



Protvino, June 2011

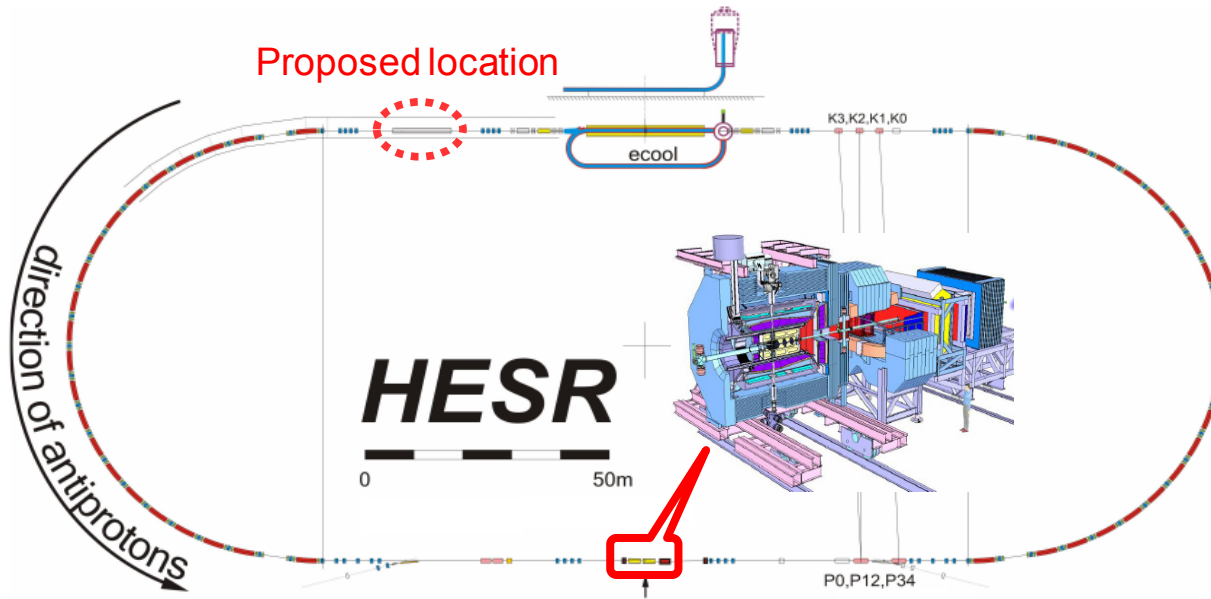


Update to day-1 experiment

Huagen Xu

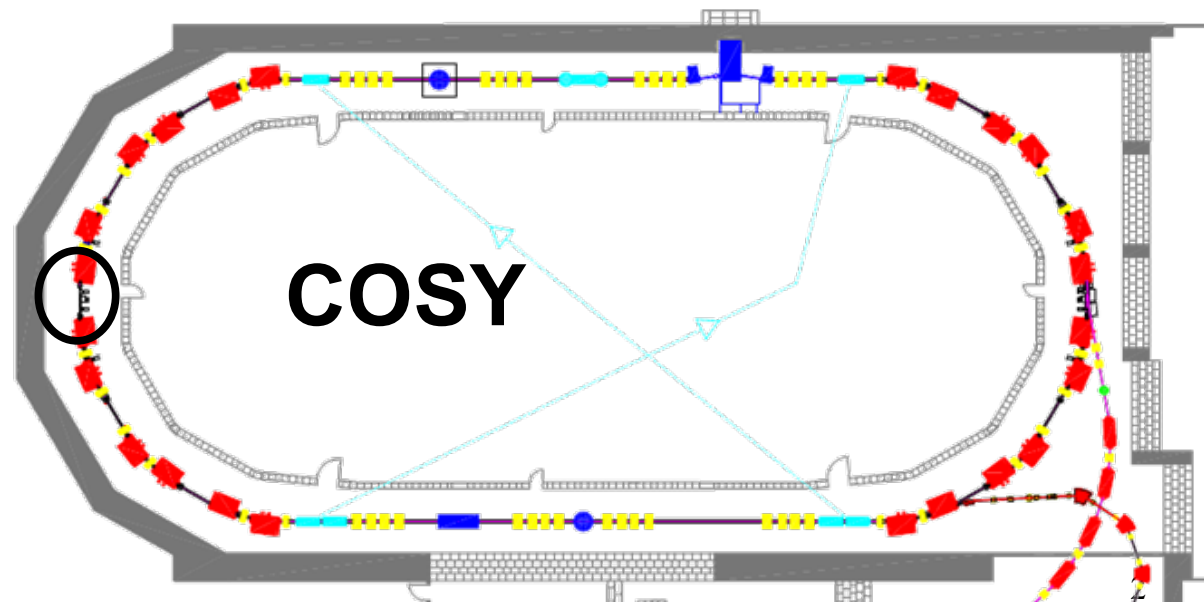
LuMo @ IKP: J. Ritman, T. Stockmanns and T. Randriamalala

