

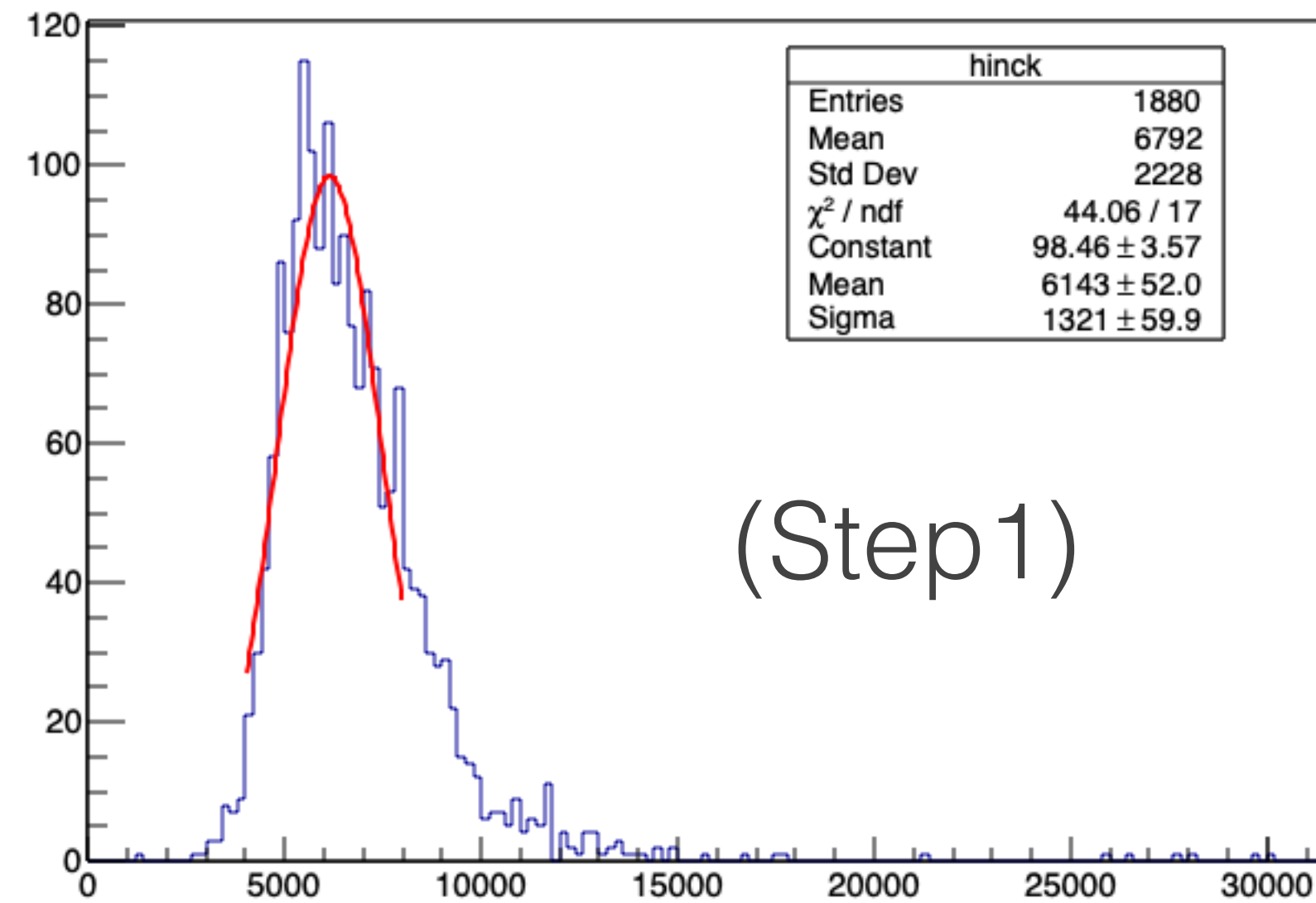
Once upon a time in Europium



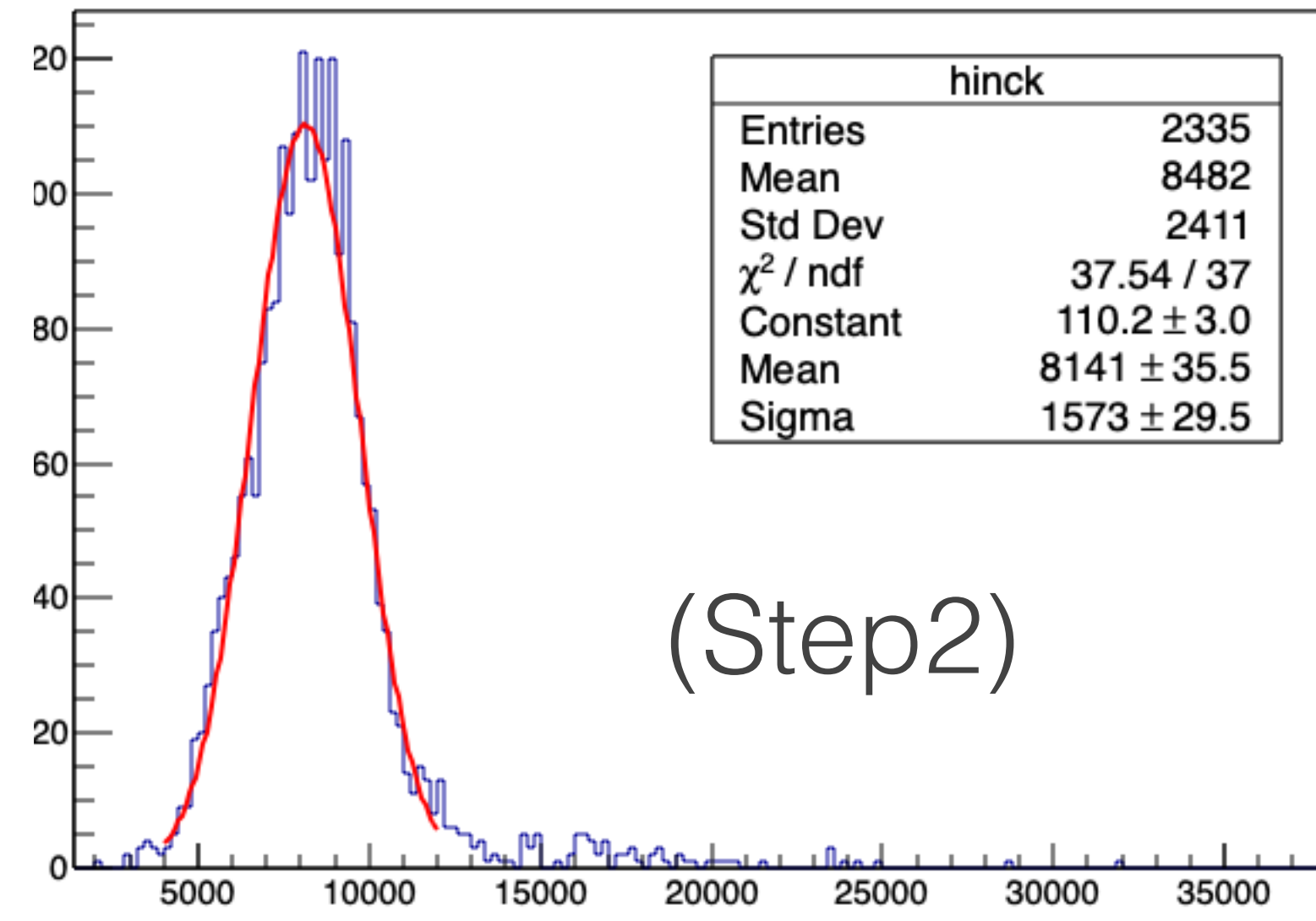
Data set and daily scan

- We took data at 5 different distances of the source from the GEM: 5cm (Step1), 15 cm (Step2), 25 cm (Step3), 35 cm (Step4), 45 cm (Step5);
- In each position about 300 runs were collected for a total of 120k pictures each;
- Daily scan performed with ^{55}Fe source (5.9 keV) provides the responses in the 5 steps;
- Calibration constants are evaluated to be: 0.96, 0.72, 0.61, 0.56, 0.55 eV/cnts

