Fast Neutron Imaging detector: A progress report

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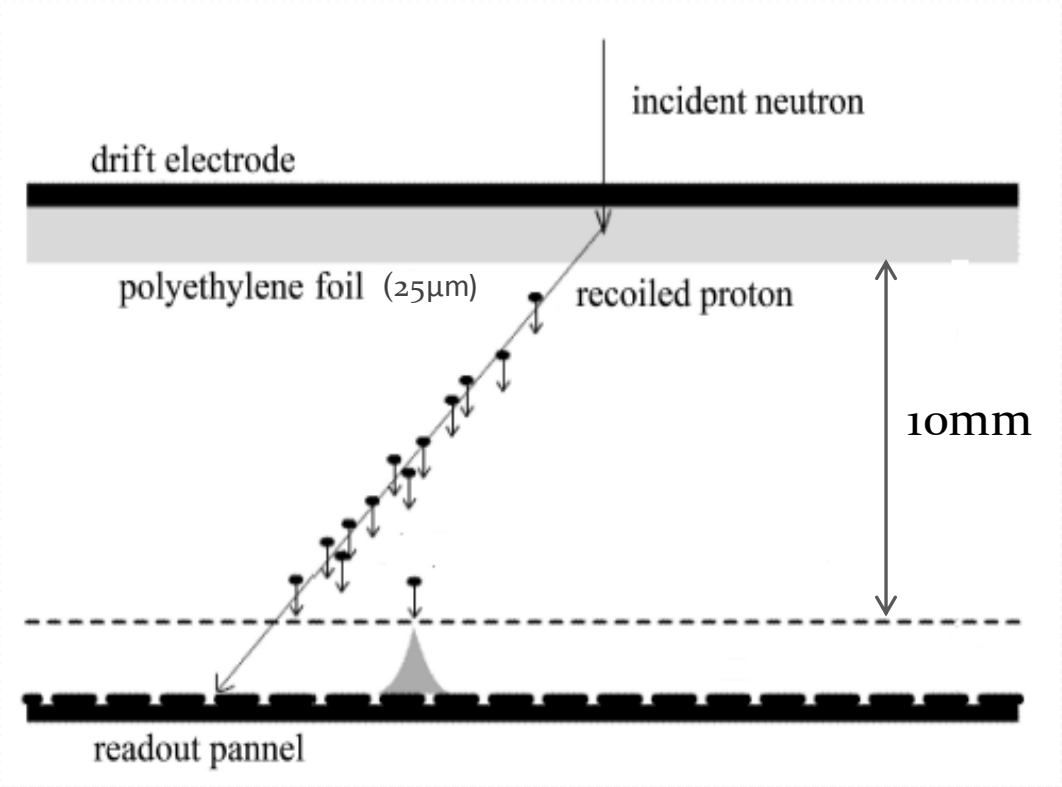
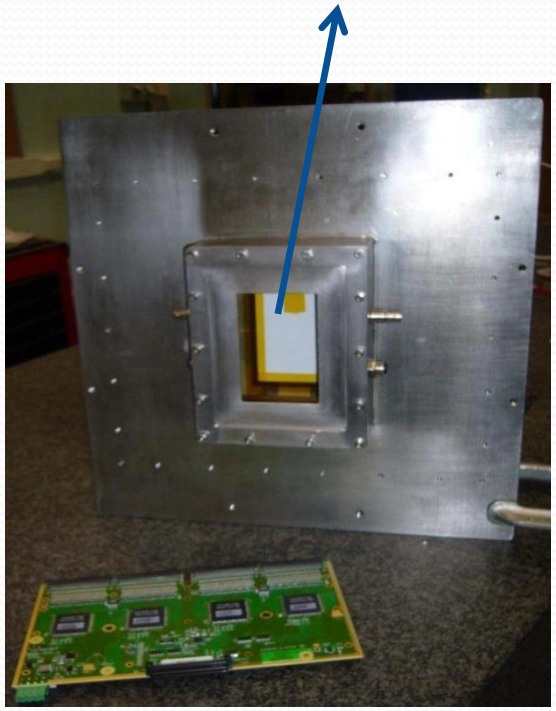
Scheme of the FNI detector