Large t-range measurement at HESR

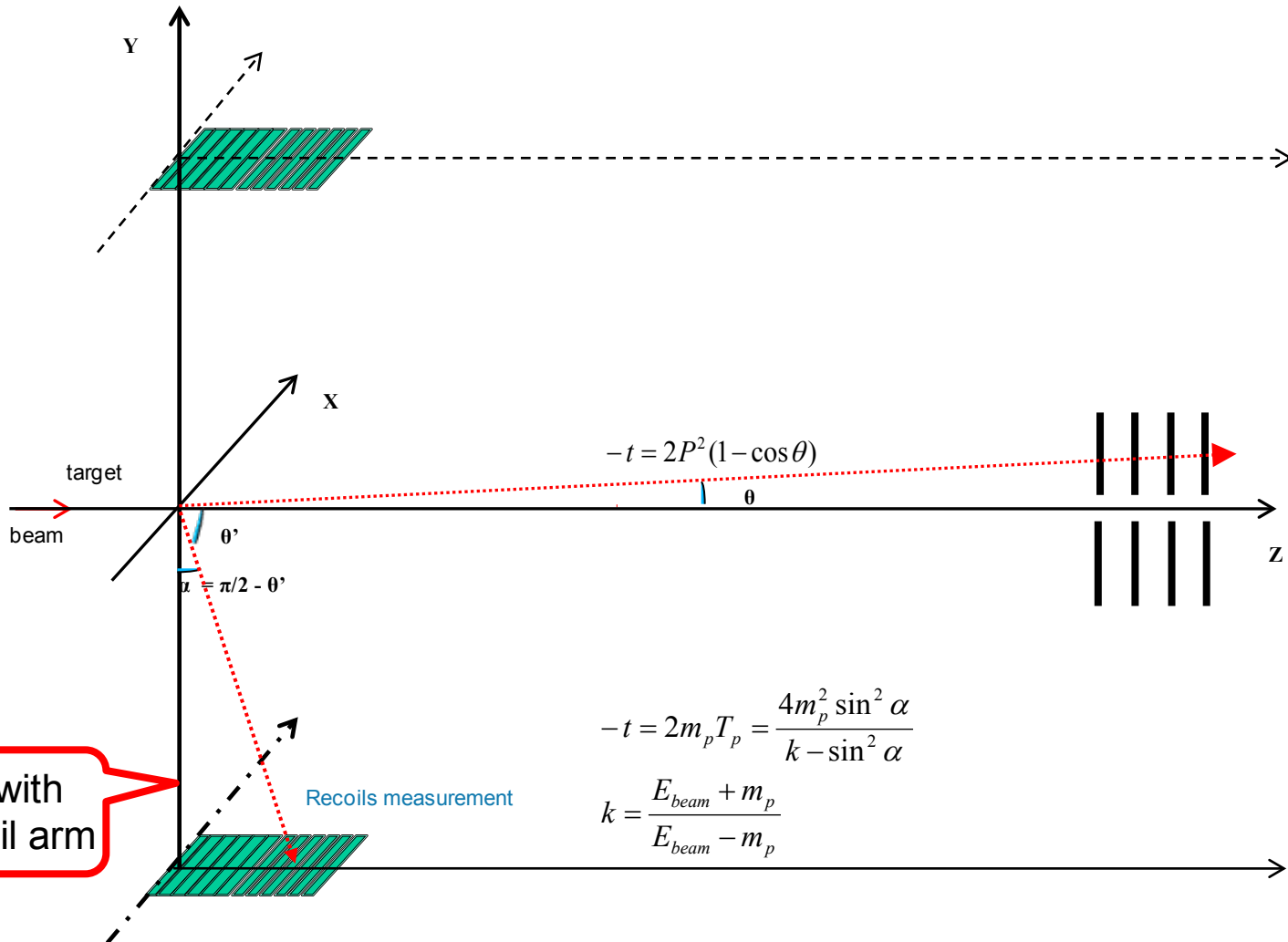


- Large t-range:
0.0008-0.1 GeV²
- Enough space in the early phase of HESR running

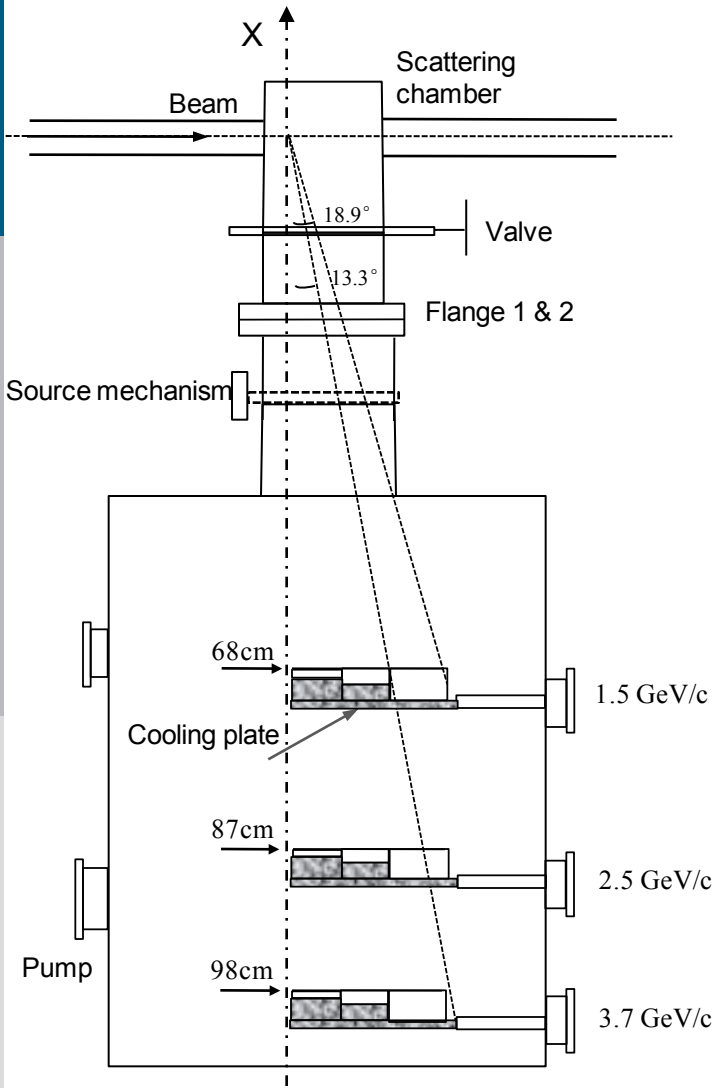
Proposed
commissioning
location



Sketch of day-one experiment design



Schematic view of recoil arm

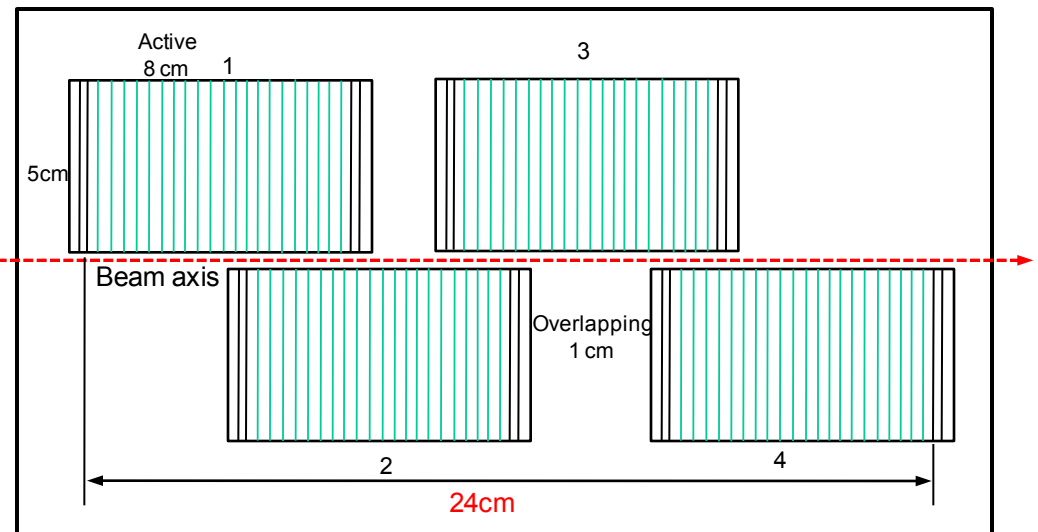


Design requirements:

- **Subtending angle**, i.e. recoil angle (between IP and Y axis) up to 18.9° at 1.5 GeV/c
- **Nearest distance** 68cm (IP to detector surface plane)
- Windowless cluster jet target

Single sided strip detectors:

- No. 1 and 2 Si : 7.68cm x 5cm x 1000 μ m with 1.2 mm pitch
- No. 3 and 4 Ge: 8cm x 5cm x 4 & 10mm with 1.2mm pitch

