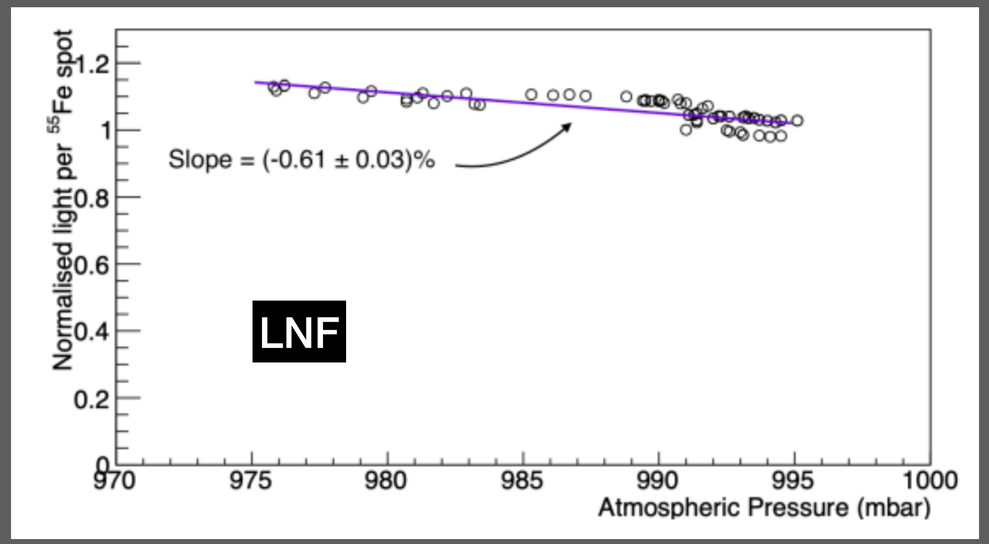
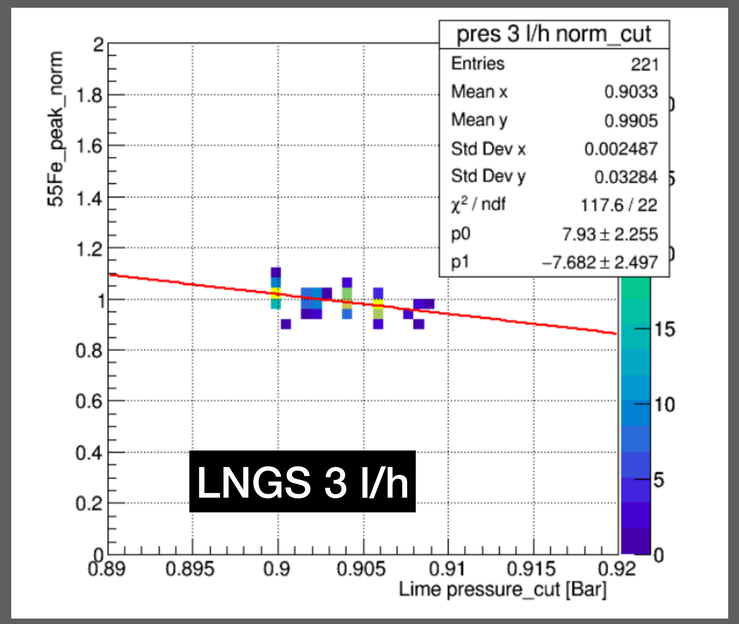
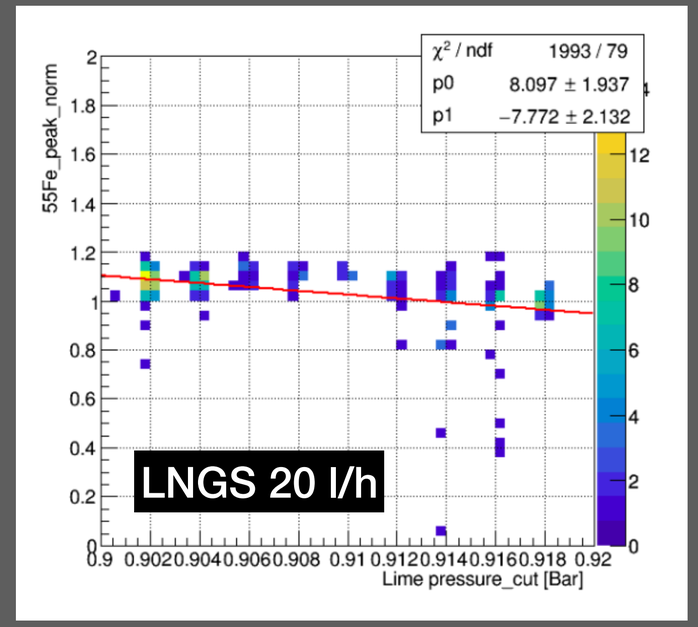
Summary of Coimbra meeting