Aluminized polyethylene foil



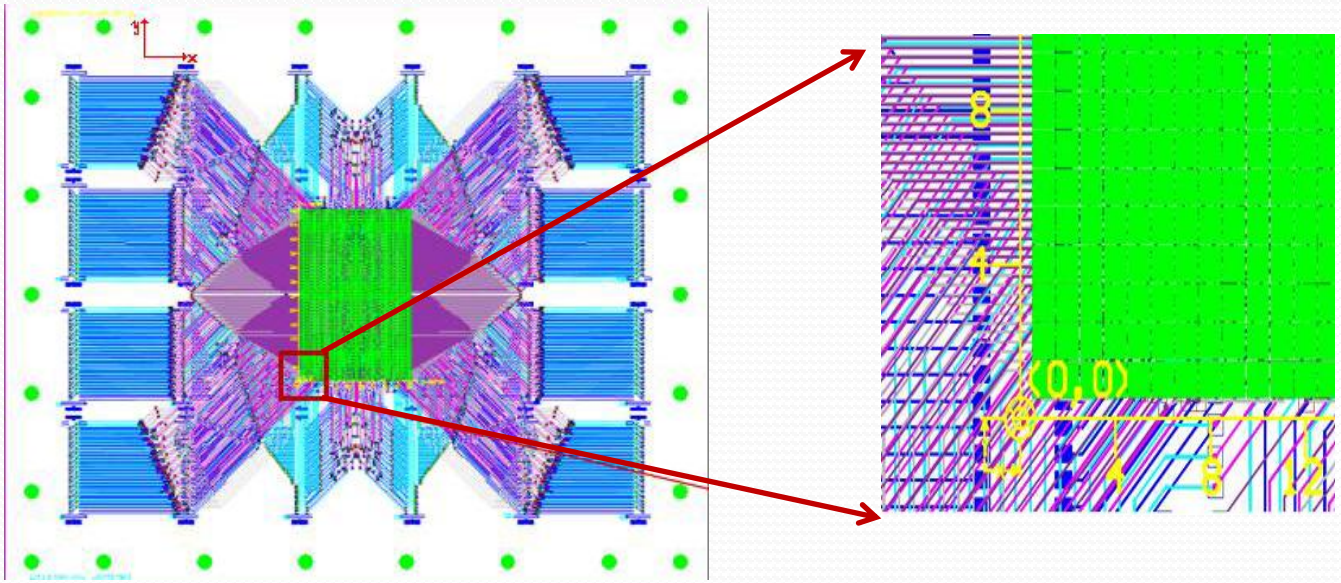
Structure of Fast Neutron Imaging(FNI) detector

Detector Sensitive area



Electronics: T2K electronics
(AFTER chip : 1728channel)