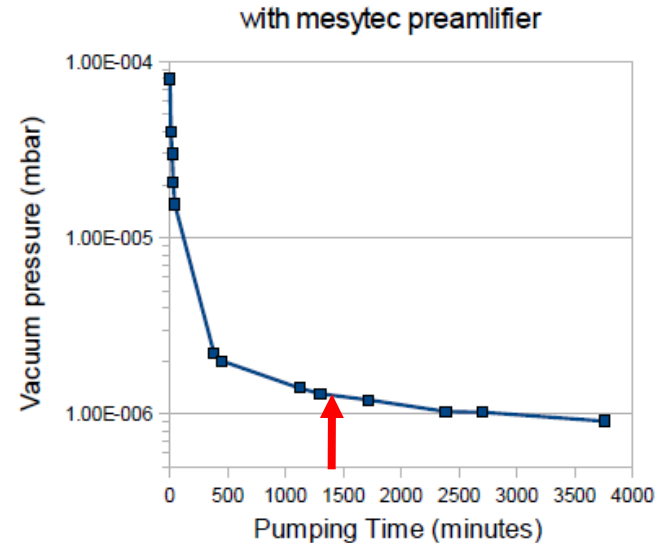
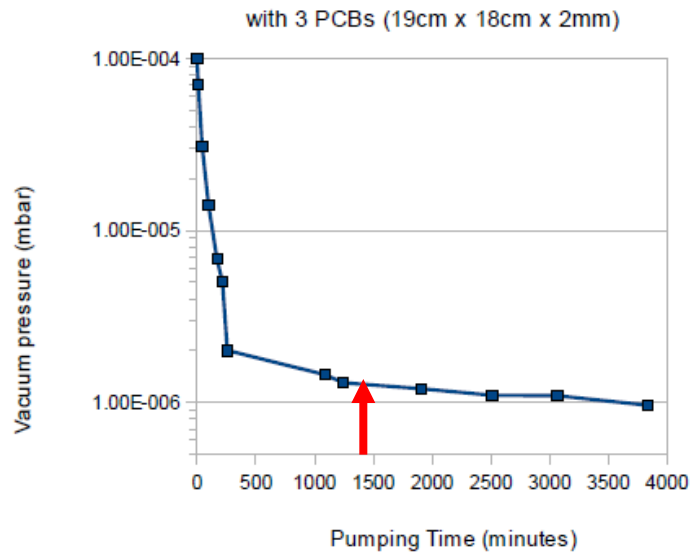
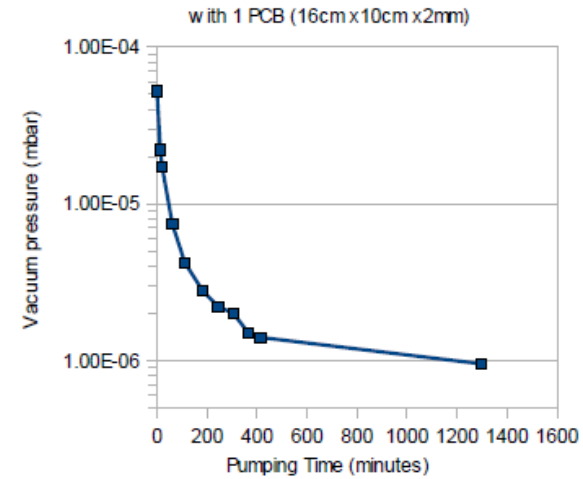
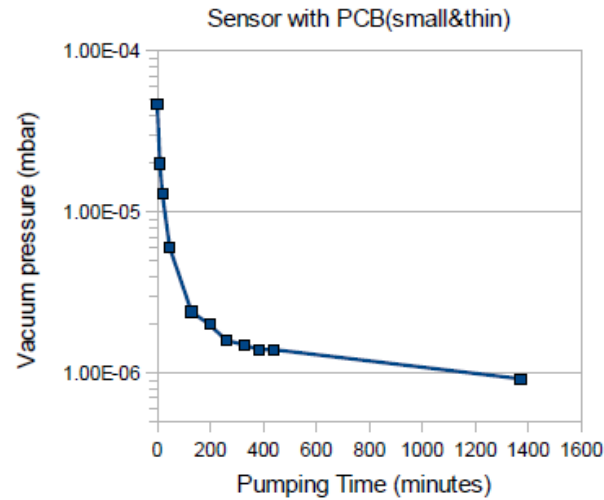
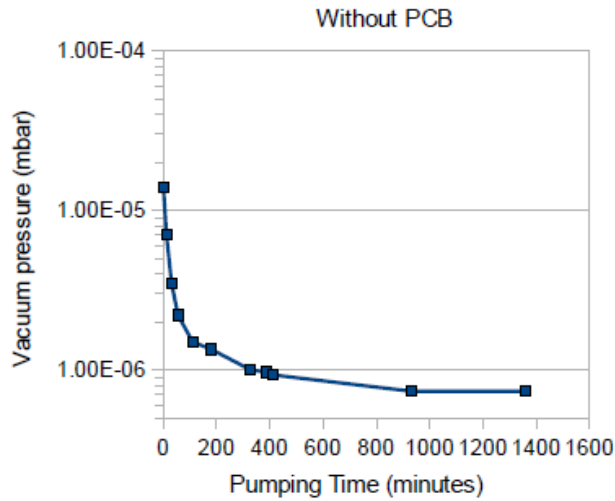


Commissioning with 160 channels

Status of recoil arm construction

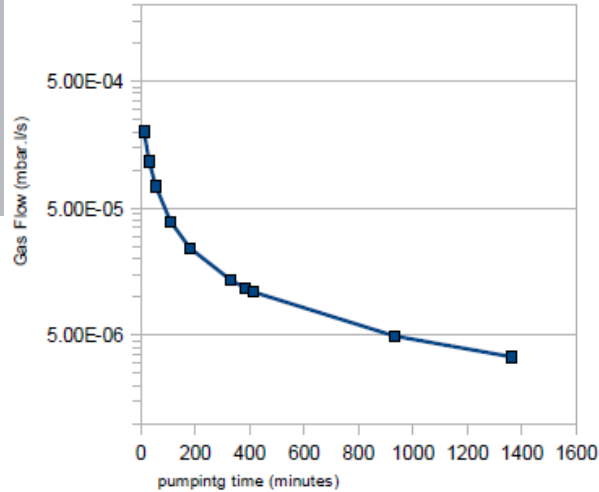
- **Part1: Detector**
 - Orders for Si sensors (Micron) and Ge crystals (Umicore) done
 - Ge sensors made by Semikon after Ge crystals available
- **Part2: FEE**
 - mesytec MUX16 & MAD32 (peak sensing ADC) available
 - confirmation test study is moving on
- **Part3: DAQ & test system**
 - Typical DAQ framework used for experiments at COSY
 - Test system is being built up
- **Part4: Mechanical**
 - Under discussion
- **Part5: Cluster jet target**
 - The first discussion meeting done
 - Funding for new stuff.
- **Part6: Accessories**
 - E.g. High voltage module, cooling system for Germanium sensor

