



Recent activity and status update at the University of Liverpool

Dan Judson

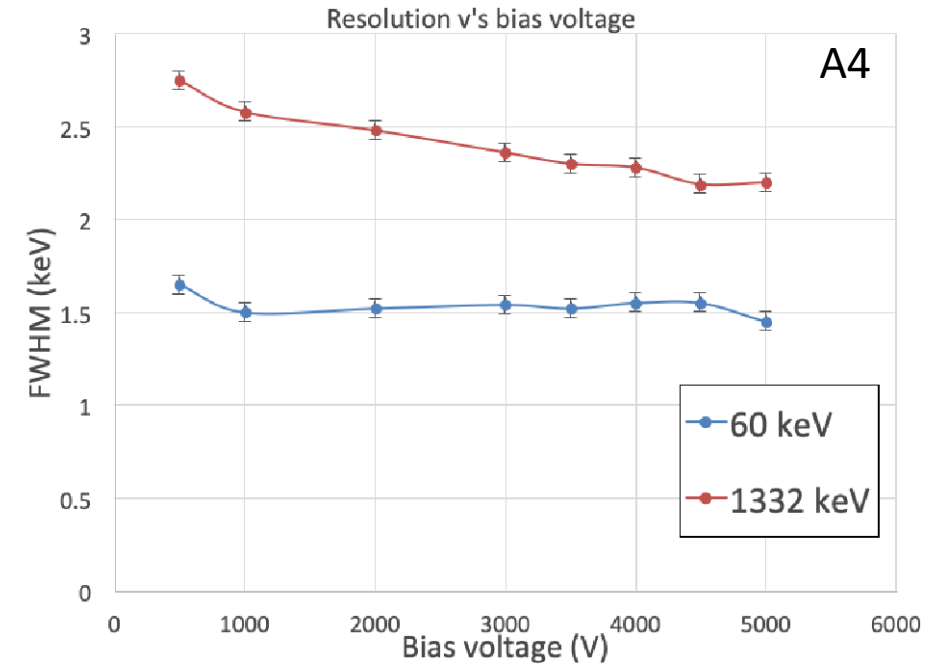
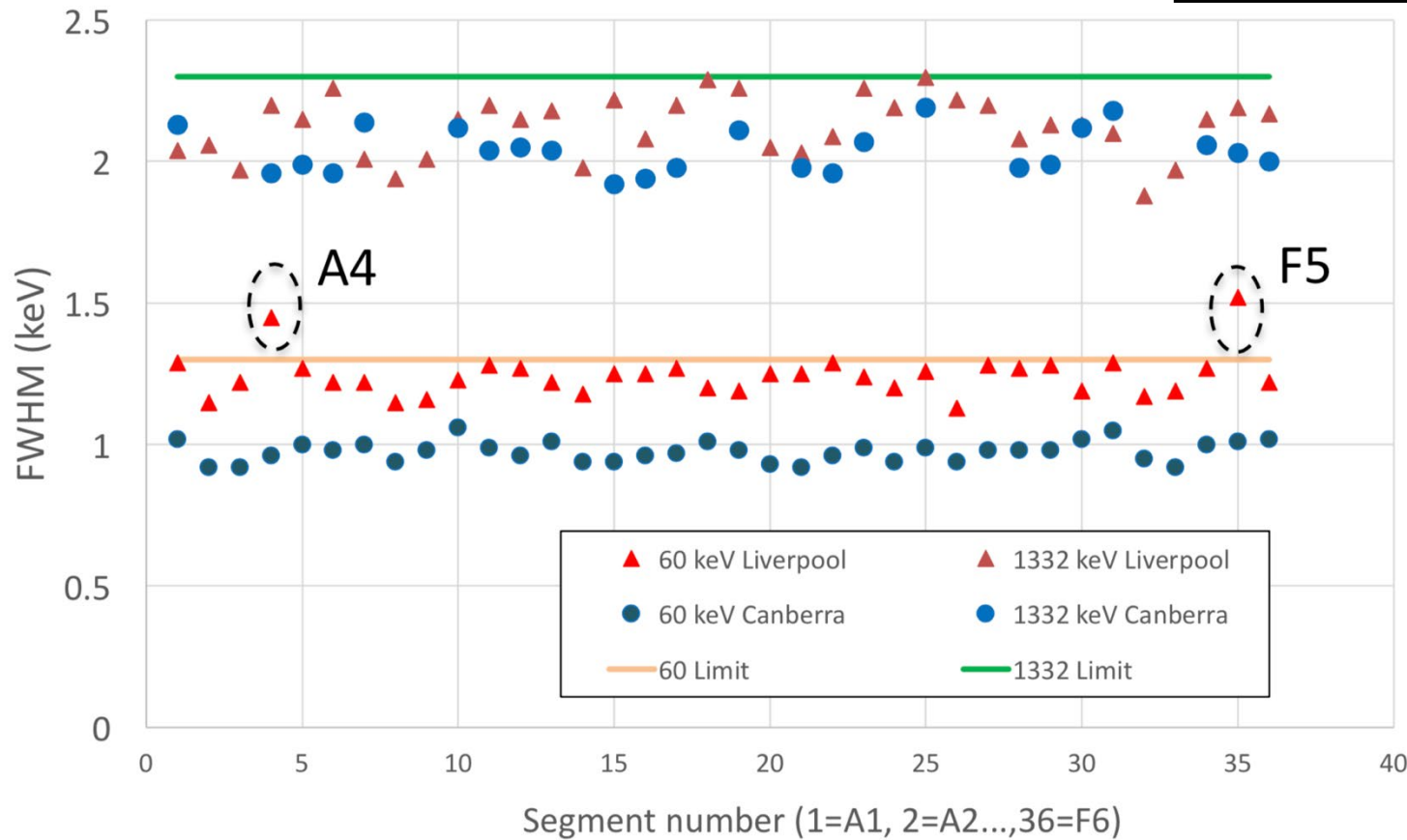
- **CAT tests:** A005 (2018) & B009 (2019) cat test results
- **Building + lab status:**
- **Personnel status:**
- **Cryostat status:**
- **Existing scanning table upgrades and commissioning:**
- **New scanning table:**
- **Future plans:**

