

# Tracking source data with OFT

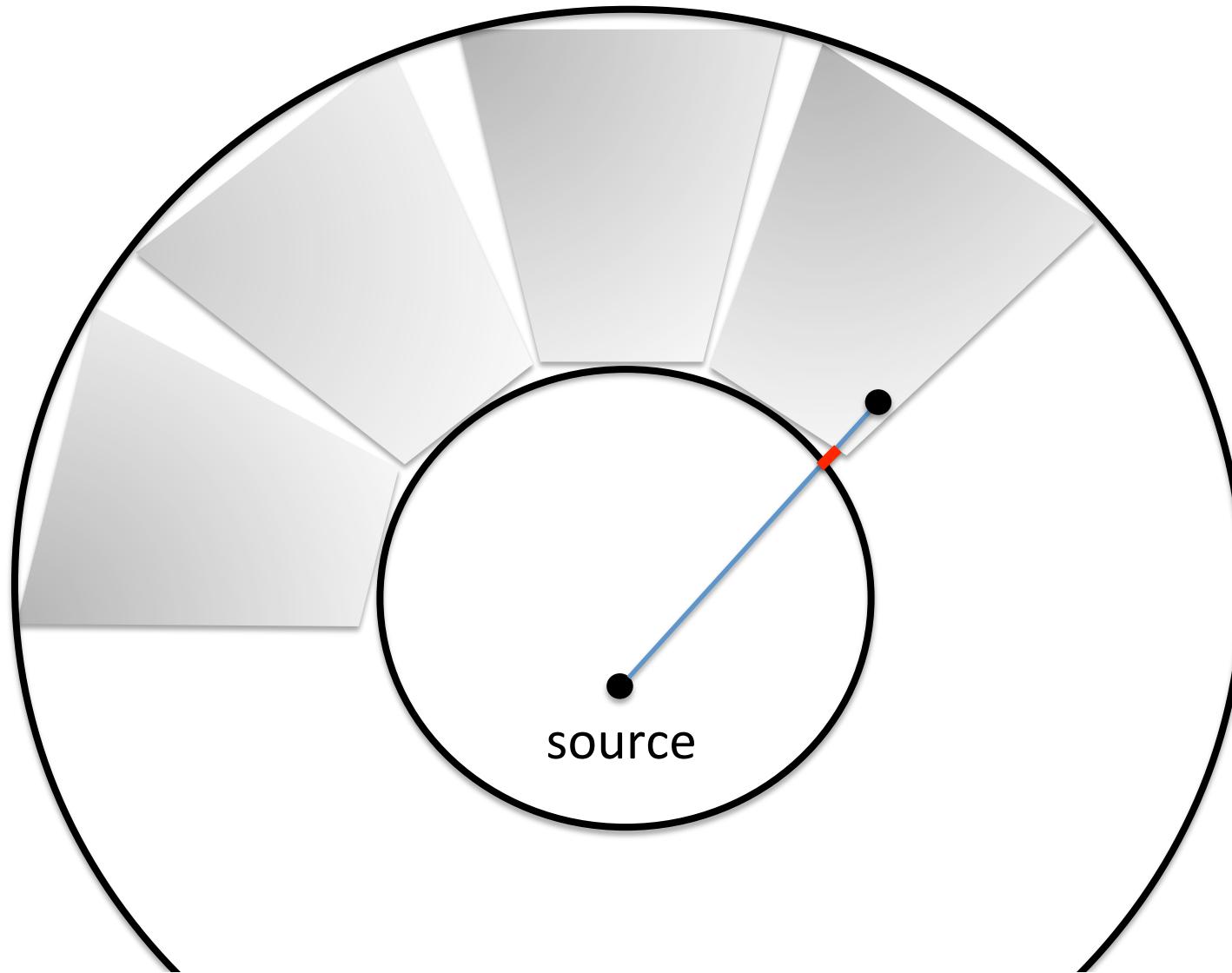
A. Lopez-Martens

AGATA week

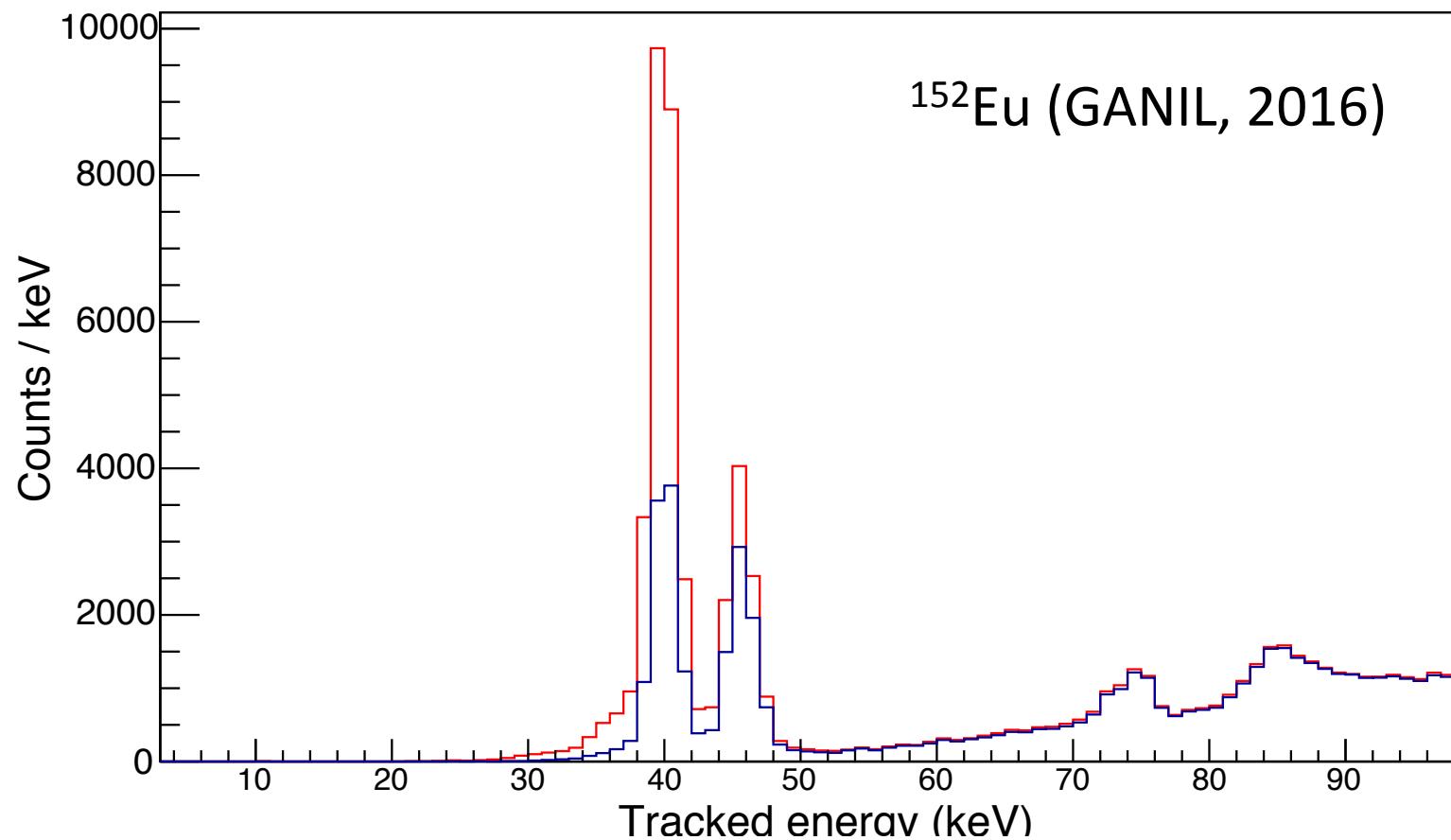
