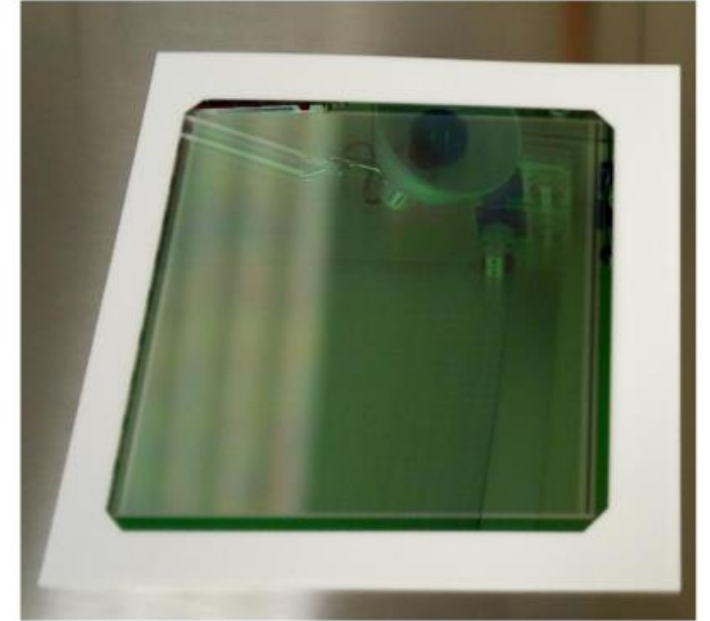
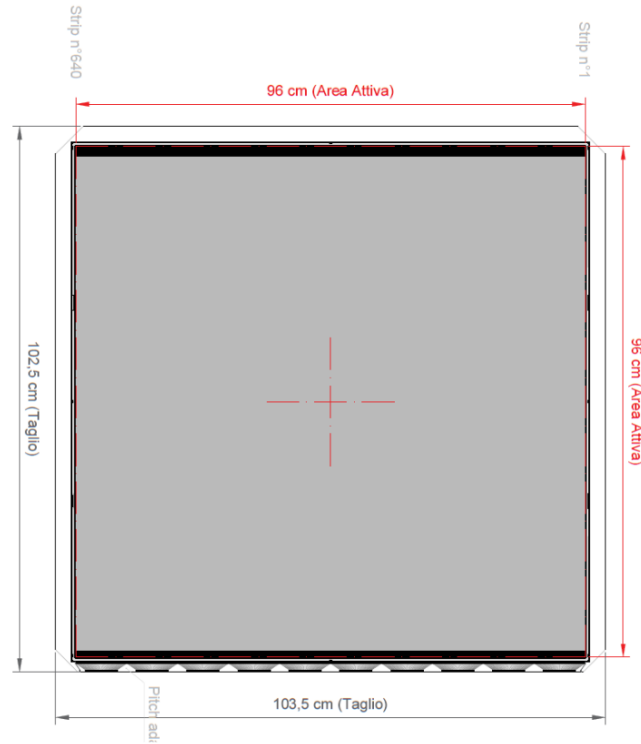
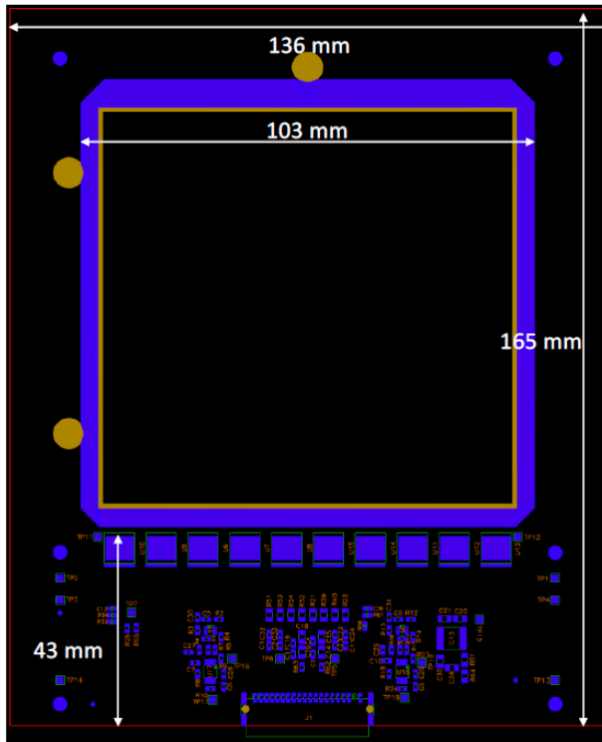