PCB boards affect vacuum pressure

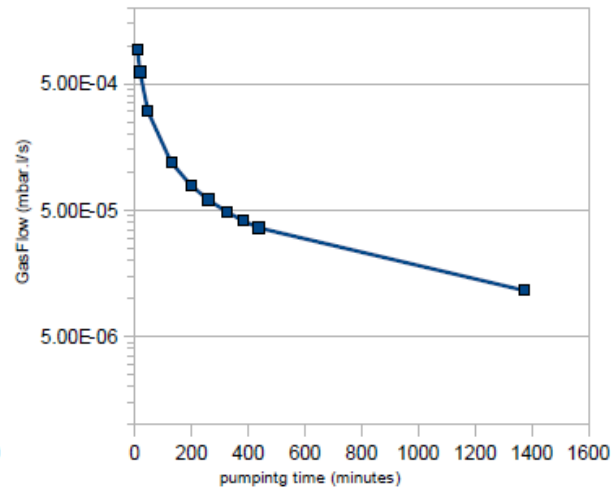


Pumping gas flow with pumping time

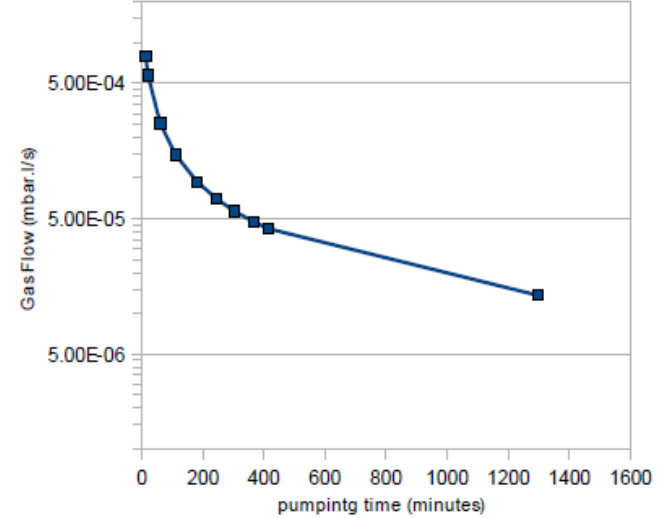
without PCB



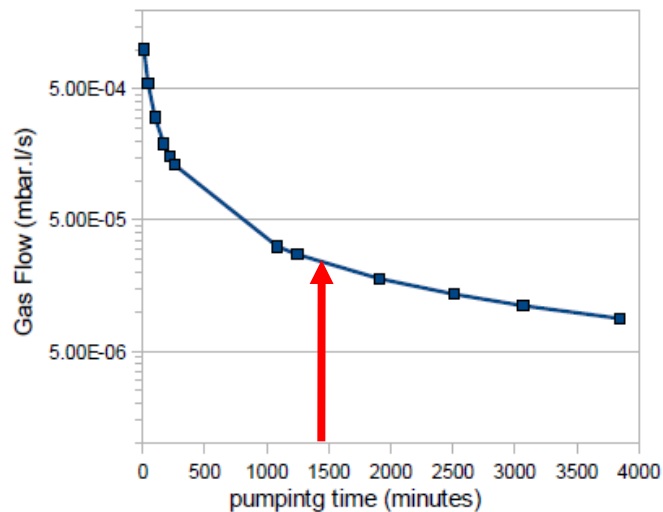
PCB with sensor (small & thin)



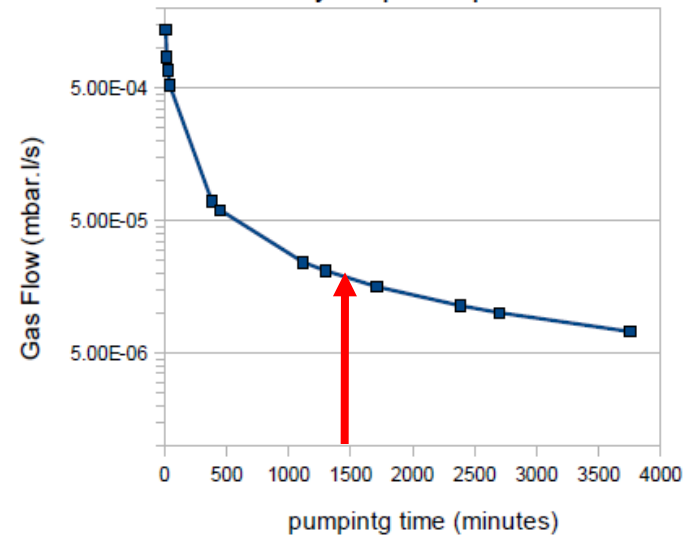
PCB (16cm x 10cm x 2mm)



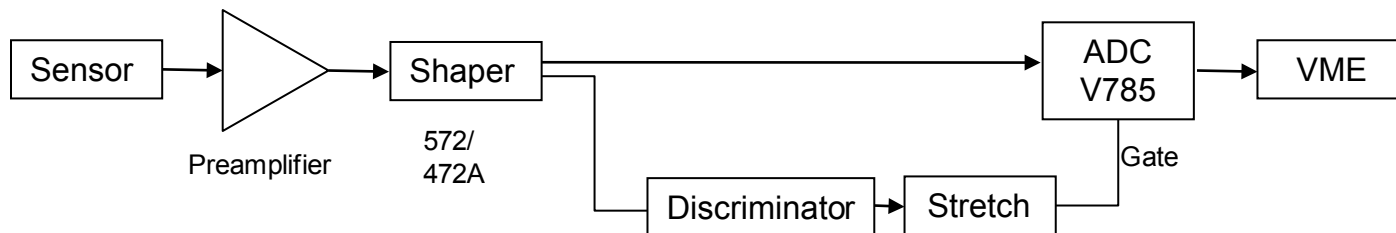
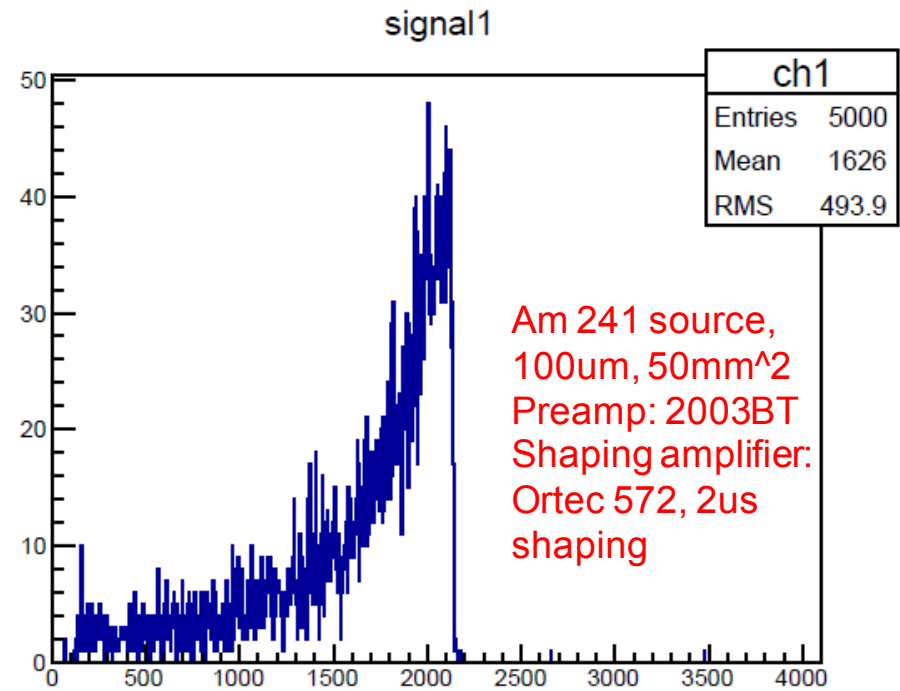
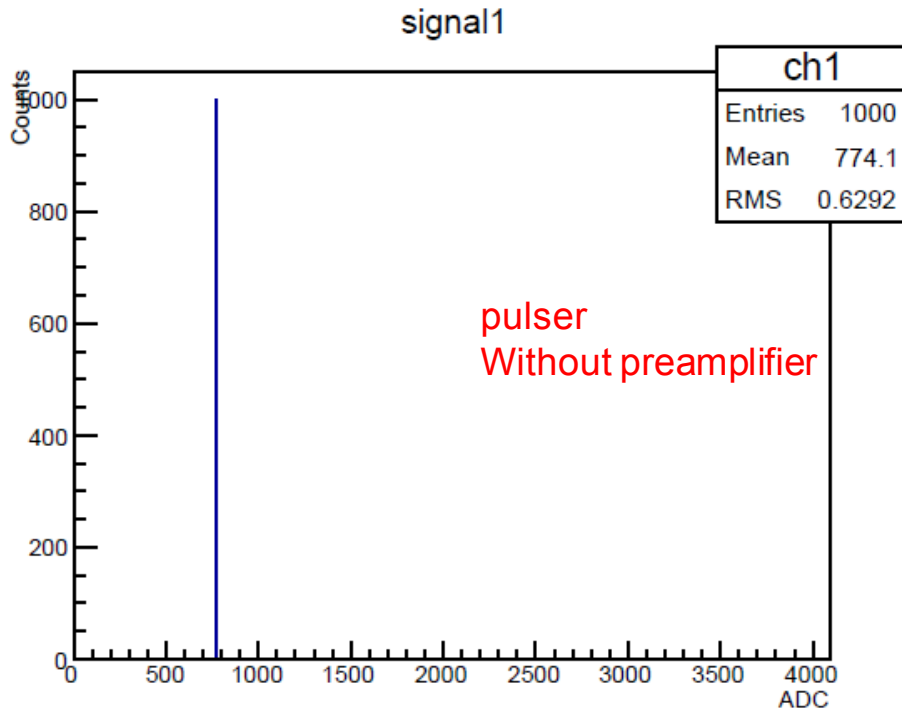
PCB (19cm x 18cm x 2mm)



