 0 Ch 10 ADC[0] (b) Layer 0 Ch 10 ADC[1] (c)Layer 0 Ch 10 ADC(ped subtracted)

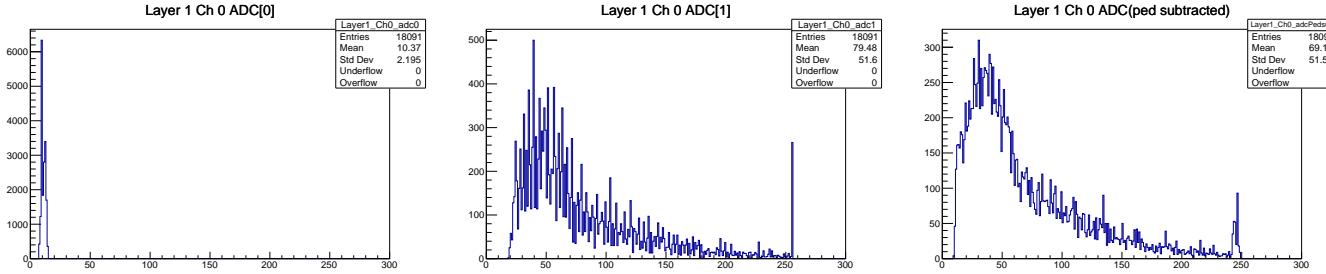


Figure 4.21: (a)Layer 1 Ch 0 ADC[0] (b) Layer 1 Ch 0 ADC[1] (c)Layer 1 Ch 0 ADC(ped subtracted)

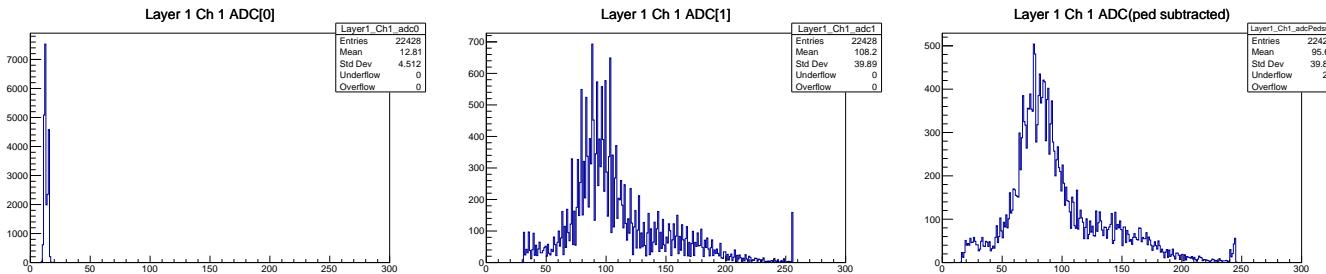


Figure 4.22: (a)Layer 1 Ch 1 ADC[0] (b) Layer 1 Ch 1 ADC[1] (c)Layer 1 Ch 1 ADC(ped subtracted)

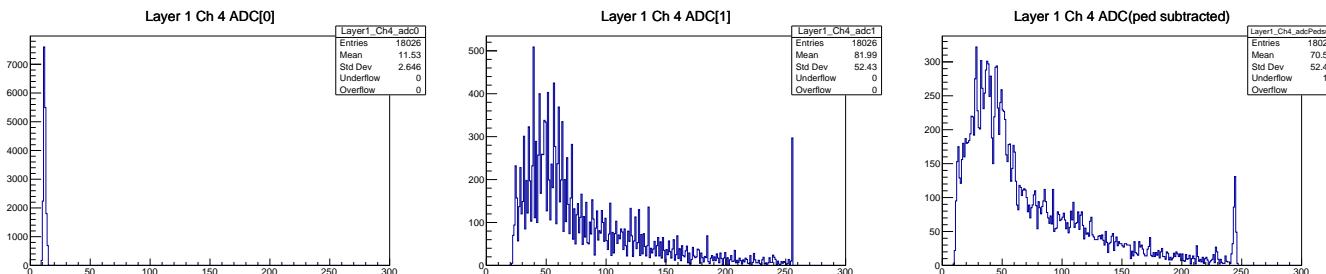


Figure 4.23: (a)Layer 1 Ch 4 ADC[0] (b) Layer 1 Ch 4 ADC[1] (c)Layer 1 Ch 4 ADC(ped subtracted)

