Test Station for the LHCb Muon chambers

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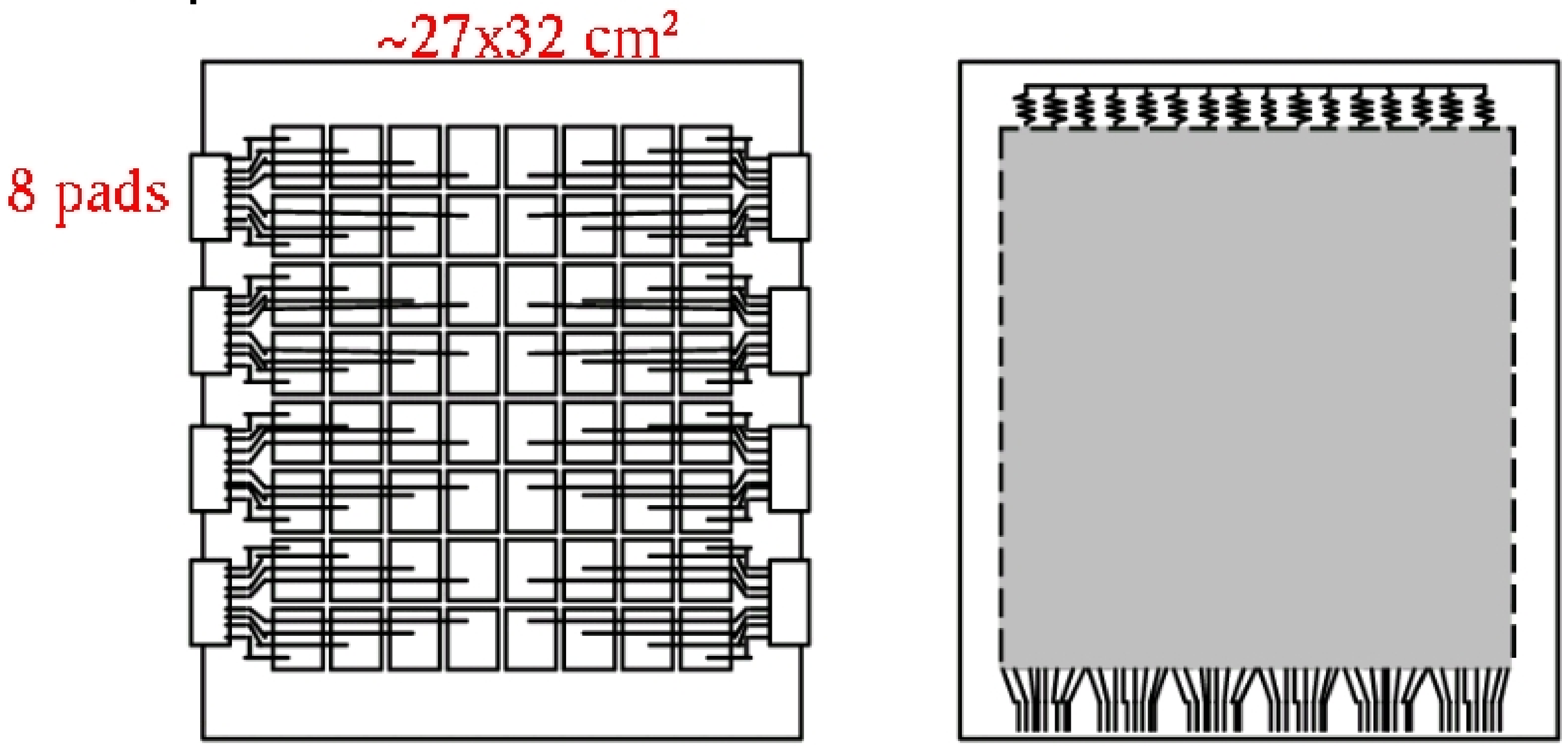
- Outline
  - General idea
  - Characterization of the delay line
  - Test of the TDC
  - Test with a monowire detector
  - Next steps

