Status of the Strasbourg scanning table

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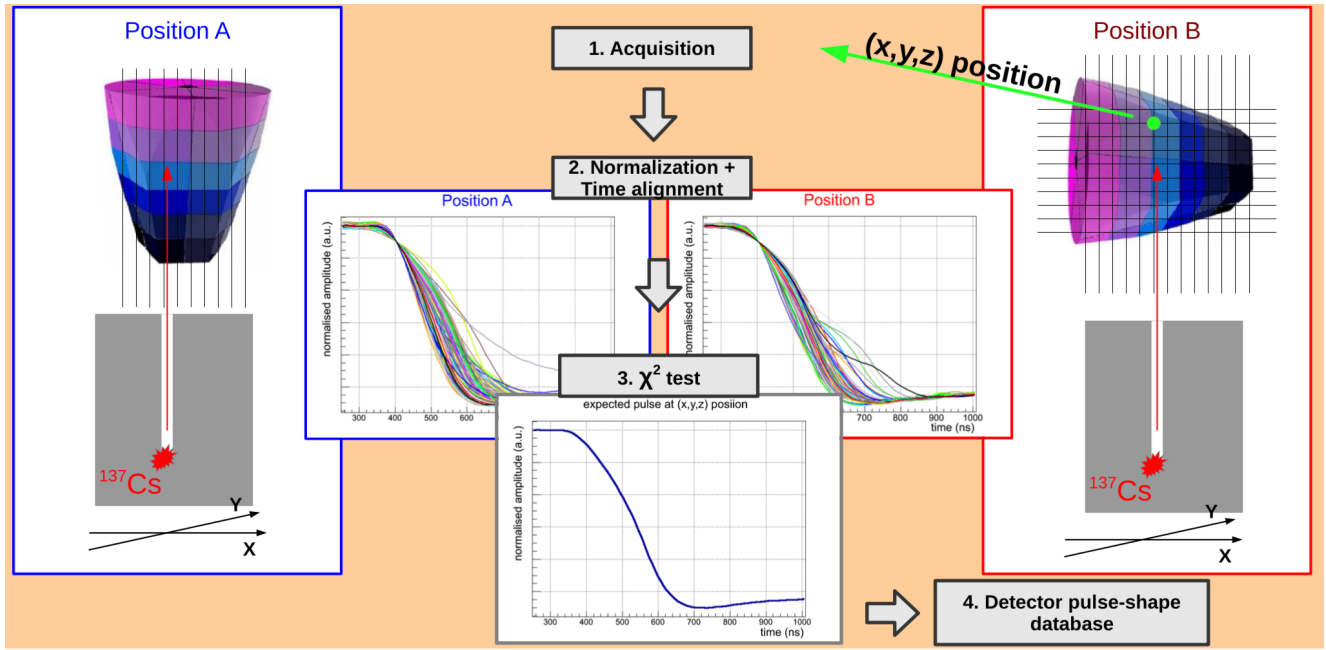
Orsay, 05 october 2016

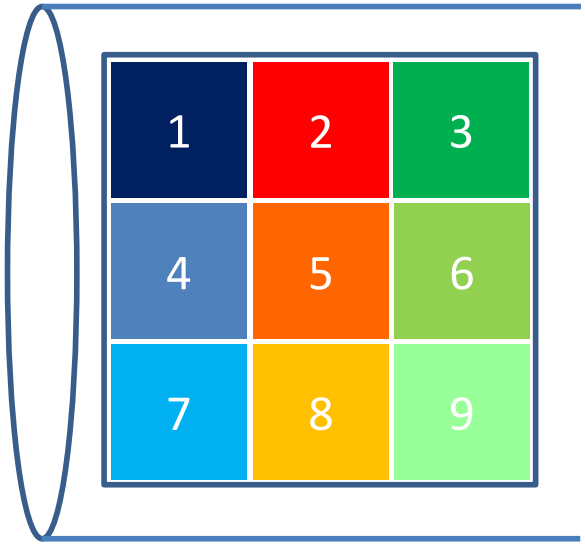
Pulse Shape Comparison Scan (PSCS)



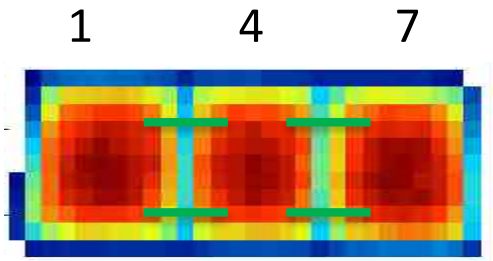
- A collimated γ on a XY table
- Detector placed vertically
- A set of pulse shapes along the Z axis at XY position
- Detector placed horizontally
- A set of pulse shapes

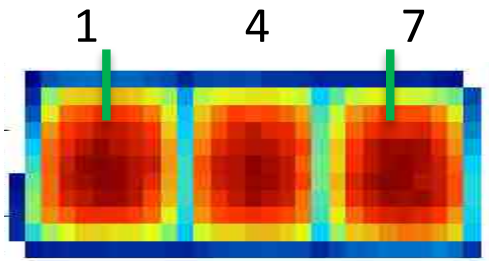
- The 2 distributions are compared
- The only similar pulse shapes correspond to the pulse shapes generated at the crossing point

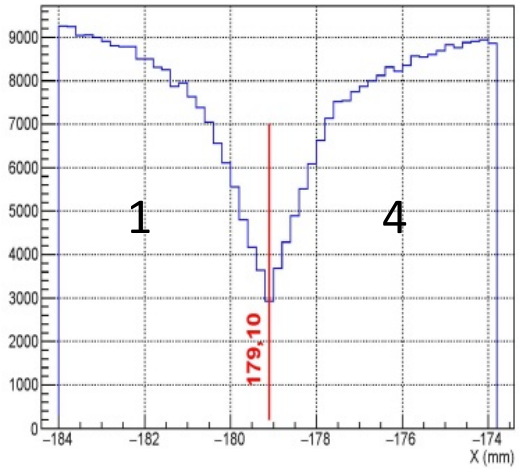
3x3 Ge planar detector

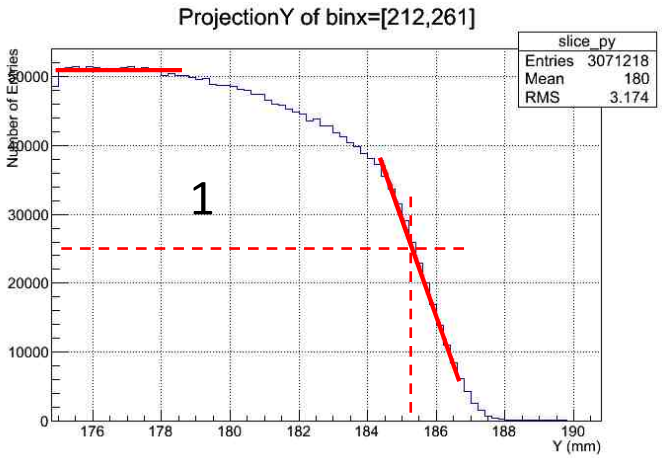


2D Crystal alignment : 200 µm Cs scan





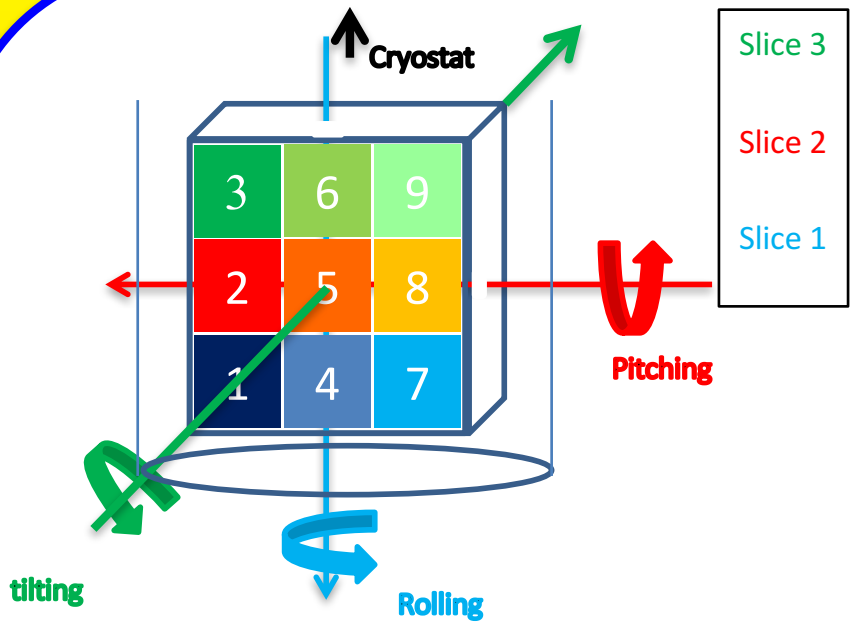




- Across segmentation line
- Decreasing in 1 when crossing segmentation line
- Reversely in 4
- The minimum : position of the segmented line

- Across B implanted face
- The spot is crossing the B implanted contact and goes progressively outside
- The mid height intensity : border of the crystal

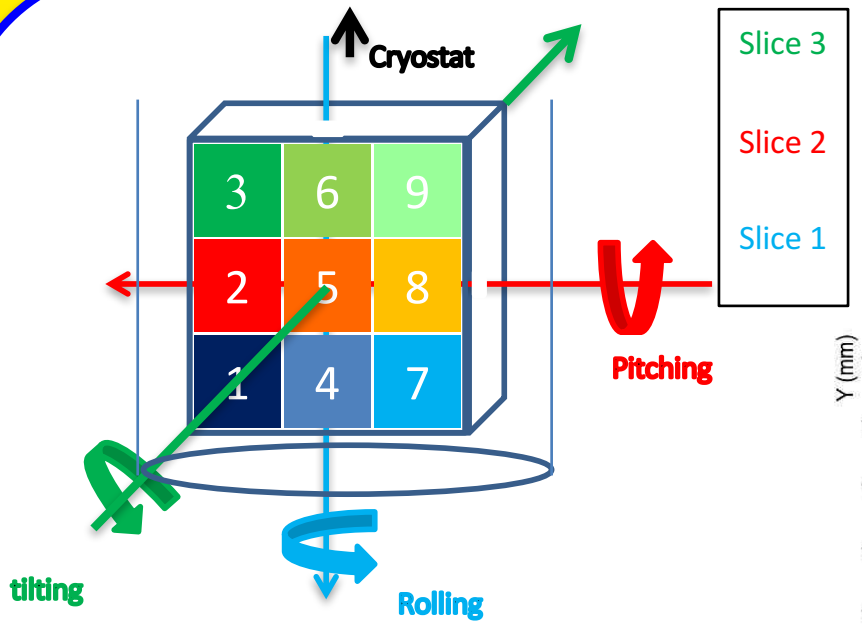
2D Crystal alignment : 200 µm Cs scan

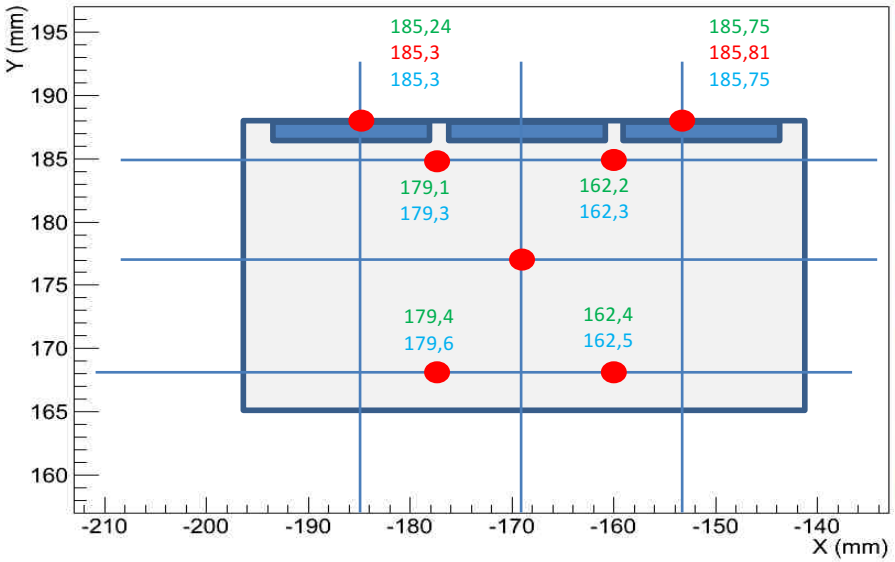


- the detector has to be aligned on the X and Y axes of the scanning table
- several scans and corrections will be considered

- Rolling corresponds to the rotation around the cryostat axis
- Pitching corresponds to the rotation around the axis passing through the central segment slice
- Tilting corresponds to the rotation around the axis perpendicular of the plan of the crystal and passing through the central segment
- the detector can be subdivided in slices of 3 segments

2D Crystal alignment : 200 µm Cs scan

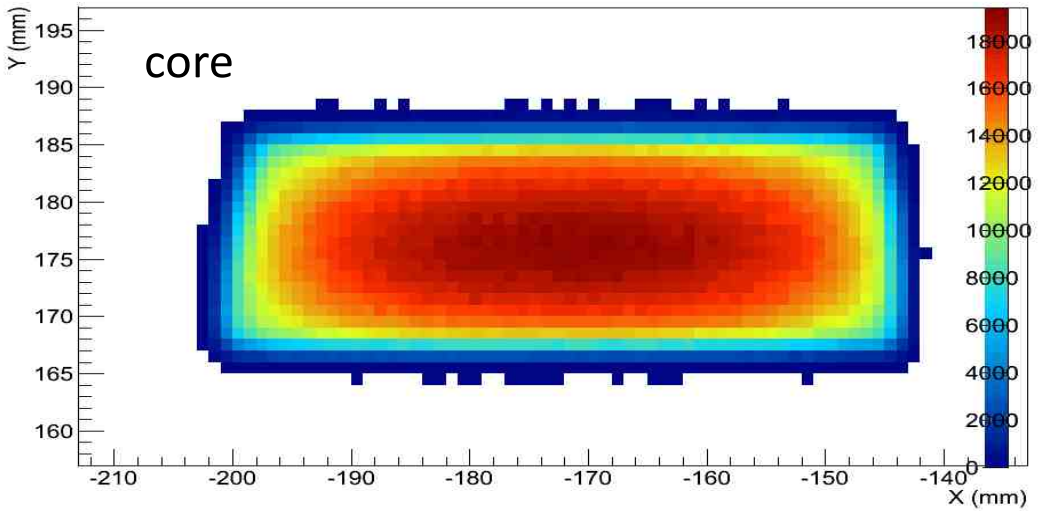


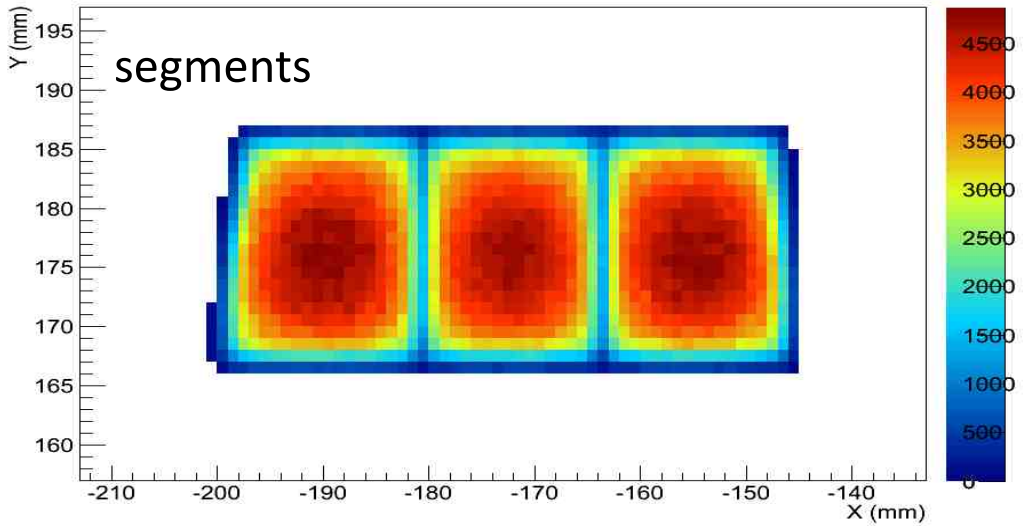


This gives:

- Rolling of 500µm (0,85°)
- Tilting of 150µm (0,5°)
- Pitching of ±30µm (±0,05°)

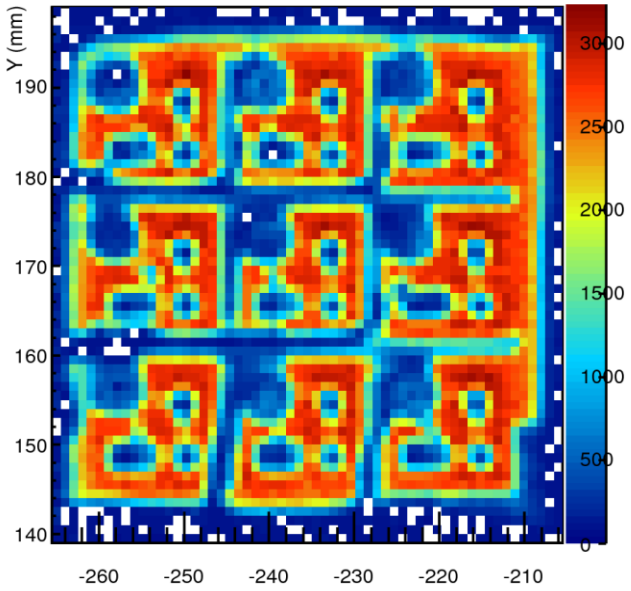
2D Cs scan (1mm x 1mm pitch)



