Noise Scan

Date : 08 - 05- 2020

Sigma Calculation

1. Calculated from scalers :

   Mean baseline position :

   B_i – baseline for bin i (i = 1..32)
   C_i – counts registered for baseline B_i
   $B_{imV} = (B_i * 2) - 32$ // from LSB to mV , baseline values go from -32 to 32 mV

   Mean baseline :

   Bl mean = $\frac{\Sigma B_{imV}}{\Sigma C_i}$

   Standard Deviation : $\sqrt{\sigma B^2} = \frac{\Sigma (B_i - B)^2 * C_i}{\Sigma C_i}$

2. From Gaussian fit

3. From S- curve measurement

4. From Rice formula : $f_t = \frac{f_0}{2} exp(-\frac{V_{TH}^2}{2\sigma_v^2})$

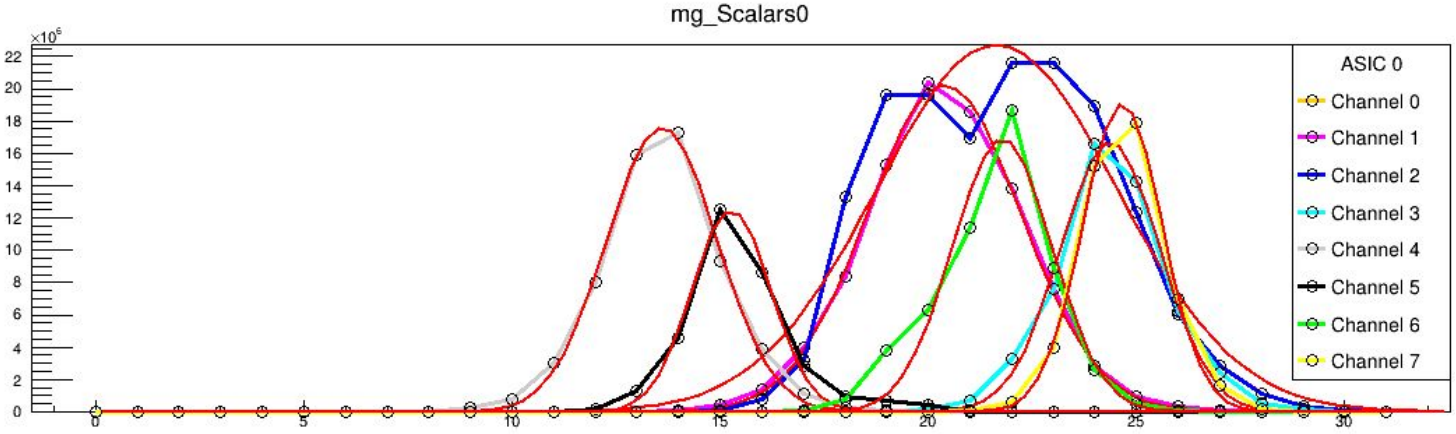
Assumptions :

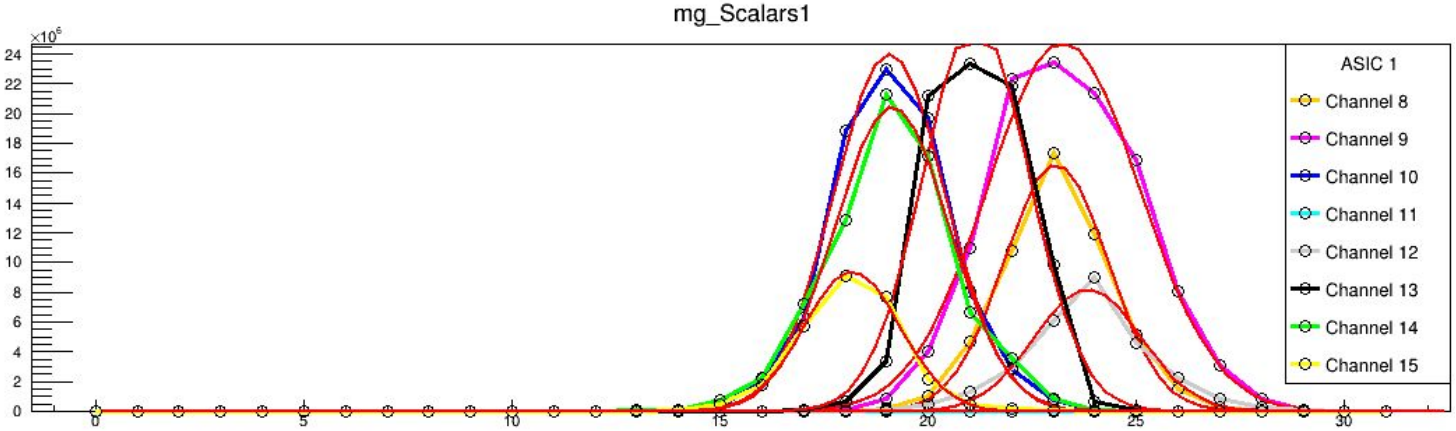
- Count profile is gaussian
- Count profile is symmetric
- Count vs Vth^2 is linear

