

Detector characterisation overview of the AGATA scanning tables

Dr Andy Boston

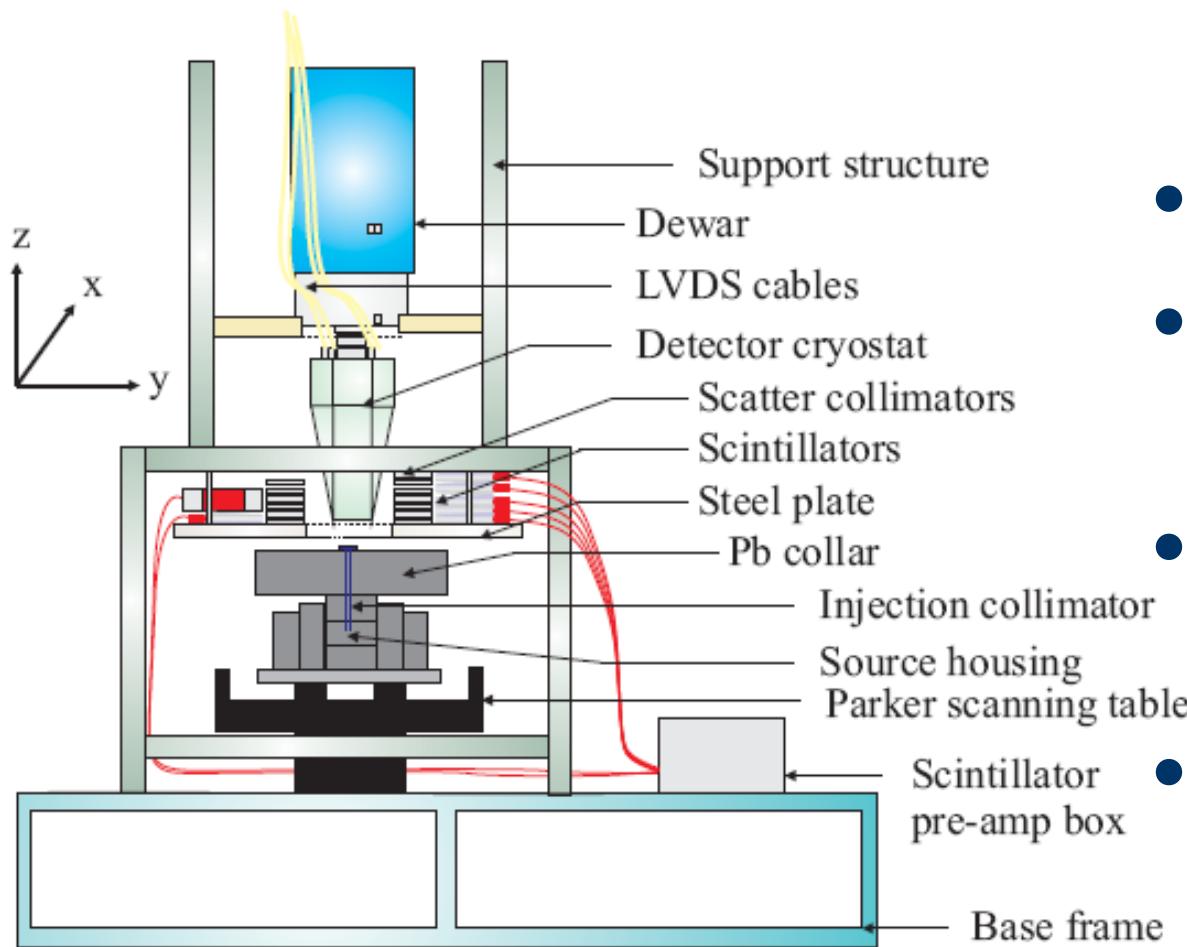
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AGATA collaboration Scanning tables

- **Liverpool**
 - Conventional singles and Coincidence
 - used to commission PSCS
 - validate other tables
- **Orsay**
 - Singles and Coincidence
- **GSI**
- **IPHC Strasbourg scanning table based on the PSCS technique**
- **Salamanca Scanning table (SALSA)**
 - 511keV coincidence and PSCS

Liverpool Detector characterisation

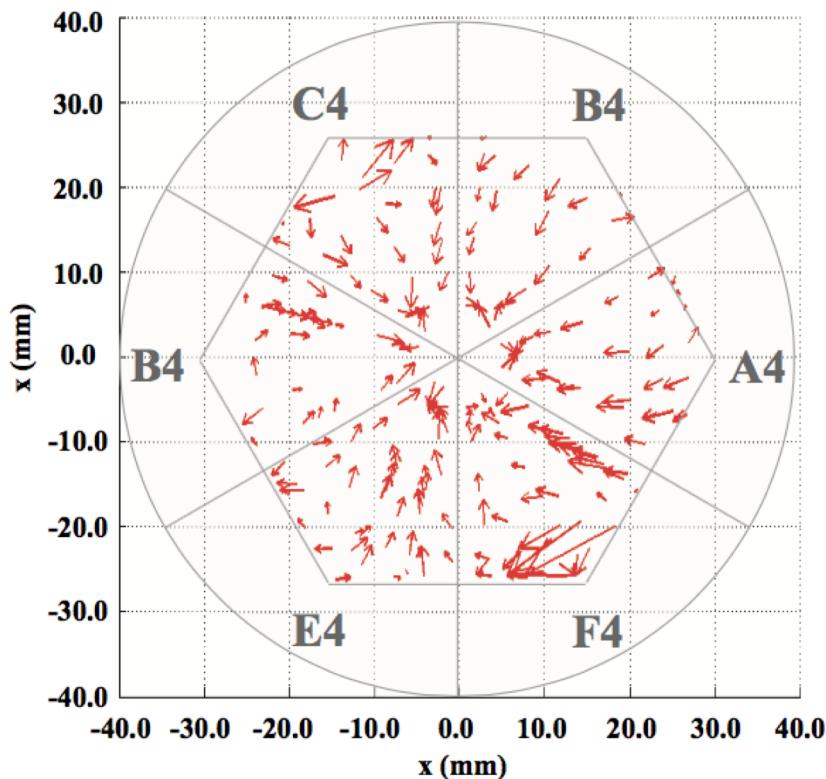


- **Singles**
- **Coincidence scanning**
- **Very precise and accurate**
- **Can be very slow**

