

# Detector status and overview

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16<sup>th</sup> AGATA week

Valencia 2015

# Status Capsules

Delivered Under Repair Pending

10

0

1

13

1

0

14

2

0

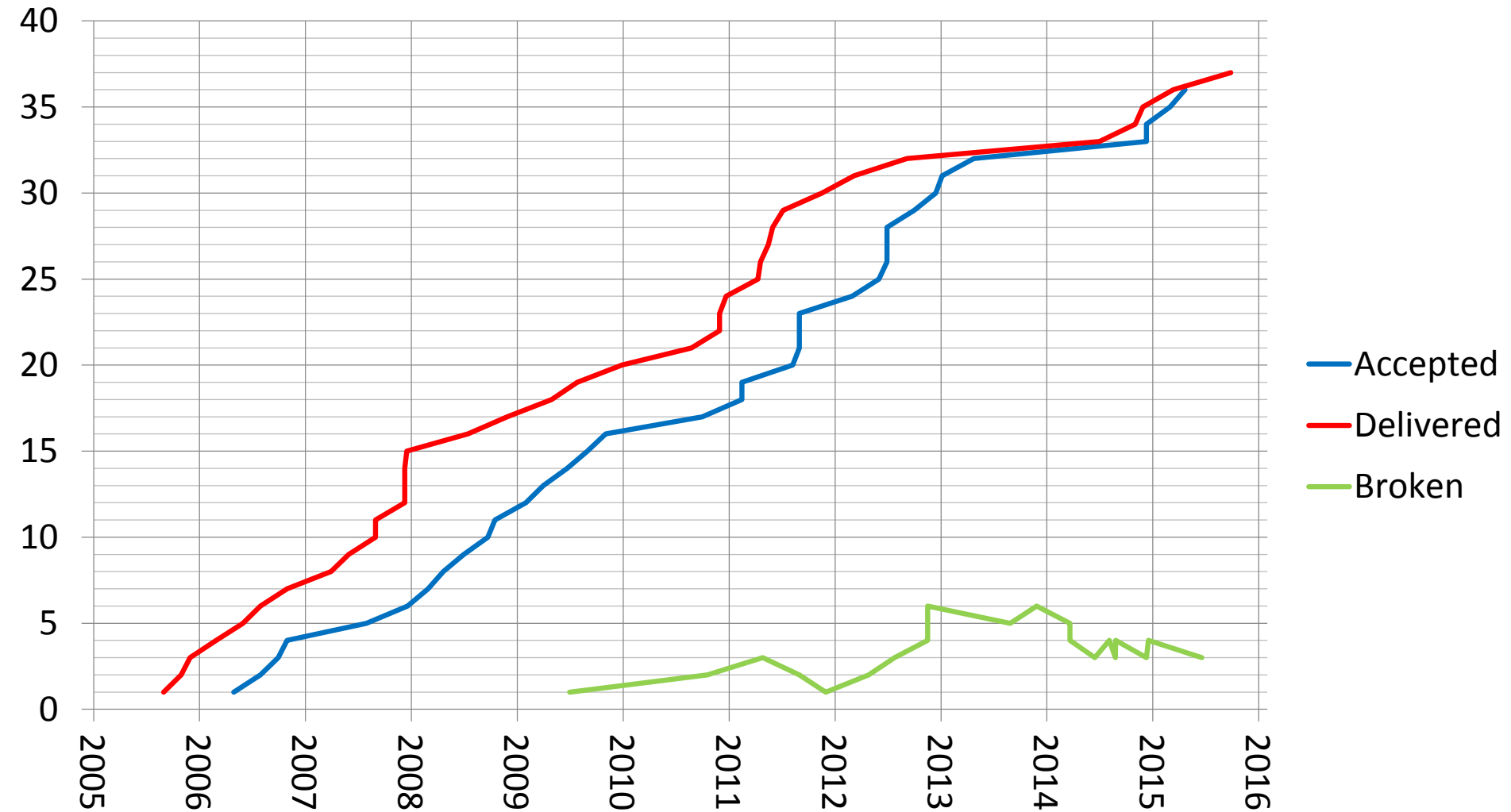
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37

3

1



# News on Capsules

- Nov 2014: C002 returned to Canberra for repair
- Dec 2014: C004 returned to Canberra for repair
- Jan 2015: C012 accepted by CEA Saclay
- Apr 2015: C014 accepted by CEA Saclay
- Jun 2015: A004 accepted by Liverpool
- Jul 2015: A010 delivered to Liverpool (CAT pending)



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# Capsule Activity

<b>ATC</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>Location</b>
1	008	001	003	GANIL
2	003	003	005	GANIL
3	002	010	001	GANIL
4	007	007	007	GANIL
5	005	002	009	GANIL
6	001	004	004	GANIL
7	006	013	006	GANIL
8	009	005	008	GANIL

# Capsule Activity

Detector	Location	Status
A010	Liverpool	CAT
B006	Strasbourg	Scanning
B009	Canberra	Repair order received
C002	Canberra	Under repair End 2015
C004	Canberra	Under repair End 2015