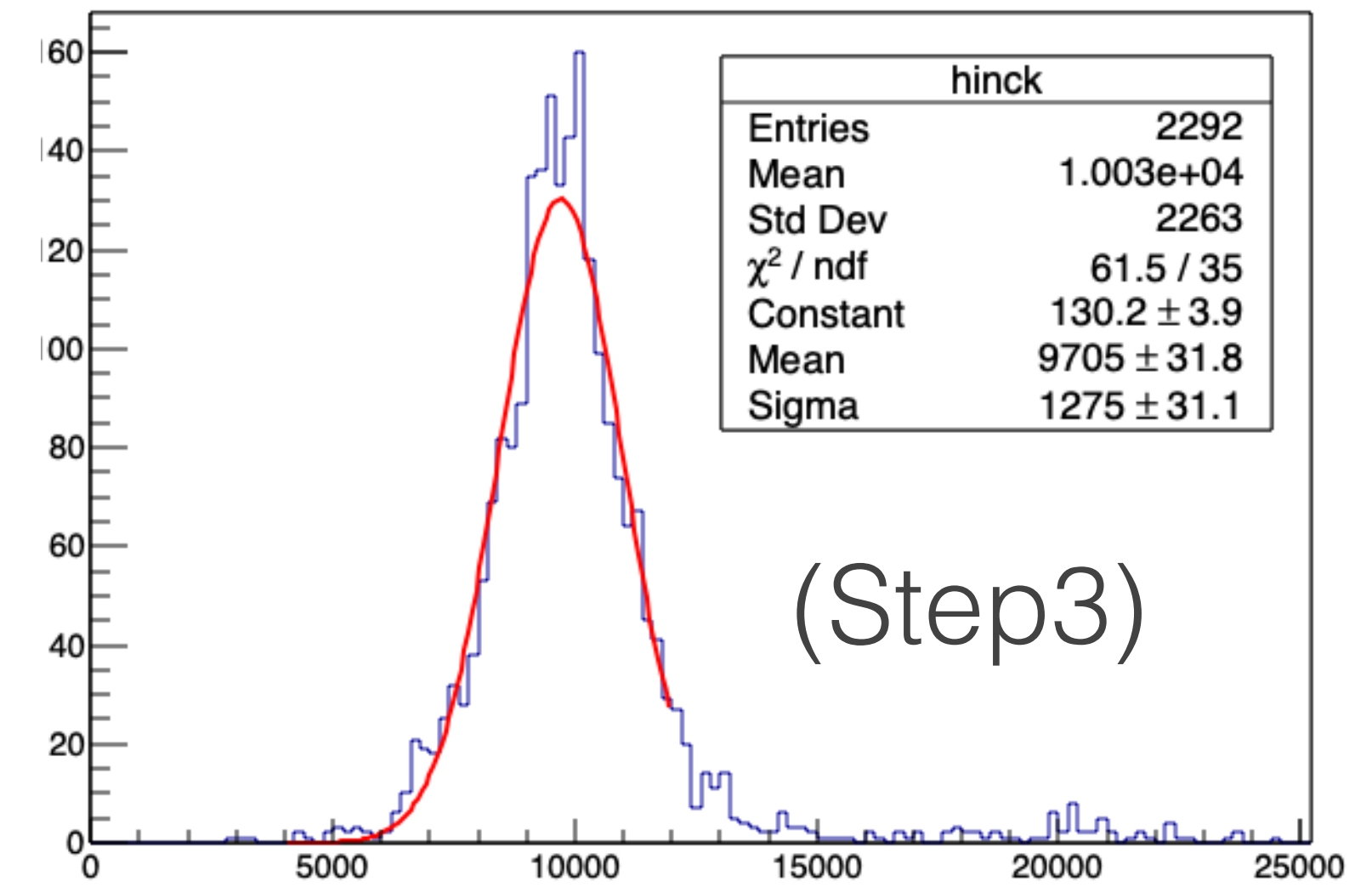
Daily scan



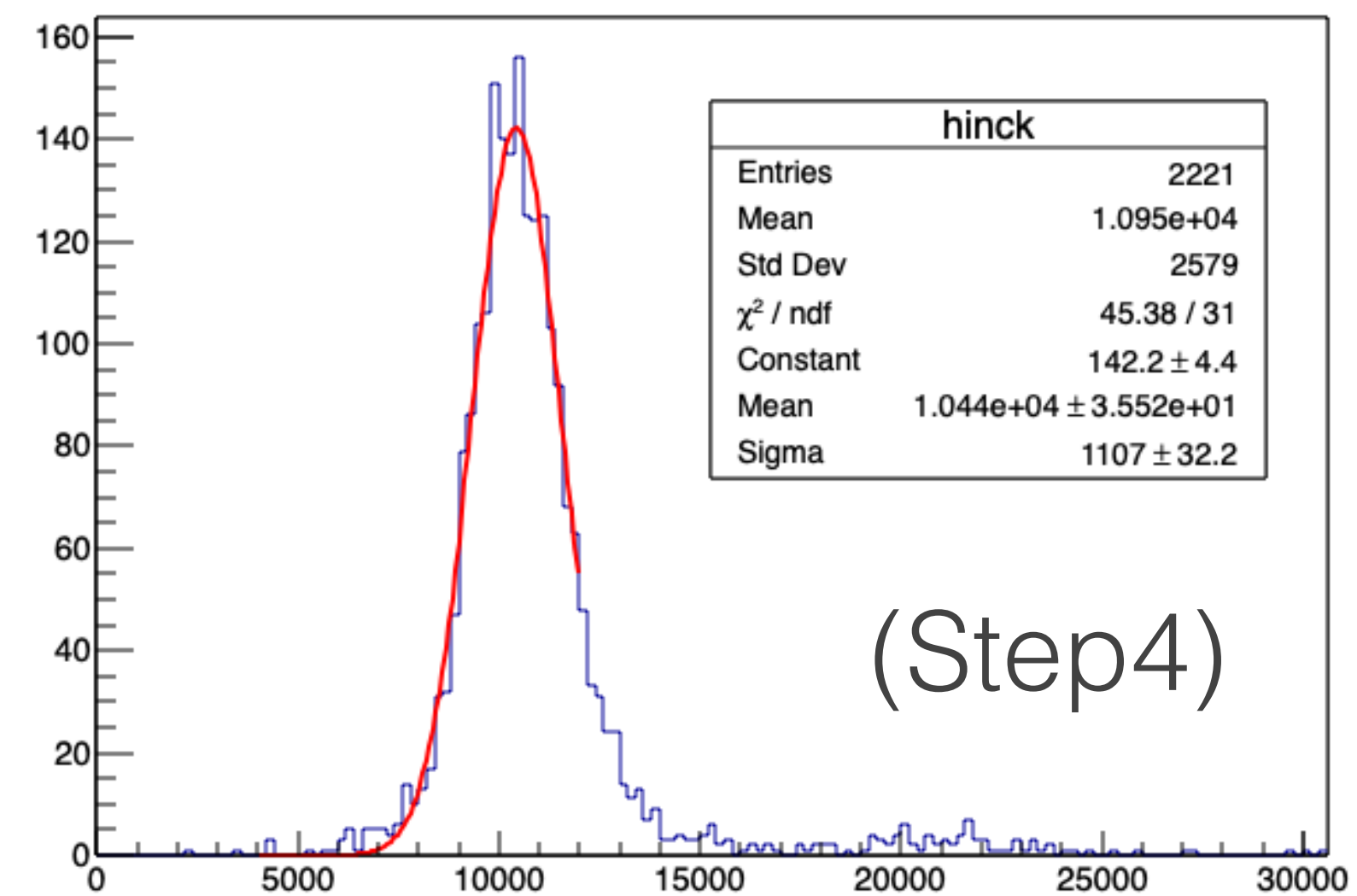
(Step1)