The Structure of PCB

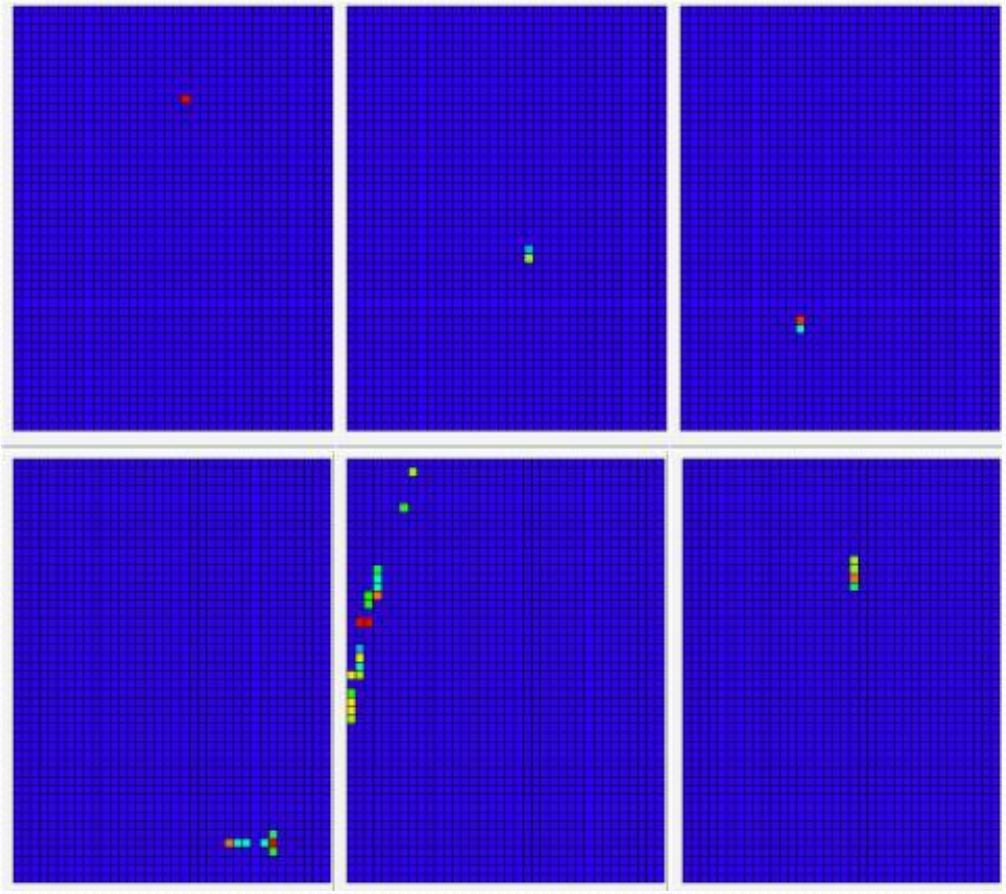


PCB was designed by Lanzhou University.

The dimension of readout PCB:

- Total area: 365.5 mm X 306.0 mm
- Sensitive area(green area): 57.4 mm X 88.6 mm
- Pads Number: 1,728 (36X48)
- Pads Size: 1.75 mm X 1.50 mm

Cosmic-ray test in Saclay (March 2011)



Experimental conditions (China, July 2011)

- Gas mixture: Ar 95% + isobutane 5%
- Pressure: 1 atm
- Neutron: beam: 14Mev, 10^7 neutron/s (DT coll.)

