



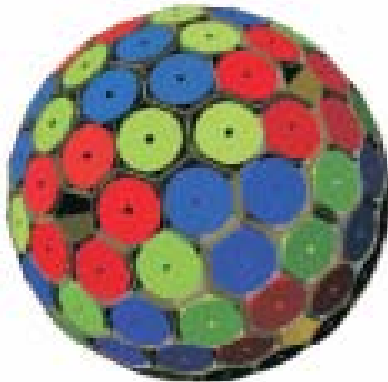
UNIVERSITY OF
LIVERPOOL



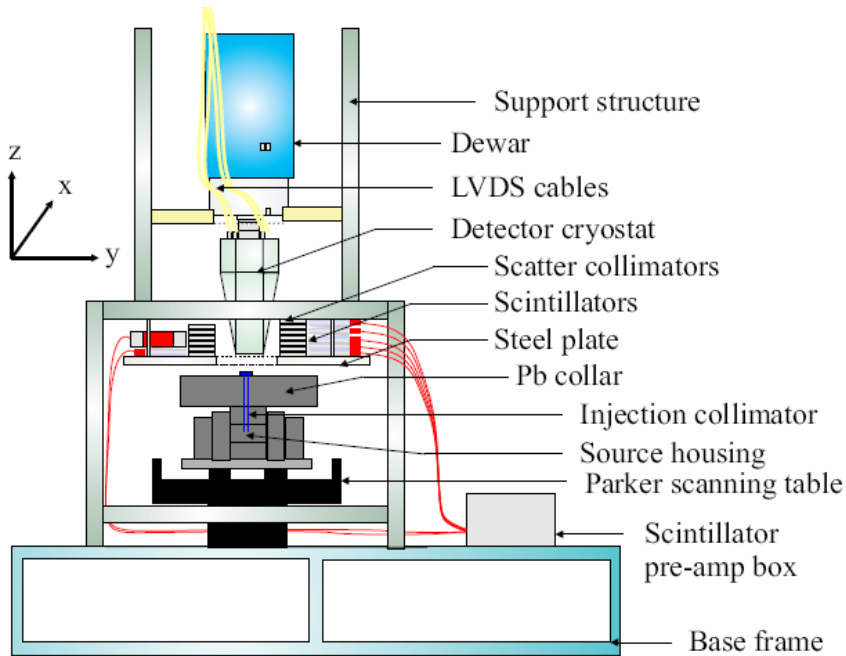
Science & Technology
Facilities Council

AGATA C001 Characterisation Measurements at Liverpool

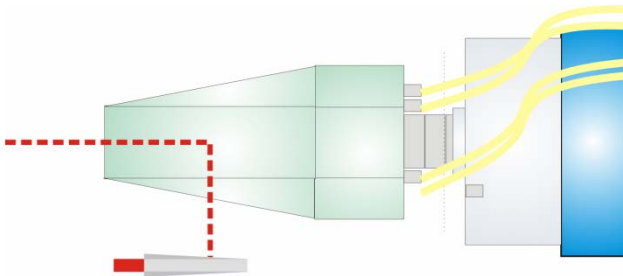
AGATA week, Cologne, March 2000



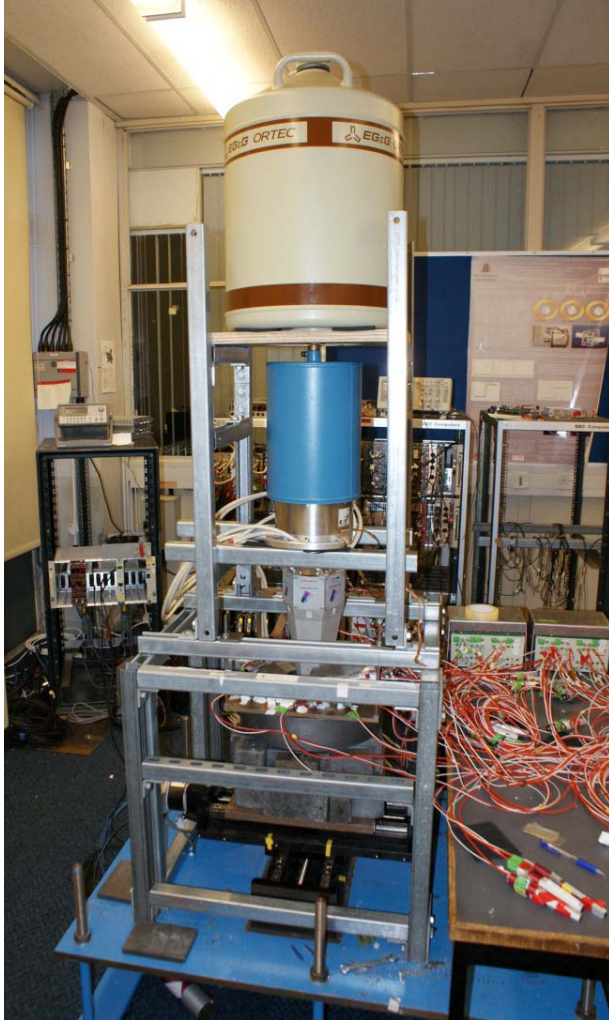
AGATA Scan Setup



- 1 GBq ^{137}Cs source housed in lead assembly.
- Two stage Tungsten collimator parallel to z axis:
 - 8 cm x 5mm diameter
 - 8cm x 1mm diameter
- Spot size $\sim 1.3\text{mm}$ at front face, $\sim 2.4\text{mm}$ at back.
- Source provides ~ 1000 cps with 450keV threshold.
- Collimator assembly movable in x-y plane.
- BGO and NaI scintillation detectors aligned with six depths of scatter collimation for coincidence scan.
- Trigger conditions:
 - > 450 keV on core for singles scan.
 - $> 60\text{keV}$ on Core AND Scintillator within 100 ns for coincidence scan.



