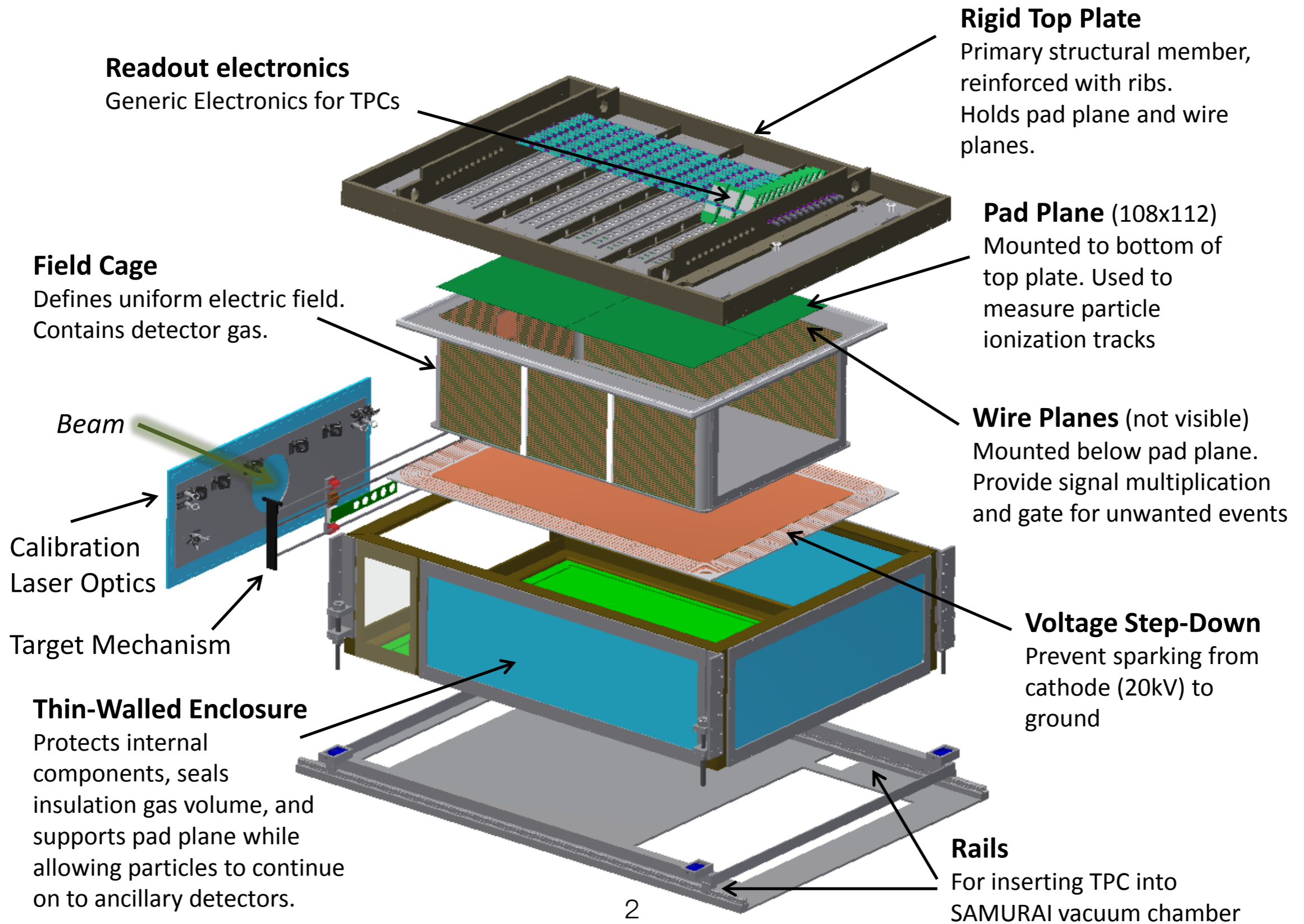


Status report of $S\pi$ RIT-TPC

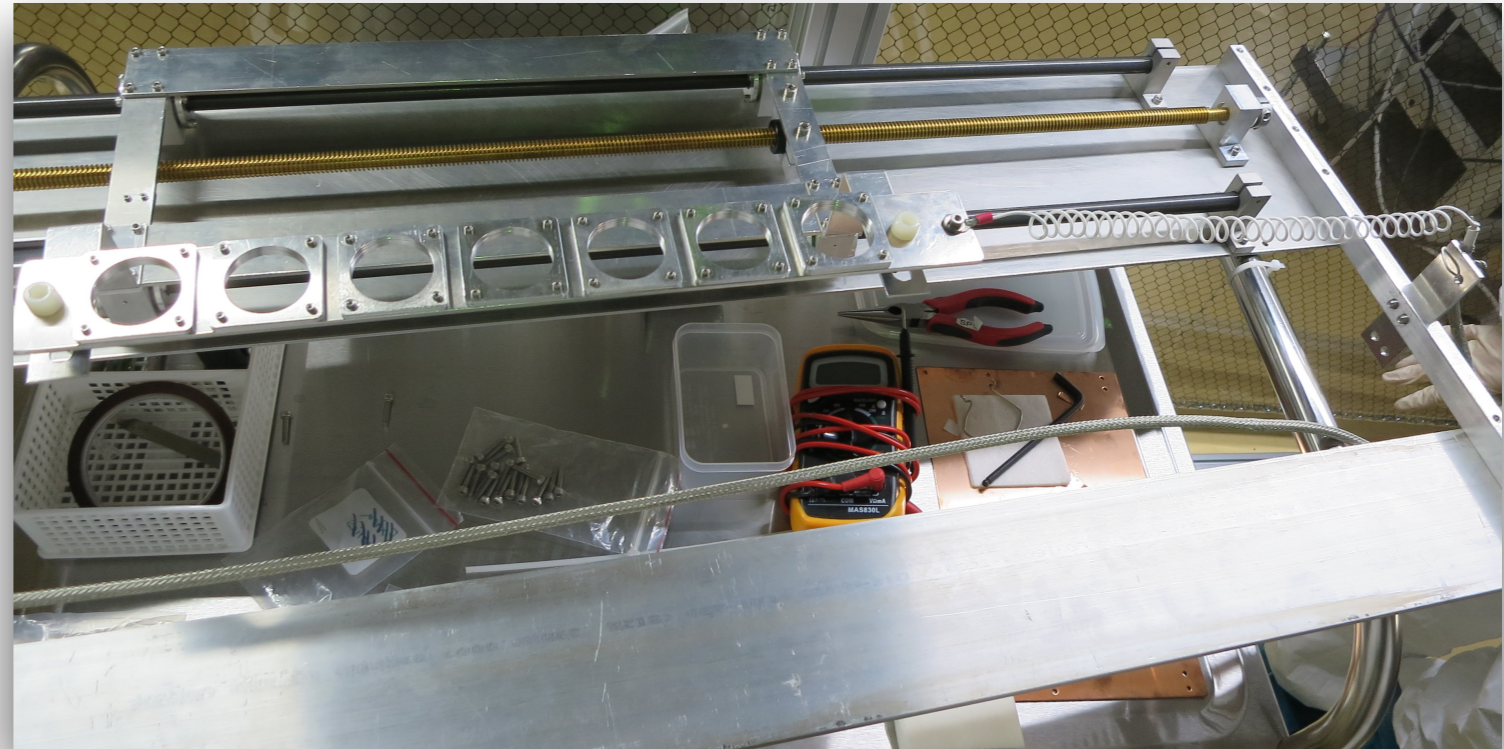
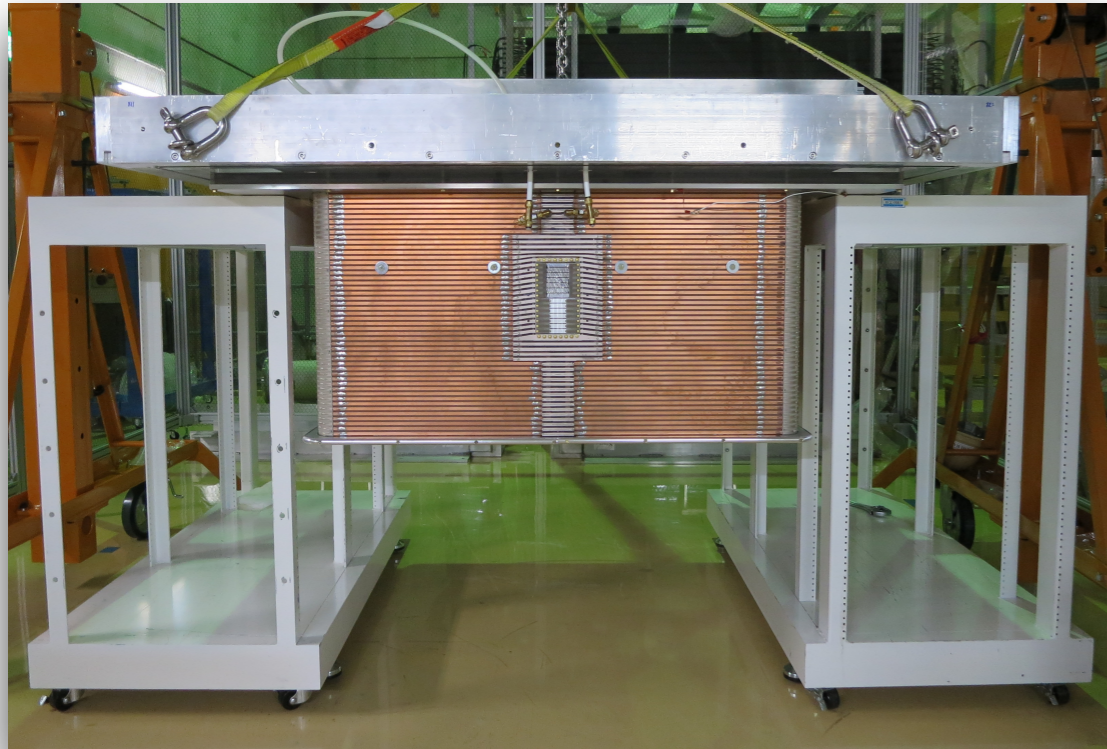
Genie Jhang
for $S\pi$ RIT Collaboration