Orsay

5-7/10/2016

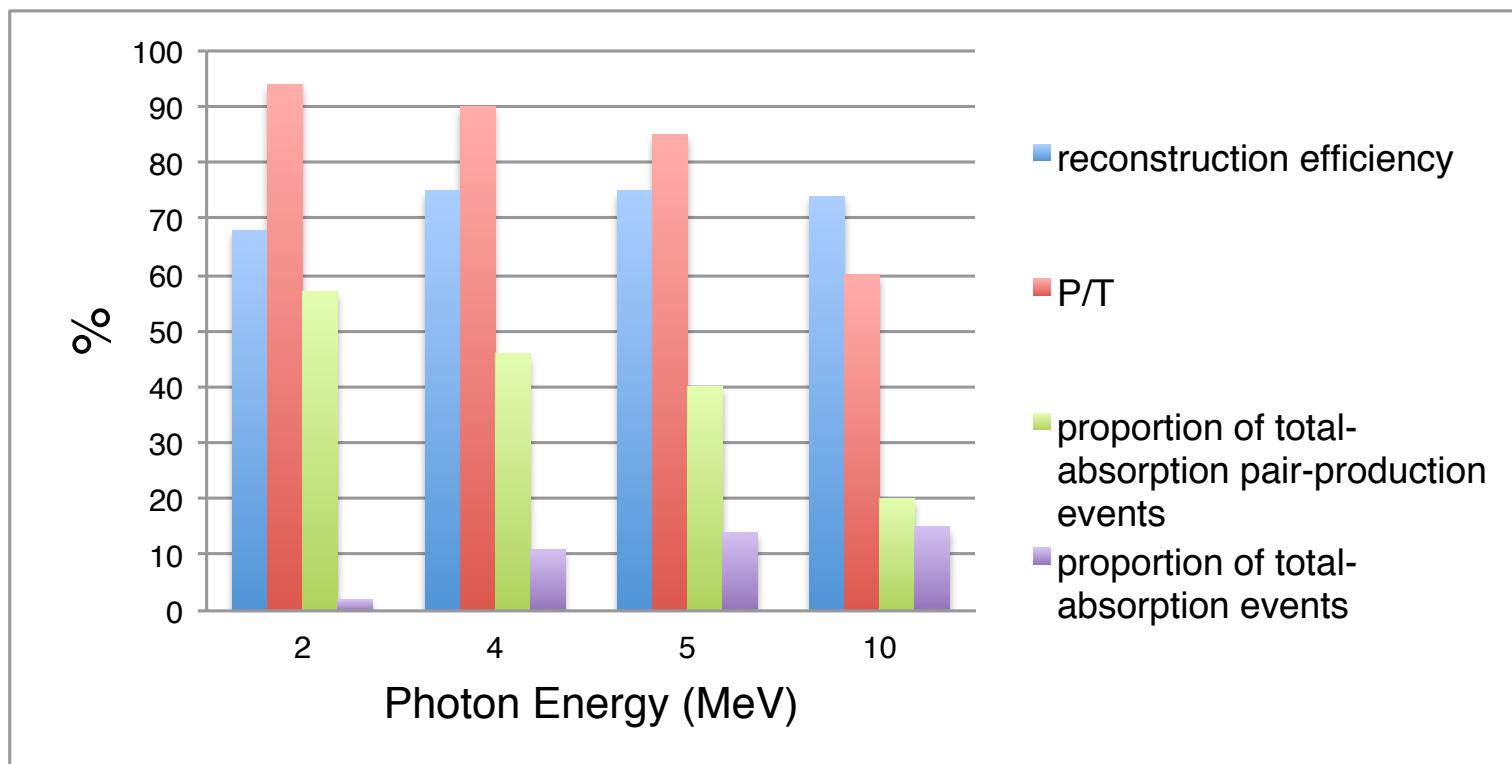
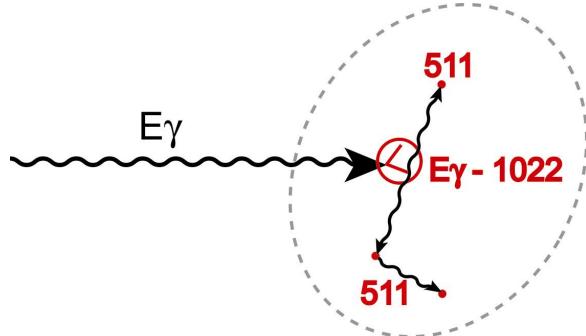
# Ge sphere approximation