# Pending Deliveries

Capsule	Scheduled
A011	End of September (Saclay)
B014	2nd Semester 2015

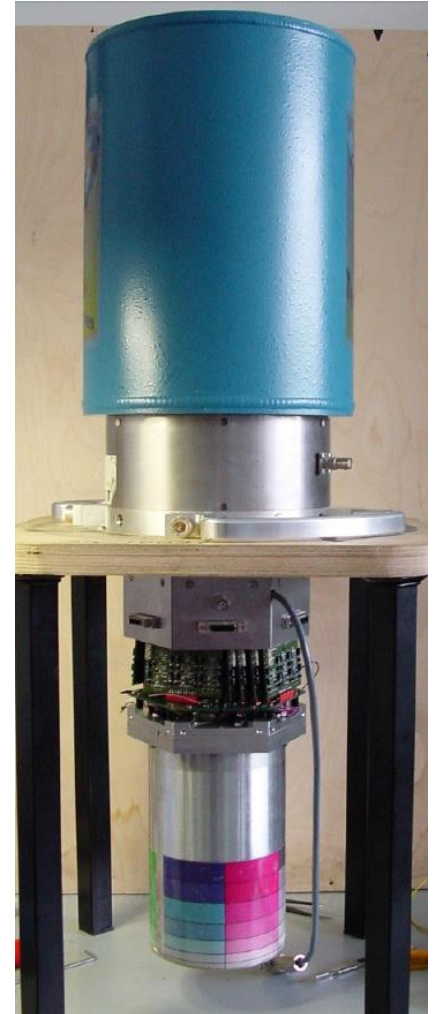
# Future Cluster

Cryostat	A	B	C	Status
ADC3	-	B011	C011	Ready
ATC9 (Orsay)	A004	B008	C013	Under Construction CTT
ATC10 (GANIL)	A010	B012	C012	Under Construction CTT
ATC11 (ADC2)	A011	B006	C014	Upgrade by CTT
ADC1	-	B009	C004	Dewar replace CTT
ADC5	-	B014	C002	Commissioning CTT

