# ProtoDUNE TPC pulser data

## ProtoDUNE simulation and reconstruction

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# Introduction

I have been studying the December external pulser data

- Internal (ASIC) and external (FEMB) pulsers
- HV off and on
- 15 amplitude settings for each
  - A = 1, 2, 3, 4, …, 30
  - Q = A ×(3.43 fC) = A × (21.4 ke) ≈ A MIP
- Standard preamp setting (14 mV/fC, 2 us)

Analysis

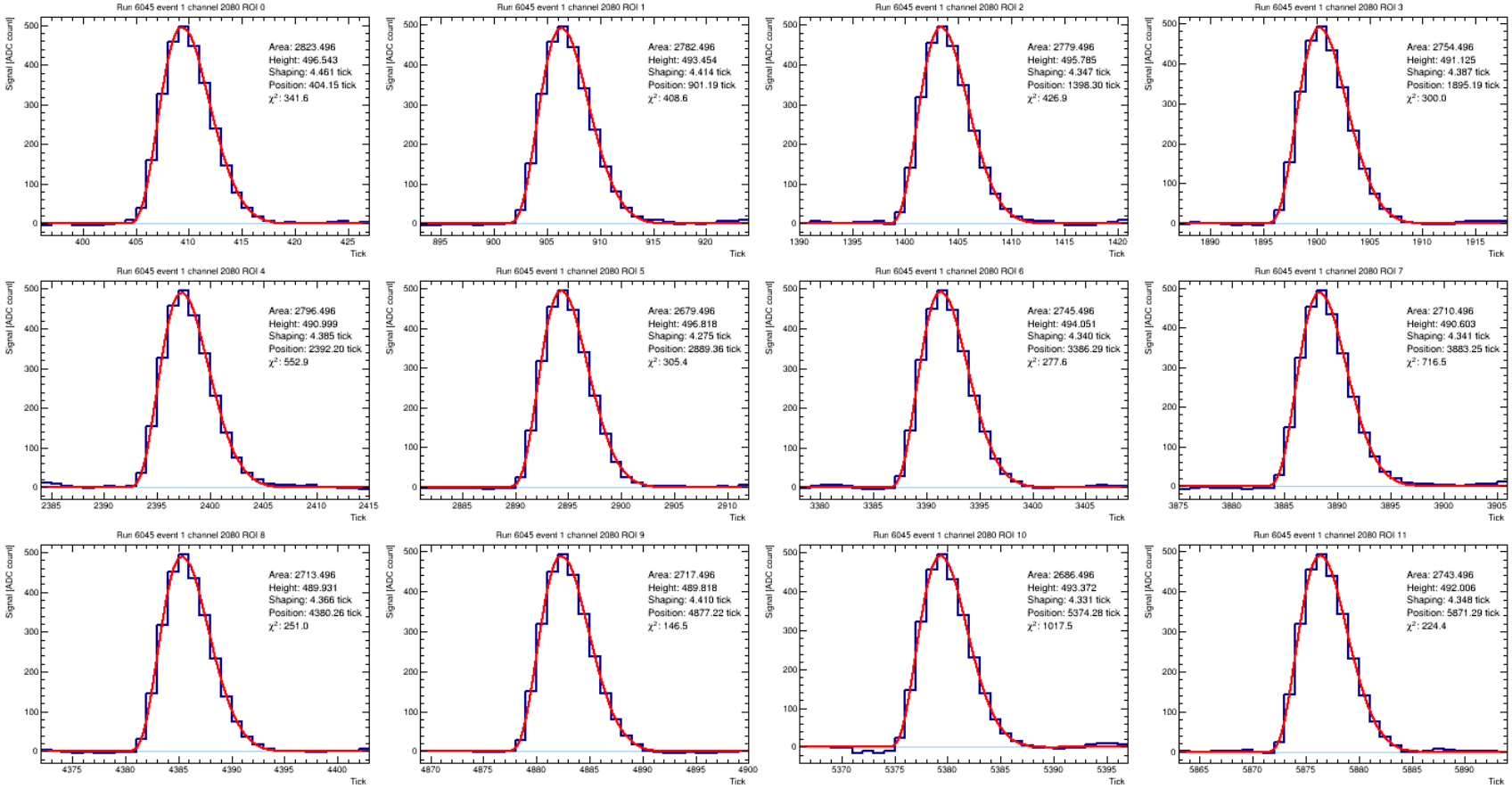
- Processed December external pulser, HV off data
- ROI's found with AdcThresholdSignalFinder
  - Threshold of 100 or 600 ADC counts (A ≥ 15)
- Data processed using AdcRoiViewer
  - Each ROI fit to CE response function
  - Histogram ROI area and fitted height and width
  - Channel summary histograms of mean and truncated RMS of area, height

# Response fits

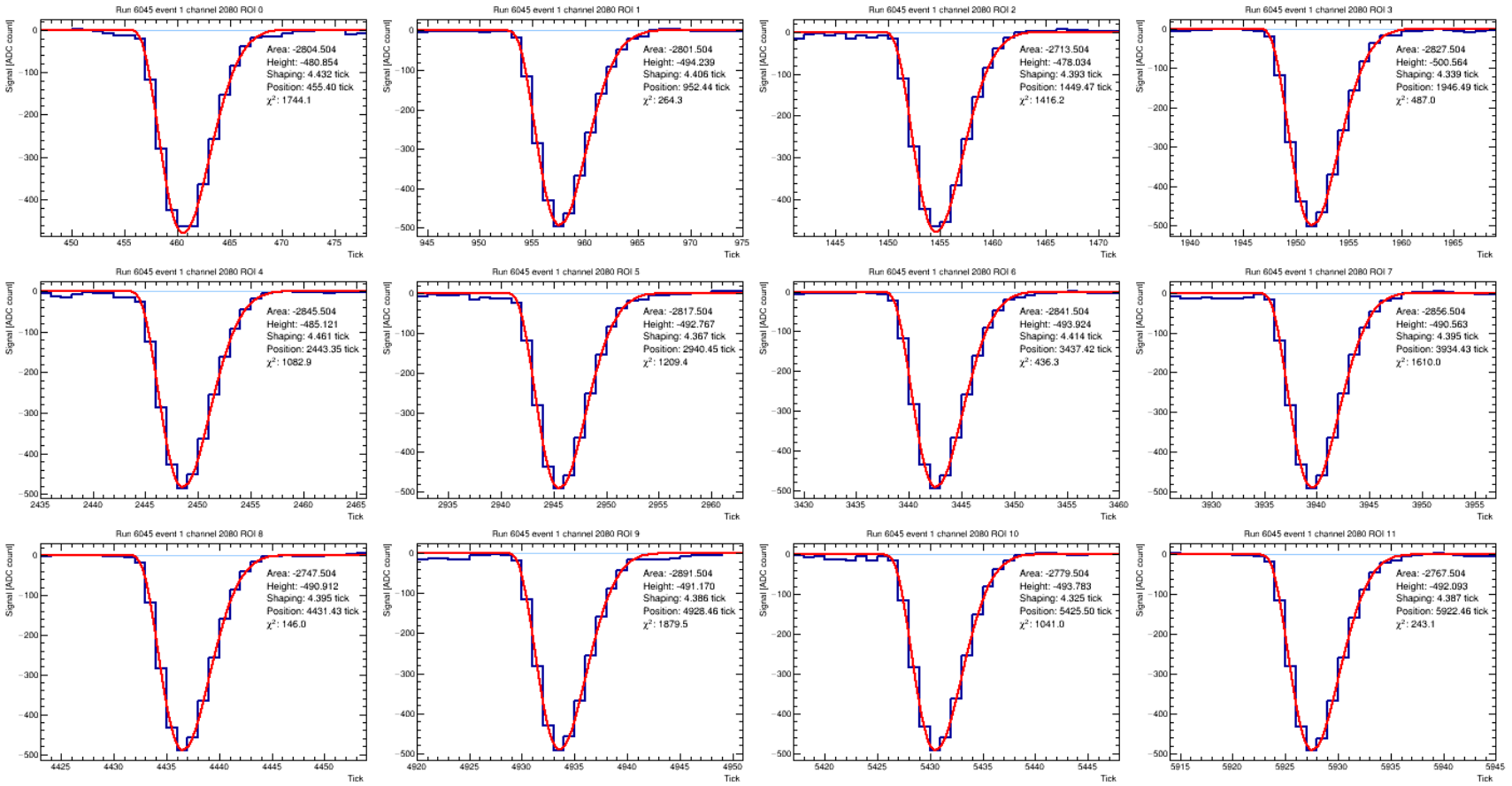
## Response obtained from signal vs. pulser setting

- Each pulse is fit with CE response function
  - Fit ➔ height, shaping time, time (tick)
  - Area evaluated as integral over full ROI
    - Here, from 10 ticks to 20 after crossing threshold
- Summary plots constructed from 50 events (600 pulses)
  - Summary histograms made for area, height, shaping time and more
  - Separately for positive and negative pulses
- Each summary plot is fit to obtain mean and RMS
  - Fit is truncated RMS algorithm described in earlier talk
- Results from multiple pulser settings used to construct response plots
  - Response is area or height vs. A
- For today's plots, $0 \leq 7$ is fit to a non-offset line
  - I.e. one parameter = slope = 1/gain
- Residual plots are shown of the following pages
  - Data signal - slope*A
  - Error bars are RMS/sqrt($N_{ROI}$) from underlying distribution

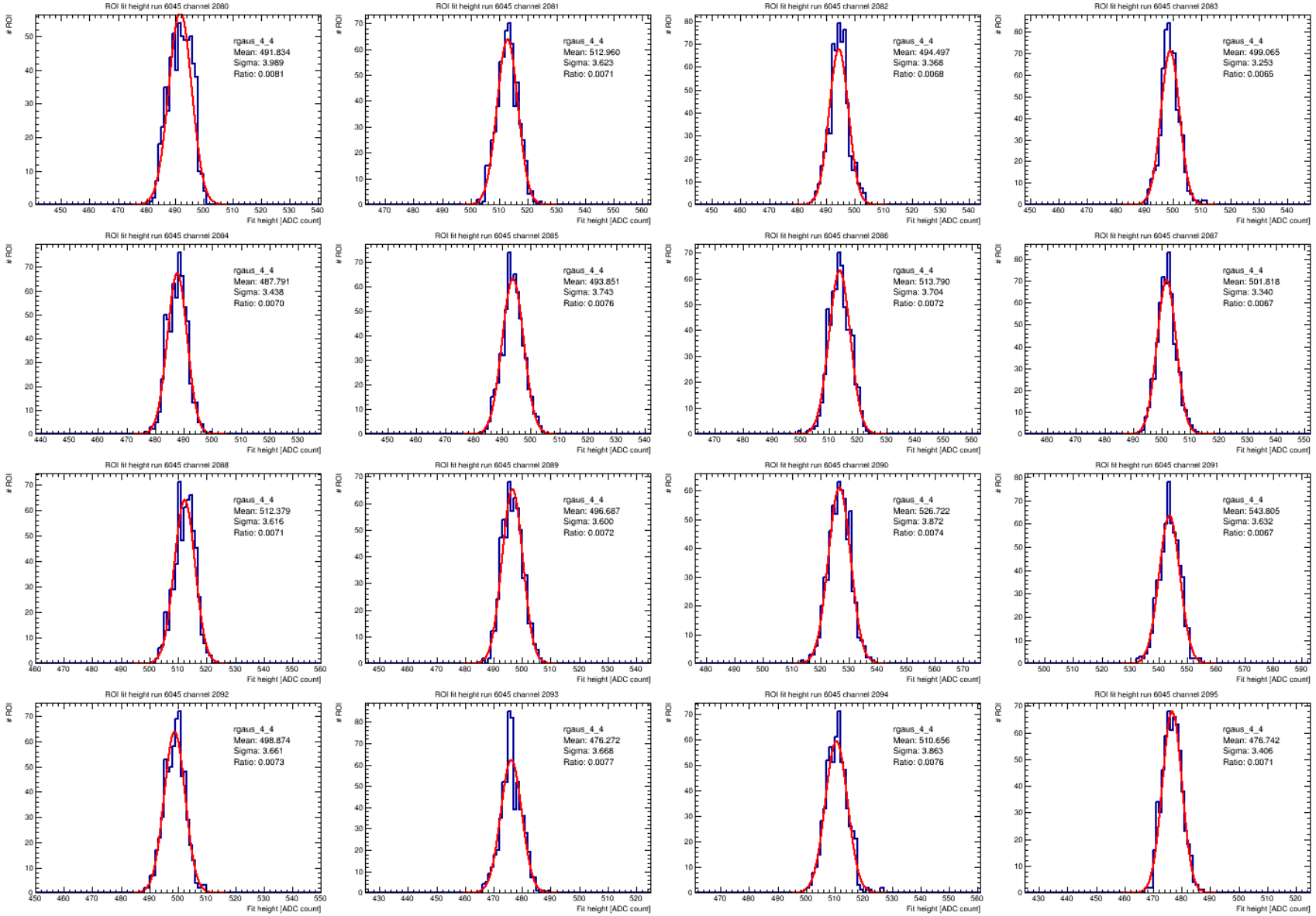
# Example positive pulses (A=3)



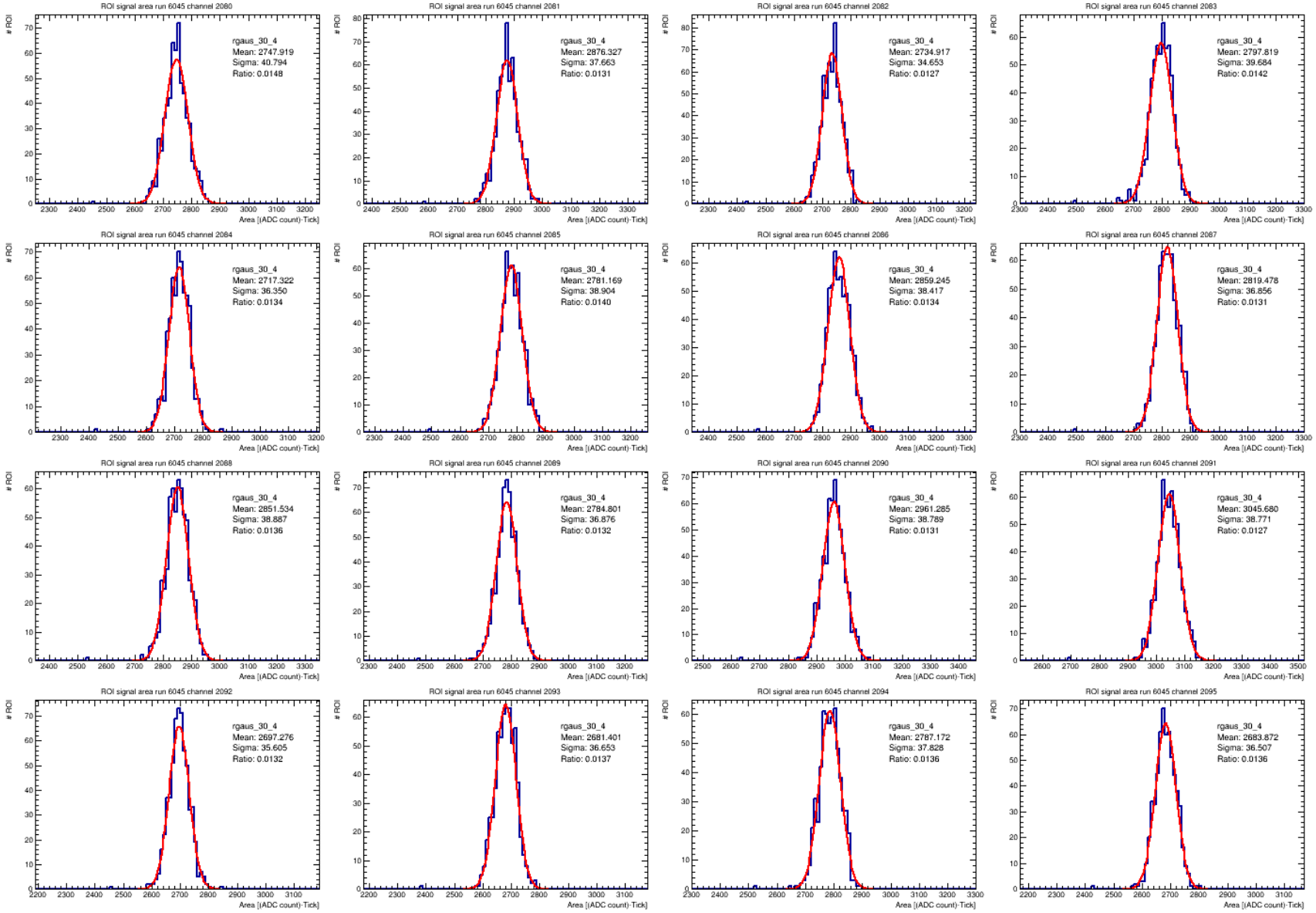
# Example negative pulses (A=-3)



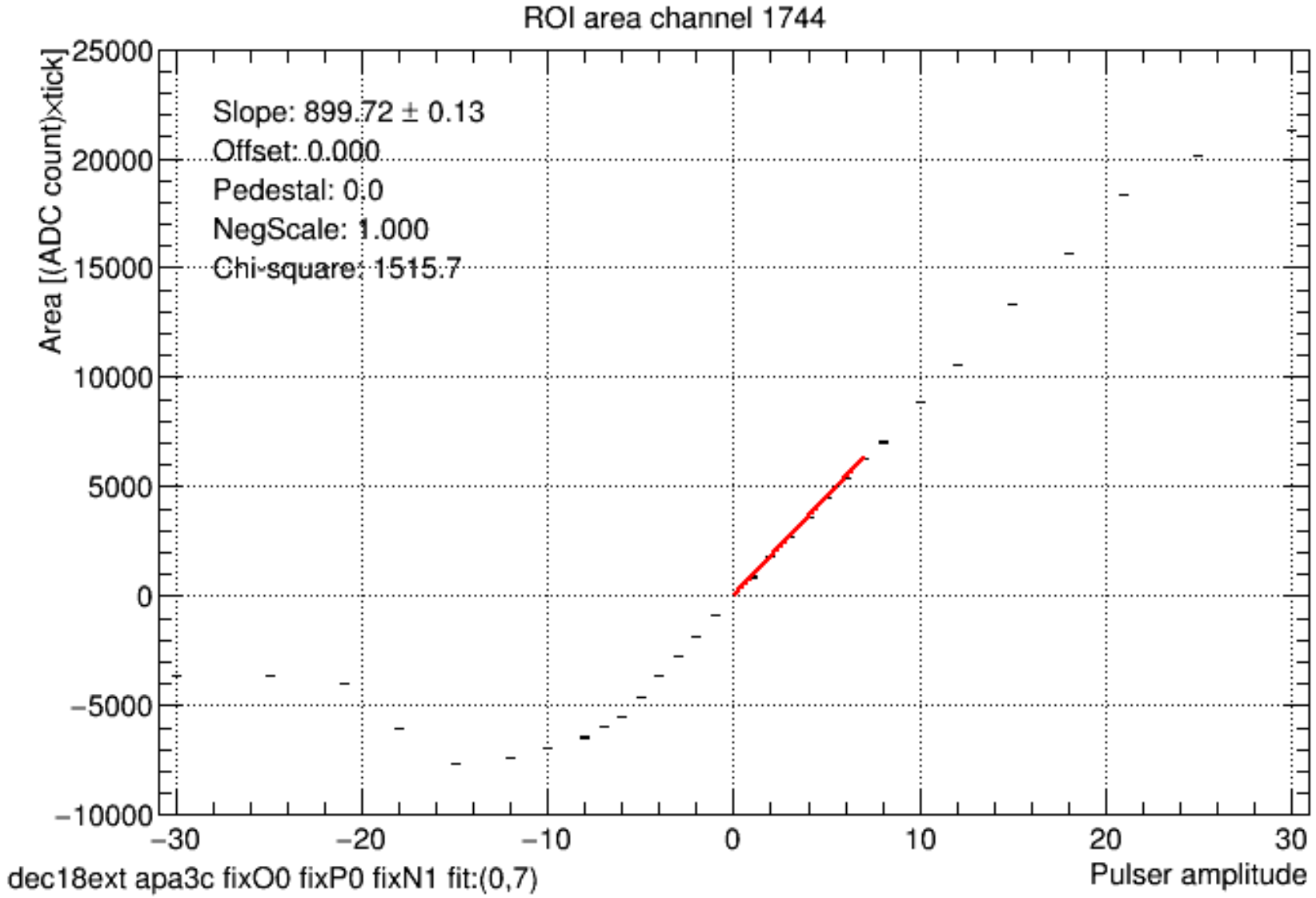
# Example fitted height summaries



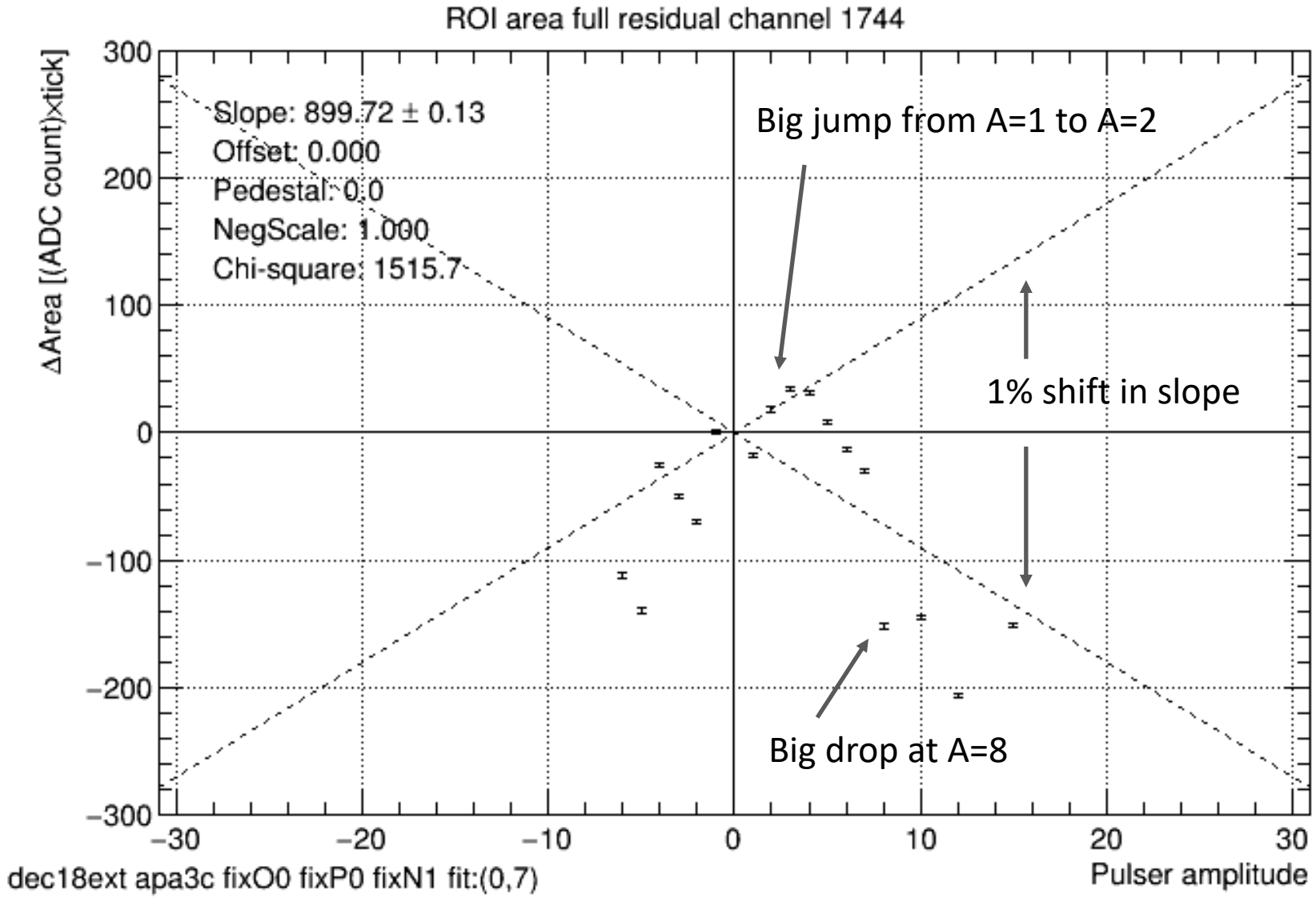
# Example fitted area summaries



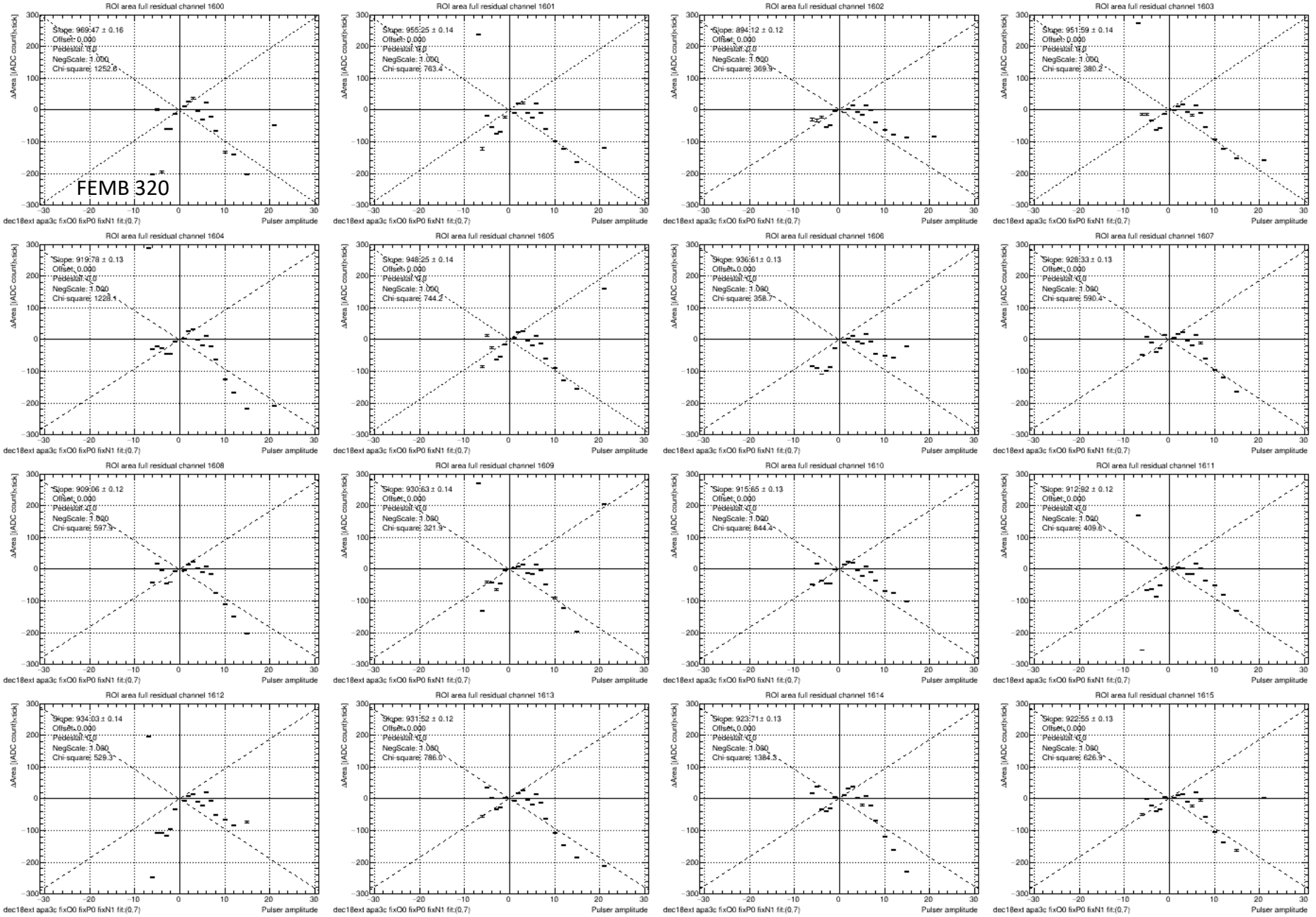
# Example response plot

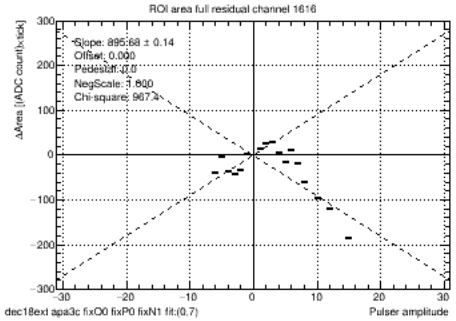


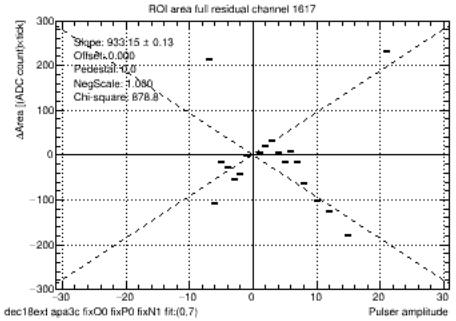
# Example response residual

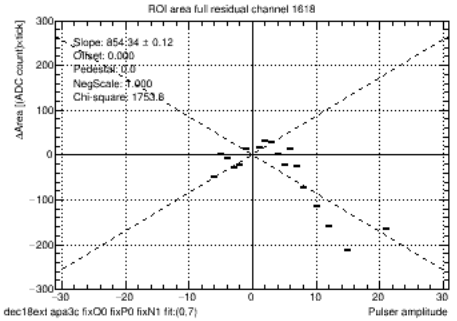


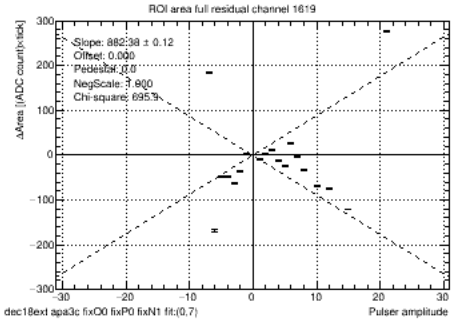
# Response fits for APA 3c

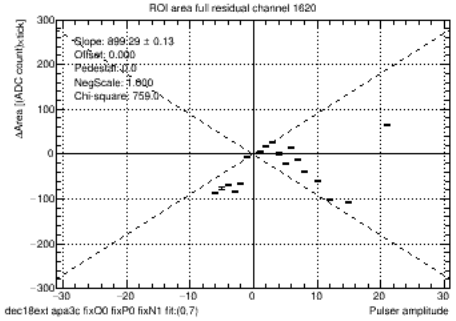

ROI area full residual channel 1600
Slope: 969.47 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1252.6
FEMB 320
ROI area full residual channel 1601
Slope: 955.25 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 763.4
ROI area full residual channel 1602
Slope: 894.12 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 369.9
ROI area full residual channel 1603
Slope: 951.59 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 380.2
ROI area full residual channel 1604
Slope: 919.78 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1228.1
ROI area full residual channel 1605
Slope: 948.25 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 744.2
ROI area full residual channel 1606
Slope: 936.61 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 358.7
ROI area full residual channel 1607
Slope: 928.33 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 590.4
ROI area full residual channel 1608
Slope: 909.06 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 597.9
ROI area full residual channel 1609
Slope: 930.63 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 321.9
ROI area full residual channel 1610
Slope: 915.65 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 844.4
ROI area full residual channel 1611
Slope: 912.92 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 409.8
ROI area full residual channel 1612
Slope: 934.03 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 529.3
ROI area full residual channel 1613
Slope: 931.52 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 786.0
ROI area full residual channel 1614
Slope: 923.71 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1384.3
ROI area full residual channel 1615
Slope: 922.55 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 626.9
ΔArea [ADC count]x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

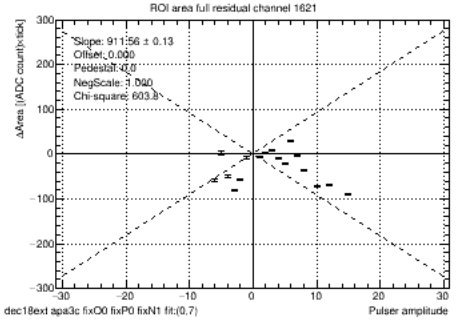

ROI area full residual channel 1616
Slope: 895.68 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 967.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

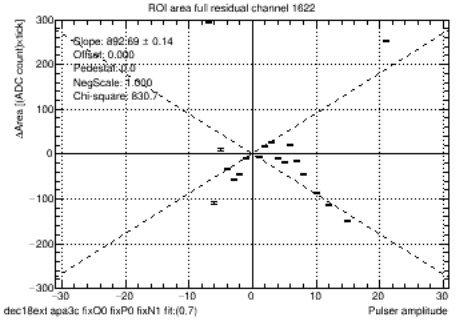

ROI area full residual channel 1617
Slope: 933.15 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 878.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