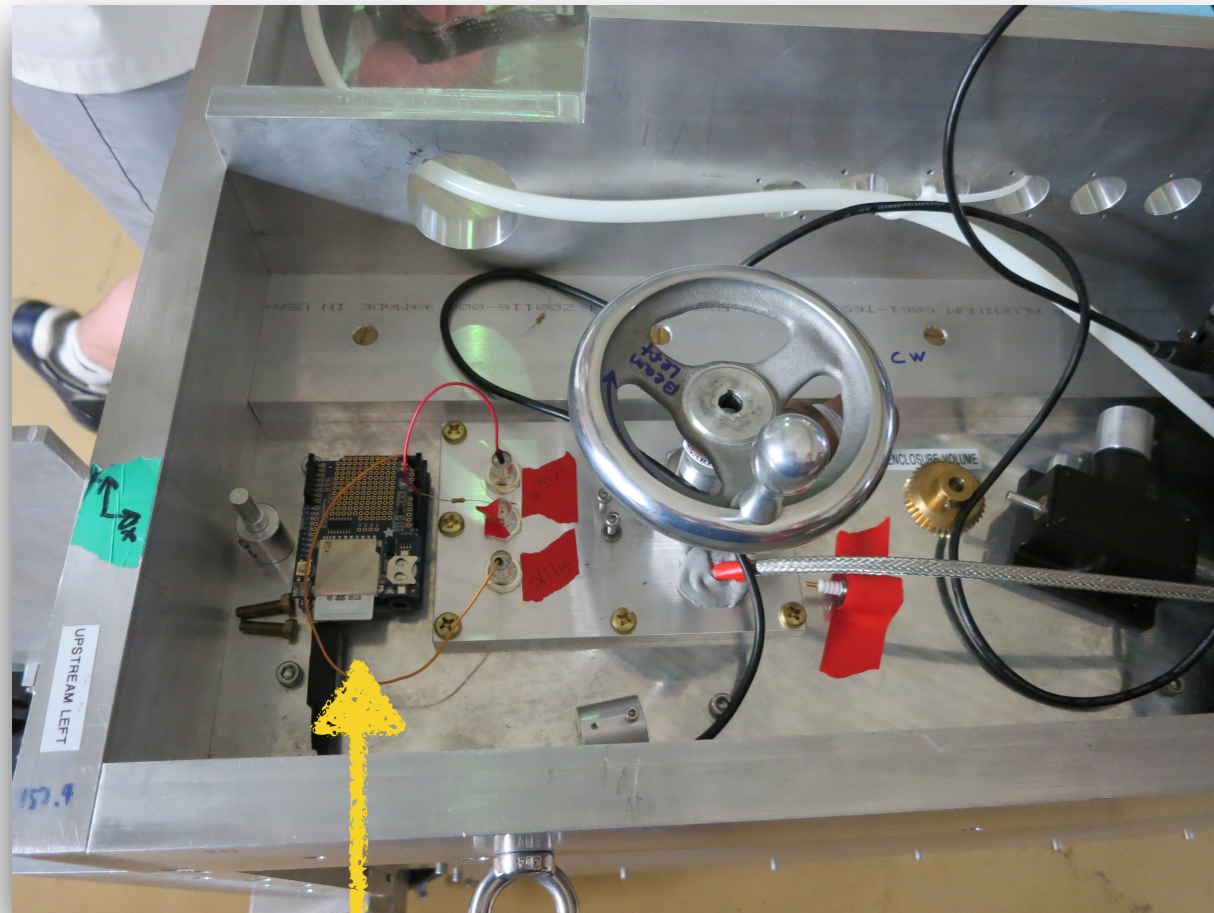
S π RIT-TPC



Target mechanism



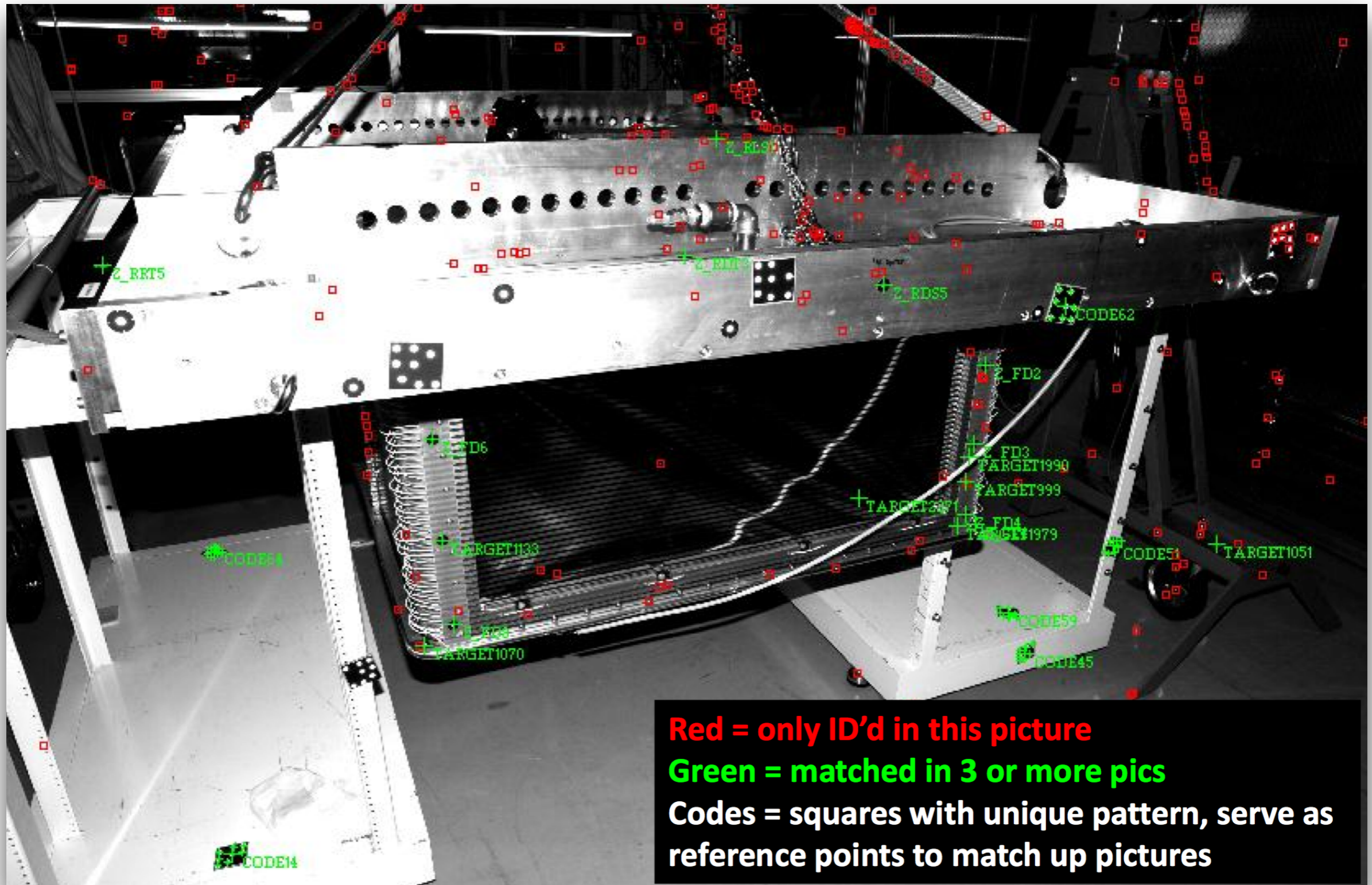
Target mechanism



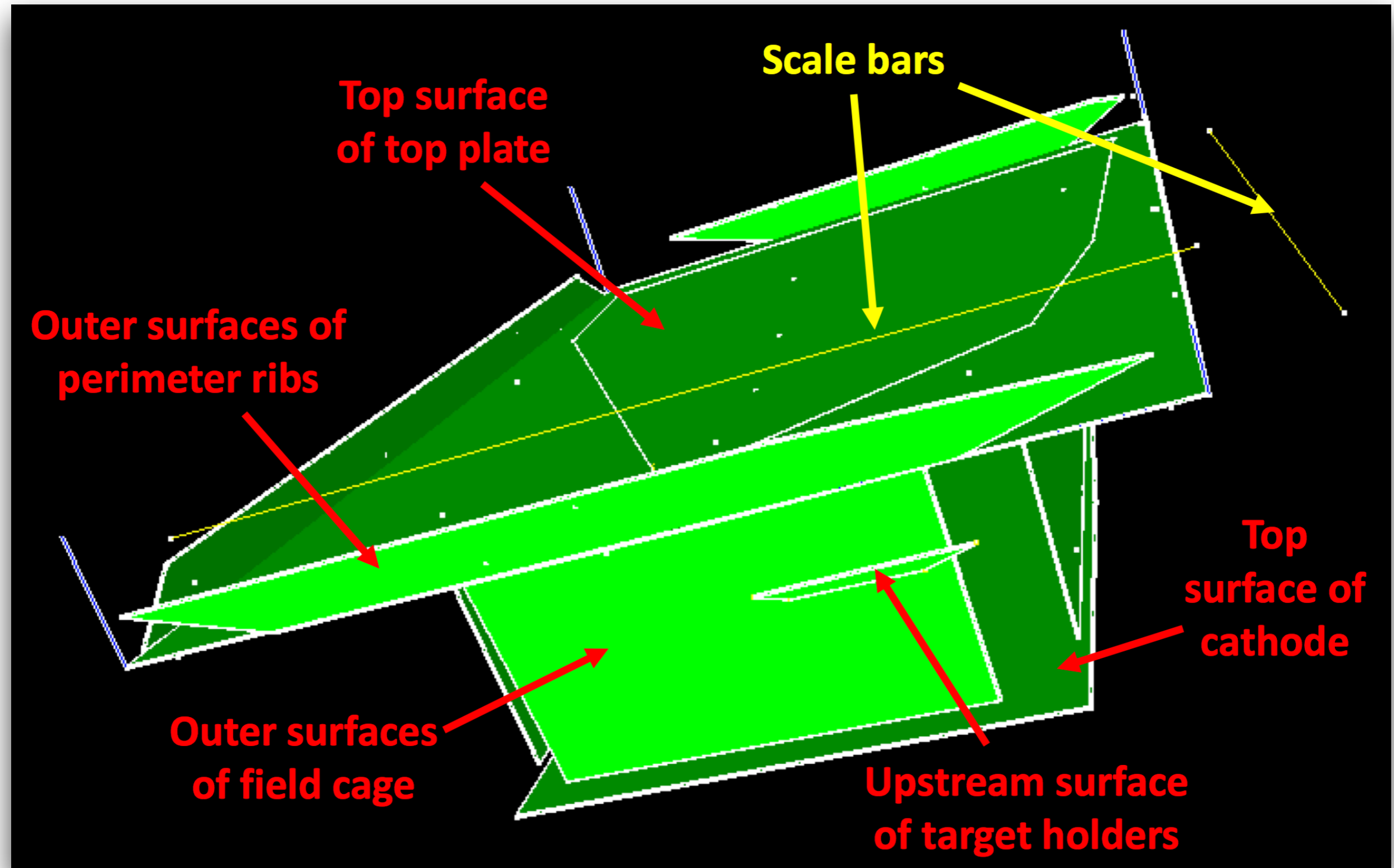
Arduino Due
for controlling and logging

- Possible to move left and right
- Will be upgraded to move back and forth.
- Target position measured with linear potentiometer and 12bit ADC.
