

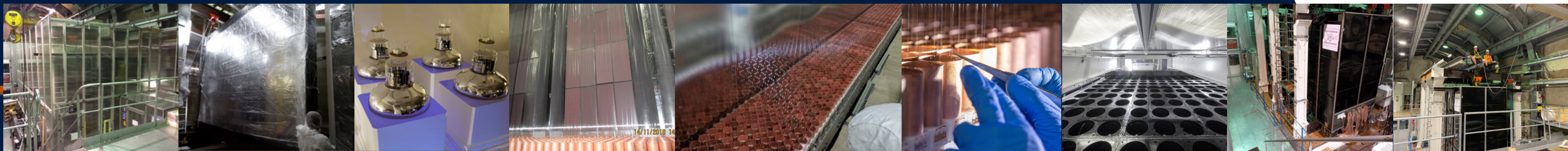
supernemo



collaboration

External events : crossing electron channel

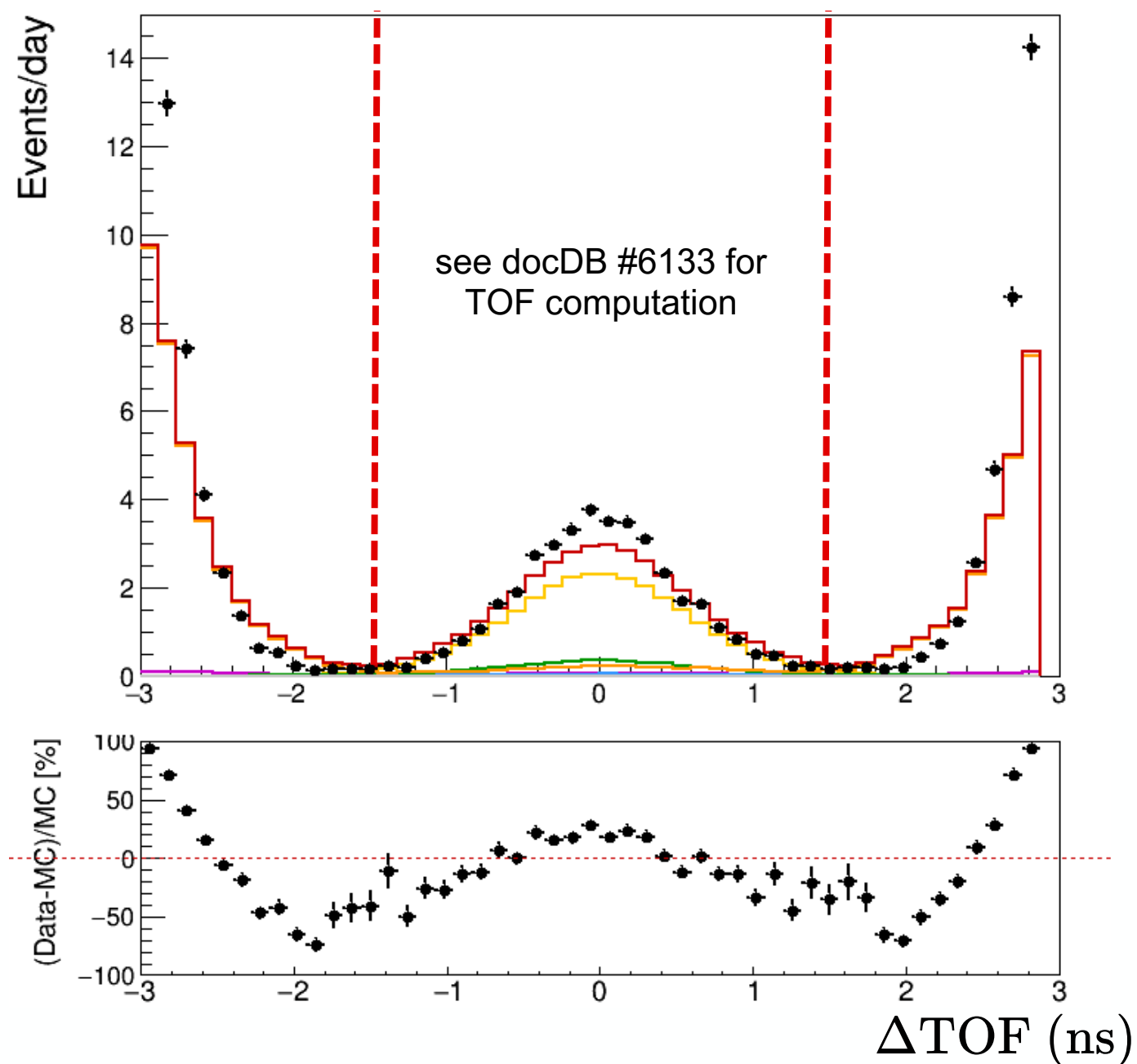
Granjon Mathis



Crossing electron