CAT tests

A005 (2018)

	Canberra Values		Uni. Of Liverpool Measured Value (keV)
	Measured (keV)	Guaranteed (keV)	
FWHM @ 122 keV (^{57}Co)	1.16	1.35	1.25
FWHM @ 1332 keV (^{60}Co)	2.17	≤ 2.35	2.24
FWT _M /FWHM @ 1332 keV (^{60}Co)	1.98	≤ 2.00	1.96

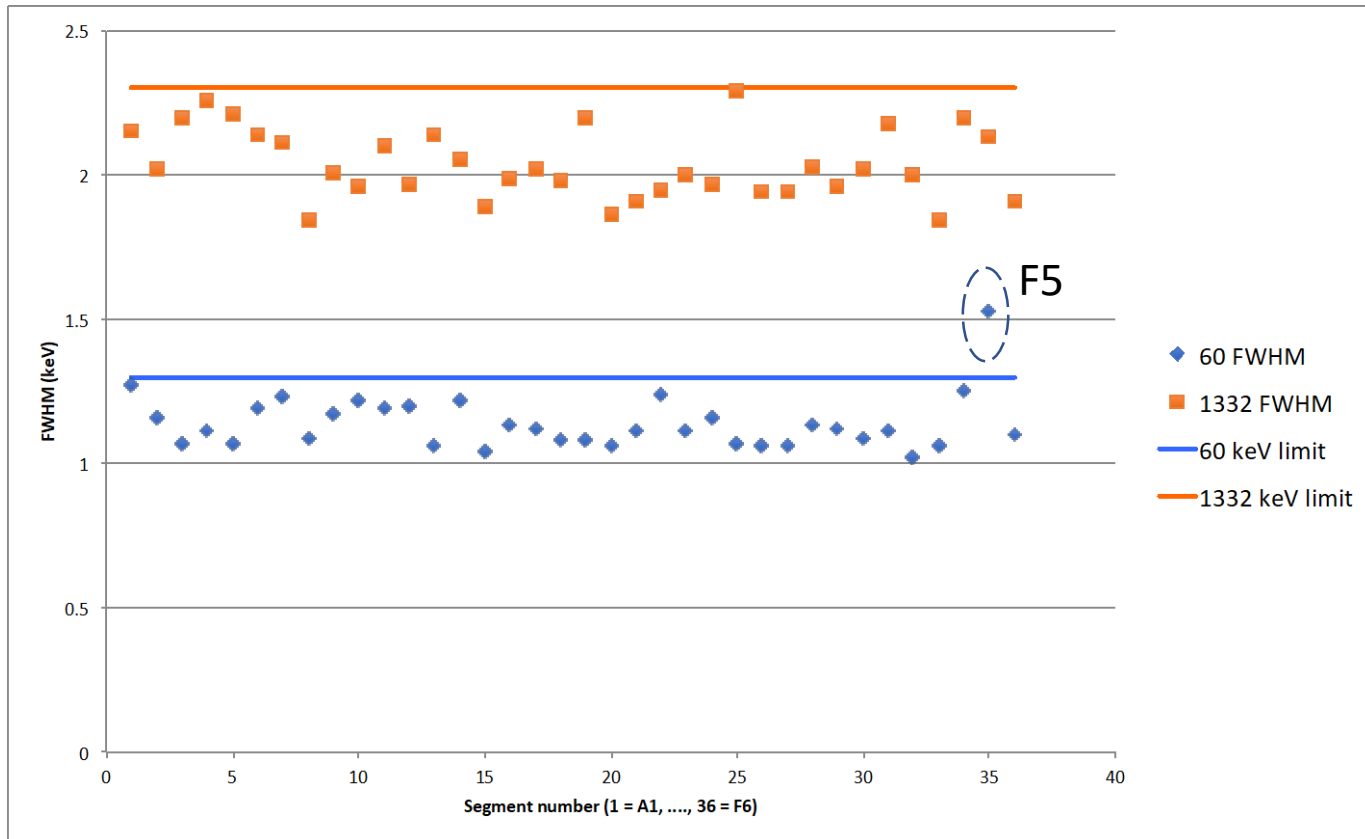
Segment resolution



CAT tests

B009 (2019)

	Canberra Values		Uni. Of Liverpool Measured Value (keV)
	Measured (keV)	Guaranteed (keV)	
FWHM @ 122 keV (^{57}Co)	1.09	≤ 1.35	1.31
FWHM @ 1332 keV (^{60}Co)	2.19	≤ 2.35	2.33



- Assembled and tested Jan-Feb 2019
- CAT tests show good performance
- Segment F5 ~ 1.5 keV @ 60 keV
- Delivered to Cologne in April
- Assembled into ATC14

- **Carl Unsworth has left Liverpool to join STFC Daresbury working on software development**
- **2 new technicians working on Agata (amongst other things) for at least 2 years, Chris + Kieran**
- **New PhD student starting in October working on Agata characterisation (supervised by A. Boston)**

Building + lab status

- **Renovation work is still ongoing (over 2 years after it began)**
- **Scheduled to finish September 2019...**
- **Lab windows and roof work completed**
- **Still a lot of work ongoing around the building**