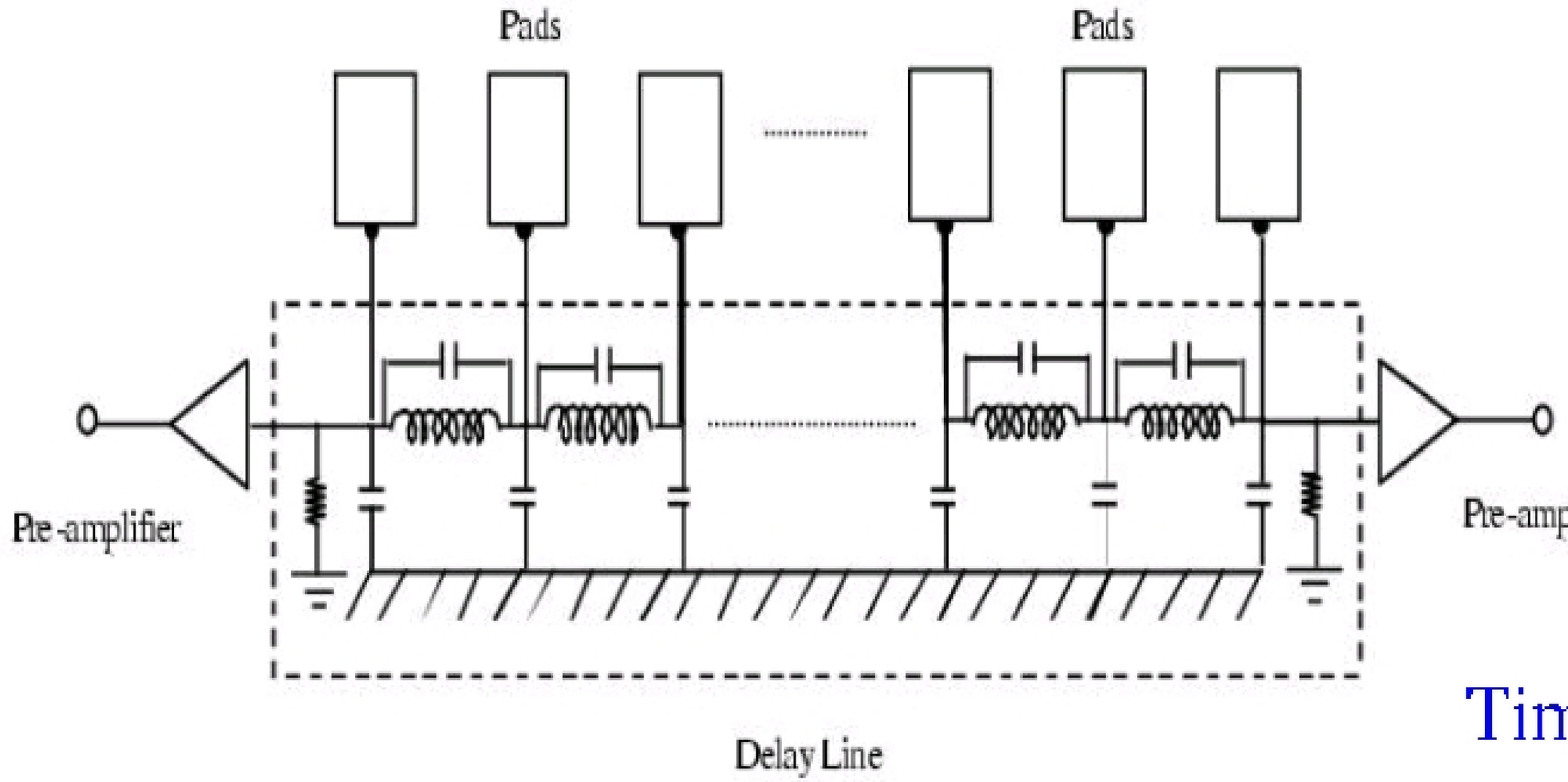
General Idea

- To develop and build a test station to be used in the production center at CERN