Modifications Since Last Scan

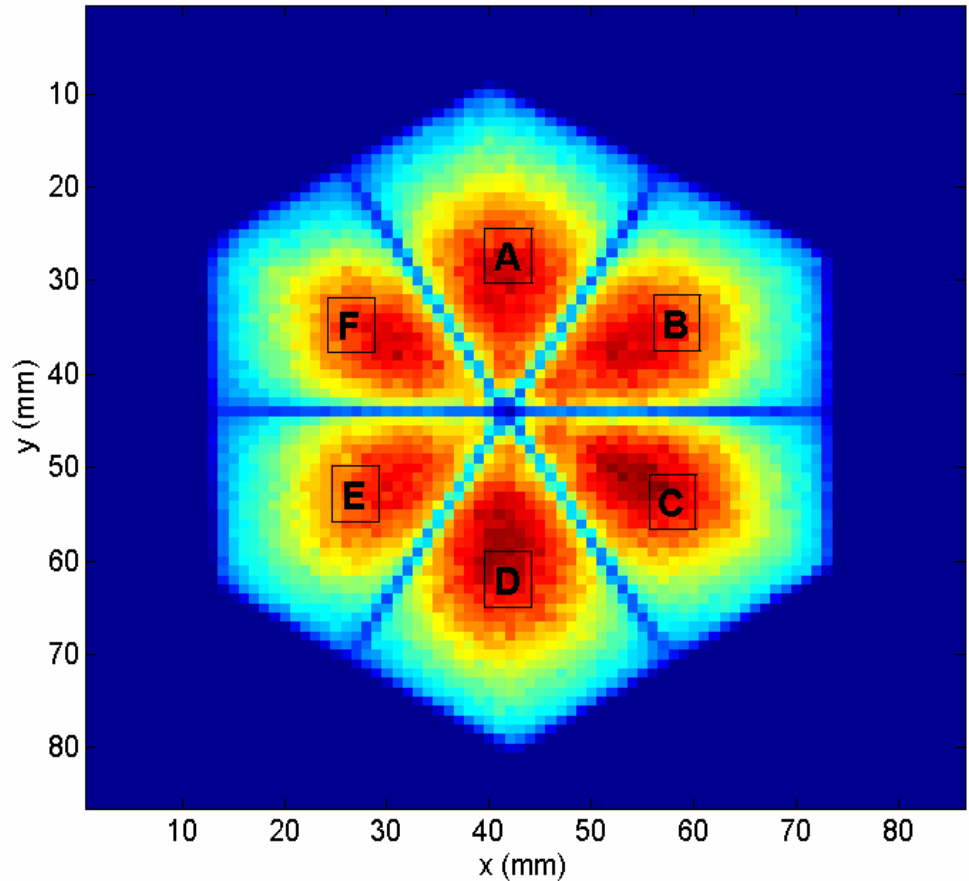


- Storage Dewar added to provide 7 days LN₂ capacity.
- TTL bias shutdown device provided by IKP Cologne.
- 4 x GRETINA digitiser cards providing 40 channels of 100MHz, 14 bit, time-aligned, FADCs.
- VME64x crate with ~3.8MB/s maximum data rate, equating to approximately 420 events per second.