- Position information is logged over wireless network via Arduino.

Photogrammetry



Photogrammetry




Photogrammetry

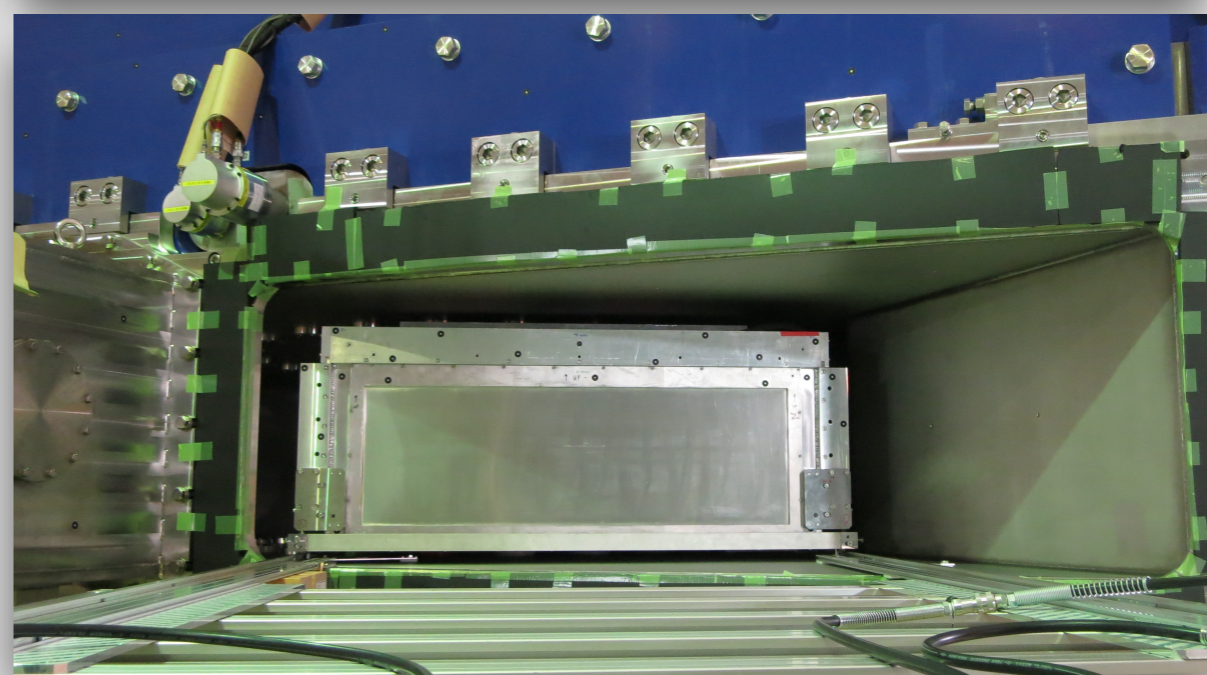
Plane	RMS (mm)
Upstream rib	0.036
Right rib	0.056
Left rib	3.975
Downstream rib	4.063
Upstream FC wall	0.051
Downstream FC window frame	0.174
Left FC wall	0.325
Right FC wall	0.375
Top plate	0.125
Cathode	0.042
Target ladder	0.007