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Cryostat status

- **Liverpool have 2 test cryostats – ‘Daresbury’ and ‘Cologne’**
- **Both have been in regular use for ~ 10 years and are very tired**
- **Daresbury cryostat returned to CTT/Cologne April**
 - **refurbishment well under way, complete soon**
- **Cologne cryostat was to be used for coincidence scanning A005 and then refurbished but recently developed a vacuum leak inside Ln2 Dewar**
 - **return for refurbishment when Daresbury cryostat is ready for collection**
 - **hopefully 2nd refurbishment will be completed early 2020**
- **A test cryostat is being borrowed from Salamanca while the Cologne cryostat is refurbished / repaired**
 - **to be collected 24th - 25th of September**
 - **unused for several years – will require some maintenance**

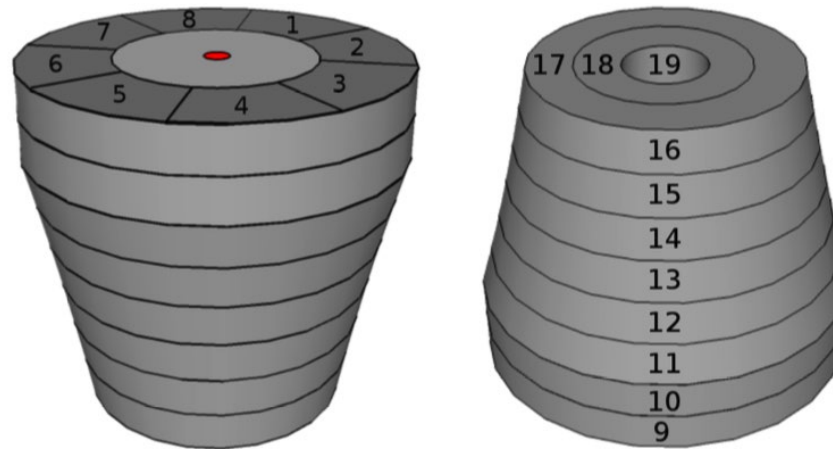
Existing scanning table status



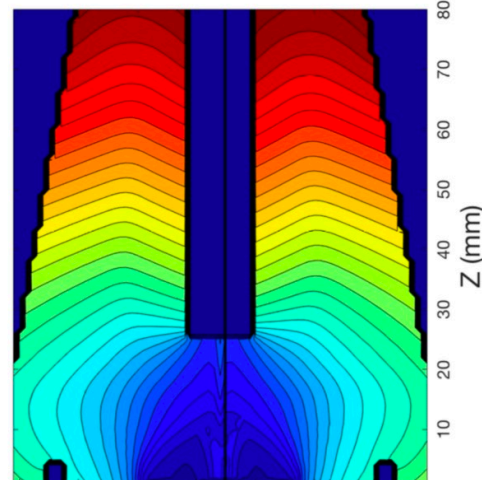
- Existing scanning equipment has been upgraded significantly since the last Agata data was taken
 - Old scanning system based around Gretina digitisers + analogue trigger
 - Now uses Caen V1724 digitiser + V1495 digital trigger or software trigger
 - New custom designed BGO's
 - New detector support frame with easily adjustable height
 - New 3d printed secondary detector mountings
 - New lead shielding around source
 - Easier to align source with collimator
 - New 3d-printed 0.5 mm tungsten collimator
- Just finished commissioning with SIGMA detector

Existing scanning table status

SIGMA: Segmented, Inverted-coaxial **GerMANium** detector
P-type crystal manufactured by (Canberra) Mirion