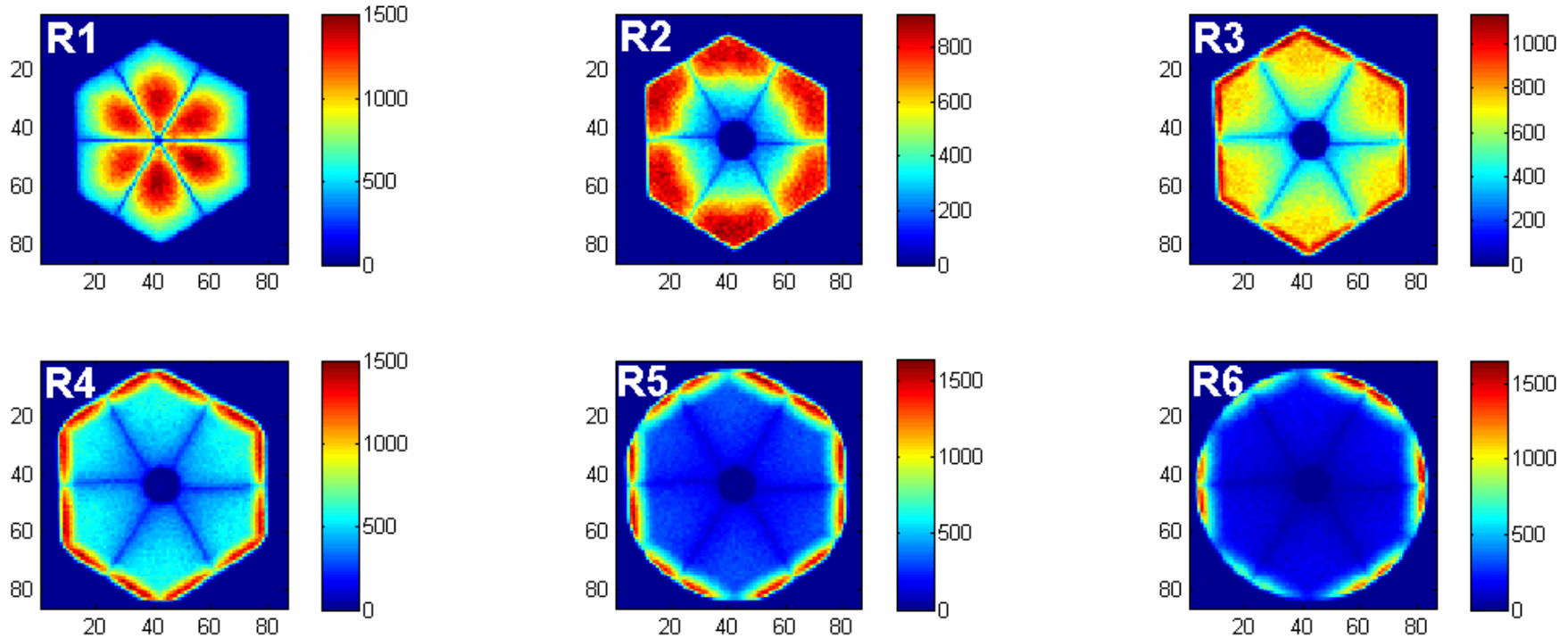


Segment Labelling

- Image shows intensity of single segment photopeak events for ring one.
- Sectors labelled A to F as shown on image.
- Rings labelled 1 to 6 from front to back.
- Singles scan conducted on 1mm Cartesian grid.
- This orientation will be used for all following images.