Possible reasons for large rms

- Limited number of points
- Misidentification of points

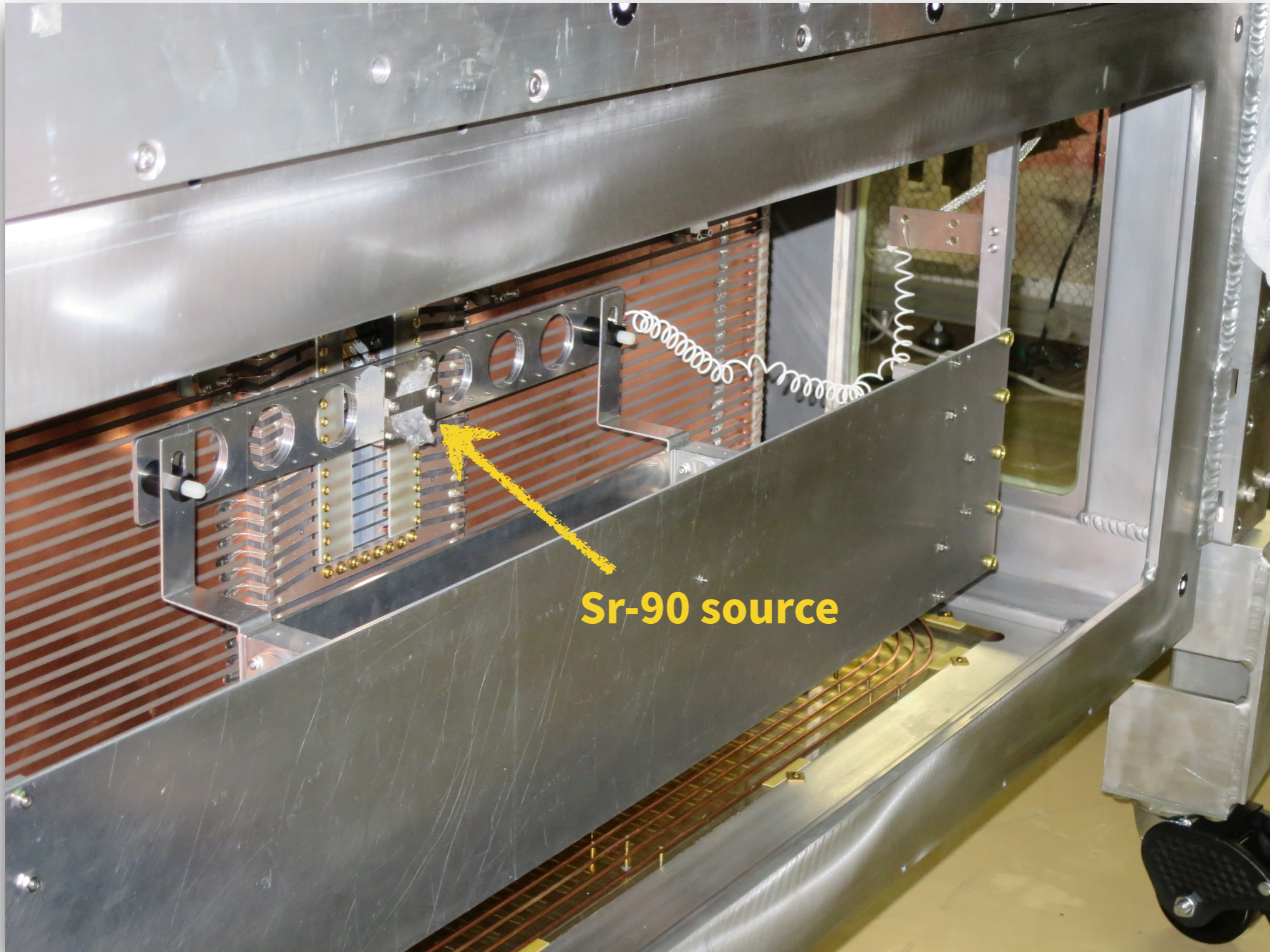


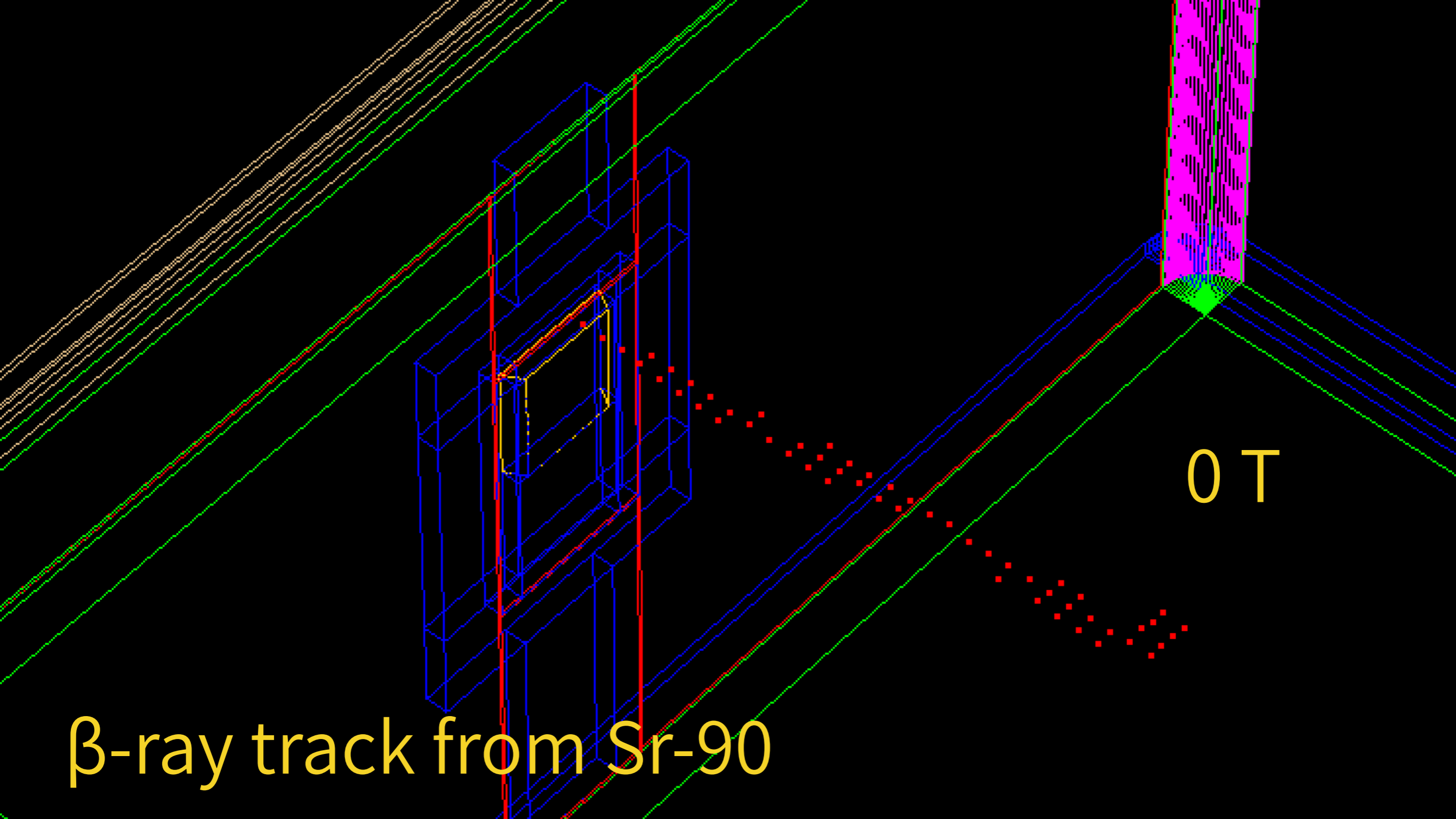
Insertion of TPC



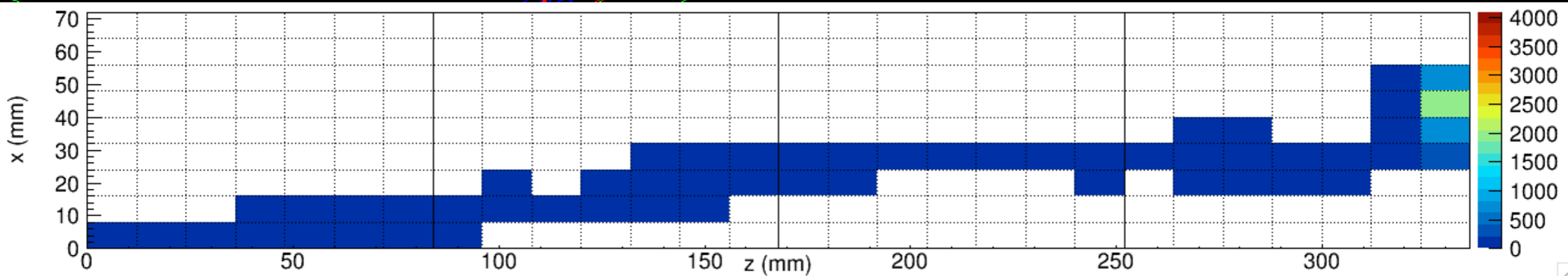
<https://www.youtube.com/watch?v=SAGHOD5LrGw>

