Supercluster containment and data / simulation resolution

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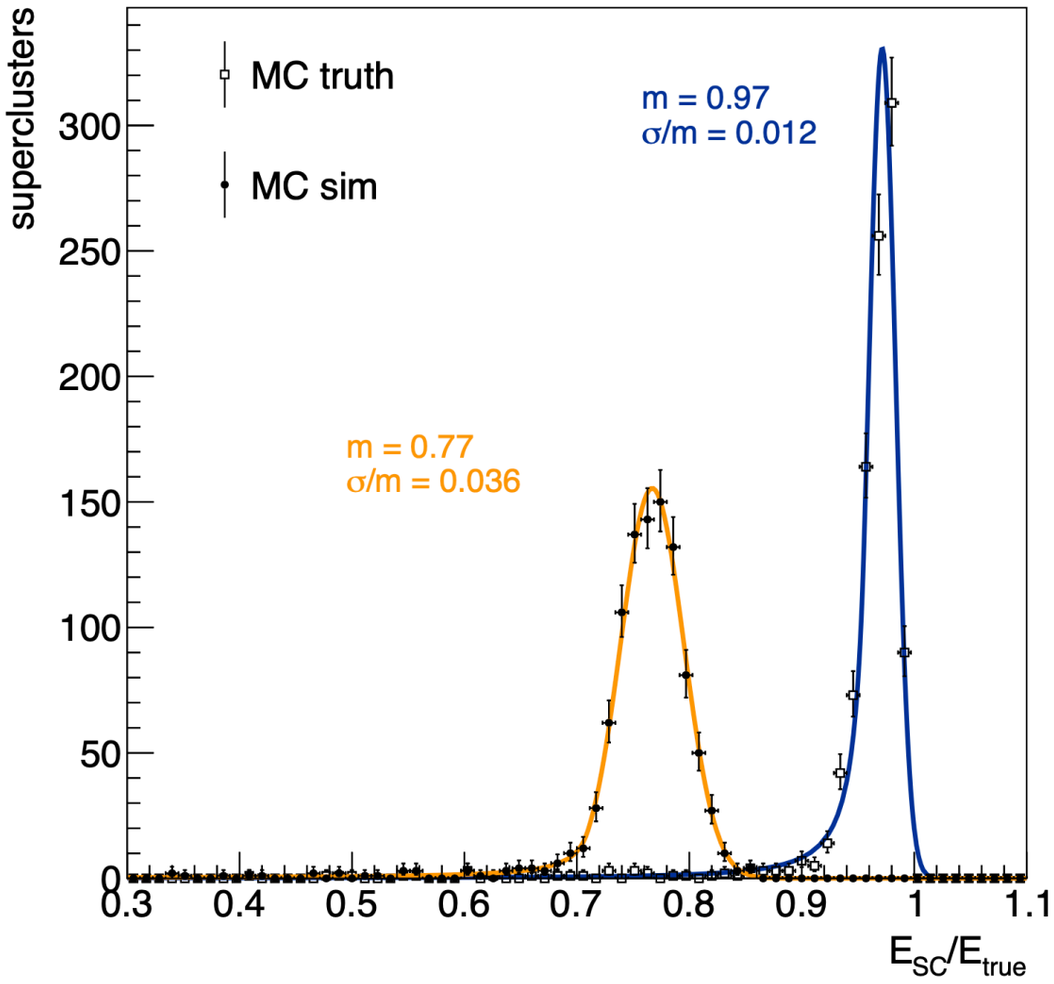
Energy containment and resolution

- In the paper on nuclear recoils identification with neutrons we describe the basic- and super-cluster reconstruction
- would be useful to show the energy containment on simulation: mean of E/E_{true} distribution
  - taken from Giulia / Fabrizio a sim of E=6 keV NRs either “pure MC” or with simulation of electronics noise + diffusion



Considerations:

1. w/o noise, containment better than 5%
2. with noise, it decreases to ~80%. Not a problem, since 55Fe calibrates the absolute energy
   1. it could be tuned on simulation
3. *resolution with noise+diffusion (4%) is still much better than in data (~15% on Fe)*
   1. indicates that some more realistic model is needed in sim. 2.1 can be done once we have a better modeling

