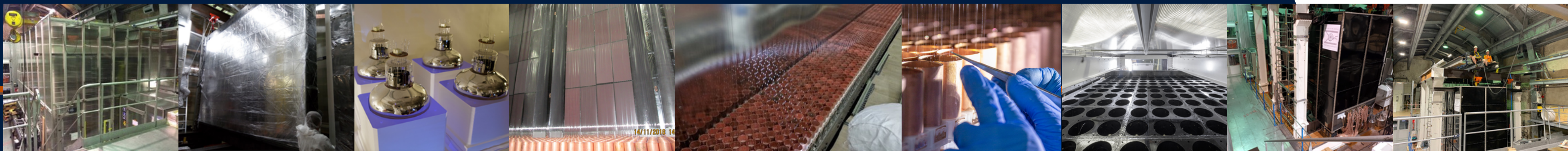


supernemo



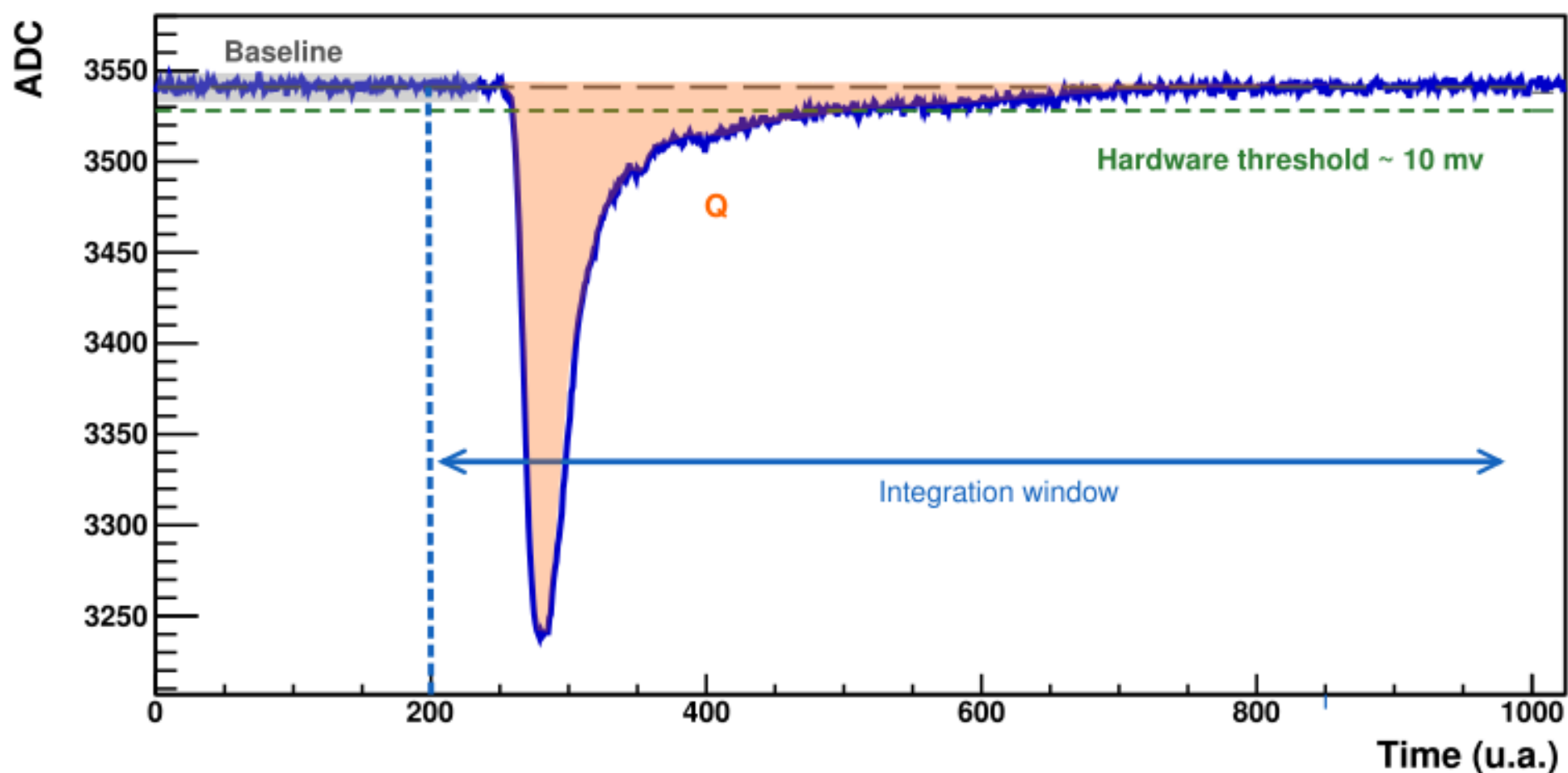
# Analysis threshold definition

Granjon Mathis



Hardware threshold is an OM-by-OM voltage threshold

Waveform example for an electron