DAQ test with Sr-90 under B-field



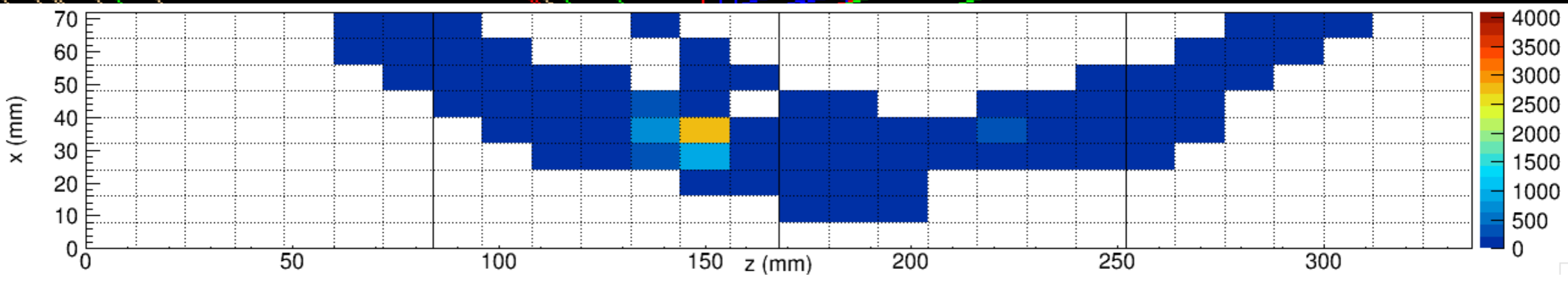


β -ray track from Sr-90

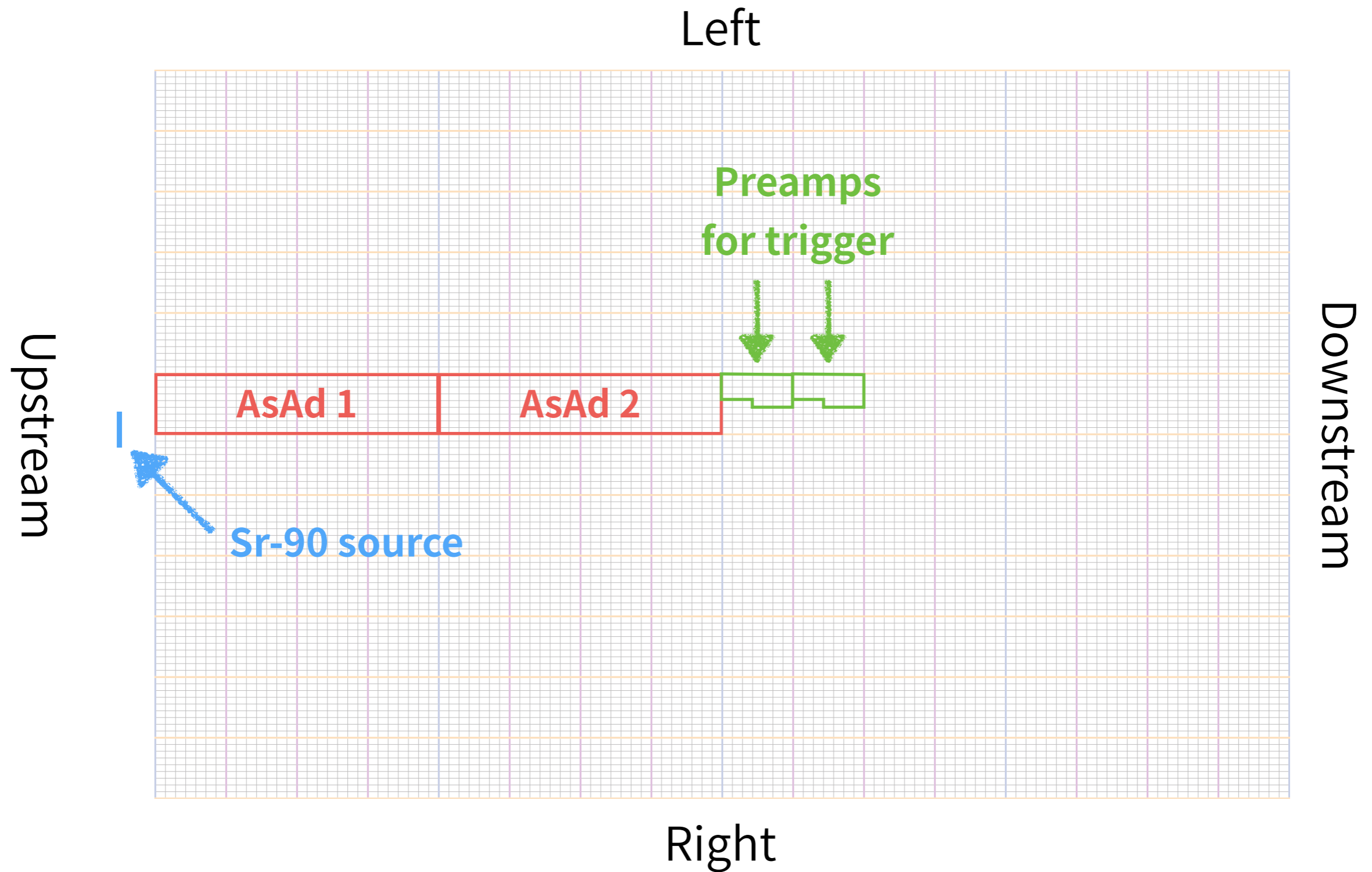


0.3 T

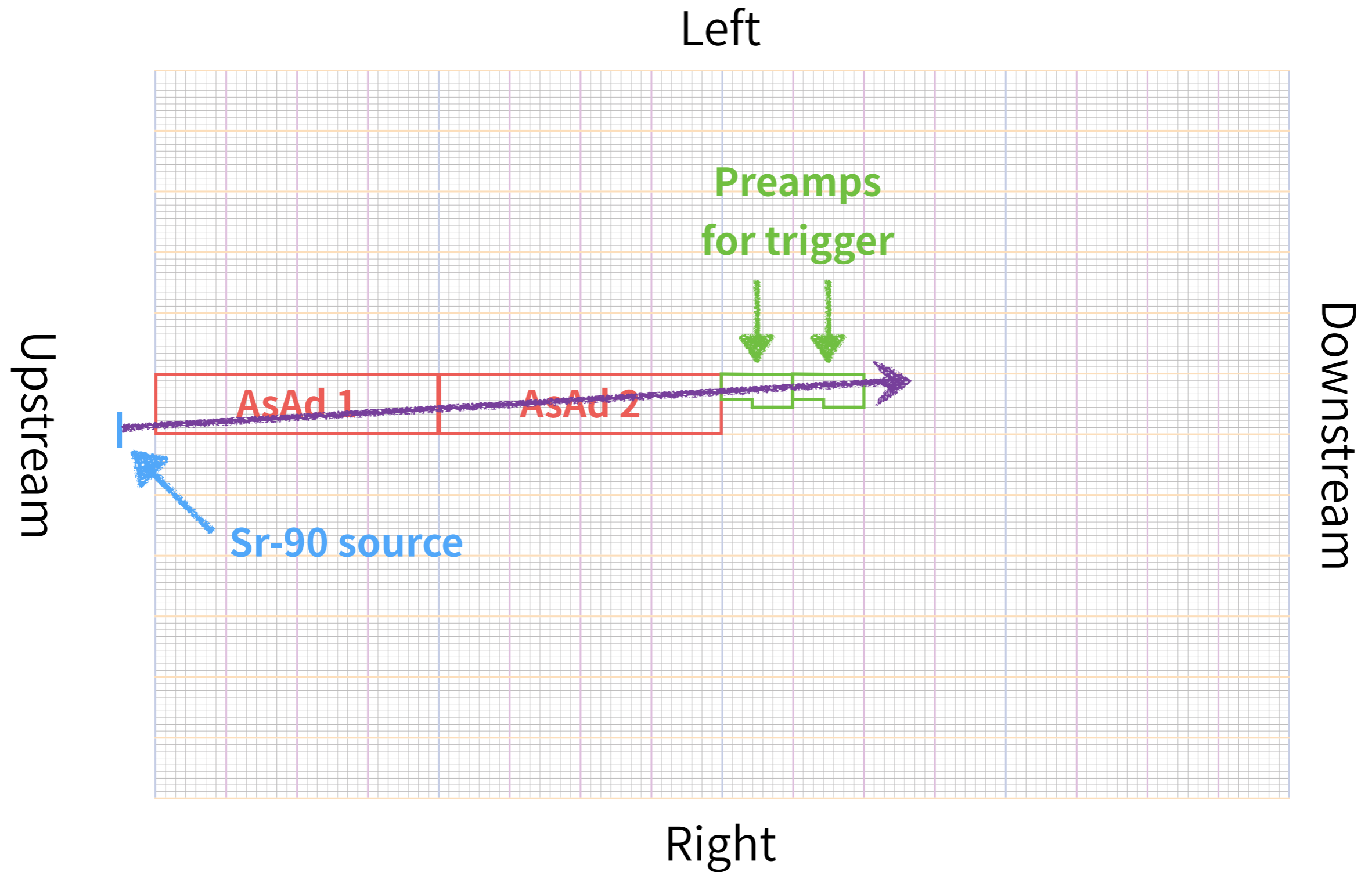
Unknown charged particle
circling inside the TPC