Lime - T & P



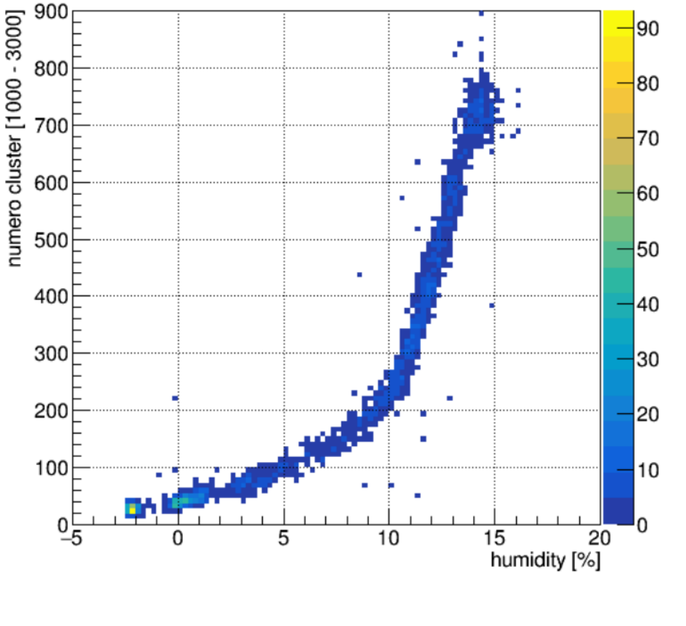


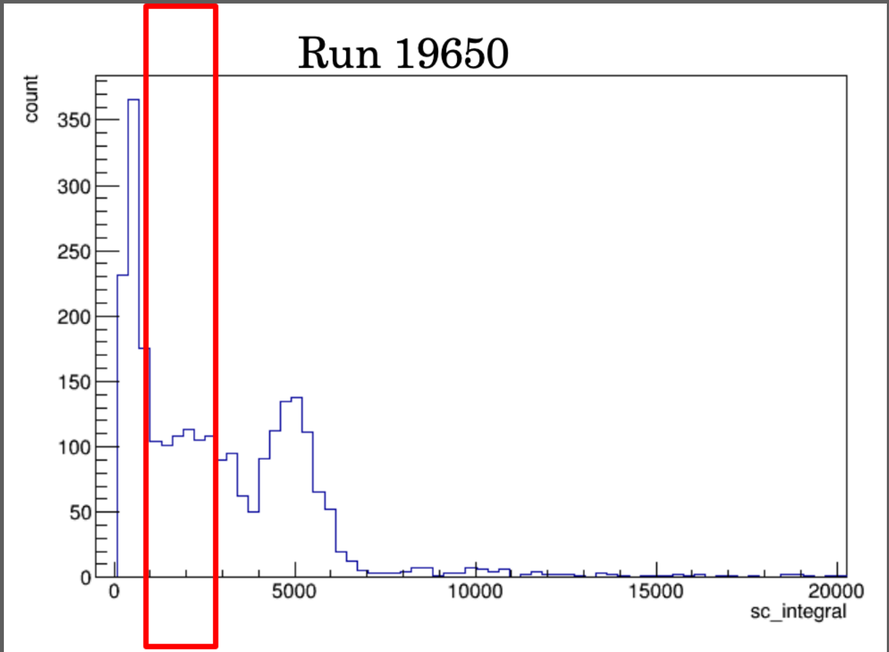


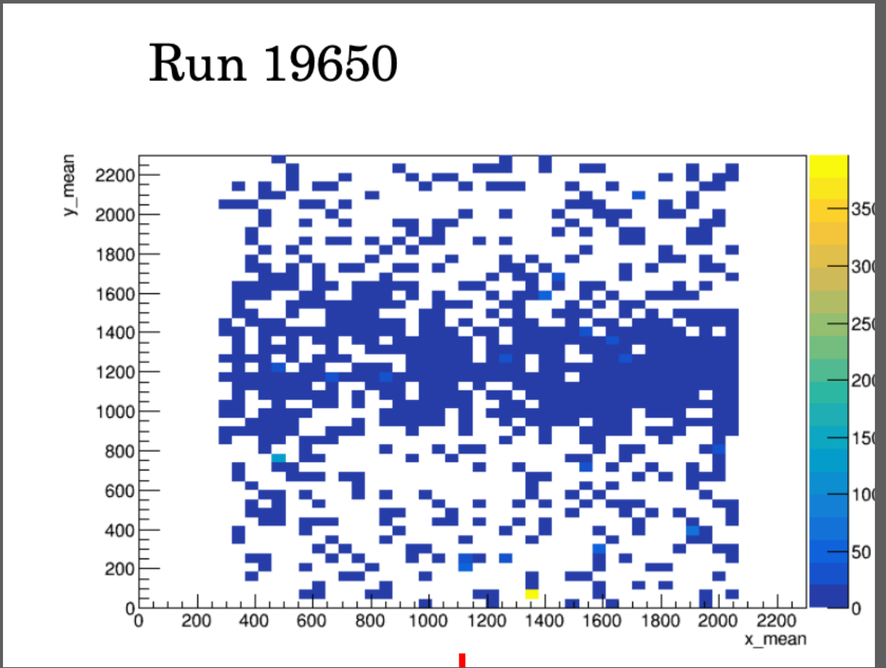
We can conclude that a correction for P of 0.7% per mbar is a good starting point

How to proceed?