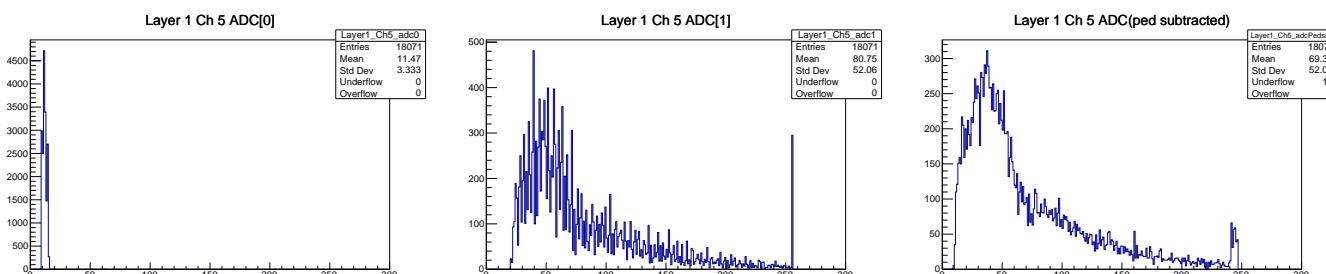


Figure 4.24: (a)Layer 1 Ch 5 ADC[0] (b) Layer 1 Ch 5 ADC[1] (c)Layer 1 Ch 5 ADC(ped subtracted)

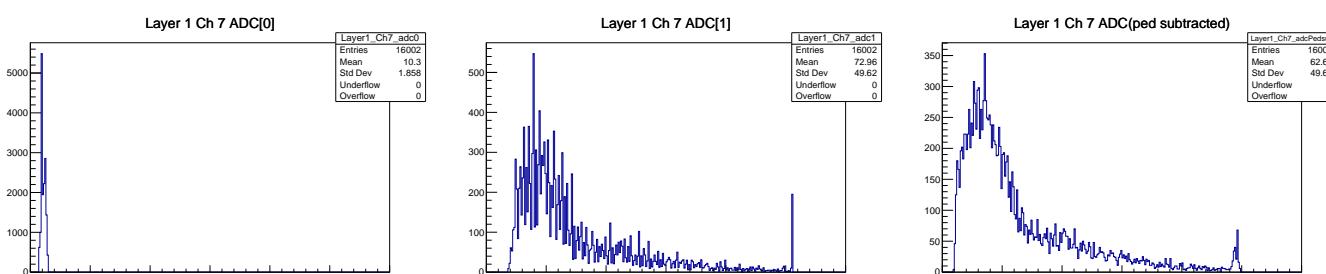


Figure 4.25: (a)Layer 1 Ch 7 ADC[0] (b) Layer 1 Ch 7 ADC[1] (c)Layer 1 Ch 7 ADC(ped subtracted)

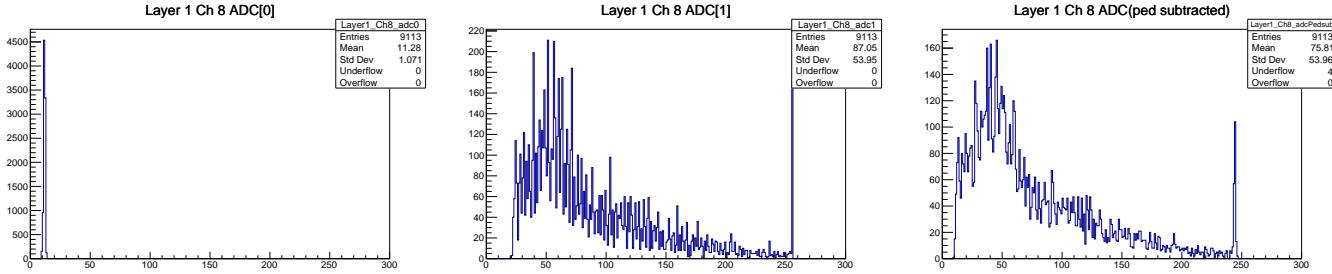


Figure 4.26: (a)Layer 1 Ch 8 ADC[0] (b) Layer 1 Ch 8 ADC[1] (c)Layer 1 Ch 8 ADC(ped subtracted)

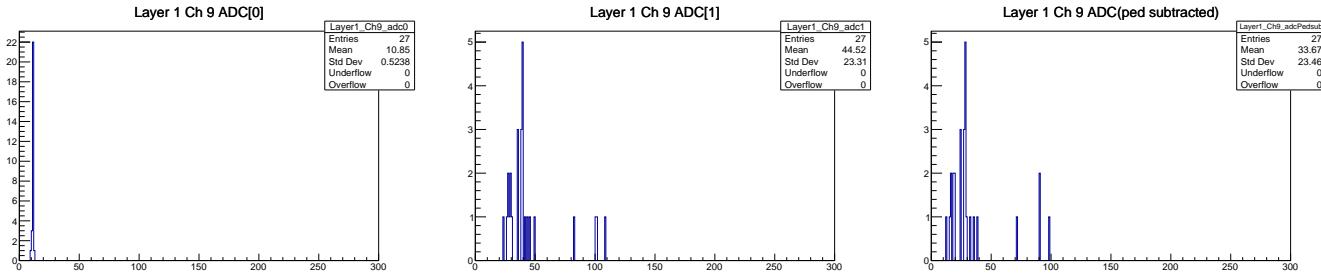


Figure 4.27: (a)Layer 1 Ch 9 ADC[0] (b) Layer 1 Ch 9 ADC[1] (c)Layer 1 Ch 9 ADC(ped subtracted)

