



Low gain Run4 Analysis - first steps

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- T1 : Check the iron data in different positions. In particular to look at light and diffusion as a function of z for the different data blocks.
- T2: Look at the $sc_integral$ vs $sc_integral/sc_nhits$ of iron data in different positions, how does the iron blob move in this plot?

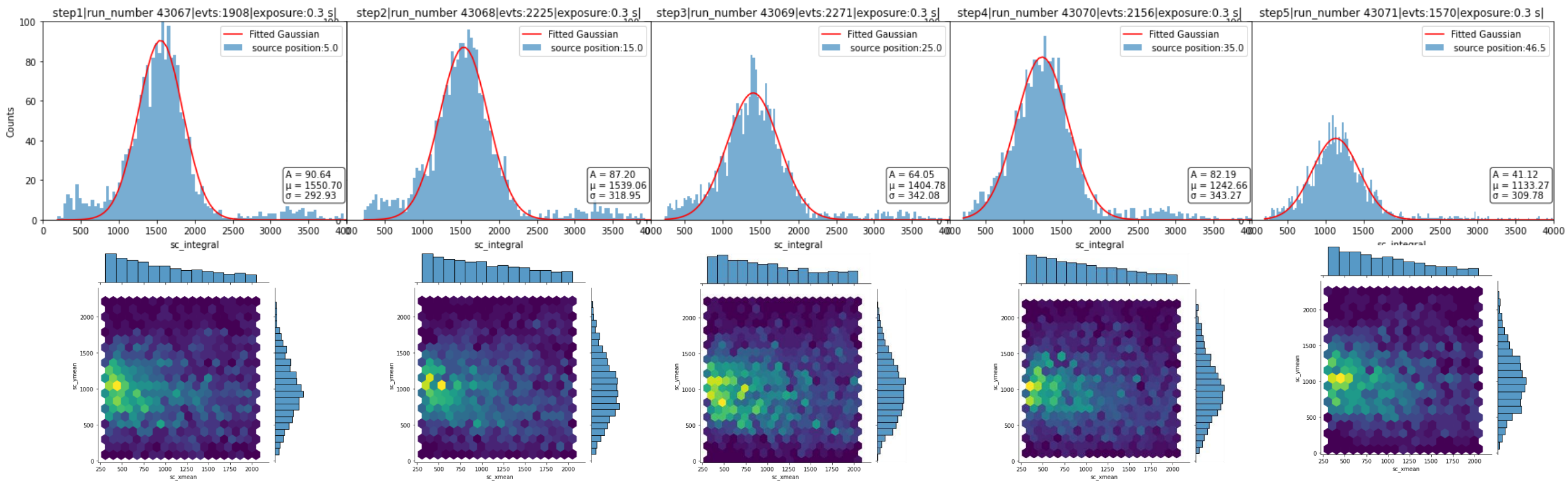
T1: Check the iron data in different positions (z scans).

- runs_to_analyse = [42867,43071]
- run unique values: [43067 43068 43069 43070 43071]
- start_time unique values: ['15/12/2023 17:31' '15/12/2023 17:33' '15/12/2023 17:36' '15/12/2023 17:39' '15/12/2023 17:42']
- exposure_sec unique values: [0.3]
- GEM3_V unique values: [400]
- GEM2 unique values: [400]
- GEM1_V unique values: [400]
- T2_V unique values: [500]
- T1_V unique values: [500]
- DRIFT_V unique values: [960]
- total_gas_flow unique values: [5.]

SC_INTEGRAL

• runs_to_analyse = [42863, 43185]

