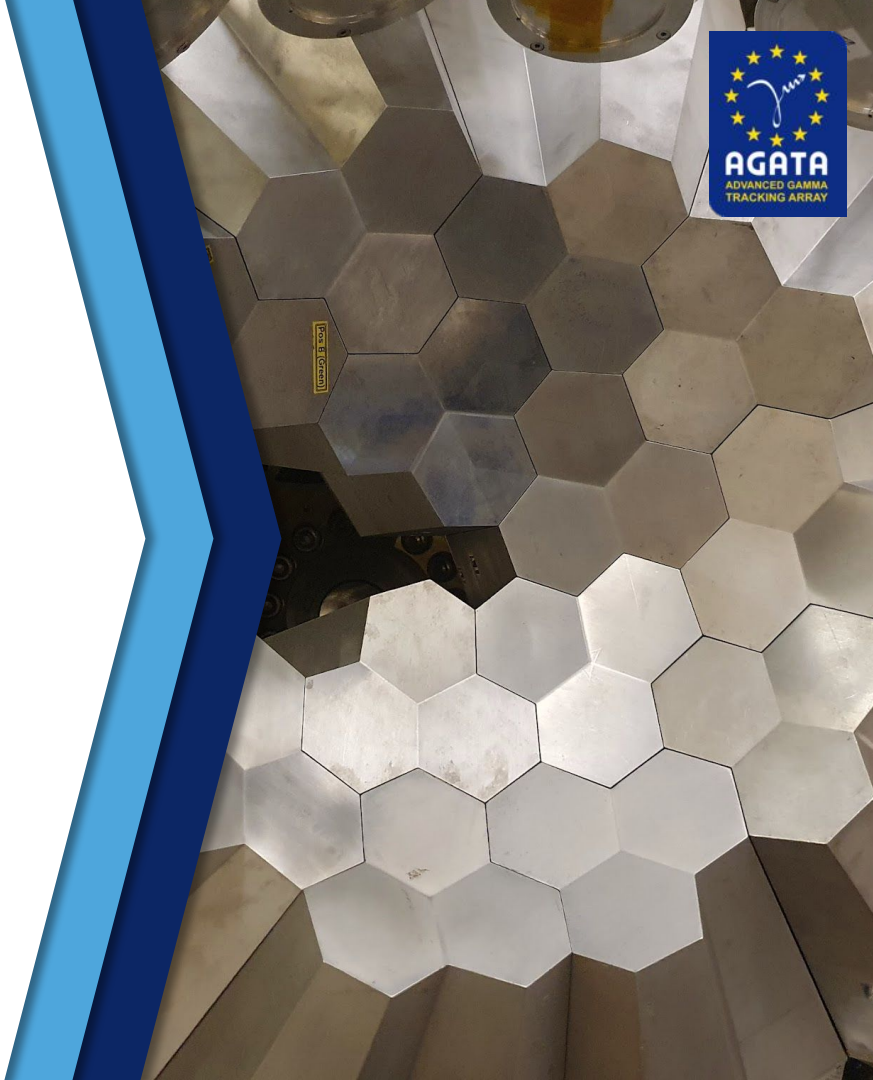
Status of the AGATA detectors

R. M. Pérez-Vidal
for the AGATA collaboration

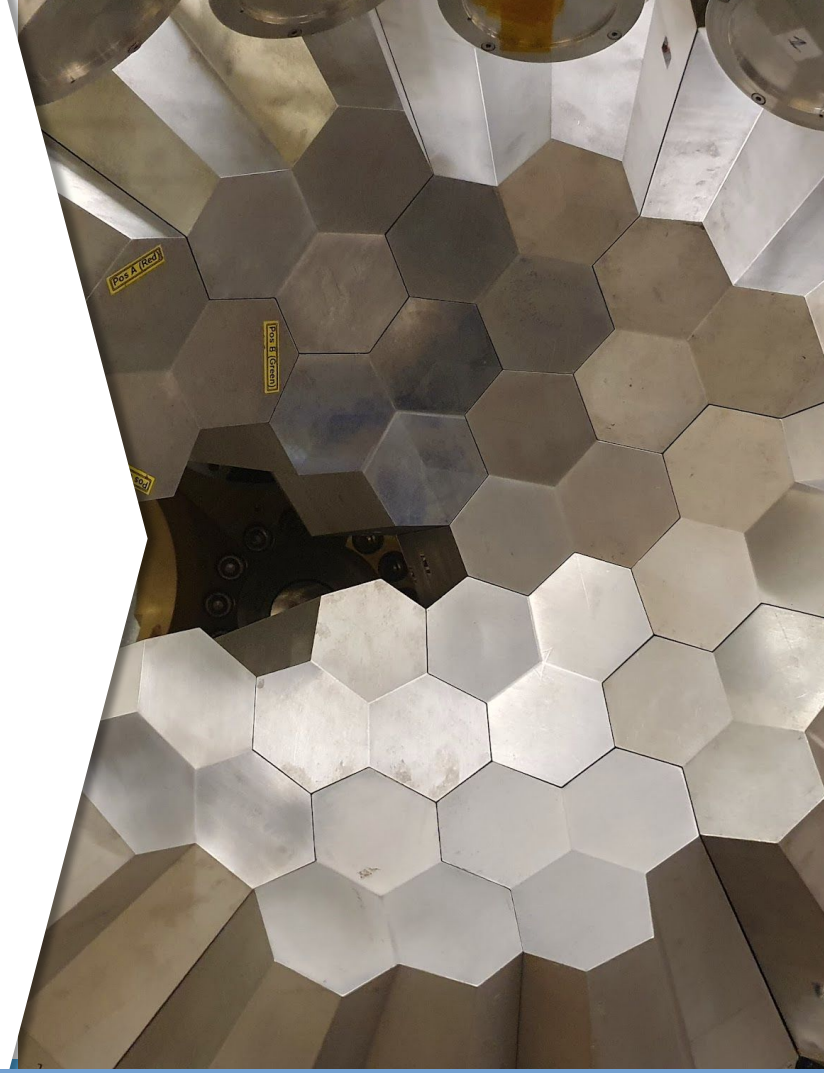
IFIC-CSIC-UV

25th AGATA Week | 19th September 2025



Outline

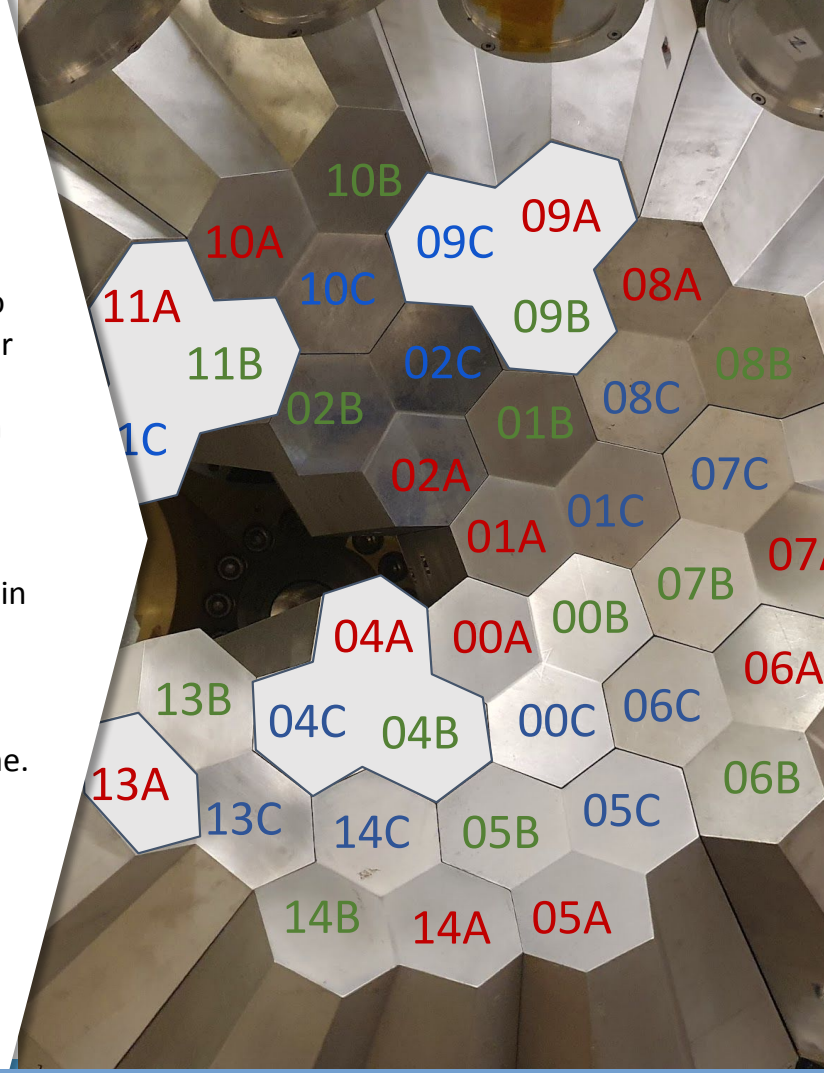
- Status July
- Data processing (reminder)
- Resolution
- 24h measurement 60Co
    - Energy gain drifts
    - PSA
- Summary



Status July 2025

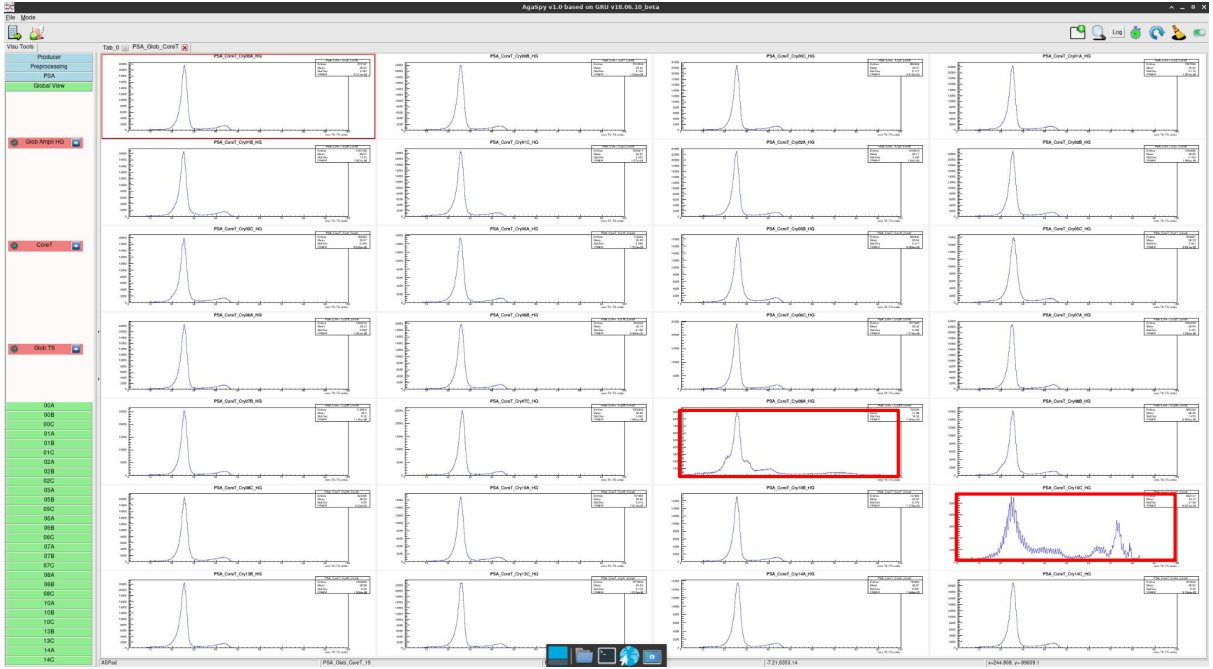
10 ATC - 29 AGATA crystals

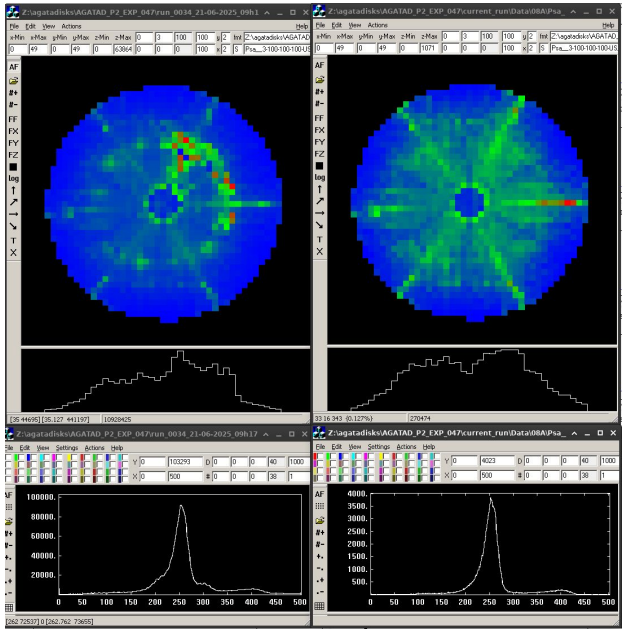
- **02C (C013 - ATC 17):** seg. B4 missing (no signal in scope) and B5 also
- **05C (C006 - ATC 9):** gain and baseline of the core jump together over time, this change affects the gain of the core and of the segments
- **07B (B019 - ATC 2):** bad resolution due to the continuous oscillation of the energy in the HG core (LG ok)
- **08A (A022 -ATC 22):** T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.
- **08B (B022 - ATC 22)**: seg. B4 with a broken FET causing ghost peaks in the neighbours and seg. B3 with adc offset out of range (saturates).
- **04 (ATC 7), 09 (ATC 12), 11 (ATC 1):** unmounted for maintenance.
- **10C (C022 - ATC 23)**: In many segments was confirmed a gain shift over time. In addition the T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.
- **13A (A020 - ATC 21)**: used for tests
- **00B (B018 - ATC 18):** displays a cross in the PSA hit pattern



Status July 2025

08A and 10C



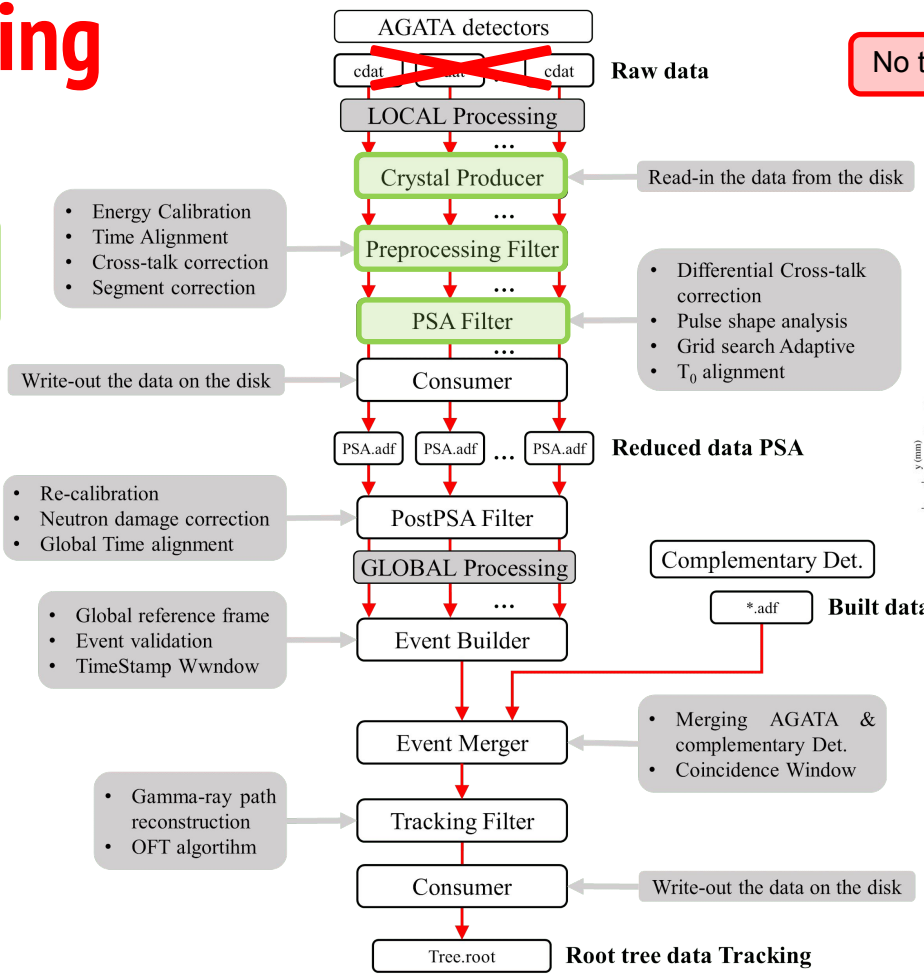


Tzero in 08A not working properly and affecting to the PSA. Recovered by switching off/on the preamp.

Data Processing

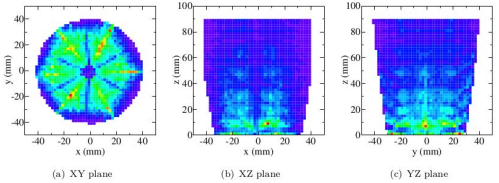
Narval Actors

Operations up to the PSA need to be carefully prepared before the experiment and checked online

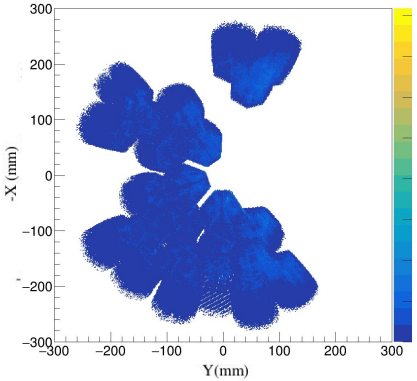


No traces stored during LNL campaign

Pulse Shape Analysis



Tracking

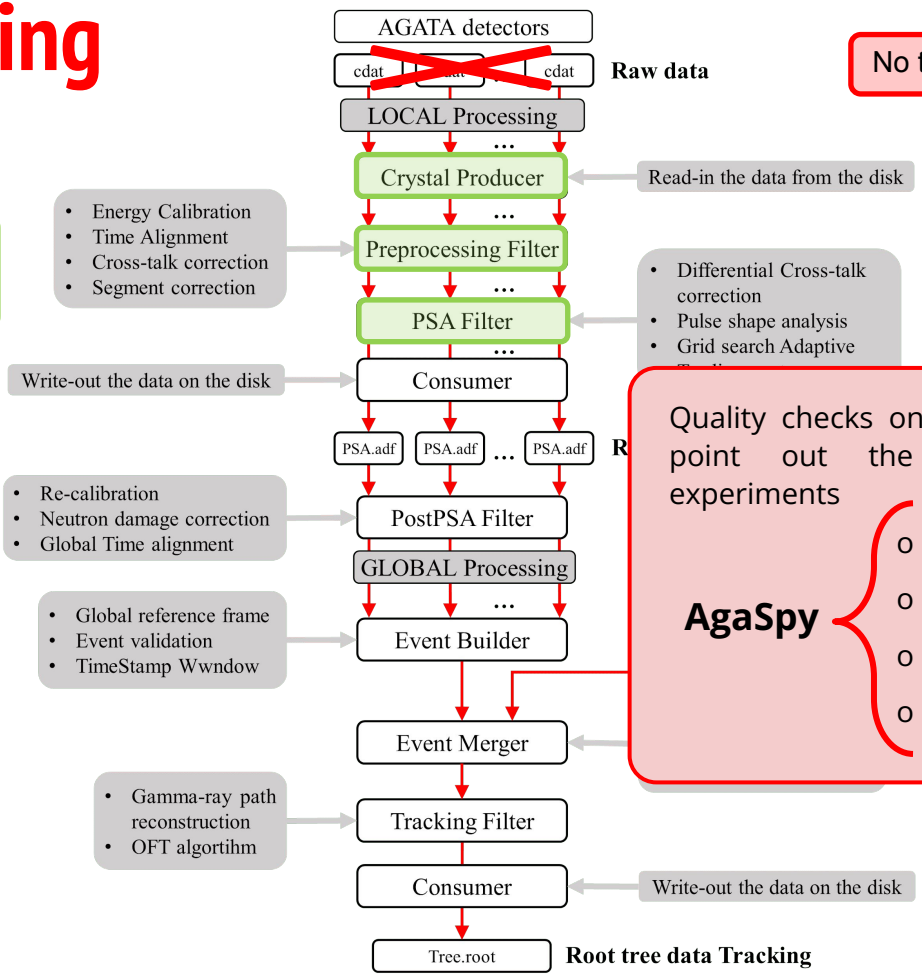


First Interaction pattern

Data Processing

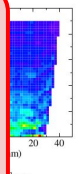
Narval Actors

Operations up to the PSA need to be carefully prepared before the experiment and checked online



