Ecal prototype test

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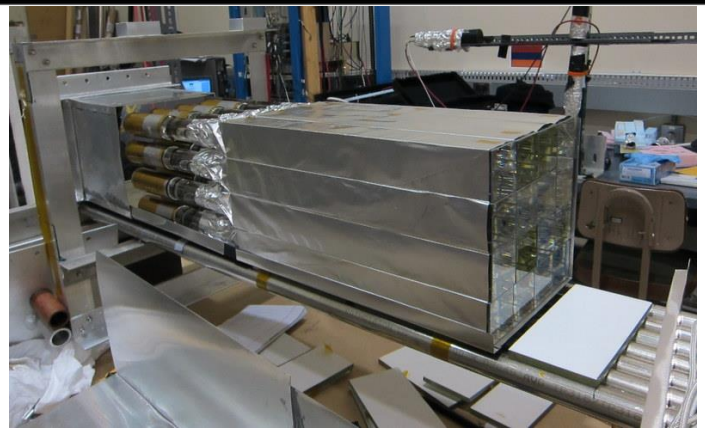
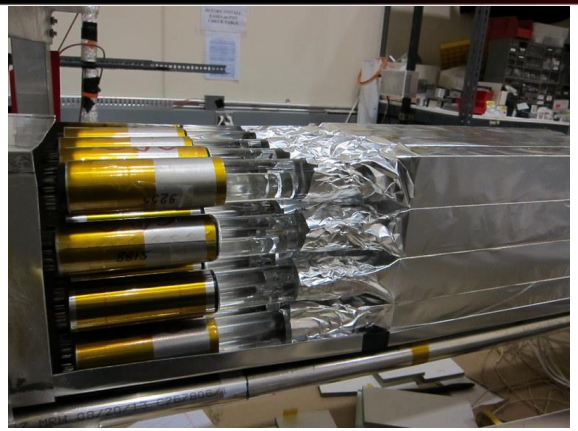
B. Wojtsekhowski

Construction of C16

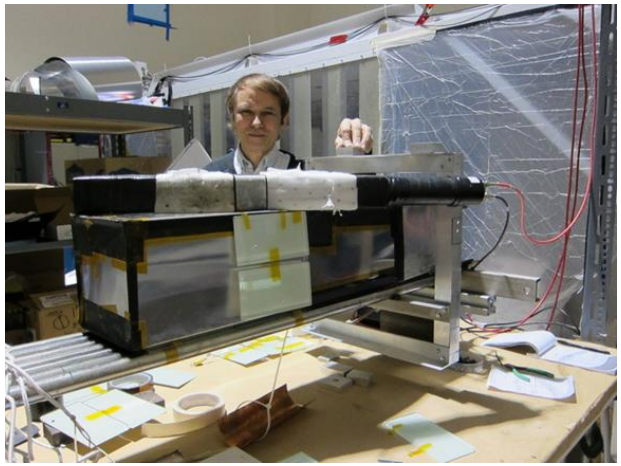


4x4 array of 4.2x4.2x30cm^3 lead glass

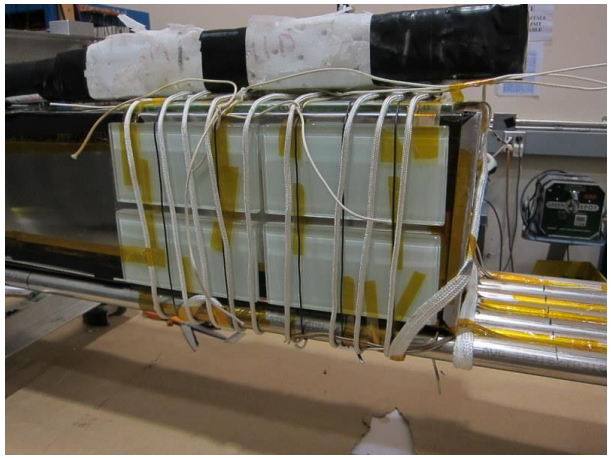


15cm light guide, then PMT

Light tight enclosure



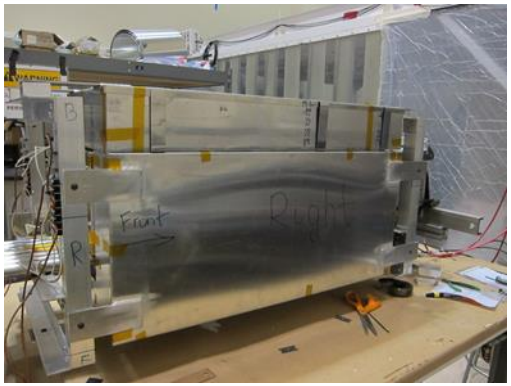
Check signals and light tightness

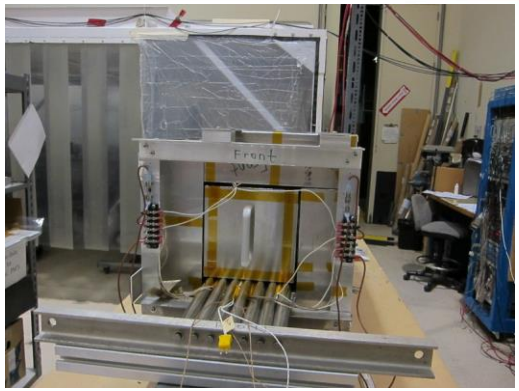


Wrap heating coil and glass tile between coil and glass.

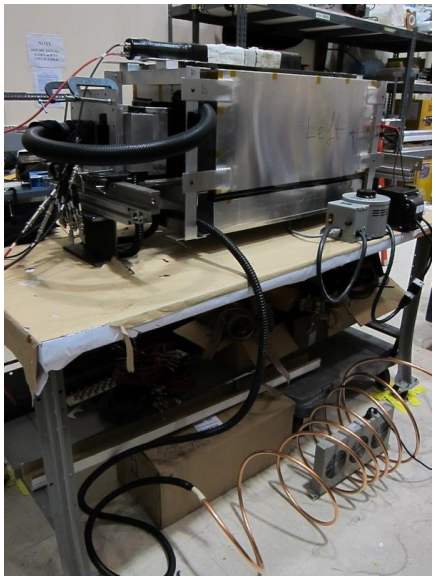
Glass foam insulation

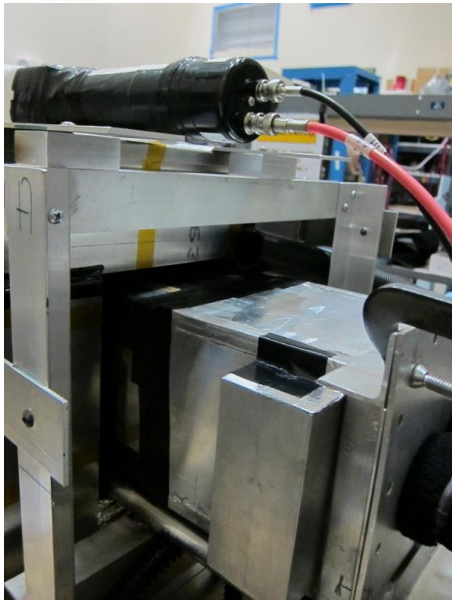
Construction of C16 (part 2)