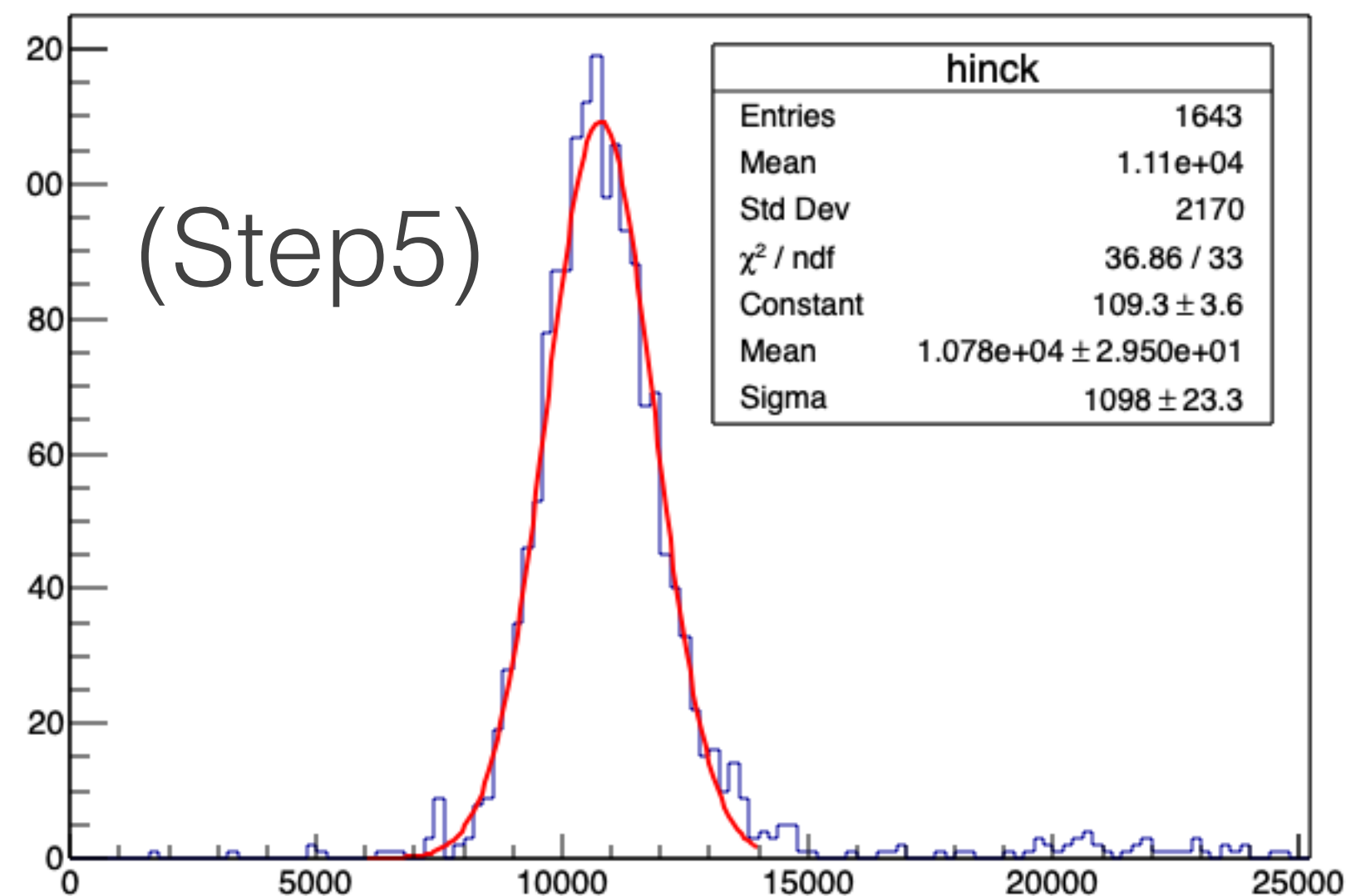
(Step2)



(Step3)



(Step4)



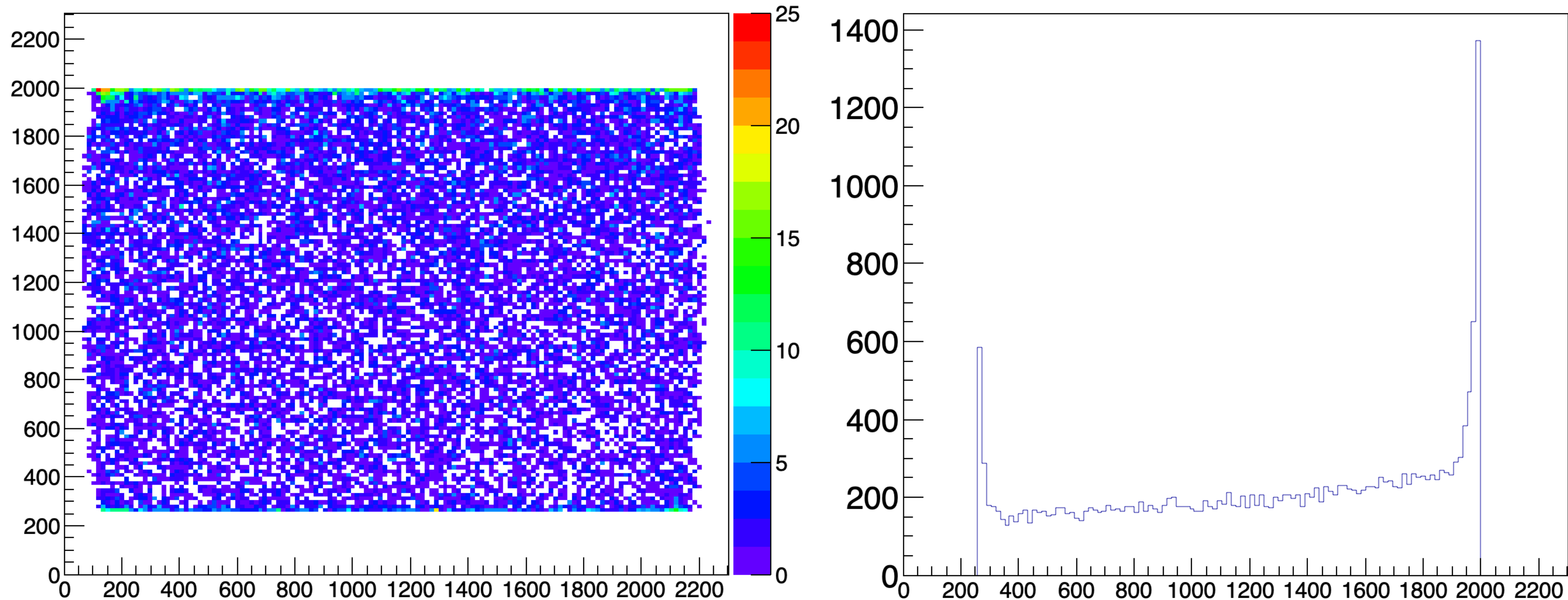
(Step5)

Fe peaks after the use of
“the map”