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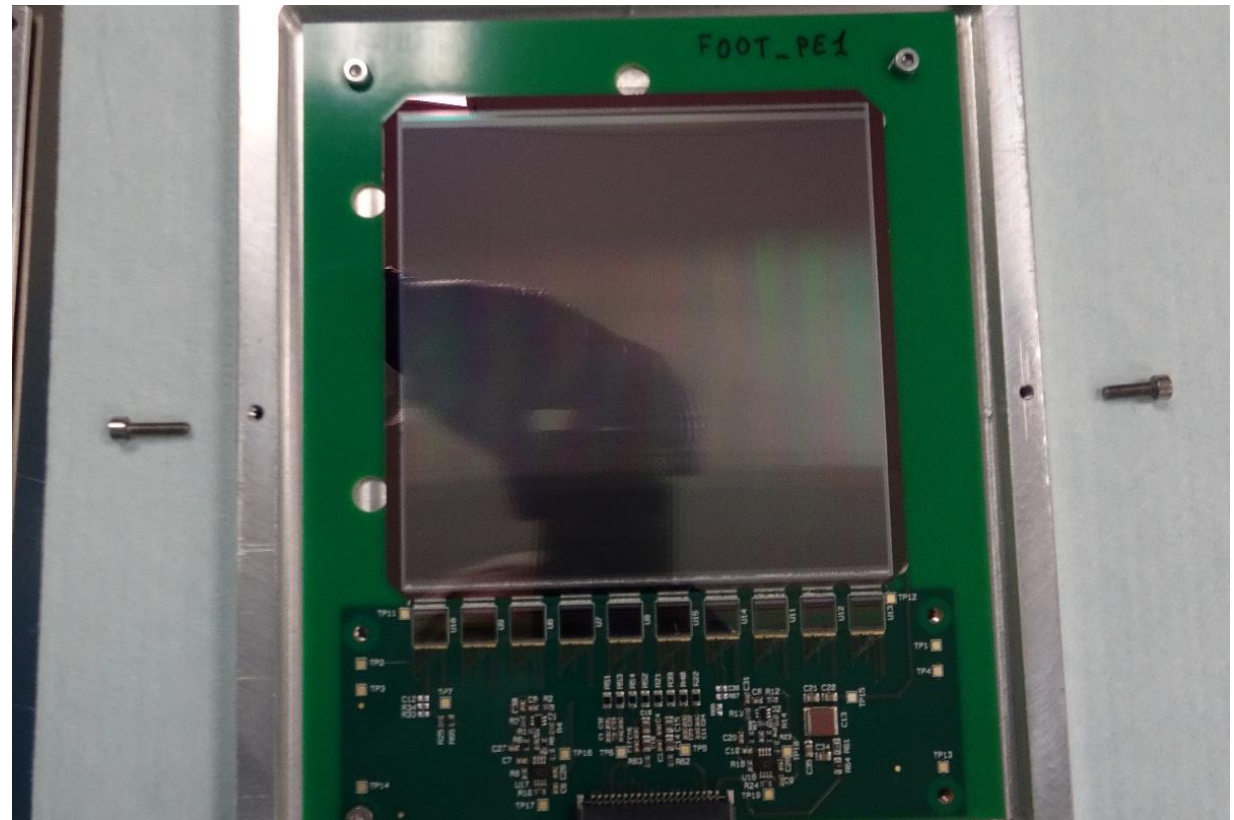
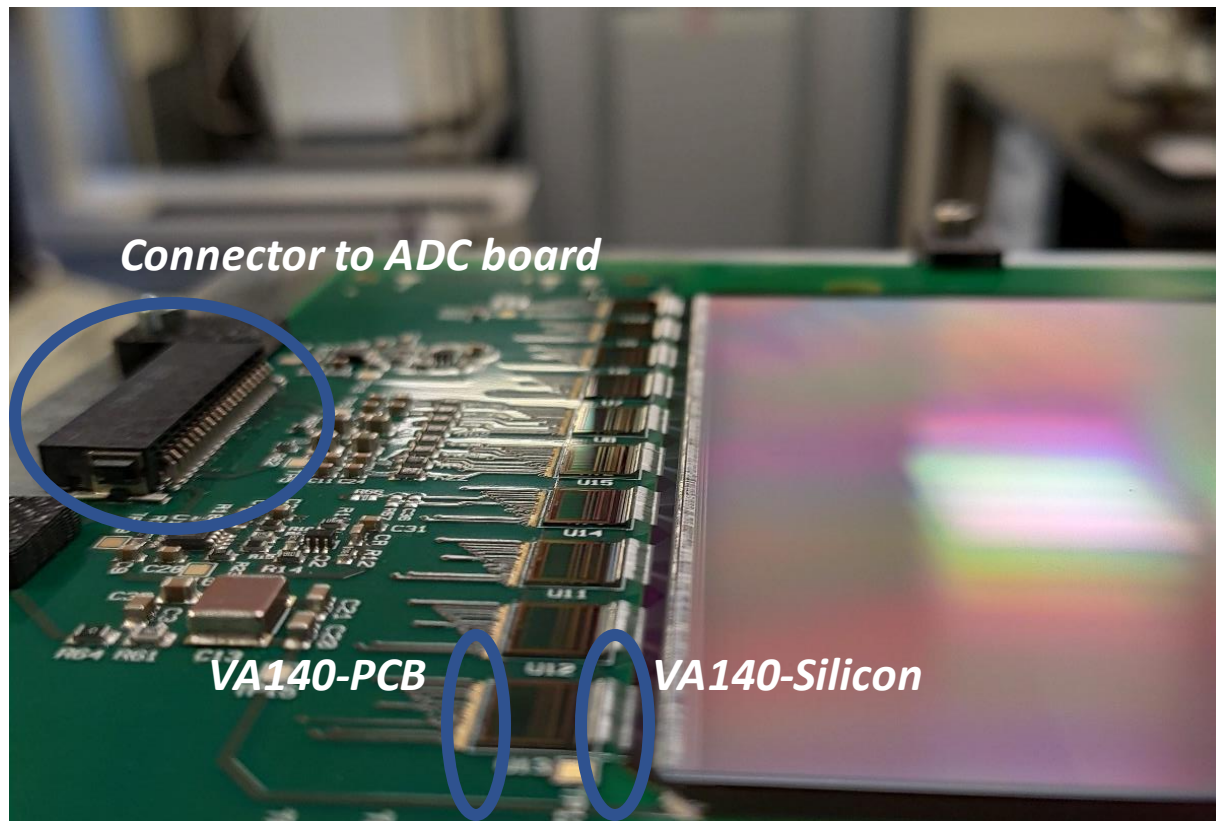
Gianluigi Silvestre, Francesca Peverini, Leonello Servoli

