

Towards partial
capture rates of
 ^{76}Se with ALPACA
data

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Steps

1. Test analysis chain

- Select calibration data
- Select detector
- Fit calibration peaks
- Produce relative efficiency curve ---> Try different efficiency curves
- Select beam data
- Fit peaks
- Produce relative intensities
- Derive partial yields

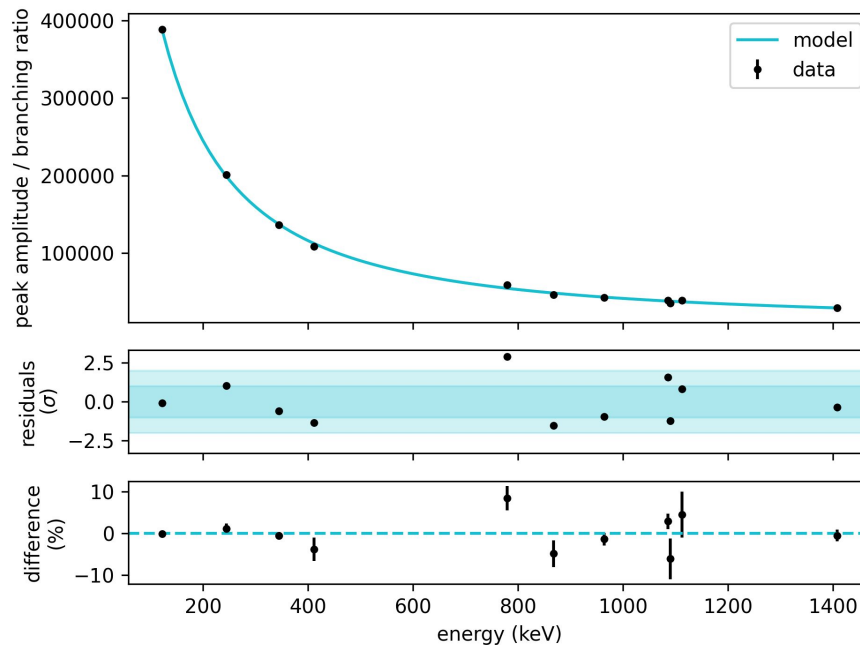
2. Apply to all 8 detectors

3. Perform multi-detector analysis

Efficiency fit

- χ^2 fit (Neyman) using iminuit
- model under study

$$\epsilon(E) = \frac{1}{E} \cdot \sum_i C_i \ln(E)^i *$$



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Efficiency fit

- Model 1* $\rightarrow \epsilon(E) = \frac{1}{E} \cdot \sum_i C_i \ln(E)^i$
- Model 2** $\rightarrow \ln(\epsilon(E)) = \sum_{i \leq 5} a_i \cdot \ln\left(\frac{c}{E}\right)^i$
- Model 3** $\rightarrow \ln(\epsilon(E)) = \sum_i a_i \cdot \ln(E)^i$
- Model 4** $\rightarrow \ln(\epsilon(E)) = \sum_{i=-1}^4 a_i \cdot E^{-i}$
- Model 5** $\rightarrow \epsilon(E) = \frac{c}{a \cdot E^{-x} + b \cdot E^y}$