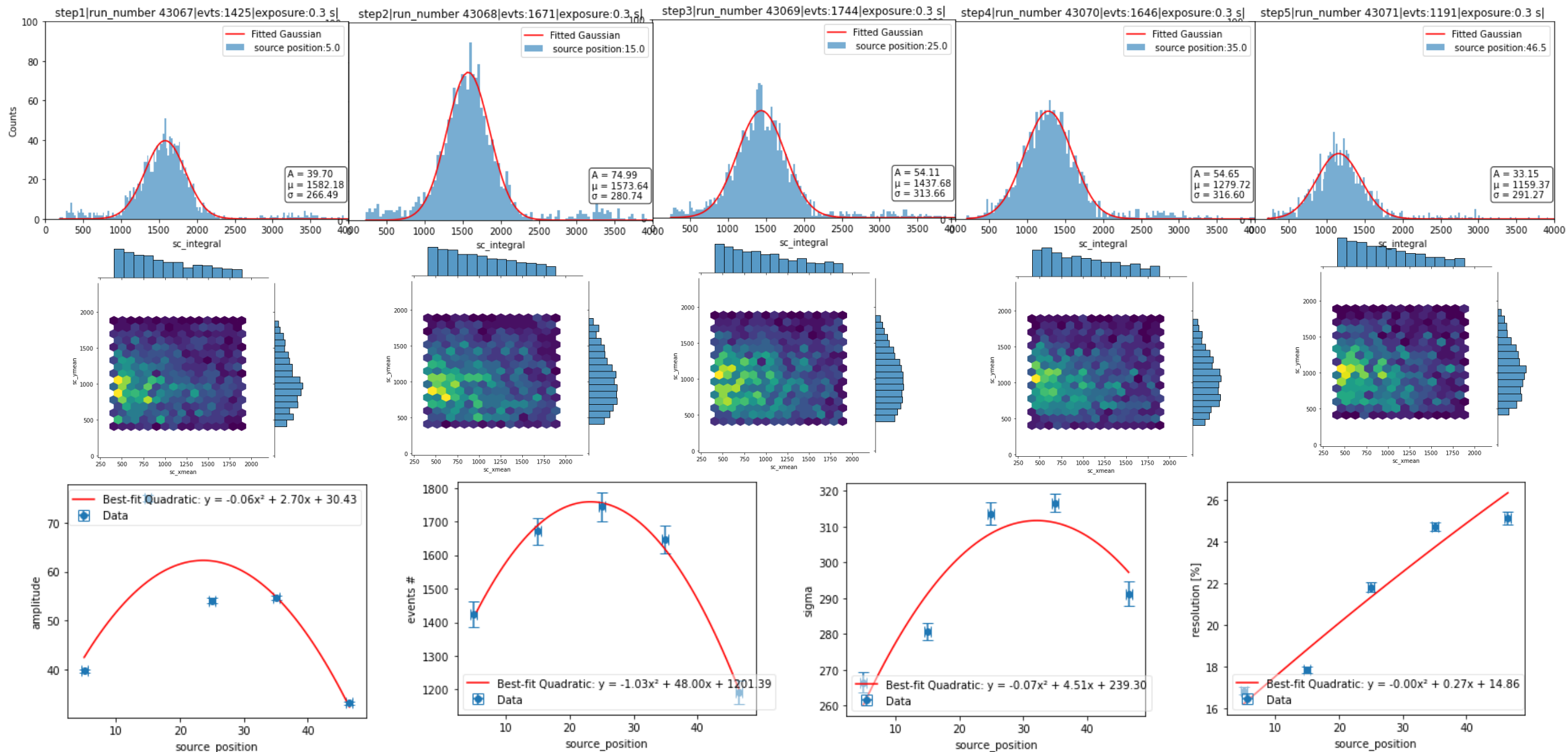
~~cuts: 'sc_xmin': [400, inf], 'sc_xmax': [-inf, 1900], 'sc_ymin': [400, inf], 'sc_ymax': [-inf, 1900]~~



SC_INTEGRAL

• runs_to_analyse = [42863, 43185]

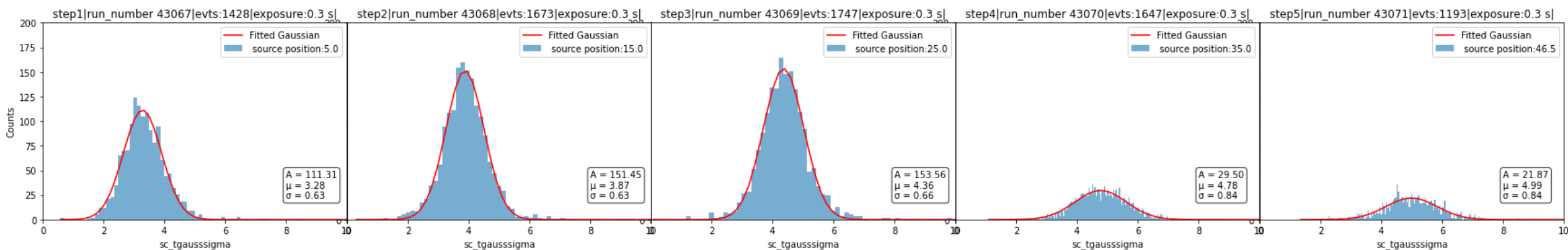
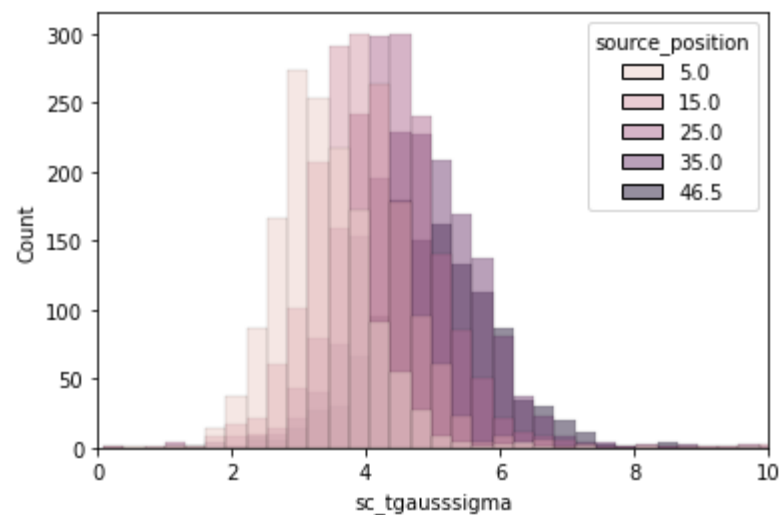
cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



