



中国科大
U S T C



cepc ecal 数据分析

李想

2025.1.3

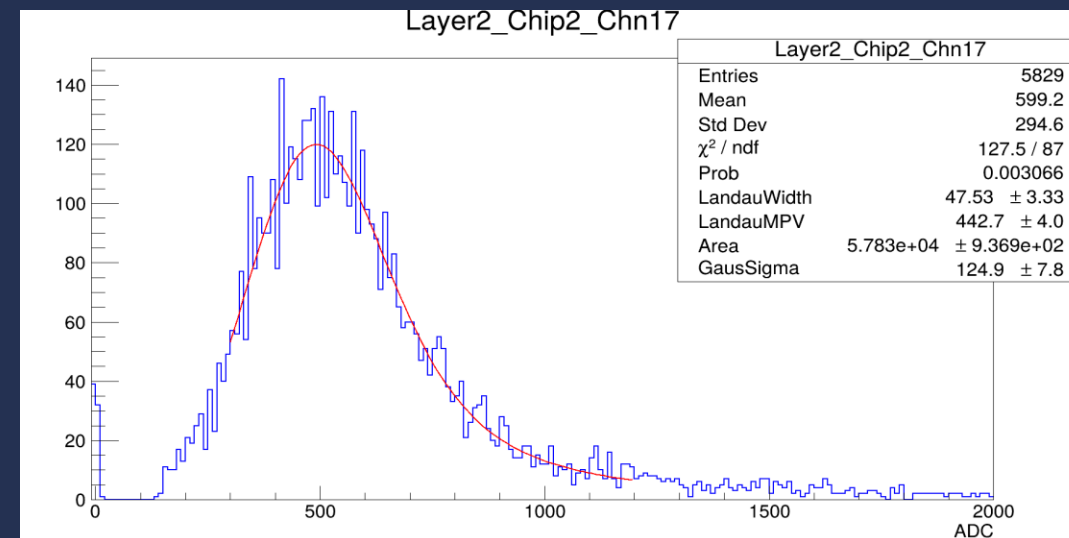
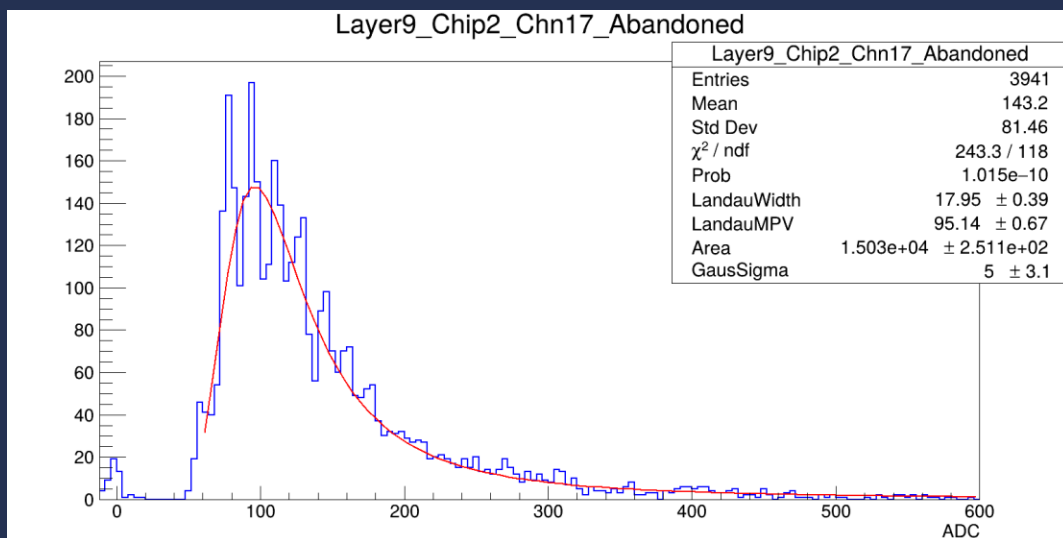
motivation:

➤ 问题: cepec ecal 束流测试MIP谱存在部分通道刻度不准的问题

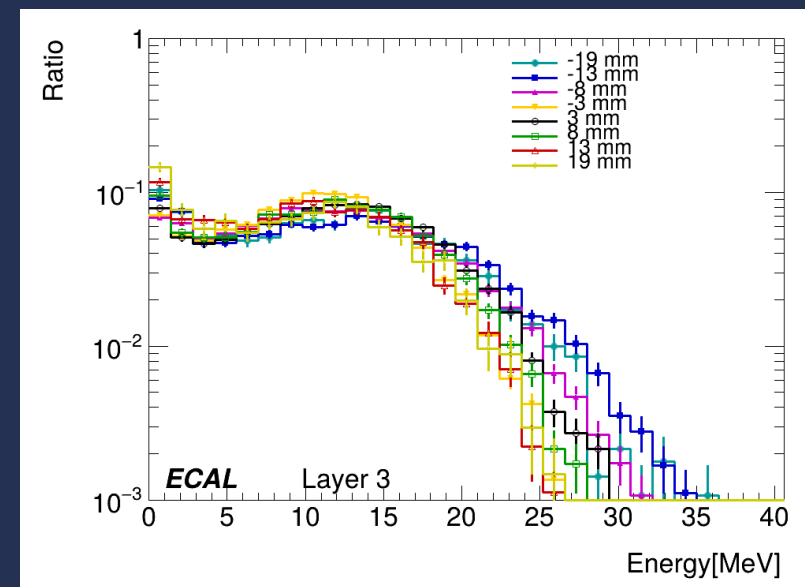
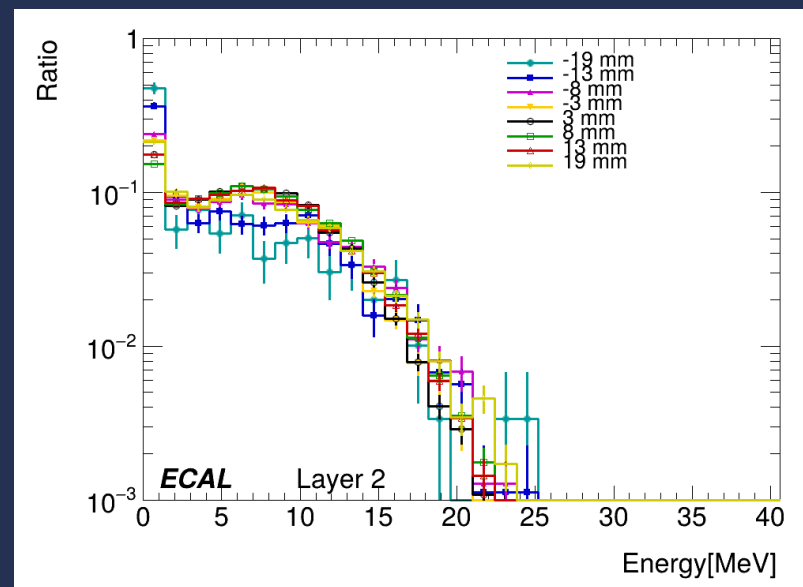
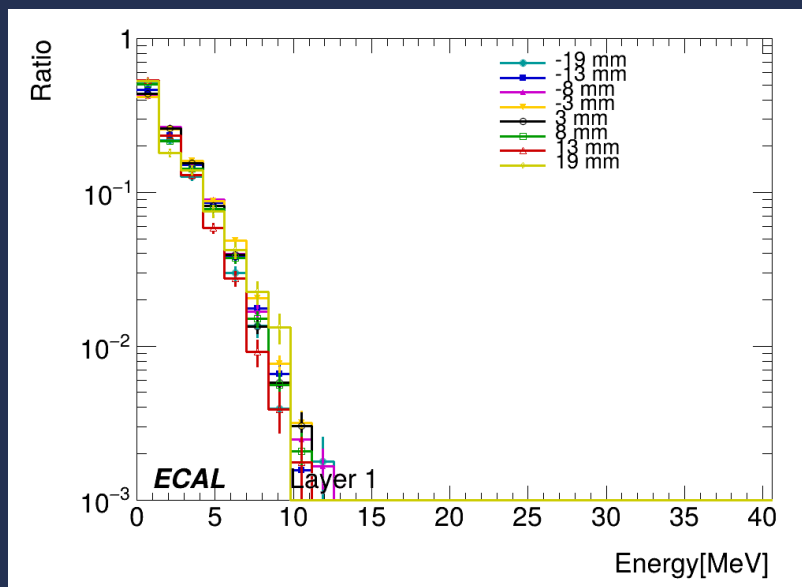
具体表现: 在模拟中束斑中心区域不同通道塑闪能谱大致相同

但在束流测试结果中, 不同通道塑闪能谱在某些layer上存在较大差异

解决思路: 分析束斑中心区域的单通道, 根据能量重心所对应的通道的ADC谱, 比较不同通道的差异性。

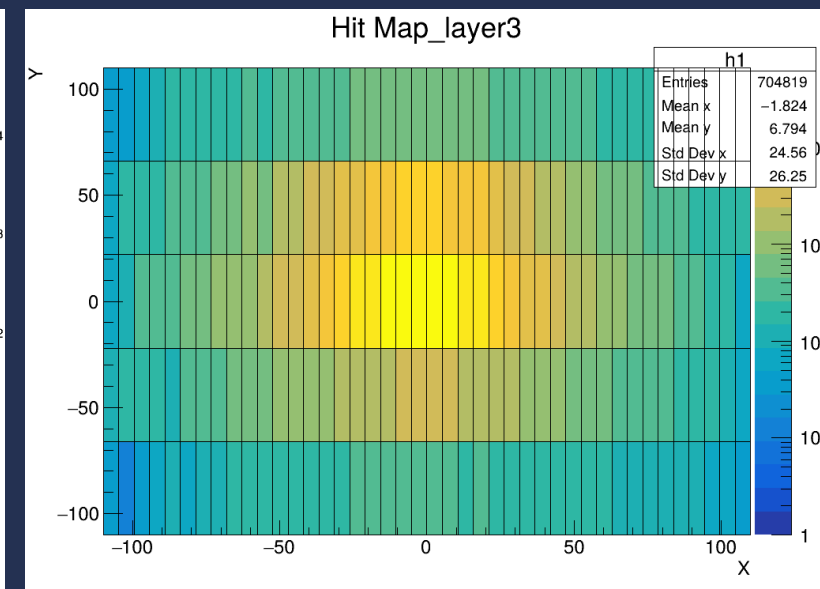
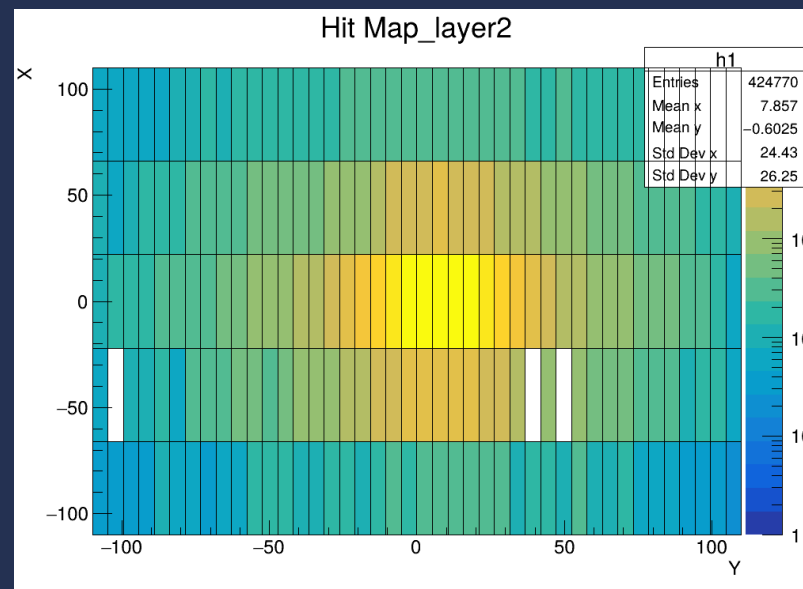
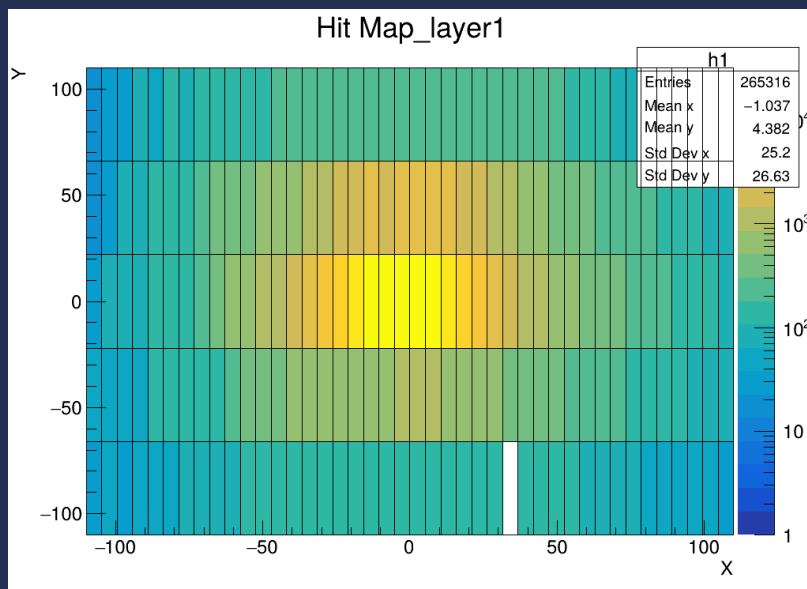


簇射开始阶段——探测器前侧layer单通道能谱



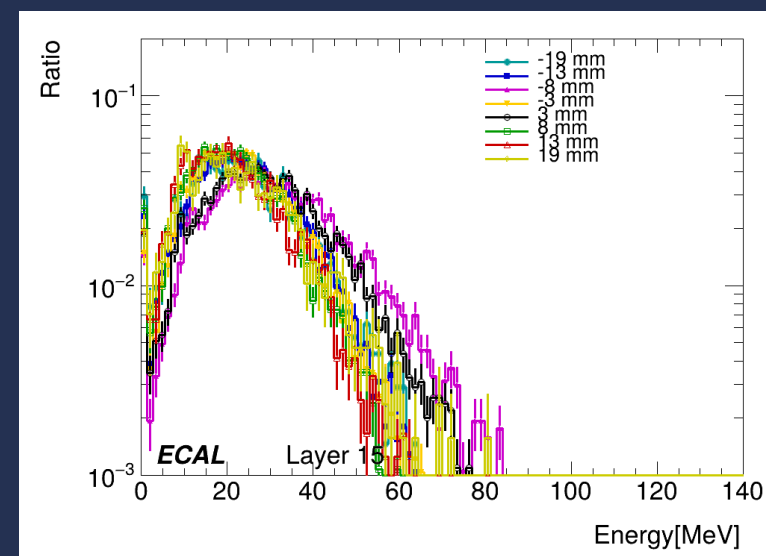
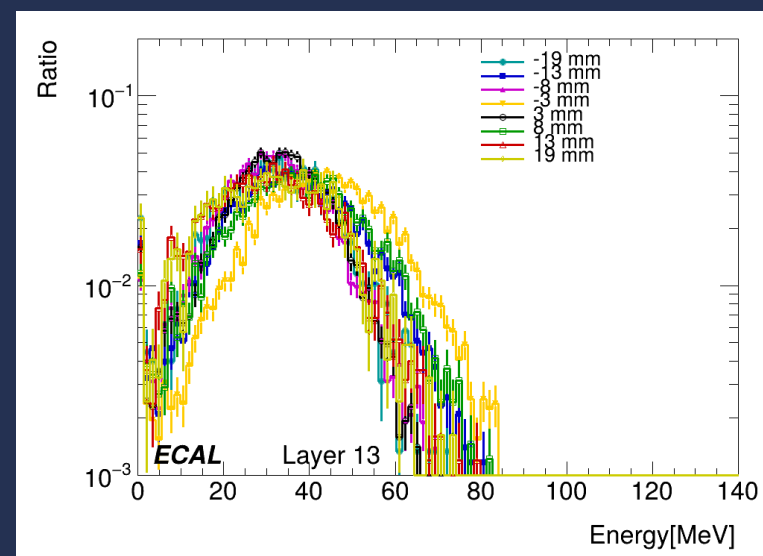
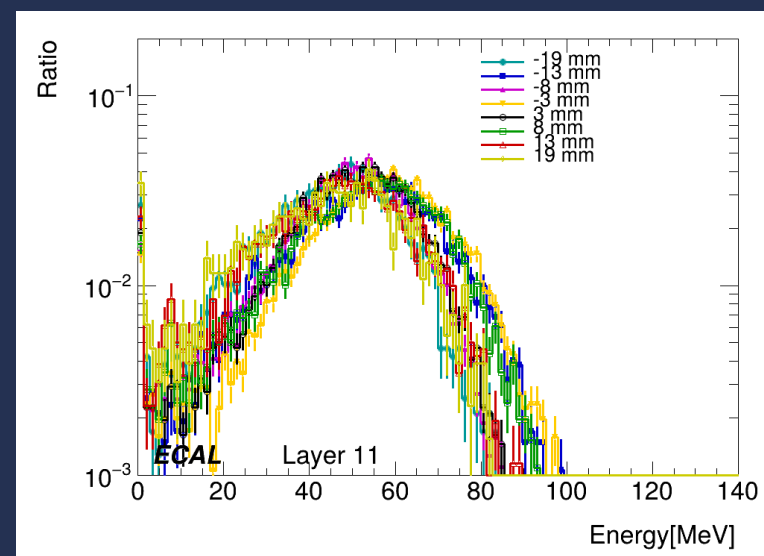
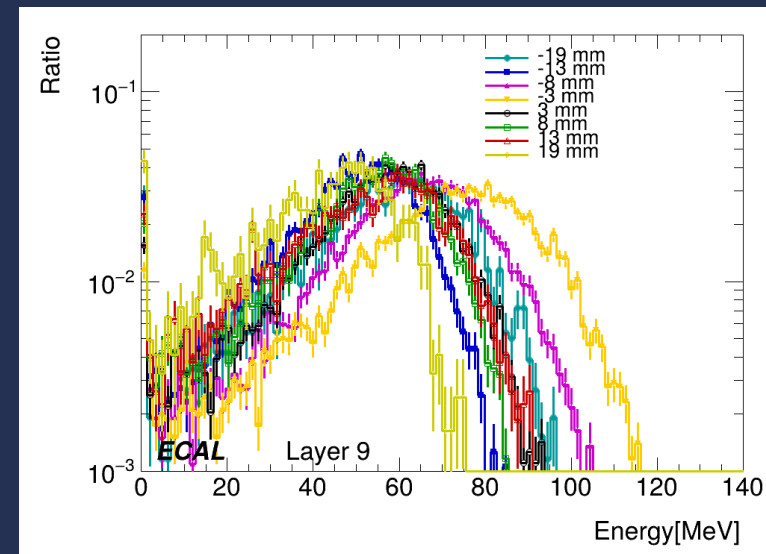
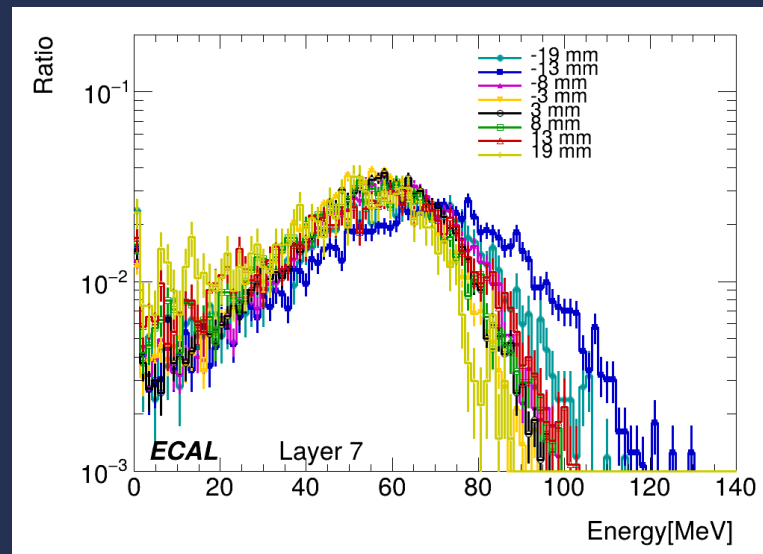
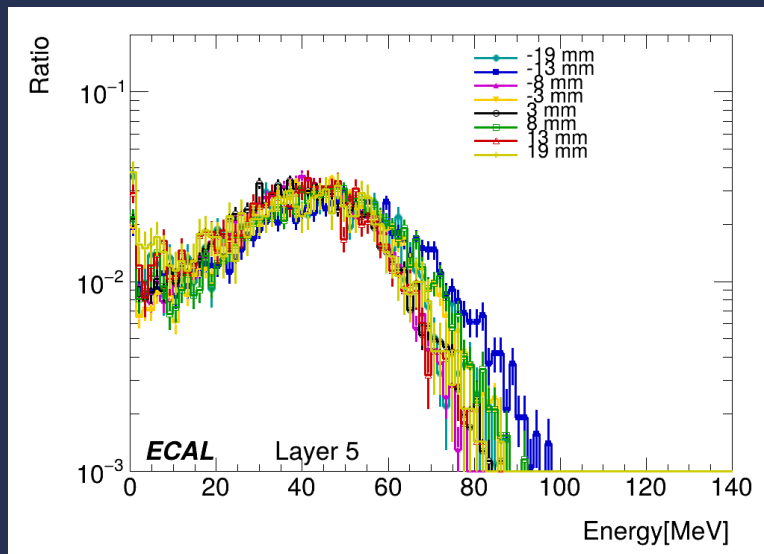
➤ 能量沉积较少

簇射开始阶段——探测器前侧layer单通道Hit_map

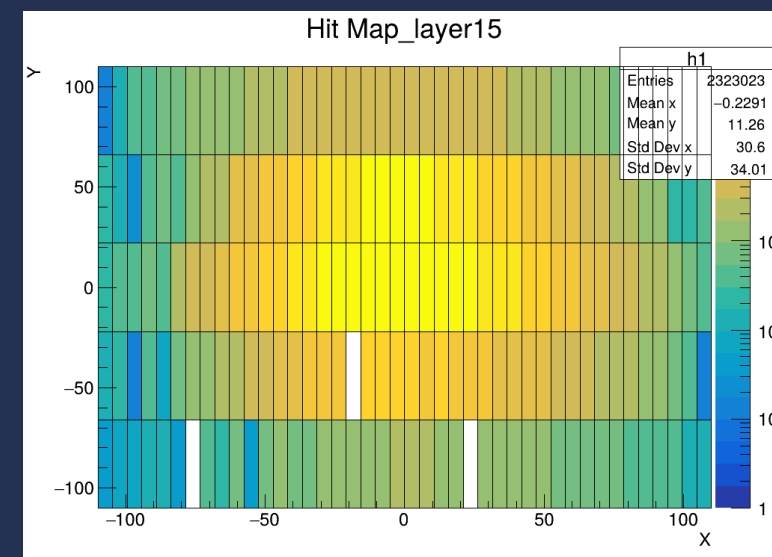
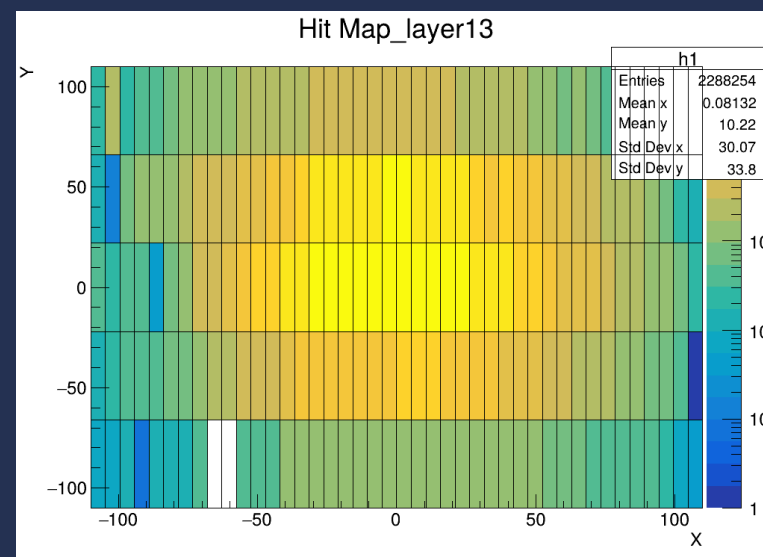
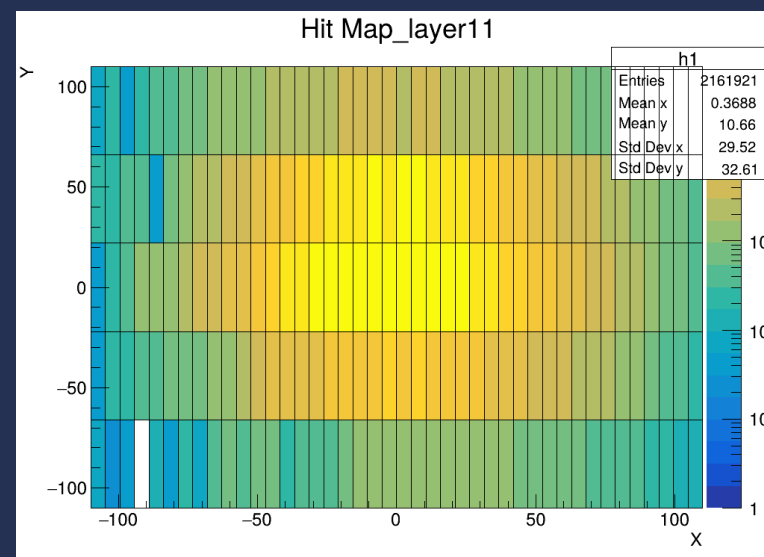
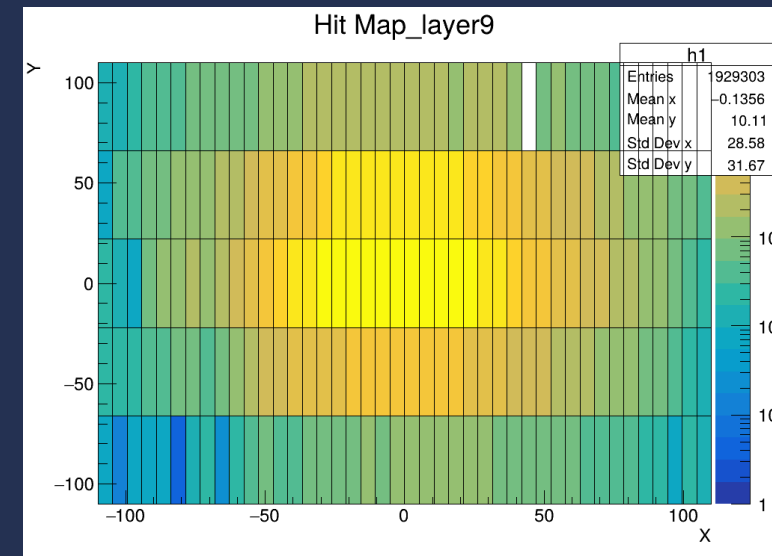
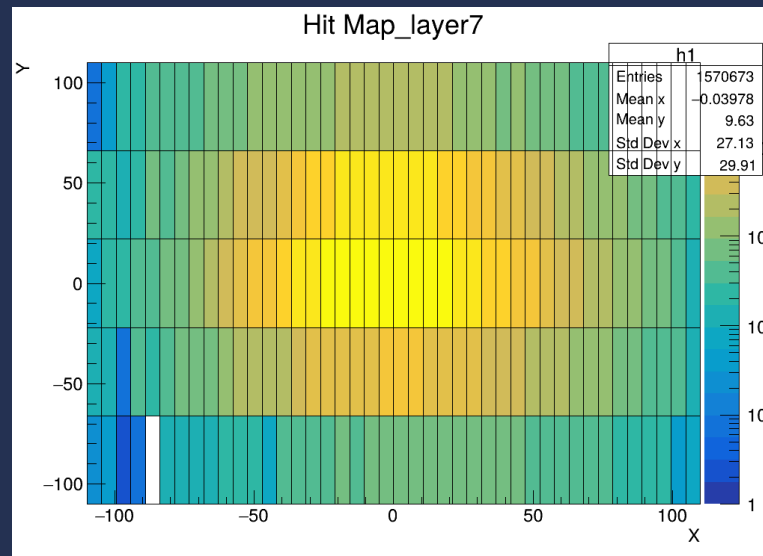
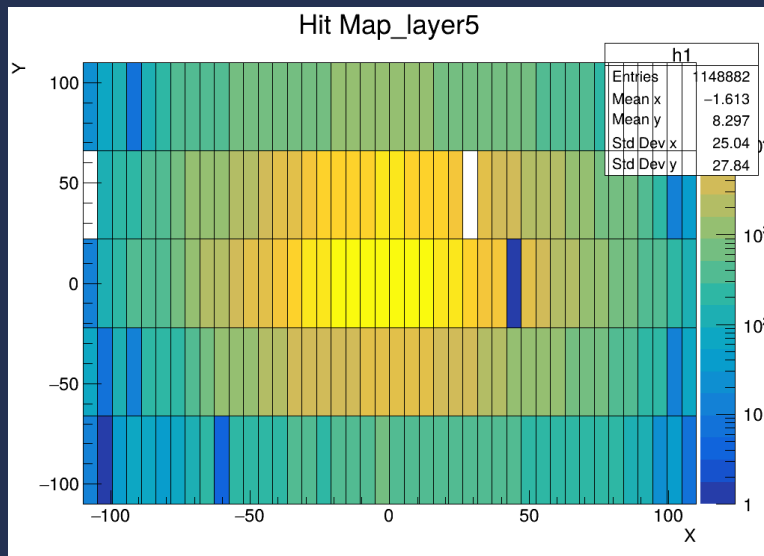


- 能量沉积较少
- 空白格为物理死区

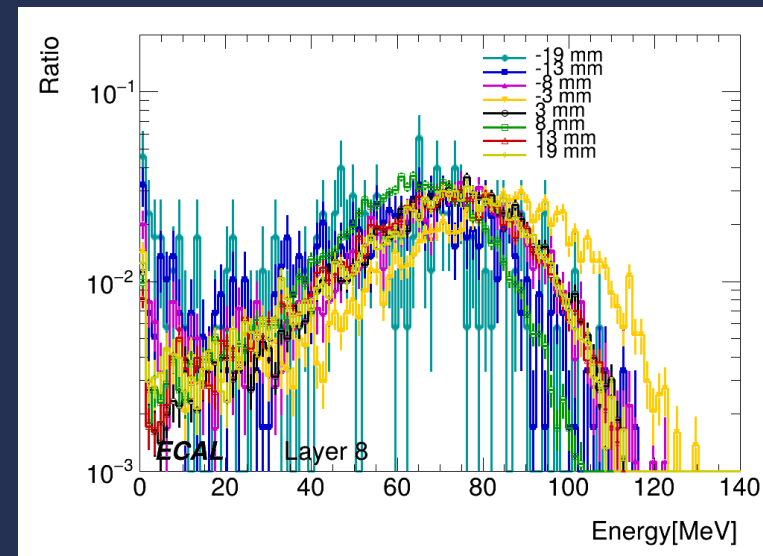
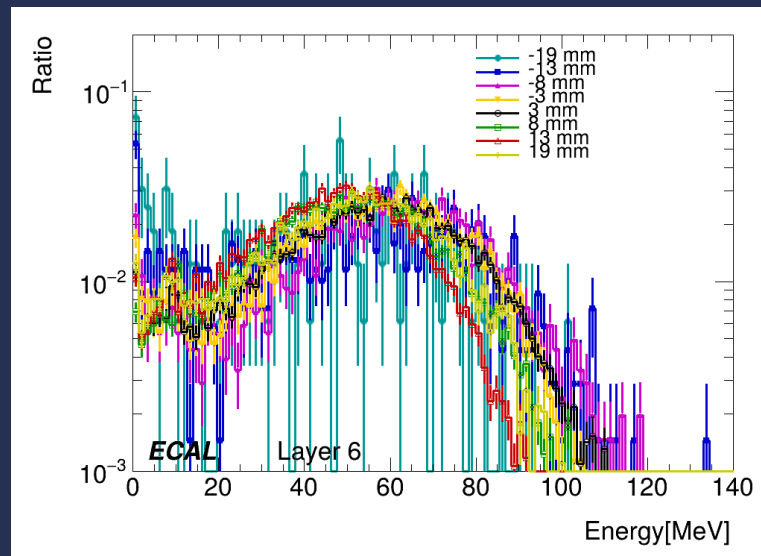
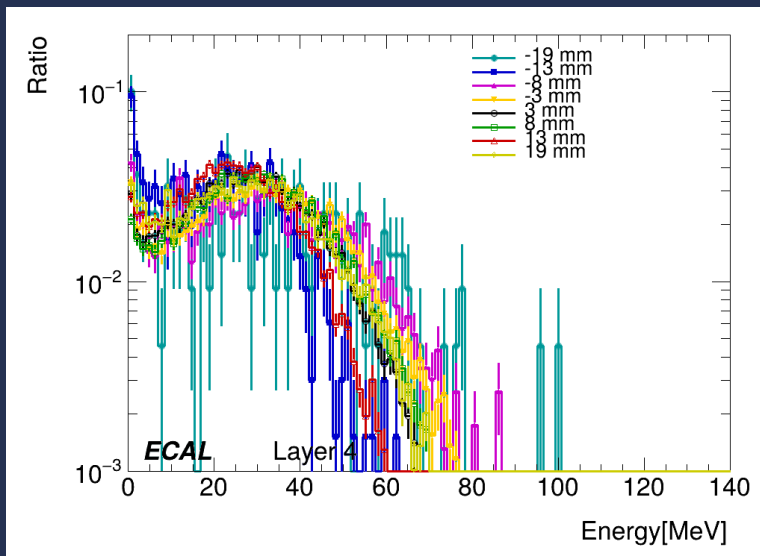
簇射极大——探测器中部layer（奇数层）单通道能谱



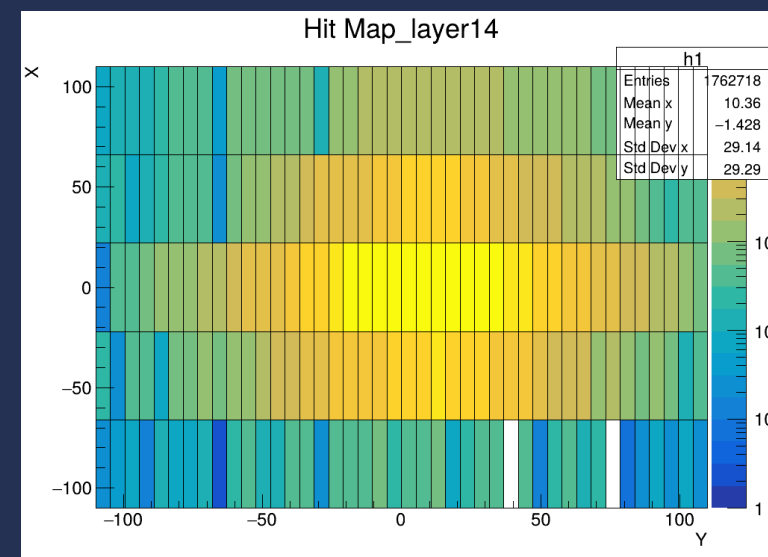
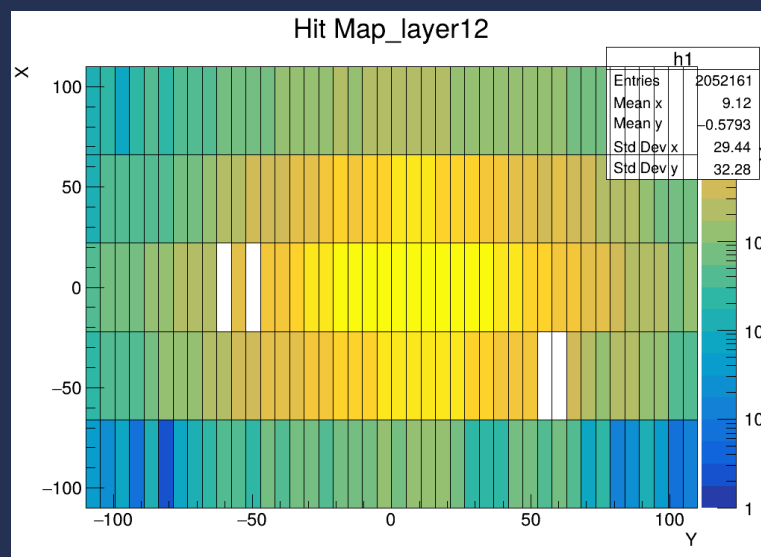
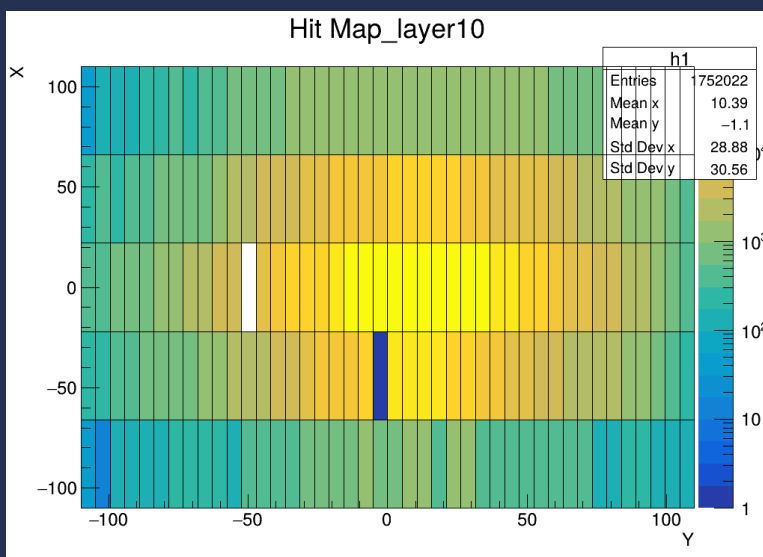
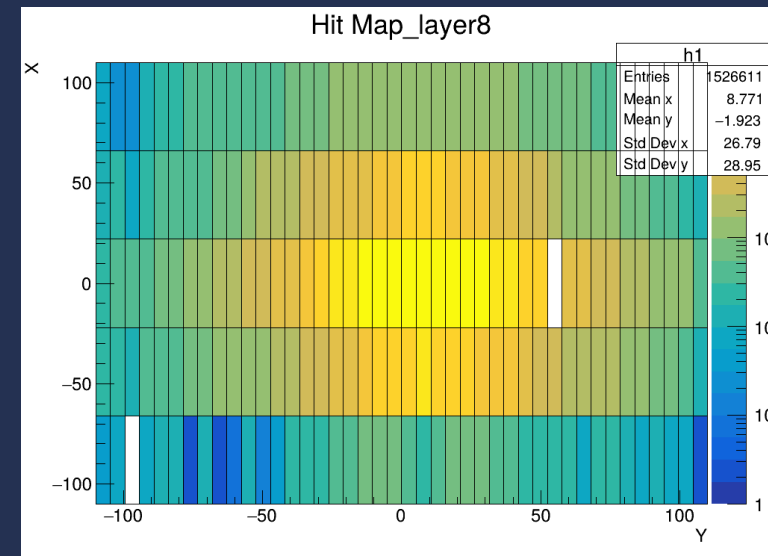
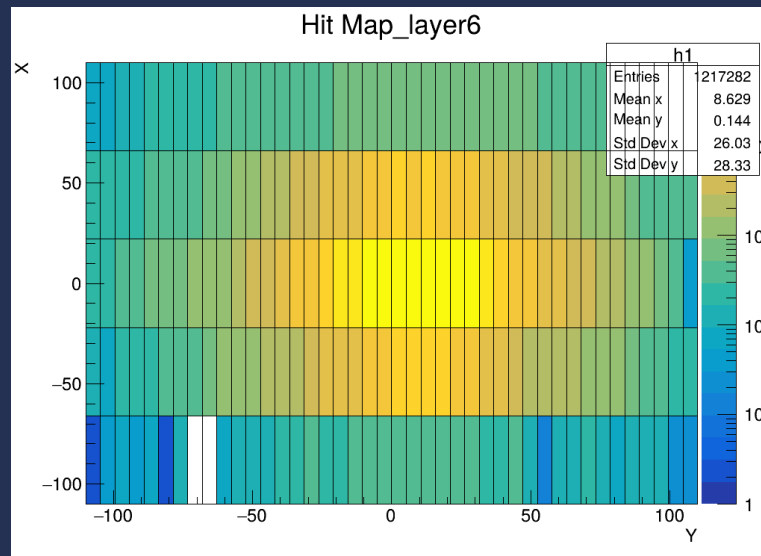
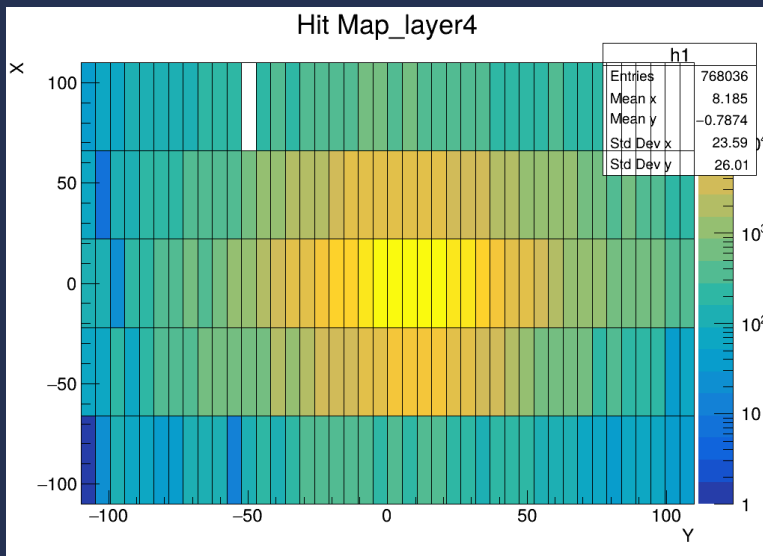
簇射极大——探测器中部layer（奇数层）单通道能谱