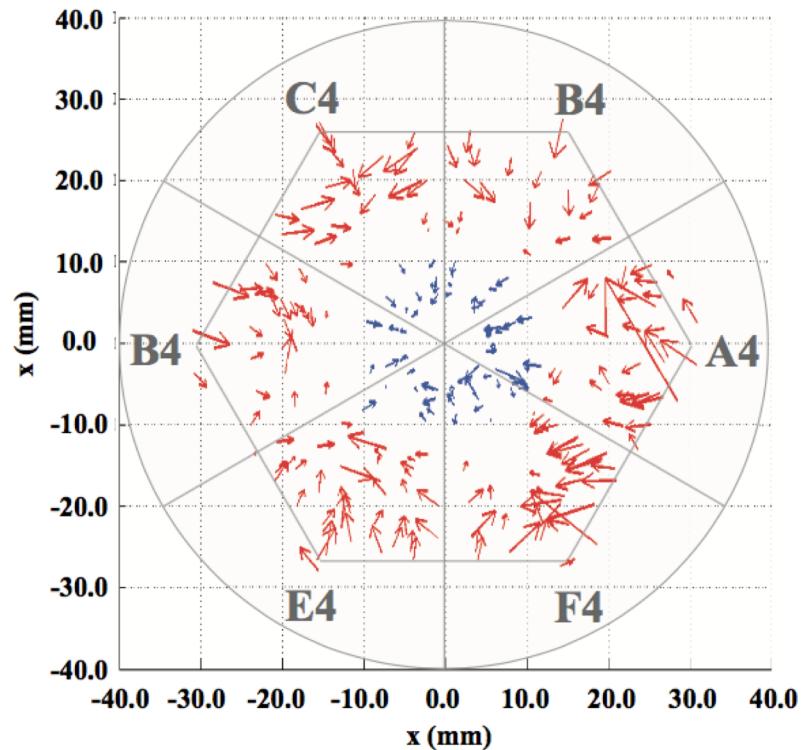


Upgrade of system in progress

Coincidence scan vs basis



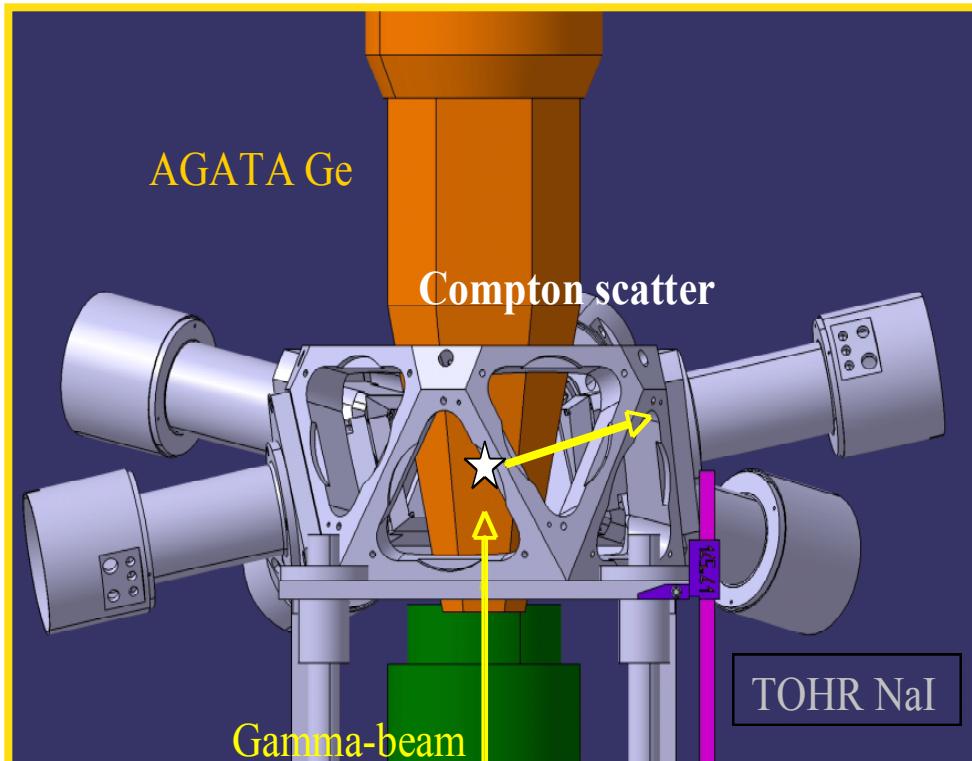
a) Displacement vectors, $z = 4.8 \pm 0.3\text{mm}$