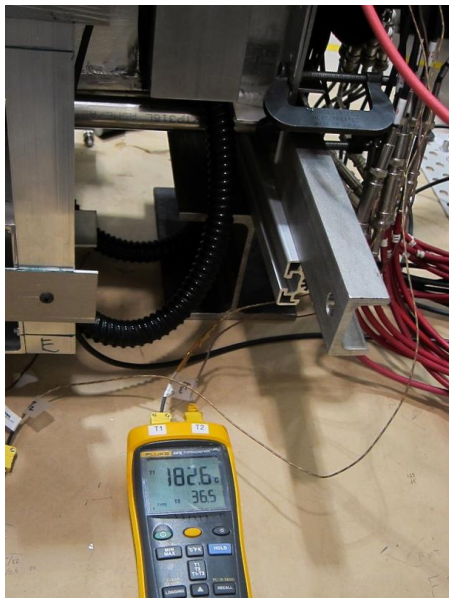




Enclose in thin aluminum







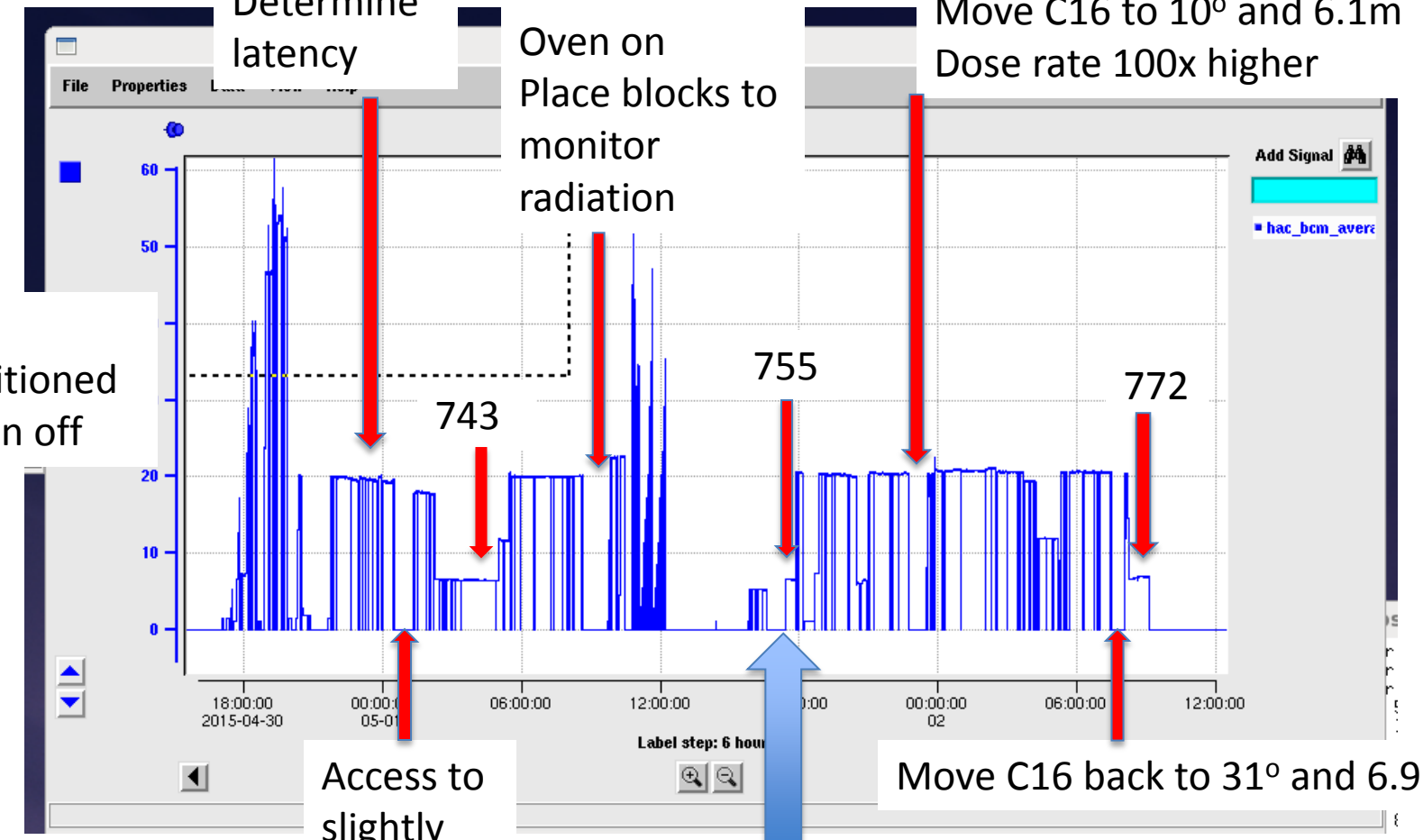
Cool air blow in back to cool PMT

Temperature monitored at multiple places 225^{o}, 185^{o} and 38^{o} C at PMT

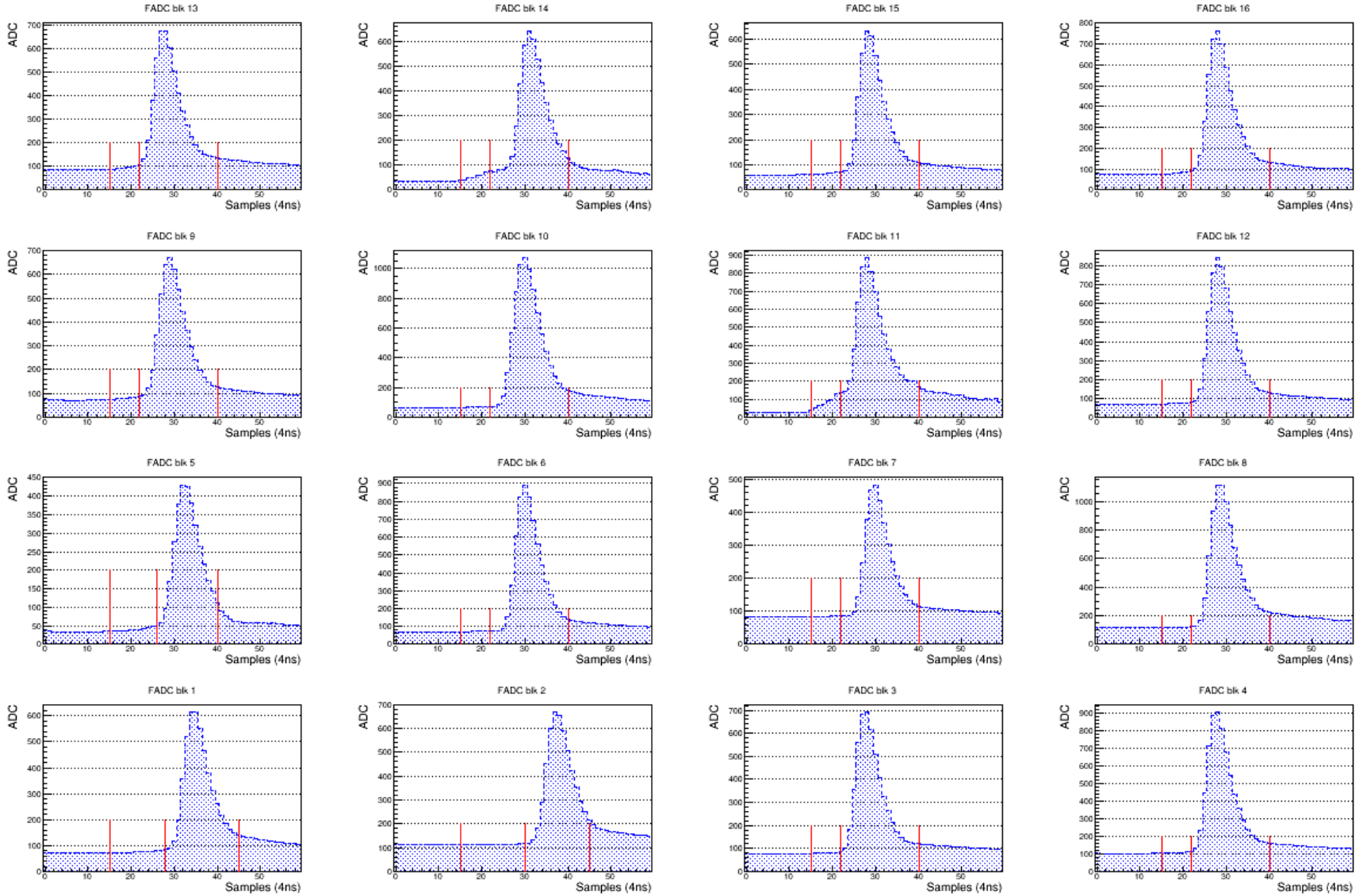
Test of C16 in Hall A

- Test done between April 30th at 17:00 to May 2nd at 10:00 am.
- Beam energy = 2.056 GeV, 15 cm LH2 target.
- RHRS set for elastic protons at 48.74º and 1.07 GeV/c
- C16
  - placed at 31º and elastic electrons with 1.574 GeV/c .
  - at 6.9m from target so covers about 25x25msr.
  - Expect about 1.5% change in elastic electron momentum across the face of C16.
- DAQ system used RHRS scintillators as trigger and readout the C16 in FADC250. Readout in sampling mode with time window of 60 samples x 4ns = 240 ns.

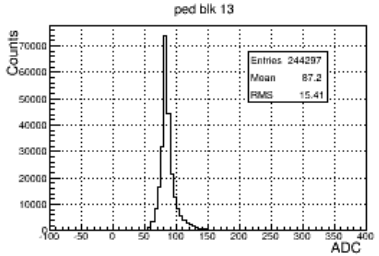
Timeline


LH2 data
Determine
latency
Oven on
Place blocks to
monitor
radiation
Move C16 to 10° and 6.1m
Dose rate 100x higher
C16
positioned
Oven off
743
755
772
Access to
slightly
move C16
Move C16 back to 31° and 6.9m
Oven at 250, 190 and 38
File
Properties
Add Signal
hac_bcm_avera
60
50
20
10
0
18:00:00
2015-04-30
06:00:00
12:00:00
00:00:00
02
06:00:00
12:00:00

FADC250 Sampling histogram



Pedestals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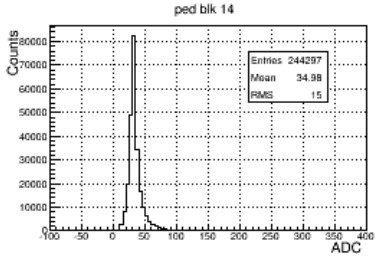
RMS 15.41
Counts
ADC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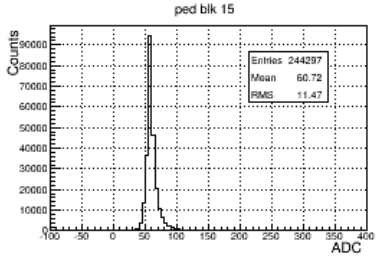
RMS 15
Counts
ADC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Counts
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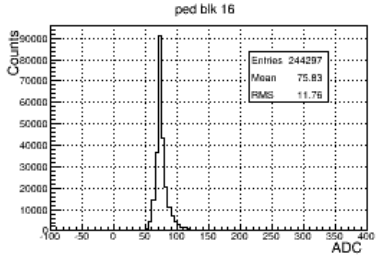