Scalars

(New packed asic connected to detector)

Tp 15 ns

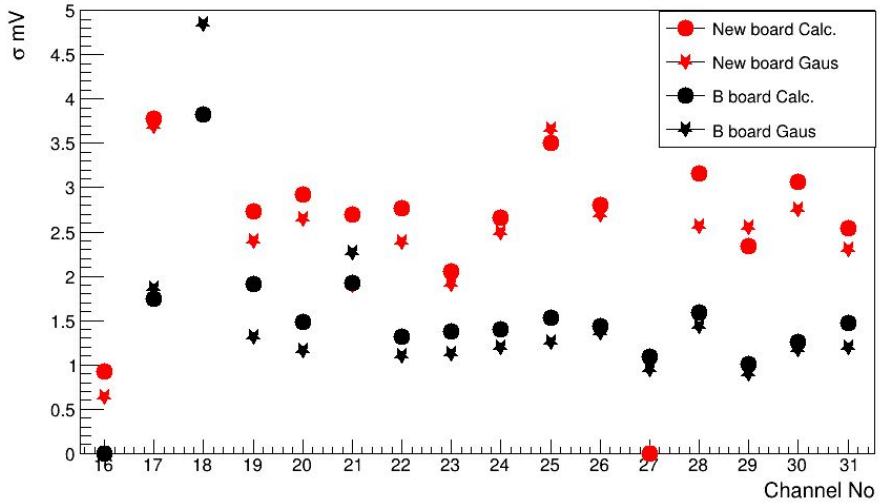




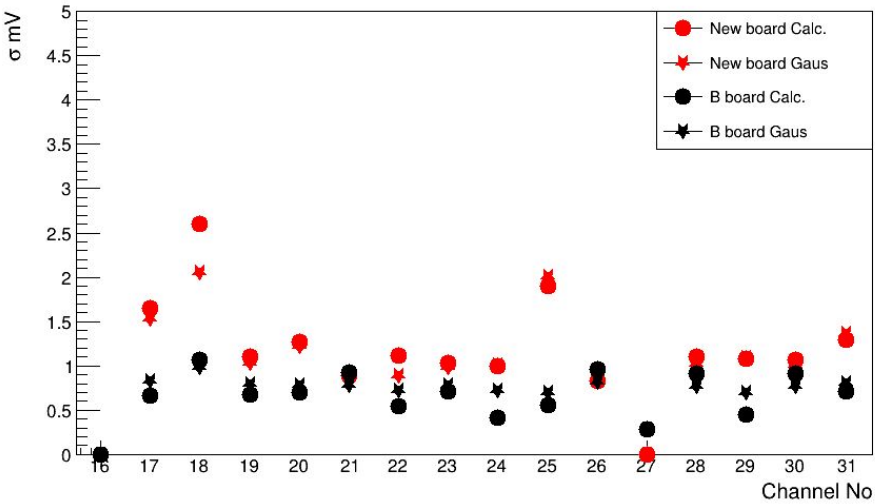
Sigma

(New packed asic & B board)