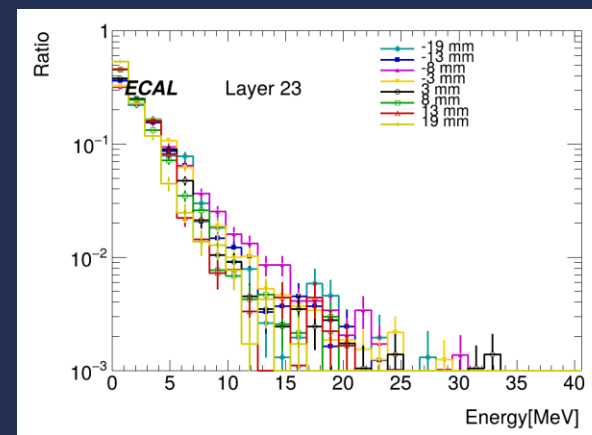
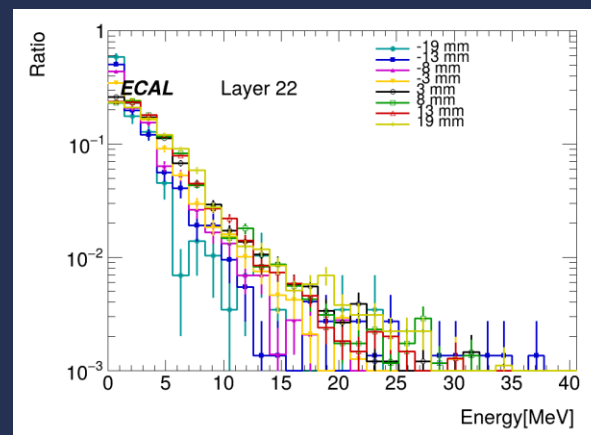
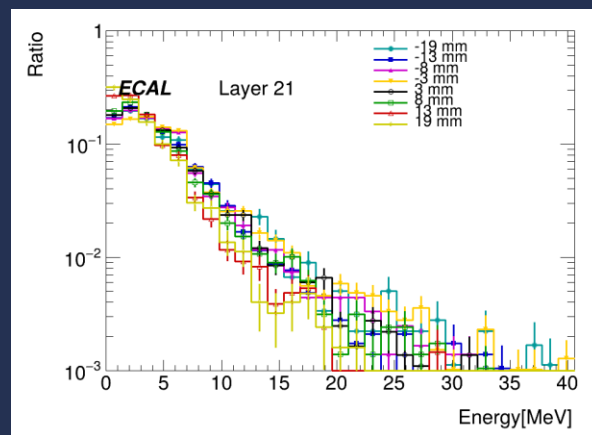
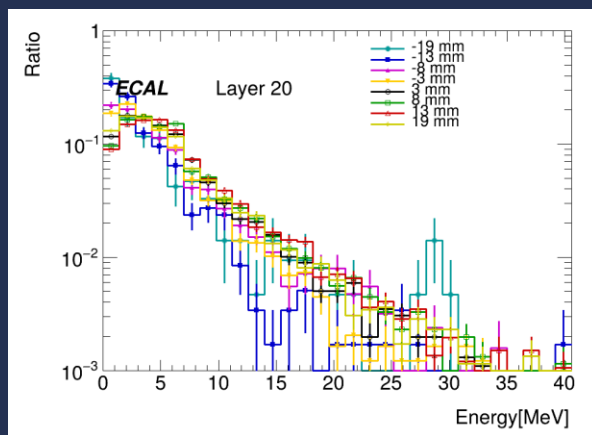
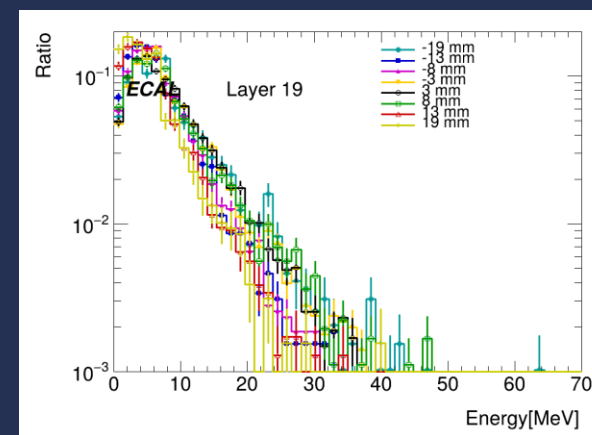
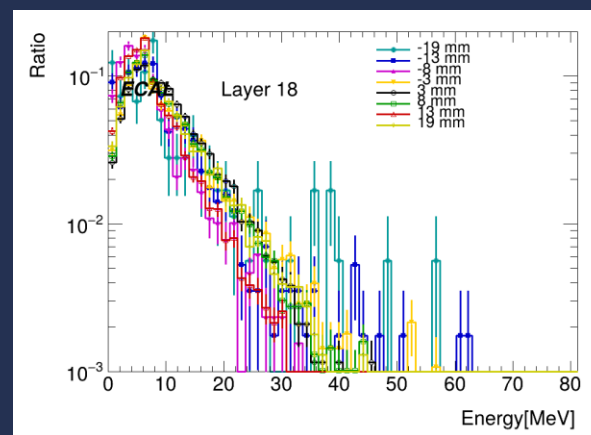
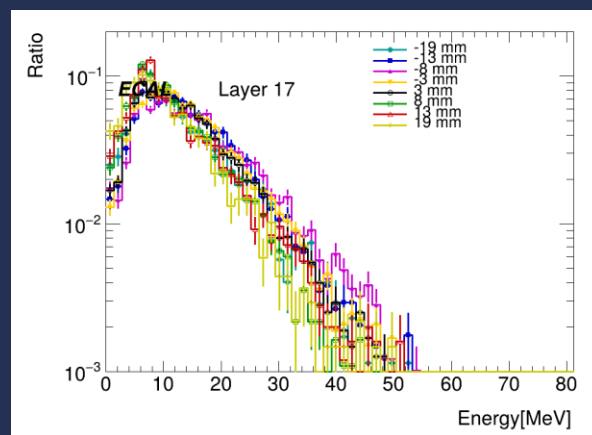
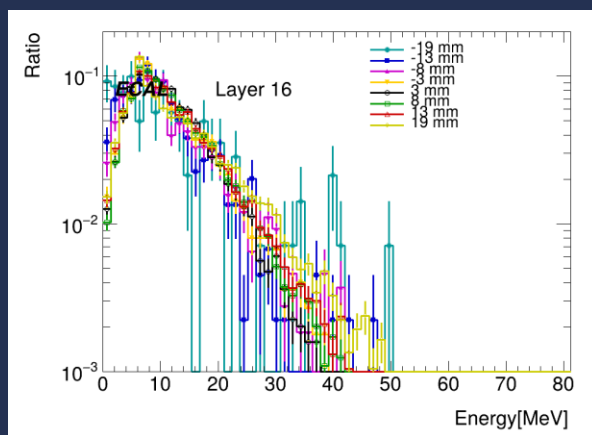
簇射极大——探测器中部layer（偶数层）单通道能谱



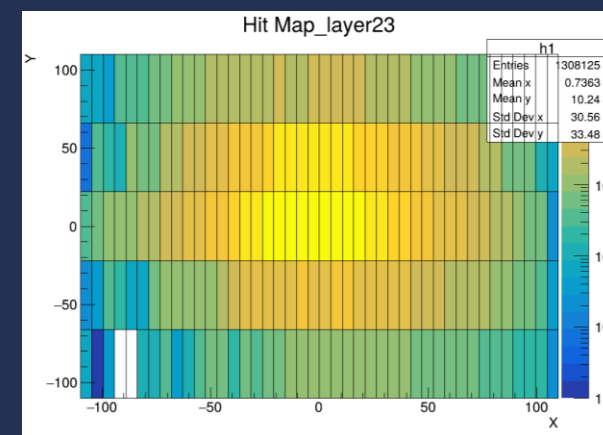
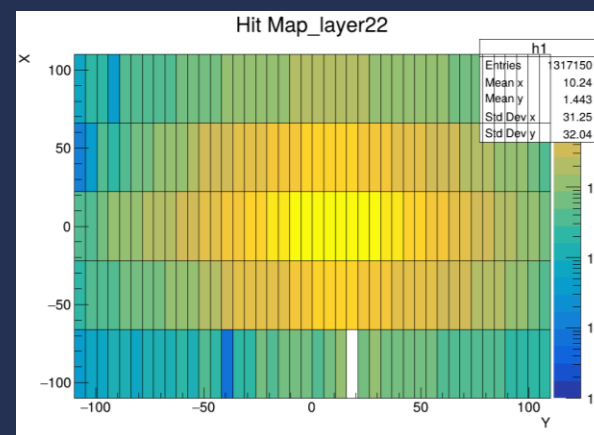
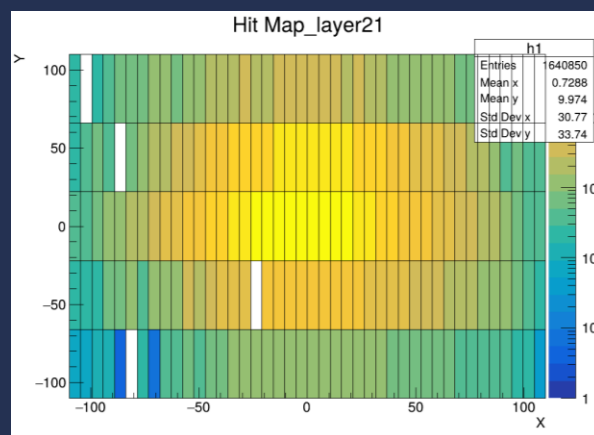
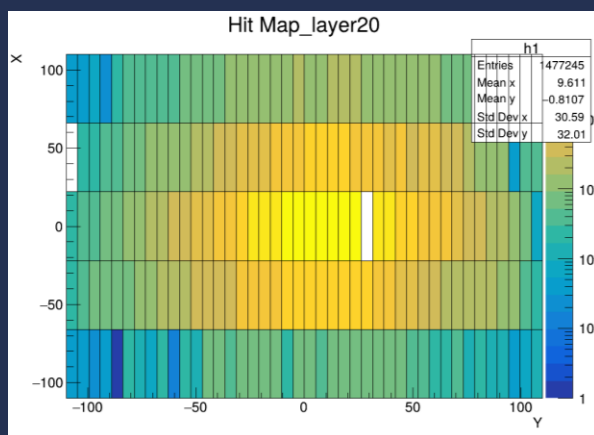
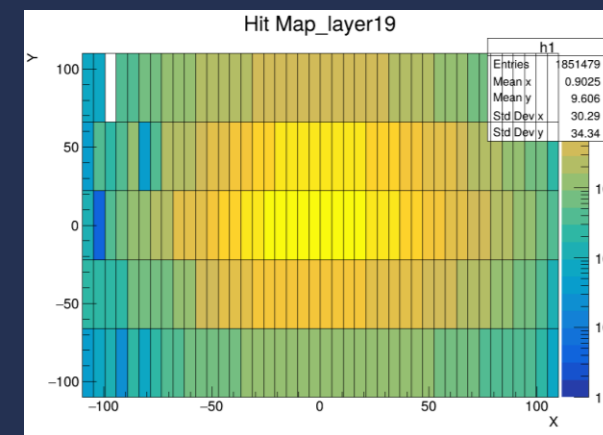
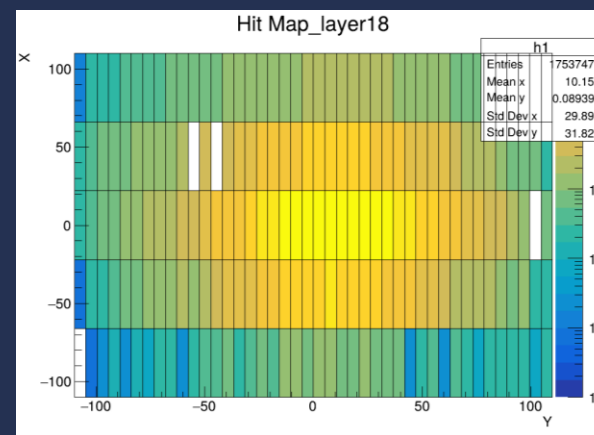
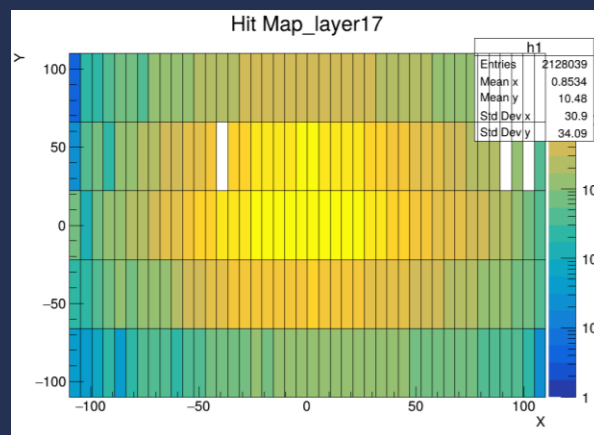
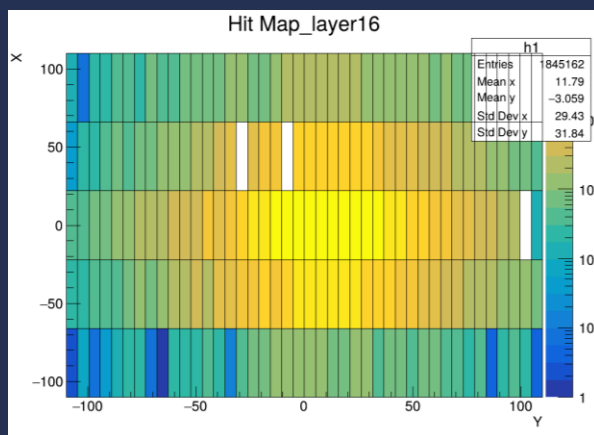
簇射极大——探测器中部layer（偶数层）单通道能谱



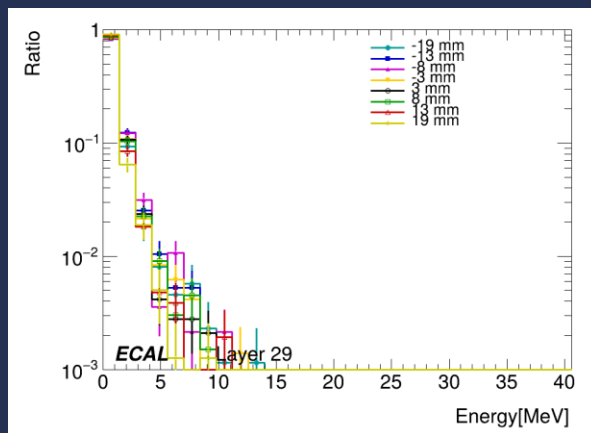
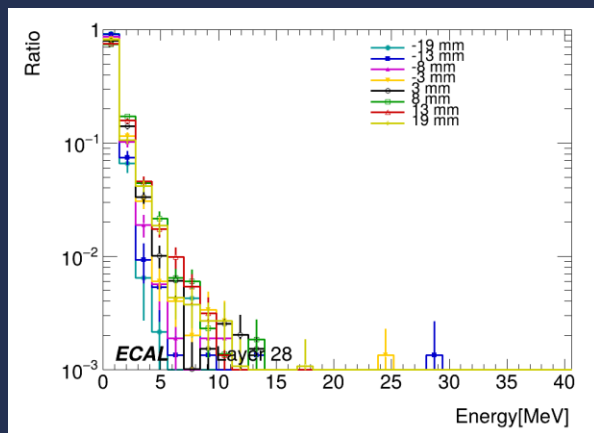
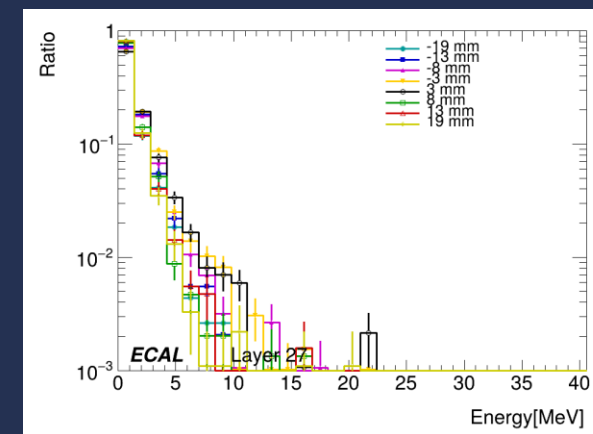
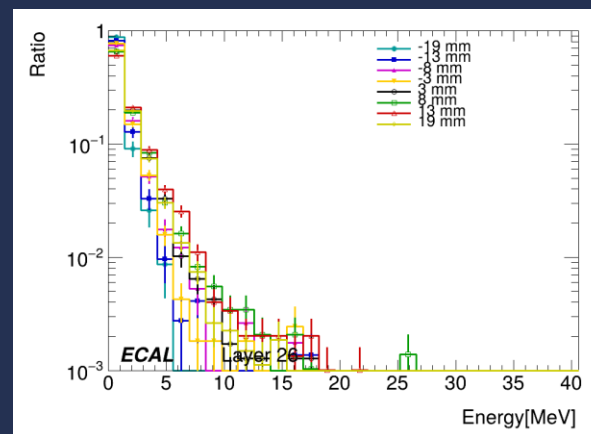
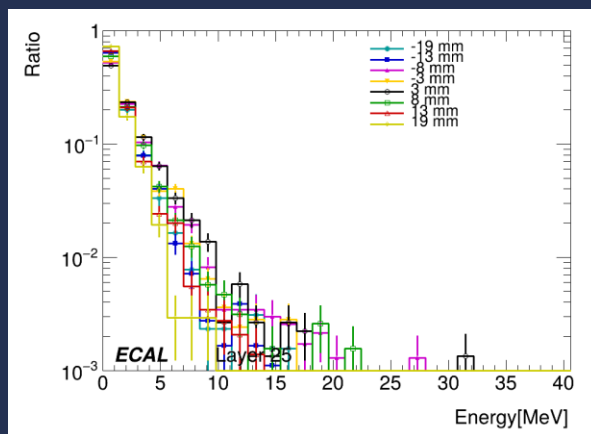
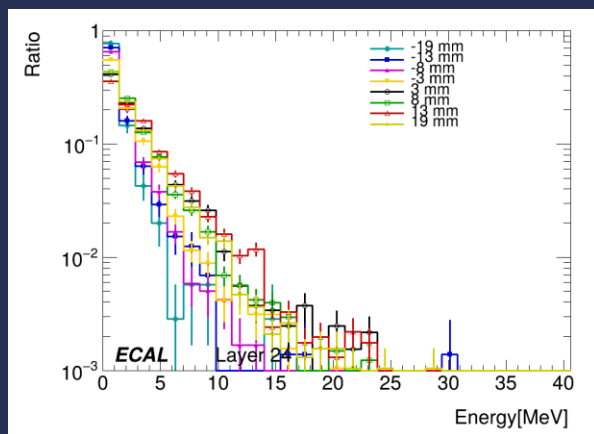
簇射末期——探测器后侧layer单通道能谱



簇射末期——探测器后侧layer单通道能谱

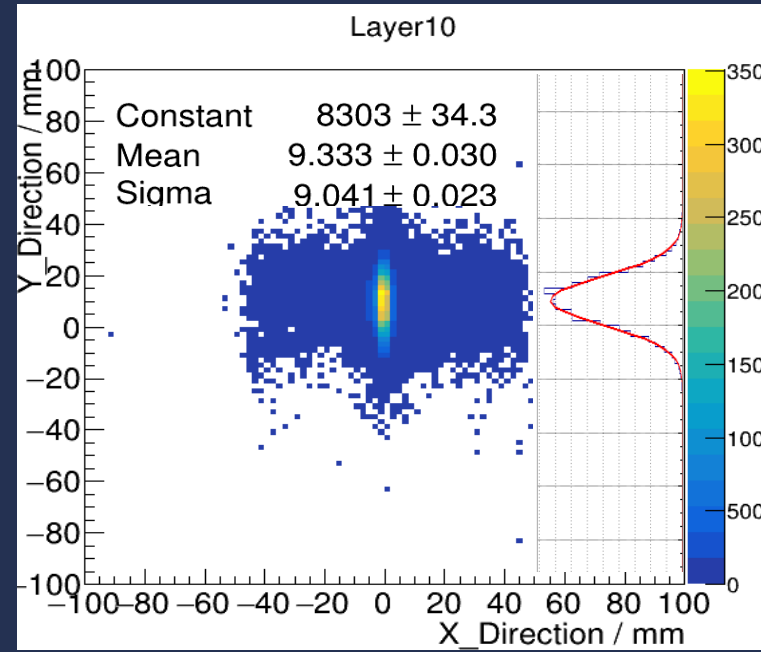
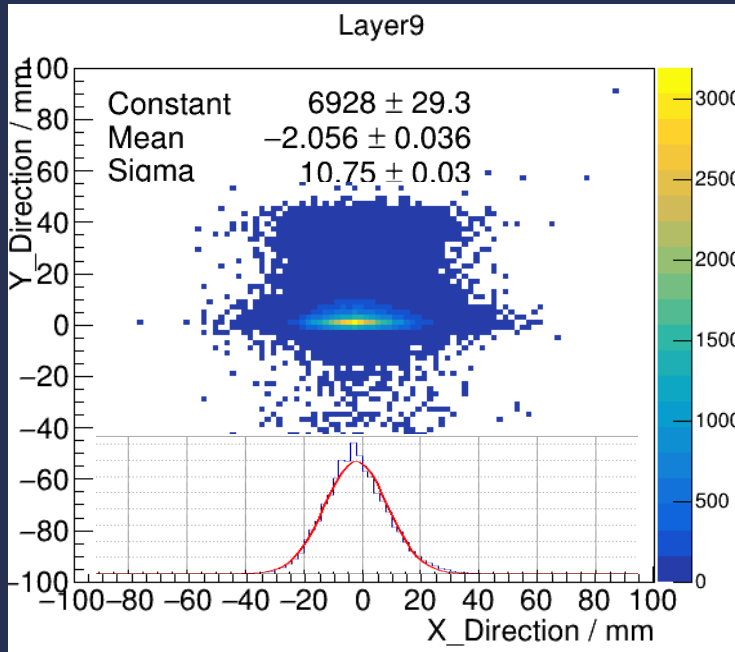


簇射末期——探测器后侧layer单通道能谱

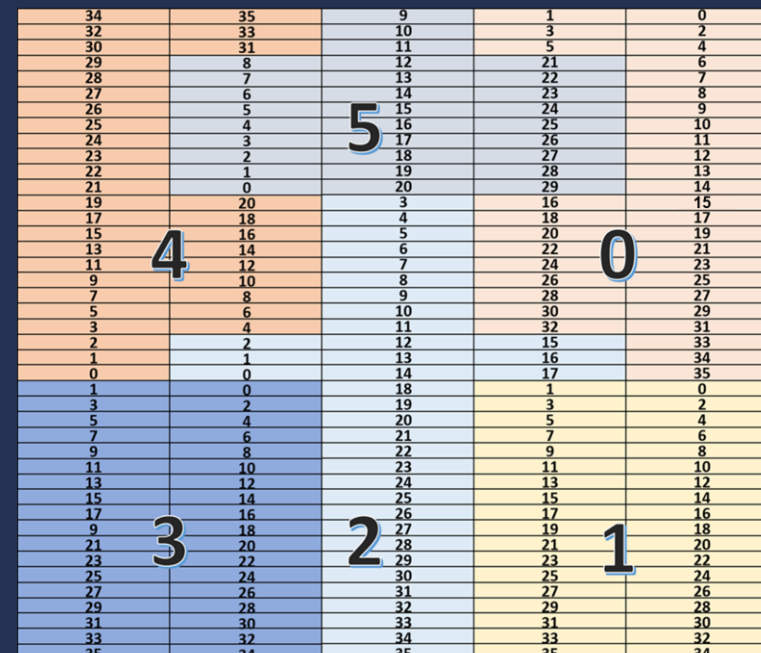
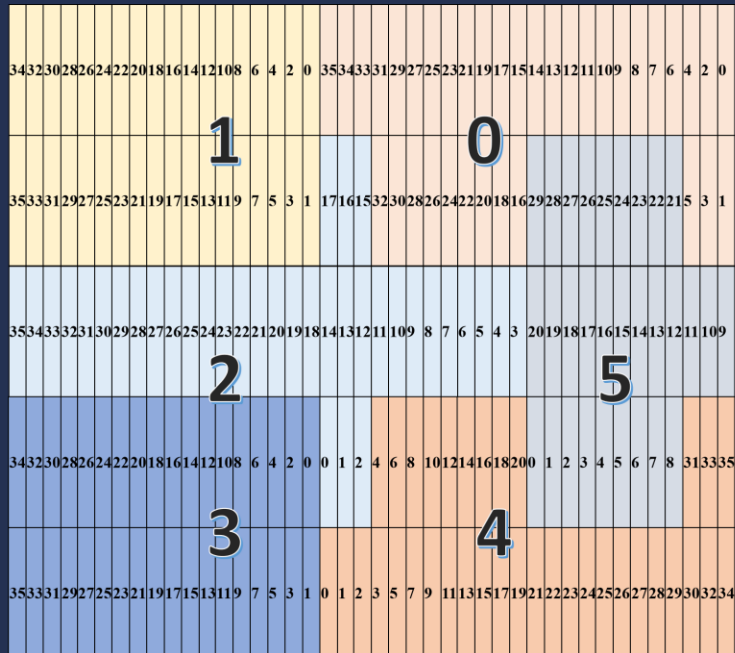




ADC Spectrum Scaling - 束流位置



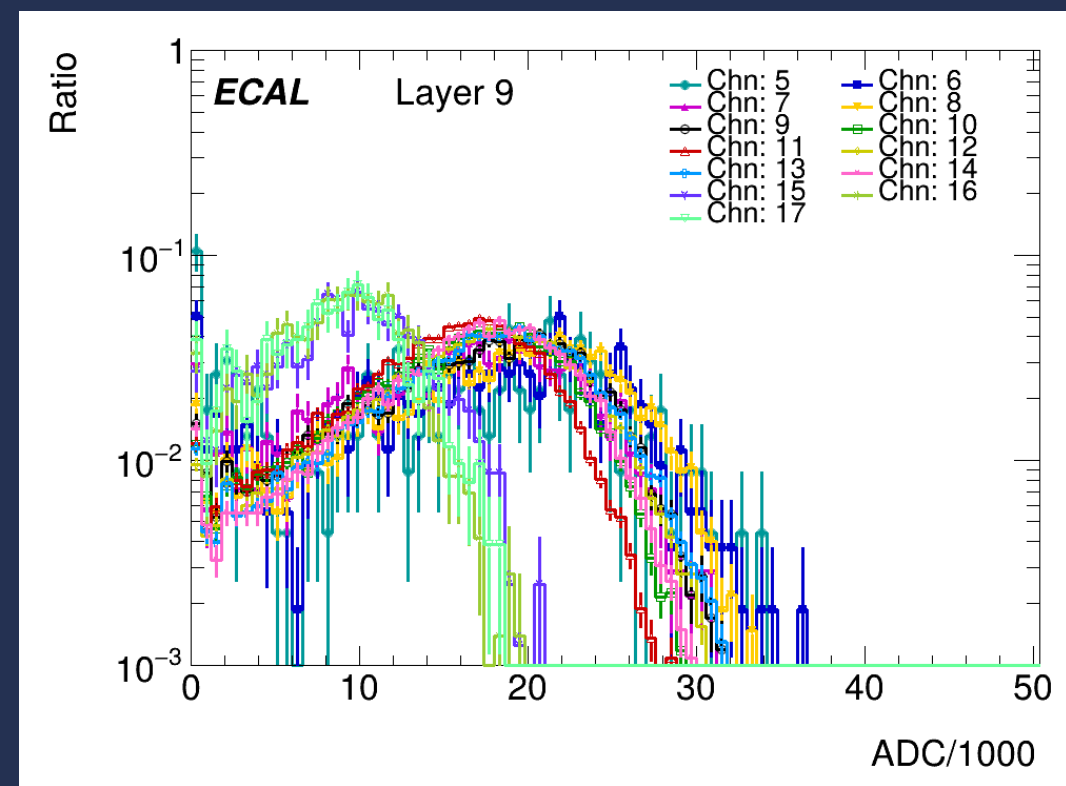
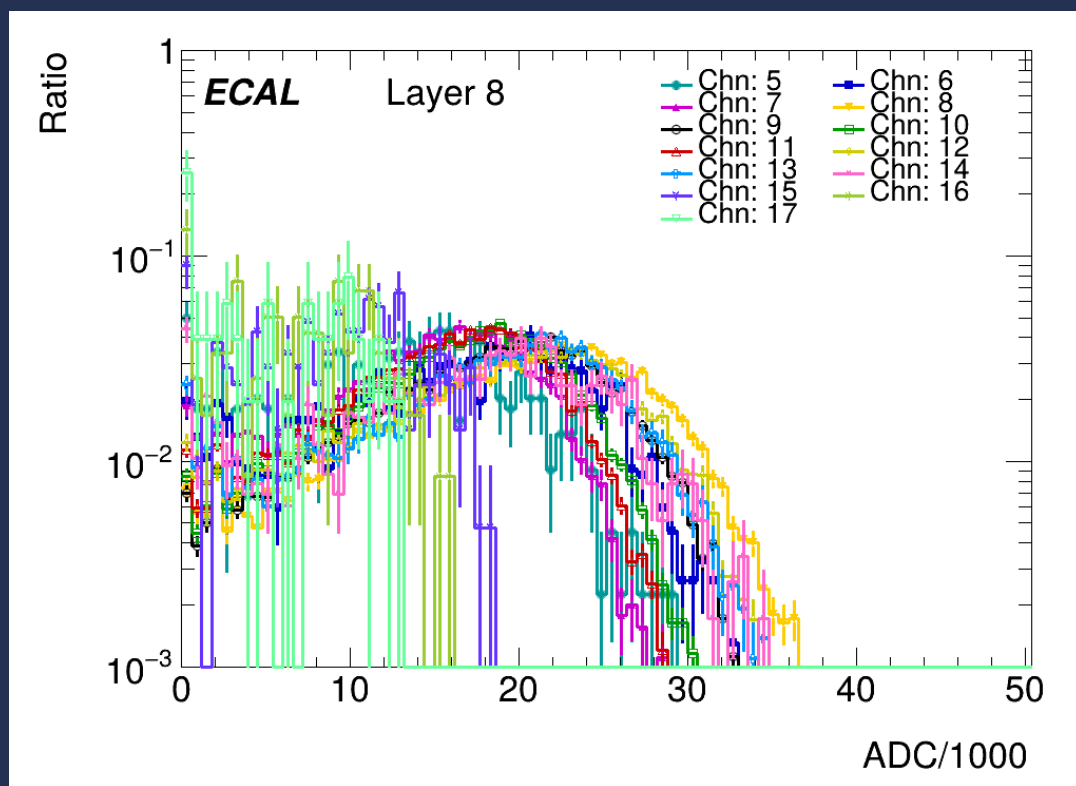
Pick cells to scale according to relative position wrt beam center



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — 8mm
- chn14 — 13mm
- chn18 — 19mm



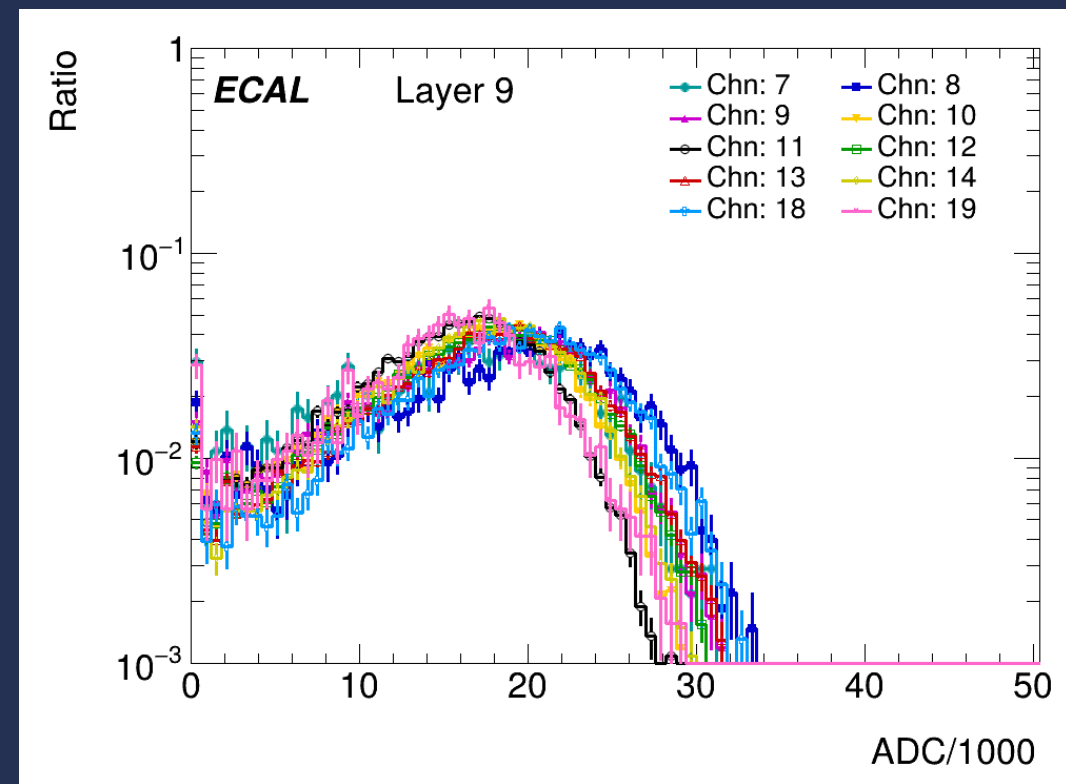
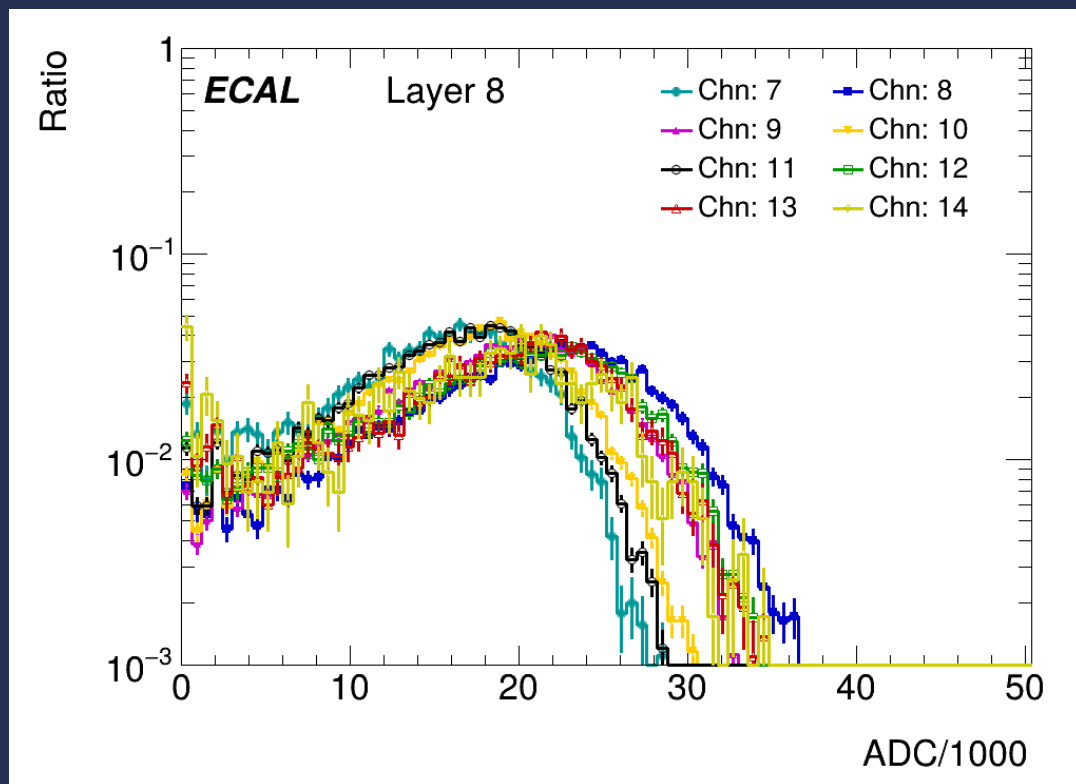
ADC Spectrum Scaling - 束流位置