**Wait for triples? Good news for AGATA!**  
**New Triple Detector + New Triple Cryostat**

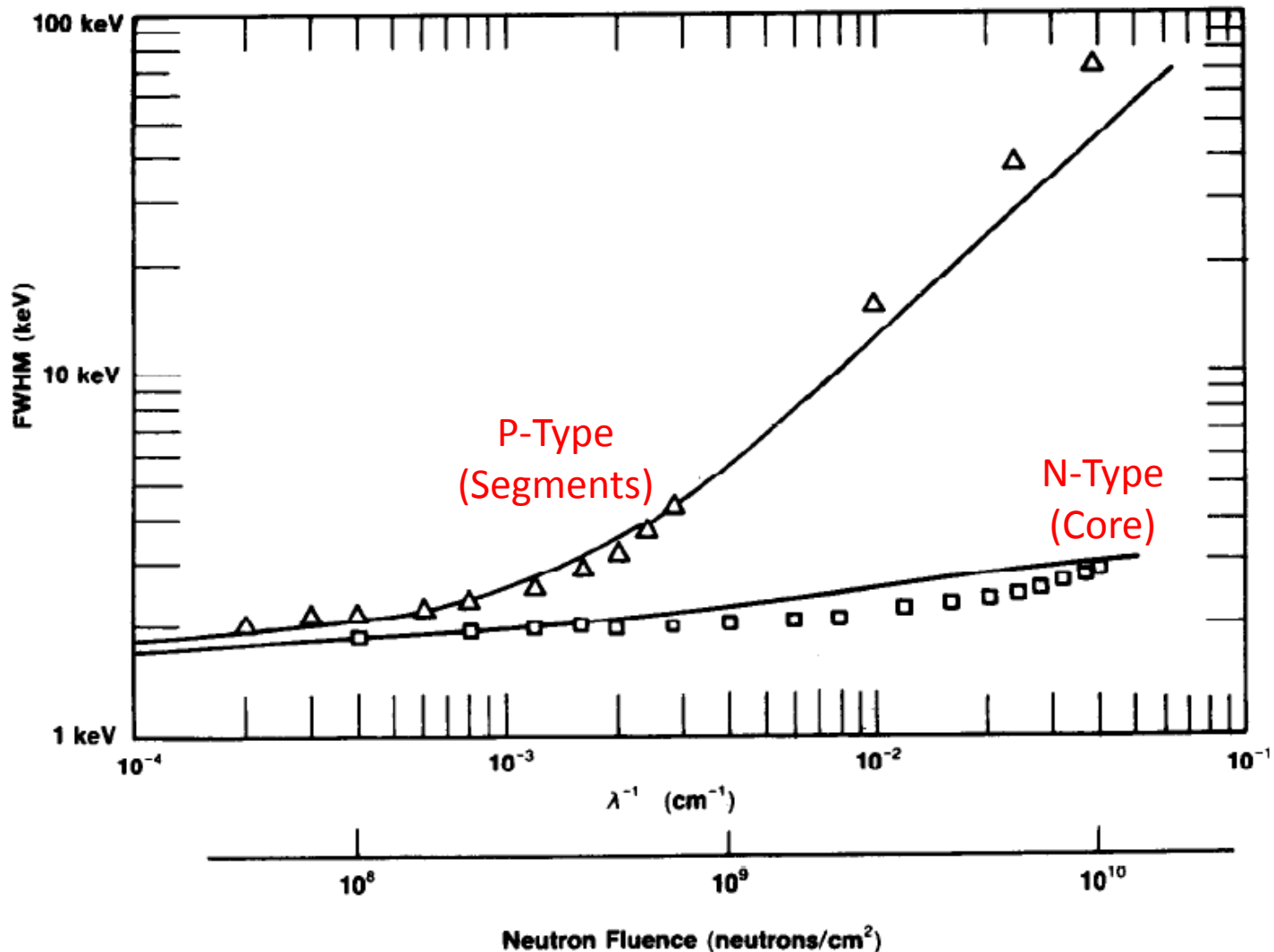
# Status Test Cryostats

TC	Location	Activity
1	Cologne	CAT
2	Saclay	CAT
3	Liverpool	CAT
4	Liverpool	CAT
5	Cologne	Capsule Development
6	Cologne	CAT