Tp 15 ns



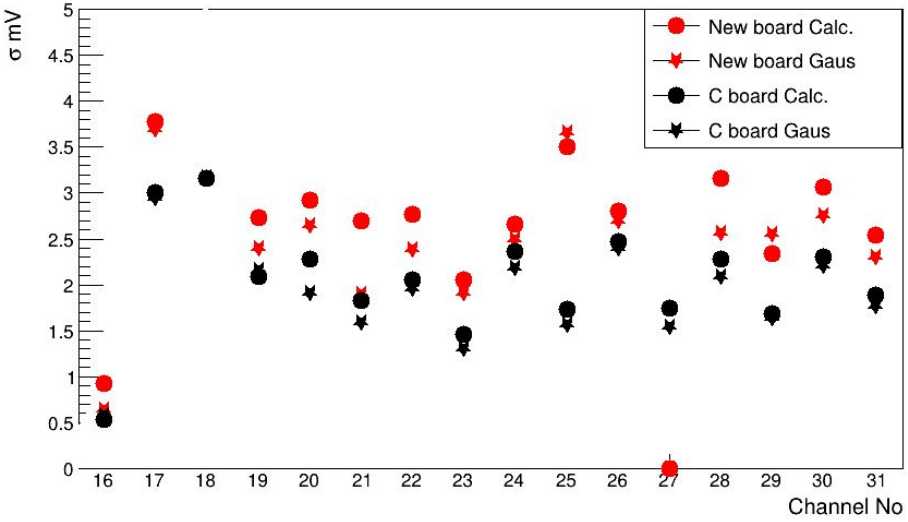
Tp 20 ns



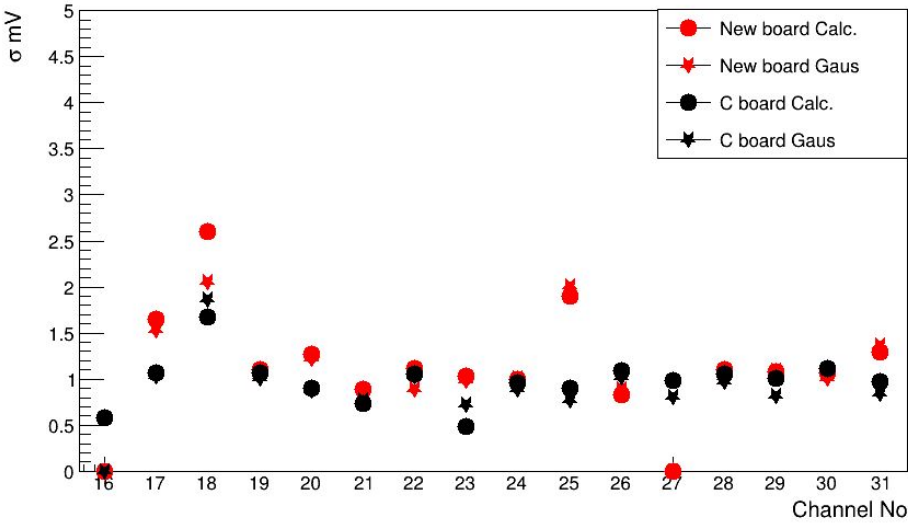
Sigma

(New packed asic & C board)