07/10/2020



First Prototype FOOT_PE01

- 150um thick Silicon Sensor from Hamamatsu
- Prototype readout board to be used with old DAQ system from Artel
- Readout chips: IDE1140 from Ideas
- Strip implantation pitch: 50um
- Strip readout pitch: 150um (2 floating strips)

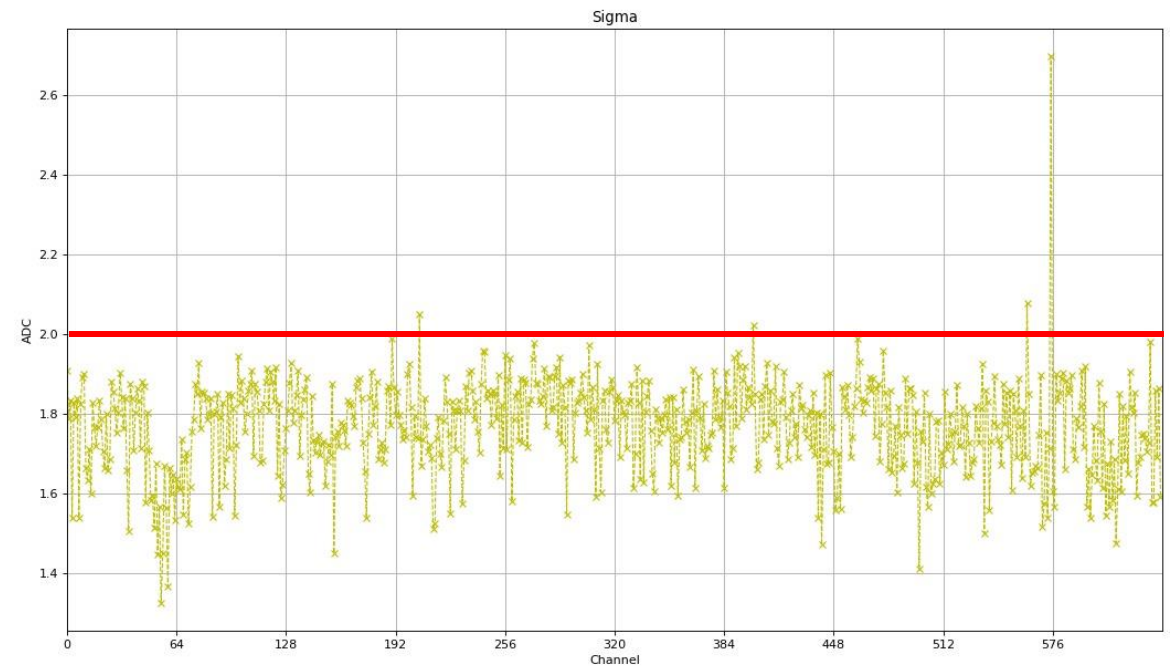
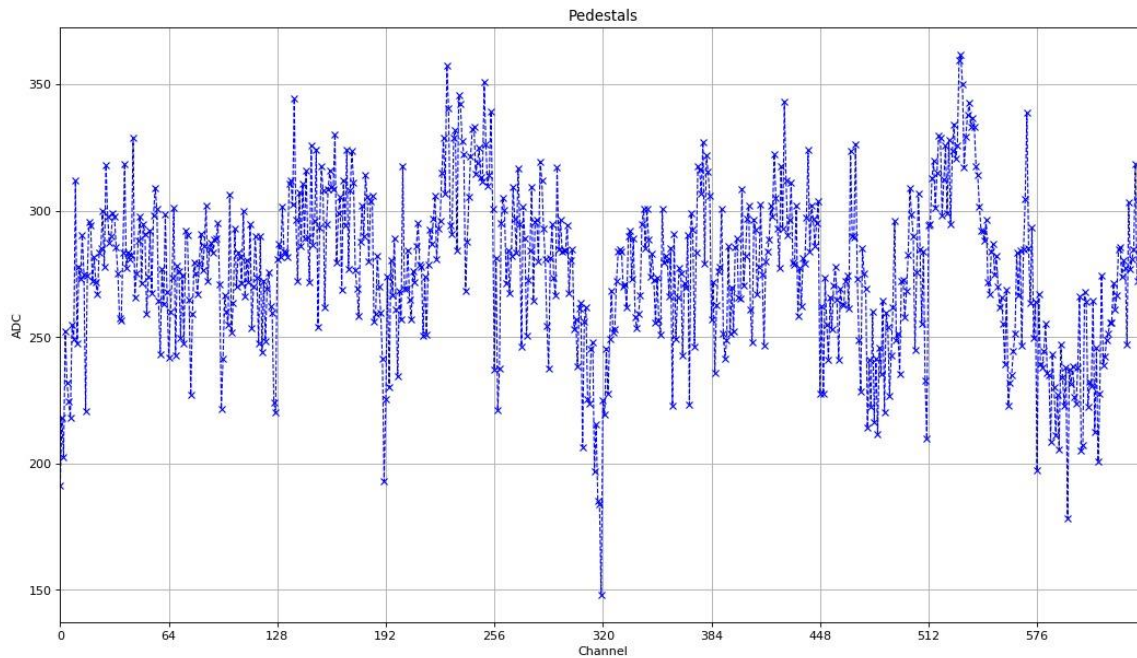


First Prototype
FOOT_PE01

- Mechanical assembly procedure working
 - part positioning
 - V140 and sensor gluing
 - micro bonding