7	Cologne	Repair
8	Strasbourg	Scanning



# Neutron damage of HpGe-Detectors

T. W. Raudorf and R. H. Pehl, Nucl. Instr. Meth. A, 255 (1987) 538-551

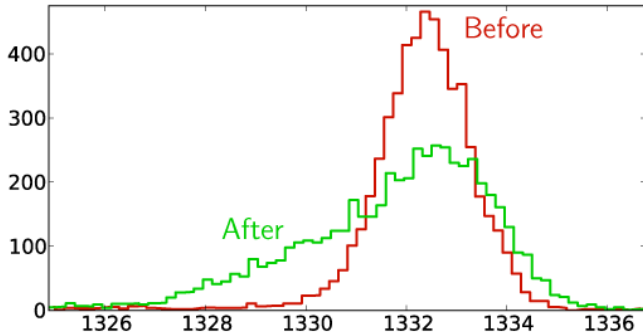
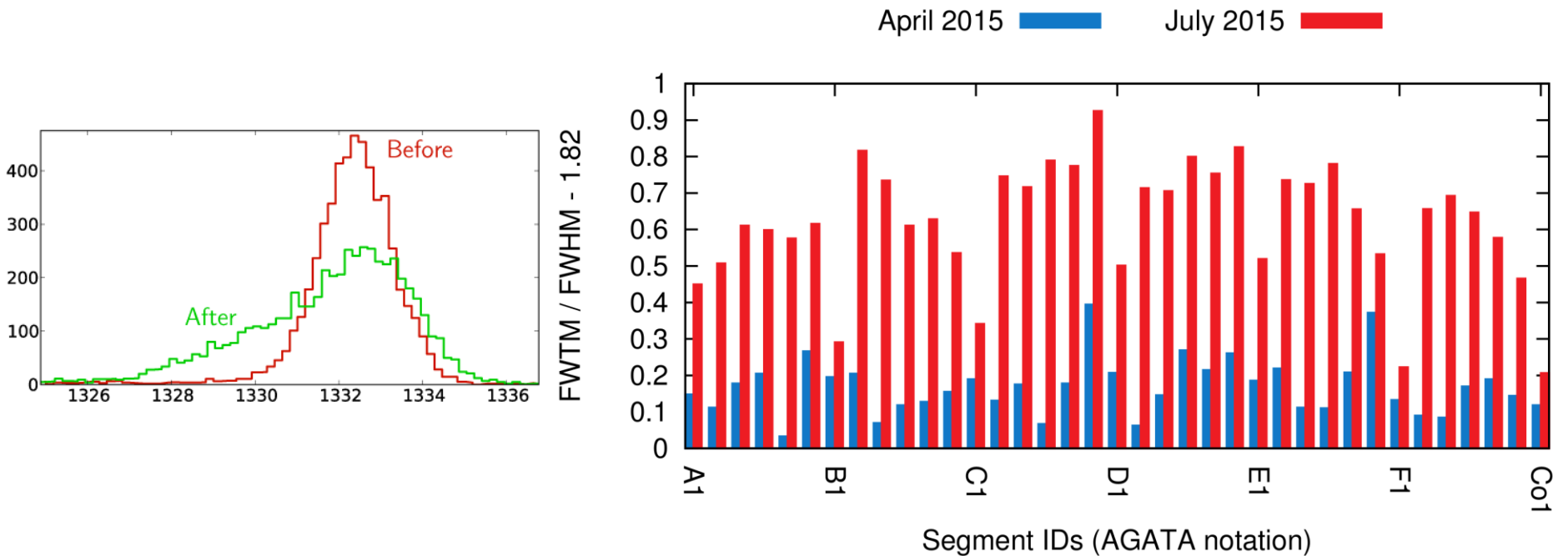
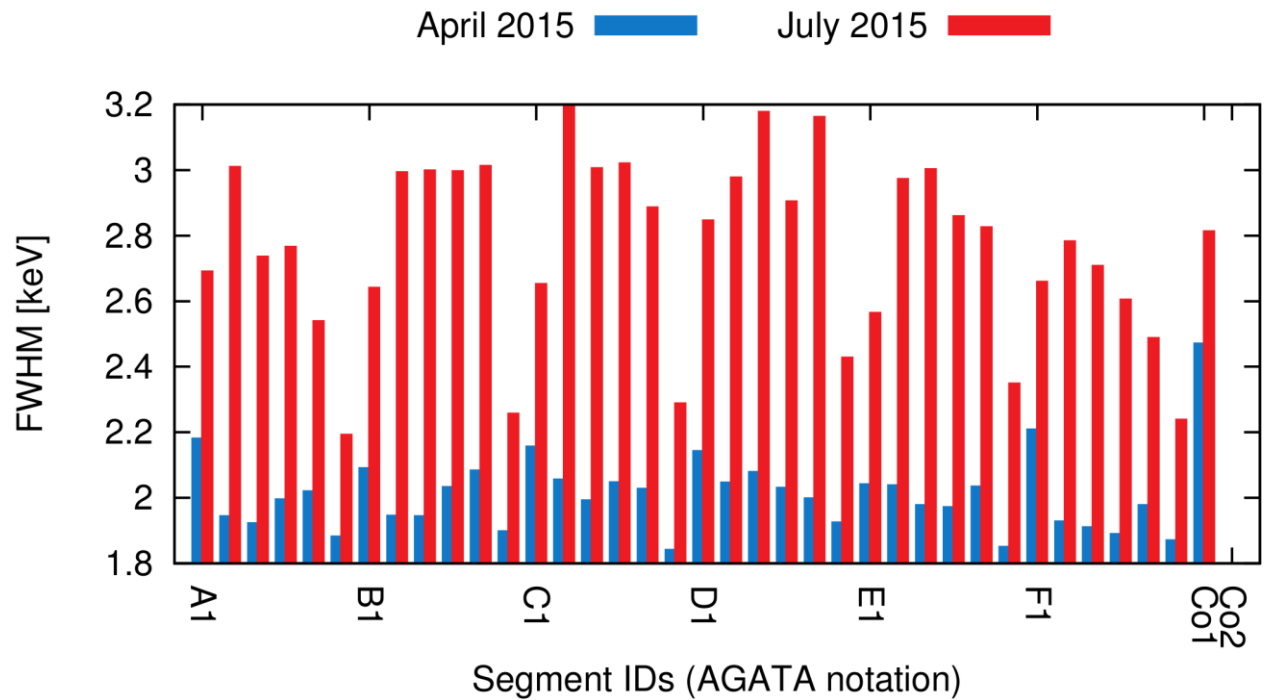