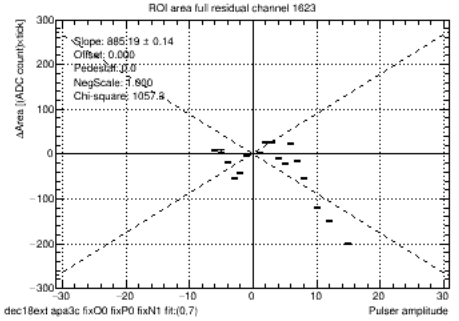

ROI area full residual channel 1618
Slope: 854.34 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1753.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

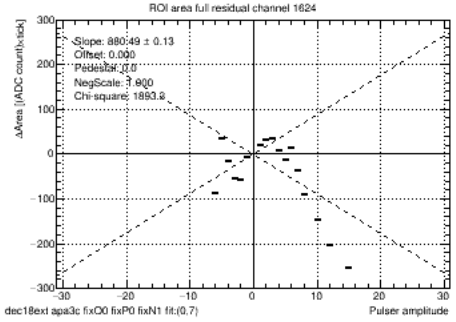

ROI area full residual channel 1619
Slope: 882.38 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 695.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

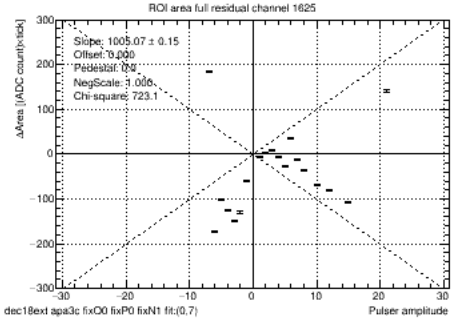

ROI area full residual channel 1620
Slope: 899.29 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 759.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

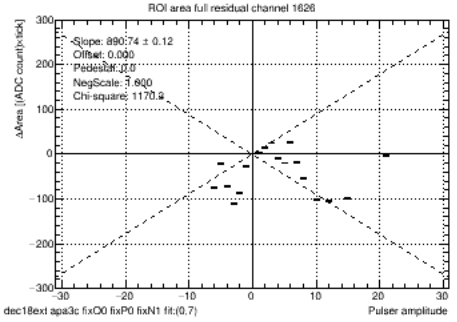

ROI area full residual channel 1621
Slope: 911.56 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 603.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

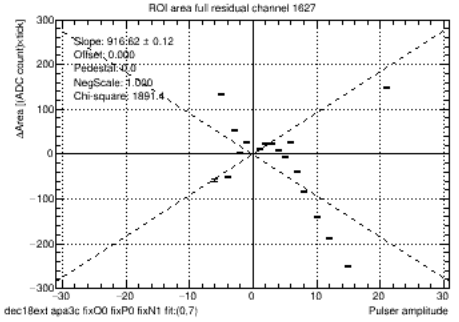

ROI area full residual channel 1622
Slope: 892.69 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 830.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

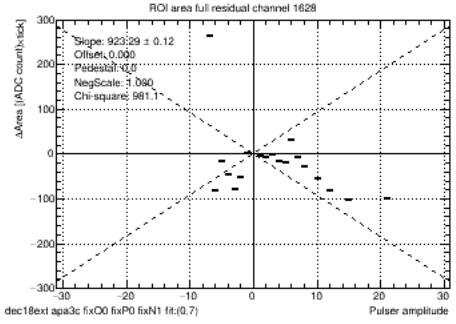

ROI area full residual channel 1623
Slope: 885.19 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1057.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

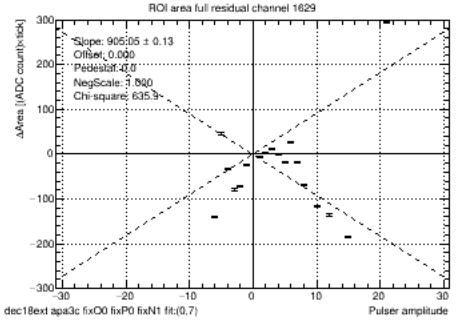

ROI area full residual channel 1624
Slope: 880.49 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1893.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

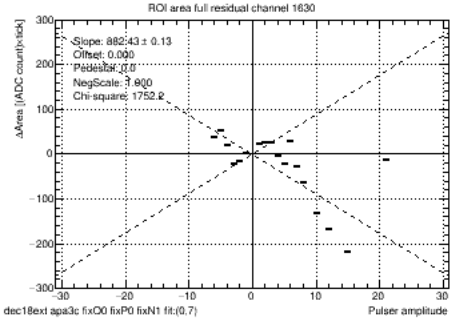

ROI area full residual channel 1625
Slope: 1005.07 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 723.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

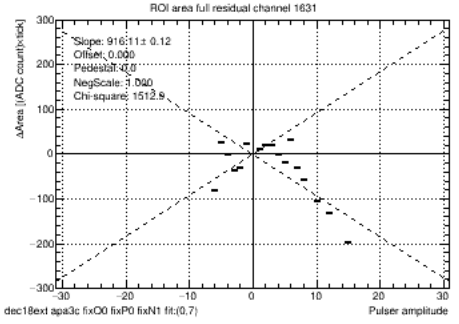

ROI area full residual channel 1626
Slope: 890.74 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1170.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

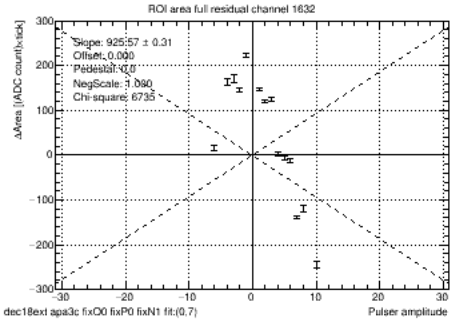

ROI area full residual channel 1627
Slope: 916.62 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1891.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

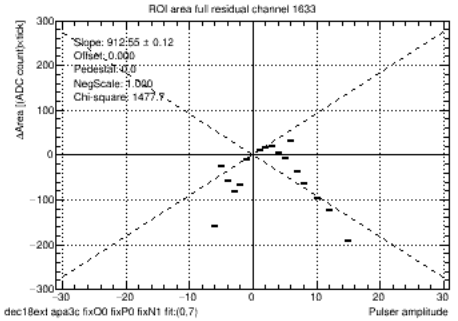

ROI area full residual channel 1628
Slope: 923.29 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 981.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

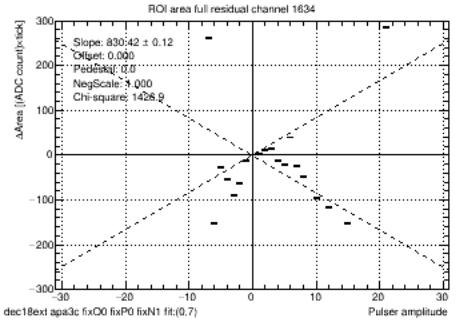

ROI area full residual channel 1629
Slope: 905.05 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 635.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

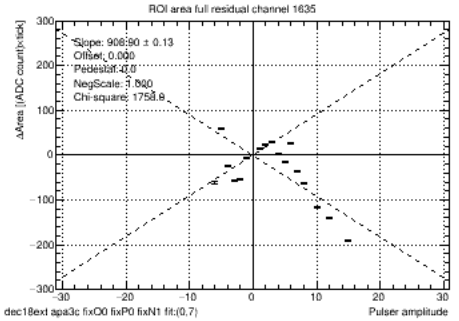

ROI area full residual channel 1630
Slope: 882.43 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1752.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

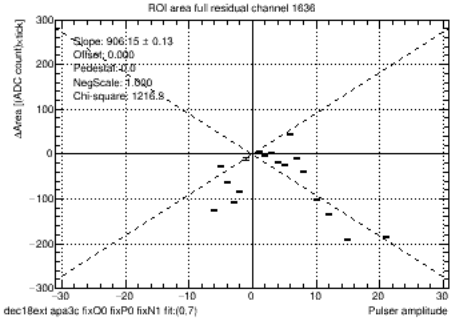

ROI area full residual channel 1631
Slope: 916.11 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1512.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

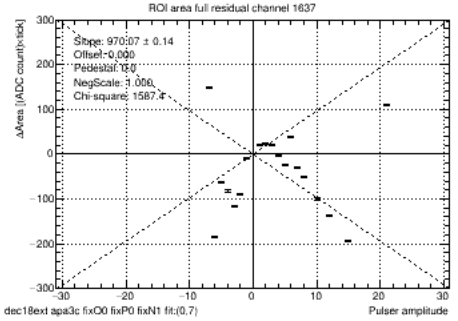

ROI area full residual channel 1632
Slope: 925.57 ± 0.31
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 6735
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

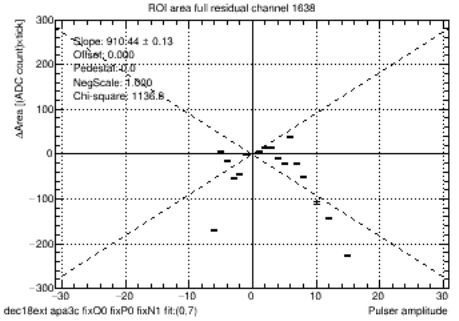

ROI area full residual channel 1633
Slope: 912.55 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1477.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

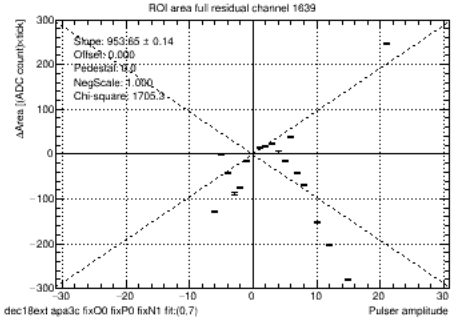

ROI area full residual channel 1634
Slope: 830.42 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1426.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

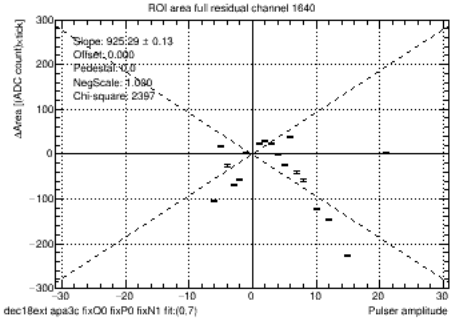

ROI area full residual channel 1635
Slope: 908.90 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1758.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

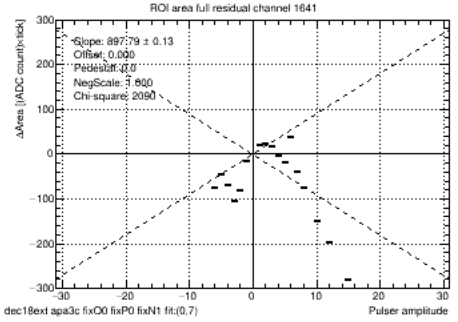

ROI area full residual channel 1636
Slope: 906.15 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1218.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

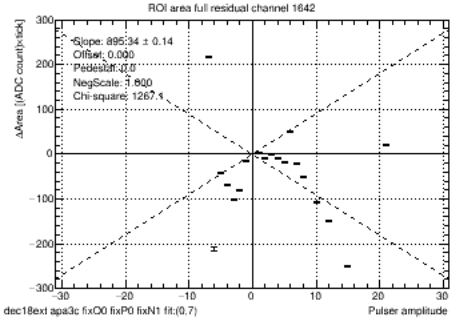

ROI area full residual channel 1637
Slope: 970.07 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1587.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

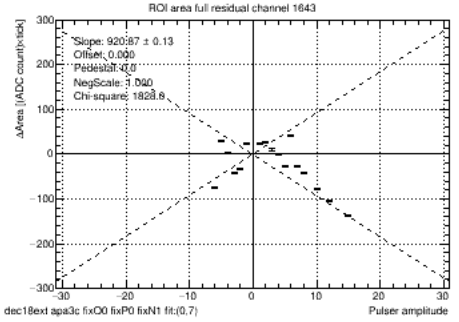

ROI area full residual channel 1638
Slope: 910.44 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 1136.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

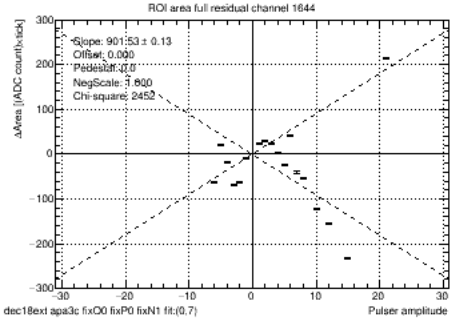

ROI area full residual channel 1639
Slope: 953.65 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1705.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

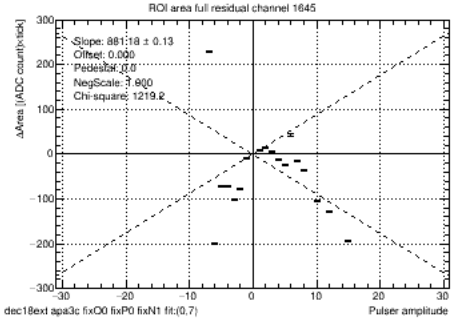

ROI area full residual channel 1640
Slope: 925.29 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 2397
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

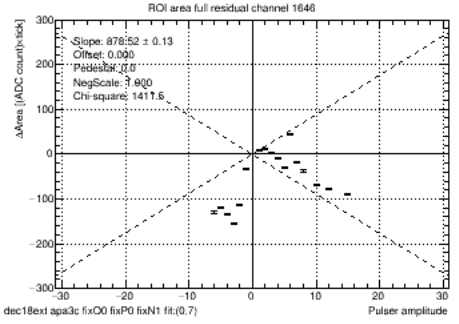

ROI area full residual channel 1641
Slope: 897.79 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.060
Chi-square: 2090
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

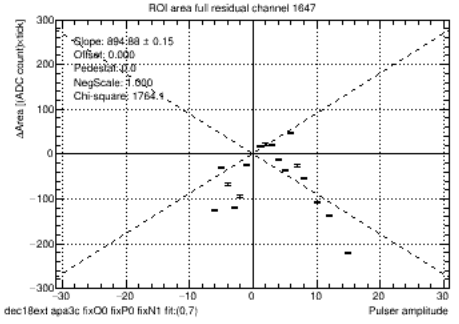

ROI area full residual channel 1642
Slope: 895.34 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 1267.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

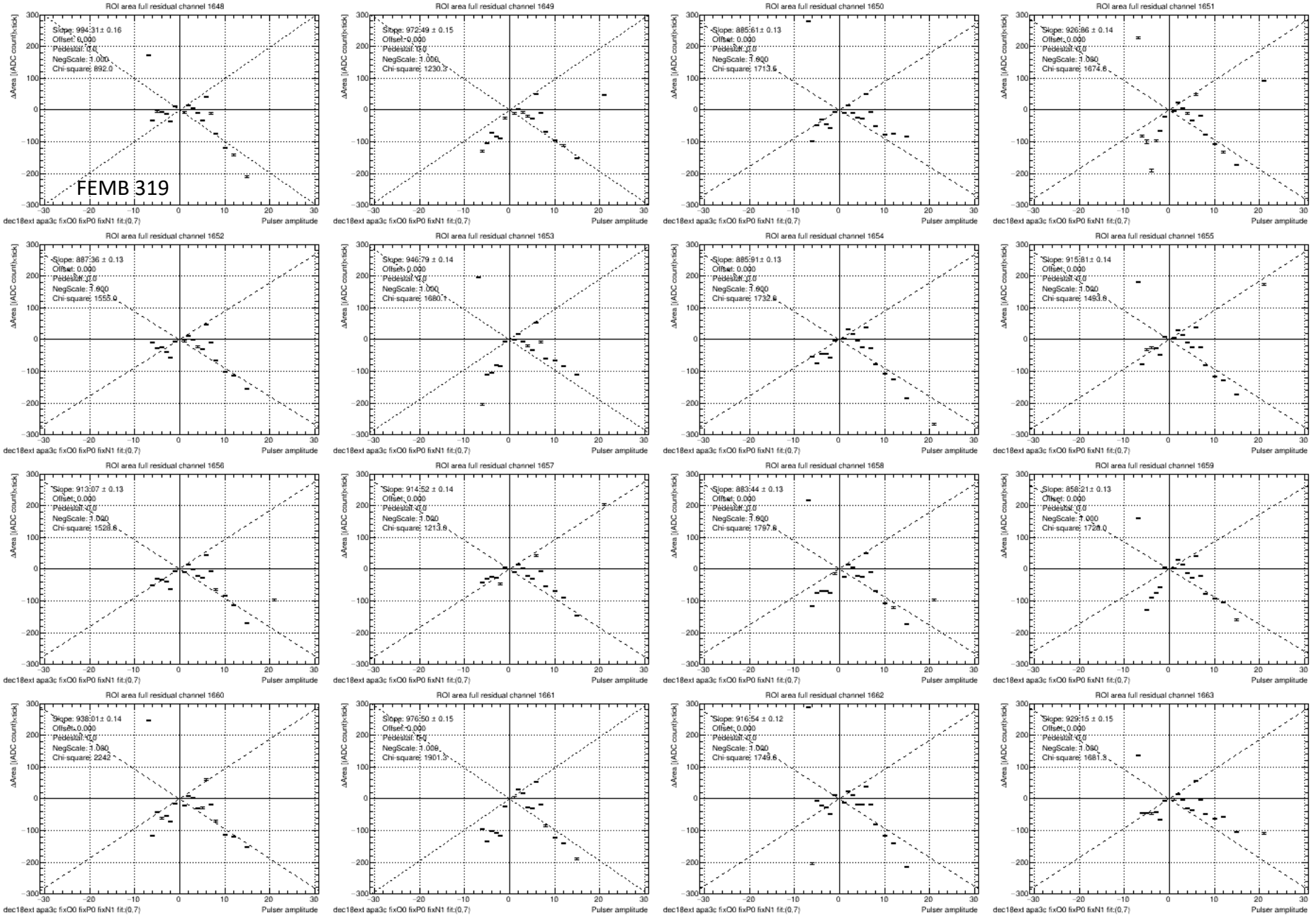

ROI area full residual channel 1643
Slope: 920.87 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1828.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

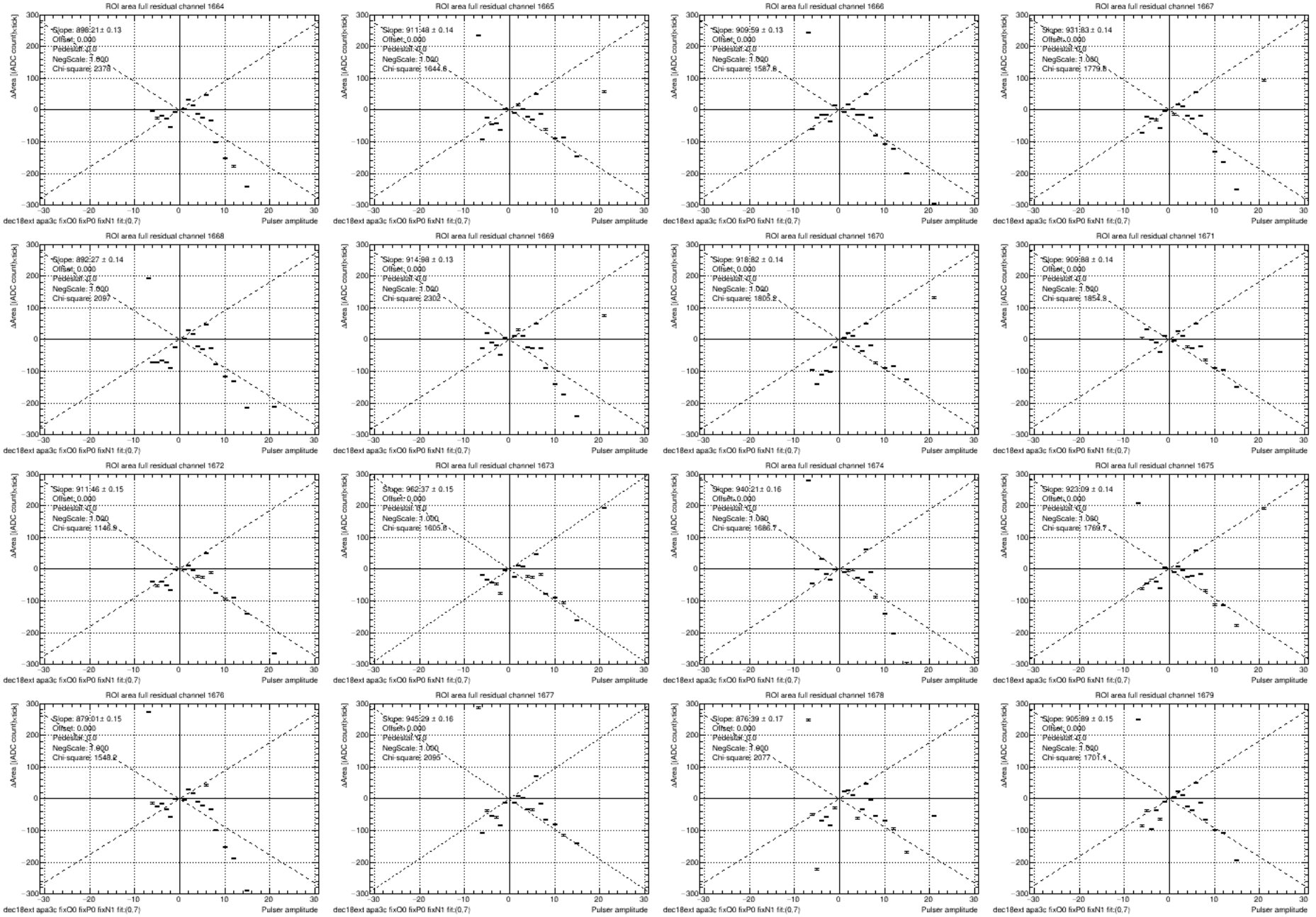

ROI area full residual channel 1644
Slope: 901.53 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 2452
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

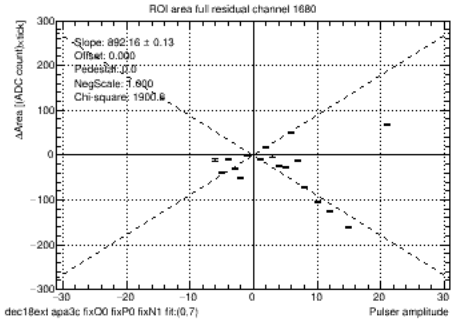

ROI area full residual channel 1645
Slope: 881.18 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1219.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

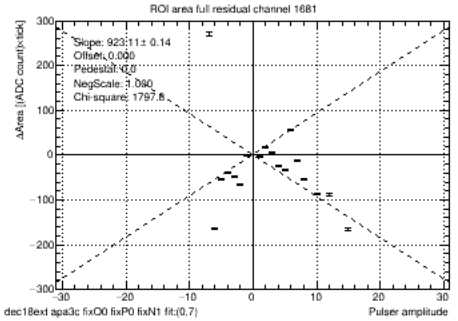

ROI area full residual channel 1646
Slope: 878.52 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1411.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

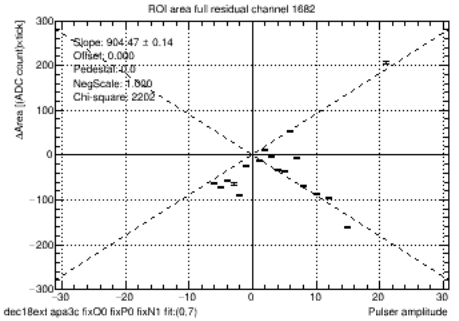

ROI area full residual channel 1647
Slope: 894.88 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1764.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

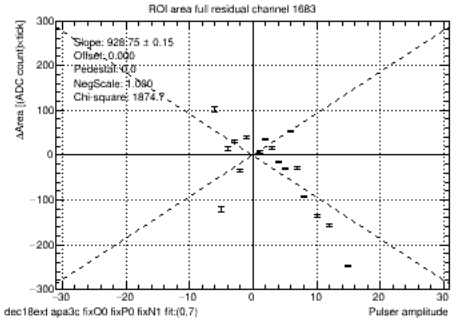

ROI area full residual channel 1648
Slope: 994.31± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 892.0
FEMB 319
ROI area full residual channel 1649
Slope: 972.49 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1230.3
ROI area full residual channel 1650
Slope: 885.61± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1713.6
ROI area full residual channel 1651
Slope: 926.86 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1674.6
ROI area full residual channel 1652
Slope: 887.36 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1555.9
ROI area full residual channel 1653
Slope: 946.79 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1680.1
ROI area full residual channel 1654
Slope: 885.91± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1732.6
ROI area full residual channel 1655
Slope: 915.81± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1493.6
ROI area full residual channel 1656
Slope: 913.07 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1528.6
ROI area full residual channel 1657
Slope: 914.52 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1213.8
ROI area full residual channel 1658
Slope: 883.44 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1797.6
ROI area full residual channel 1659
Slope: 858.21± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1728.0
ROI area full residual channel 1660
Slope: 938.01± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2242
ROI area full residual channel 1661
Slope: 976.50 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1901.3
ROI area full residual channel 1662
Slope: 916.54 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1749.6
ROI area full residual channel 1663
Slope: 929.15 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1681.3
ΔArea [ADC count]x-tick]
Pulser amplitude
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)

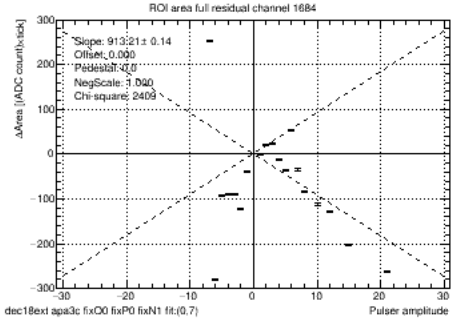

ROI area full residual channel 1664
Slope: 898.21 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2378
ROI area full residual channel 1665
Slope: 911.48 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1644.6
ROI area full residual channel 1666
Slope: 909.59 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1587.6
ROI area full residual channel 1667
Slope: 931.83 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1779.5
ROI area full residual channel 1668
Slope: 892.27 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2097
ROI area full residual channel 1669
Slope: 914.98 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2302
ROI area full residual channel 1670
Slope: 918.82 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1805.2
ROI area full residual channel 1671
Slope: 909.88 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1854.8
ROI area full residual channel 1672
Slope: 911.46 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1146.9
ROI area full residual channel 1673
Slope: 962.37 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1605.8
ROI area full residual channel 1674
Slope: 940.21 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1686.7
ROI area full residual channel 1675
Slope: 923.09 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1769.7
ROI area full residual channel 1676
Slope: 879.01 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1548.2
ROI area full residual channel 1677
Slope: 945.29 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2095
ROI area full residual channel 1678
Slope: 876.39 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2077
ROI area full residual channel 1679
Slope: 905.89 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1701.1
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

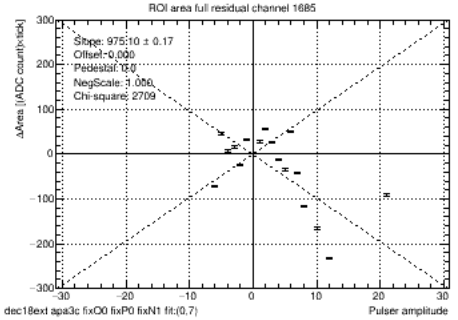

ROI area full residual channel 1680
Slope: 892.16 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1900.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

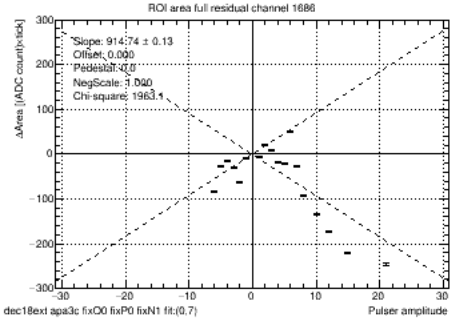

ROI area full residual channel 1681
Slope: 923.11 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1797.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

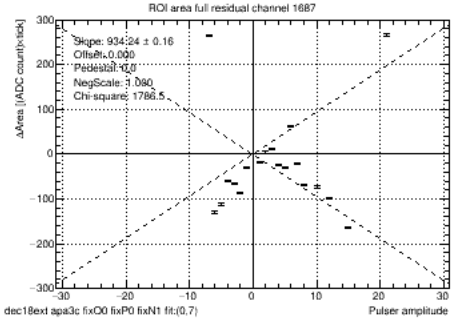

ROI area full residual channel 1682
Slope: 904.47 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 2202
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

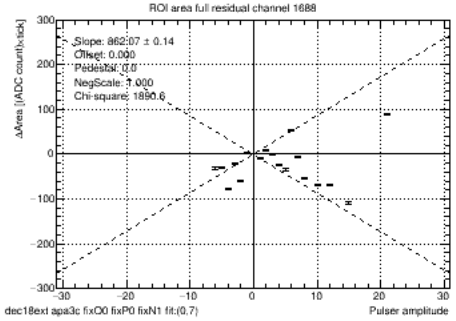

ROI area full residual channel 1683
Slope: 928.75 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1874.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

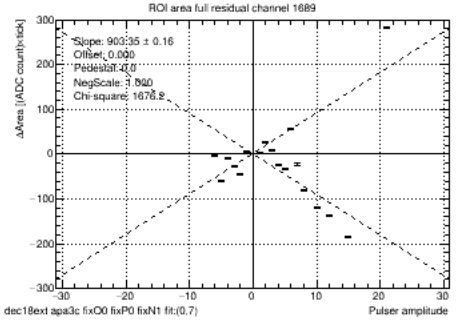

ROI area full residual channel 1684
Slope: 913.21 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 2409
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

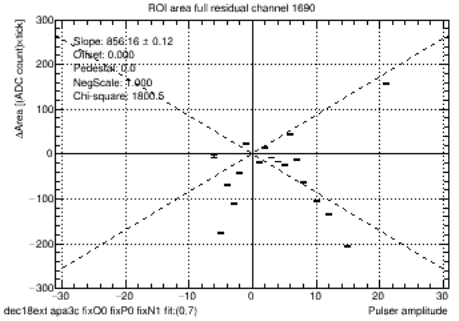

ROI area full residual channel 1685
Slope: 975.10 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2709
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

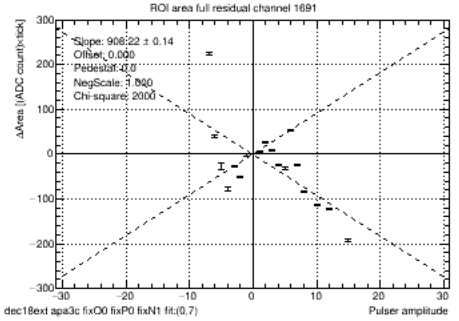

ROI area full residual channel 1686
Slope: 914.74 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1963.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

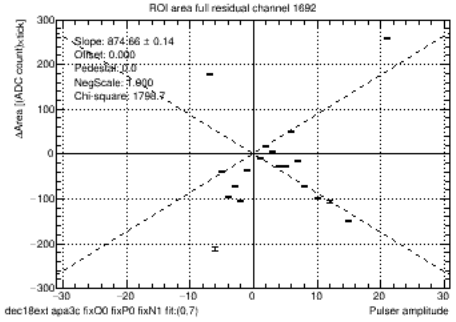

ROI area full residual channel 1687
Slope: 934.24 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1786.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

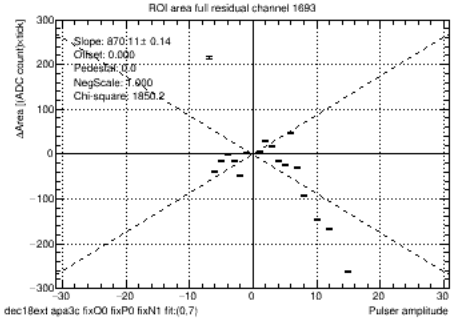

ROI area full residual channel 1688
Slope: 862.07 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1850.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

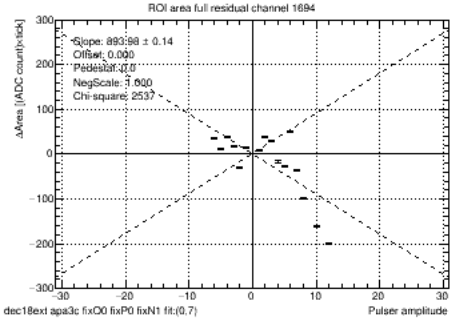

ROI area full residual channel 1689
Slope: 903.35 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1678.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

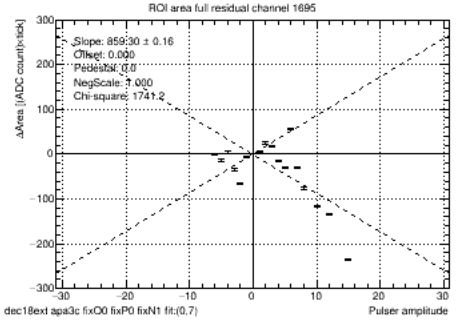

ROI area full residual channel 1690
Slope: 856.16 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1800.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