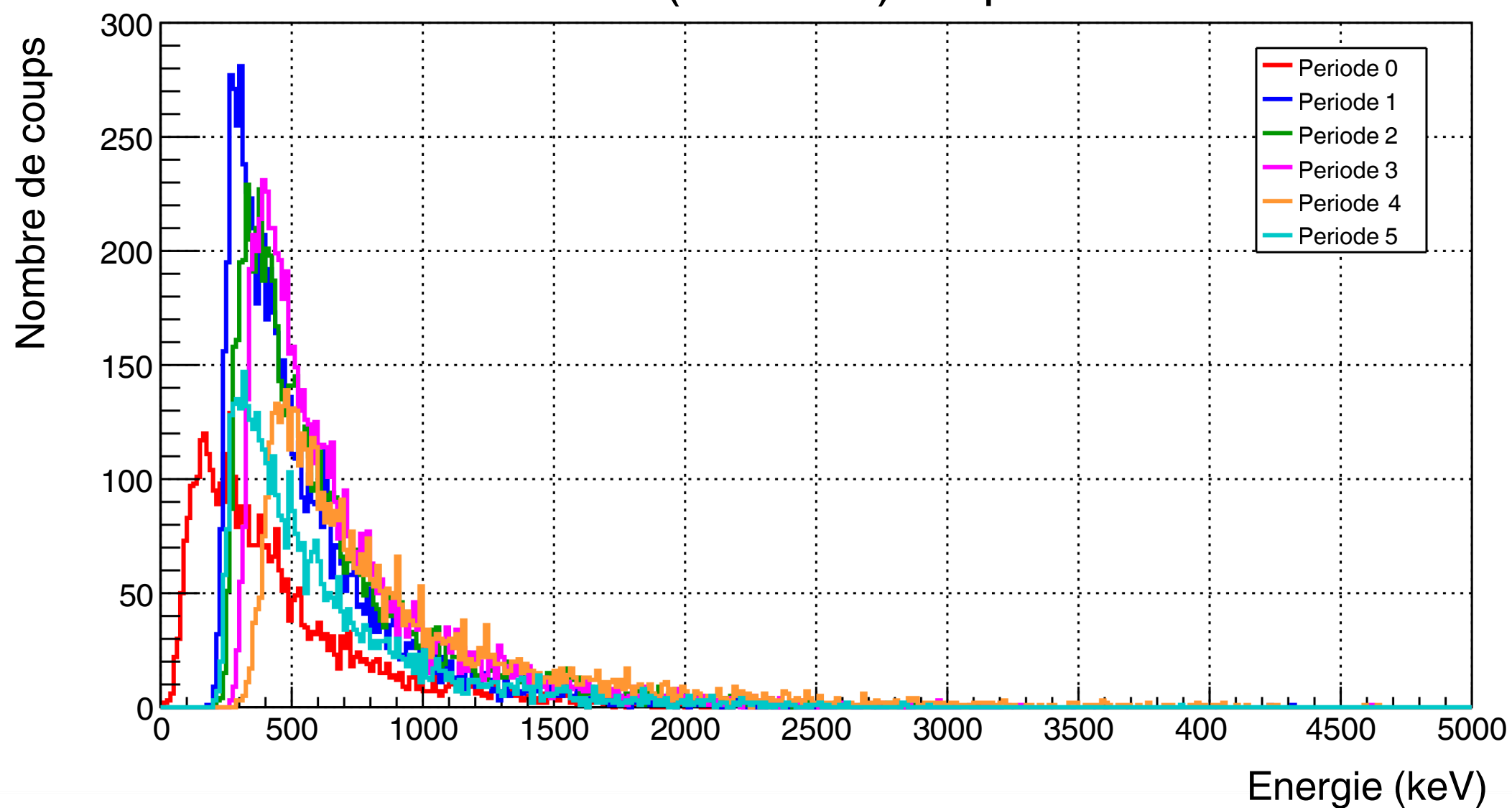


Due to **gain** variation, same energy deposit will sometimes trigger OM sometimes not

This effect should be avoid by energy second threshold we applied in analysis (350/50 keV)