SC_TGAUSSSIGMA

• runs_to_analyse = [42863,43185]

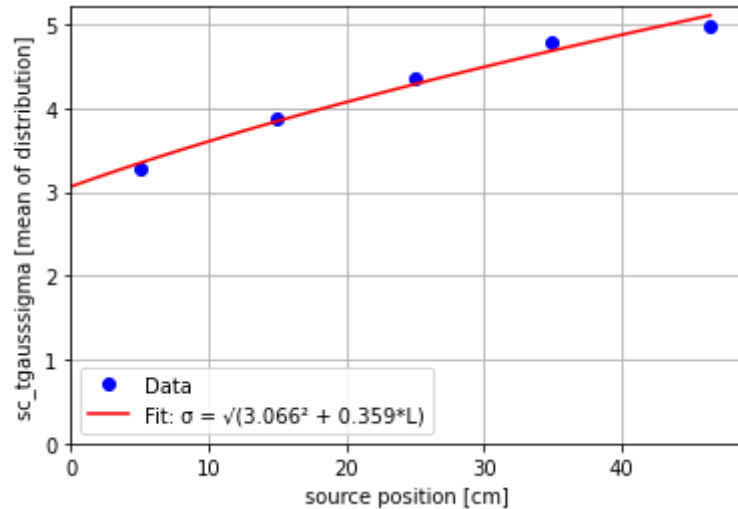
cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



SC_TGAUSSSIGMA

• runs_to_analyse = [42863,43185]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



```
# Modified fit function:  $\sigma_T^2 = \text{term0}^2 + \alpha * L$   
def diffusion_model(L, term0, alpha):  
    return np.sqrt(term0**2 + alpha * L)
```

```
# Calculate  $D_T/\mu$  from alpha  
#  $\alpha = 2 (D_T/\mu) / E \Rightarrow D_T/\mu = (\alpha * E) / 2$   
DT over mu = (alpha fit * E) / 2
```