Gaussian fits just to get
raw calibrations in each
step

Eu Map

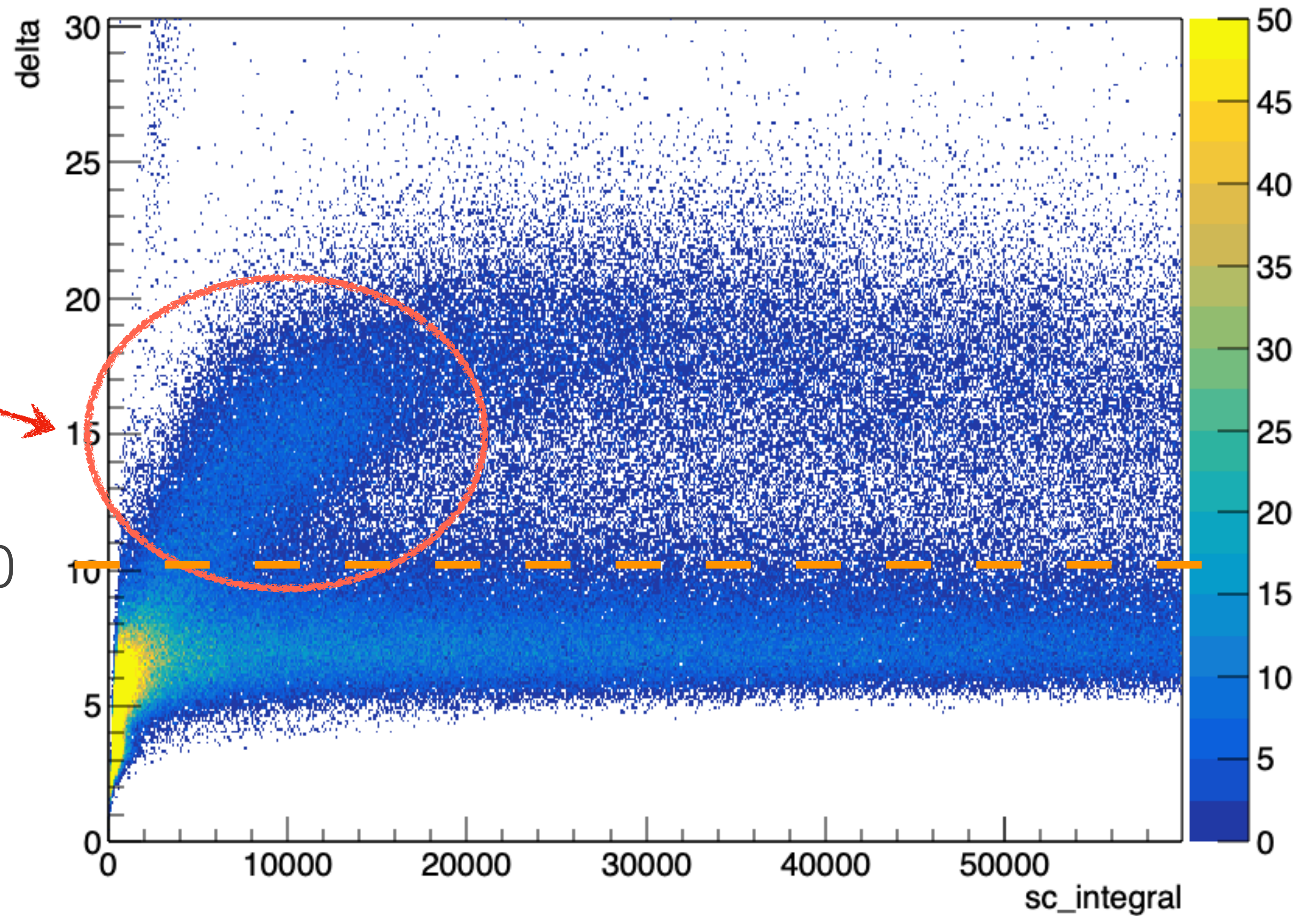
- Space distributions of events with corrected integral between 3k and 20k
- in all shown analyses, `sc_ymean` below 300 and above 1850 are rejected



Analysis

We are interested in those

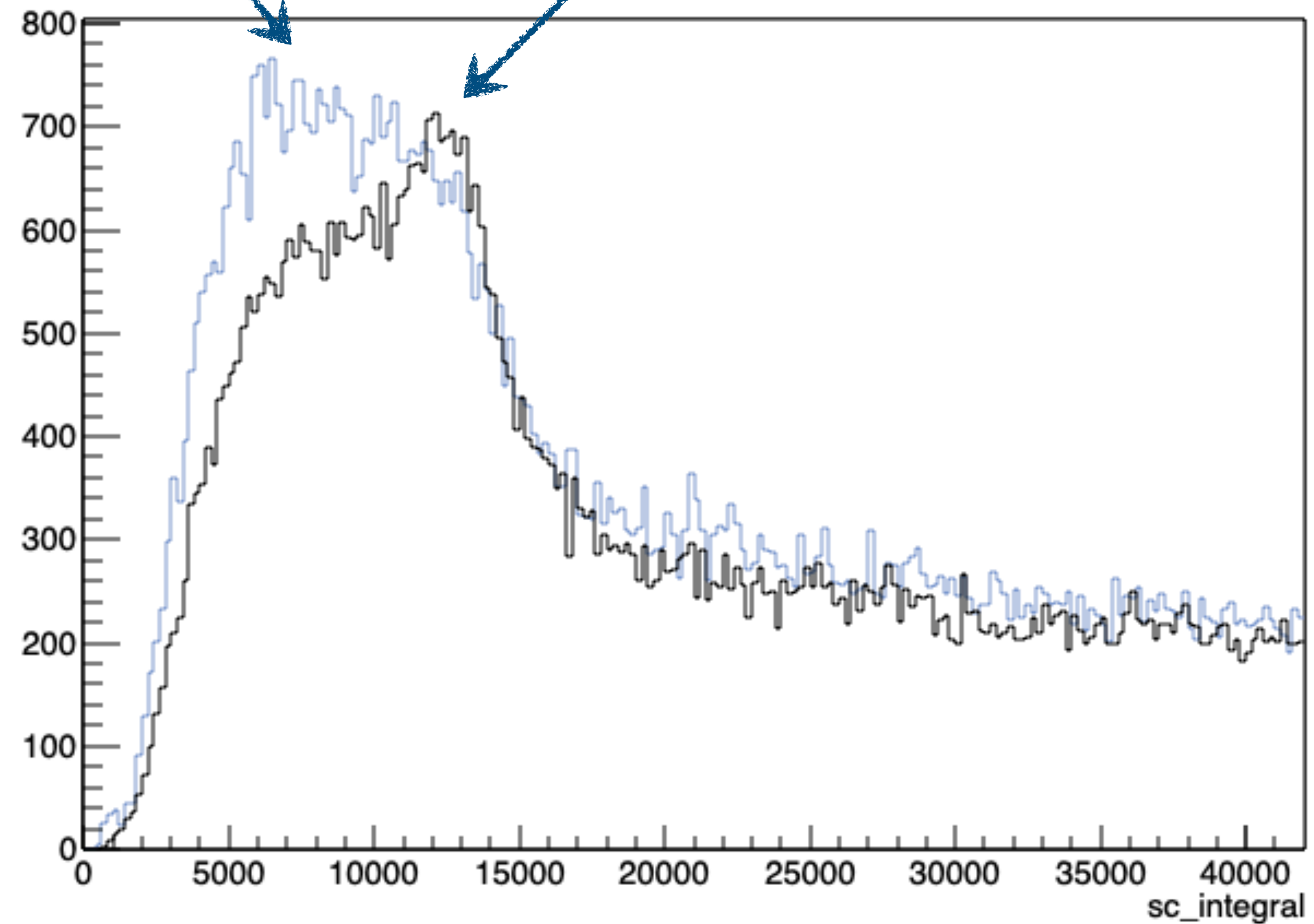
Cut away delta below 10



Analysis

without “the map”