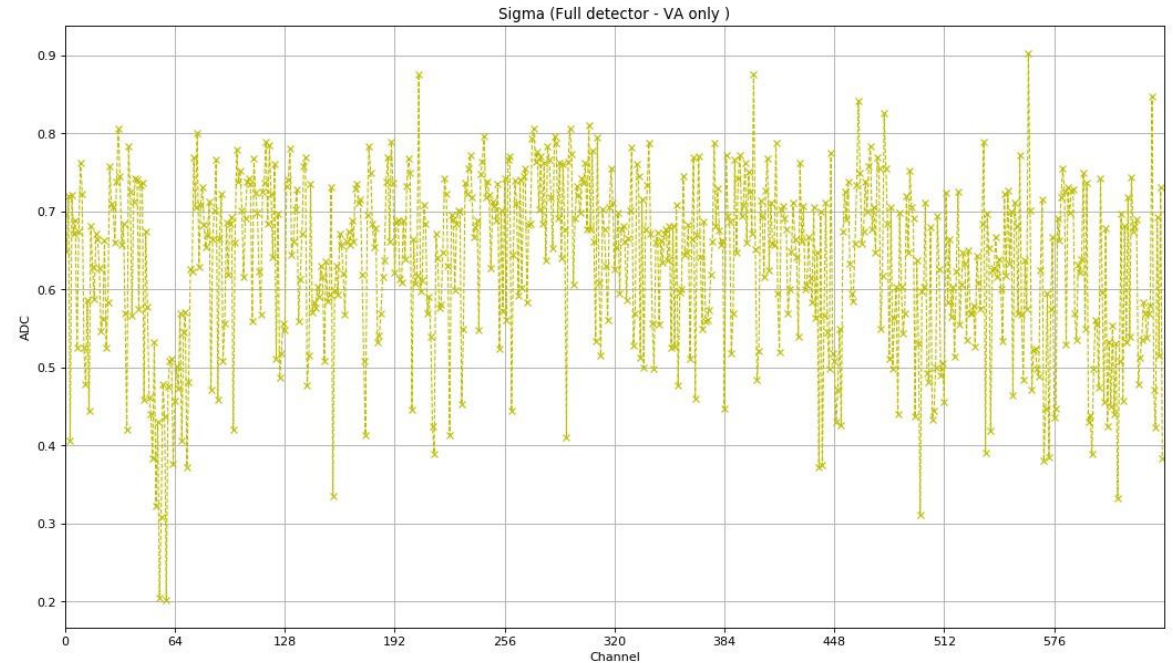
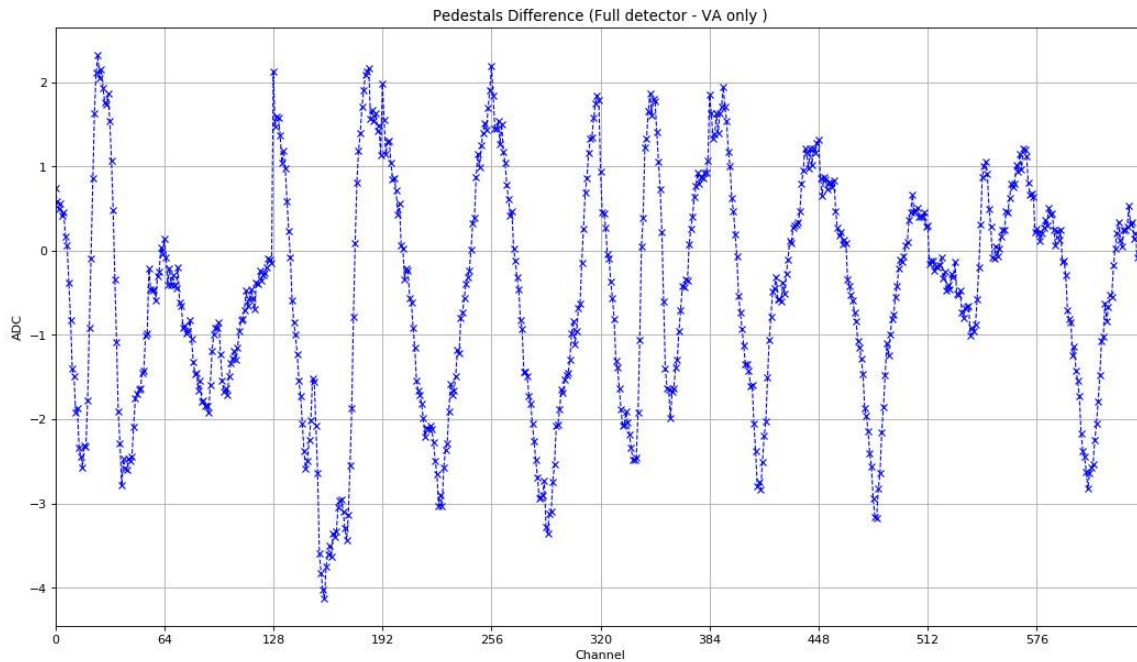
Typical Noise of the assembled detector

- Mean pedestals value of readout electronics ≈ 270 ADC counts (12bits ADC)
- Typical channel noise less than 2 ADC counts
- Leakage current @80V: 510nA for the silicon, 700nA for the complete prototype
- Depletion voltage according to Hamamatsu: ≈ 20 V