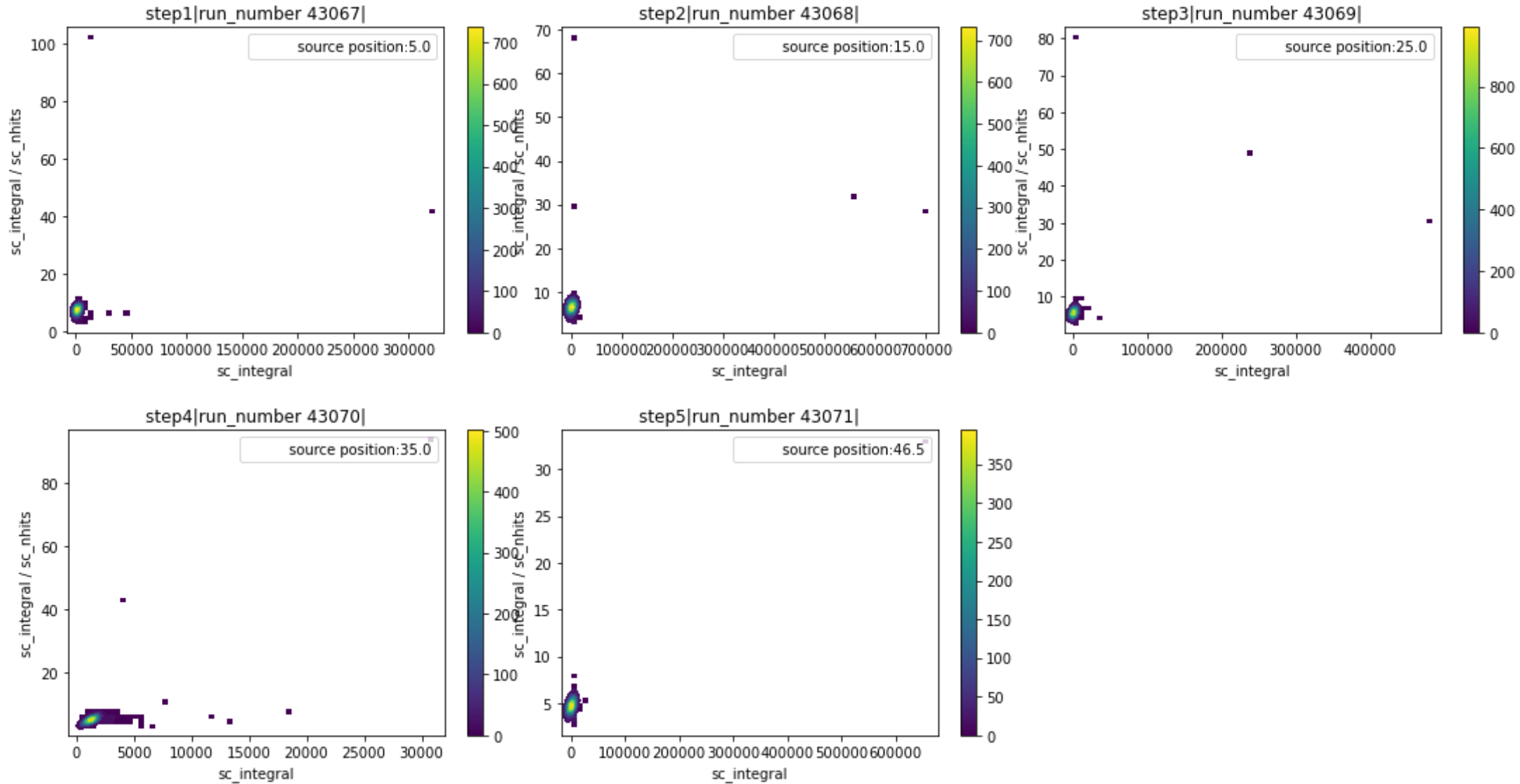
Fitted term0 = 3.06577 ± 0.11342 cm
Fitted alpha = 0.35889 ± 0.02741 cm
Fitted D_T/μ = 172.26857 ± 13.15473 V

SC_TGAUSSSIGMA α diffusion

SC_INTEGRAL VS SC_INTEGRAL/SC_NHITS

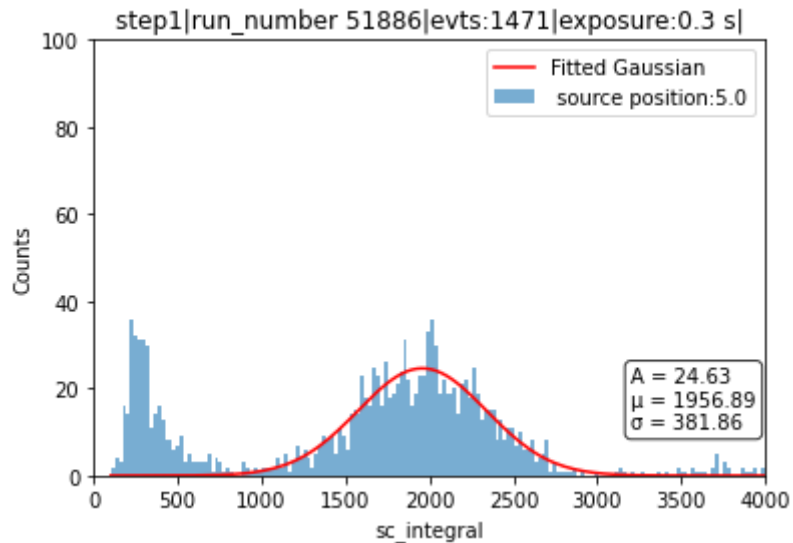
• runs_to_analyse = [42863, 43185]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



T1: Check the iron data in different positions (z scans).