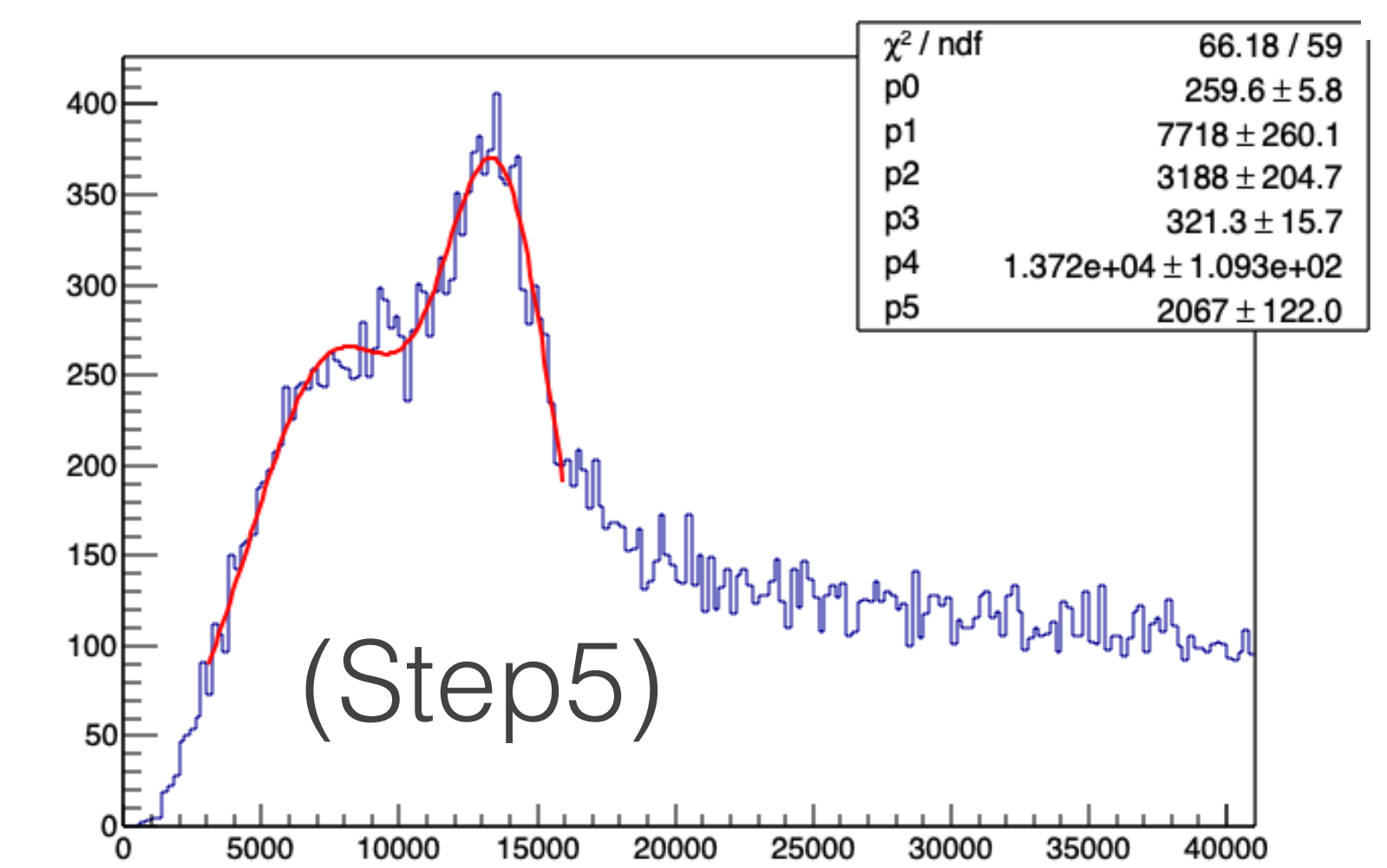
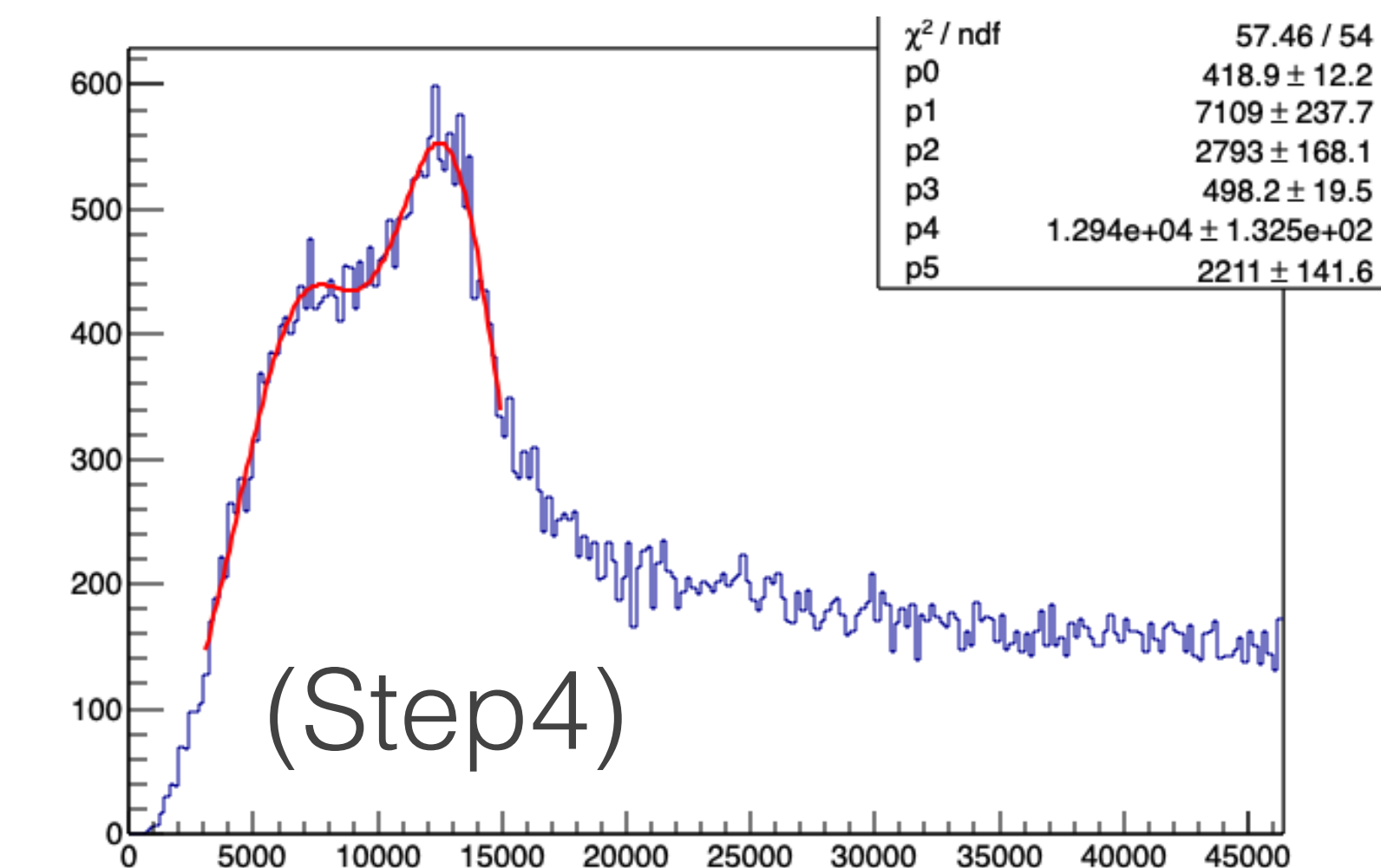
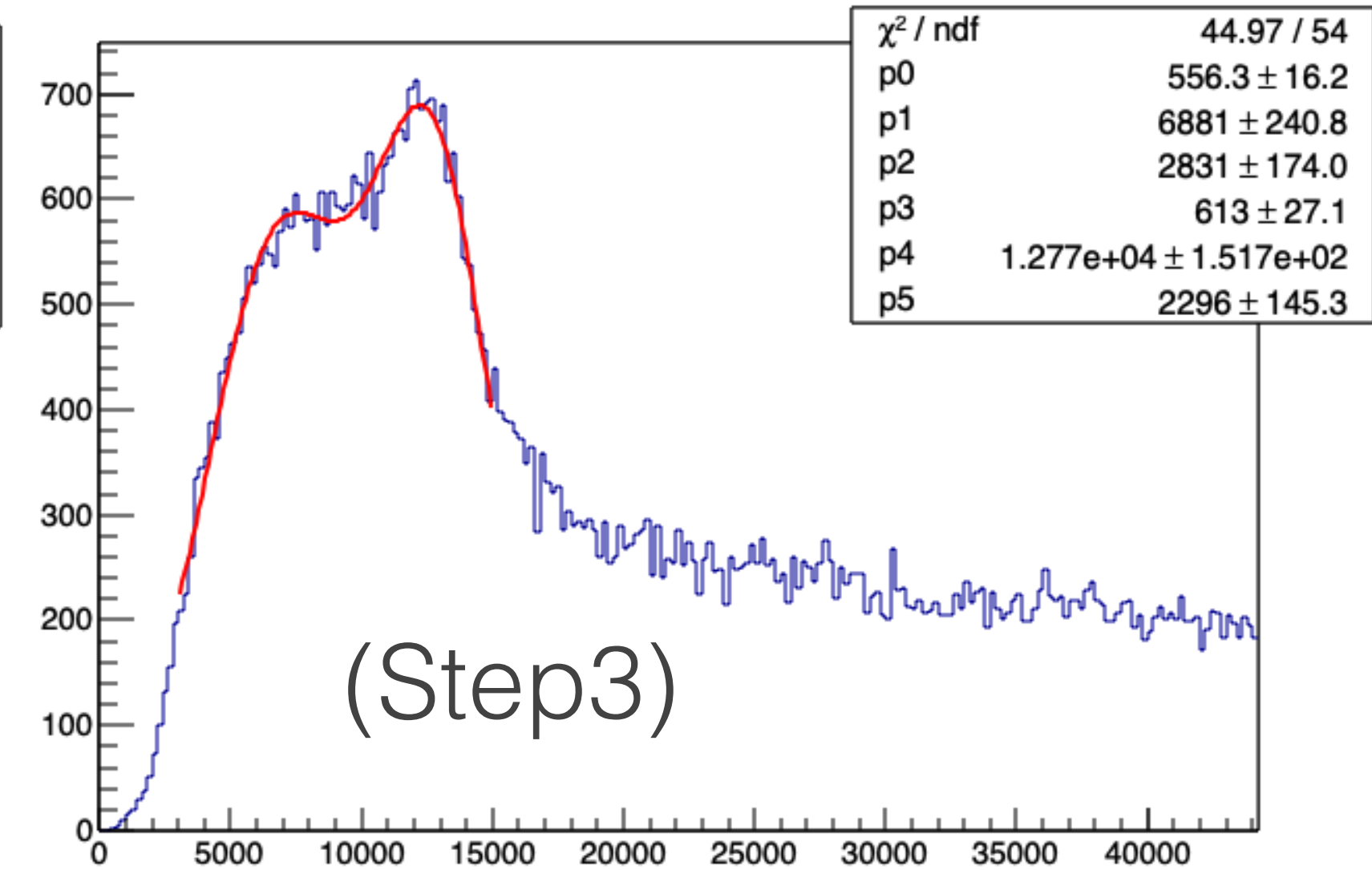