Same selection as double beta decay

Exept timing condition $\Delta TOF > 1.5 \text{ ns}$



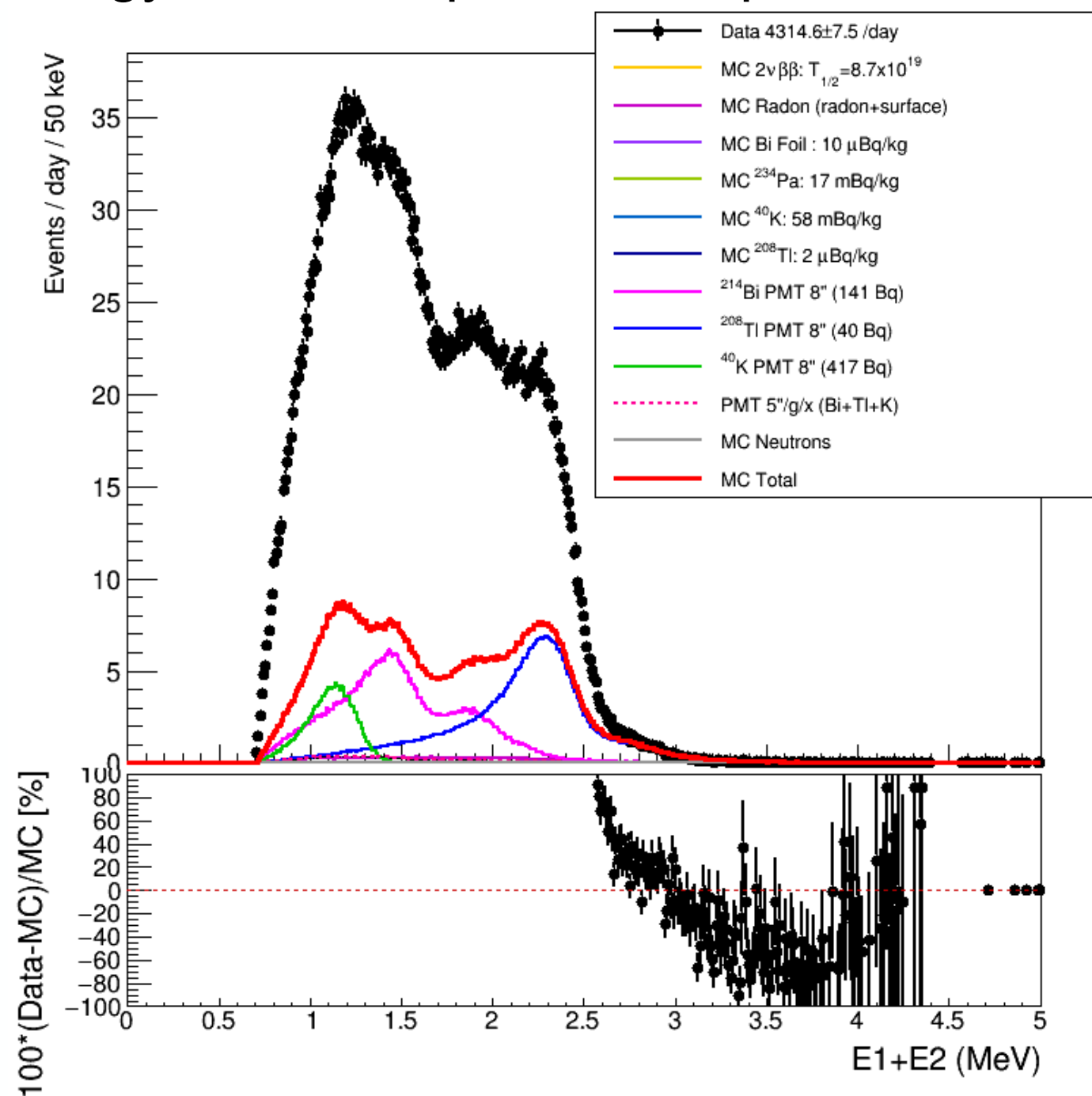
Looking for this topology



Crossing electron

First analysis of the crossing electron channel