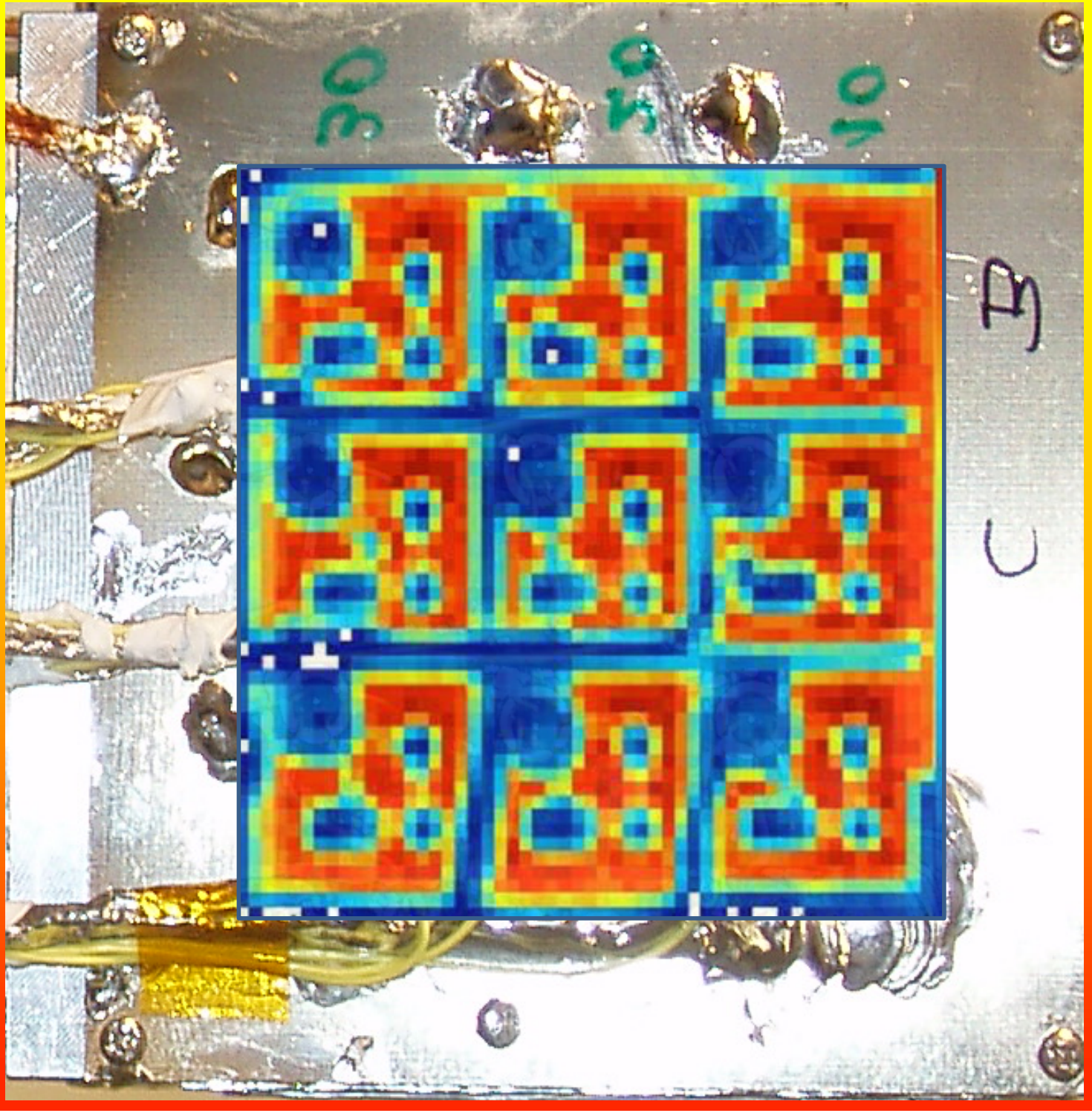


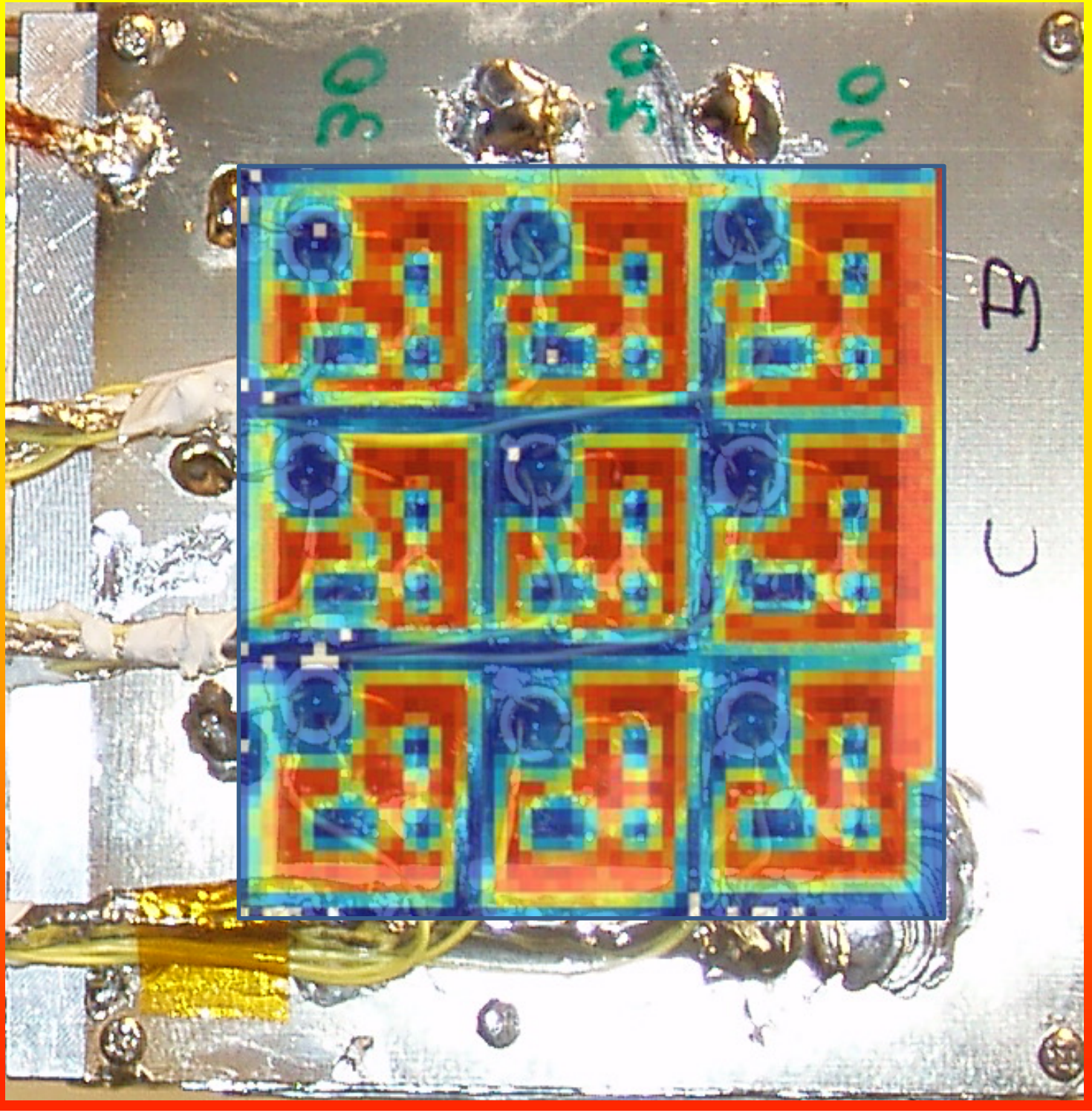
2D 1mm x 1mm Am scan

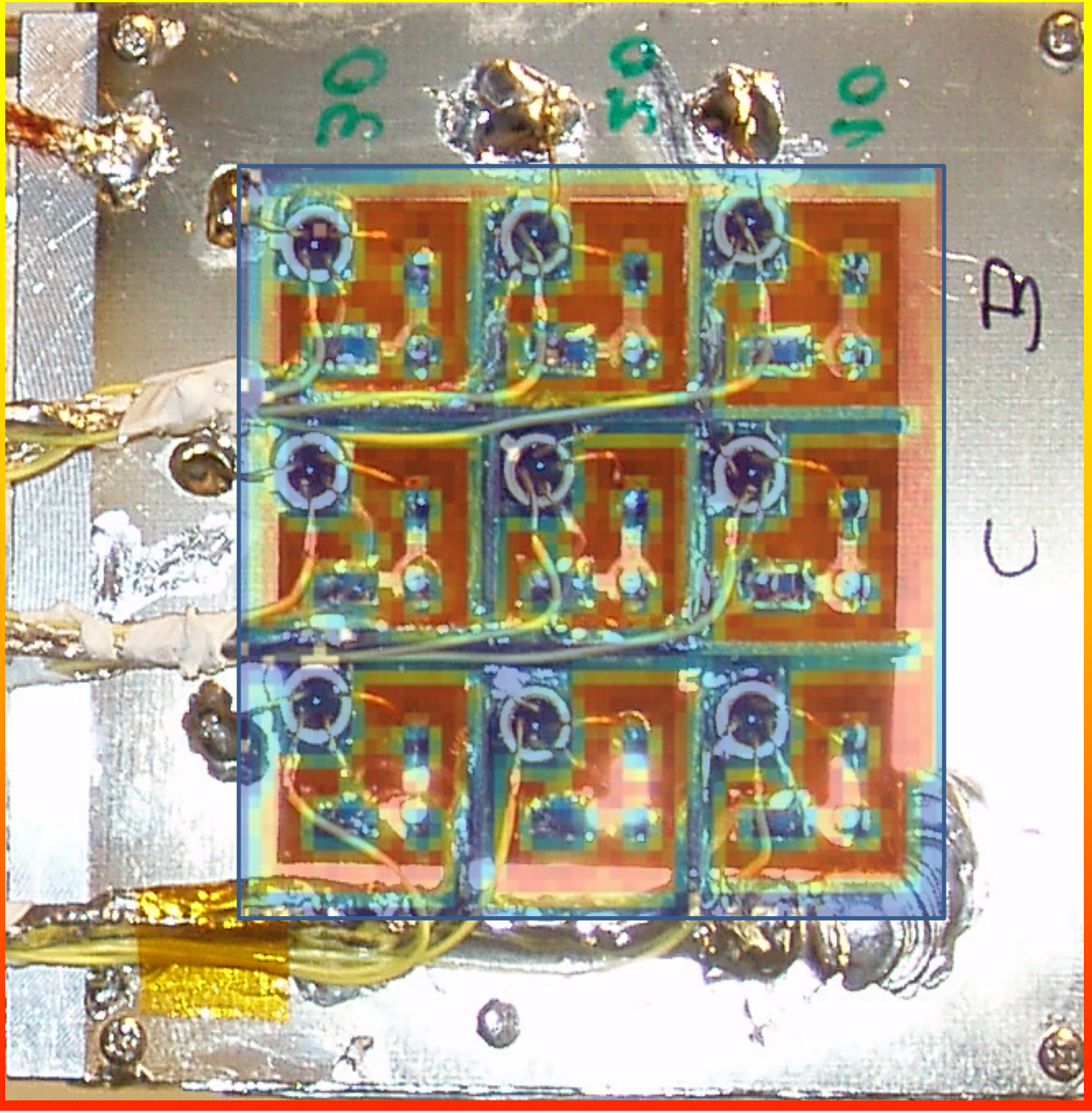
segments

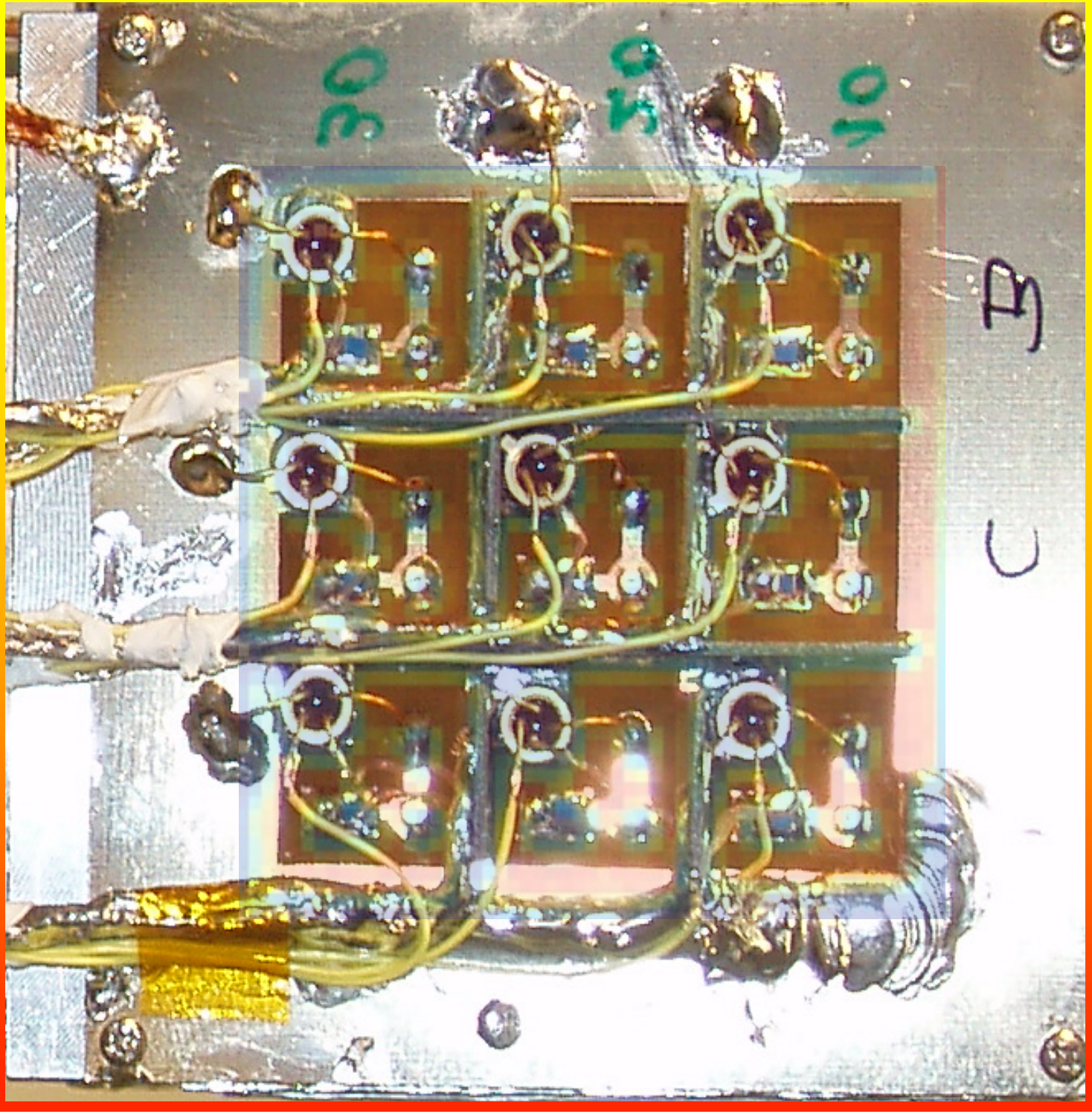


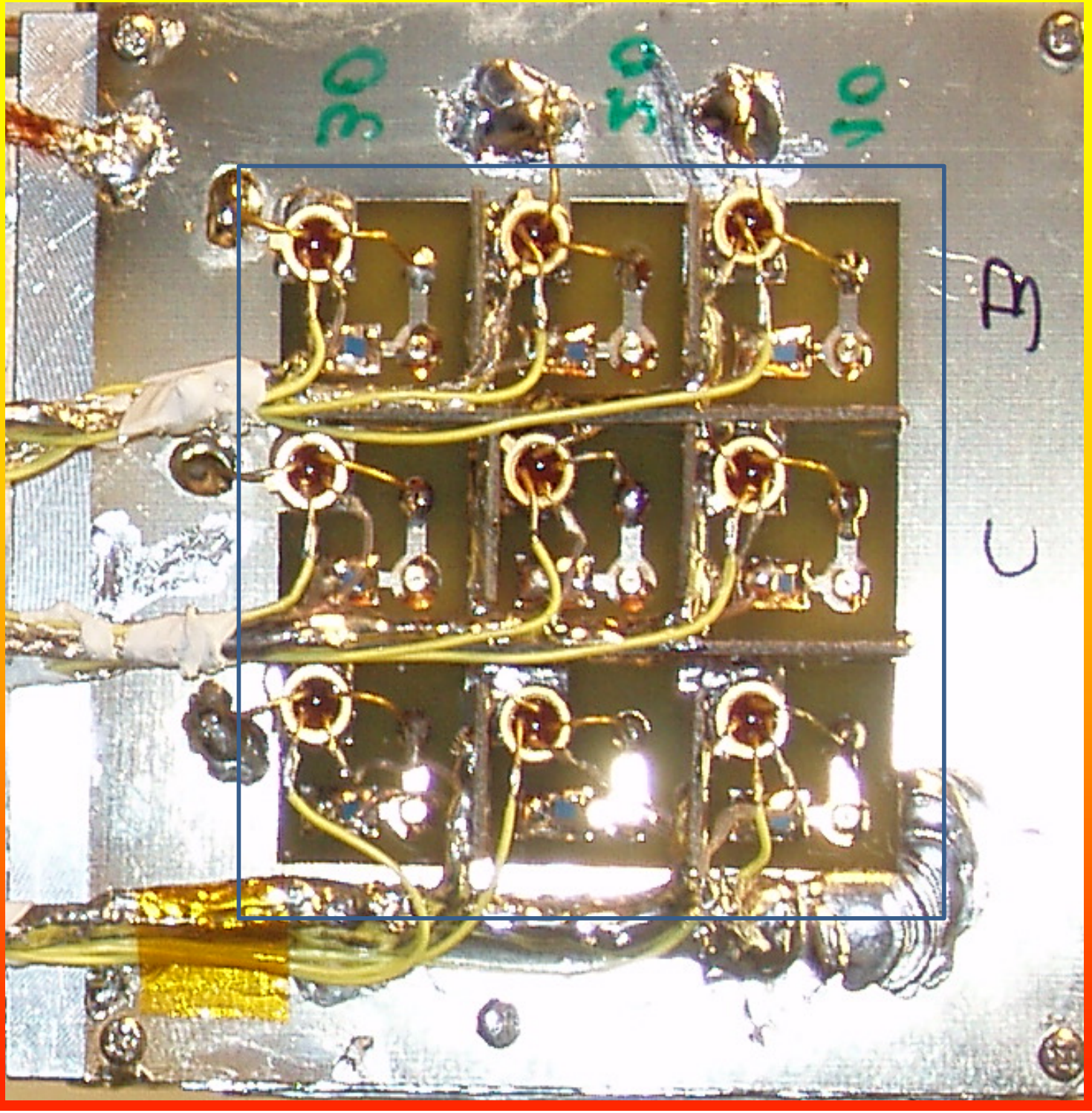
- Detector in horizontal position
- scan with Am source (pitch 1mm)
- Strange structures are observed with strong absorption



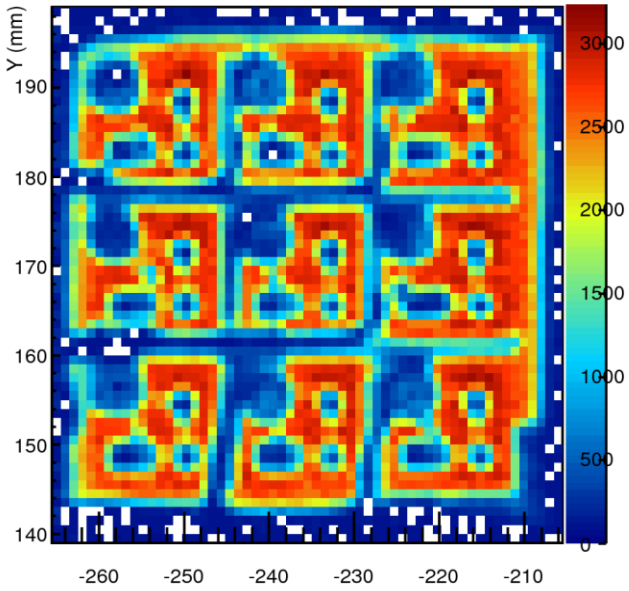


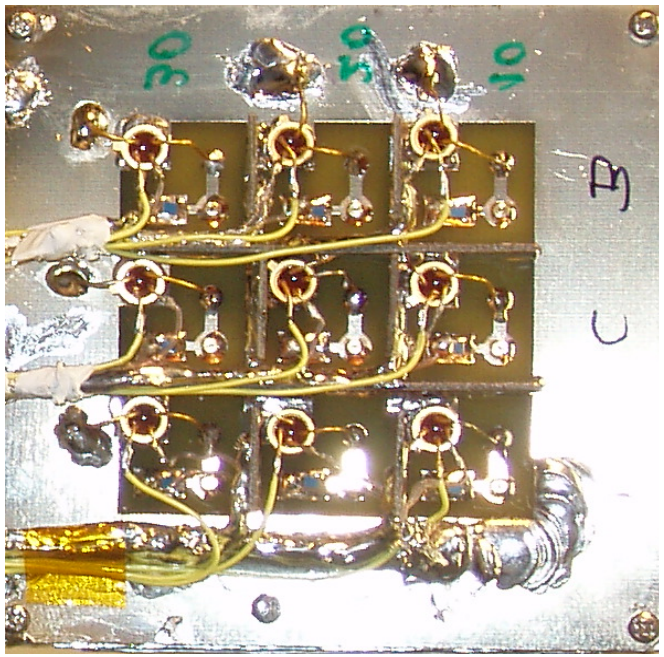






2D 1mm x 1mm Am scan

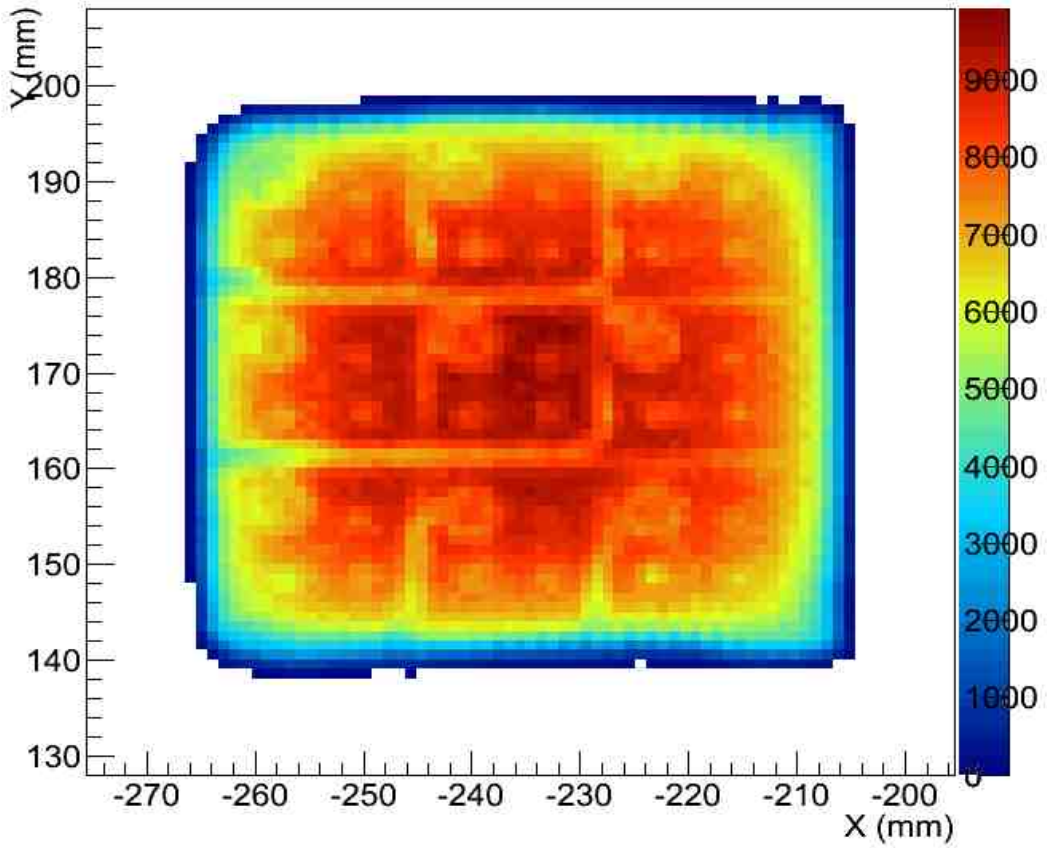




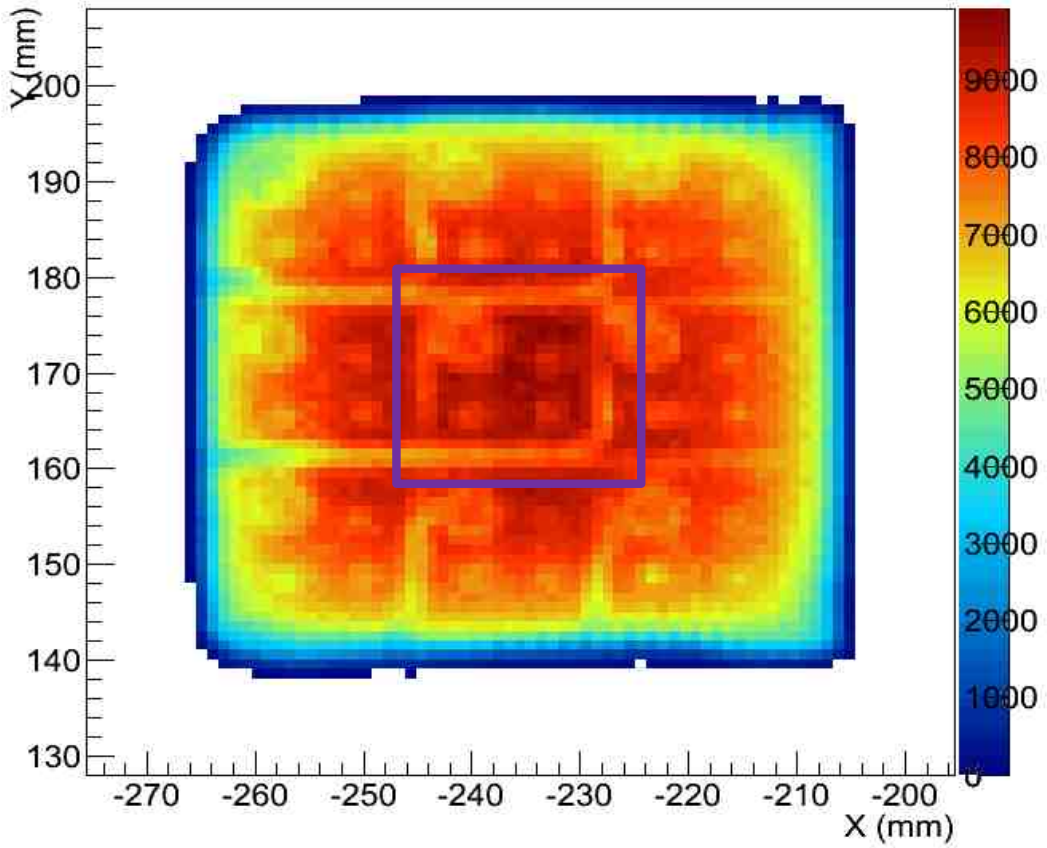
This corresponds to cold electronics placed on a pcb in front of the segmentation face.

2D 1mm x 1mm Cs scan

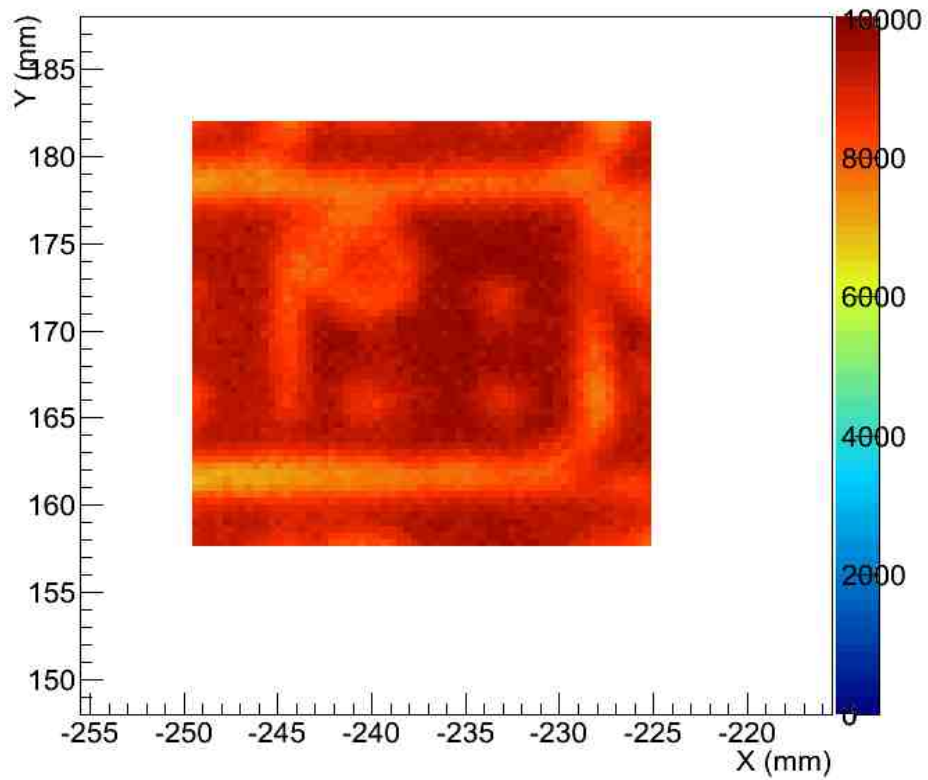
segments

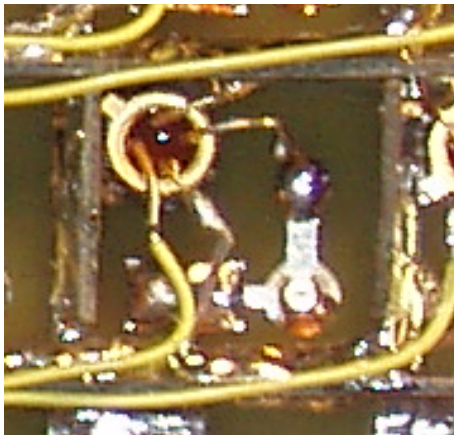


2D 1mm x 1mm Cs scan

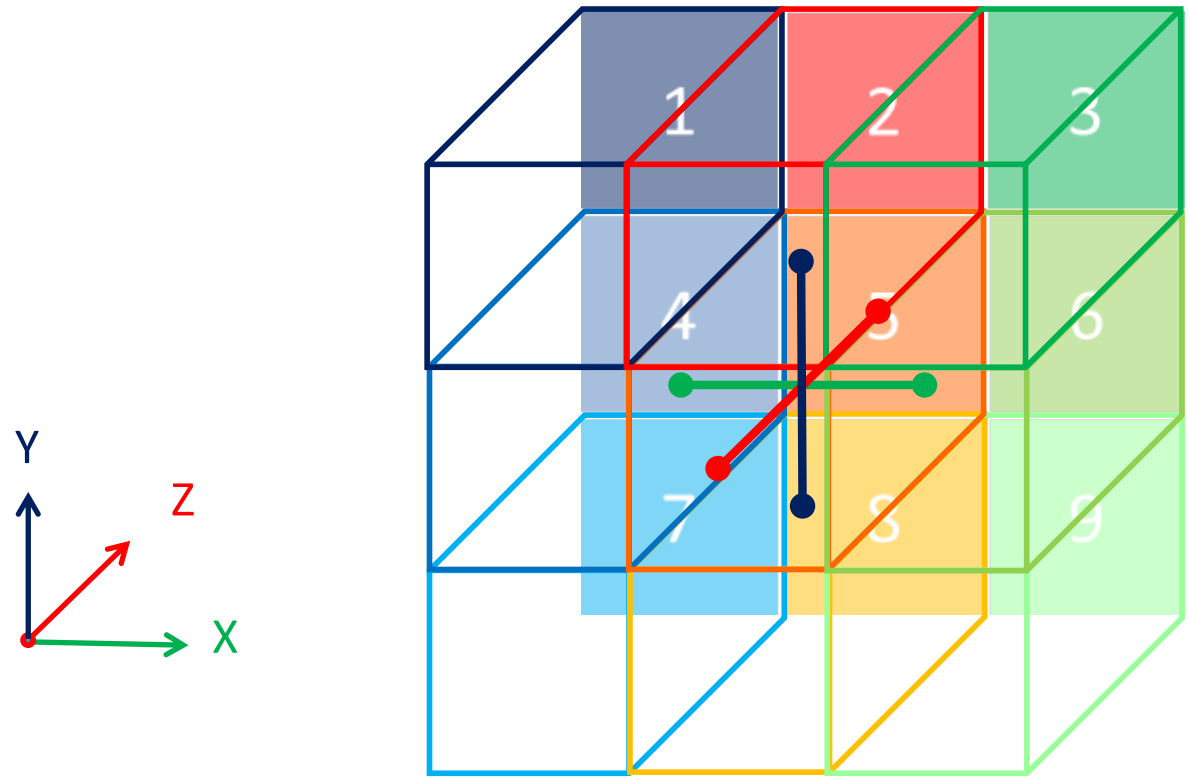


2D 400µm x 400µm Cs scan





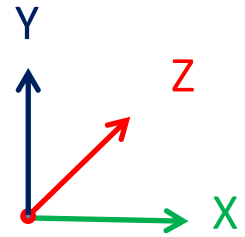
3D Pulse shapes of the central segment

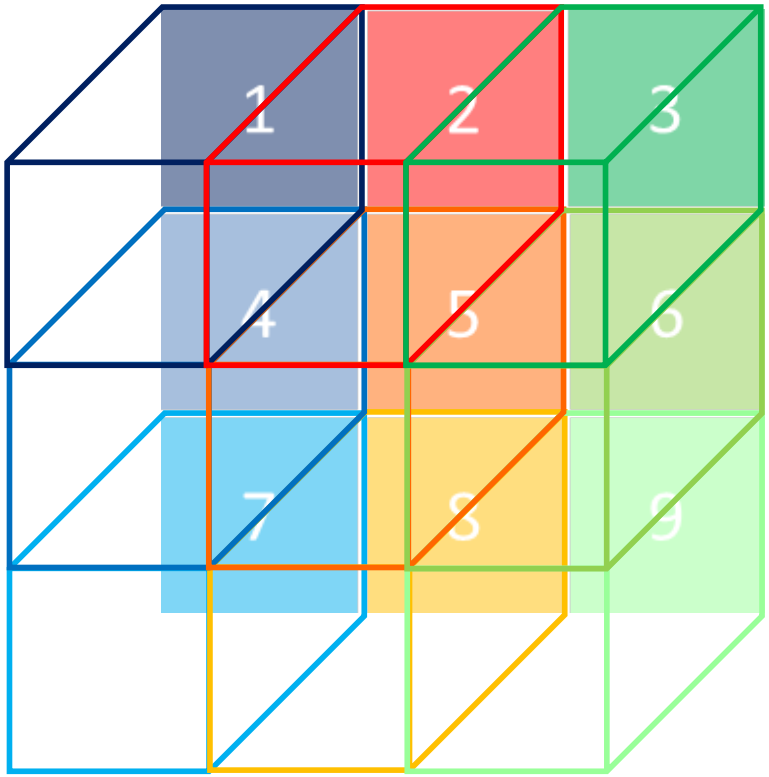


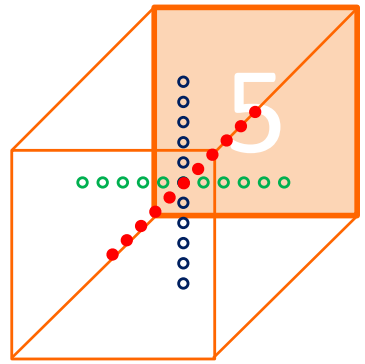
3D scan in the full volume of the crystal :