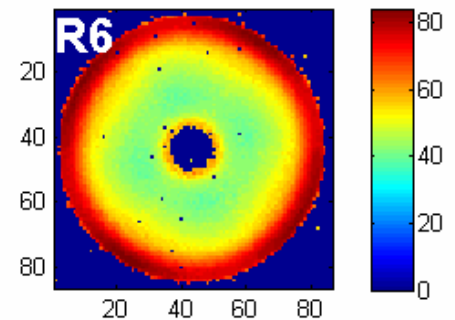
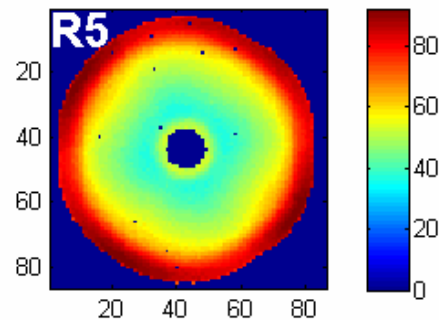
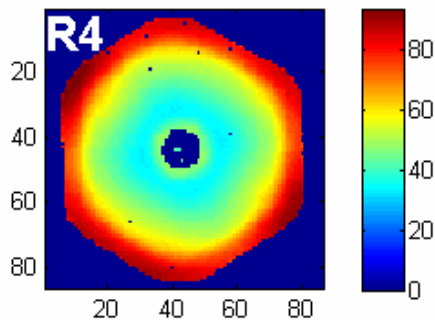
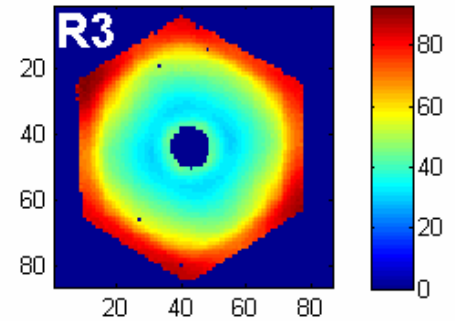
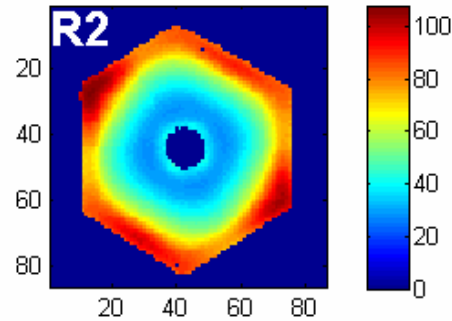
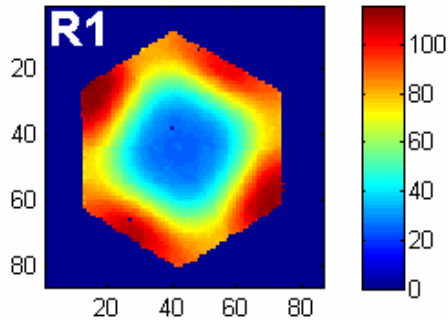