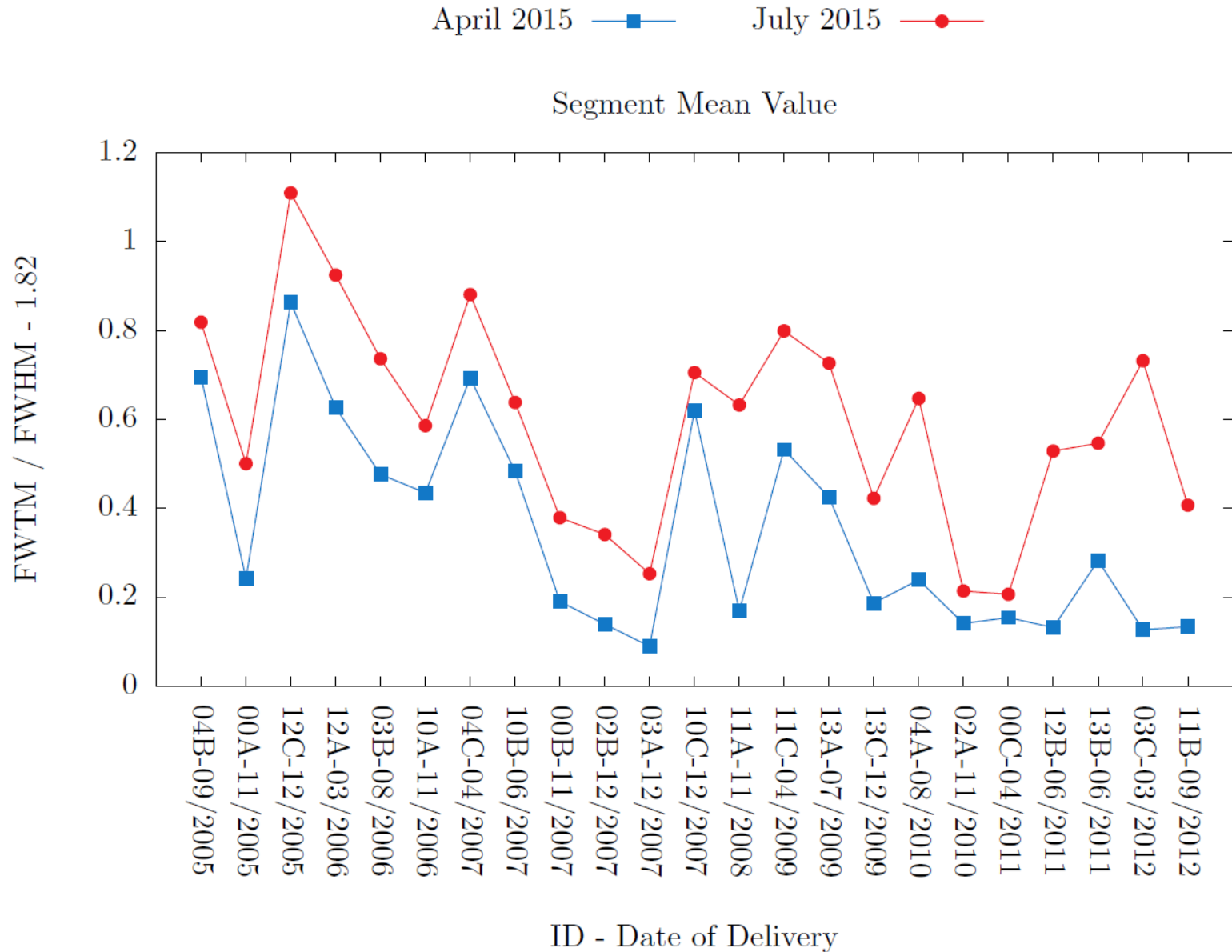
# Neutron Damage

Before and after  
experimental  
campaign @ GANIL

## A006



# Overview of neutron damage



Details of Annealing:

[A. Wiens – Status of the AGATA Detectors, AGATA week 2011 Darmstadt](#)

[F. Radeck – Bachelor thesis 2011, University of Cologne](#)

# Segment FWHM

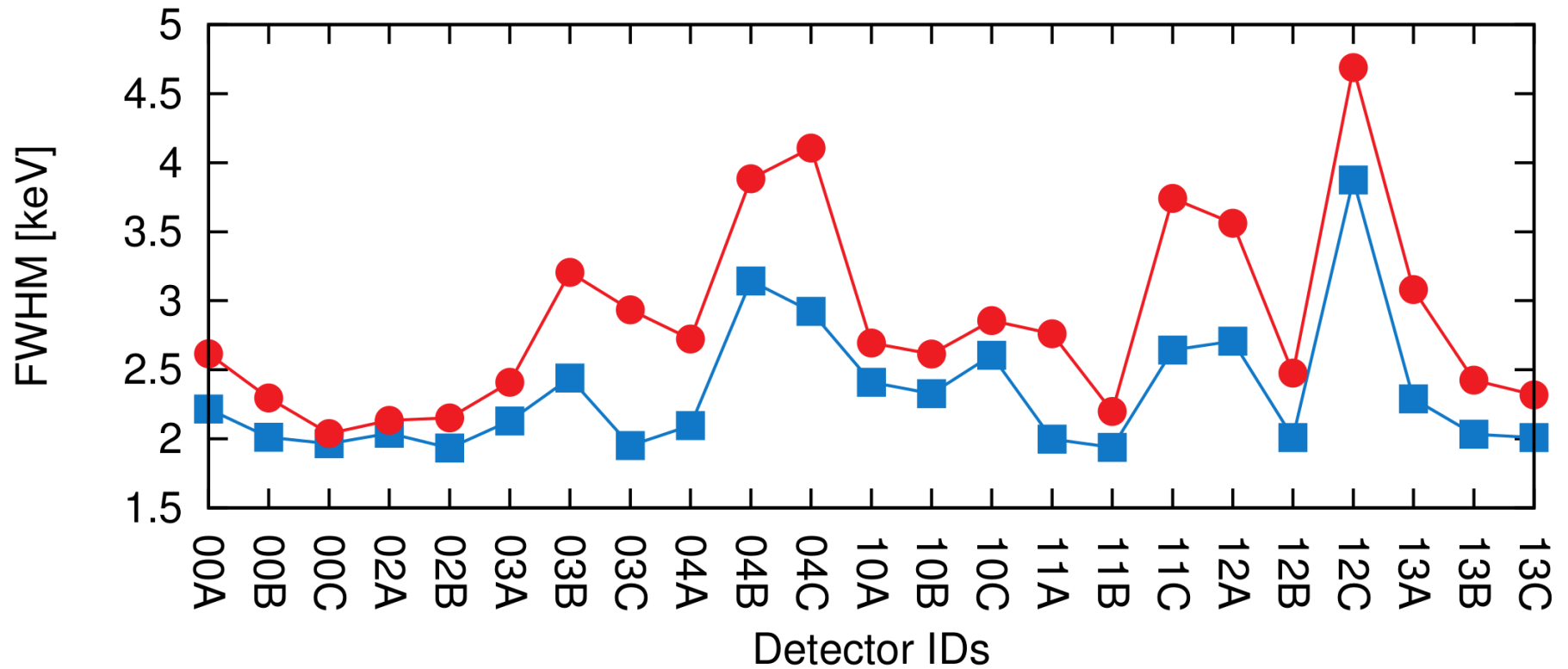
April 2015



July 2015



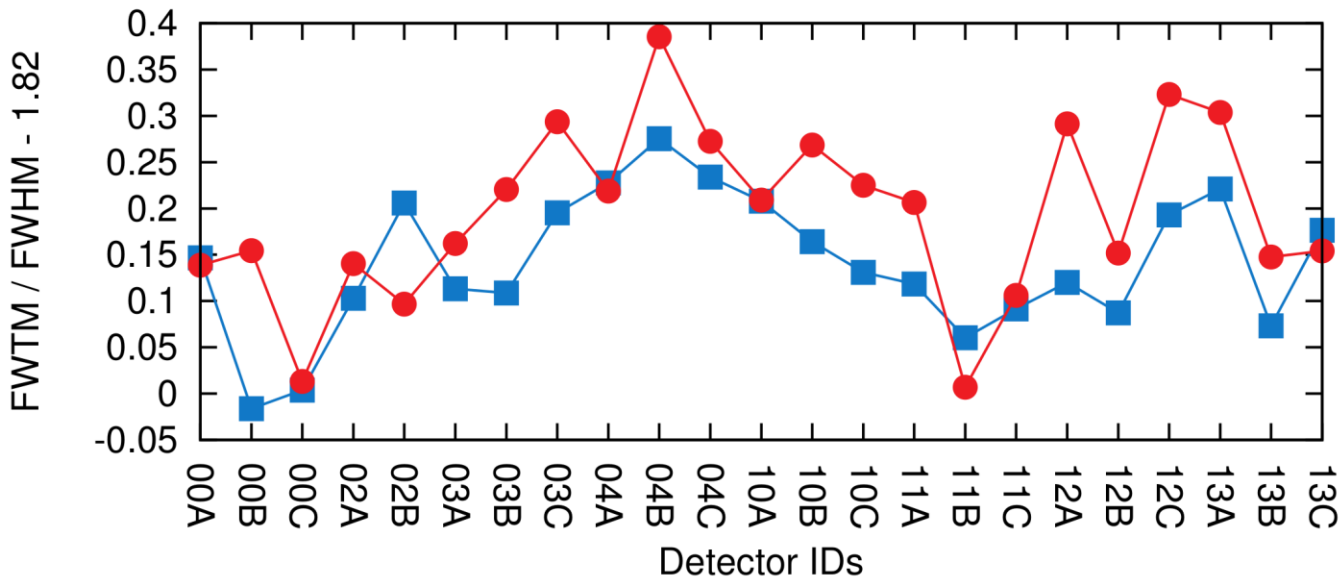
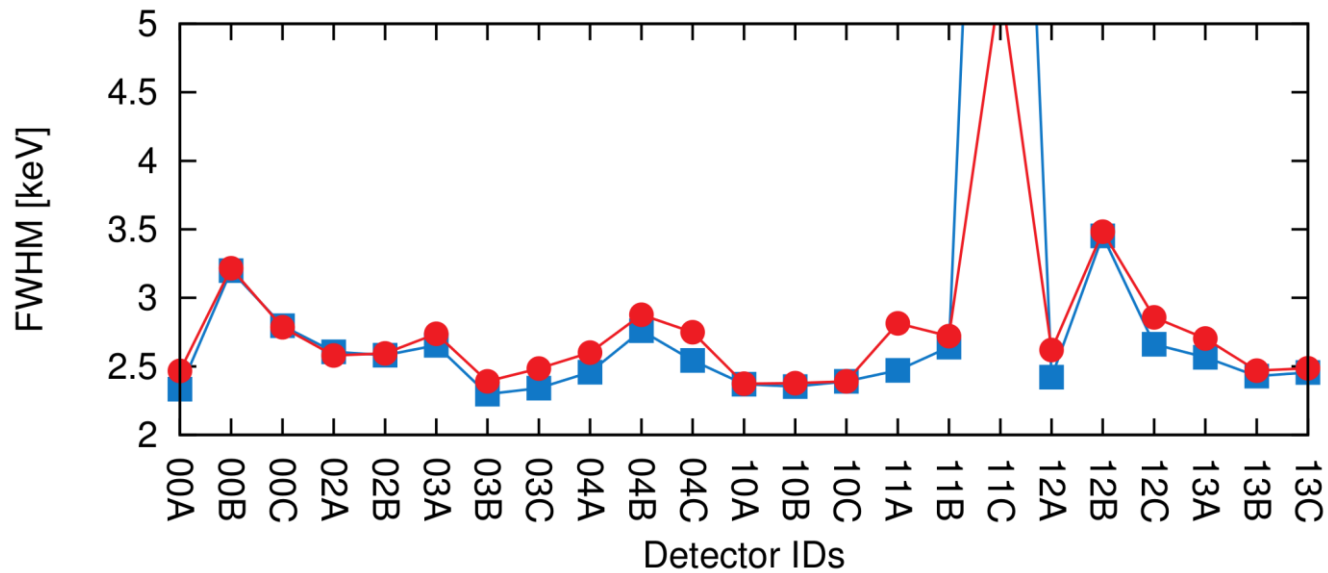
Segment Mean Value



# Core Values

April 2015 ■ July 2015 ●

Core (high gain)



