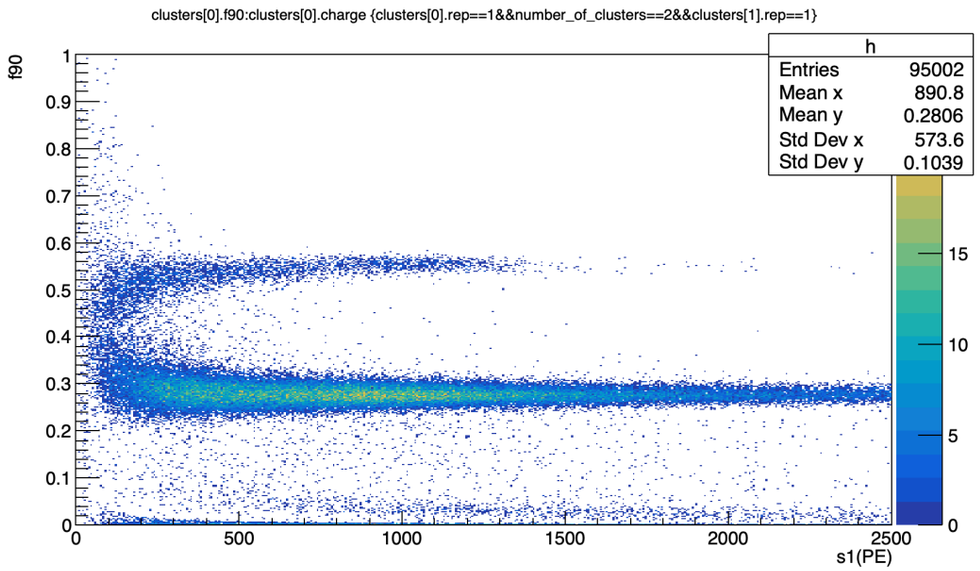
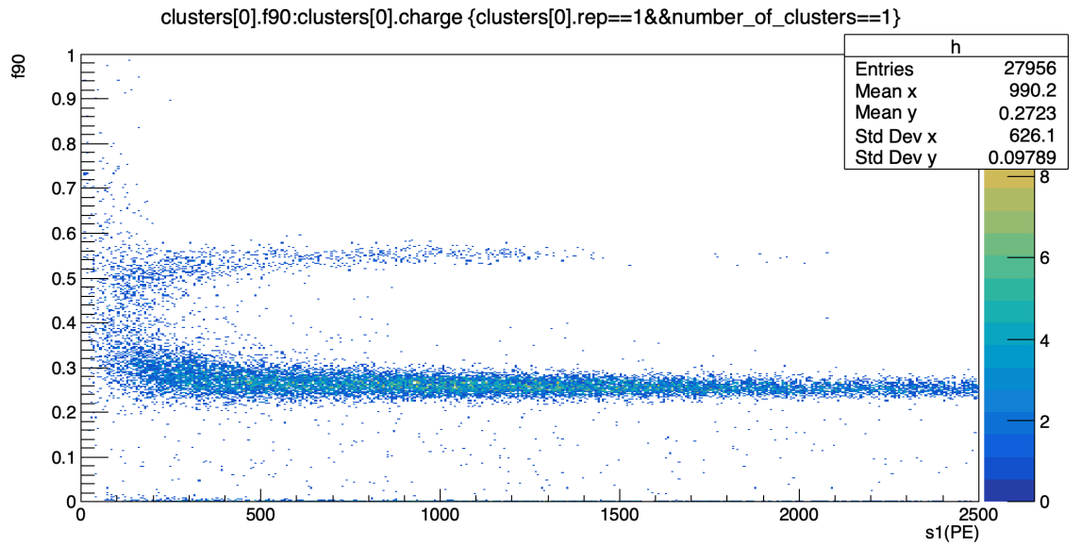
PSD of the TPC was studied in the last runs from DD-gun:

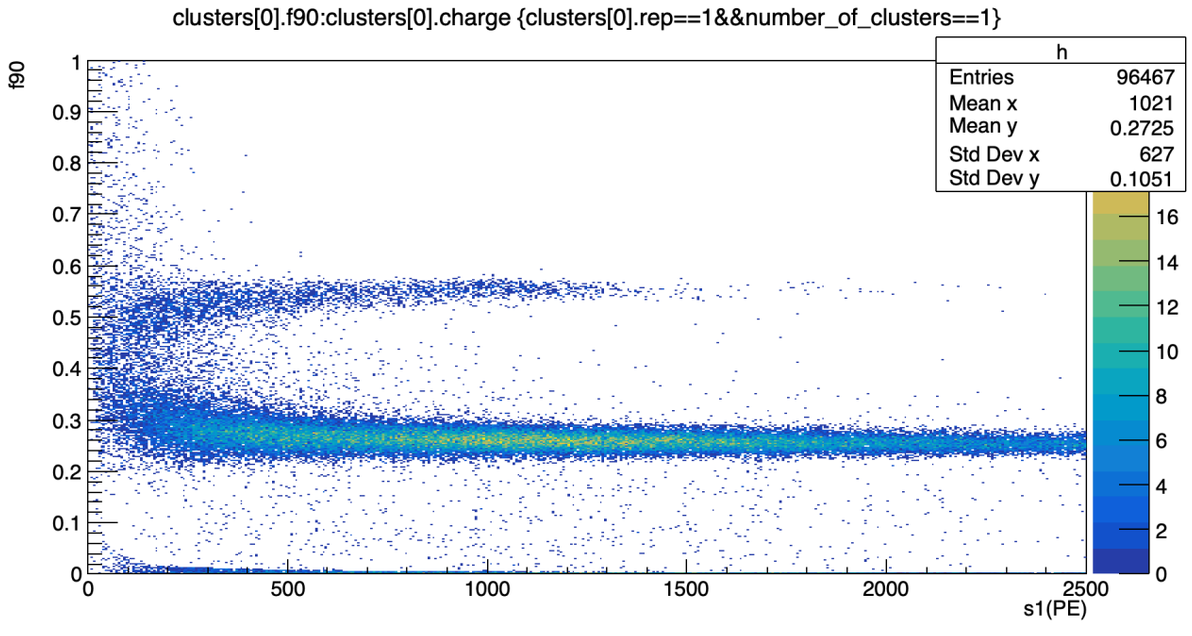
1219, 1220 and 1226.



<—f90 vs s1, run 1226. The ER dominated region (f90<0.4) is very well separated from the NR dominated region (f90>0.4)



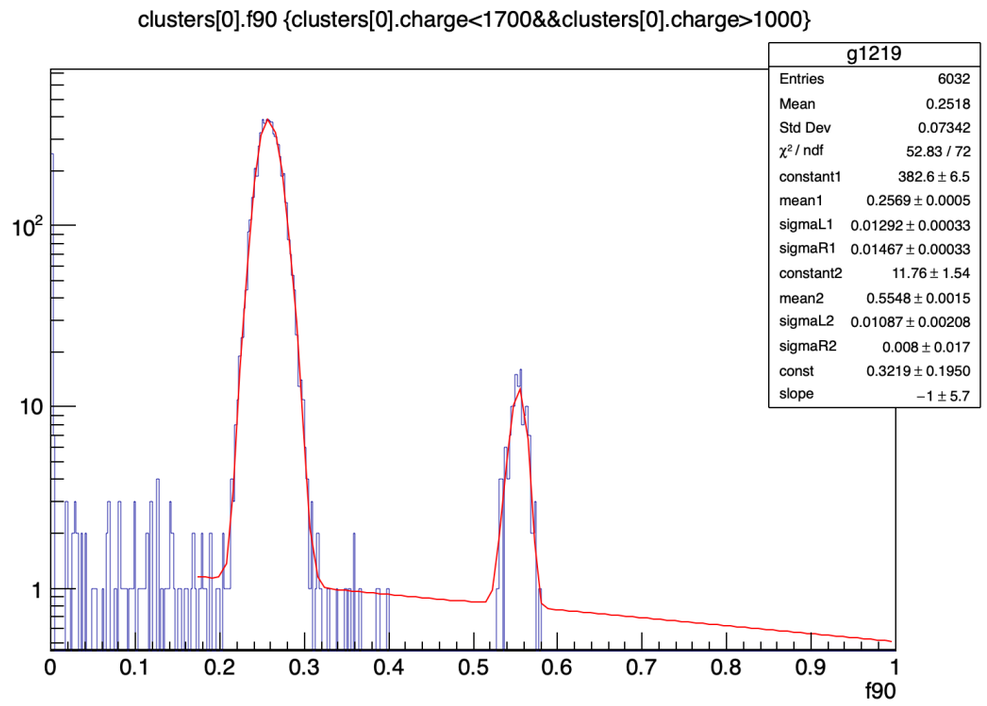
Run 1219—>



<— run 1220

Fitting f90 with a more accurate function..