Layer 8,9 as an example, poor stats in edge cells



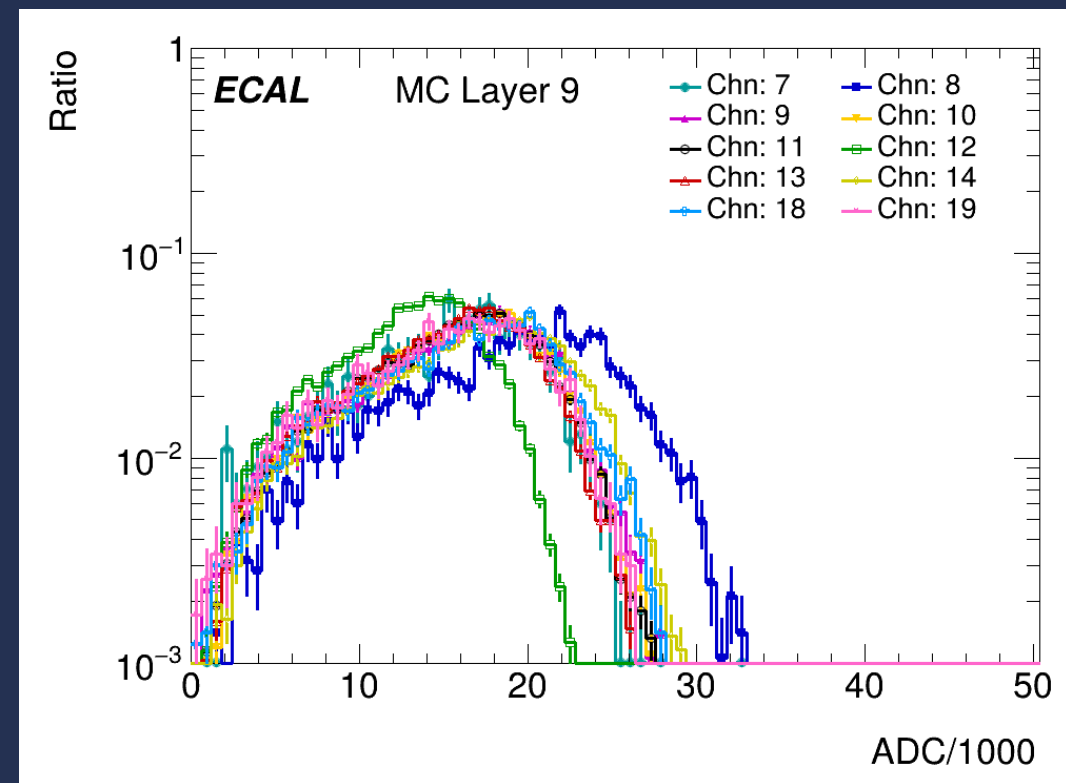
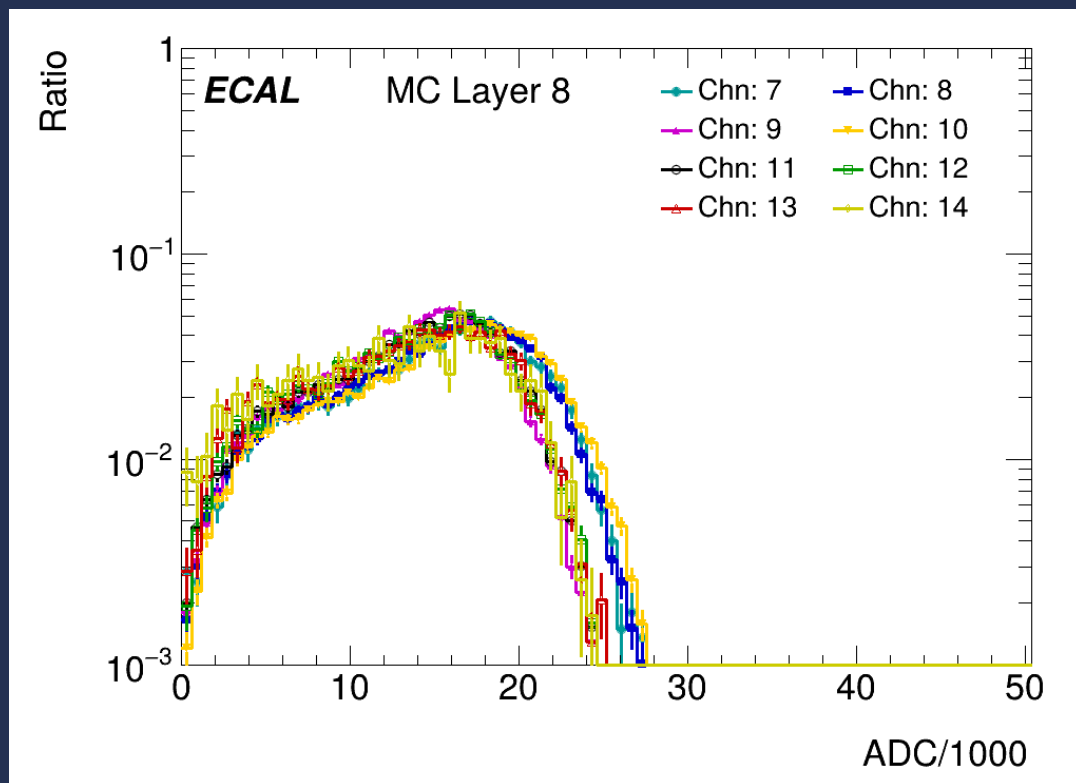
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

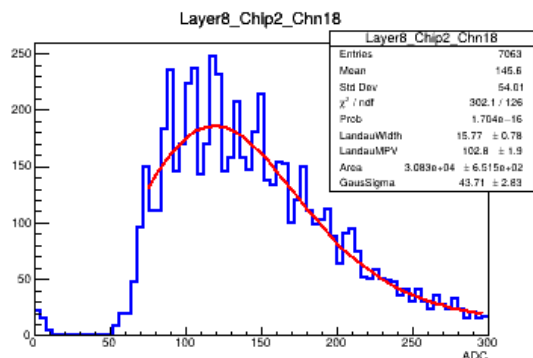
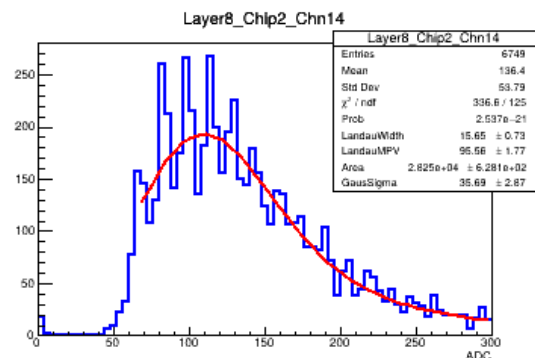
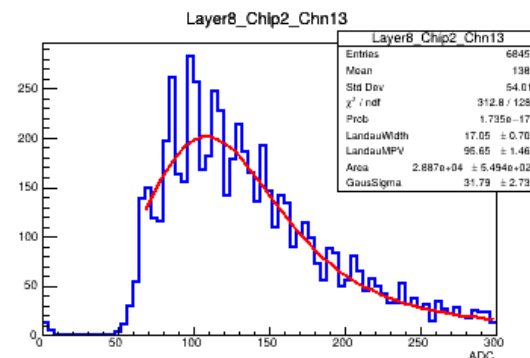
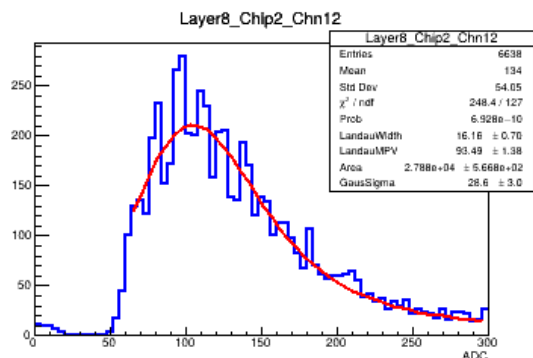
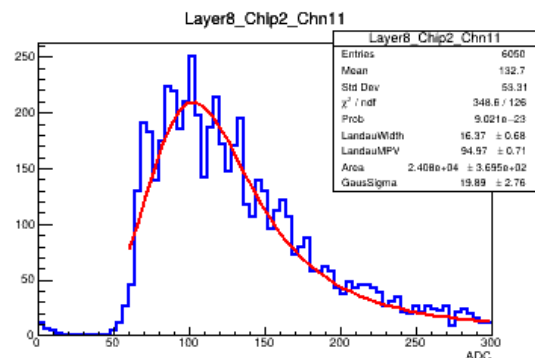
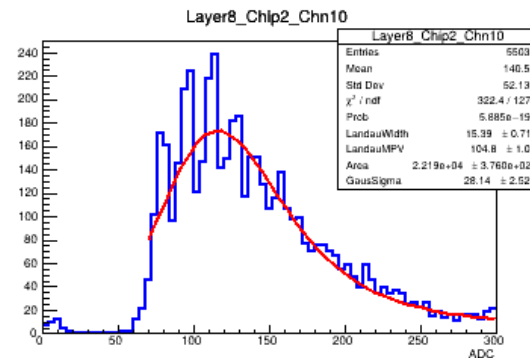
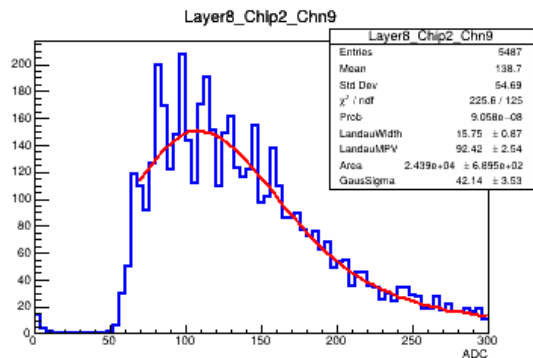
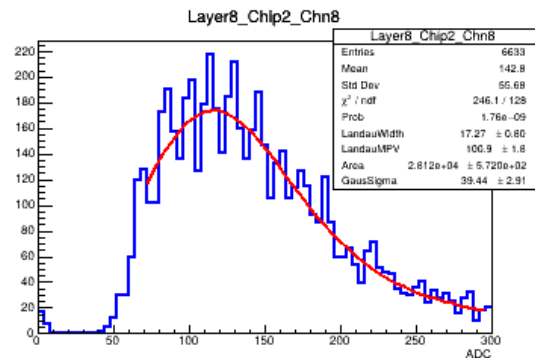


ADC Spectrum Scaling - 束流位置



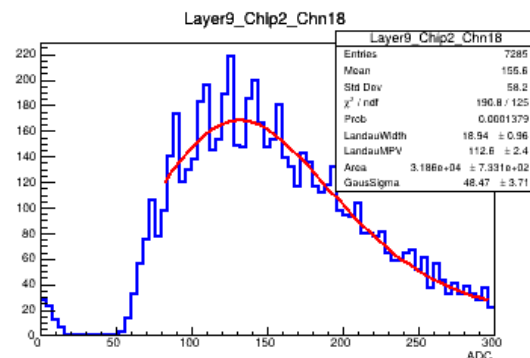
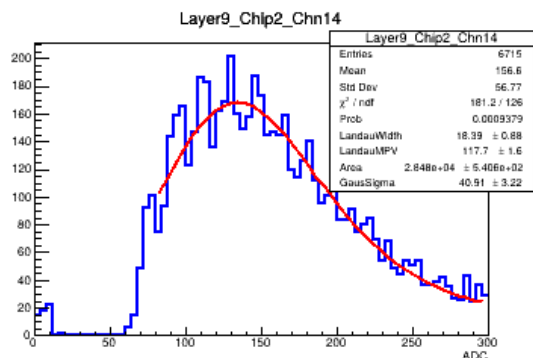
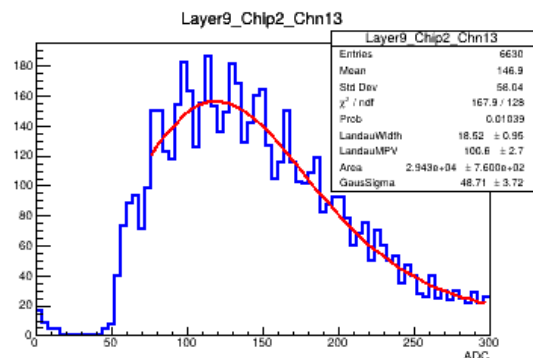
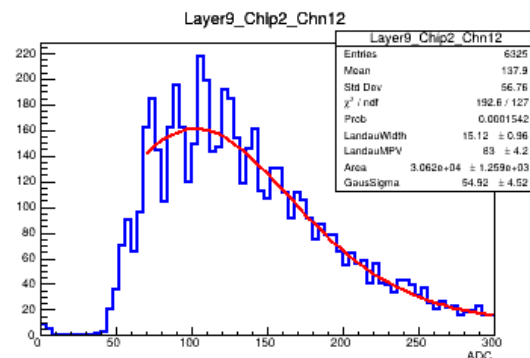
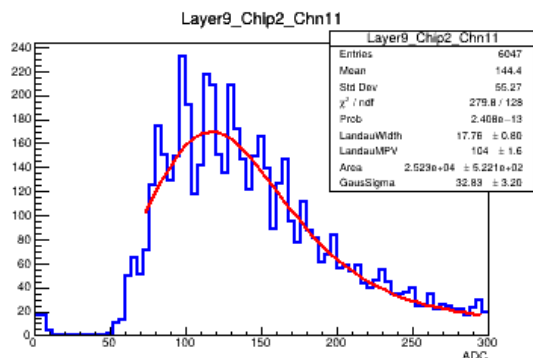
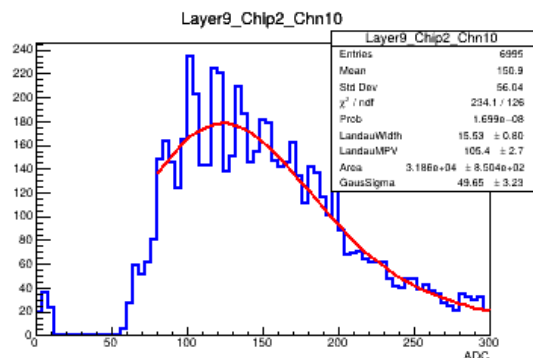
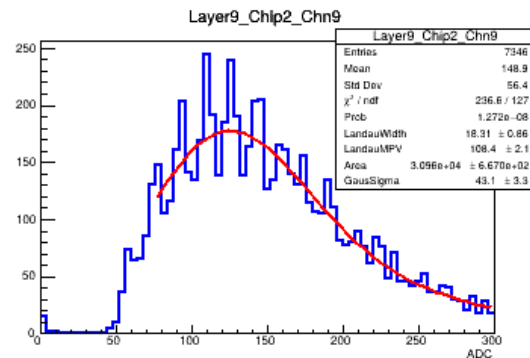
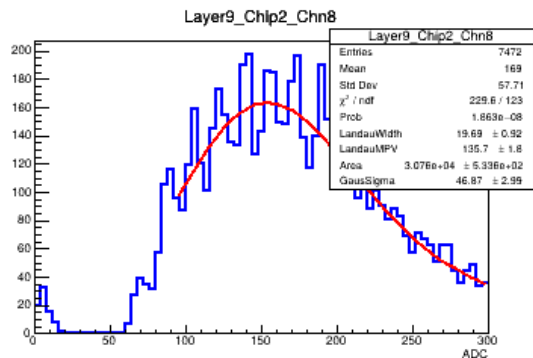
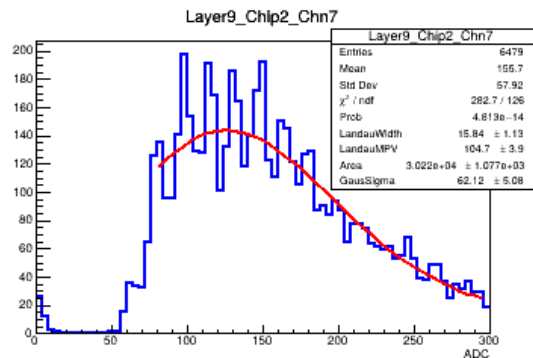
Standard selection? Mean value scaling?

Layer 8 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm

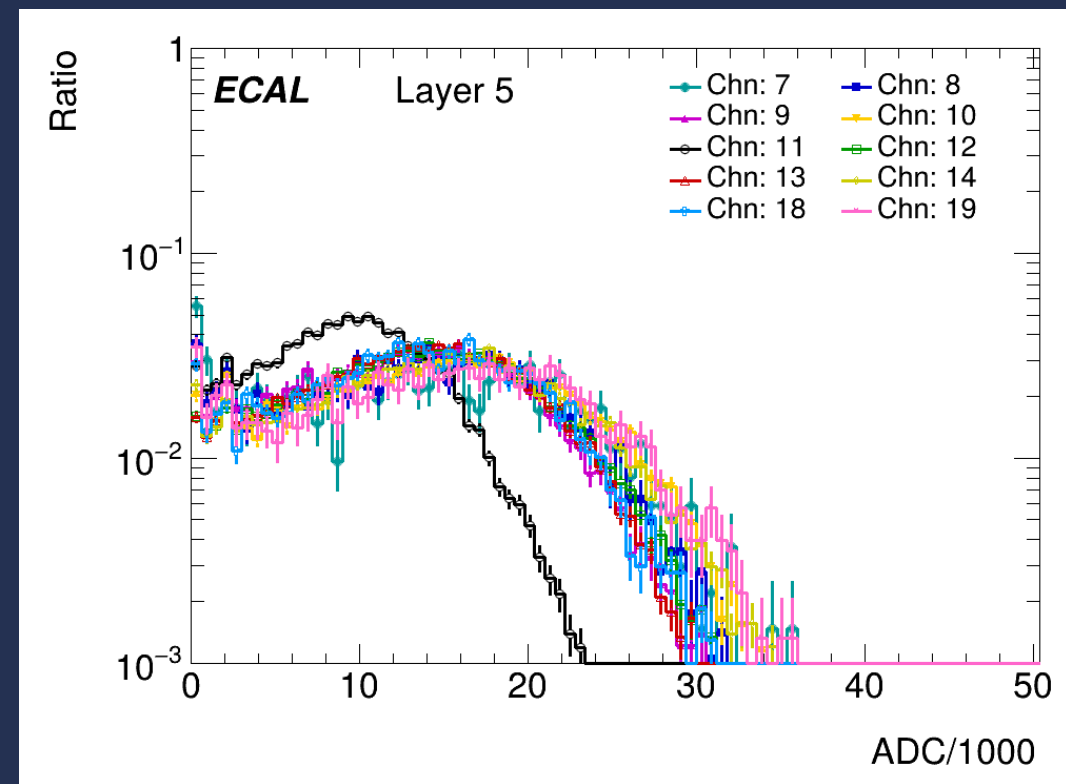
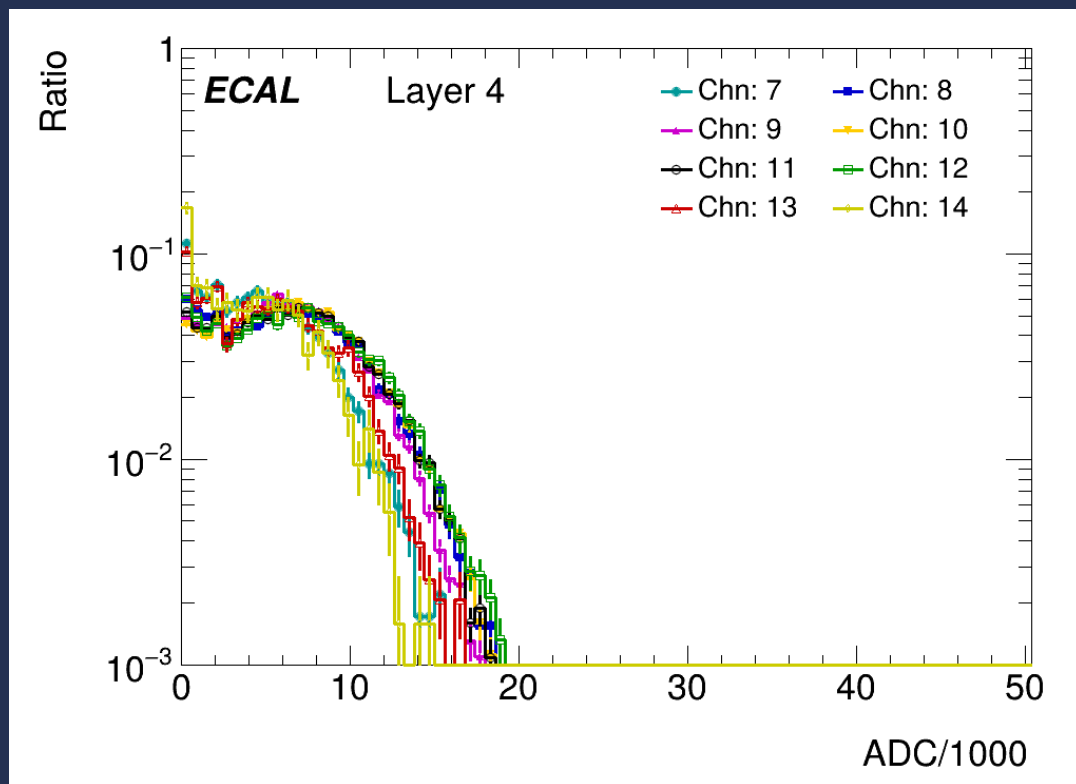
Layer 9 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



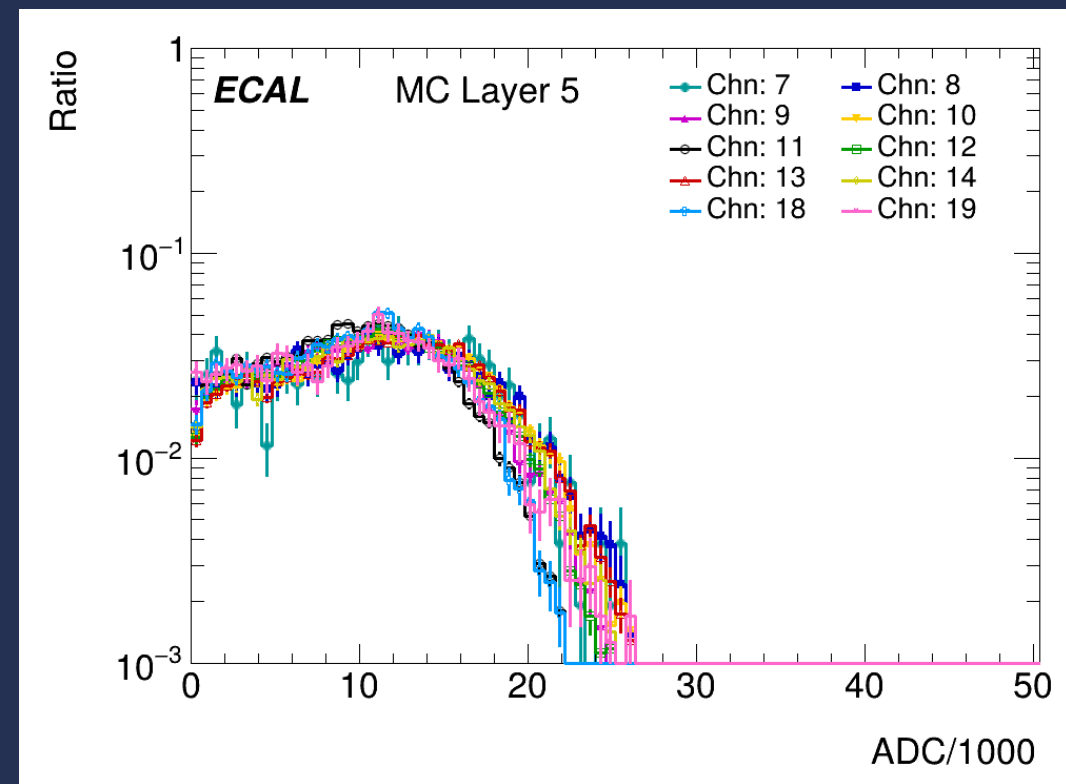
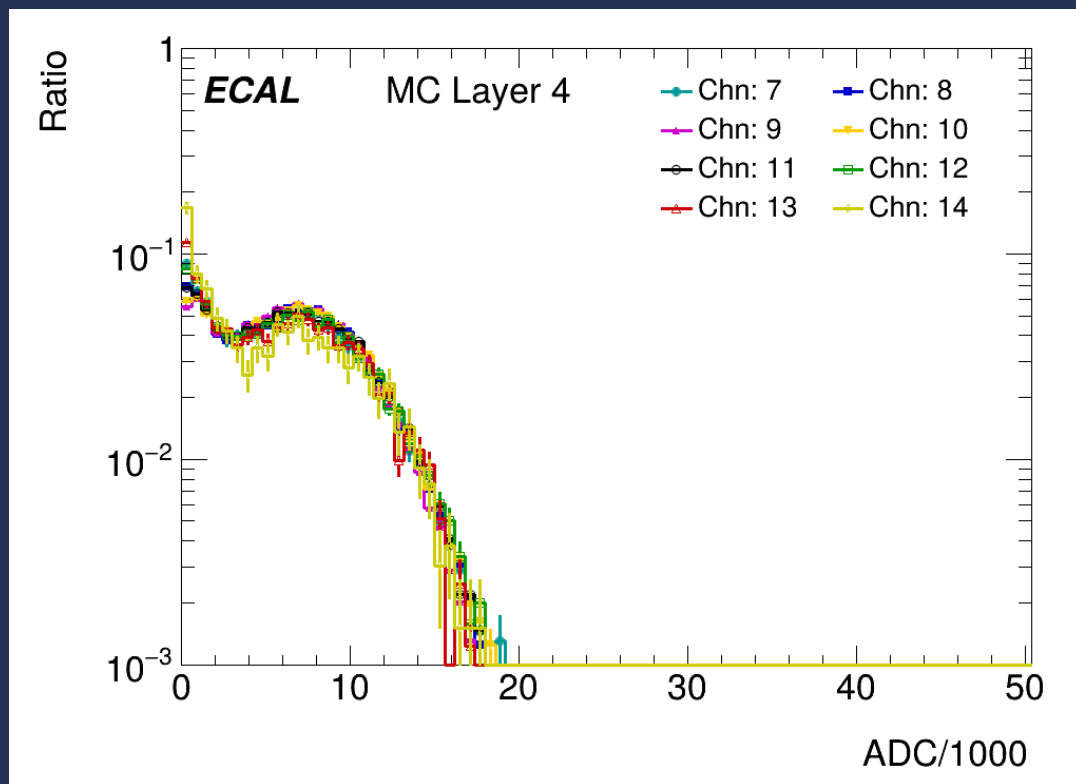
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

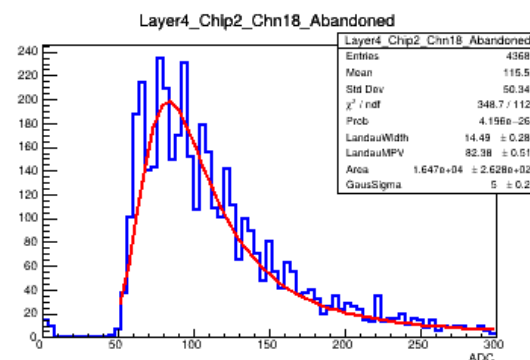
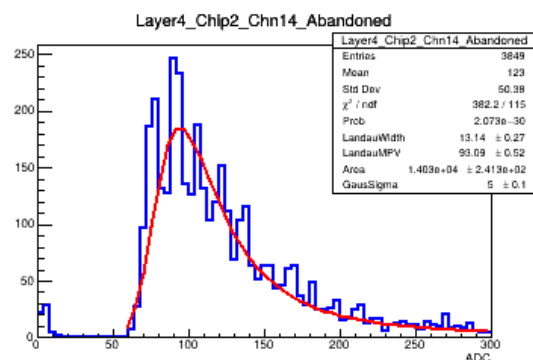
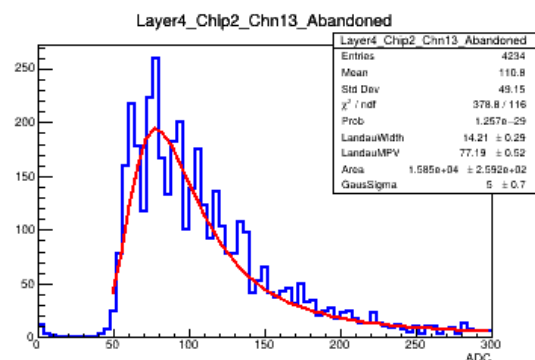
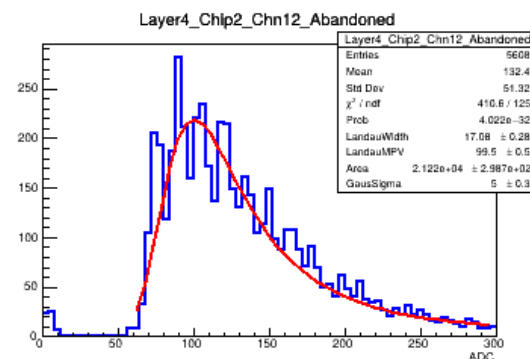
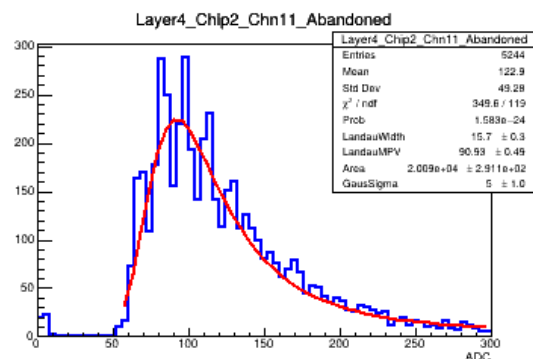
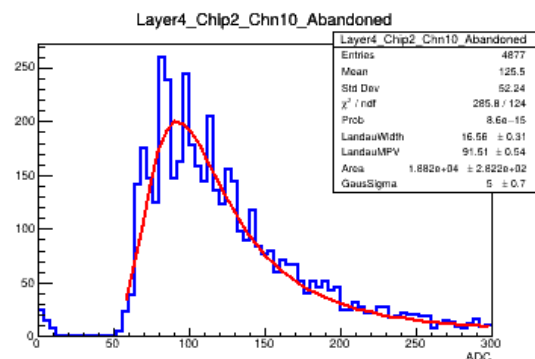
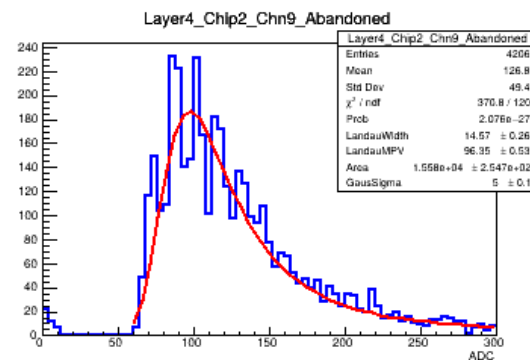
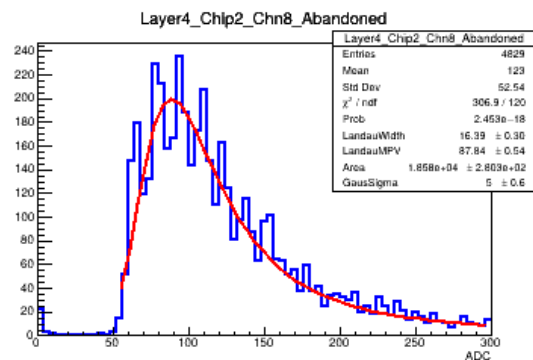
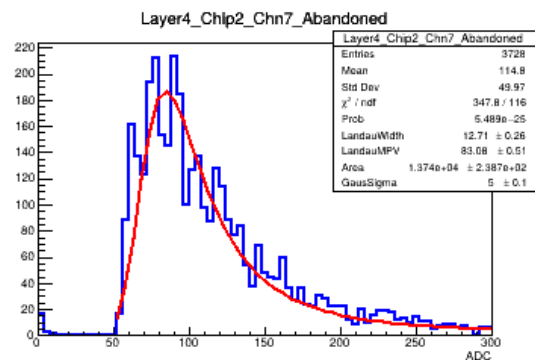


ADC Spectrum Scaling - 束流位置



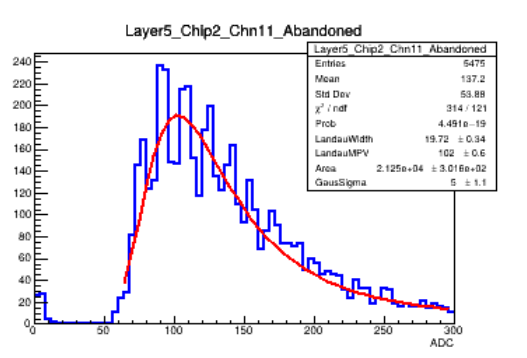
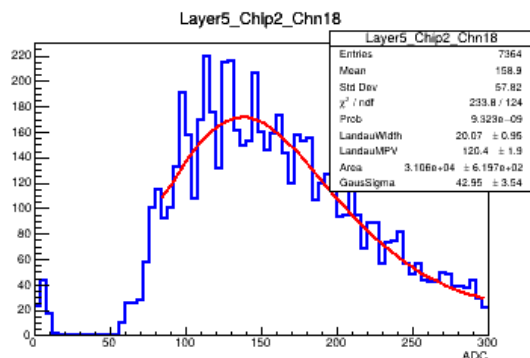
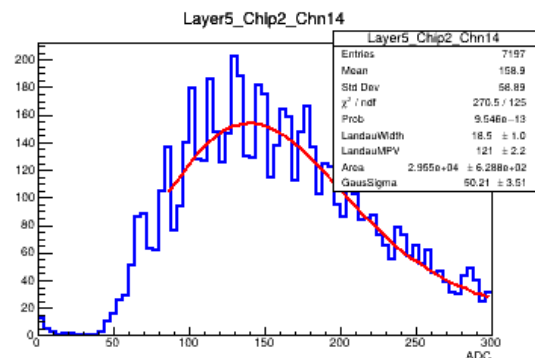
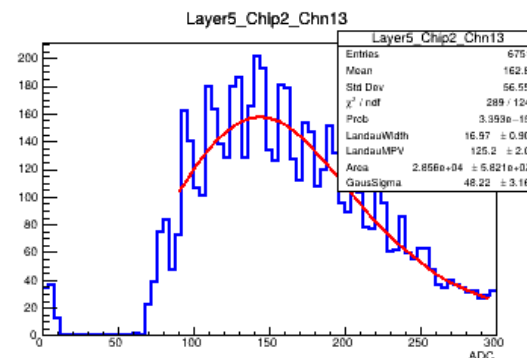
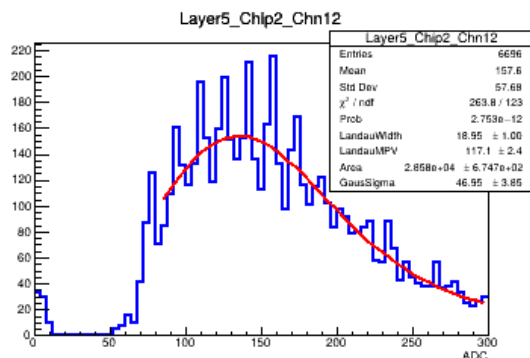
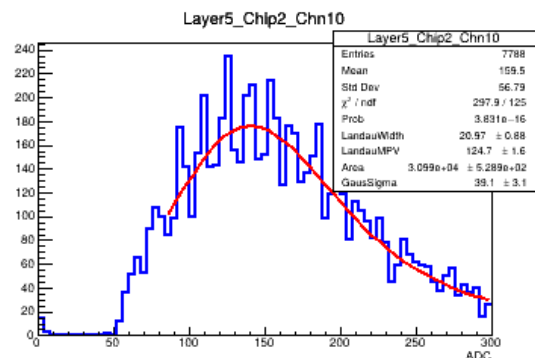
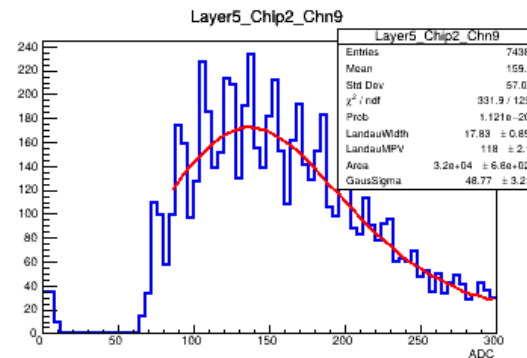
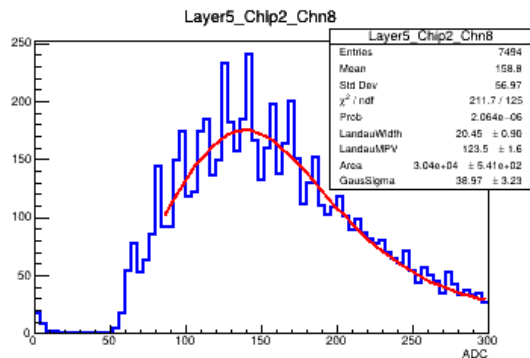
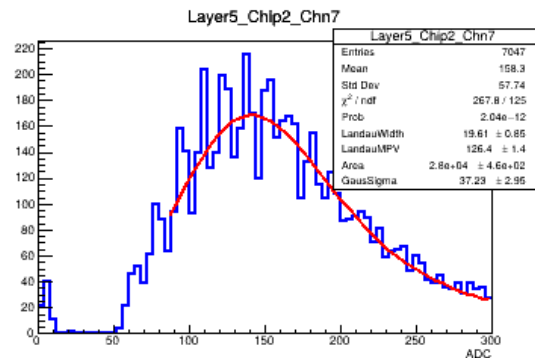
Standard selection? Mean value scaling?