No traces stored during LNL campaign

Pulse Shape Analysis

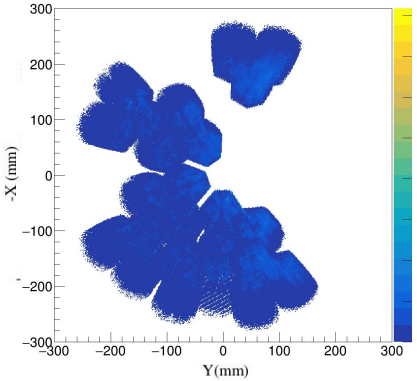


Quality checks on the data are crucial to point out the problems during the experiments

AgaSpy

- Time shifts
- T0 shifts
- Unstable/Dead segments
- Drifts in energy

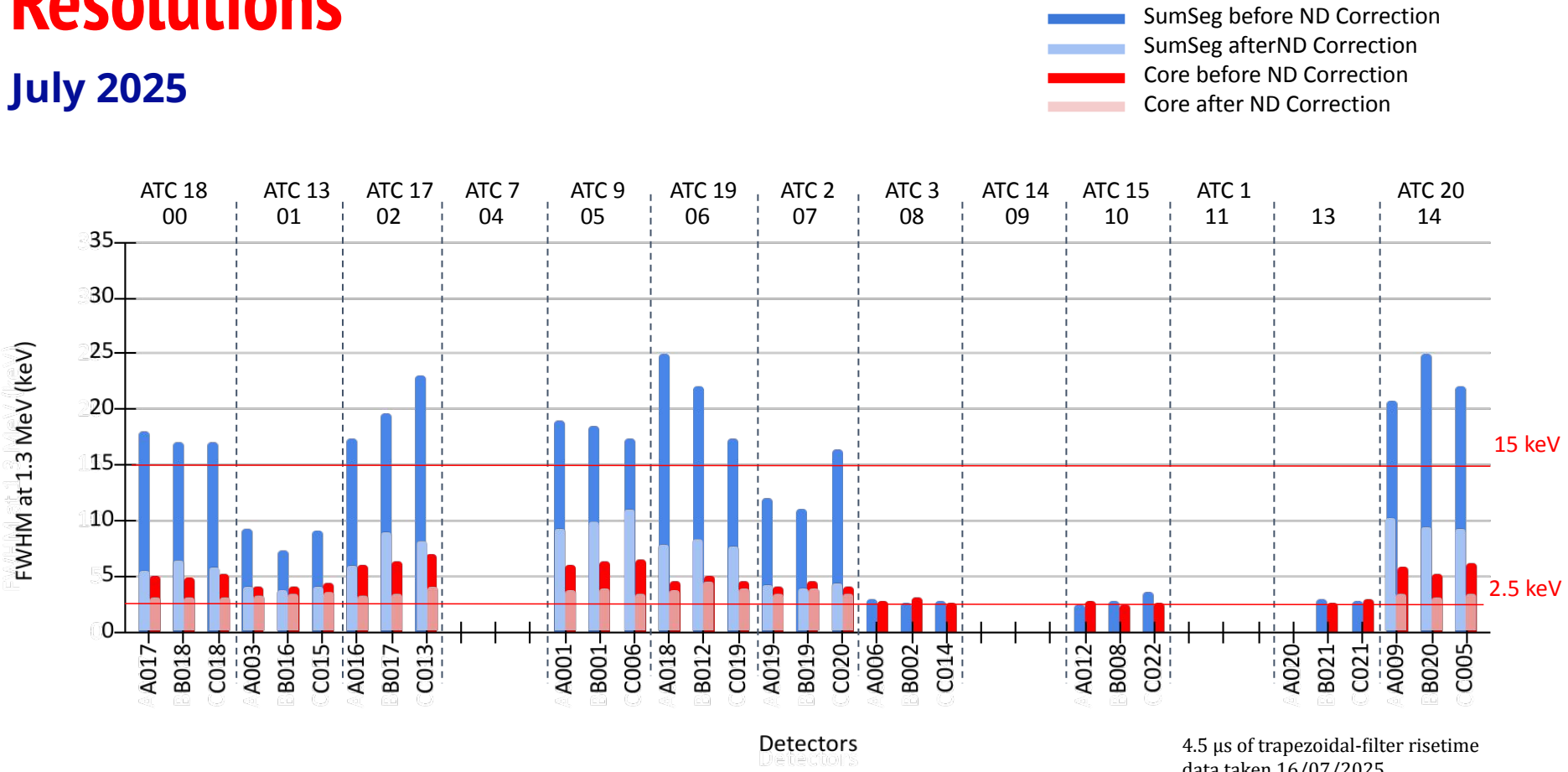
Tracking



First Interaction pattern

Resolutions

July 2025

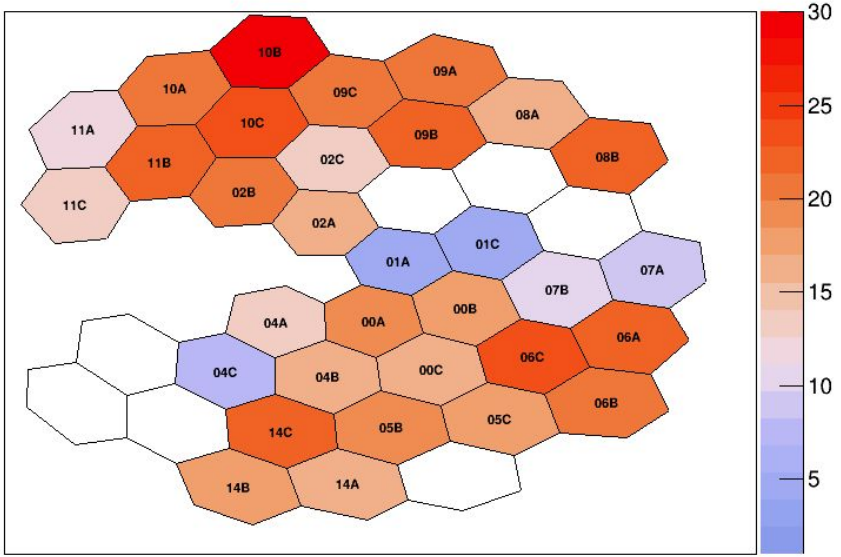


4.5 μs of trapezoidal-filter risetime
data taken 16/07/2025

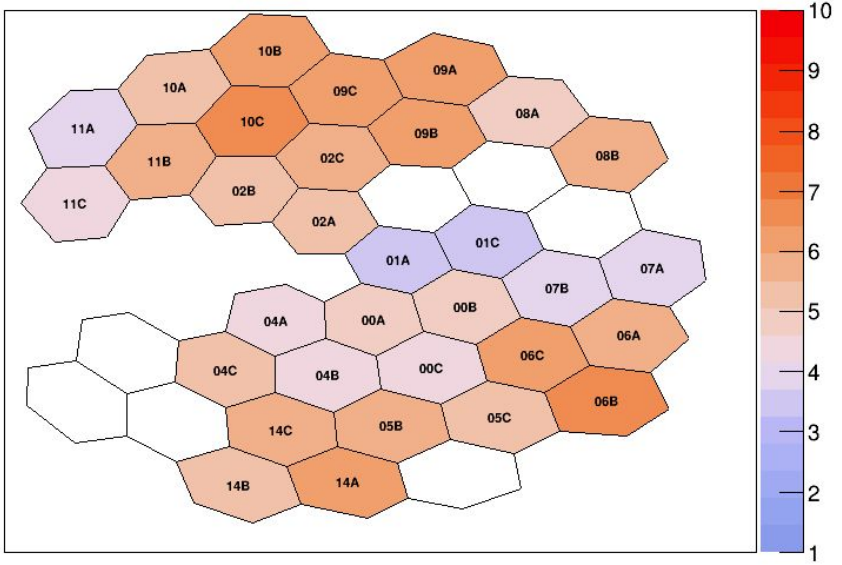
Resolution

FWHM over time

Sum Segs.



Core

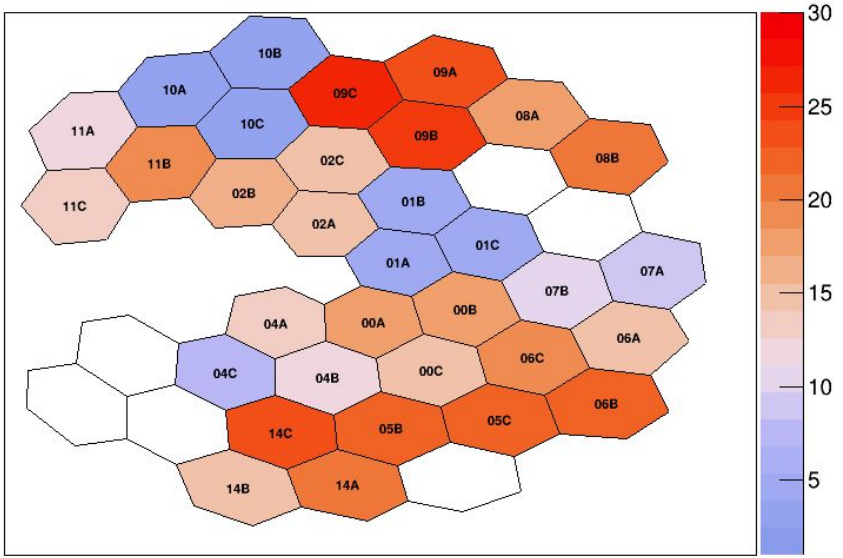


July 2024
after Tandem-Alpi-Piave Beams

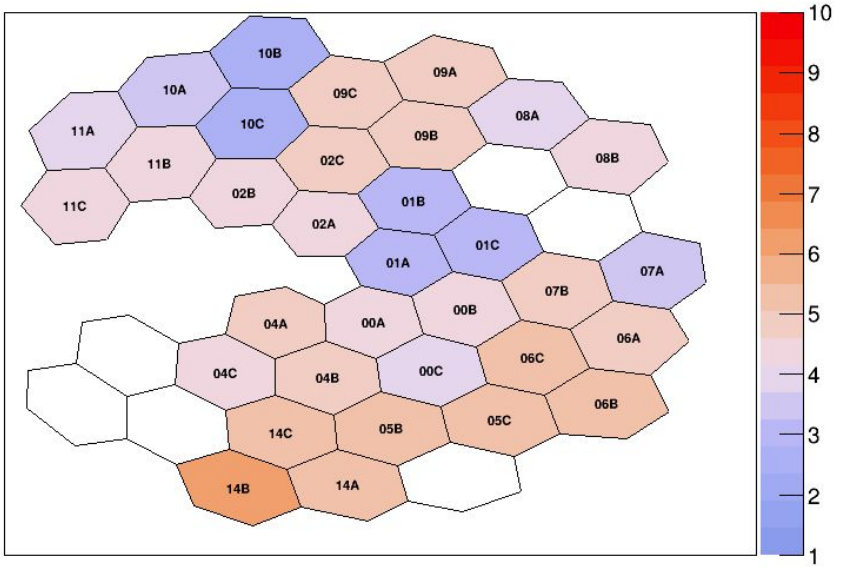
Resolution

FWHM over time

Sum Segs.



Core

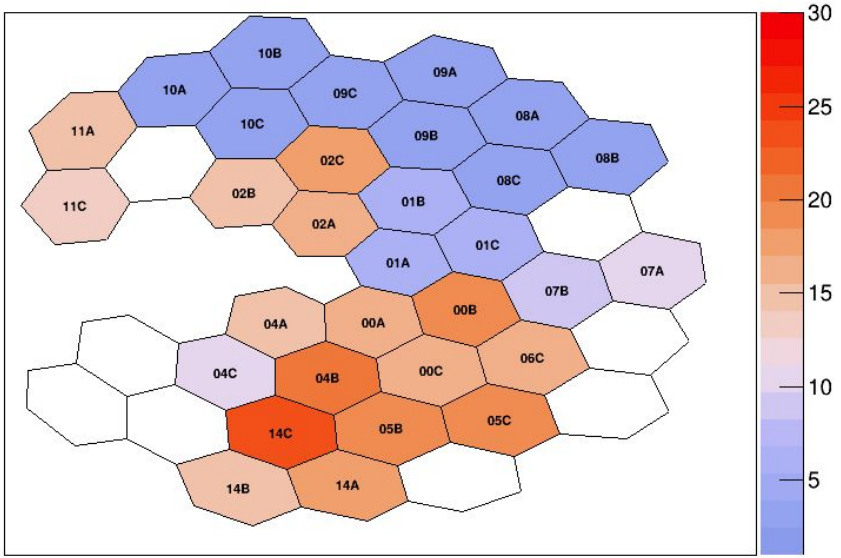


December 2024
after Tandem Beams

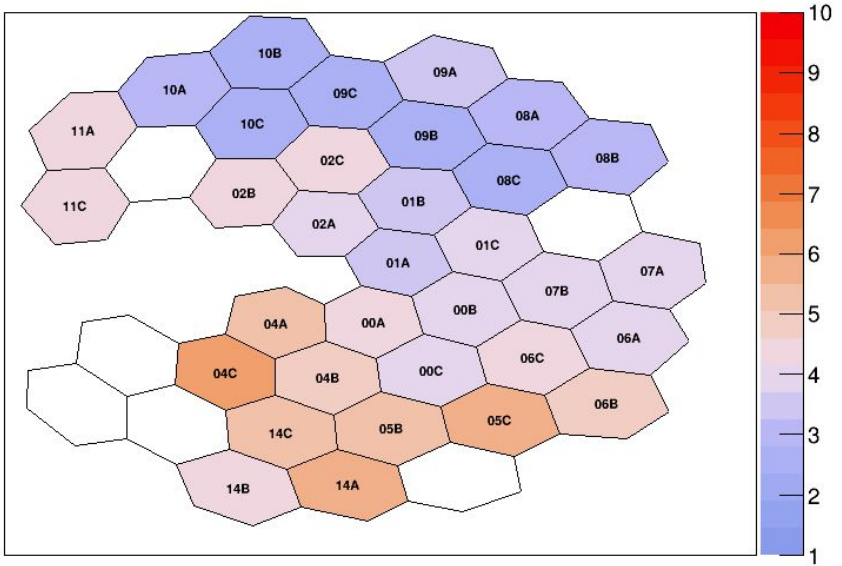
Resolution

FWHM over time

Sum Segs.



Core

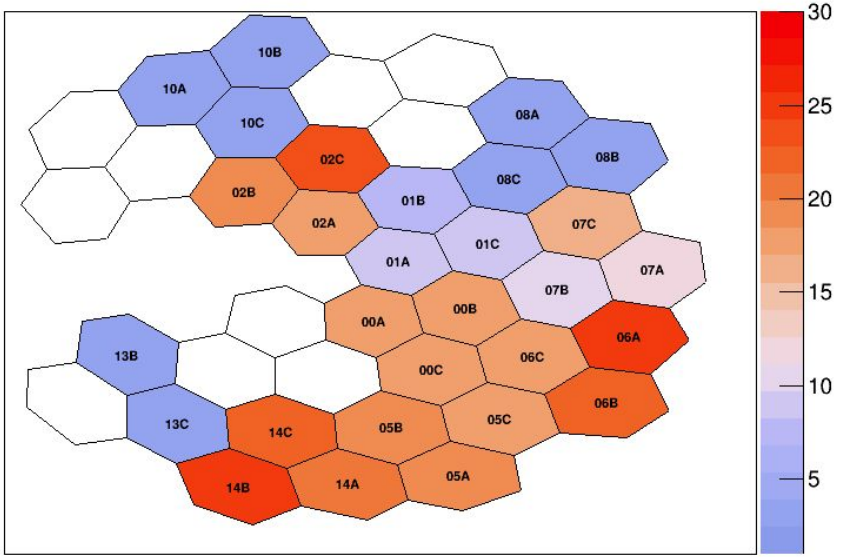


April 2025
after Tandem Beams

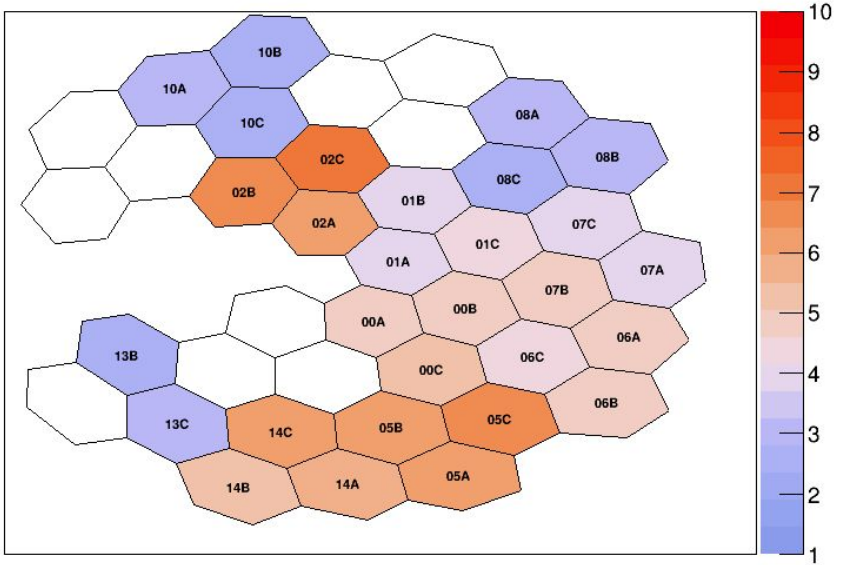
Resolution

FWHM over time

Sum Segs.



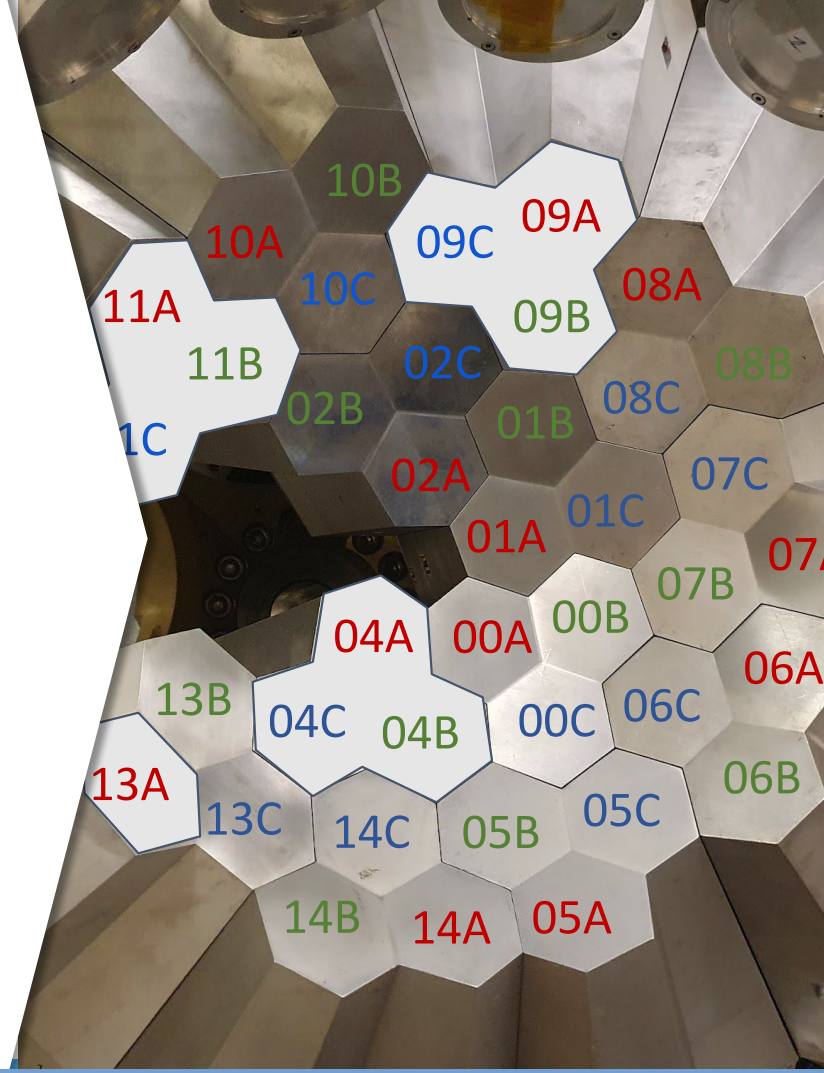
Core



July 2025
after Tandem Beams

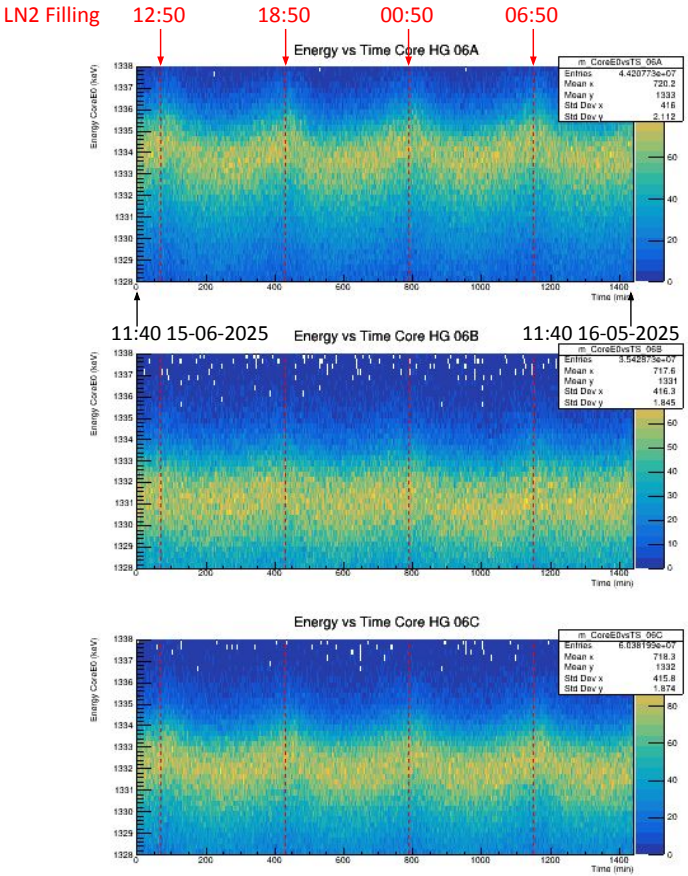
24h measurement

- 60Co
- Fold 2
- Source in AGATA holder position
- Validation rates 300-700 Hz per crystal
- 4µs