Sr-90 test with 2 AsAds



Sr-90 test with 2 AsAds

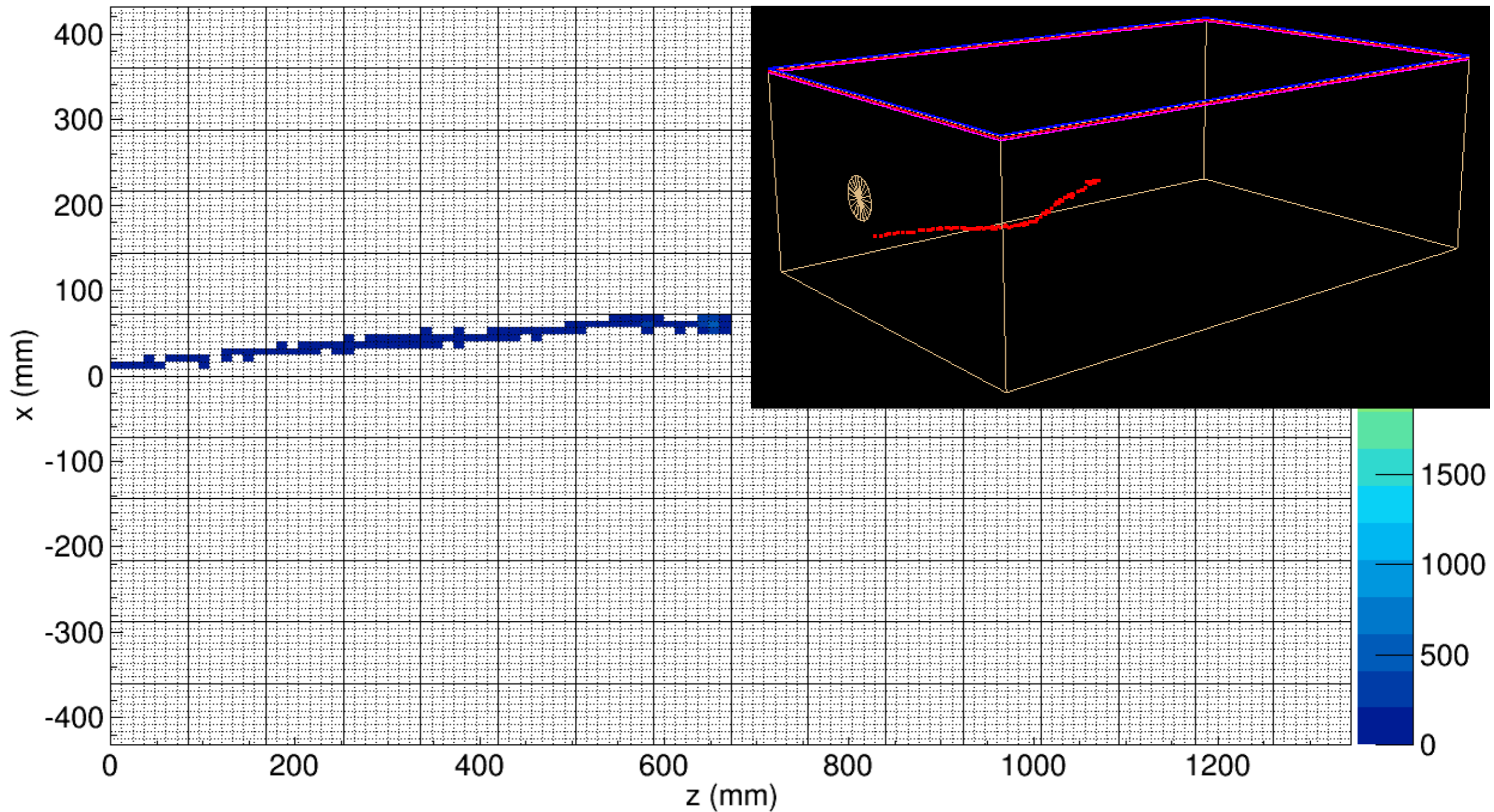


Sr-90 test with 2 AsAds



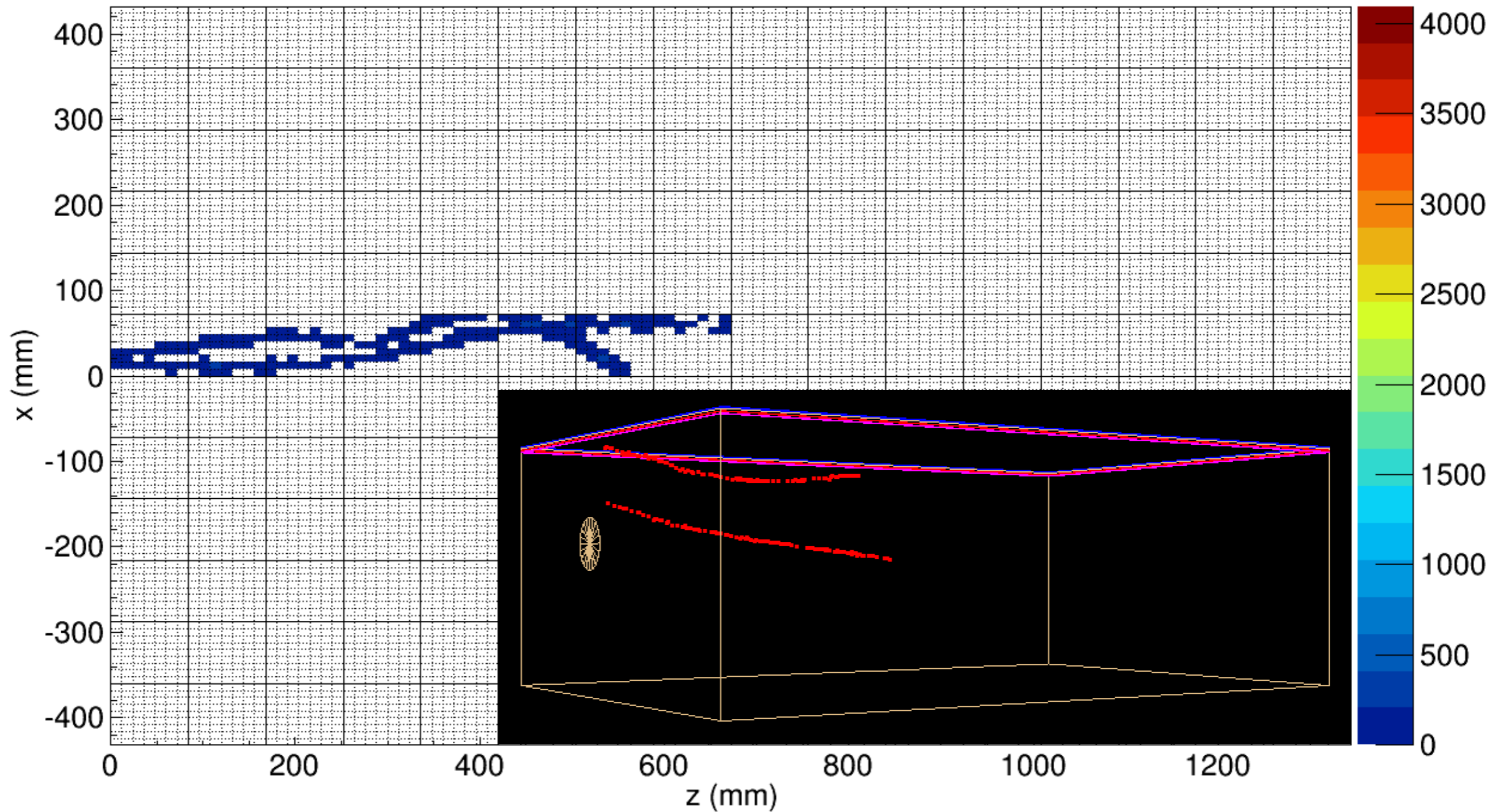
Sr-90 test with 2 AsAds

SpiRIT Pad Plane