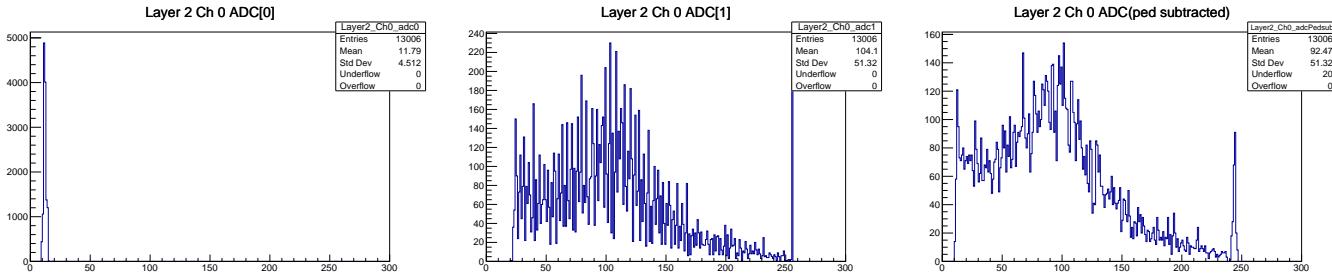


Figure 4.28: (a)Layer 2 Ch 0 ADC[0] (b) Layer 2 Ch 0 ADC[1] (c)Layer 2 Ch 0 ADC(ped subtracted)

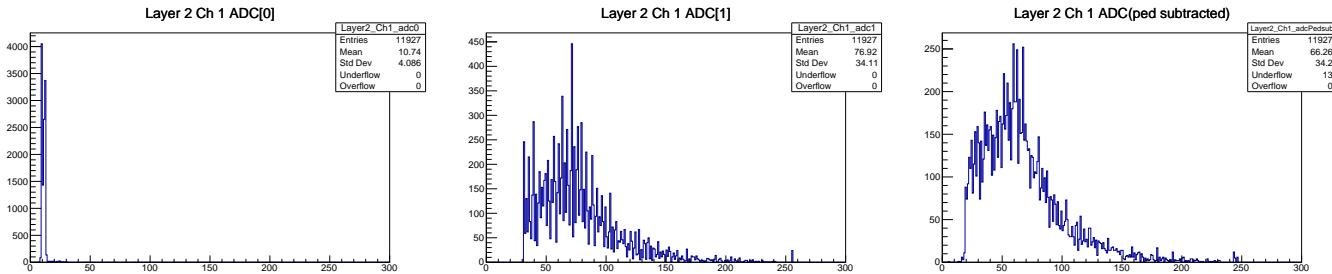


Figure 4.29: (a)Layer 2 Ch 1 ADC[0] (b) Layer 2 Ch 1 ADC[1] (c)Layer 2 Ch 1 ADC(ped subtracted)