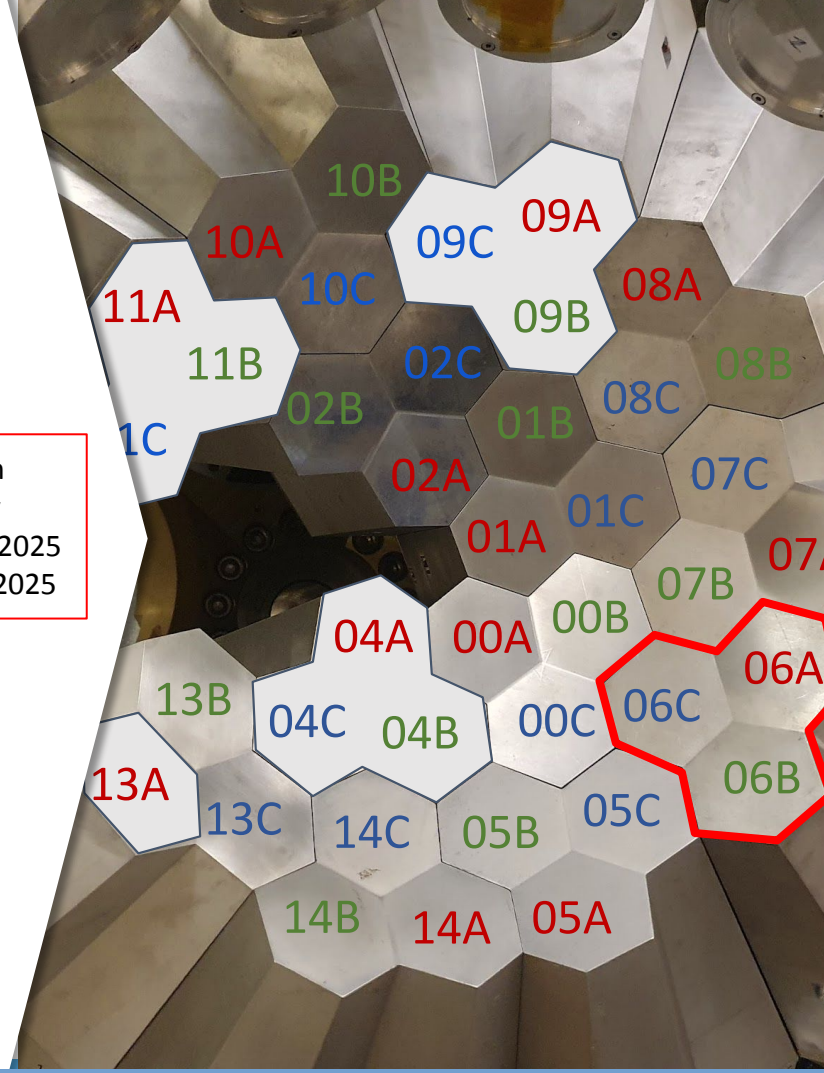


24h measurement

Pos 6 - ATC 19

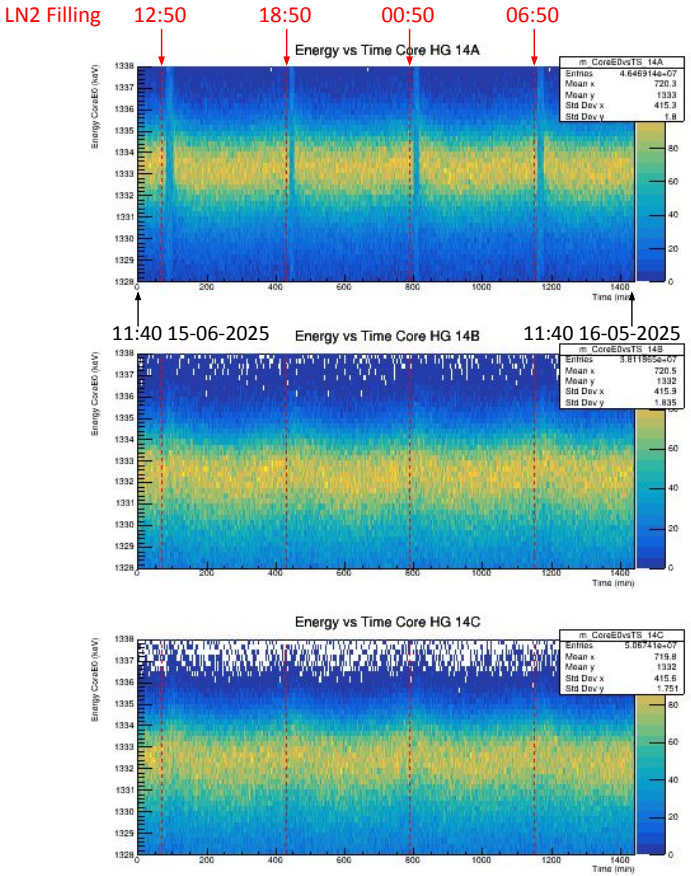


60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025

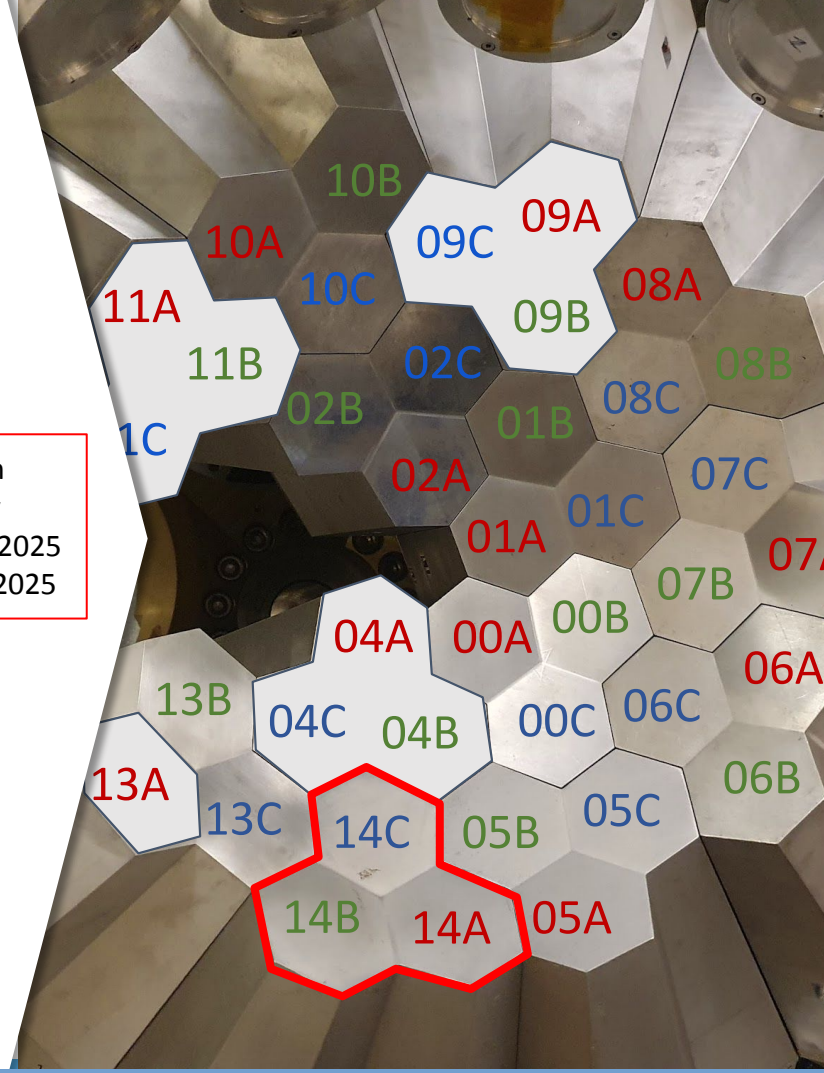


24h measurement

Pos 14 - ATC 20



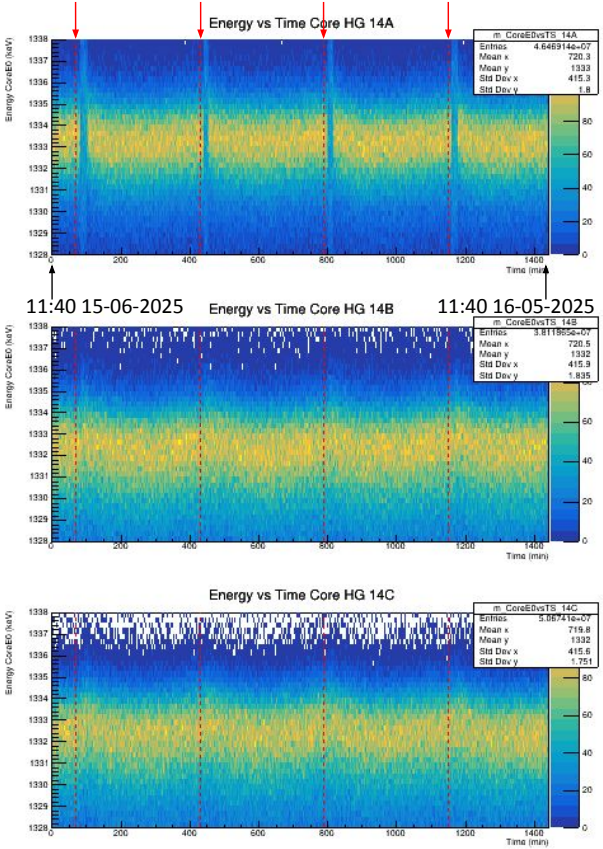
60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025