- ~7000 crossing points
- Pitch of 2 mm
- Traces of 120 samples (1.2 μs)

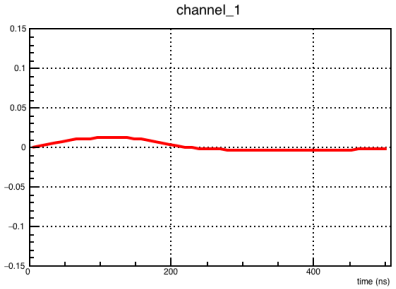
3D Pulse shapes along the Z axis

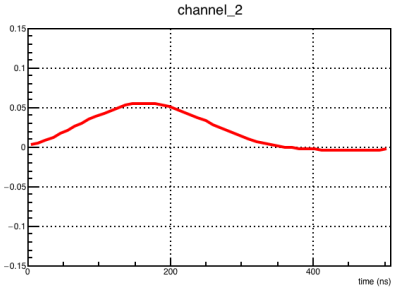


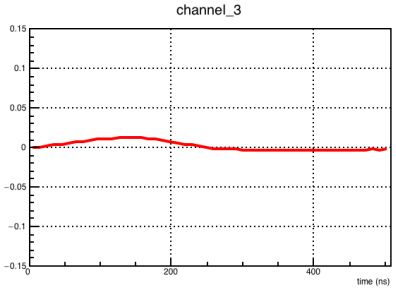


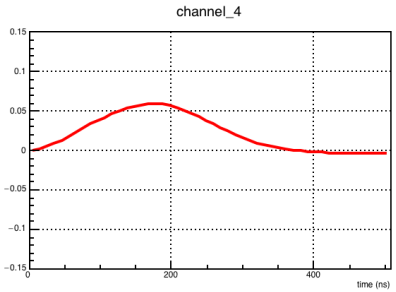


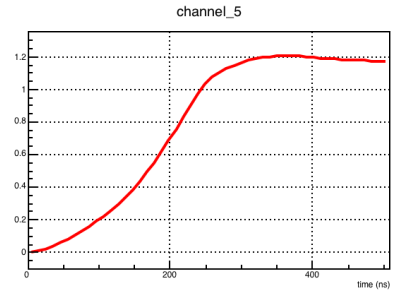
3D Pulse shapes along the Z axis

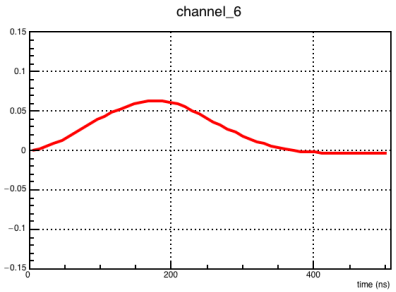


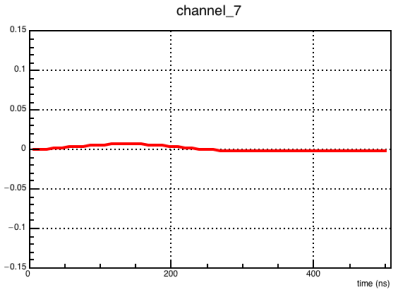


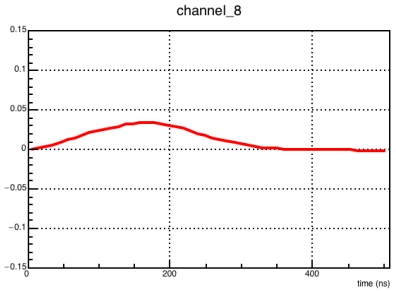


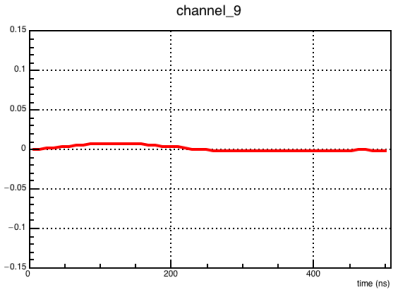


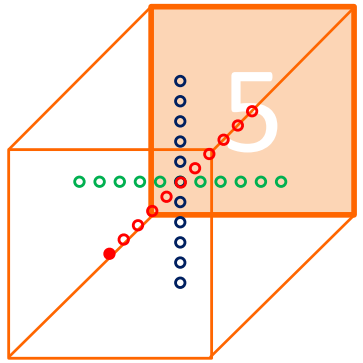




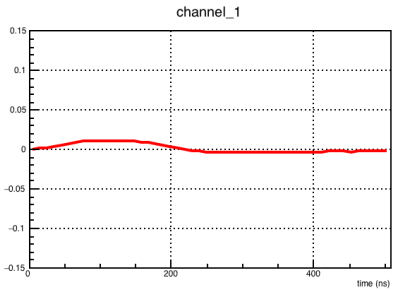


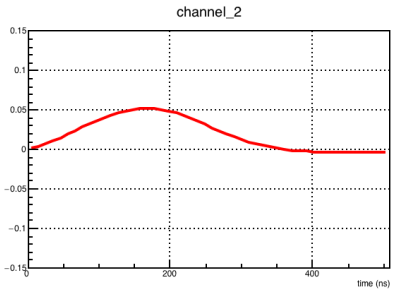


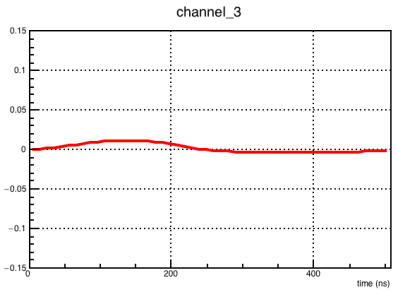


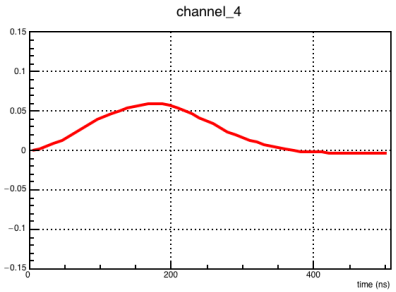


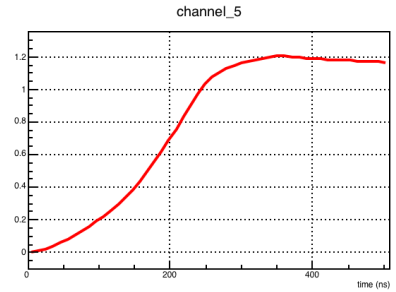
3D Pulse shapes along the Z axis

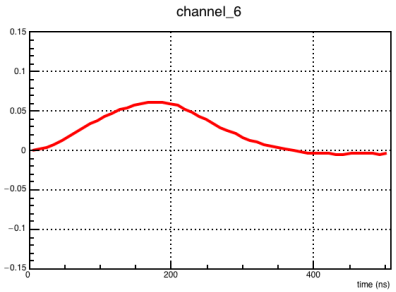


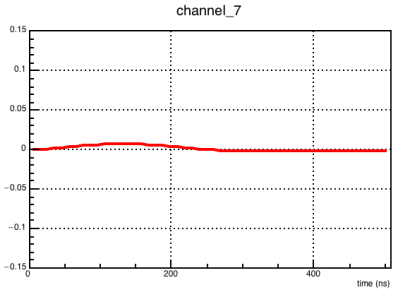


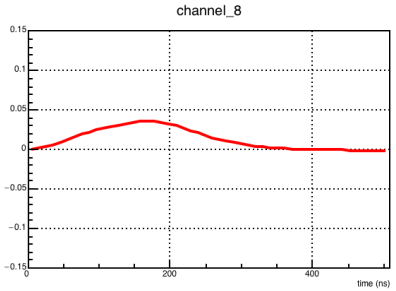


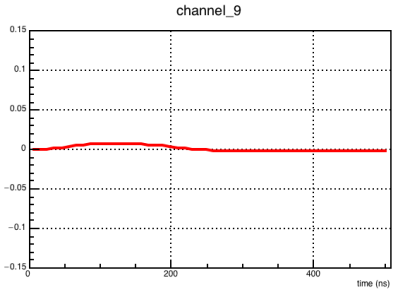


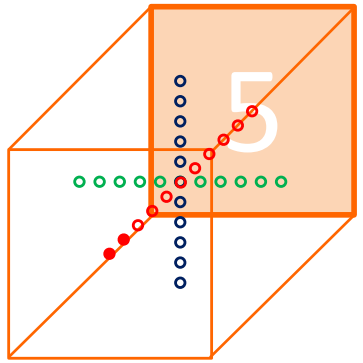




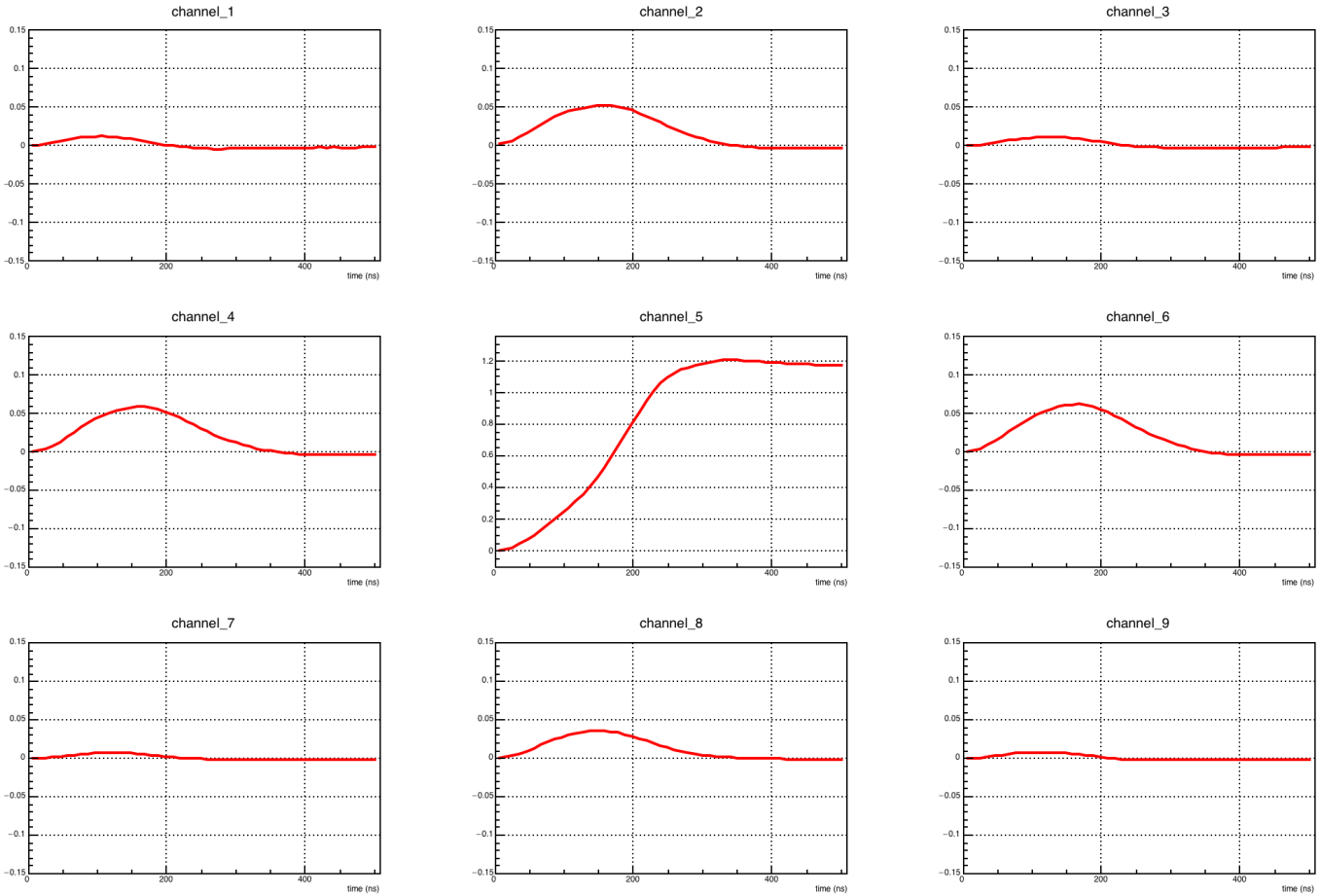


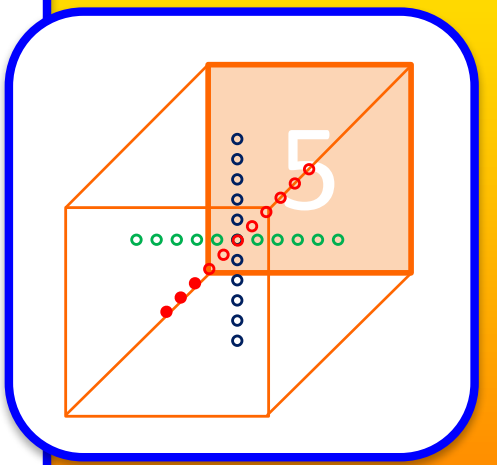




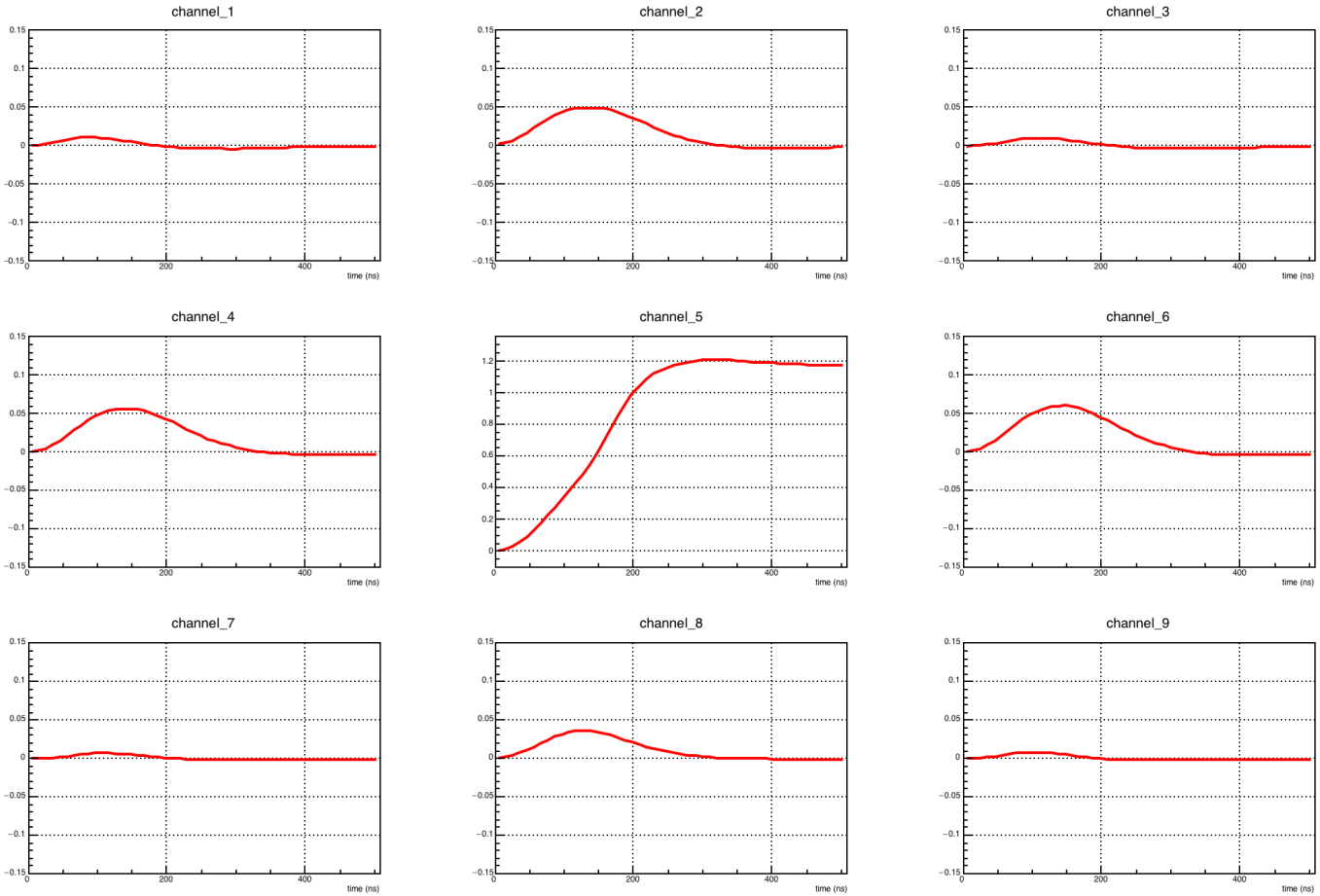


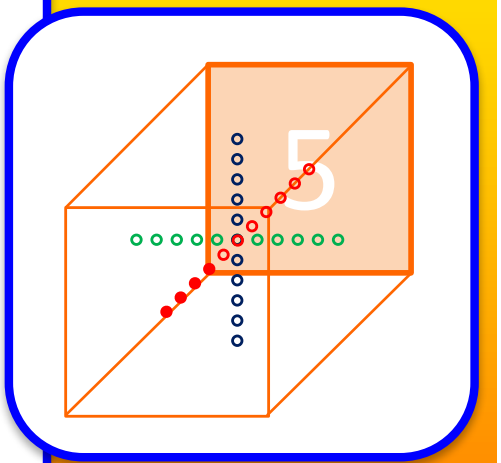
3D Pulse shapes along the Z axis





3D Pulse shapes along the Z axis





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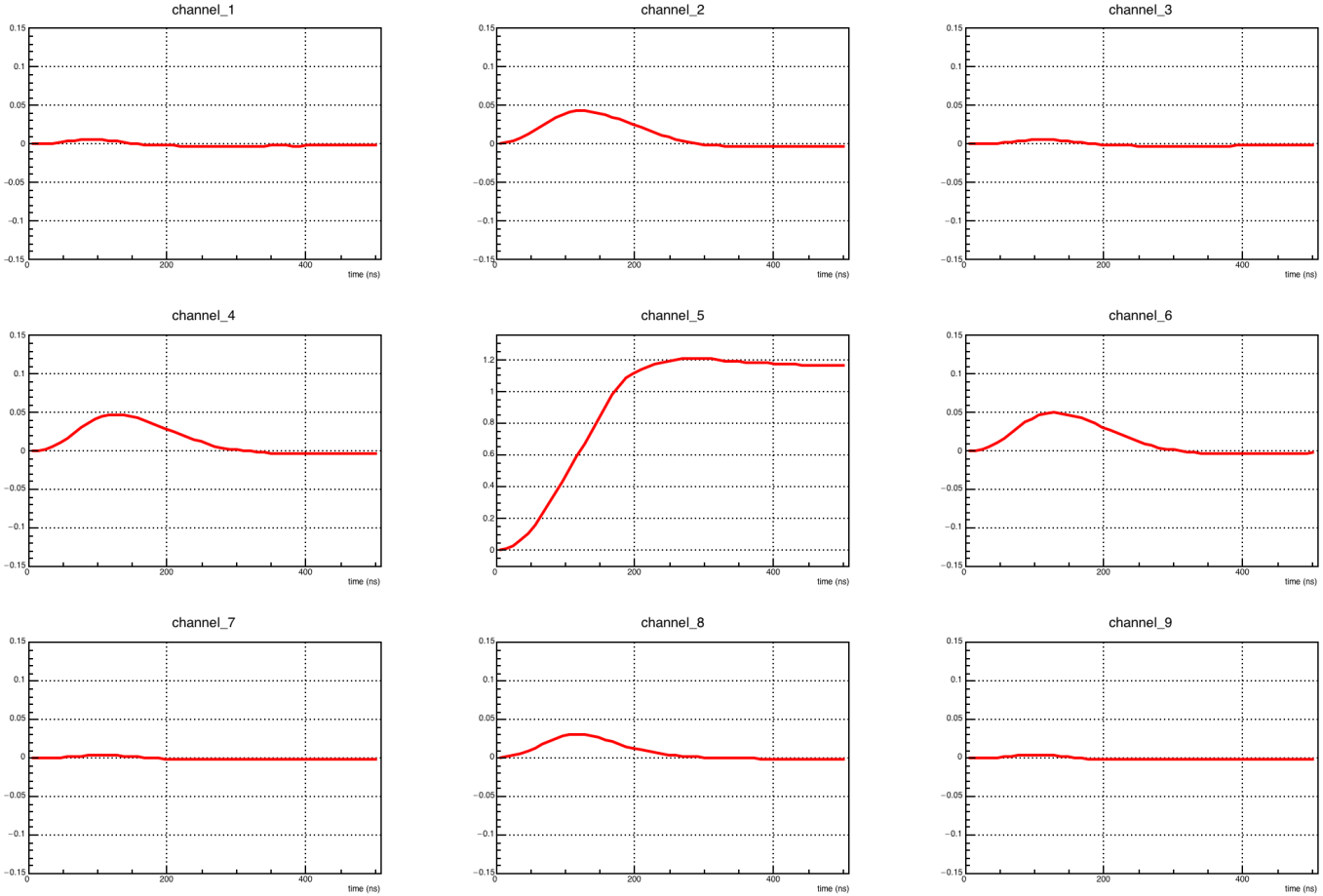
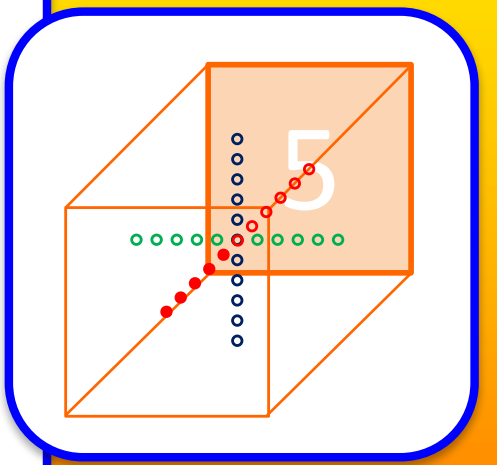
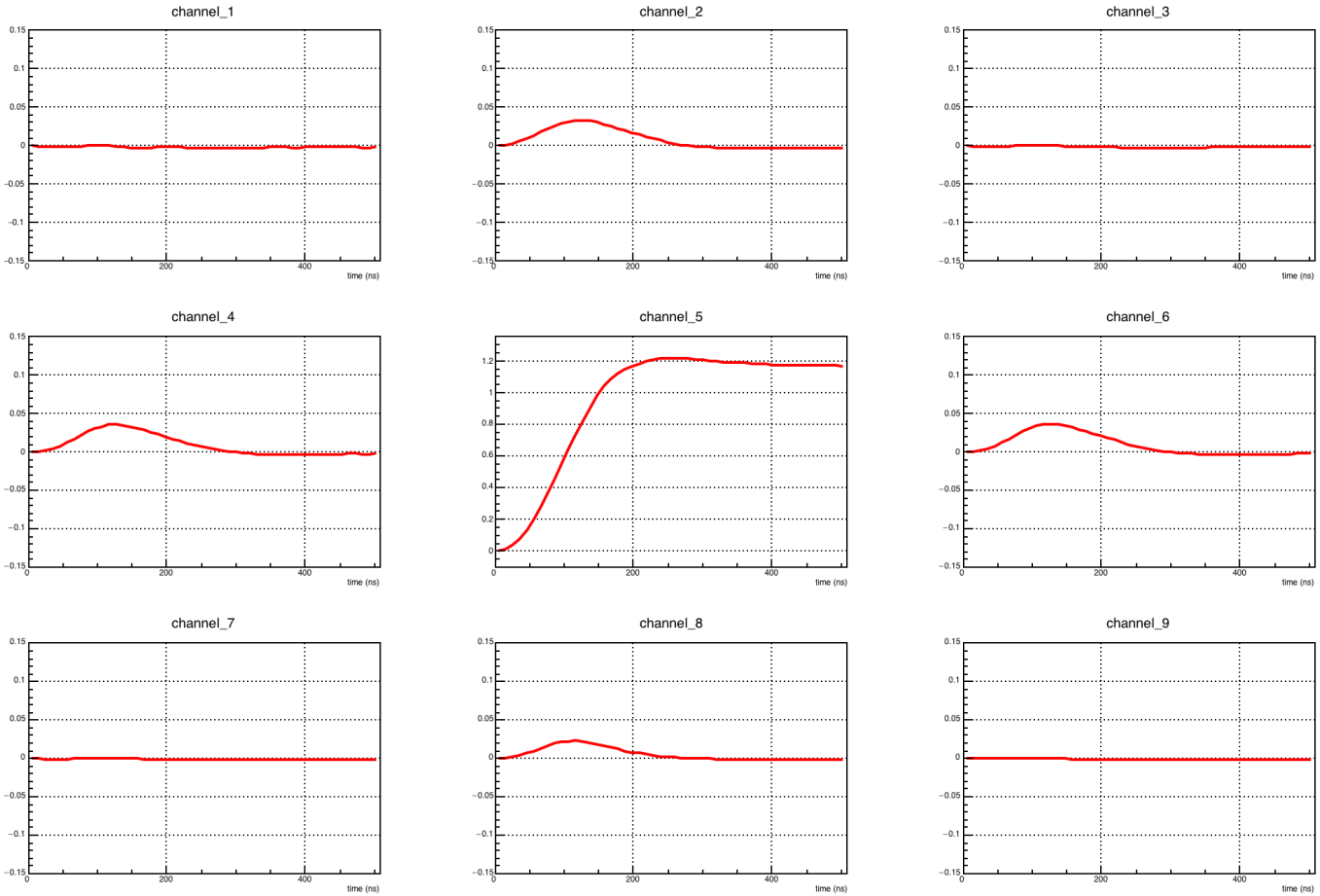
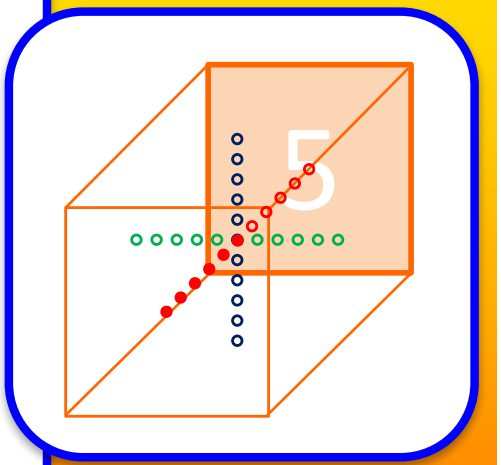