Layer 4 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm

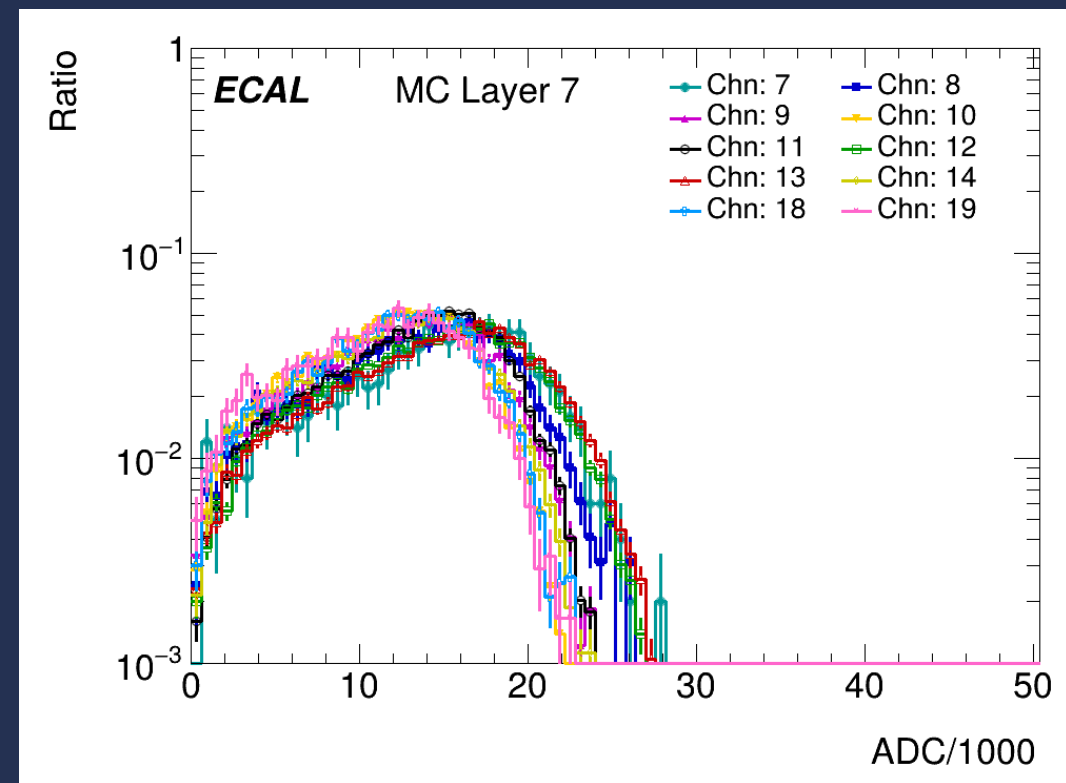
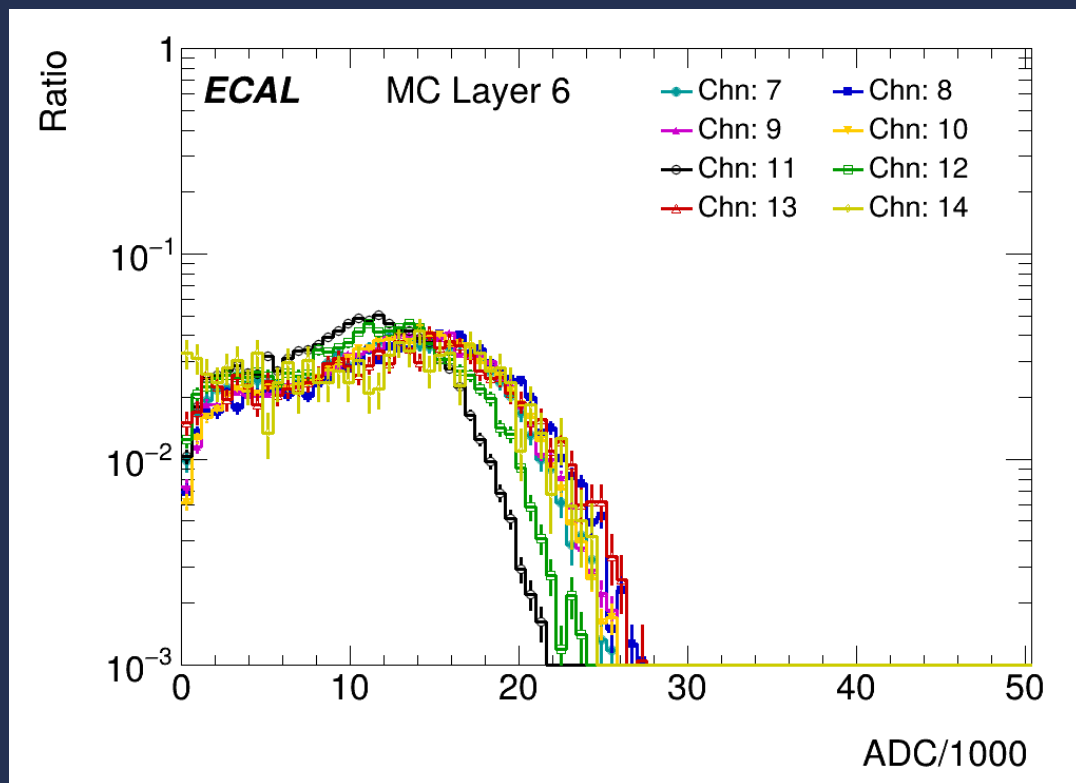
Layer 5 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



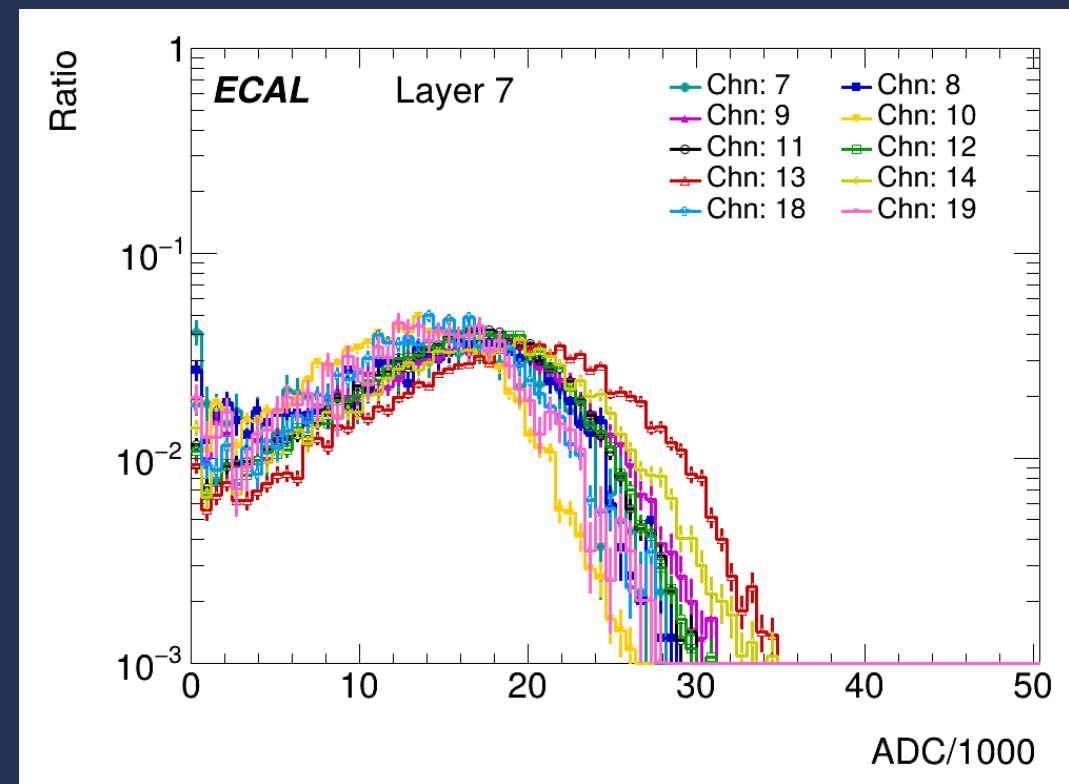
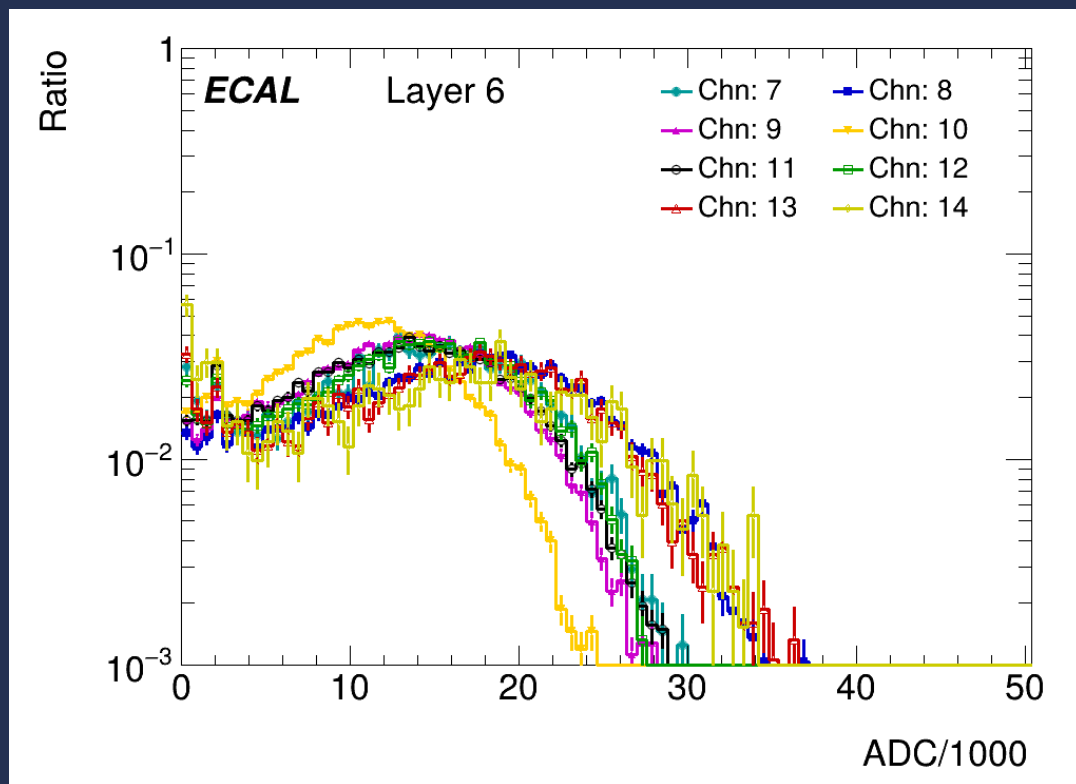
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

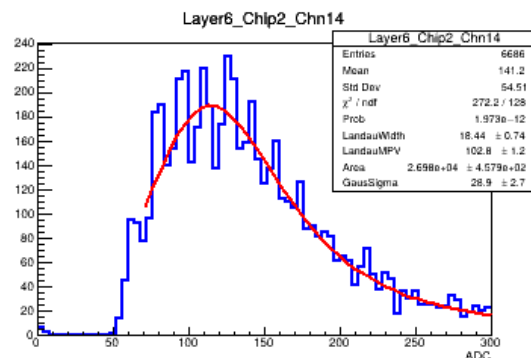
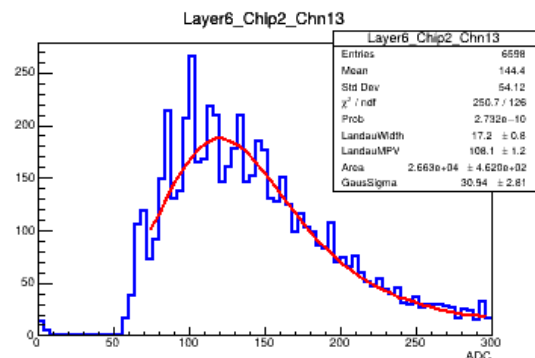
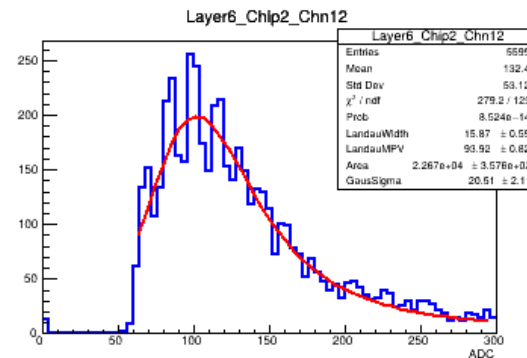
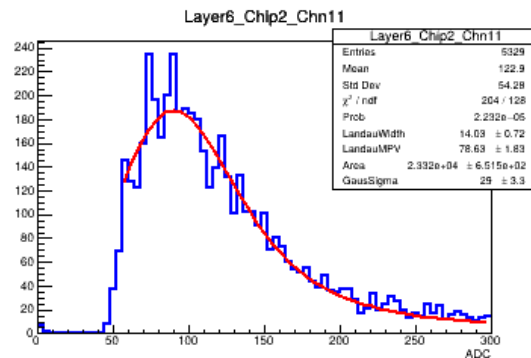
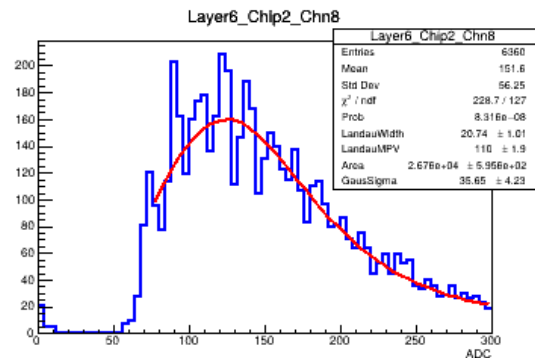


ADC Spectrum Scaling - 束流位置



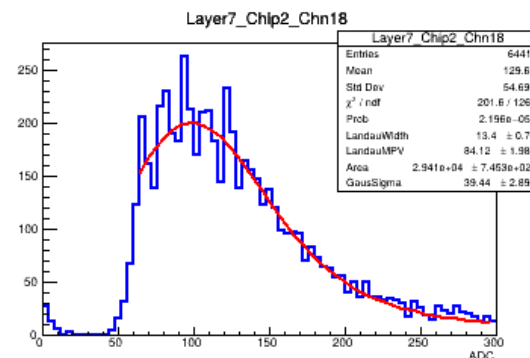
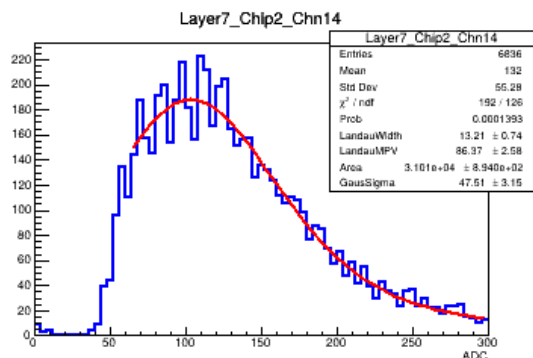
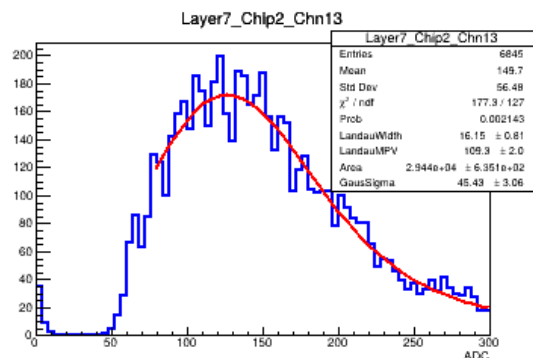
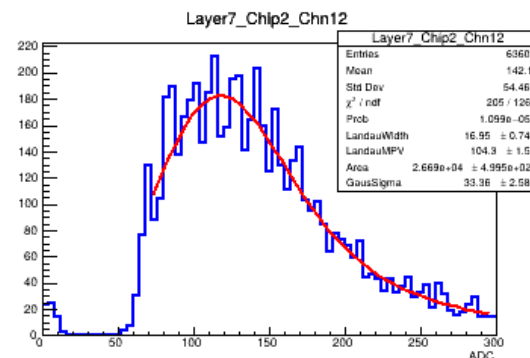
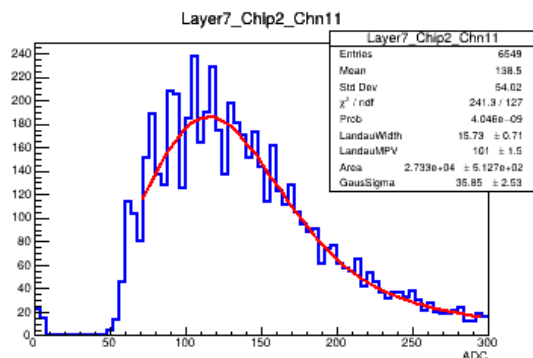
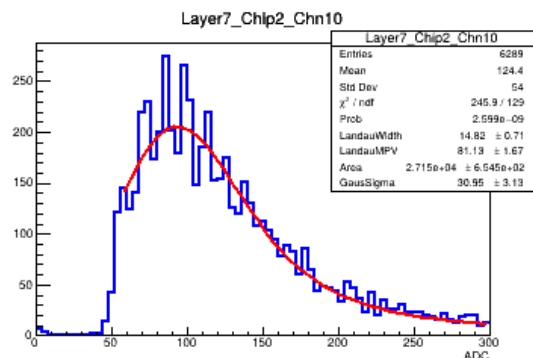
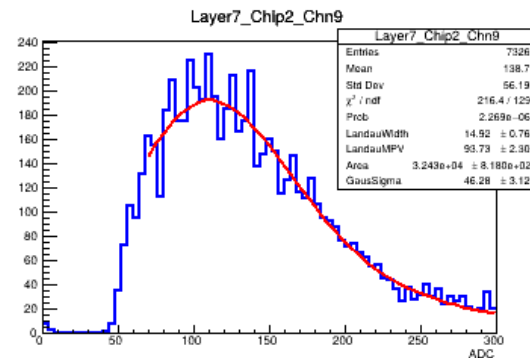
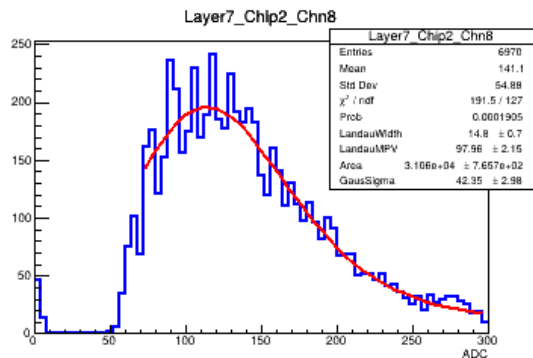
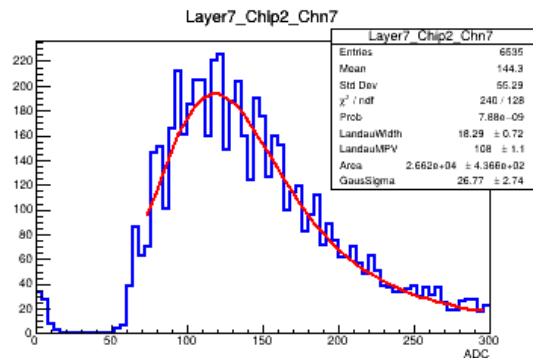
Standard selection? Mean value scaling?

Layer 6 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm

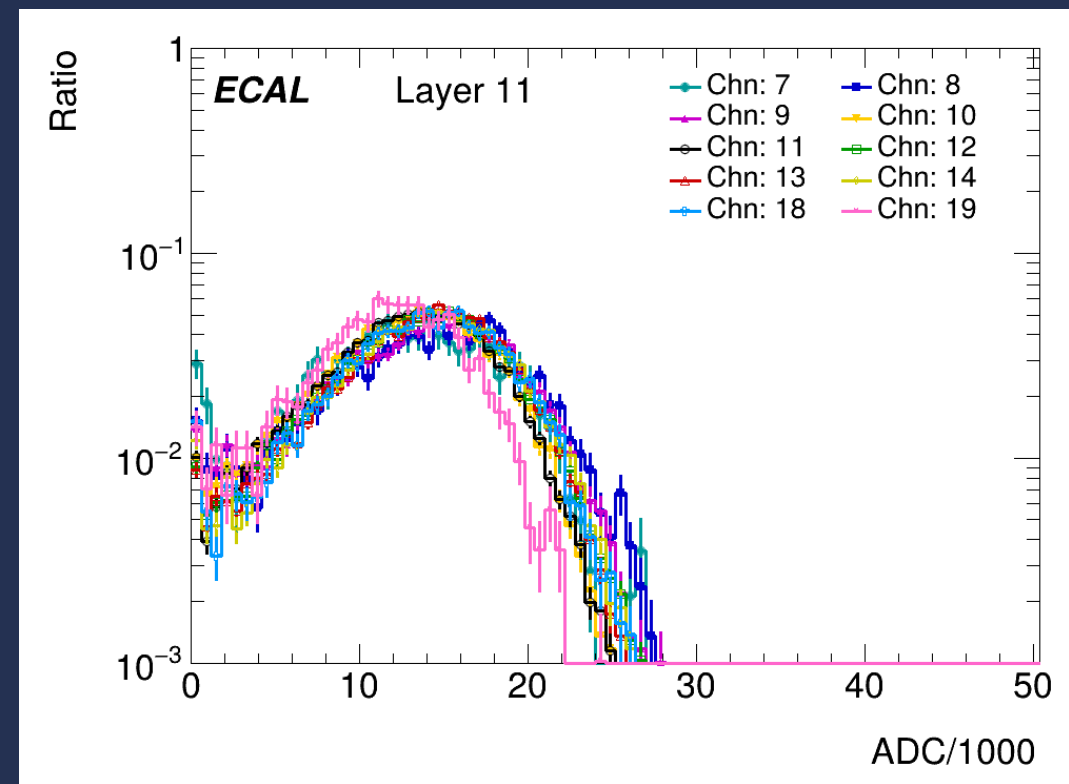
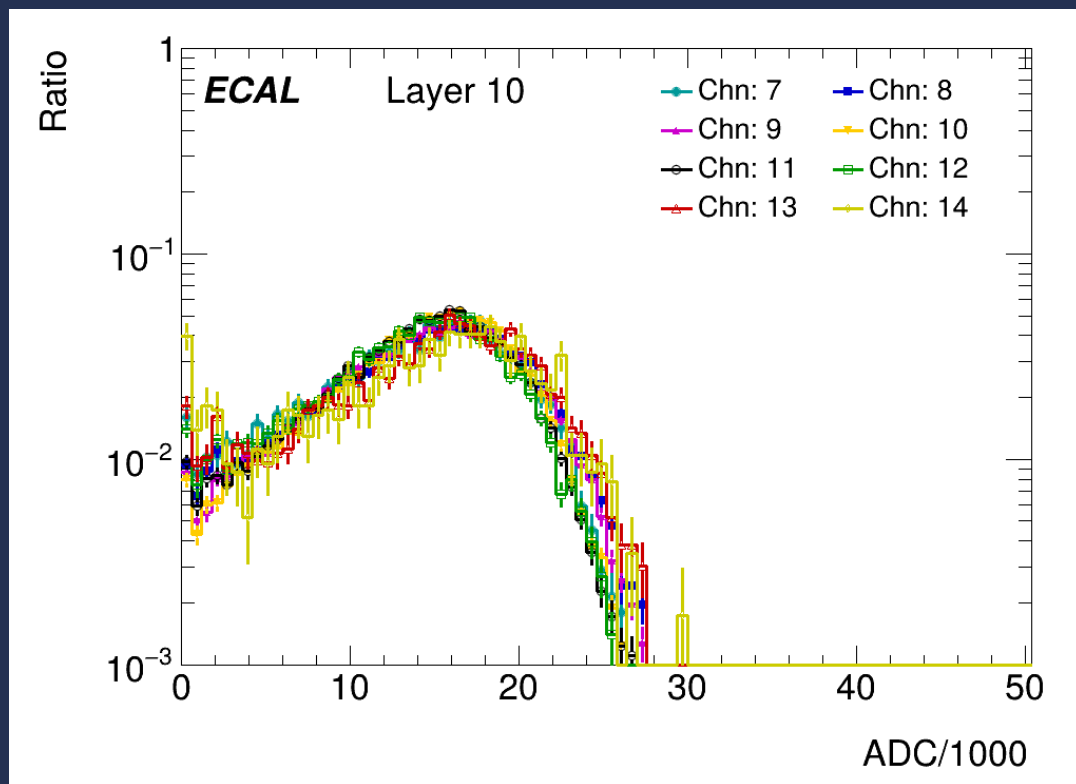
Layer 7 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



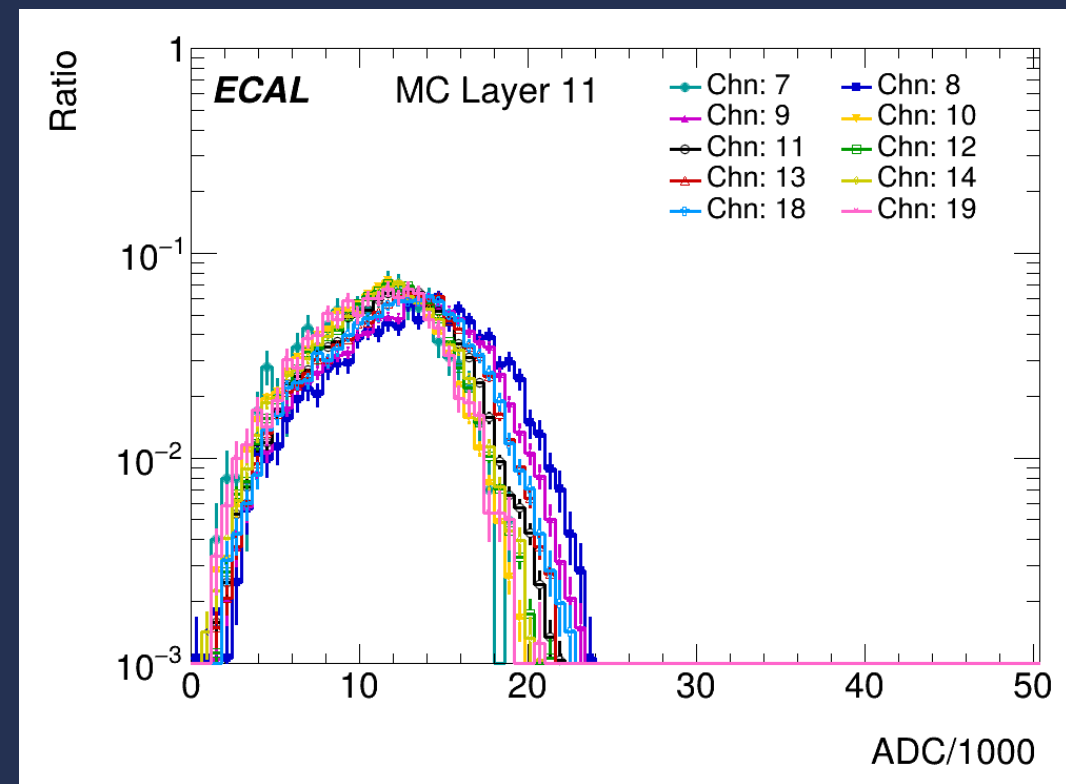
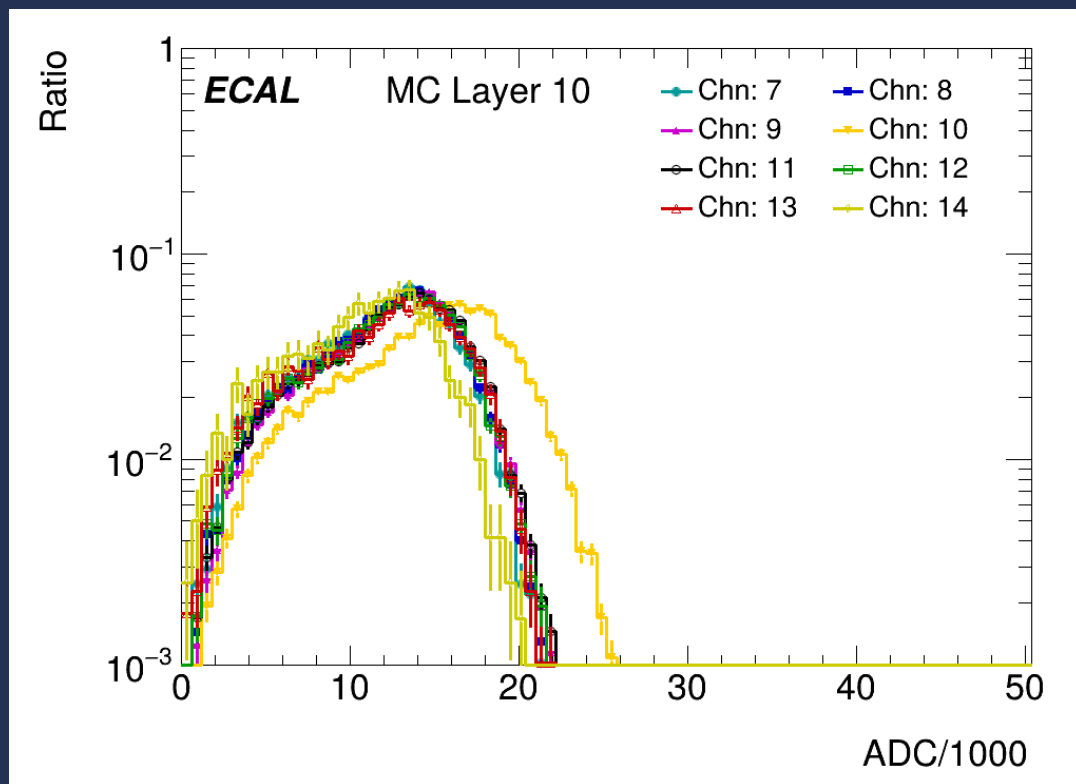
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

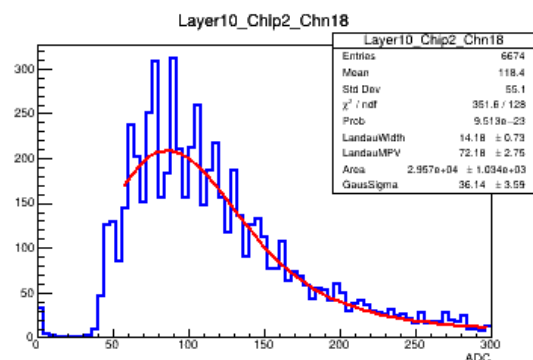
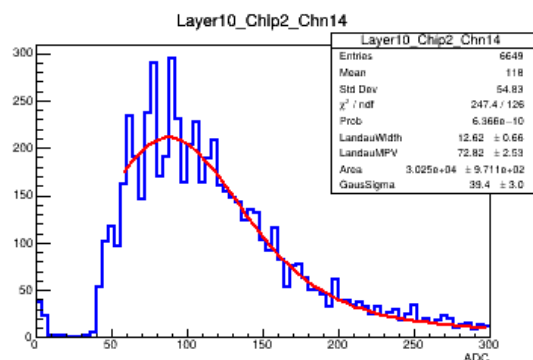
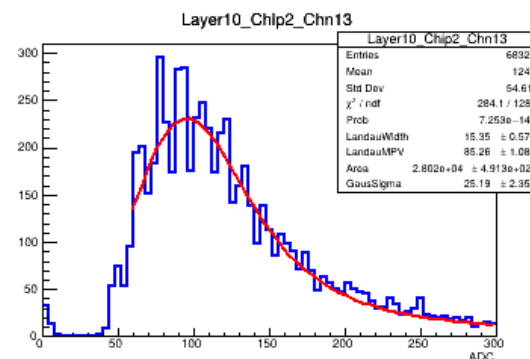
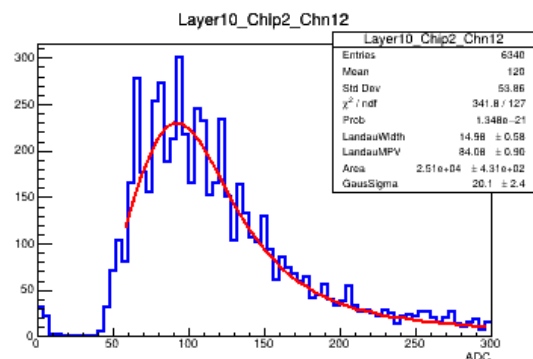
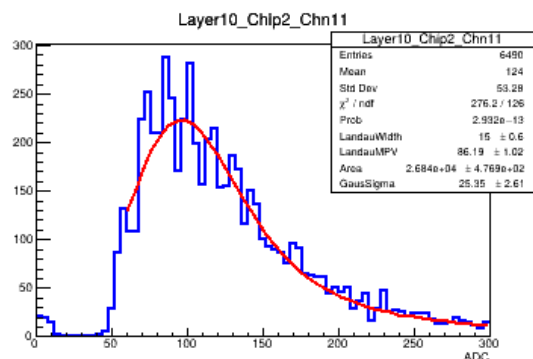
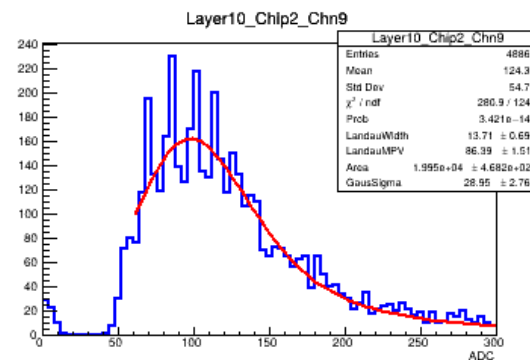
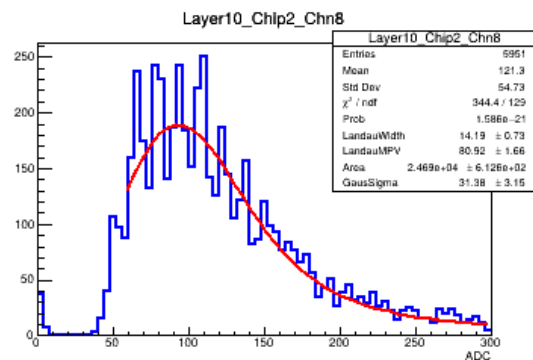
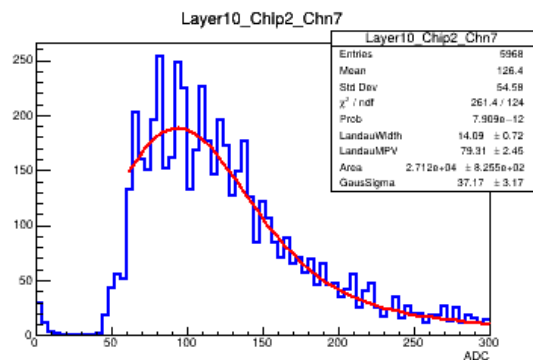


ADC Spectrum Scaling - 束流位置



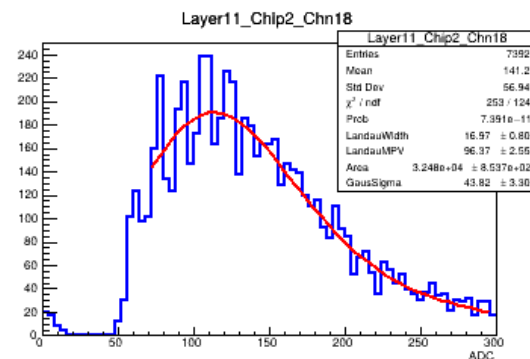
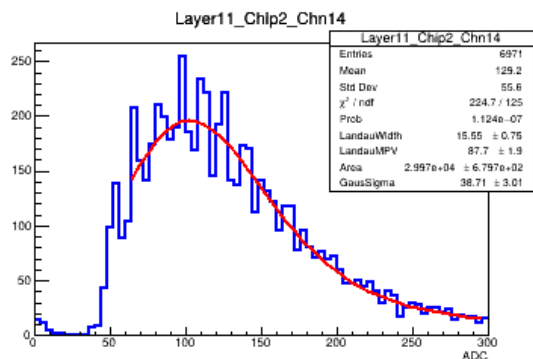
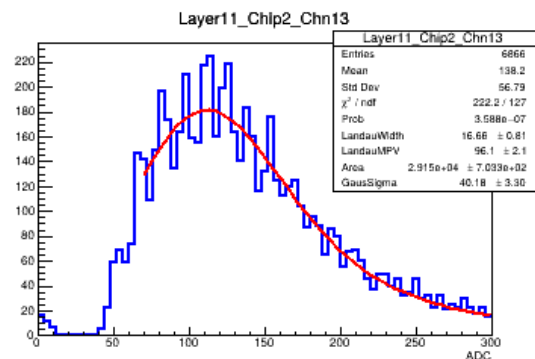
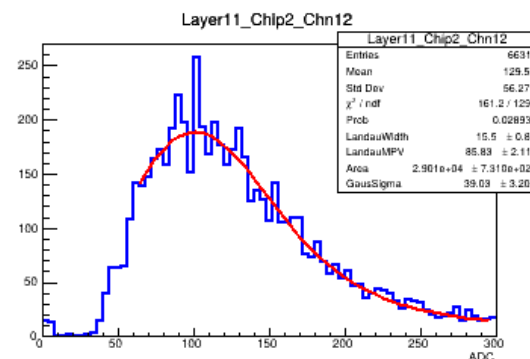
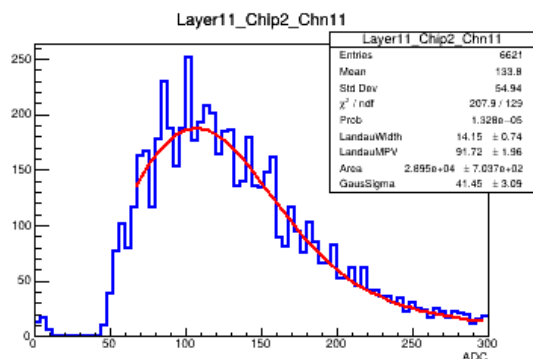
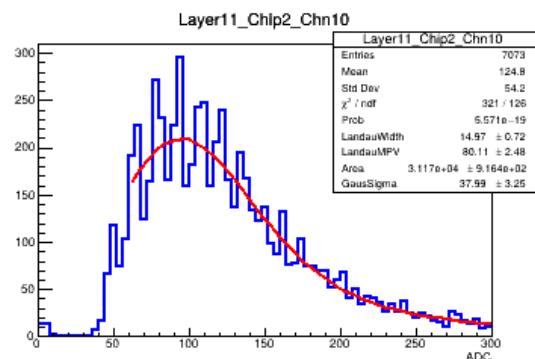
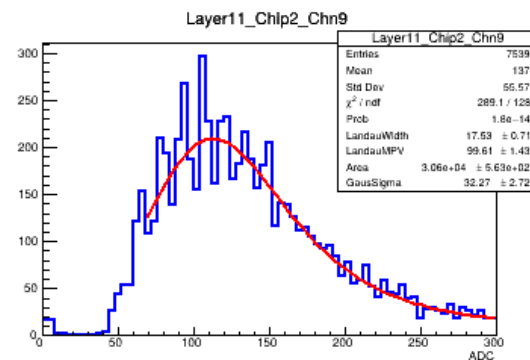
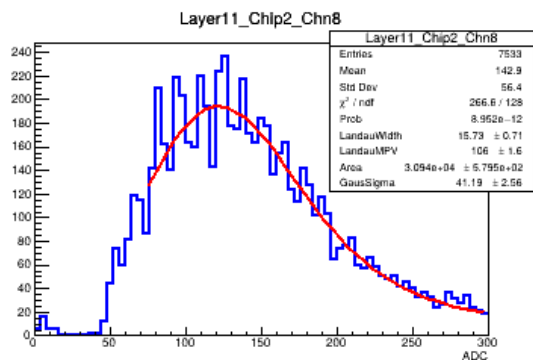
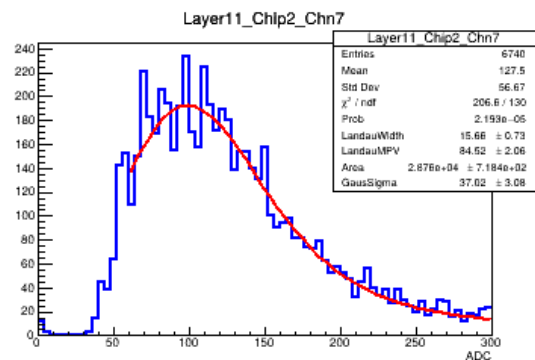
Standard selection? Mean value scaling?