General Idea

- Use cosmic rays (uniform irradiation)
- Connect the pads to a delay line

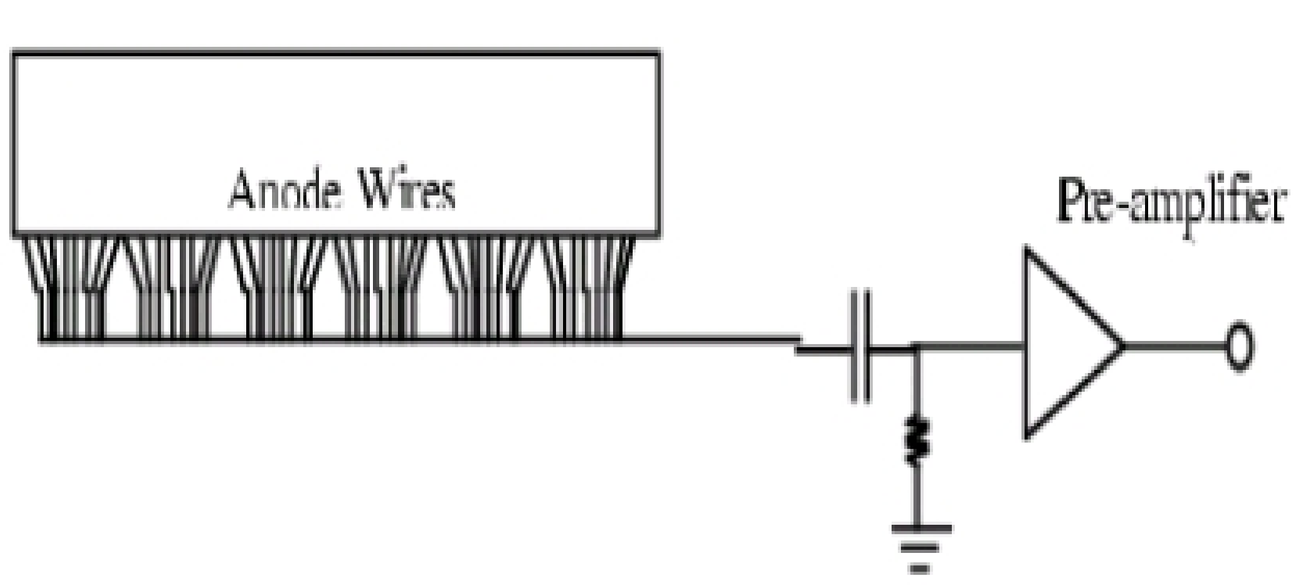


Discriminator →TDC