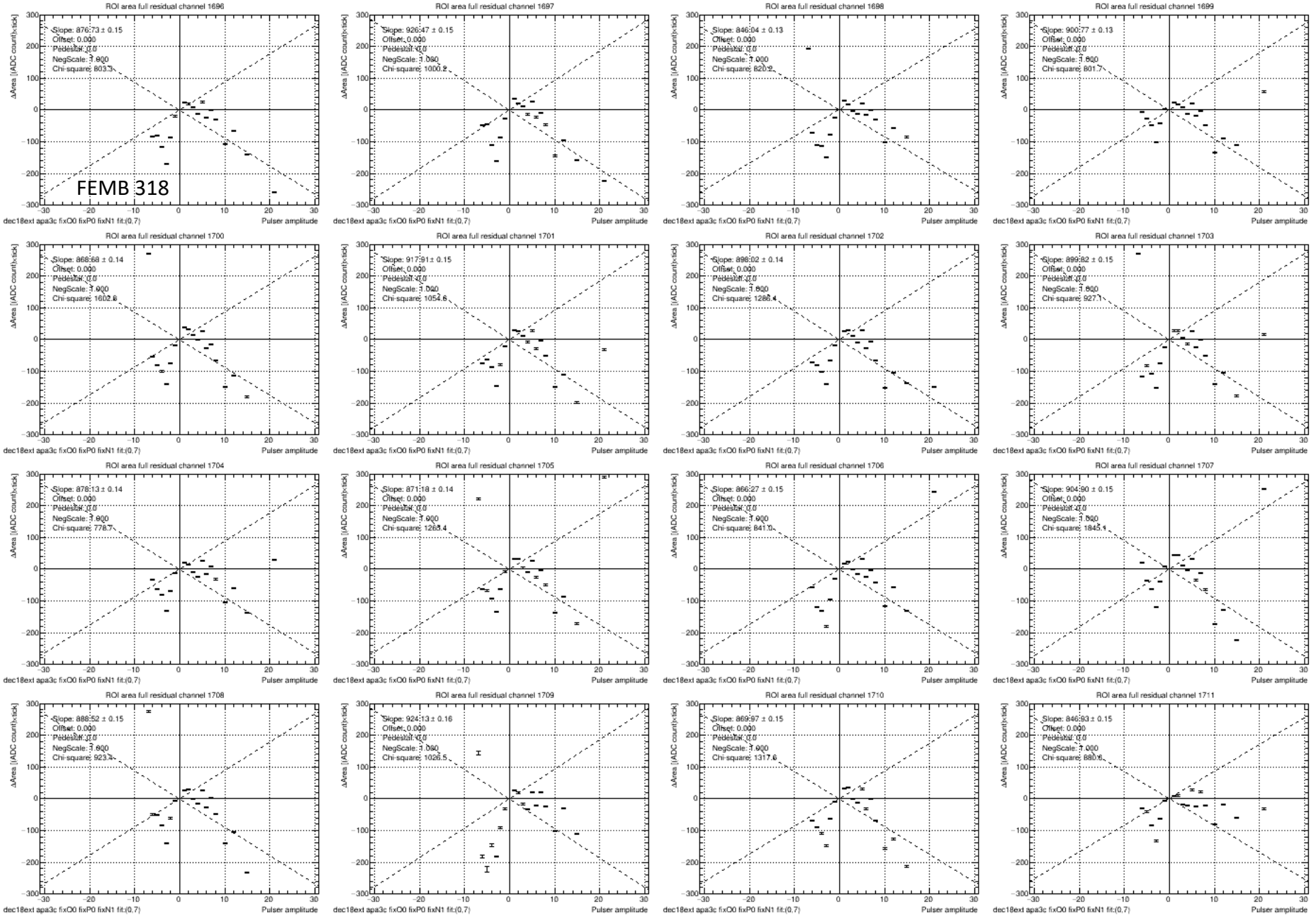

ROI area full residual channel 1691
Slope: 908.22 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 2000
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

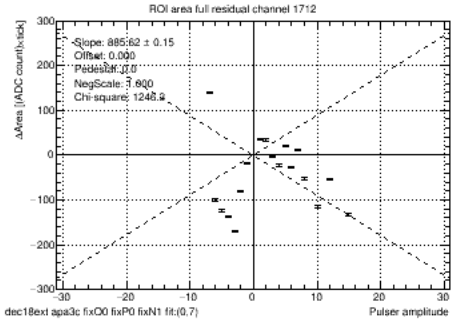

ROI area full residual channel 1692
Slope: 874.66 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1798.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

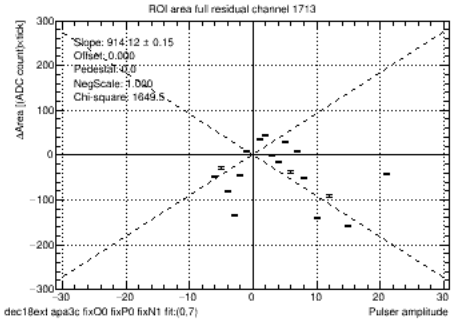

ROI area full residual channel 1693
Slope: 870.11 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1850.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

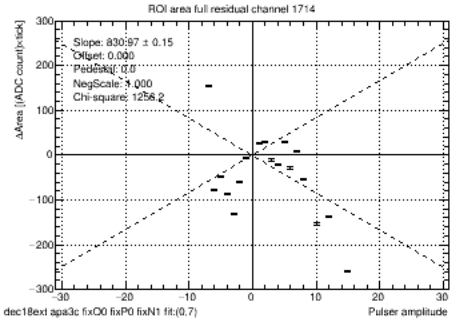

ROI area full residual channel 1694
Slope: 893.98 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2537
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

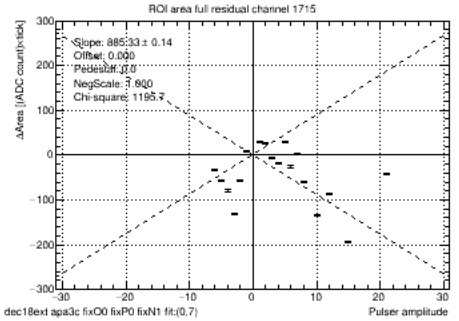

ROI area full residual channel 1695
Slope: 859.30 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1741.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

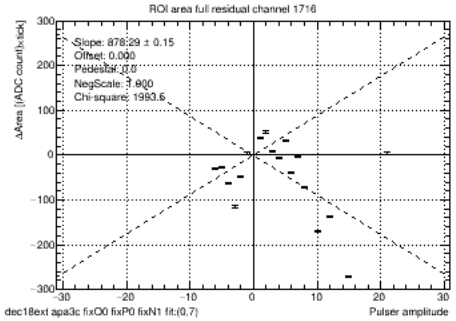

ROI area full residual channel 1696
Slope: 876.73 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 803.3
FEMB 318
ROI area full residual channel 1697
Slope: 926.47 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1000.2
ROI area full residual channel 1698
Slope: 846.04 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 820.2
ROI area full residual channel 1699
Slope: 900.77 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 801.7
ROI area full residual channel 1700
Slope: 868.68 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1602.6
ROI area full residual channel 1701
Slope: 917.91 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1054.6
ROI area full residual channel 1702
Slope: 898.02 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1286.4
ROI area full residual channel 1703
Slope: 899.82 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 927.1
ROI area full residual channel 1704
Slope: 878.13 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 778.7
ROI area full residual channel 1705
Slope: 871.18 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1263.4
ROI area full residual channel 1706
Slope: 866.27 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 841.0
ROI area full residual channel 1707
Slope: 904.90 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1845.1
ROI area full residual channel 1708
Slope: 888.52 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 923.3
ROI area full residual channel 1709
Slope: 924.13 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1026.5
ROI area full residual channel 1710
Slope: 869.97 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1317.6
ROI area full residual channel 1711
Slope: 846.93 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 880.6
ΔArea [(ADC count)x-tick]
Pulser amplitude
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)

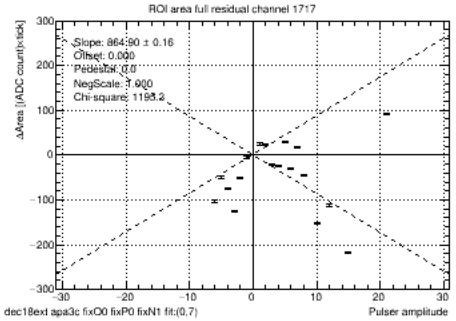

ROI area full residual channel 1712
Slope: 885.62 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1248.9
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

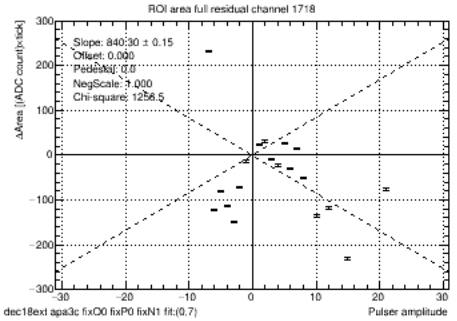

ROI area full residual channel 1713
Slope: 914.12 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1649.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

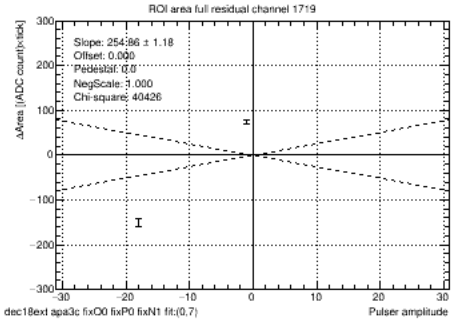

ROI area full residual channel 1714
Slope: 830.97 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1256.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

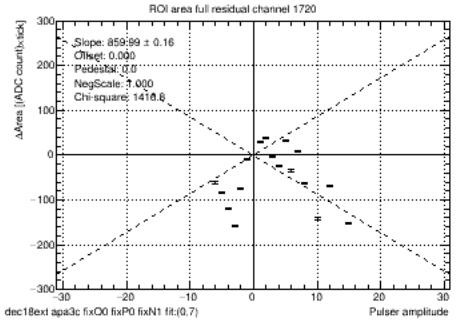

ROI area full residual channel 1715
Slope: 885.33 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1195.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

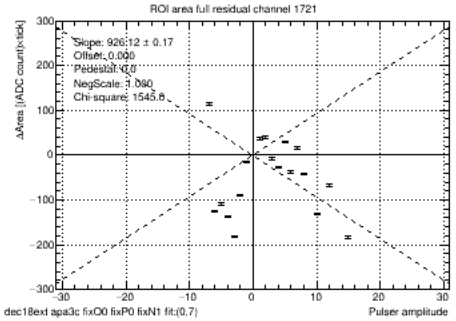

ROI area full residual channel 1716
Slope: 878.29 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1993.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

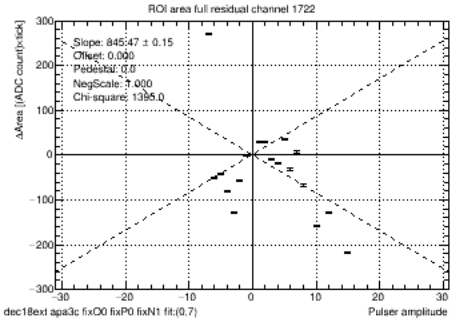

ROI area full residual channel 1717
Slope: 864.90 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1198.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

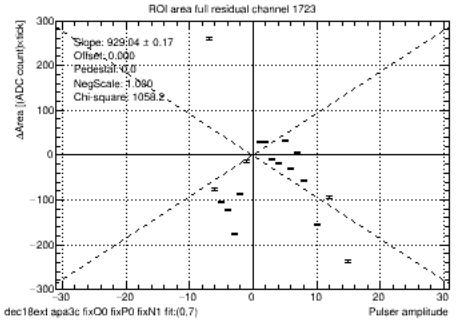

ROI area full residual channel 1718
Slope: 840.30 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1256.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

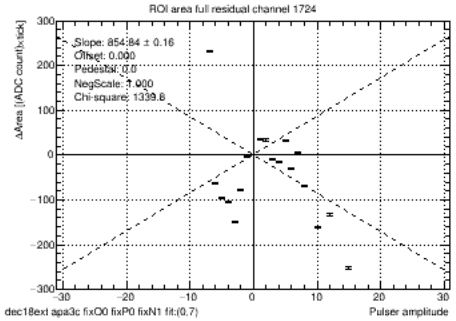

ROI area full residual channel 1719
Slope: 254.86 ± 1.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 40426
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

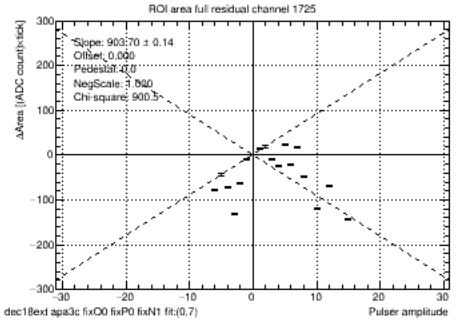

ROI area full residual channel 1720
Slope: 859.99 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1418.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

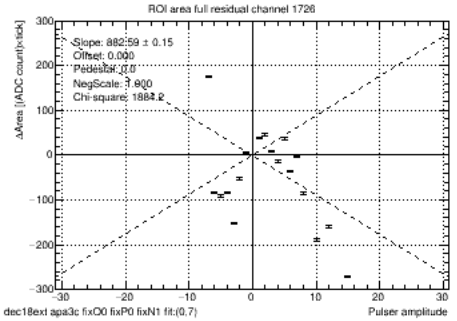

ROI area full residual channel 1721
Slope: 926.12 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1545.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

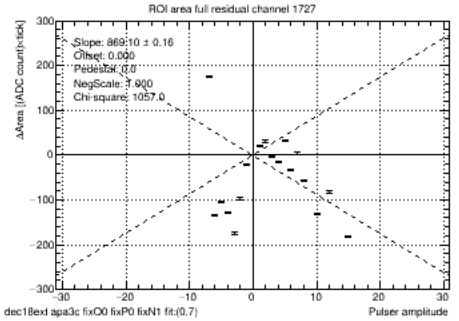

ROI area full residual channel 1722
Slope: 845.47 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1395.0
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

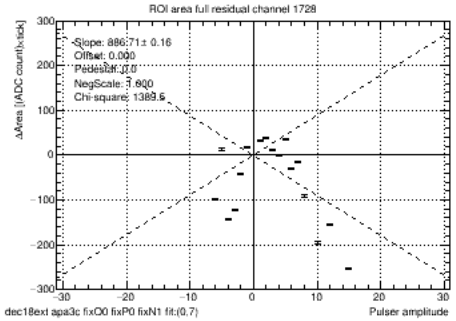

ROI area full residual channel 1723
Slope: 929.04 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1058.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

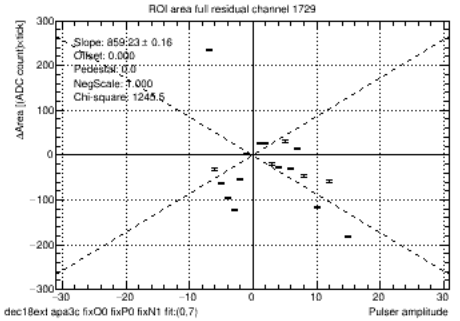

ROI area full residual channel 1724
Slope: 854.84 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1339.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

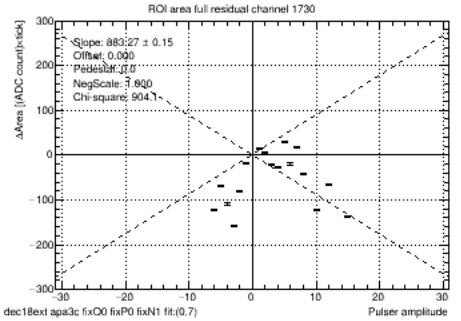

ROI area full residual channel 1725
Slope: 903.70 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 900.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

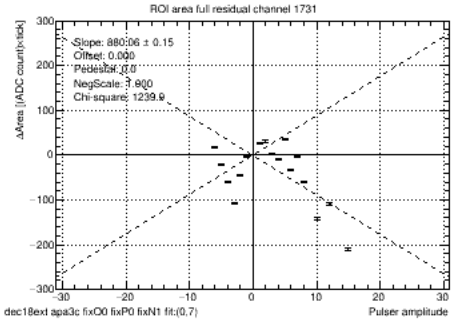

ROI area full residual channel 1726
Slope: 882.59 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1884.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

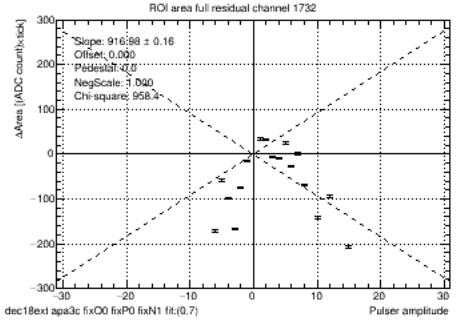

ROI area full residual channel 1727
Slope: 869.10 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1057.0
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

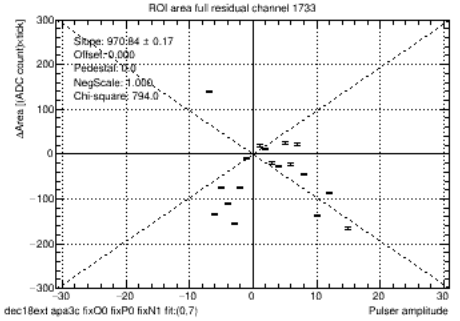

ROI area full residual channel 1728
Slope: 886.71 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1389.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

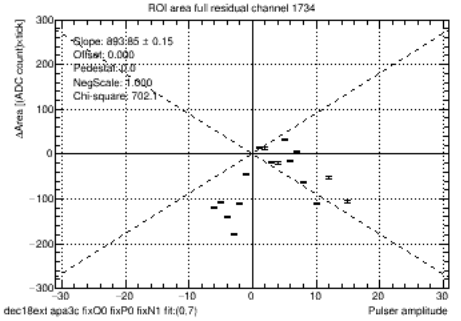

ROI area full residual channel 1729
Slope: 859.23 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1245.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

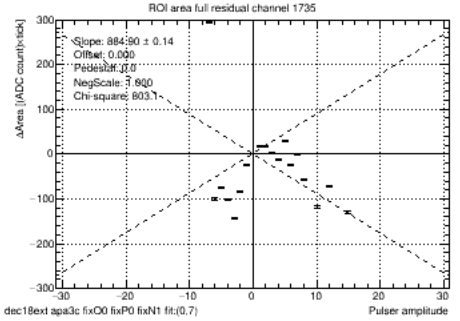

ROI area full residual channel 1730
Slope: 883.27 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 904.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

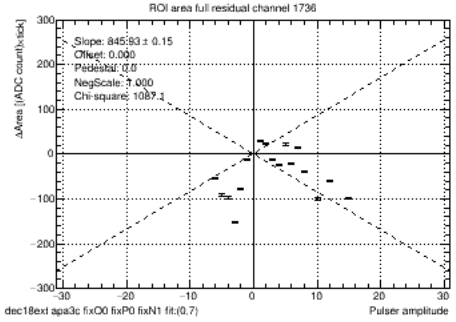

ROI area full residual channel 1731
Slope: 880.06 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1239.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

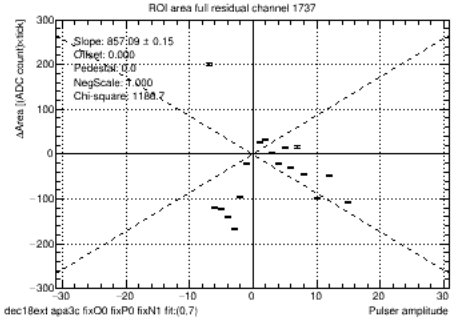

ROI area full residual channel 1732
Slope: 916.98 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 958.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

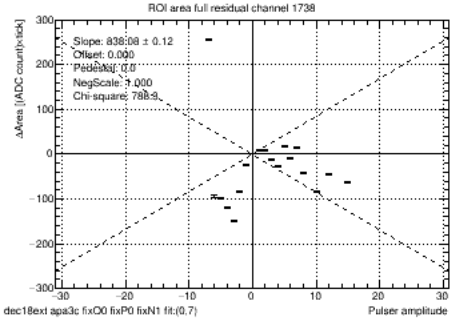

ROI area full residual channel 1733
Slope: 970.84 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 794.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

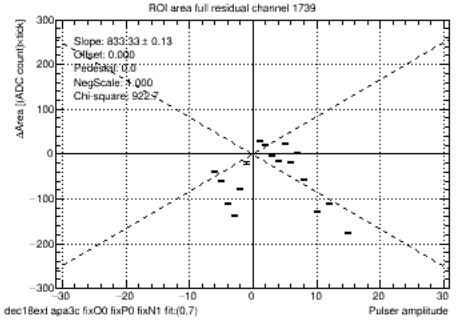

ROI area full residual channel 1734
Slope: 893.85 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 702.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

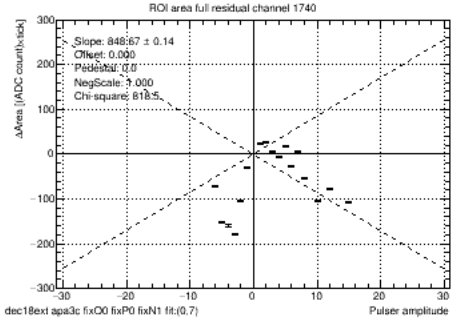

ROI area full residual channel 1735
Slope: 884.90 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 803.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

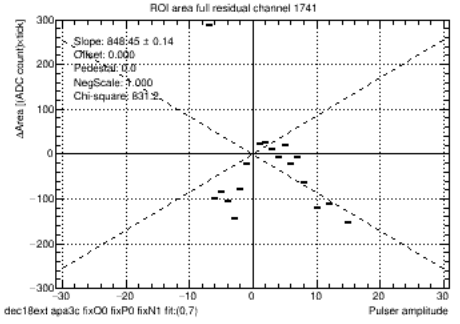

ROI area full residual channel 1736
Slope: 845.93 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1087.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

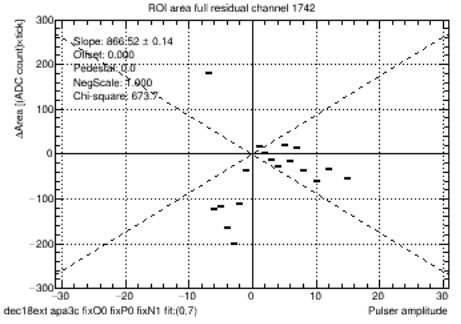

ROI area full residual channel 1737
Slope: 857.09 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1180.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

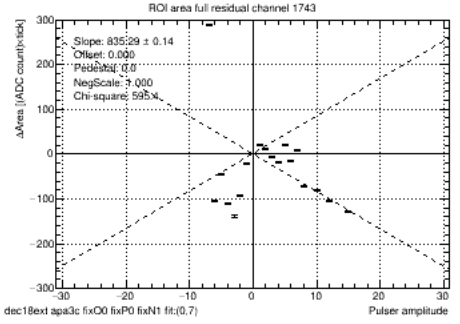

ROI area full residual channel 1738
Slope: 838.08 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 788.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

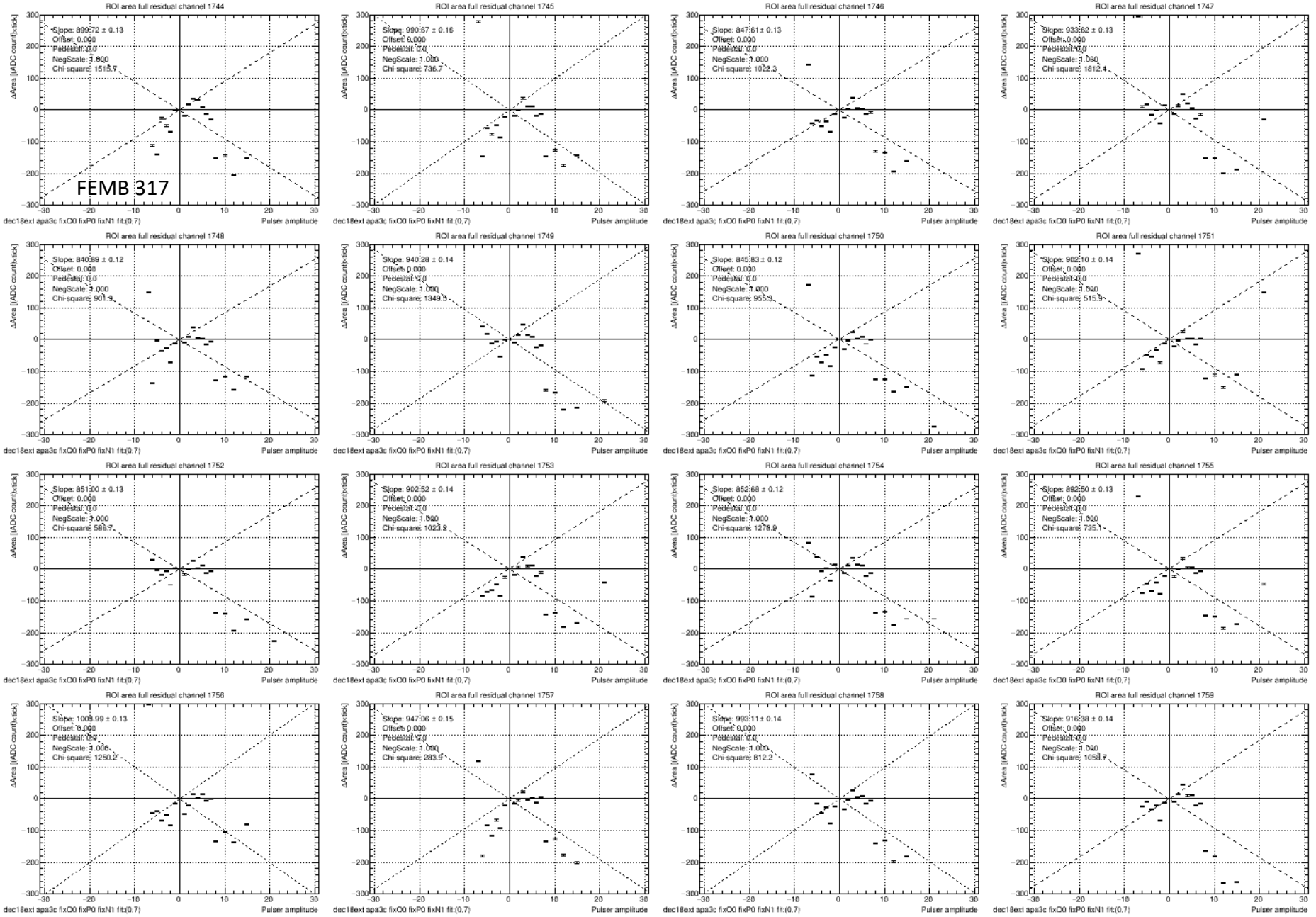

ROI area full residual channel 1739
Slope: 833.33 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 922.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 1740
Slope: 848.67 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 818.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 1741
Slope: 848.45 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 831.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 1742
Slope: 866.52 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 673.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 1743
Slope: 835.29 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 595.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 1744
Slope: 899.72 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1515.7
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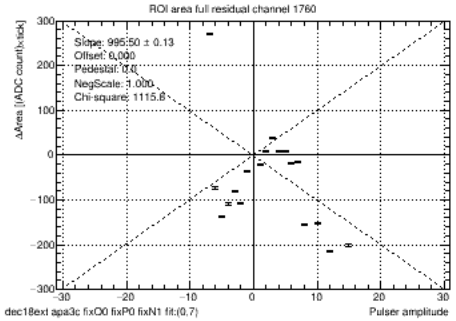
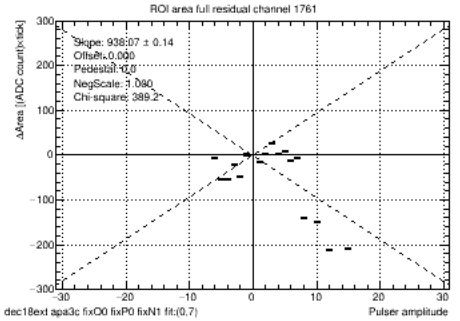
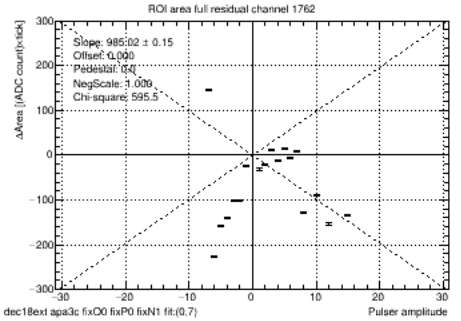
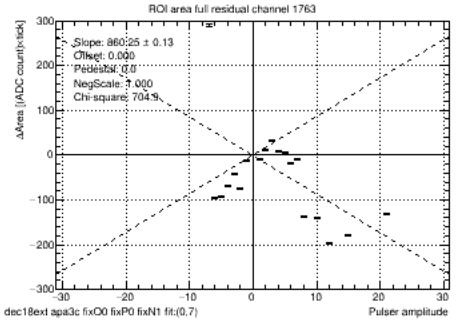
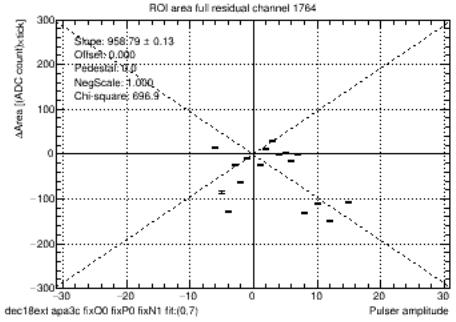
ROI area full residual channel 1745
Slope: 990.67 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 736.7
ROI area full residual channel 1746
Slope: 847.61 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1022.3
ROI area full residual channel 1747
Slope: 933.62 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1812.4
ROI area full residual channel 1748
Slope: 840.89 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 901.9
ROI area full residual channel 1749
Slope: 940.28 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1349.5
ROI area full residual channel 1750
Slope: 845.83 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 955.9
ROI area full residual channel 1751
Slope: 902.10 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 515.3
ROI area full residual channel 1752
Slope: 851.00 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 586.7
ROI area full residual channel 1753
Slope: 902.52 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1023.8
ROI area full residual channel 1754
Slope: 852.68 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1278.9
ROI area full residual channel 1755
Slope: 892.50 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 735.1
ROI area full residual channel 1756
Slope: 1009.99 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1250.2
ROI area full residual channel 1757
Slope: 947.06 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 283.9
ROI area full residual channel 1758
Slope: 993.11 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 812.2
ROI area full residual channel 1759
Slope: 916.38 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1058.7
ΔArea [ADC count]x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

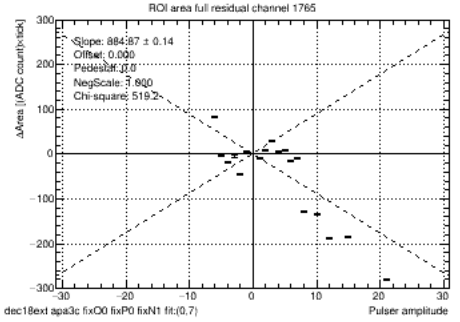

ROI area full residual channel 1760
Slope: 995.50 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1115.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

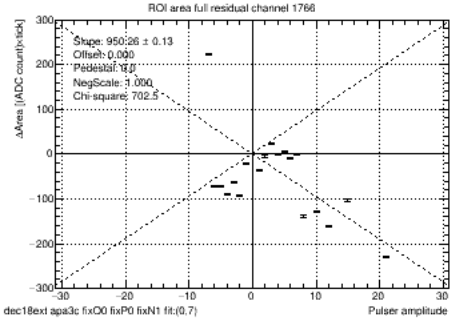

ROI area full residual channel 1761
Slope: 938.07 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 389.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

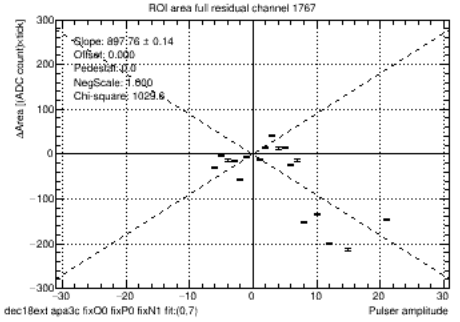

ROI area full residual channel 1762
Slope: 985.02 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 595.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

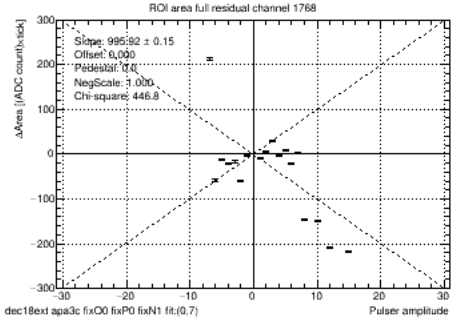

ROI area full residual channel 1763
Slope: 860.25 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 704.9
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