mesytec preamplifier

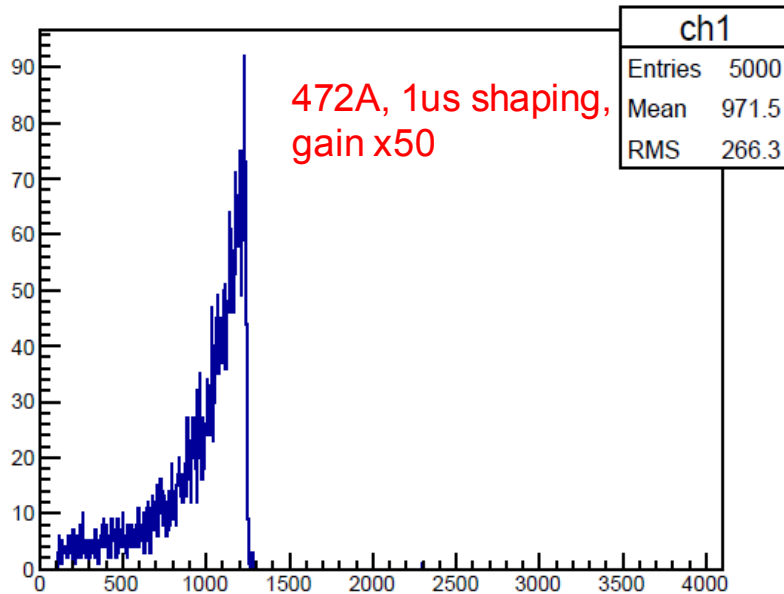


Test 2: DAQ system with CAEN ADC(V785)

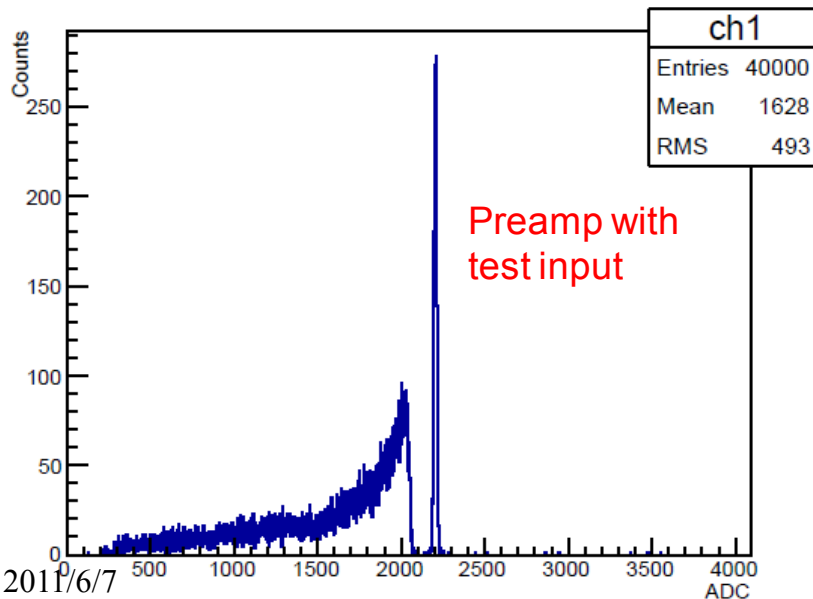
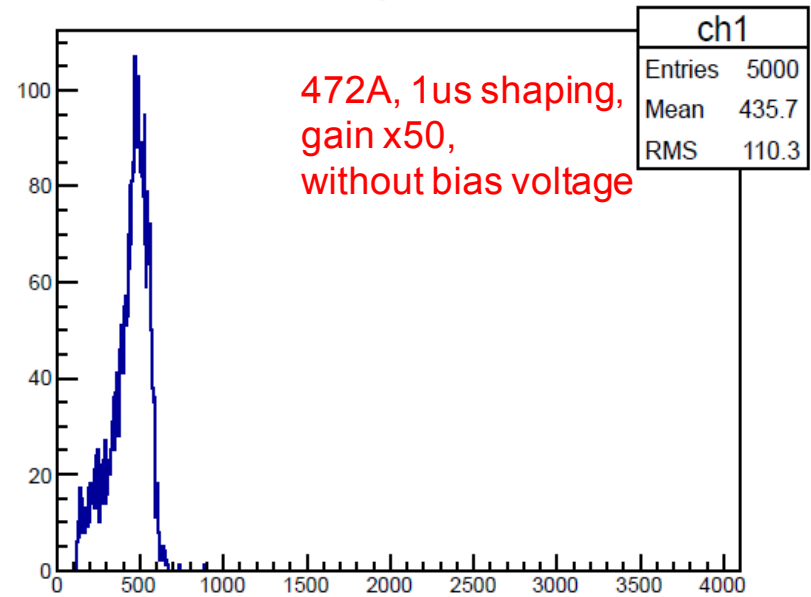