Time distribution: resolution

General Idea

- Connect the short- circuited anode pads to a pre- amplifier

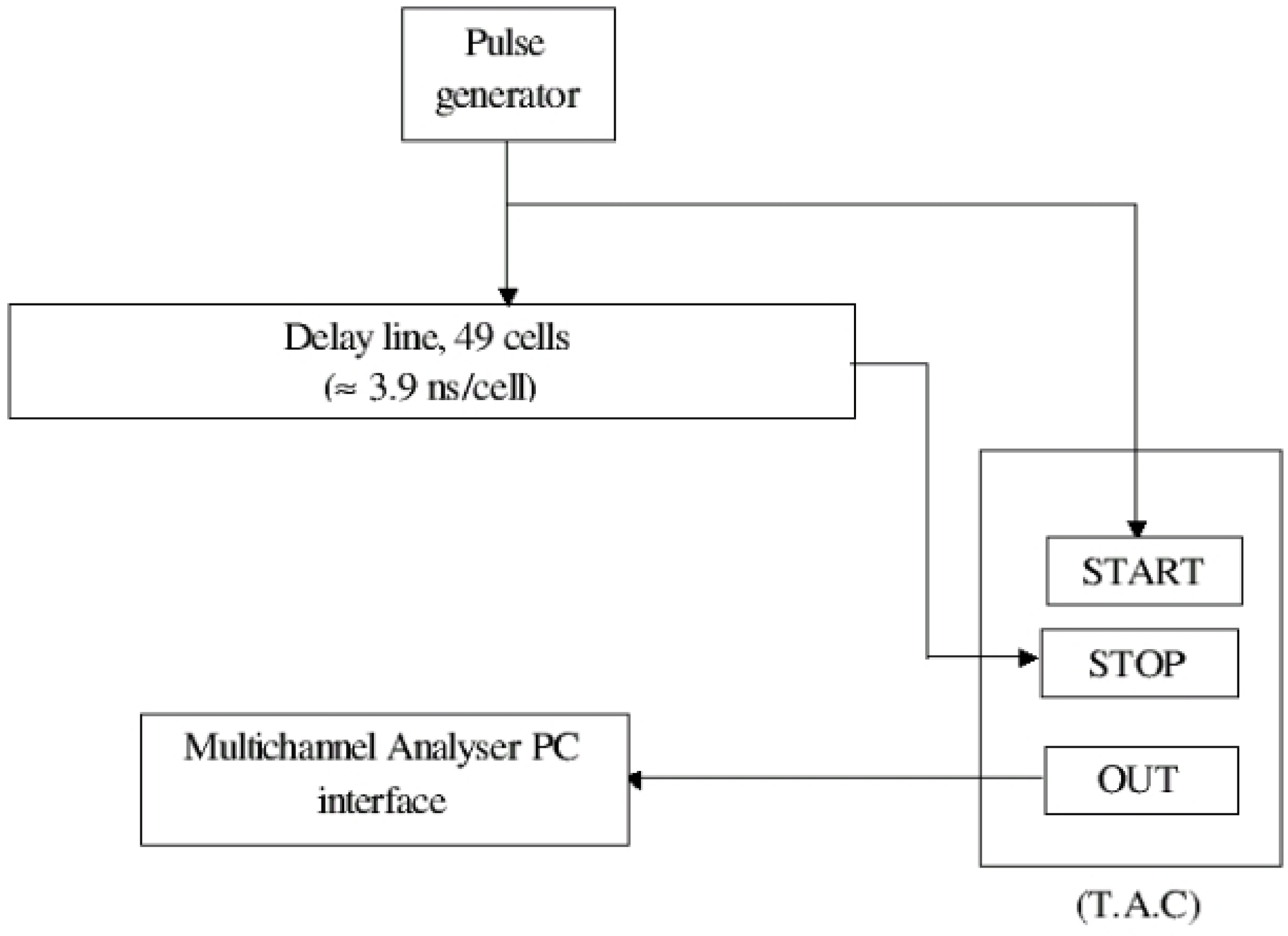


→ ADC/MCA