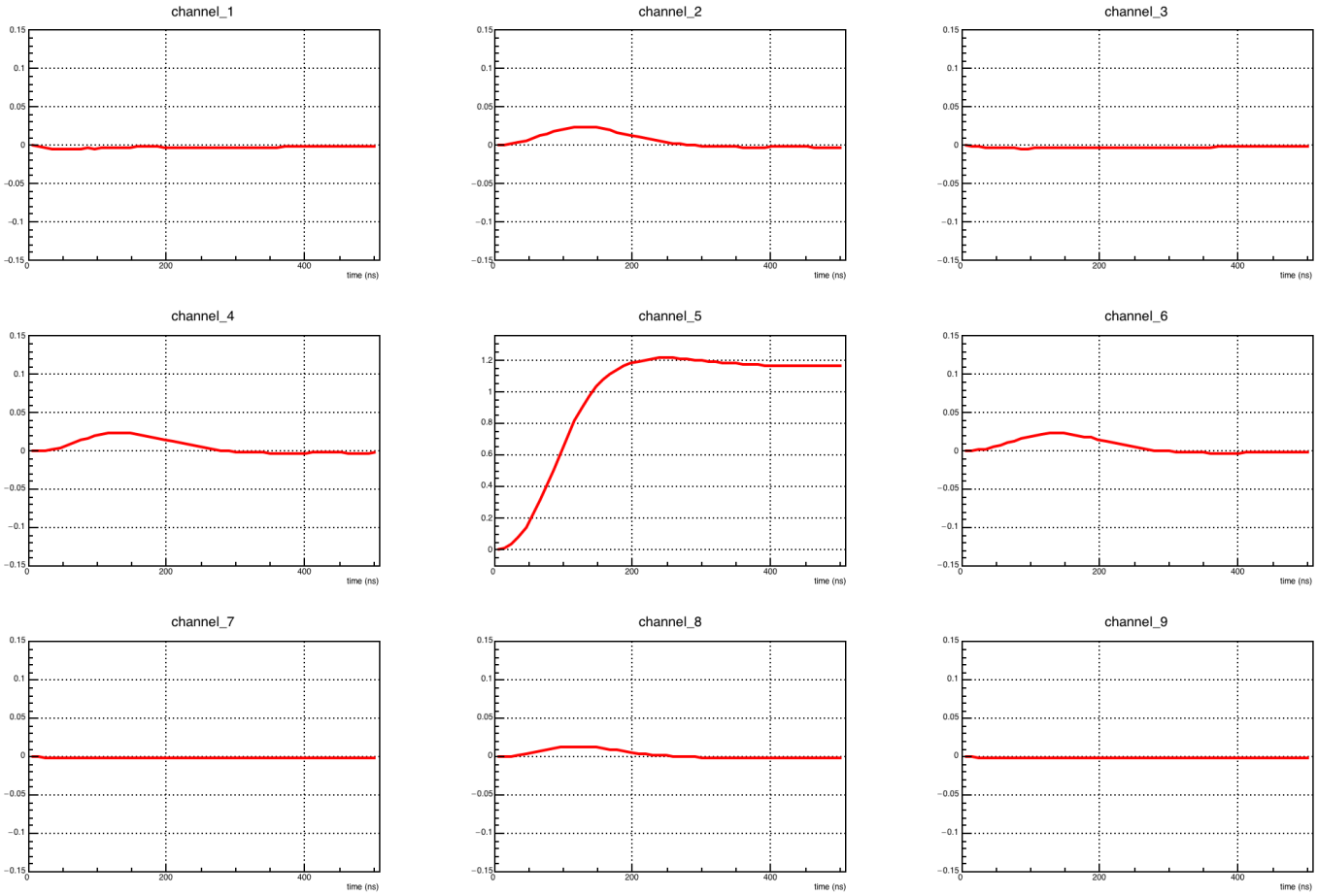


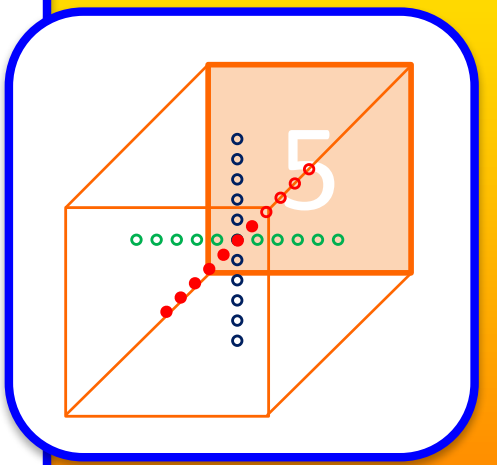
3D Pulse shapes along the Z axis



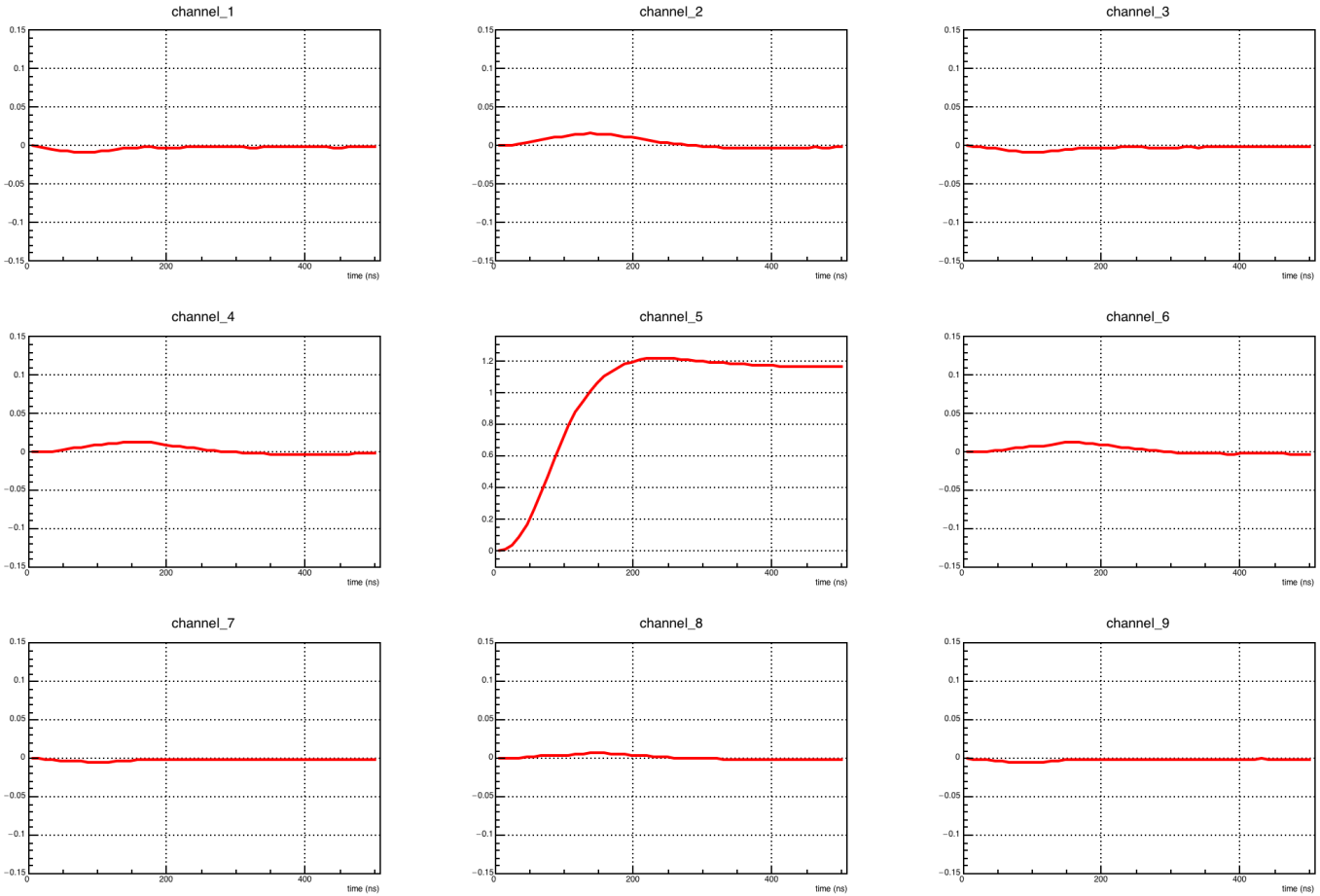


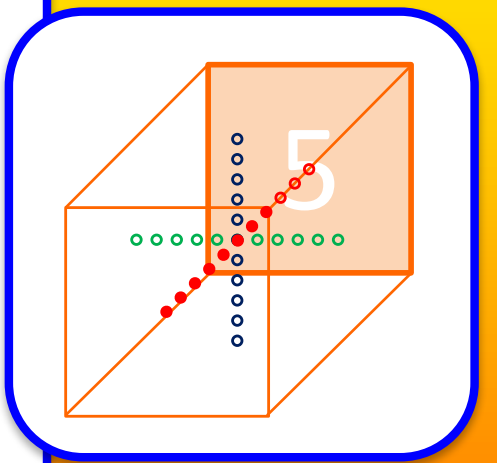
3D Pulse shapes along the Z axis



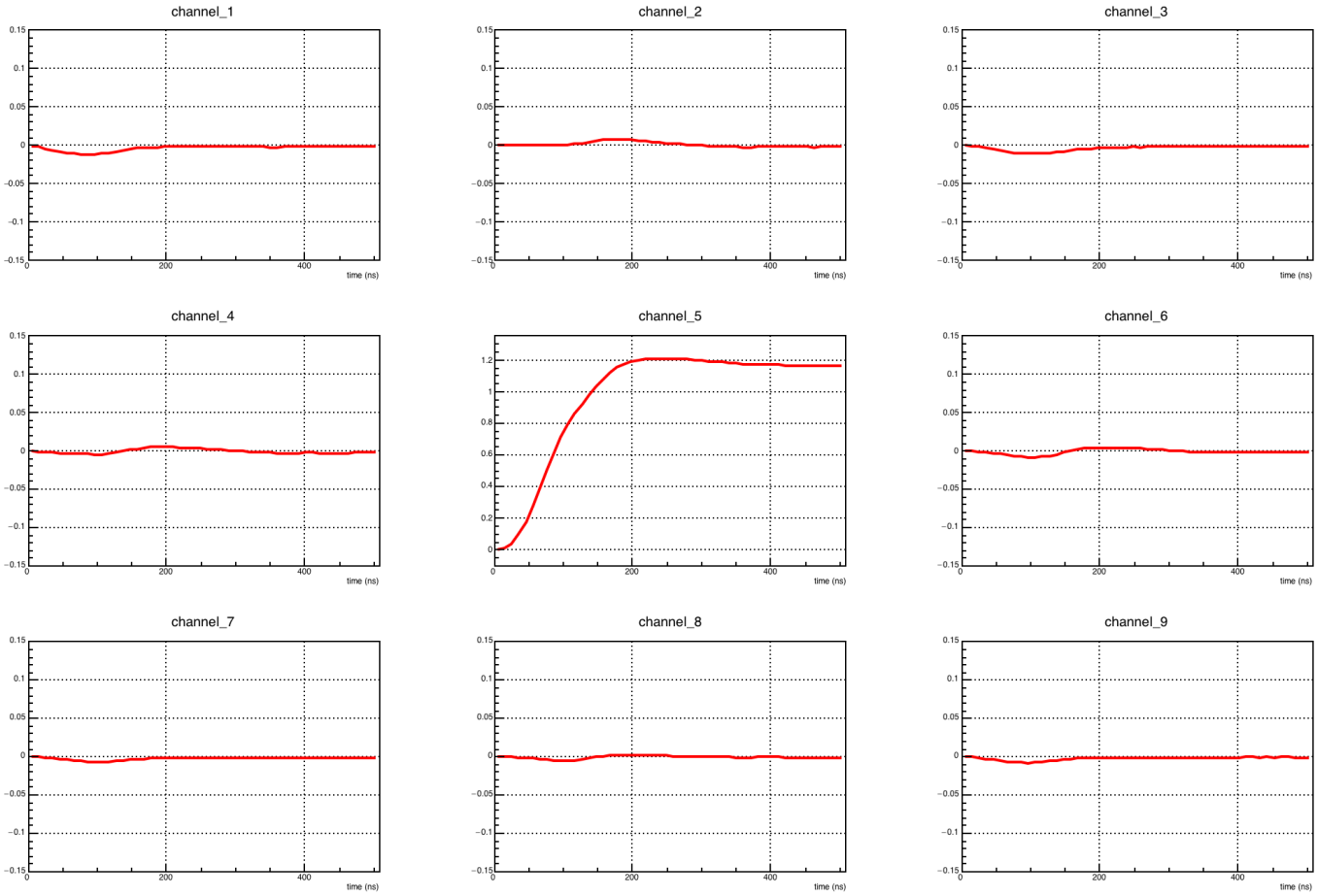


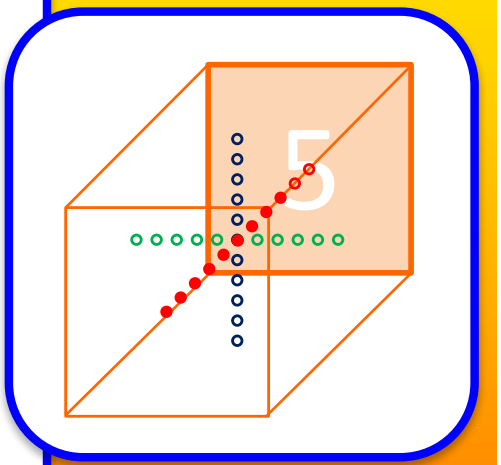
3D Pulse shapes along the Z axis



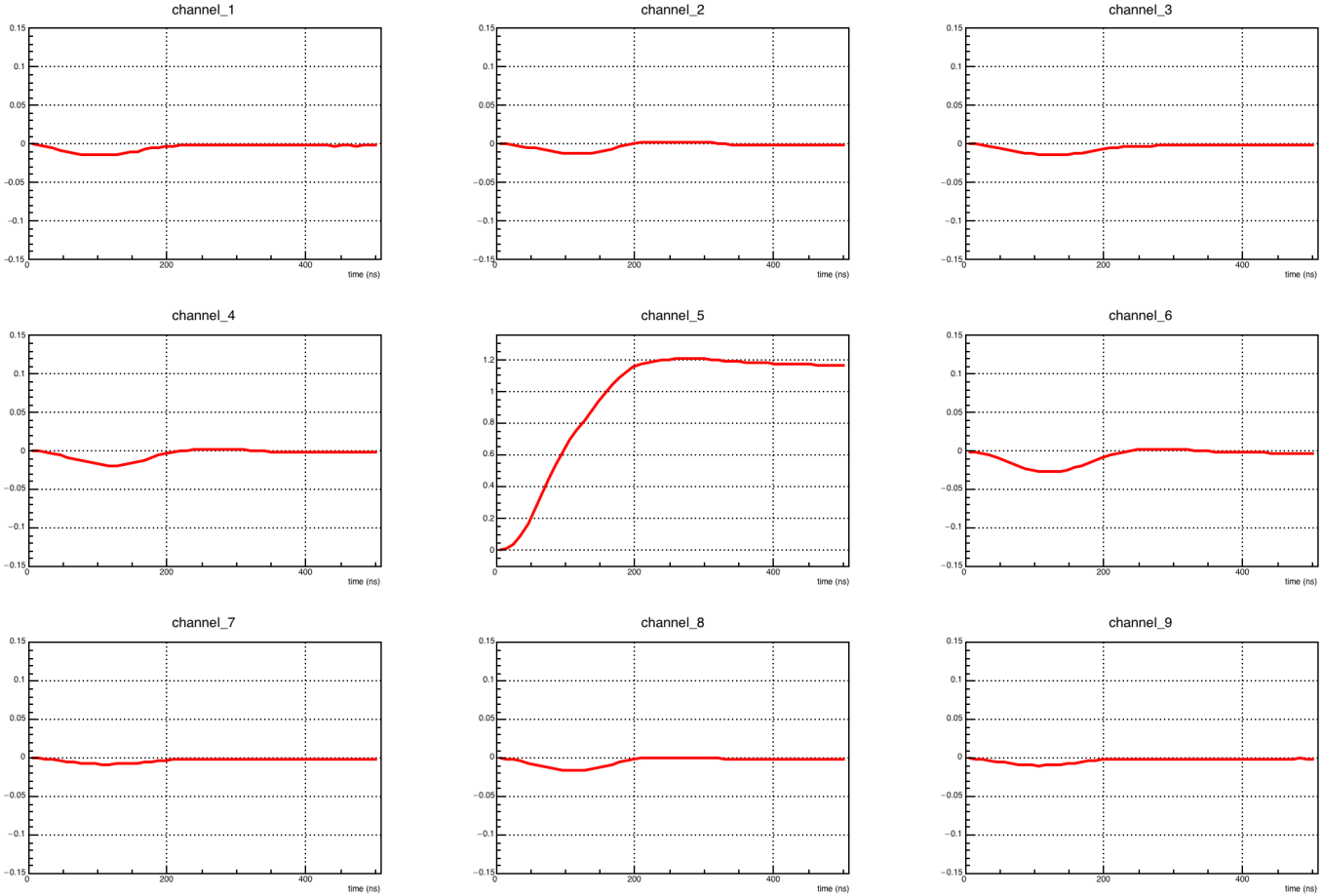


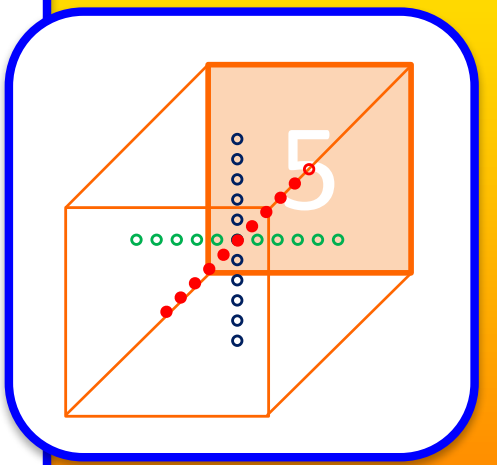
3D Pulse shapes along the Z axis



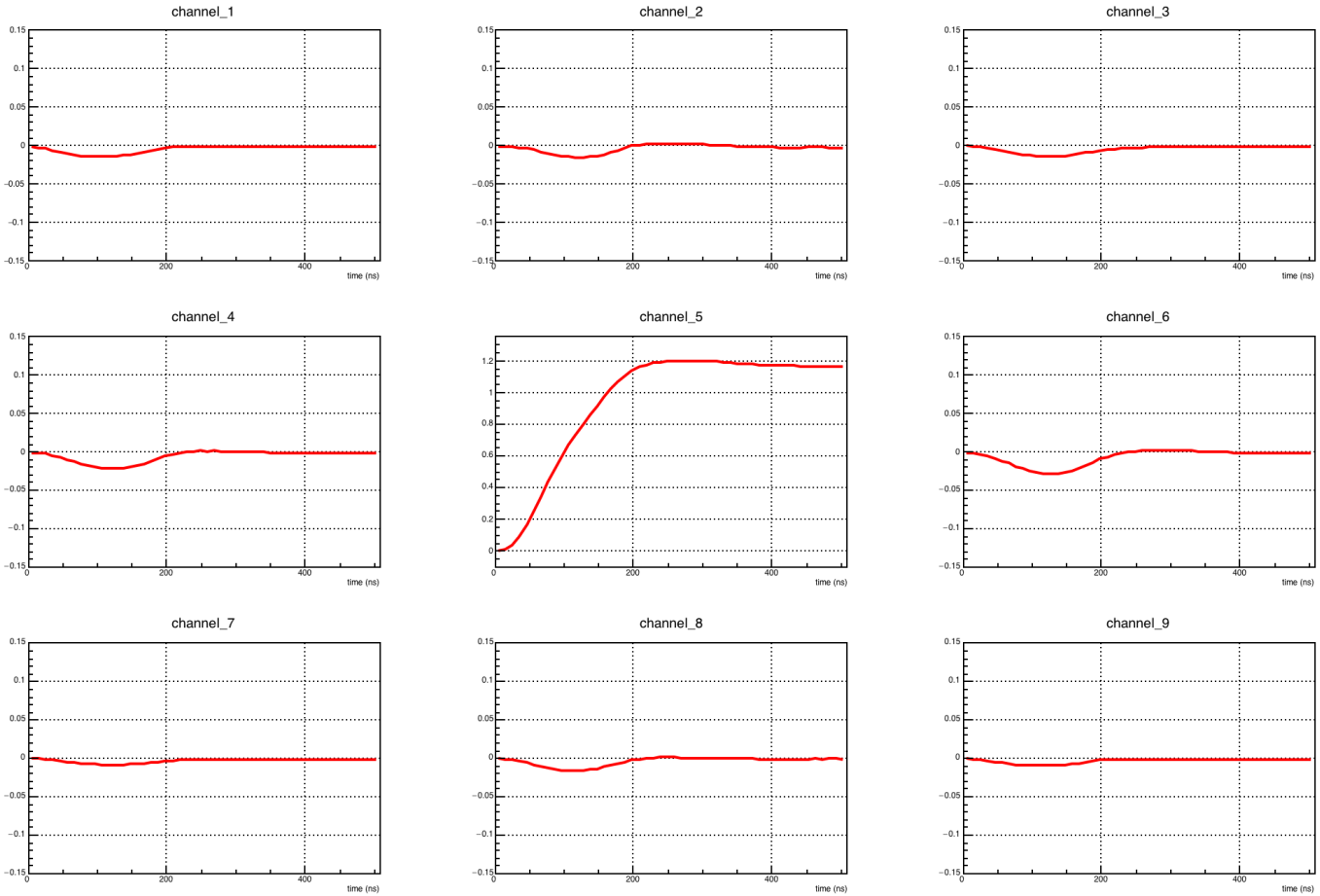


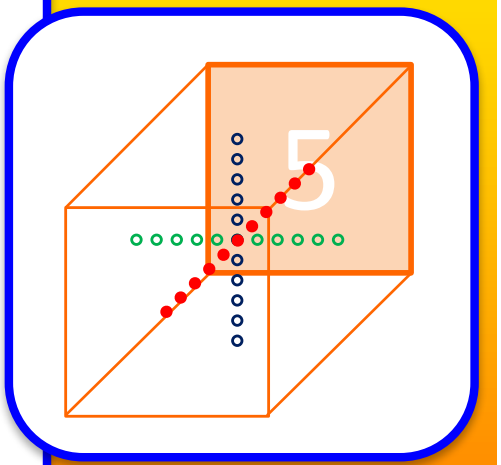
3D Pulse shapes along the Z axis



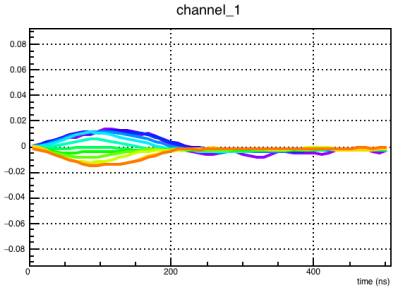


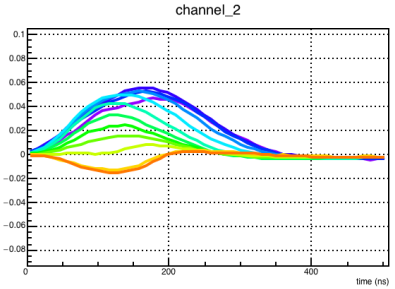
3D Pulse shapes along the Z axis

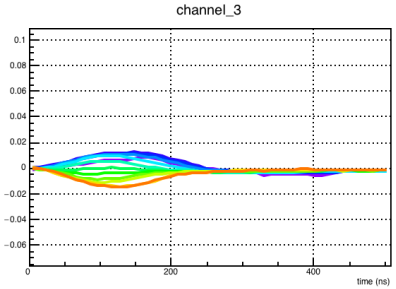


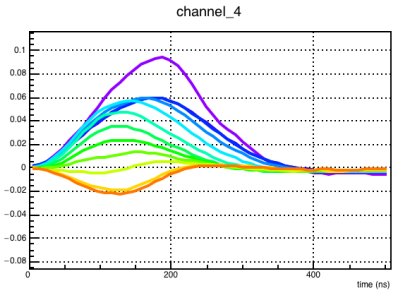


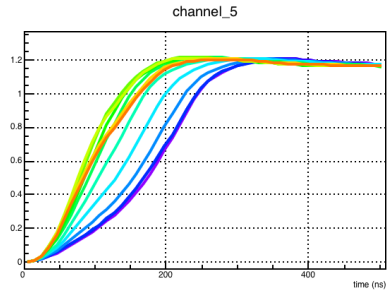
3D Pulse shapes along the Z axis