Problem shooting

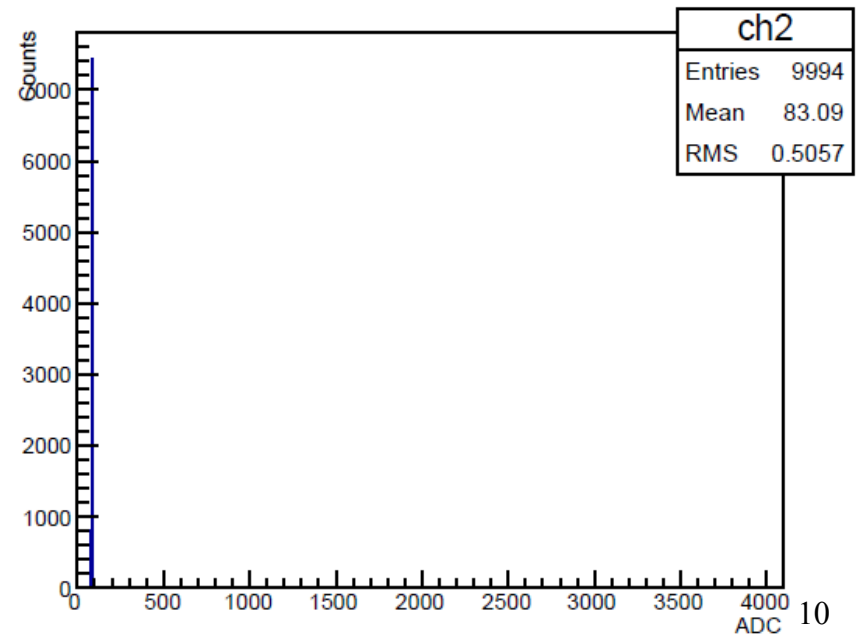
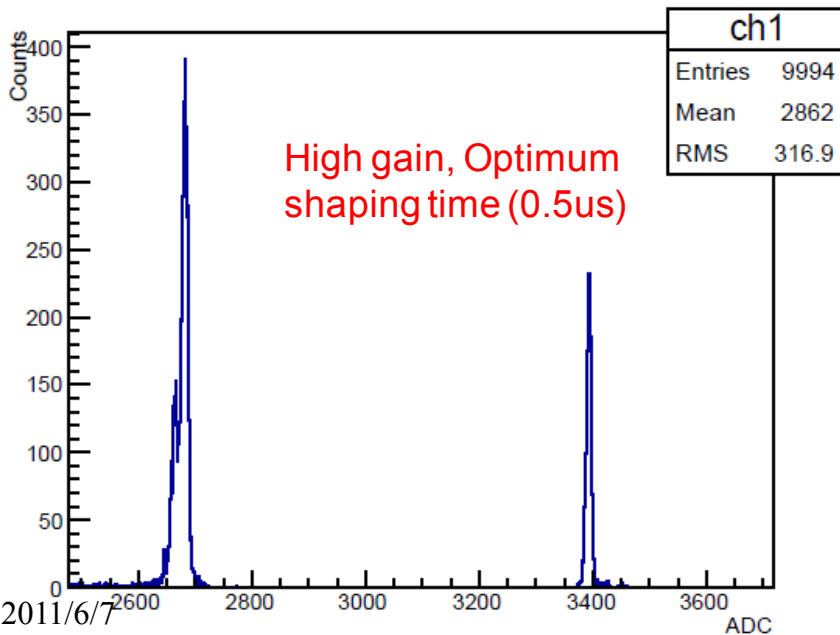
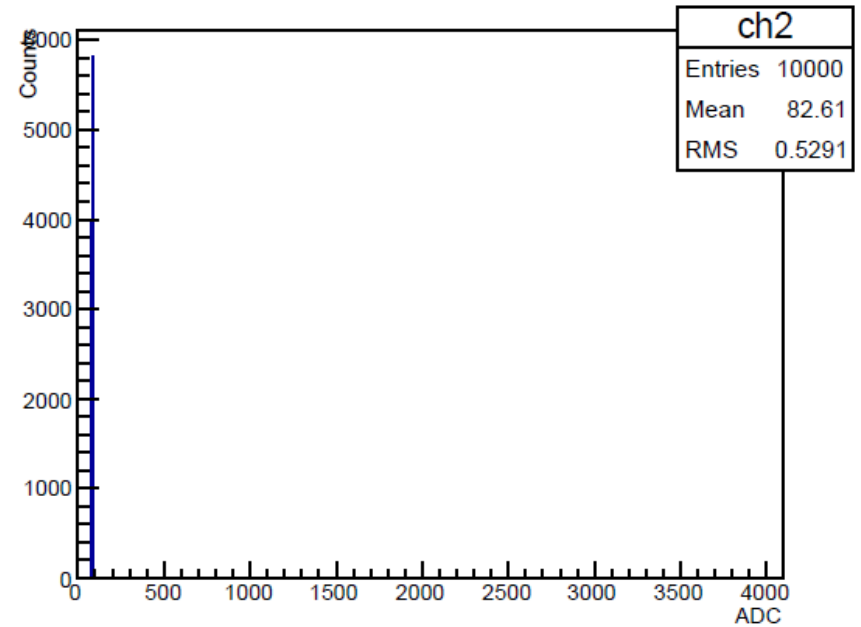
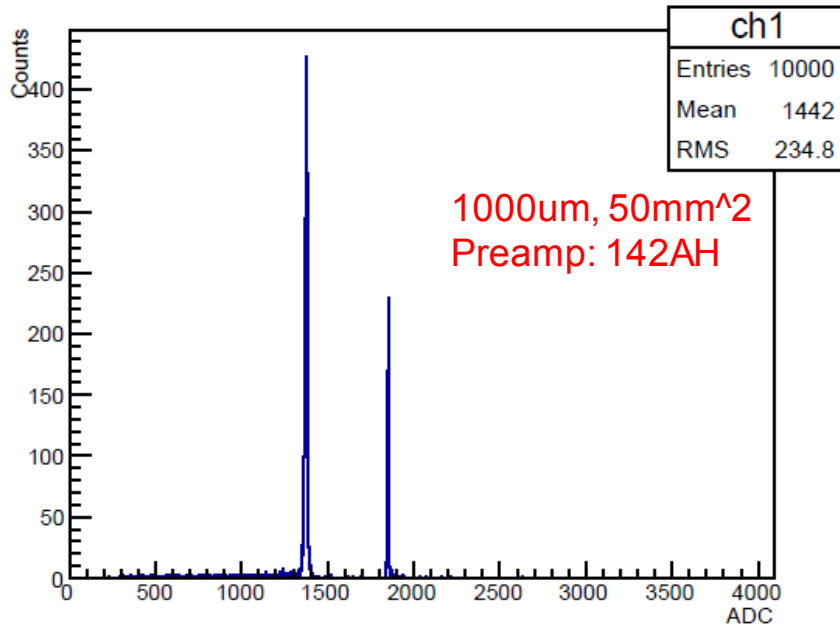
signal1