a) Displacement vectors, $z = 15.7 \pm 0.3\text{mm}$

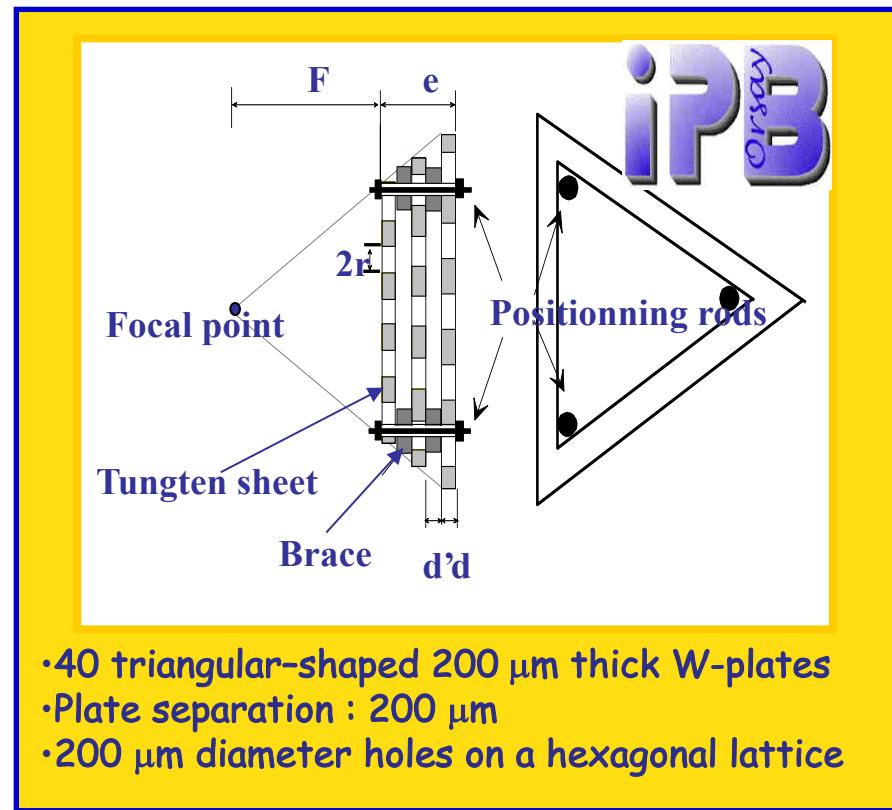
Concept of the scanning set-up at Orsay

Agata detector : θ movement
Xy movement



Intense Source : 500 MBq

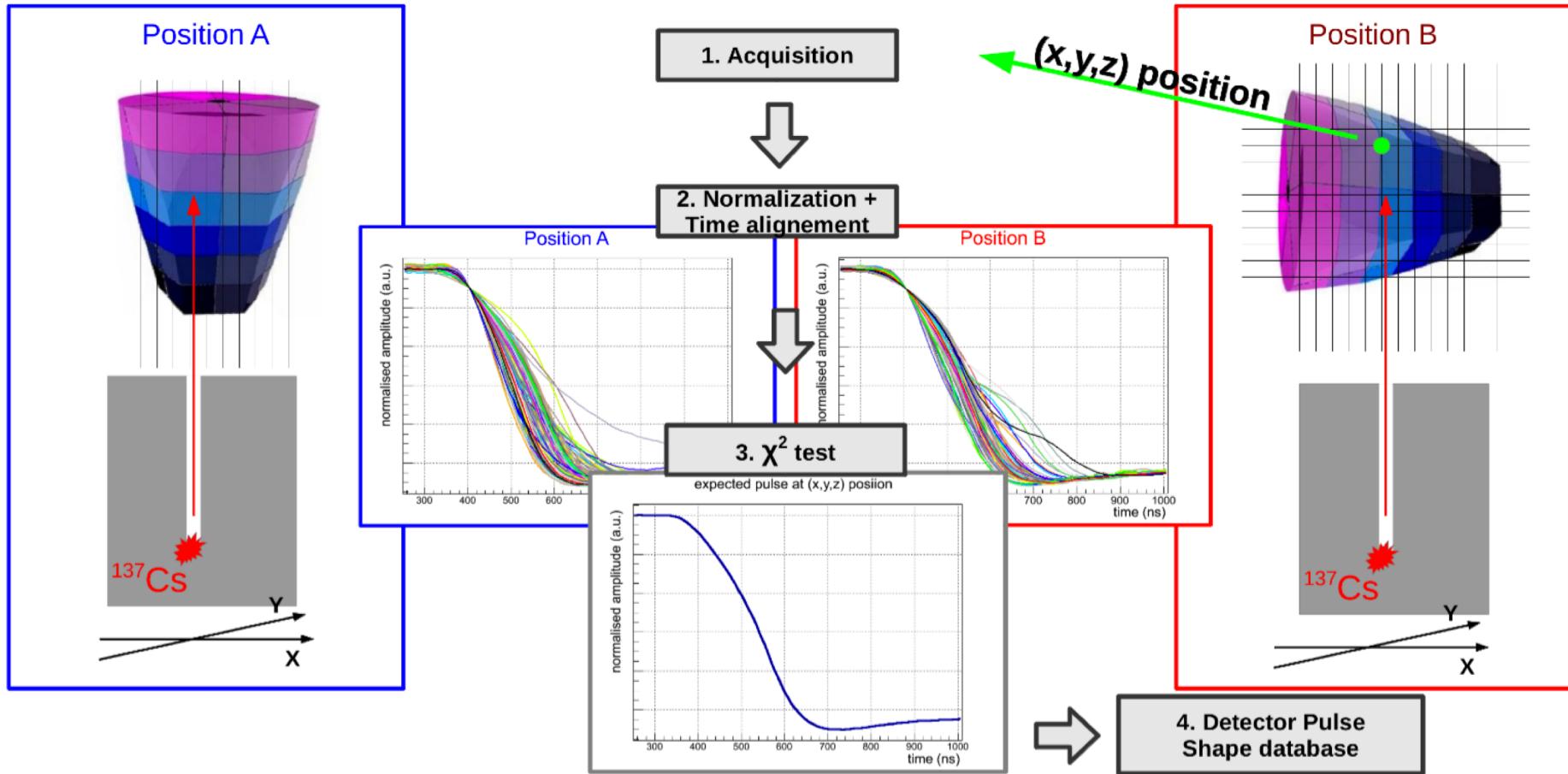
Tohr : z movement
Coincidences : 6 NaI detectors