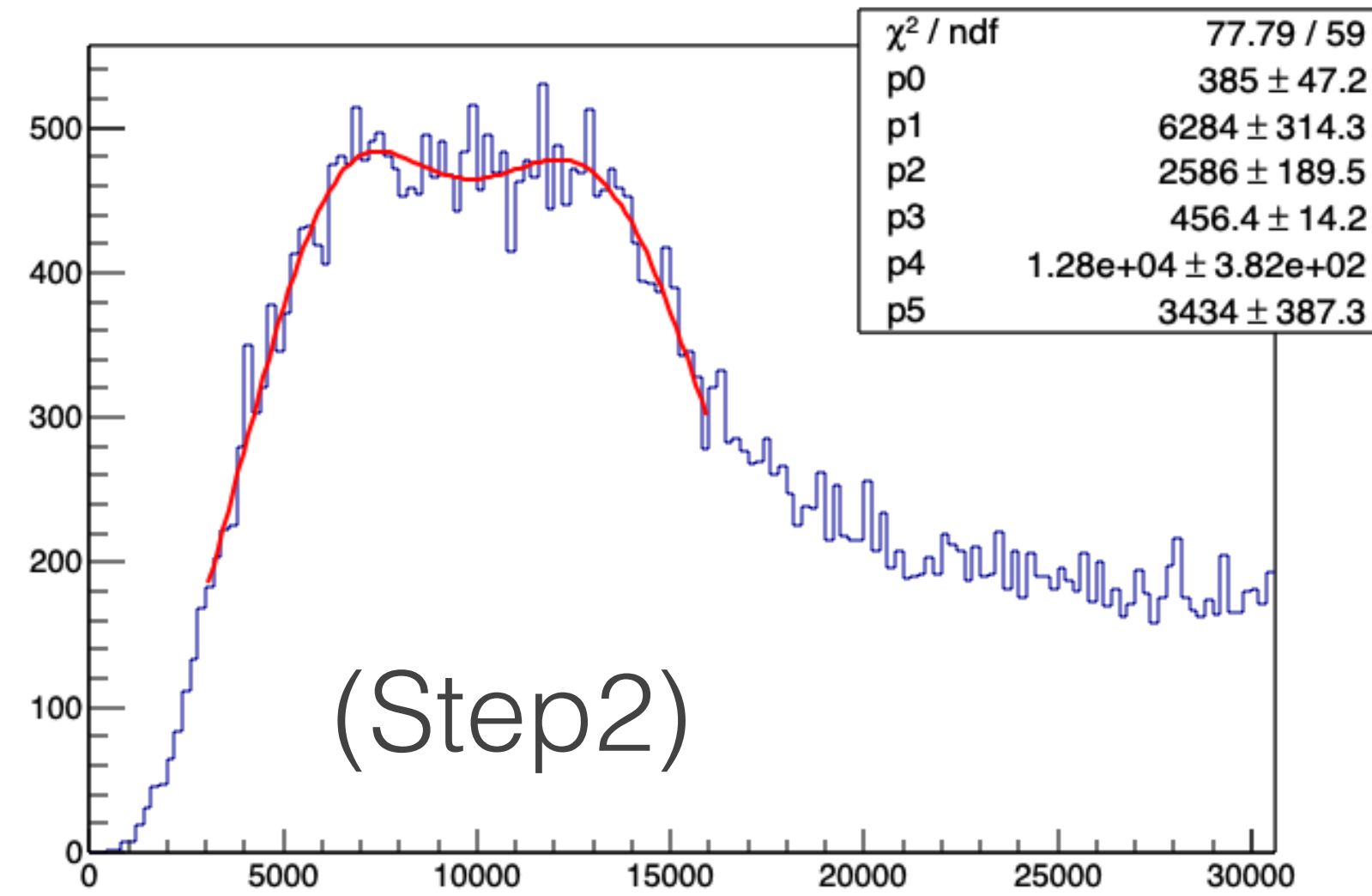
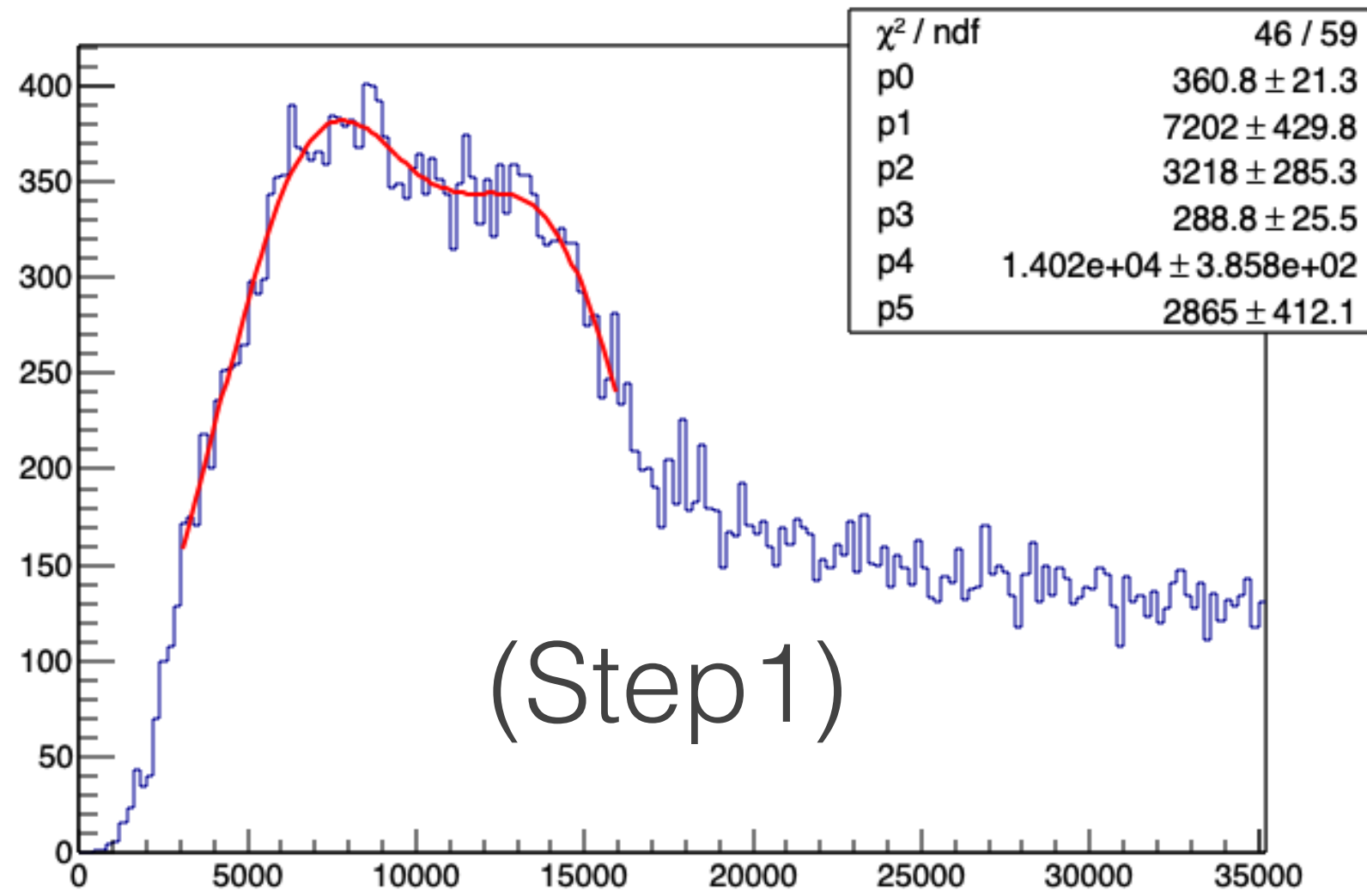
with “the map”