Tp 15 ns



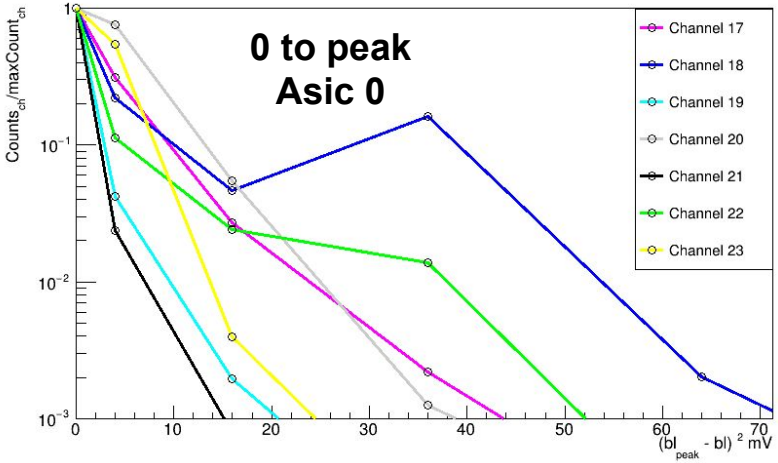
Tp 20 ns

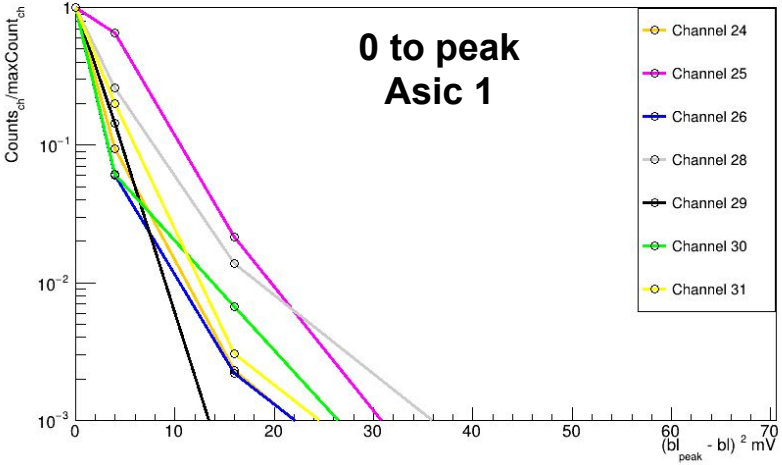


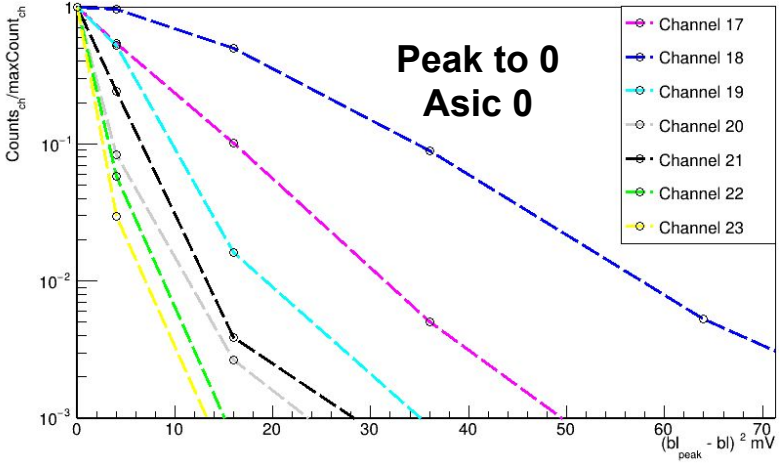
New board

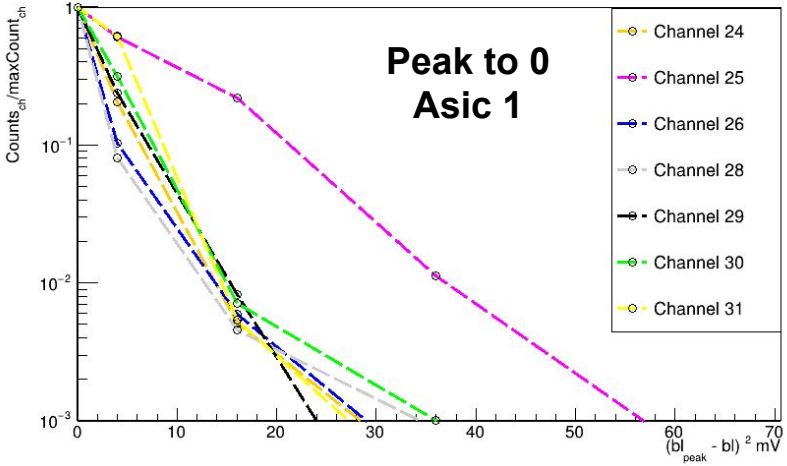
Counts vs Bl^2

Tp 20 ns