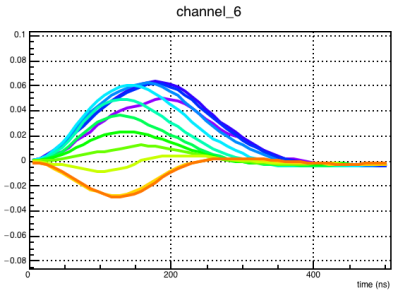


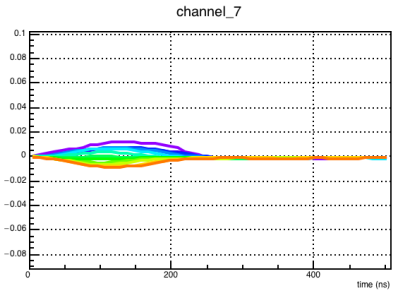


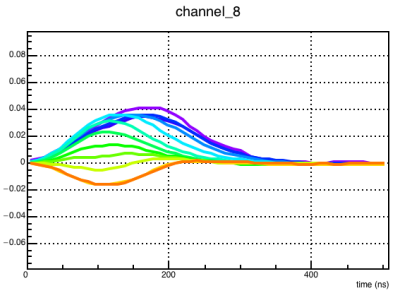


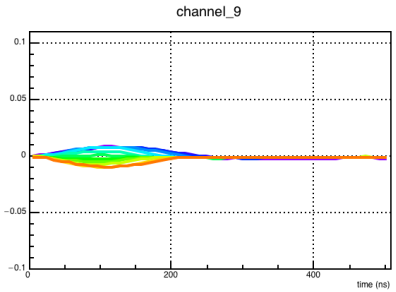


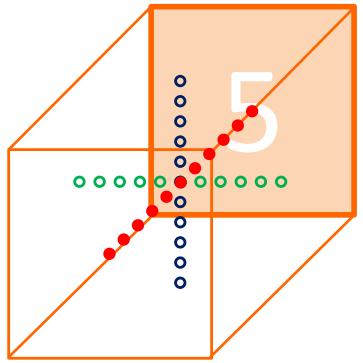




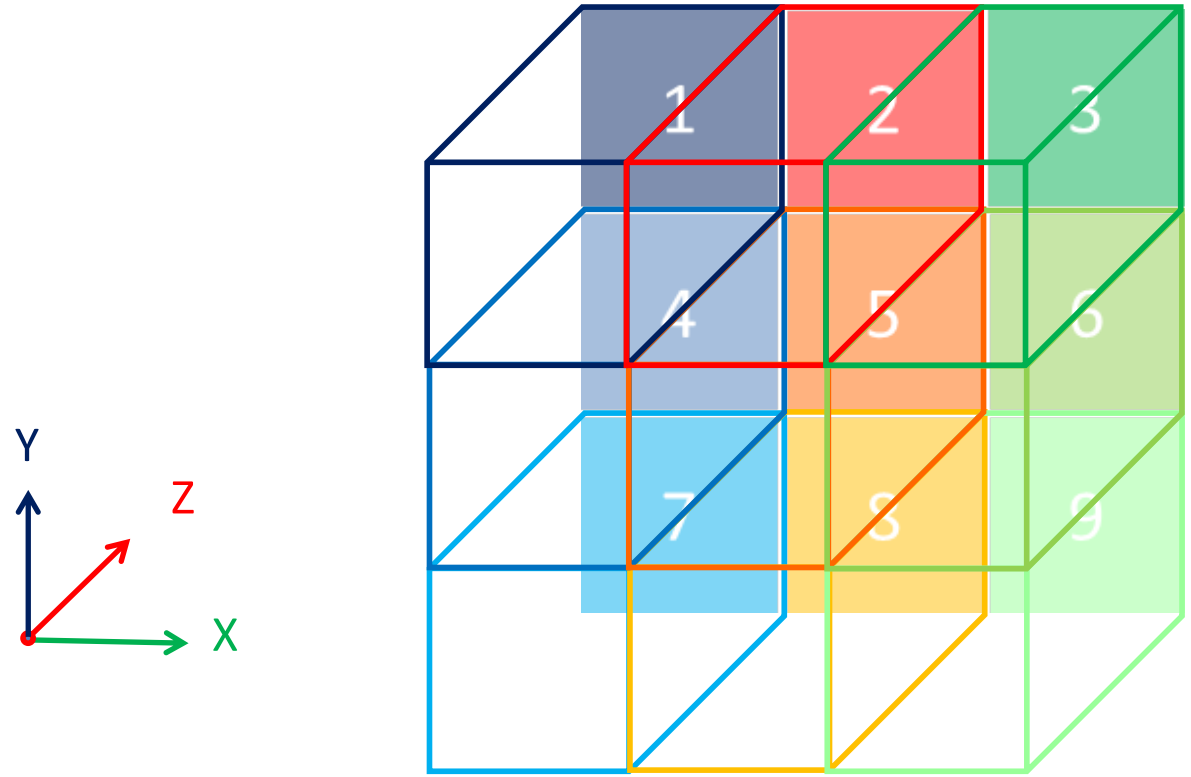


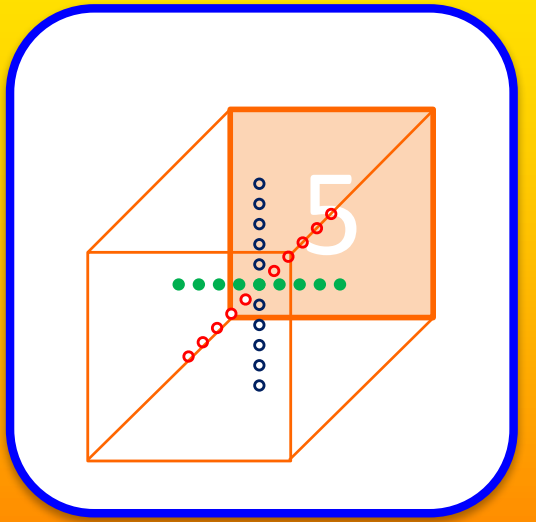




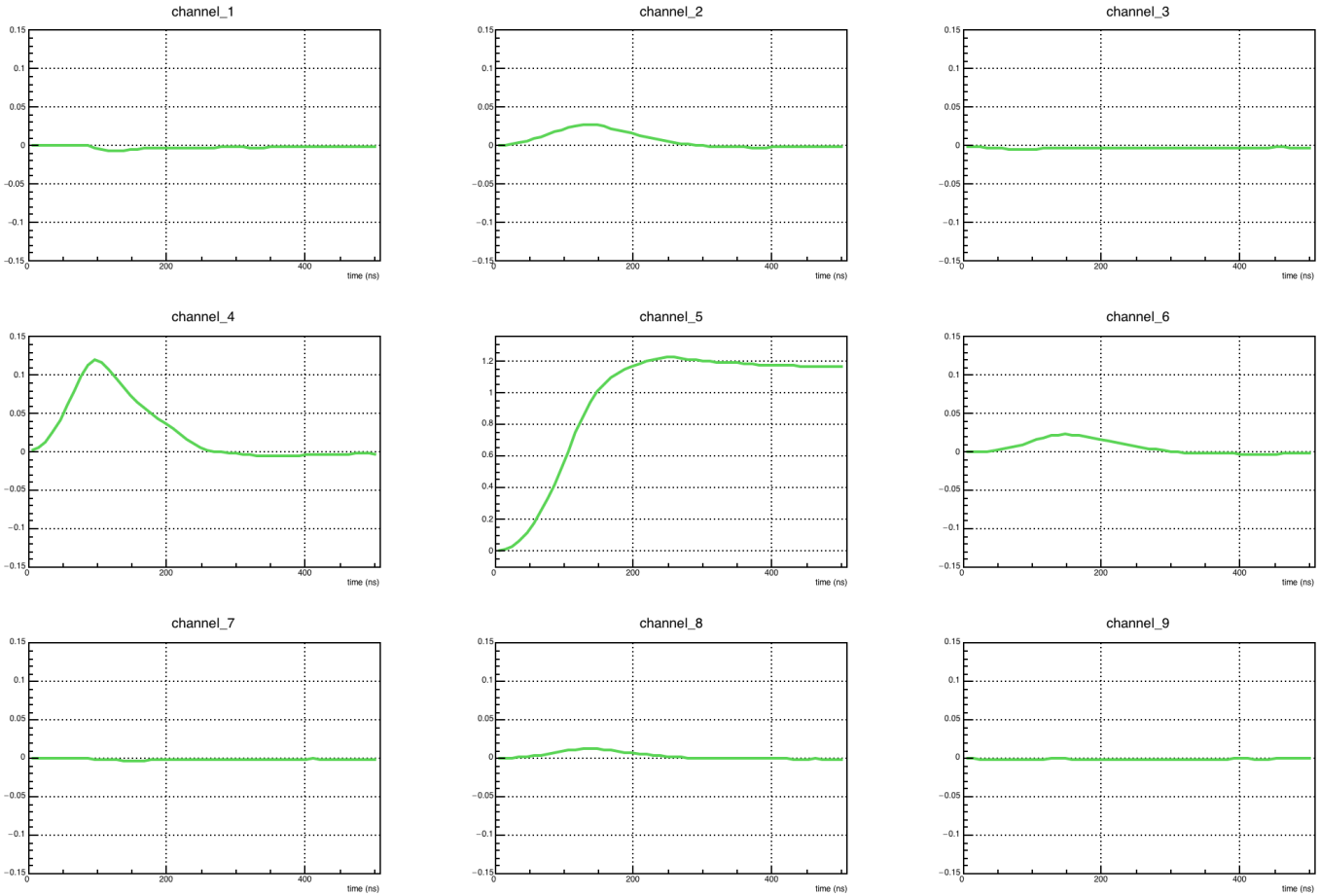


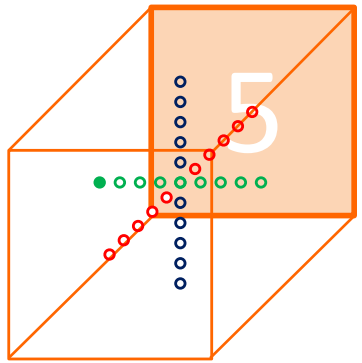
3D Pulse shapes along the X axis



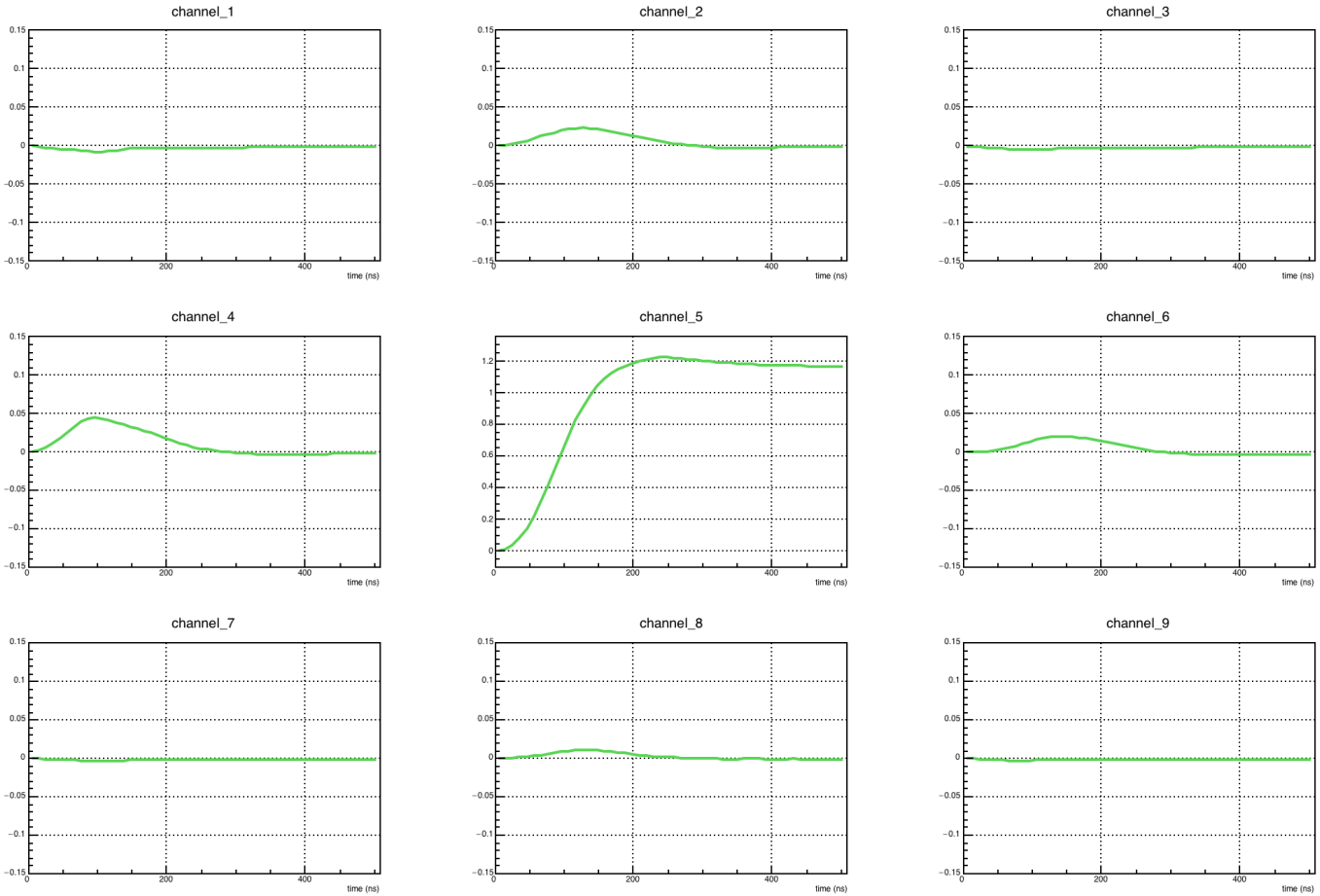


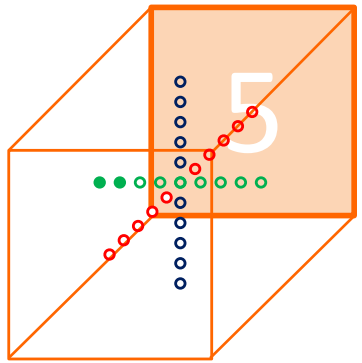
3D Pulse shapes along the X axis



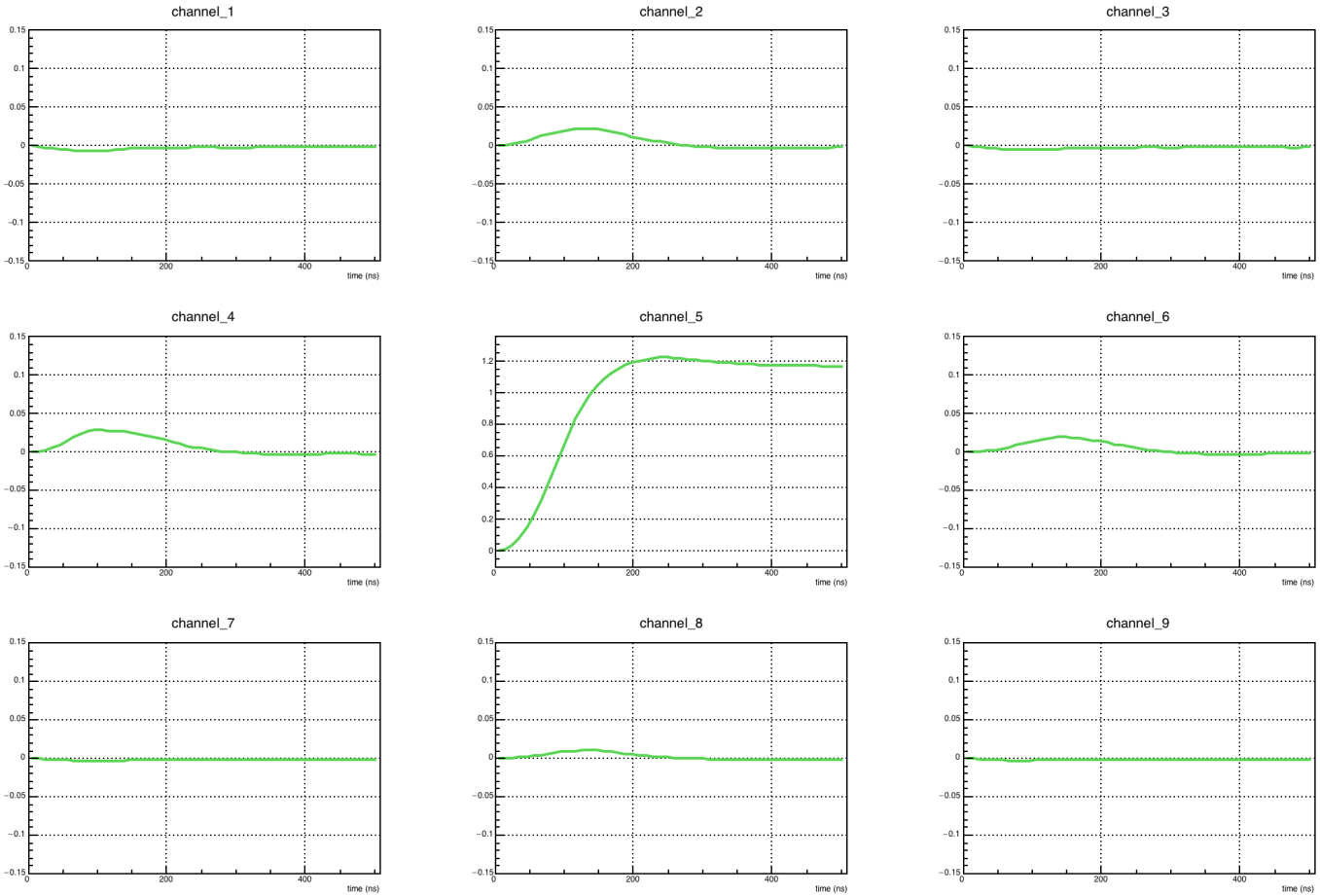


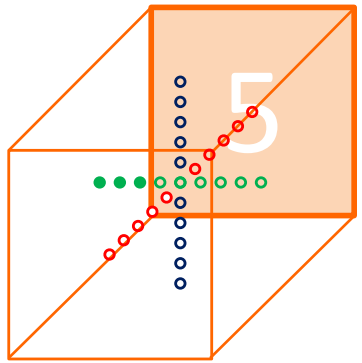
3D Pulse shapes along the X axis



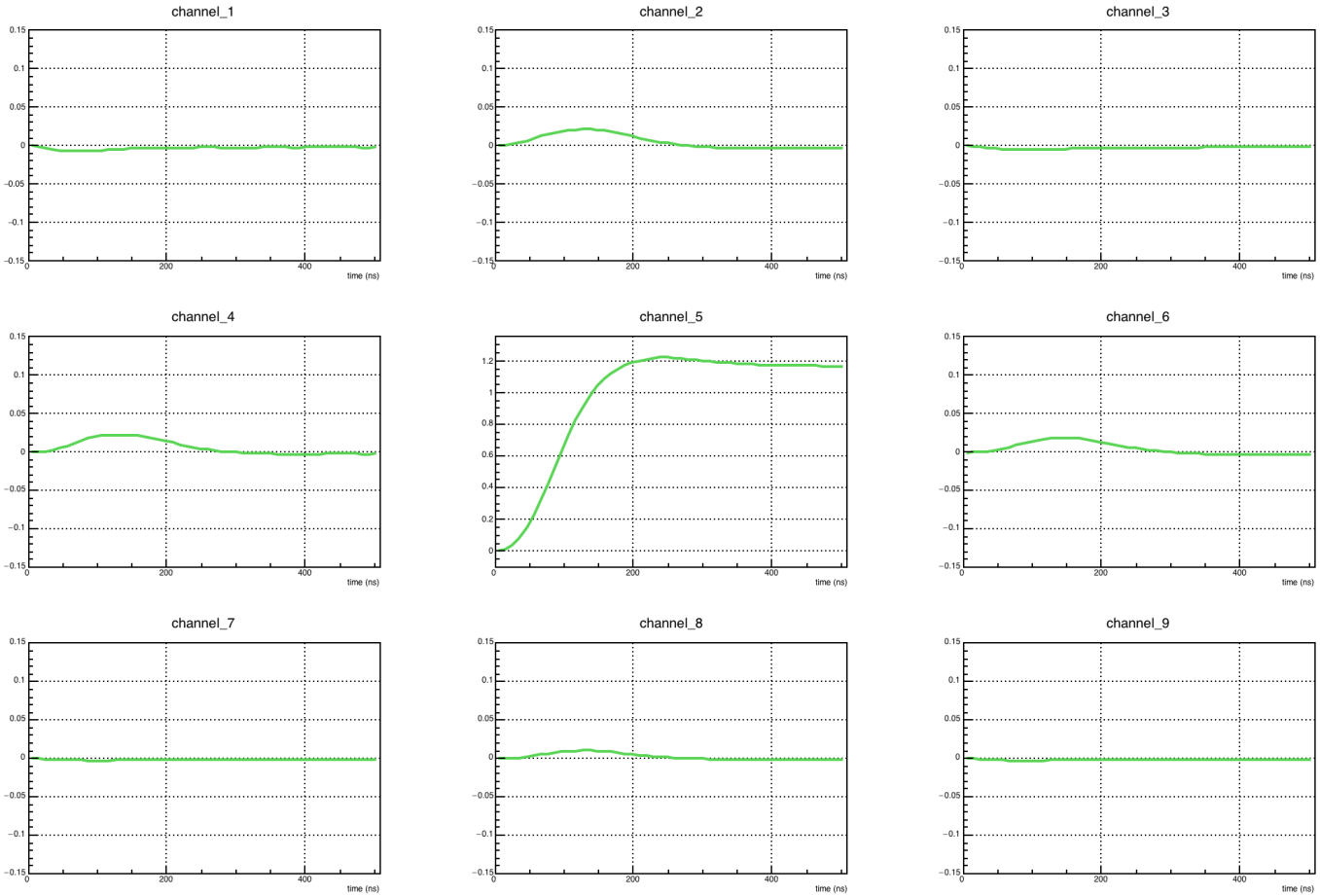


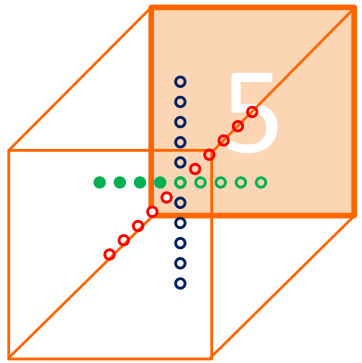
3D Pulse shapes along the X axis





3D Pulse shapes along the X axis





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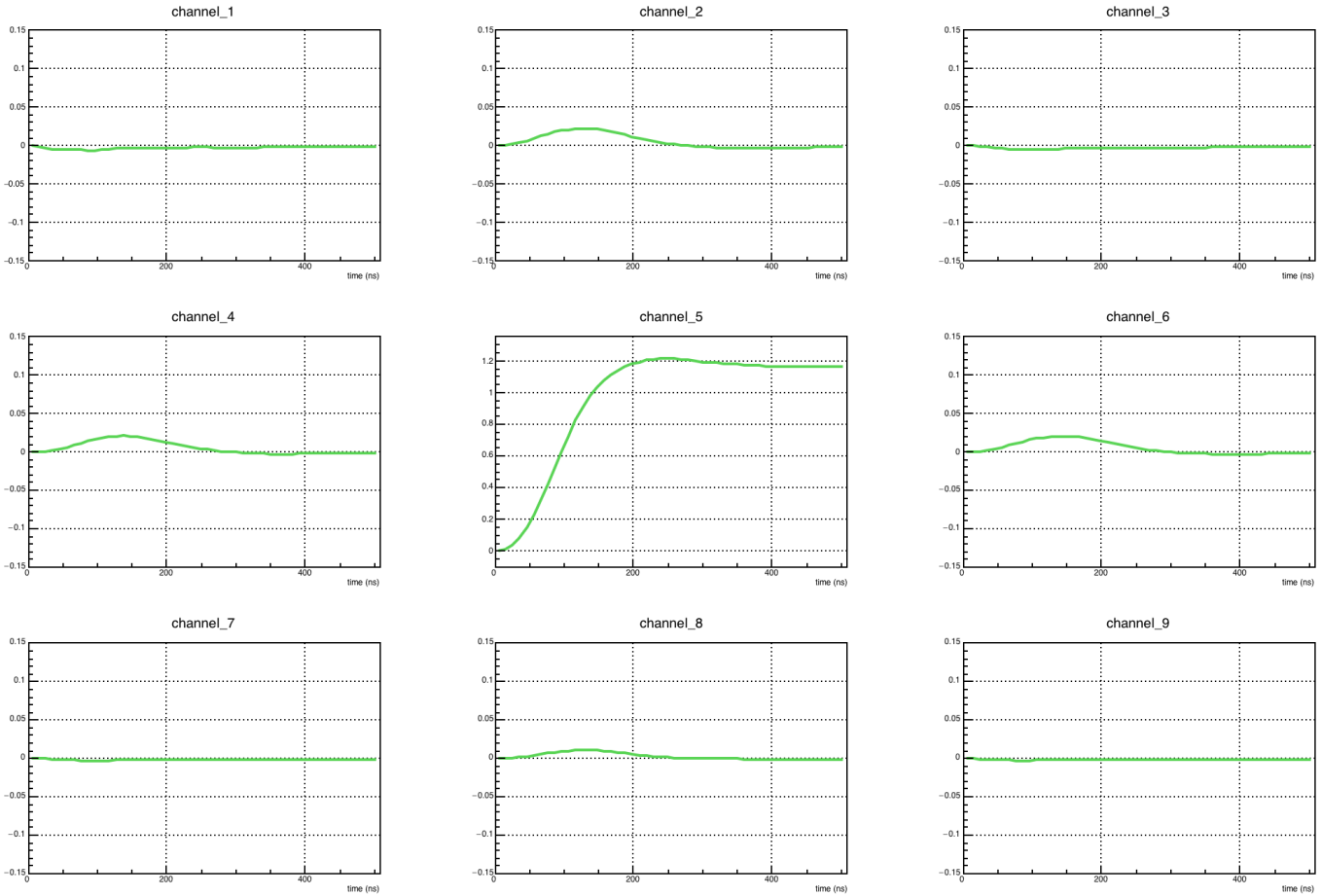