24h measurement

Pos 14 - AT

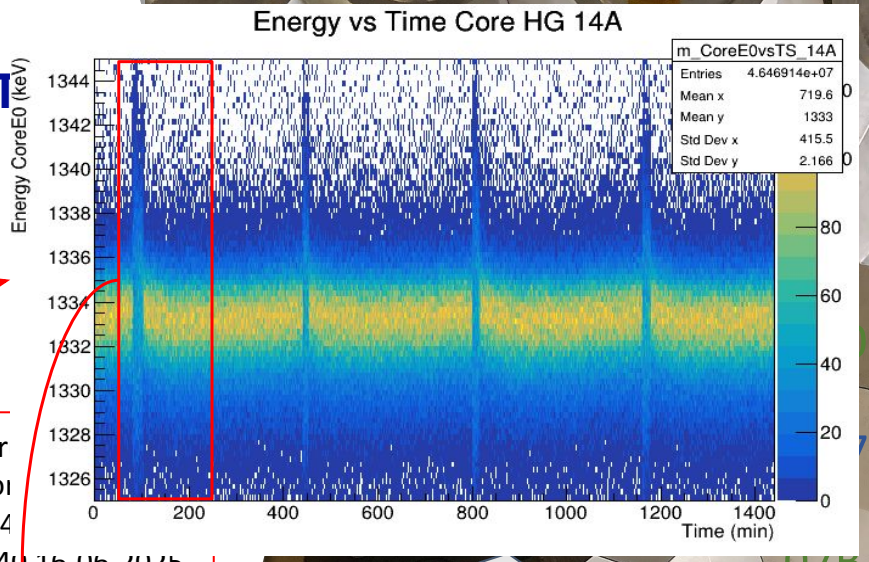
LN2 Filling 12:50 18:50 00:50 06:50

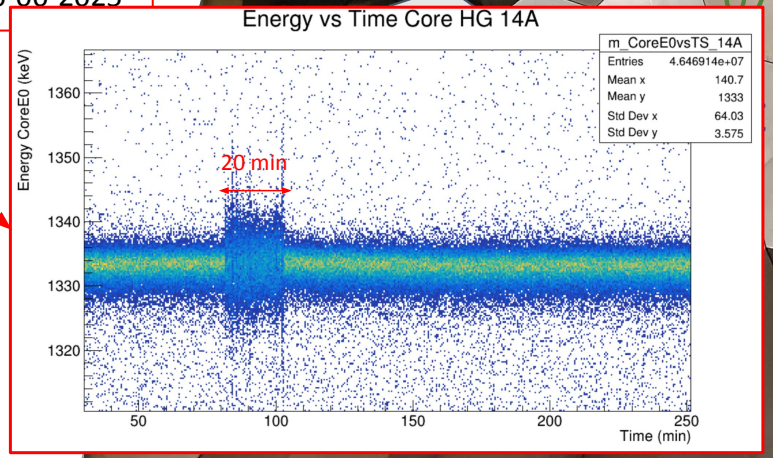


11:40 15-06-2025

11:40 16-05-2025

60Co r
HG co
START: 11:4
STOP: 11:40 16-06-2025

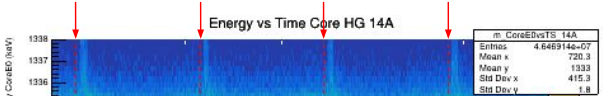


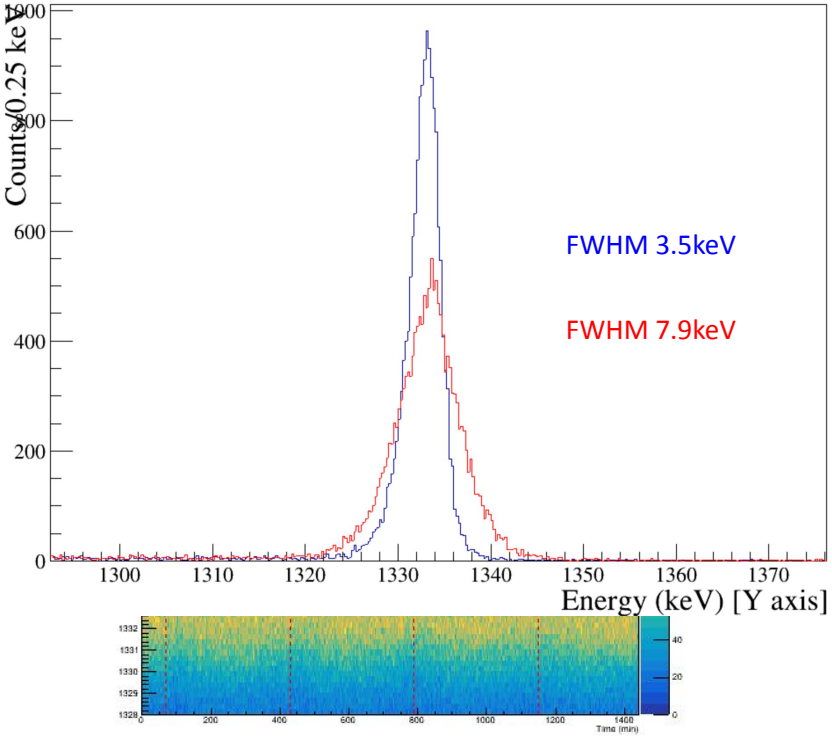


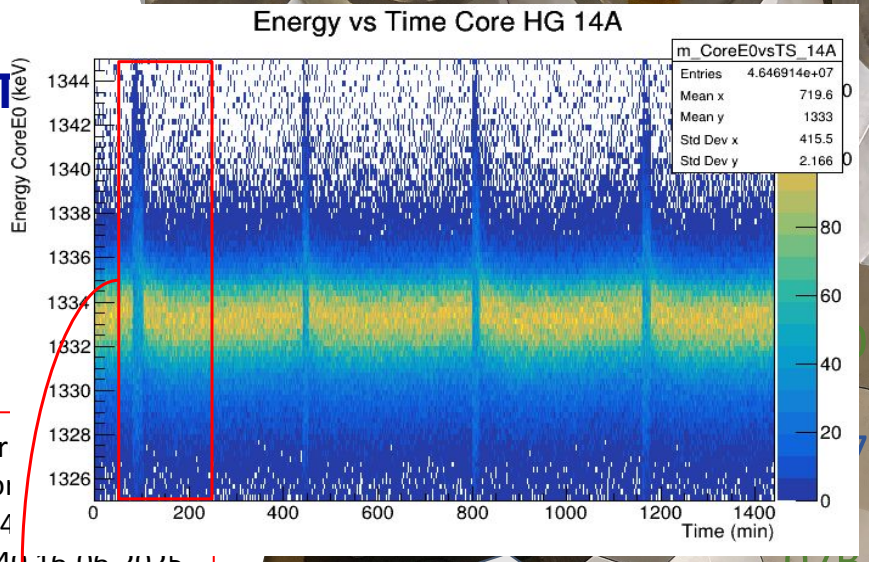
24h measurement

Pos 14 - AT

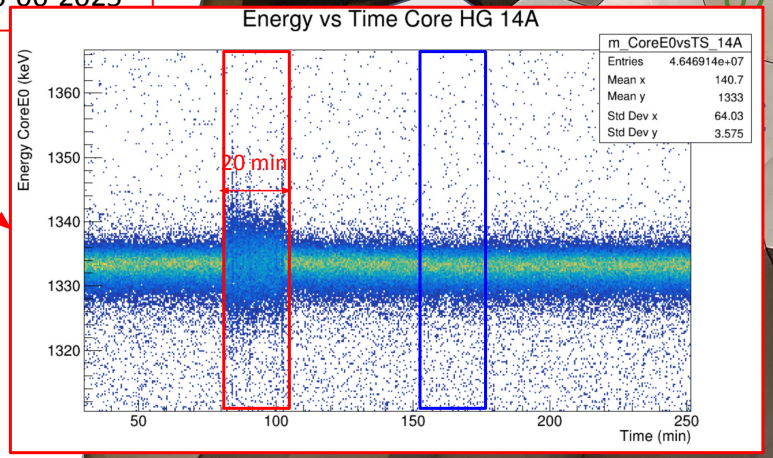
LN2 Filling 12:50 18:50 00:50 06:50







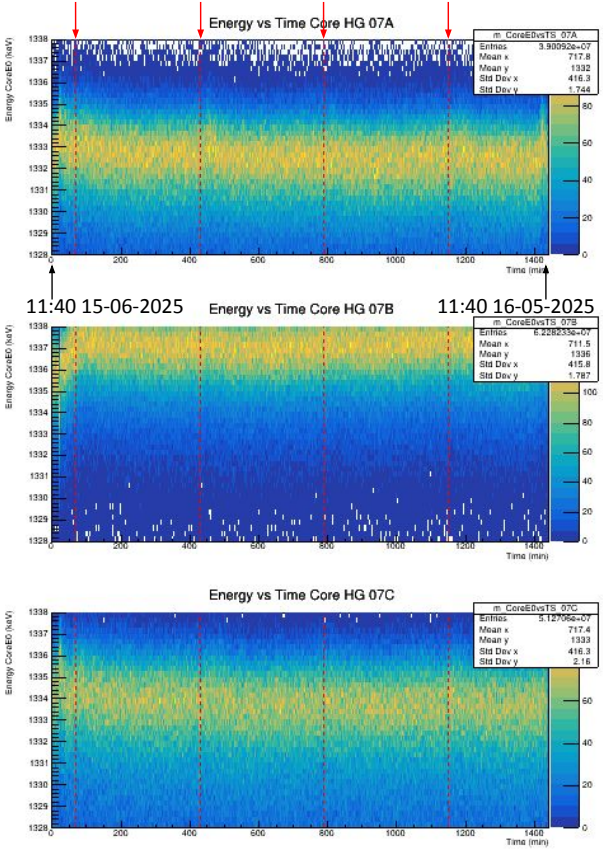
)Co r
G coı
: 11:4
11:40 16-06-2025



24h measurement

Pos 7 - ATC 2

LN2 Filling 12:50 18:50 00:50 06:50



11:40 15-06-2025

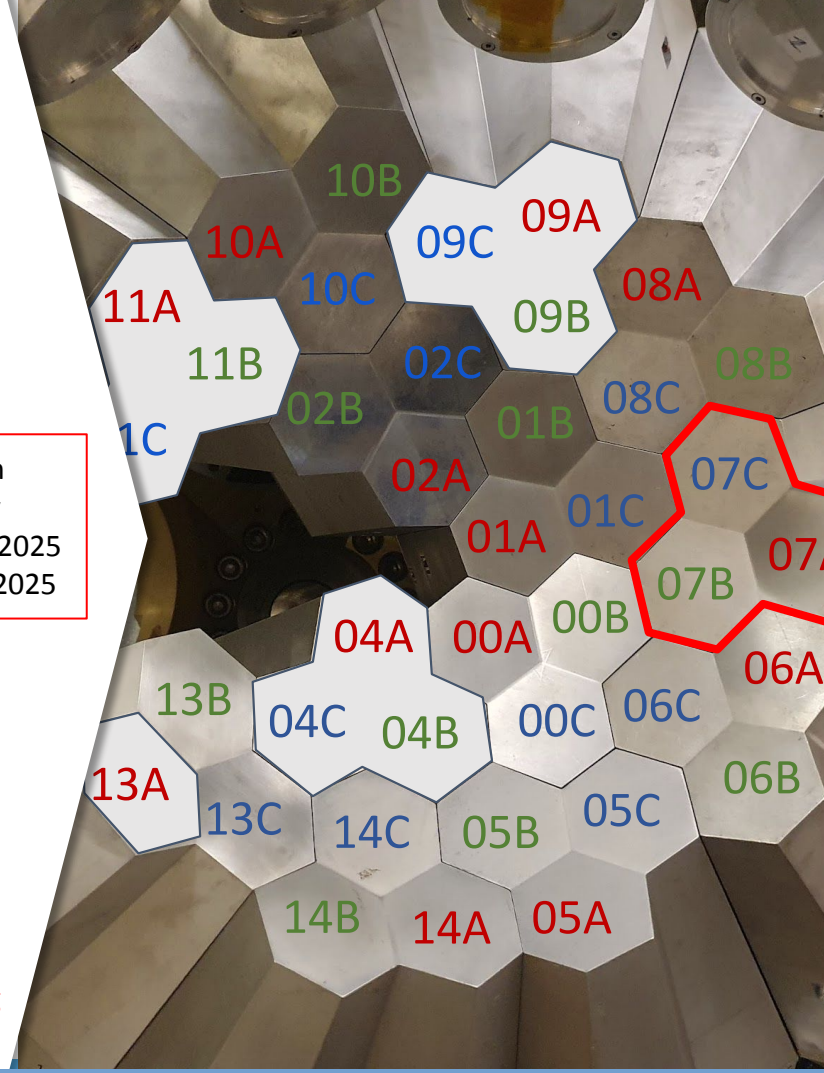
11:40 16-05-2025

60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025

07B (B019 - ATC 2)

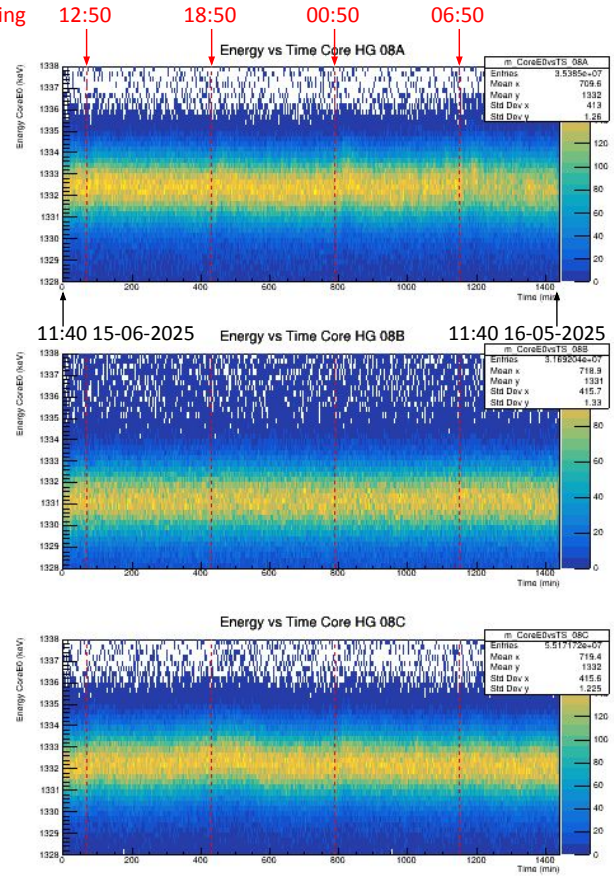
bad resolution due to the continuous oscillation of the energy in the HG core (LG ok)

NOT related to the filling

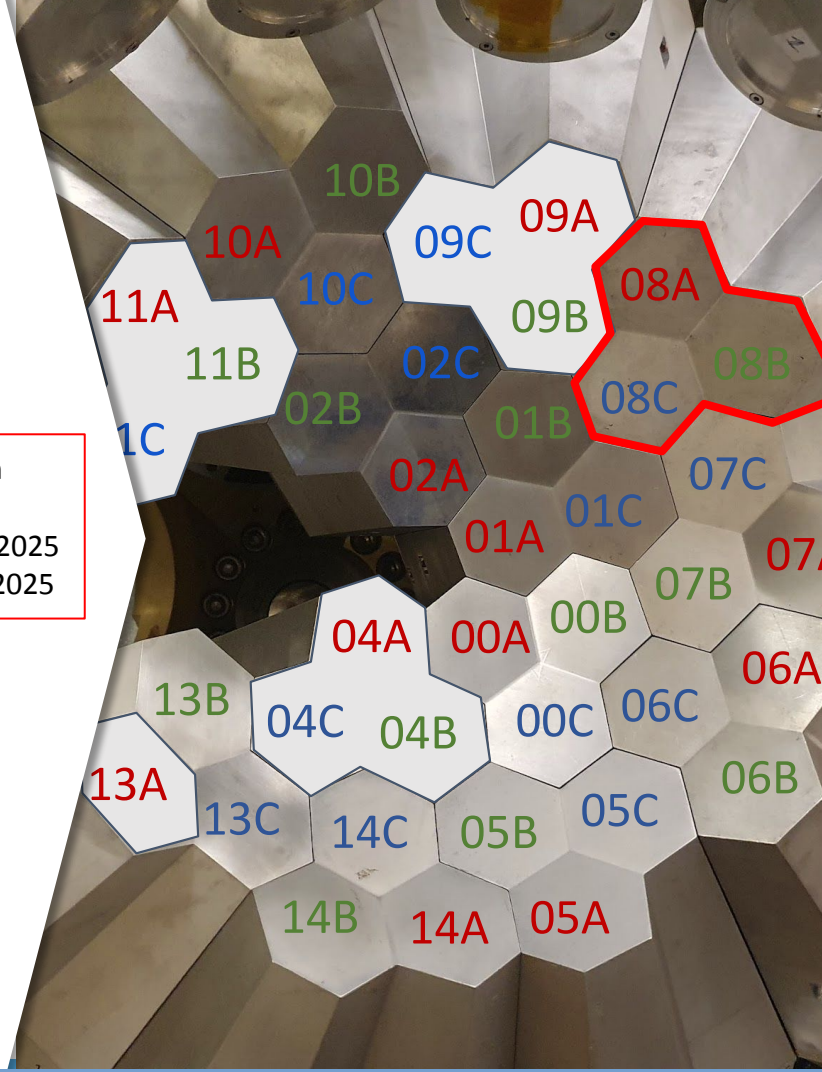


24h measurement

Pos 8 - ATC 22

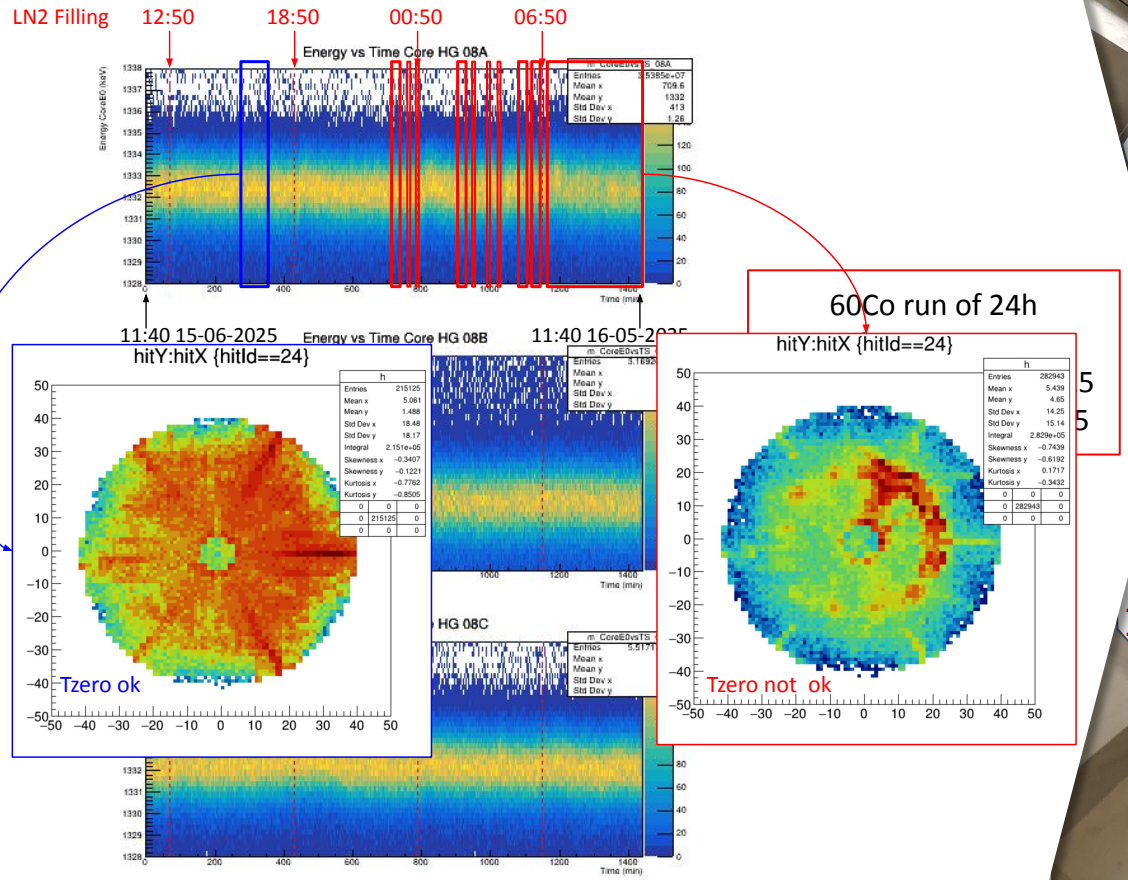


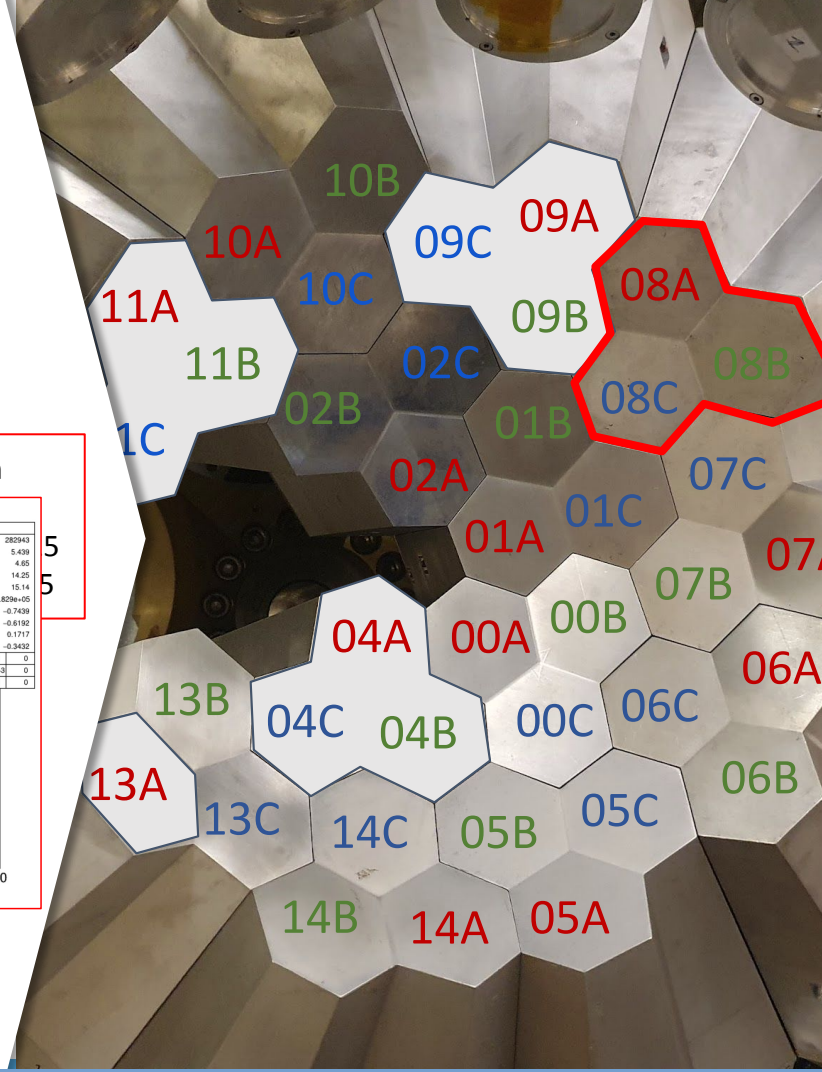
60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025