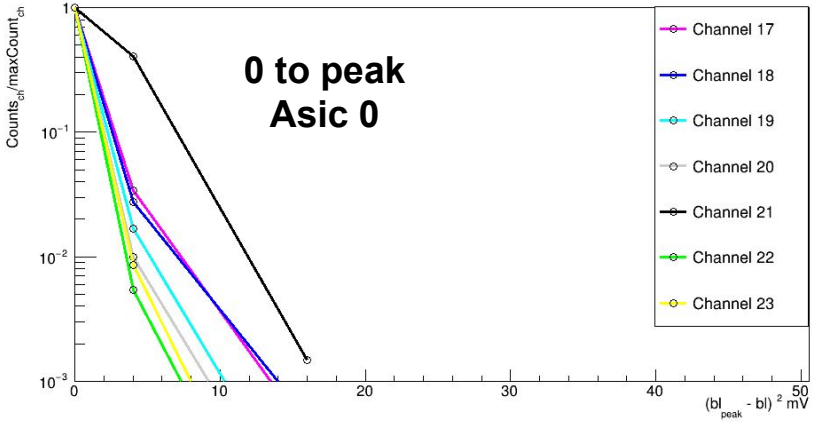


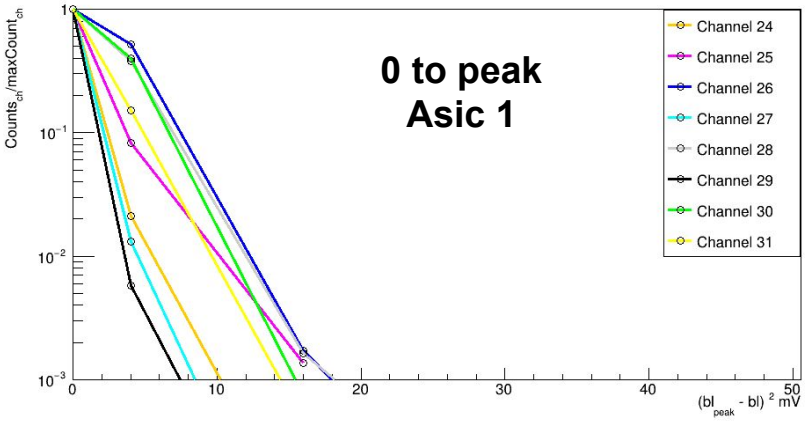


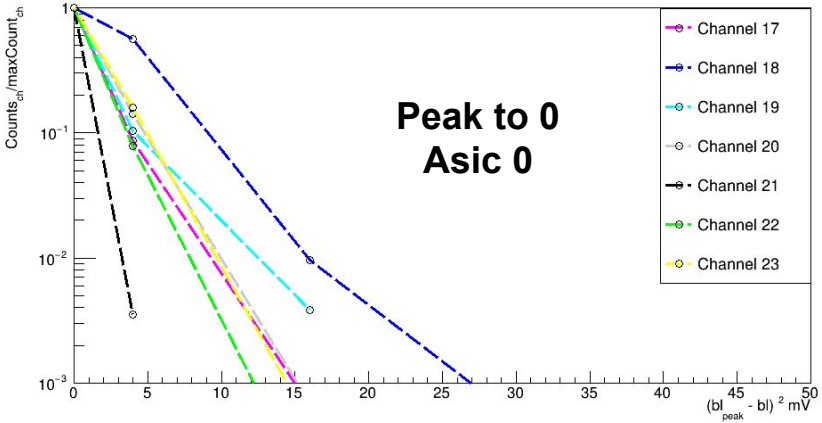
B board

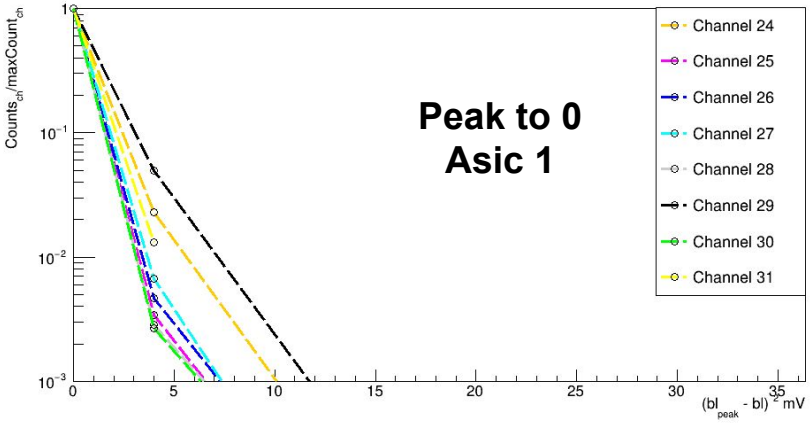
Counts vs Bl^2

Tp 20 ns





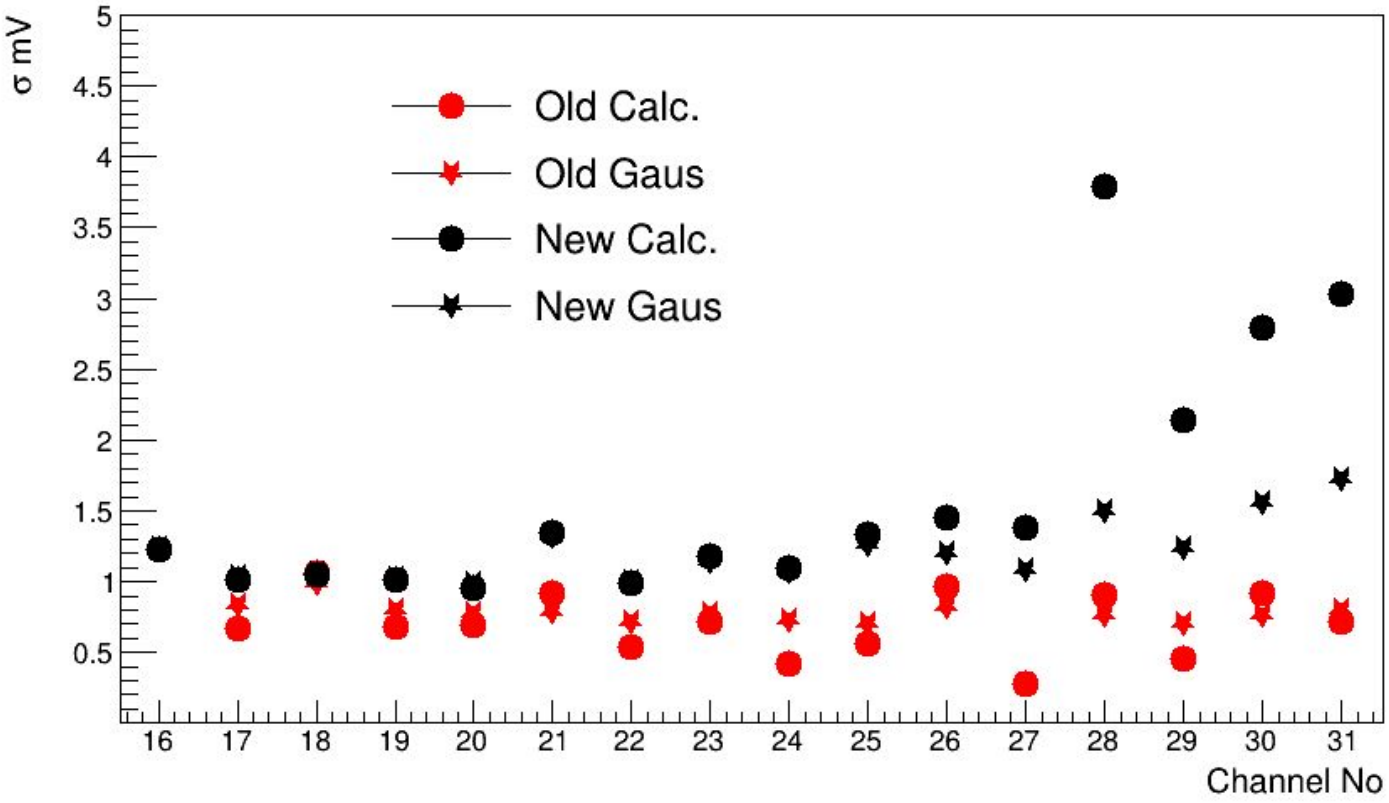