- runs_to_analyse = [51886, 51891]
- run unique values: [51886 51887 51888 51889 51890]
- start_time unique values: ['12/03/2024 08:43' '12/03/2024 08:46' '12/03/2024 08:49' '12/03/2024 08:51' '12/03/2024 08:54']
- exposure_sec unique values: [0.3]
- GEM3_V unique values: [400]
- GEM2 unique values: [400]
- GEM1_V unique values: [400]
- T2_V unique values: [500]
- T1_V unique values: [500]
- DRIFT_V unique values: [960]
- total_gas_flow unique values: [5.]



No change in detector parameters, since runs_to_analyse = [42863, 43185].

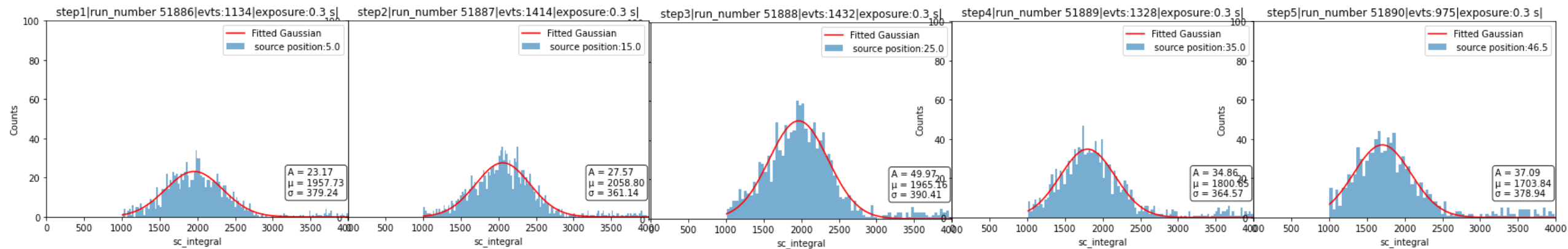
Yet there was:

- increase in the sc_integral values for the iron peak
- the appearance of an exponential componente (noise?)

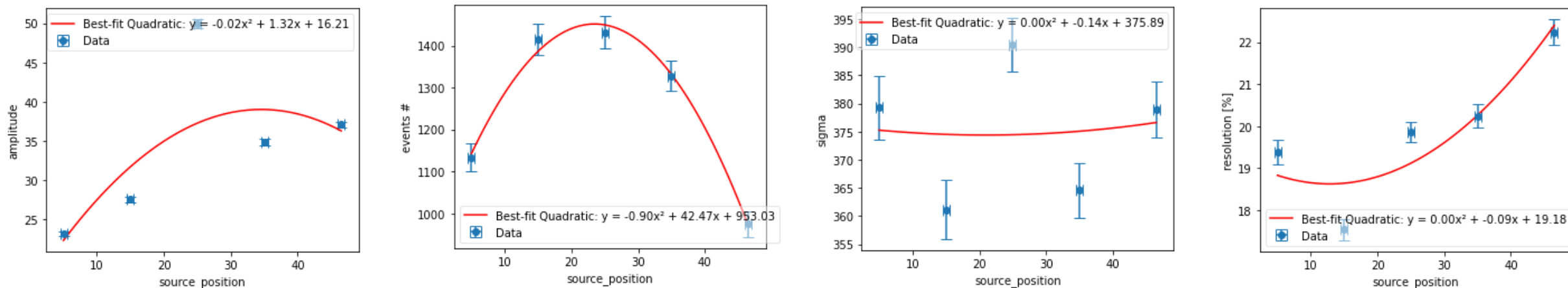
SC_INTEGRAL

• runs_to_analyse = [51886, 51891]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



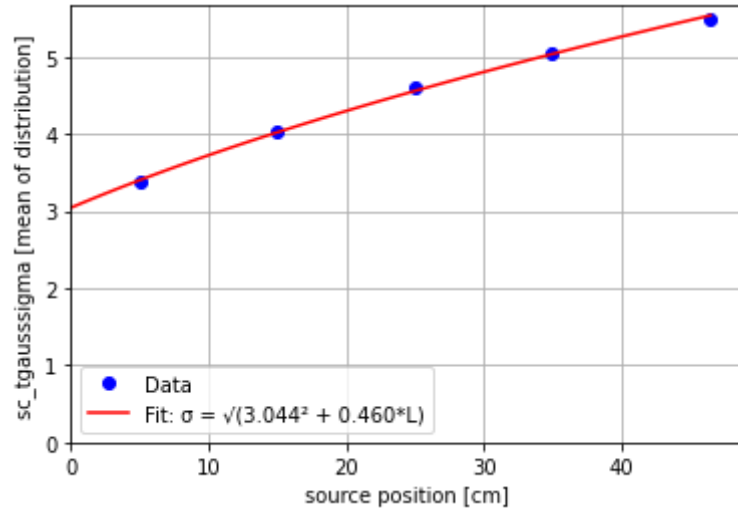
threshold at $sc_integral = 1000$, before the gaussian fit