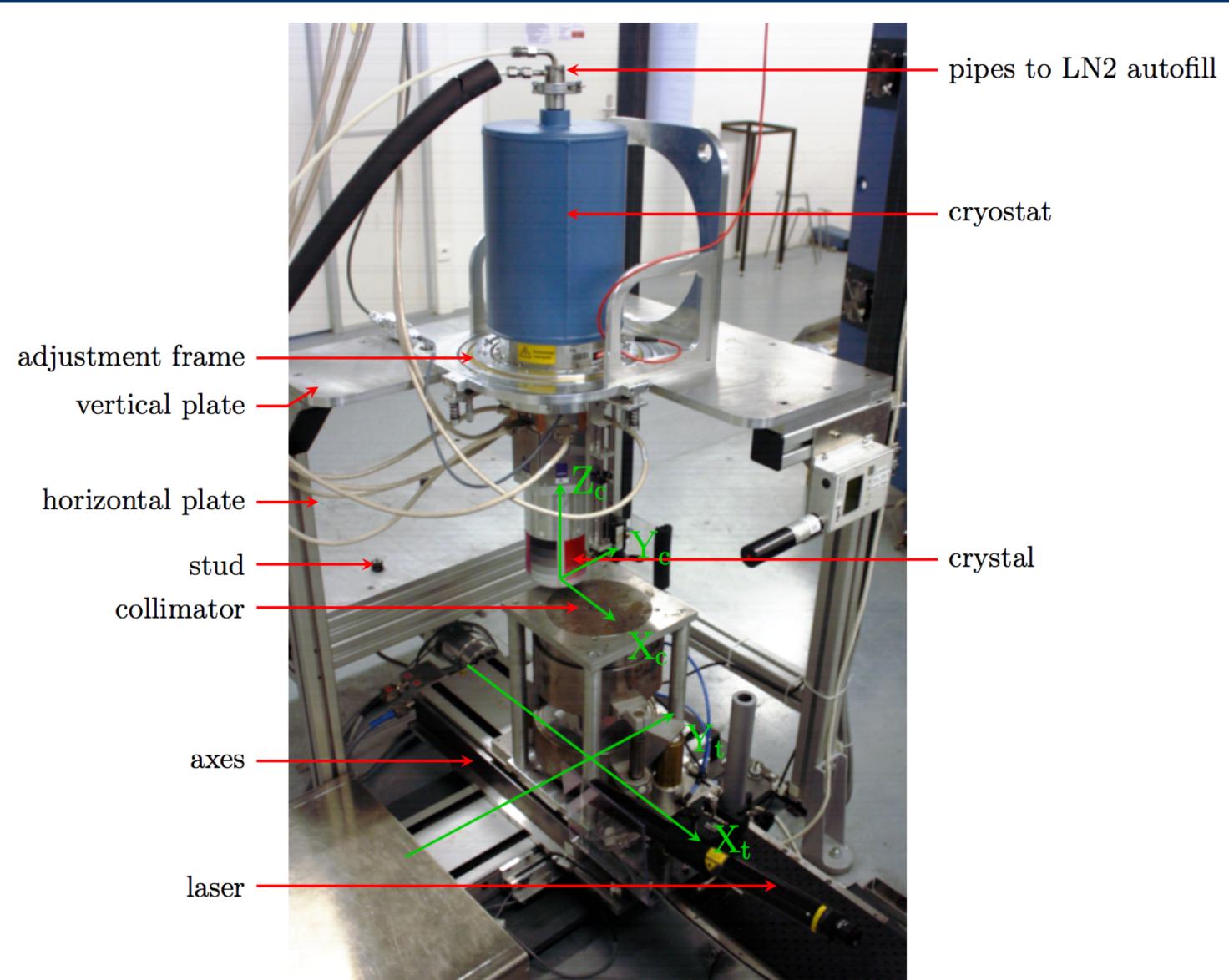
Volume /scan point : $2 \times 2 \times 2$ -
3 mm³ : 3D Scan of the whole detector

From simulations, the number of single interaction Compton scatter events at a given position :
400/h @front face, 100/h @front third and 10/h @the back of the detector

Pulse Shape Comparison Scan (PSCS)