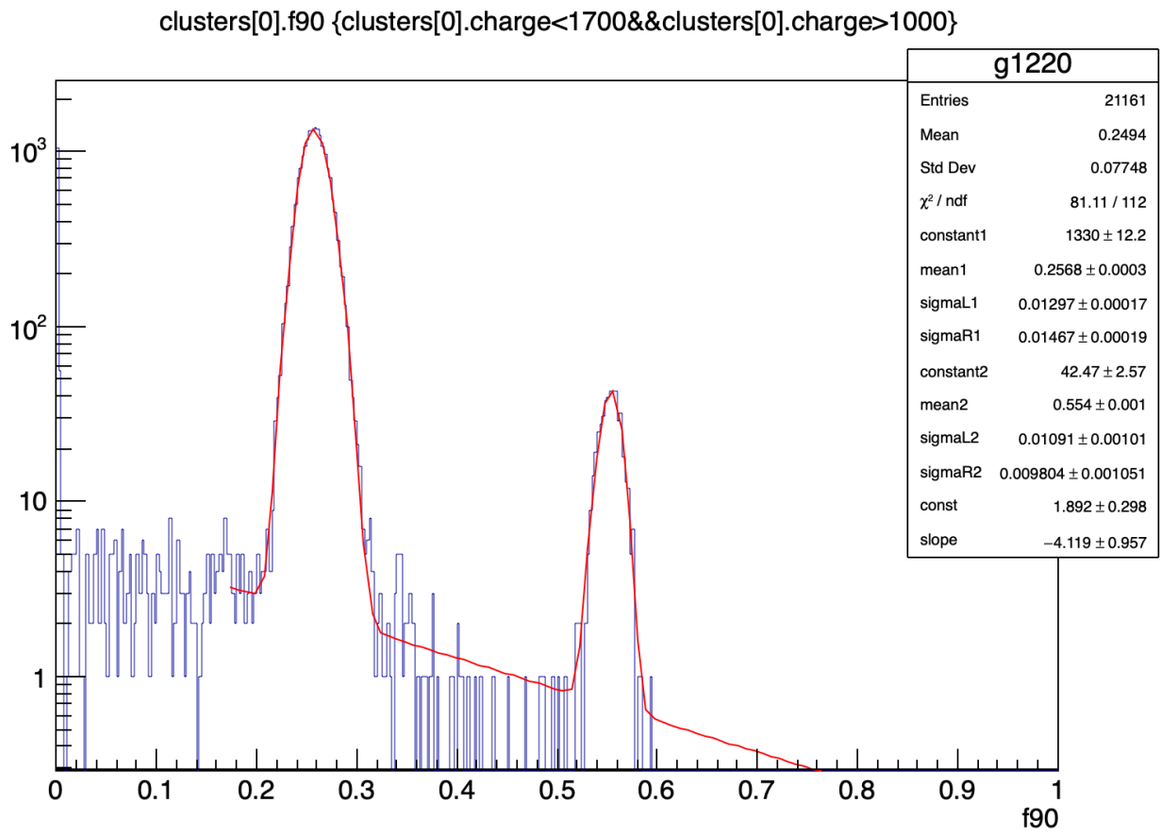
In order to better fit both peaks present in f90 plots, the best function up to now looks a gaus+gaus+exp. We can take a look at some fit examples..



..more precisely, the fit function was defined with 2 asymmetric gaussians (a sigma_left and a sigma_right) and a descending exponential.

left, Run 1219, f90, s1 “slice” 1000-1700 PE

below, Run 1220, f90, s1 “slice” 1000-1700 PE



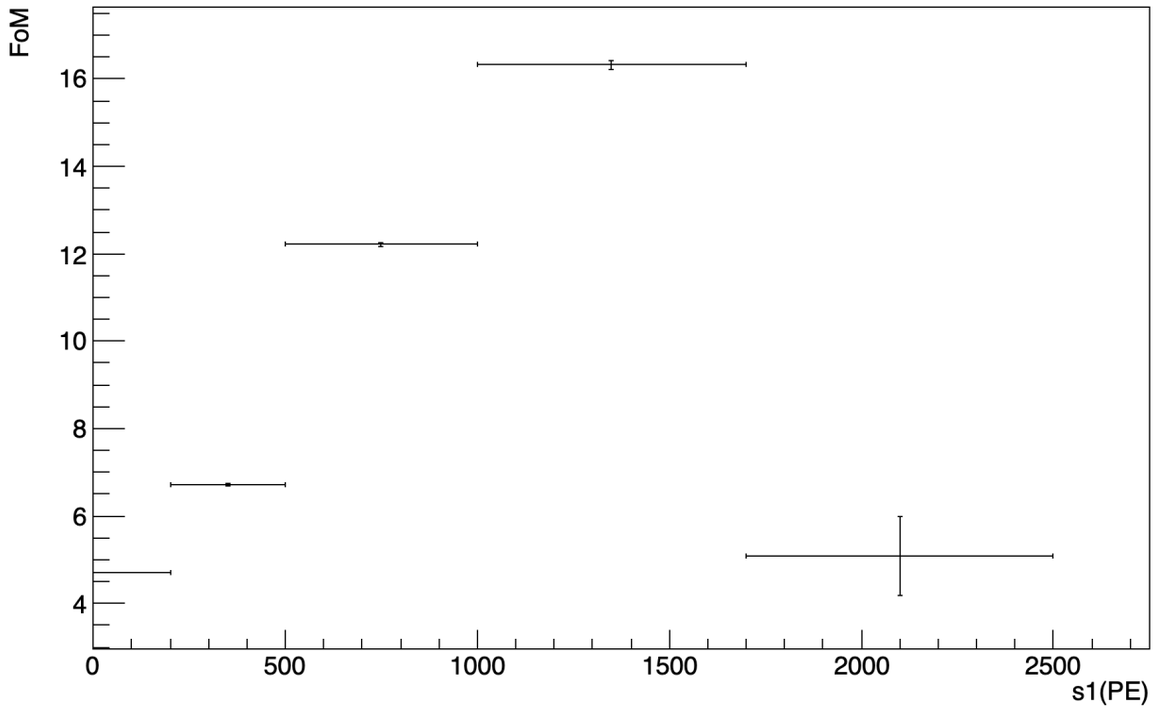
…the FoM (figure of merit) was defined therefore as:

FoM= (mu_2 - mu_1)/sqrt(sigma_R1^2 + sigma_L2^2). The 2 sigmas that define the separation between the ER dominated region and the NR dominated region are in the middle, so sigma_R1 and sigma_L2.

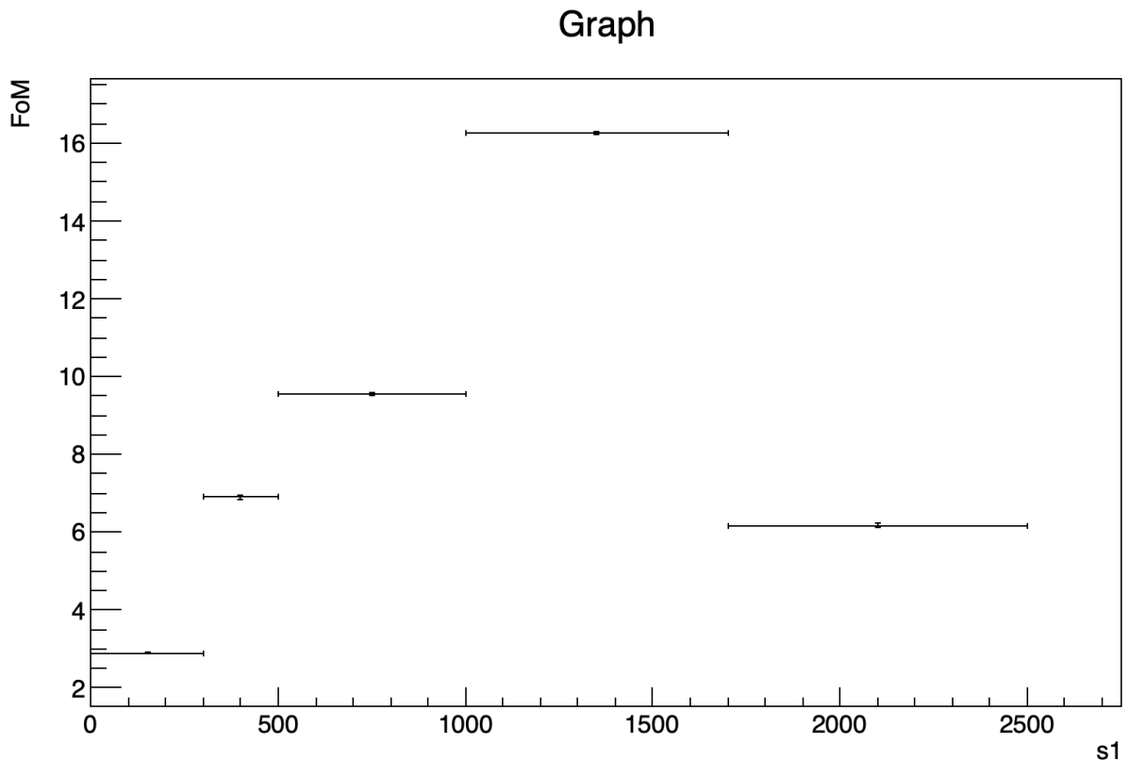
Errors were derived from the errors given from fits, and from calculations :