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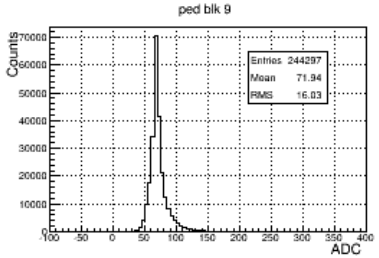
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RMS 16.03
Counts
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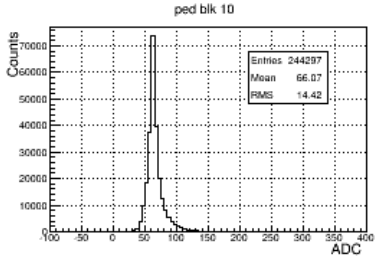
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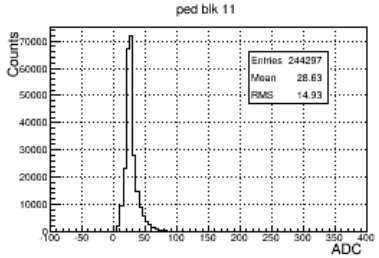
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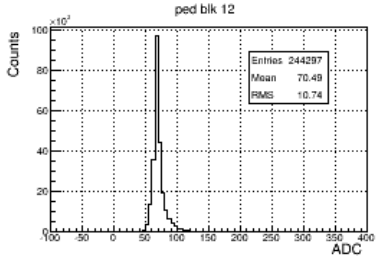
Counts
ADC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RMS 10.74
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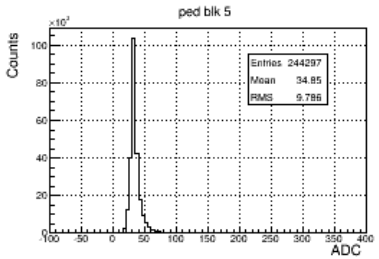
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RMS 9.786
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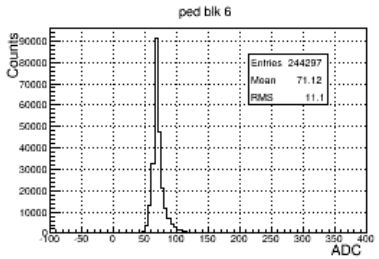
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Counts
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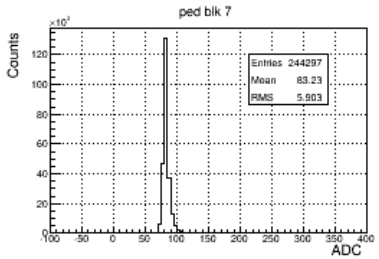
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RMS 5.903
Counts
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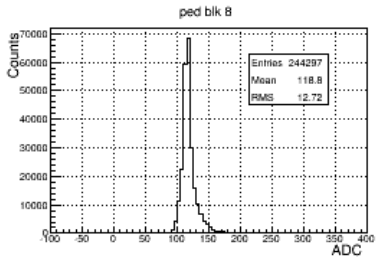
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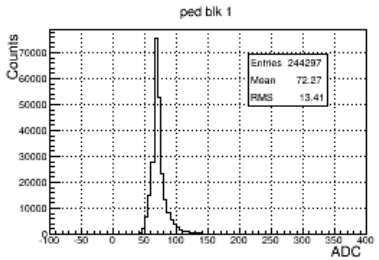
RMS 12.72
Counts
ADC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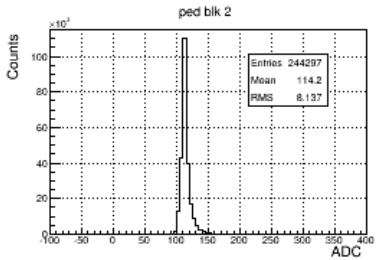
RMS 13.41
Counts
ADC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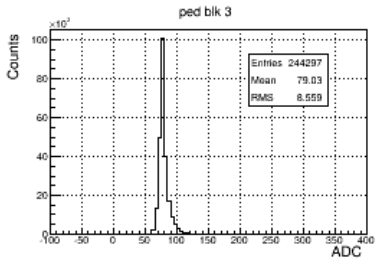
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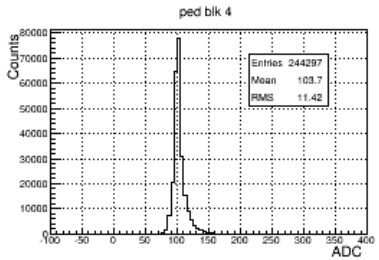
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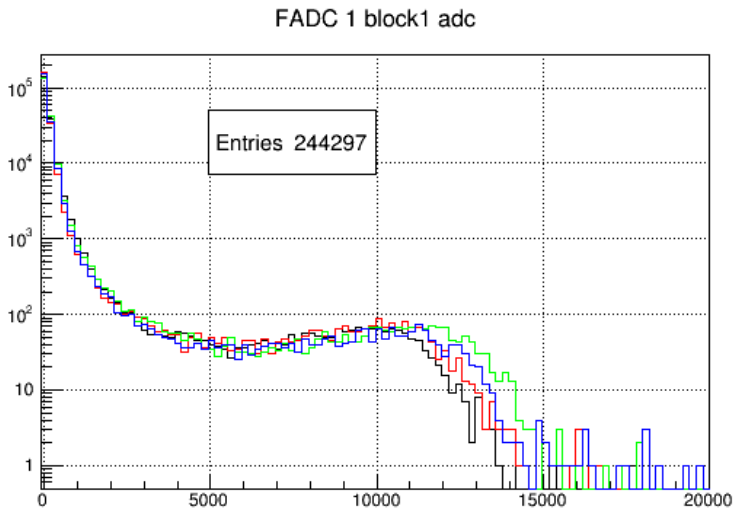
Entries 244297
Mean 103.7
RMS 11.42
Counts
ADC