IPHC Strasbourg scanning table



PSCS validation and experimental basis

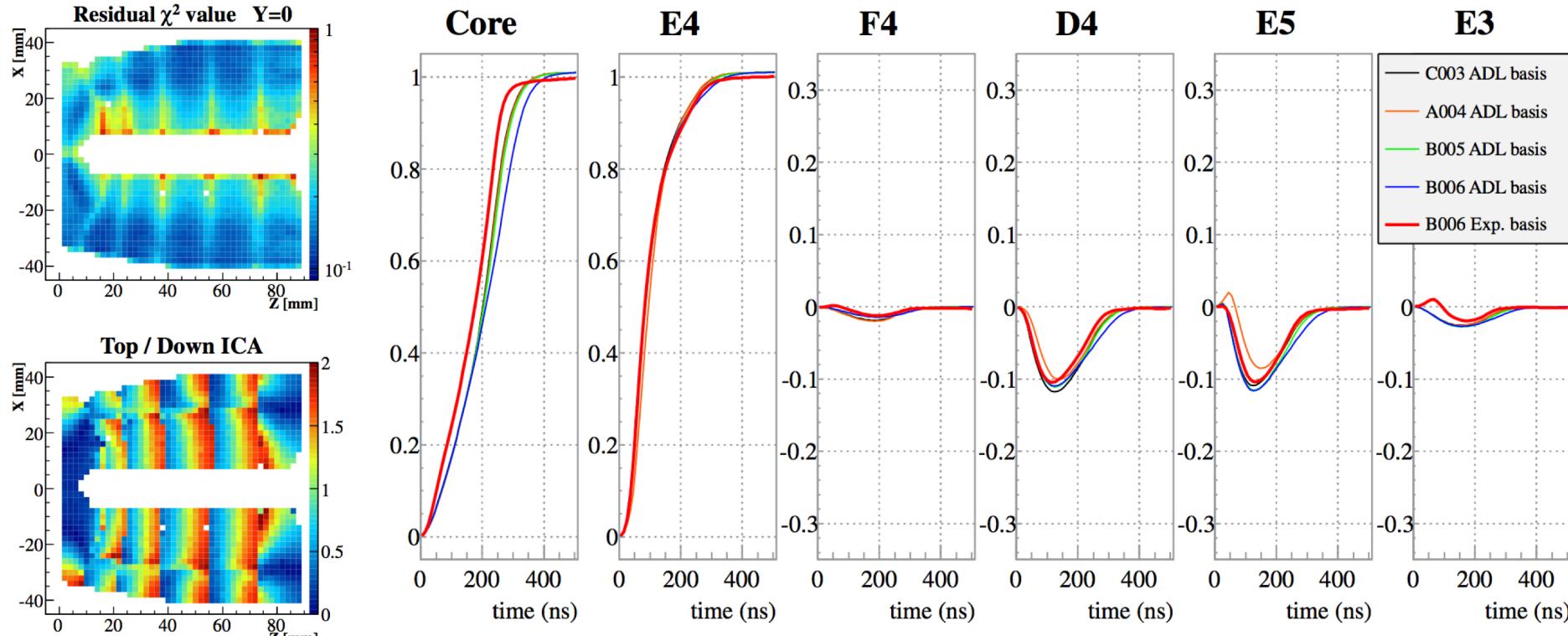
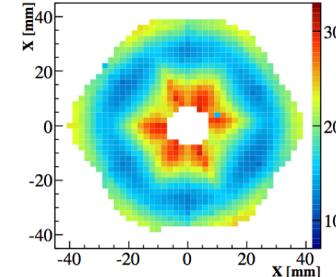
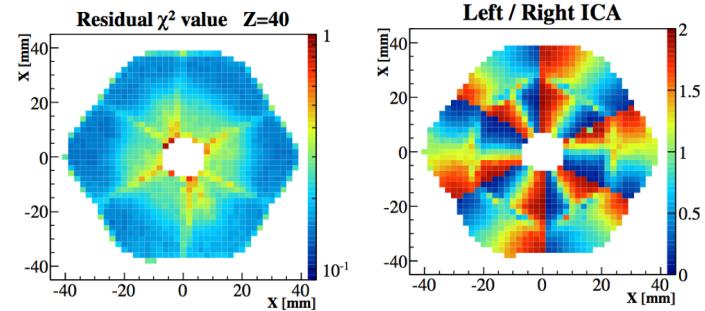
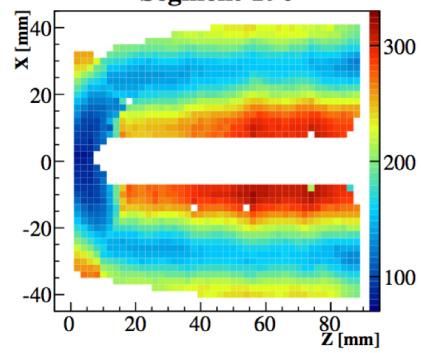


