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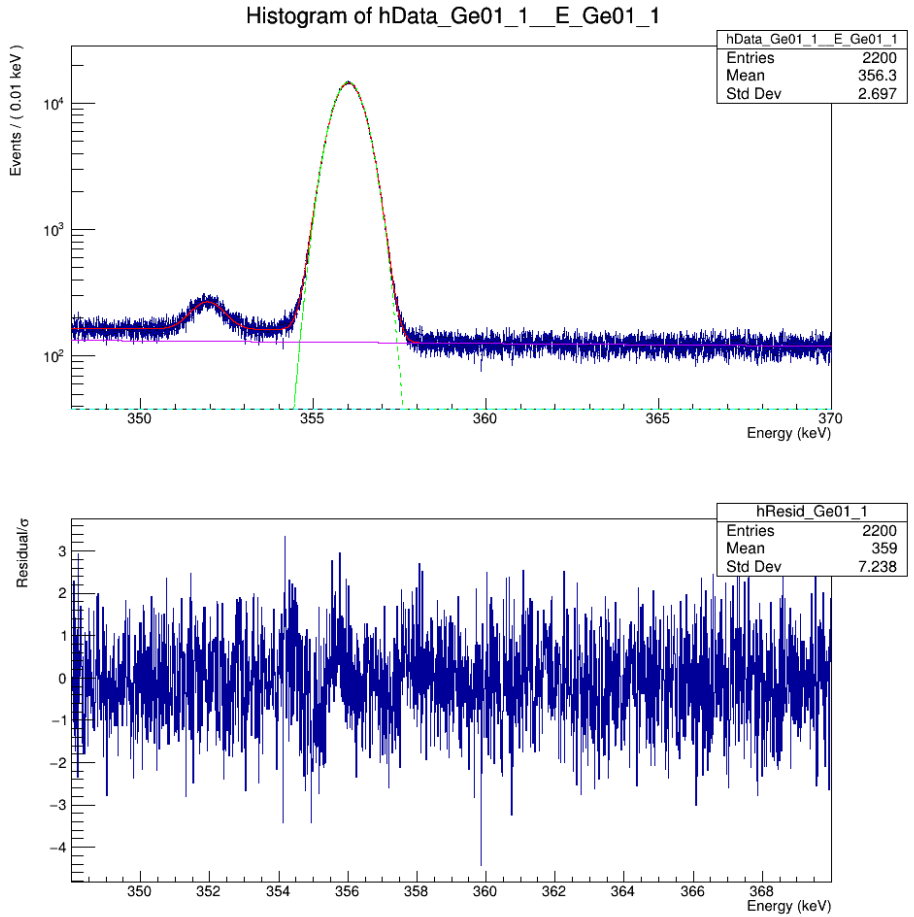
Update muX meeting 22/03

Michael Heines

Updates to fitting code

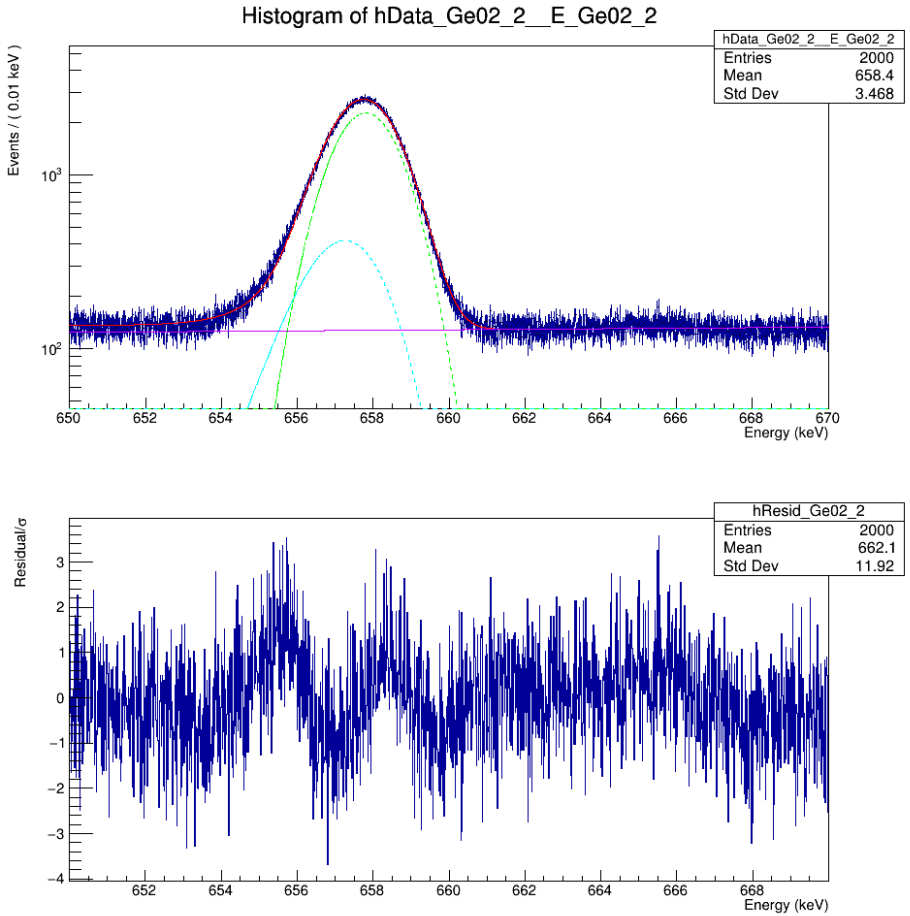
- Peak doublets with identical line shape and fixed $\delta\mu$