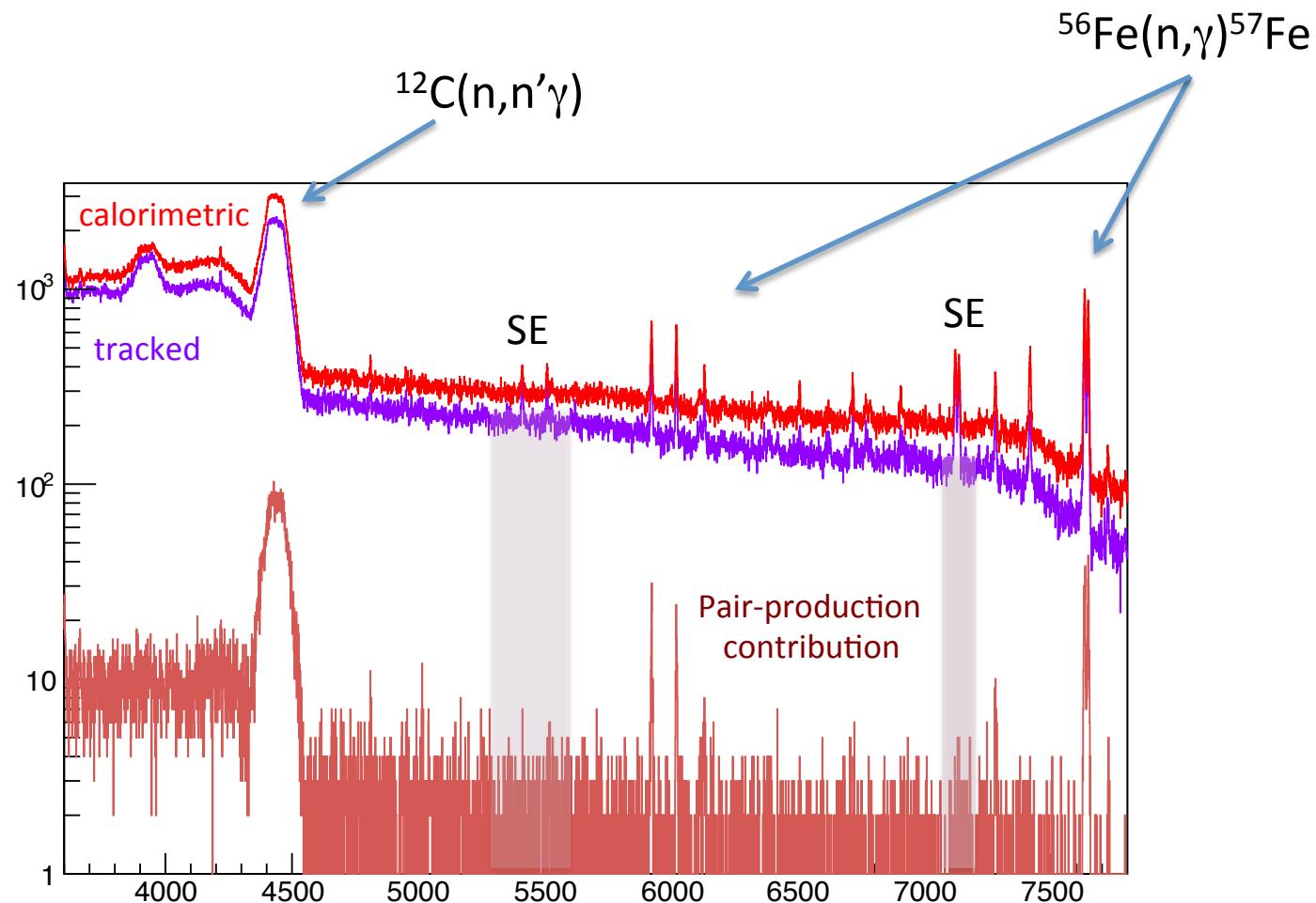
# Low-energy efficiency



# Pair Production

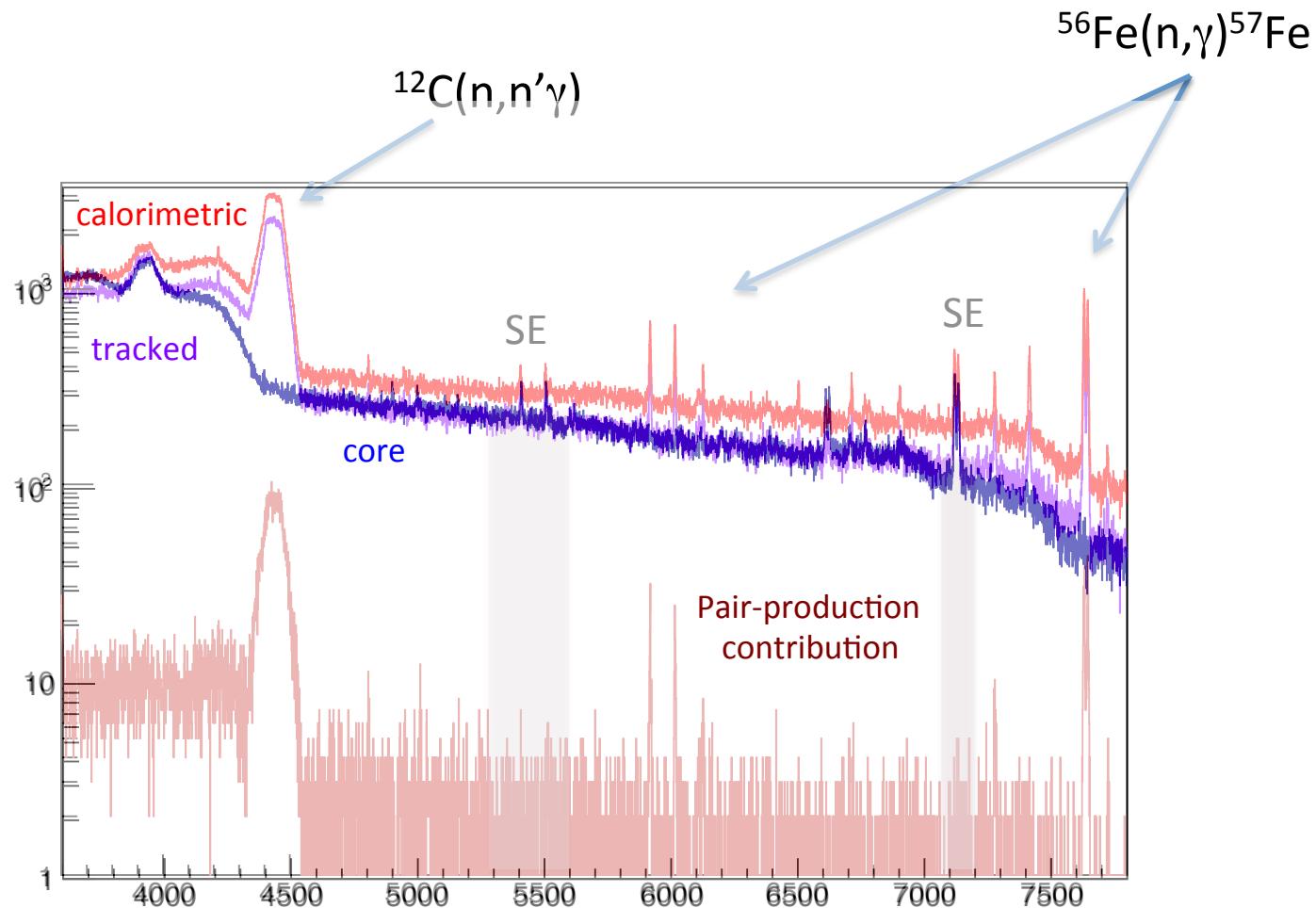


# Example of AmBeFe source



NB: such a source cannot be centered

# Example of AmBeFe source

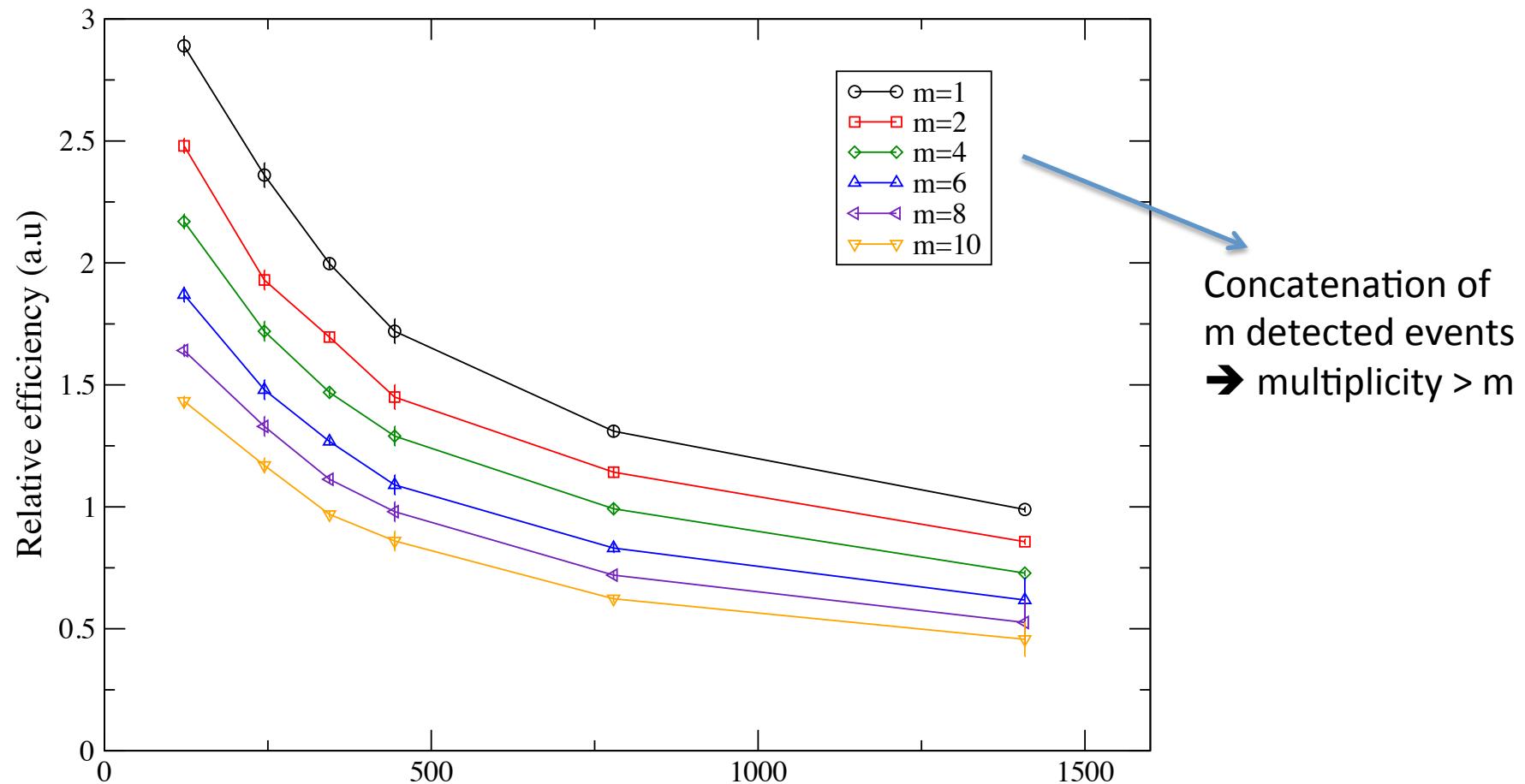


NB: such a source cannot be centered