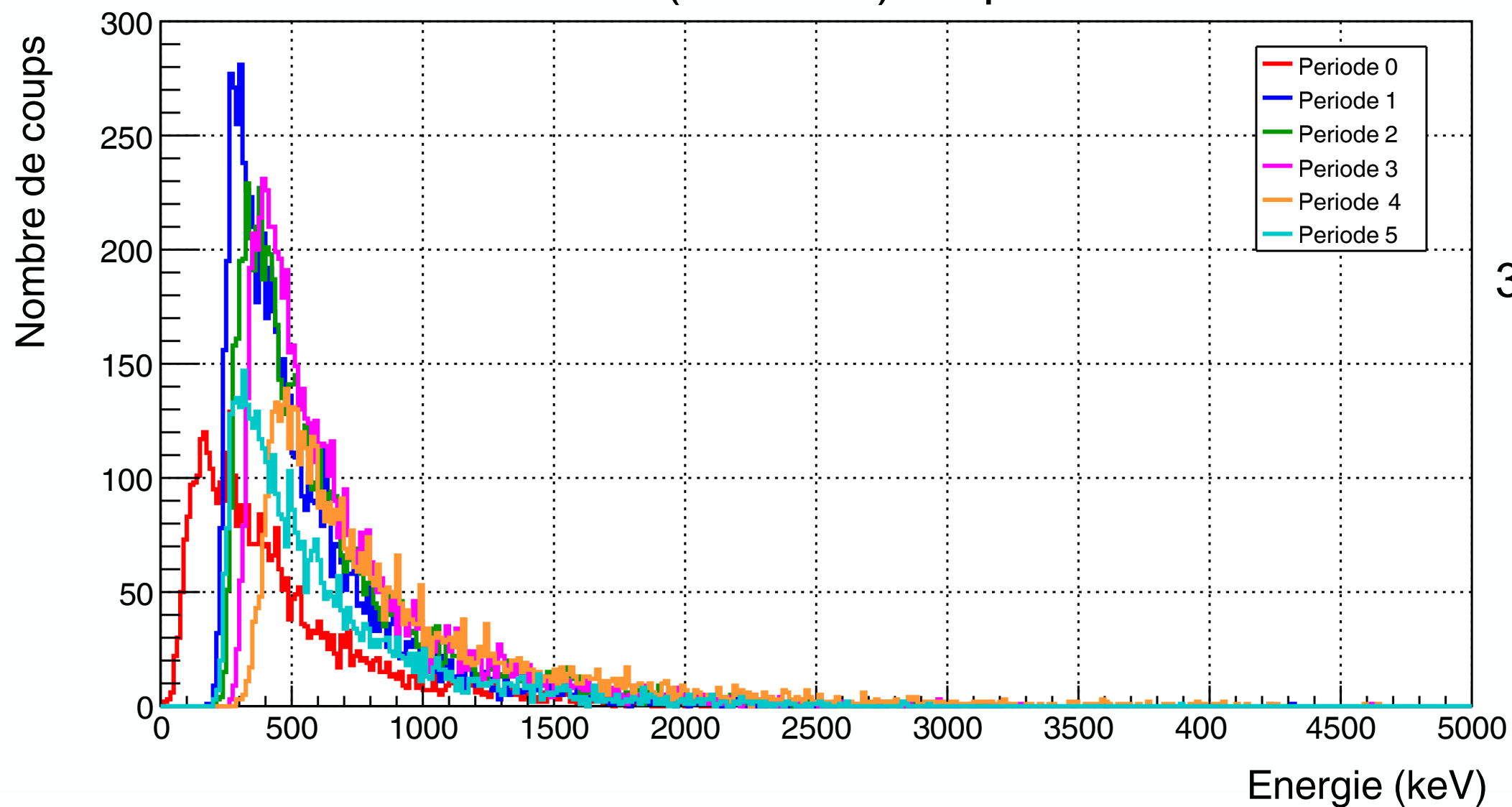
Is it really the case?

Spectra from all energy deposit in  
OM 112 (unstable) for phase 0



- Lets investigate this effect through energy distributions
- Periods are defined by  $^{207}\text{Bi}$  calibration
- Energy distributions are shifted with calibration

Spectra from all energy deposit in  
OM 112 (unstable) for phase 0



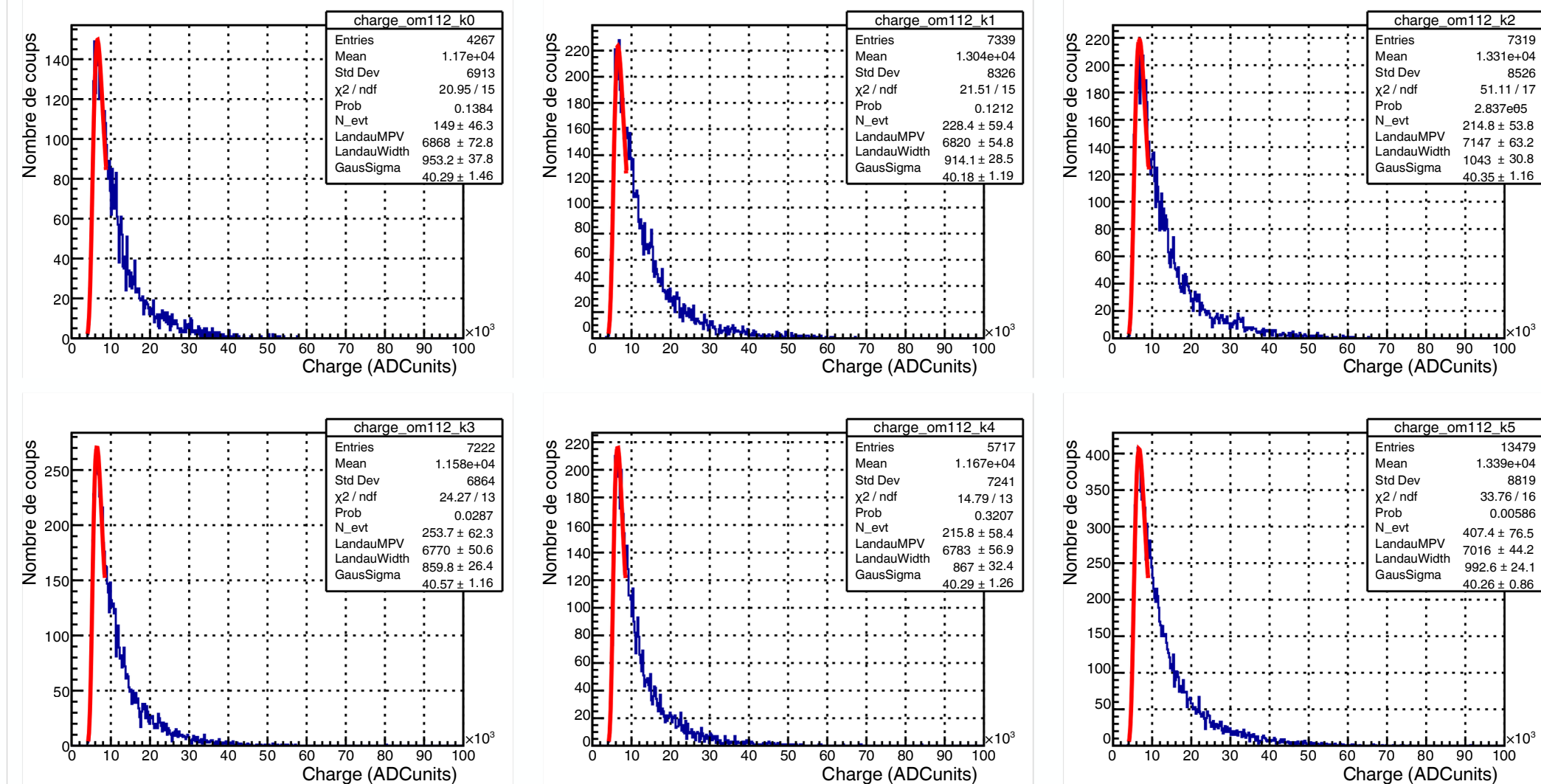
Threshold variables effects can not be reproduce in data