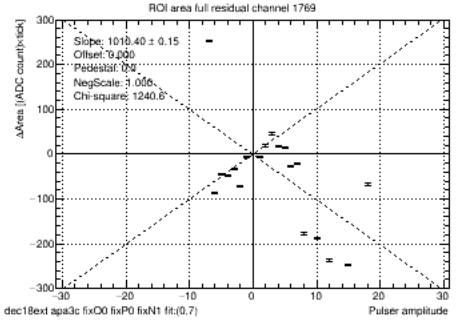

ROI area full residual channel 1764
Slope: 958.79 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 696.9
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

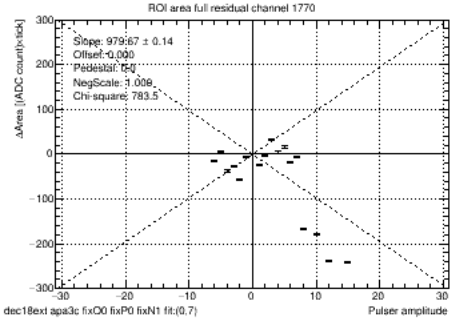

ROI area full residual channel 1765
Slope: 884.87 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 519.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

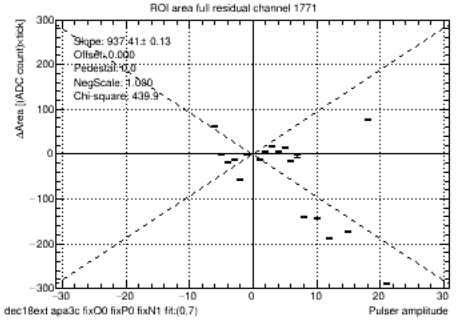

ROI area full residual channel 1766
Slope: 950.26 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 702.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

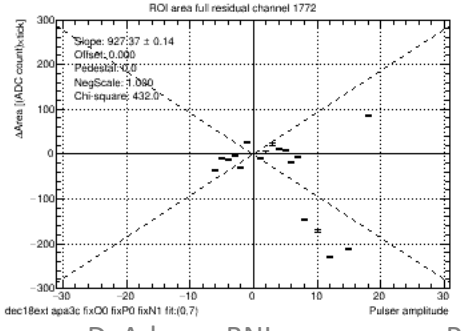

ROI area full residual channel 1767
Slope: 897.76 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1029.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

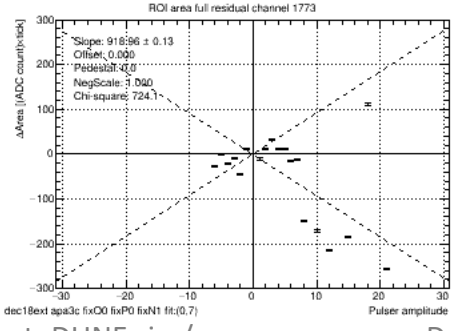

ROI area full residual channel 1768
Slope: 995.92 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 446.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

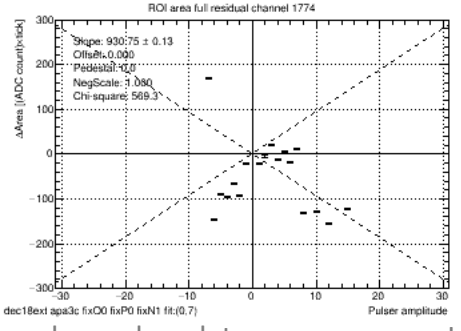

ROI area full residual channel 1769
Slope: 1010.40 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1240.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

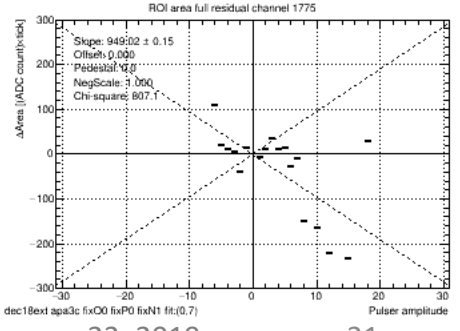

ROI area full residual channel 1770
Slope: 979.67 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 783.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

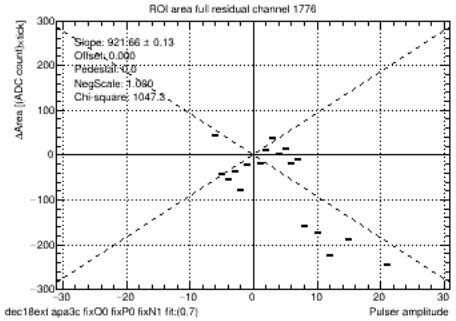

ROI area full residual channel 1771
Slope: 937.41 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 439.9
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

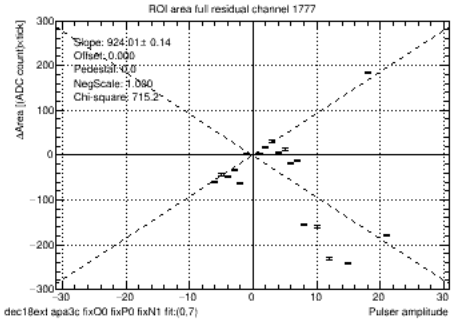

ROI area full residual channel 1772
Slope: 927.37 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 432.0
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

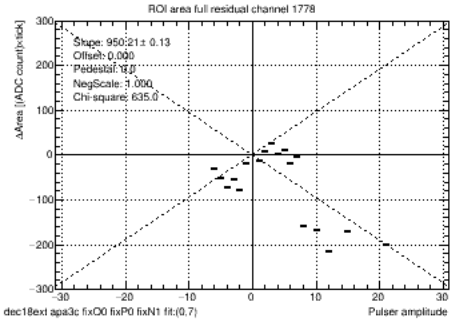

ROI area full residual channel 1773
Slope: 918.96 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 724.1
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

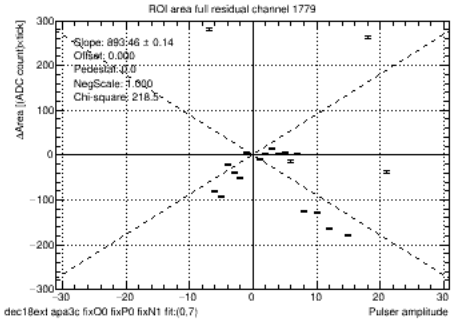

ROI area full residual channel 1774
Slope: 930.75 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 569.3
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

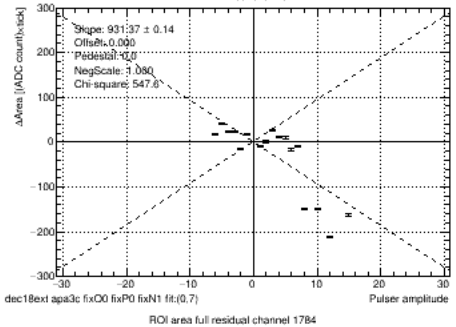

ROI area full residual channel 1775
Slope: 949.02 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 807.1
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

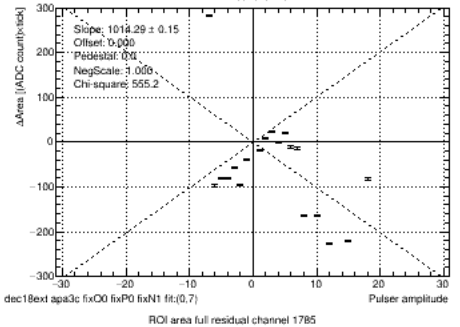

ROI area full residual channel 1776
Slope: 921.66 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1047.3
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

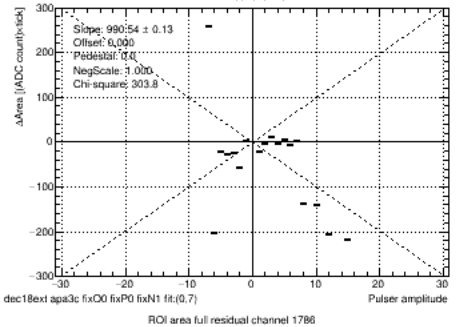

ROI area full residual channel 1777
Slope: 924.01 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 715.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

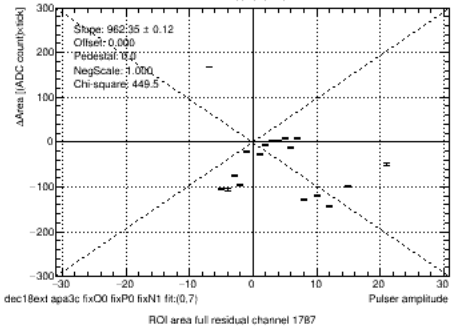

ROI area full residual channel 1778
Slope: 950.21 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 635.0
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

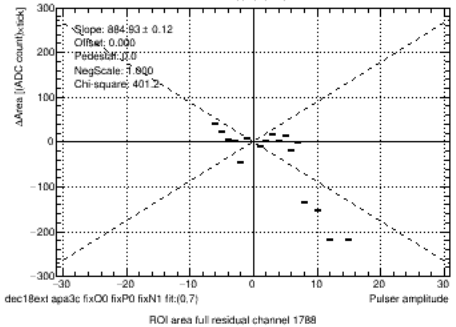

ROI area full residual channel 1779
Slope: 893.46 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 218.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

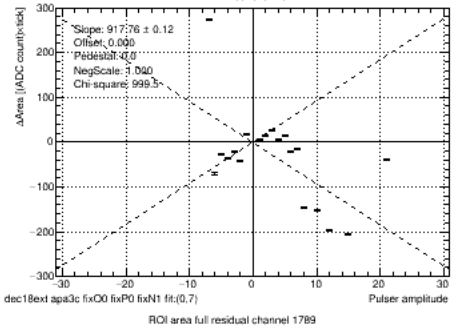

ROI area full residual channel 1780
Slope: 931.37 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 547.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

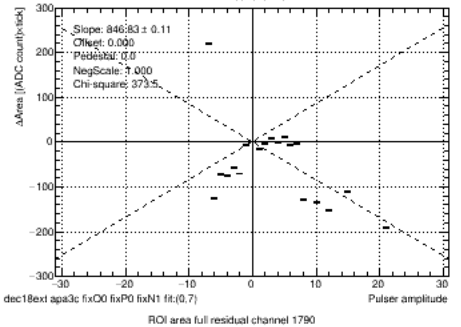

ROI area full residual channel 1781
Slope: 1014.29 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 555.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

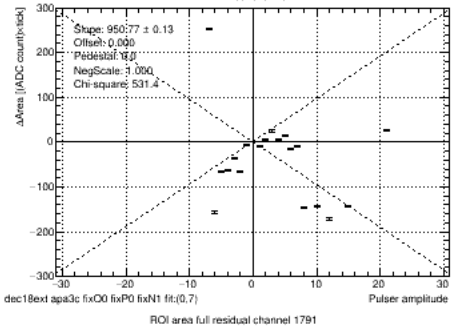

ROI area full residual channel 1782
Slope: 990.54 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 303.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

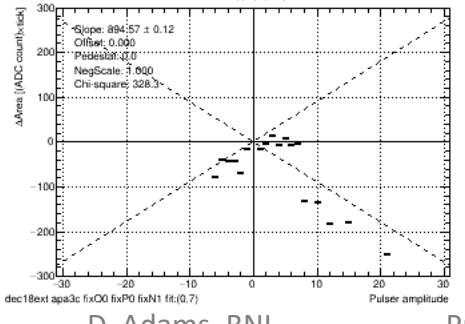

ROI area full residual channel 1783
Slope: 962.35 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 449.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

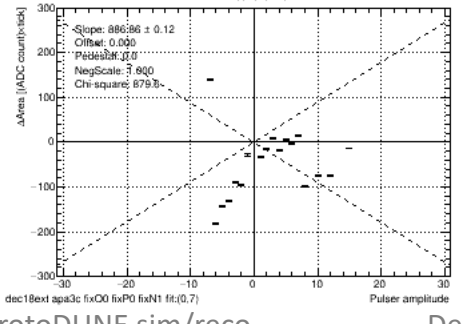

ROI area full residual channel 1784
Slope: 884.93 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 401.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

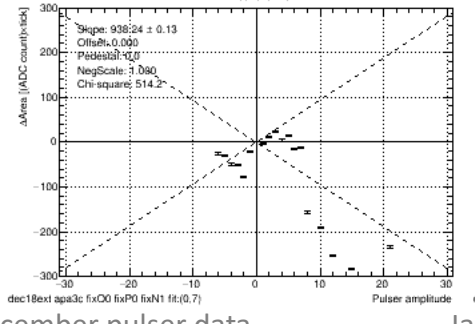

ROI area full residual channel 1785
Slope: 917.76 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 999.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

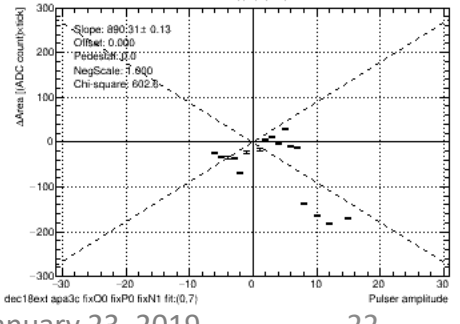

ROI area full residual channel 1786
Slope: 846.83 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 373.5
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

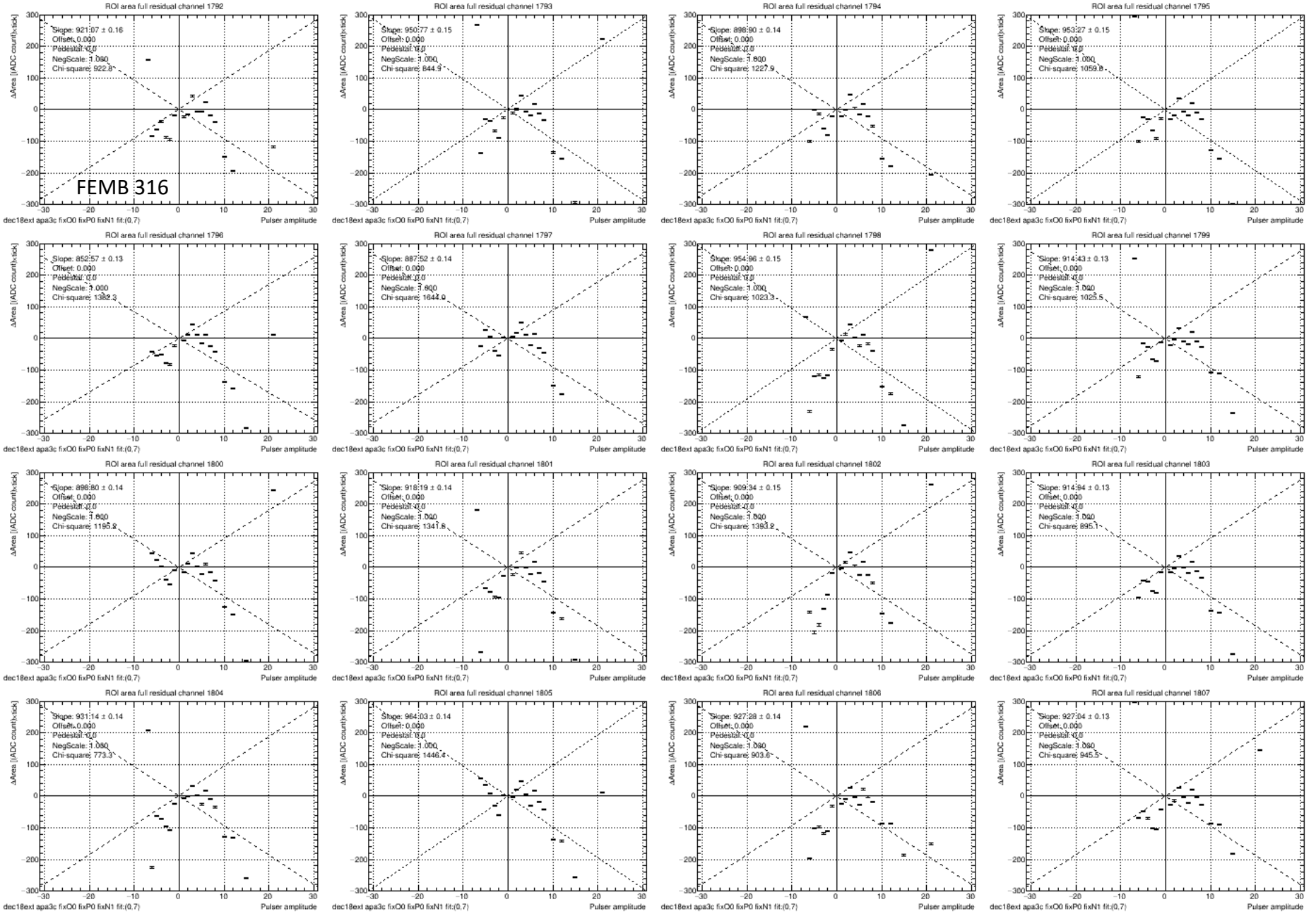

ROI area full residual channel 1787
Slope: 950.77 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 531.4
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

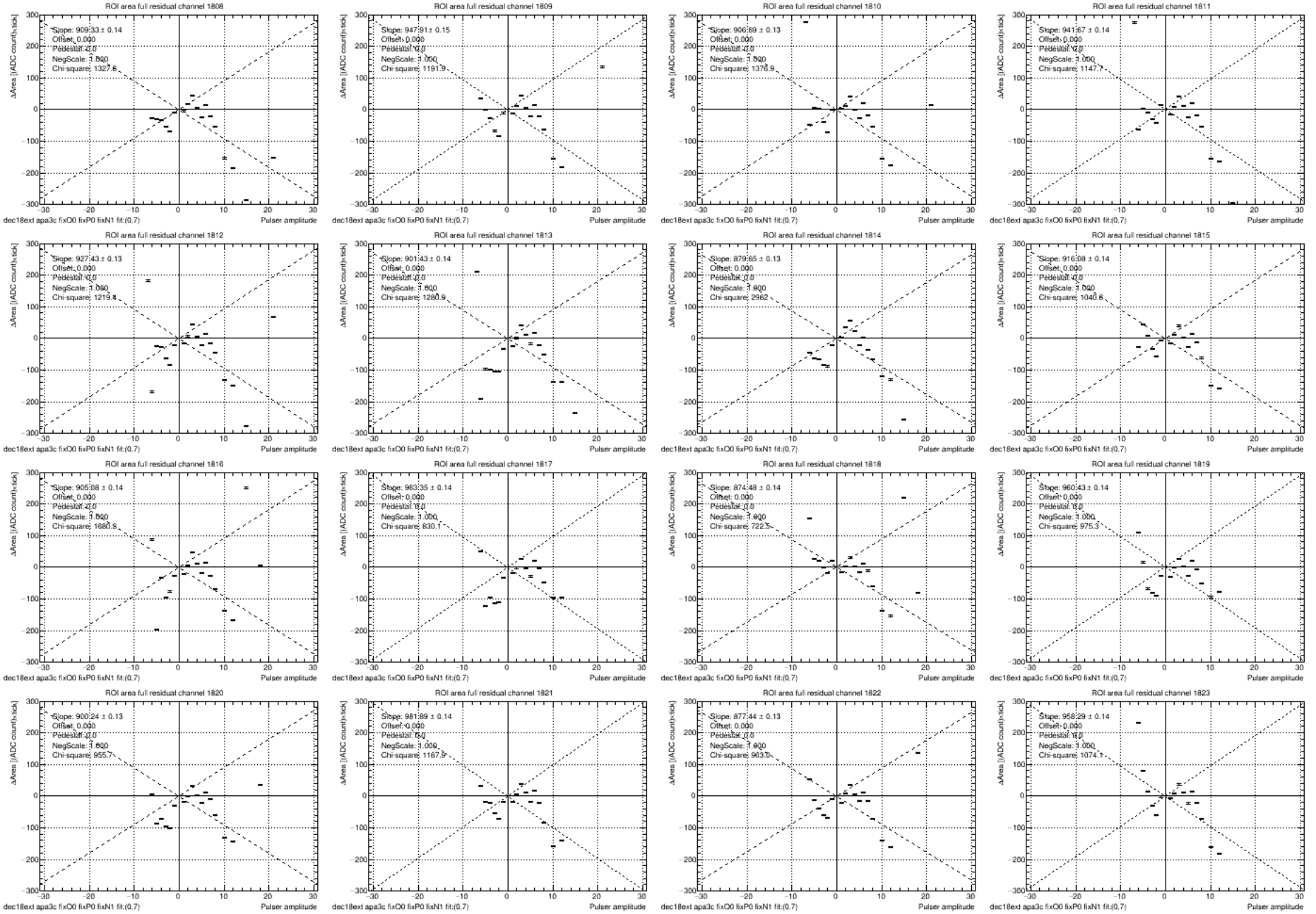

ROI area full residual channel 1788
Slope: 894.57 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 328.3
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

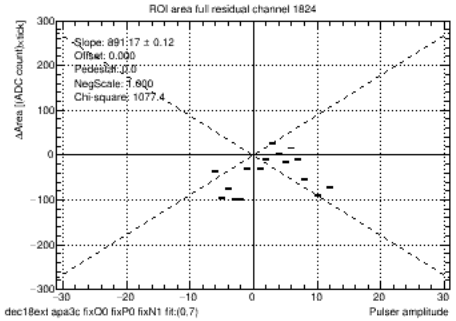

ROI area full residual channel 1789
Slope: 886.86 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 879.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

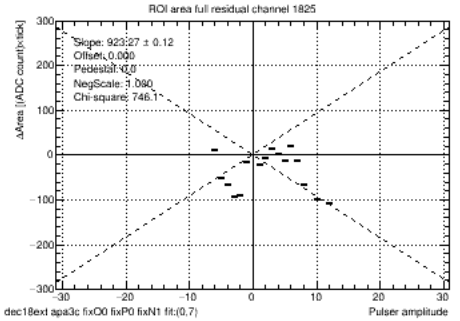

ROI area full residual channel 1790
Slope: 938.24 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.060
Chi-square: 514.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

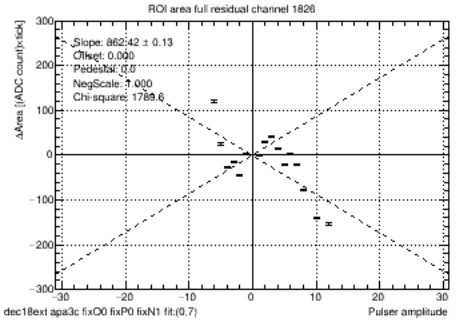

ROI area full residual channel 1791
Slope: 890.31 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 602.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

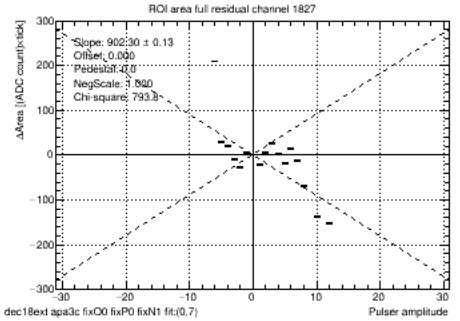

ROI area full residual channel 1792
Slope: 921.07 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 922.8
FEMB 316
ROI area full residual channel 1793
Slope: 950.77 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 844.9
ROI area full residual channel 1794
Slope: 898.90 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 1227.9
ROI area full residual channel 1795
Slope: 953.27 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1059.0
ROI area full residual channel 1796
Slope: 852.57 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1382.3
ROI area full residual channel 1797
Slope: 887.52 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1644.0
ROI area full residual channel 1798
Slope: 954.96 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1023.3
ROI area full residual channel 1799
Slope: 914.43 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1025.5
ROI area full residual channel 1800
Slope: 898.80 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 1195.2
ROI area full residual channel 1801
Slope: 918.19 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1341.6
ROI area full residual channel 1802
Slope: 909.34 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 1393.2
ROI area full residual channel 1803
Slope: 914.94 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 895.1
ROI area full residual channel 1804
Slope: 931.14 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 773.3
ROI area full residual channel 1805
Slope: 964.03 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1446.4
ROI area full residual channel 1806
Slope: 927.28 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 903.6
ROI area full residual channel 1807
Slope: 927.04 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 945.5
ΔArea [ADC count]x-tick]
Pulser amplitude
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)

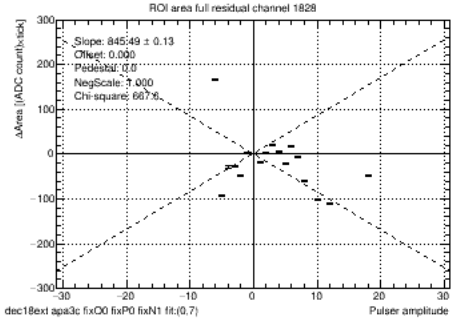

ROI area full residual channel 1808
Slope: 909.33 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1327.6
ROI area full residual channel 1809
Slope: 947.91 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1191.9
ROI area full residual channel 1810
Slope: 906.69 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1378.9
ROI area full residual channel 1811
Slope: 941.67 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1147.7
ROI area full residual channel 1812
Slope: 927.43 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1219.4
ROI area full residual channel 1813
Slope: 901.43 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1280.9
ROI area full residual channel 1814
Slope: 879.65 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2962
ROI area full residual channel 1815
Slope: 916.08 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1040.6
ROI area full residual channel 1816
Slope: 905.08 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1680.8
ROI area full residual channel 1817
Slope: 963.35 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 830.1
ROI area full residual channel 1818
Slope: 874.48 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 722.5
ROI area full residual channel 1819
Slope: 960.43 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 975.3
ROI area full residual channel 1820
Slope: 900.24 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 955.7
ROI area full residual channel 1821
Slope: 981.89 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1167.9
ROI area full residual channel 1822
Slope: 877.44 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 963.0
ROI area full residual channel 1823
Slope: 958.29 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1074.1
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

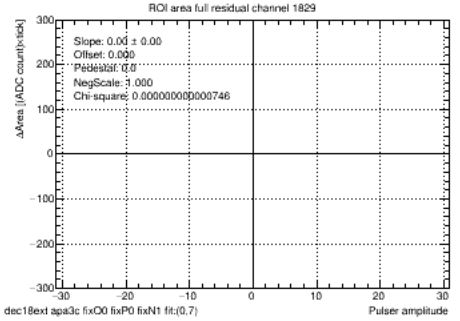

ROI area full residual channel 1824
Slope: 891.17 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1077.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

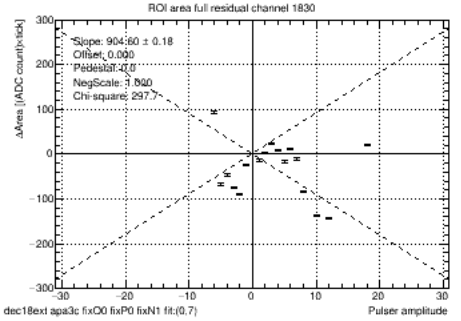

ROI area full residual channel 1825
Slope: 923.27 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 746.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

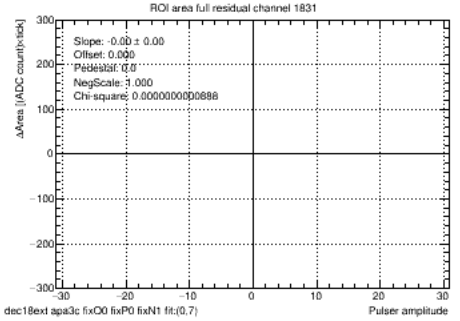

ROI area full residual channel 1826
Slope: 862.42 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1789.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

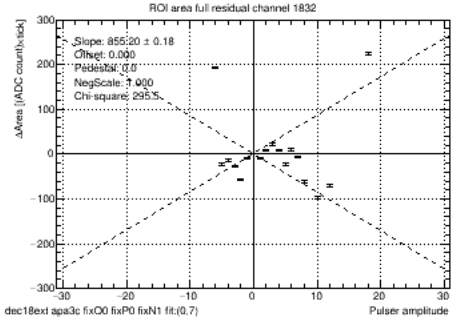

ROI area full residual channel 1827
Slope: 902.30 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 793.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

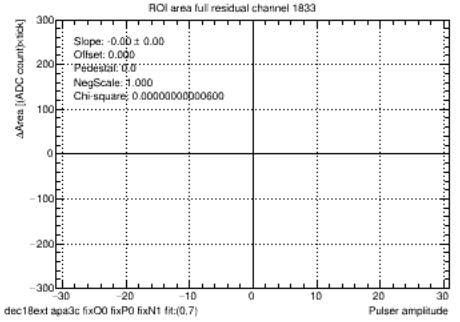

ROI area full residual channel 1828
Slope: 845.49 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 667.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

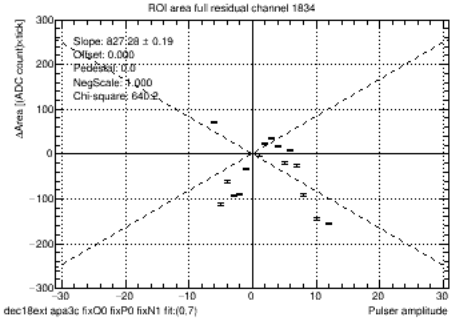

ROI area full residual channel 1829
Slope: 0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000000746
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

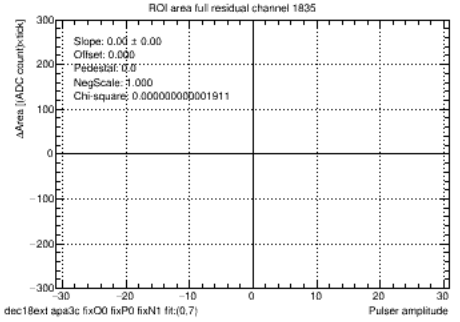

ROI area full residual channel 1830
Slope: 904.60 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.020
Chi-square: 297.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

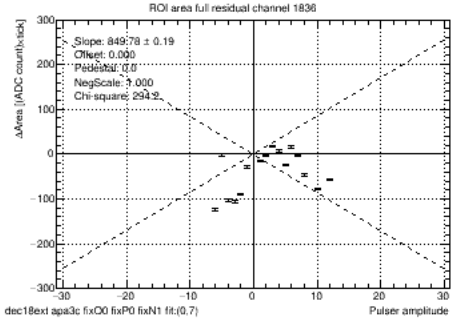

ROI area full residual channel 1831
Slope: -0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000000888
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

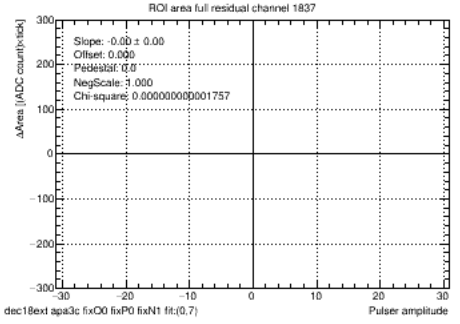

ROI area full residual channel 1832
Slope: 855.20 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 295.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

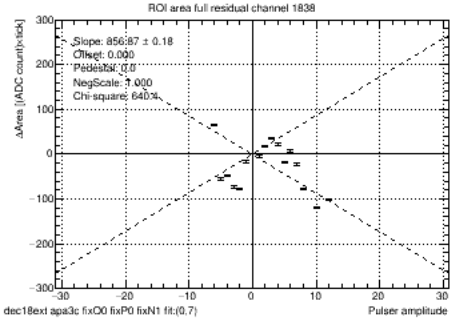

ROI area full residual channel 1833
Slope: -0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000000600
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

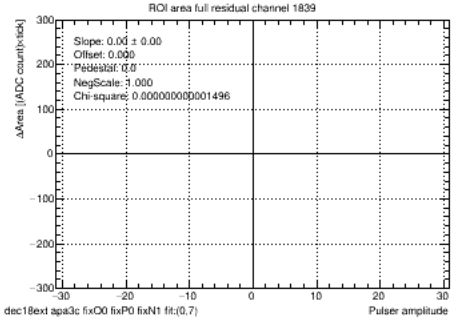

ROI area full residual channel 1834
Slope: 827.28 ± 0.19
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 640.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