# What to do?

- Trapping correction based on PSA

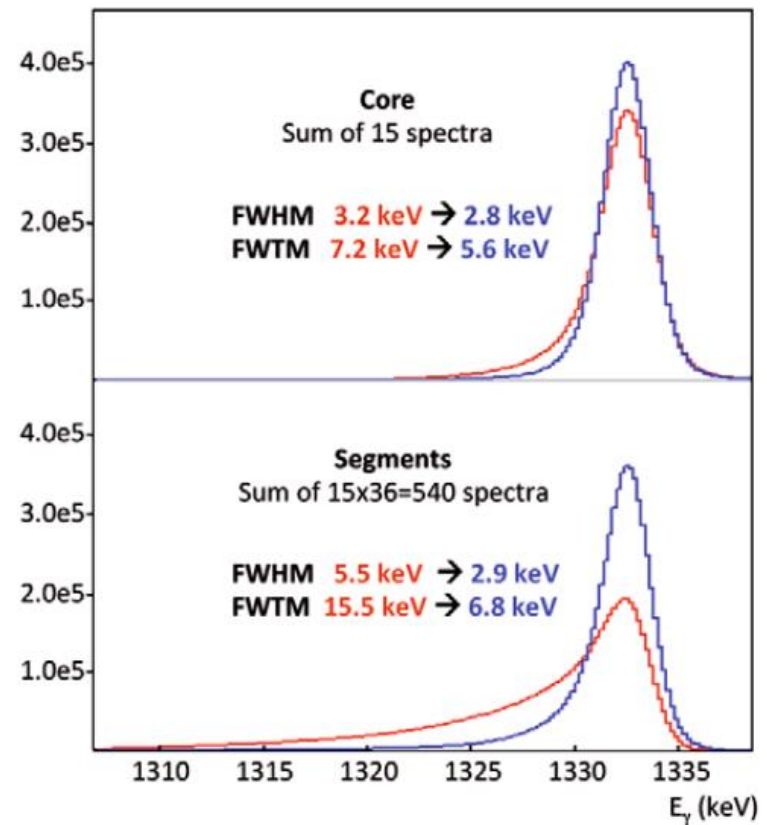
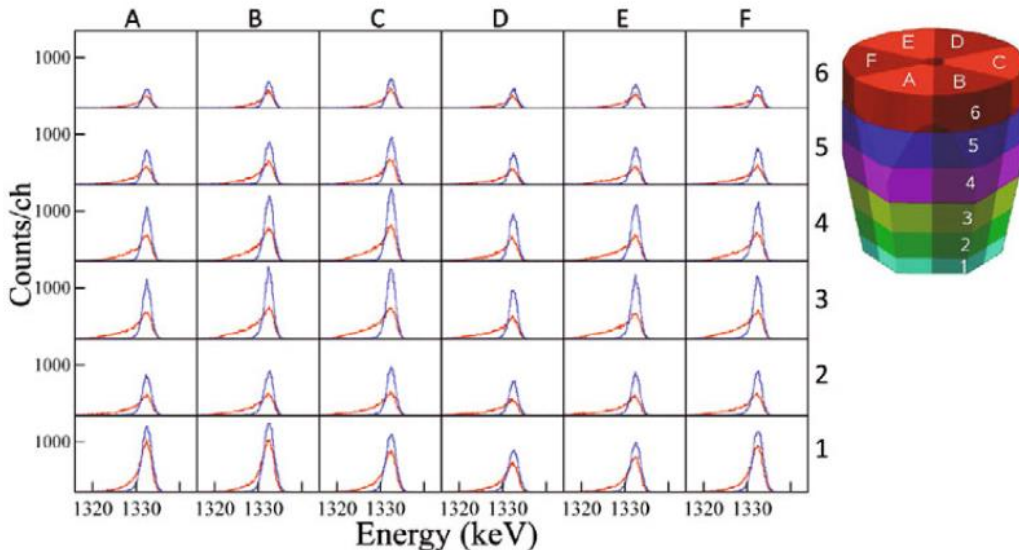
[B. Bruyneel et al. Eur. Phys. J. A \(2013\) 49: 61](#)

Depending on the length of the trajectory of the charge carriers a correction is performed to reconstruct the initial energy resolution and peak shape

Short- to mid-term solution, as correction will fail for severe neutron damage.

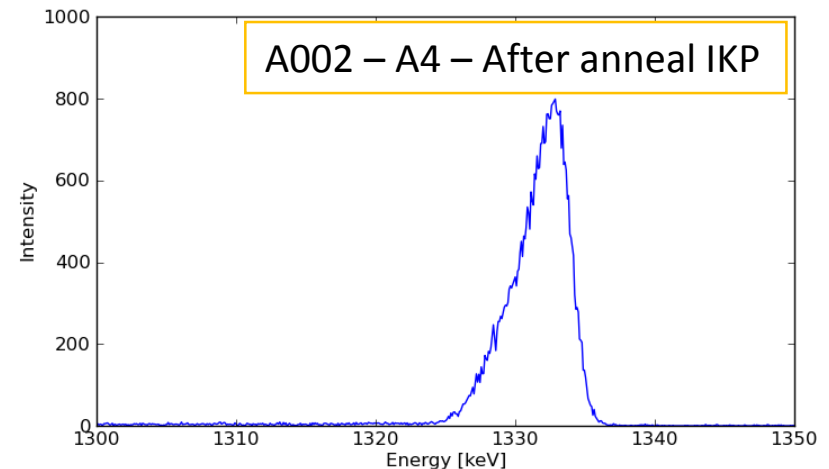
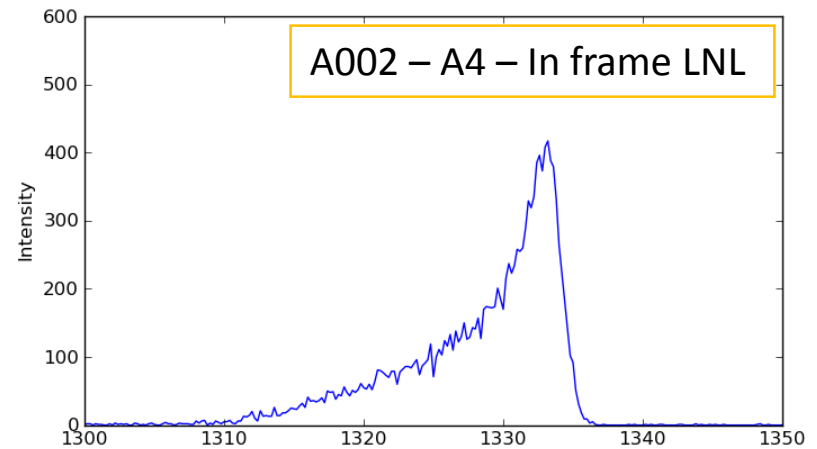
Parameters must be adjusted with source measurements.