→ simplification = take maximum threshold

3 levels of threshold

- Old general constant threshold per phase 350/50 keV
- New maximum value per phase for simulation
- Variable threshold changing with time

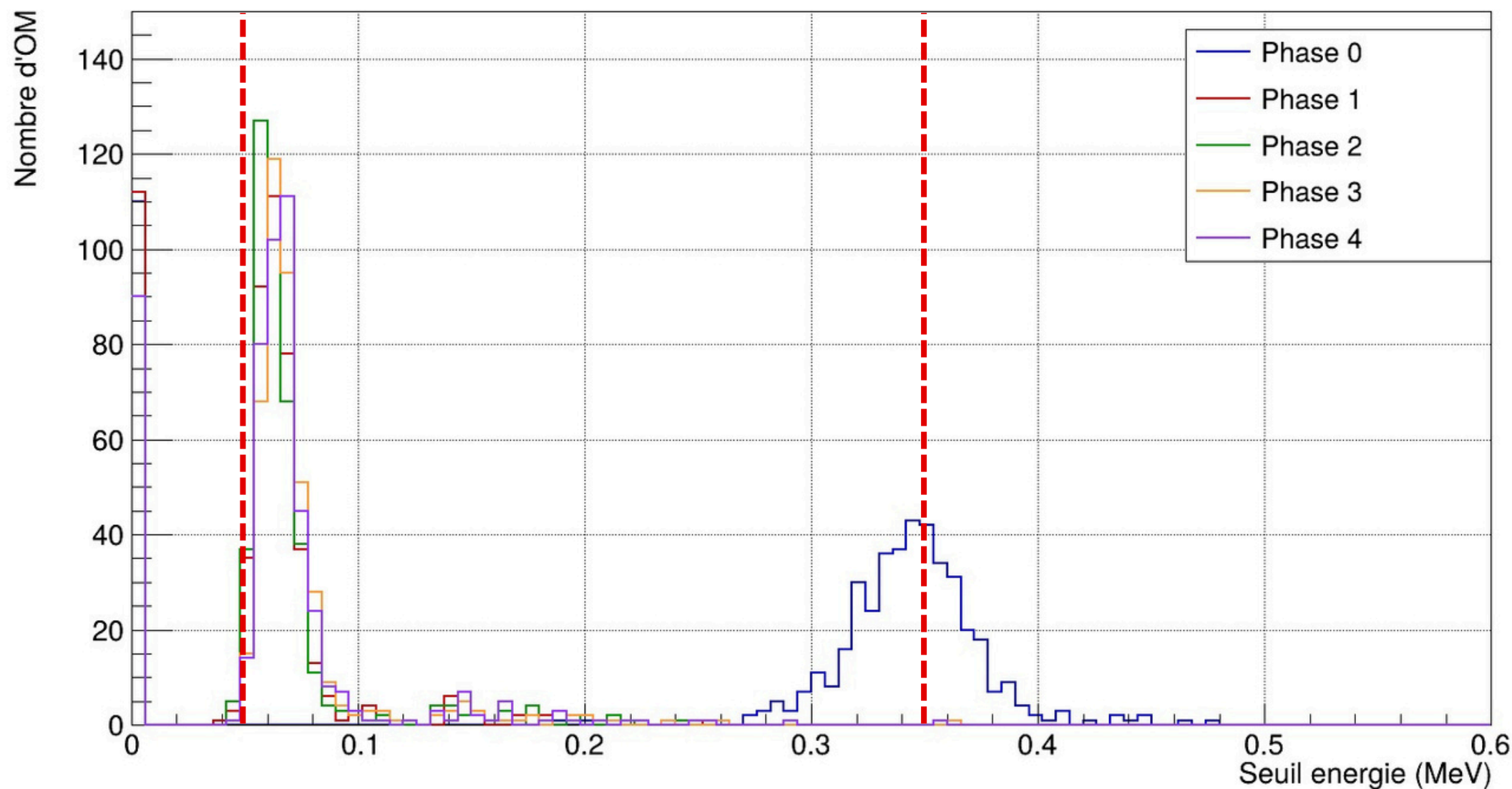
## Example of fitted charge spectra for phase 0 om 112