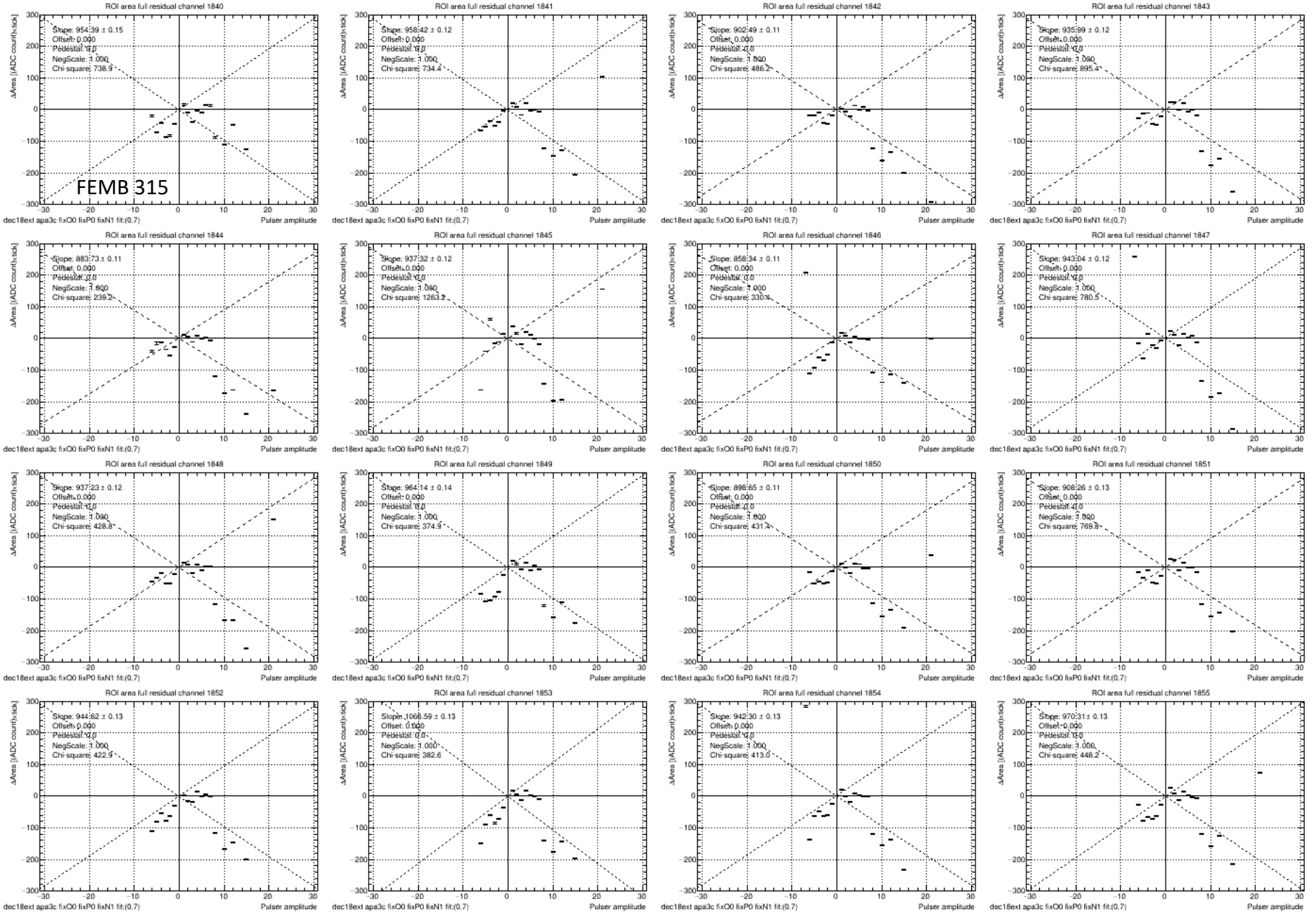

ROI area full residual channel 1835
Slope: 0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000001911
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

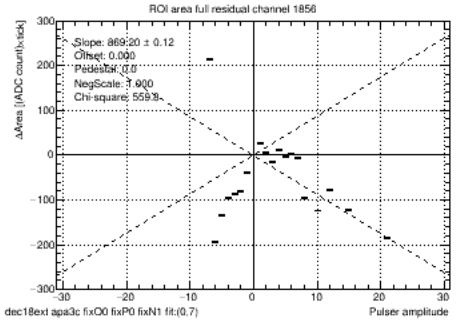

ROI area full residual channel 1836
Slope: 849.78 ± 0.19
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 294.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

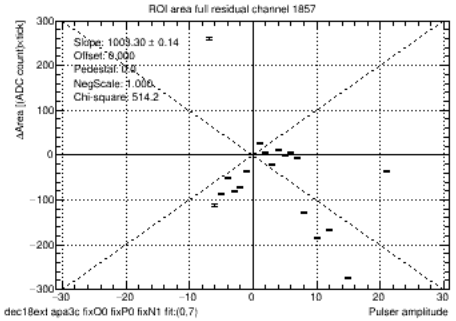

ROI area full residual channel 1837
Slope: -0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000001757
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

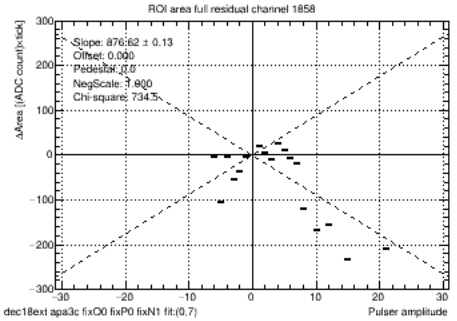

ROI area full residual channel 1838
Slope: 856.87 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 640.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

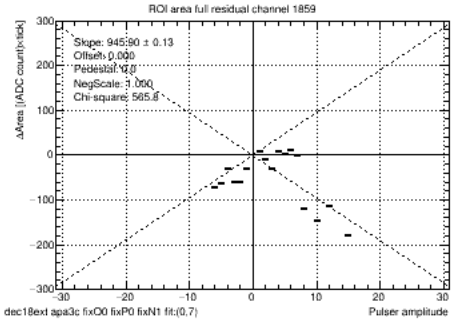

ROI area full residual channel 1839
Slope: 0.00 ± 0.00
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 0.0000000001496
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

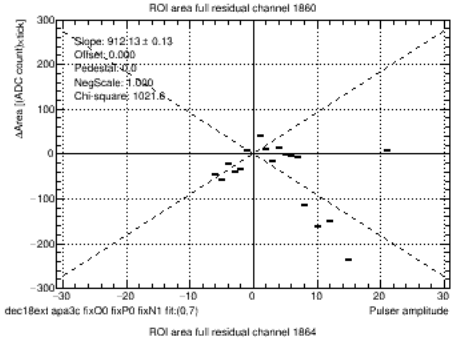

ROI area full residual channel 1840
Slope: 954.39 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 738.9
FEMB 315
ROI area full residual channel 1841
Slope: 958.42 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 734.4
ROI area full residual channel 1842
Slope: 902.49 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 486.2
ROI area full residual channel 1843
Slope: 935.99 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 895.4
ROI area full residual channel 1844
Slope: 883.73 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 239.2
ROI area full residual channel 1845
Slope: 937.32 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1263.2
ROI area full residual channel 1846
Slope: 858.34 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 330.4
ROI area full residual channel 1847
Slope: 943.04 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 780.5
ROI area full residual channel 1848
Slope: 937.23 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 428.8
ROI area full residual channel 1849
Slope: 964.14 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 374.9
ROI area full residual channel 1850
Slope: 898.65 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 431.4
ROI area full residual channel 1851
Slope: 908.26 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 769.8
ROI area full residual channel 1852
Slope: 944.62 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 422.9
ROI area full residual channel 1853
Slope: 1068.59 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 382.6
ROI area full residual channel 1854
Slope: 942.30 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 413.0
ROI area full residual channel 1855
Slope: 970.31 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 448.2
ΔArea [ADC count]x-tick]
Pulser amplitude
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)

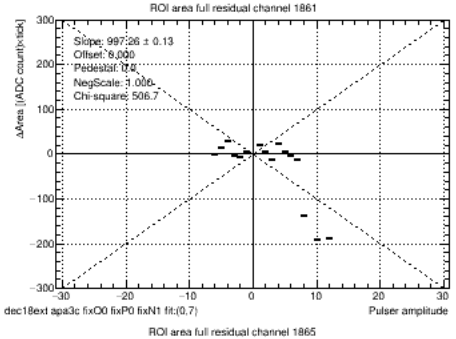

ROI area full residual channel 1856
Slope: 869.20 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 559.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

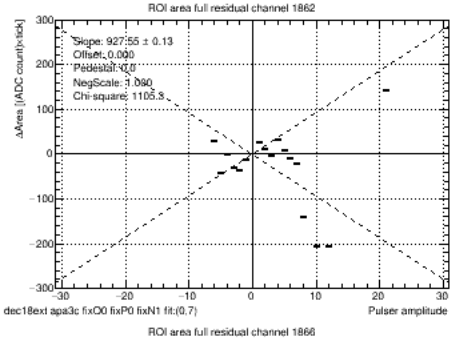

ROI area full residual channel 1857
Slope: 1009.30 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 514.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

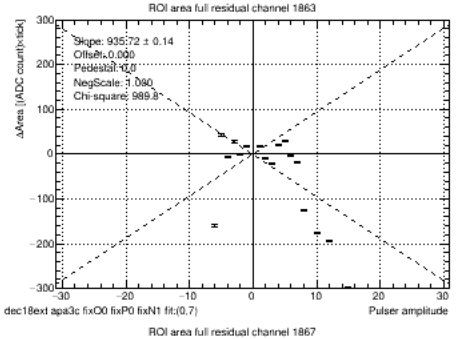

ROI area full residual channel 1858
Slope: 876.62 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 734.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

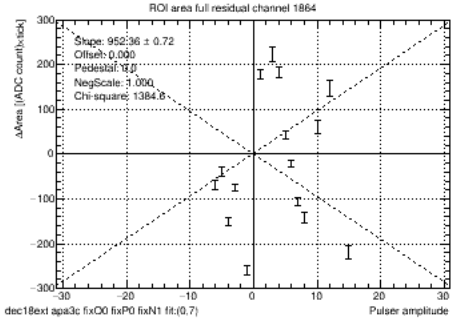

ROI area full residual channel 1859
Slope: 945.90 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 565.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

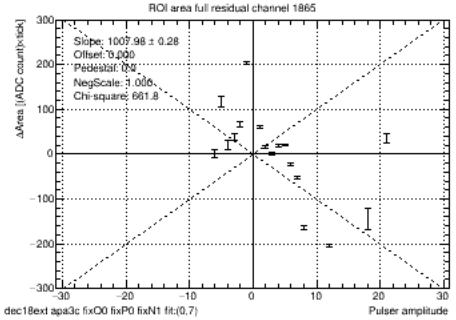

ROI area full residual channel 1860
Slope: 912.13 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1021.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

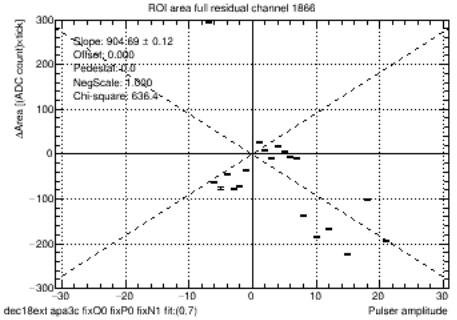

ROI area full residual channel 1861
Slope: 997.26 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 506.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

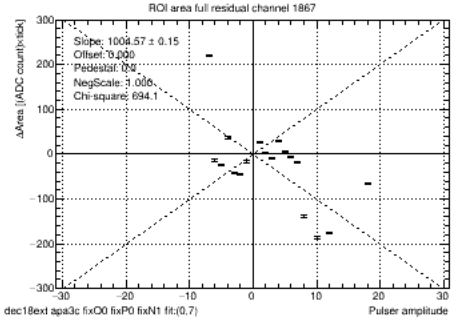

ROI area full residual channel 1862
Slope: 927.55 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1105.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

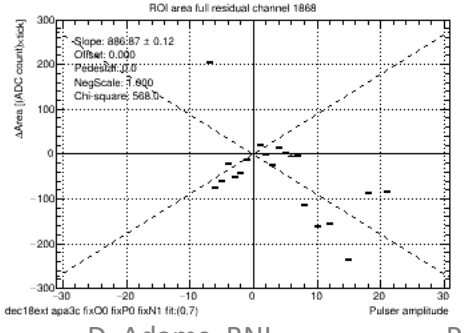

ROI area full residual channel 1863
Slope: 935.72 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 989.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

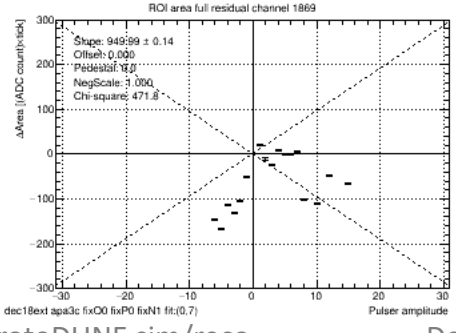

ROI area full residual channel 1864
Slope: 952.36 ± 0.72
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1384.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

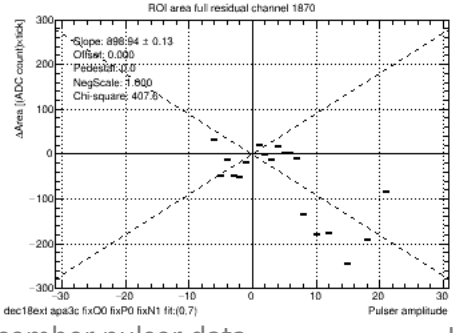

ROI area full residual channel 1865
Slope: 1007.98 ± 0.28
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 661.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

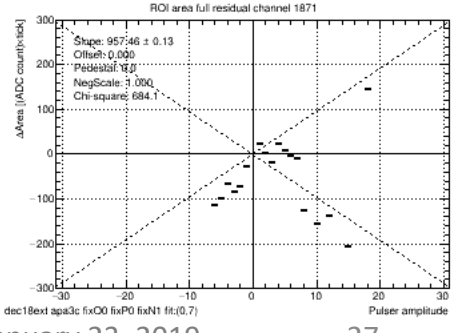

ROI area full residual channel 1866
Slope: 904.69 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 636.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

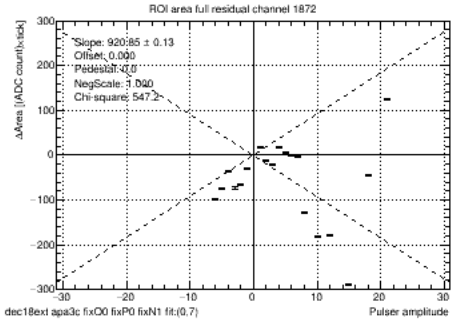

ROI area full residual channel 1867
Slope: 1004.57 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 694.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

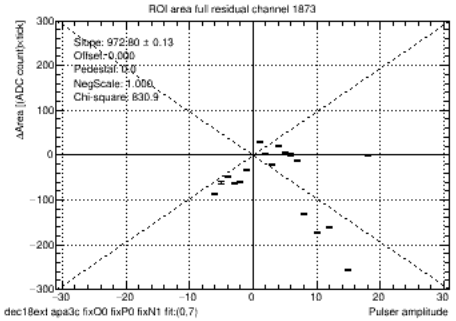

ROI area full residual channel 1868
Slope: 886.87 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 568.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

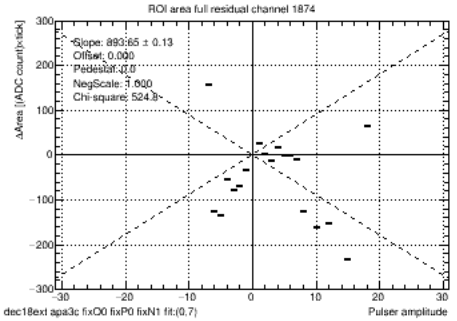

ROI area full residual channel 1869
Slope: 949.99 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 471.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

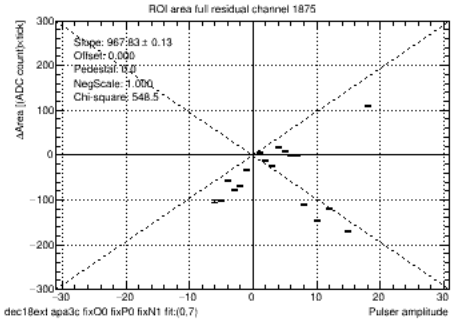

ROI area full residual channel 1870
Slope: 898.94 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 407.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

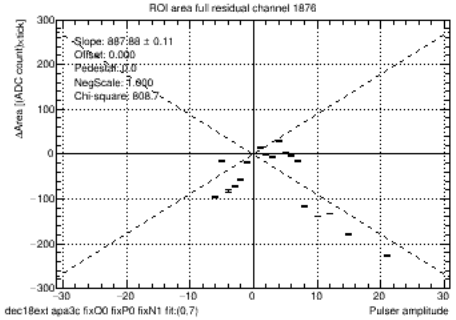

ROI area full residual channel 1871
Slope: 957.46 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 684.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

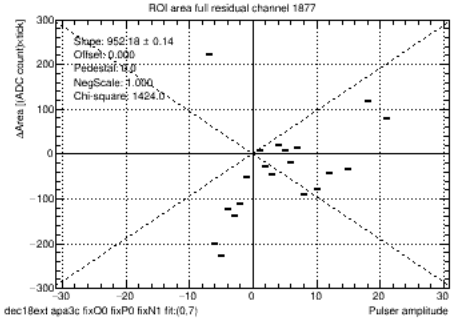

ROI area full residual channel 1872
Slope: 920.85 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 547.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

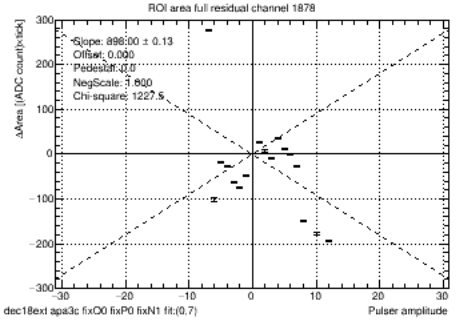

ROI area full residual channel 1873
Slope: 972.80 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.006
Chi-square: 830.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

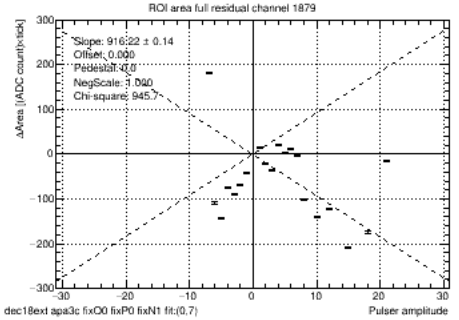

ROI area full residual channel 1874
Slope: 893.65 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 524.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

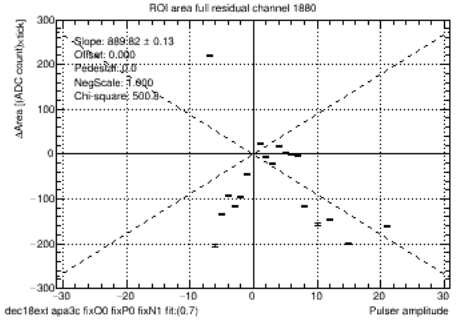

ROI area full residual channel 1875
Slope: 967.83 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 548.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

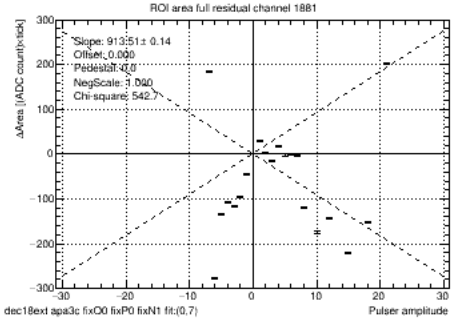

ROI area full residual channel 1876
Slope: 887.88 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 808.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

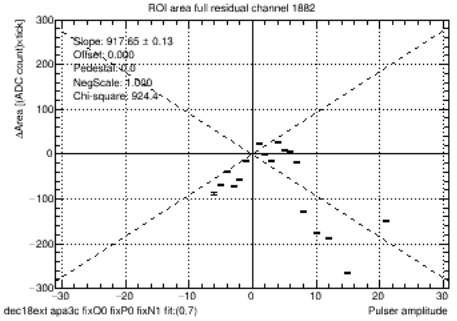

ROI area full residual channel 1877
Slope: 952.18 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1424.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

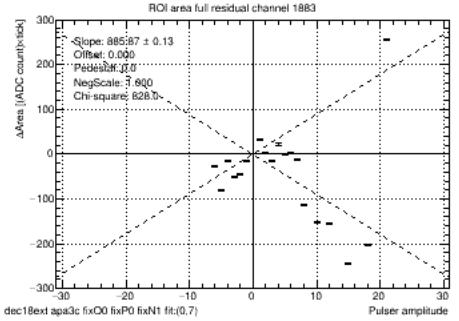

ROI area full residual channel 1878
Slope: 898.00 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1227.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

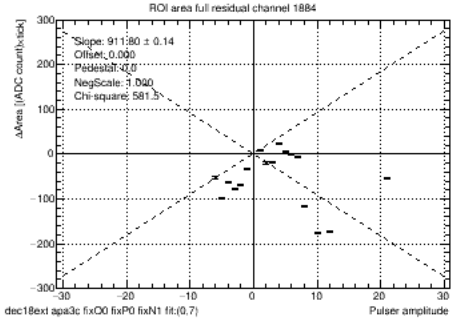

ROI area full residual channel 1879
Slope: 916.22 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 945.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

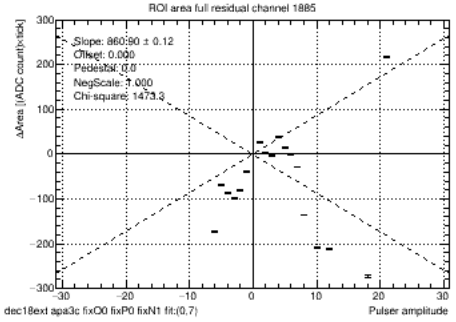

ROI area full residual channel 1880
Slope: 889.82 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 500.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

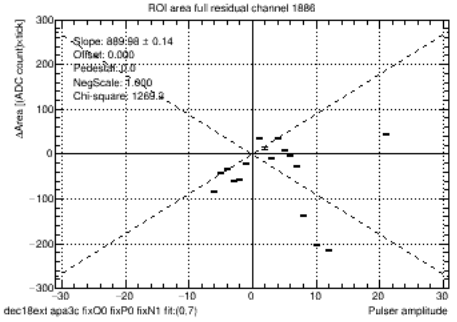

ROI area full residual channel 1881
Slope: 913.51 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 542.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

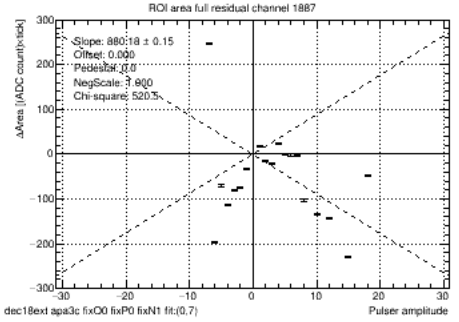

ROI area full residual channel 1882
Slope: 917.65 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 924.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

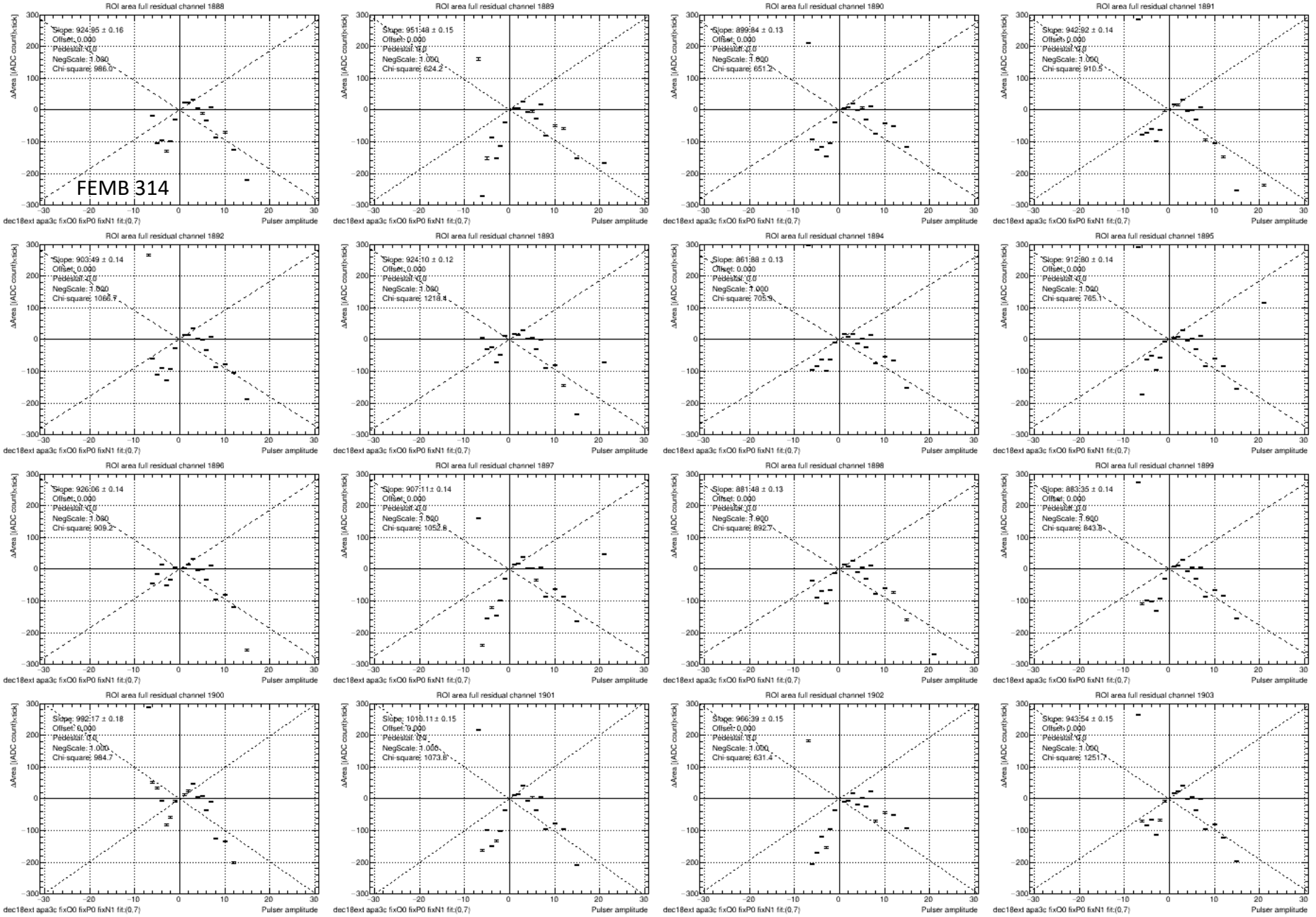

ROI area full residual channel 1883
Slope: 885.87 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 828.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

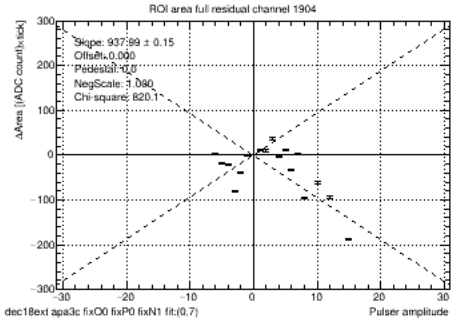

ROI area full residual channel 1884
Slope: 911.80 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 581.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

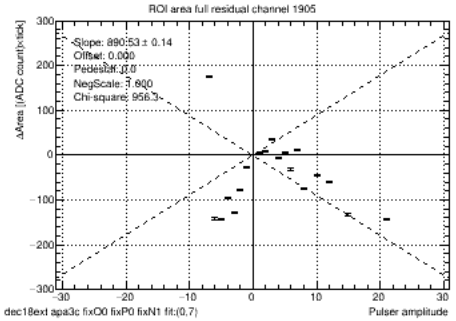

ROI area full residual channel 1885
Slope: 860.90 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1473.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

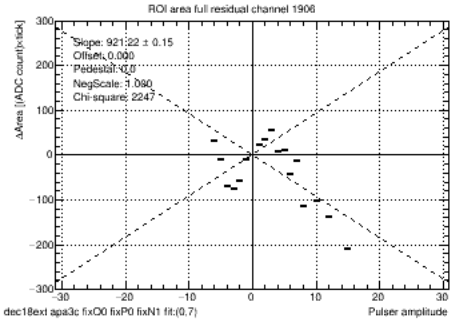

ROI area full residual channel 1886
Slope: 889.98 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1269.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

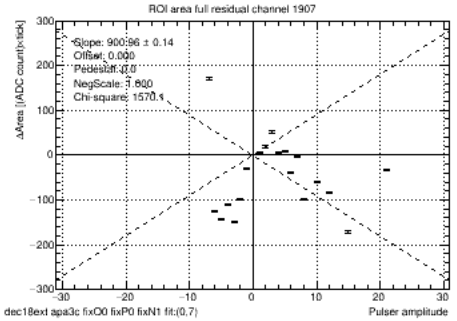

ROI area full residual channel 1887
Slope: 880.18 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 520.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

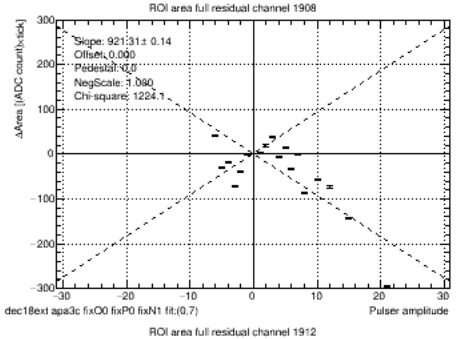

ROI area full residual channel 1888
Slope: 924.95 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 986.0
FEMB 314
ROI area full residual channel 1889
Slope: 951.48 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 624.2
ROI area full residual channel 1890
Slope: 899.84 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 651.2
ROI area full residual channel 1891
Slope: 942.92 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 910.5
ROI area full residual channel 1892
Slope: 903.49 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1066.7
ROI area full residual channel 1893
Slope: 924.10 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1218.4
ROI area full residual channel 1894
Slope: 861.88 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 705.9
ROI area full residual channel 1895
Slope: 912.80 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 765.1
ROI area full residual channel 1896
Slope: 926.06 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 909.2
ROI area full residual channel 1897
Slope: 907.11 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1052.8
ROI area full residual channel 1898
Slope: 881.48 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 892.7
ROI area full residual channel 1899
Slope: 883.35 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 843.8
ROI area full residual channel 1900
Slope: 992.17 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 984.7
ROI area full residual channel 1901
Slope: 1010.11 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1073.6
ROI area full residual channel 1902
Slope: 966.39 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 631.4
ROI area full residual channel 1903
Slope: 943.54 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1251.7
ΔArea [ADC count]x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

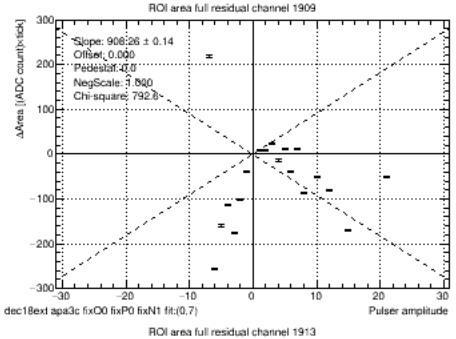

ROI area full residual channel 1904
Slope: 937.99 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 820.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

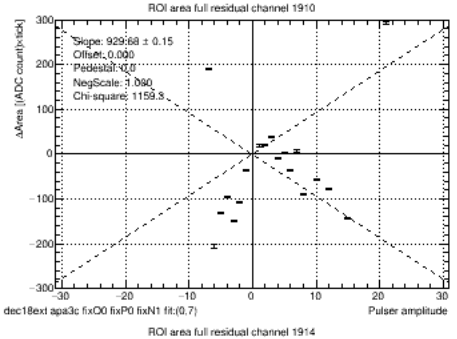

ROI area full residual channel 1905
Slope: 890.53 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.090
Chi-square: 956.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

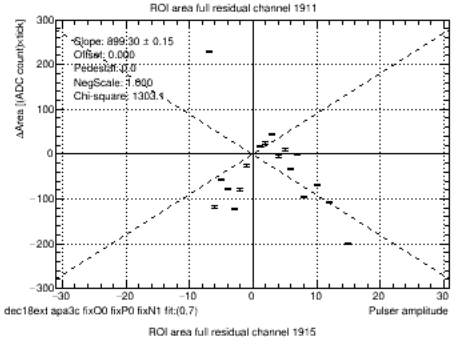

ROI area full residual channel 1906
Slope: 921.22 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 2247
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

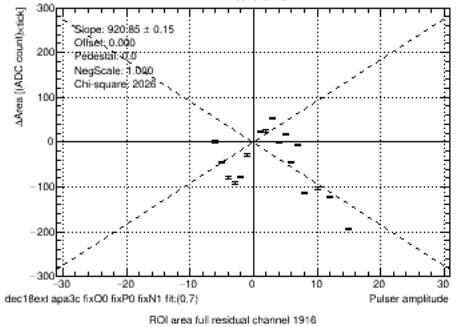

ROI area full residual channel 1907
Slope: 900.96 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.800
Chi-square: 1570.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