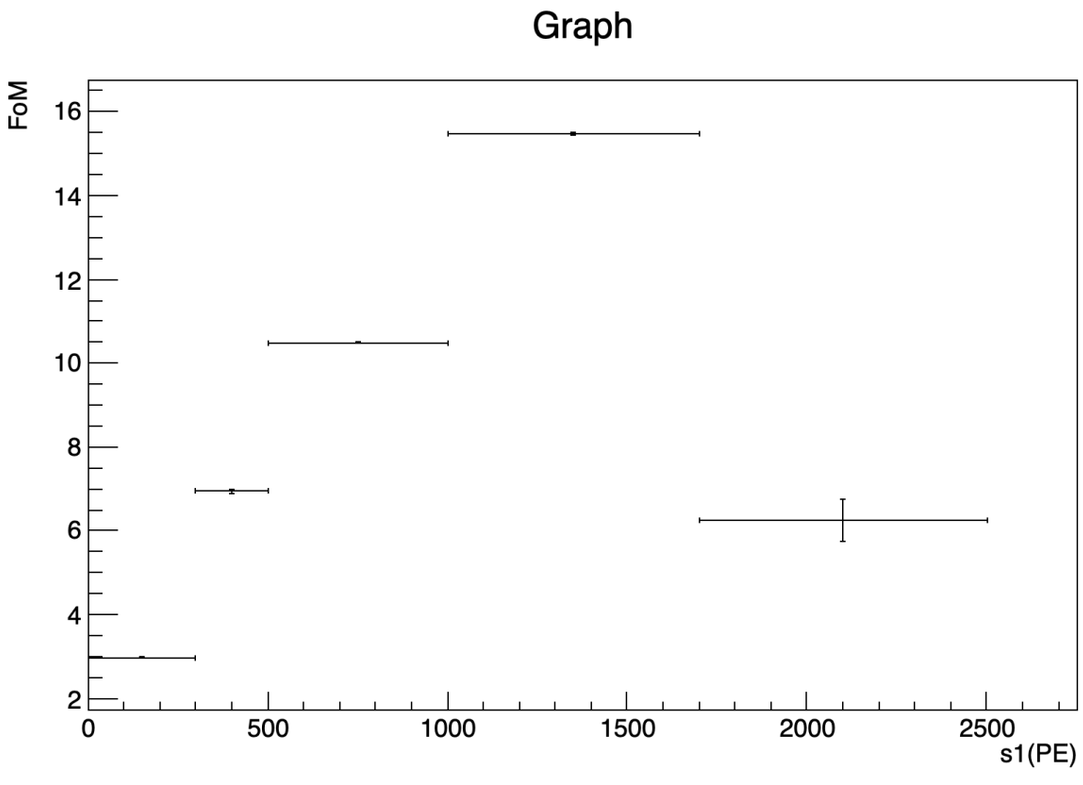
```
8.29                  run 1219 complete, a first attempt to determine the FoM
4.7  ± 0                   0–200
6.7 ±  0.026      200–500
13.32 ± 0.05      >500 (threshold)
12.20 ±  0.05     500–1000
16.32 ±  0.09     1000–1700
5.1  ±   0.9      1700–2500


12.26 ± 0.02          run 1220 s1>500 (threshold)
6.90  ± 0.06               300<s1<500
2.90  ±  0.03     0–300
 9.56 ±  0.03     500–1000
16.26 ±  0.05     1000–1700
 6.17 ±  0.06    1700–2500

2.97  ±  0.01         run 1226 0–300
6.93  ±  0.06          300–500
12.87 ±   0.02    s1>500     (threshold)
10.49 ±   0.03    500–1000
15.48 ± 0.03      1000–1700
6.25  ±   0.5     1700–2500
```

Scatter plots were cut in “slices” of s1 (PE), and f90 was determined.
Regions ER and NR dominated are best separated in the range 1000-1700 PE.
At low energies background impedes a good separation. At high energies, poor statistics play an important role.