Energy external spectra - all phases combined



Huge mismatch between **simulation** and **data**

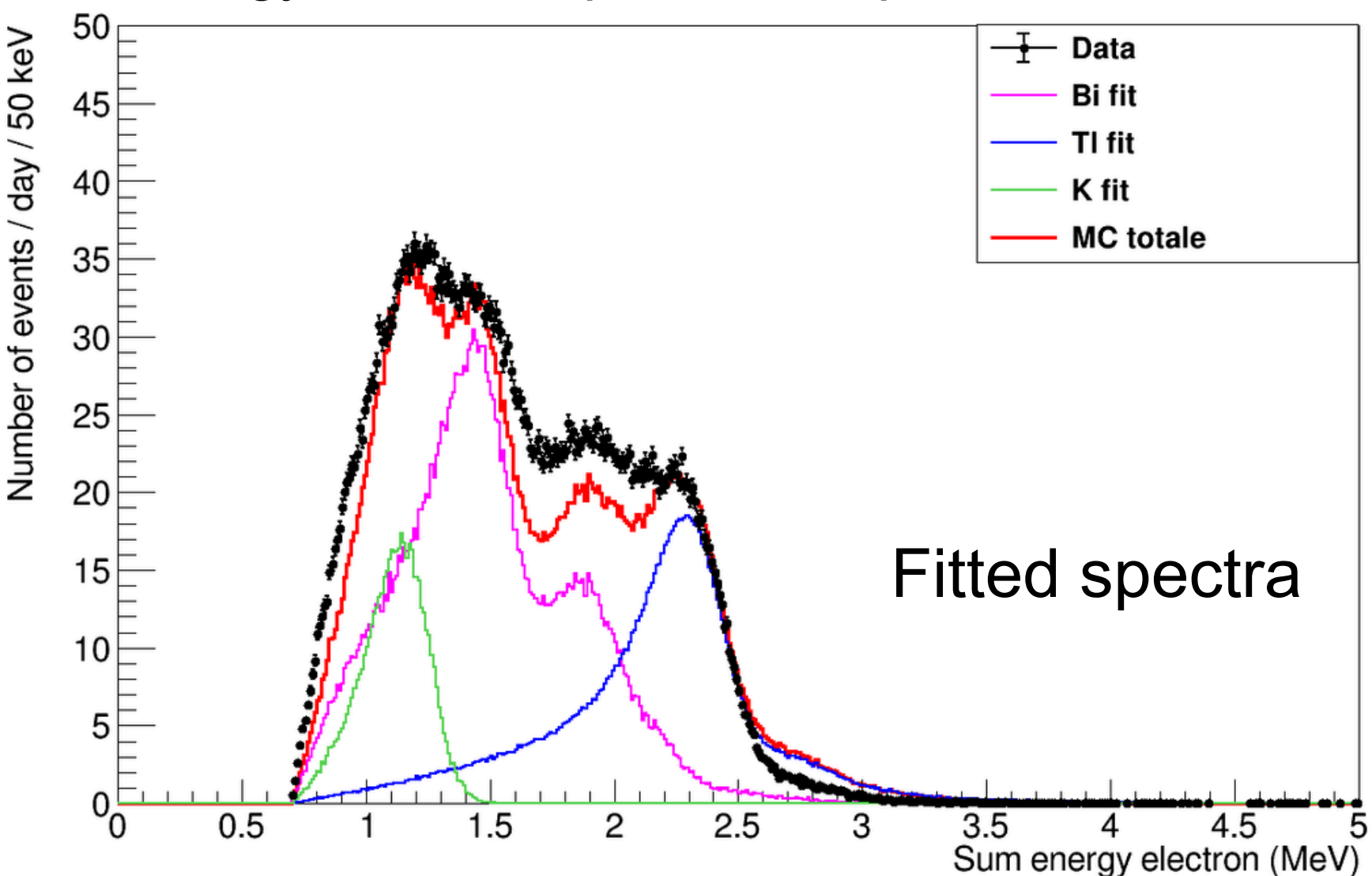
Simulation curve shape seems good,
is it only activity problem?