24h measurement

Pos 8 - ATC 22

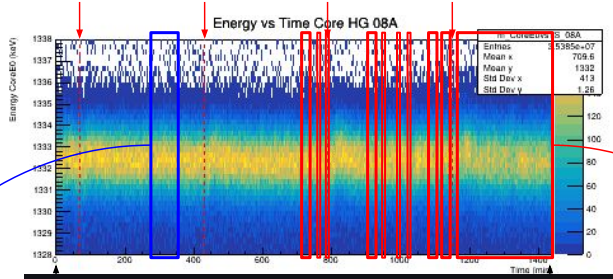


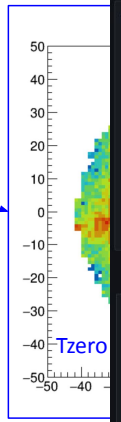


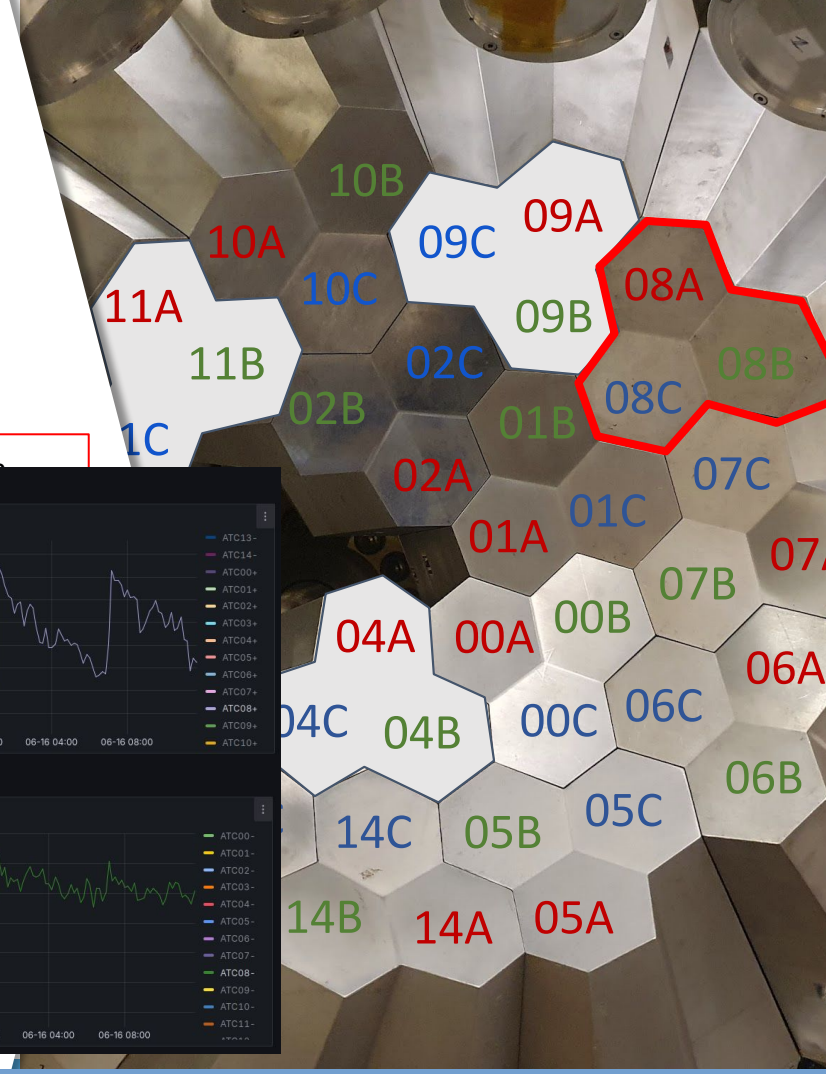
24h measurement

Pos 8 - ATC 22

LN2 Filling 12:50 18:50 00:50 06:50

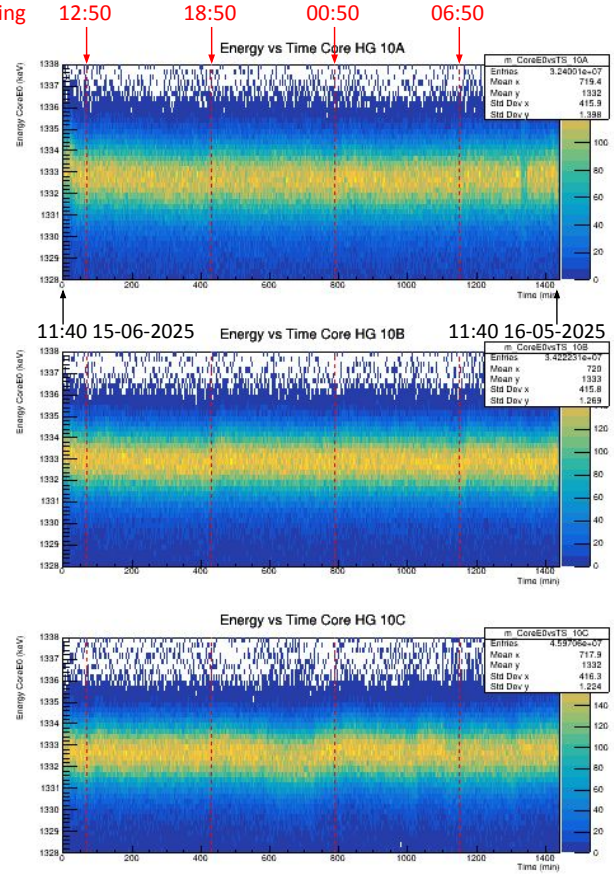




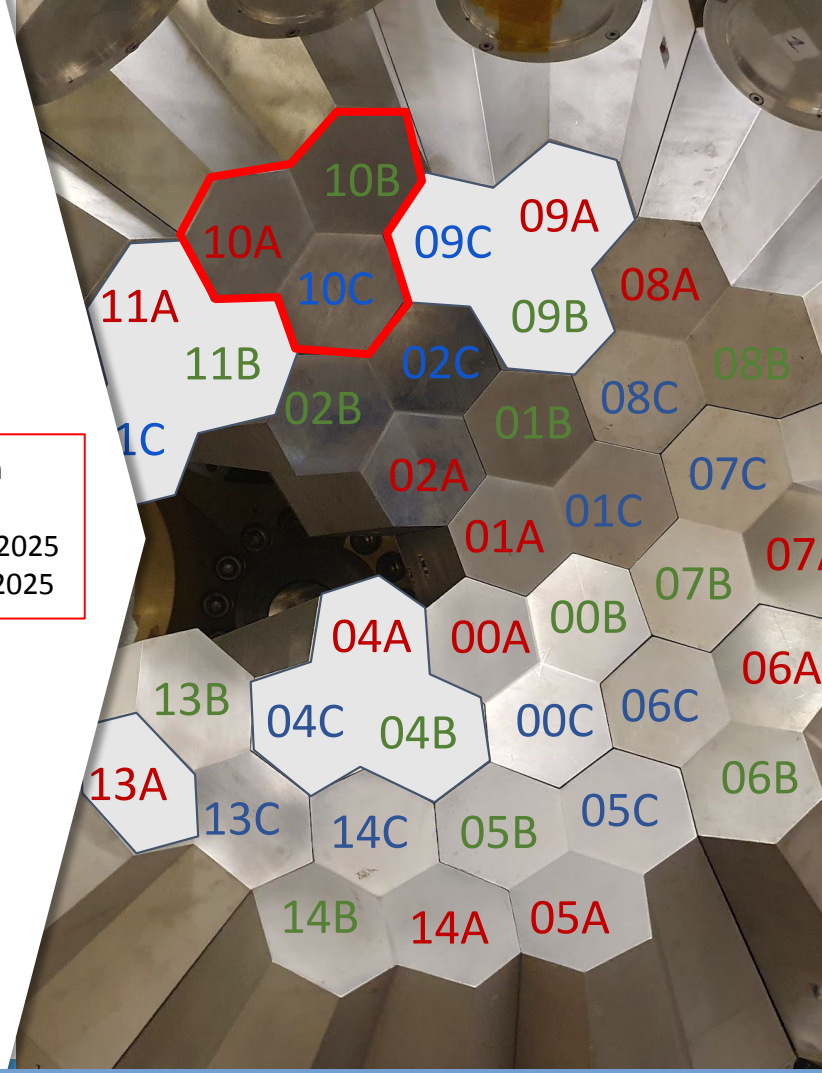


24h measurement

Pos 10 - ATC 23



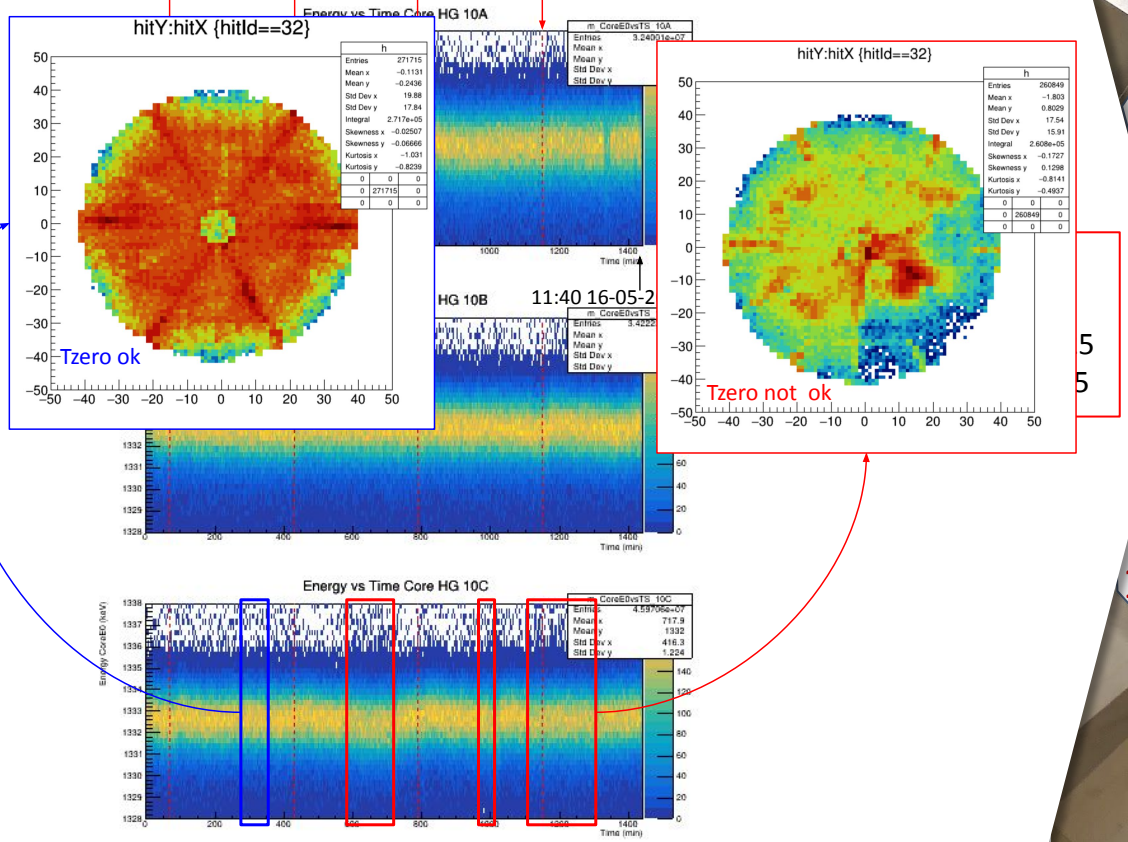
60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025

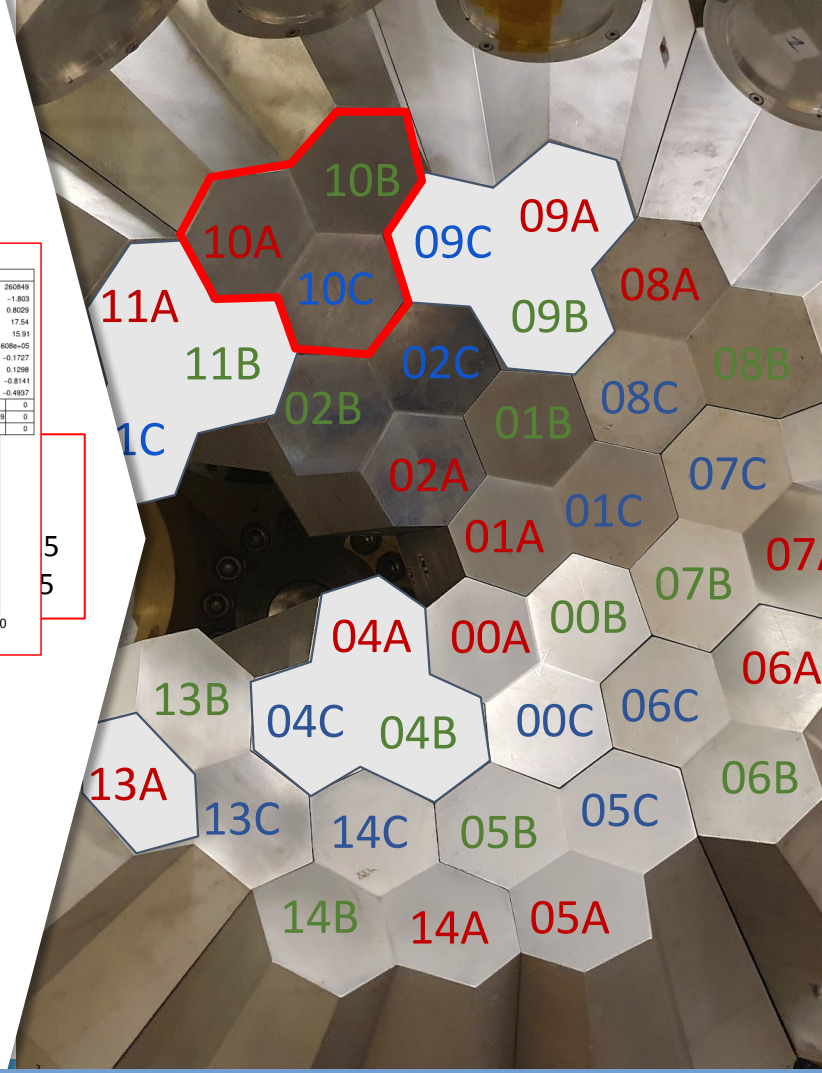


24h measurement

Pos 10 - ATC 23

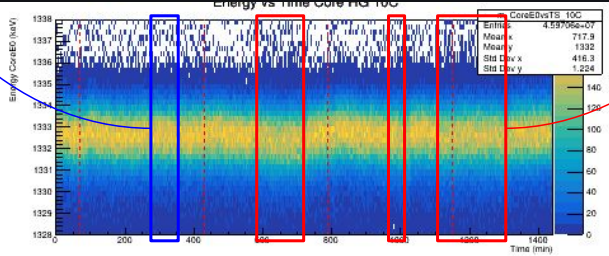
LN2 Filling 12:50 18:50 00:50 06:50





24h measurement

Pos 10 - ATC 23

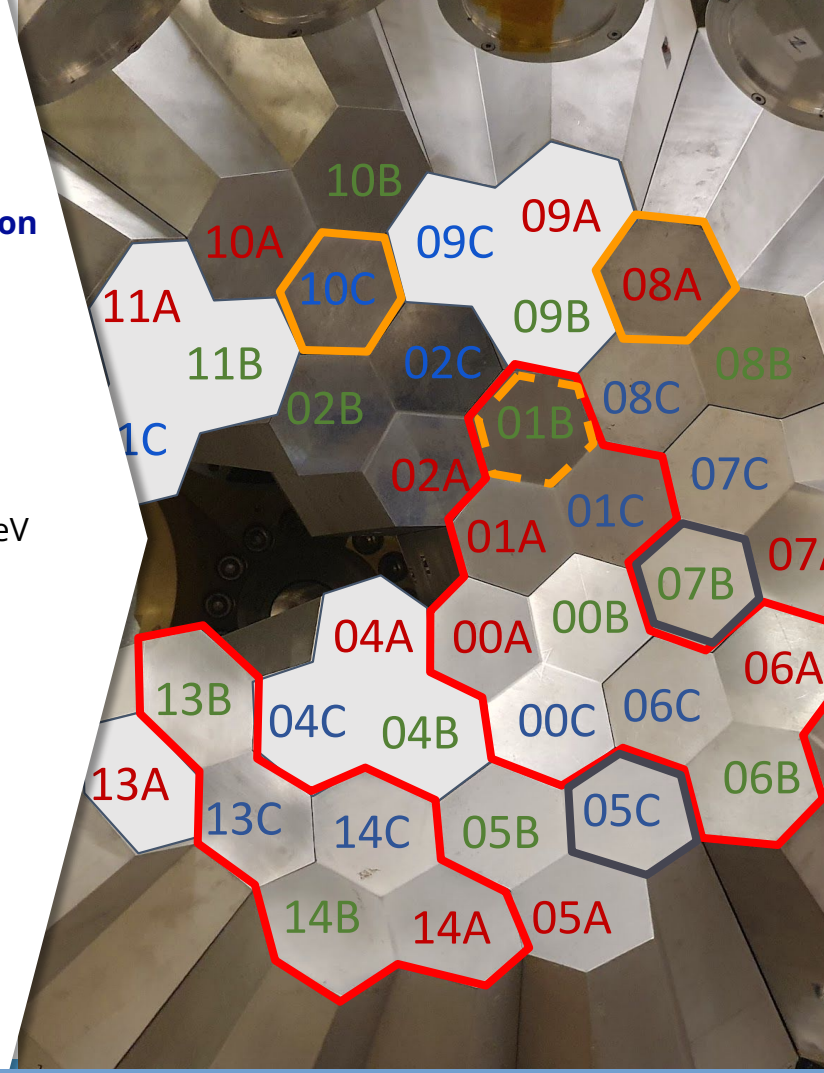


Summary

- **Average FWHM resolution at 1.3MeV (before/after correction neutron damage correction):**
  - Core: ~4,6 keV ➡ ~3,3 keV
  - Sum Seg.: ~13,4keV ➡ ~ 5,8 keV

- **24h measurement 60Co to investigate**
  - **Energy drifts and LN2 filling**
    - **Pos 0, 1, 6,13,14:** most-affected detectors at 1.3MeV
    - **07B, 05C:** no clear correlation with the jumps
  - **PSA issues and LV current**
    - **08A:** no clear correlation
    - **10C:** correlation
    - **(01B):** not enough stats

- **Future perspectives:**
  - checks in-beam data
  - checks Sum Segs
  - checks baselines
  - checks monitoring LV current preamp



Status of the AGATA detectors

R. M. Pérez-Vidal
for the AGATA collaboration

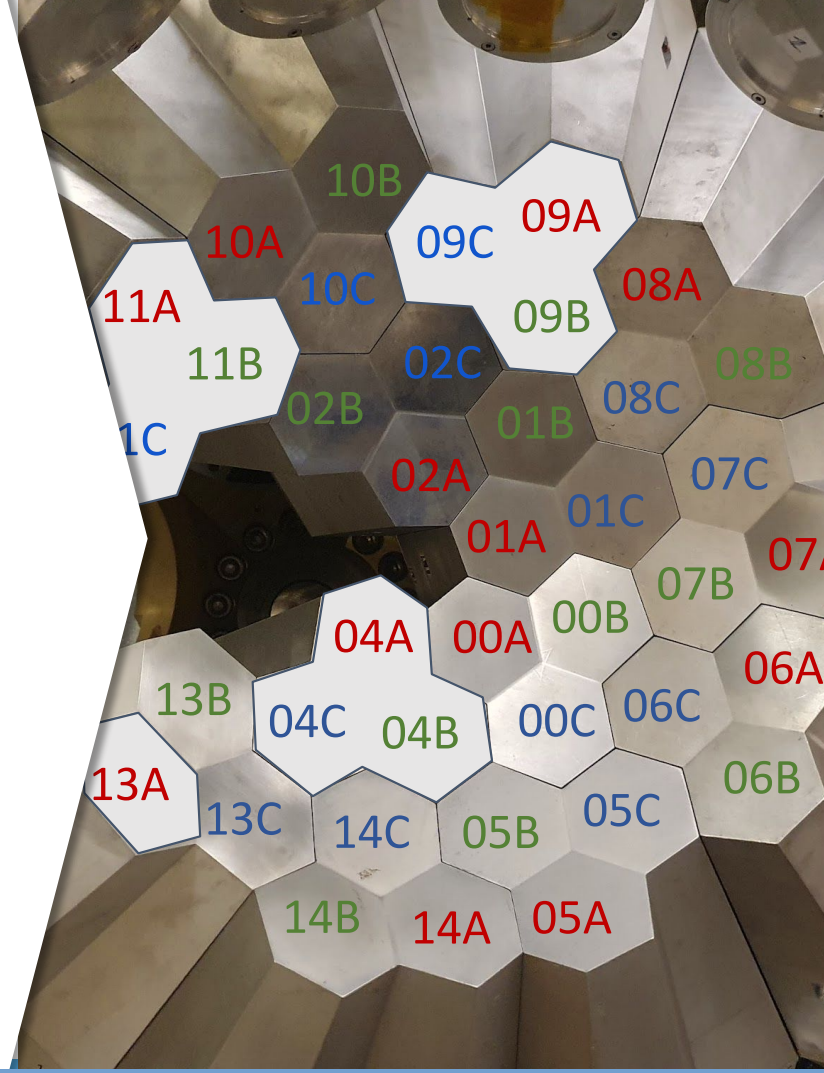
IFIC-CSIC-UV

25th AGATA Week | 19th September 2025

AGATA Crystal lookup table

July 2025. 10 ATC - 29 AGATA crystals

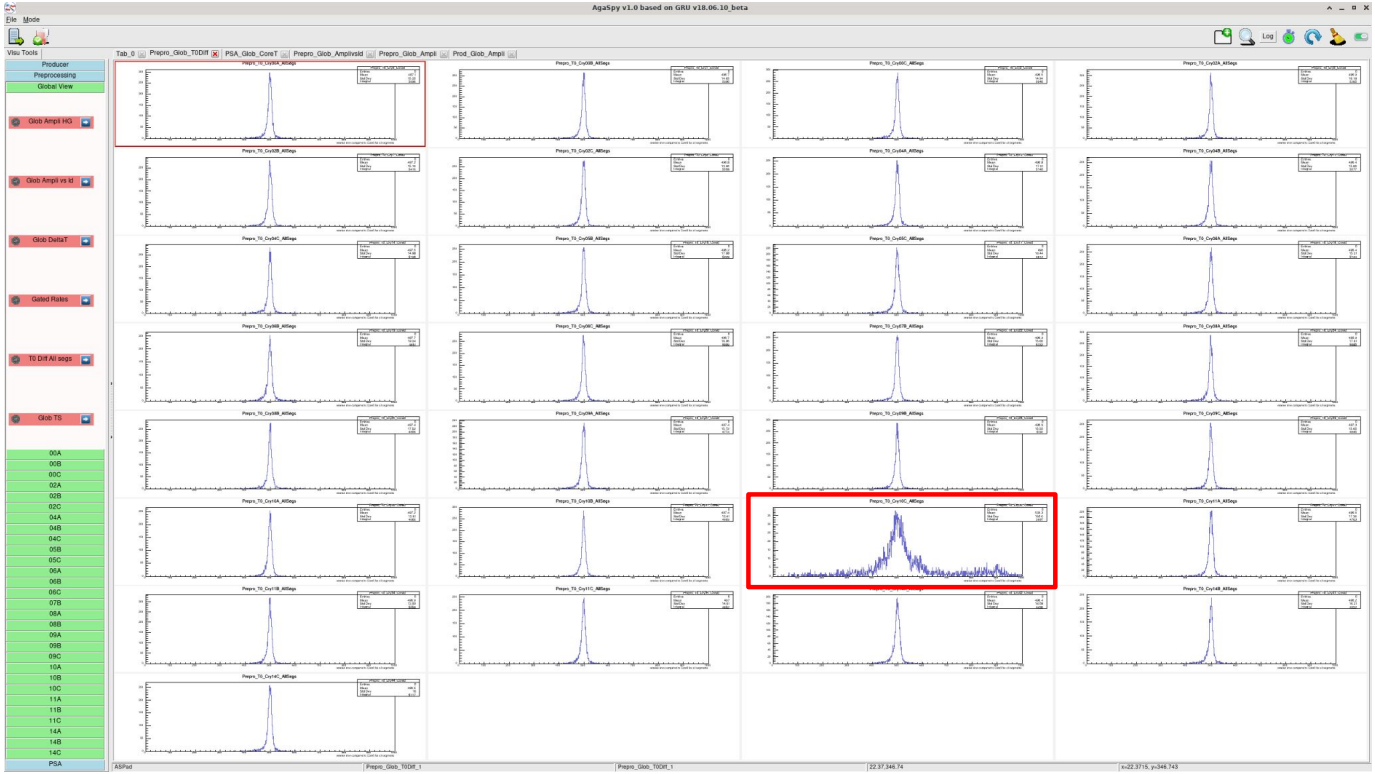
Position	ATC	Crystal			Installation date
		A	B	C	
00	18	017	018	018	15/01/2024
01	13	003	016	015	03/04/2024
02	17	016	017	013	01/02/2022
05	09	001	001	006	01/05/2022
06	19	018	012	019	13/02/2024
07	2	019	019	020	18/09/2023
08	22	022	022	014	17/03/2025
10	23	012	008	022	04/10/2024
13	21	020	021	021	28/01/2025
14	20	009	020	005	01/01/2023



10C (C022 - ATC 23)

PSA. TT segments

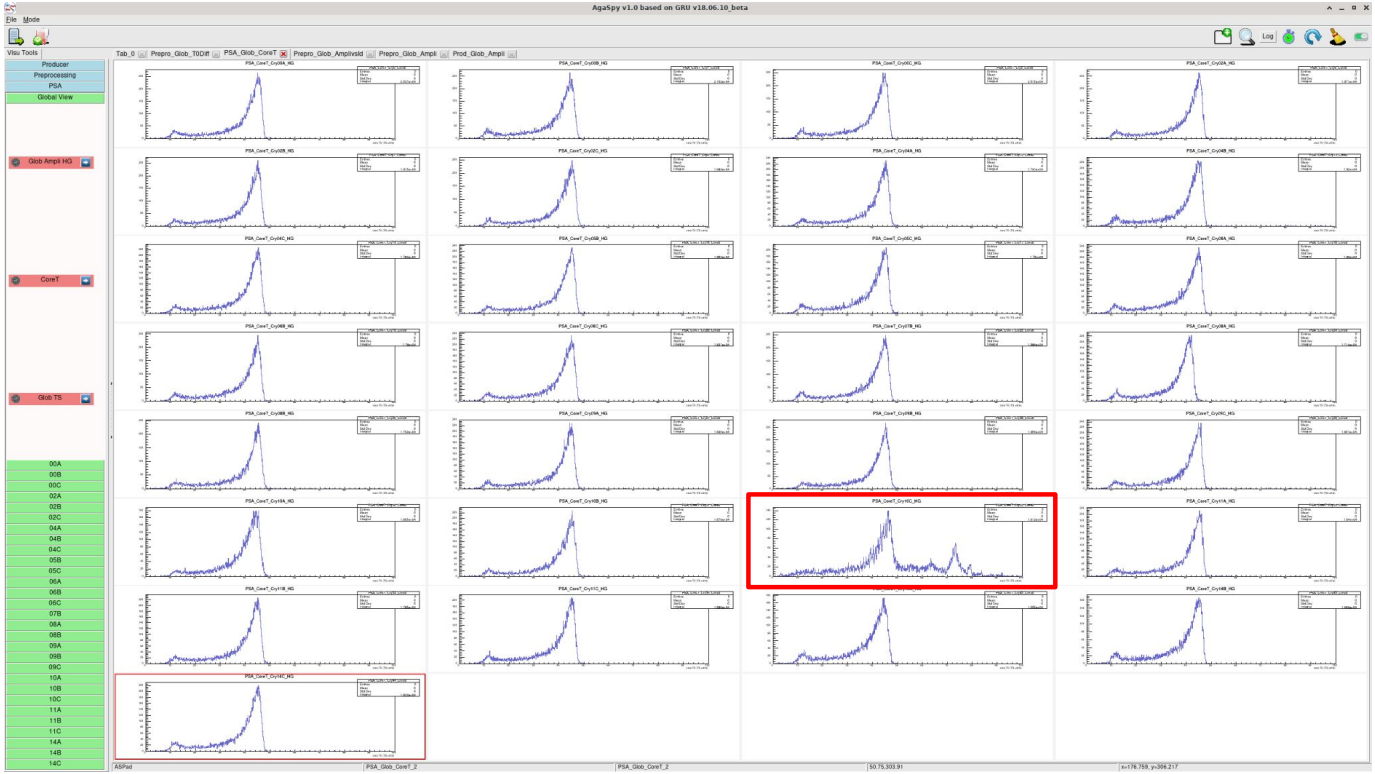
T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.