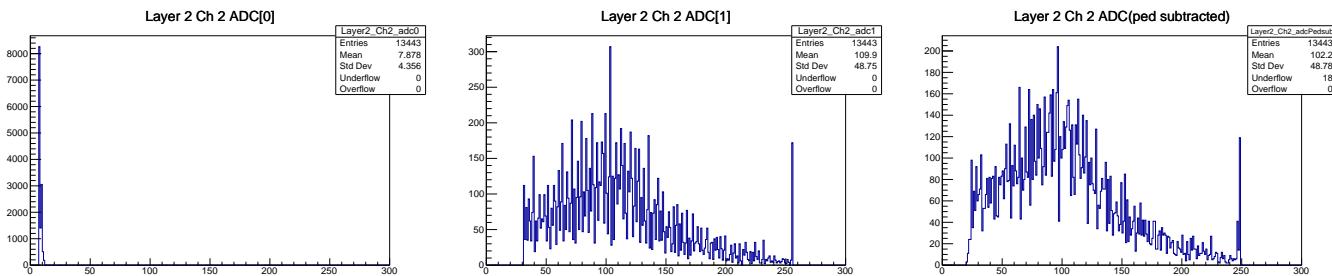
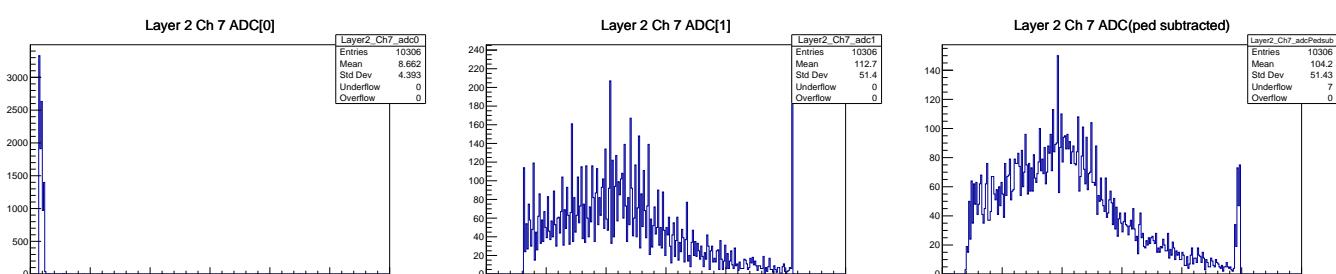
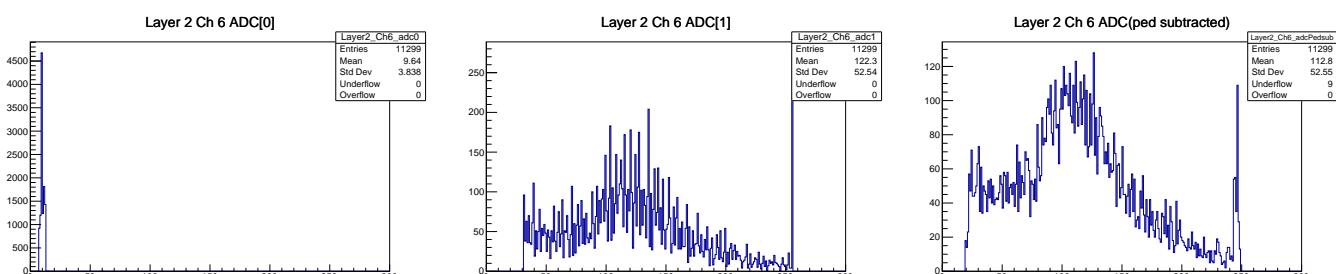
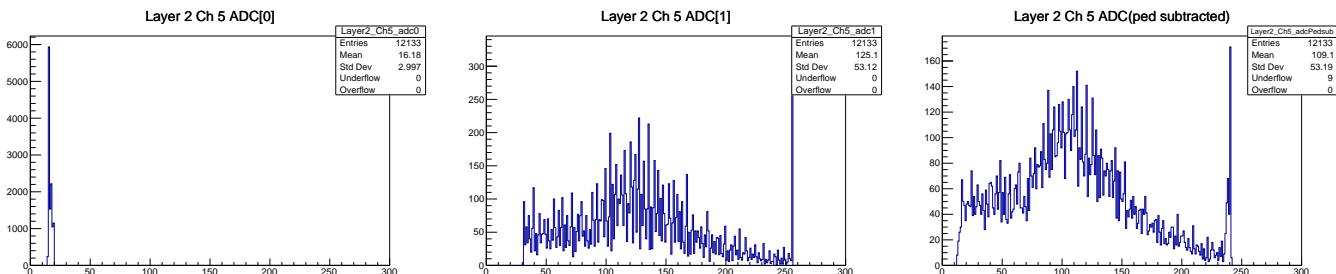
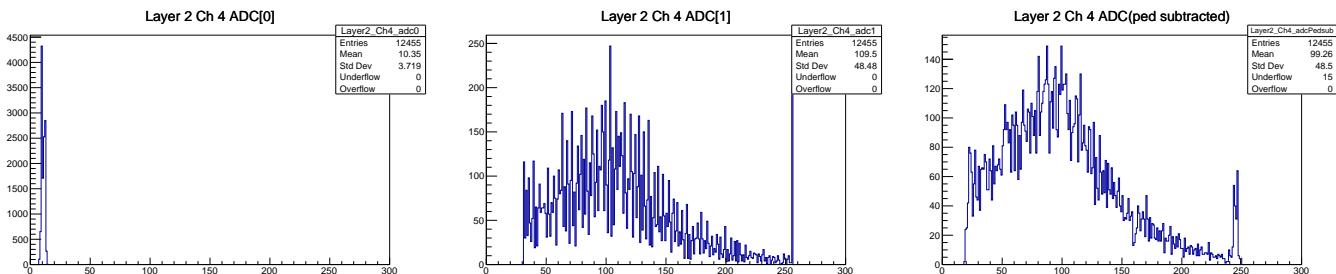
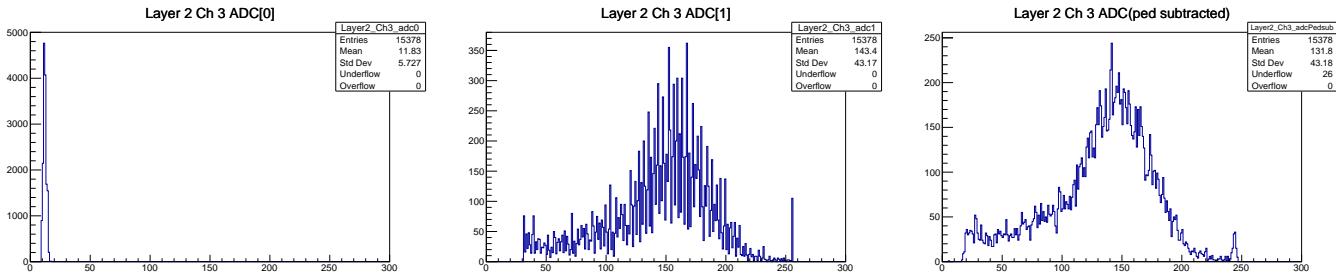