Layer 10 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm

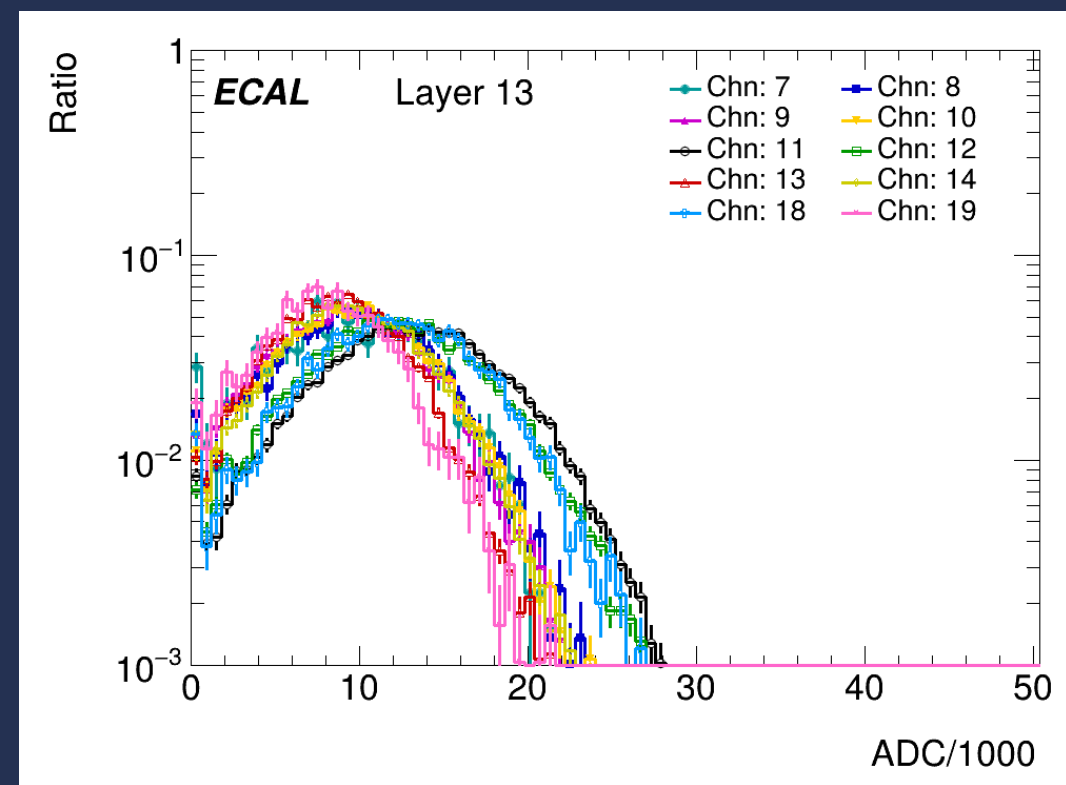
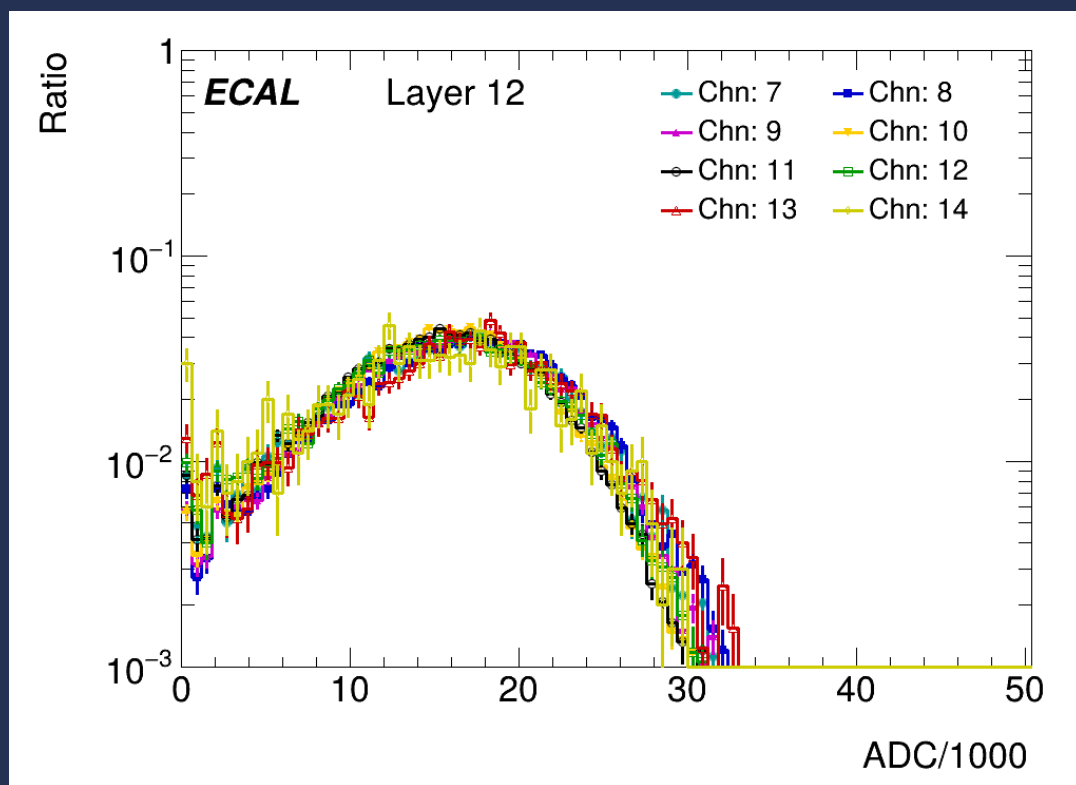
Layer 11 MIP



chn7 — -24mm
 chn8 — -19mm
 chn9 — -13mm
 chn10 — -8mm
 chn11 — -3mm
 chn12 — 3mm
 chn13 — -8mm
 chn14 — 13mm
 chn18 — 19mm



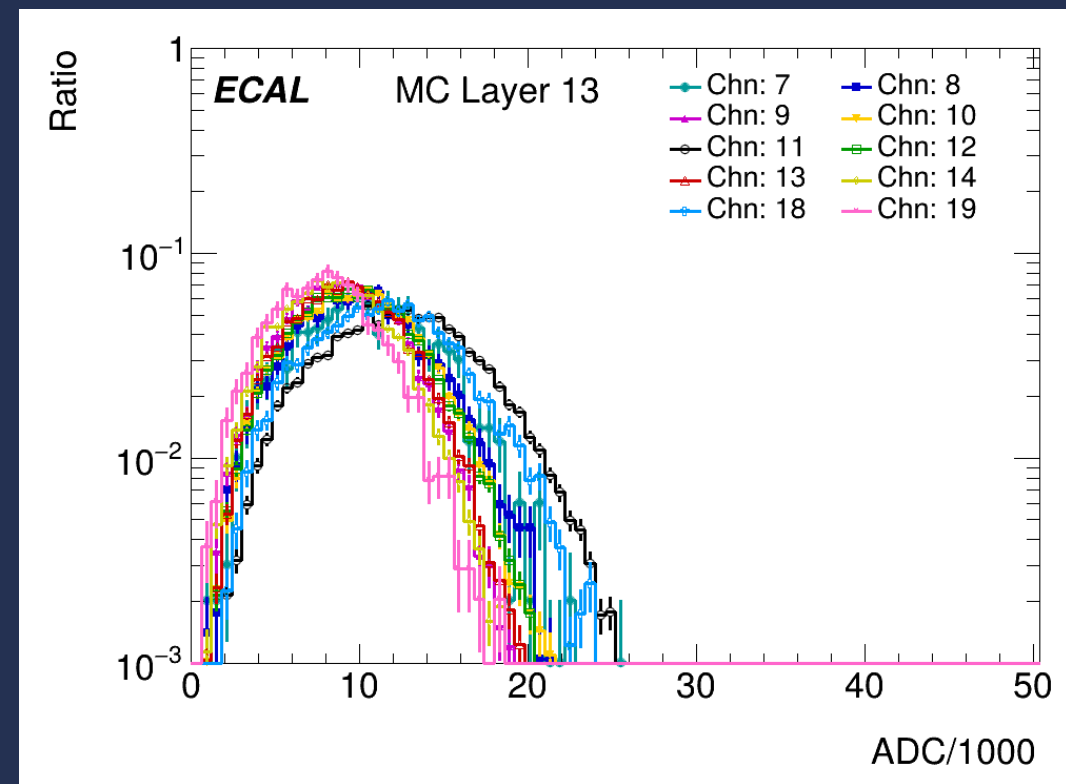
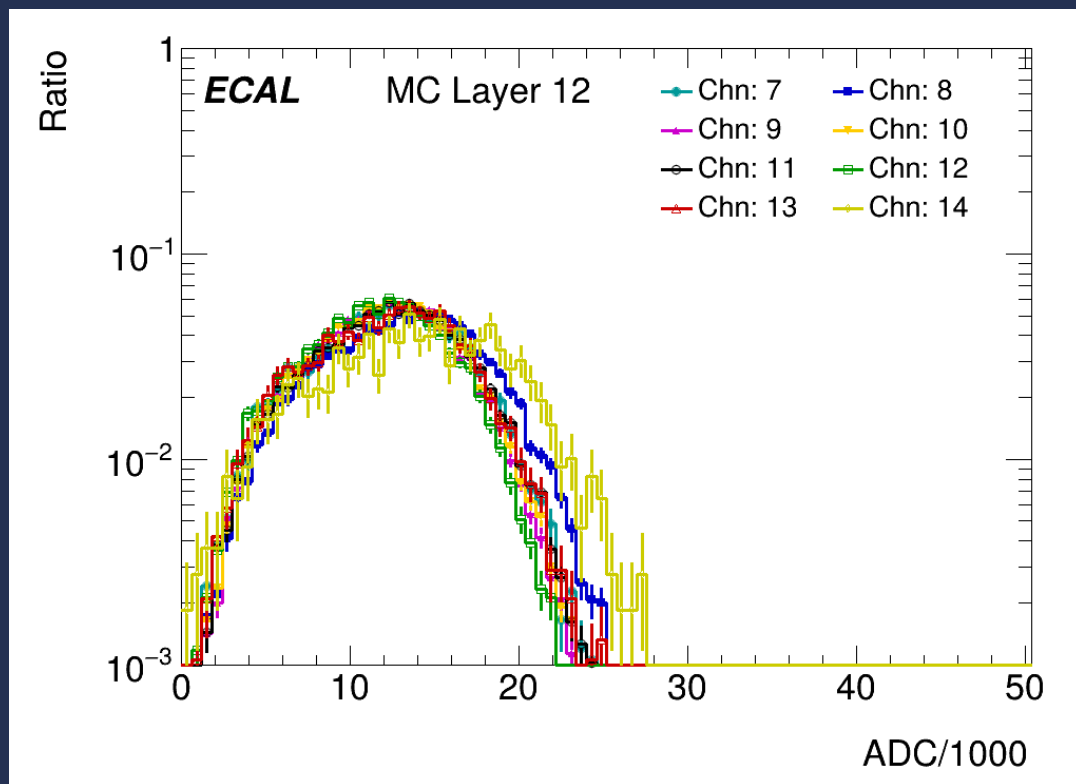
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

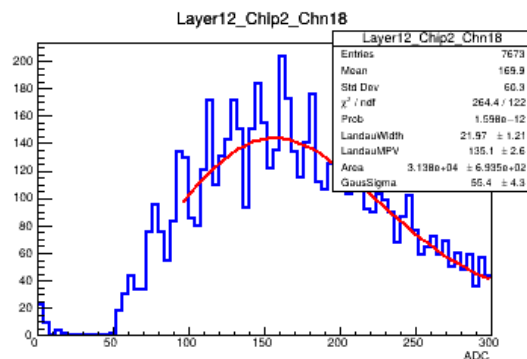
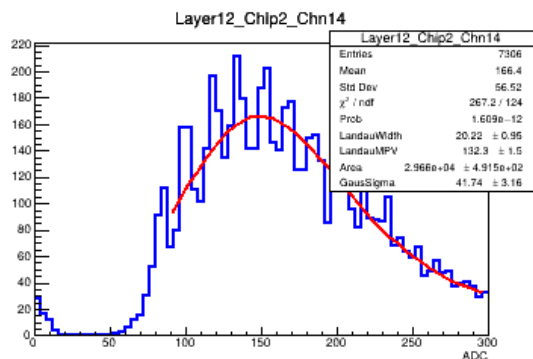
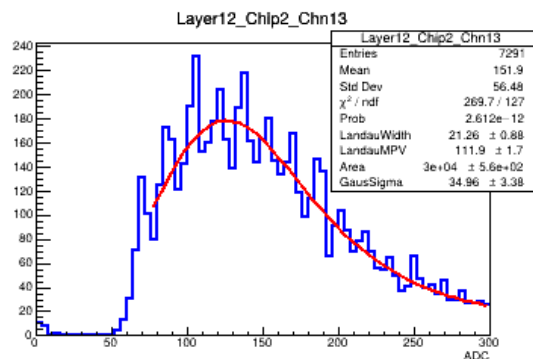
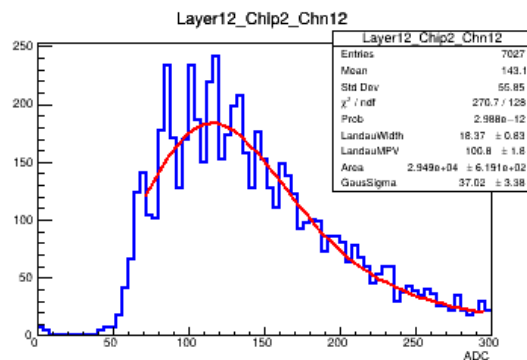
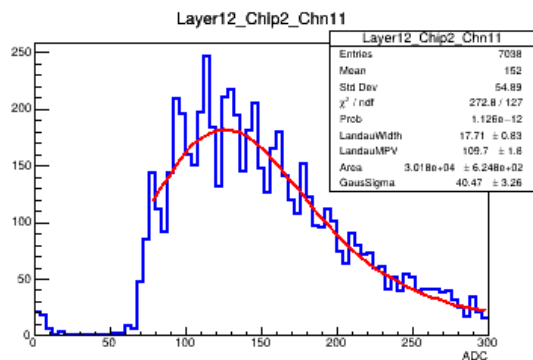
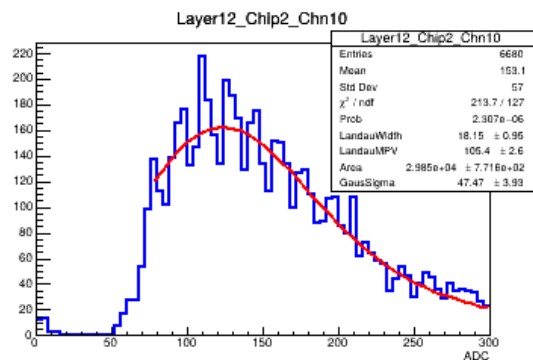
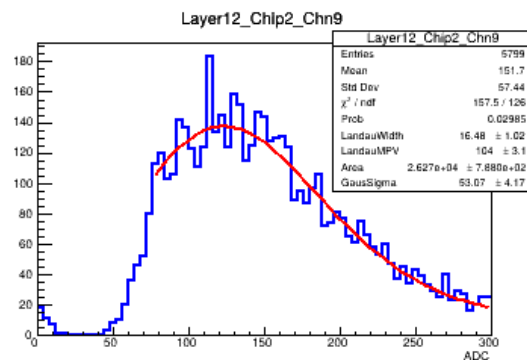
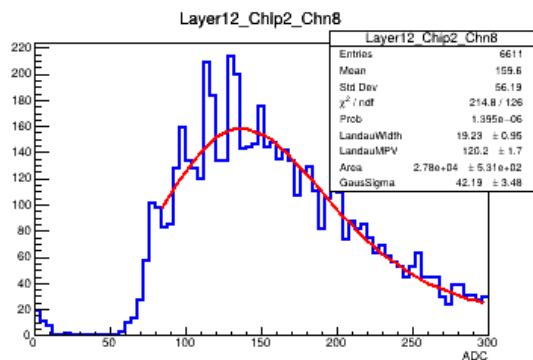
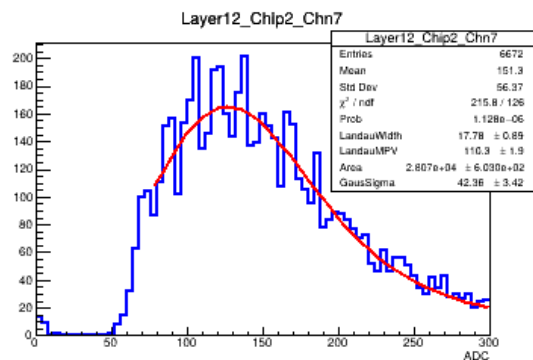


ADC Spectrum Scaling - 束流位置



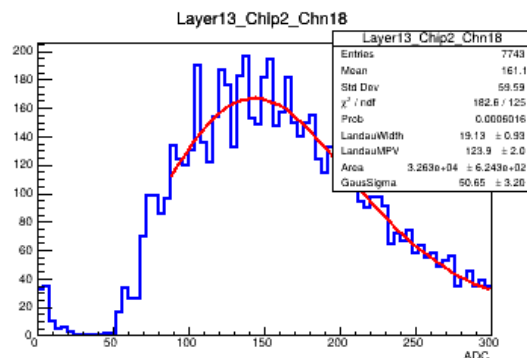
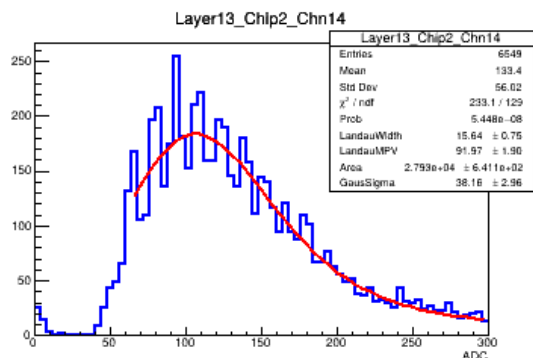
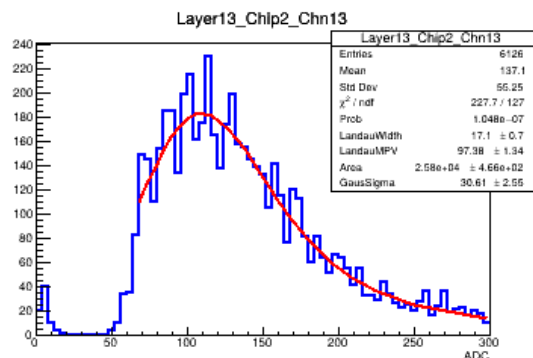
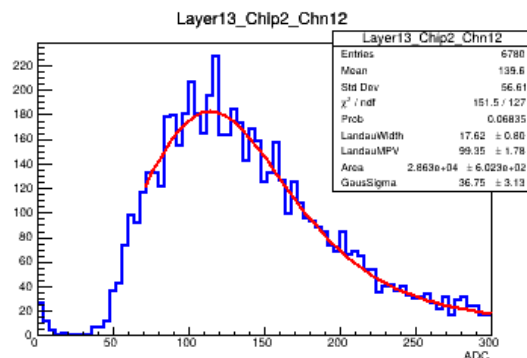
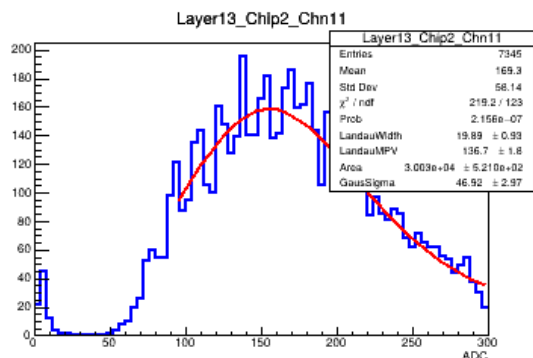
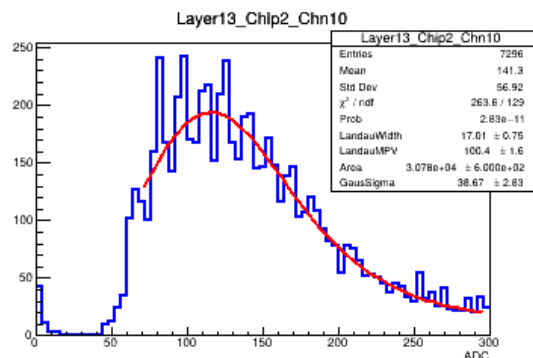
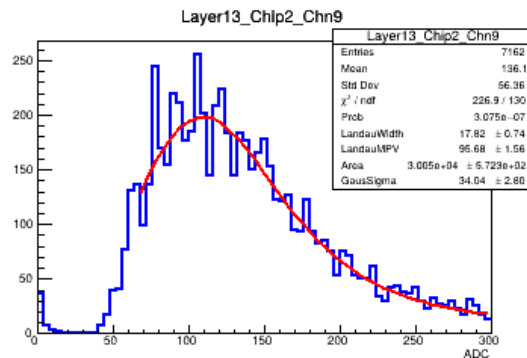
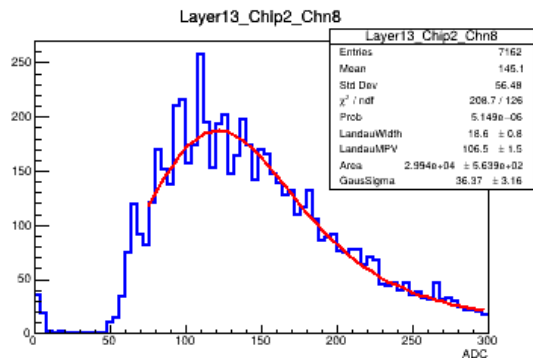
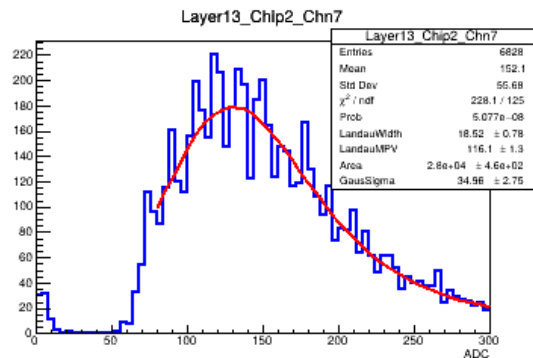
Standard selection? Mean value scaling?

Layer 12 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm

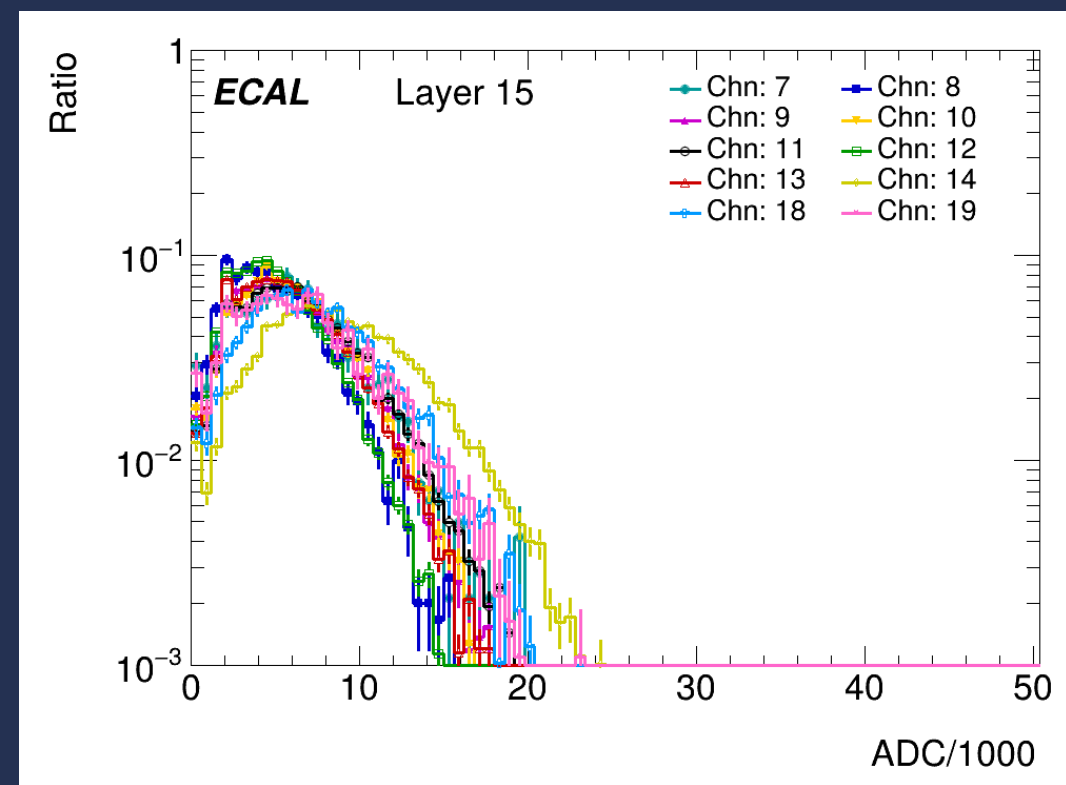
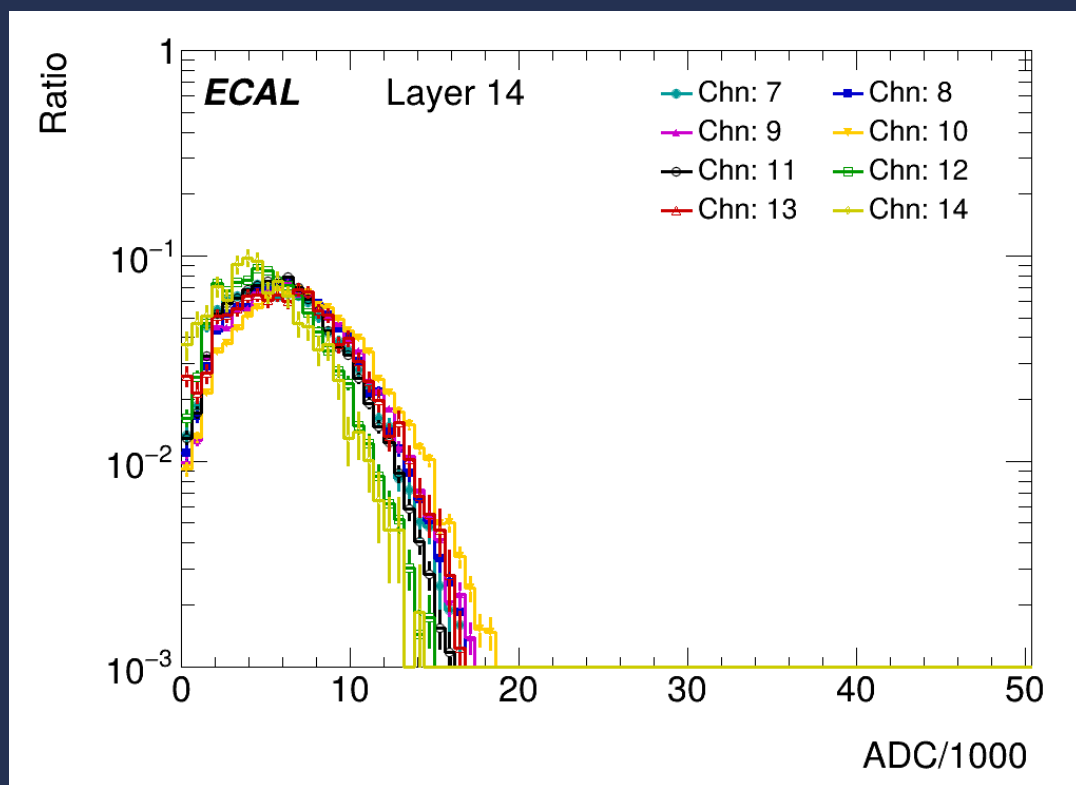
Layer 13 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



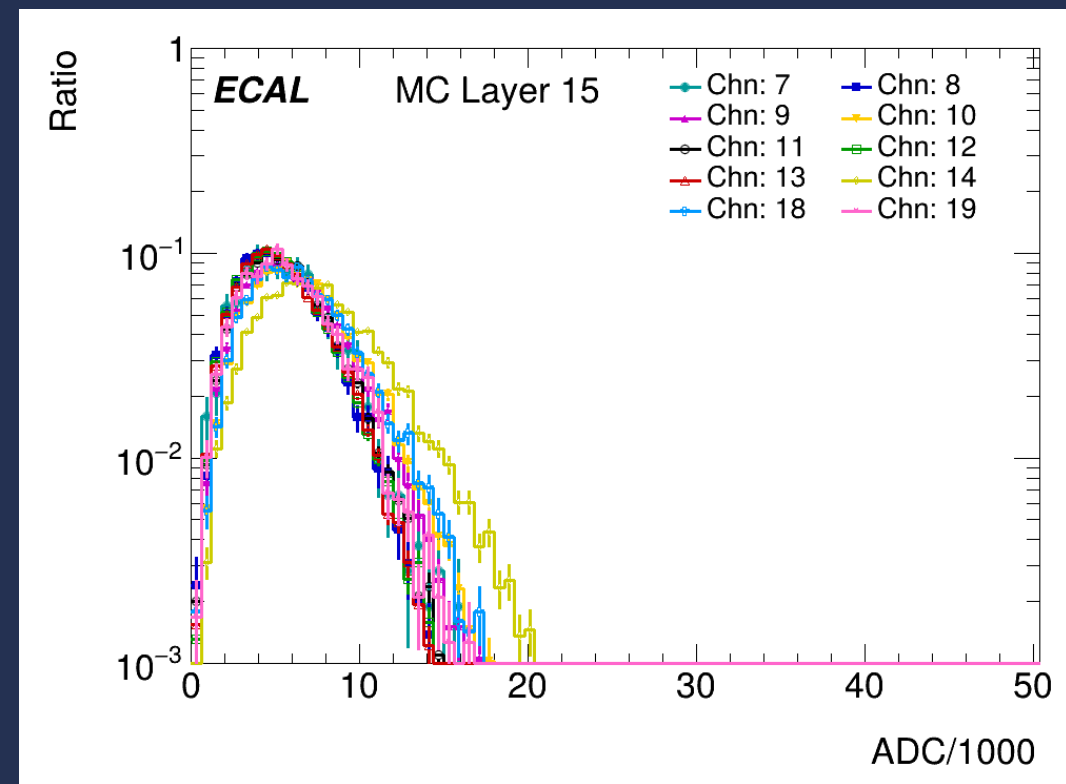
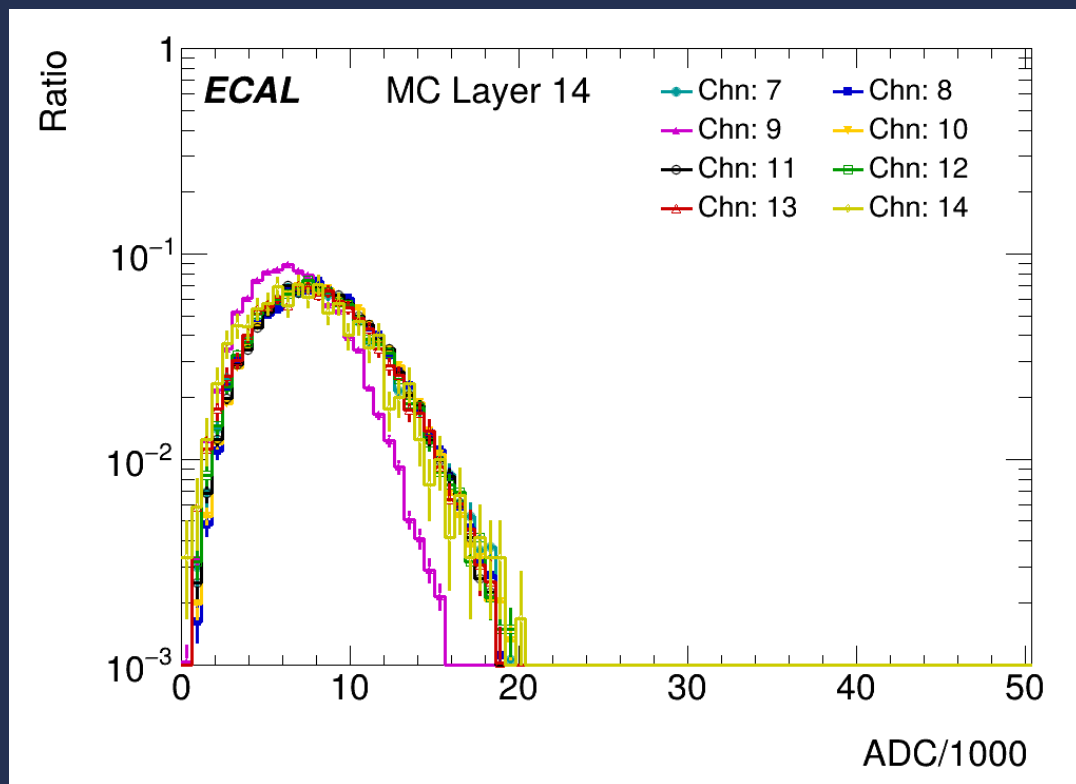
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

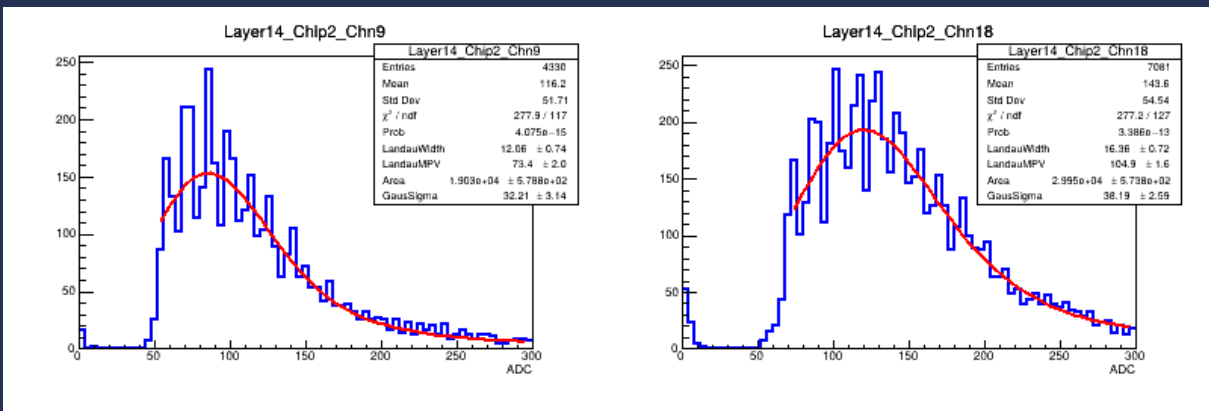


ADC Spectrum Scaling - 束流位置

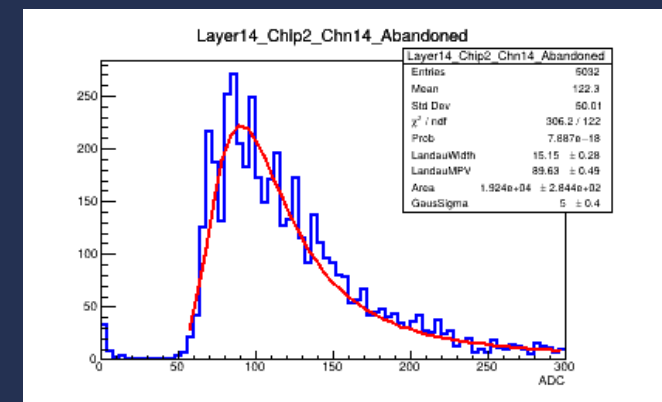
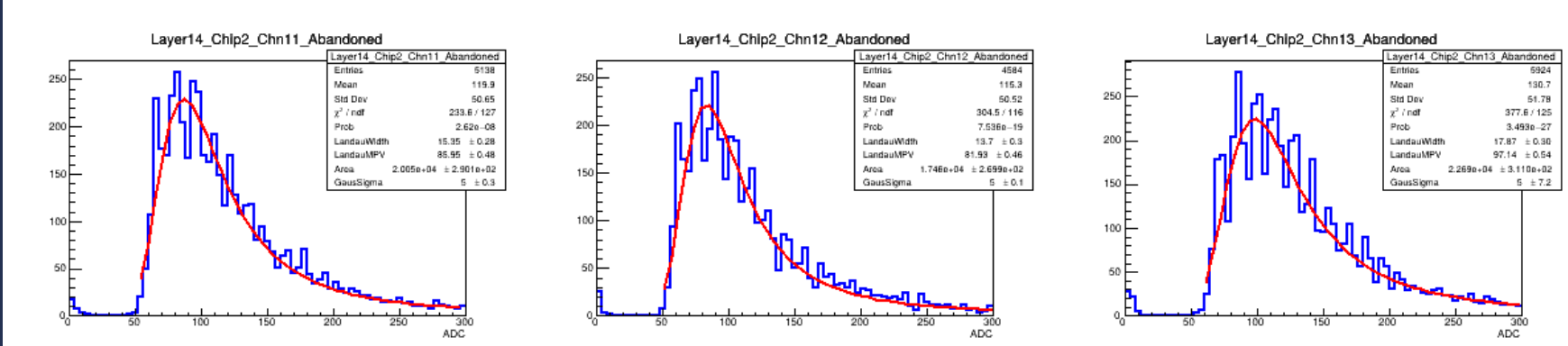
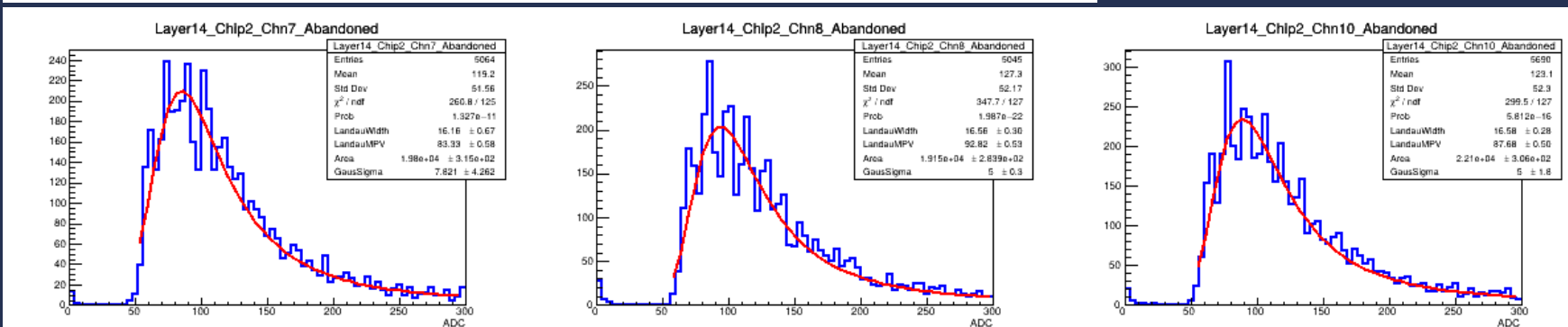


Standard selection? Mean value scaling?