# Efficiency considerations

Is the calibration efficiency curve measured with low-multiplicity sources applicable to in-beam data ?

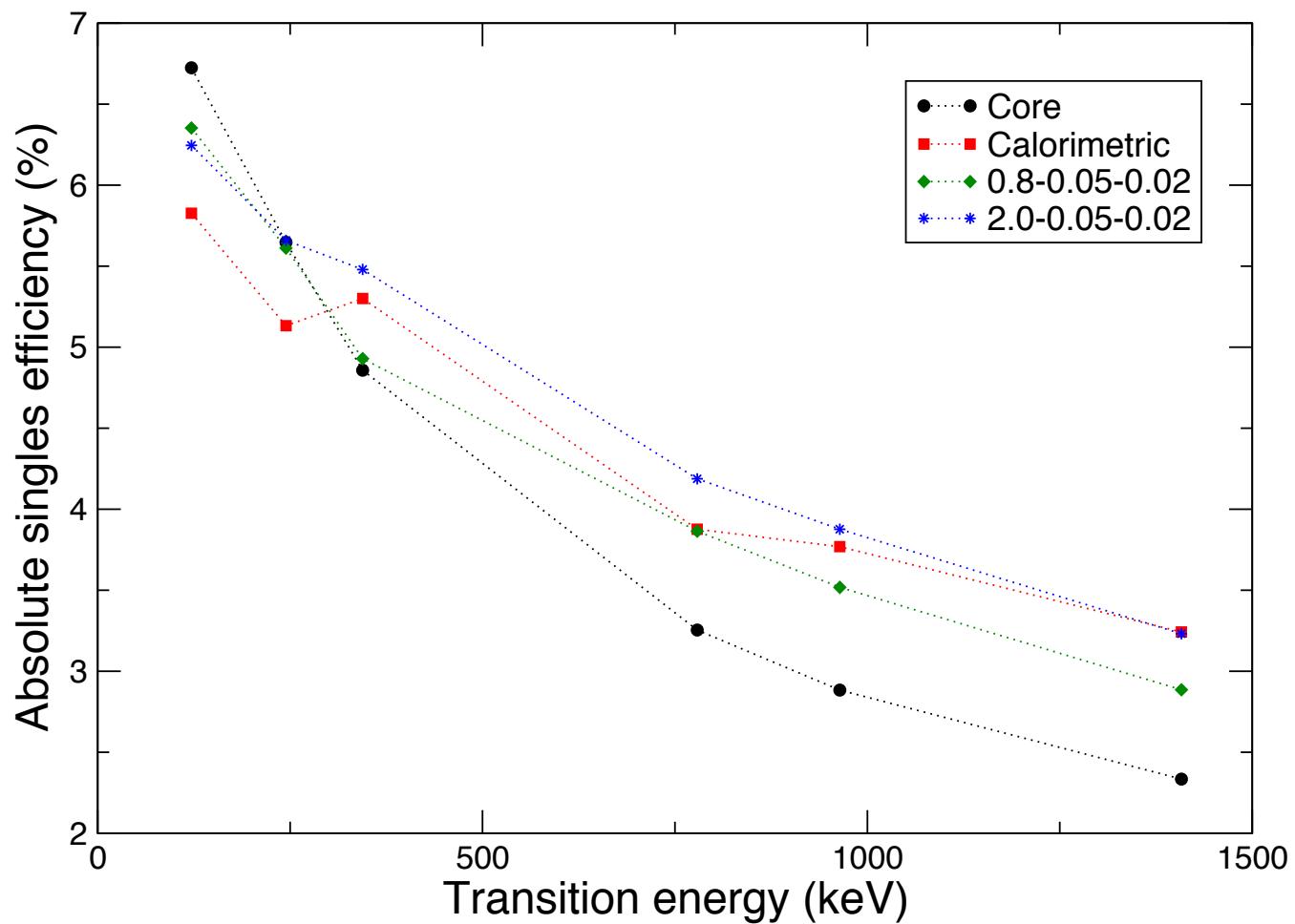
GSI,  $^{152}\text{Eu}$ , 21 capsules



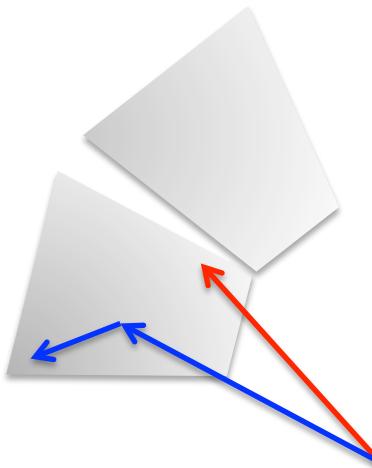
# Absolute efficiency

(known source method)