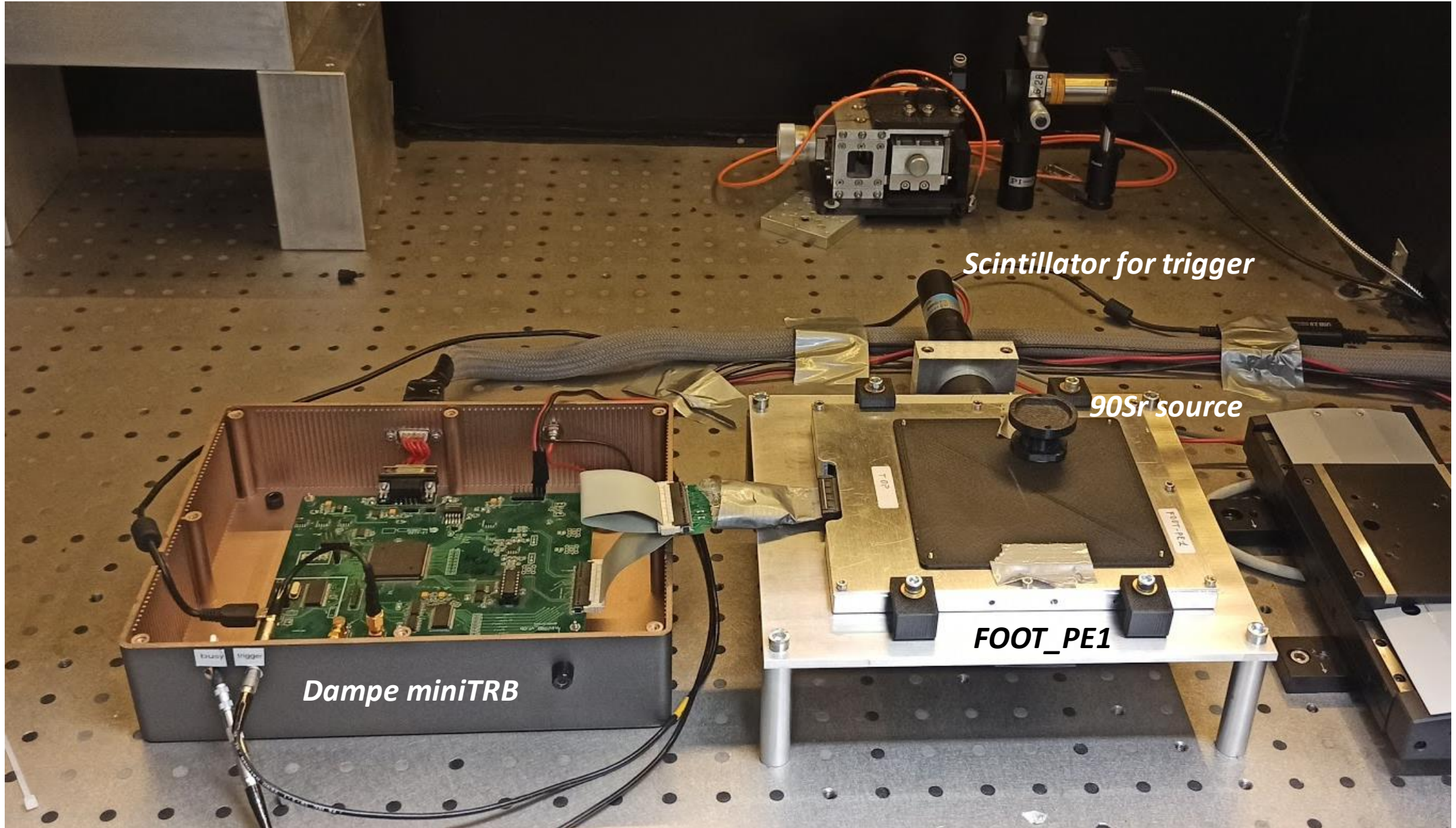


Effect of the silicon sensor

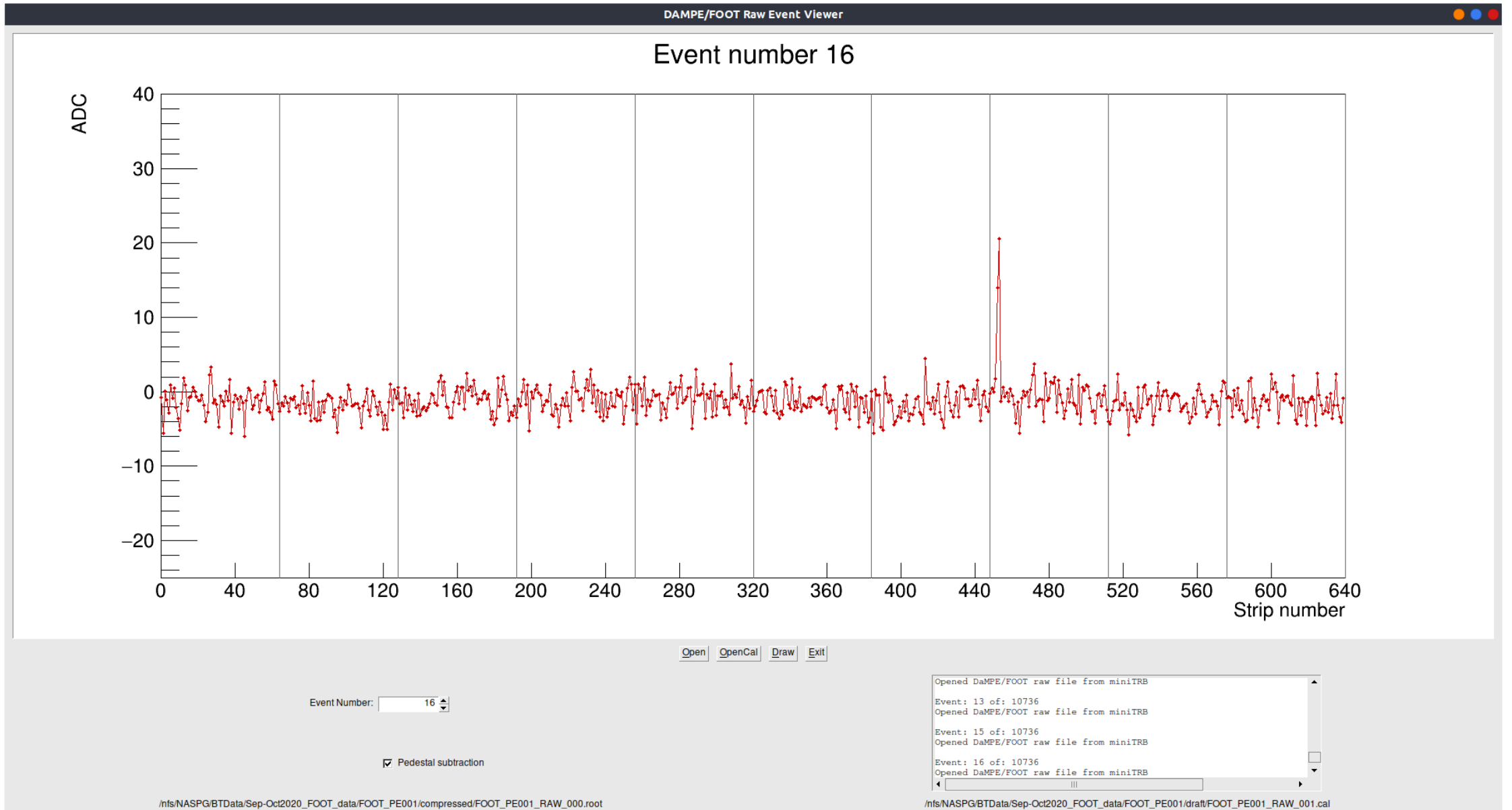
- Difference on pedestals after sensor gluing and bonding of a few ADC counts