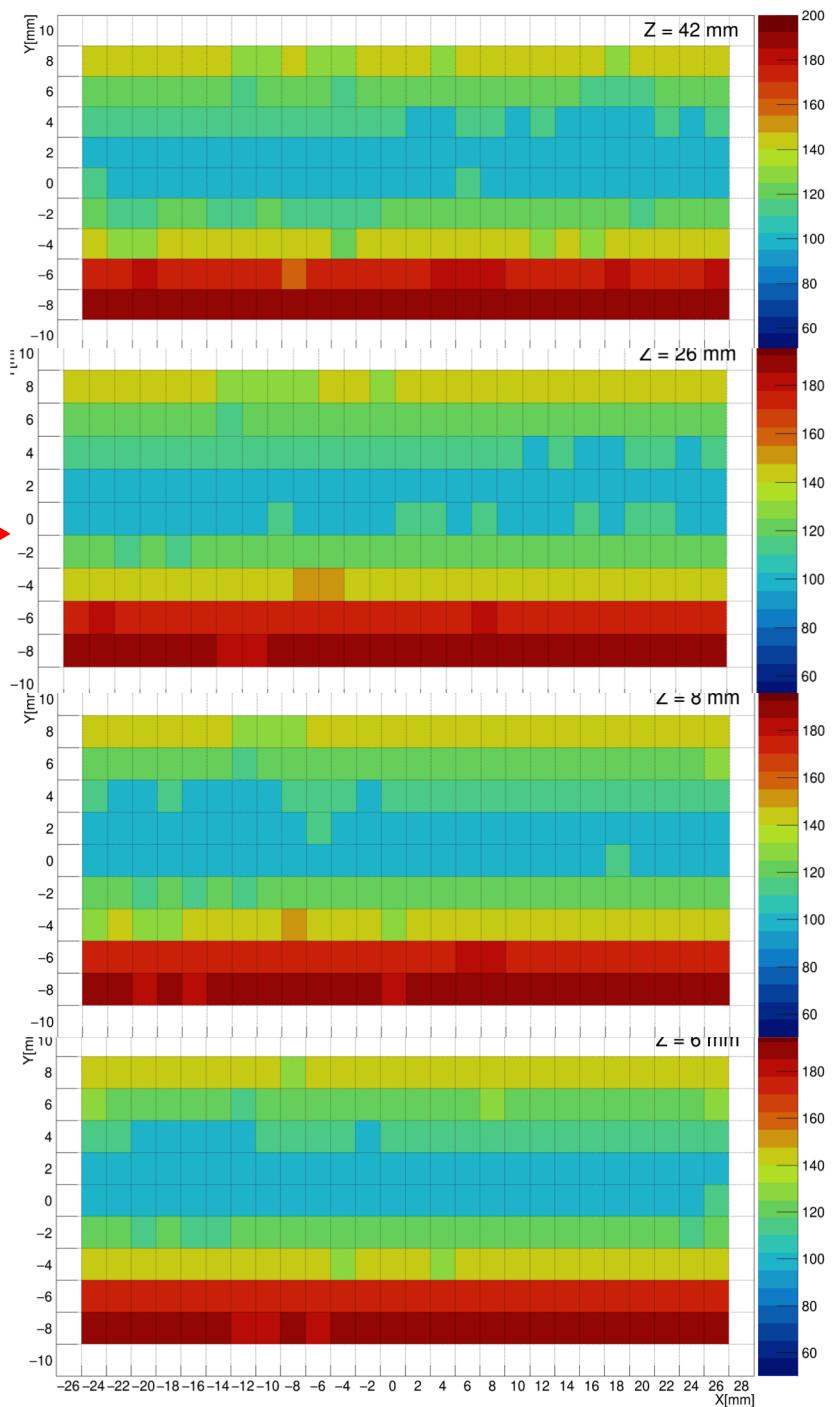
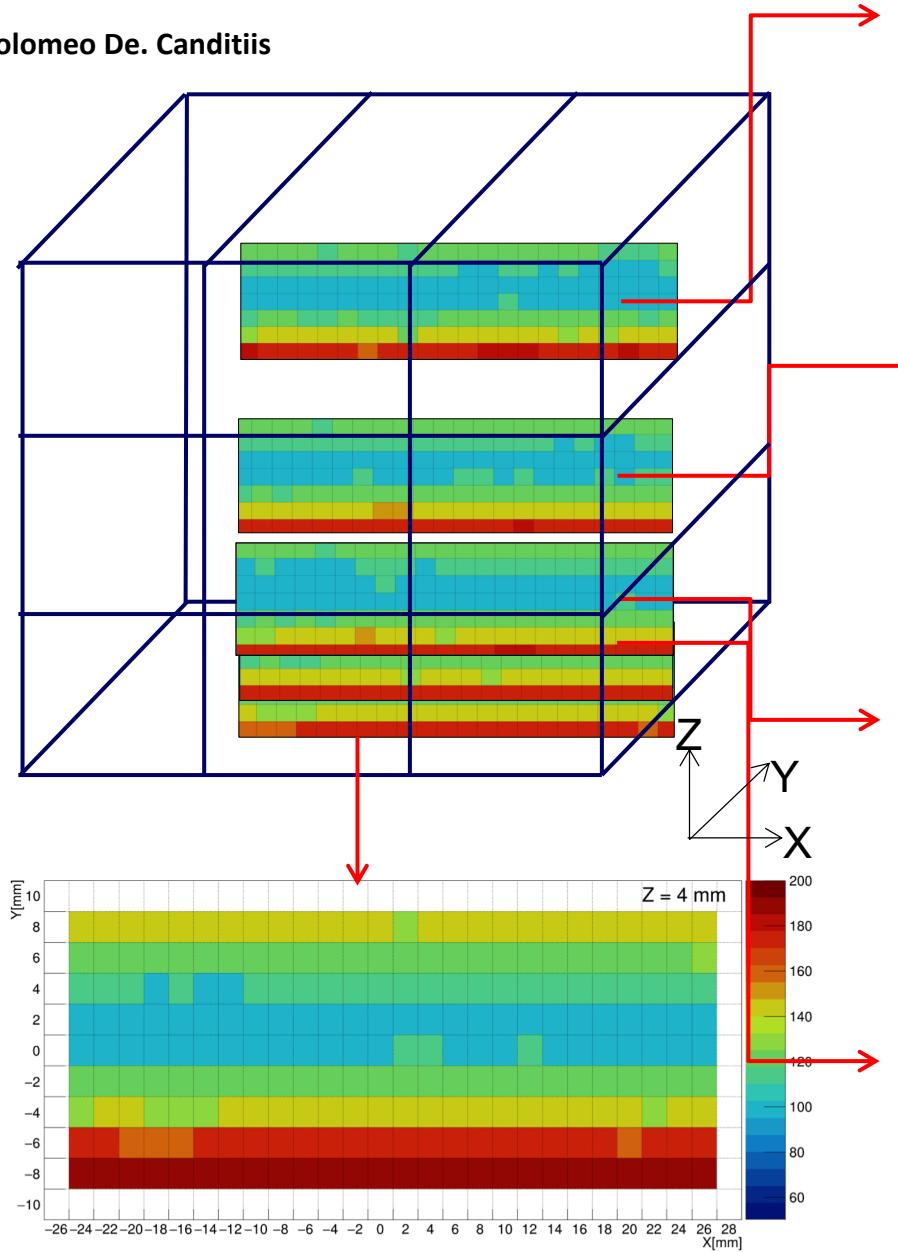
Figure 5.17: Comparison between experimental basis and several ADL basis at position $X=30$, $Y=-4$, $Z=48$ mm