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Efficiency fit

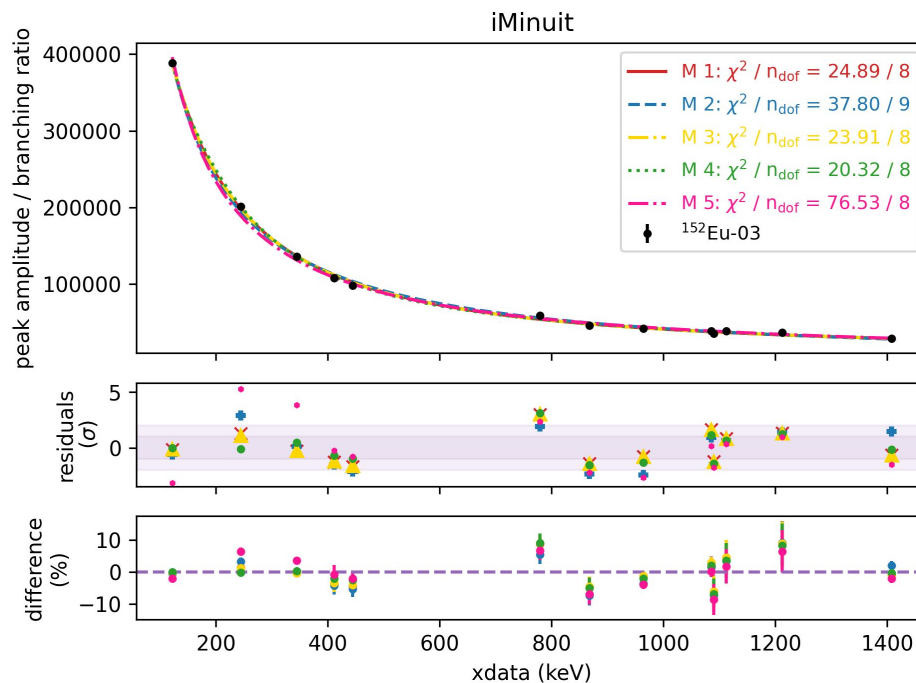
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- Model 3^{**} $\rightarrow \ln(\epsilon(E)) = \sum_i a_i \cdot \ln(E)^i$

- Model 4^{**} $\rightarrow \ln(\epsilon(E)) = \sum_{i=-1}^4 a_i \cdot E^{\ominus i}$

- Model 5^{**} $\rightarrow \epsilon(E) = \frac{c}{a \cdot E^{-x} + b \cdot E^y}$