Lime - Hot Spots

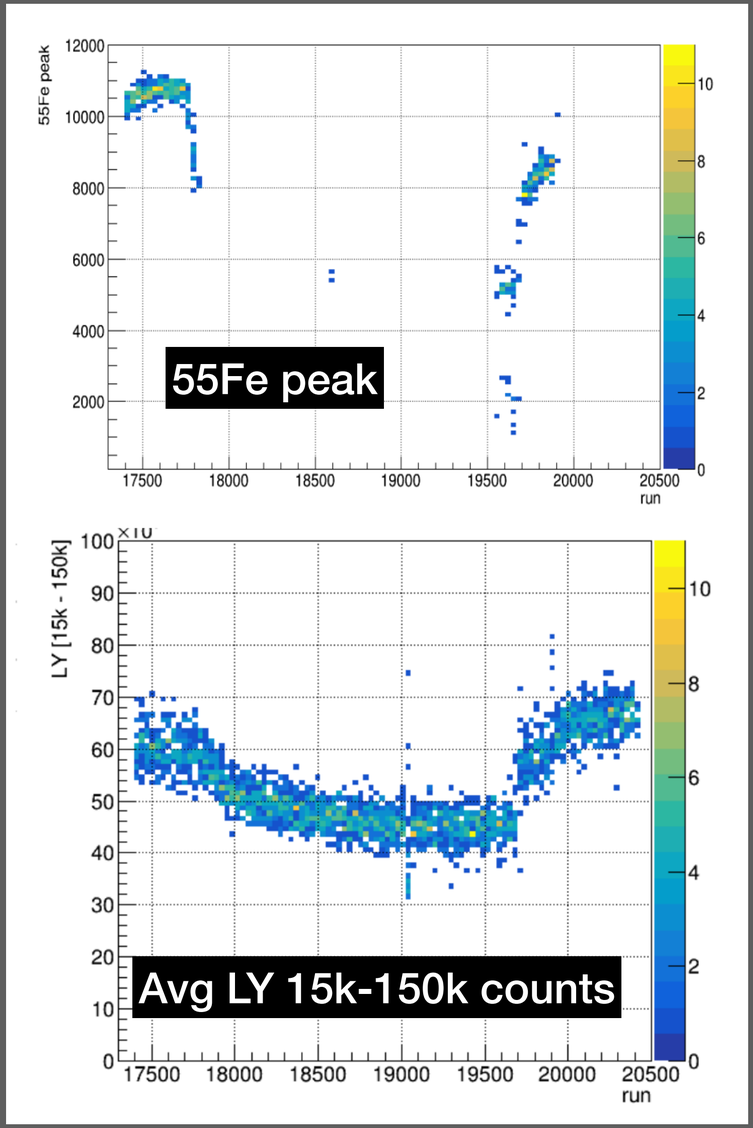






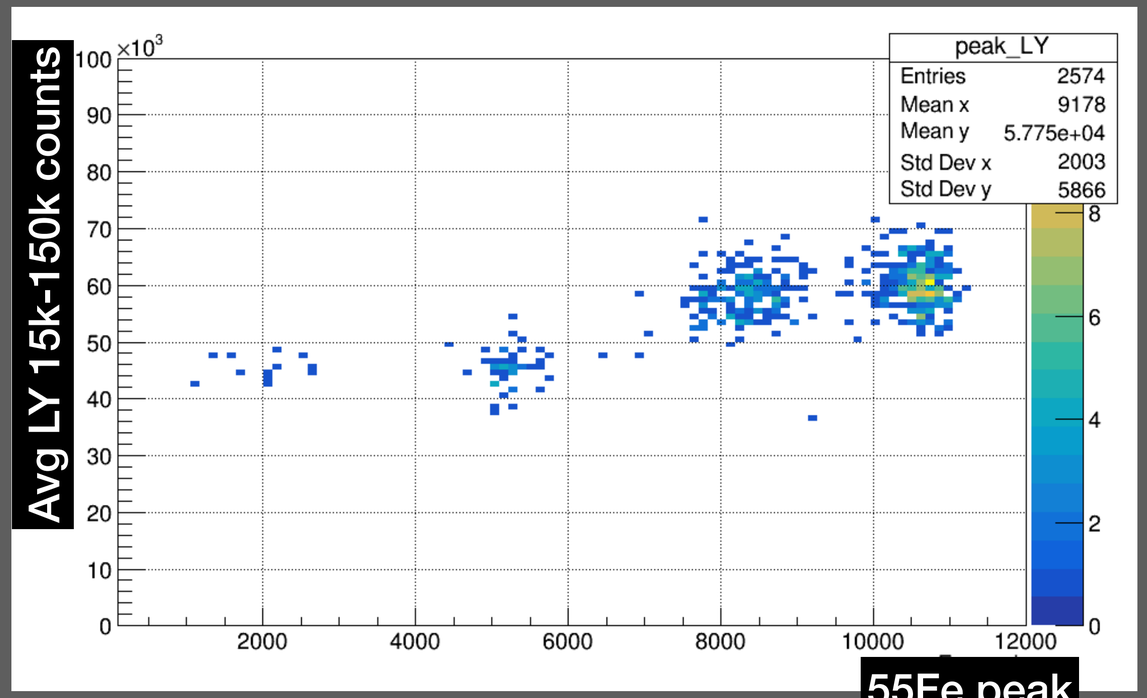
We collected a rich sample of hot spots. It represent an opportunity to characterise them (images and PMT) for future rejections

Lime - Daily Calib



The behavior of the average light yield above 10 keV and the 6 keV position seems quite correlate;