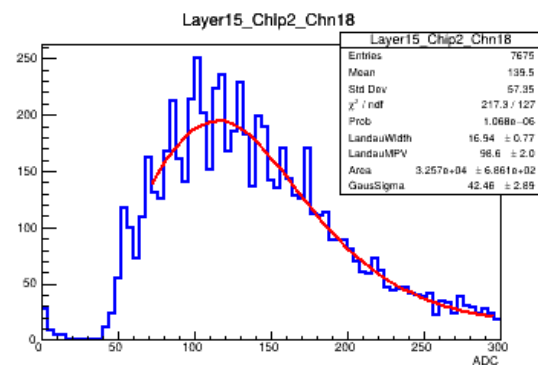
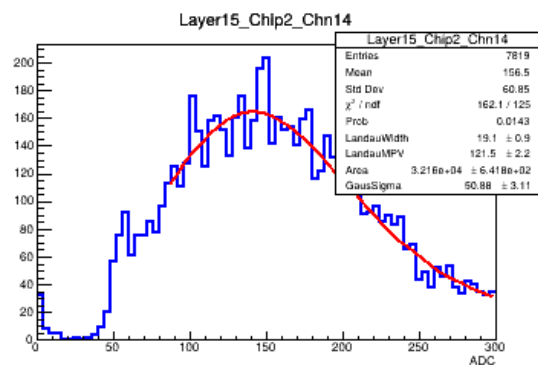
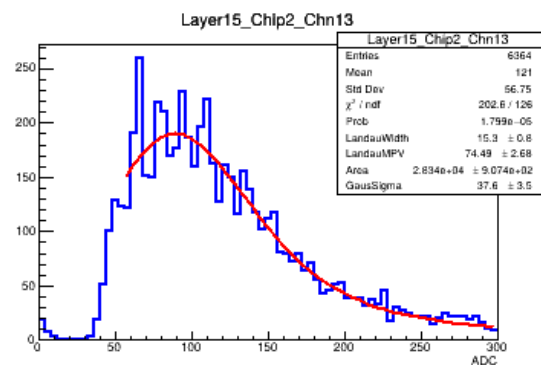
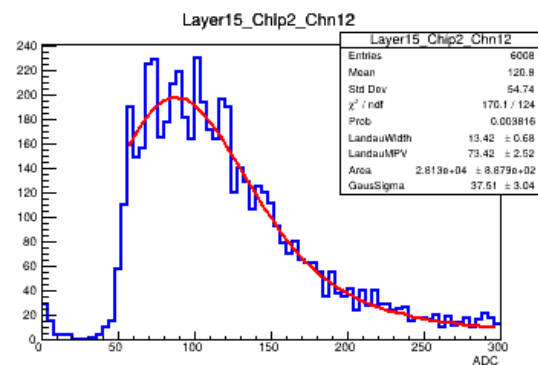
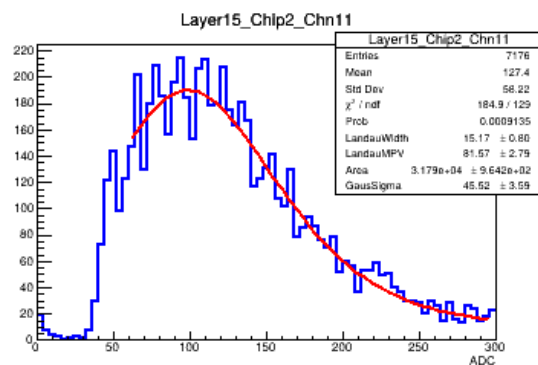
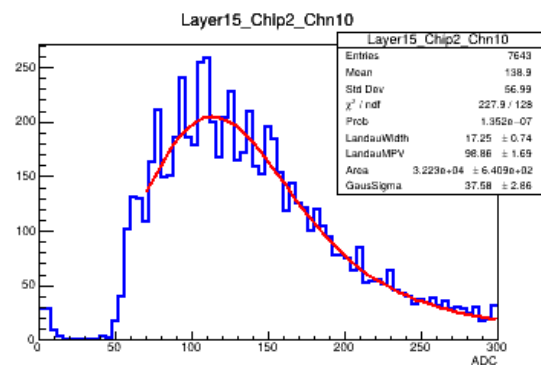
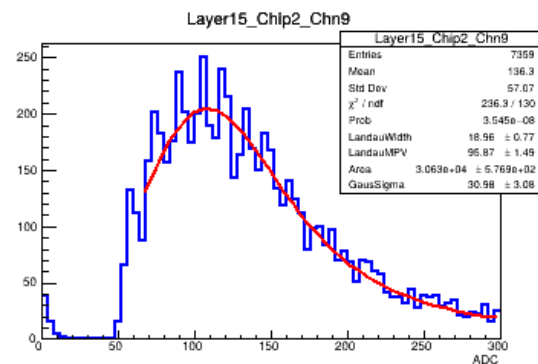
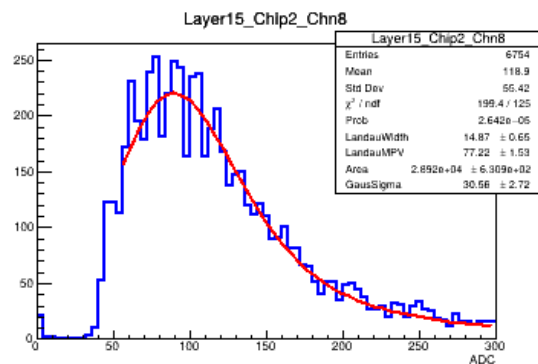
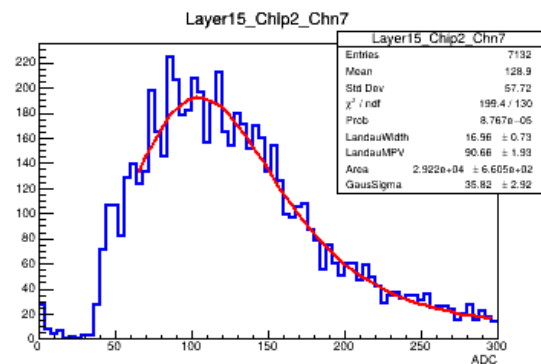
Layer 14 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



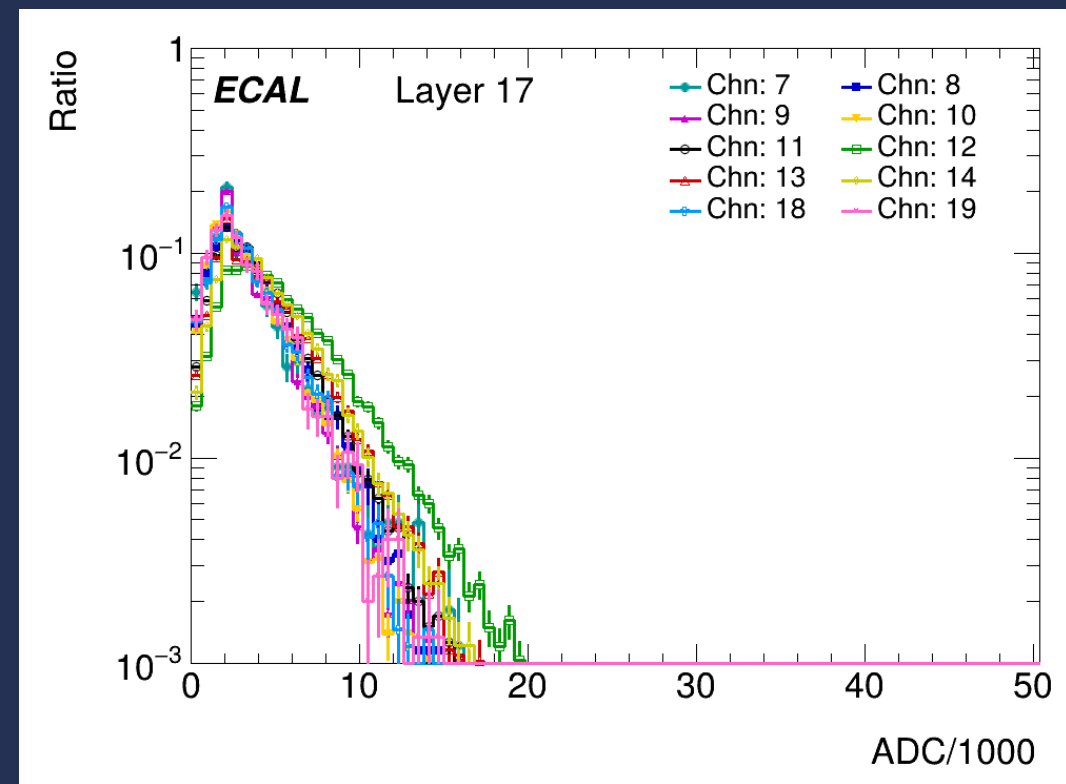
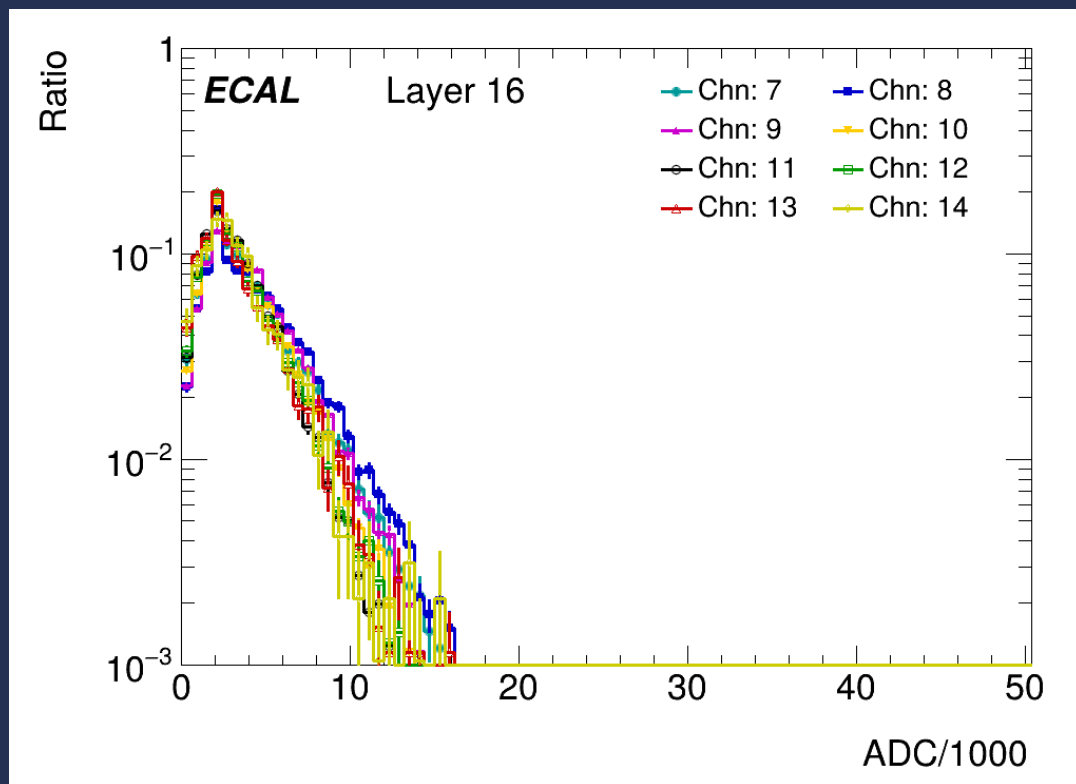
Layer 15 MIP



- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



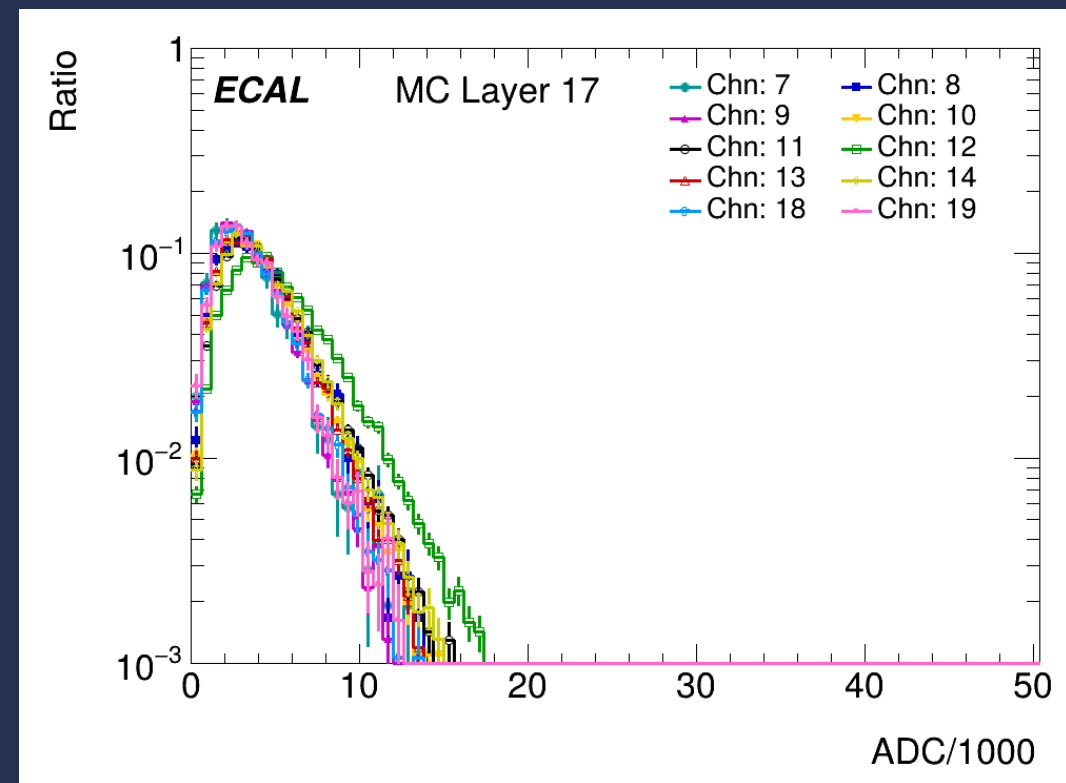
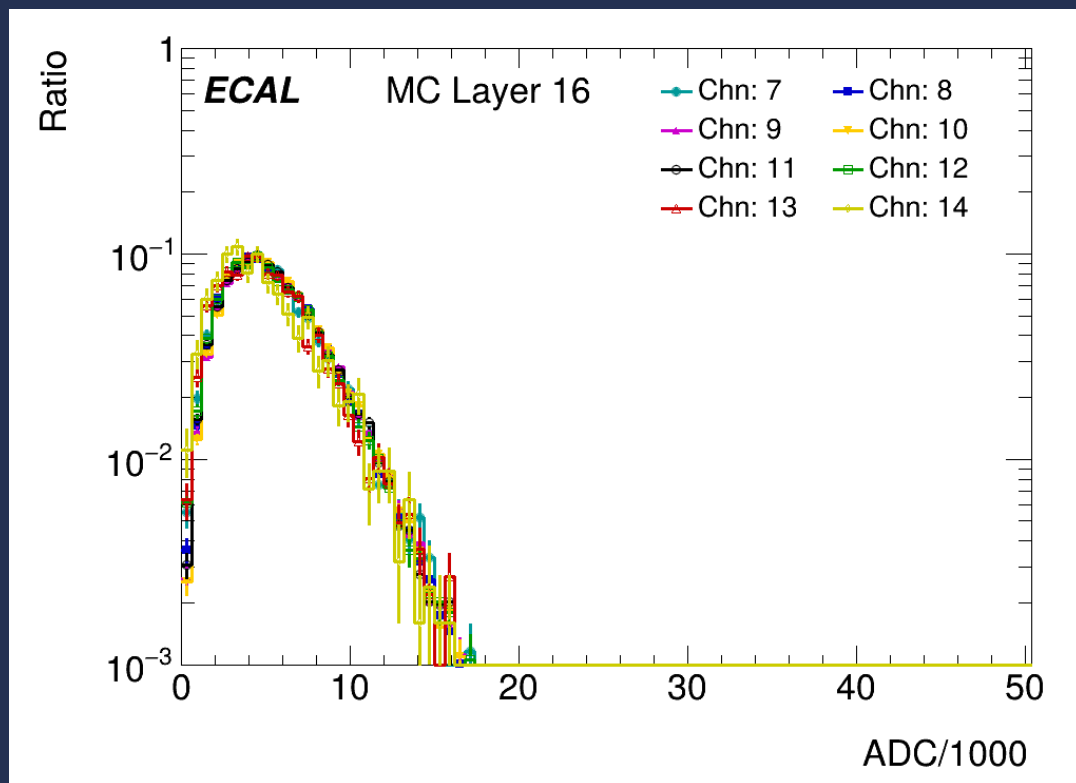
ADC Spectrum Scaling - 束流位置



Standard selection? Mean value scaling?

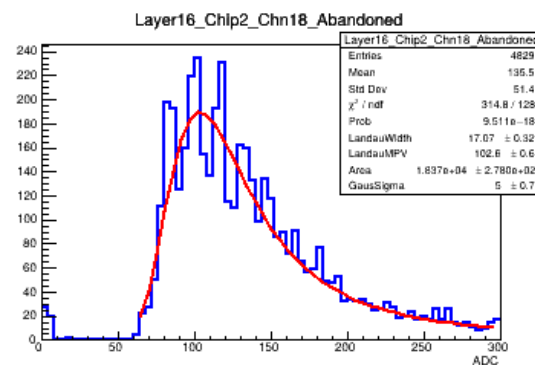
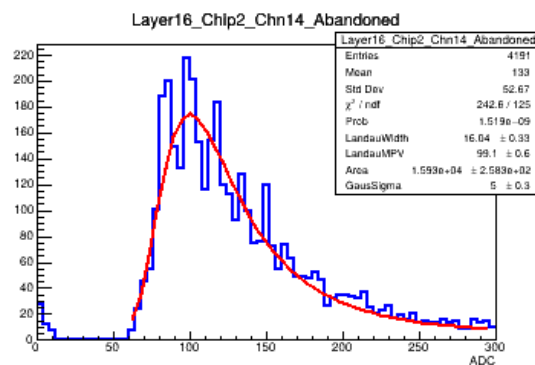
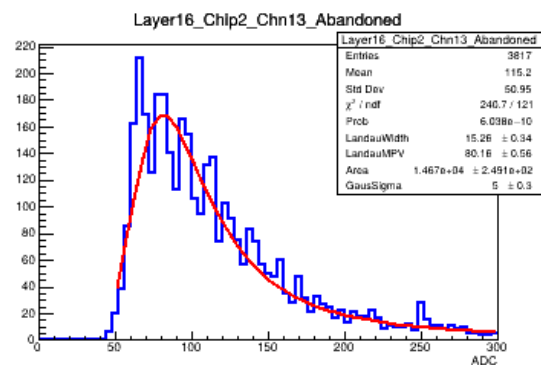
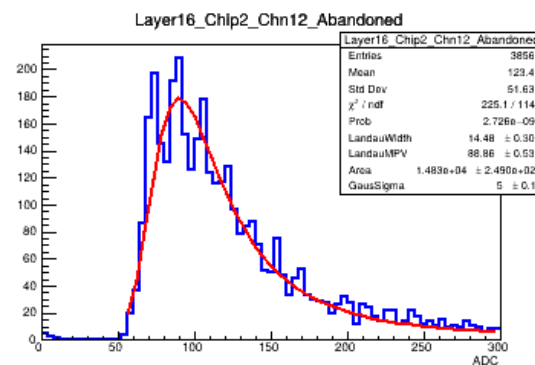
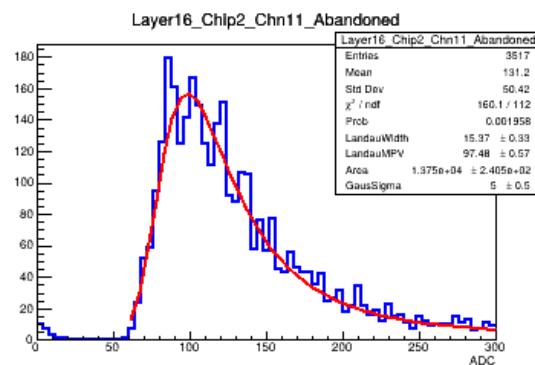
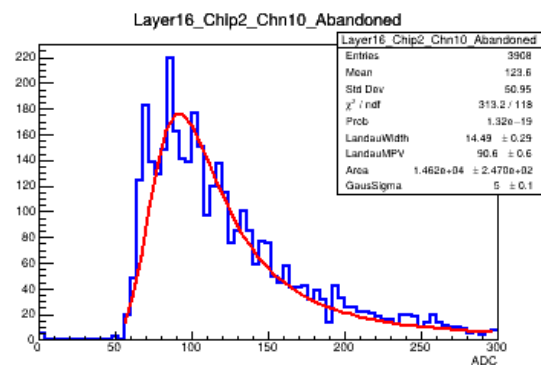
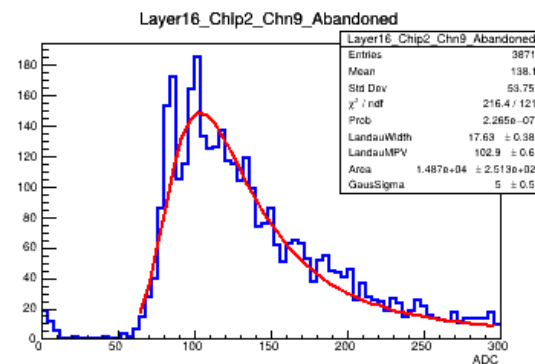
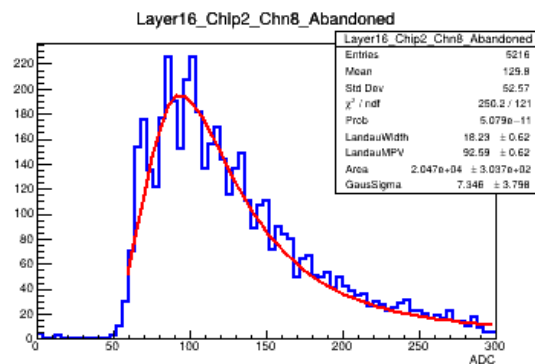
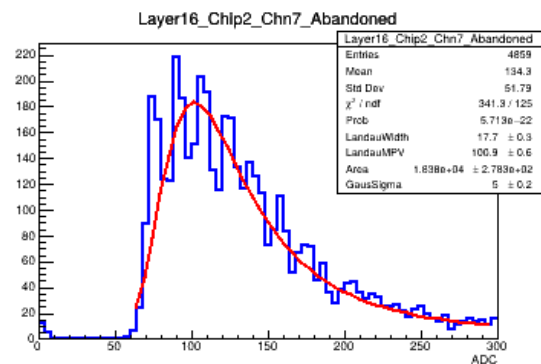


ADC Spectrum Scaling - 束流位置



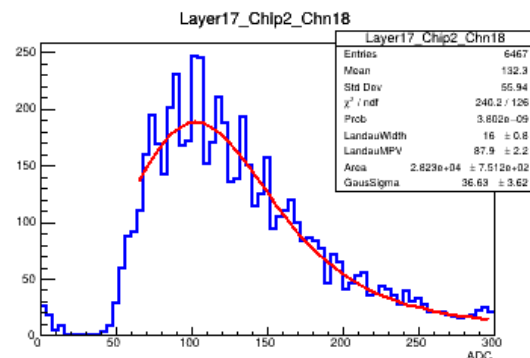
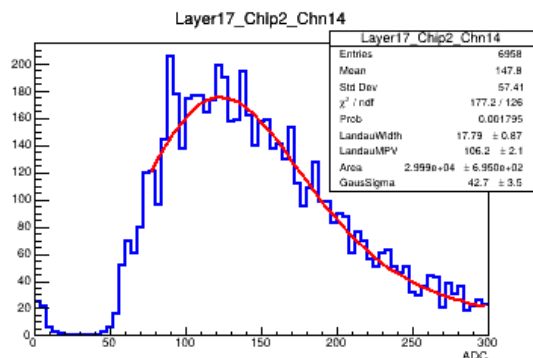
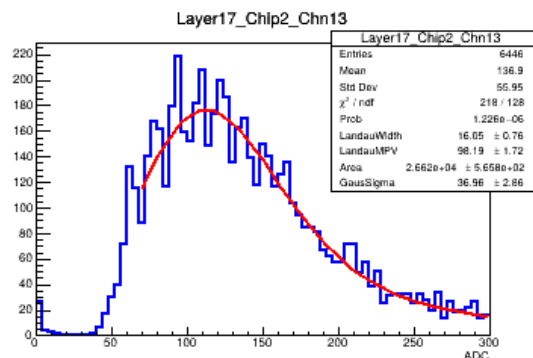
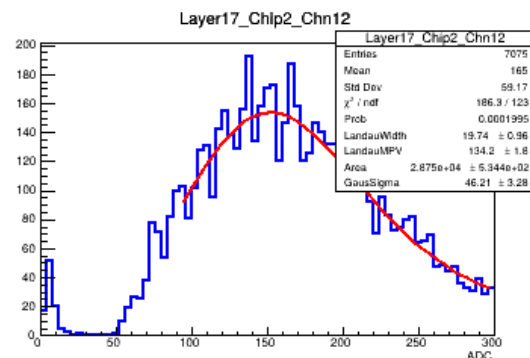
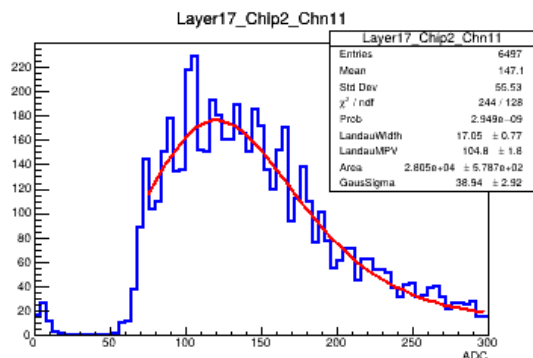
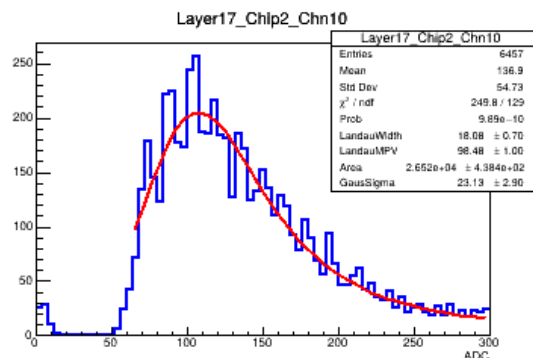
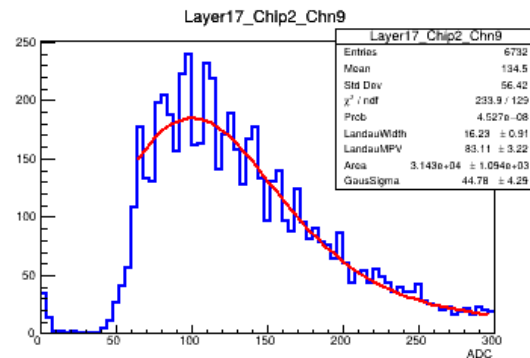
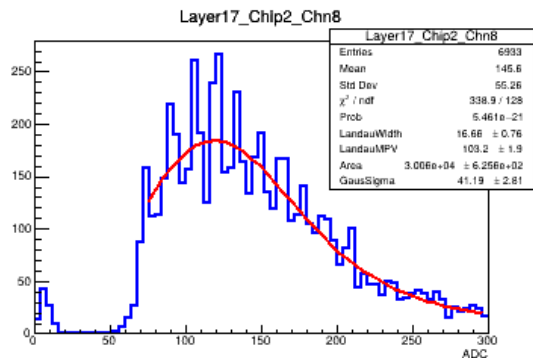
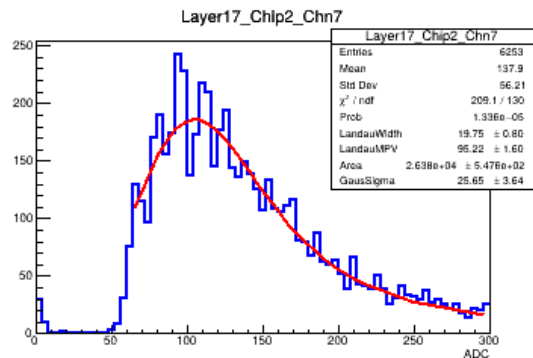
Standard selection? Mean value scaling?

Layer 16 MIP

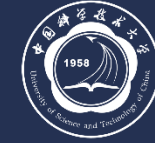


chn7 — -24mm
 chn8 — -19mm
 chn9 — -13mm
 chn10 — -8mm
 chn11 — -3mm
 chn12 — 3mm
 chn13 — -8mm
 chn14 — 13mm
 chn18 — 19mm

Layer 17 MIP

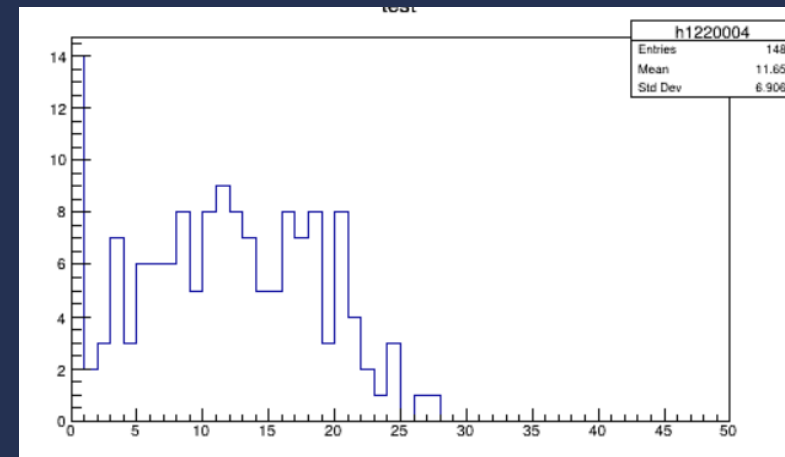
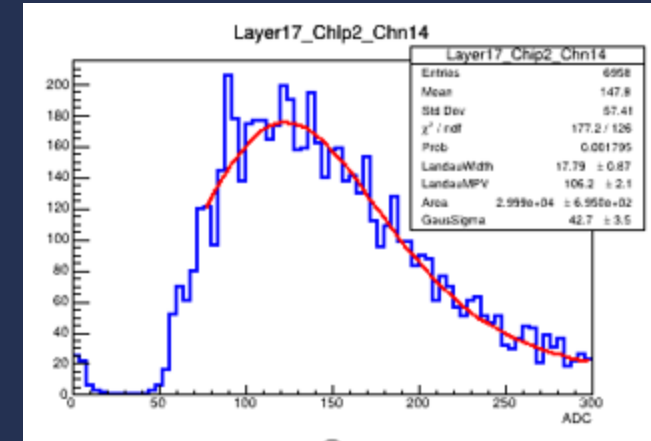


- chn7 — -24mm
- chn8 — -19mm
- chn9 — -13mm
- chn10 — -8mm
- chn11 — -3mm
- chn12 — 3mm
- chn13 — -8mm
- chn14 — 13mm
- chn18 — 19mm



Standard channel selection

- Rules of selection:
- MIPs calibration quality
- Channel statistics
- Data/MC agreements

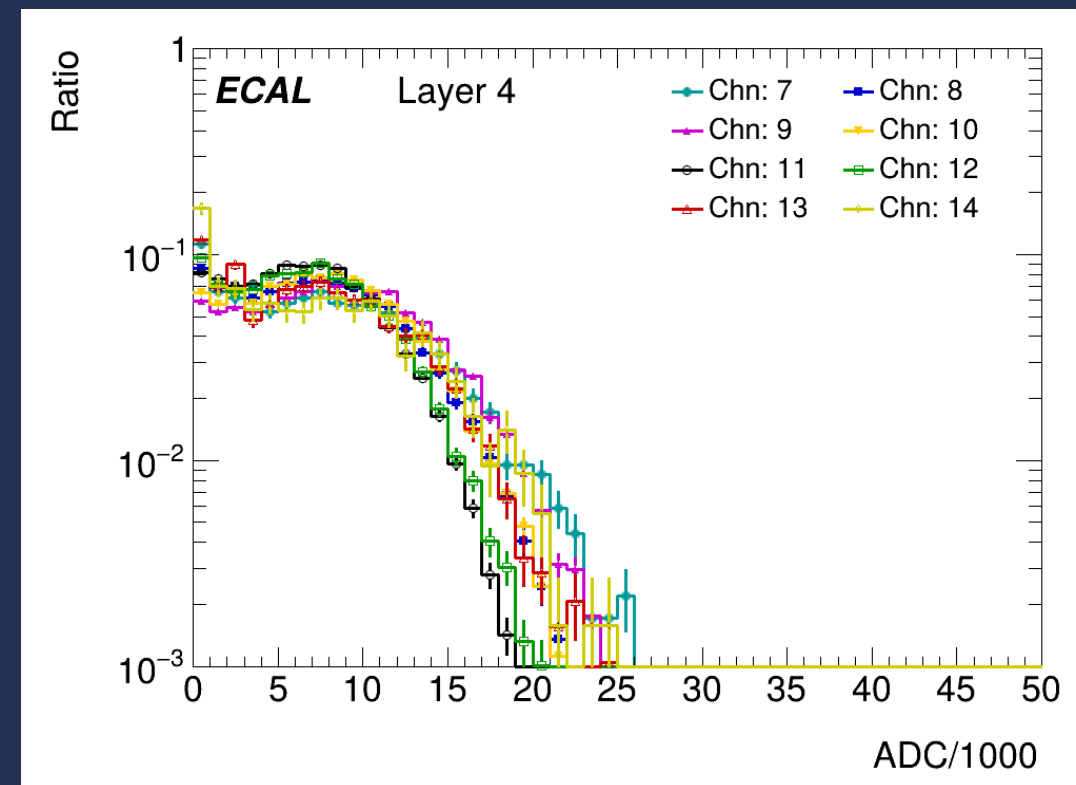
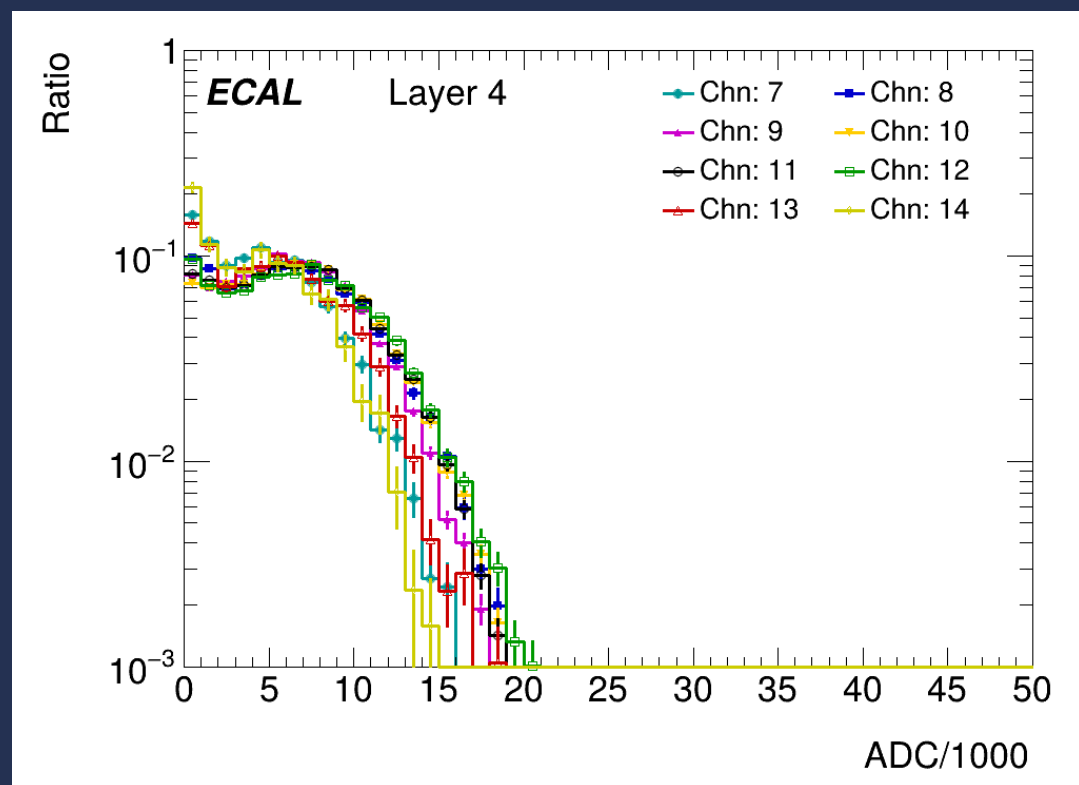