Lets change PMT activities to see

Crossing electron

First analysis of the crossing electron channel

Energy external spectra - all phases combined



Shape is still good but we missed contribution

Missing external contributions?

Old activities

$$A(^{214}\text{Bi}) = 141 \text{ Bq}$$

$$A(^{208}\text{Tl}) = 40 \text{ Bq}$$

$$A(^{40}\text{K}) = 417 \text{ Bq}$$

Activities found

$$A(^{214}\text{Bi}) = 705 \text{ Bq}$$

$$A(^{208}\text{Tl}) = 108 \text{ Bq}$$

$$A(^{40}\text{K}) = 1668 \text{ Bq}$$

x5

x2.7

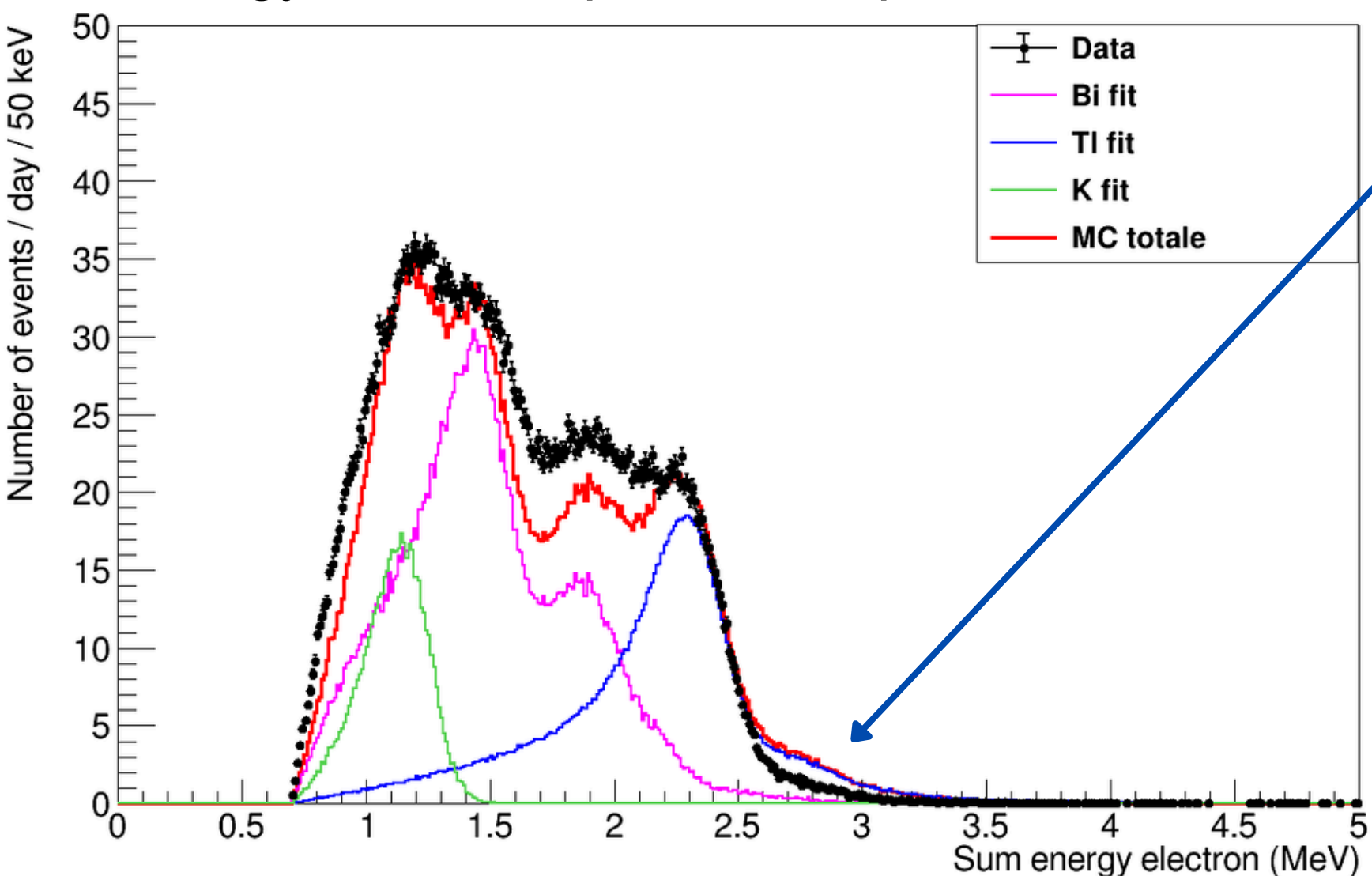
x4

Too high?