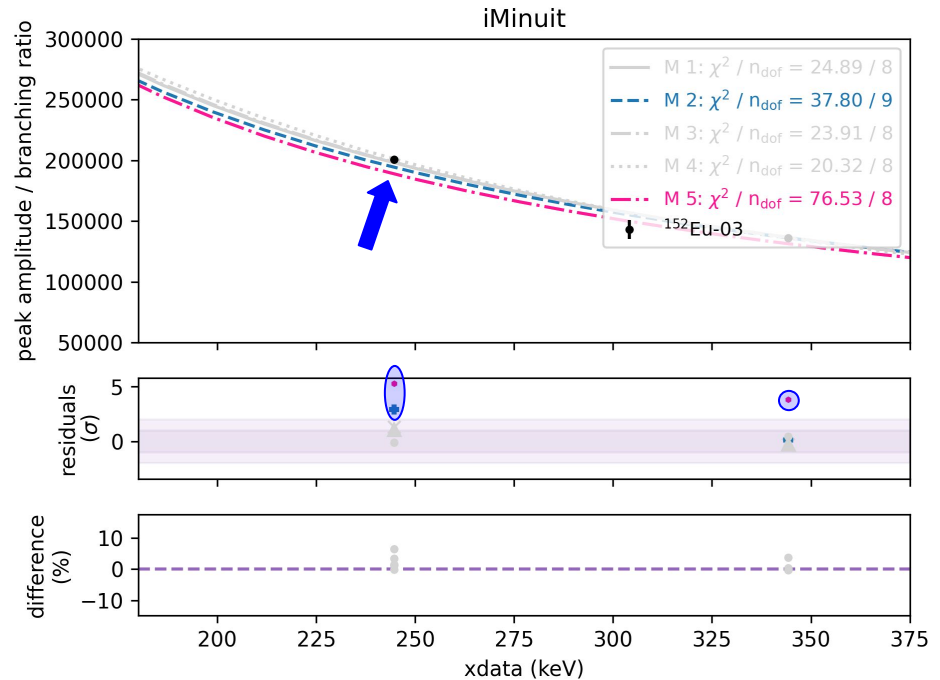


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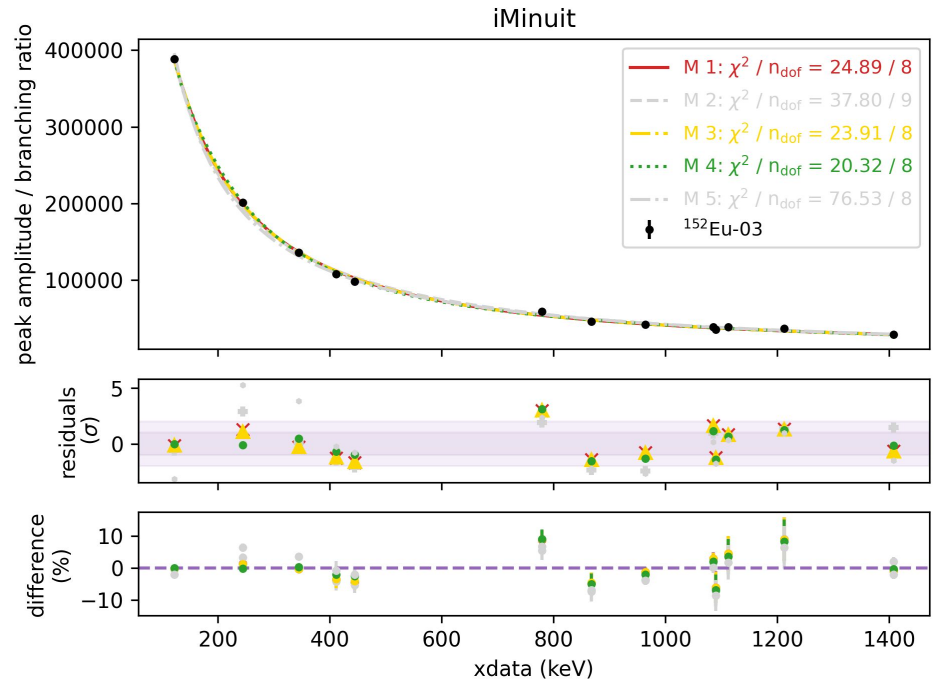


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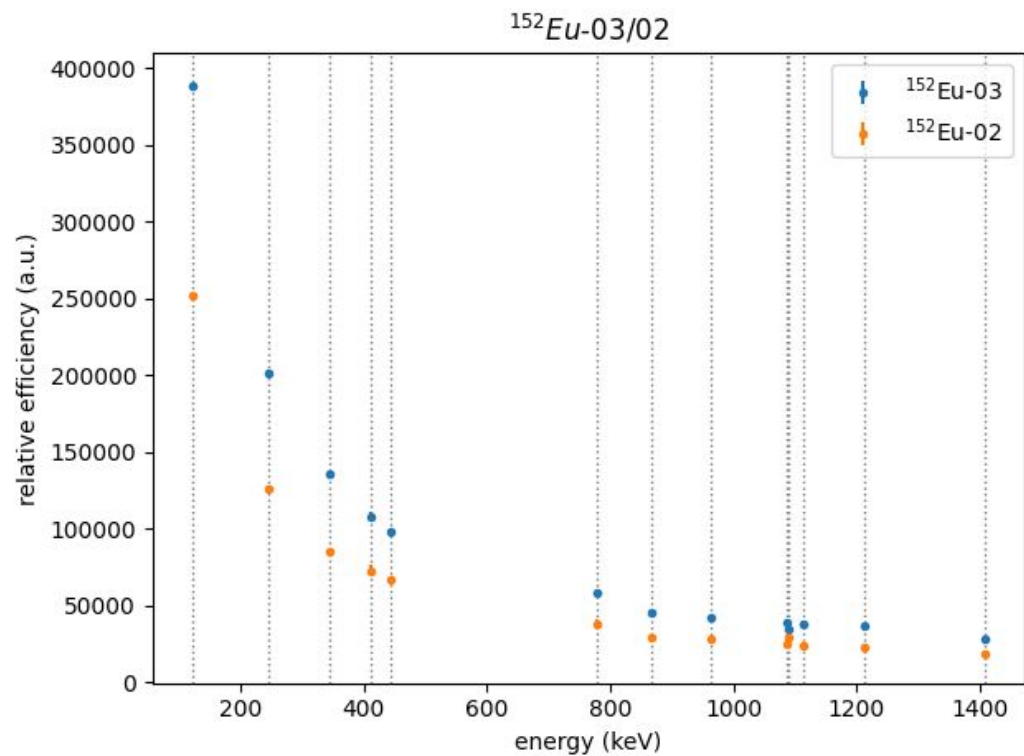
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Steps