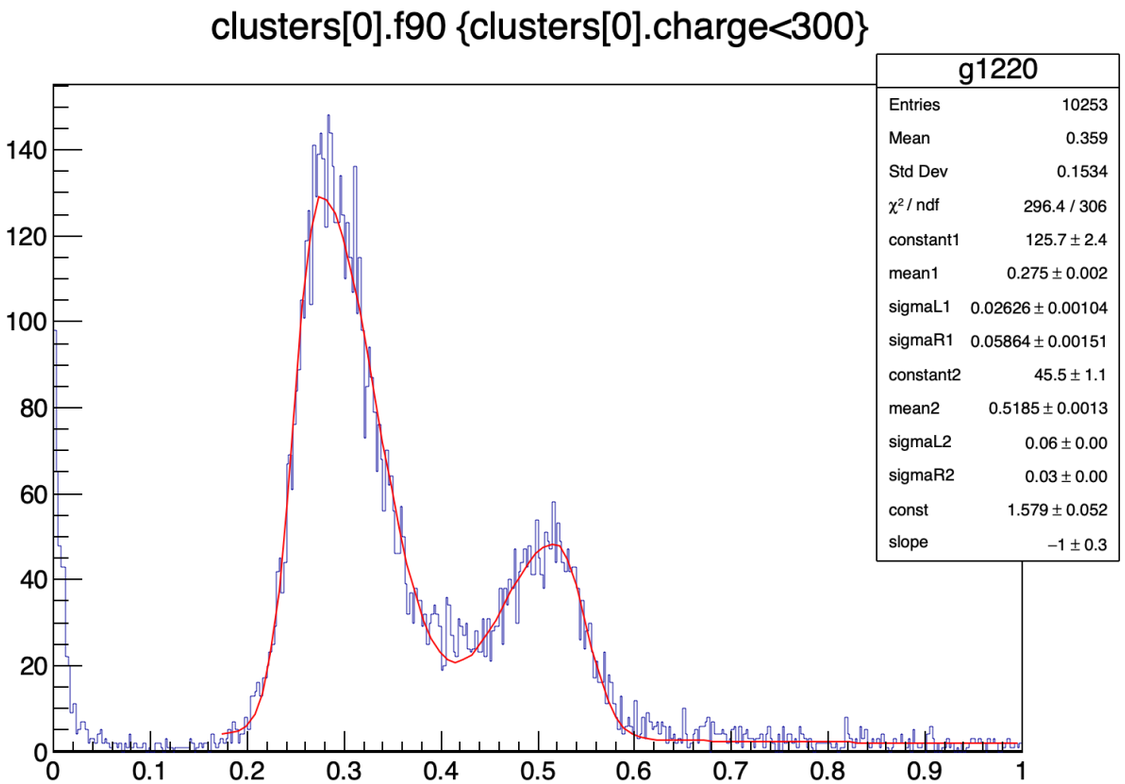


Left, run 1219 FoM slices. Below on the right, run 1220. Bottom left, run 1226.