- Fit = gaussian convoluted with landau
- Idea = group charge spectra for each calibration
- Fit each charge spectra
- Keep maximal landau value
- Transform this value in energy with calibration parameters

# Threshold results

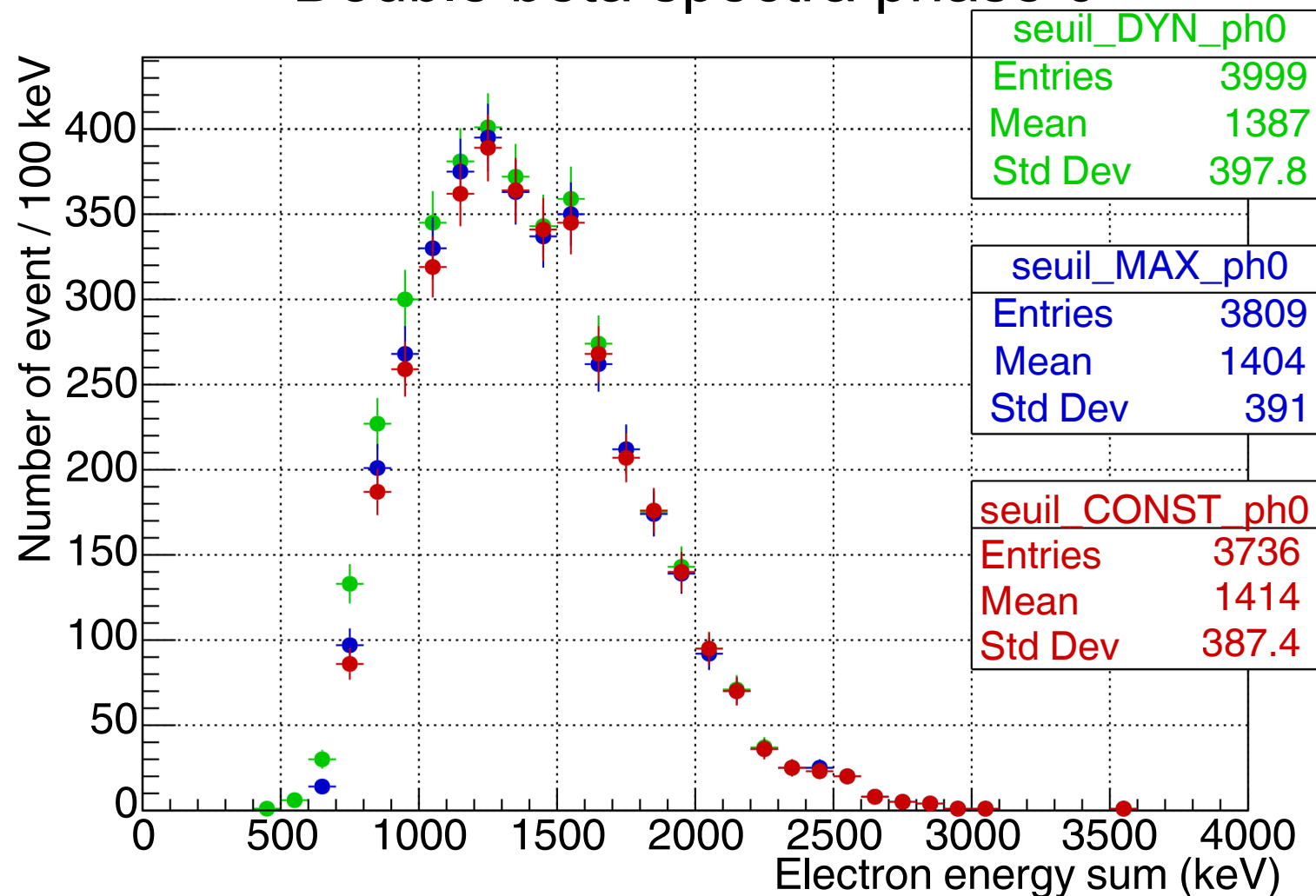
Threshold results per phase and per OM



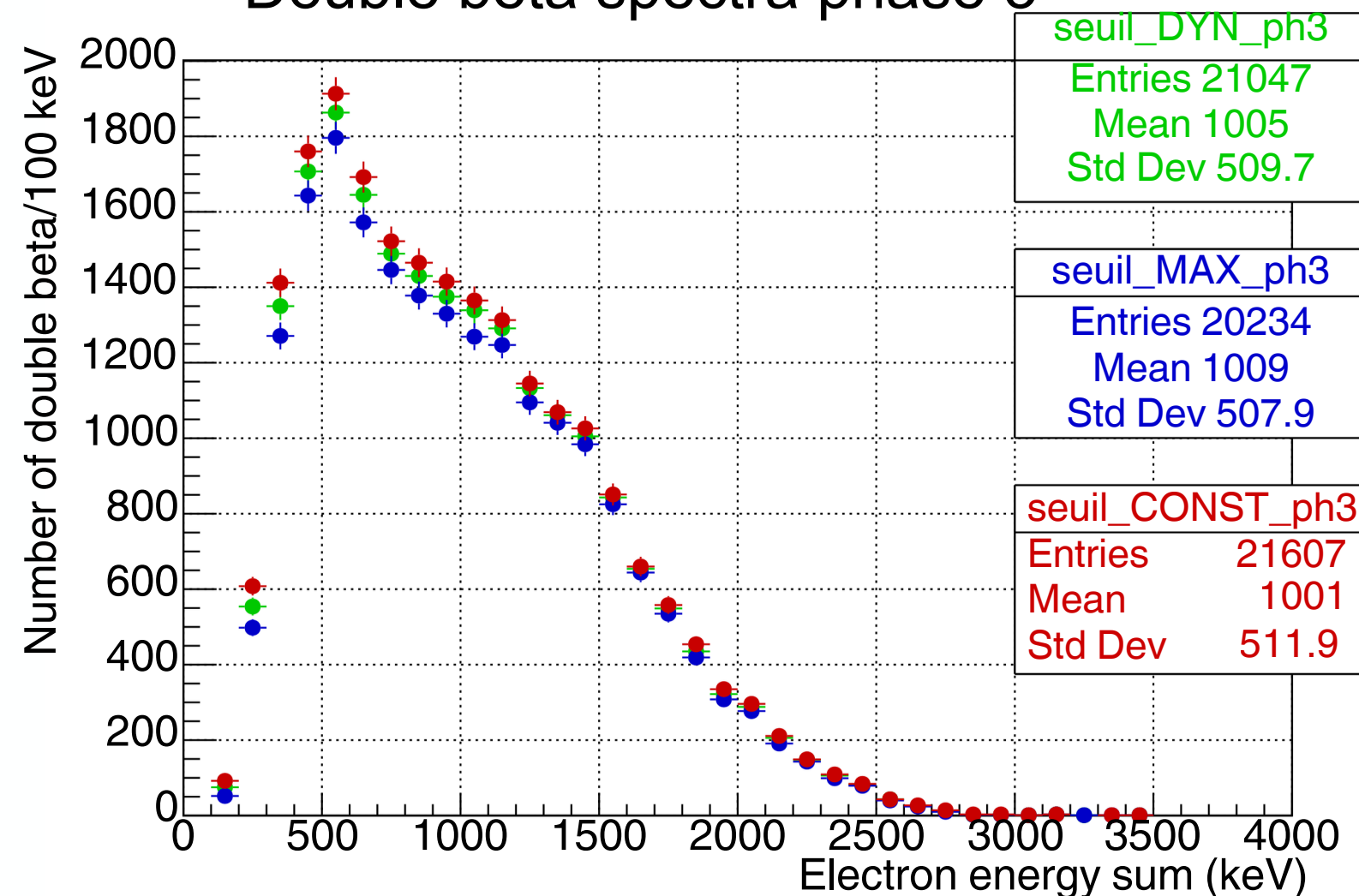
- Difference between constant **350/50 keV threshold** and individual measured one
- Threshold too low for phase 1,2,3
- Individual thresholds are necessary for all OMs
- Thresholds values are available here :  
*/sps/nemo/scratch/margnes/data/seuil\_max*

# Application to double beta data spectra

Double beta spectra phase 0



Double beta spectra phase 3



Overestimated general threshold → gain of events

Underestimated general threshold → events loose

- Depending on the phase we gain or loose events
- Better description of the beginning of the spectra

# Next steps calibrations precisions

First measurement of individual, time-dependent OM energy thresholds.

- The fit method is robust and performs well for most OMs.
- The previous global 350/50 keV thresholds were too approximate to account for OM-to-OM threshold variations.
- These new thresholds have a measurable impact on the double-beta energy spectra.

Next steps

- Implement variable threshold in simulation?