1. Test analysis chain

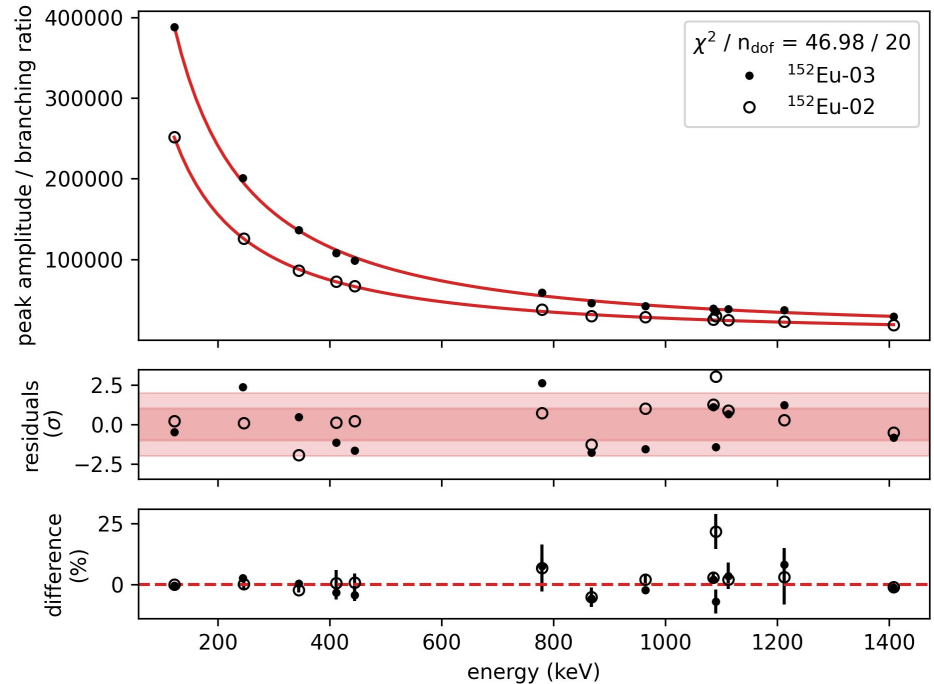
- Produce relative efficiency curve
 - > Try different efficiency curves
 - > Test with combine fit