Connected to detector

Tp 20 ns

Sigma - B board



Connected to detector

Sigma - B board

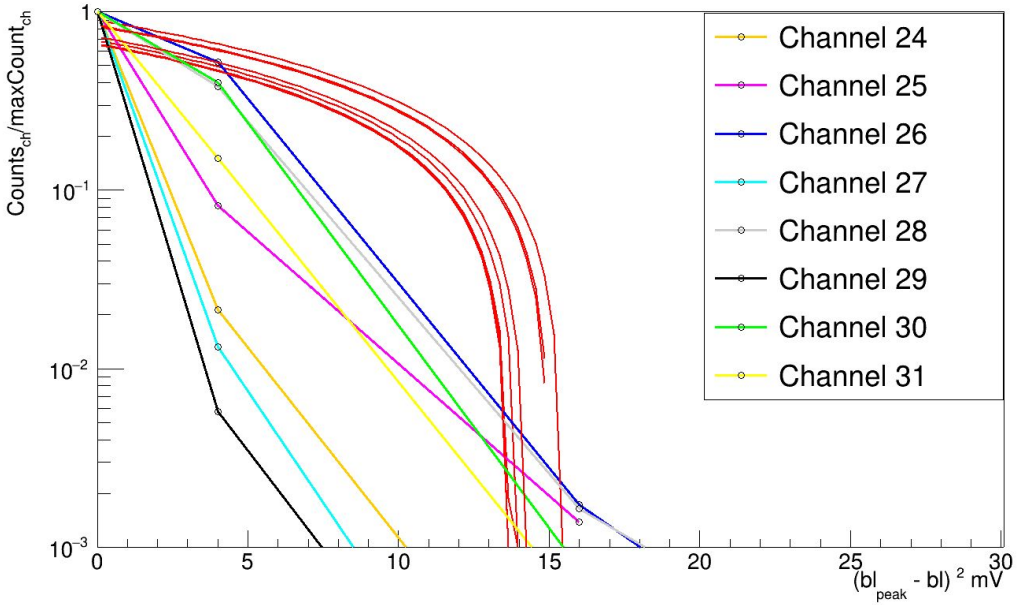
Tp 20 ns

Channel	Baseline scan @ thr = 0 mV				Pulse generator
	σ (gaussian fit) mV		Std dev. mV		σ (error func. fit) mV
	New	Old	New	Old	
1	1.24	0	1.23	0	1.52
3	1.06	0.98	1.05	1.05	1.30
5	0.99	0.78	0.96	0.69	1.45
7	1.01	0.72	0.99	0.54	1.42
9	1.08	0.72	1.10	0.40	1.47
11	1.20	0.82	1.45	0.95	1.52
13	1.49	0.77	3.79	0.90	1.62
15	1.56	0.76	2.79	0.91	1.69