Need to use “the map”;

No peaks visible without “the map”

Fits on Europium



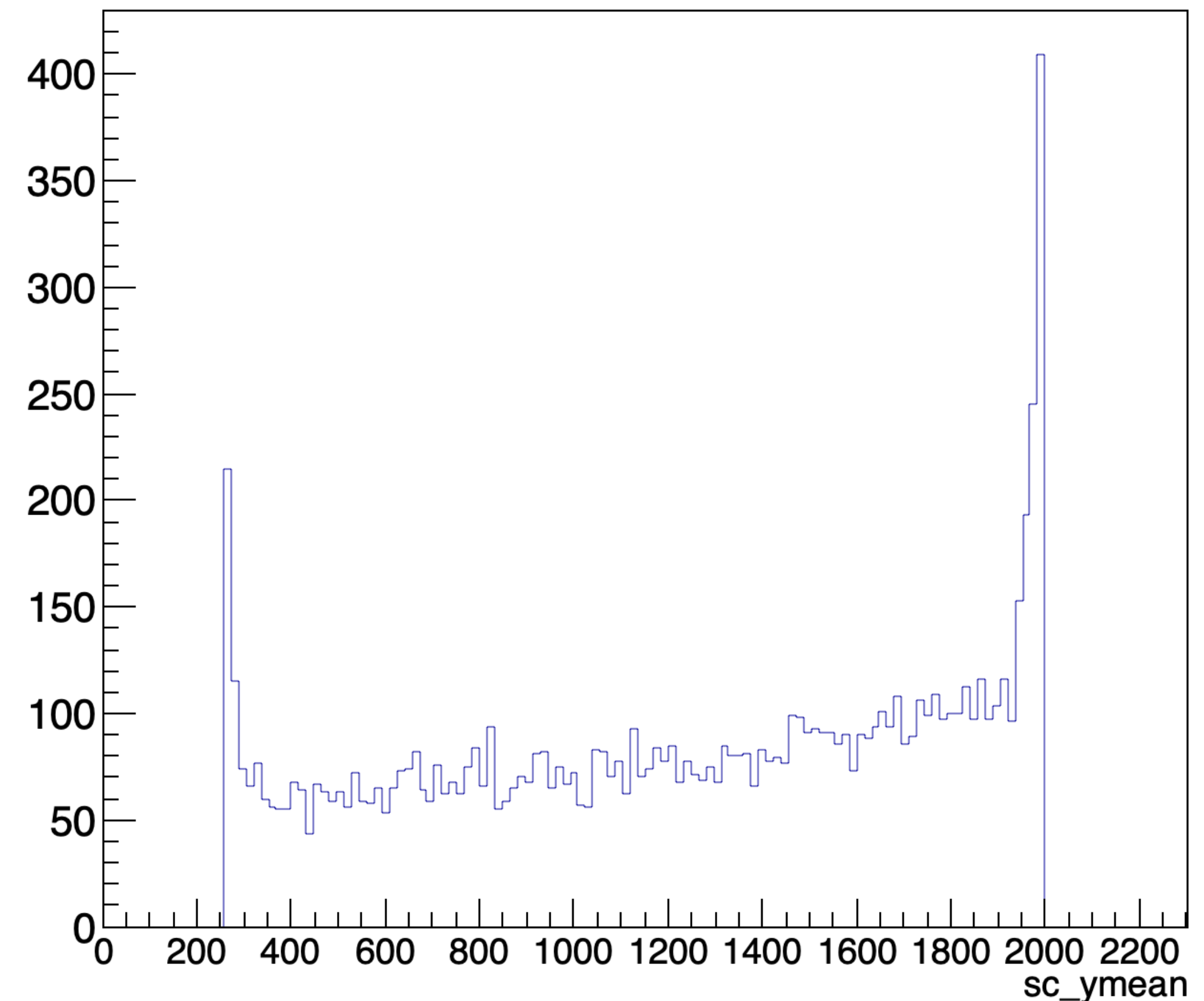
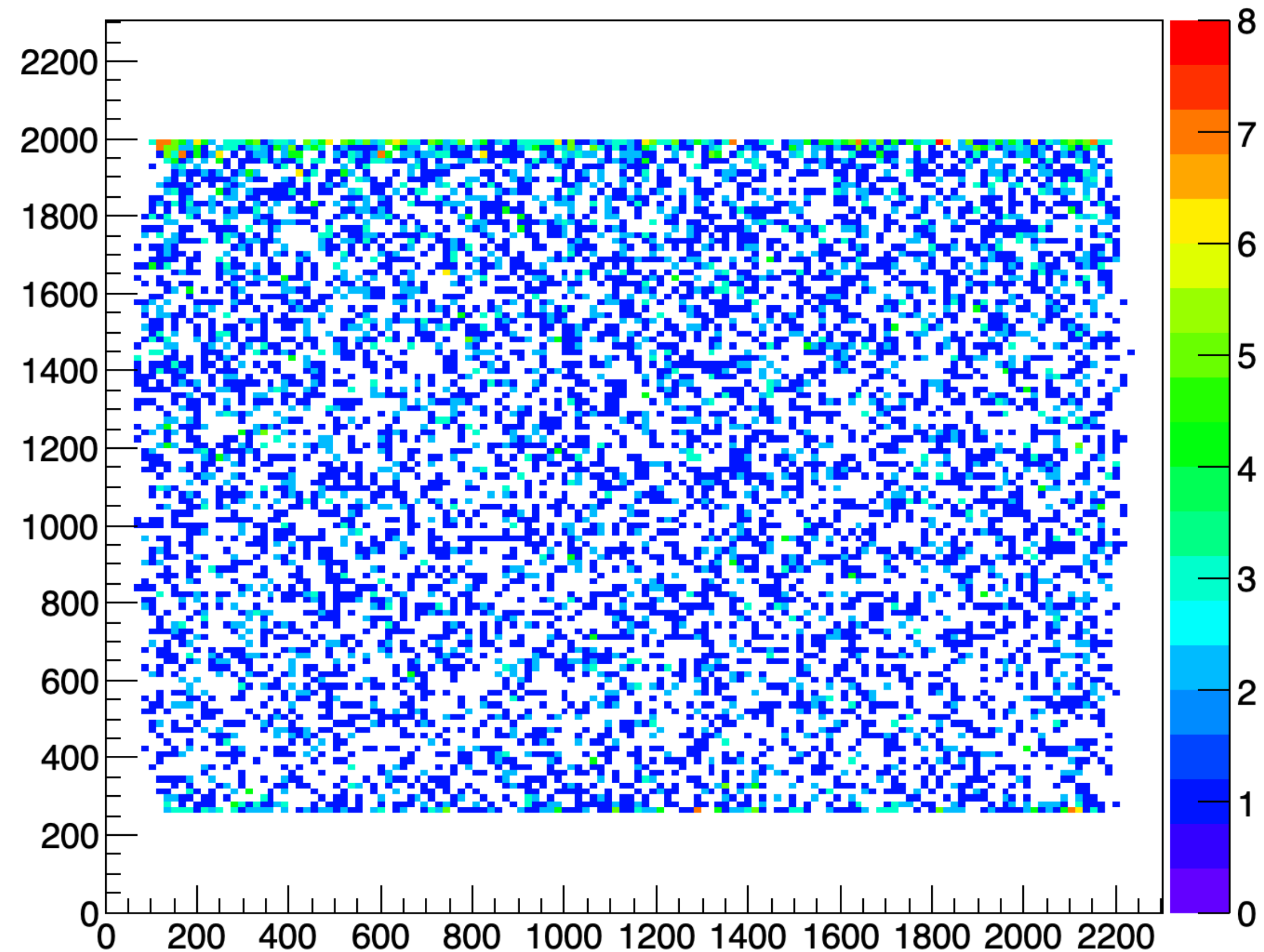
Step 3: 7.8 keV