Final selection



Efficiency fit

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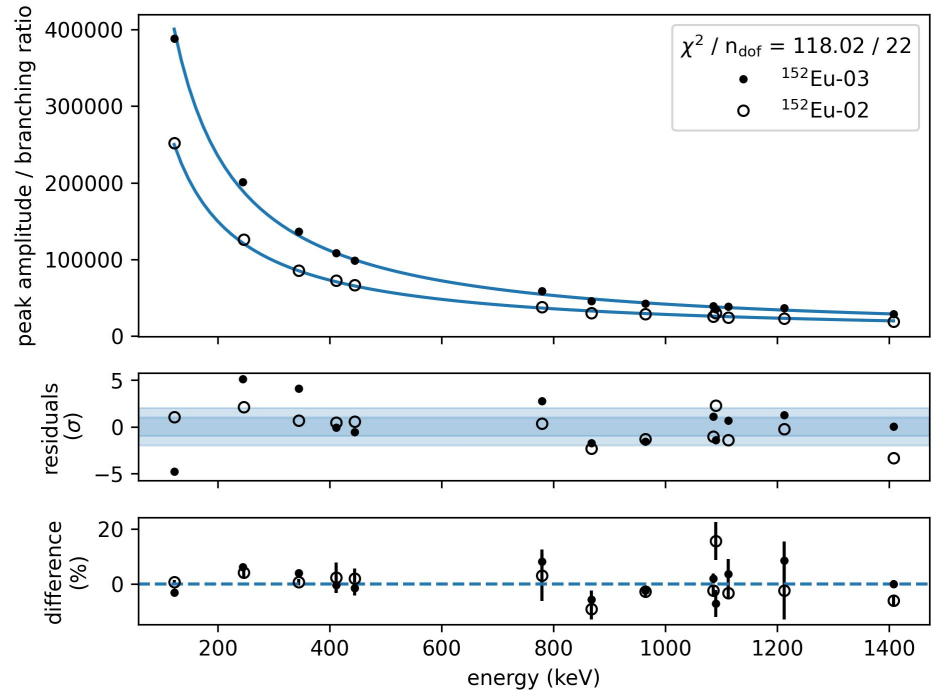


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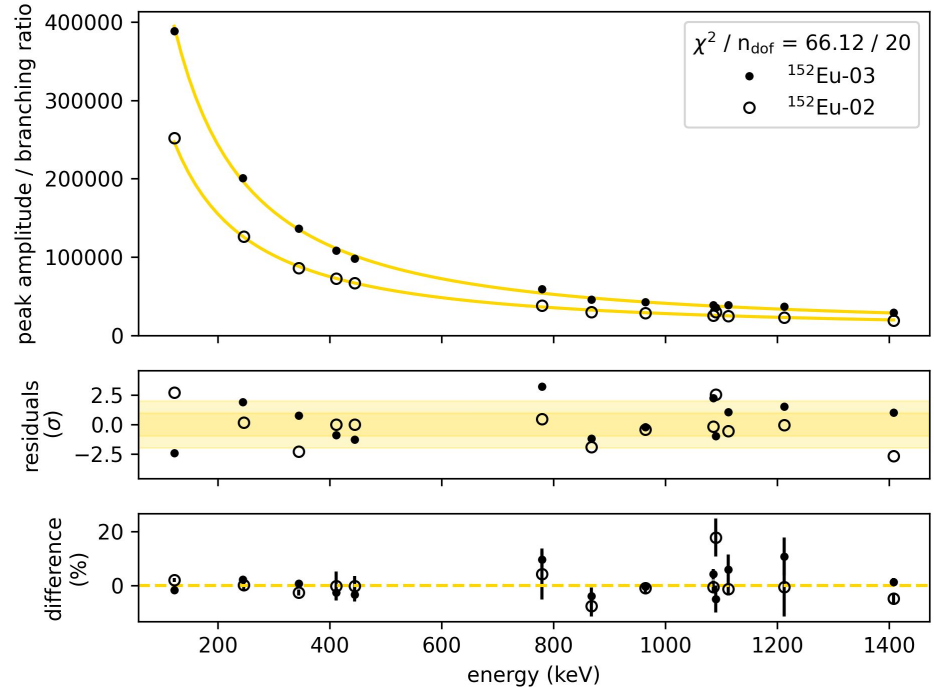