10C (C022 - ATC 23)

PSA. CoreT

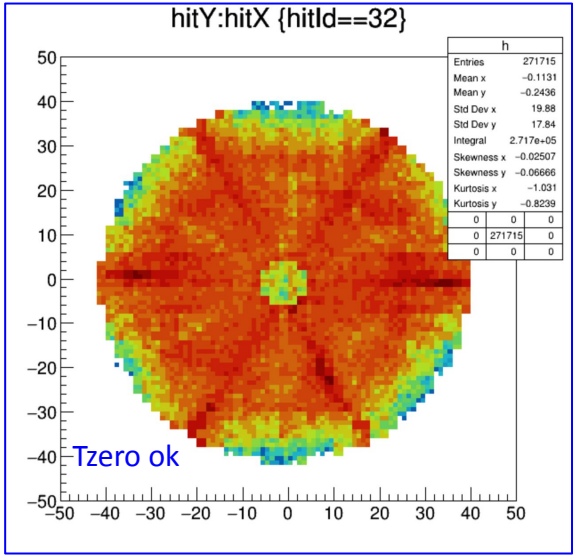
T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.

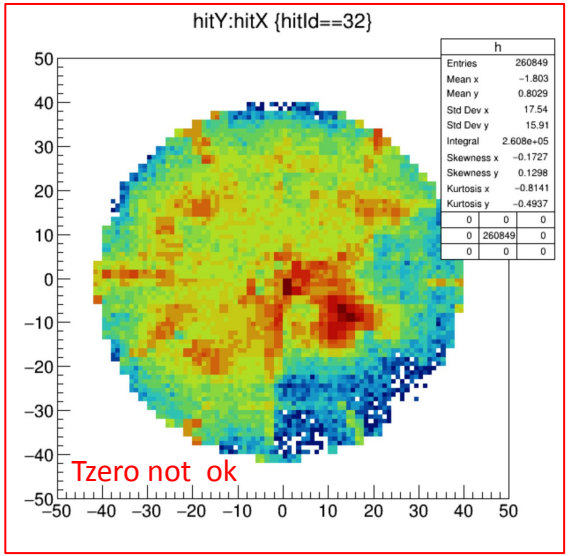


10C (C022 - ATC 23)

PSA. Tzero

T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.

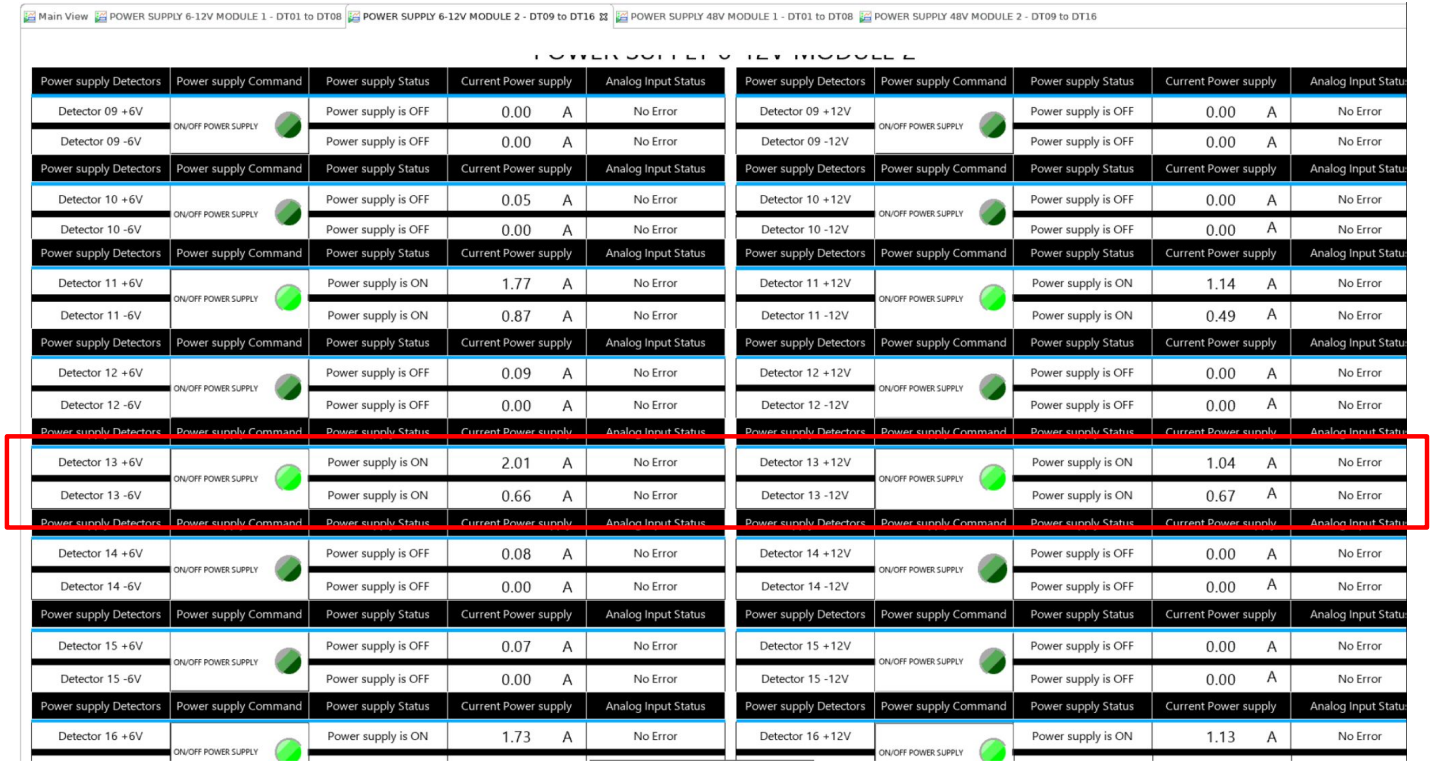




10C (C022 - ATC 23)

PSA. LV preamp

T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.



Main View | POWER SUPPLY 6-12V MODULE 1 - DT01 to DT08 | POWER SUPPLY 6-12V MODULE 2 - DT09 to DT16 | POWER SUPPLY 48V MODULE 1 - DT01 to DT08 | POWER SUPPLY 48V MODULE 2 - DT09 to DT16

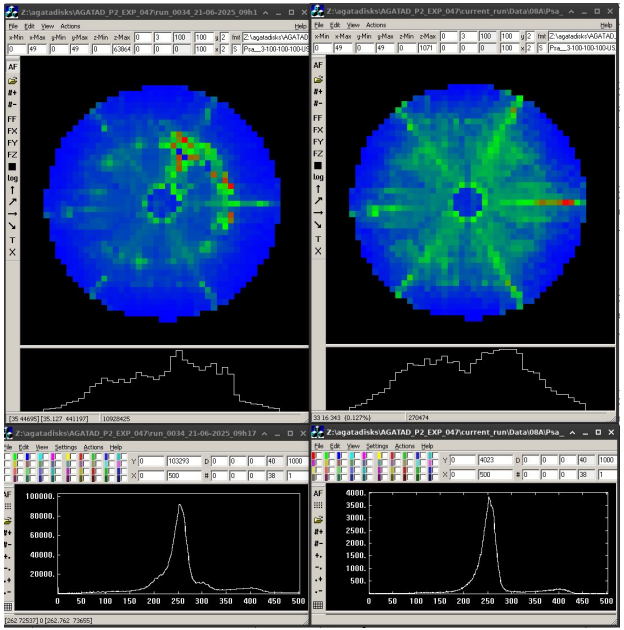
Power supply Detectors	Power supply Command	Power supply Status	Current Power supply	Analog Input Status
Detector 09 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 09 -6V		Power supply is OFF	0.00 A	No Error
Detector 10 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.05 A	No Error
Detector 10 -6V		Power supply is OFF	0.00 A	No Error
Detector 11 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.77 A	No Error
Detector 11 -6V		Power supply is ON	0.87 A	No Error
Detector 12 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.09 A	No Error
Detector 12 -6V		Power supply is OFF	0.00 A	No Error
Detector 13 +6V	ON/OFF POWER SUPPLY	Power supply is ON	2.01 A	No Error
Detector 13 -6V		Power supply is ON	0.66 A	No Error
Detector 14 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.08 A	No Error
Detector 14 -6V		Power supply is OFF	0.00 A	No Error
Detector 15 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.07 A	No Error
Detector 15 -6V		Power supply is OFF	0.00 A	No Error
Detector 16 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.73 A	No Error

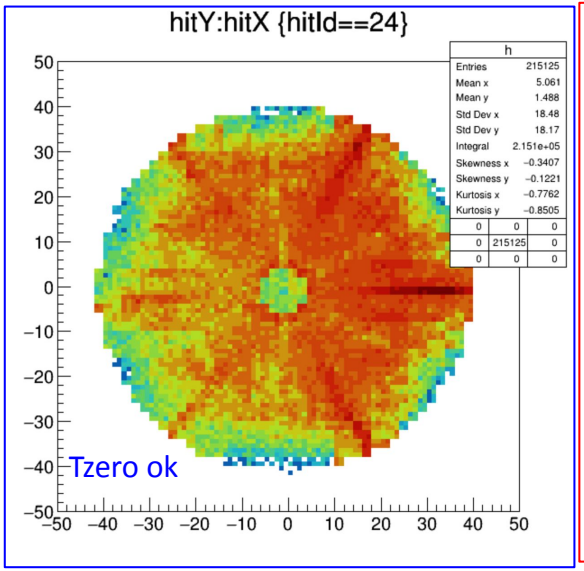
Power supply Detectors	Power supply Command	Power supply Status	Current Power supply	Analog Input Status
Detector 09 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 09 -12V		Power supply is OFF	0.00 A	No Error
Detector 10 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 10 -12V		Power supply is OFF	0.00 A	No Error
Detector 11 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.14 A	No Error
Detector 11 -12V		Power supply is ON	0.49 A	No Error
Detector 12 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 12 -12V		Power supply is OFF	0.00 A	No Error
Detector 13 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.04 A	No Error
Detector 13 -12V		Power supply is ON	0.67 A	No Error
Detector 14 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 14 -12V		Power supply is OFF	0.00 A	No Error
Detector 15 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 15 -12V		Power supply is OFF	0.00 A	No Error
Detector 16 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.13 A	No Error

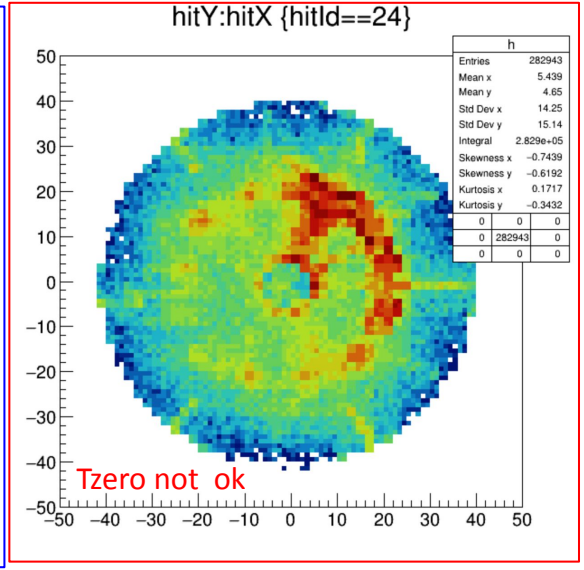
08A (A022 - ATC 22)

PSA. Tzero

T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.







08A (A022 - ATC 22)

PSA. LV preamp

T0 and TT gets strange shapes time to time. Solved during the experiments by switching off and on the preamp.

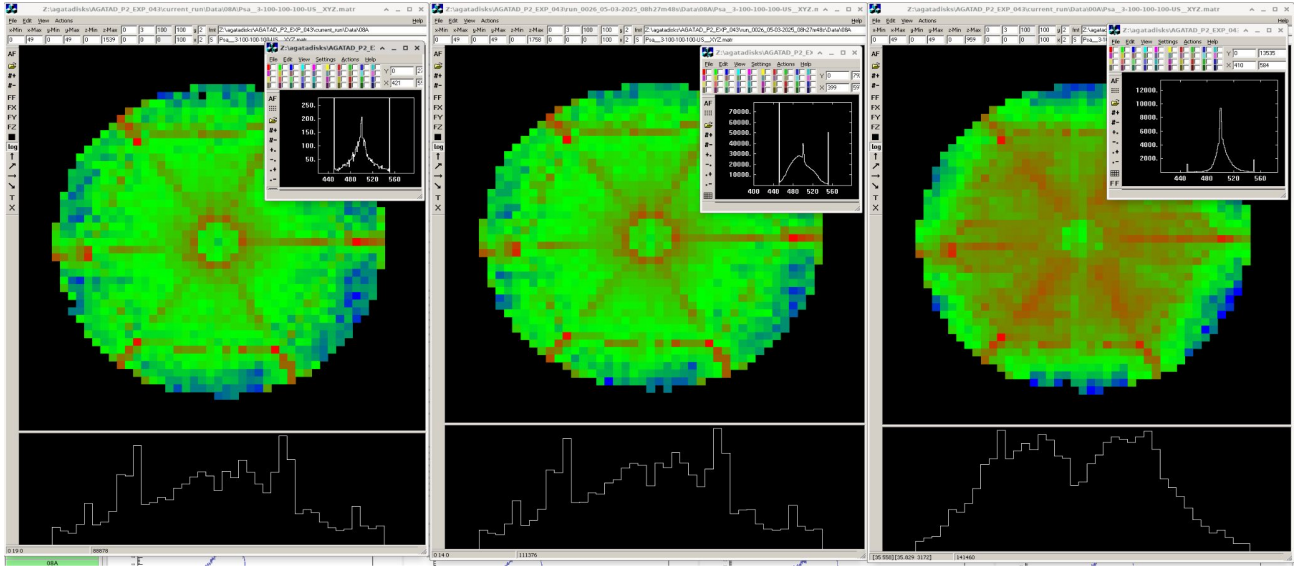
Main View | POWER SUPPLY 6-12V MODULE 1 - DT01 to DT08 | POWER SUPPLY 6-12V MODULE 2 - DT09 to DT16 | POWER SUPPLY 48V MODULE 1 - DT01 to DT08 | POWER SUPPLY 48V MODULE 2 - DT09 to DT16

Power supply Detectors	Power supply Command	Power supply Status	Current Power supply	Analog Input Status
Detector 01 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.40 A	No Error
Detector 01 -6V		Power supply is ON	0.96 A	No Error
Detector 02 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.42 A	No Error
Detector 02 -6V		Power supply is ON	0.99 A	No Error
Detector 03 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.40 A	No Error
Detector 03 -6V		Power supply is ON	0.95 A	No Error
Detector 04 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.34 A	No Error
Detector 04 -6V		Power supply is ON	0.99 A	No Error
Detector 05 +6V	ON/OFF POWER SUPPLY	Power supply is ON	2.17 A	No Error
Detector 05 -6V		Power supply is ON	0.72 A	No Error
Detector 06 +6V	ON/OFF POWER SUPPLY	Power supply is OFF	0.05 A	No Error
Detector 06 -6V		Power supply is OFF	0.00 A	No Error
Detector 07 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.46 A	No Error
Detector 07 -6V		Power supply is ON	0.98 A	No Error
Detector 08 +6V	ON/OFF POWER SUPPLY	Power supply is ON	1.46 A	No Error

Power supply Detectors	Power supply Command	Power supply Status	Current Power supply	Analog Input Status
Detector 01 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.38 A	No Error
Detector 01 -12V		Power supply is ON	0.54 A	No Error
Detector 02 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.36 A	No Error
Detector 02 -12V		Power supply is ON	0.57 A	No Error
Detector 03 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.37 A	No Error
Detector 03 -12V		Power supply is ON	0.00 A	No Error
Detector 04 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.37 A	No Error
Detector 04 -12V		Power supply is ON	0.57 A	No Error
Detector 05 +12V	ON/OFF POWER SUPPLY	Power supply is ON	0.99 A	No Error
Detector 05 -12V		Power supply is ON	0.67 A	No Error
Detector 06 +12V	ON/OFF POWER SUPPLY	Power supply is OFF	0.00 A	No Error
Detector 06 -12V		Power supply is OFF	0.00 A	No Error
Detector 07 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.39 A	No Error
Detector 07 -12V		Power supply is ON	0.56 A	No Error
Detector 08 +12V	ON/OFF POWER SUPPLY	Power supply is ON	1.35 A	No Error

08A (A002 - ATC 3)

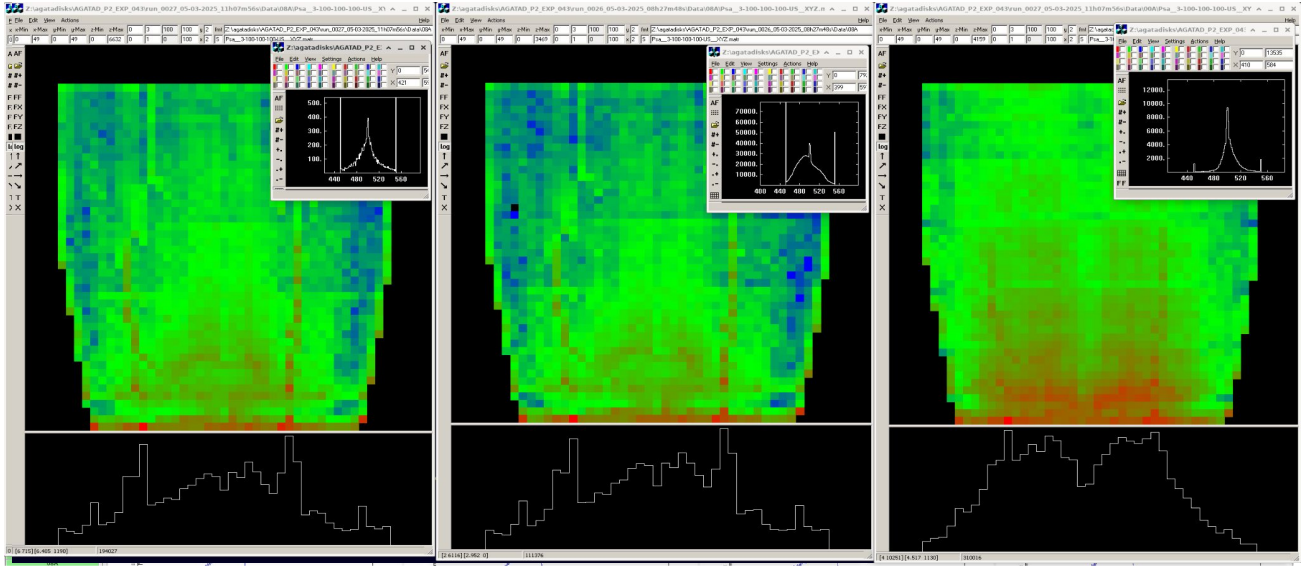
PSA



Time shift for the Tzero 08A shifted during the experiment, nevertheless even correcting the time shift to be applied the PSA is not performed correctly. The projections XY (first attachment) and XZ (second attachment) are displayed in the attachments. Detector 08A with the correct time shift and wrong time shift are displayed on the left and center panels. Detector 00A is displayed in the right panels for reference.