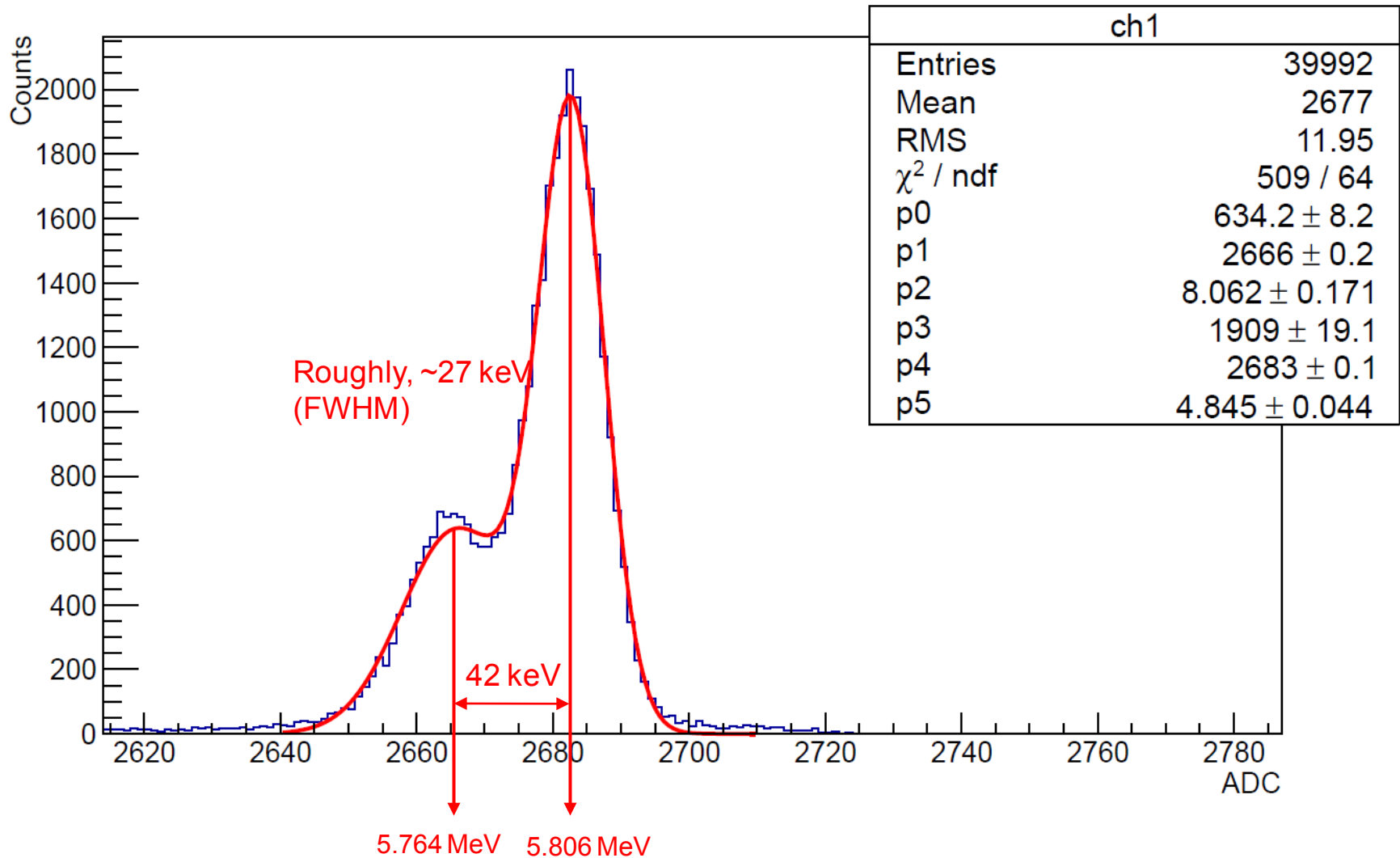


signal1



**Problem remaining with
Detector ?
or
Source?**



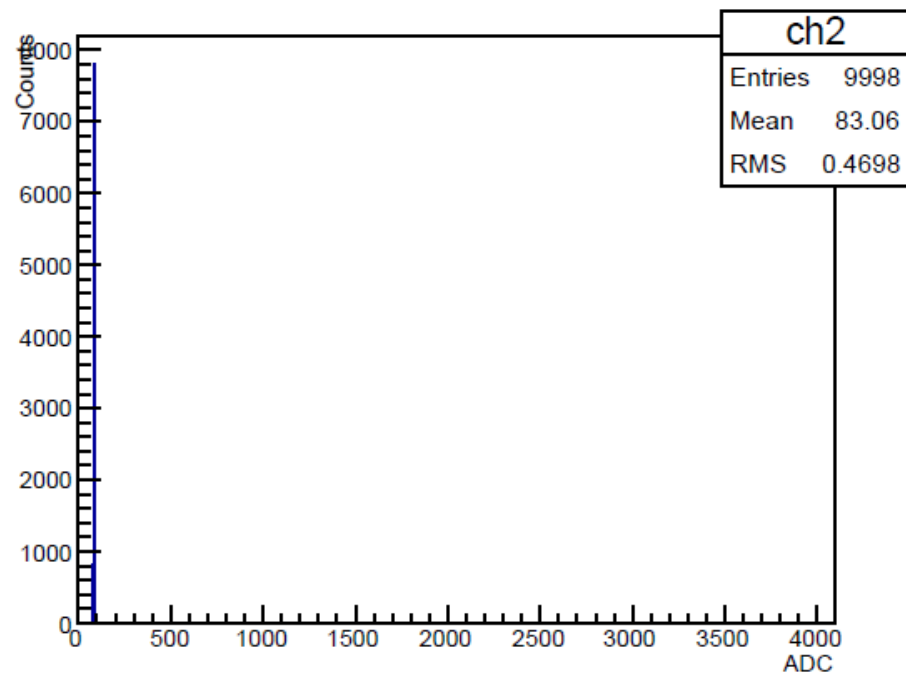
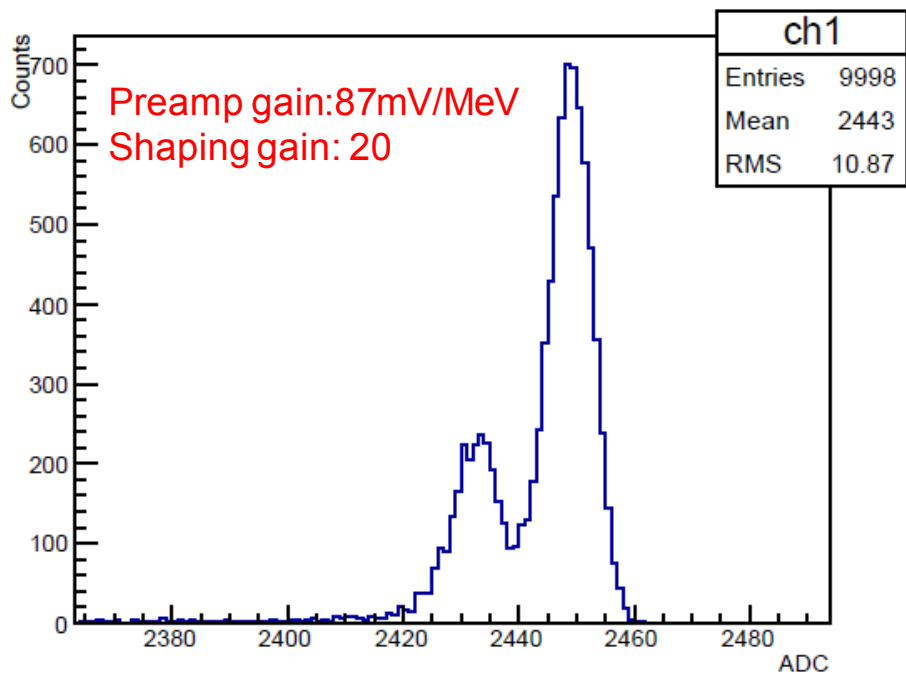
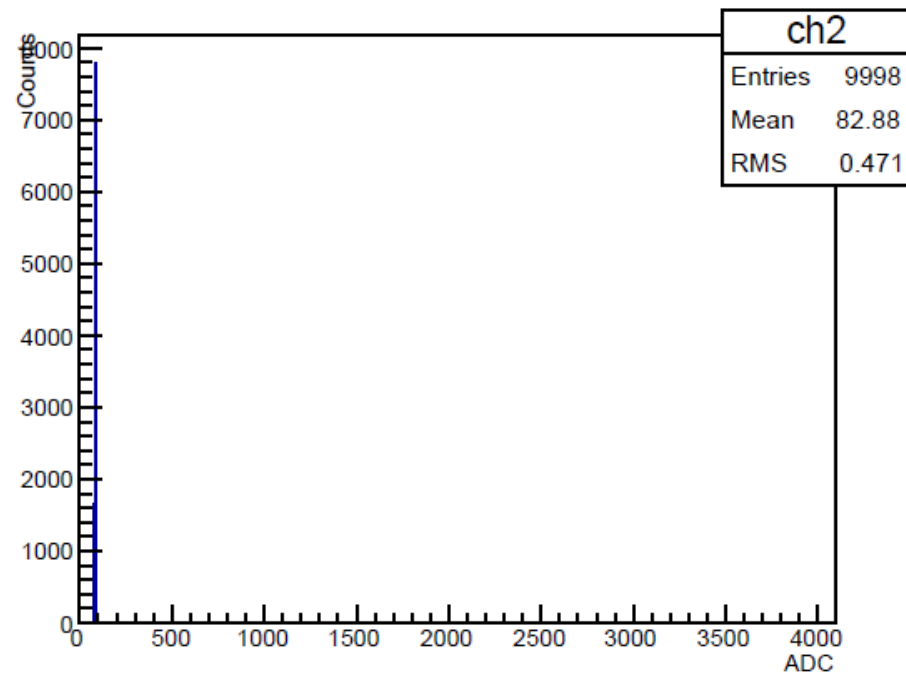
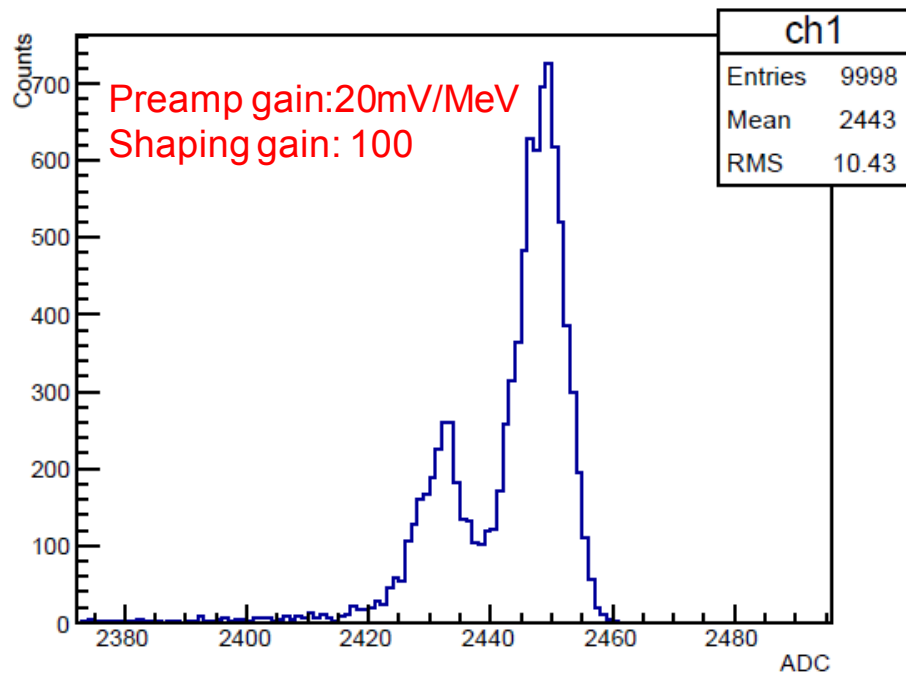