- Difference on channel noise less than 1 ADC count
- Leakage current difference after gluing and bonding: about 200nA @80V



Setup for data acquisition

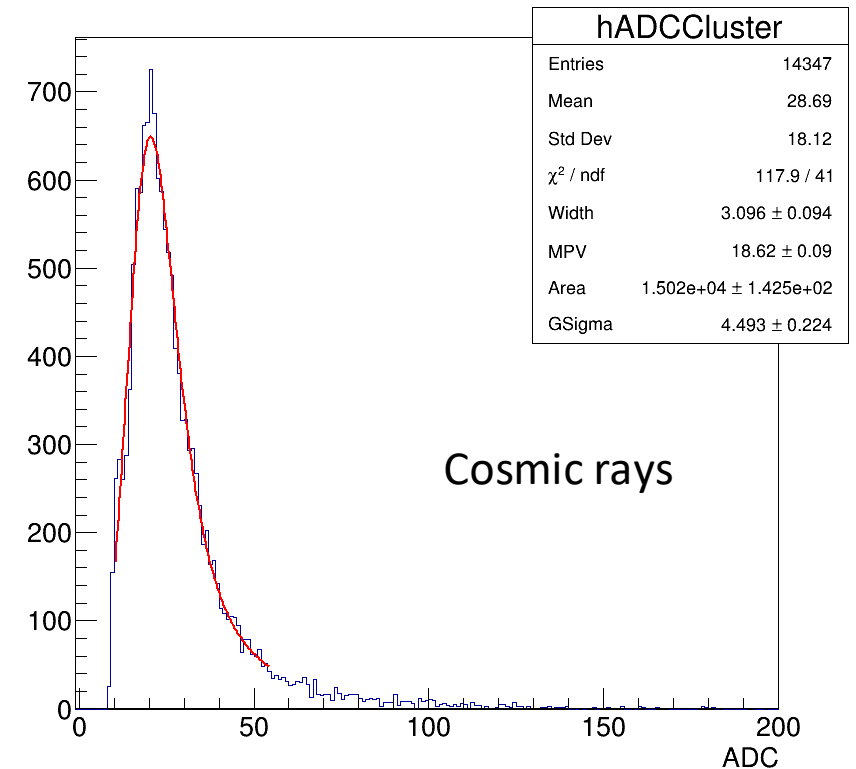
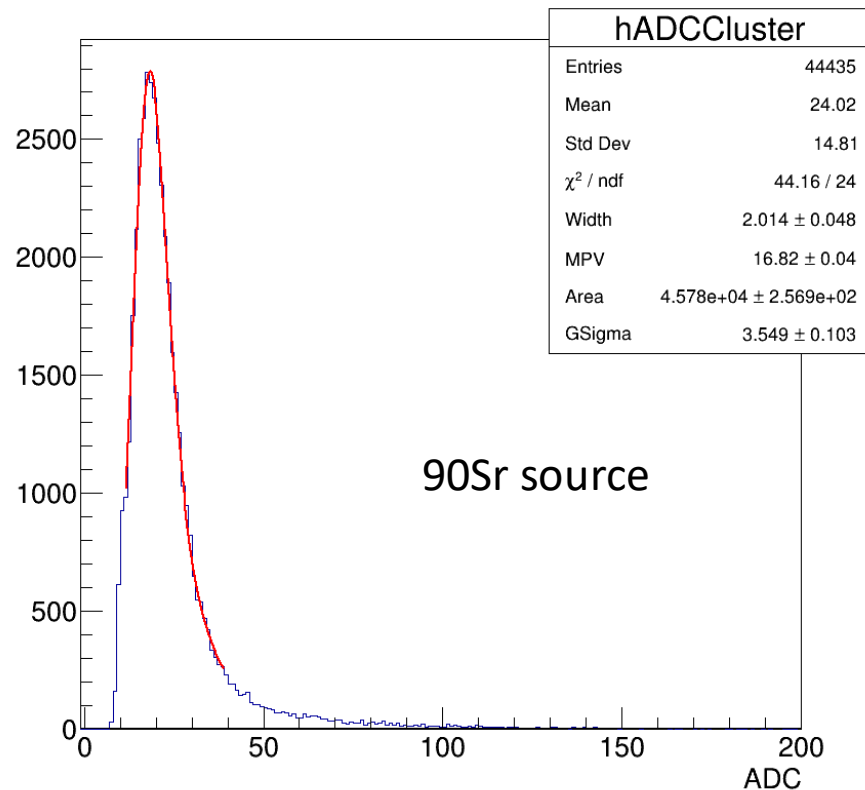