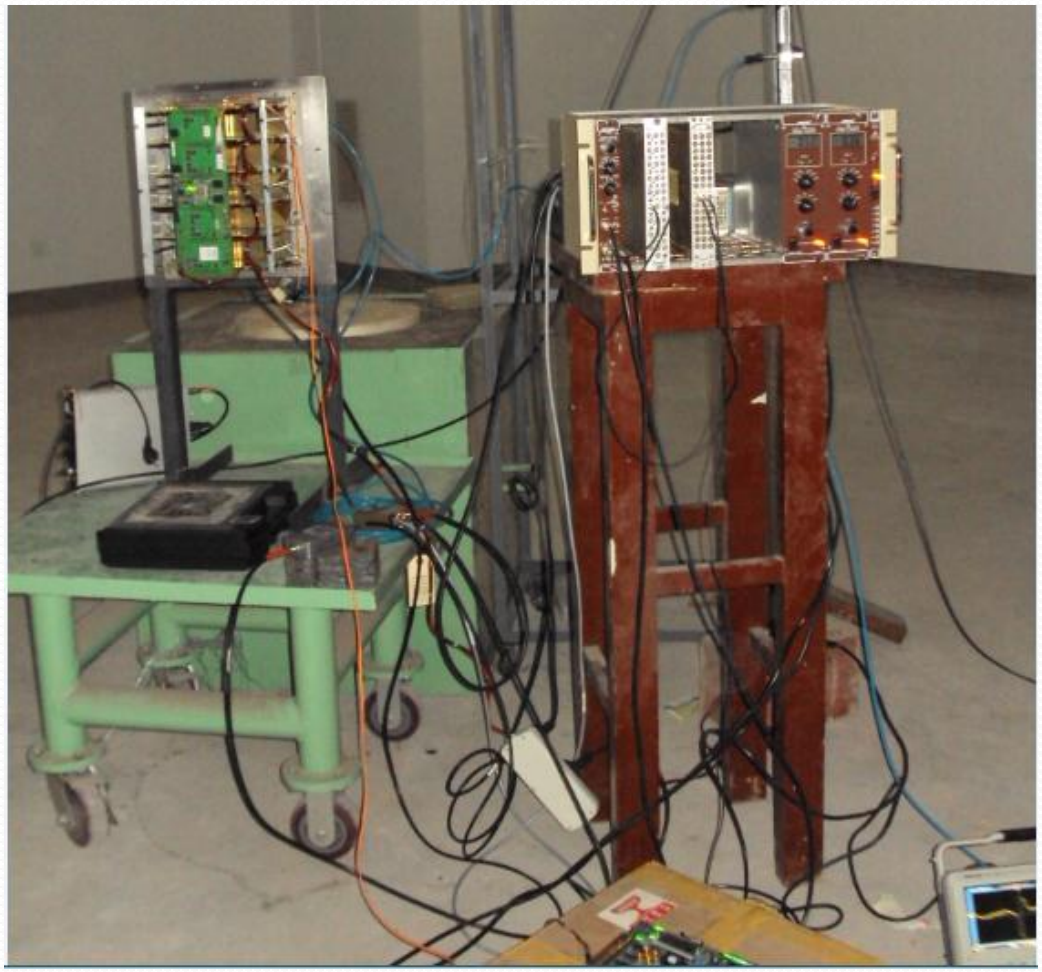
  source: ^{241}Am+Be -> n (1-2MeV)
- Tested samples:

  Materials: 1.7 cm Pb

  and paraffine

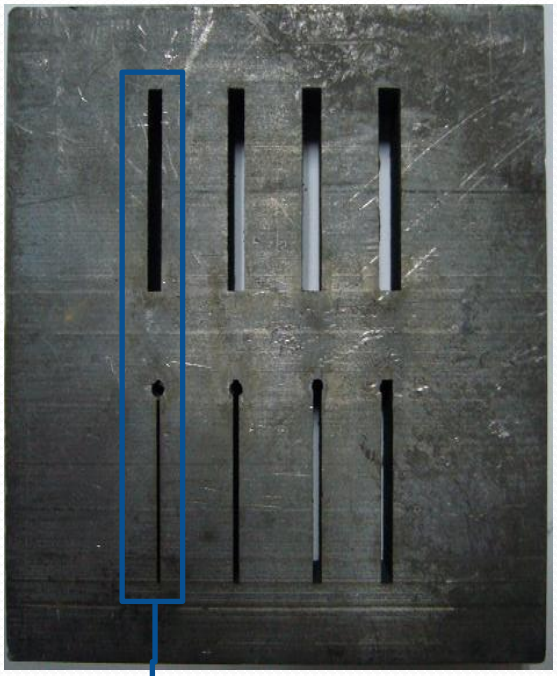
Data taking in China last month

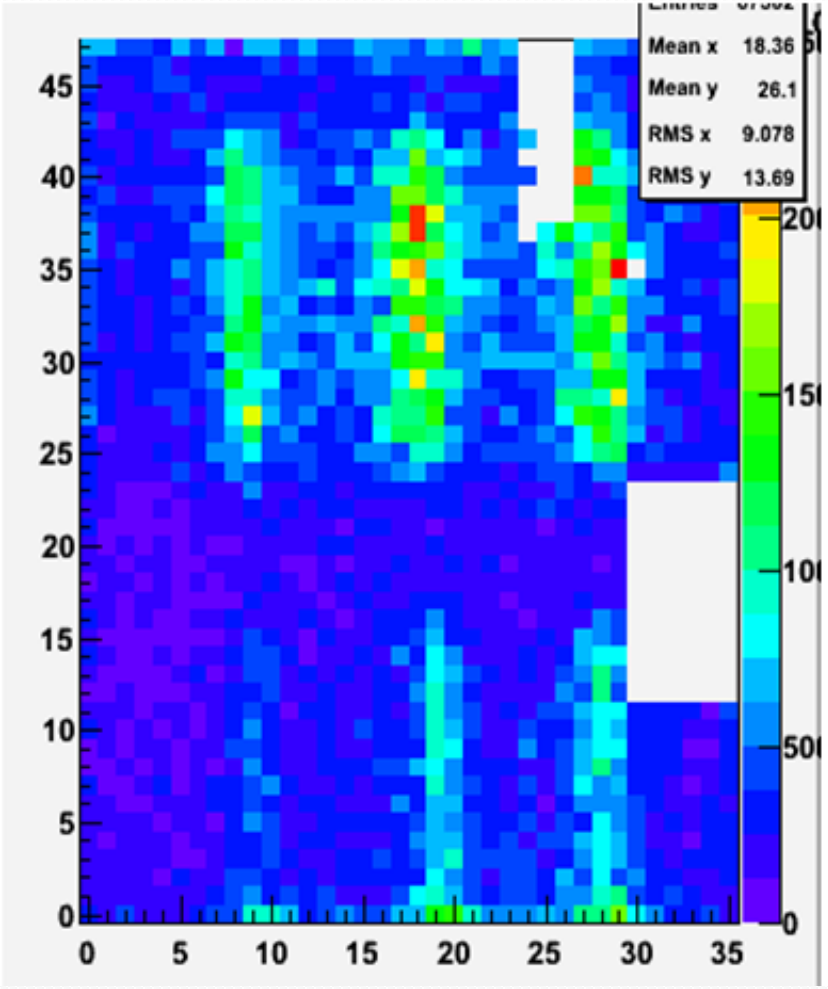
Experimental equipment (using ^{241}Am source)



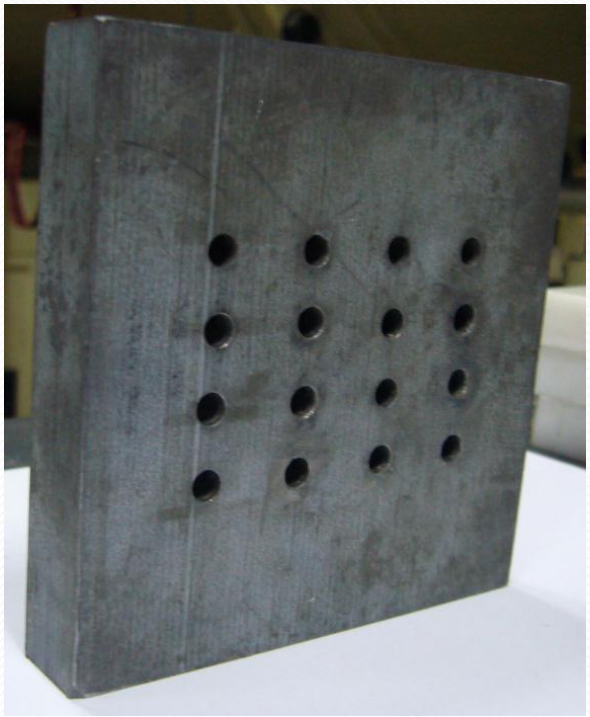
Online Display (using ^{241}Am source)