ADC spectra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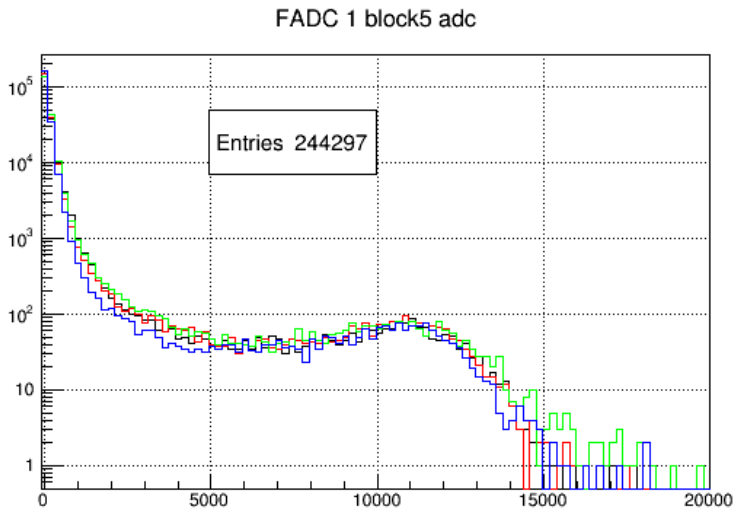
Entries 244297
10^5
10^4
10^3
10^2
10
1
0
5000
10000
15000
20000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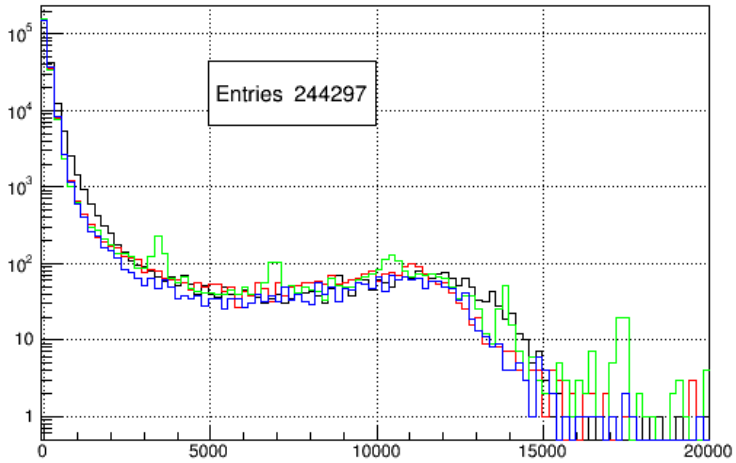
10^4
10^3
10^2
10
1
0
5000
10000
15000
20000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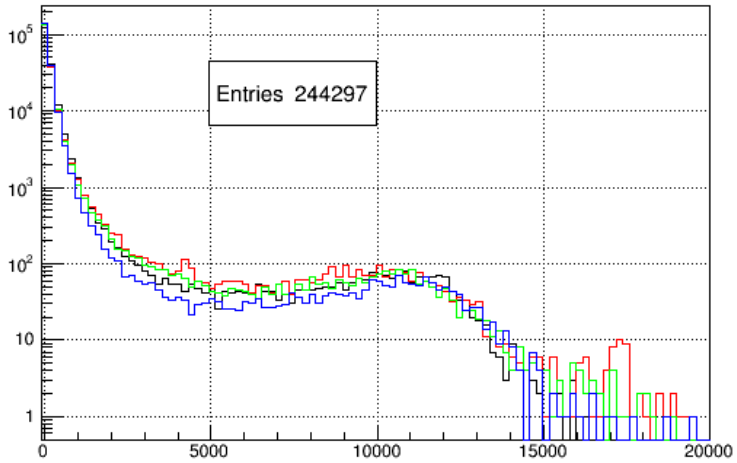
10^5
10^4
10^3
10^2
10
1
0
5000
10000
15000
20000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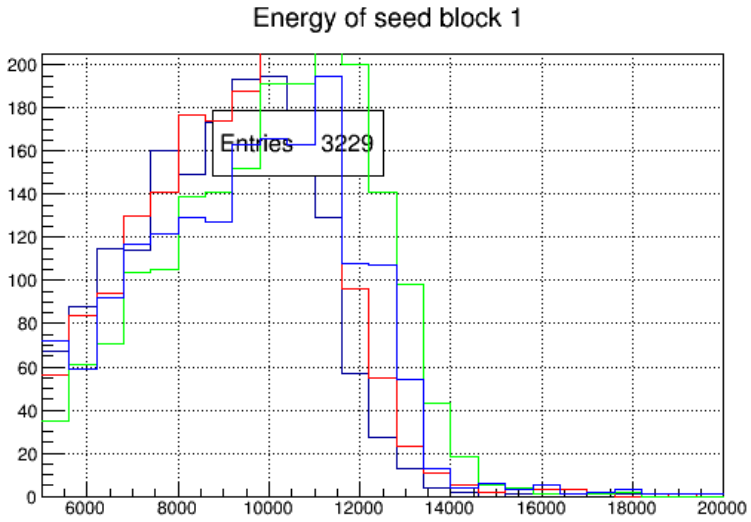
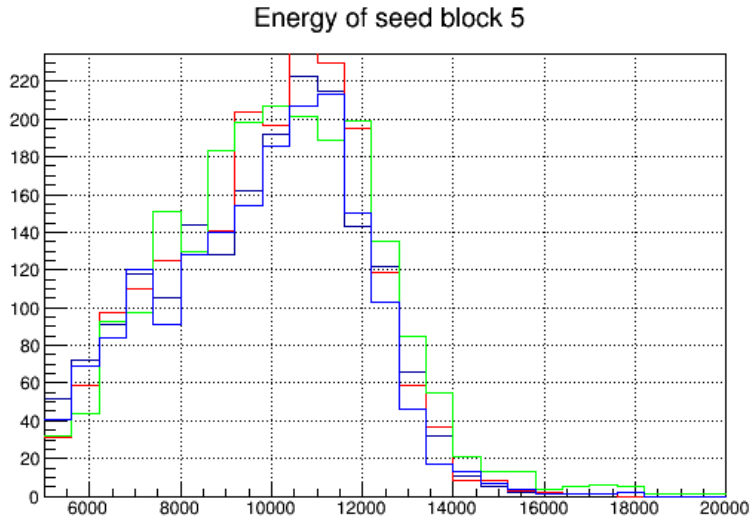
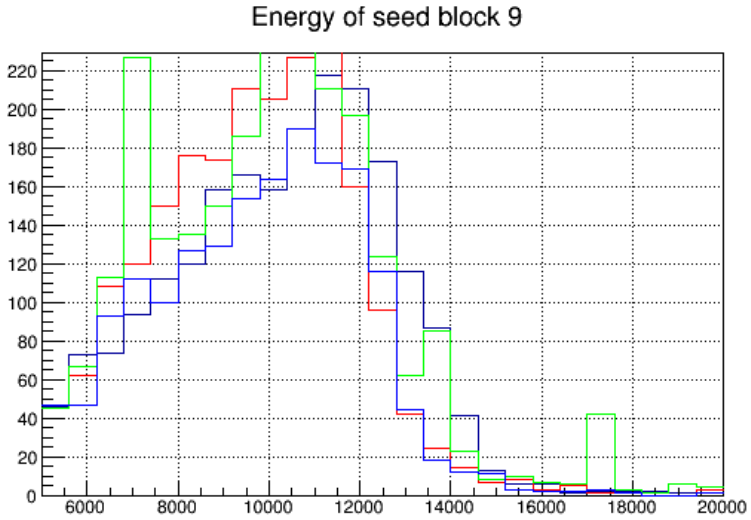
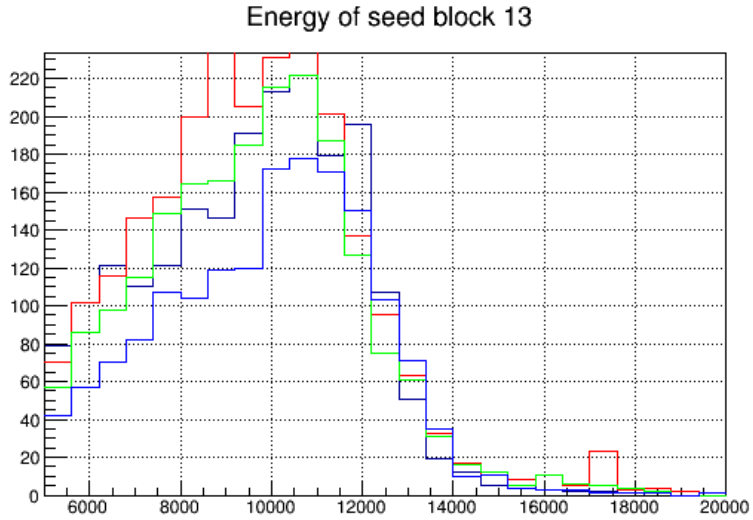
10^4
10^3
10^2
10
1
0
5000
10000
15000
20000