Figure 4.30: (a)Layer 2 Ch 2 ADC[0] (b) Layer 2 Ch 2 ADC[1] (c)Layer 2 Ch 2 ADC(ped subtracted)



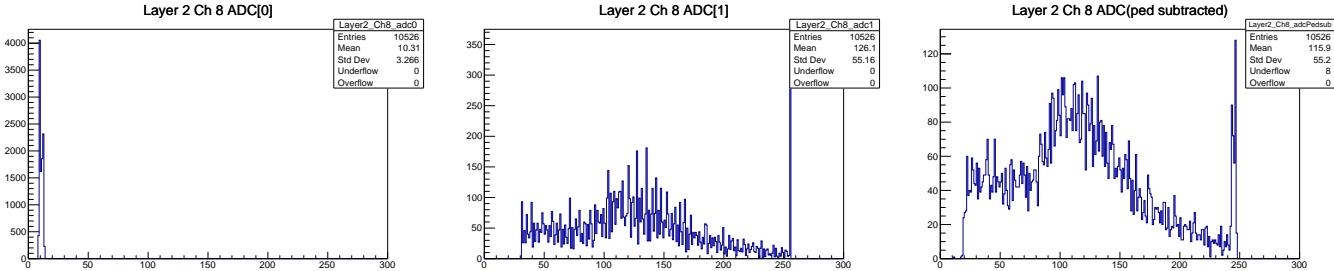


Figure 4.36: (a)Layer 2 Ch 8 ADC[0] (b) Layer 2 Ch 8 ADC[1] (c)Layer 2 Ch 8 ADC(ped subtracted)

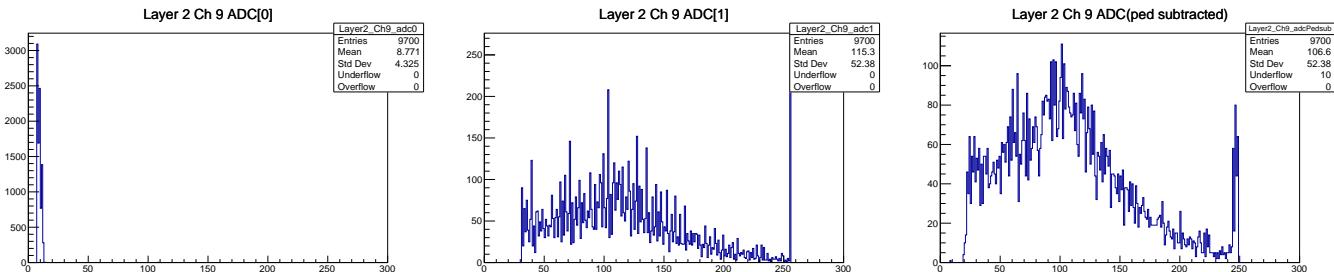


Figure 4.37: (a)Layer 2 Ch 9 ADC[0] (b) Layer 2 Ch 9 ADC[1] (c)Layer 2 Ch 9 ADC(ped subtracted)

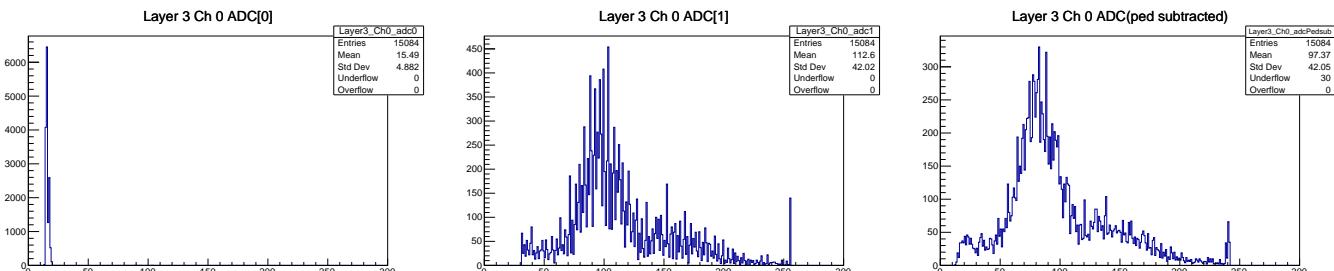


Figure 4.38: (a)Layer 3 Ch 0 ADC[0] (b) Layer 3 Ch 0 ADC[1] (c)Layer 3 Ch 0 ADC(ped subtracted)