08A (A002 - ATC 3)

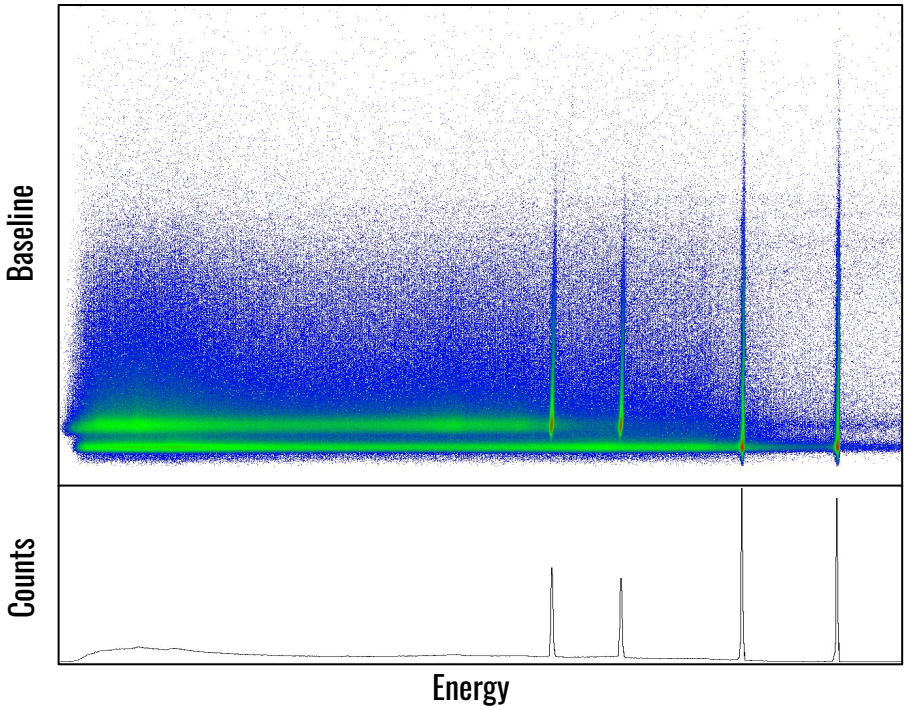
PSA

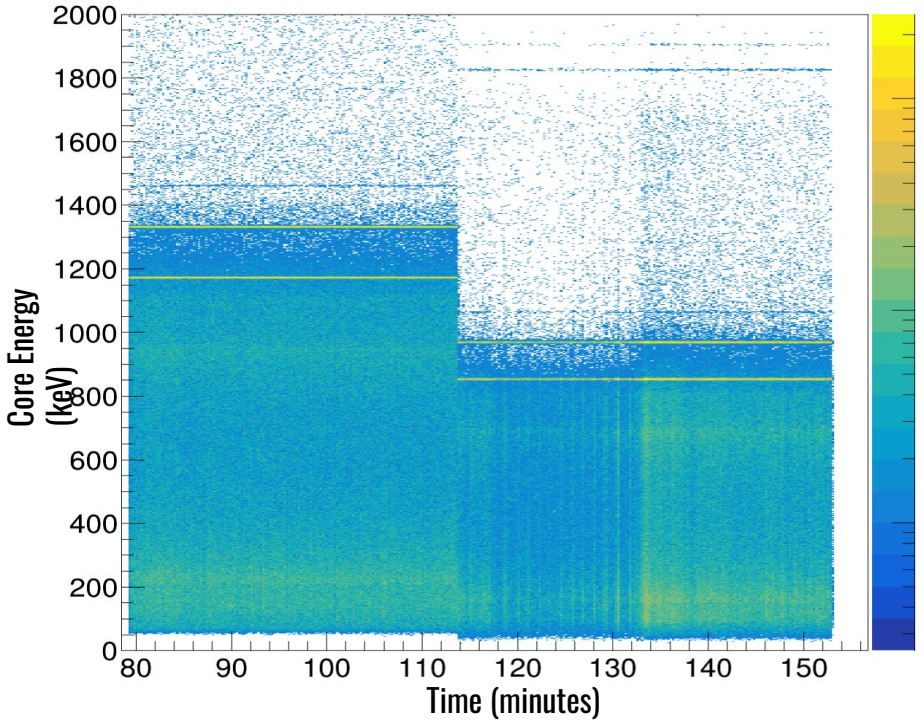


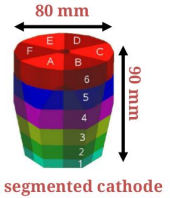
Time shift for the Tzero 08A shifted during the experiment, nevertheless even correcting the time shift to be applied the PSA is not performed correctly. The projections XY (first attachment) and XZ (second attachment) are displayed in the attachments. Detector 08A with the correct time shift and wrong time shift are displayed on the left and center panels. Detector 00A is displayed in the right panels for reference.

05C (C004 and C009 - ATC9)

Core baseline jump over time

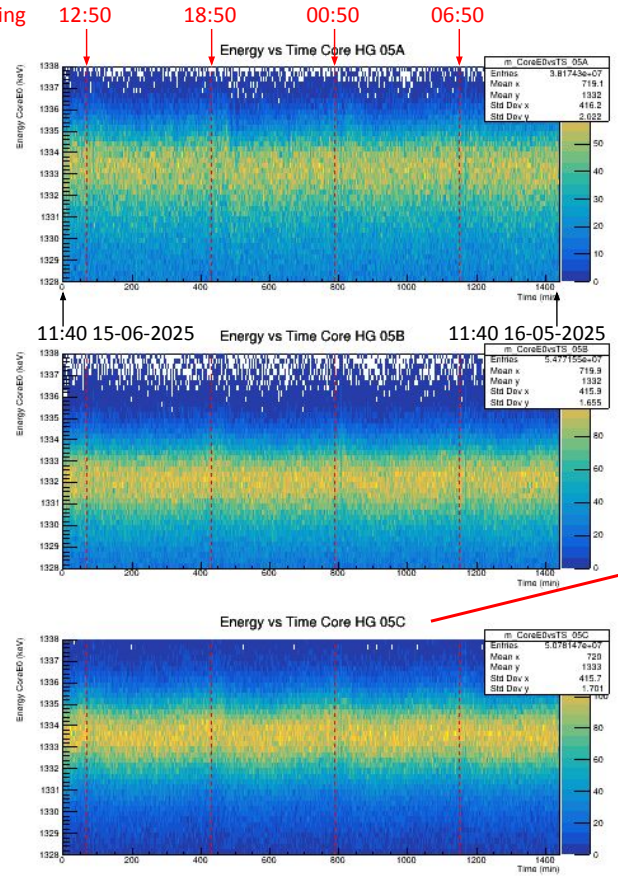






24h measurement

Pos 5 - ATC 9

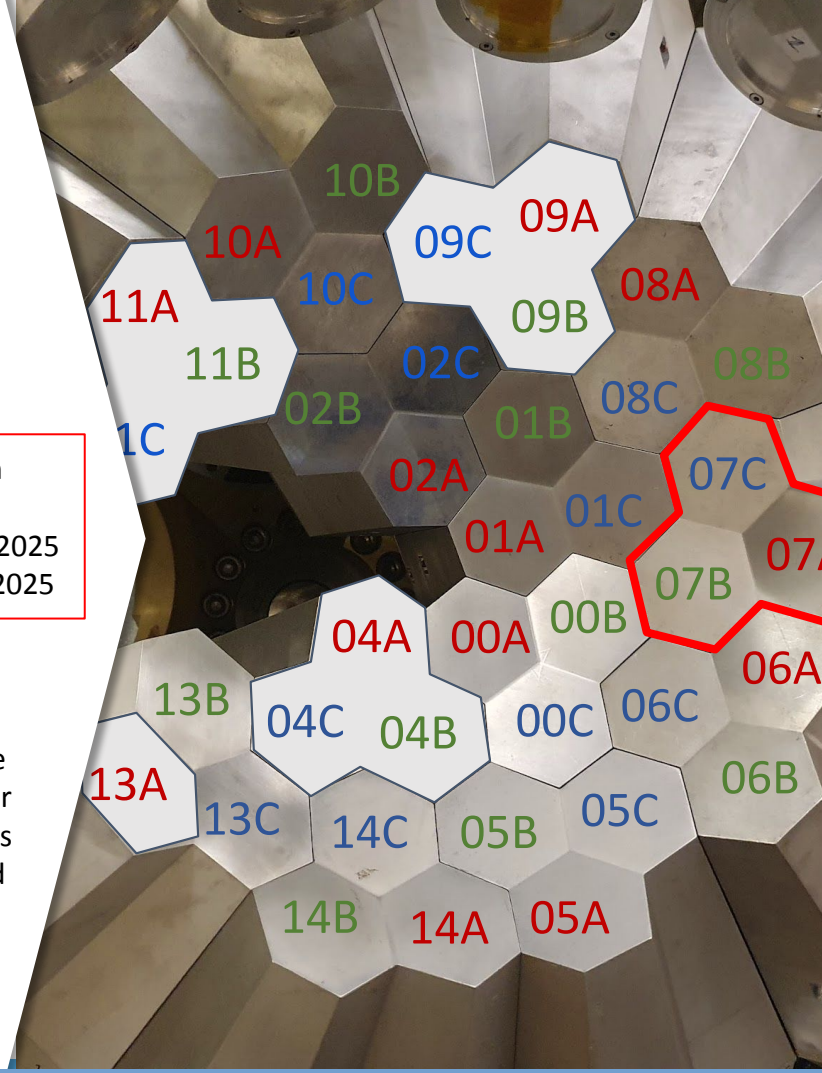


60Co run of 24h
HG core energy
START: 11:40 15-06-2025
STOP: 11:40 16-06-2025

05C (C006 - ATC 9)

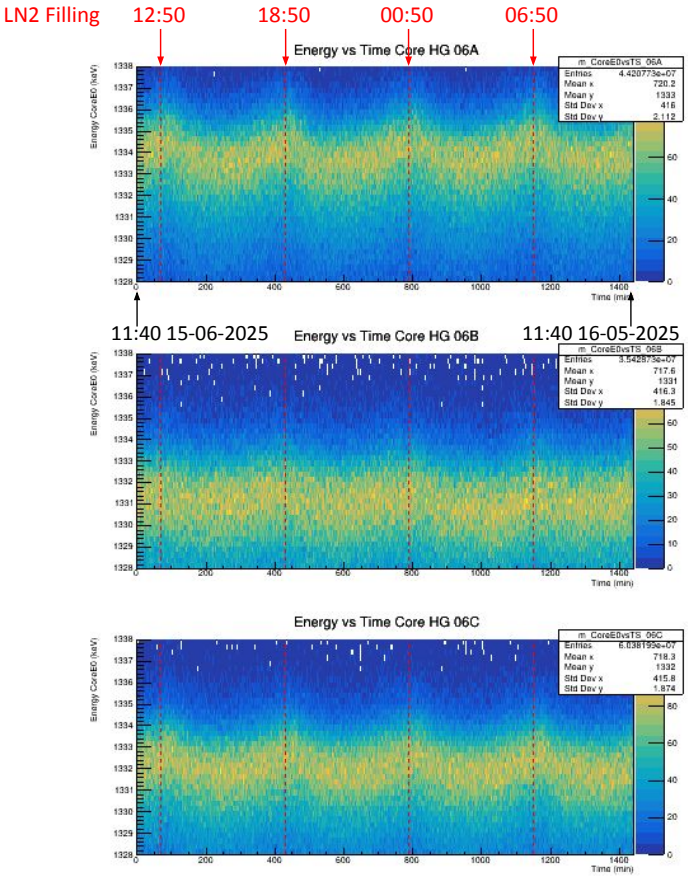
gain and baseline of the core jump together over time, this change affects the gain of the core and of the segments

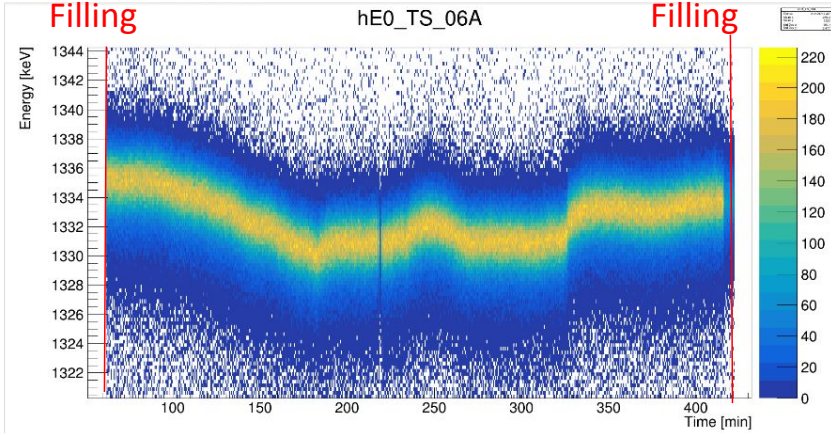
NOT observed during the 24h



24h measurement

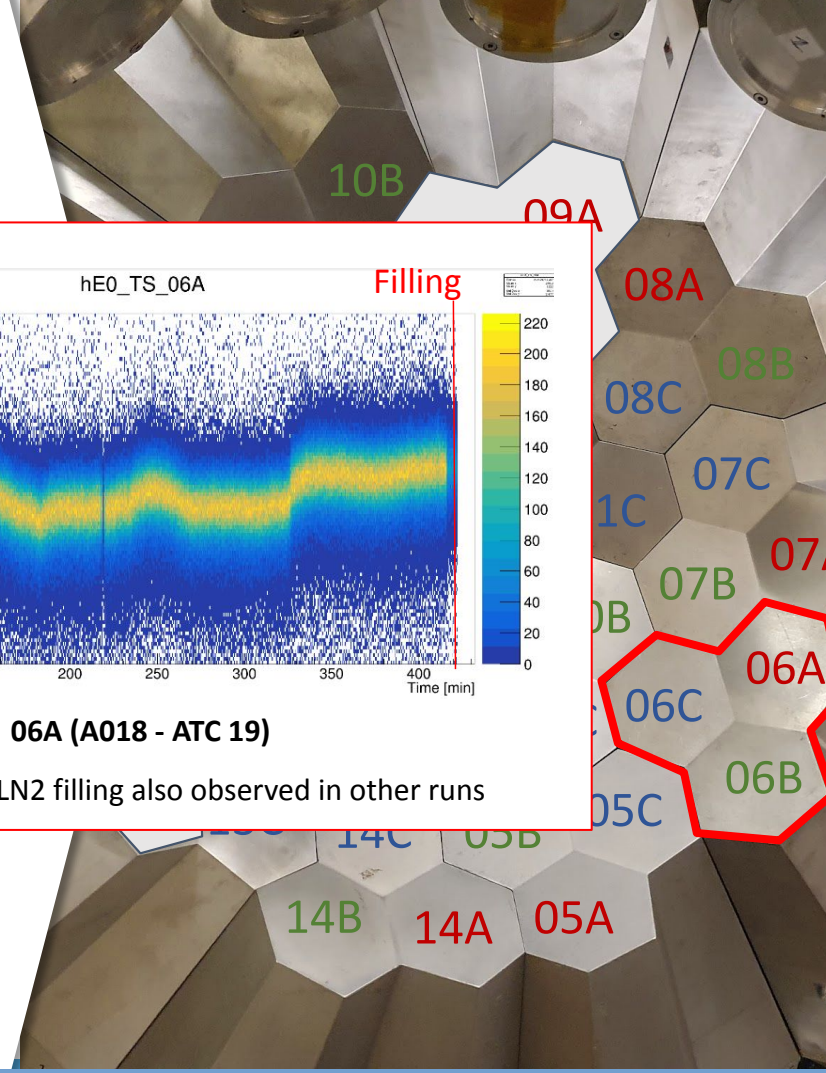
Pos 6 - ATC 19





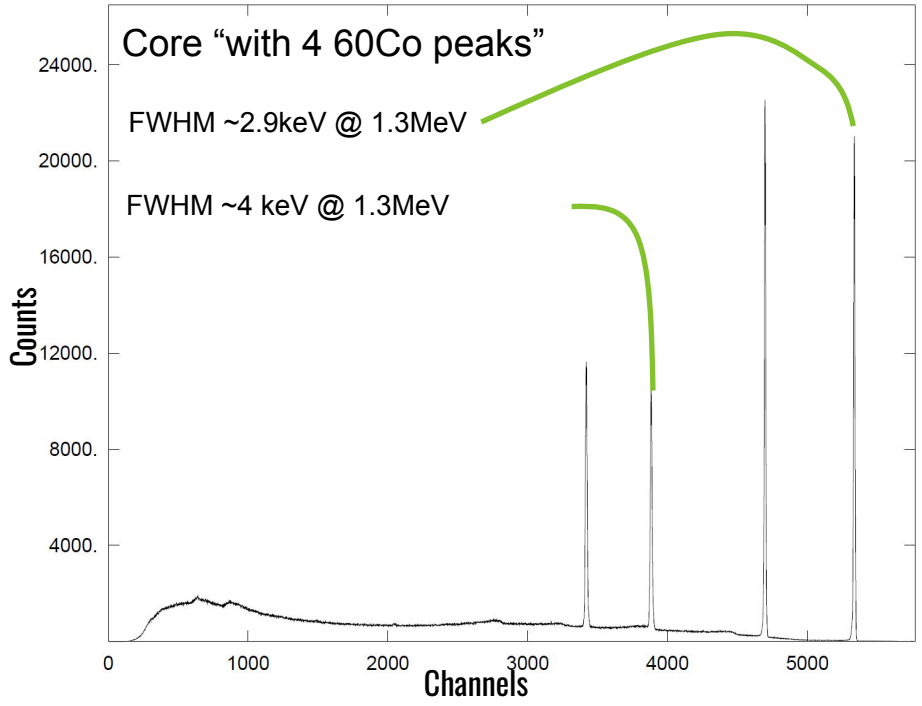
06A (A018 - ATC 19)

Drifts between LN2 filling also observed in other runs

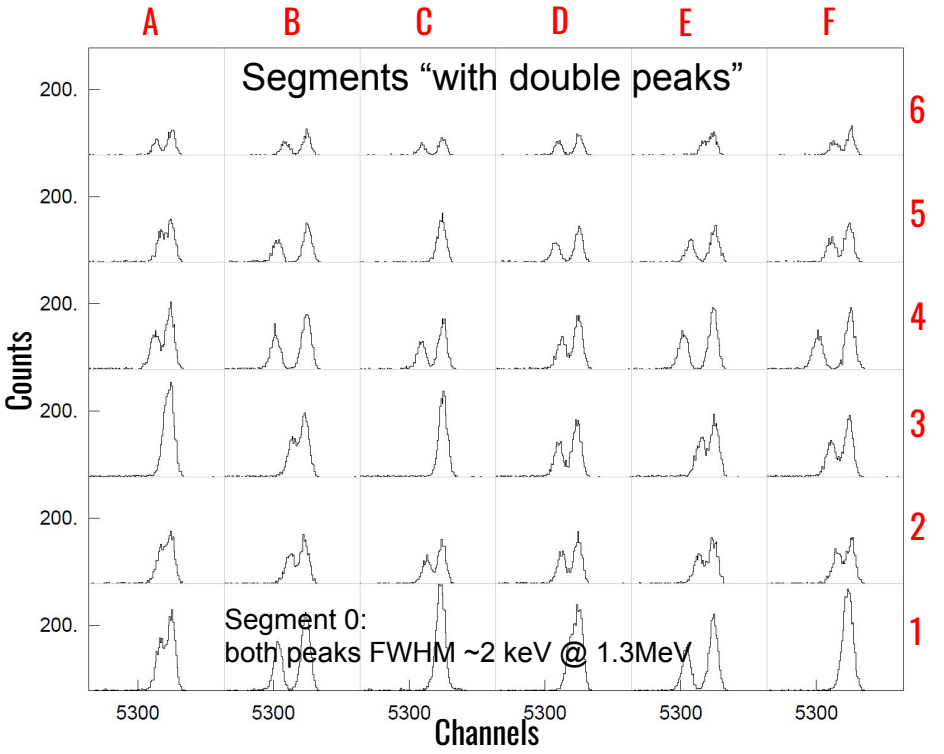


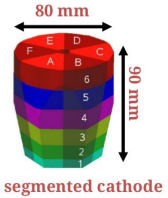
05C (C004 and C009 - ATC9)