First cosmic rays signals



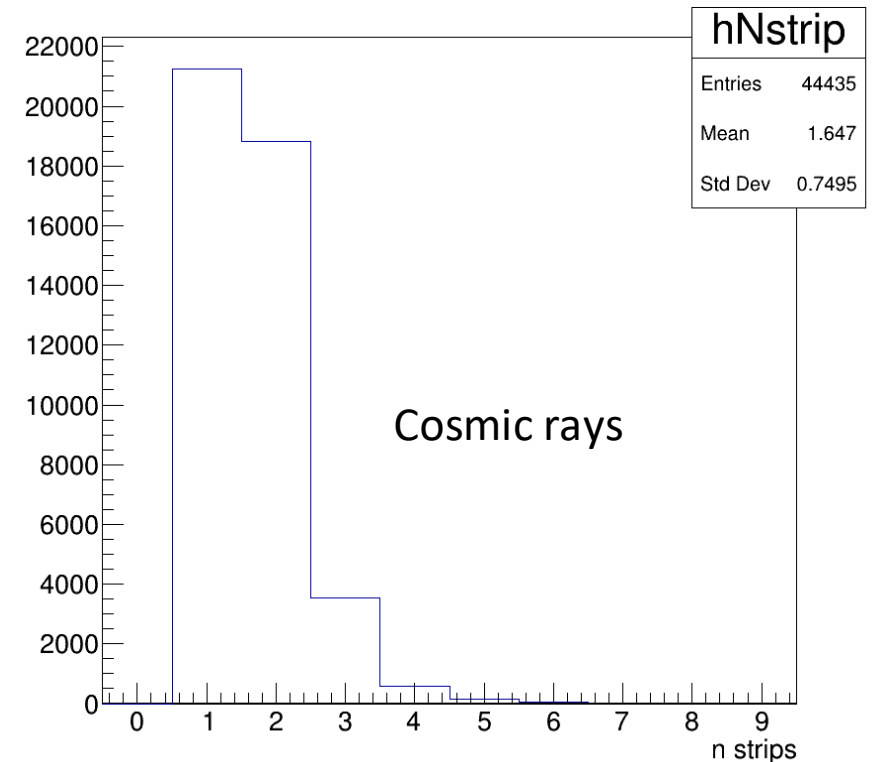
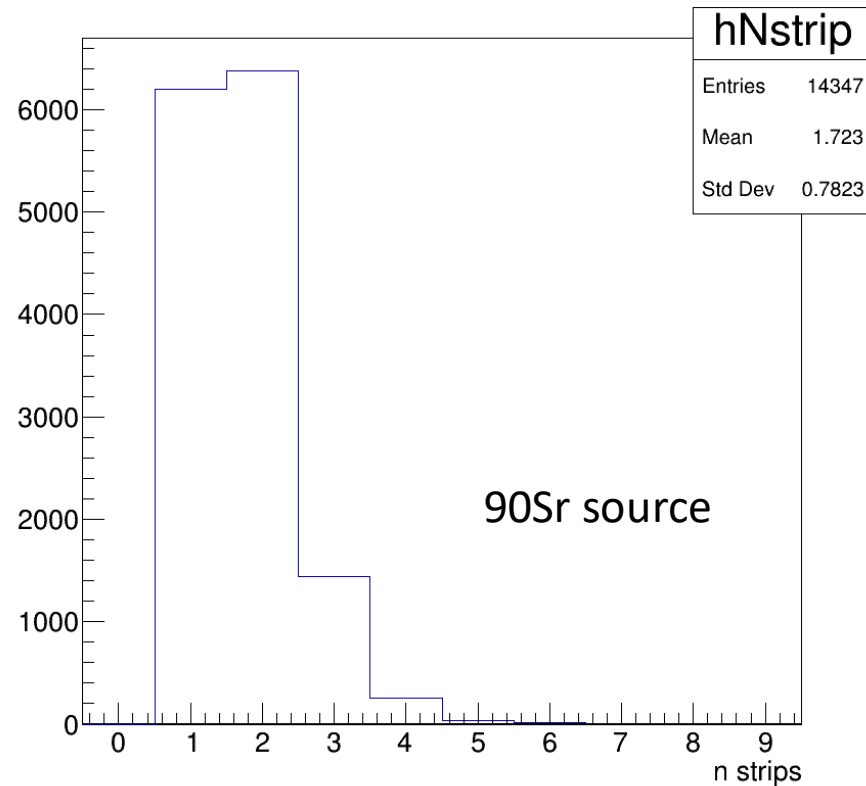
Preliminary signal distributions @50V bias