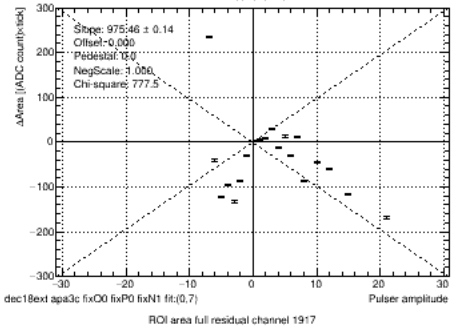

ROI area full residual channel 1908
Slope: 921.31± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1224.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

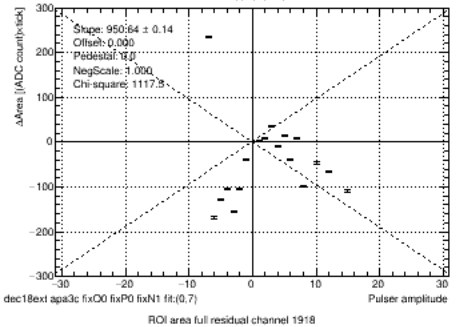

ROI area full residual channel 1909
Slope: 908.26 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.800
Chi-square: 792.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

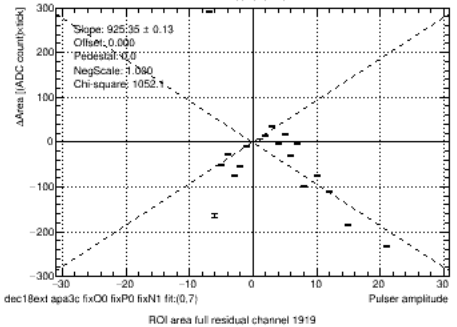

ROI area full residual channel 1910
Slope: 929.68 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1159.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

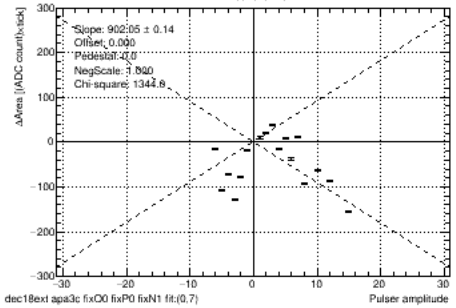

ROI area full residual channel 1911
Slope: 899.30 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.800
Chi-square: 1303.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

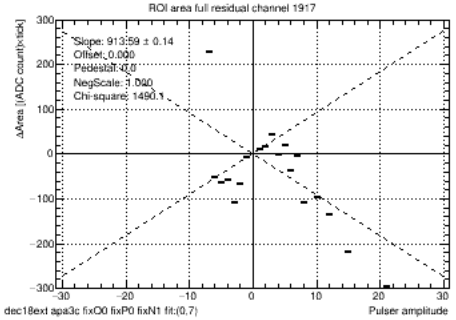

ROI area full residual channel 1912
Slope: 920.85 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.090
Chi-square: 2028
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

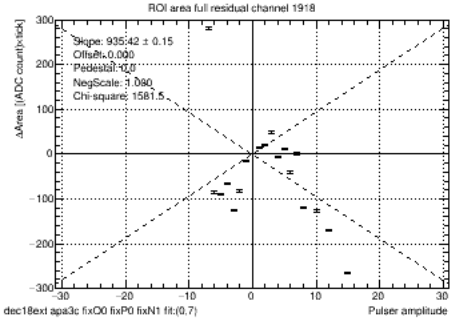

ROI area full residual channel 1913
Slope: 975.46 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 777.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

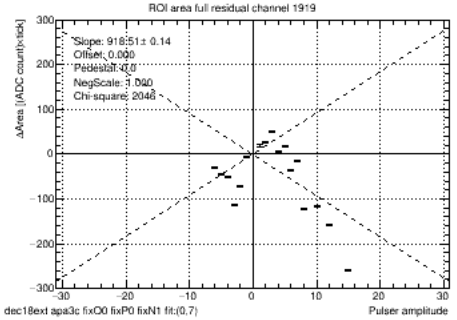

ROI area full residual channel 1914
Slope: 950.64 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1117.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

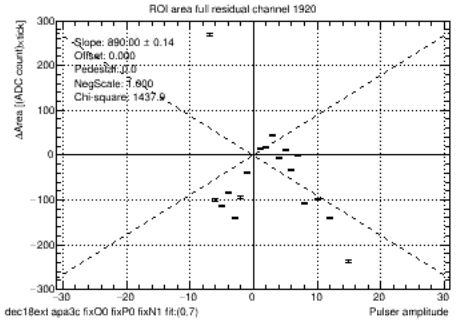

ROI area full residual channel 1915
Slope: 925.35 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1052.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

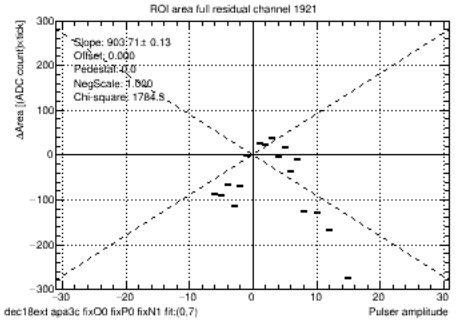

ROI area full residual channel 1916
Slope: 902.05 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.090
Chi-square: 1344.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

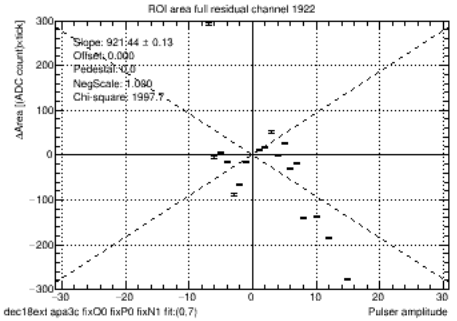

ROI area full residual channel 1917
Slope: 913.59 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.090
Chi-square: 1490.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

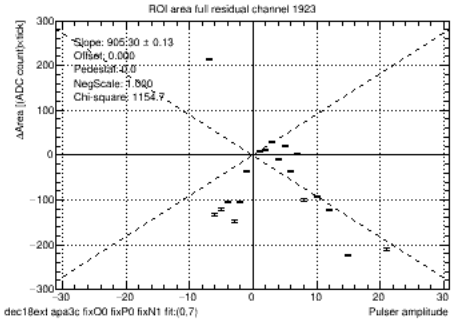

ROI area full residual channel 1918
Slope: 935.42 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1581.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

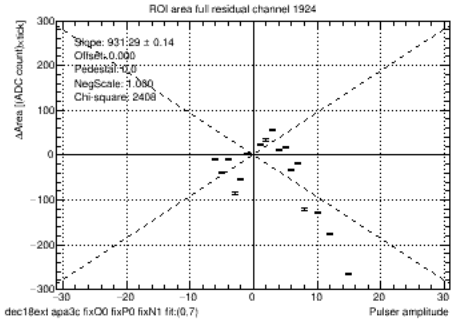

ROI area full residual channel 1919
Slope: 918.51 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 2048
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

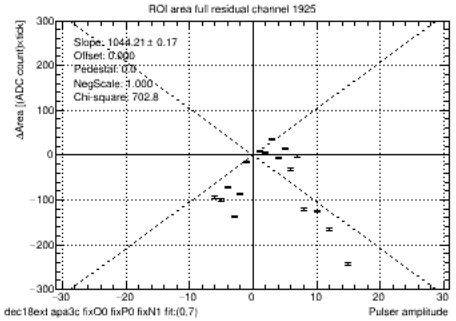

ROI area full residual channel 1920
Slope: 890.00 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1437.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

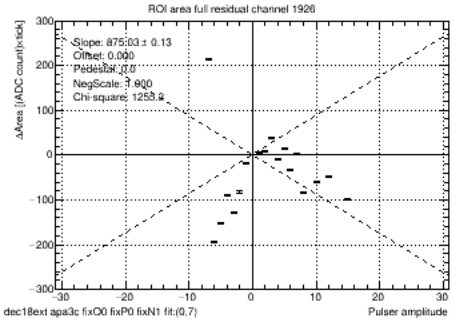

ROI area full residual channel 1921
Slope: 903.71 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1784.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

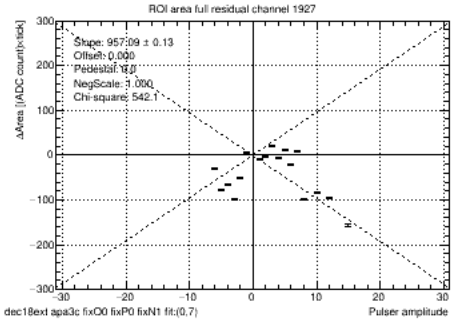

ROI area full residual channel 1922
Slope: 921.44 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1997.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

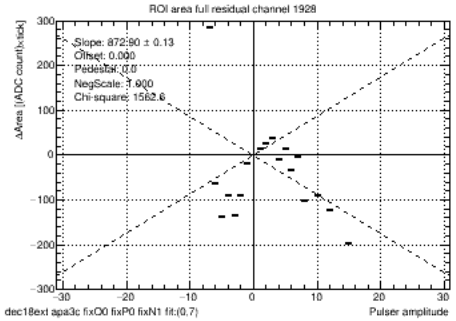

ROI area full residual channel 1923
Slope: 905.30 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1154.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

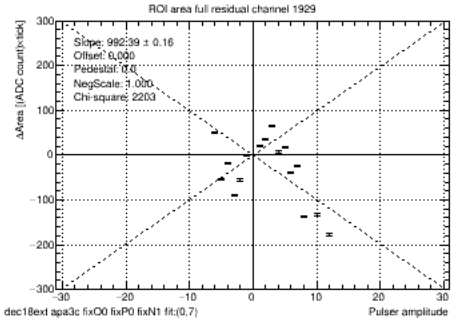

ROI area full residual channel 1924
Slope: 931.29 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2408
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

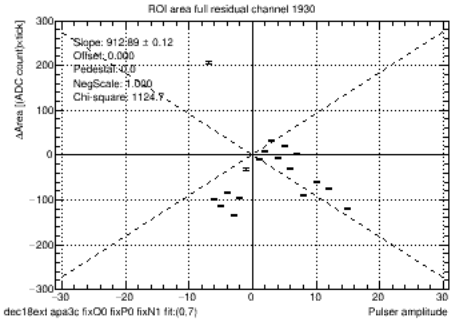

ROI area full residual channel 1925
Slope: 1044.21 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 702.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

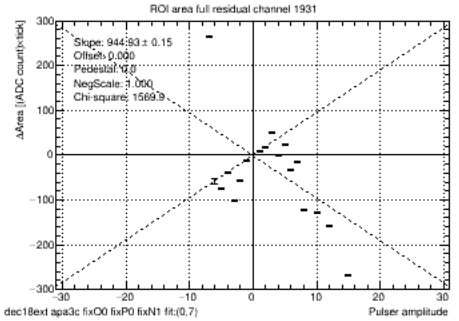

ROI area full residual channel 1926
Slope: 875.03 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1253.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

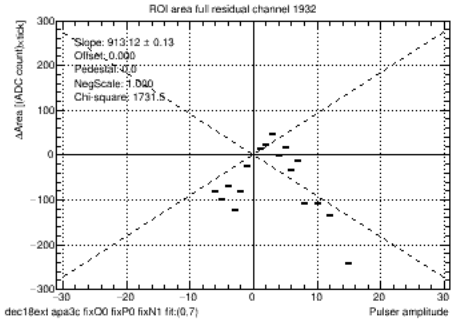

ROI area full residual channel 1927
Slope: 957.09 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 542.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

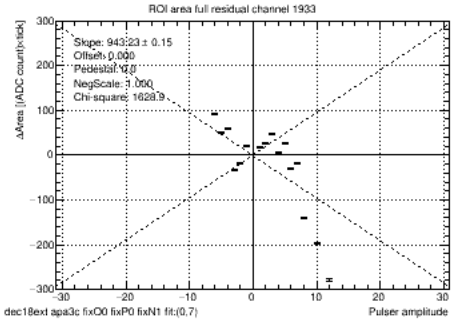

ROI area full residual channel 1928
Slope: 872.90 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1562.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

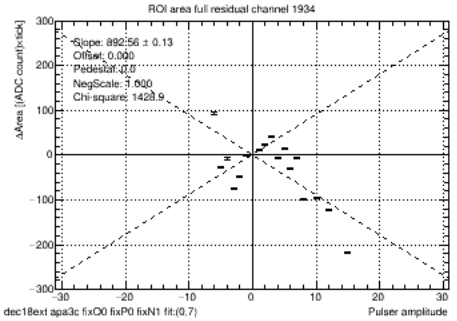

ROI area full residual channel 1929
Slope: 992.39 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2203
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

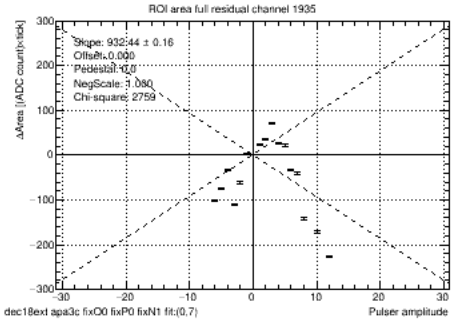

ROI area full residual channel 1930
Slope: 912.89 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1124.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

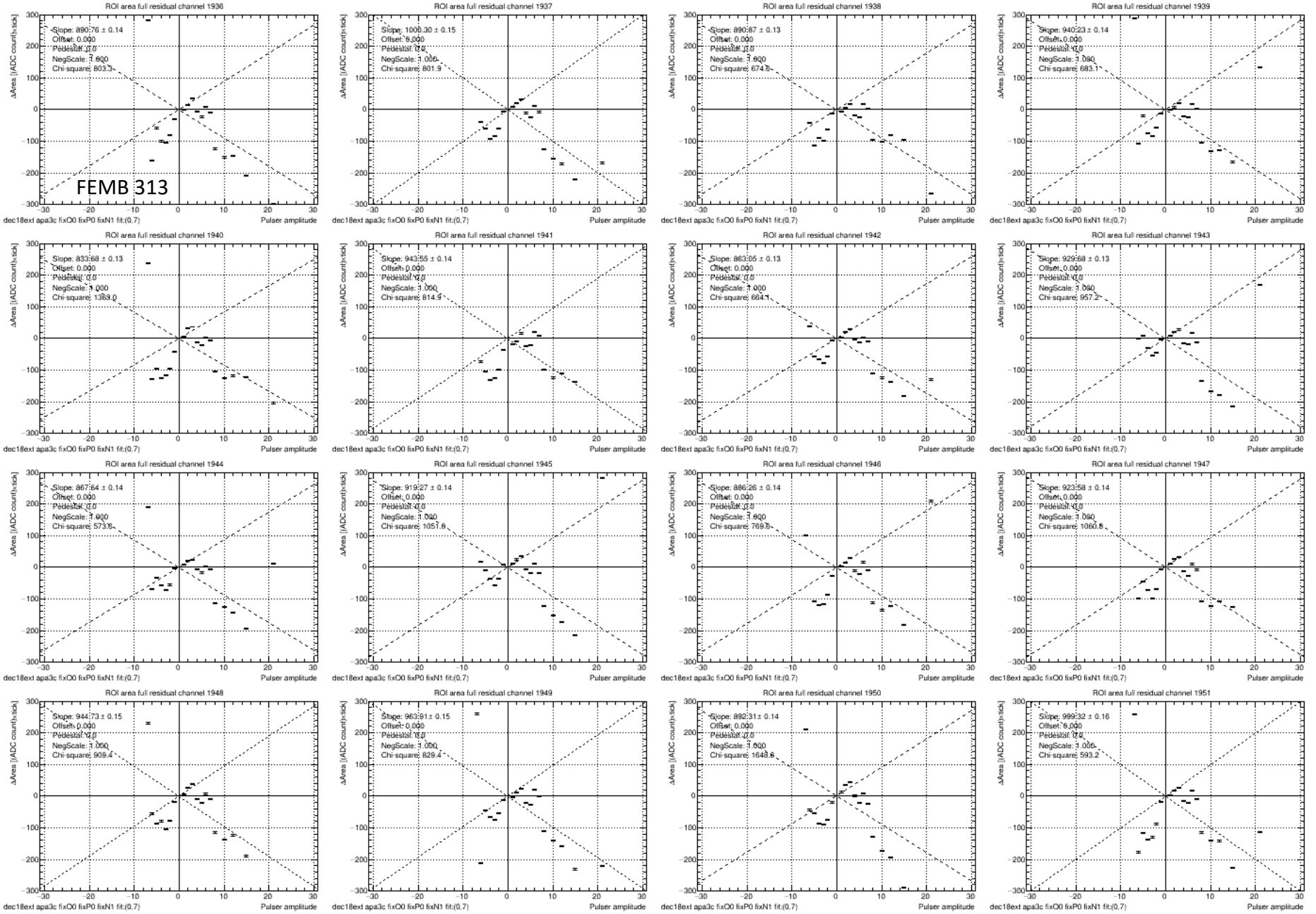

ROI area full residual channel 1931
Slope: 944.93 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1569.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

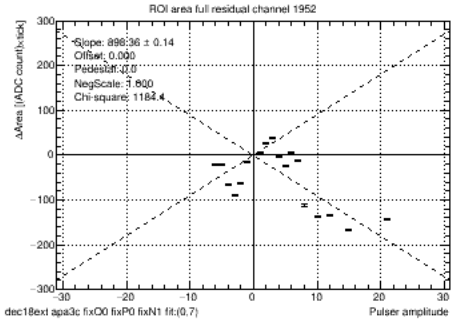

ROI area full residual channel 1932
Slope: 913.12 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1731.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

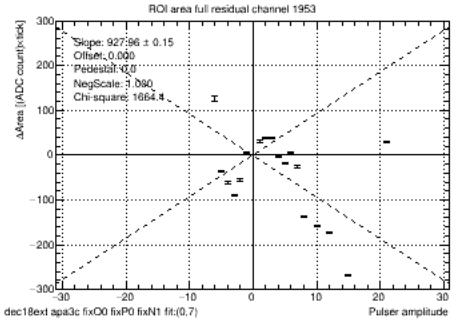

ROI area full residual channel 1933
Slope: 943.23 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1628.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

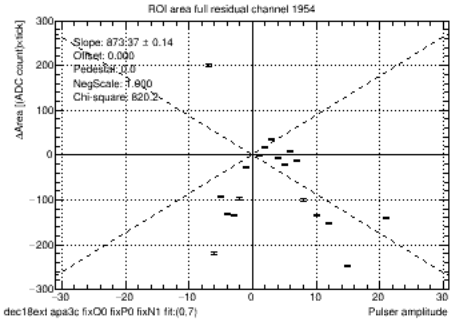

ROI area full residual channel 1934
Slope: 892.56 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1428.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

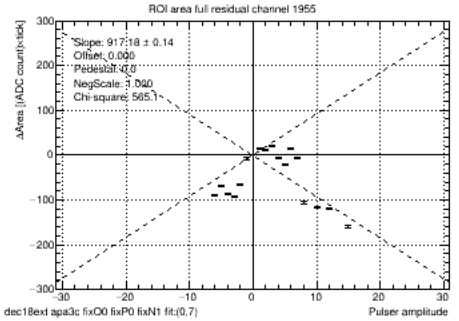

ROI area full residual channel 1935
Slope: 932.44 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2759
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

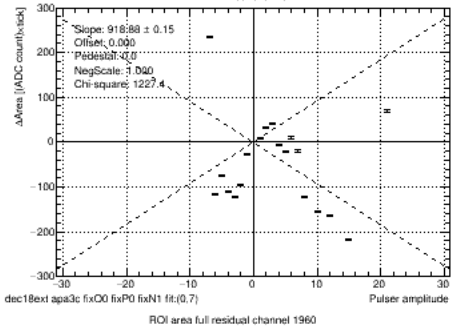

ROI area full residual channel 1936
Slope: 890.76 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 803.3
FEMB 313
ROI area full residual channel 1937
Slope: 1008.30 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 801.9
ROI area full residual channel 1938
Slope: 890.87 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 674.8
ROI area full residual channel 1939
Slope: 940.23 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 683.1
ROI area full residual channel 1940
Slope: 833.68 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1383.0
ROI area full residual channel 1941
Slope: 943.55 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 814.9
ROI area full residual channel 1942
Slope: 863.05 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 664.1
ROI area full residual channel 1943
Slope: 929.68 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 957.2
ROI area full residual channel 1944
Slope: 867.64 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 573.6
ROI area full residual channel 1945
Slope: 919.27 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1051.8
ROI area full residual channel 1946
Slope: 886.26 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 769.8
ROI area full residual channel 1947
Slope: 923.58 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1060.8
ROI area full residual channel 1948
Slope: 944.73 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 909.4
ROI area full residual channel 1949
Slope: 963.91 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 829.4
ROI area full residual channel 1950
Slope: 892.31 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1648.6
ROI area full residual channel 1951
Slope: 999.32 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 593.2
ΔArea [ADC count]x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

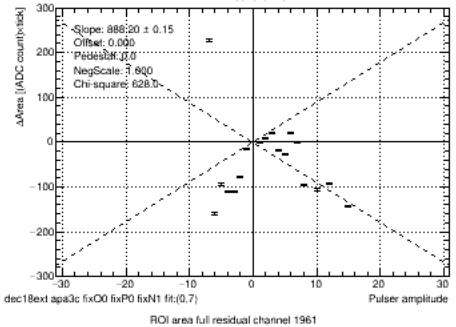

ROI area full residual channel 1952
Slope: 898.36 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1184.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

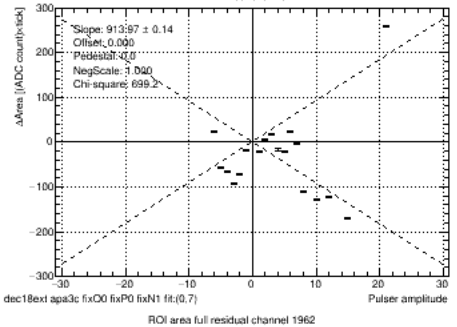

ROI area full residual channel 1953
Slope: 927.96 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1664.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

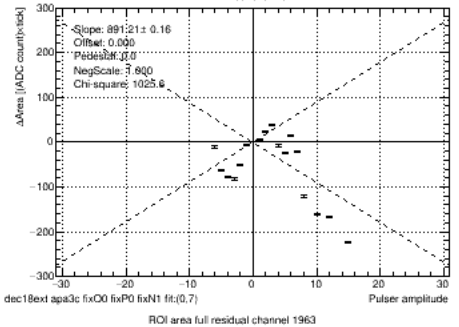

ROI area full residual channel 1954
Slope: 873.37 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 820.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

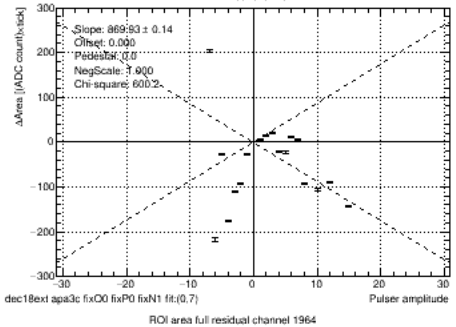

ROI area full residual channel 1955
Slope: 917.18 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 565.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

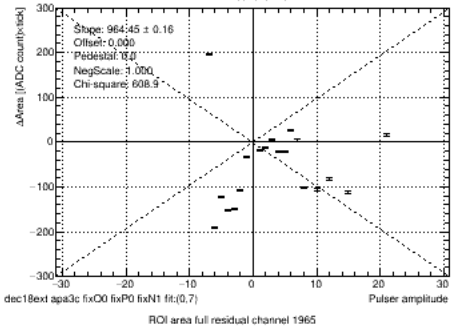

ROI area full residual channel 1956
Slope: 918.88 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 1227.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

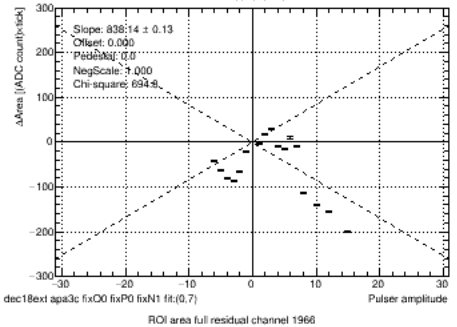

ROI area full residual channel 1957
Slope: 888.20 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 628.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

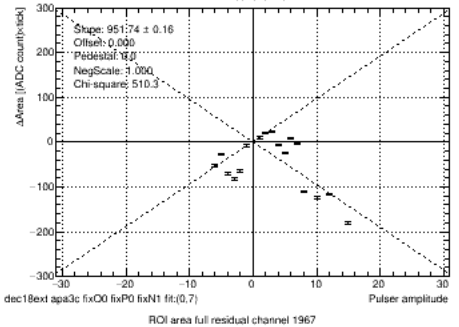

ROI area full residual channel 1958
Slope: 913.97 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.040
Chi-square: 699.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

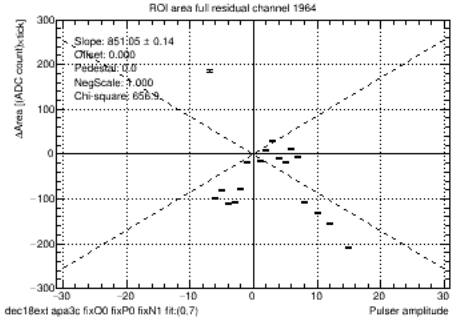

ROI area full residual channel 1959
Slope: 891.21 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1025.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

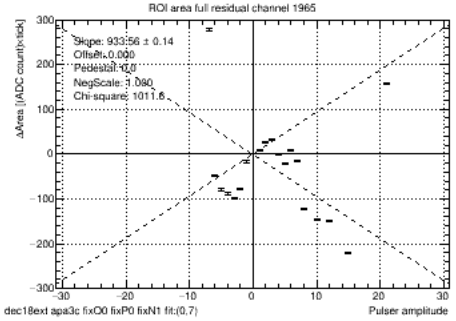

ROI area full residual channel 1960
Slope: 869.93 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 600.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

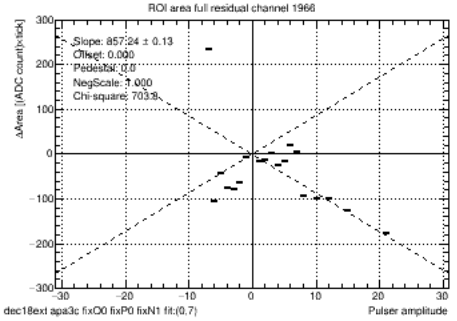

ROI area full residual channel 1961
Slope: 964.45 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 608.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

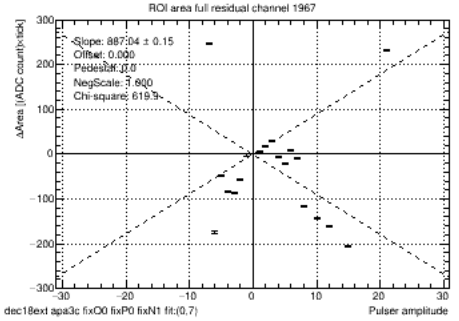

ROI area full residual channel 1962
Slope: 838.14 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 694.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

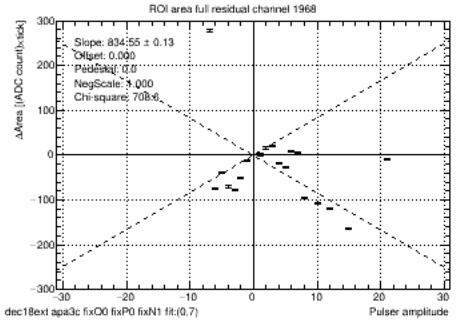

ROI area full residual channel 1963
Slope: 951.74 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 510.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

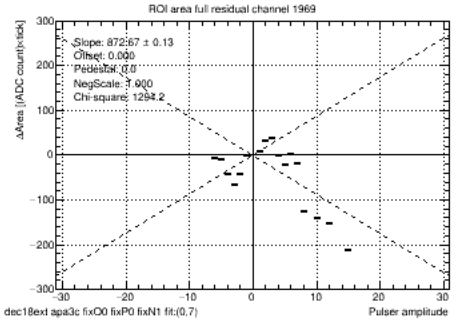

ROI area full residual channel 1964
Slope: 851.05 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 656.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

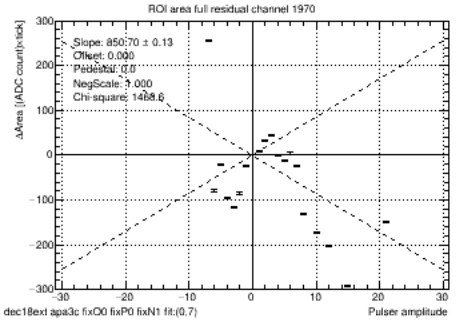

ROI area full residual channel 1965
Slope: 933.56 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1011.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

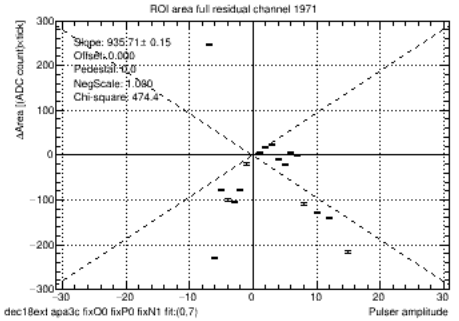

ROI area full residual channel 1966
Slope: 857.24 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 703.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

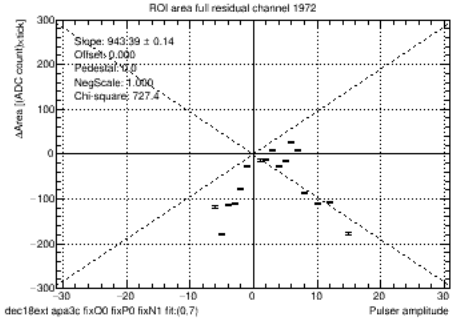

ROI area full residual channel 1967
Slope: 887.04 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 619.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

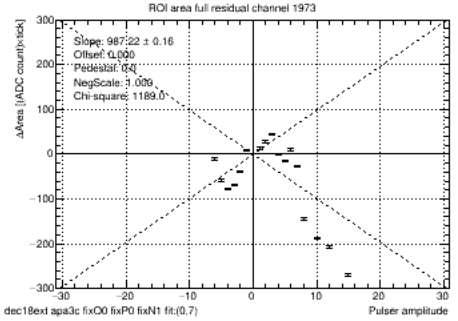

ROI area full residual channel 1968
Slope: 834.55 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 708.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

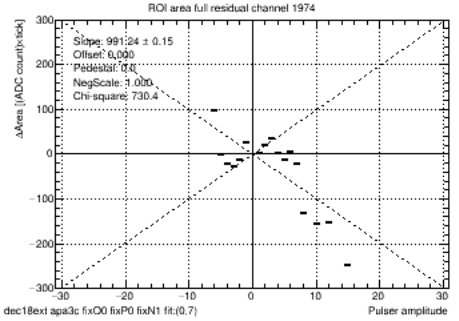

ROI area full residual channel 1969
Slope: 872.67 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1294.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

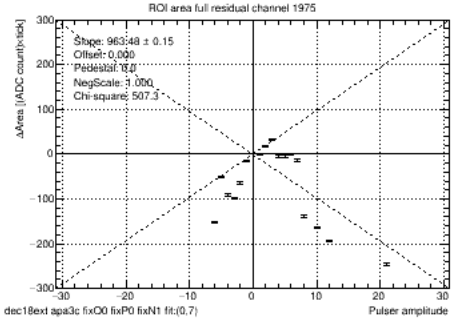

ROI area full residual channel 1970
Slope: 850.70 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1468.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

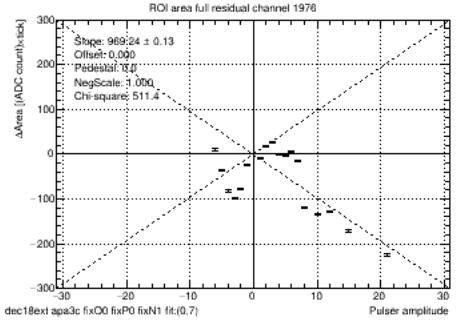

ROI area full residual channel 1971
Slope: 935.71 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 474.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

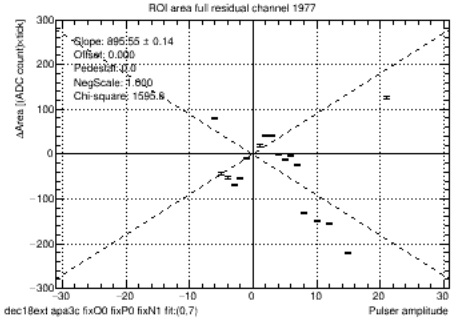

ROI area full residual channel 1972
Slope: 943.39 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 727.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