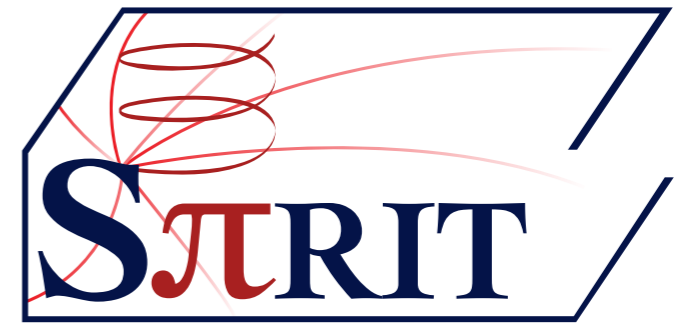


Sr-90 test with 2 AsAds

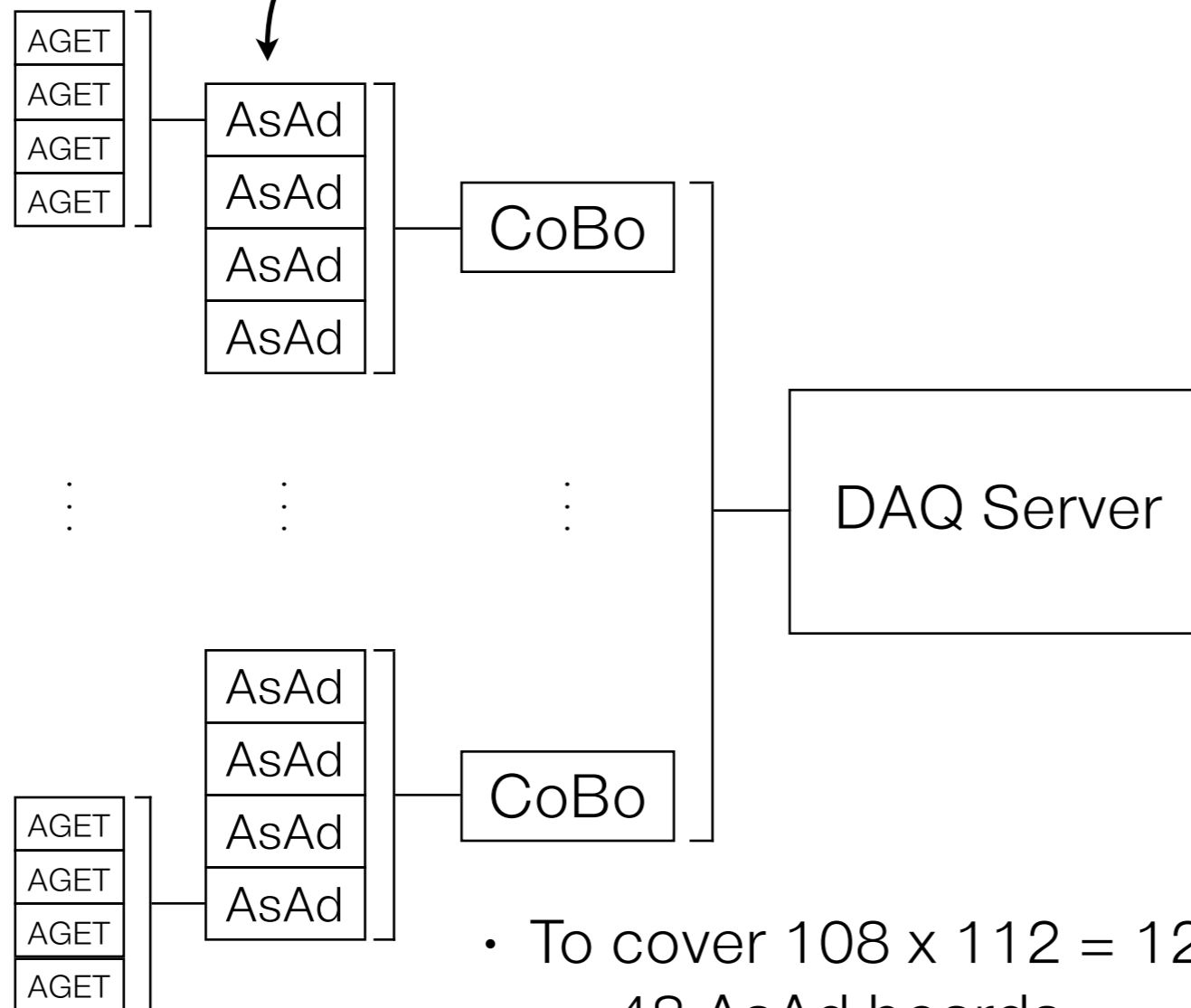
SpiRIT Pad Plane



DAQ System of



- 1 AGET chip handles 64 channels.
- 1 AsAd contains 4 AGET chips.