Crossing electron

First analysis of the crossing electron channel

Energy external spectra - all phases combined



Discrepancy MC/data for very high energy

Discrepancy could be due to Birks? Investigation with ^{207}Bi in next talk

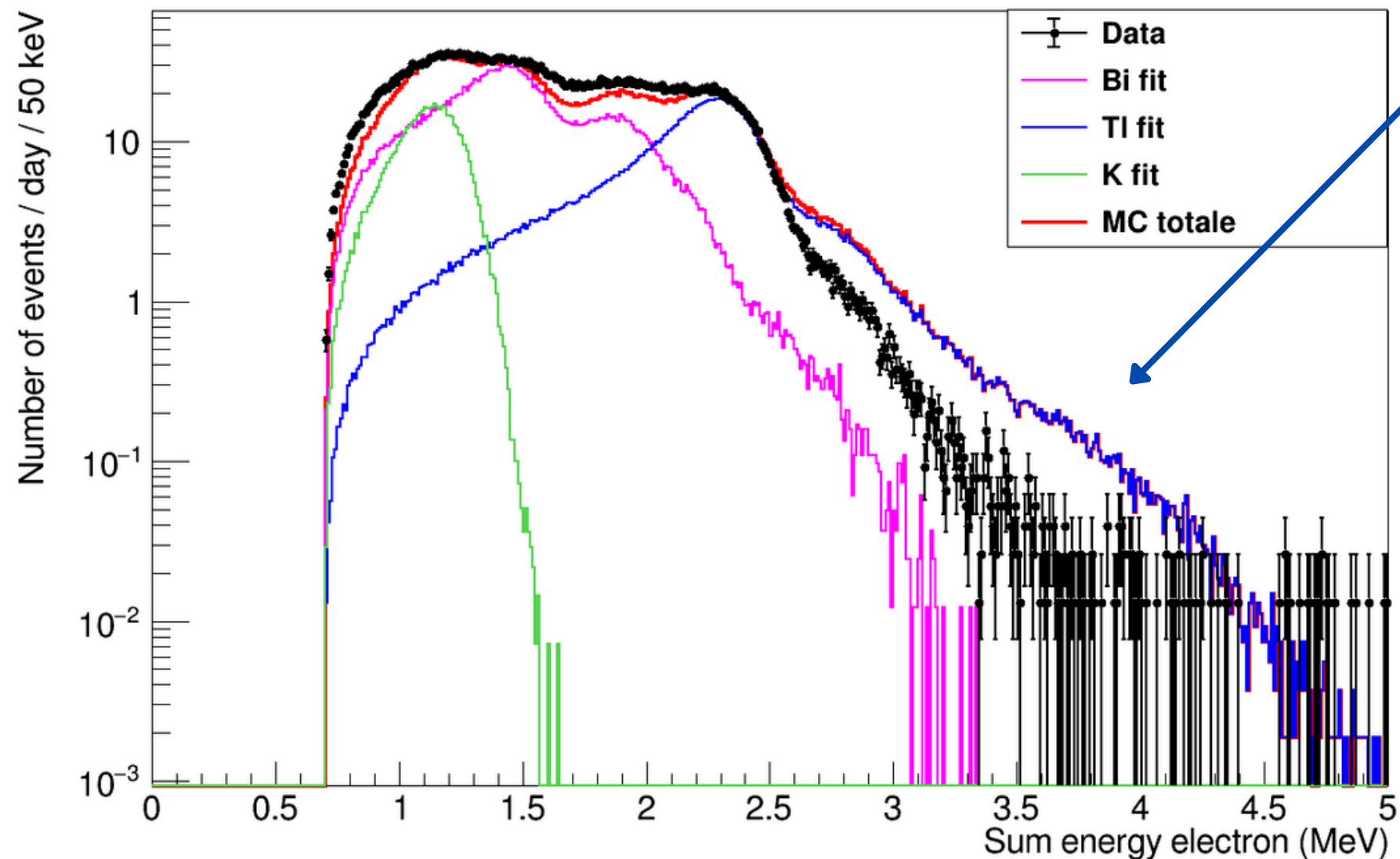
Missing optical glue in simulation?
Problem of non-uniformity?
any ideas?