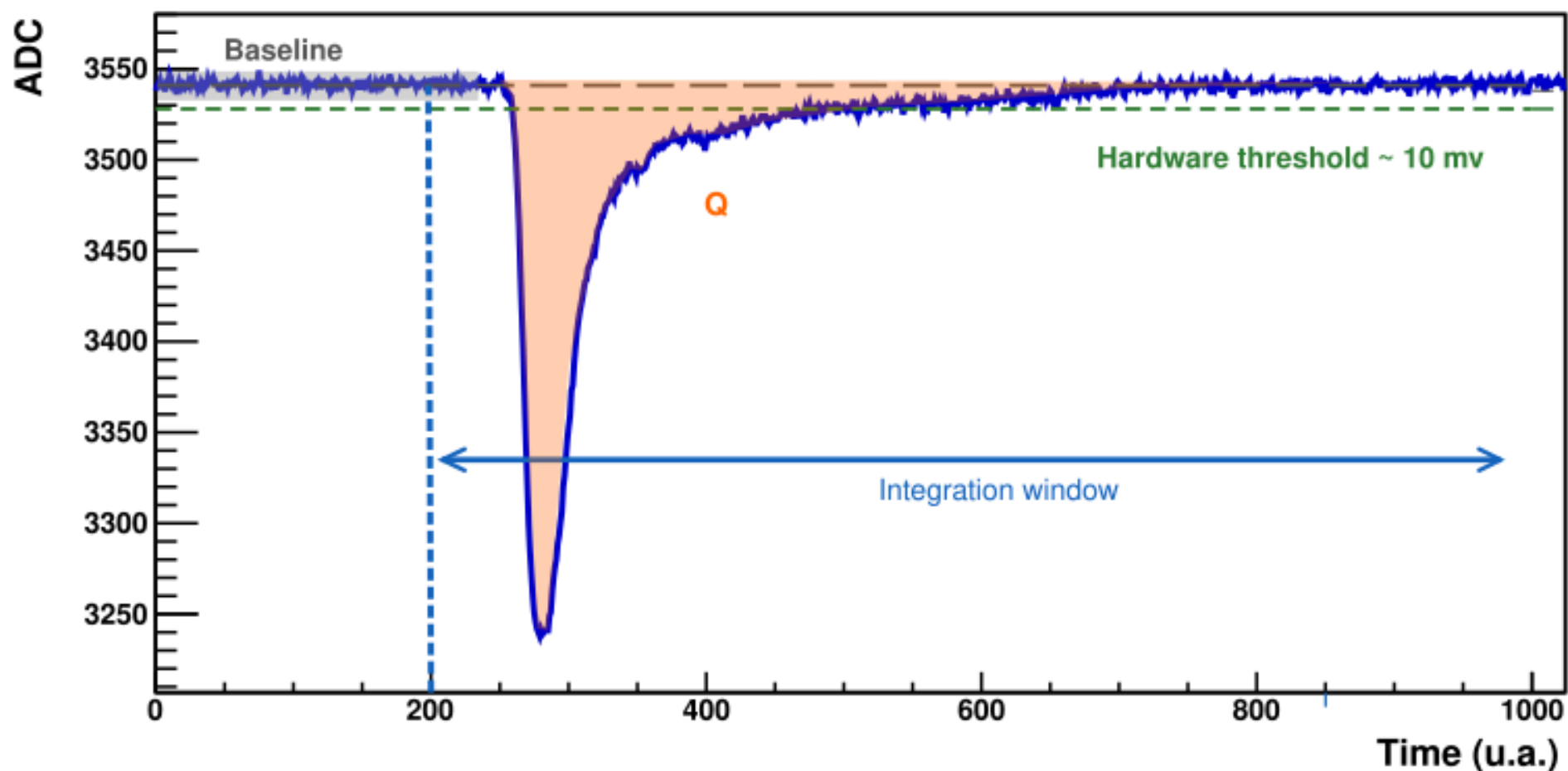
Thanks for listening

Btw this is not my work but the one from M2 internship Raphaël Margnes

Congratulation and thanks to him

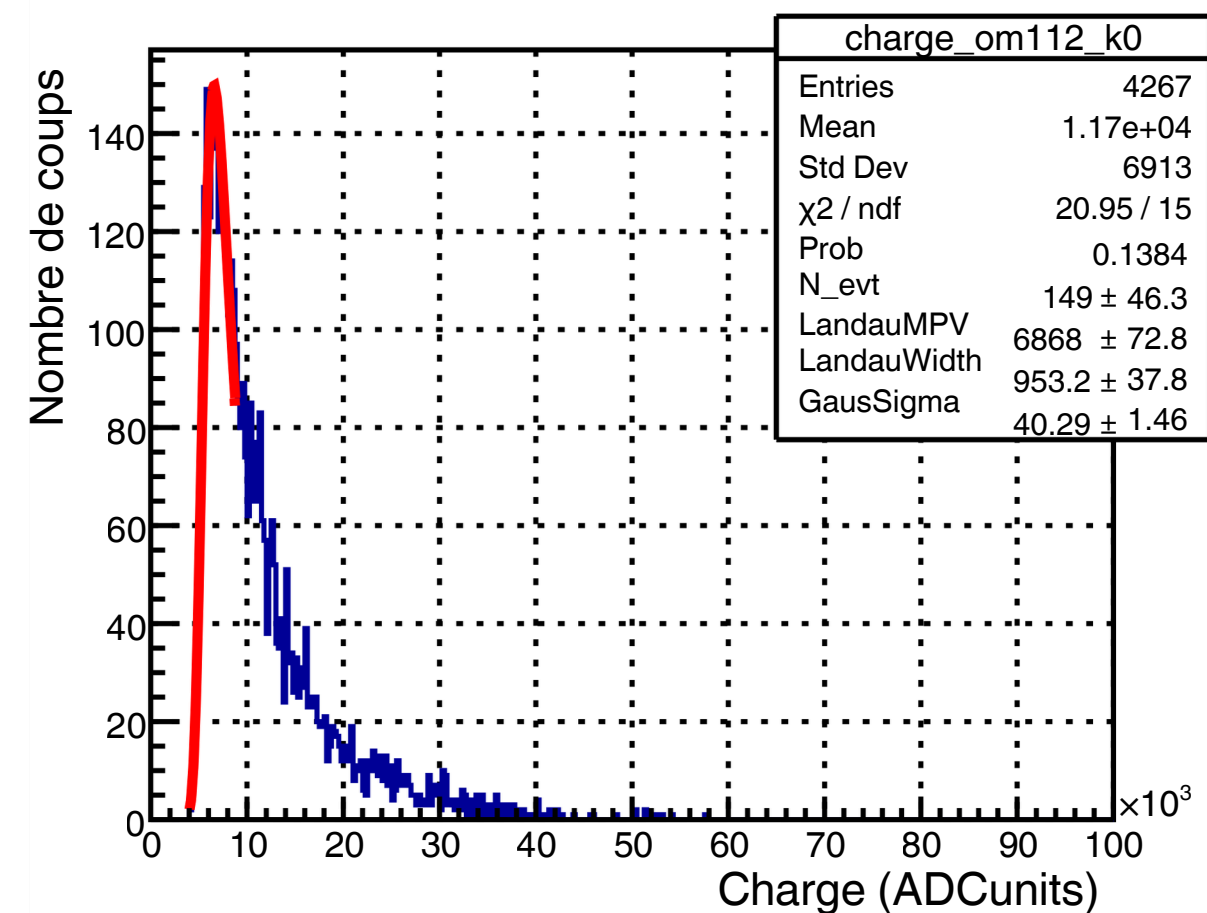


Waveform example for an electron

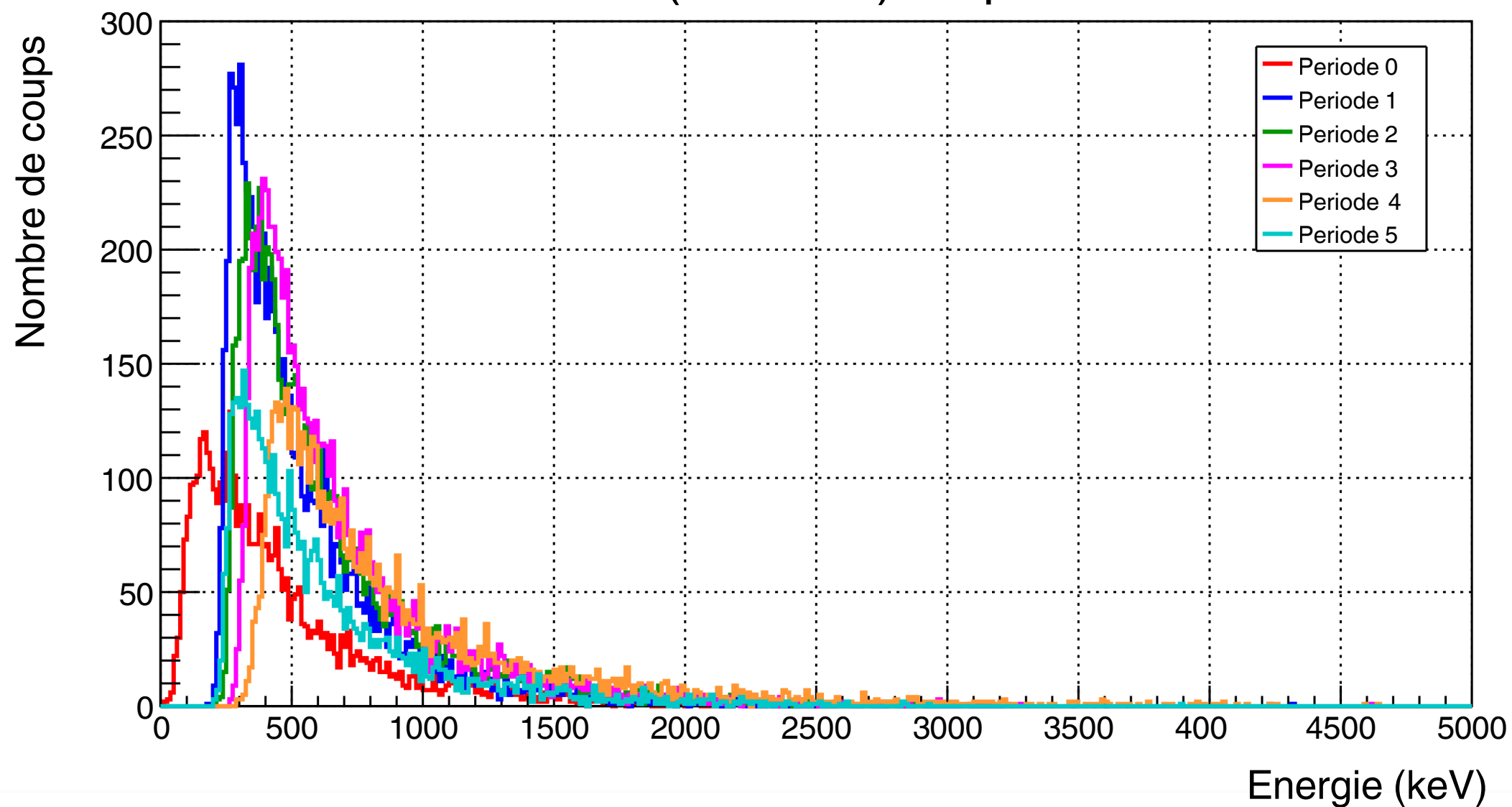


Hardware threshold is an OM-by-OM voltage threshold

This threshold will give charge spectra



Spectra from all energy deposit in  
OM 112 (unstable) for phase 0



- Energy distributions are shifted with calibration
- Periods are defined by  $^{207}\text{Bi}$  calibration