Scale the ADC codes according to scale factors

Standard channel:12

shift 前

shift 后

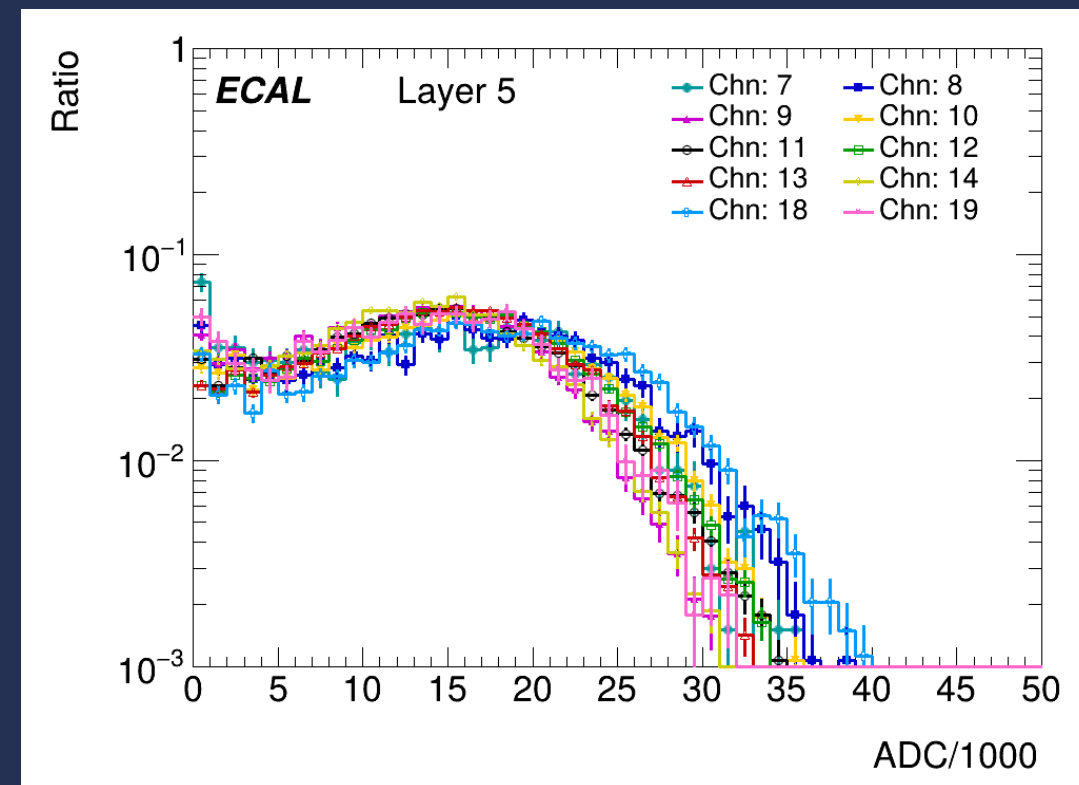
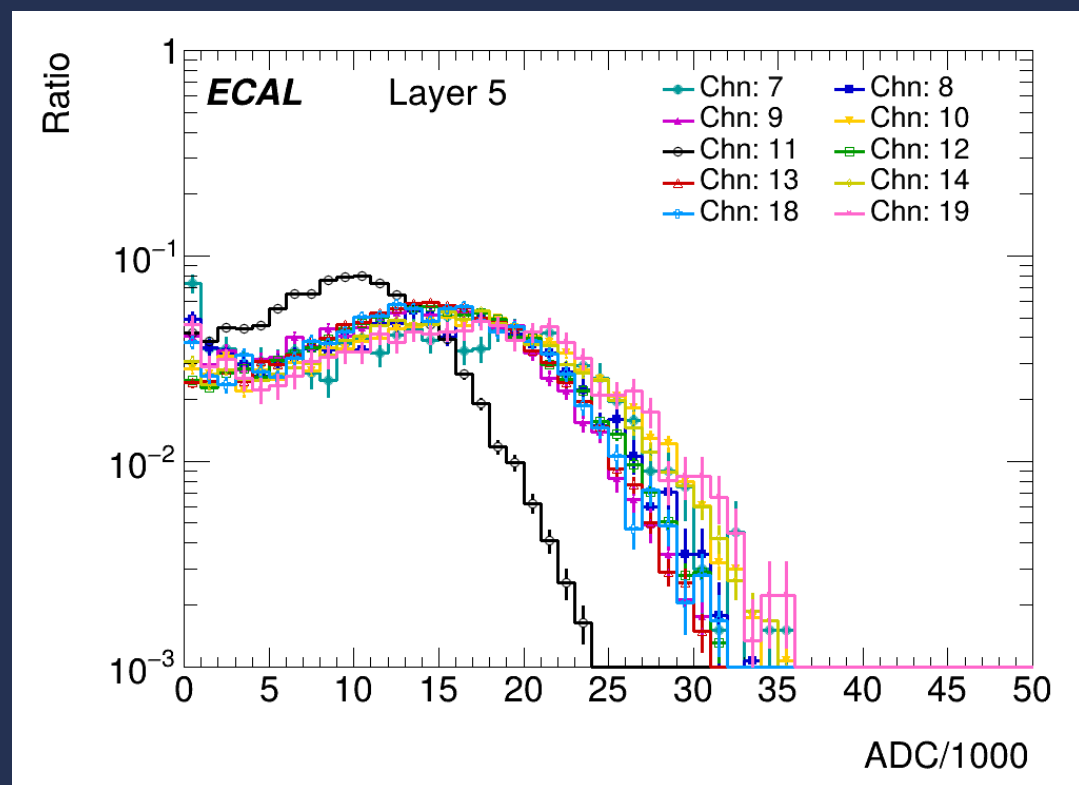


Scale the ADC codes according to scale factors

Standard channel:10

shift 前

shift 后

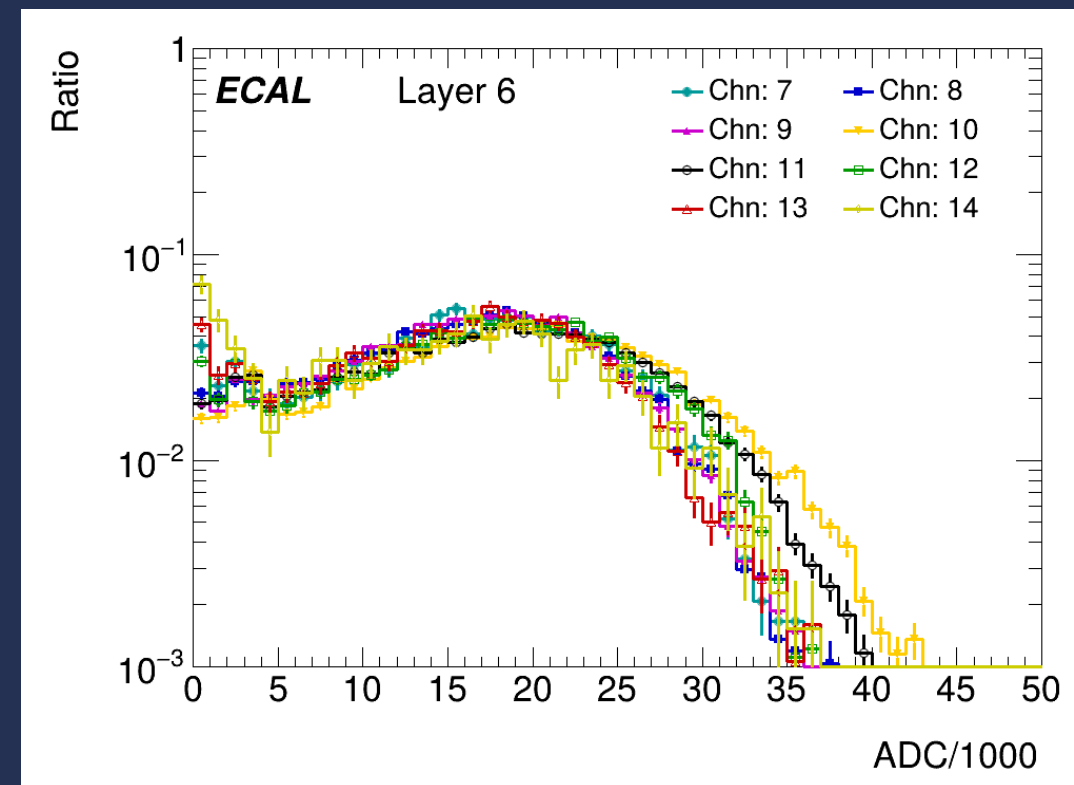
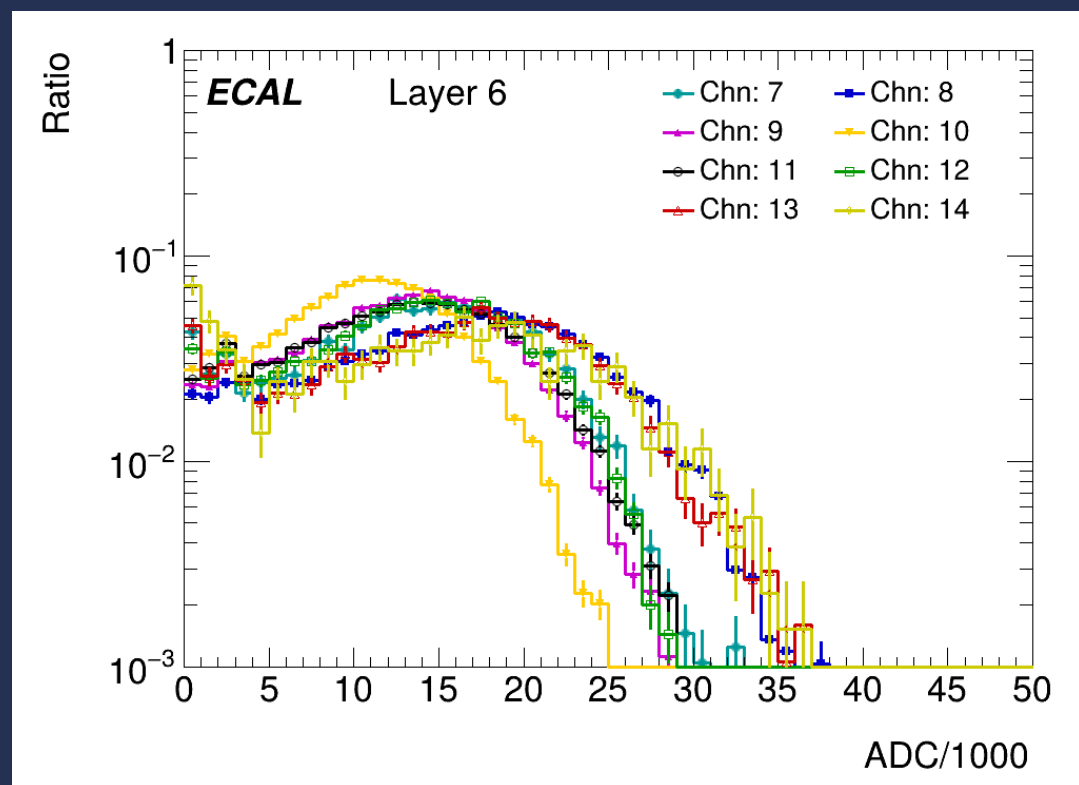


Scale the ADC codes according to scale factors

Standard channel:13

shift 前

shift 后

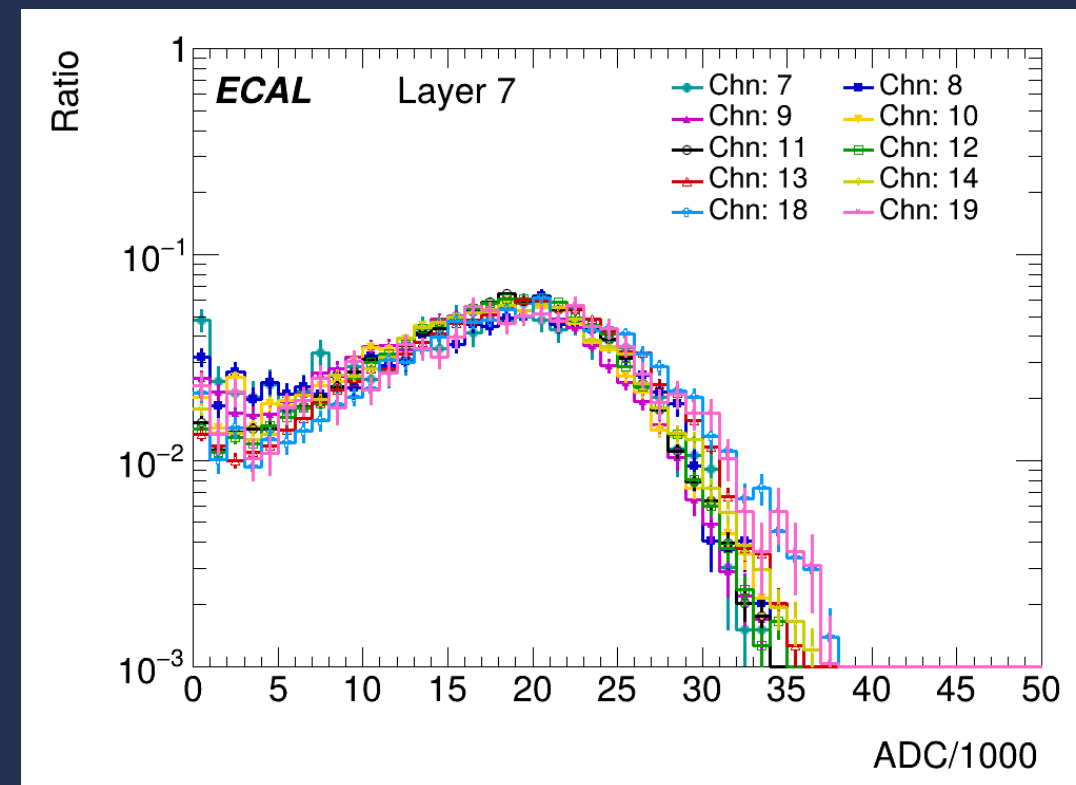
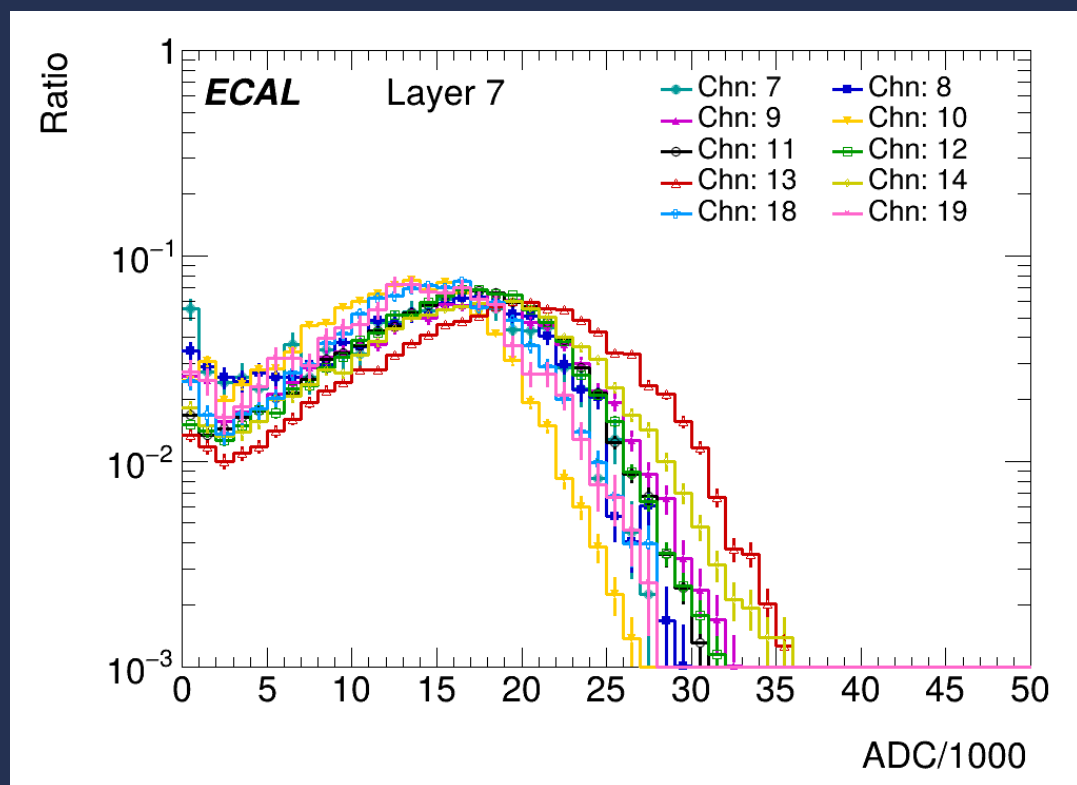


Scale the ADC codes according to scale factors

Standard channel:13

shift 前

shift 后

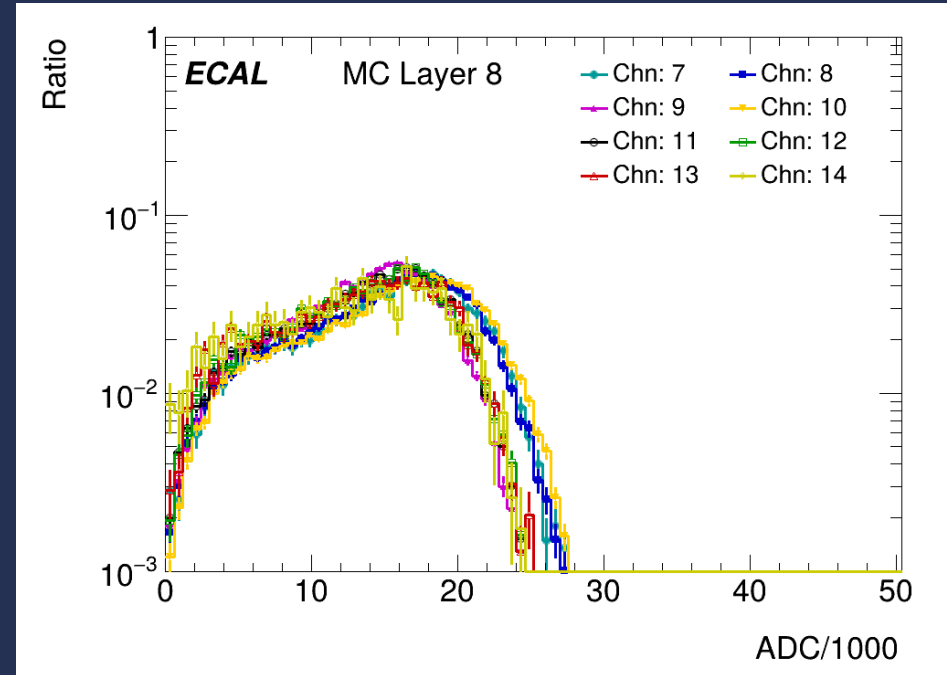
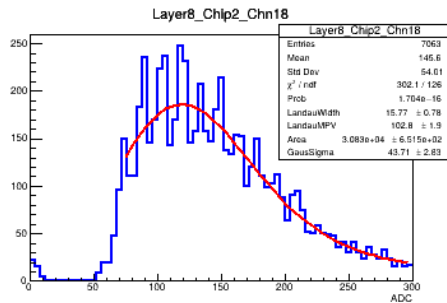
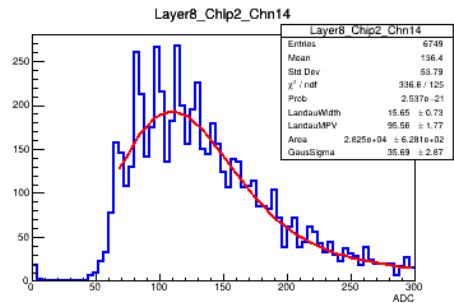
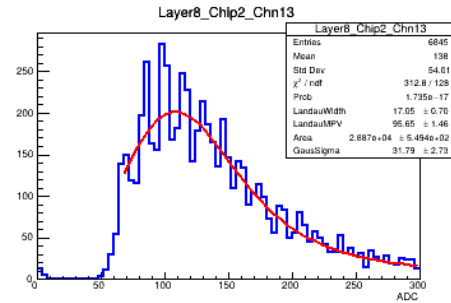
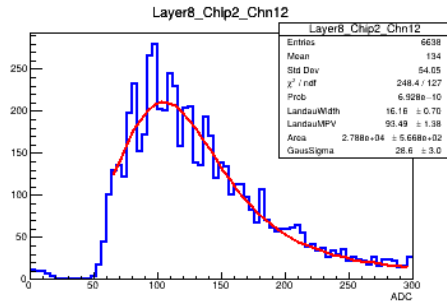
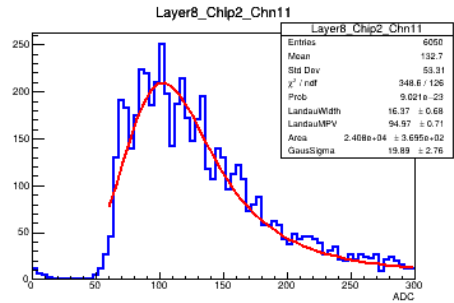
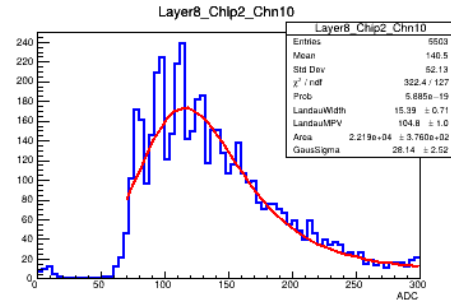
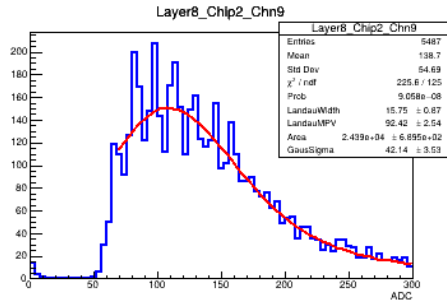
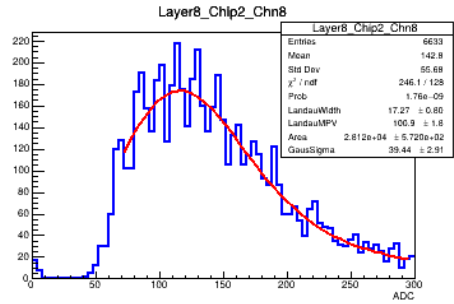


Scale the ADC codes according to scale factors

Standard channel:11



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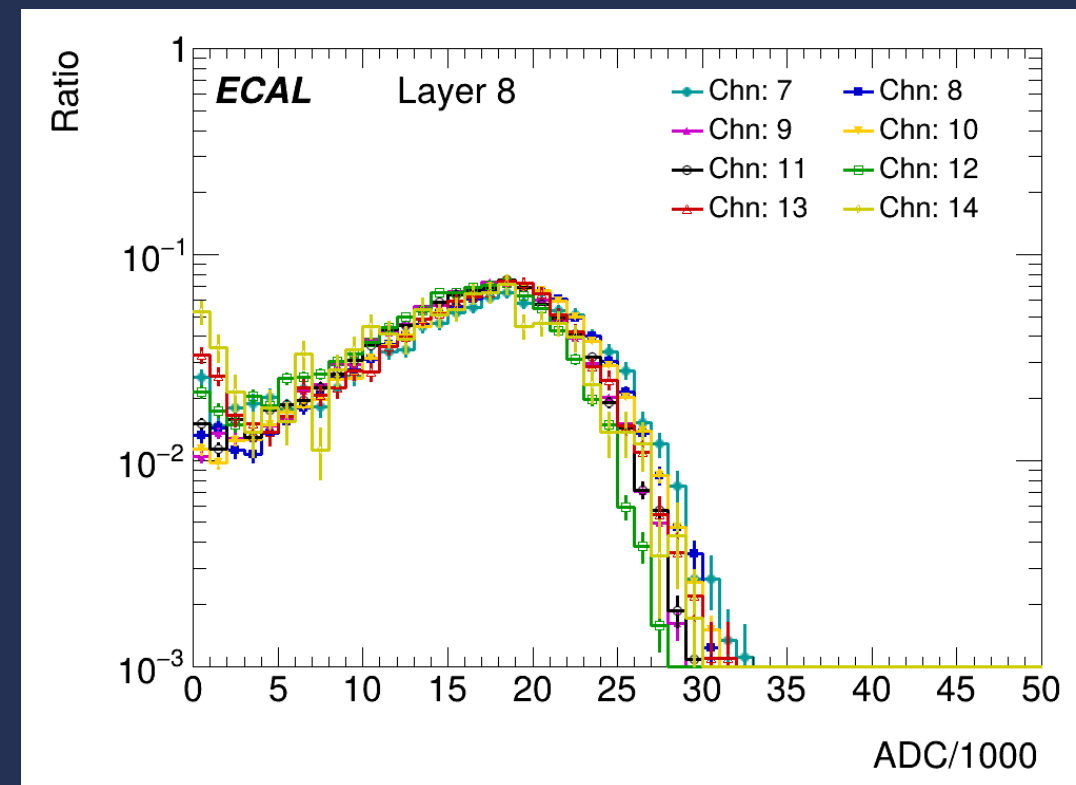
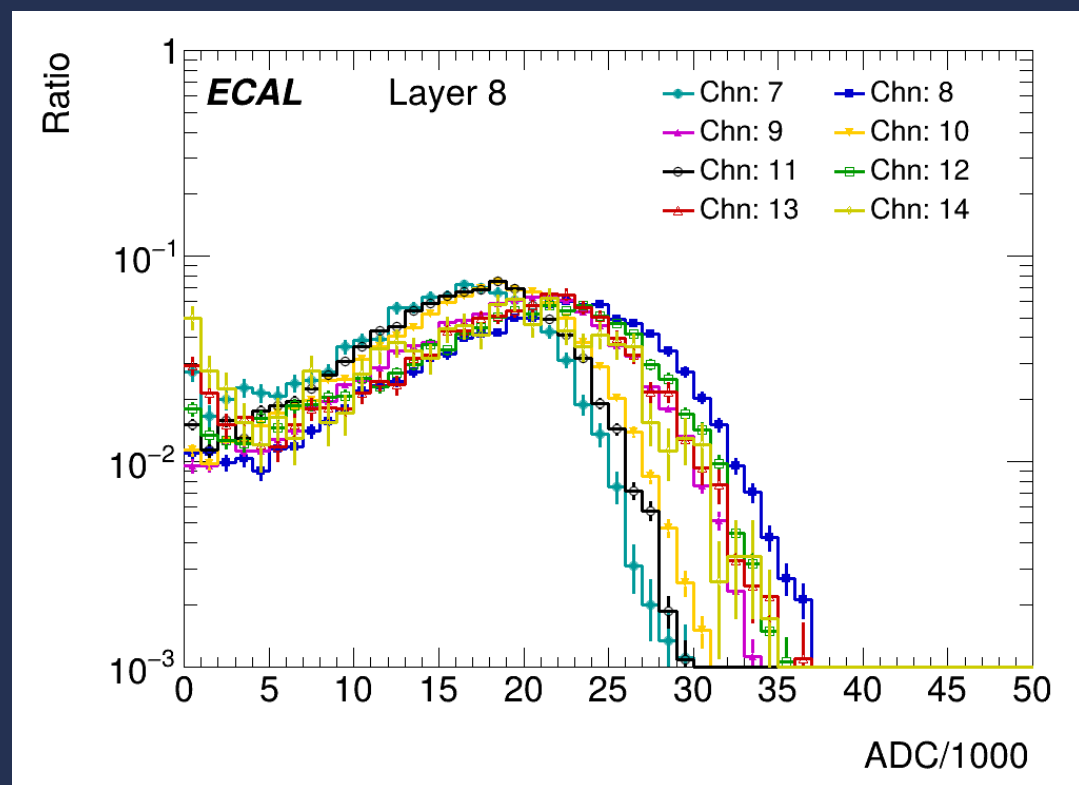


Scale the ADC codes according to scale factors

Standard channel:11

shift 前

shift 后

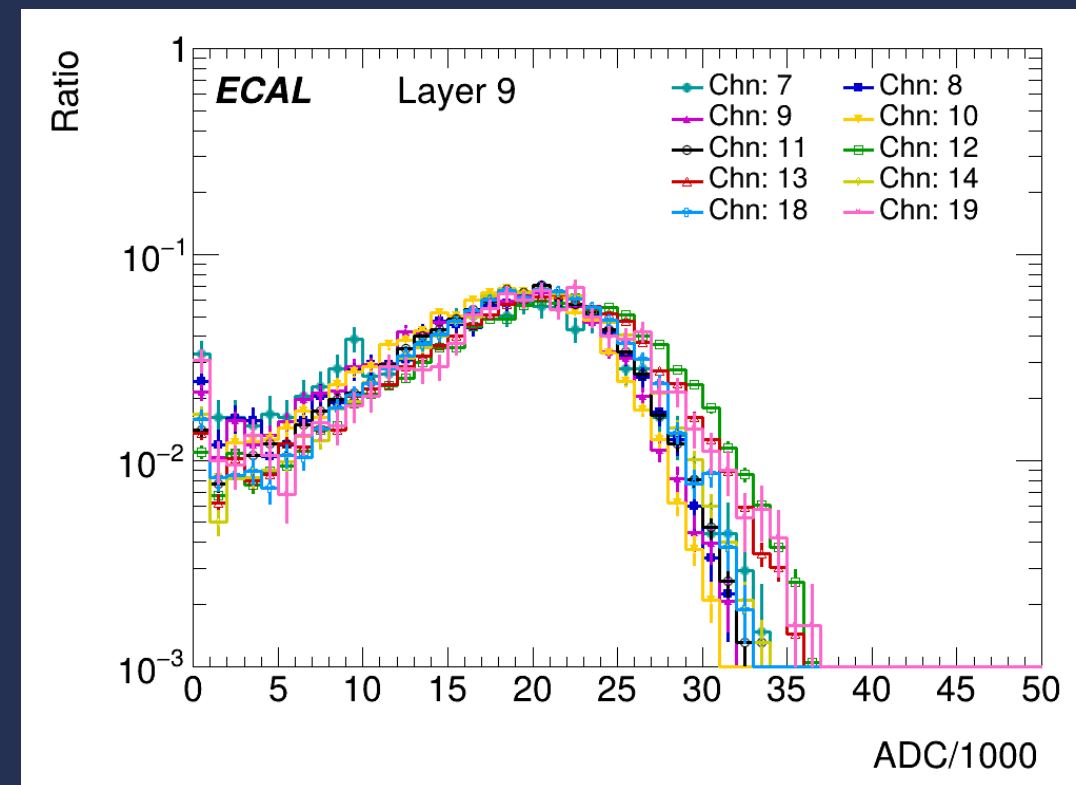
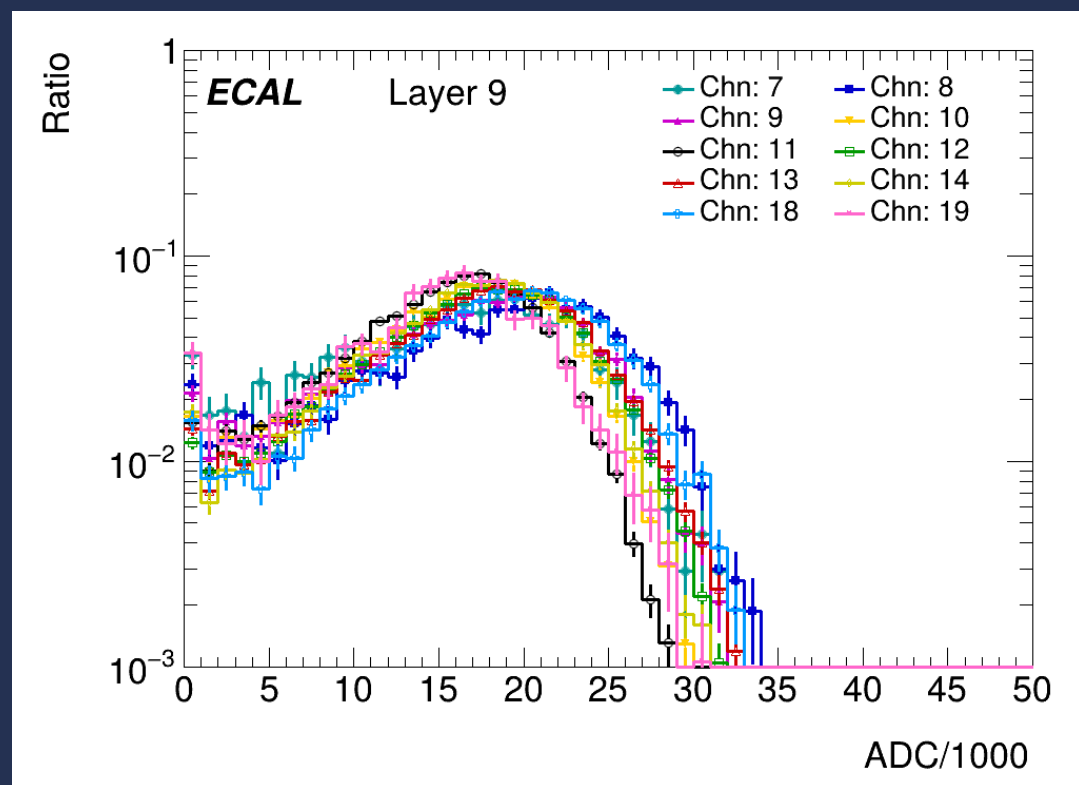


Scale the ADC codes according to scale factors

Standard channel:18

shift 前

shift 后

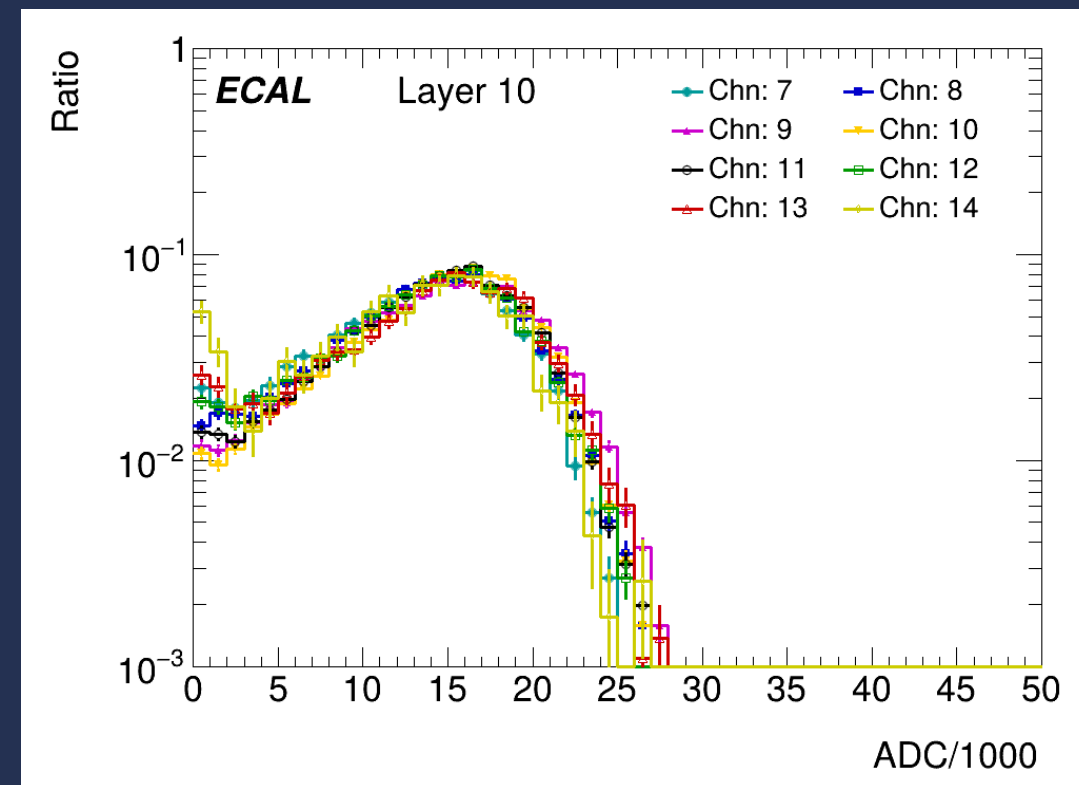
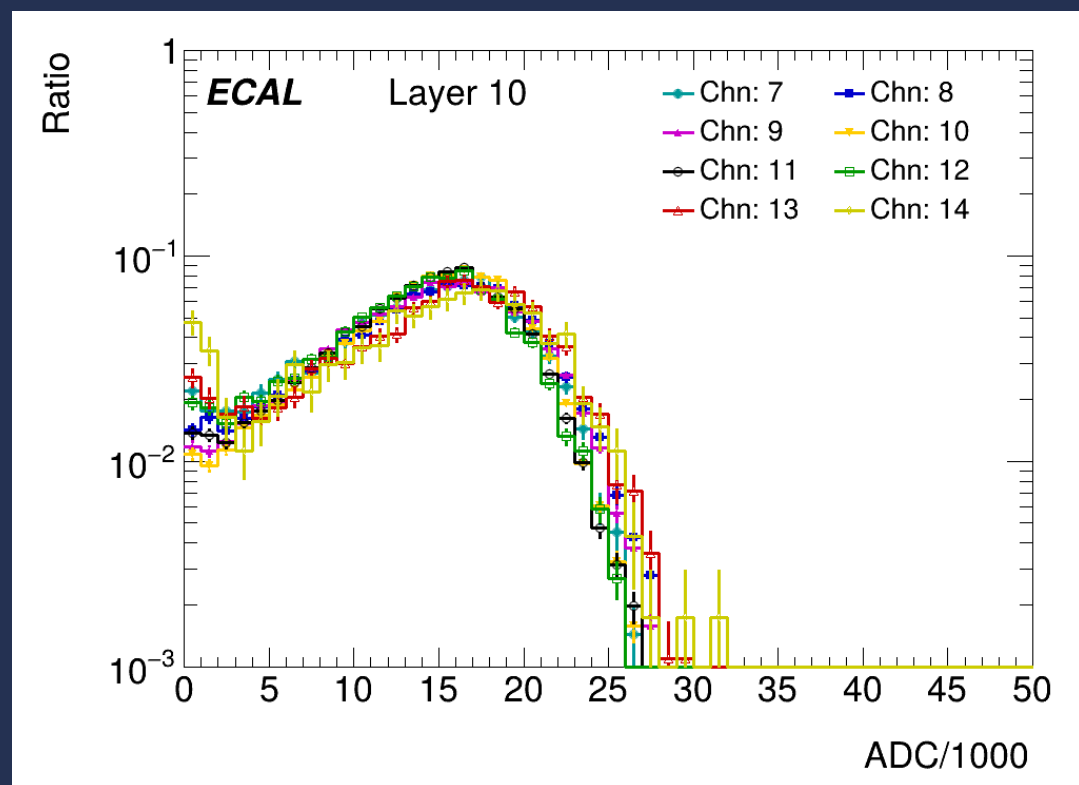