Fold-1 Photopeak Intensity Maps



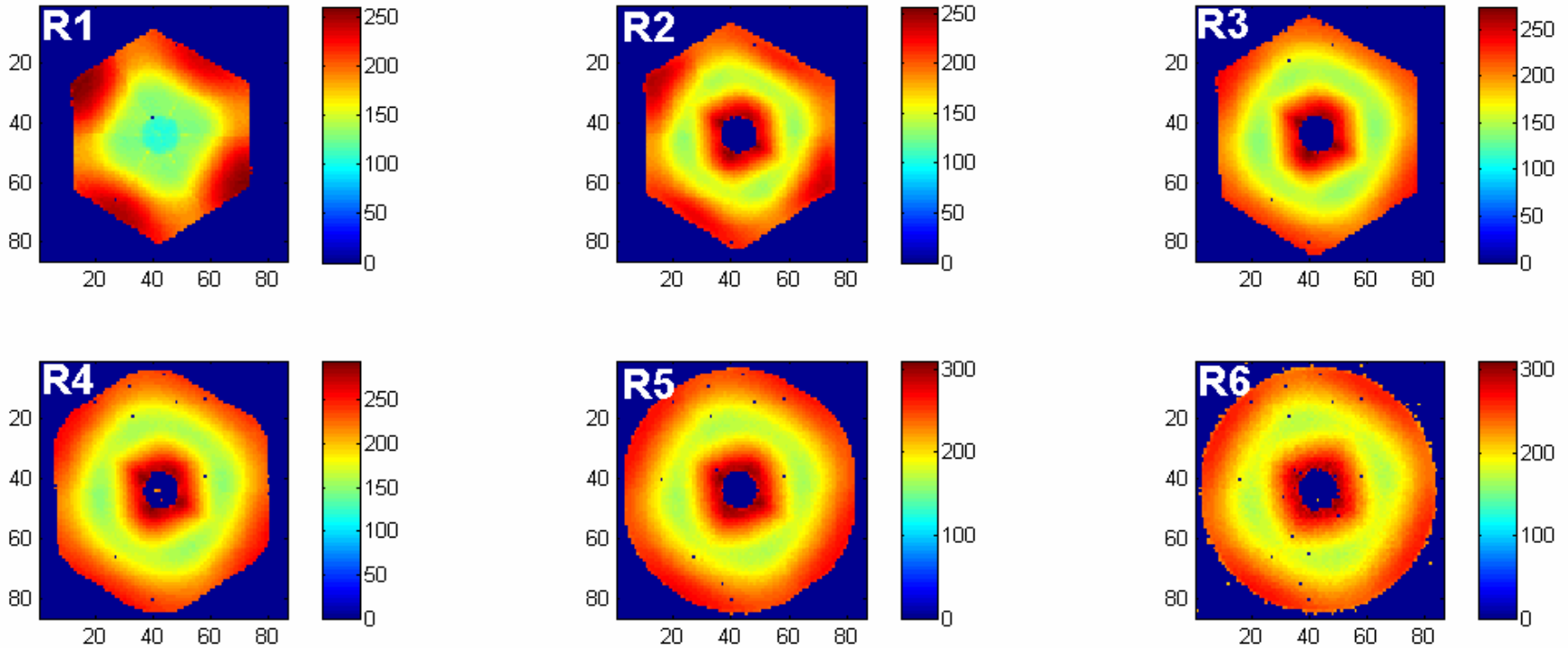
- Segmentation boundaries and attenuation of gamma flux through crystal depth can be seen.
- x-y crystal centre and rotation of crystal in x,y and z can also be obtained.