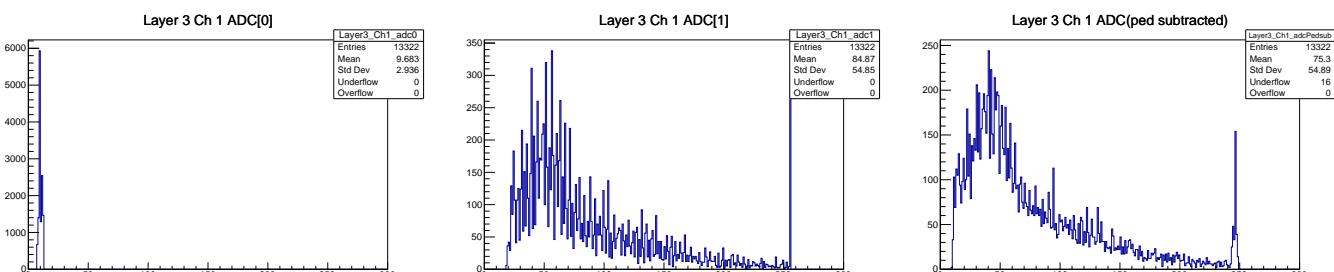


Figure 4.39: (a)Layer 3 Ch 1 ADC[0] (b) Layer 3 Ch 1 ADC[1] (c)Layer 3 Ch 1 ADC(ped subtracted)

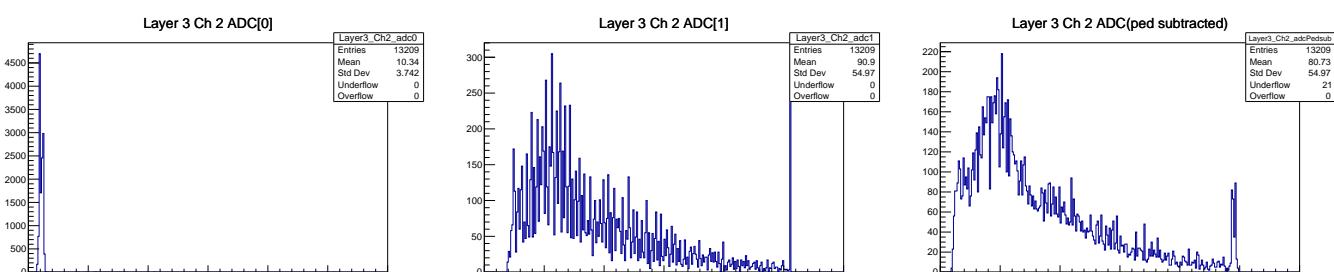


Figure 4.40: (a)Layer 3 Ch 2 ADC[0] (b) Layer 3 Ch 2 ADC[1] (c)Layer 3 Ch 2 ADC(ped subtracted)

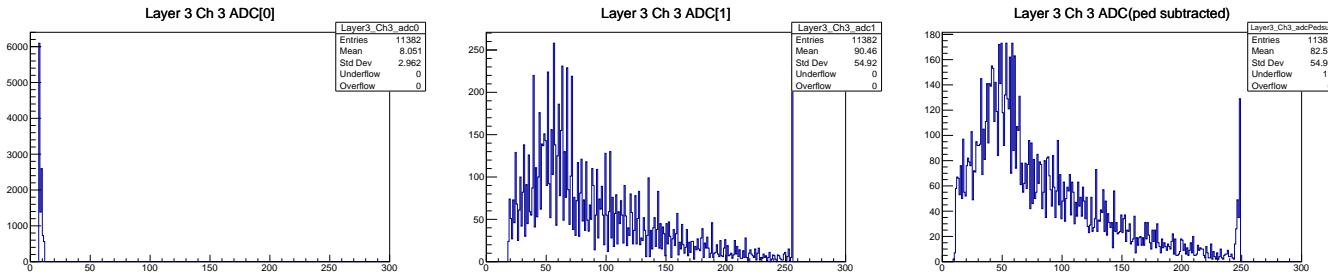


Figure 4.41: (a)Layer 3 Ch 3 ADC[0] (b) Layer 3 Ch 3 ADC[1] (c)Layer 3 Ch 3 ADC(ped subtracted)

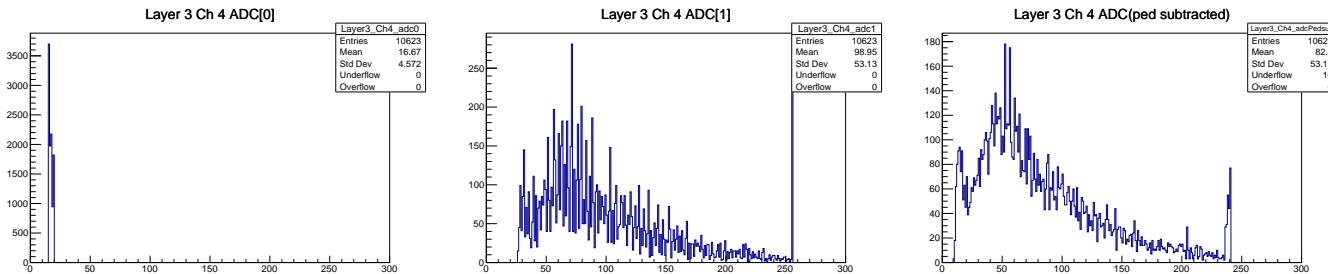


Figure 4.42: (a)Layer 3 Ch 4 ADC[0] (b) Layer 3 Ch 4 ADC[1] (c)Layer 3 Ch 4 ADC(ped subtracted)