Core baseline jump over time



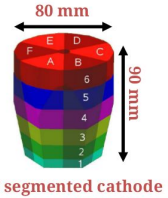
Happening in both gains of the core



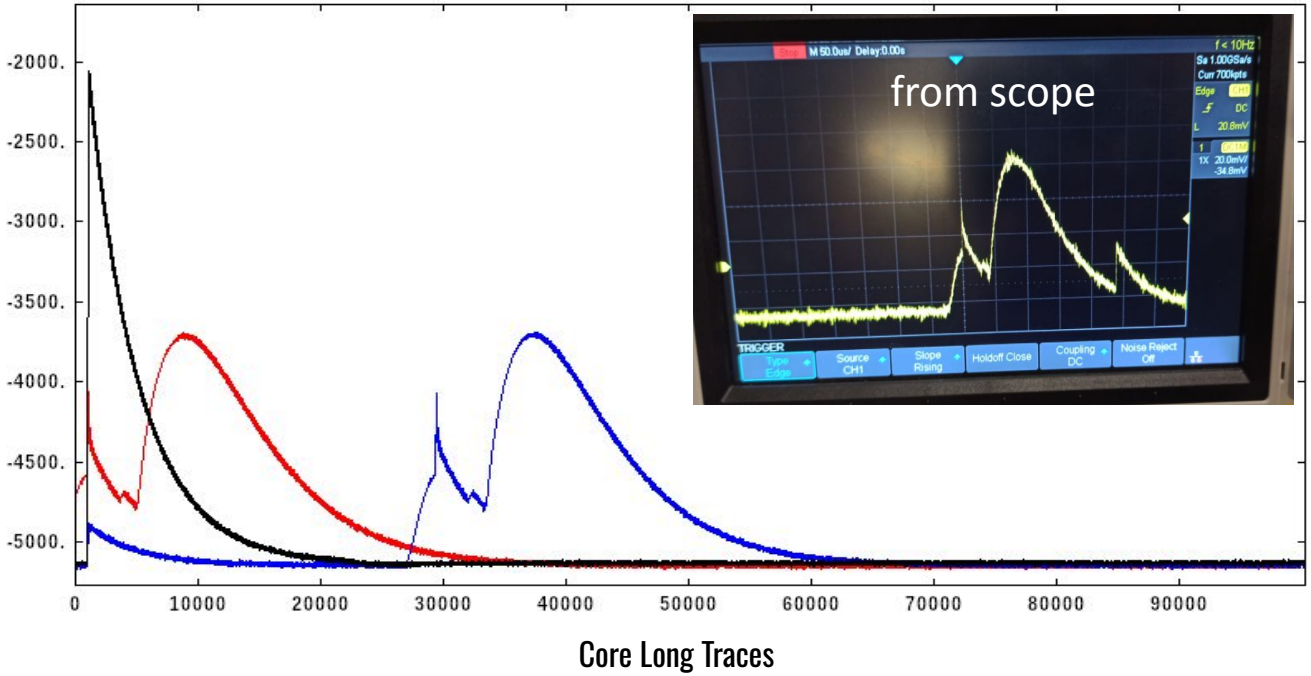


06C (C002 and C014 - ATC 6)

Strange noise in the core

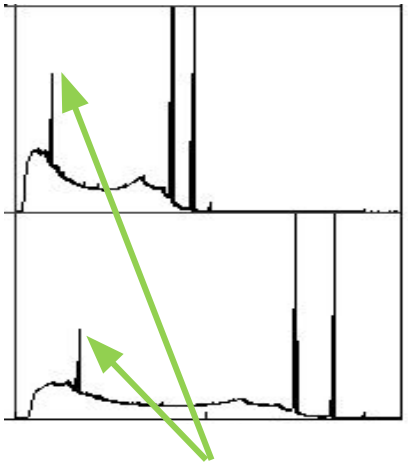


from ggp read out



Core Long Traces

core with strange noise in the trace which makes cores energy with an extra peak around 105keV

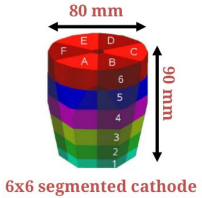


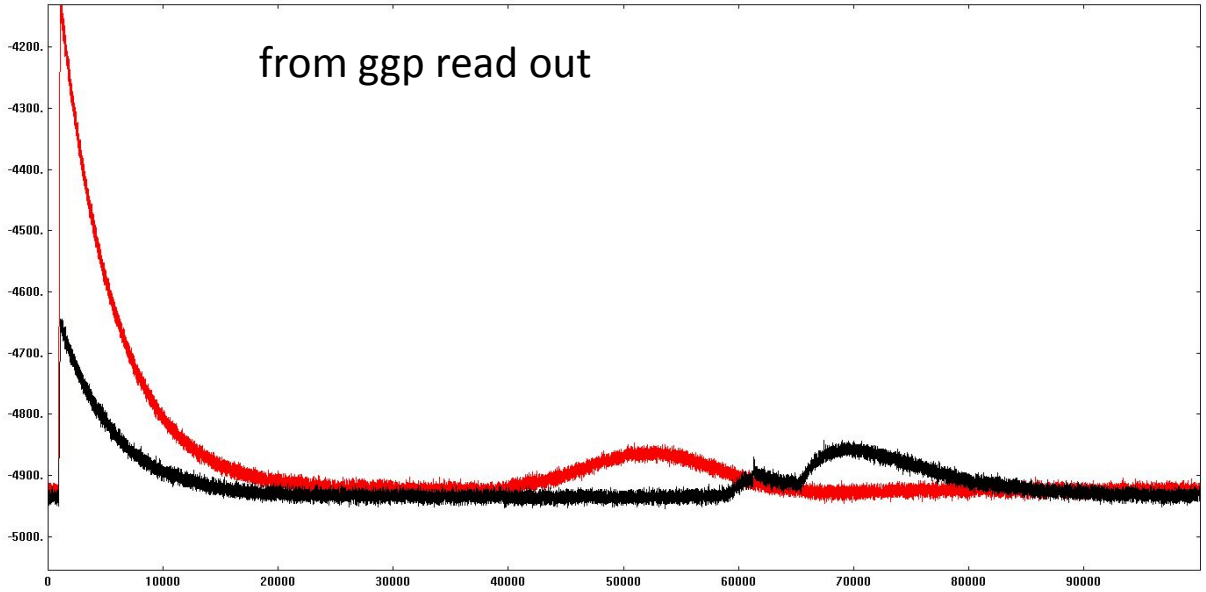
Not appearing when triggering with a segment

ATC 6 out of the structure since December 14th 2023

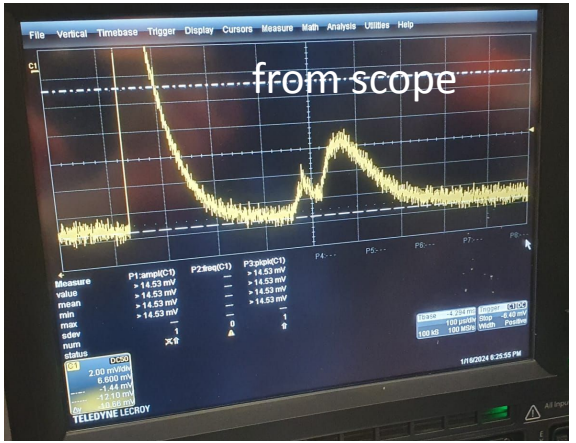
11A (A010 - ATC 1)

Strange noise in the core





Core Long Traces

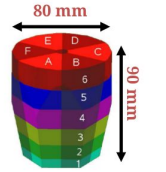


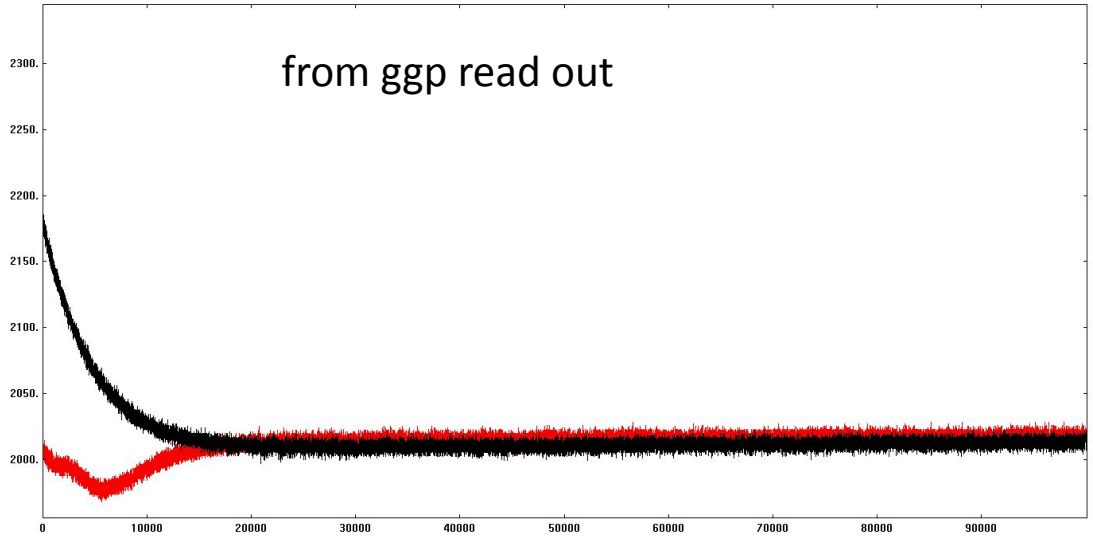
negative polarity

less amplitude than in 06C (16-01-2024)

09C (C016 - ATC 14)

Strange noise in the core





Core Long Traces

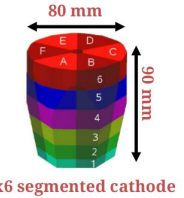
positive polarity

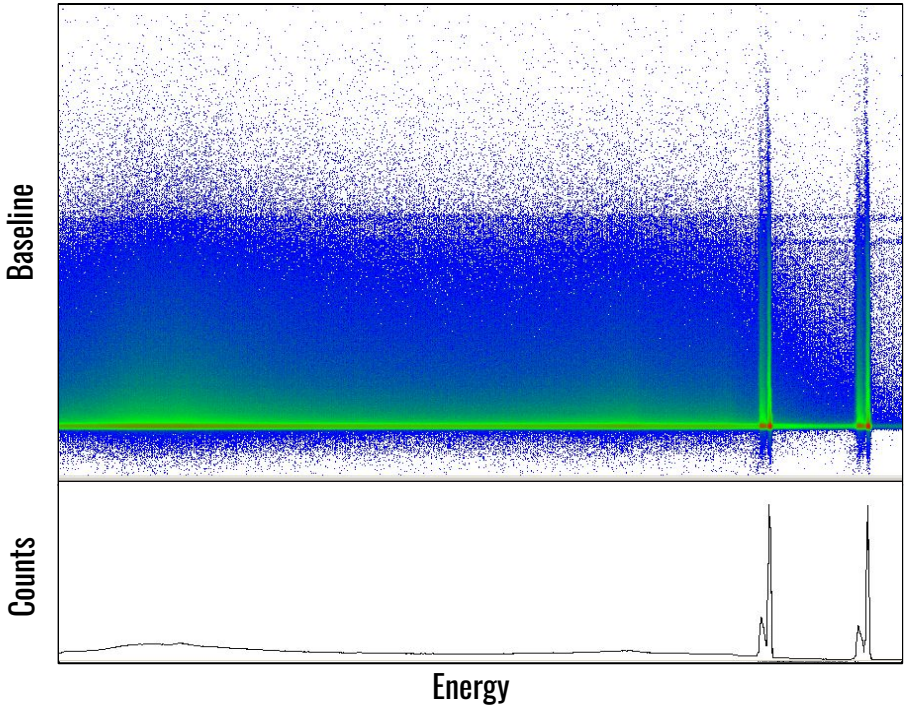
less amplitude than in 06C (16-01-2024)

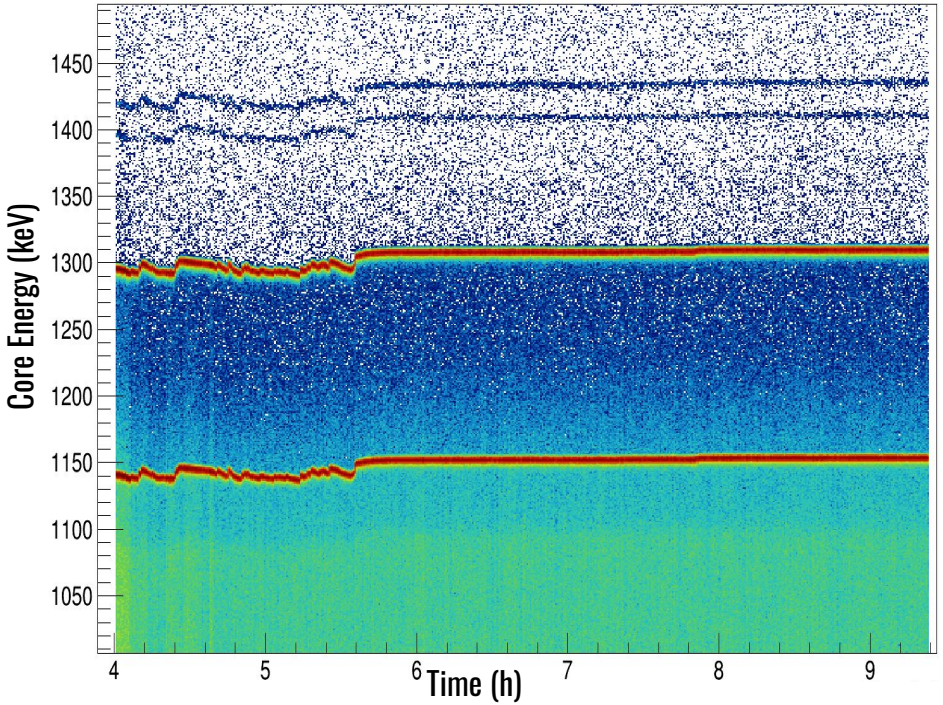
07B (B020 - ATC 2)

Gain oscillating over time HG core

No jumps for the capsule B010 - ATC14 in position 07B!



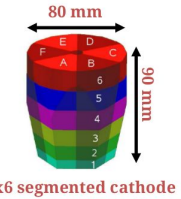


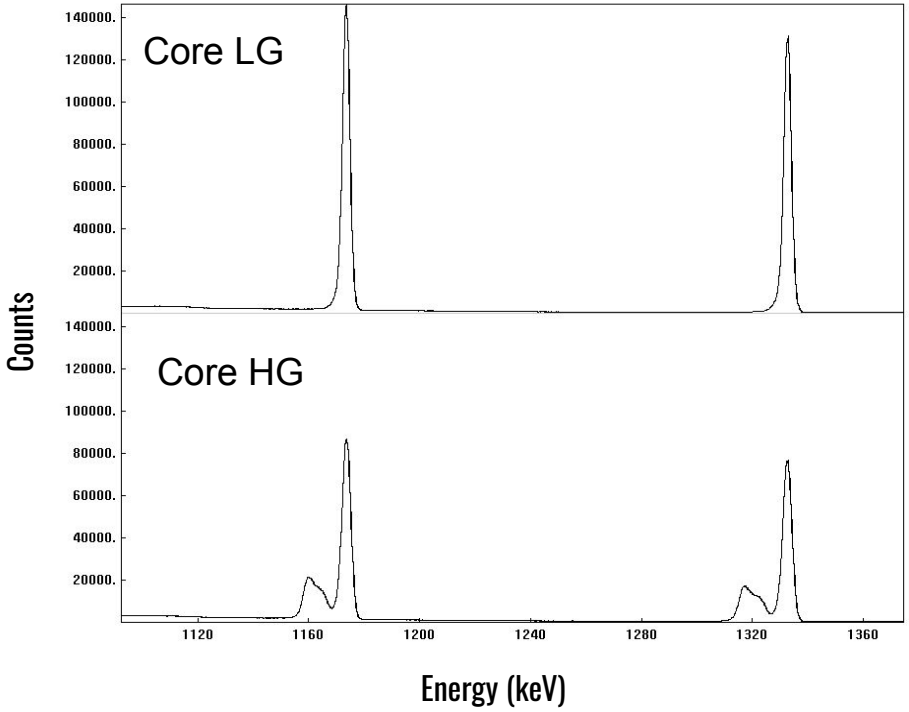


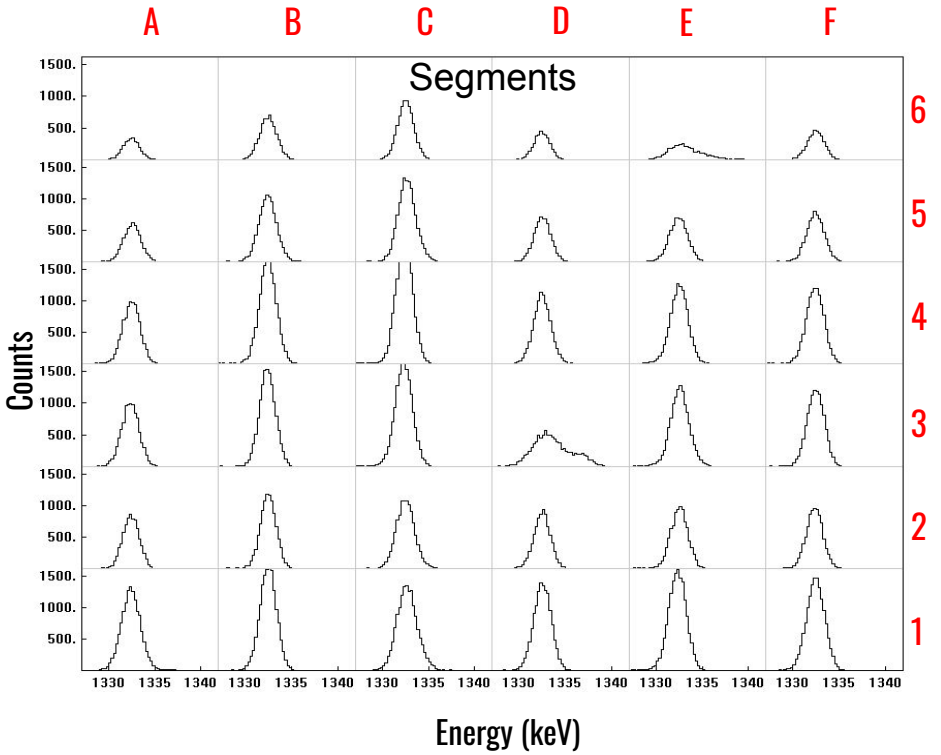
07B (B020 - ATC 2)

Gain oscillating over time HG core

No jumps for the capsule B010 - ATC14 in position 07B!

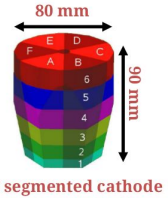






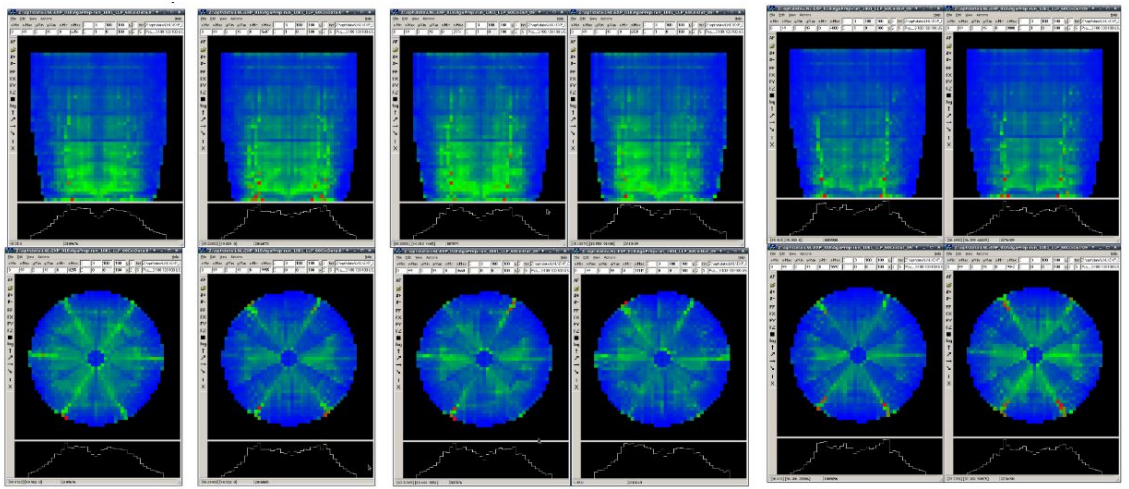
00B (B018 - ATC 18)

Displays a cross in the PSA pattern



6x6 segmented cathode

00B February 2024 00B (B018 - ATC 18)



00C | 00B | 00B swap BCDEFA | 00B swap CDEFAB | 00B lib09A-A017 | 00B lib09C-C018

The values for the simulation of the PSA basis of B018 were double checked and the basis was recreated. However the new basis of B018 resulted to be binary identically to the old.