B board

Counts vs Bl^2

Tp 20 ns



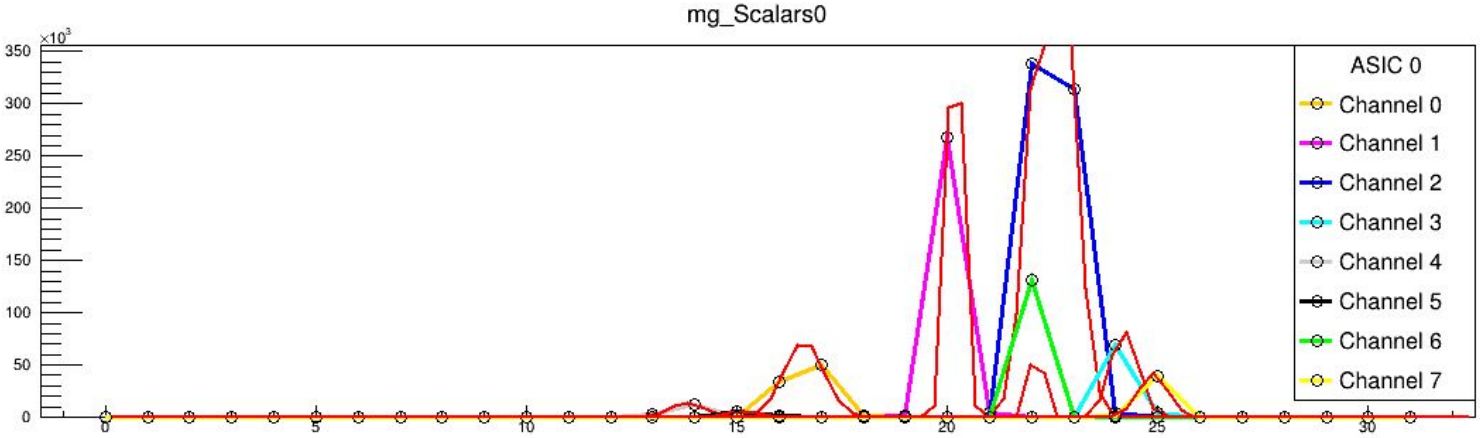
$$f_t = \frac{f_0}{2} exp(-\frac{V_{TH}^2}{2\sigma_v^2}) \qquad Slope = \frac{-1}{2\sigma^2}$$

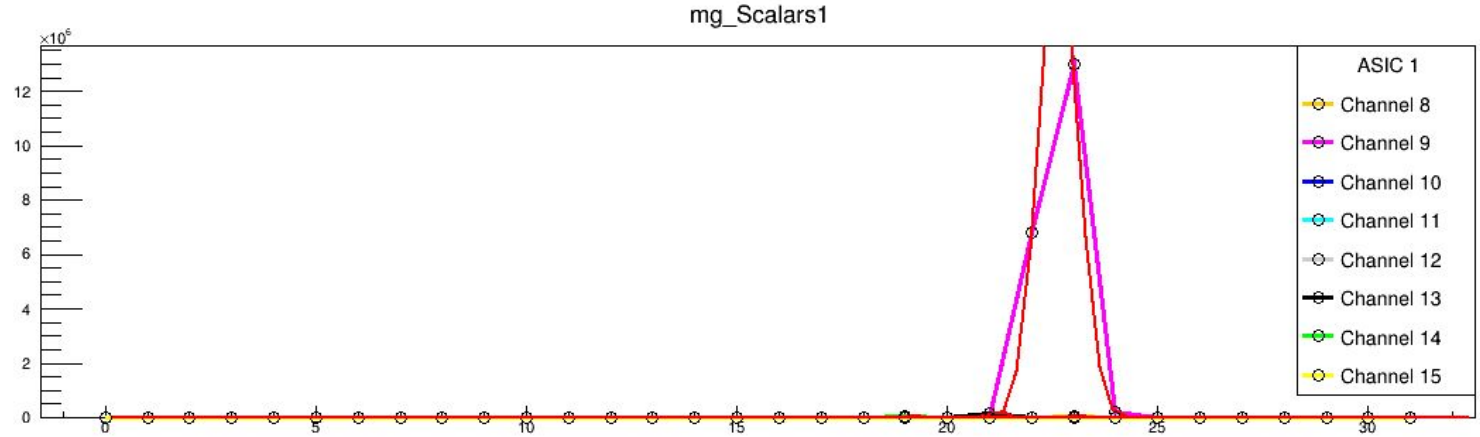
$$\sigma_{Ricefit} = \frac{\sigma_{0topeak} + \sigma_{peakto0}}{2}$$

Channel	σ (Rice fit) mV
1	0
3	3.06
5	3.17
7	3.19
9	3.21
11	3.07
13	3.11
15	2.27

Scalars

(New packed asic disconnected from detector)





Counts vs Bl^2