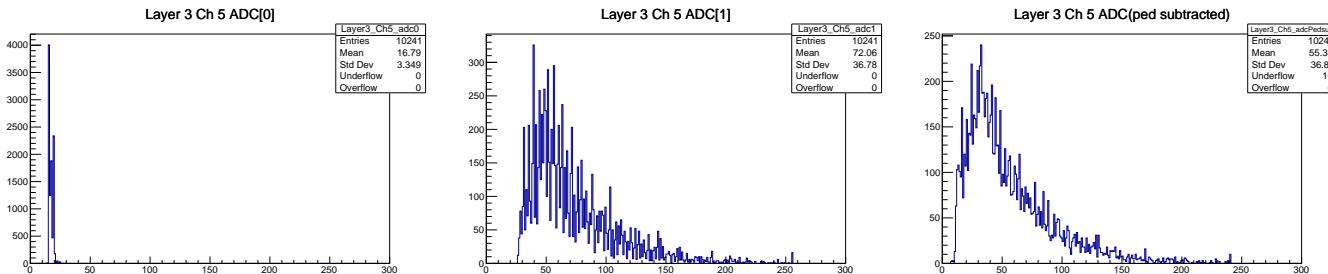


Figure 4.43: (a)Layer 3 Ch 5 ADC[0] (b) Layer 3 Ch 5 ADC[1] (c)Layer 3 Ch 5 ADC(ped subtracted)

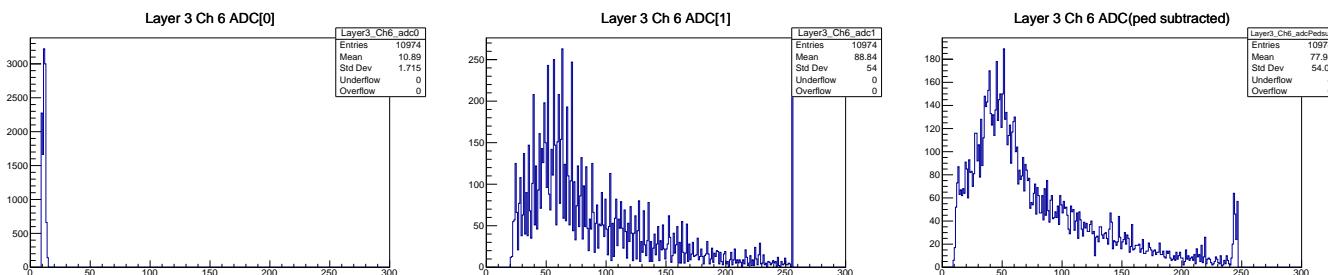


Figure 4.44: (a)Layer 3 Ch 6 ADC[0] (b) Layer 3 Ch 6 ADC[1] (c)Layer 3 Ch 6 ADC(ped subtracted)

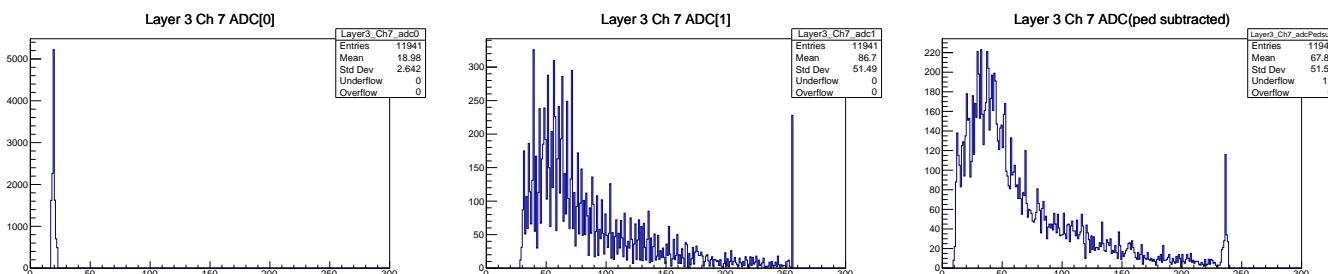


Figure 4.45: (a)Layer 3 Ch 7 ADC[0] (b) Layer 3 Ch 7 ADC[1] (c)Layer 3 Ch 7 ADC(ped subtracted)