- Charge spectrum:
  - peak position → chamber uniformity
  - Noise

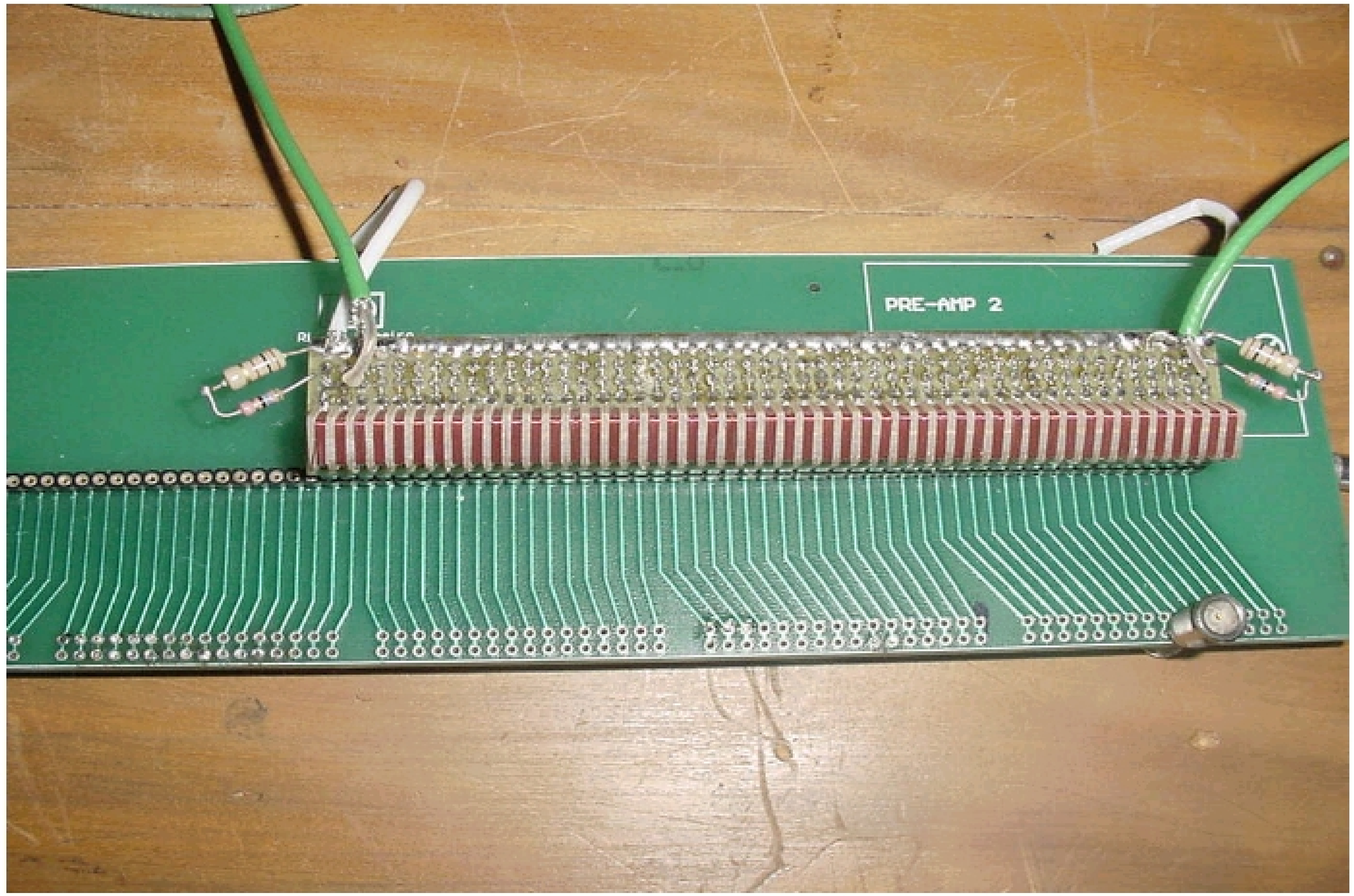
Characterization of the delay line

- Experimental Setup