- Gaussian line shape showed large multicollinearity between linear and square root
  - ➢Fix to preliminary fit (later slides)
  - ➢No longer sends tail to maximum
  - ➢Quite minor change to residuals compared to single peak fits



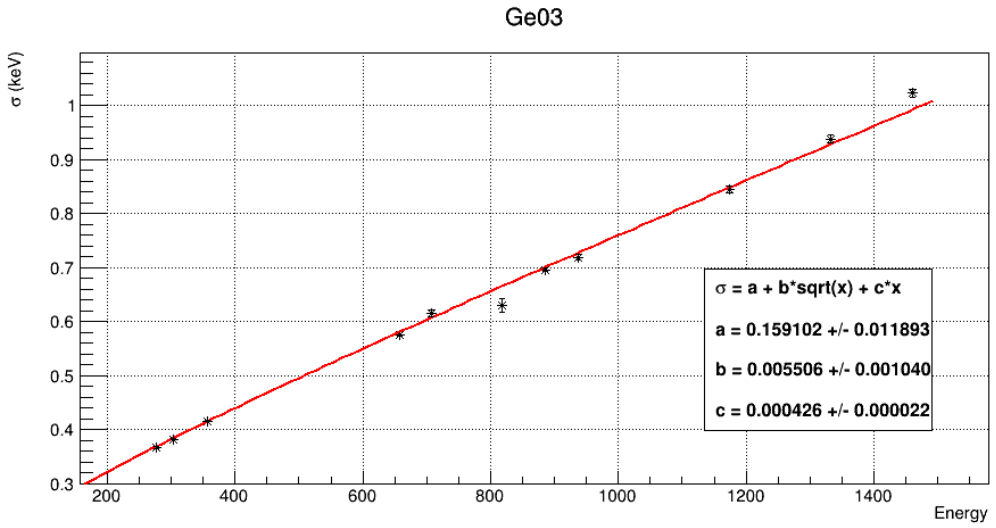
Updates to fitting code

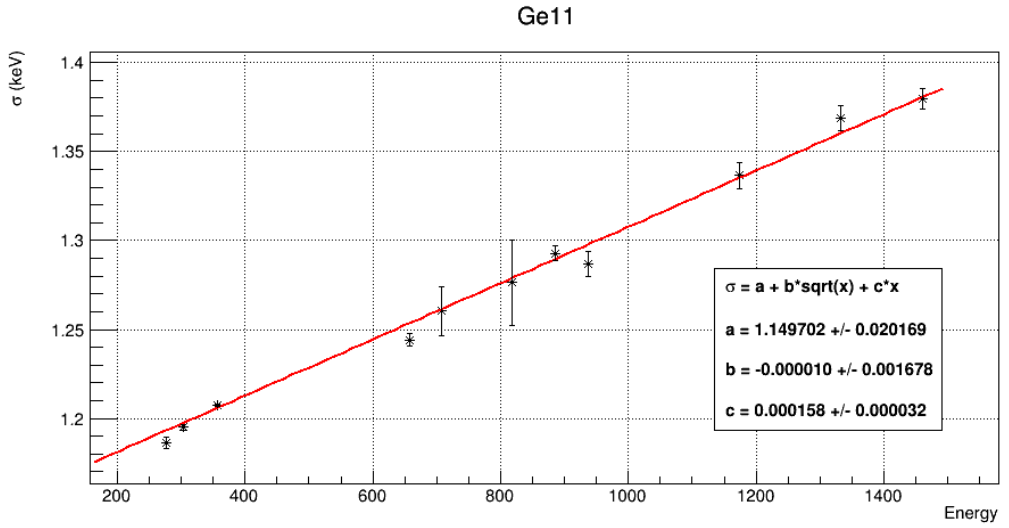
- Ratio of step to signal indeed consistent
- $\frac{f_G}{f_T}$ seems to be very constant, using single parameter for all peaks
- Linear $\frac{\beta}{\sigma}$ seems to work well