Step 4: 7.2 keV

Step 5: 7.5 keV

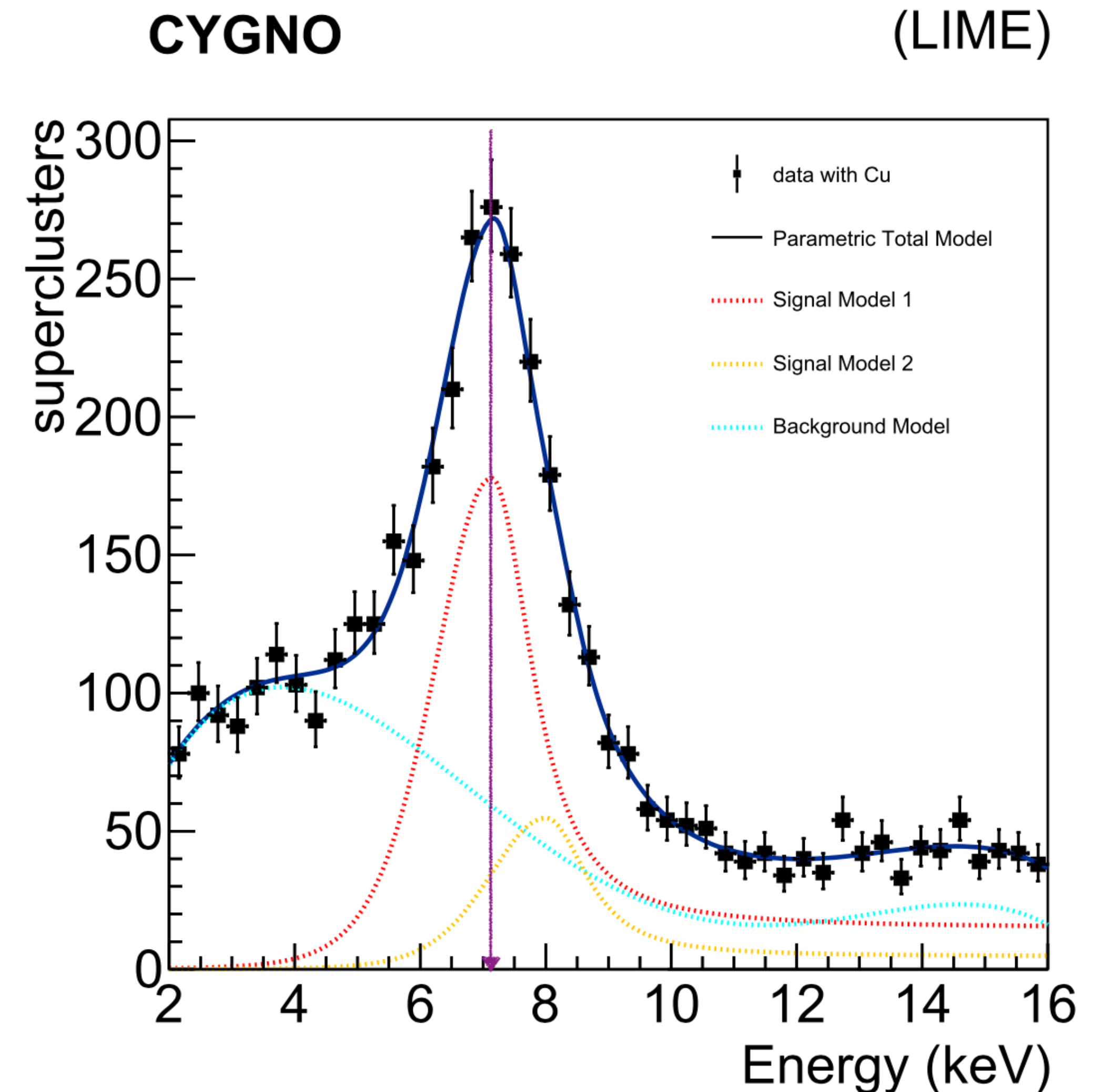
Maps

- Space distributions of events with corrected integral between 10k and 15k
- in all shown analyses, `sc_ymean` below 300 and above 1850 are anyway rejected



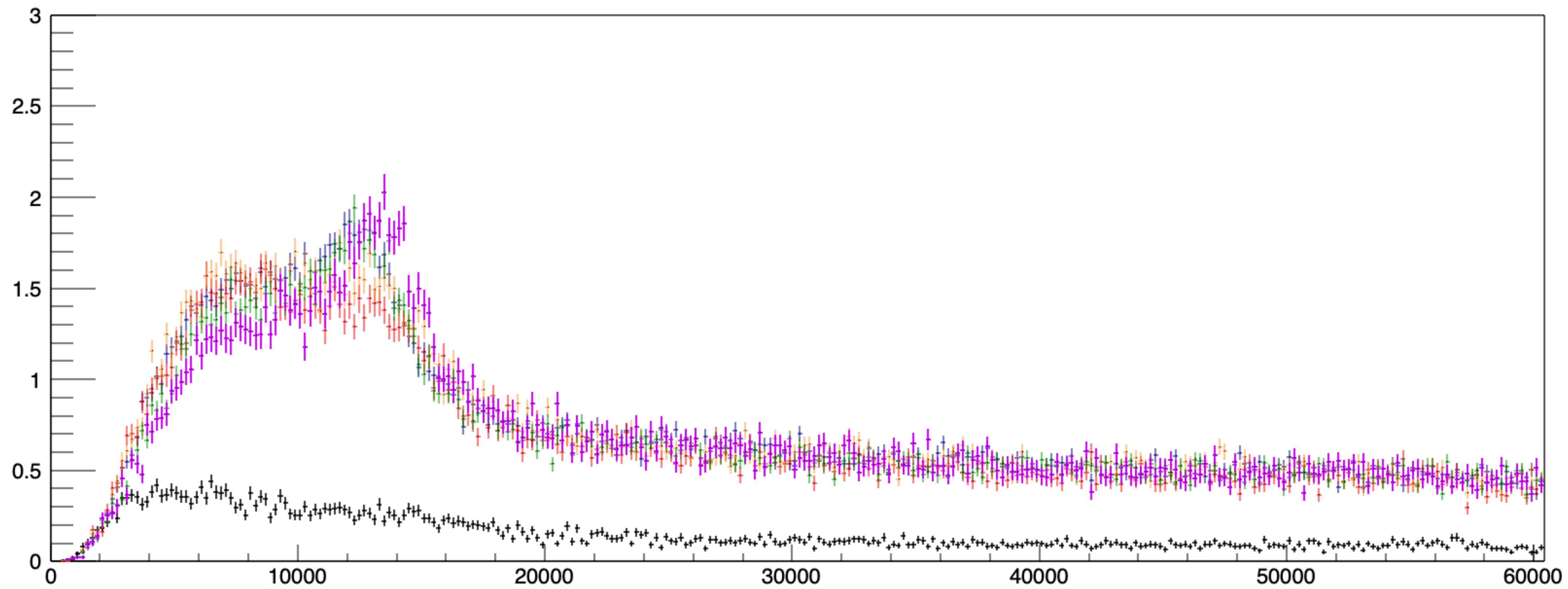
Conclusion

- For some reason, very likely the non-linearity (aka “saturation”) Copper peak is always below the expected energy;
- It was reconstructed around 7 keV also in LNF published data;
- This value seems compatible with the peak found in Eu data that can be due to the X-fluorescence induced on the copper rings;



Spares

Fits



Compton cross section

Fig. 5. Photon interaction probabilities within a 3 mm distance for CF_4 at 50 Torr, using data from Refs. [58,59]. Photoelectric data are shown in green, with the 5–15 keV photoelectron energy range highlighted by the thicker green line. Compton interaction probabilities are shown in blue, with the 5–15 keV Compton electron region of interest shown by the thicker blue line; the latter was obtained by integrating the Klein–Nishina cross section formula between the appropriate angles.