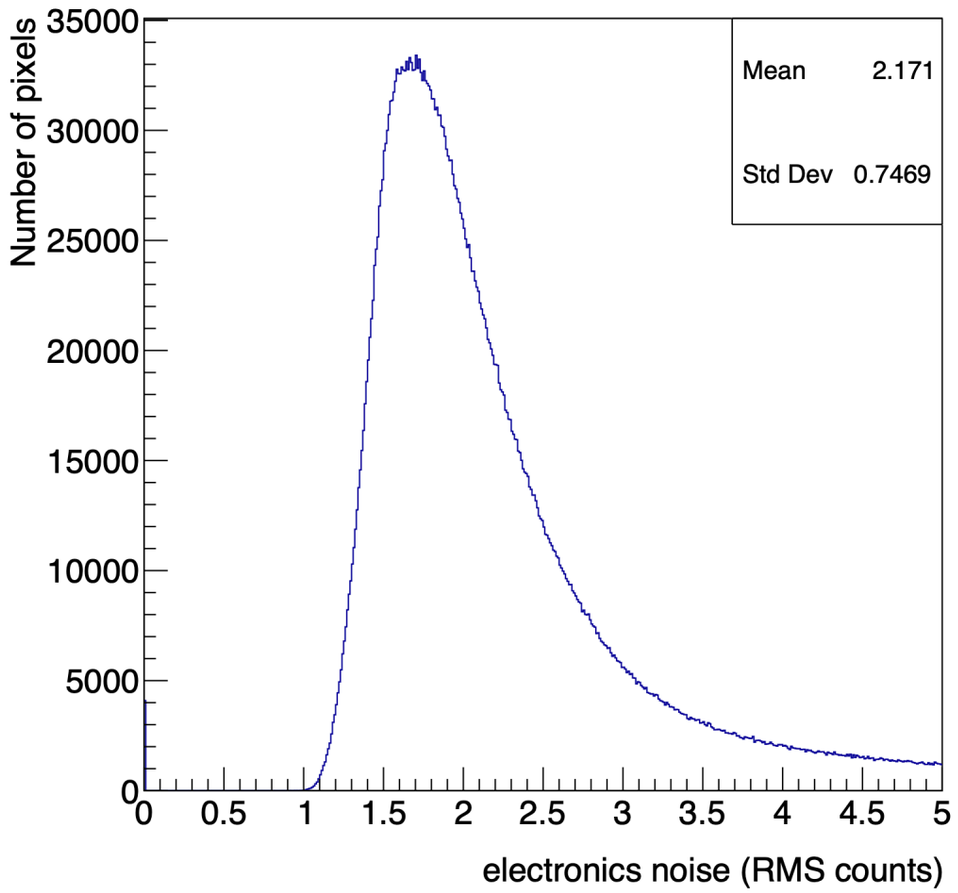
inputs to improve

- Two items that can impact resolution

1. Noise modeling. Currently a simple Gaussian is used, with σ = 2 photons
    1. the value is OK, but data has a distribution with non Gaussian tails with much larger tail. This should be easy to address: just sample the measured distribution in data to assign the pixel noise

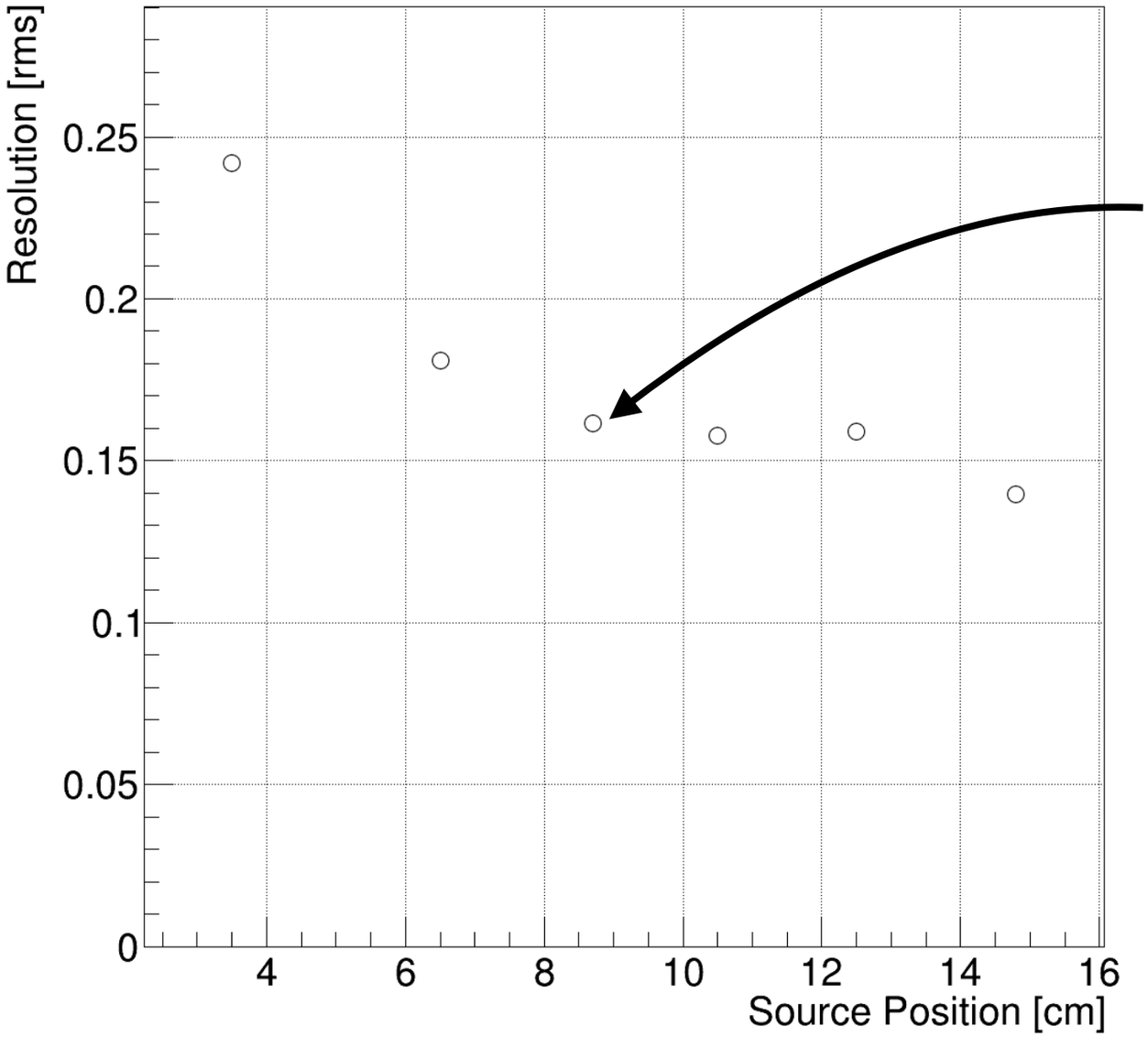
2. Diffusion modeling. The measured diffusion seems larger than the one predicted.
    1. also here, one should try to use the measured one, instead of the simple sqrt(z) model?