Core T30 Maps



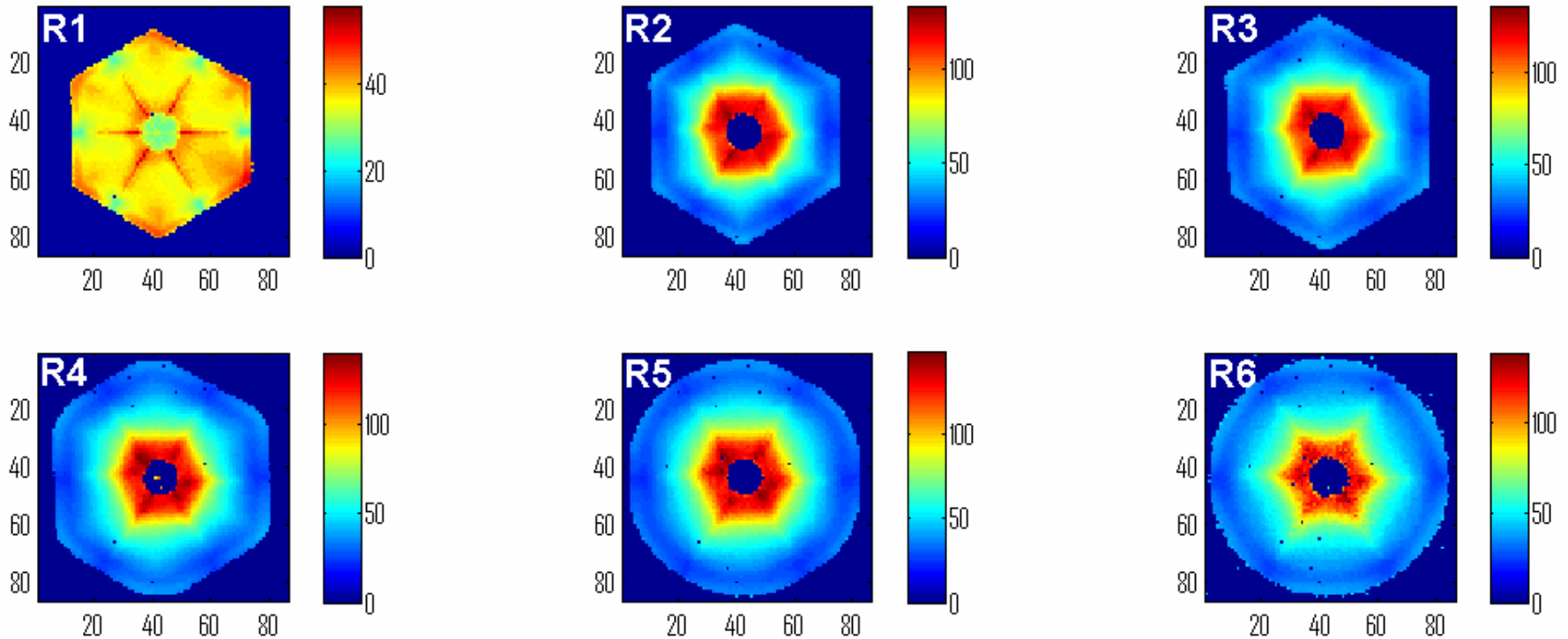
- Time in ns for charge pulse to rise from 10% to 30% of its maximum height.
- Fourfold symmetry of crystal can be seen.
- $[1\ 0\ 0]$ axis produces fastest risetime.
- Long charge collection times can be seen in regions of weak field at crystal corners.

Core T90 Maps



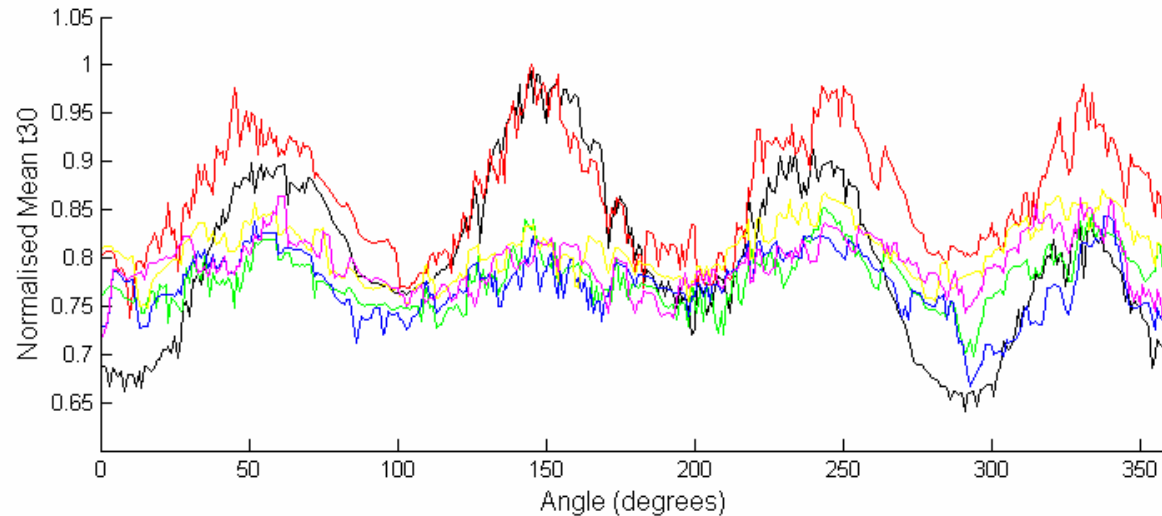
- Time in ns for charge pulse to rise from 10% to 90% of its maximum height.
- Longest risetimes seen in corners of ring 1 and near core in rings 2-6.
- Shortest risetimes seen in front of core in ring 1.