Crossing electron

First analysis of the crossing electron channel

Energy external spectra - all phases combined (log scale)

Discrepancy MC/data for very high energy



Discrepancy could be due to Birks? Investigation with ^{207}Bi in next talk

Missing optical glue in simulation?
Problem of non-uniformity?
any ideas?

Conclusion and next steps

First investigation of the crossing electron channel

- Observation of a significant energy shift between MC and data
- Low-energy spectra require additional contributions to be properly described

Next steps:

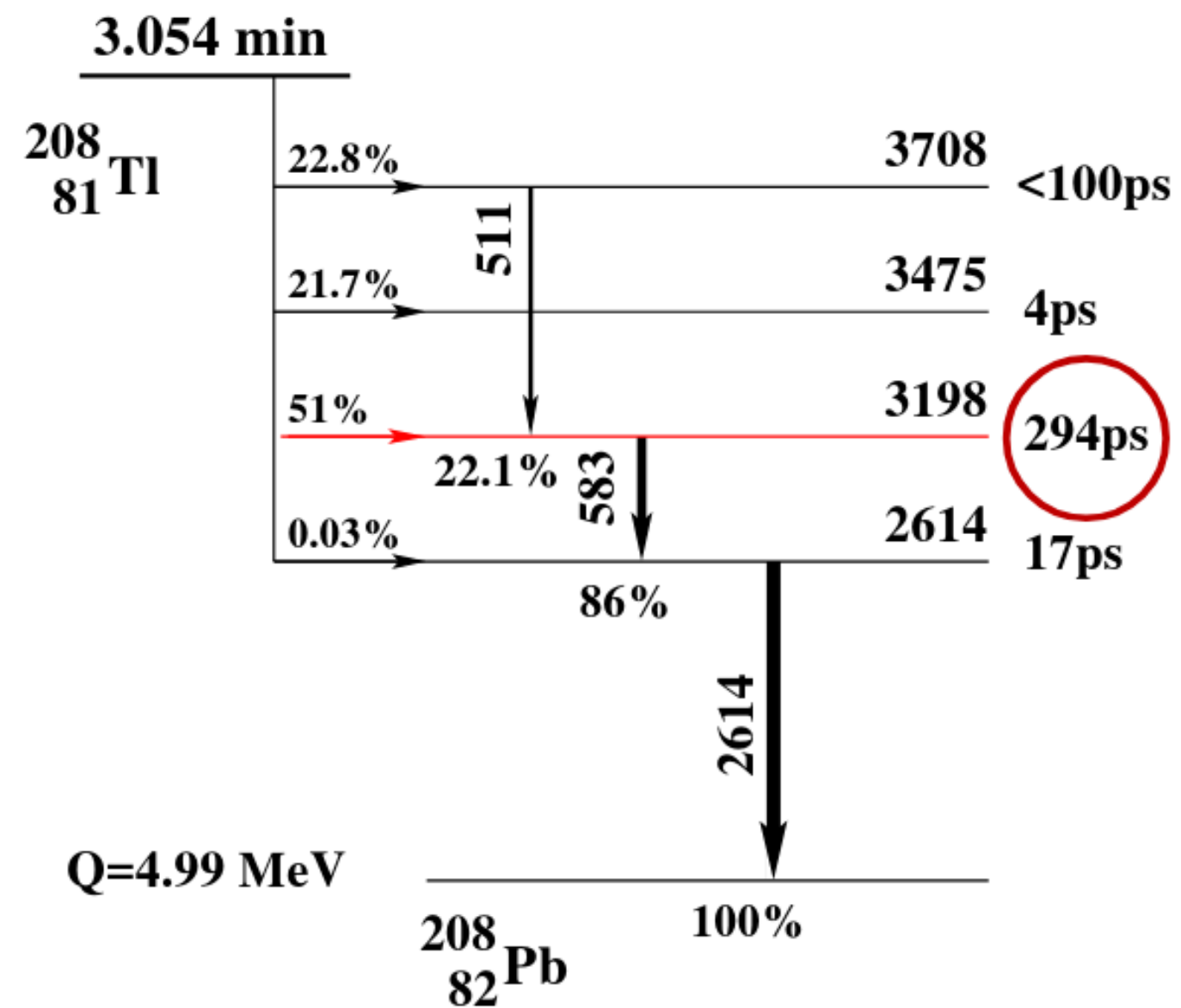
- Correct Birks and Cherenkov effects in the simulation
- Apply measured non-uniformity corrections
- Investigate inclusion of additional materials (e.g. glue) in the detector simulation