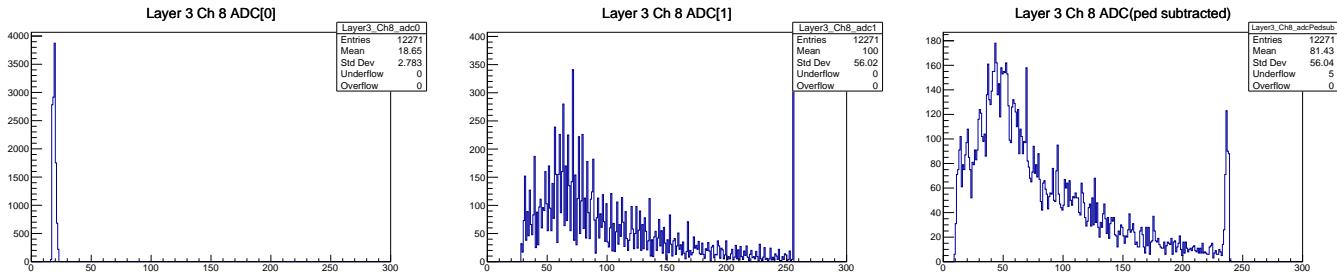


Figure 4.46: (a)Layer 3 Ch 8 ADC[0] (b) Layer 3 Ch 8 ADC[1] (c)Layer 3 Ch 8 ADC(ped subtracted)

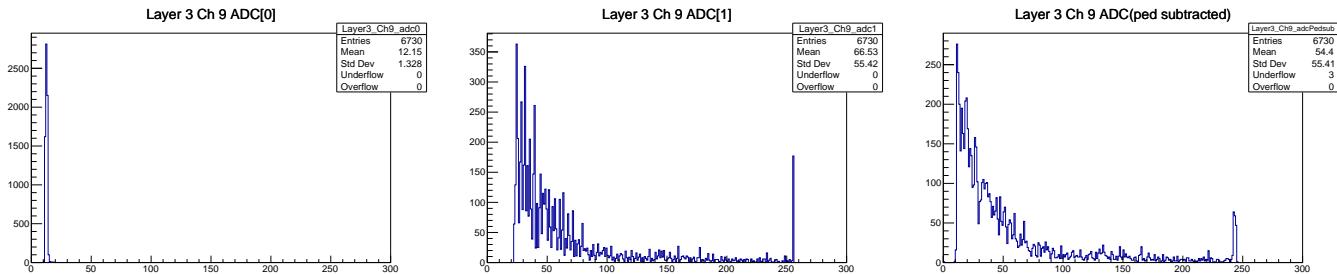


Figure 4.47: (a)Layer 3 Ch 9 ADC[0] (b) Layer 3 Ch 9 ADC[1] (c)Layer 3 Ch 9 ADC(ped subtracted)

## 5 Water Tower Analysis

Four layer coincidence.

The number of hits on muon track = 1 hit per layer

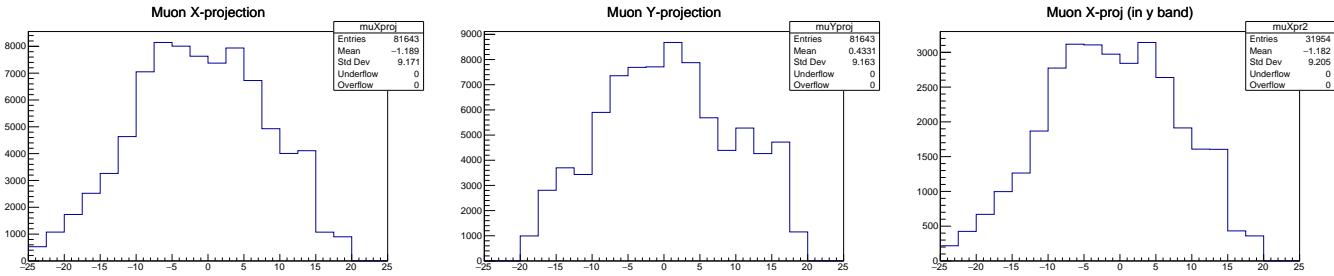


Figure 5.1: (a)Muon X-projection (b) Muon Y-projection (c)Muon X-proj (in y band)

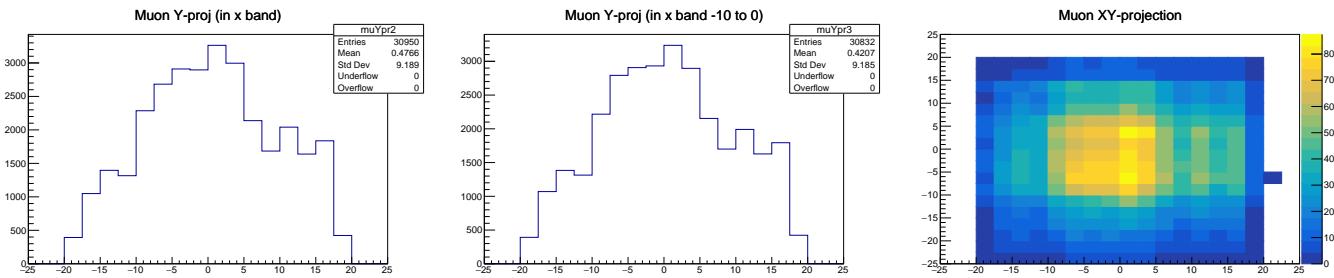


Figure 5.2: (a)Muon Y-proj (in x band) (b) Muon Y-proj (in x band -10 to 0) (c)Muon XY-projection