ADC spectra of block with highest energy

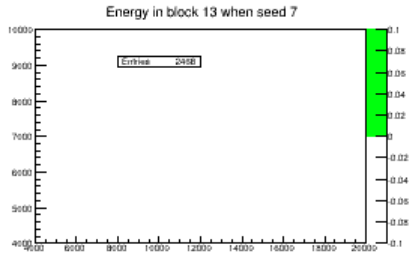


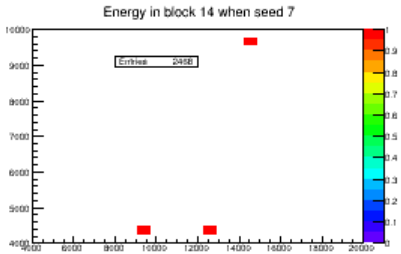


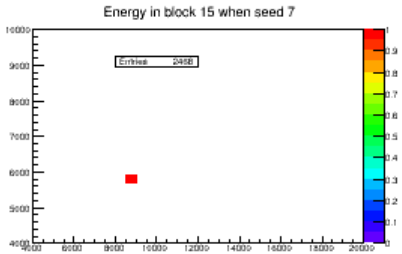


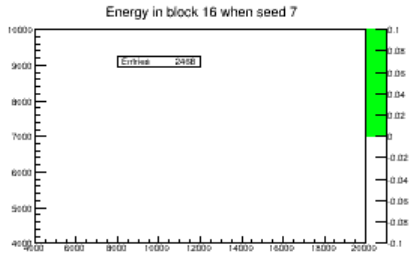


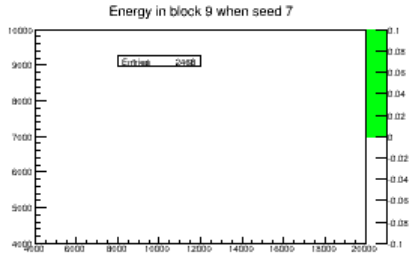
Energy in Seed block 7 versus other blocks