Material: 1.7 cm Pb
Chink width: 1.5mm -> 5.0 mm
step: 0.5 mm

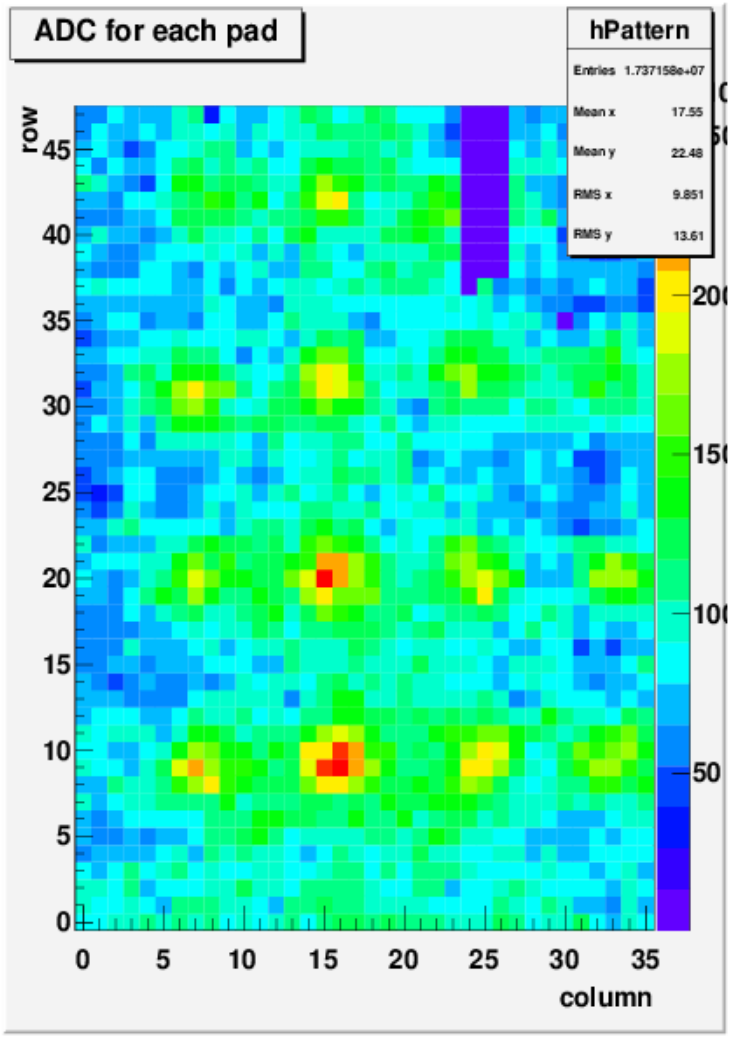




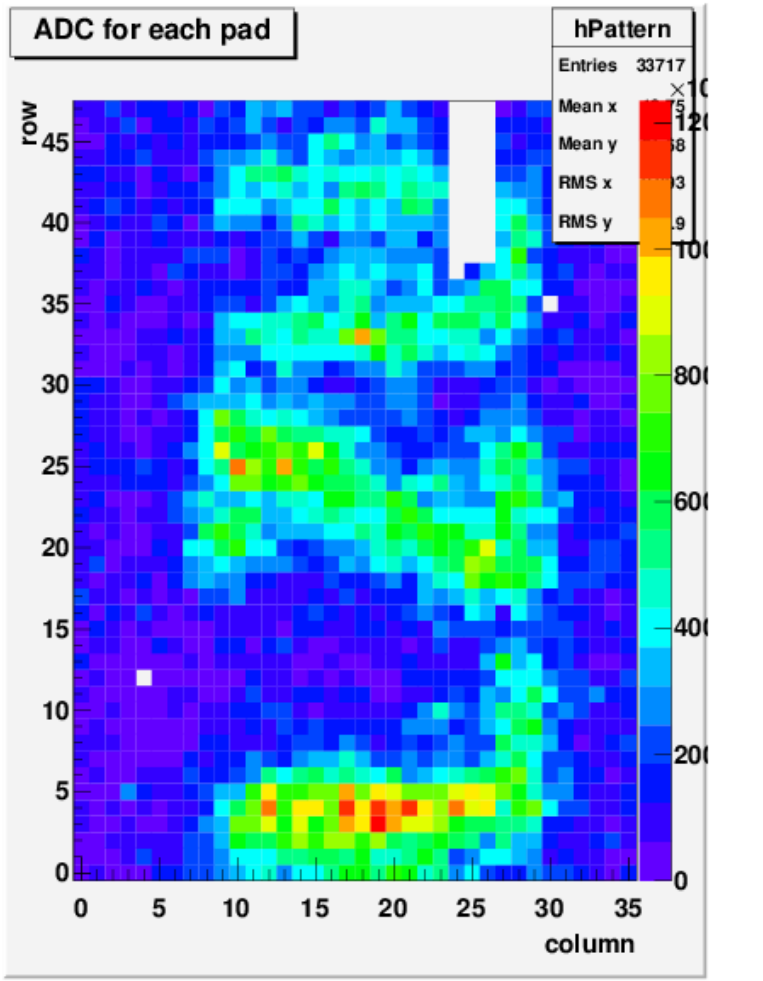
Online Display (using ^{241}Am source)