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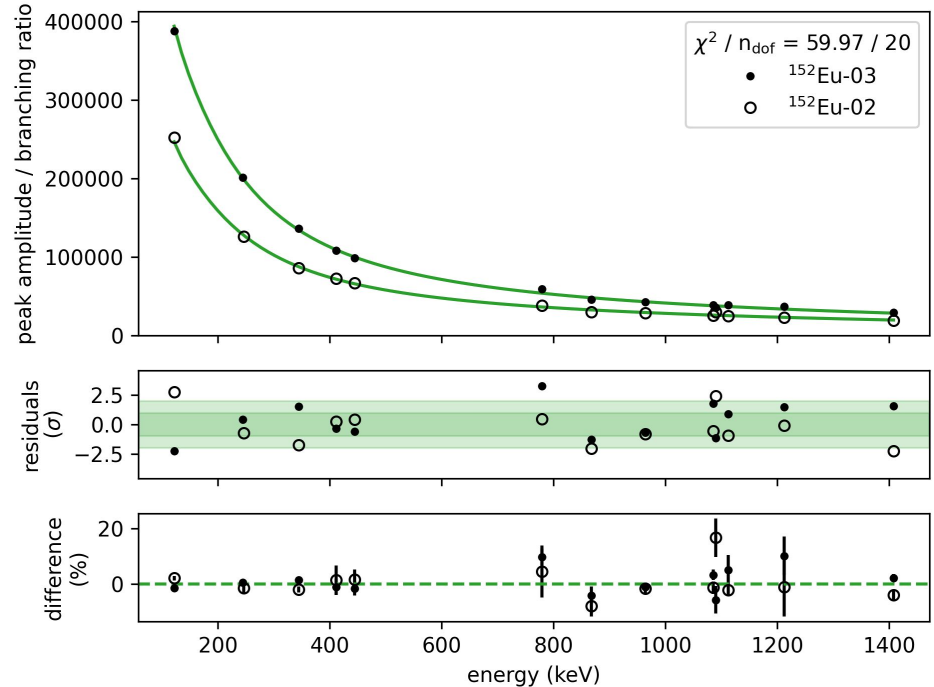


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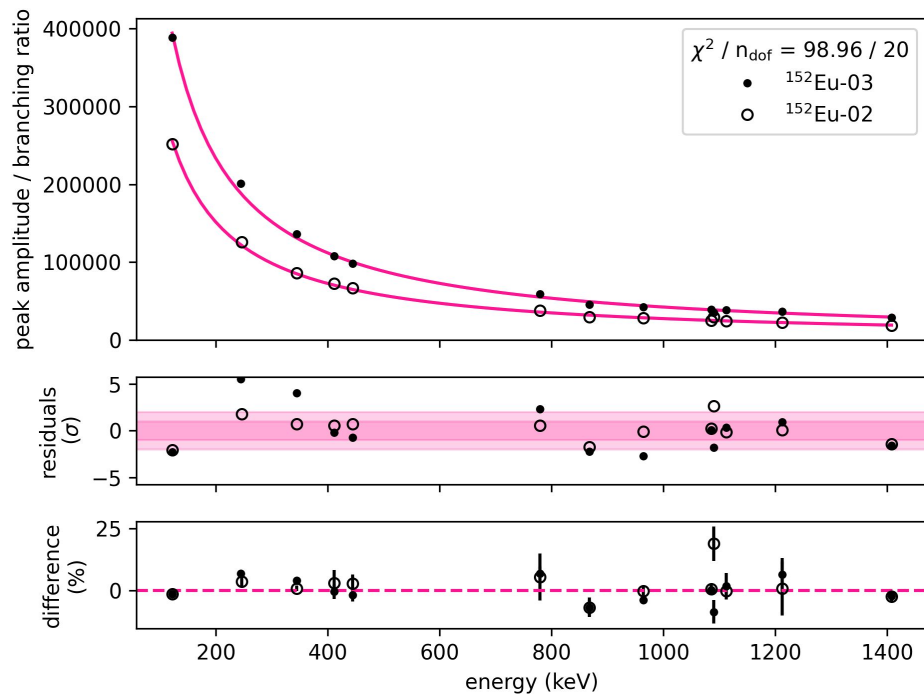


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Steps

1. Test analysis chain

- Produce relative efficiency curve
 - > Try different efficiency curves
 - > Test with combine fit
 - > Understand systematics & uncertainty

Efficiency fit