$^{152}\text{Eu}$ , GANIL  
23 AGATA capsules

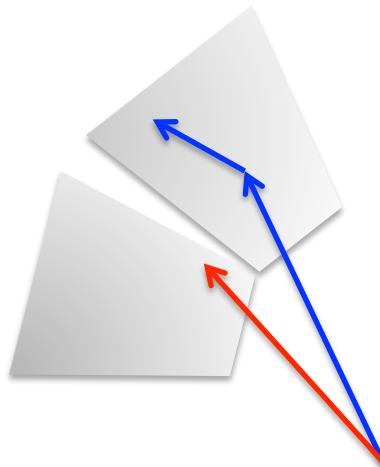


# Coincidence effect & single-interaction criterion

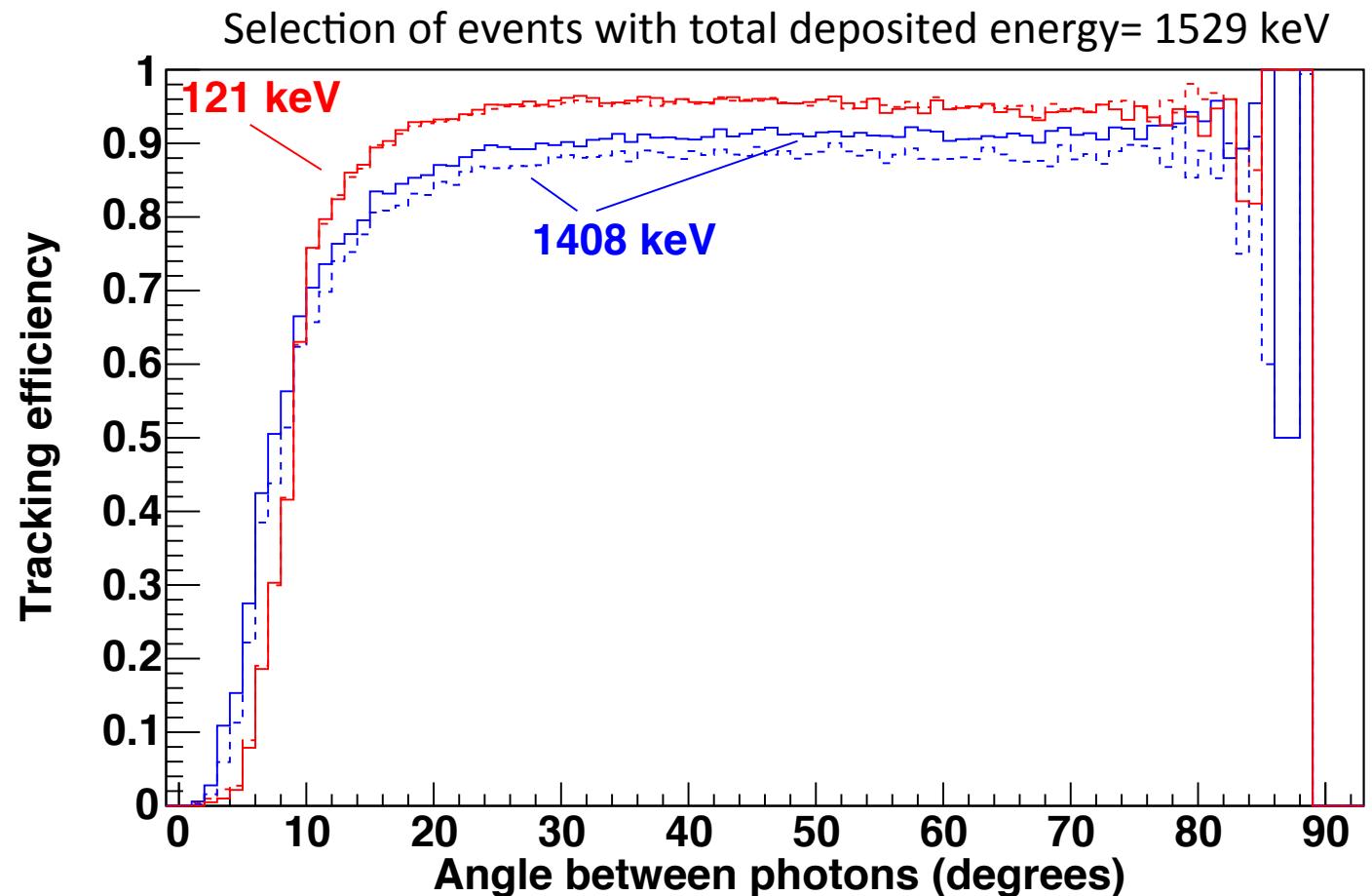
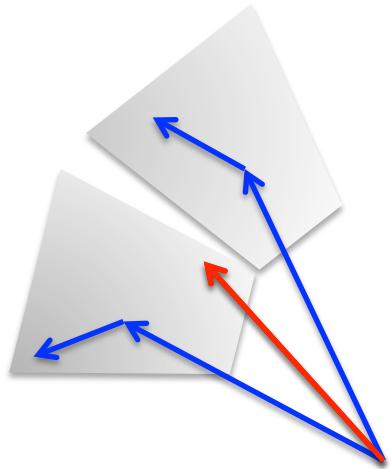