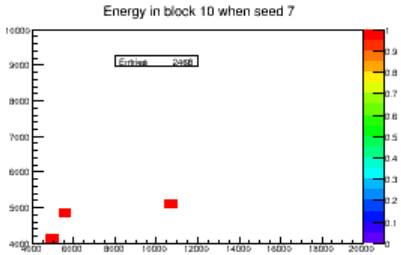


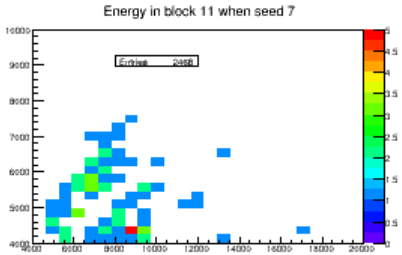


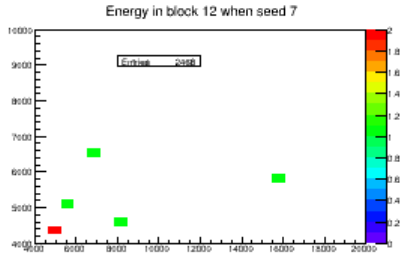


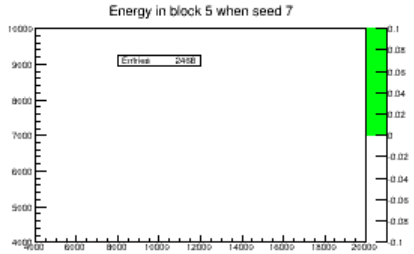


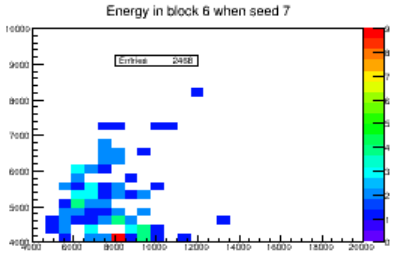


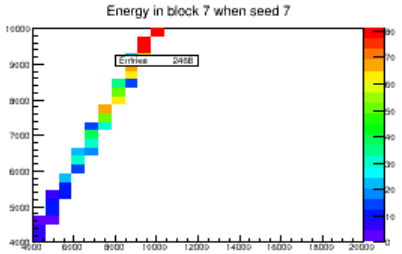


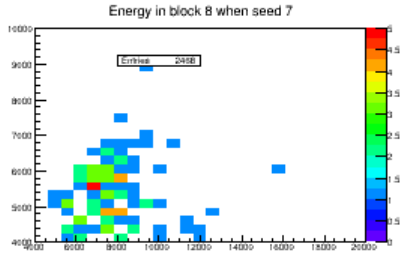


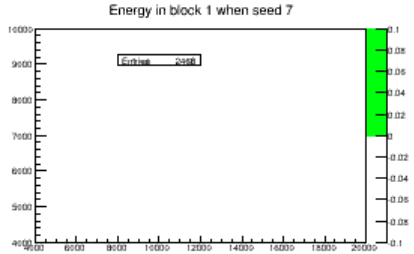


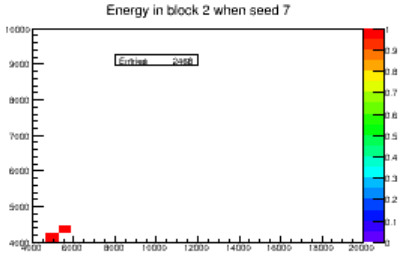


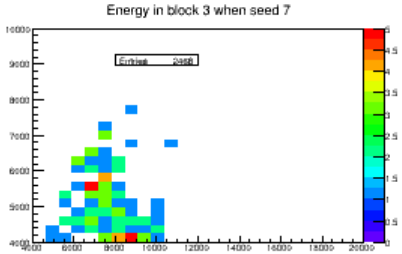


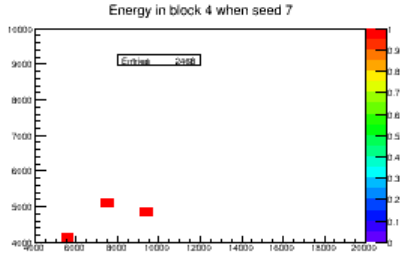






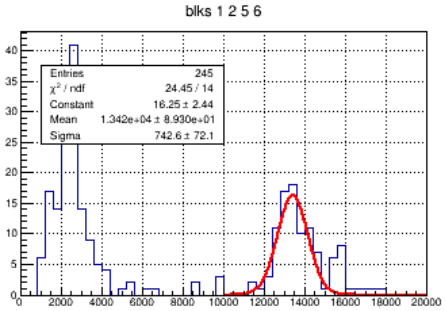


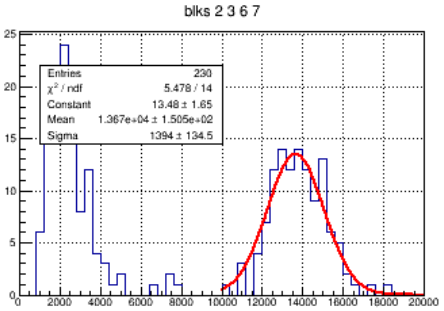


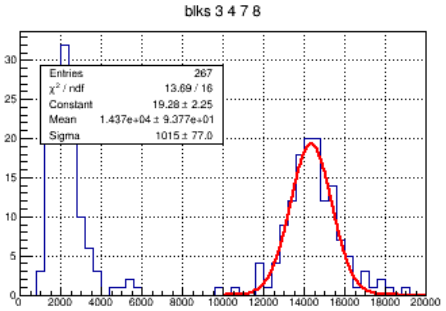


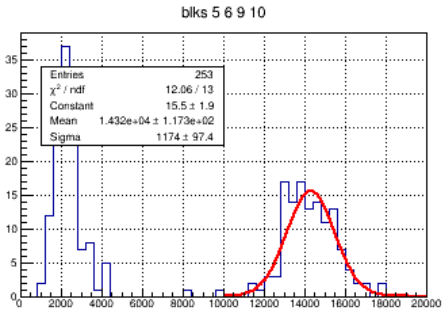
Energy resolution for run 743 at 6 uA

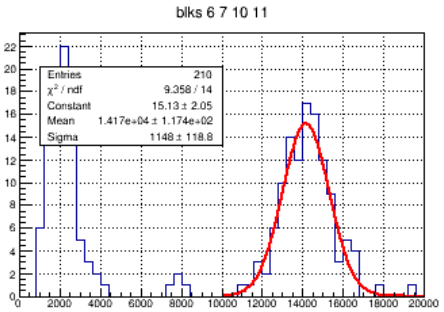
Sum energy in four neighbor blocks which each 1/6 of the energy seed block