Segment T30 maps



- 6-fold symmetry of segmentation visible.
- Longer risetimes seen near segment boundaries and at corners due to weaker field at these points.

Identification of Fast Axis

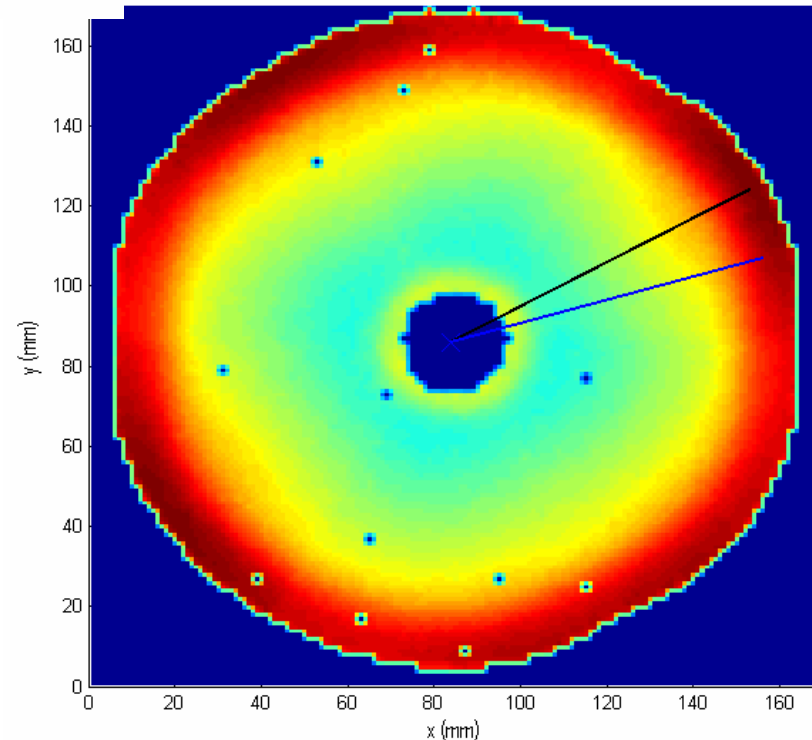


Ring 1
Ring 2
Ring 3
Ring 4
Ring 5
Ring 6

Canberra [100]
Scan [100]

- Mean T30 found along 360 radial lines.
- Results normalised by drift distance.
- Preliminary results measurements show 12° offset toward segment B.
- ^{241}Am scan will allow more precise measurement.

Ring 5 fast axis plot



Further Plans For C001

- Completion of coincidence scan.
- ^{137}Cs singles scan from side.
- ^{241}Am surface scan.
- Compton imaging to gauge performance of PSA (Fay Filmer and Mike Slee).
- Collaboration with Fabio Crespi (Milan) to produce single site interaction pulses from front and side singles scans using PSCS method.
- Singles scan with varying bias to study depletion behaviour.

Thank You

Collaborators:

A.J. Boston, H. Boston, S.J Colosimo,
J. Cresswell, M.R. Dimmock, D. Oxley, F.
Filmer, D. Judson , P.J. Nolan, M. Slee

Any Questions?