Selection of events with total deposited energy= 1529 keV

# Coincidence effect & single-interaction criterion



# Coincidence effect & single-interaction criterion



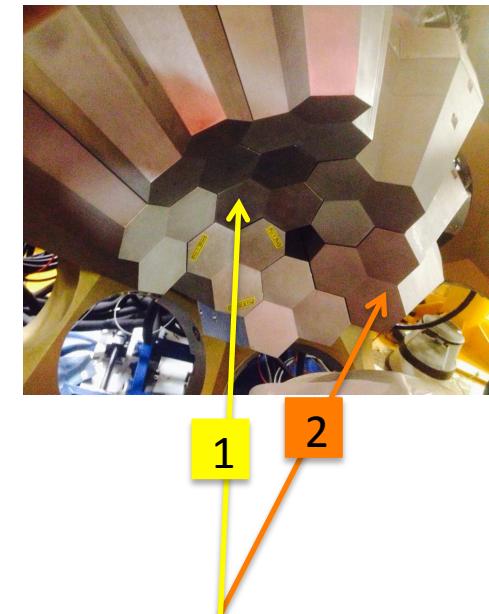
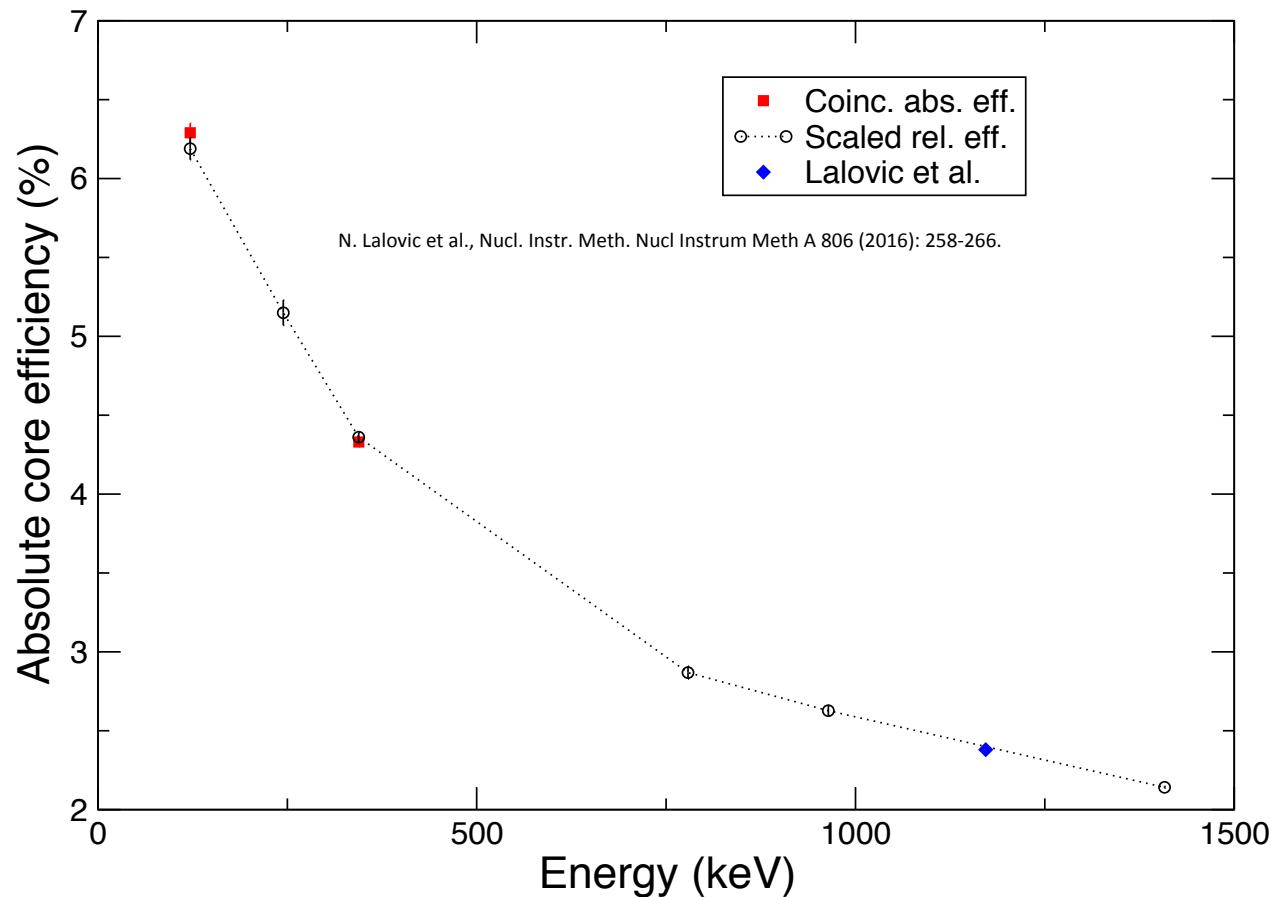
# Absolute Efficiency

(coincidence method)

Core efficiencies:

$$N_{\text{det,singles}} = N_{\text{emit}} \times \text{AliveT} \times 1/(1+\alpha_{\text{tot1}}) \times \text{efficiency}(E_1)$$

$$N_{\text{det,coinc}} = N_{\text{emit}} \times \text{AliveT} \times 1/(1+\alpha_{\text{tot1}}) \times \text{efficiency}(E_1) \times 1/(1+\alpha_{\text{tot2}}) \times \text{efficiency}(E_2) \times W(\theta) \times (N-1)/N$$



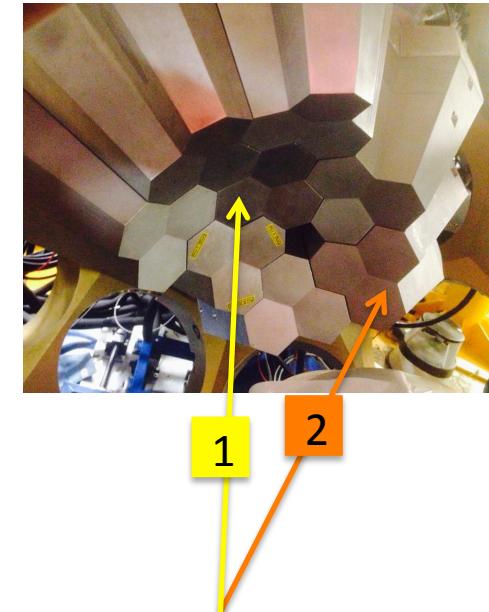
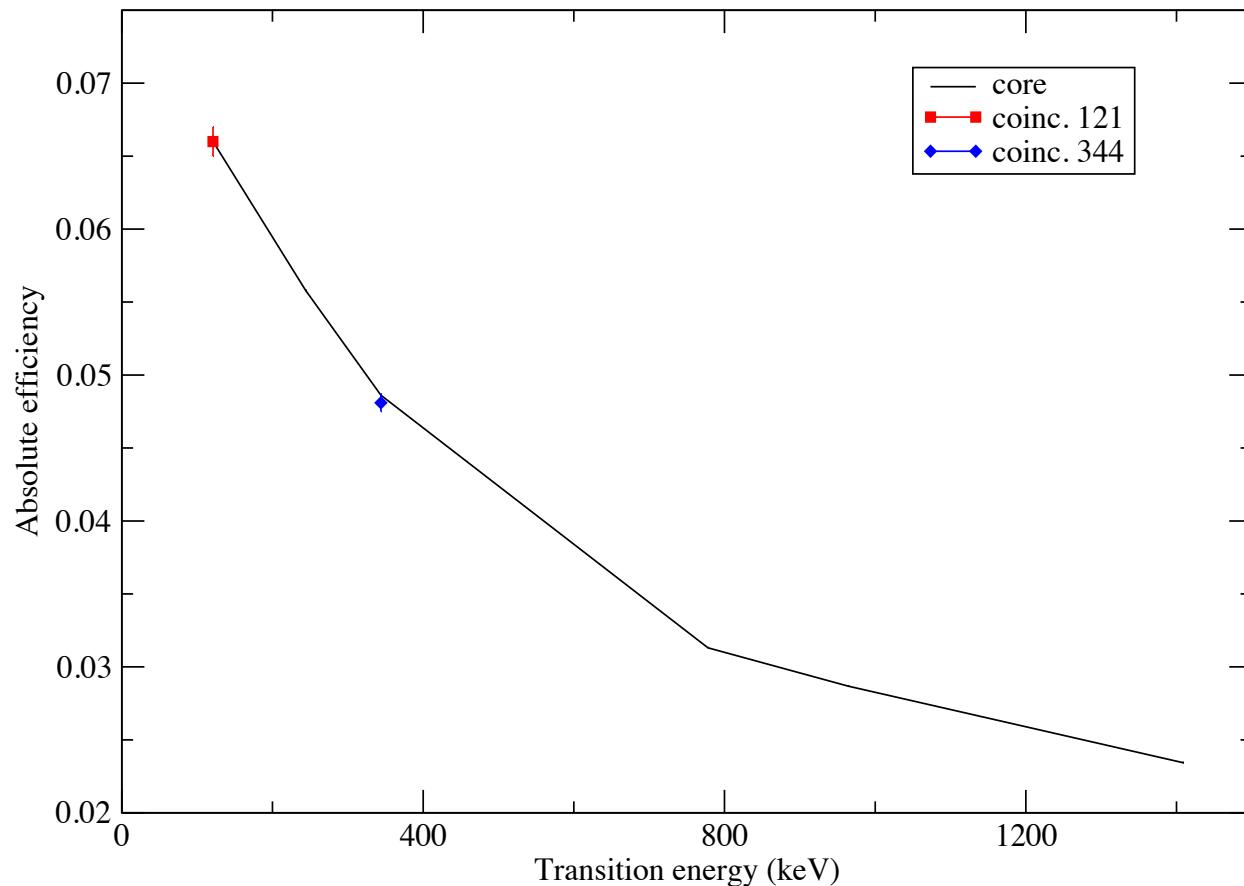
# Absolute Efficiency