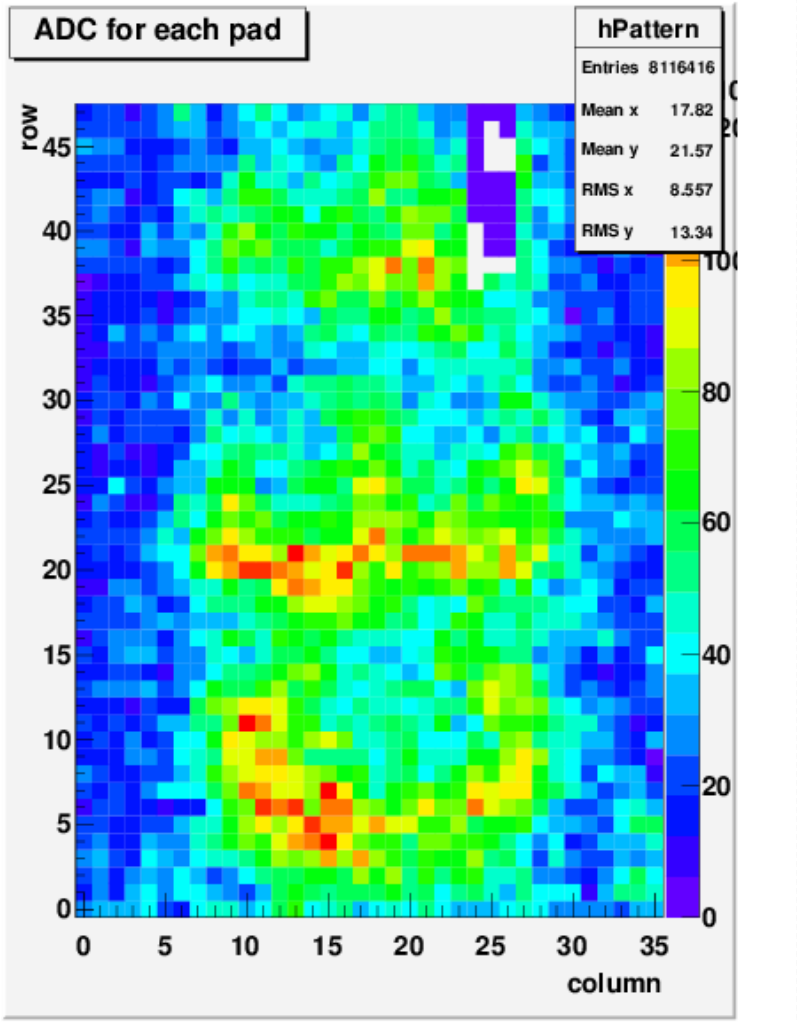
hole radius 2.5mm



Online Display (using ^{241}Am source)



Online Display (using ^{241}Am source)



Future plan

For reducing background:

- Optimize the gas mixture (He-based)
- Decrease the thickness of gas wall and improve side shielding
- Reduce the drift gap instead of extrapolating proton track

Continue the data analysis to reconstruct images

Thanks for your attention!