This could allow a “run per run” response calibration

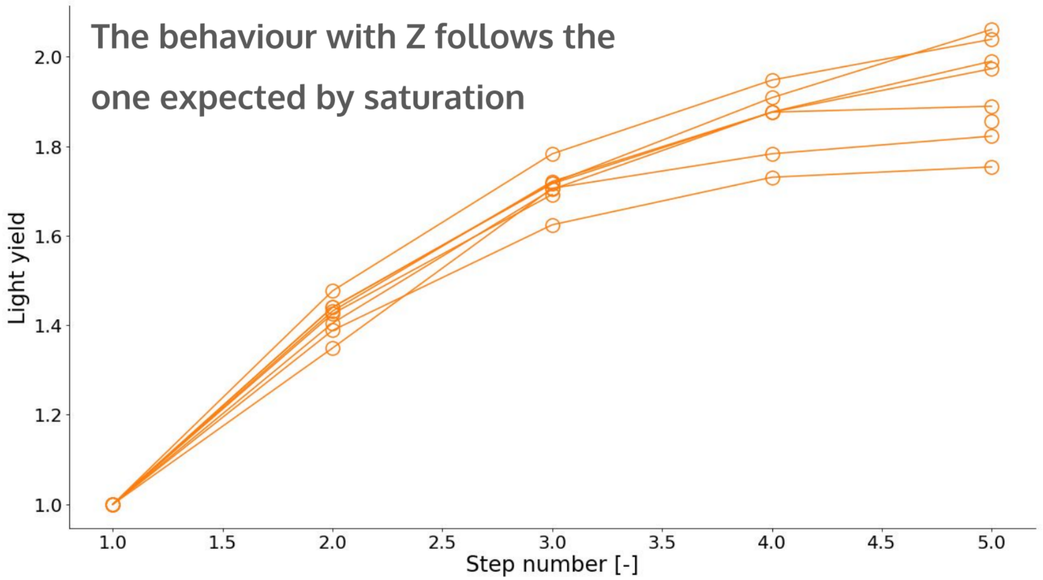


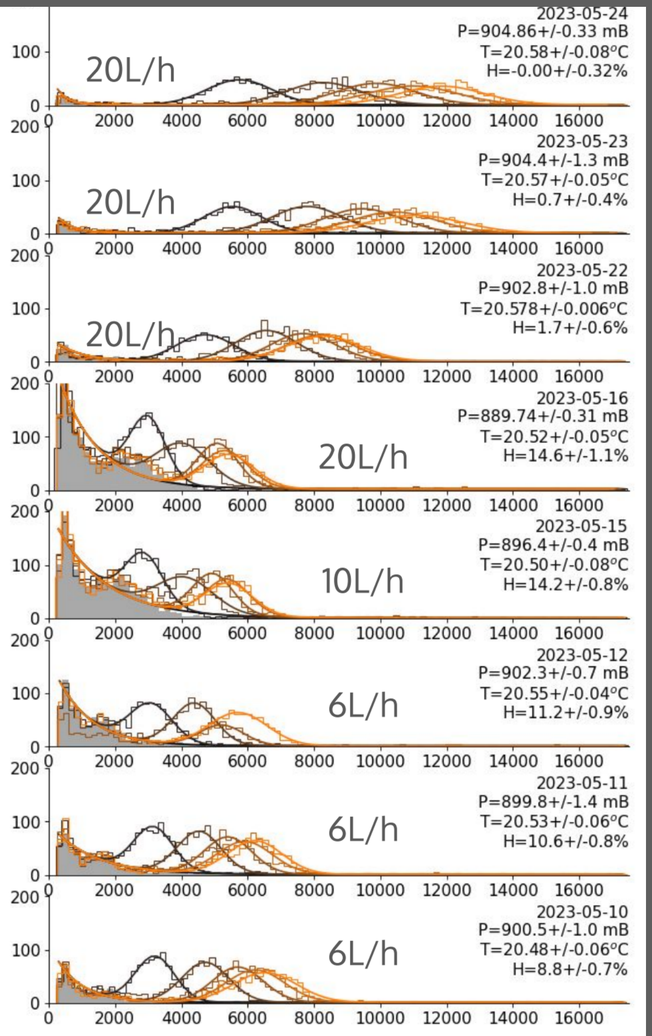
Lime - Daily Calib

Light yield spectra

The background (parking runs) was fitted to an exponential function.

The light yield spectra were then fitted to a gaussian summed to the background exponential profile.