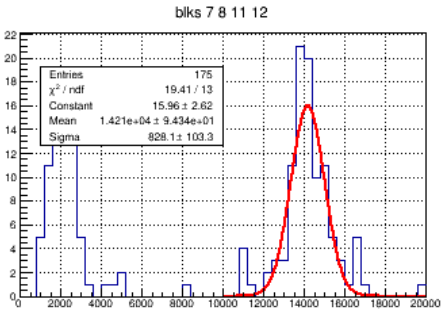


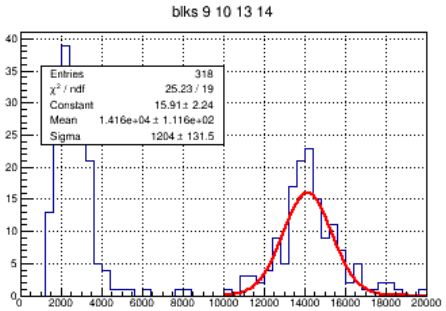


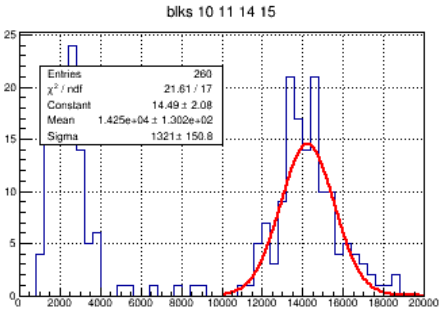


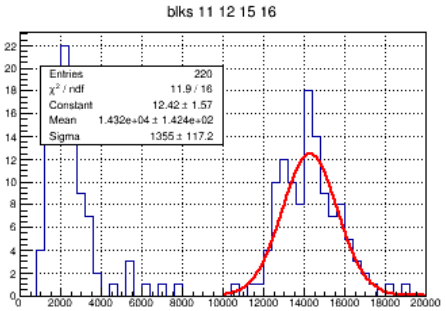




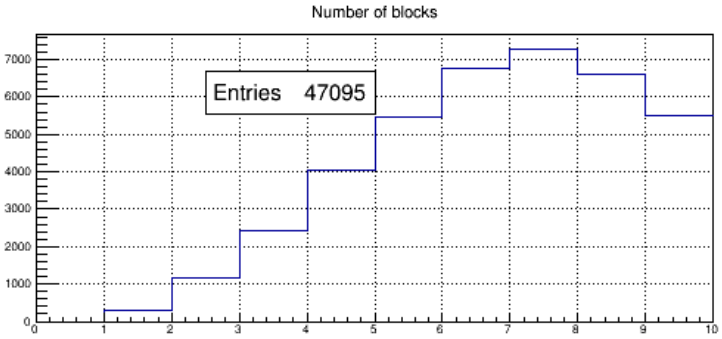


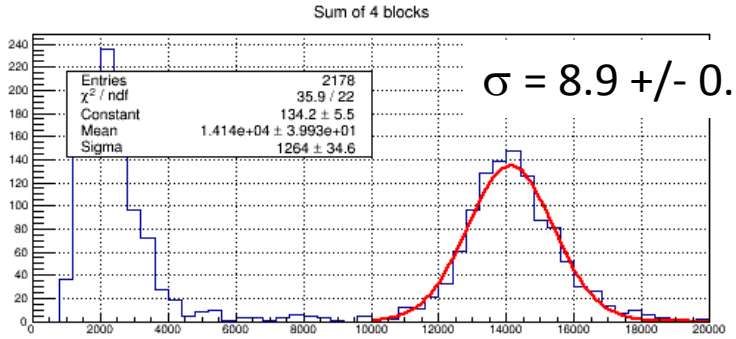




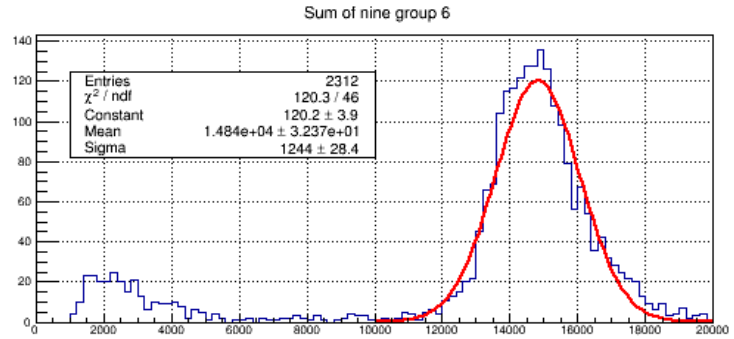


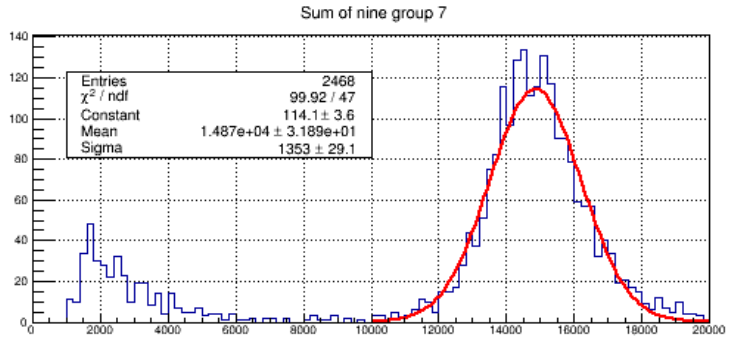
Energy resolution for run 743 at 6 uA

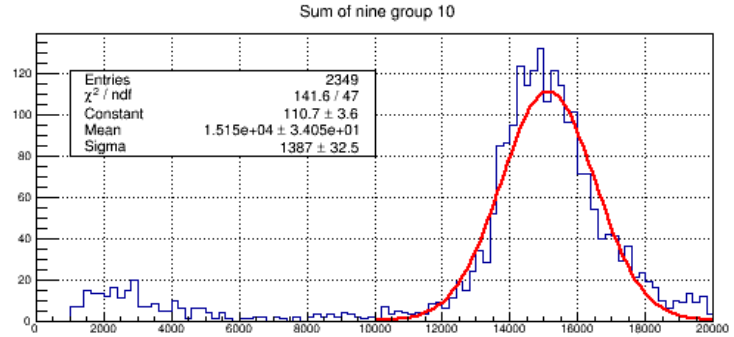


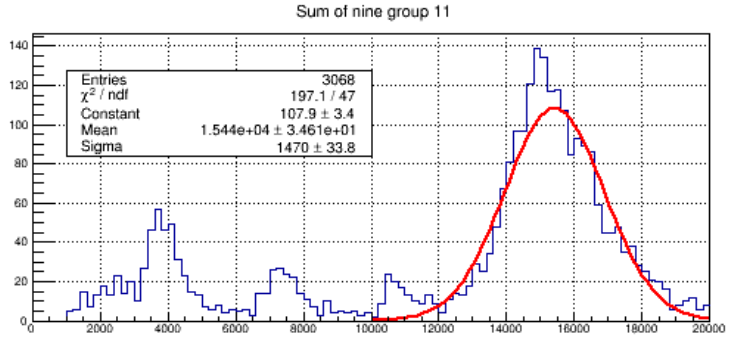