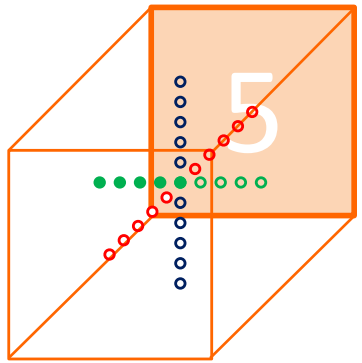

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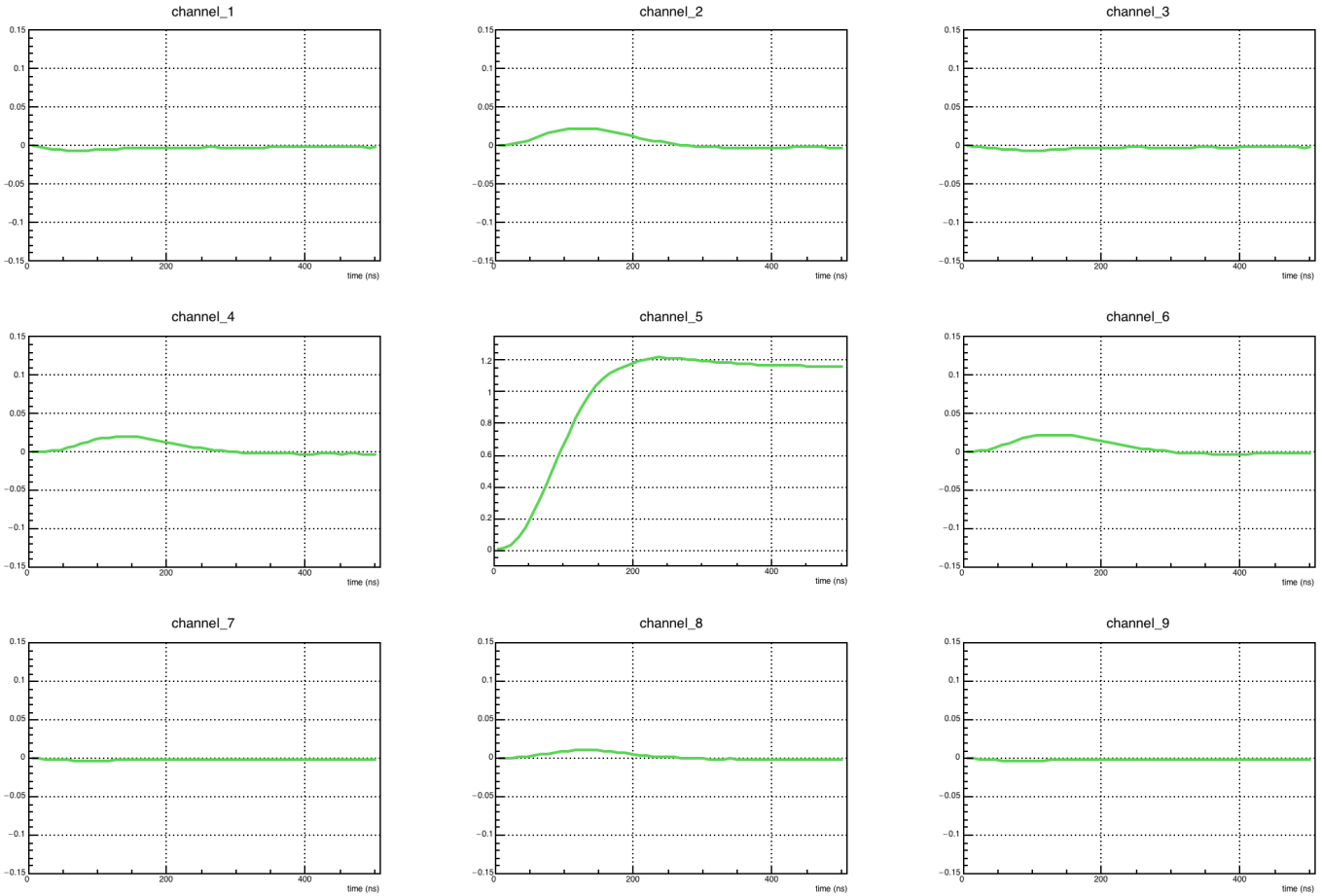

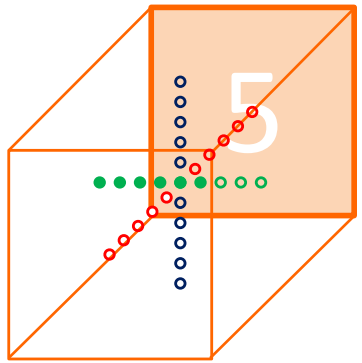

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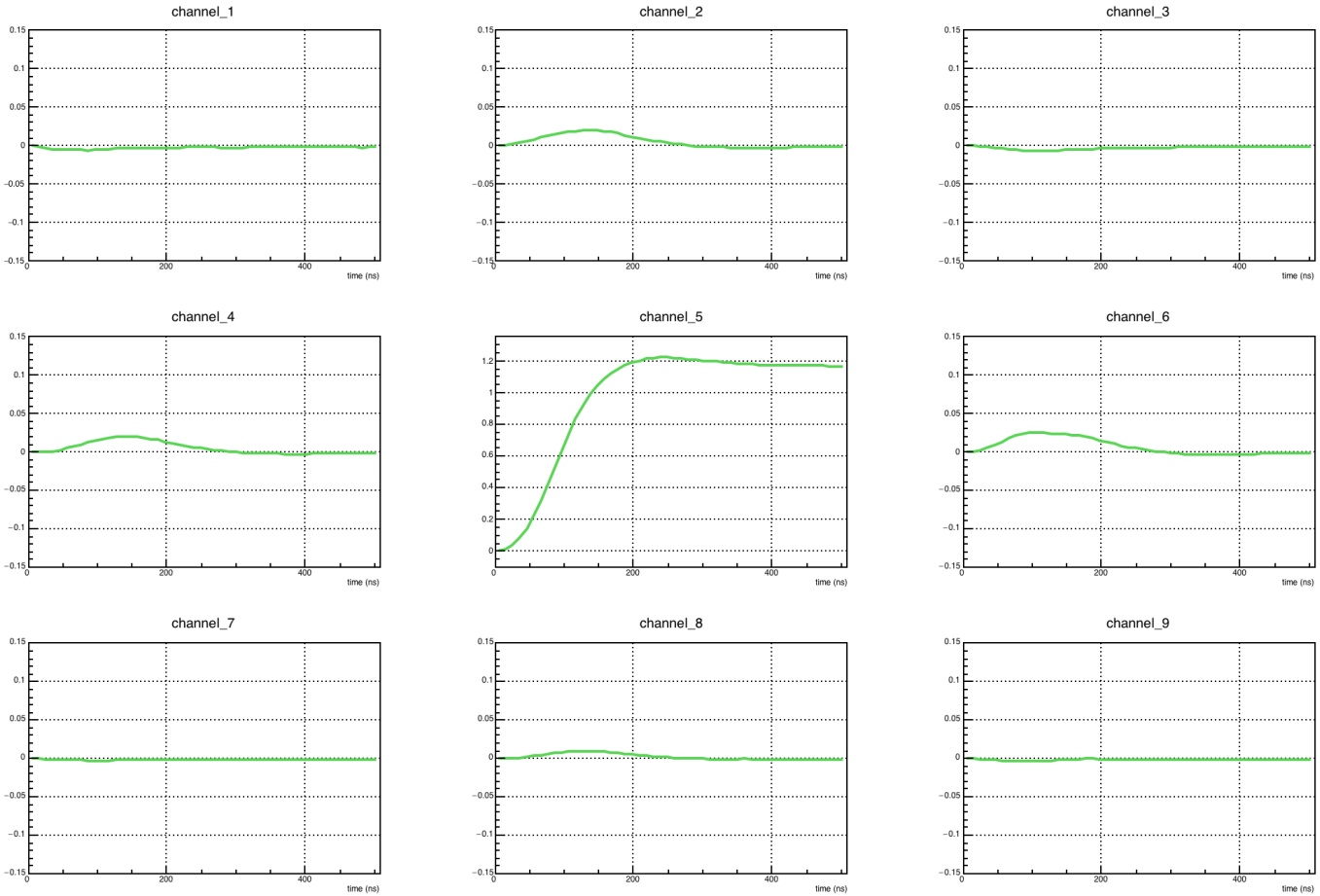

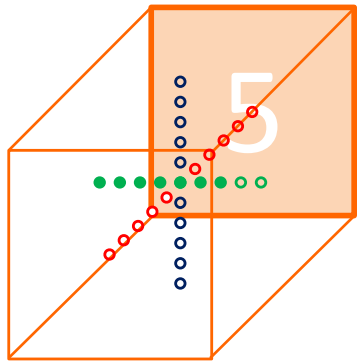

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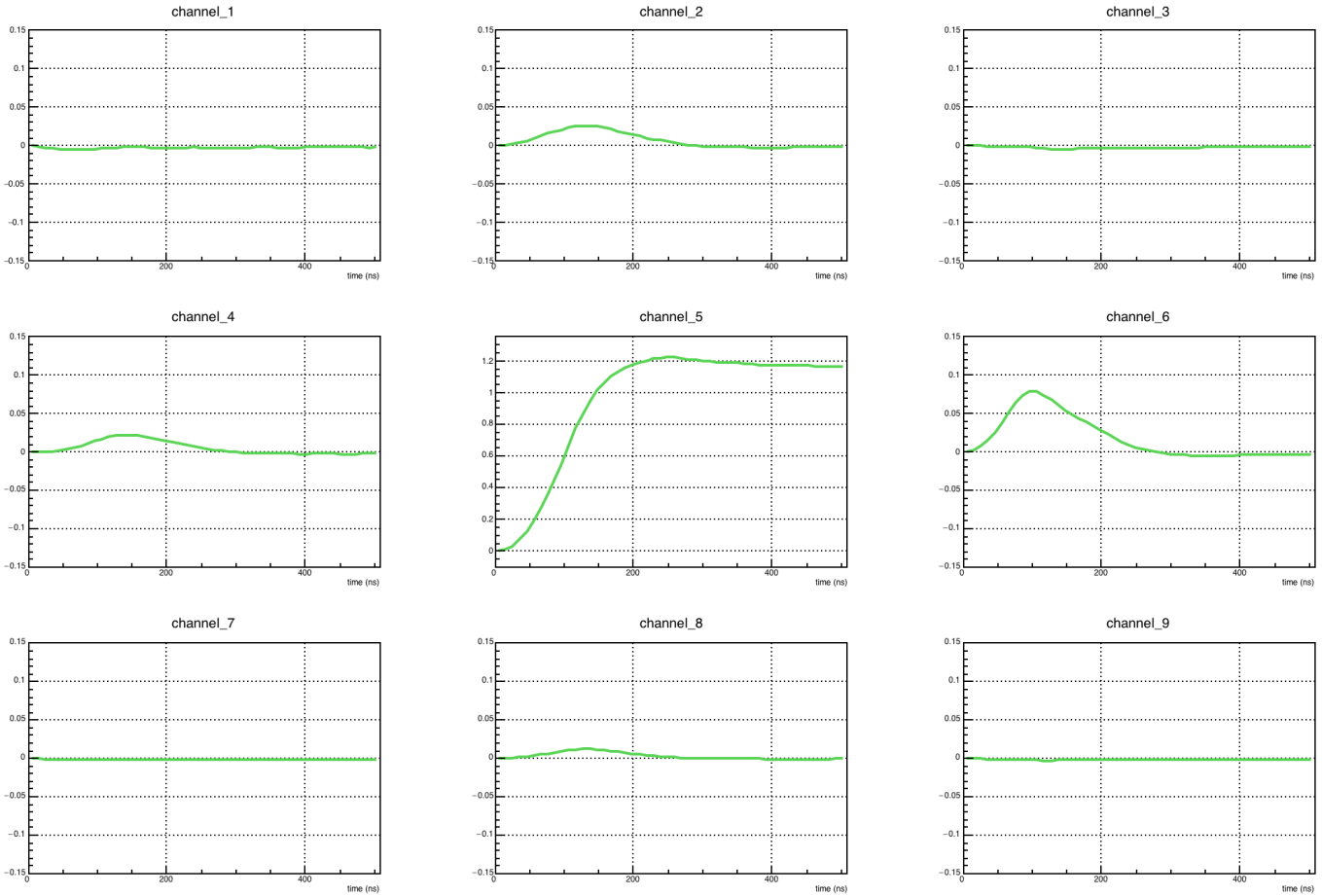
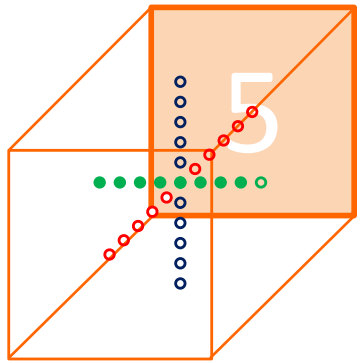
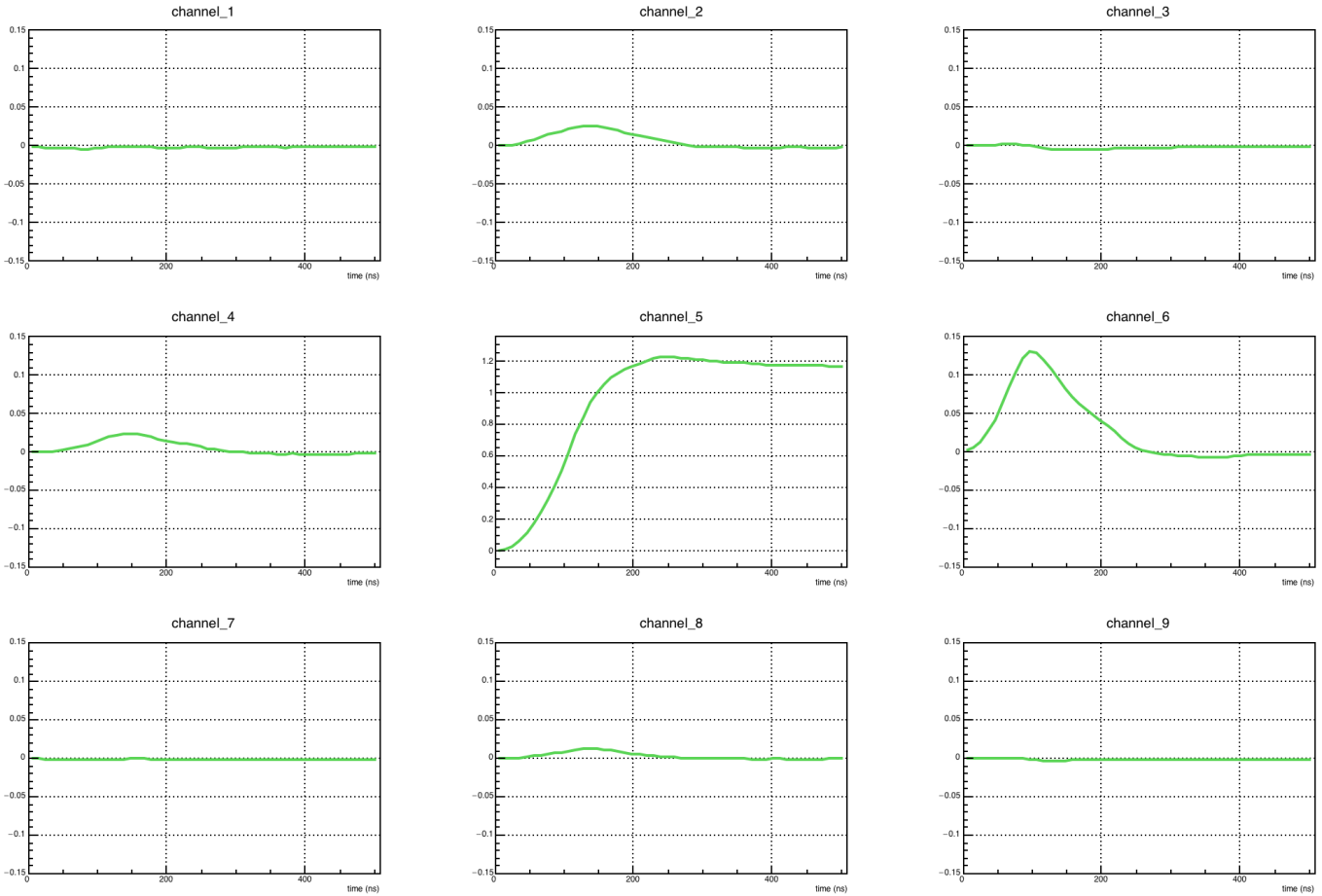
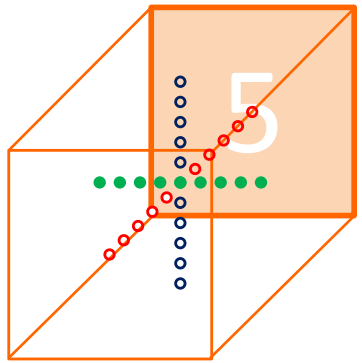




3D Pulse shapes along the X axis





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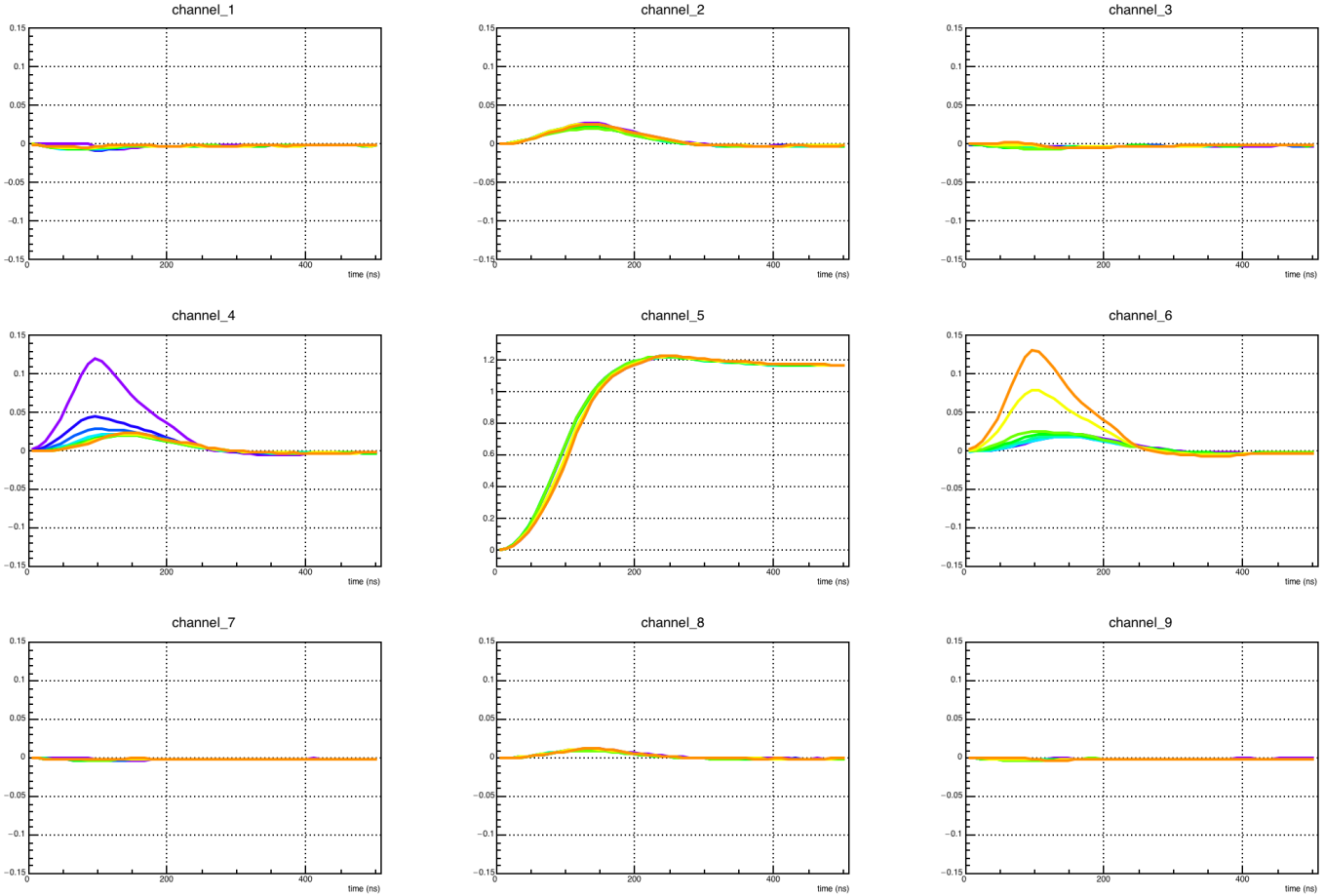
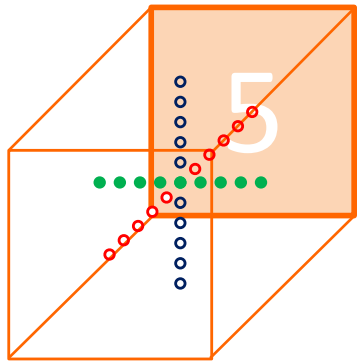
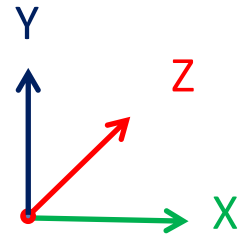
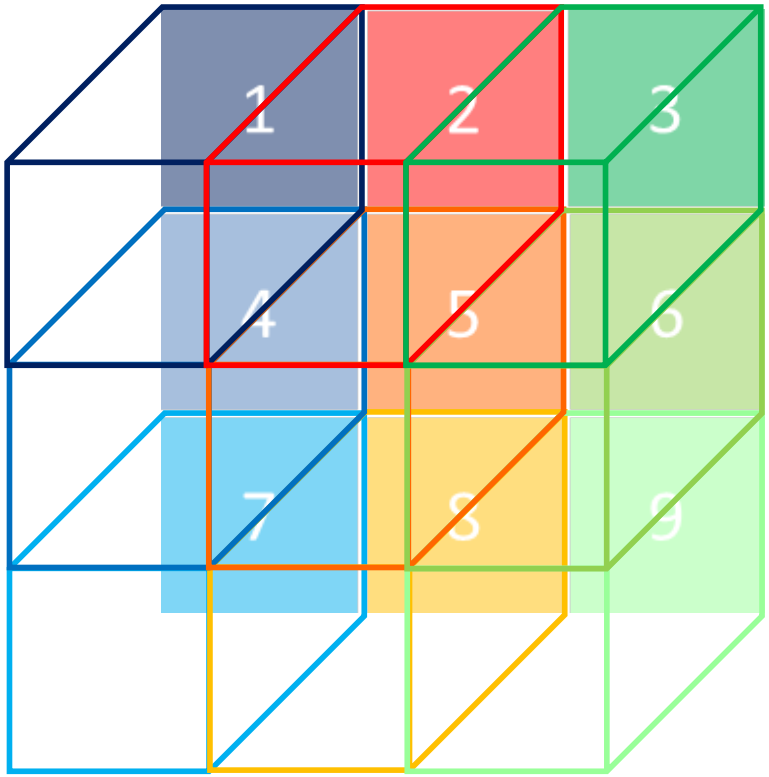
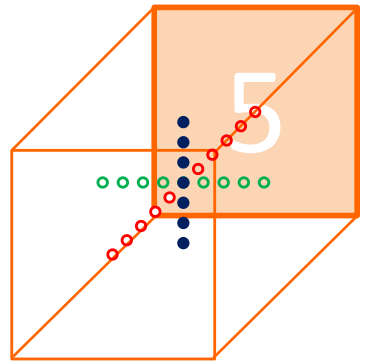