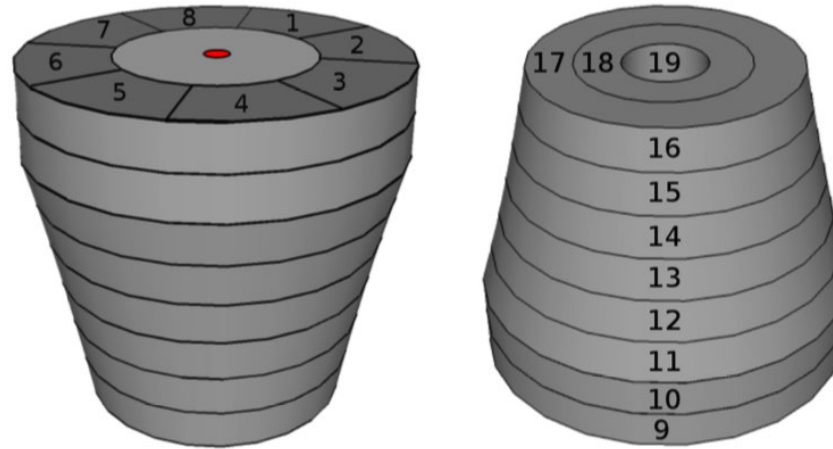
Simulated drift times (SigGen)



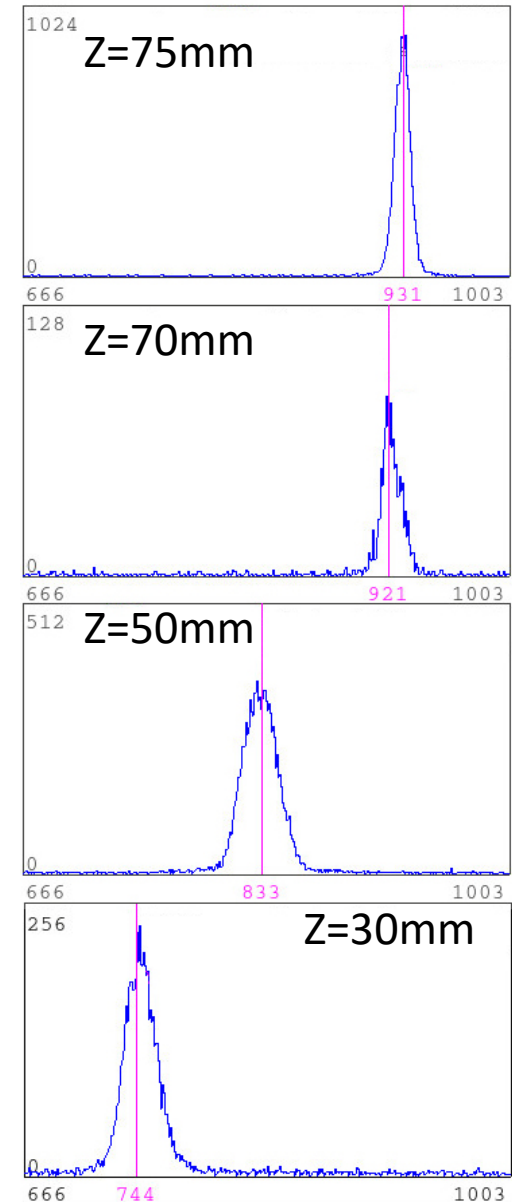
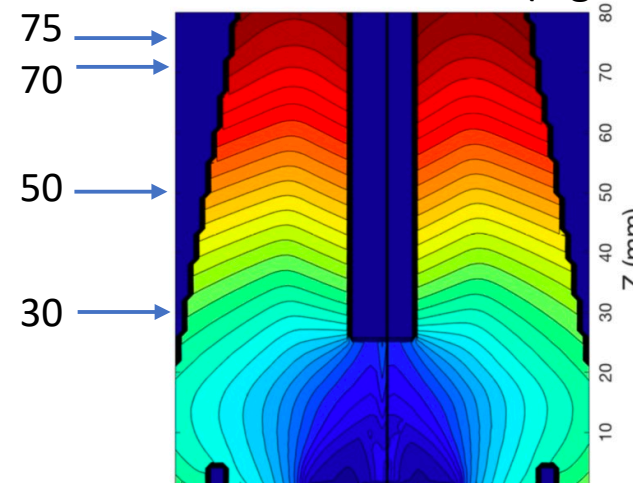
J.P. Wright et.al. NIM A892, P84, 2018