Procedure could be investigated further.



# What to do?

- Annealing detectors
  - After LNL campaign 11 detectors were annealed
    - Up to 120h (102°C) annealing, not full performance could be restored
    - 3 Crystals showed leakage current after procedure
    - Crystals are not available for 3-5 months



Details of Annealing:

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# What to do?

- Solution: anneal detectors at higher temperatures
  - Canberra annealed bare crystal successfully at high temperature
  - Specification of AGATA capsule only allows 102°C
- What is needed
  - R&D:
    - Trapping correction (implementation, standard routines, improvements)
    - Capsules (Higher temperatures, robustness and stability)
  - Manpower
    - Capsule will be not available for 3-5 months
    - Work must be done by experienced persons

# Thank you!

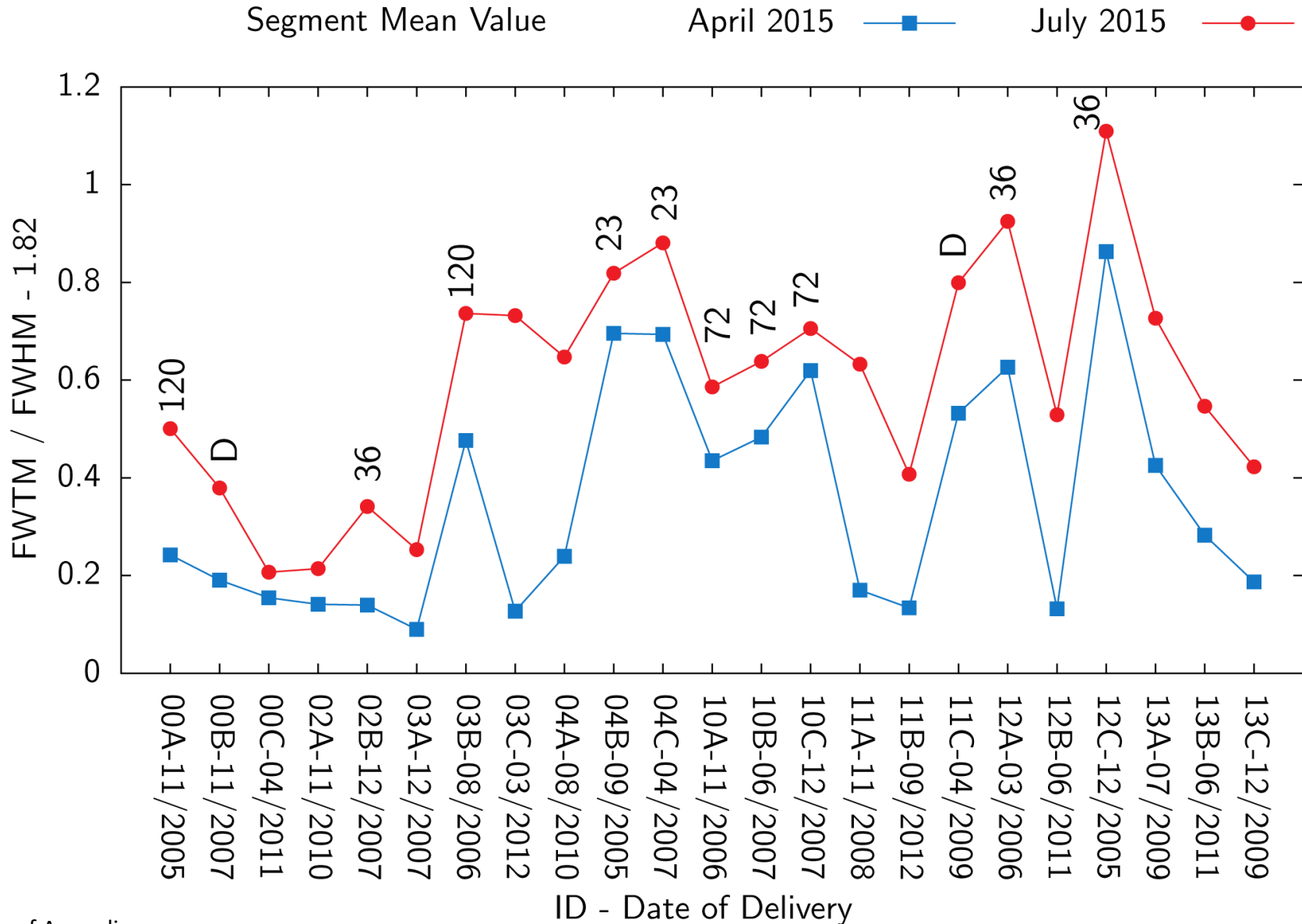


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# Overview of neutron damage



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