SC_TGAUSSSIGMA

- runs_to_analyse = [51886,51891]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



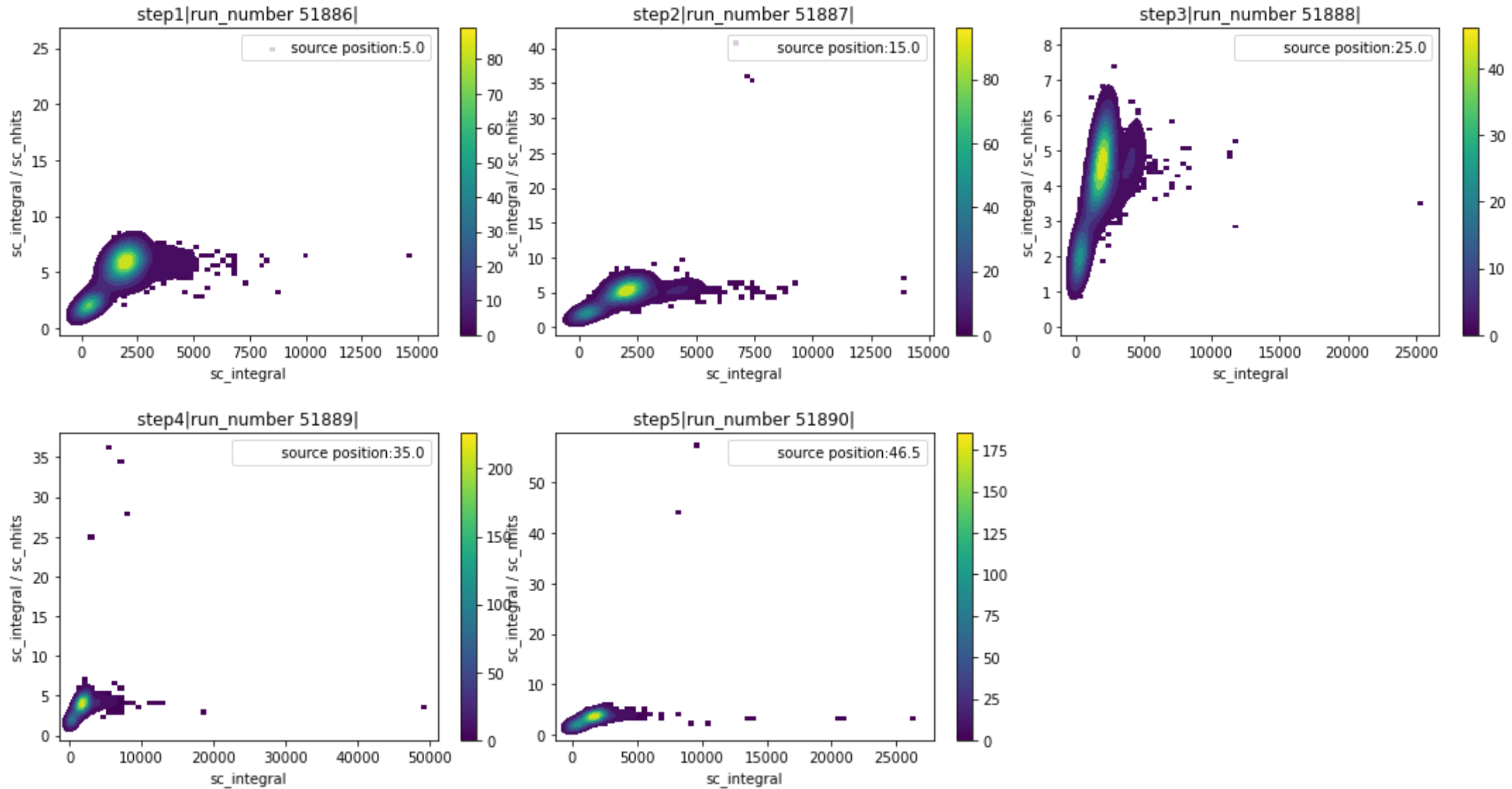
Fitted term0 = 3.04399 ± 0.05407 cm

Fitted alpha = 0.46006 ± 0.01328 cm

SC_INTEGRAL VS SC_INTEGRAL/SC_NHITS

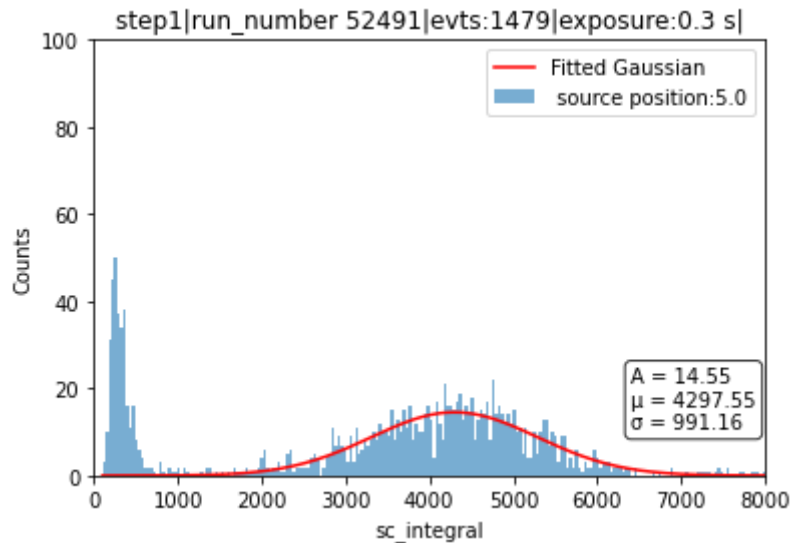
• runs_to_analyse = [51886,51891]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



T1: Check the iron data in different positions (z scans).

- runs_to_analyse = [52491, 52495]
- run unique values: [52491 52492 52493 52494 52495]
- start_time unique values: ['16/03/2024 12:43' '16/03/2024 12:45' '16/03/2024 12:54' '16/03/2024 13:02' '16/03/2024 13:08']
- exposure_sec unique values: [0.3]
- GEM3_V unique values: [420]
- GEM2 unique values: [420]
- GEM1_V unique values: [420]
- T2_V unique values: [500]
- T1_V unique values: [500]
- DRIFT_V unique values: [600]
- total_gas_flow unique values: [5.]