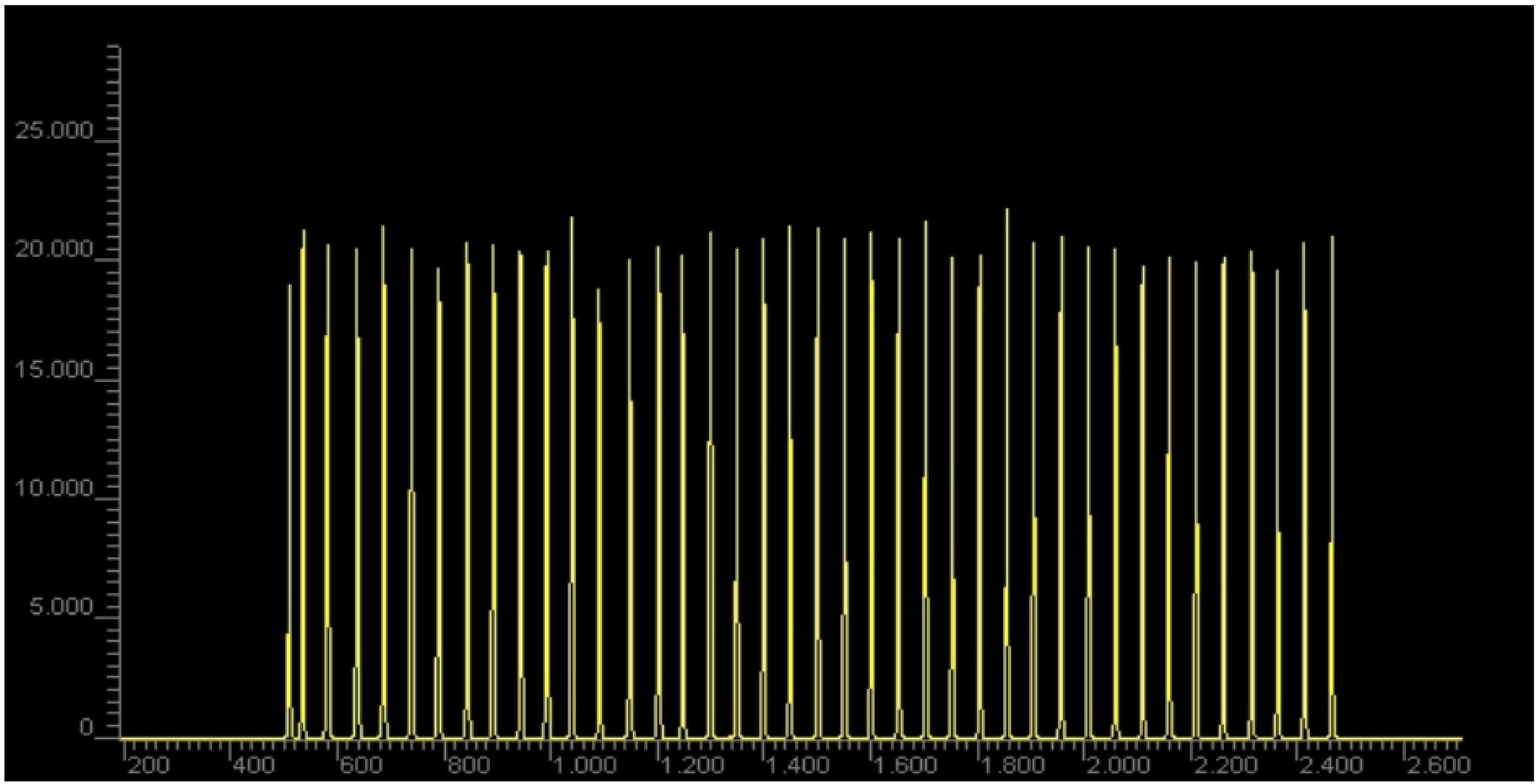


Characterization of the delay line

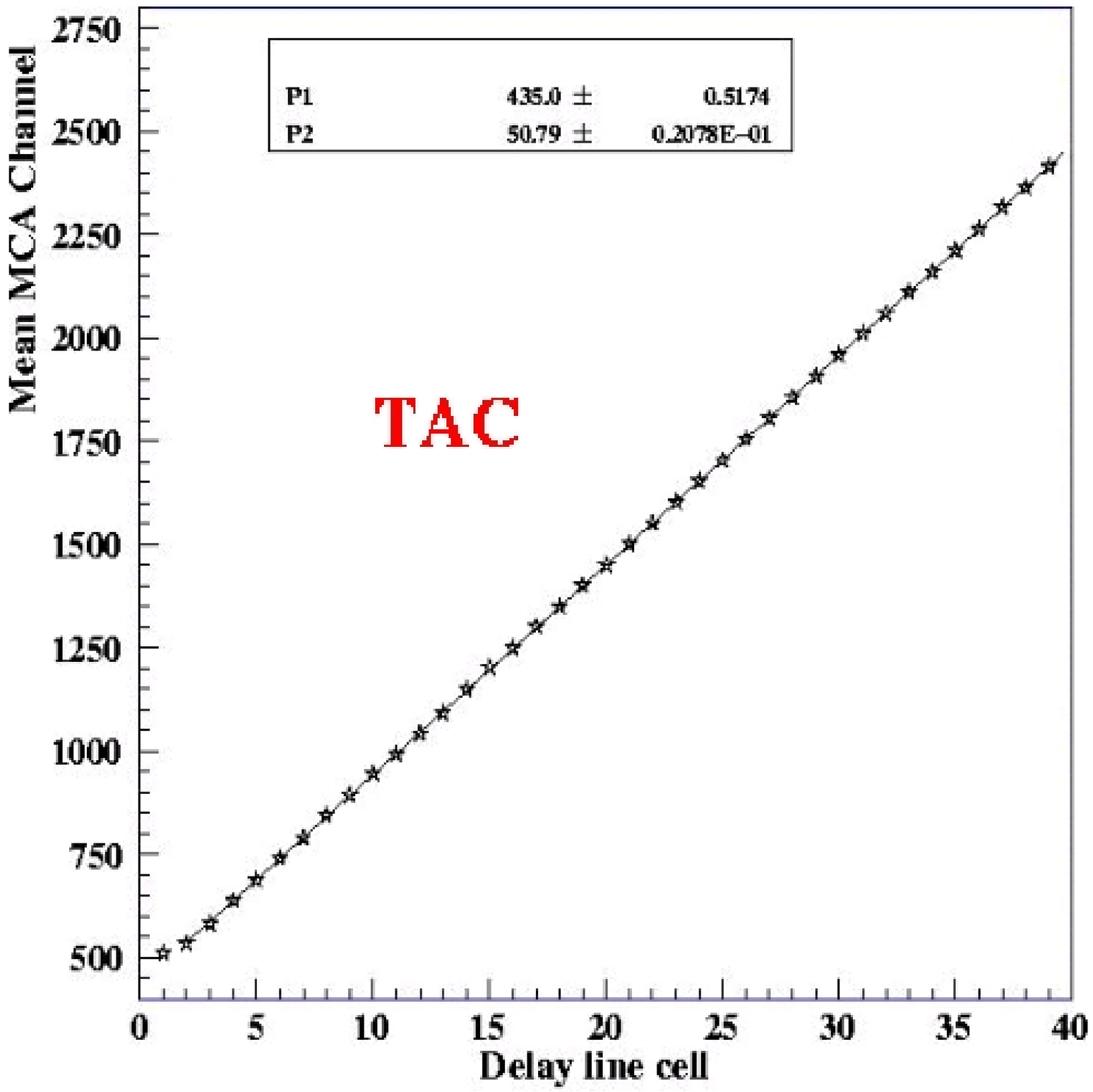
- Delay line: 49 cells, ~ 4 ns/cell