- Signals from Cosmic Rays and 90Sr radioactive source
- Most Probable Value compatible with the estimates obtained from 300um thick sensors
- Small quantitative differences due to slightly different conditions during acquisition
- Results are still preliminary: need to study signal thresholds



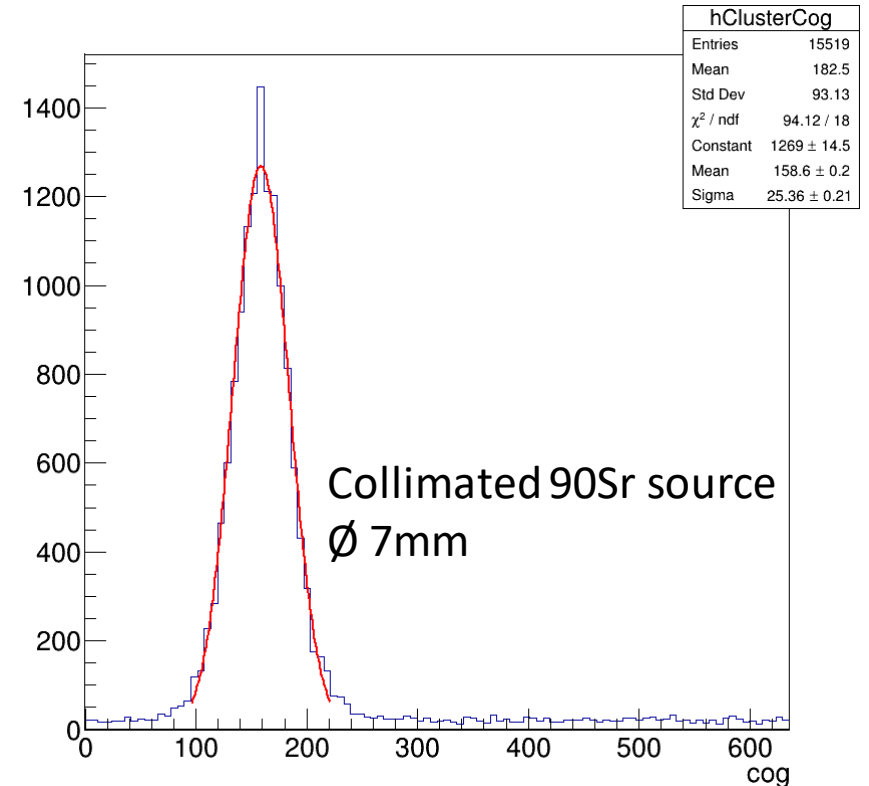
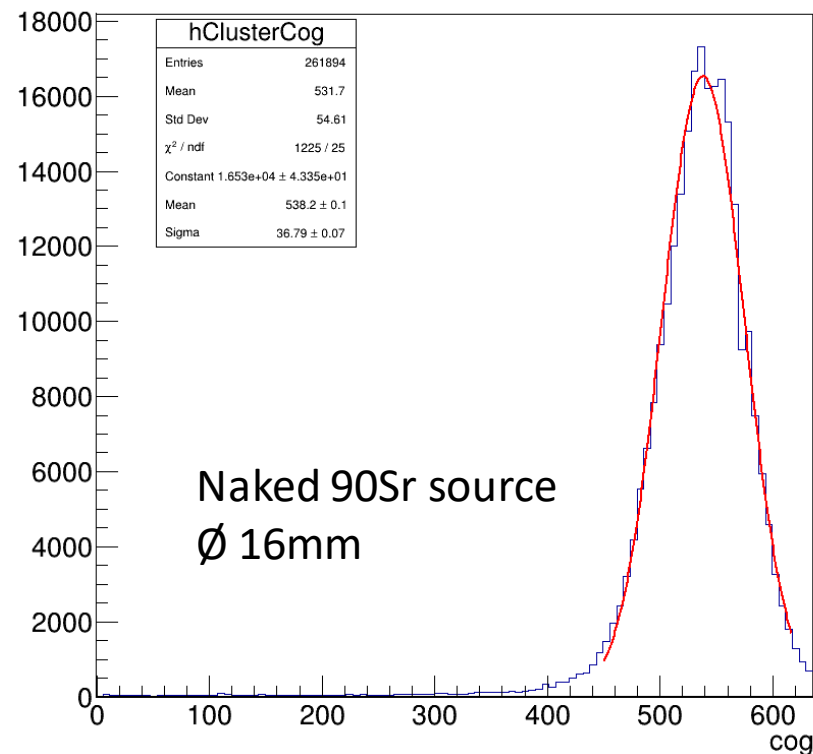
Preliminary signal clusters width @50V bias

- Cluster width reasonable given the readout pitch (150 μ m)
- Distributions dependent on cluster algorithm thresholds
- Still preliminary



Preliminary clusters Position Distributions @50V bias

- Test with naked and collimated 90Sr source
- Reconstructed "beam" profile correctly moves as we move the source
- Naked source FWHM: $\approx 1,25\text{cm}$
- Collimated source FWHM: $\approx 0,85\text{cm}$
- Values compatible with known values





ToDo

- *Here in Perugia*
 - Build the new detectors
 - Test them with new DAQ system
 - Acquire more data with MIPs to understand the detector behavior
 - Verify optimal sampling time for the readout ASICs
 - Verify optimal reverse polarizing voltage
 - Finalize the mechanical structure
- *At the accelerators: Trento and Pavia*
 - Crosscheck optimal sampling time with heavy ions signals
 - Crosscheck optimal reverse polarizing voltage with heavy ions signals
 - Equalize the response function of all the readout ASICs
 - Internal alignment of the MSD subdetector with high energy particles