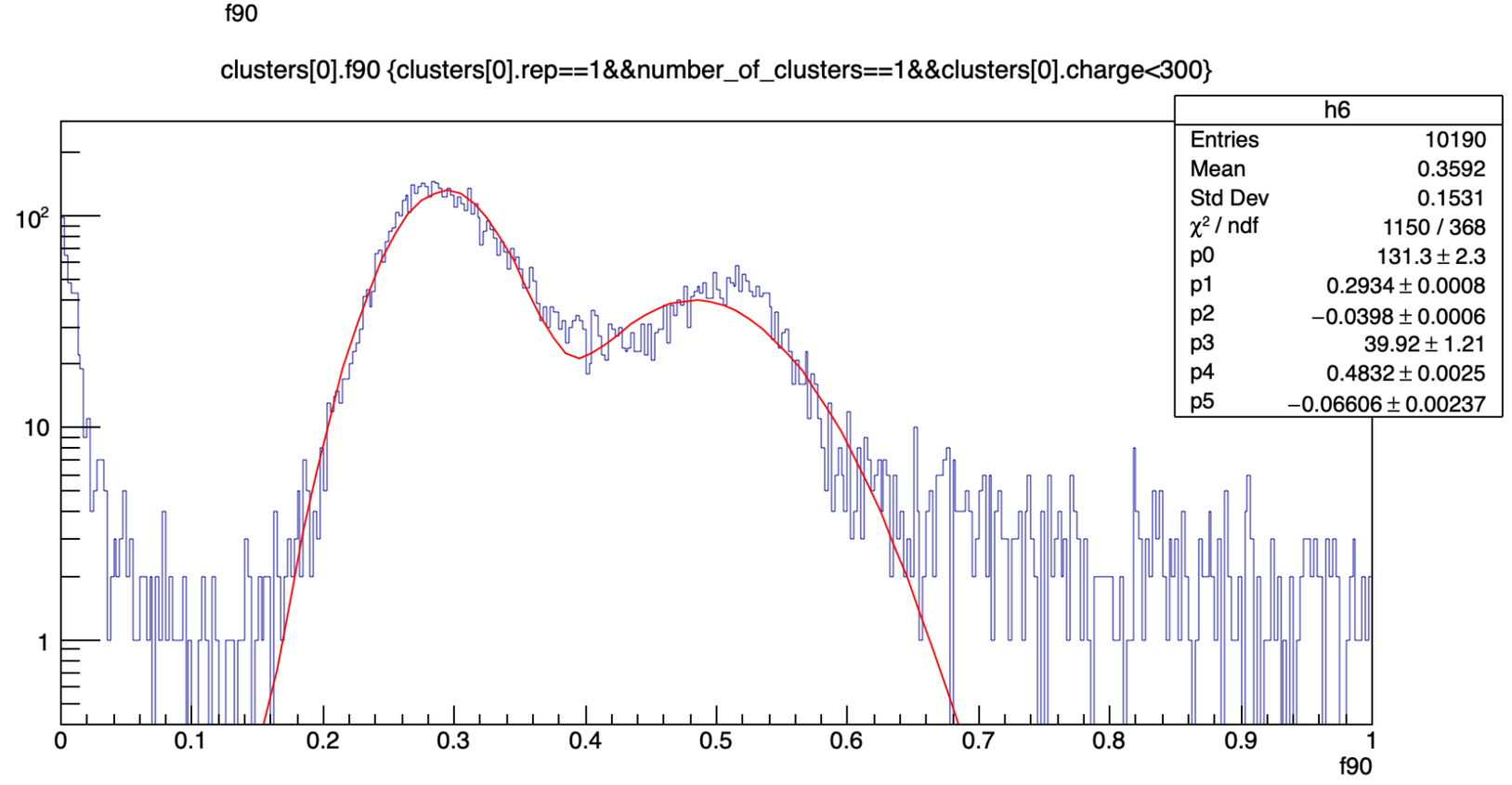




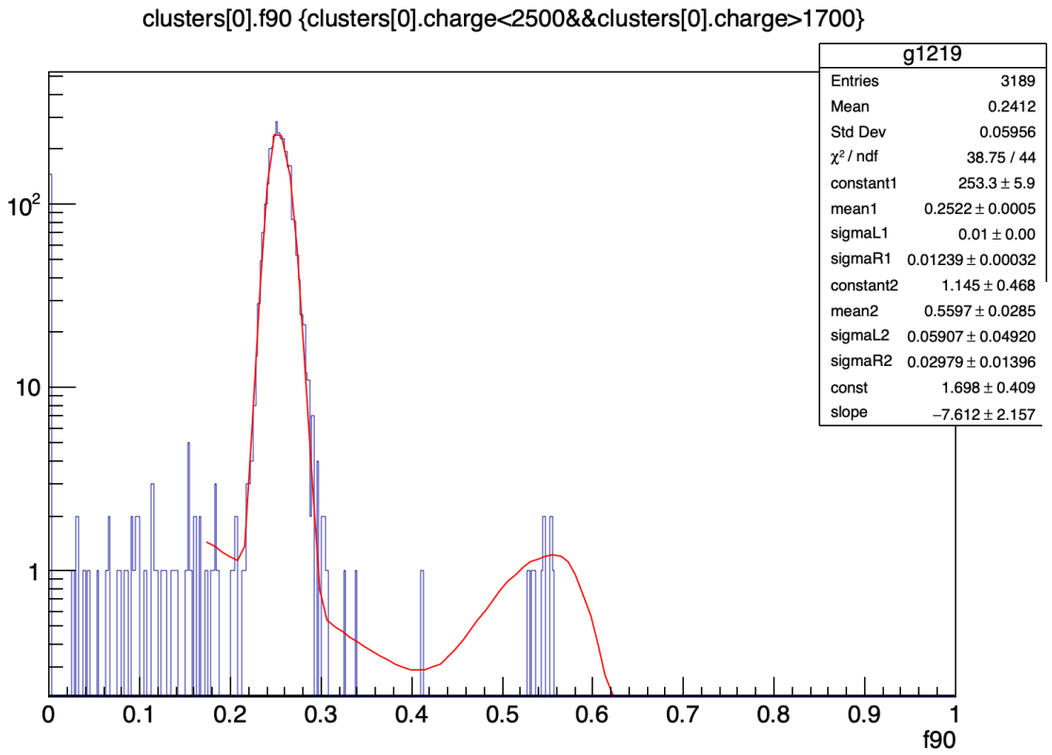
f90 cut in slices at low energies…

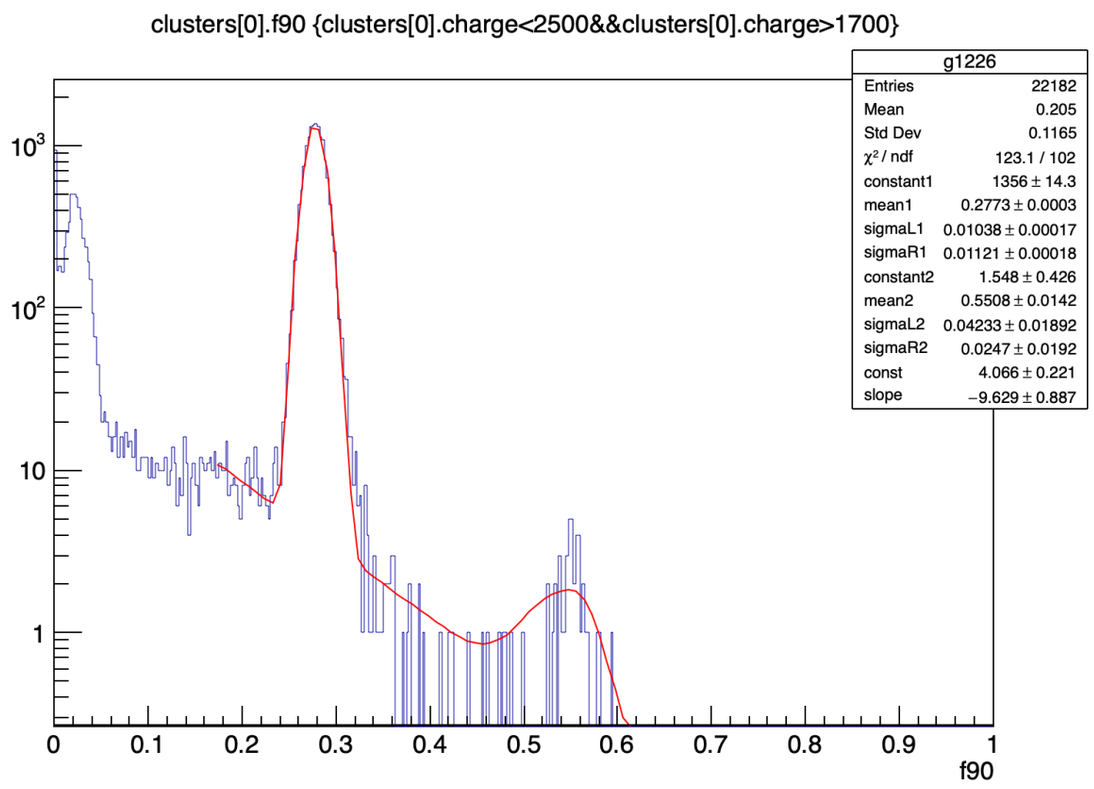


On the left, run 1220, cut below 300 PE, fit with 2 asymmetric gaussians + exp.
Below, run 1220 below 300 PE, fit with 2 symmetric gaussians. 2 asymmetric gaussians + exp still looks the most suitable function for such fits.

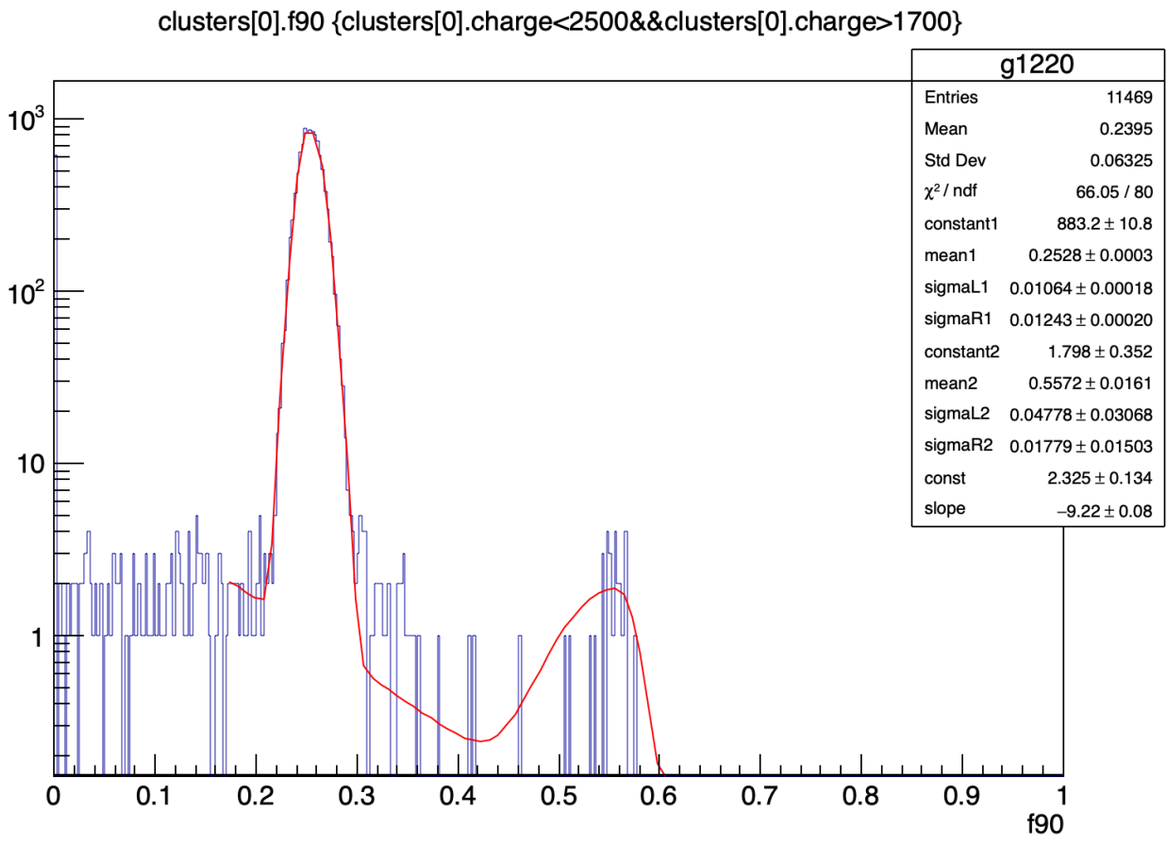


f90 at high energies…





For runs 1219 (top left) and 1220 (center right) there are difficulties in fitting histograms. Run 1226 (bottom left) looks more populated. At such high energies FoM get worse.



Excluding low energies, FoM calculations show that there is a satisfactory separation between ER and NR dominated regions.

Another ER subtraction from a run containing NRs… the normalisation factor, this time, was chosen by taking the ratio of the counts between ER peaks in run 1061 (kr-83) and in run 1197 (AmBe)