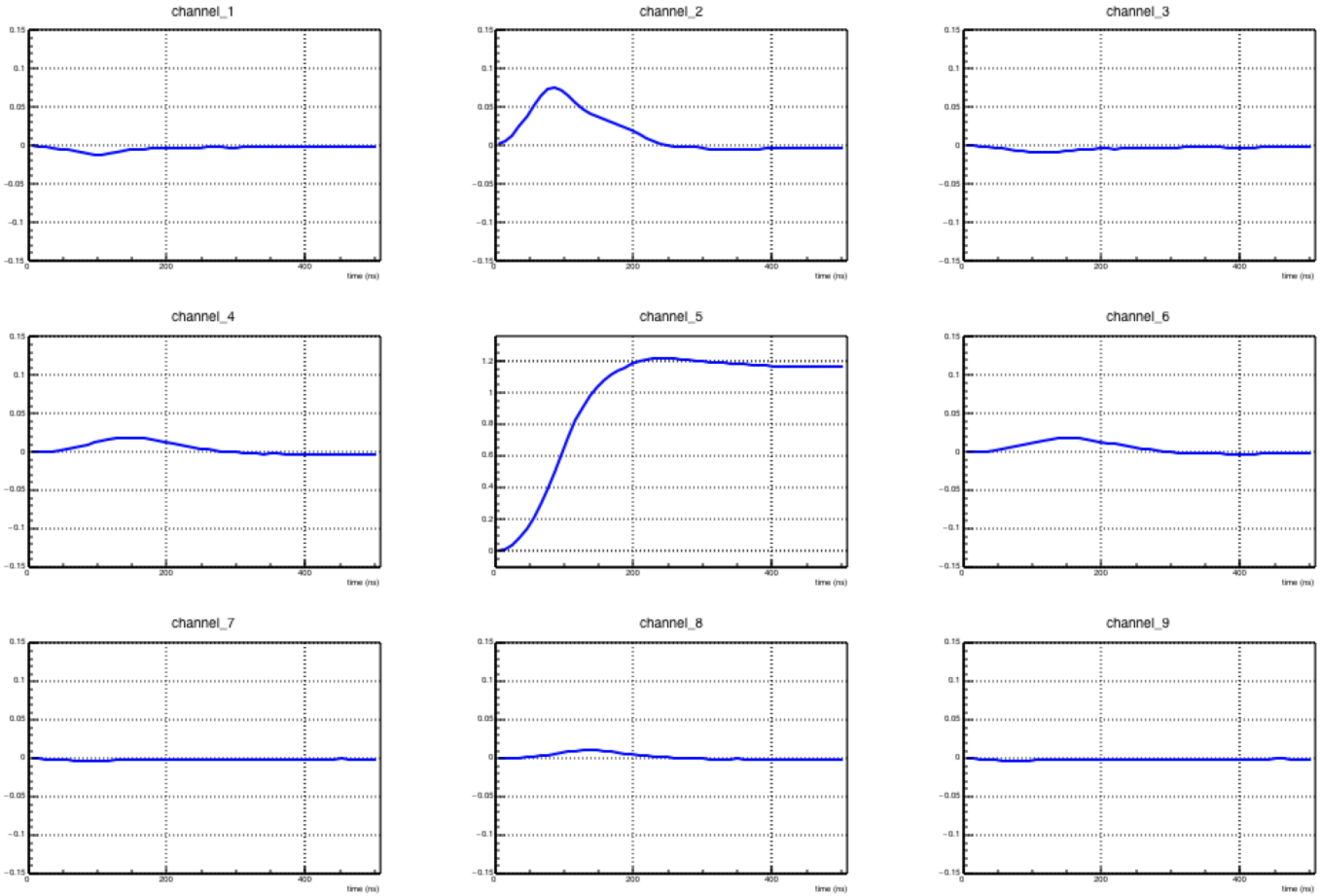
3D Pulse shapes along the Y axis

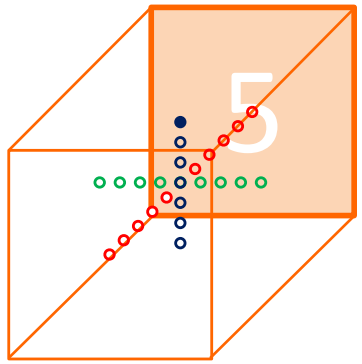




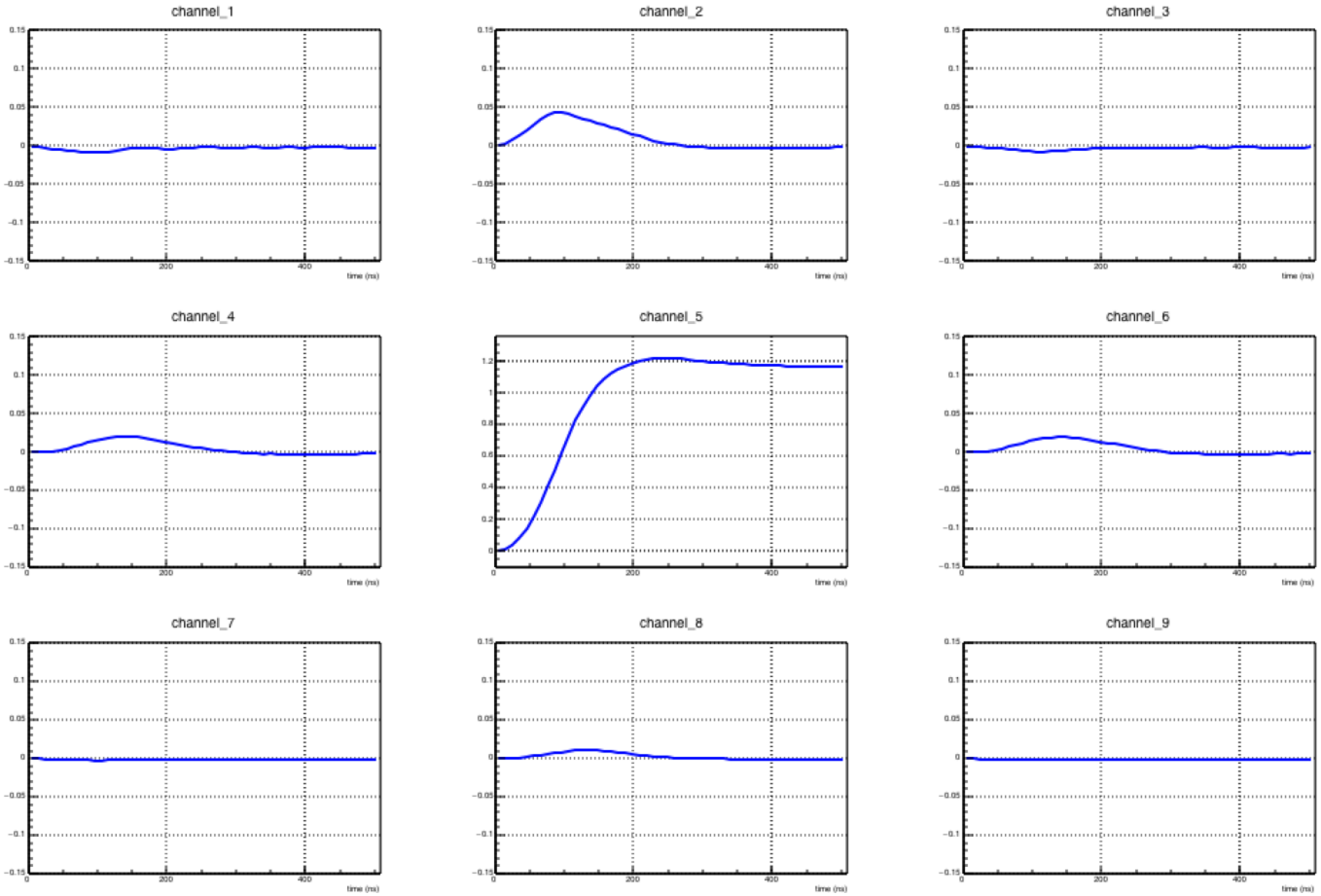


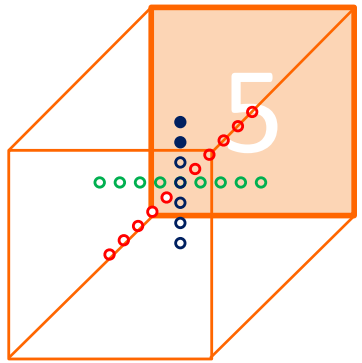
3D Pulse shapes along the Y axis



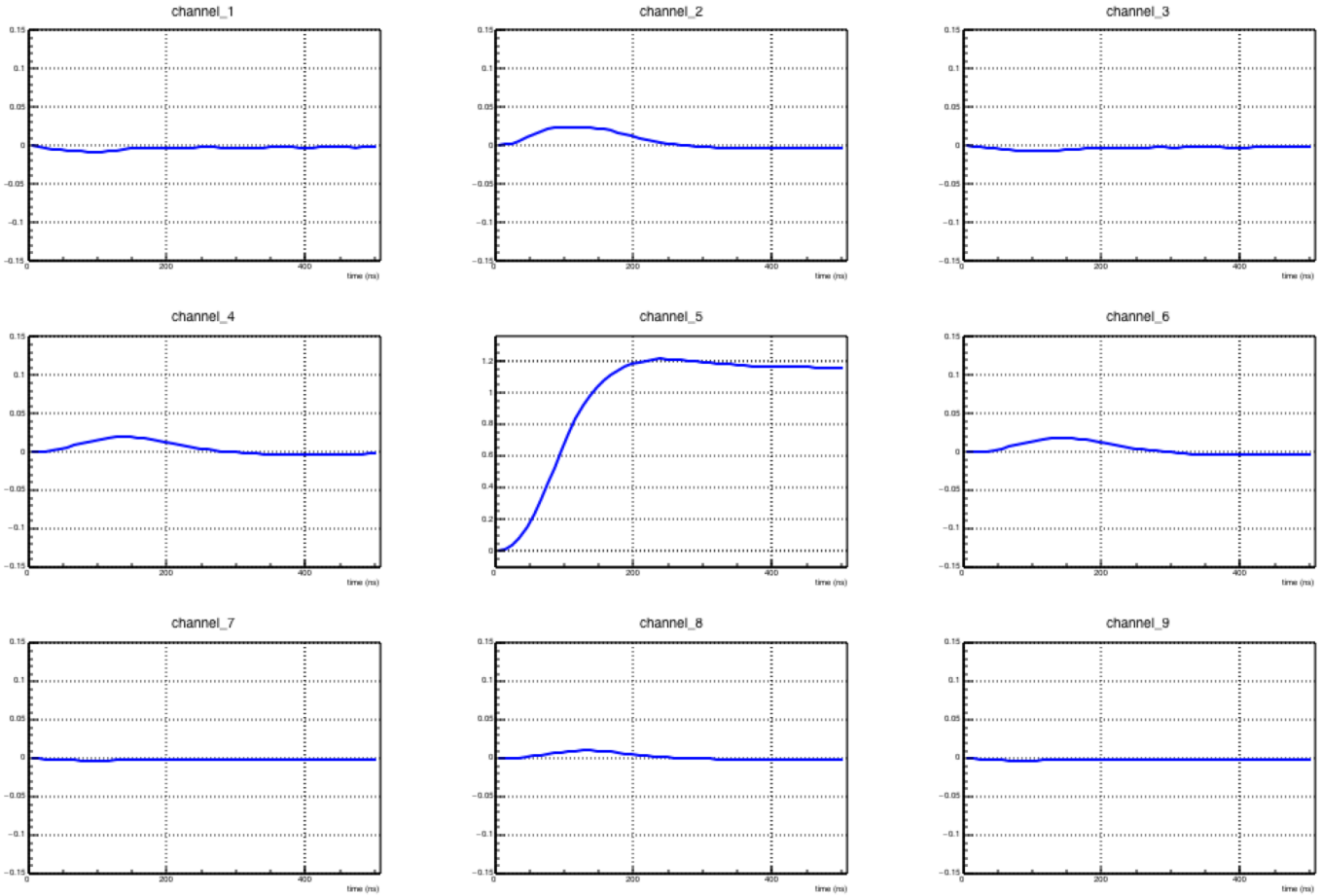


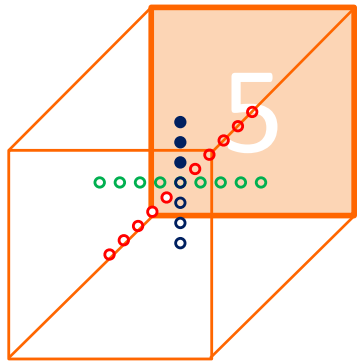
3D Pulse shapes along the Y axis



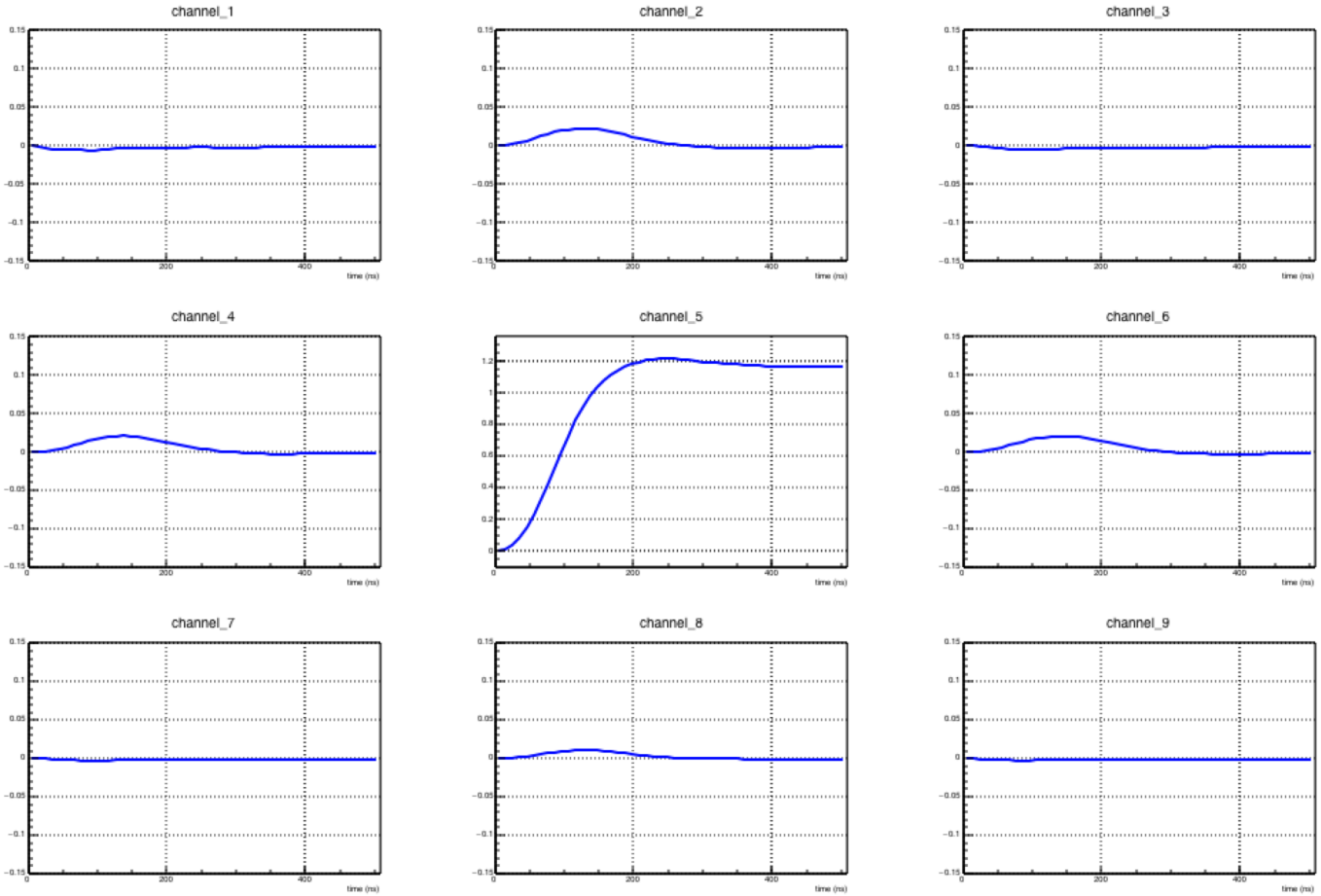


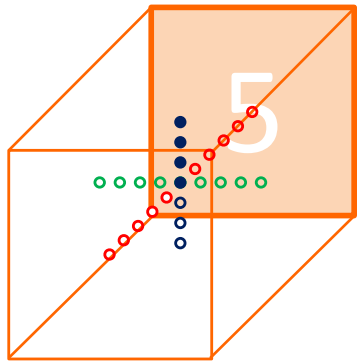
3D Pulse shapes along the Y axis



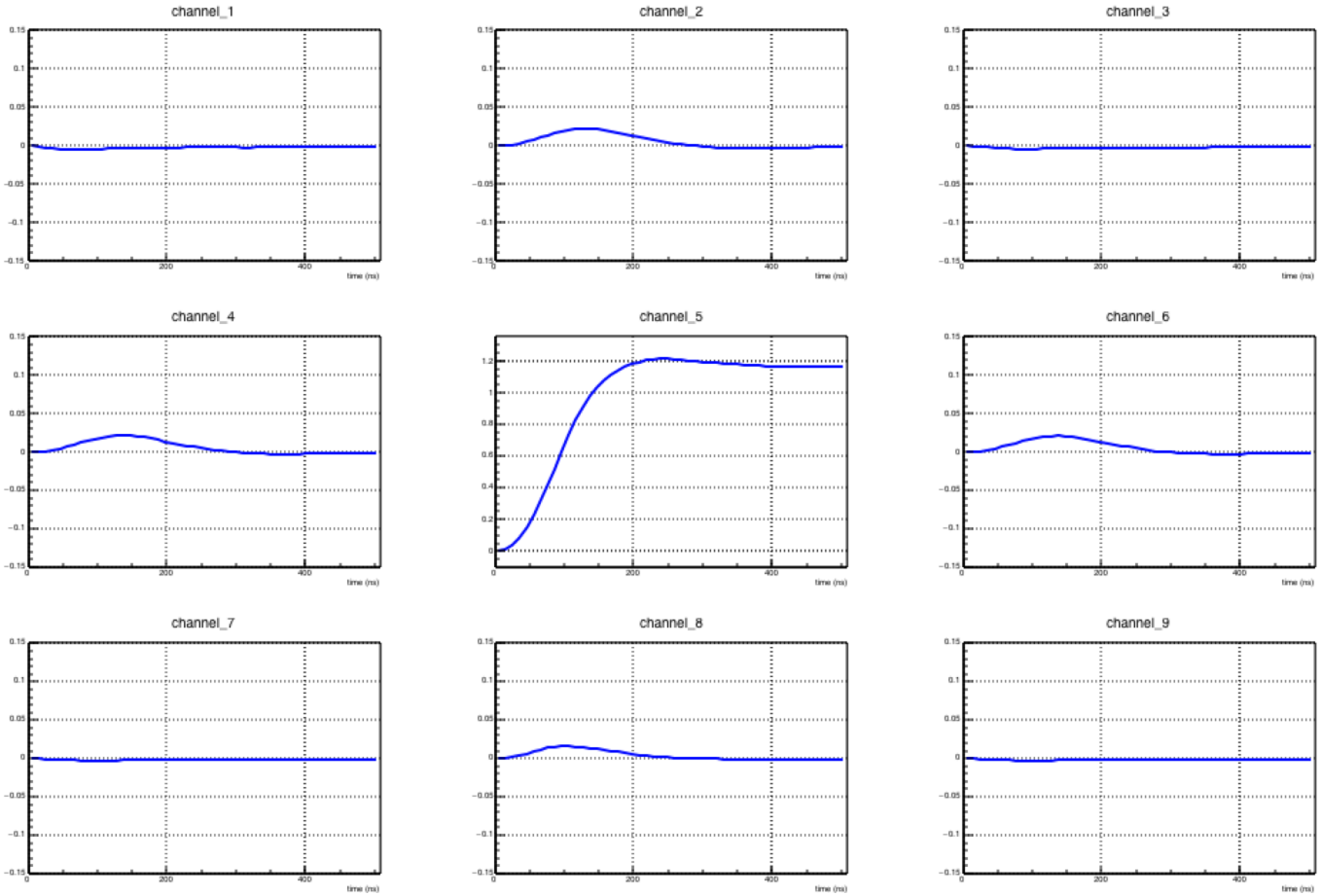


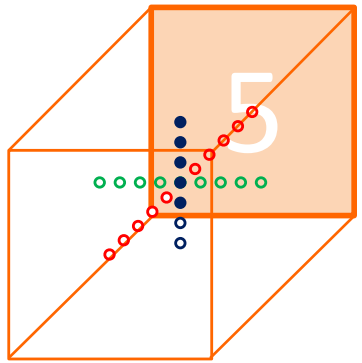
3D Pulse shapes along the Y axis



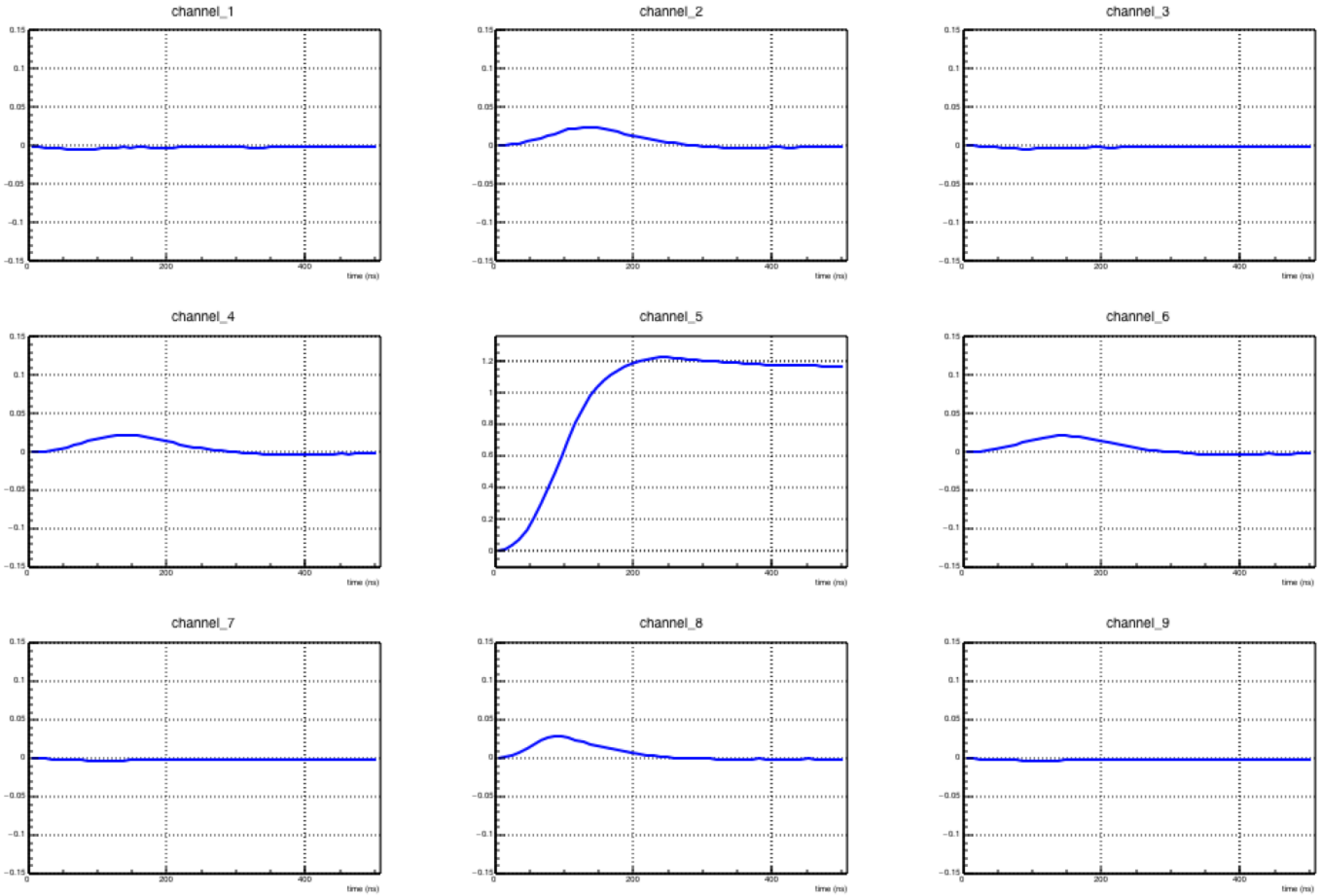


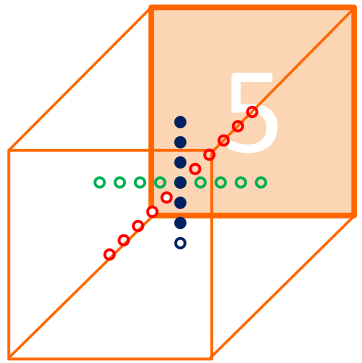
3D Pulse shapes along the Y axis



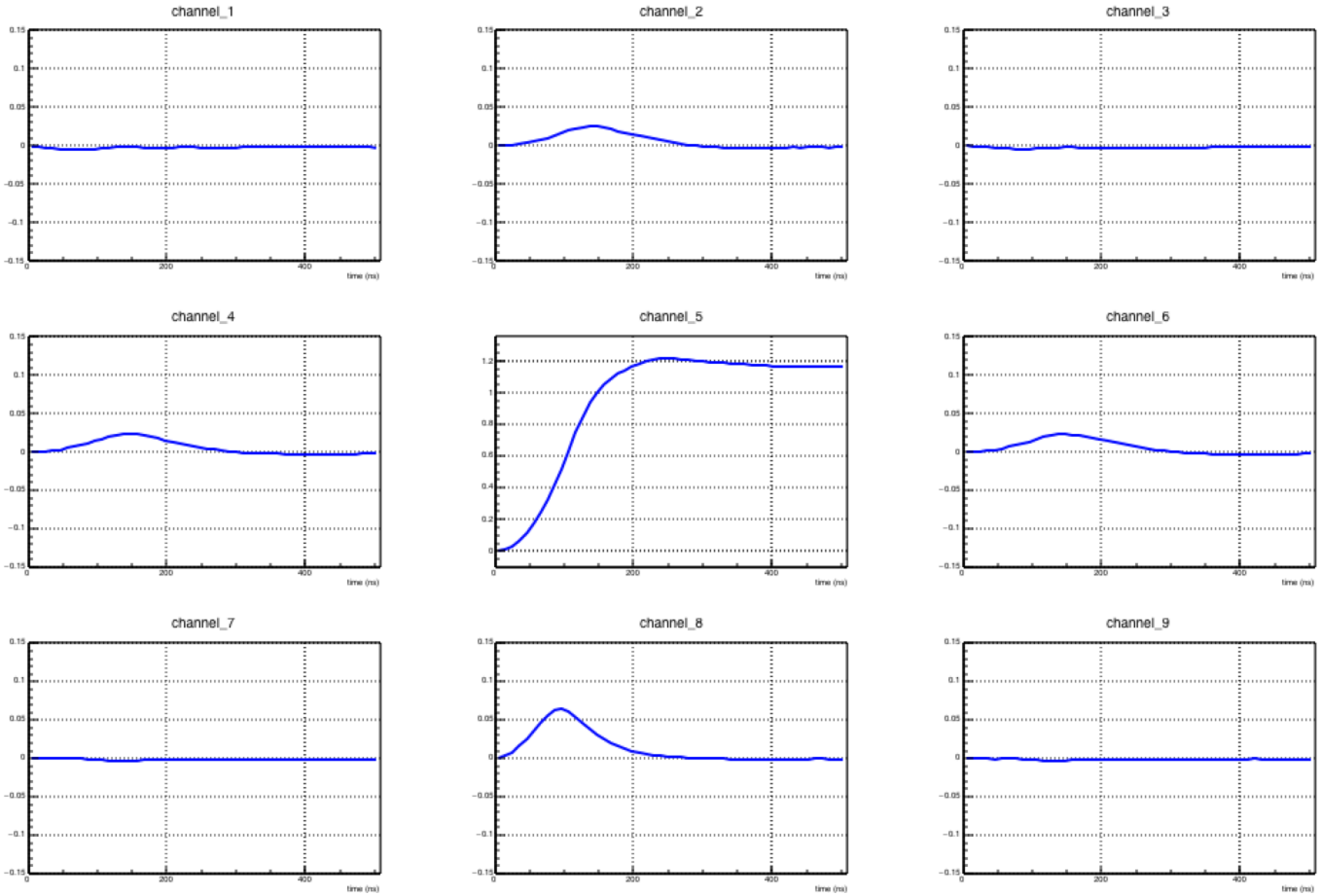


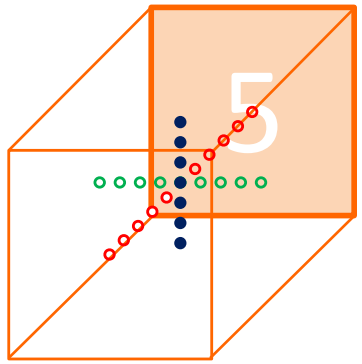
3D Pulse shapes along the Y axis



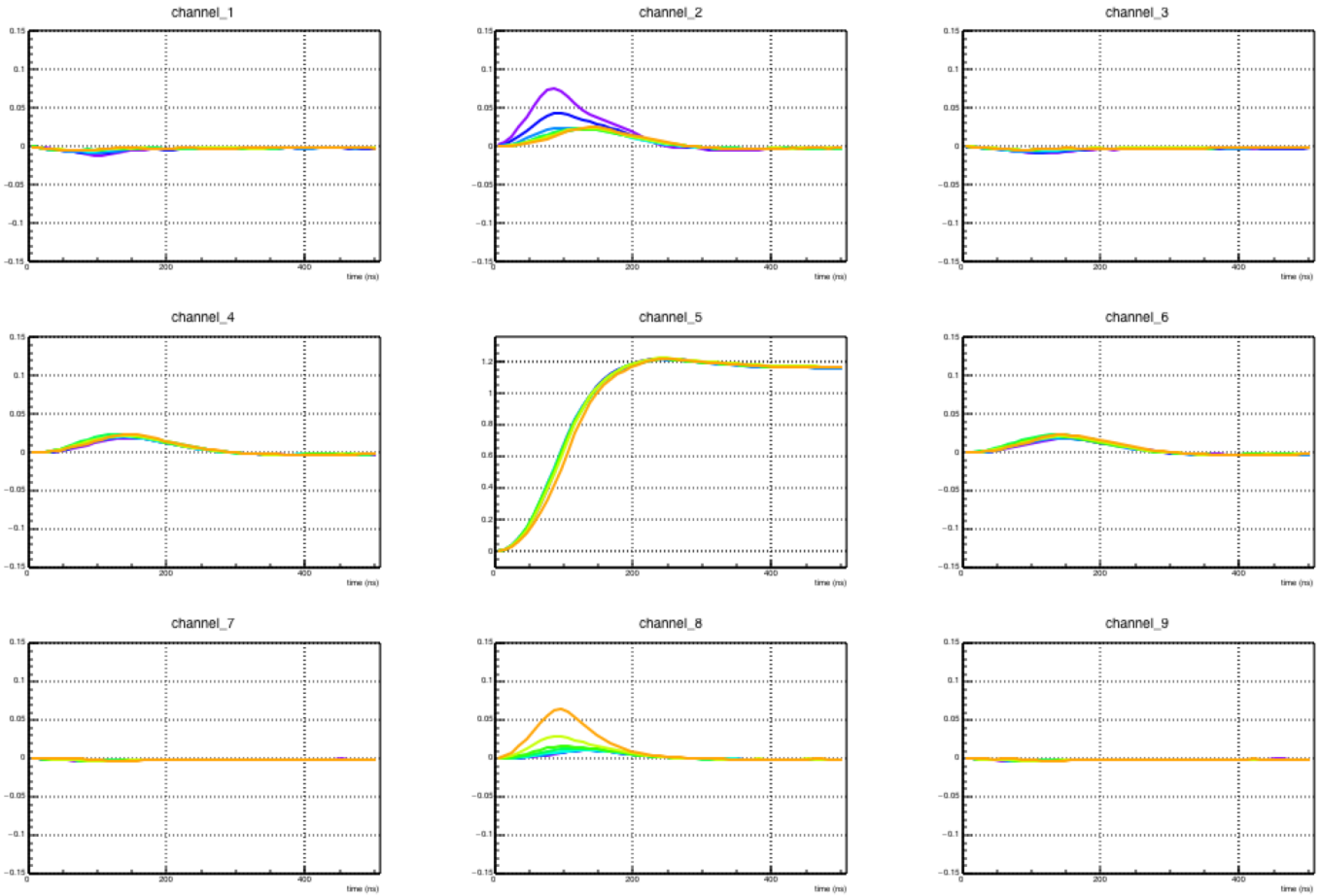


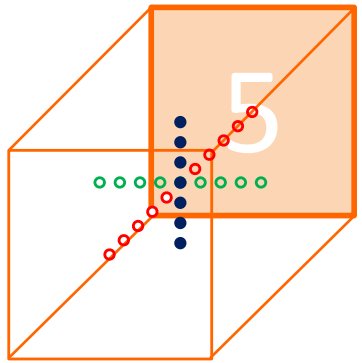
3D Pulse shapes along the Y axis





3D Pulse shapes along the Y axis

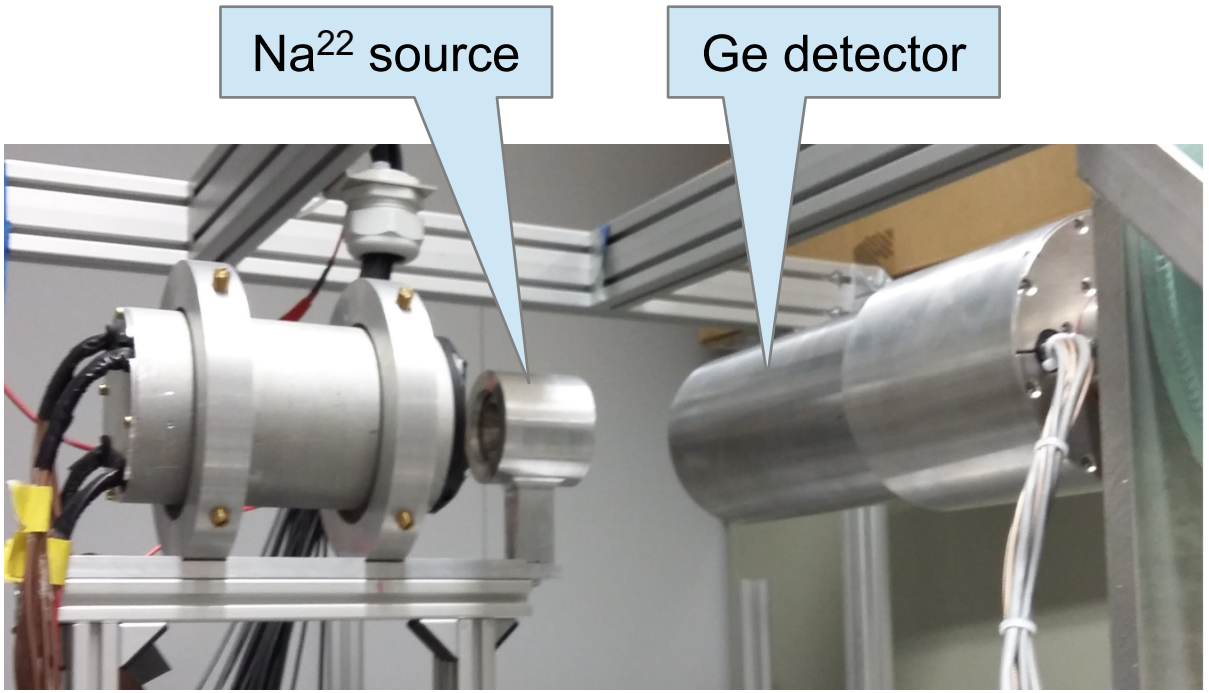




3D Pulse shapes

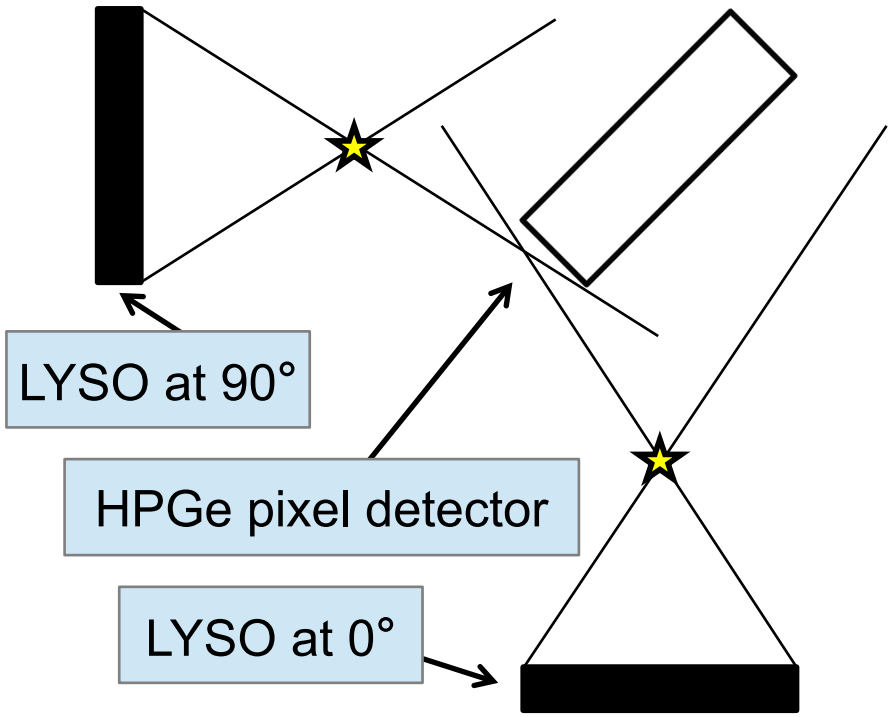