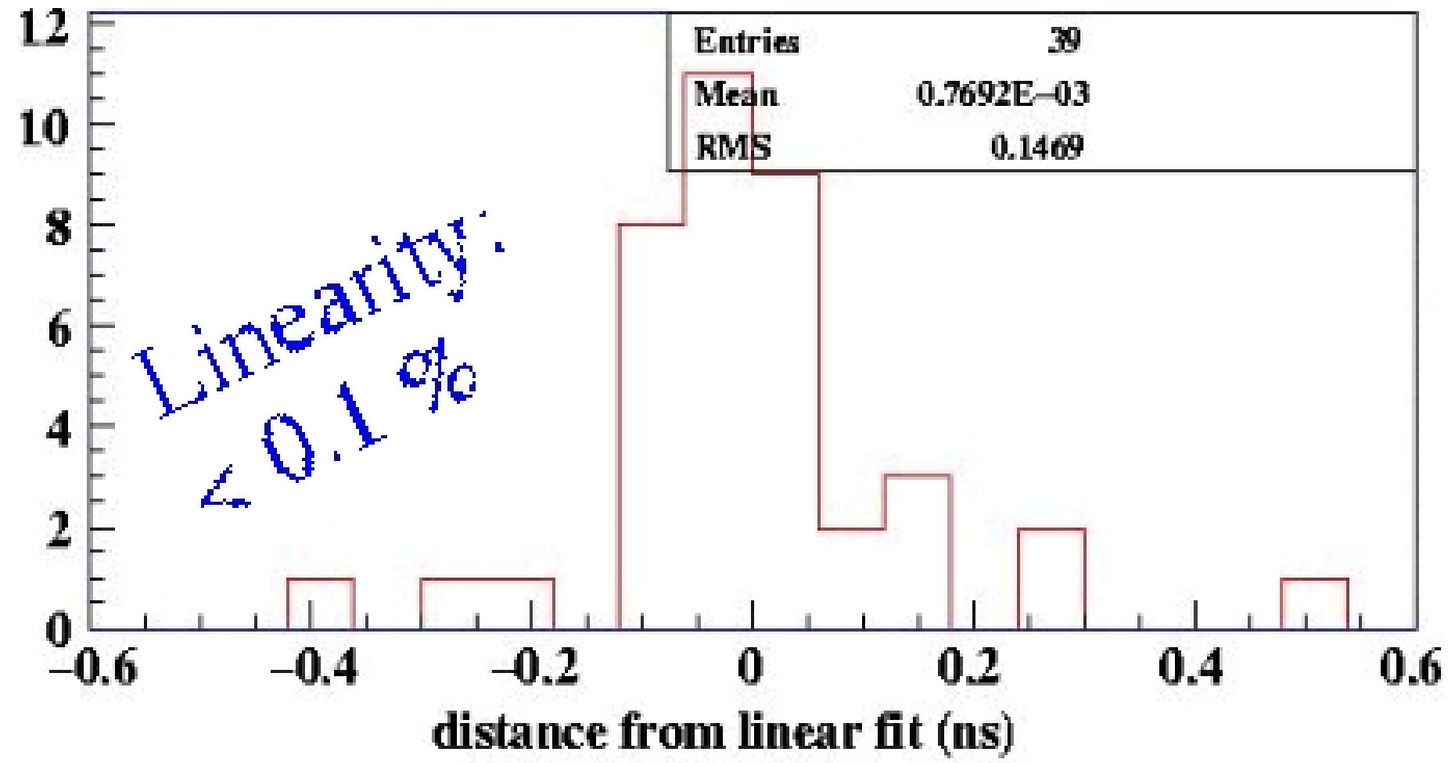


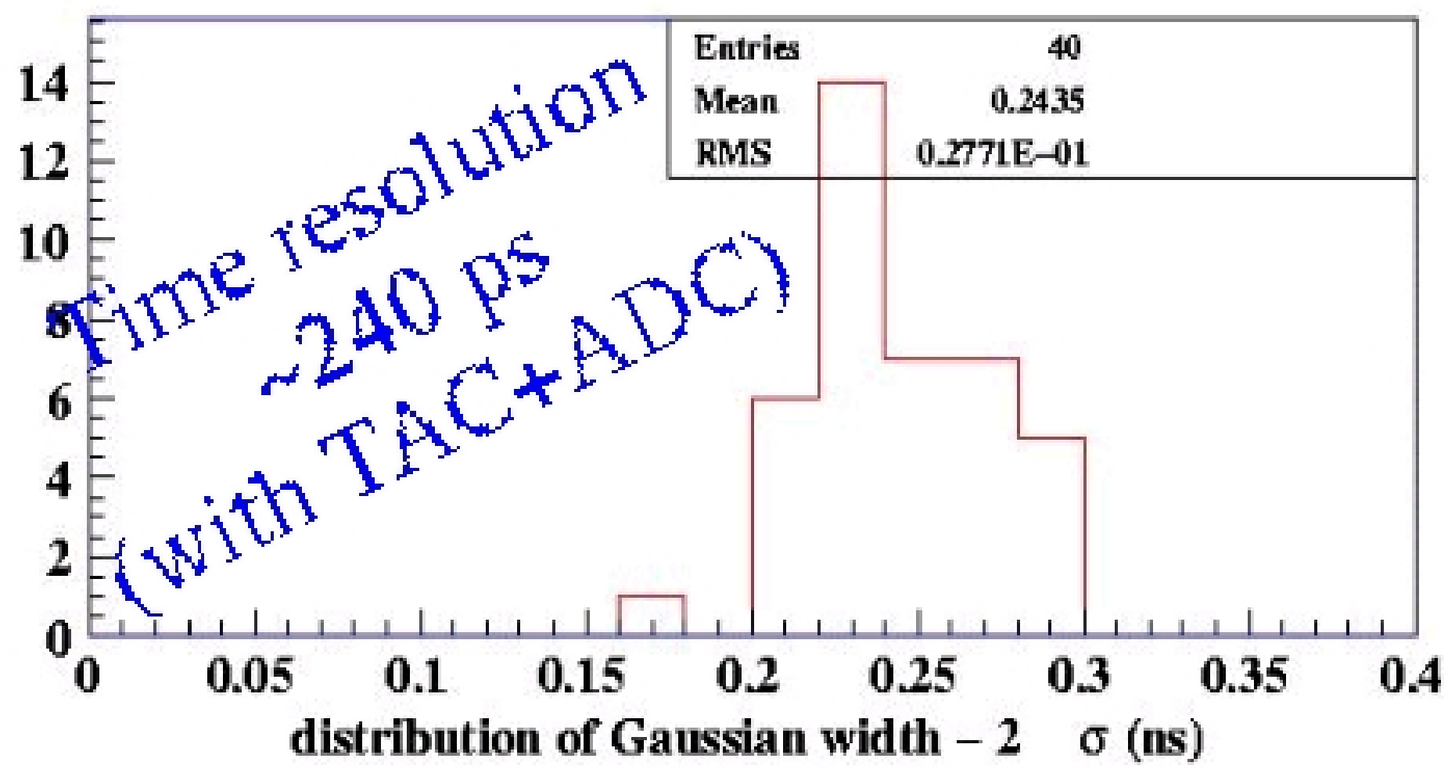
Time spectrum (TAC): pulses injected in consecutive cells of the delay line