DRIFT_V: 960 V -> 600 V

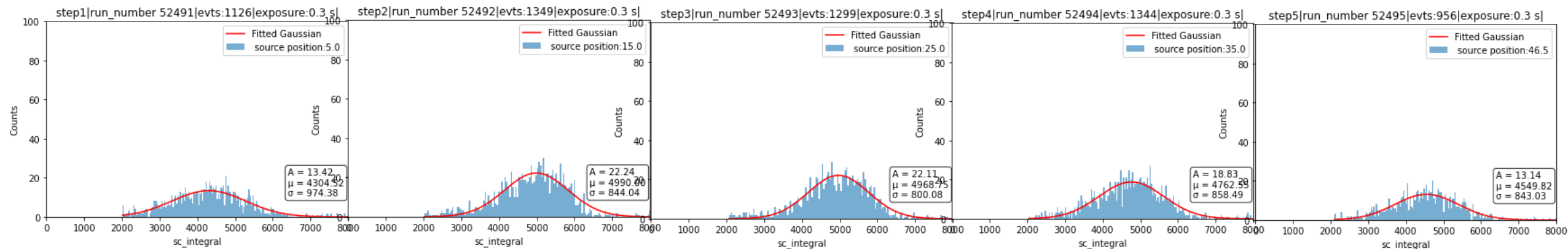
GEM1,GEM2,GEM3: 400V -> 420 V

- increase in the sc_integral values for the iron peak

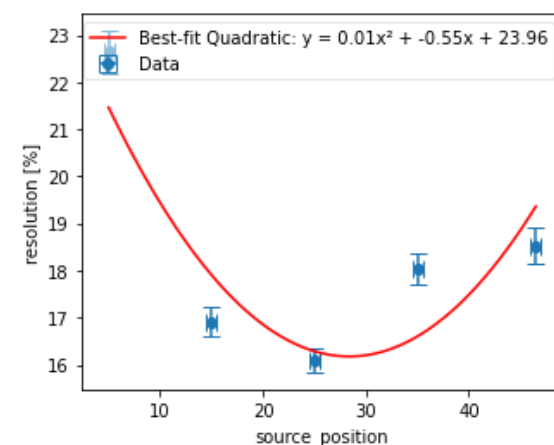
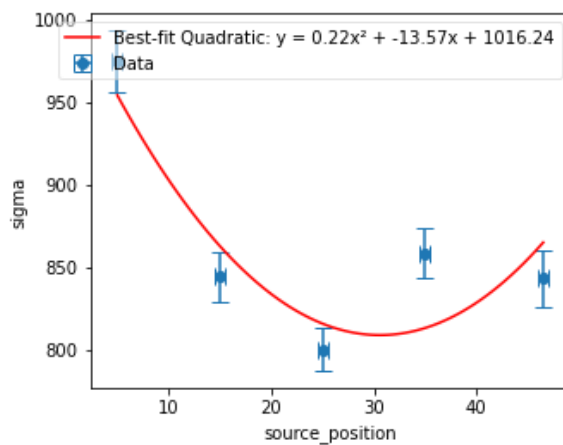
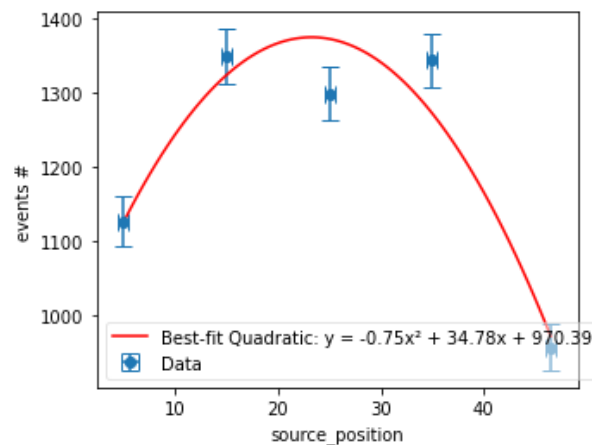
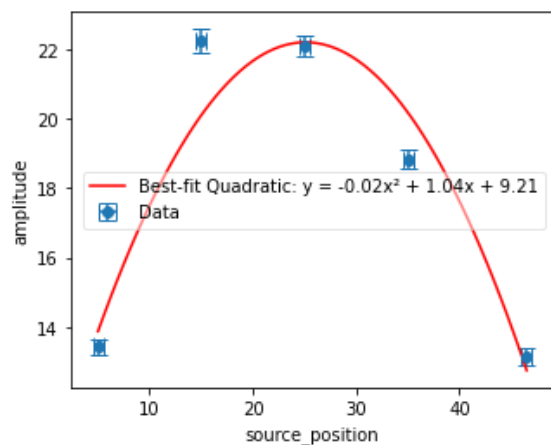
SC_INTEGRAL

• runs_to_analyse = [52491, 52495]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