(coincidence method)

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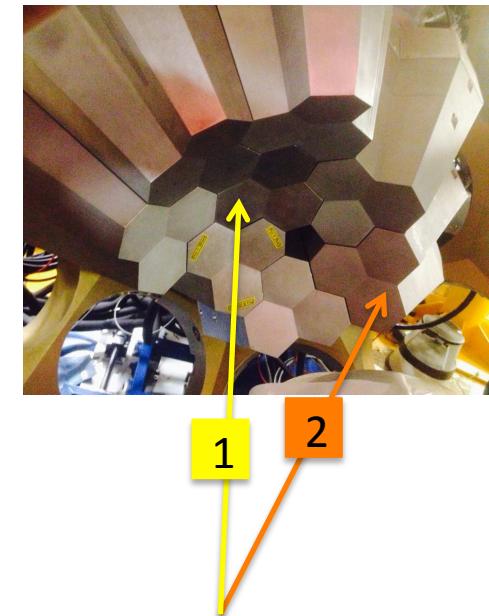
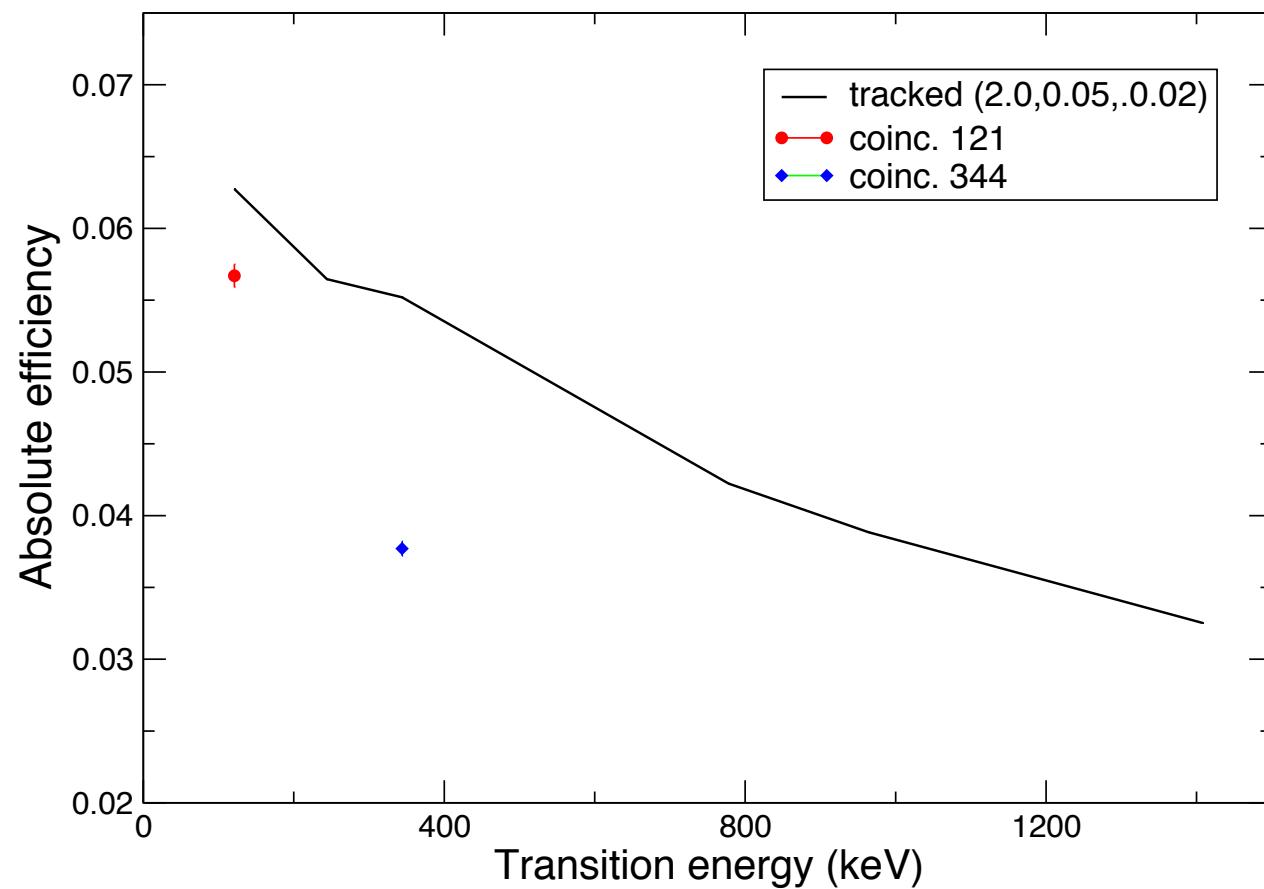
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# Absolute Efficiency

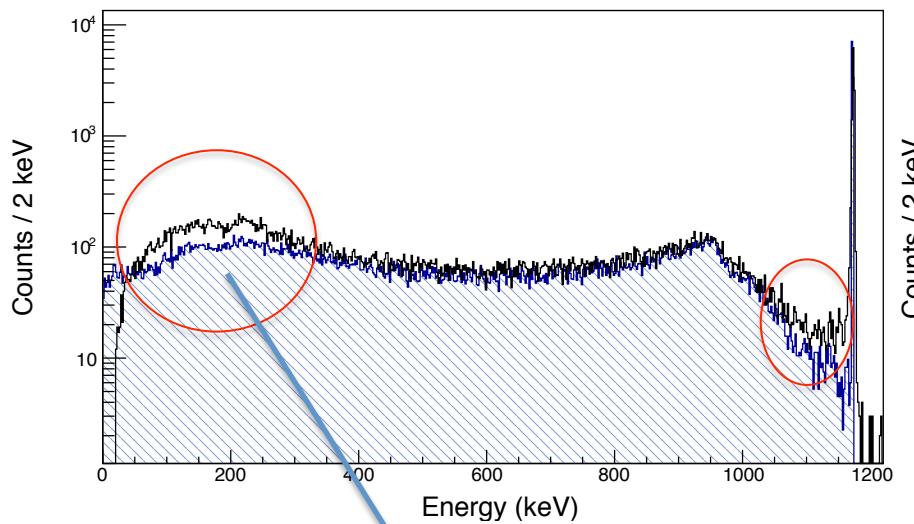
(coincidence method)