Scale the ADC codes according to scale factors

Standard channel:11

shift 前

shift 后

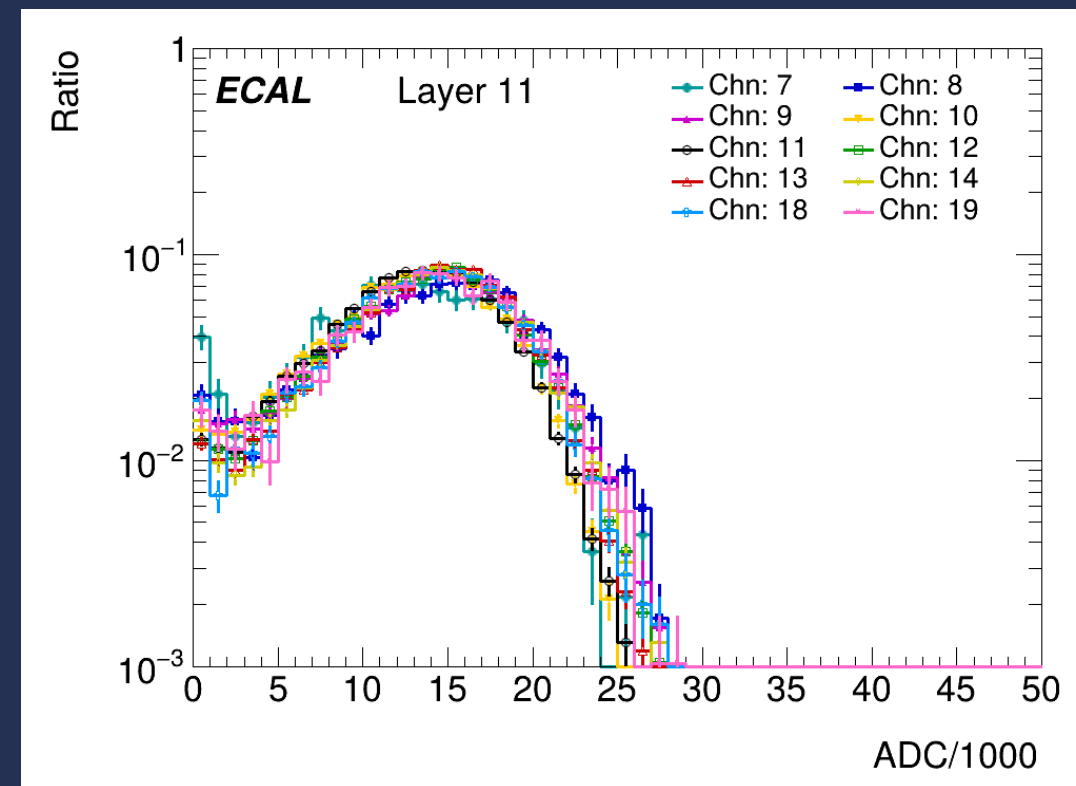
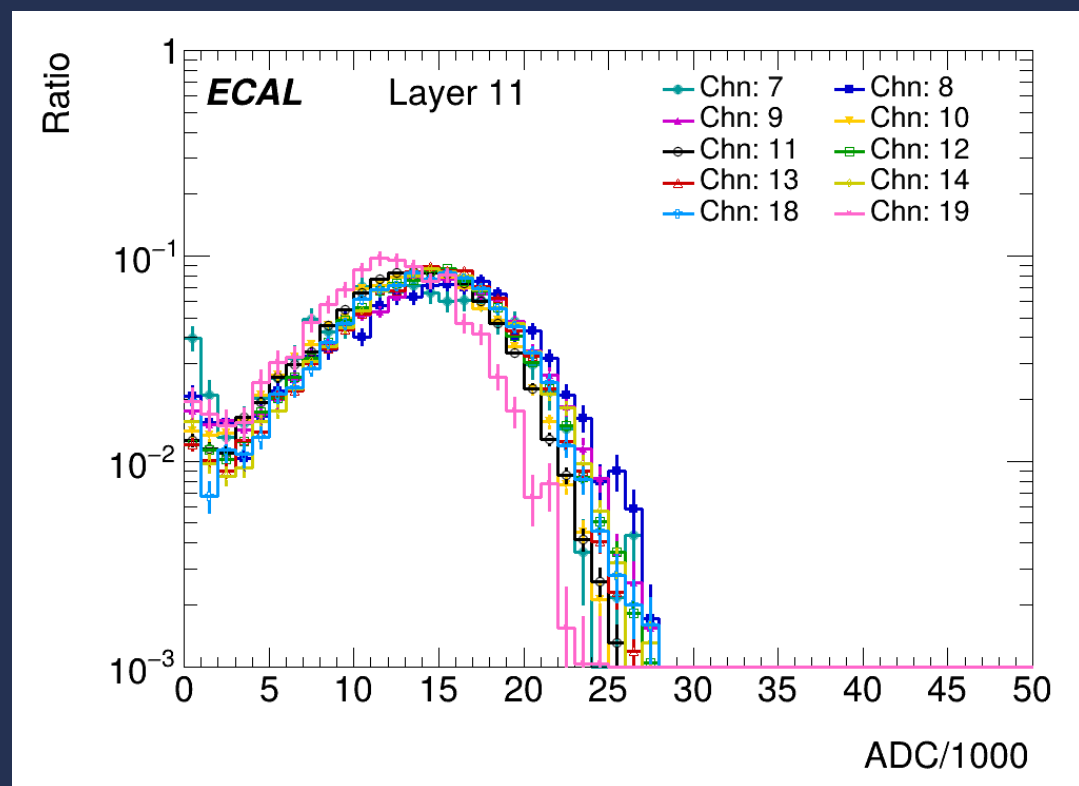


Scale the ADC codes according to scale factors

Standard channel:11

shift 前

shift 后

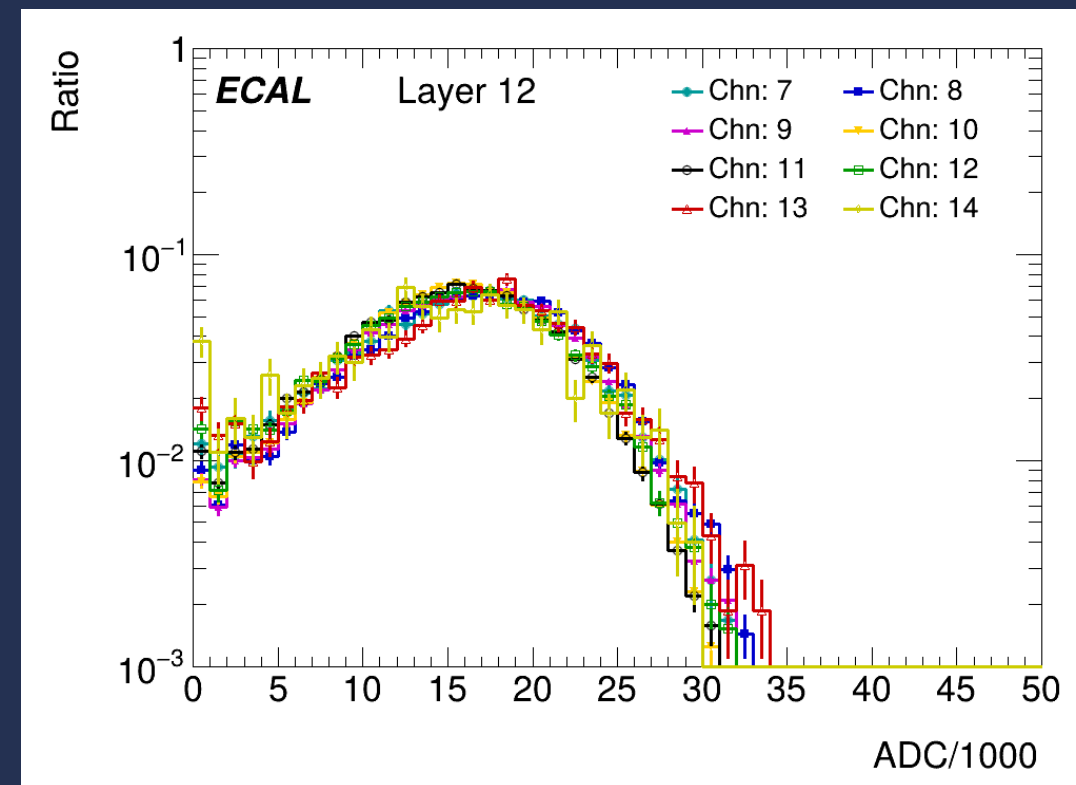
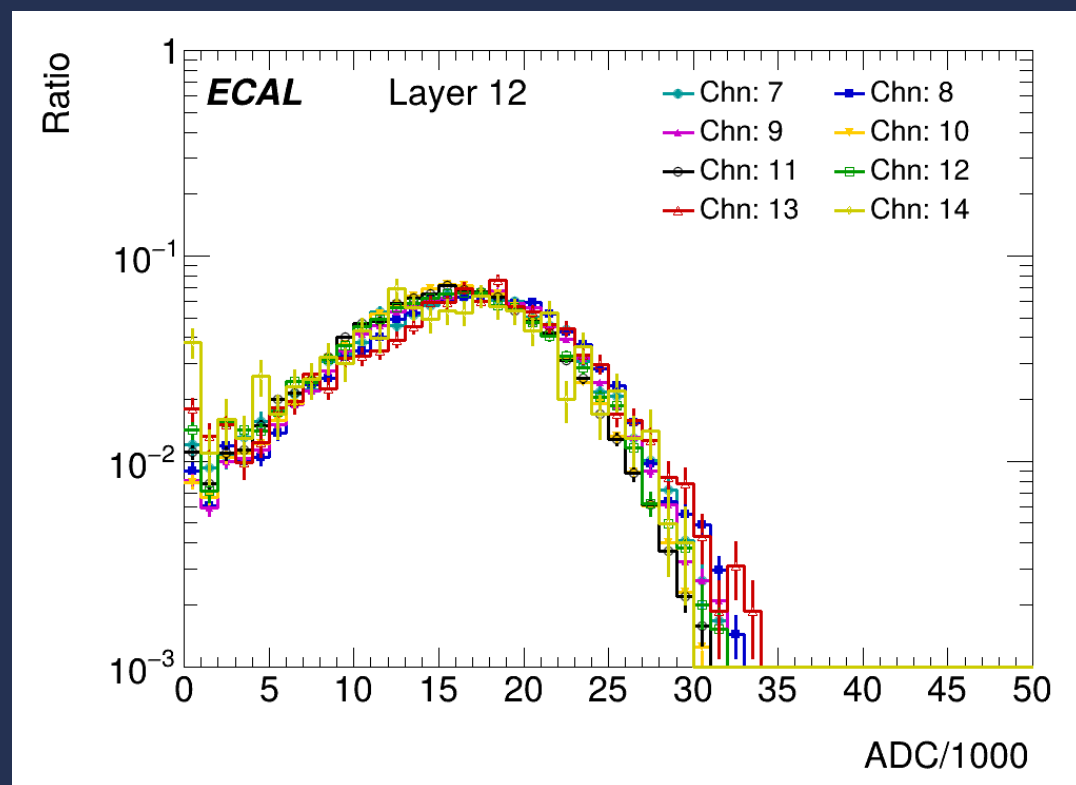


Scale the ADC codes according to scale factors

Standard channel:10

shift 前

shift 后



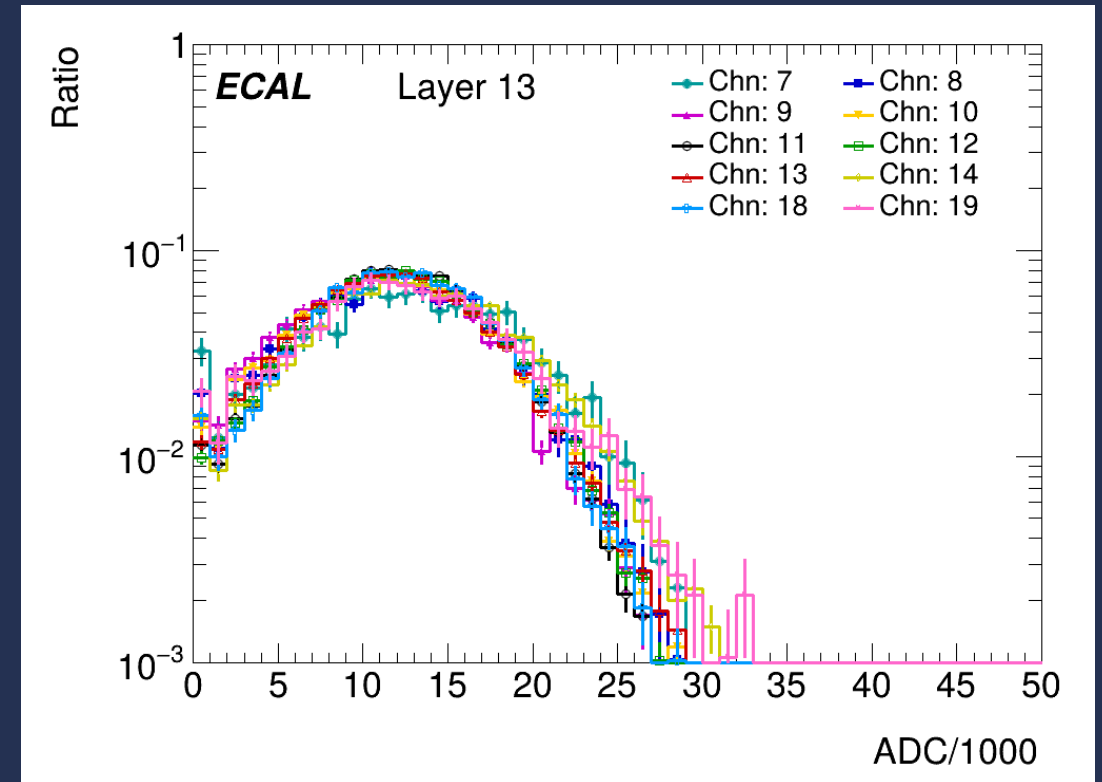
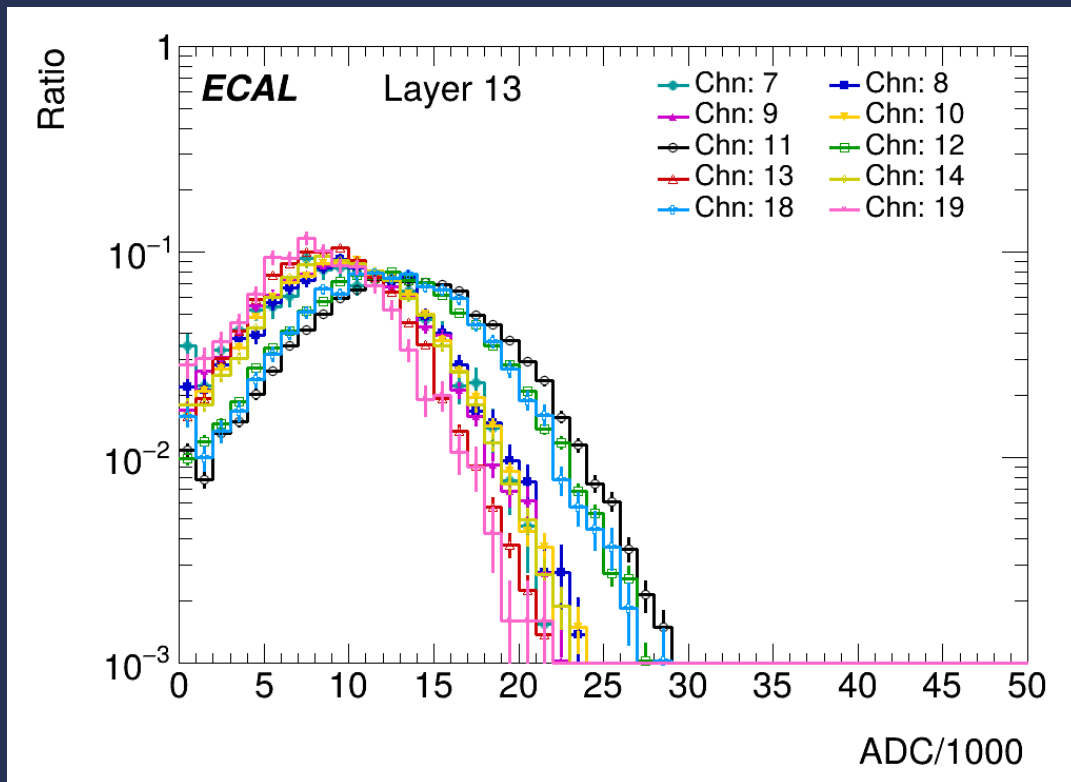


Scale the ADC codes according to scale factors

Standard channel:12

shift 前

shift 后

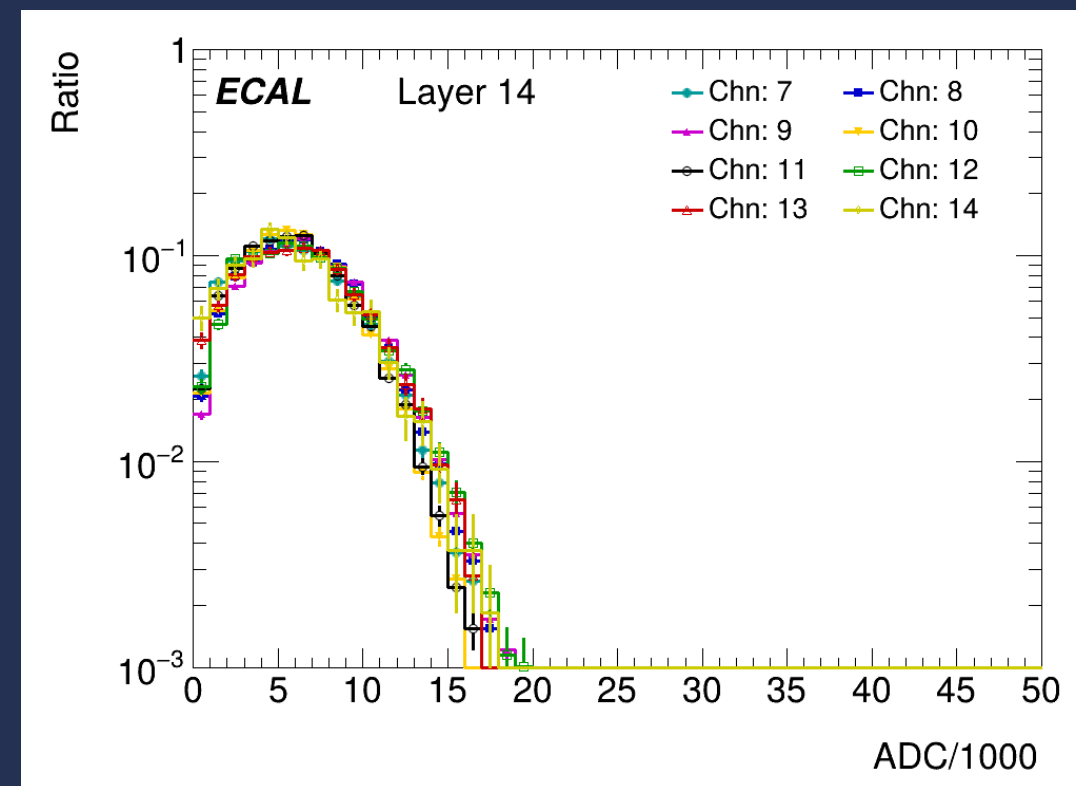
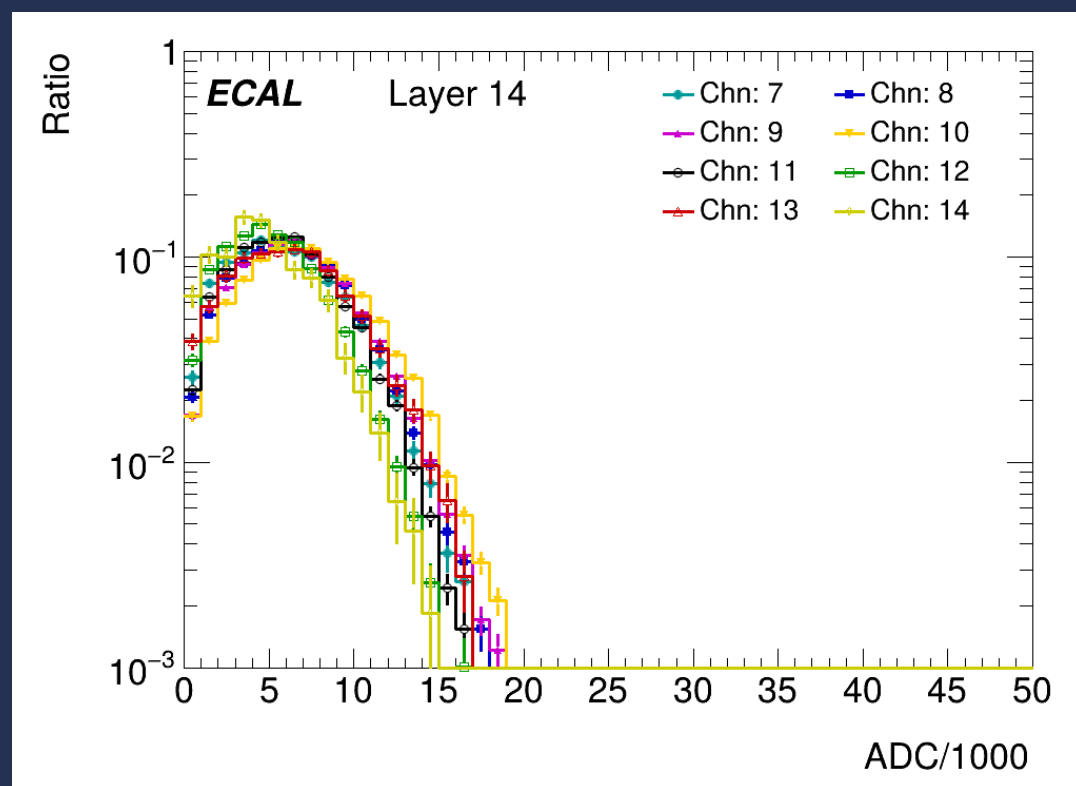


Scale the ADC codes according to scale factors

Standard channel:9

shift 前

shift 后

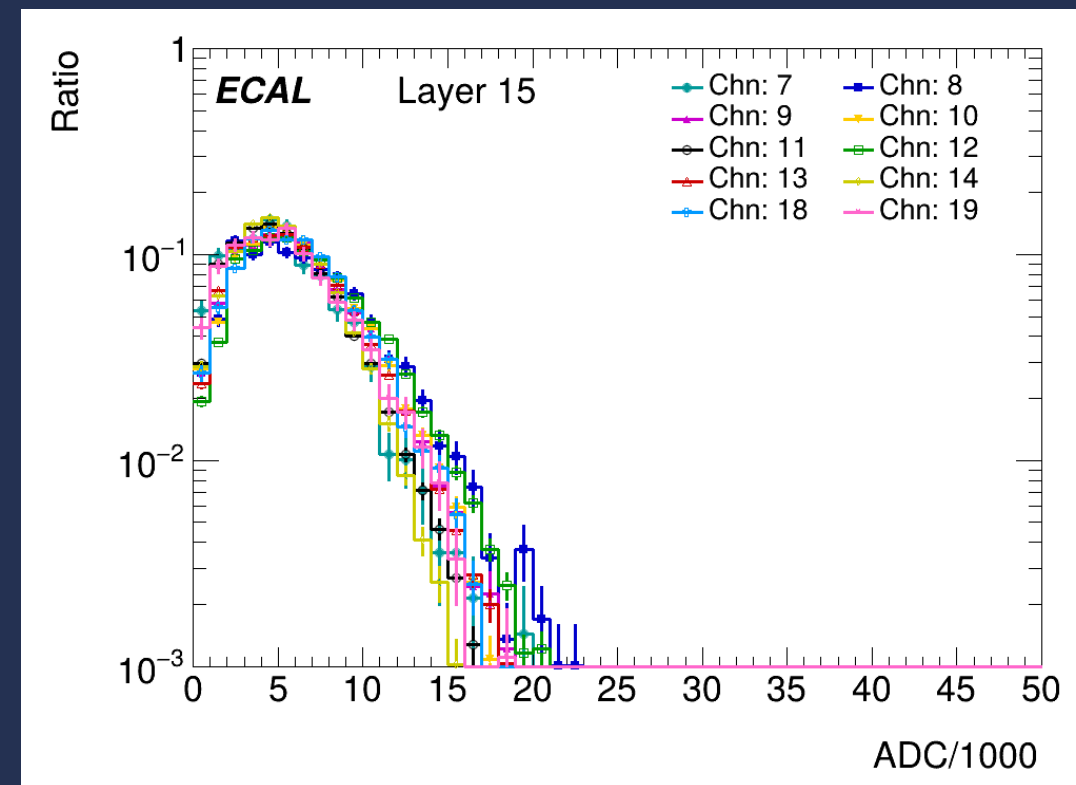
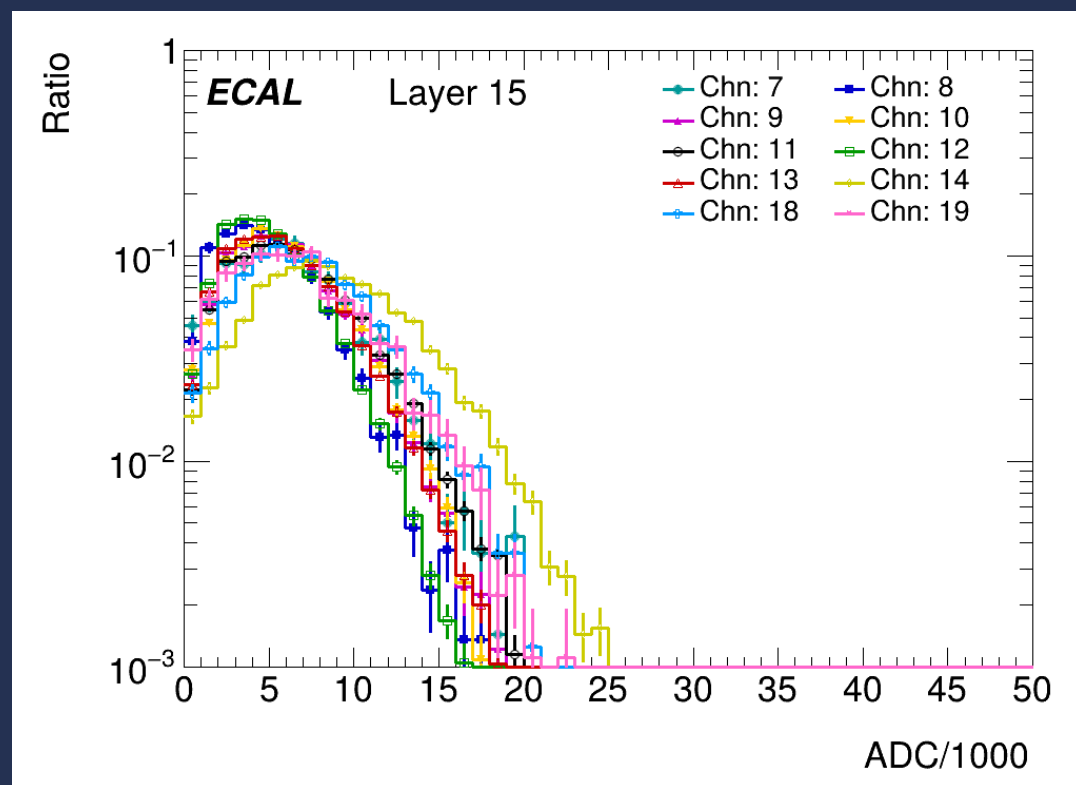


Scale the ADC codes according to scale factors

Standard channel:10

shift 前

shift 后

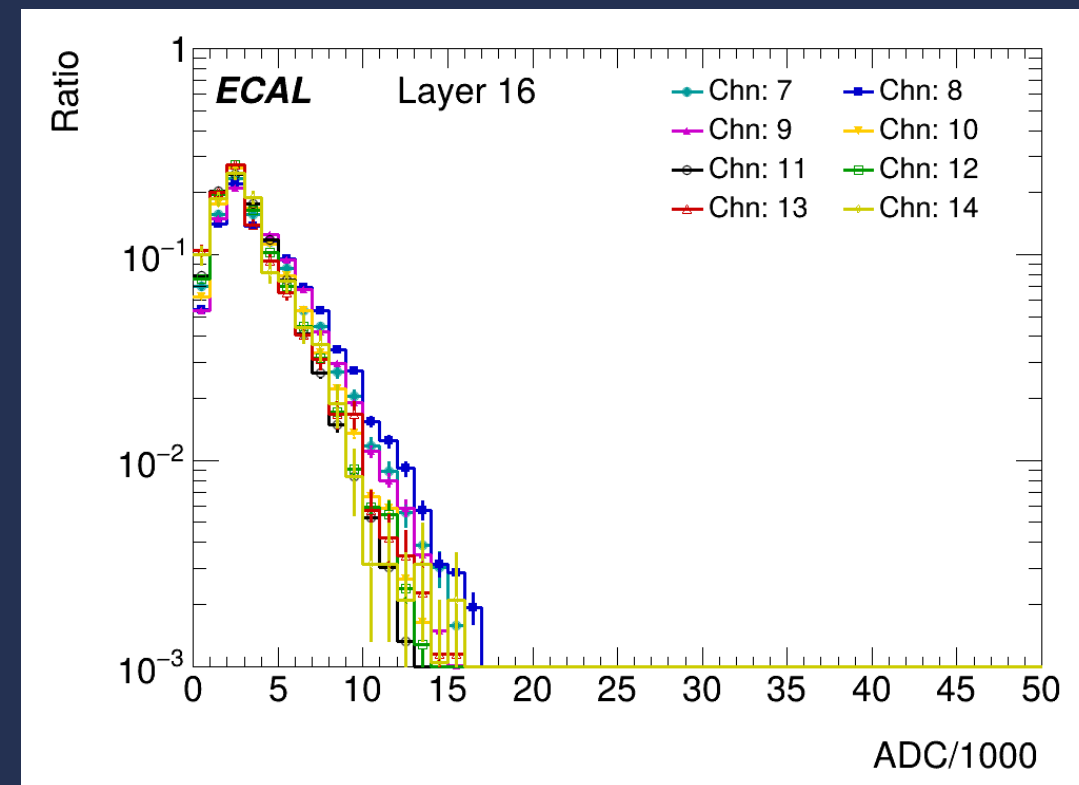
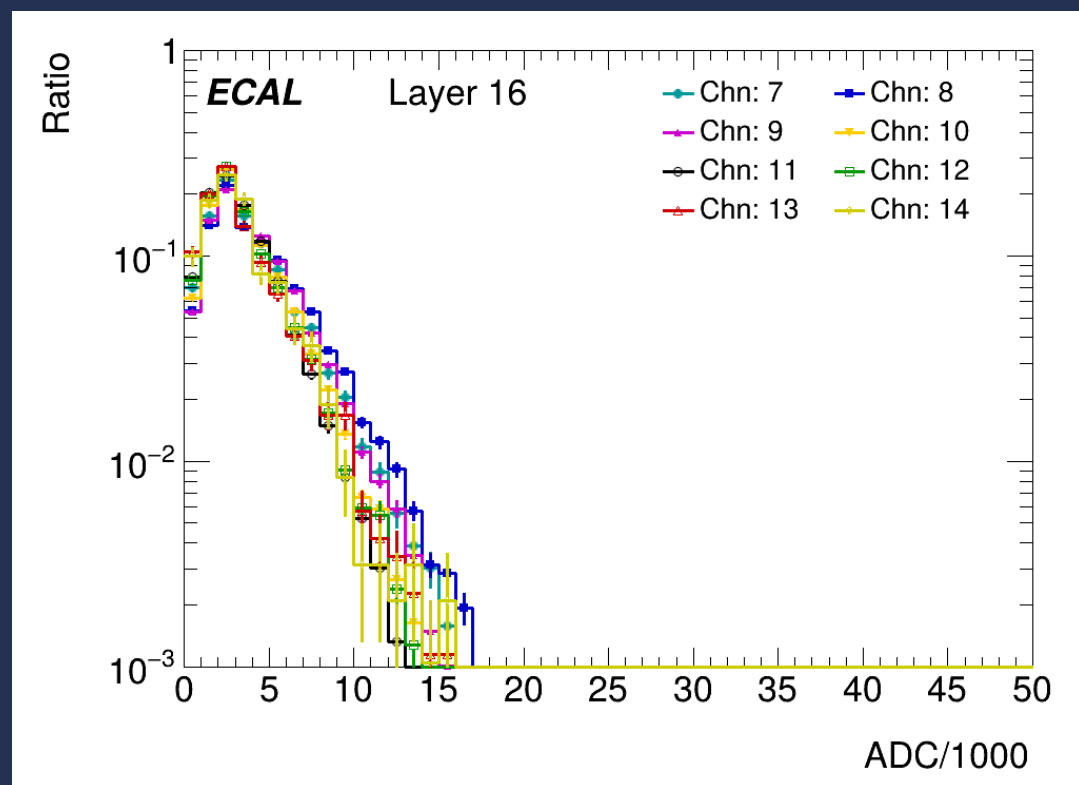


Scale the ADC codes according to scale factors

Standard channel:11

shift 前

shift 后

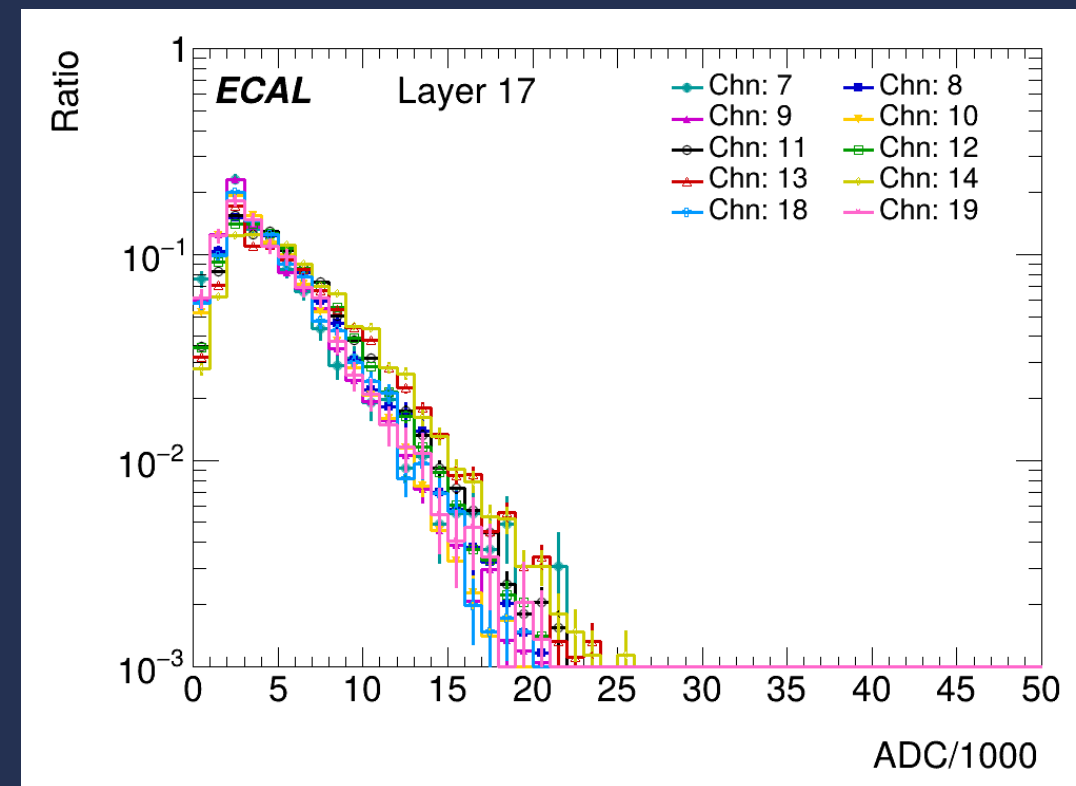
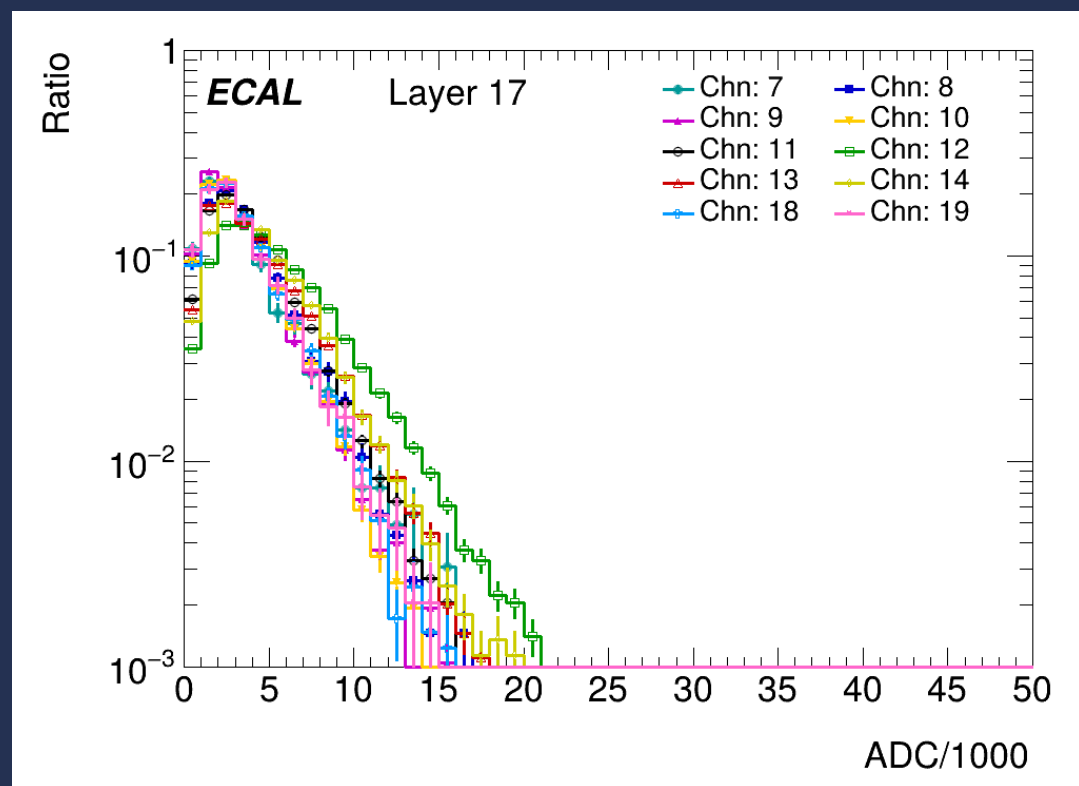


Scale the ADC codes according to scale factors

Standard channel:12

shift 前

shift 后



ADC Spectrum Scaling – Summary & Todos



- Shifts done for center layers and channels
- Evaluate the impact of this scale factor on energy resolution