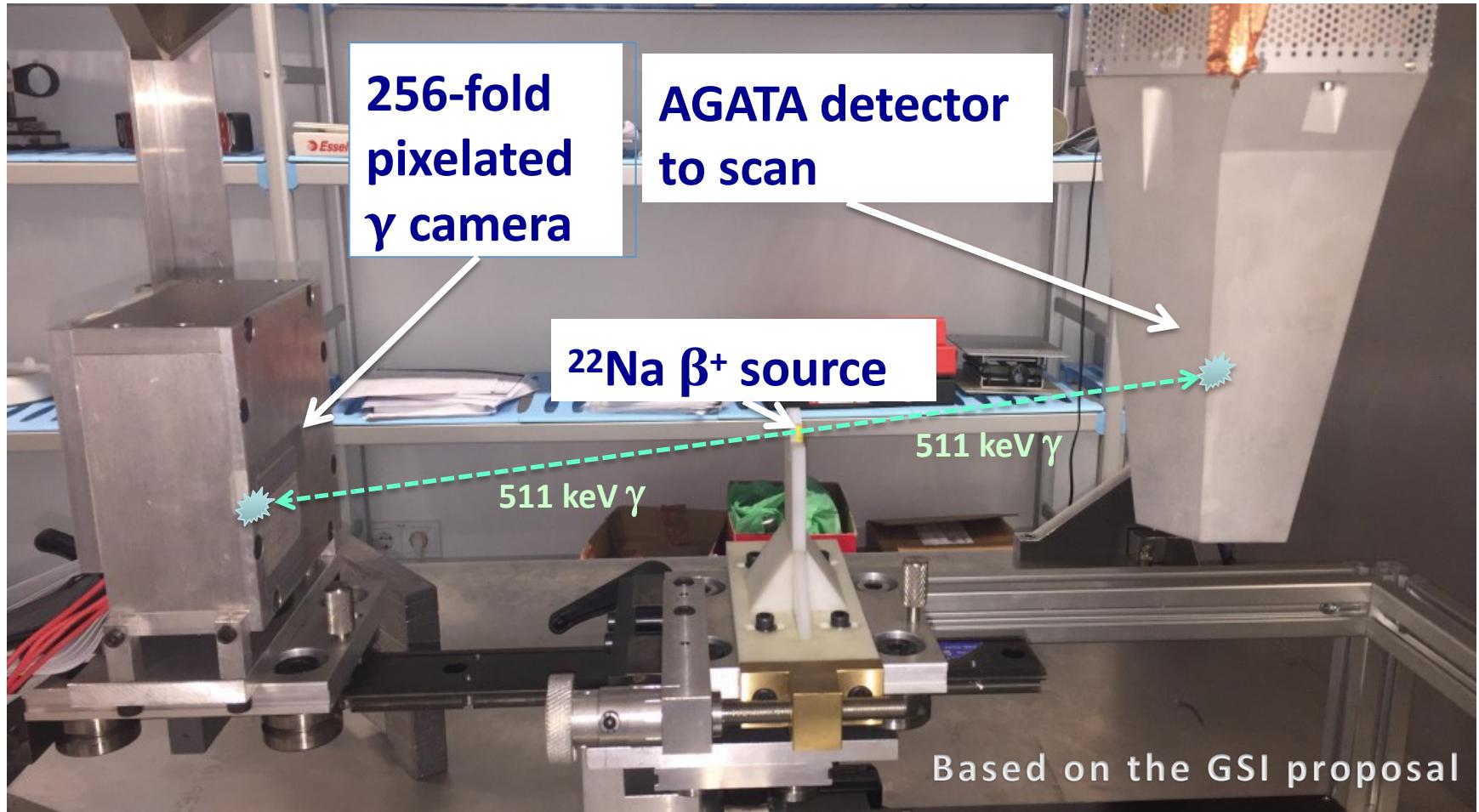
M. Ginsz
PhD Thesis
(2015)

T90 of the signals coming from a 3 by 3 pixelated detector (dimensions 51x51x19.9 mm)