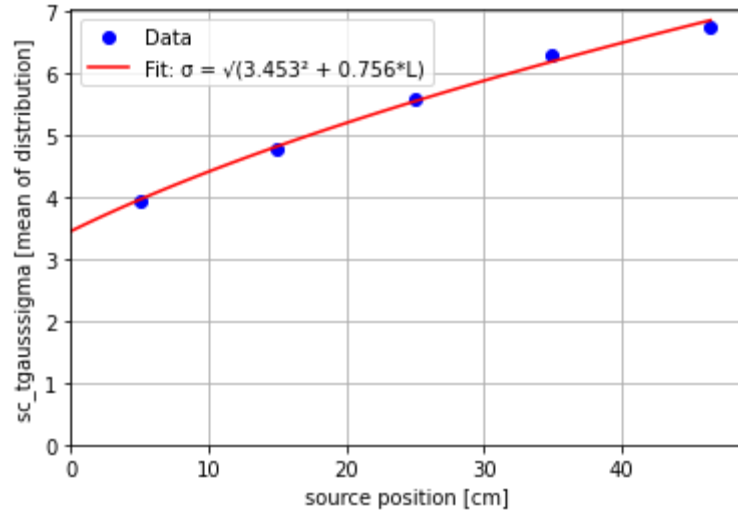
threshold at $sc_integral = 2000$, before the gaussian fit



SC_TGAUSSSIGMA

• runs_to_analyse = [52491, 52495]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]



Fitted term0 = 3.45253 ± 0.10532 cm

Fitted alpha = 0.75587 ± 0.03002 cm

SC_INTEGRAL VS SC_INTEGRAL/SC_NHITS

• runs_to_analyse = [52491, 52495]

cuts: 'sc_xmin':[400, inf], 'sc_xmax':[-inf, 1900], 'sc_ymin':[400, inf], 'sc_ymax': [-inf, 1900]