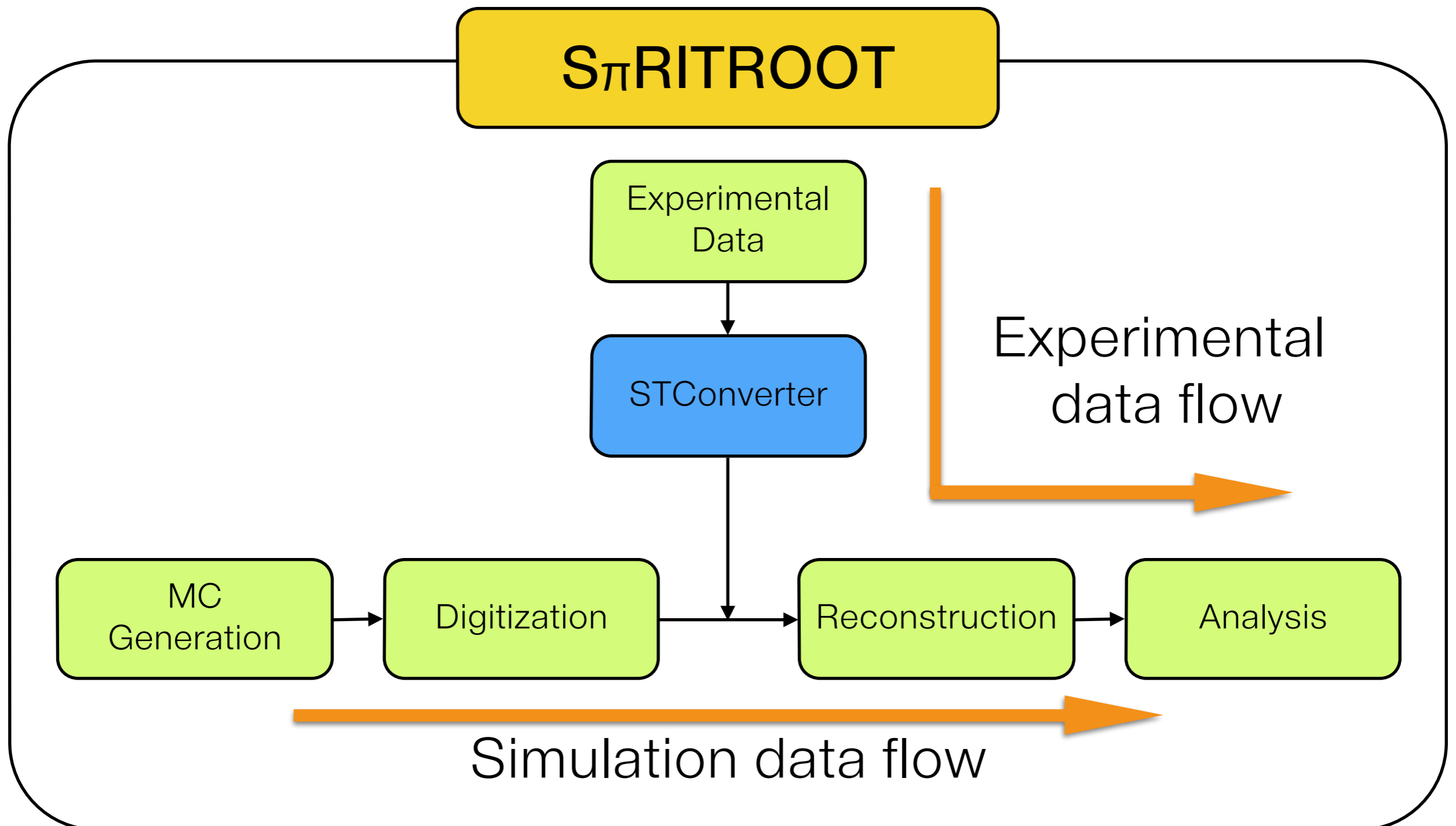


- NARVAL is used for merging data from multiple CoBos.

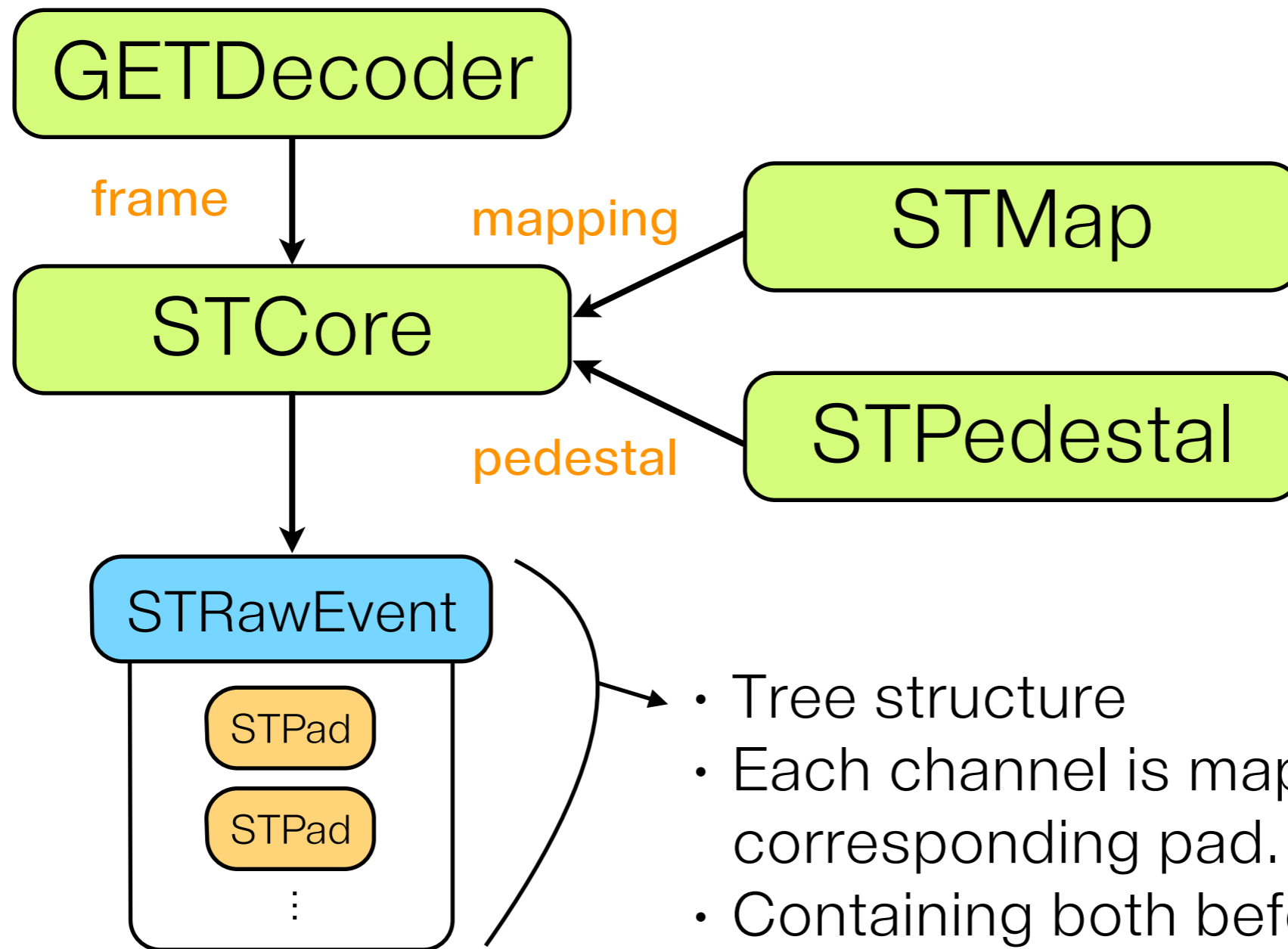
- To cover $108 \times 112 = 12,096$ pads, we use
 - 48 AsAd boards
 - 12 Cobos

SπRITROOT

- Analysis package based on FAIRROOT system.



STConverter



- Tree structure
- Each channel is mapped to the corresponding pad.
- Containing both before and after pedestal subtracted ADC values for later use.

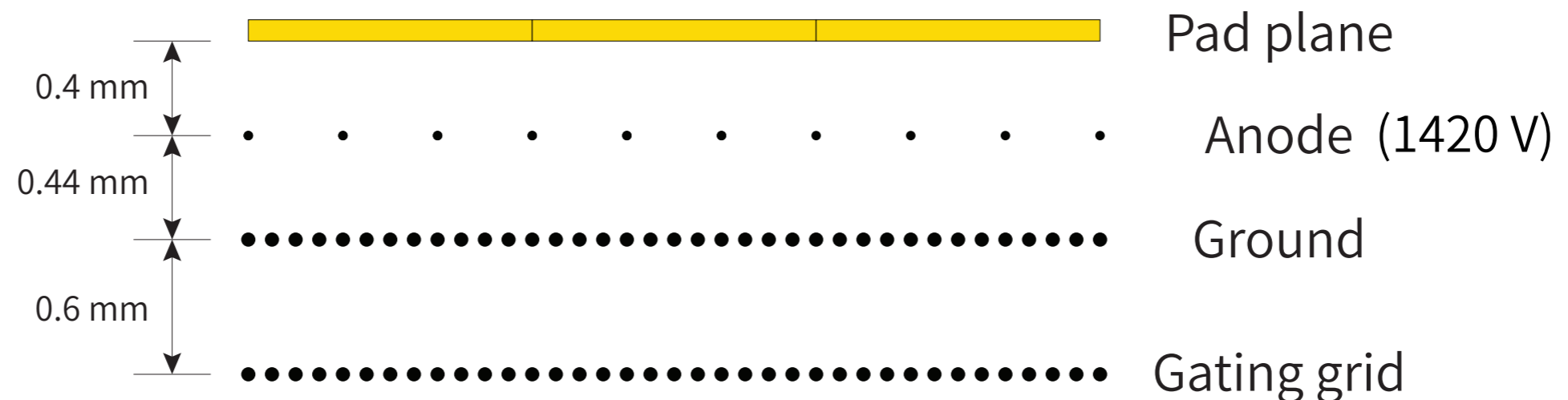
Thank you!



Backup

Design parameters

Pad plane area	1344 mm × 864 mm
Number of pads	12,096 (112 × 108)
Pad size	12 mm × 8 mm
Drift distance	49.57 mm
E-Field	120 V/cm
Drift velocity	5 cm/μs
dE/dx range	Z=1-8 (π, p, d, t, He, Li-O)
Two-track Res.	2.5 cm
Multiplicity limit	200
Gas	P10 @ 1 atm (Ar 90% + CH



Potentiometer