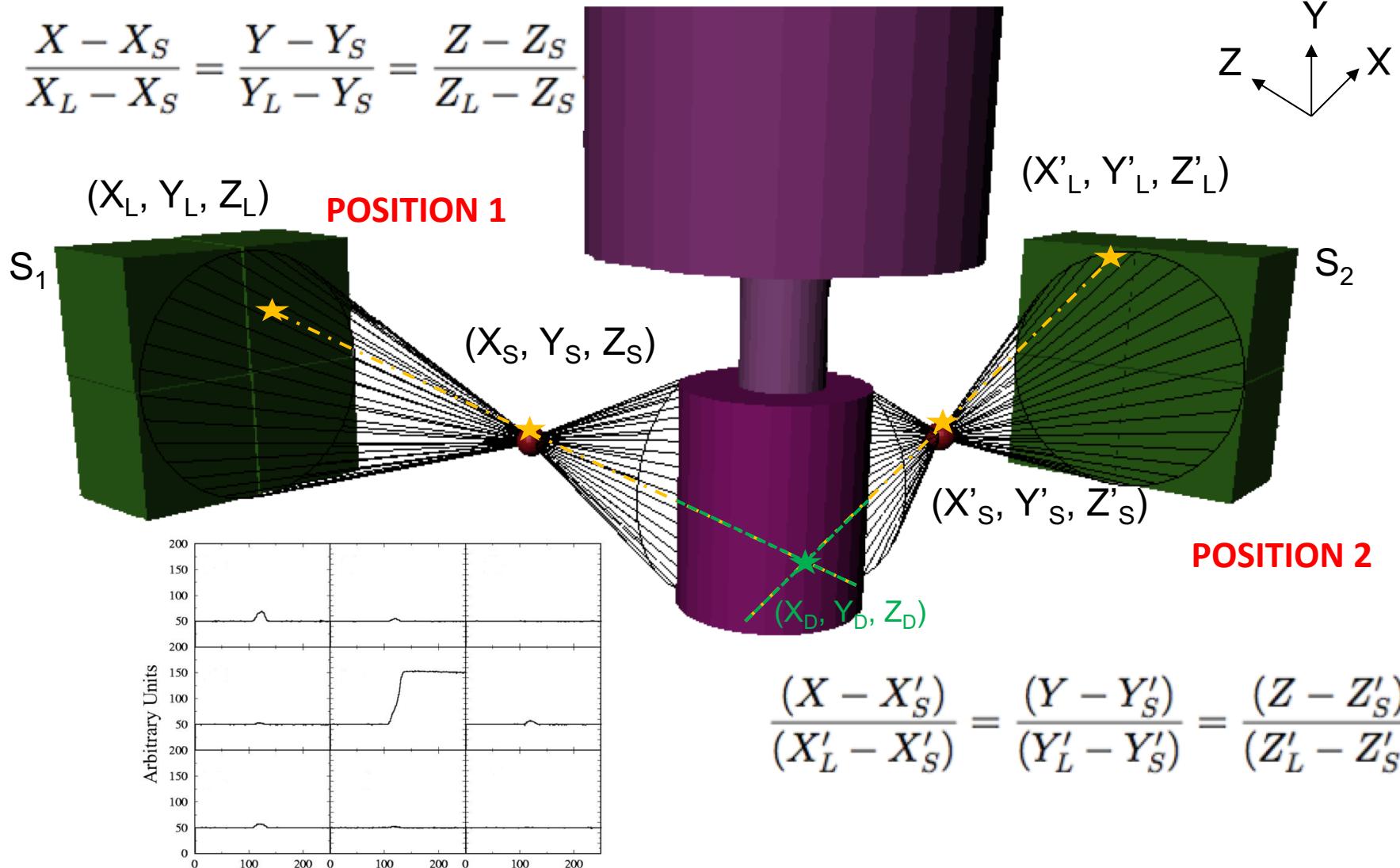
Bartolomeo De. Canditiis



SALSA concept



SALSA: Two-position scan



AGATA electronics

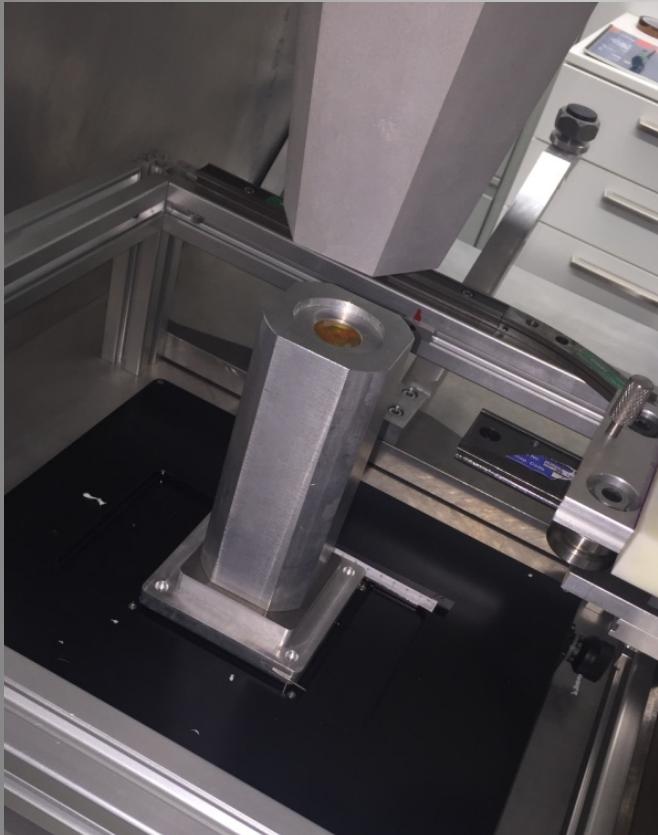
Second generation AGATA digital electronics:

- 4 DIGI OPT12 (ASCOM)
- GGP (bus PCI-Express, Padova) in HP DL360pGen8 server



AGATA-SALSA COINCIDENCES
DISENTANGLLED THROUGH
SOFTWARE BY USING A RAMP
GENERATOR

B014 capsule measurements



- ✓ B014 capsule arrival middle of June 2017
- ✓ FWHM tests carried out to check cryostat
- ✓ Mechanically collimated measurements done to determine edges between segments in slice 1
- ✓ Method to select coincident signals set up
- ✓ One of the γ camera flat panels replaced
- ✓ Scanning measurements during three months

Characterisation Summary

- Three symmetric AGATA detectors
 - Three asymmetric AGATA detectors have been characterised
 - The experimental measurements have informed the calculations
 - ADL is used to generate a simulated basis
 - PSCS is used to generate an experimental basis
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- Availability of AGATA crystals
 - Coordination of characterisation work
 - Generation of experimental single interaction data sets

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