- One pulse-shape database of ~7000 crossing points has been produced
- The detector has been shutdown and dismounted
- A second database of the same detector will be performed for comparison. No differences should appear, demonstrating the reliability of our technique
- A new comparison with an other scanning table

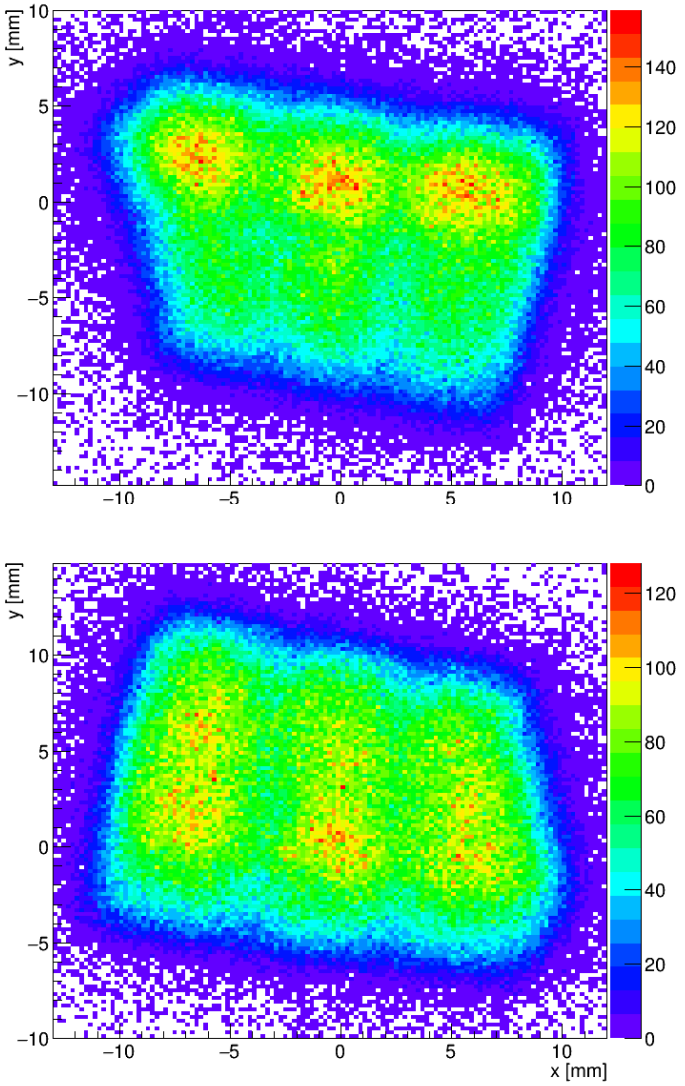
GSI scanner



T. Habermann courtesy

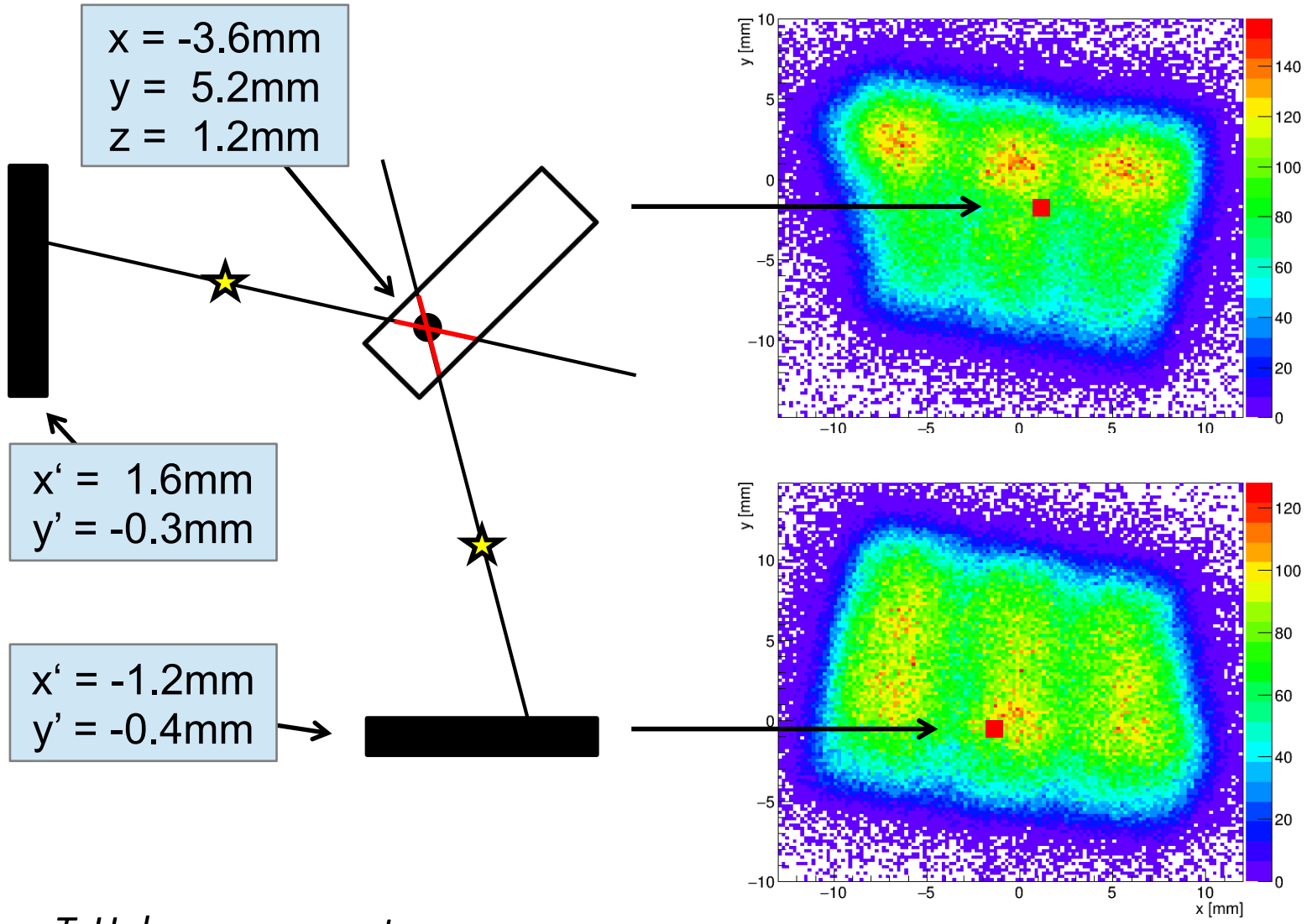
GSI Scanner: Side Views





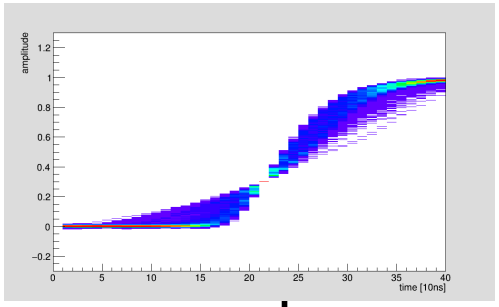
T. Habermann courtesy

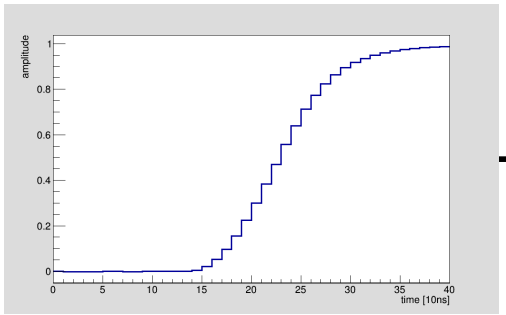
GSI Scanner: 3D -> 2D projection – Selecting the events to compare



T. Habermann courtesy

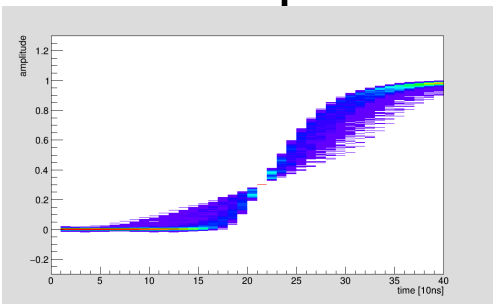
GSI Scanner: Pulse Shape Comparison

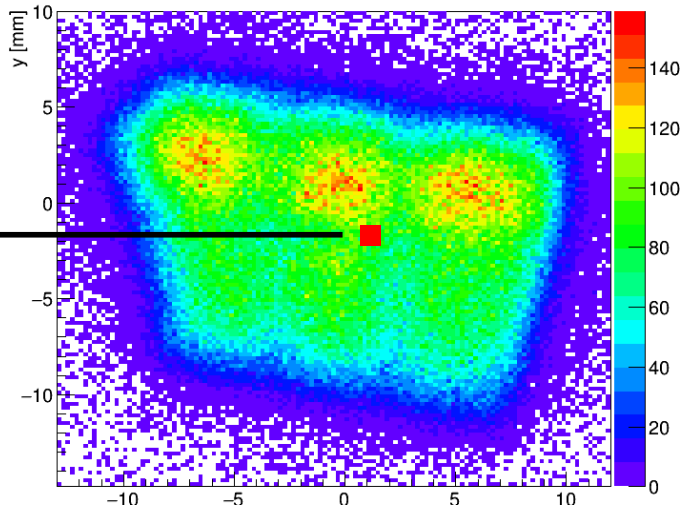


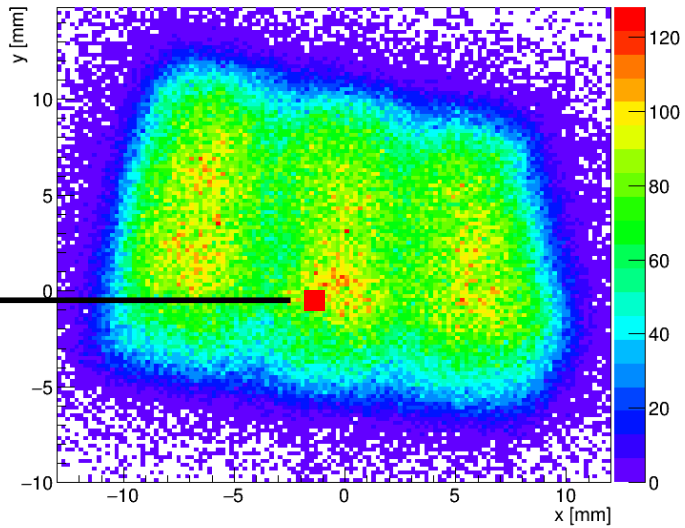


χ^2- comparison

average of 200 pulse shapes







T. Habermann courtesy

outlook

- comparison of the IPHC and GSI pulse-shape databases -> NIM paper
- scan of detectors: AGATA, Canberra, LNL prototypes, GERDA prototype, any other type
- Ge characteristic studies such as electron/hole mobilities,...