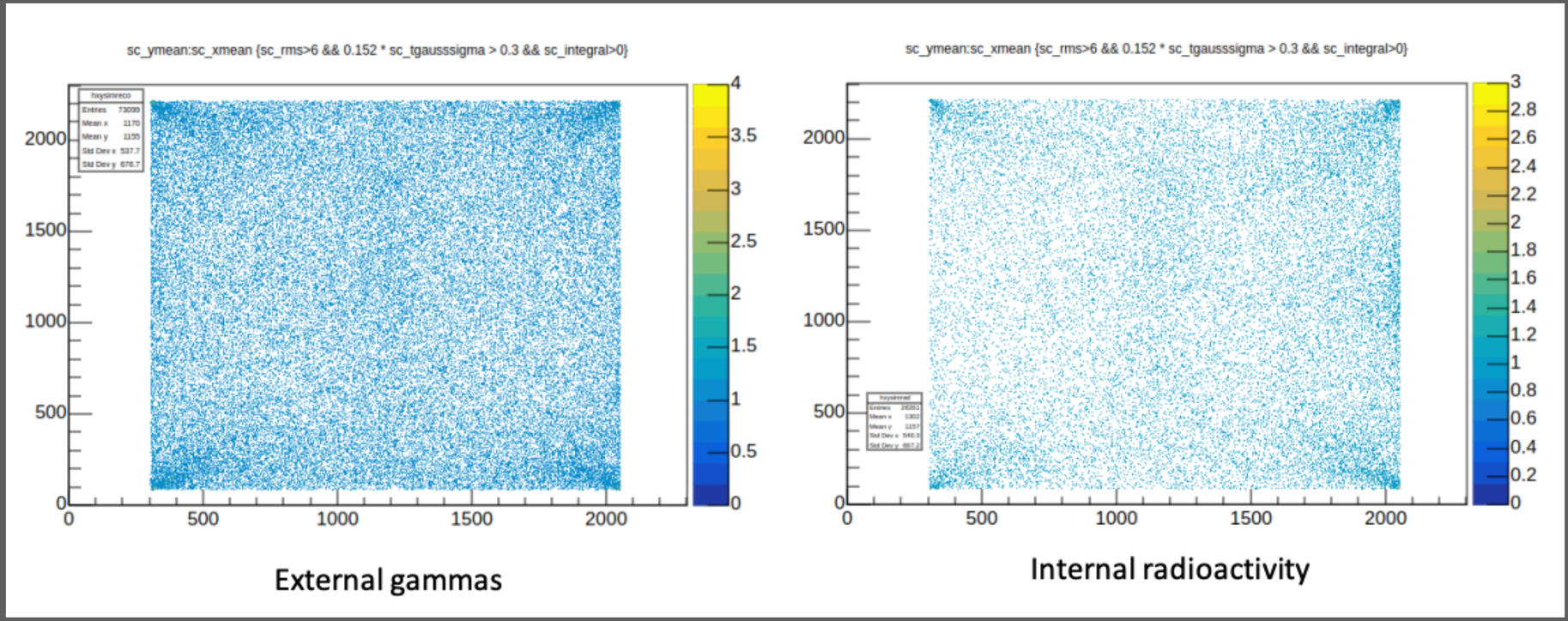




Not simple in Run3 to disentangle P and H effects

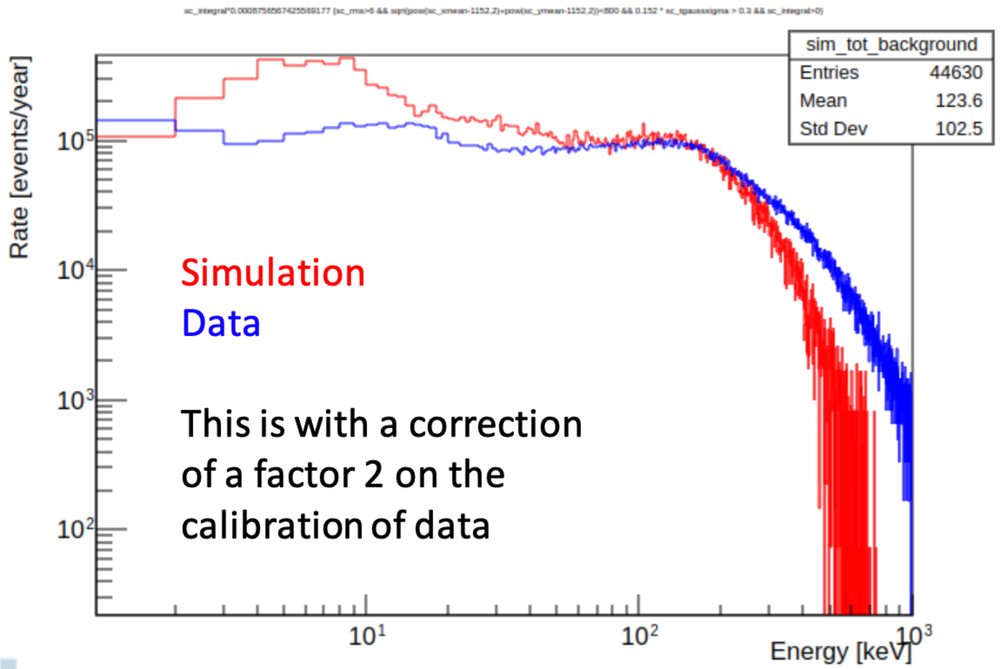
Lime - MC

Why the angles?