σ = 8.9 +/- 0.3 %

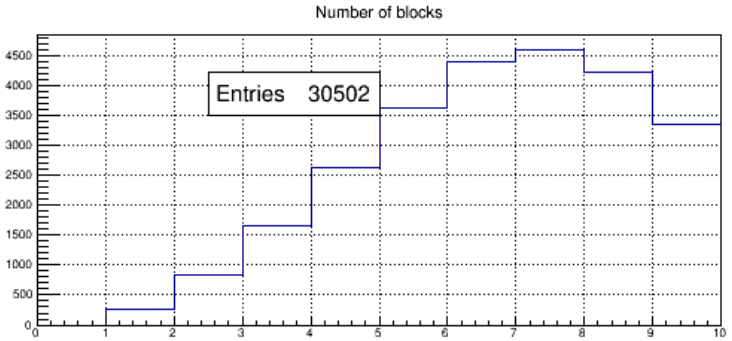


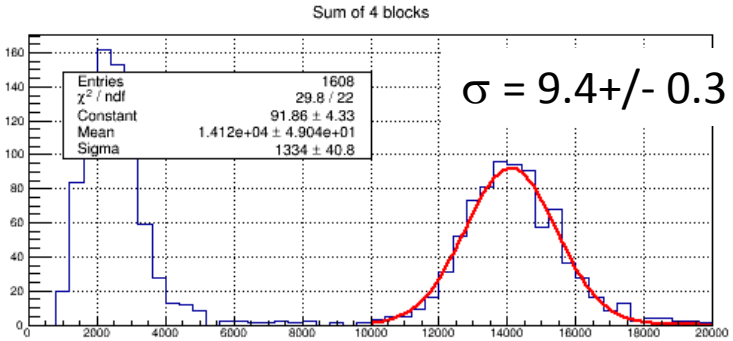




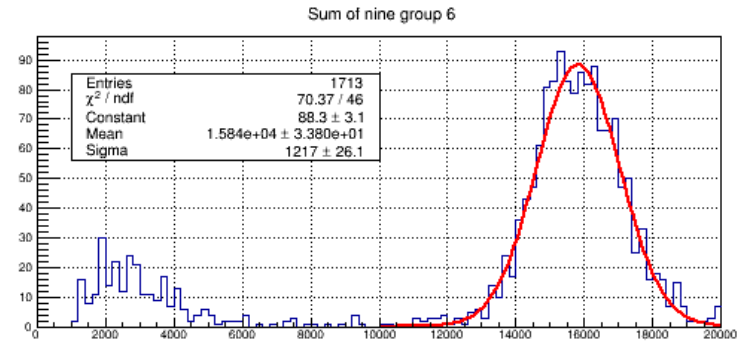


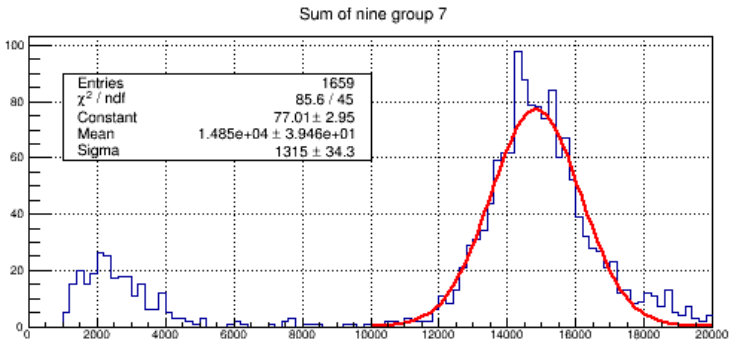
Energy resolution for run 755 at 6 uA

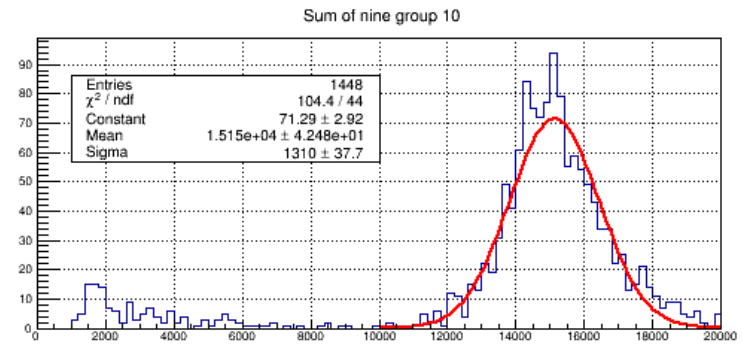


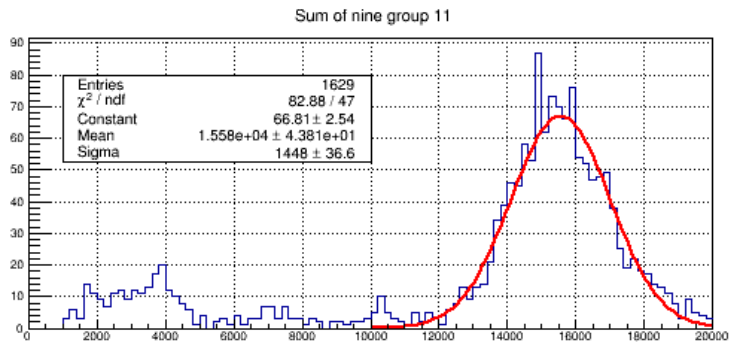


σ = 9.4+/- 0.3 %

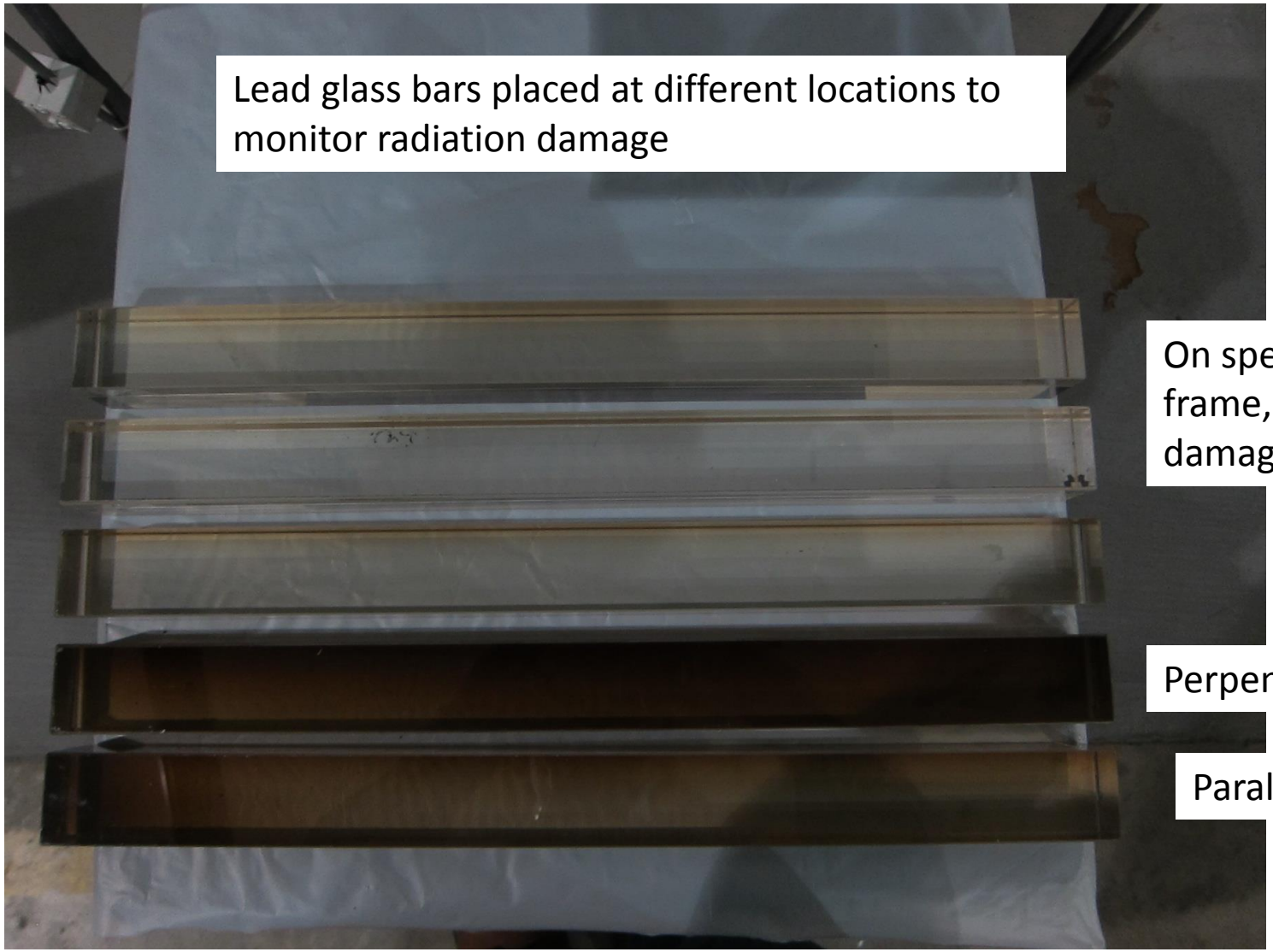








Radiation damage monitor



Energy resolution for run 772 at 6 uA