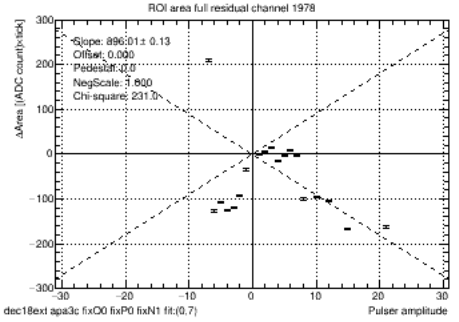

ROI area full residual channel 1973
Slope: 987.22 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1189.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

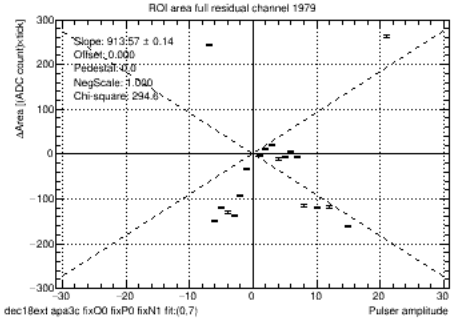

ROI area full residual channel 1974
Slope: 991.24 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 730.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

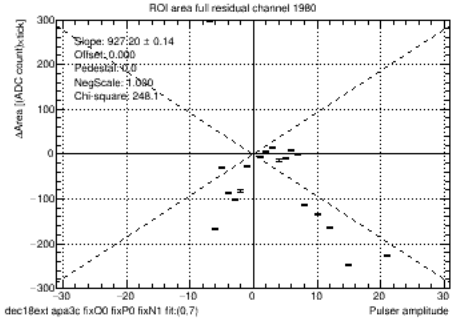

ROI area full residual channel 1975
Slope: 963.48 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 507.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

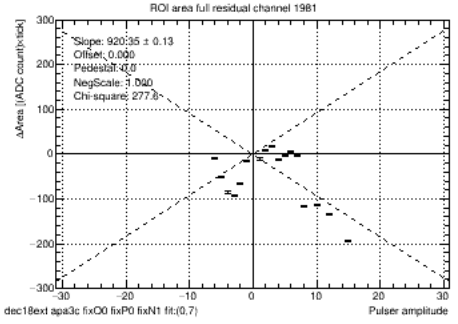

ROI area full residual channel 1976
Slope: 969.24 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 511.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

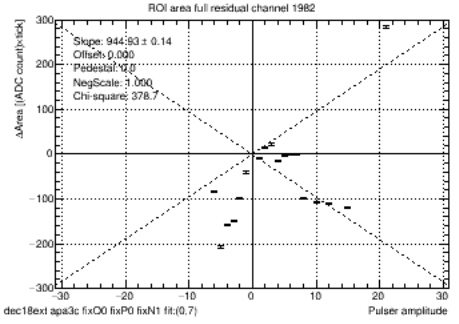

ROI area full residual channel 1977
Slope: 895.55 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1595.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

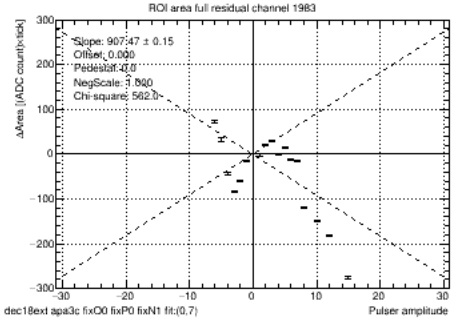

ROI area full residual channel 1978
Slope: 896.01 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 231.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

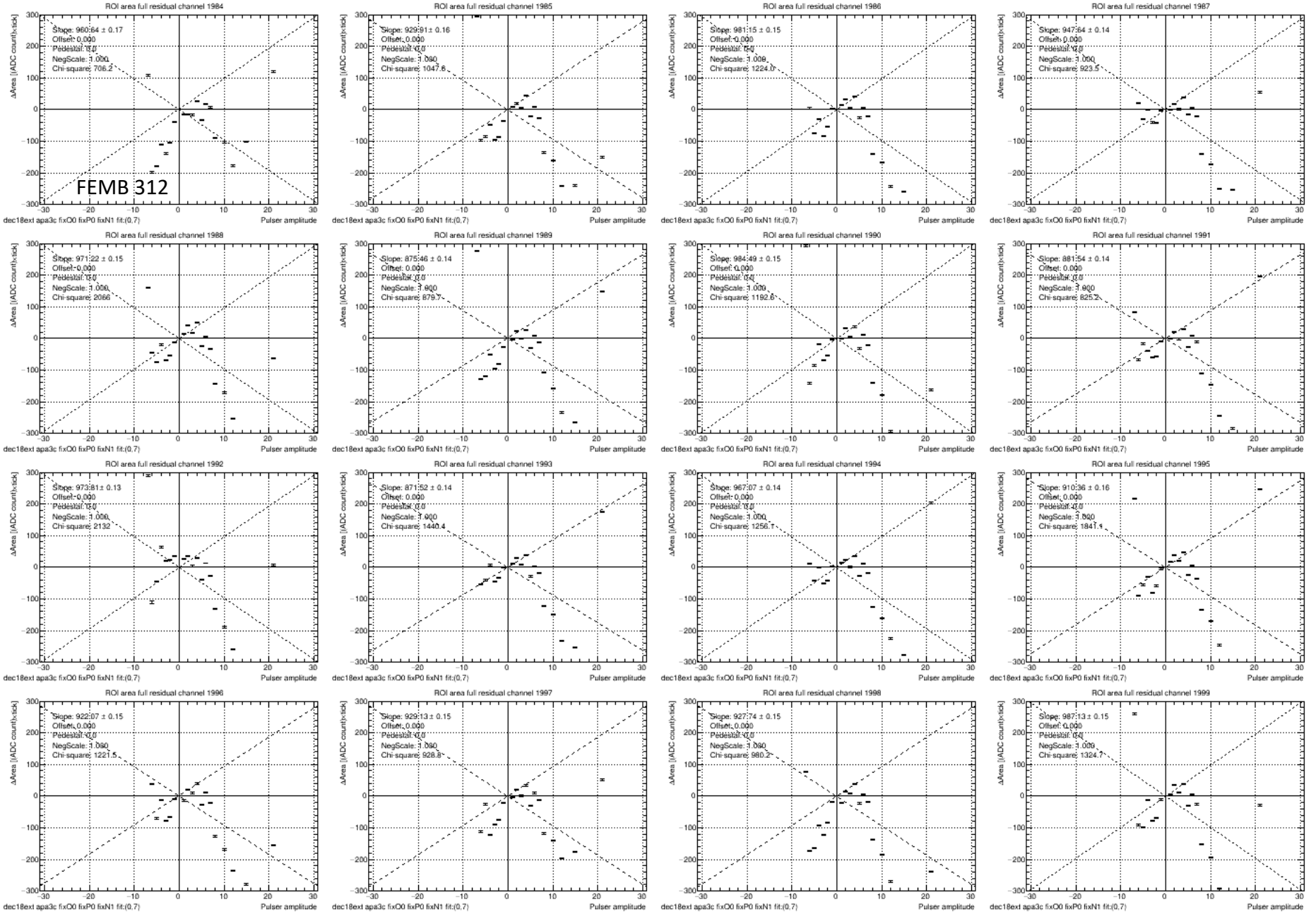

ROI area full residual channel 1979
Slope: 913.57 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 294.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

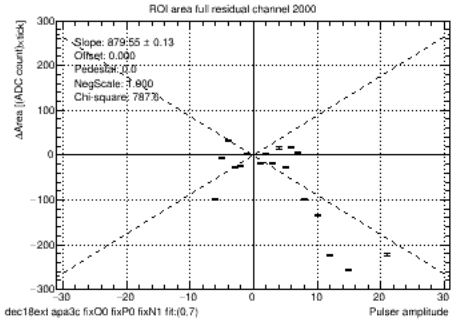

ROI area full residual channel 1980
Slope: 927.20 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 248.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

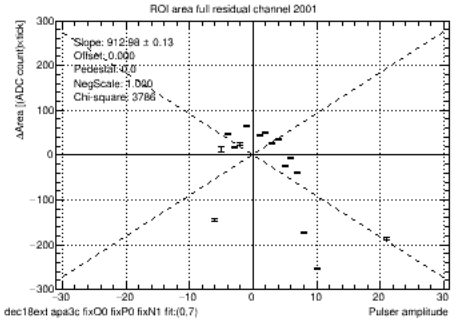

ROI area full residual channel 1981
Slope: 920.35 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 277.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

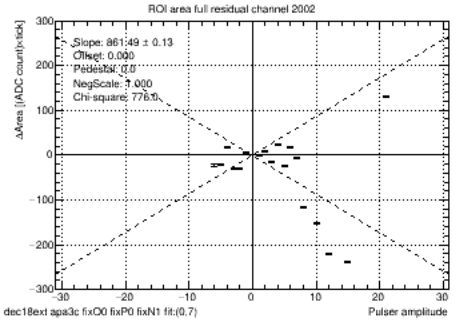

ROI area full residual channel 1982
Slope: 944.93 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 378.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

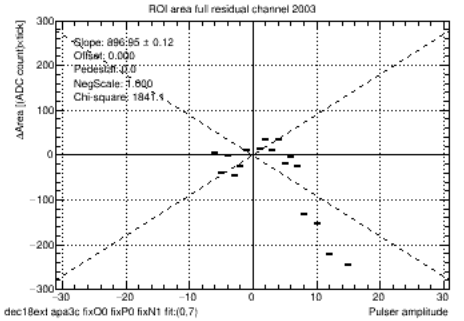

ROI area full residual channel 1983
Slope: 907.47 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 562.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

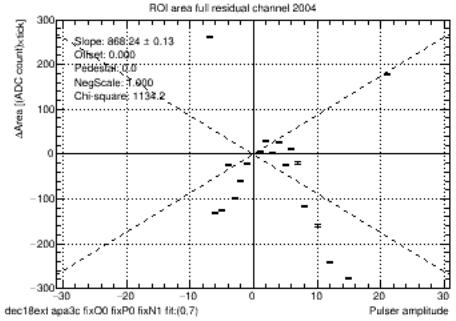

ROI area full residual channel 1984
Slope: 960.64 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 706.2
FEMB 312
ROI area full residual channel 1985
Slope: 929.91 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1047.6
ROI area full residual channel 1986
Slope: 981.15 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.008
Chi-square: 1224.0
ROI area full residual channel 1987
Slope: 947.64 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 923.5
ROI area full residual channel 1988
Slope: 971.22 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2066
ROI area full residual channel 1989
Slope: 875.46 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 879.7
ROI area full residual channel 1990
Slope: 984.49 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1192.6
ROI area full residual channel 1991
Slope: 881.54 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 825.2
ROI area full residual channel 1992
Slope: 973.81 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2132
ROI area full residual channel 1993
Slope: 871.52 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1440.4
ROI area full residual channel 1994
Slope: 967.07 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1256.1
ROI area full residual channel 1995
Slope: 910.36 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1841.1
ROI area full residual channel 1996
Slope: 922.07 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1221.5
ROI area full residual channel 1997
Slope: 929.13 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 928.8
ROI area full residual channel 1998
Slope: 927.74 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 980.2
ROI area full residual channel 1999
Slope: 987.13 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1324.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

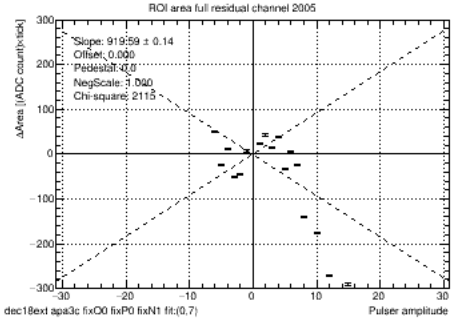

ROI area full residual channel 2000
Slope: 879.55 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 7877.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

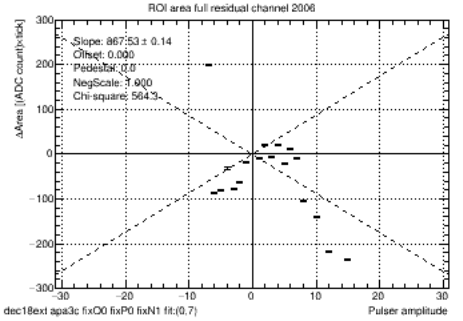

ROI area full residual channel 2001
Slope: 912.98 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 3786.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

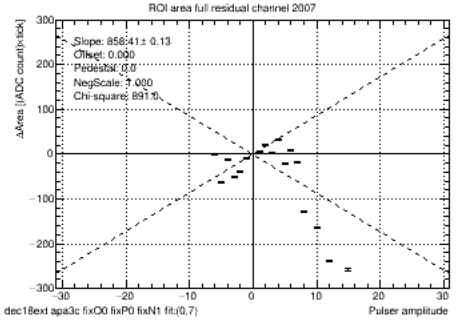

ROI area full residual channel 2002
Slope: 861.49 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 7761.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

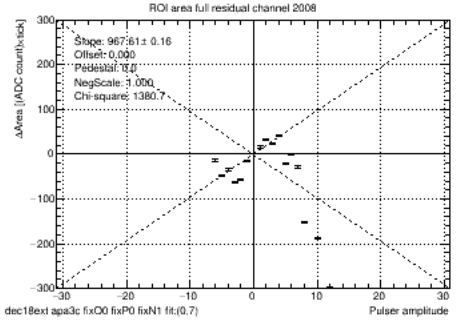

ROI area full residual channel 2003
Slope: 896.95 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1841.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

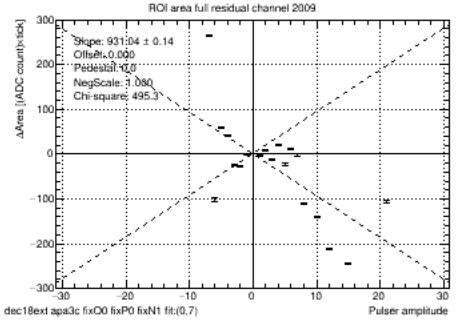

ROI area full residual channel 2004
Slope: 868.24 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1134.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

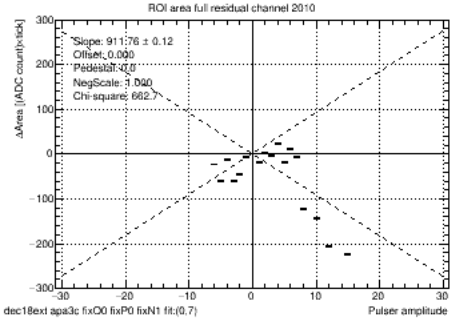

ROI area full residual channel 2005
Slope: 919.59 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2115.
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

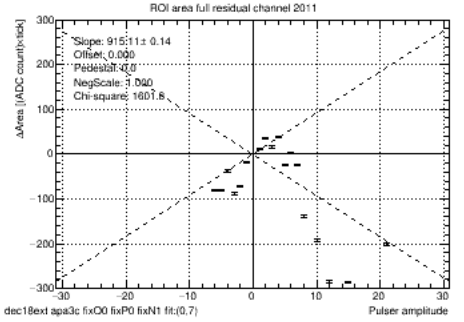

ROI area full residual channel 2006
Slope: 867.53 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 564.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

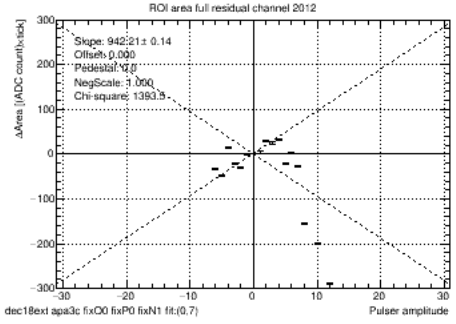

ROI area full residual channel 2007
Slope: 858.41 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 891.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

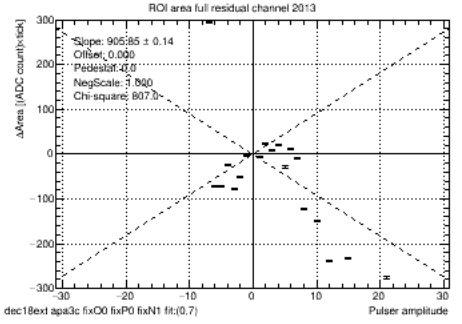

ROI area full residual channel 2008
Slope: 967.61 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1380.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

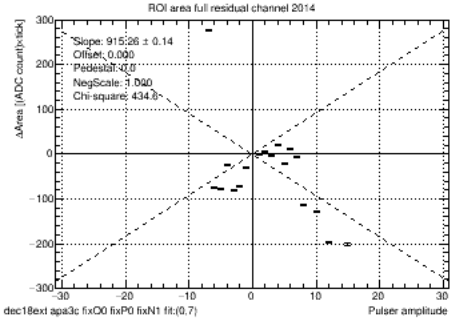

ROI area full residual channel 2009
Slope: 931.04 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 495.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

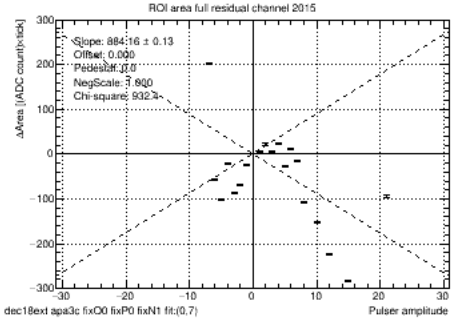

ROI area full residual channel 2010
Slope: 911.76 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 662.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

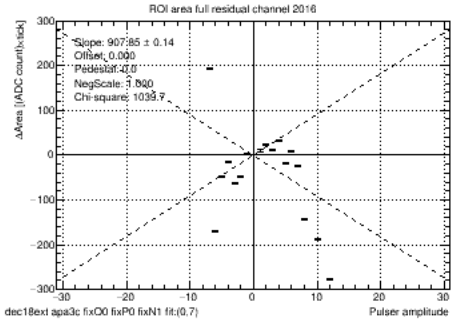

ROI area full residual channel 2011
Slope: 915.11 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1601.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

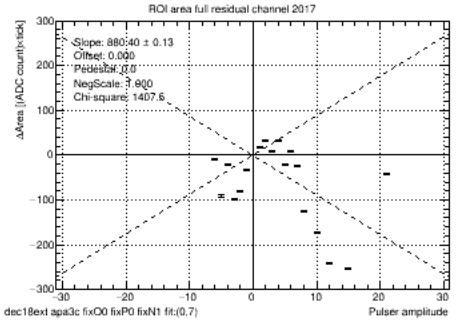

ROI area full residual channel 2012
Slope: 942.21 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1393.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

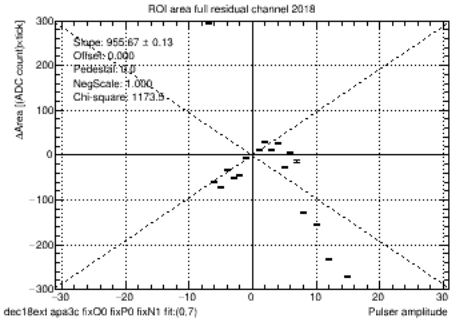

ROI area full residual channel 2013
Slope: 905.85 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 807.0
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

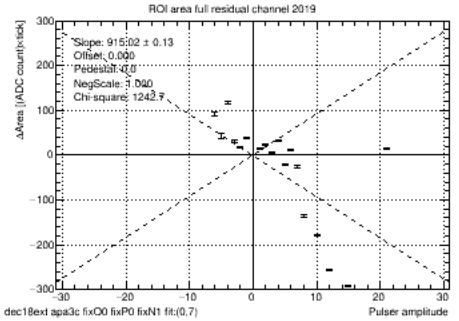

ROI area full residual channel 2014
Slope: 915.26 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 434.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

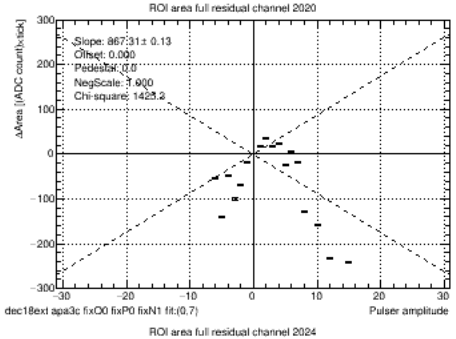

ROI area full residual channel 2015
Slope: 884.16 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 932.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

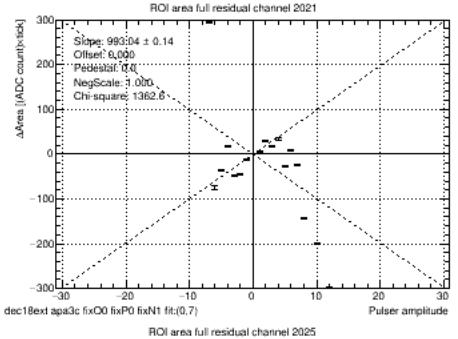

ROI area full residual channel 2016
Slope: 907.85 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1039.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

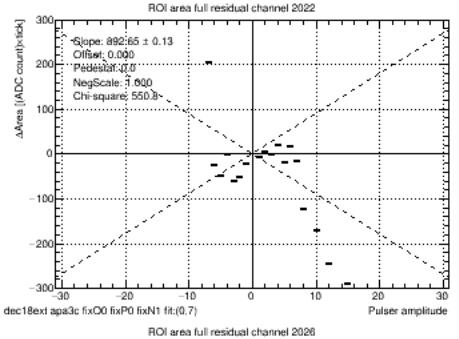

ROI area full residual channel 2017
Slope: 880.40 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1407.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

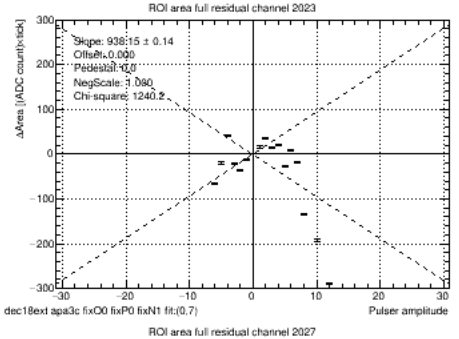

ROI area full residual channel 2018
Slope: 955.67 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1173.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

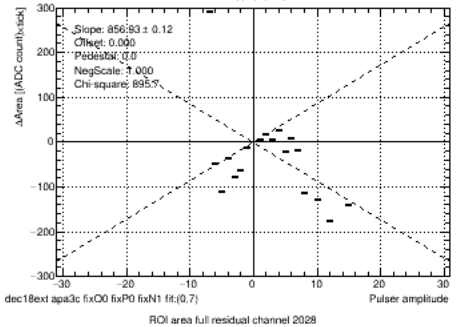

ROI area full residual channel 2019
Slope: 915.02 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1242.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

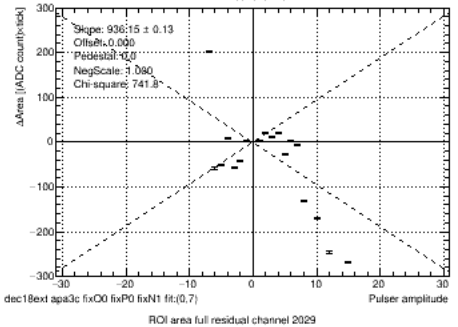

ROI area full residual channel 2020
Slope: 867.31 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1425.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

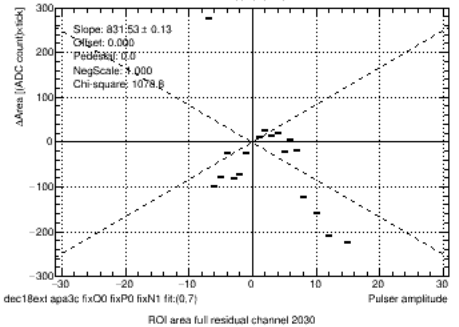

ROI area full residual channel 2021
Slope: 993.04 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1362.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

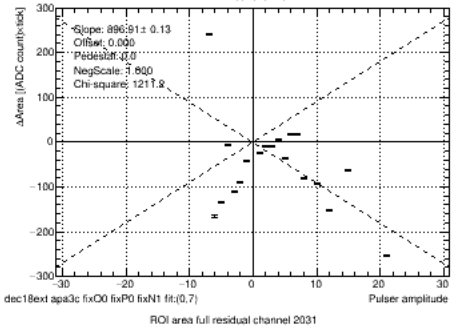

ROI area full residual channel 2022
Slope: 892.65 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 550.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

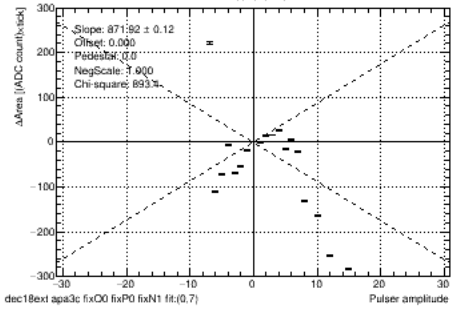

ROI area full residual channel 2023
Slope: 938.15 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1240.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

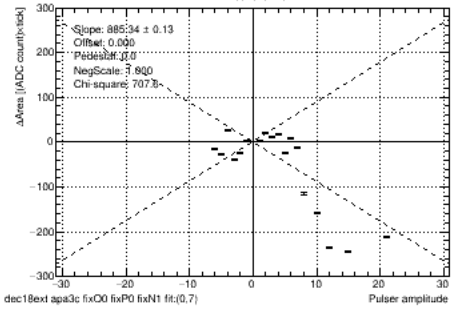

ROI area full residual channel 2024
Slope: 856.93 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 895.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

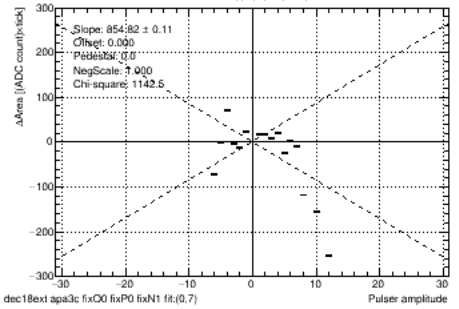

ROI area full residual channel 2025
Slope: 936.15 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 741.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

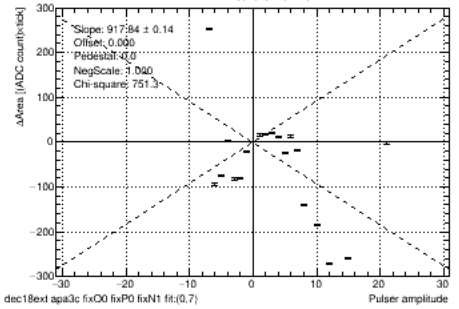

ROI area full residual channel 2026
Slope: 831.53 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1078.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

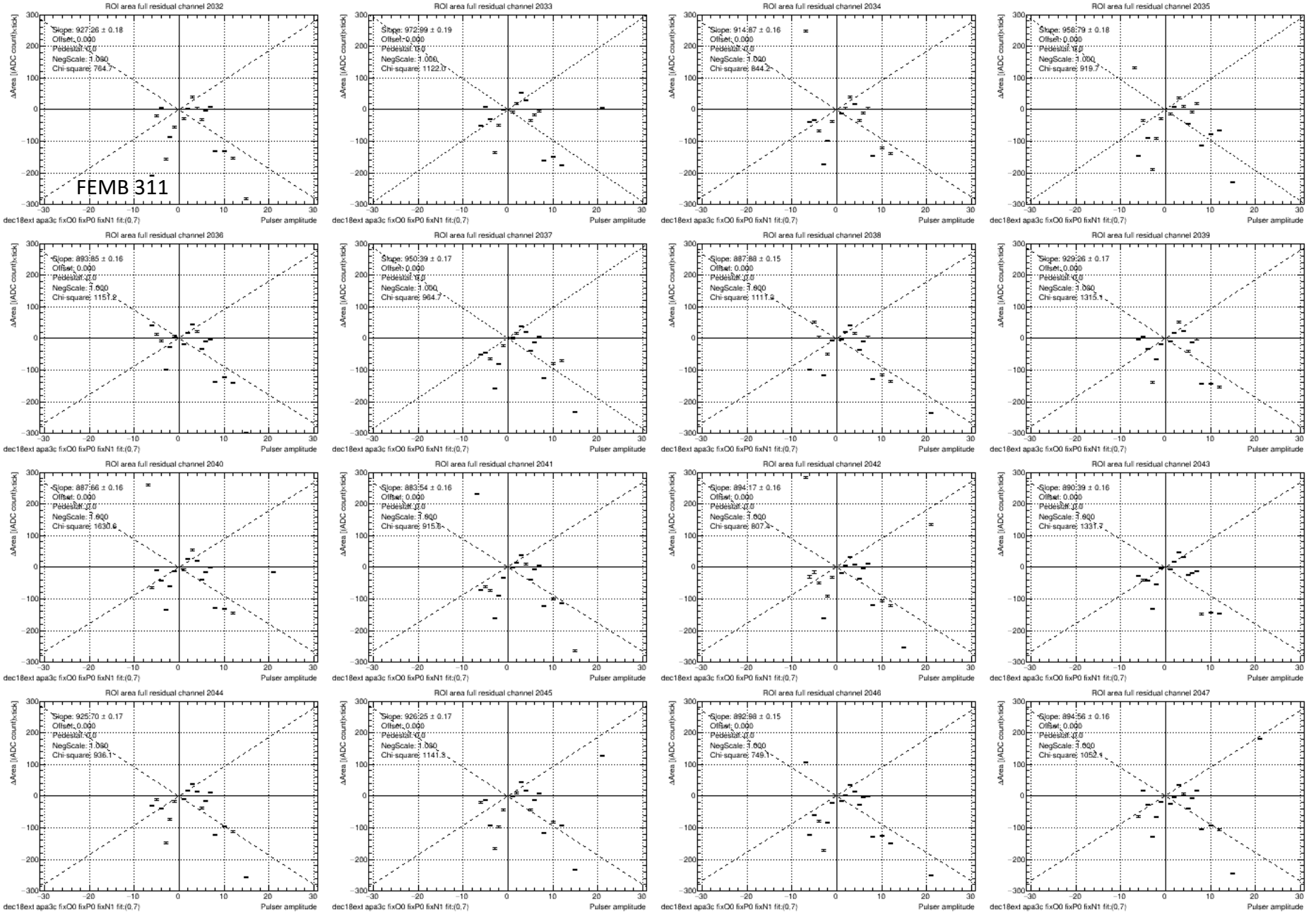

ROI area full residual channel 2027
Slope: 896.91 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1211.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2028
Slope: 871.92 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 893.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2029
Slope: 885.34 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 707.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2030
Slope: 854.82 ± 0.11
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1142.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2031
Slope: 917.84 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 751.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2032
Slope: 927.26 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 764.7
ROI area full residual channel 2033
Slope: 972.99 ± 0.19
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1122.0
ROI area full residual channel 2034
Slope: 914.87 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 844.2
ROI area full residual channel 2035
Slope: 958.79 ± 0.18
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 919.7
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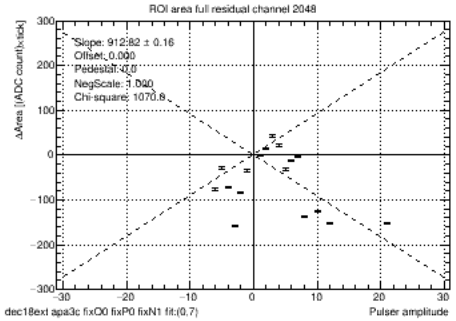
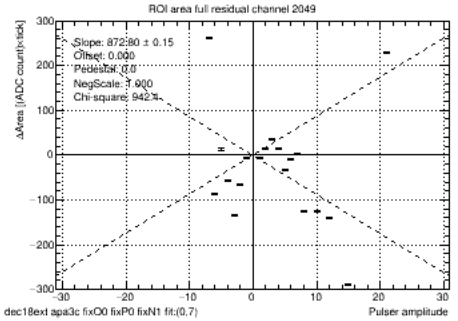
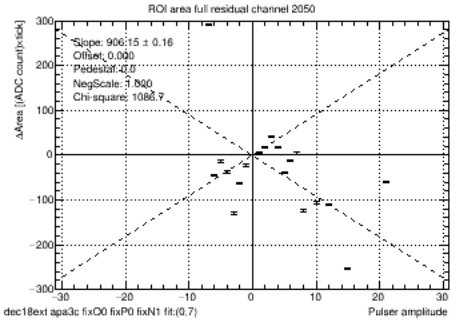
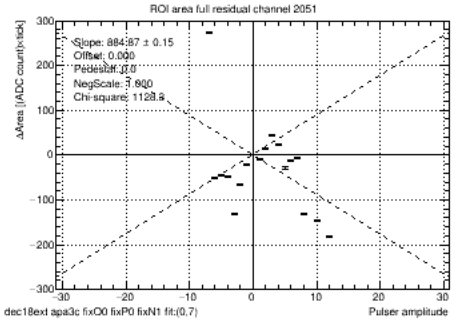
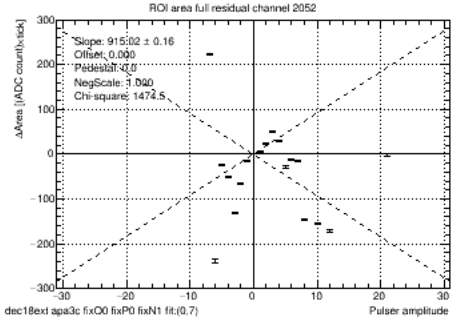
ROI area full residual channel 2036
Slope: 893.85 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1157.2
ROI area full residual channel 2037
Slope: 950.39 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 964.7
ROI area full residual channel 2038
Slope: 887.88 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1111.2
ROI area full residual channel 2039
Slope: 929.26 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1315.1
ROI area full residual channel 2040
Slope: 887.66 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1630.6
ROI area full residual channel 2041
Slope: 883.54 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 915.6
ROI area full residual channel 2042
Slope: 894.17 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 807.4
ROI area full residual channel 2043
Slope: 890.39 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1331.7
ROI area full residual channel 2044
Slope: 925.70 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 936.1
ROI area full residual channel 2045
Slope: 926.25 ± 0.17
Offset: 0.000
Pedestal: 0.0
NegScale: 1.080
Chi-square: 1141.3
ROI area full residual channel 2046
Slope: 892.98 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 749.1
ROI area full residual channel 2047
Slope: 894.56 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1052.1
ΔArea [ADC count]x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