Lime - MC

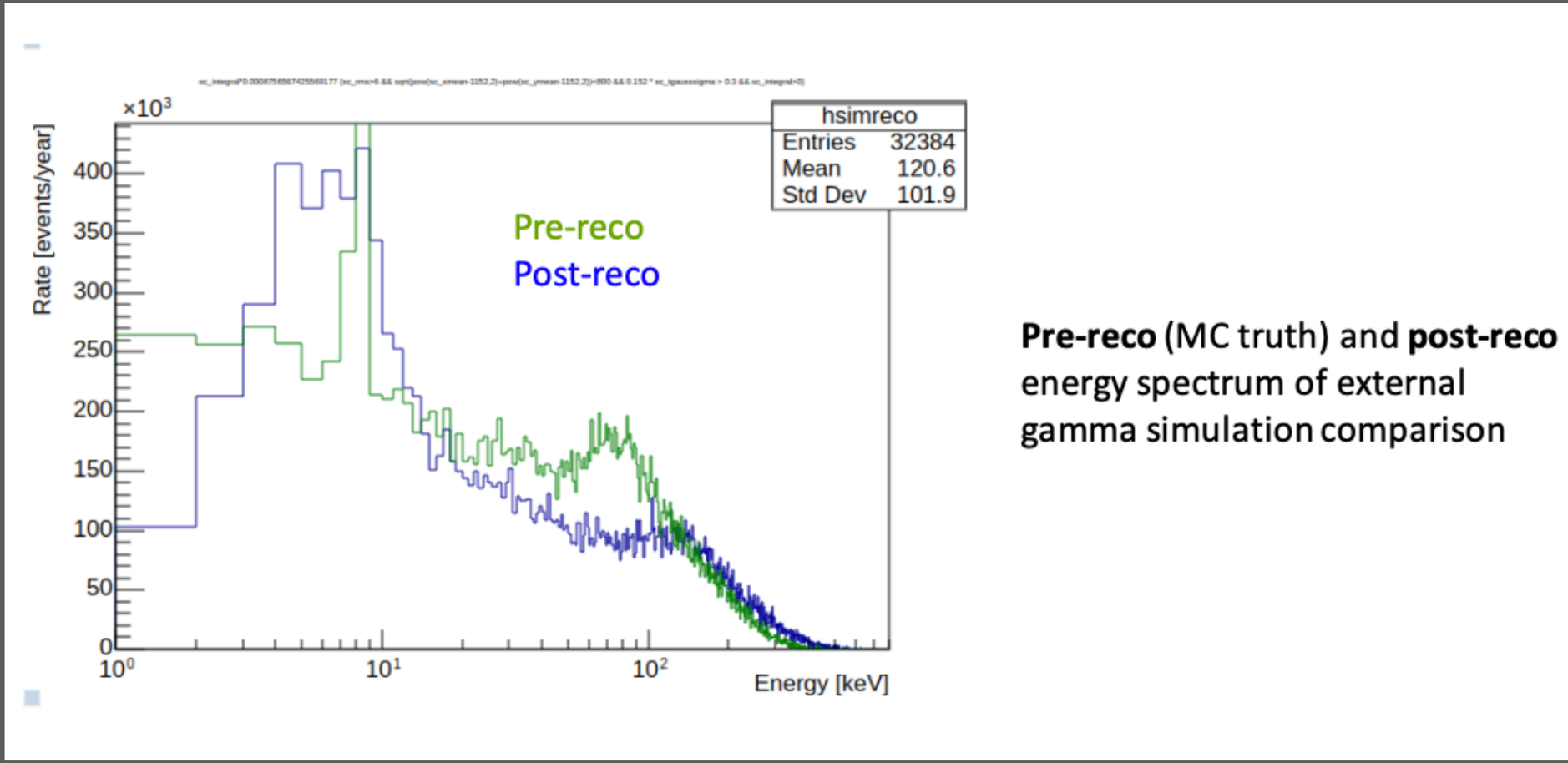
Apply right rate using dead time evaluation from Stefano



Integral rates

- **Data**: 2.95x10^7 events/yr (0.93 Hz)
- External gammas simulation: 2.70x10^7 events/yr (0.86 Hz)
- Radioactivity simulation: 2.04x10^6 events/yr (0.065 Hz)
- **Total rate from simulation**: 2.90x10^7 events/yr (0.92 Hz)

Lime - MC



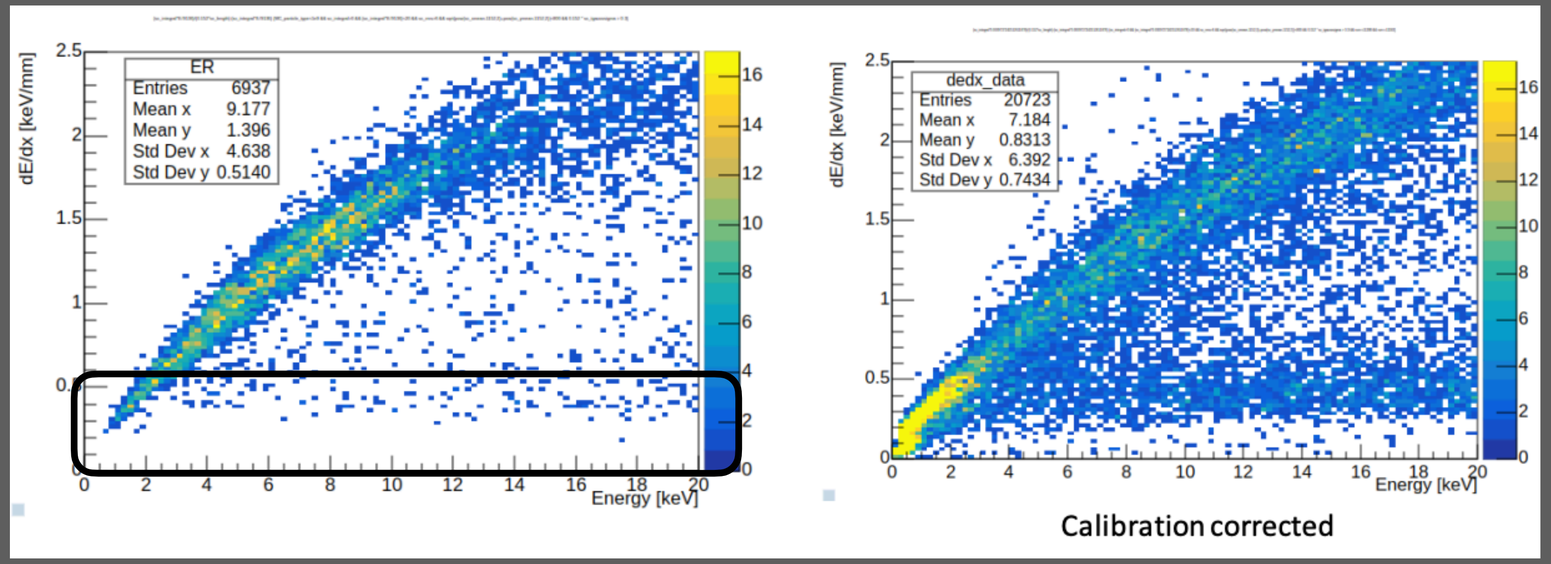
Pre-reco (MC truth) and **post-reco** energy spectrum of external gamma simulation comparison