Test system is starting to work

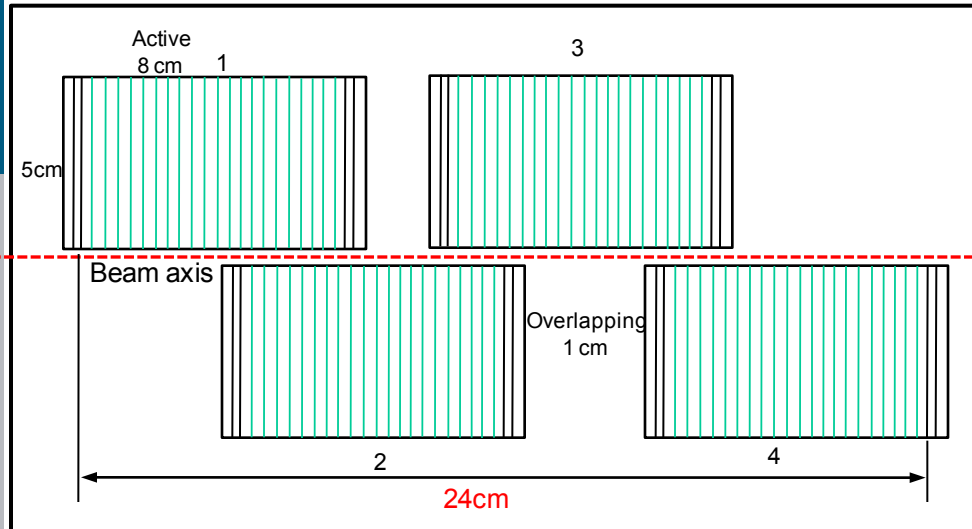
To be done

- **Part1: Detector**
 - Detector holder design, mechanical drawings, detector test and so on
 - Integration
- **Part2: FEE**
 - mesytec FEE performance confirmation study
 - Definition of optimum specs for preamplifier
- **Part3: DAQ & test system**
 - Code work for DAQ to make mesytec ADC run .
 - Code work for online display/offline analysis
- **Part4: Mechanical**
 - Mechanical design for commissioning (i.e. Vacuum chamber for detector, FEE enclosure?)
- **Part5: Cluster jet target**
 - Muenster group will steer.
- **Part6: Accessories**
 - High voltage system combined with cooling system to realize automatic self-protection (e.g. over-temp shutdown or over-current shutdown)

Thanks for your attention!



Detectors layout & FEE channels distribution



Single sided strip detectors

- No. 1 and 2 Si strip sensor:
7.68cm x 5cm x 1000 μ m with 1.2 mm pitch
- No. 3 and 4 Ge strip sensors:
8cm x 5cm x 4 & 10mm with 1.2mm pitch

Probable fired strips per events:

- No. 1 (up to 3.7°), E: up to 6 MeV(2.3), track projection on z: 0.06 mm (3.7°)
- No. 2 (1.1° - 7.8°): E: 0.2 – 10.5 MeV, track projection on z: 0.02mm-0.14mm
- No. 3 (7.0° - 13.5°): (3strips in 1) E: 8.5 – 32 MeV, track projection on z: 0.5mm-0.96mm
- No. 4 (12.7° - 18.9°): (3strips in 1) E: 27 – 60 MeV, track projection on z: 2.25mm- 3.4mm

Commissioning with 160 channels