Crossing electron vertices map

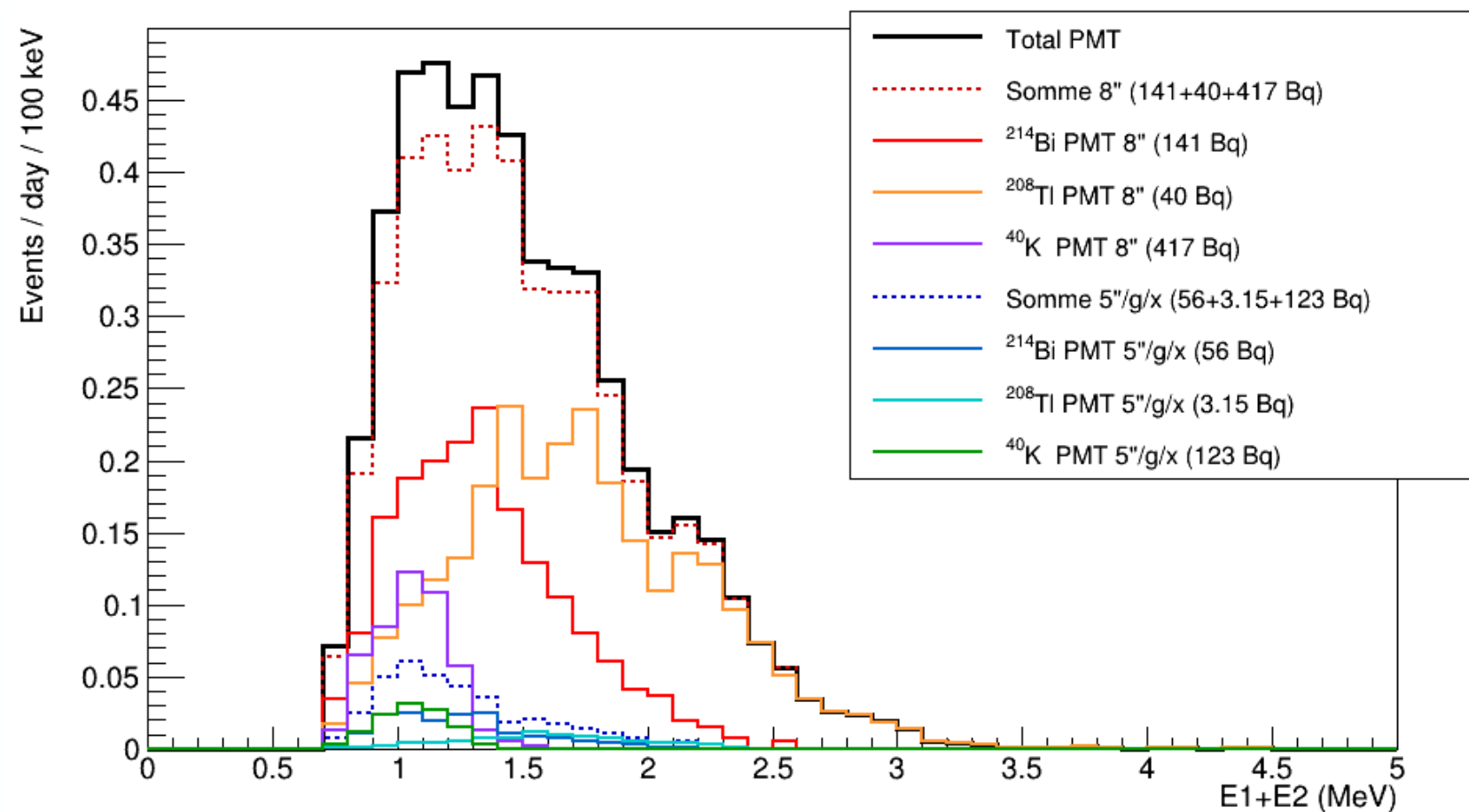
First analysis of the crossing electron channel