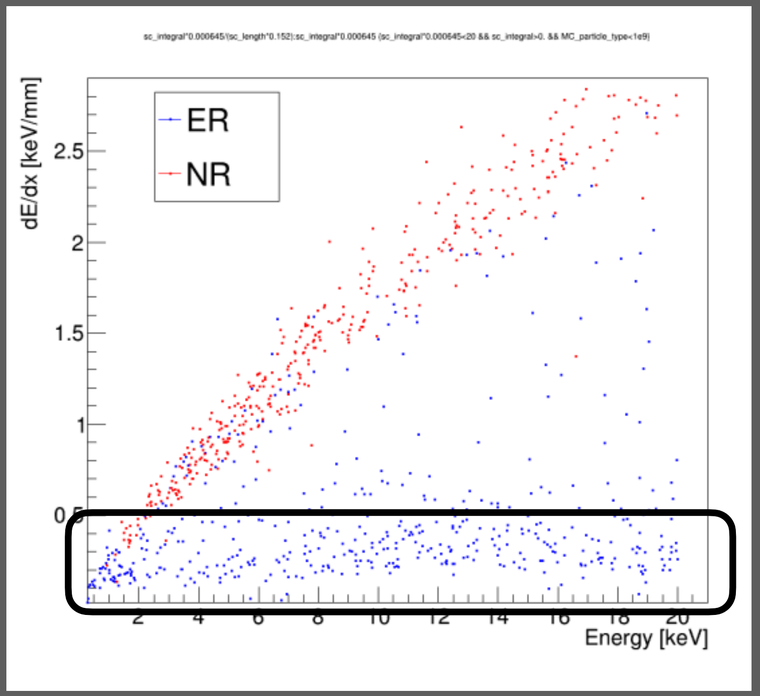
We should probably study the correlation between pre-reco and post-reco to look at the effects of digitization and reconstruction

Lime - MC

Why mip band is missing in LIME simulation (but is present in AmBe one)?

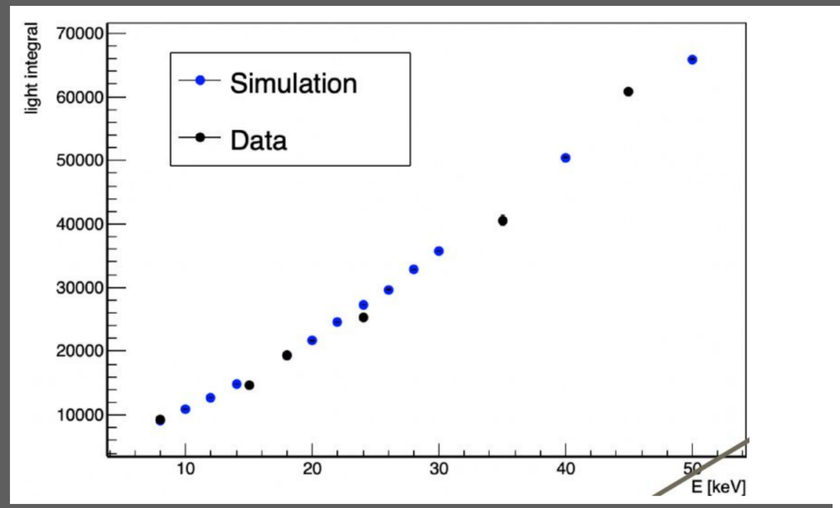
Can we look at plots with same statistics?



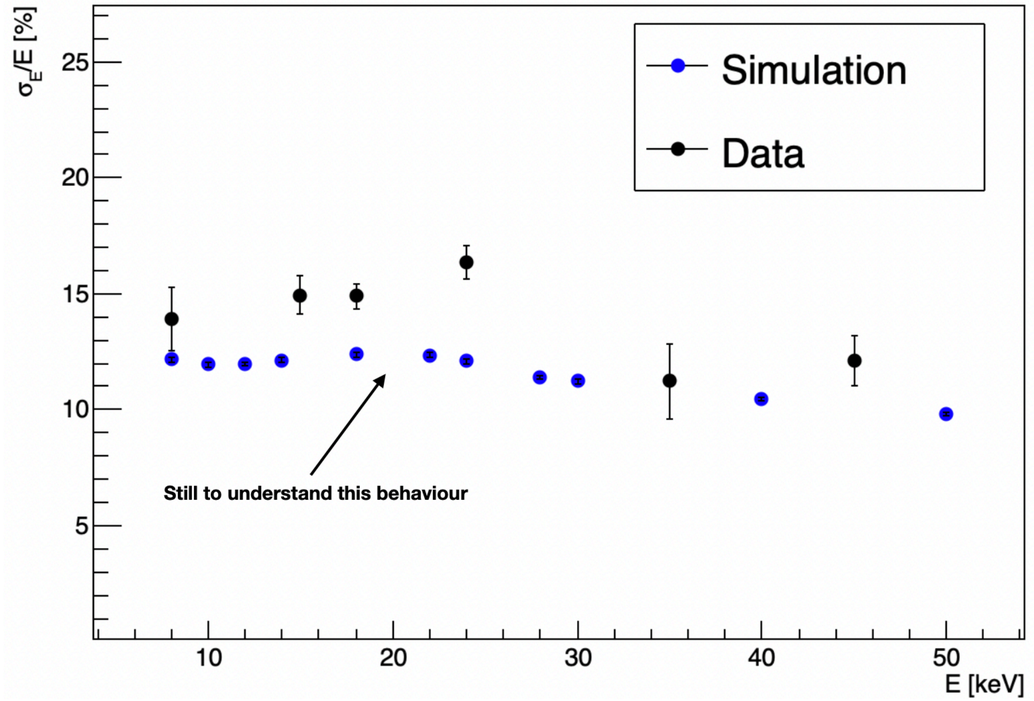


ER - MC

While linearity is well reproduced by MC, energy resolution is not perfect:



- Only k_α energy resolution shown in the plot for data (same sigma for both peaks)
- Gaussian energy distribution for data



It is probably necessary to:

- add xy fluctuations;
- use regression on MC - data;

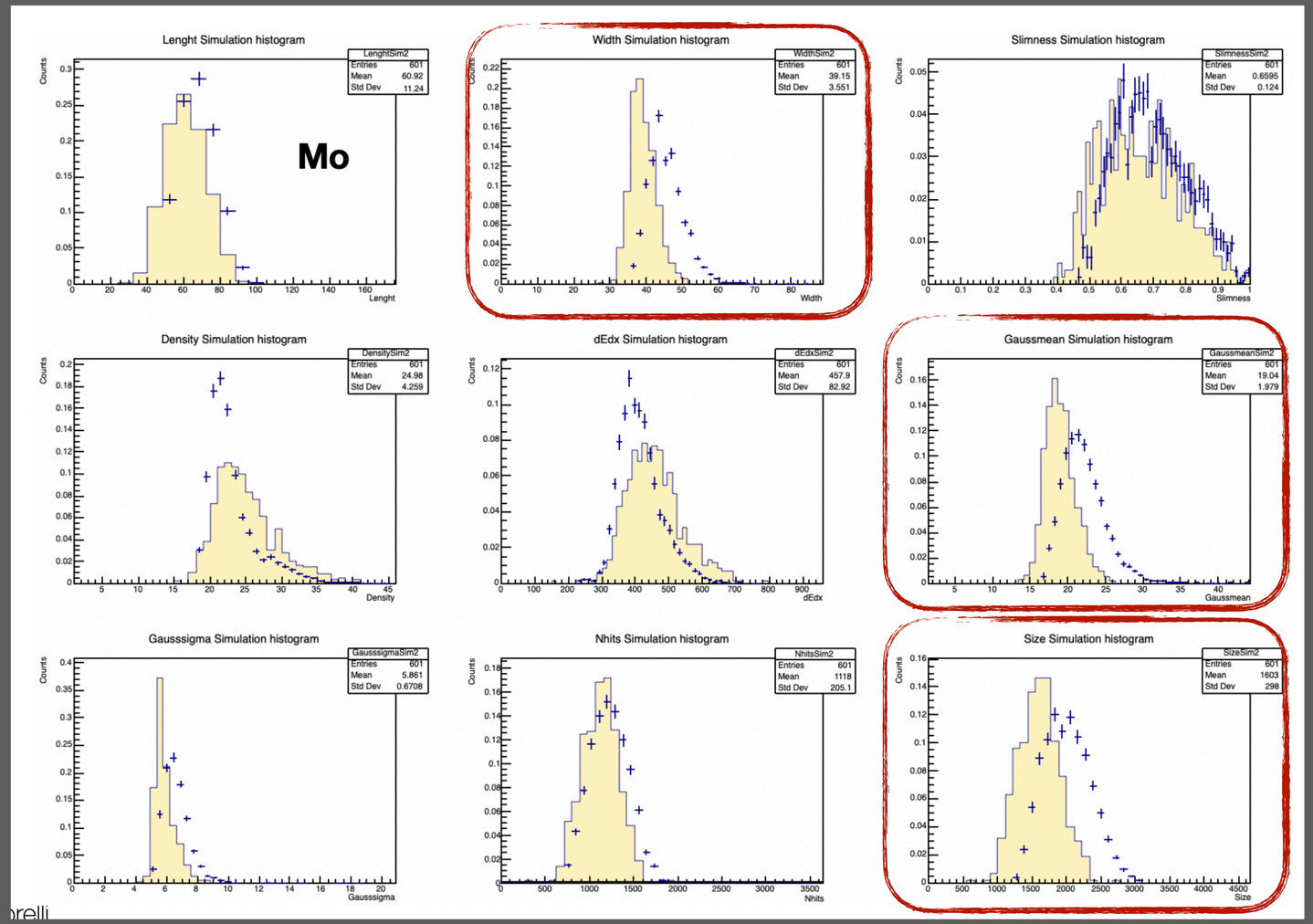
In general it would be useful to simulate 1-10 keV in steps of 1 keV;

ER - MC

Some of shape variables seem to indicate an under-estimation of spot size.

How do this behaves as a function of energy?

Can we tune parameters to recover the difference?



PMT

Calibration measurements

Alpha angle: quantify to what extent PMT reco is sensible to alpha in range 3-5

1. Measure @ LNF (to do):
   a. Study effect of angle (done) and distance separately
   b. Study effect of source spectrum, UV vs visible
   c. Study effect of material: plexiglass, gas, and interfaces between them
2. Use data golden sample (ongoing)
3. Calibrate PMT response with Xray sources @ LNF:
   a. Energy response: linearity and resolution
   b. Can we produce incline tracks? Shoot Xrays perpendicular to the GEM plane? Energetic Xray and a collimator?
4. Use high energy electrons, is it possible to redo this testbeam?
5. Use the neutron run foreseen soon at the BTF

on-going

There was also the idea of measuring PMT readout time for DAQ

Very pleasant and fruitful meeting
Thank you Coimbra!