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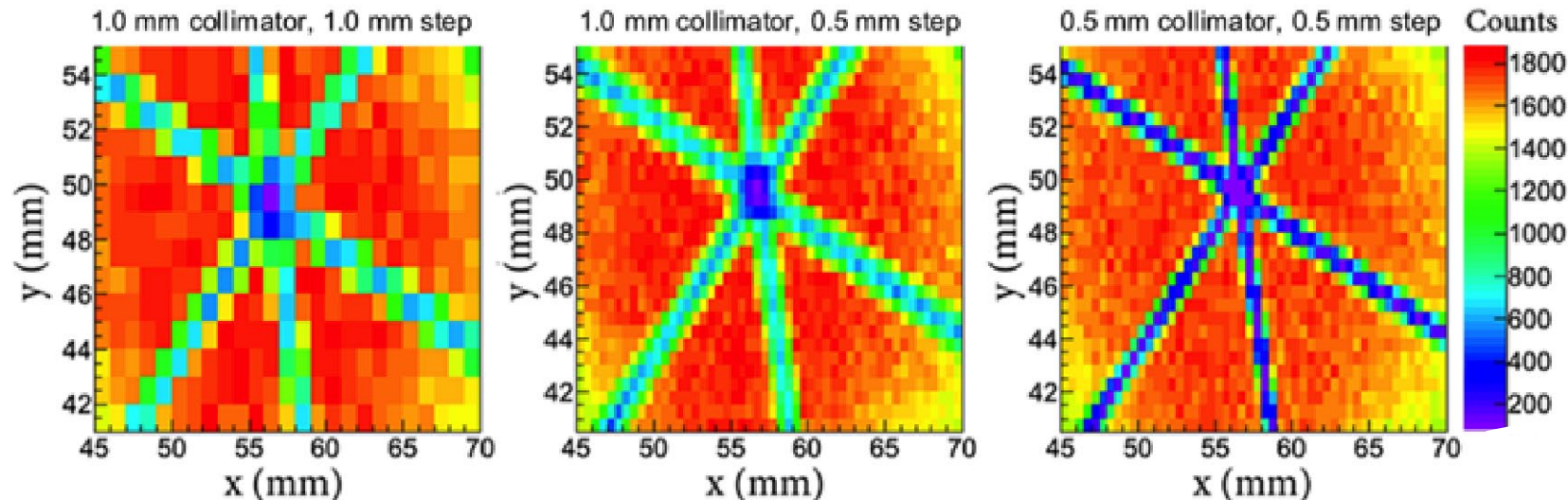
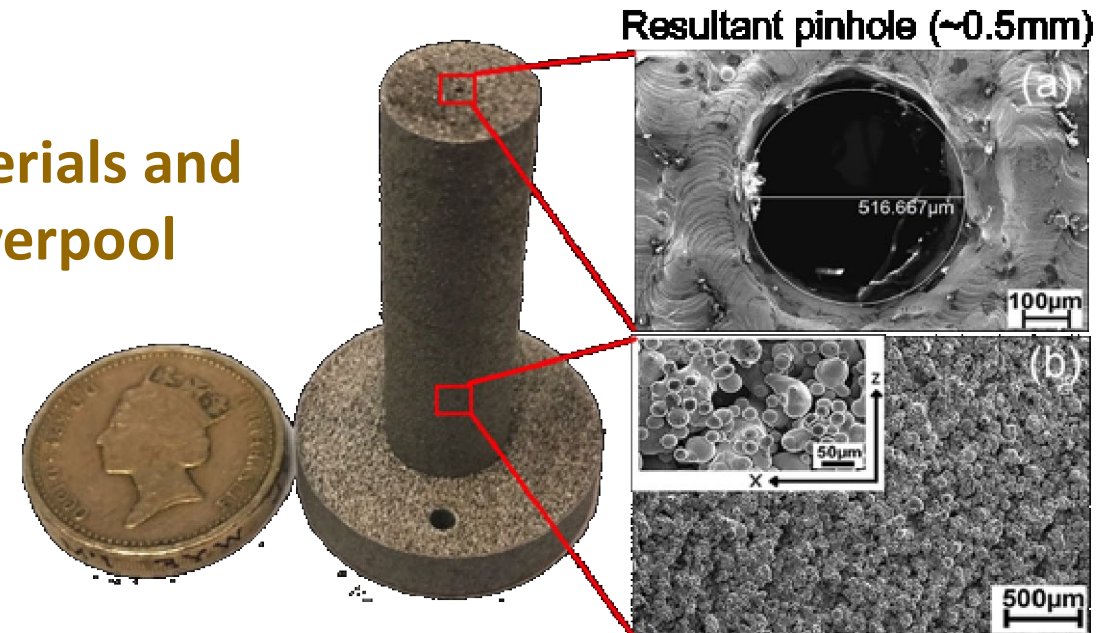
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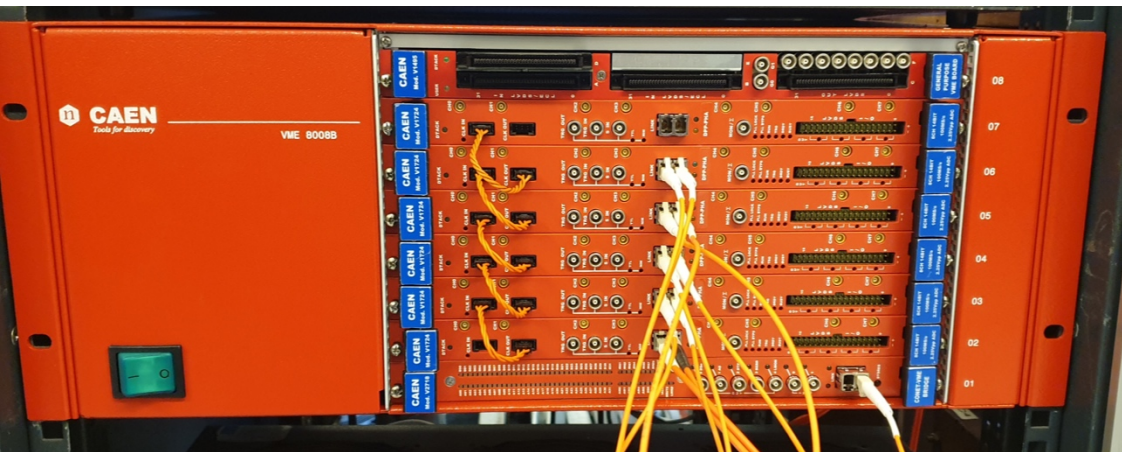
Existing scanning table status

- ‘Prototype’ 0.5 mm collimator manufactured
 - made by Department of Mechanical, Materials and Aerospace Engineering at University of Liverpool as a test of their technique
 - ‘laser powder bed fusion scanning’
 - 99.9% pure W
 - Count rate ~ 15 cps



New scanning table

- Plans for a second scanning table to expand our capabilities and allow higher throughput of detectors
- Aim to use stronger ^{137}Cs / ^{241}Am sources than existing setup
- Project has been fully funded by University of Liverpool + STFC
- Acquiring new equipment - DAQ, secondary collimation, detectors etc. is underway
- Hope to be operational early 2020



Future plans

- **Any other CAT measurements**
 - **when we have a working test cryostat**
- **Coincidence scan A005**
 - **this can begin scanning as soon as we have a working test cryostat**
- **Coincidence scan a neutron damaged detector as soon as one becomes available**
- **Scan a detector using Agata digitisers and compare results with our Caen digitisers to see if/how the digitisers influence pulse shapes**