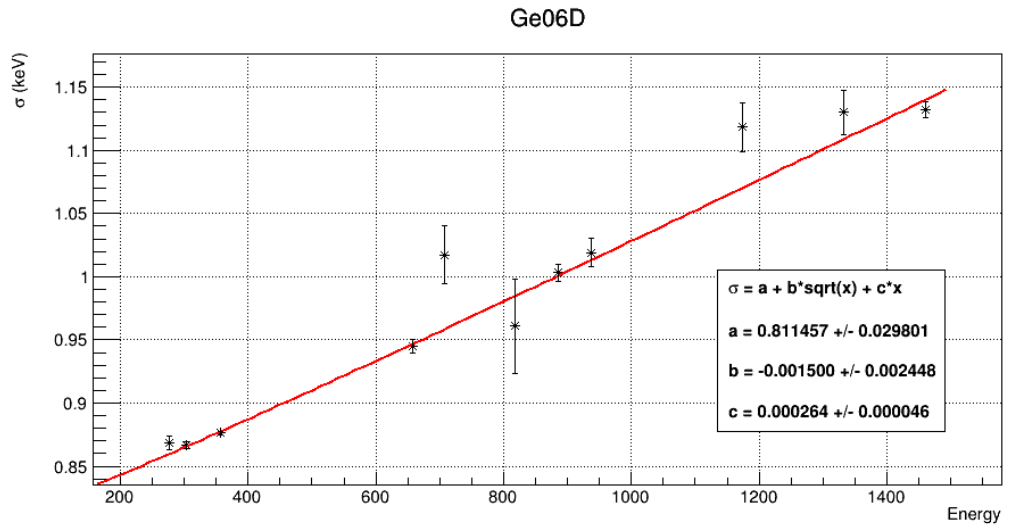
Fixing parameters for $\sigma = a + b\sqrt{E} + cE$

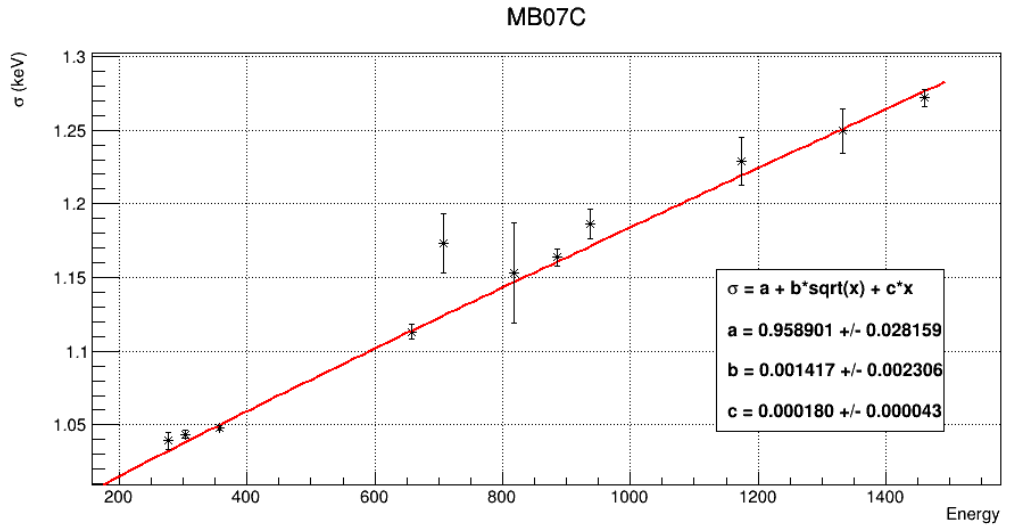
- Only use clean peaks
- Regular root fitting: fit → fit again from $\mu - \sigma$ so there is no tail





Fixing parameters for $\sigma = a + b\sqrt{E} + cE$





Current idea

- Fixed σ during calibration fit
- New calibration for each physics run (rates might induce different tailing)
- Rest of line shape still variable during calibration, but not for fitting x-rays
- Cross-check systematics on absolute energy and difference with 657.7600(11) keV line by evaluating literature line 706.6760(15) keV after not taking it into account in the calibration

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