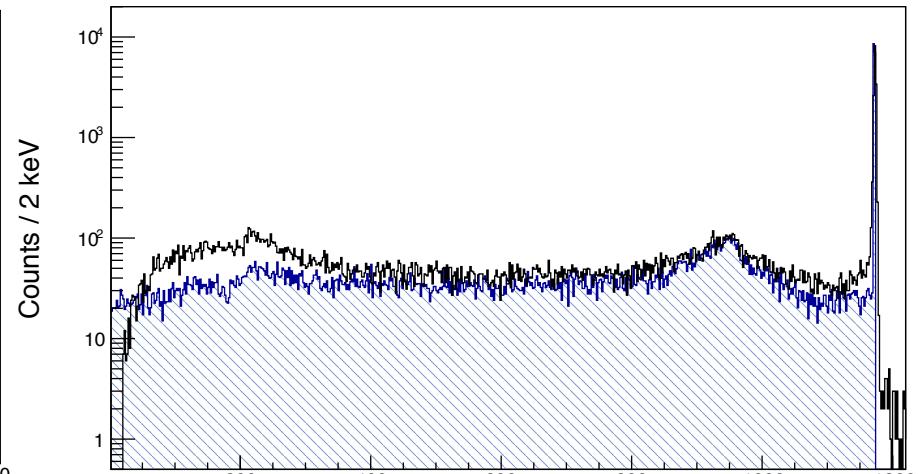
# P/T (experiment vs simulation)

GSI, 21 capsules  
EB-gated  $^{60}\text{Co}$

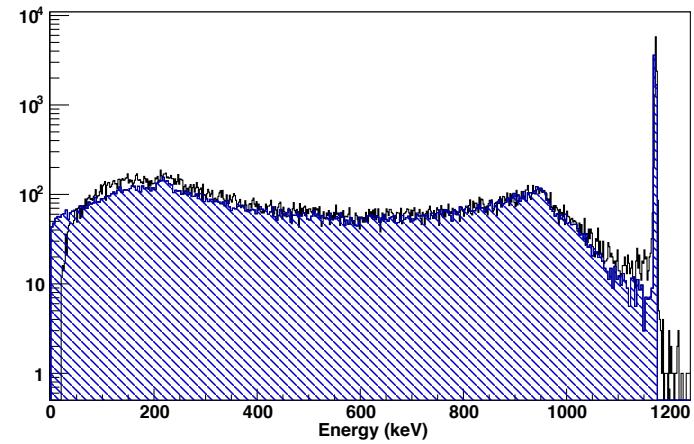
Core spectra



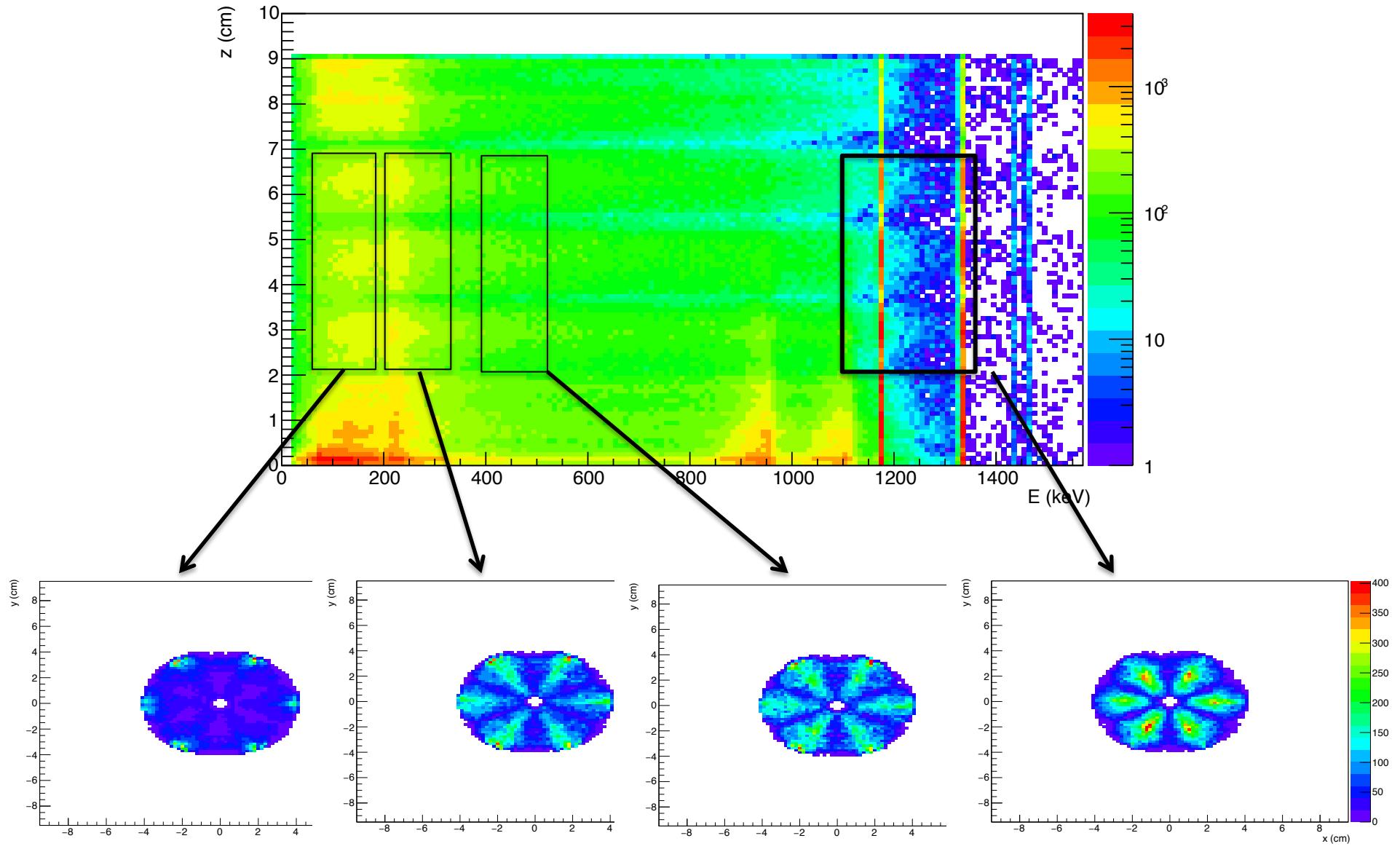
Calorimetric spectra



Can ~reproduce the backscatter peak with a thicker cryostat thickness (and including any material which favours backsacttering)



# Strange events below the backscatter peak



1 interaction in AGATA –  $z$  distribution and selected ( $x, y$ ) distributions

# Conclusion

Upgrades to the OFT code have been made

OFT tracking efficiency & P/T have been investigated :

The relative efficiency curve is found to be ~insensitive to the gamma-ray multiplicity

The single-interaction proximity criterion affects low-energy efficiency of photons emitted in a cascade

The coincidence method and known-source method do not coincide when tracking is performed and the discrepancy is energy and angular-correlation dependent

The exp. core P/T can be better reproduced by including more backscattering materials in the simulations.

An underlying « unphysical ? » background remains in the exp. spectra....(present In Legnaro, GSI and GANIL)