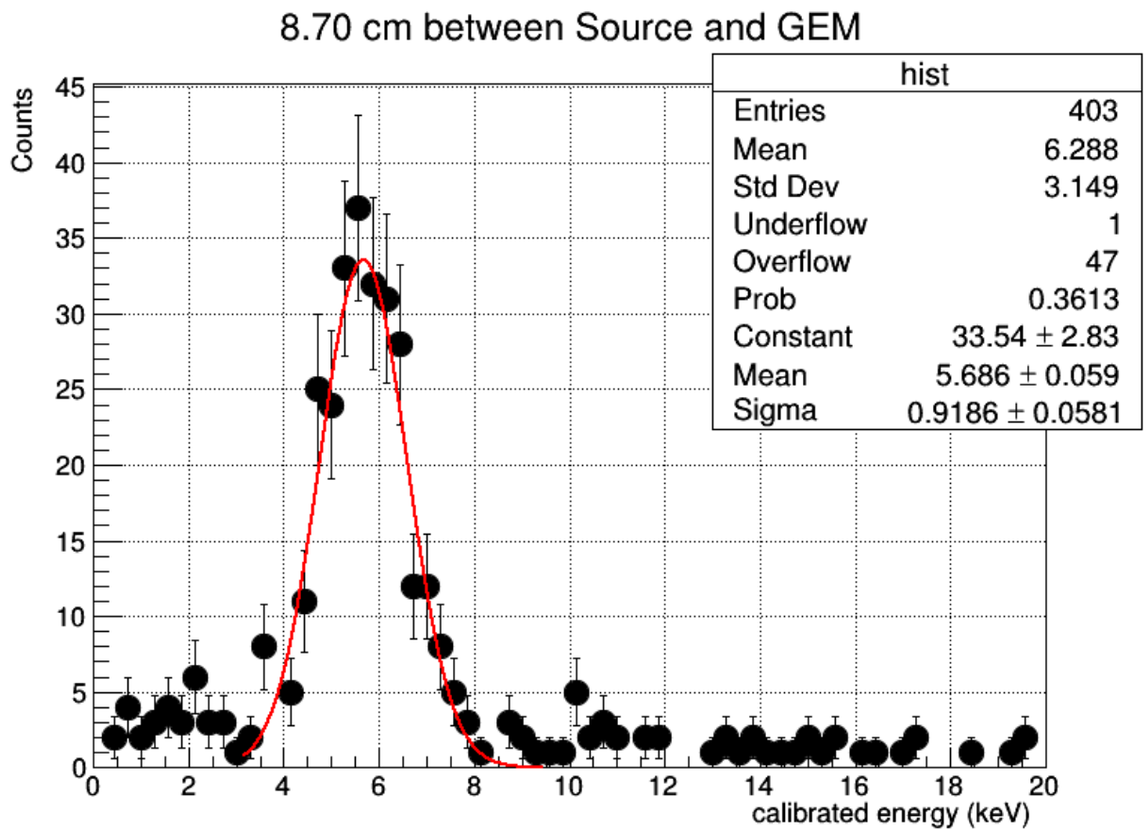
3. Other?
    1. Fe data is a good dataset to validate this, since the clustering is trivial



Resolution measured in data

- With Fe source, 60/40 $HeCF_4$ mixture, different z. Converges to 15%





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