Backup

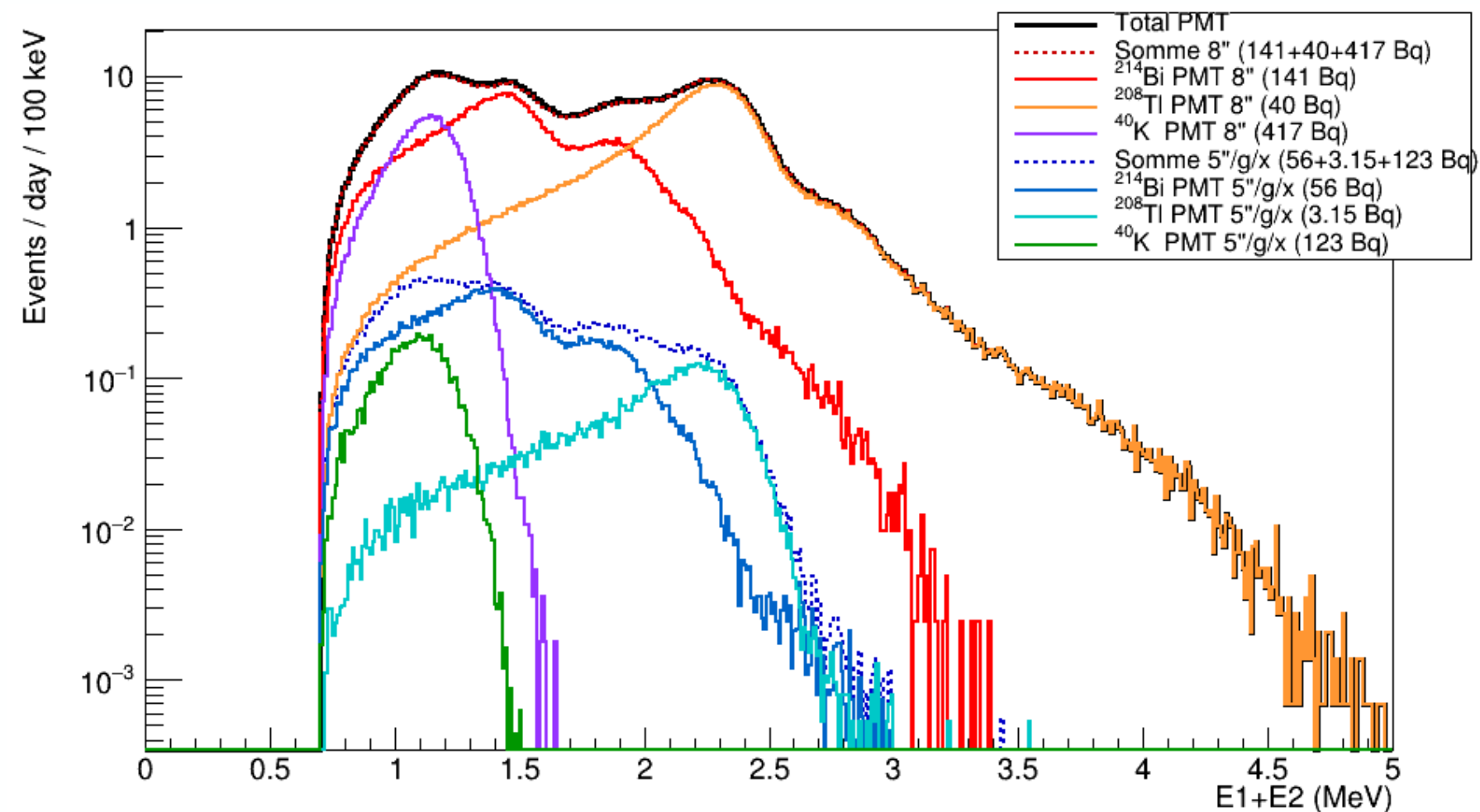
Thanks for listening



Internal contribution



External contribution



5" PMT are negligible for both