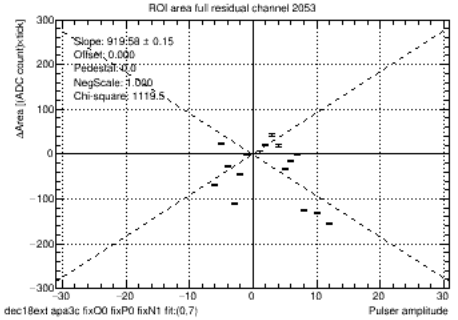

ROI area full residual channel 2048
Slope: 912.82 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1070.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

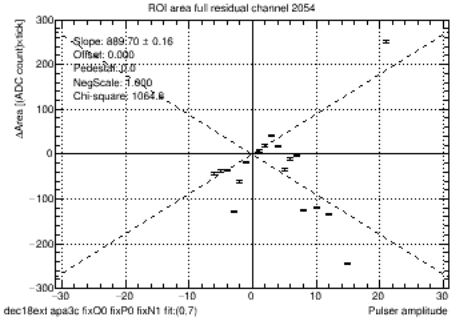

ROI area full residual channel 2049
Slope: 872.80 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 942.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

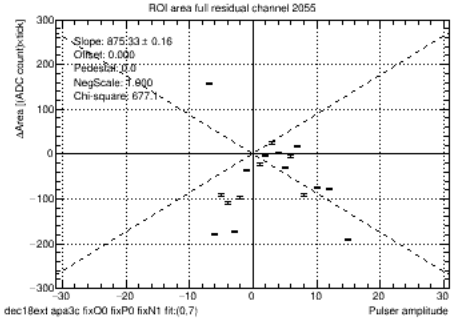

ROI area full residual channel 2050
Slope: 906.15 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1080.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

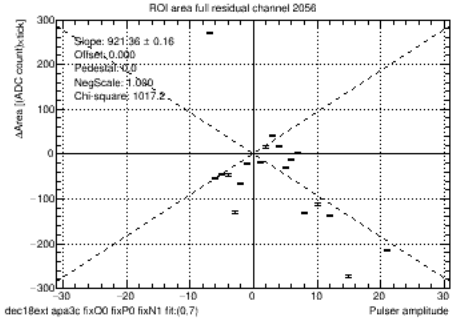

ROI area full residual channel 2051
Slope: 884.87 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1128.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

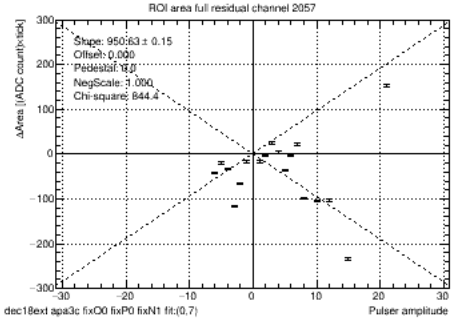

ROI area full residual channel 2052
Slope: 915.02 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1474.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

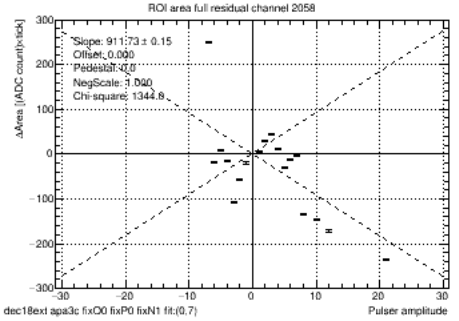

ROI area full residual channel 2053
Slope: 919.58 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1119.5
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

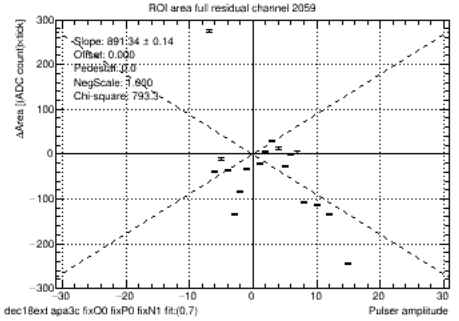

ROI area full residual channel 2054
Slope: 889.70 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1064.6
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

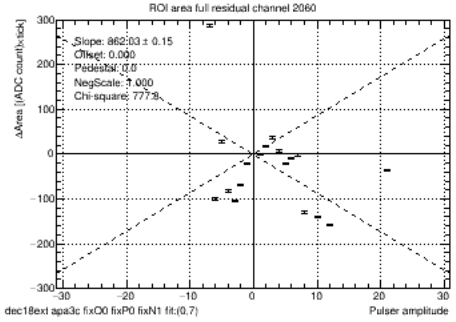

ROI area full residual channel 2055
Slope: 875.33 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 677.1
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

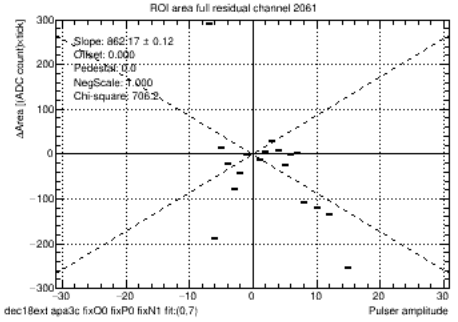

ROI area full residual channel 2056
Slope: 921.36 ± 0.16
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1017.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

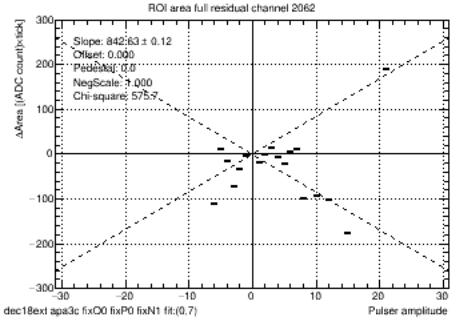

ROI area full residual channel 2057
Slope: 950.63 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 844.4
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

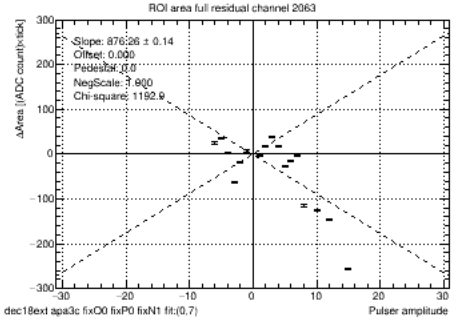

ROI area full residual channel 2058
Slope: 911.73 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1344.8
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

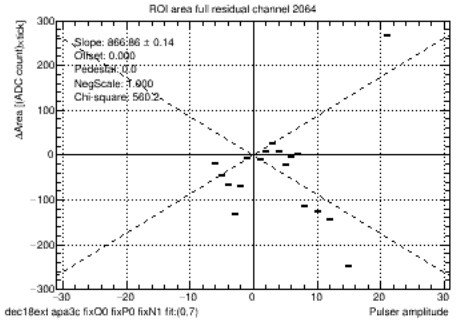

ROI area full residual channel 2059
Slope: 891.34 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 793.3
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

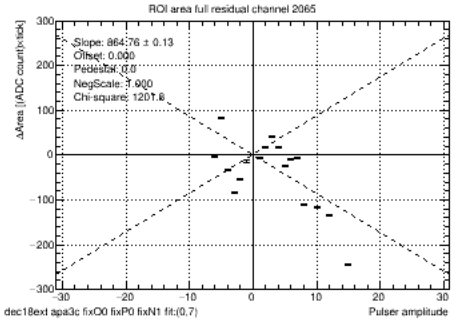

ROI area full residual channel 2060
Slope: 862.03 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 777.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

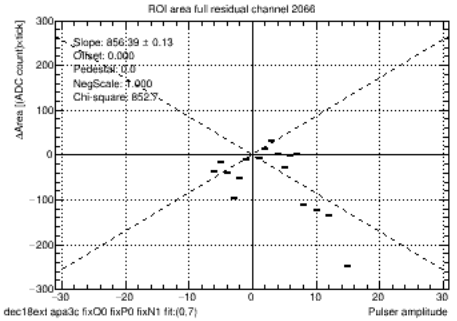

ROI area full residual channel 2061
Slope: 862.17 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 706.2
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

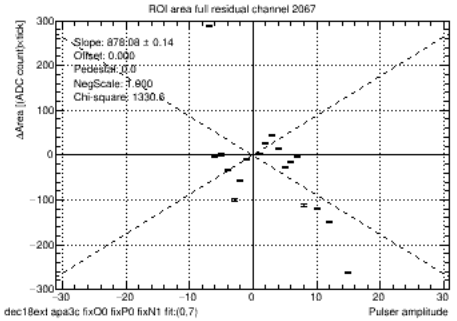

ROI area full residual channel 2062
Slope: 842.63 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 575.7
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

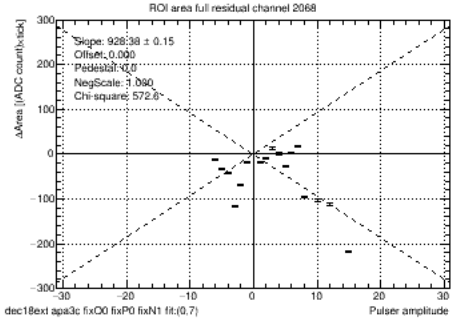

ROI area full residual channel 2063
Slope: 876.26 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1192.9
ΔArea [(ADC count)x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

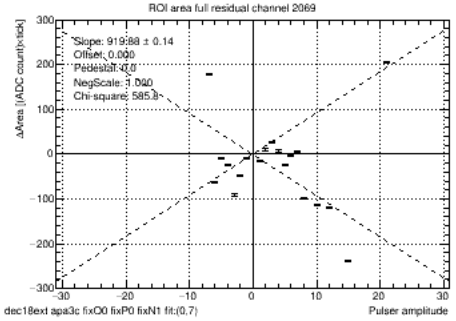

ROI area full residual channel 2064
Slope: 866.86 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 560.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

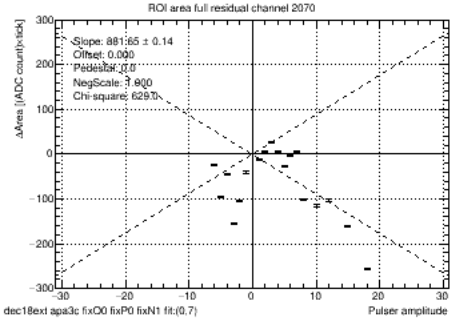

ROI area full residual channel 2065
Slope: 864.76 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1201.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

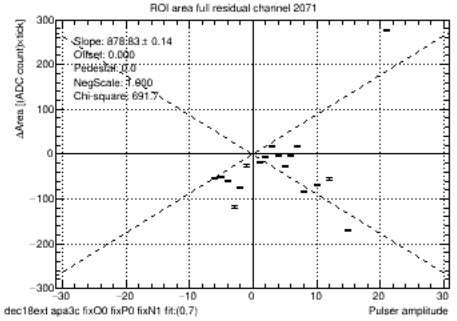

ROI area full residual channel 2066
Slope: 856.39 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 852.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

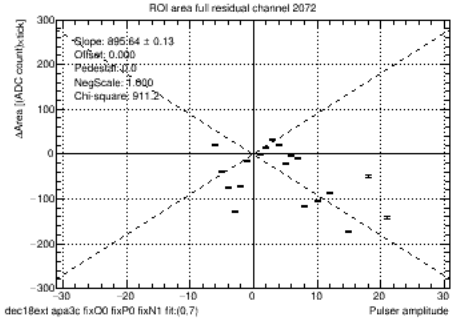

ROI area full residual channel 2067
Slope: 878.08 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1330.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

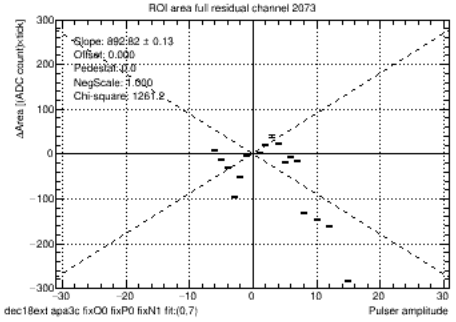

ROI area full residual channel 2068
Slope: 928.38 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 572.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

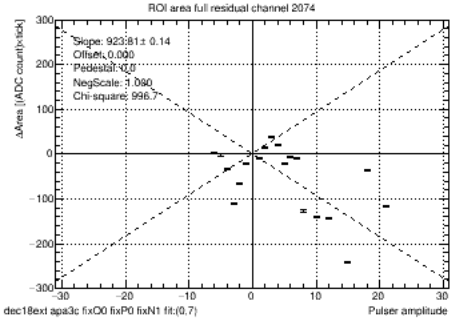

ROI area full residual channel 2069
Slope: 919.88 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 585.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

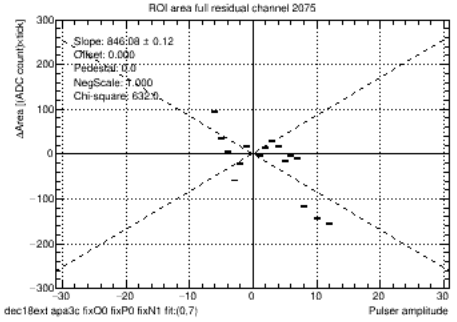

ROI area full residual channel 2070
Slope: 881.65 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 629.0
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

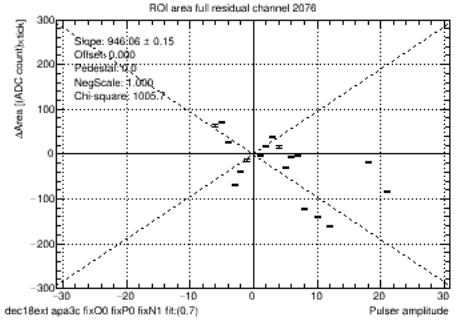

ROI area full residual channel 2071
Slope: 878.83 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 691.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

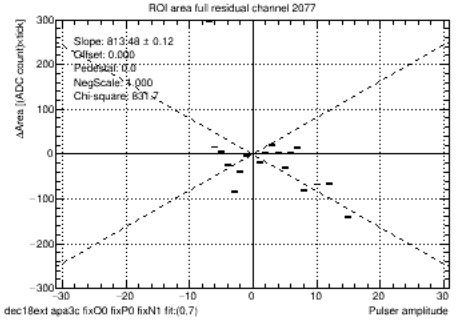

ROI area full residual channel 2072
Slope: 895.64 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 911.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

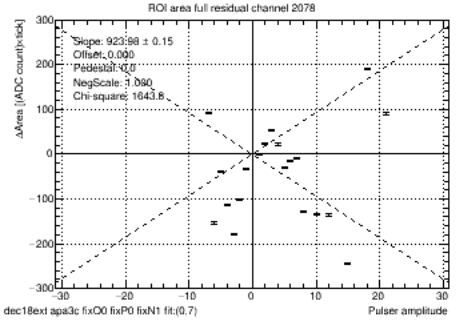

ROI area full residual channel 2073
Slope: 892.82 ± 0.13
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1261.2
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

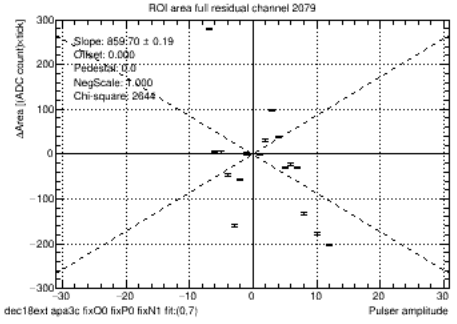

ROI area full residual channel 2074
Slope: 923.81 ± 0.14
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 996.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2075
Slope: 846.08 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 632.6
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2076
Slope: 946.06 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1005.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2077
Slope: 813.48 ± 0.12
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 831.7
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2078
Slope: 923.98 ± 0.15
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 1643.8
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude


ROI area full residual channel 2079
Slope: 859.70 ± 0.19
Offset: 0.000
Pedestal: 0.0
NegScale: 1.000
Chi-square: 2644
ΔArea [|ADC count|x-tick]
dec18ext apa3c fixO0 fixP0 fixN1 fit:(0,7)
Pulser amplitude

# Comments on residual distributions

Fitted area slopes are around 900 ADC/$Q_{step}$

- $Q_{step}$ = 3.43. fC = 21.4 ke (nominal)
- slope = 260 ADC/fC = 40 ADC/ke
- Scale on plots is ±300 ADC = ±7100 e

Points in response plots show a lot of scatter

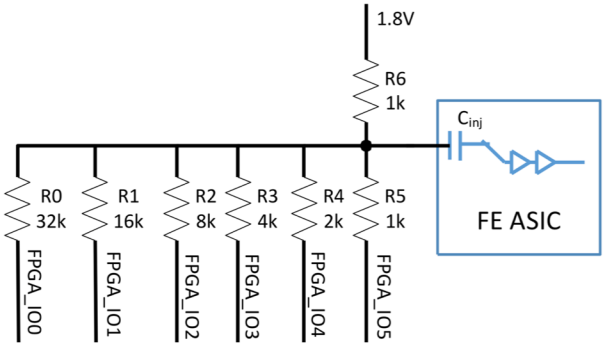
- Range ±1000 e for the first seven (fitted) points
- RMS (i.e. the error on any one measurement) is similar to this value
- But the error on the mean (error bars) is much smaller

Where does the non-linearity come from?

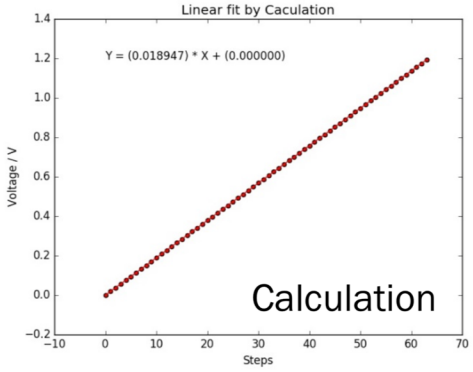
- We were blaming the ADCs
- Now see we also expect a significant contribution from the pulser
  - See the following…

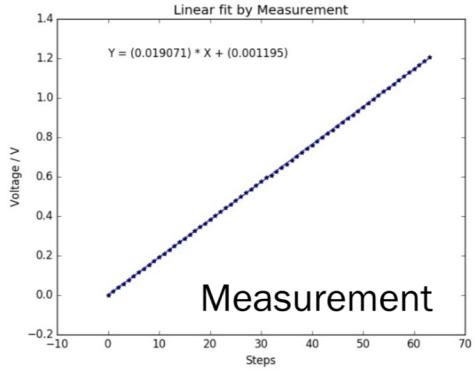
# Pulser circuit (Hucheng)

## FEMB Optimization (2): FPGA-DAC for Calibration




FPGA IO source or sink current limit: 2mA
Maximize source current: 0.574mA
Maximize sink current: 1.187mA
R6 = 1kΩ
**R0 = 32.4k Ω (1%)**
**R1 = 16.02kΩ (1%)**
**R2 = 8.06kΩ (1%)**
**R3 = 4.02kΩ (1%)**
**R4 = 2.00kΩ (1%)**
**R5 = 1.00kΩ (1%)**




FPGA-DAC works well at both room and cryogenic temperatures

- Very good agreement between calculation and measurement
- A most convenient way for ProtoDUNE-SP calibration

10

# Pulser charge

Circuit on previous page is a voltage divider

- IO lines are 0 (off) or 1.8 V (on)
- Bits in pulser setting A correspond to switching lines on

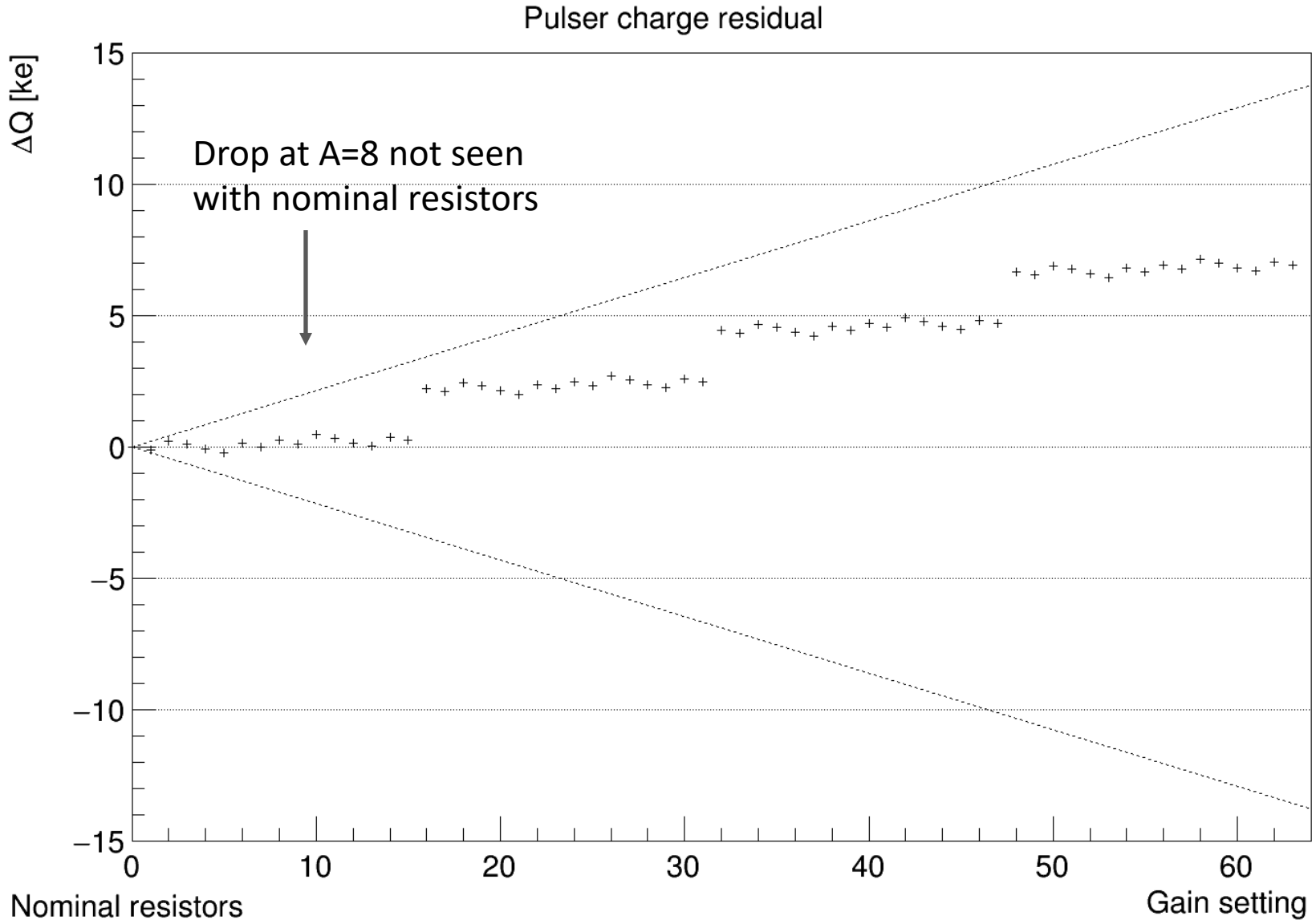
Code in dunetpc to give V/Q as function of A

- $R_1$, …, $R_6$ and $V_{fpga}$ are variable parameters
- Confirmed the code gives almost (0.001) the same values as plot

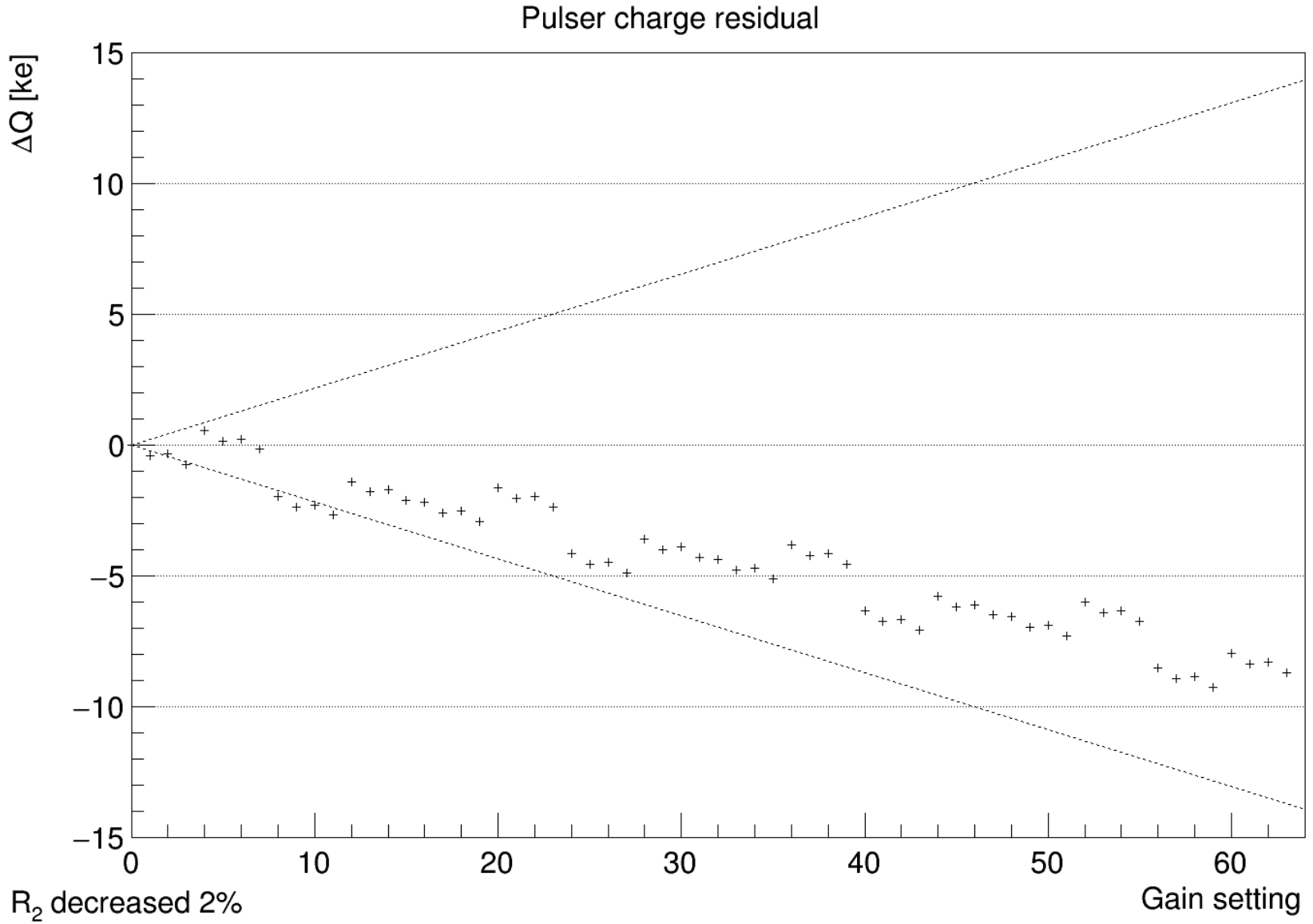
Use this to study nonlinearity

- As with protoDUNE data, I fit A ≤ 7 to line passing through origin
- Then plot residual: Q – slope*A
- Example plots on following pages
  - I try to reproduce the protoDUNE drop at A = 8
    - Need to shift $R_2$ by 2%
    - Resistor tolerance is 1%

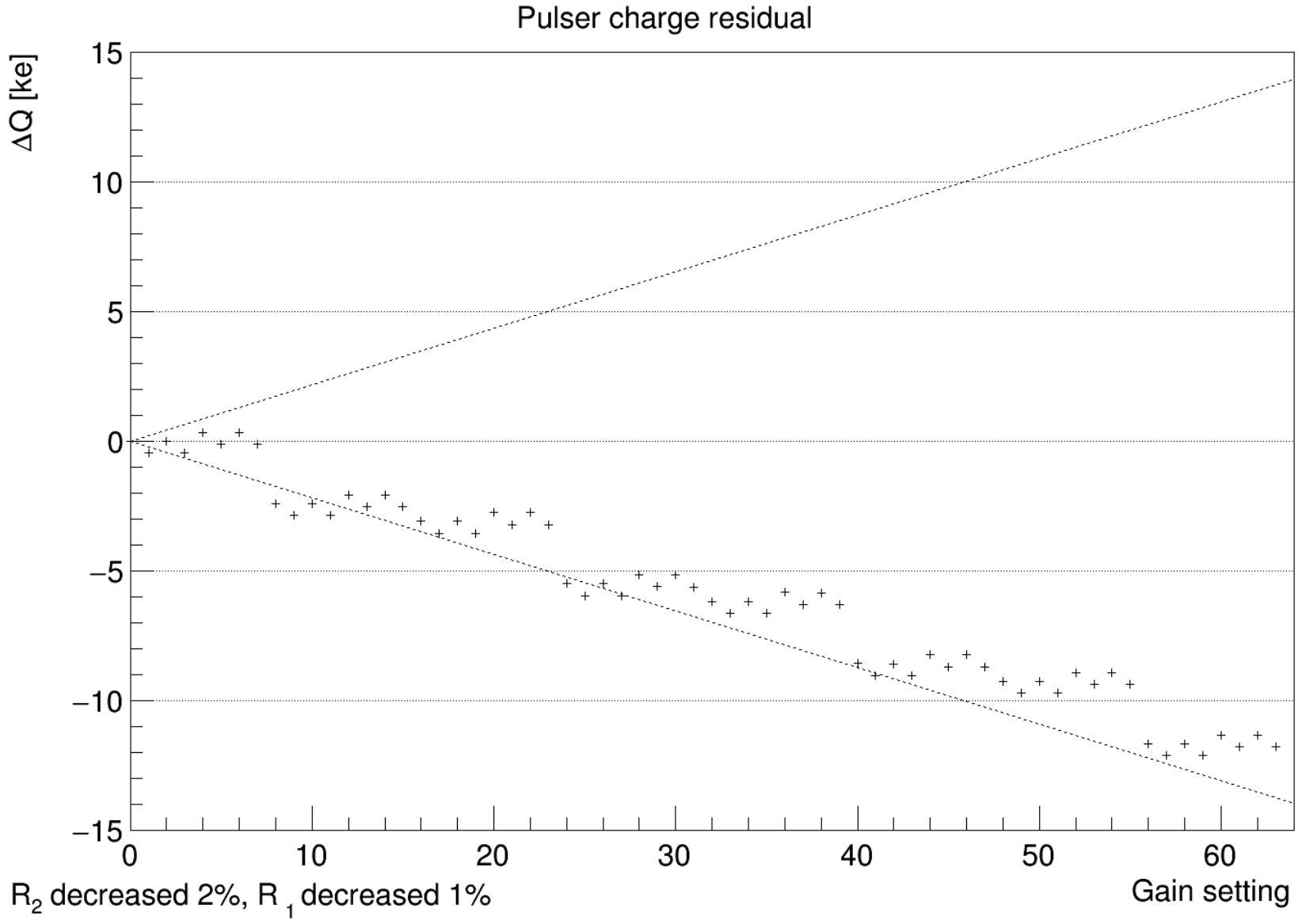
# Pulser non-linearity with nominal resistors



# Pulser non-linearity shifting $R_2$



# Pulser non-linearity shifting $R_2$ and $R_1$



# Next

Like to get more pulser data

- Fill in missing settings: 9, 11, 13, 14, 16, 17
- External pulser data at gain of 7.8
  - To distinguish ADC and pulser nonlinearities

Analysis

- Try fitting pulser parameters (resistances) to protoDUNE data
- Can we find best fit values for each FEMB (128 channels)?