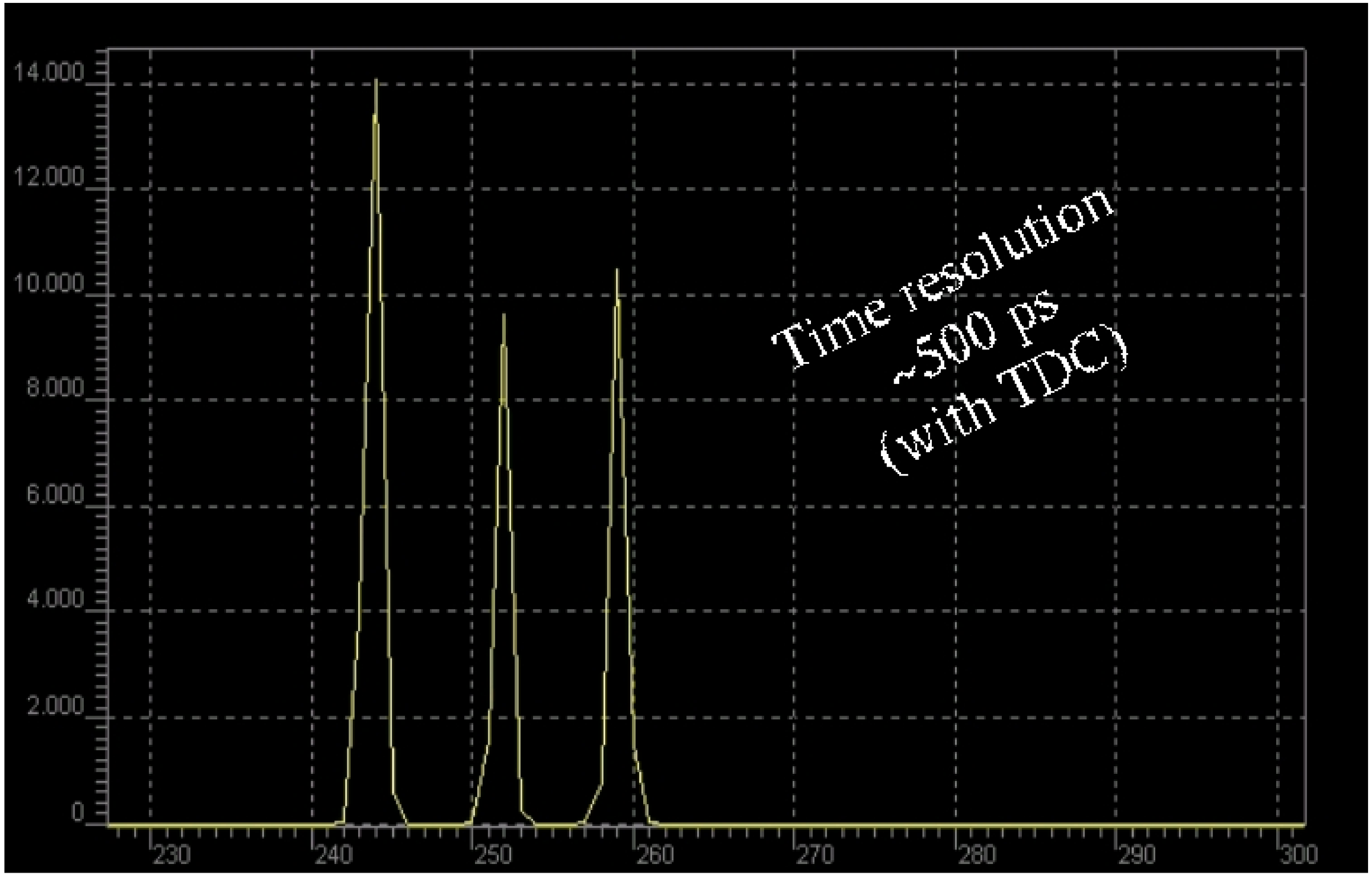
Characterization of the delay line





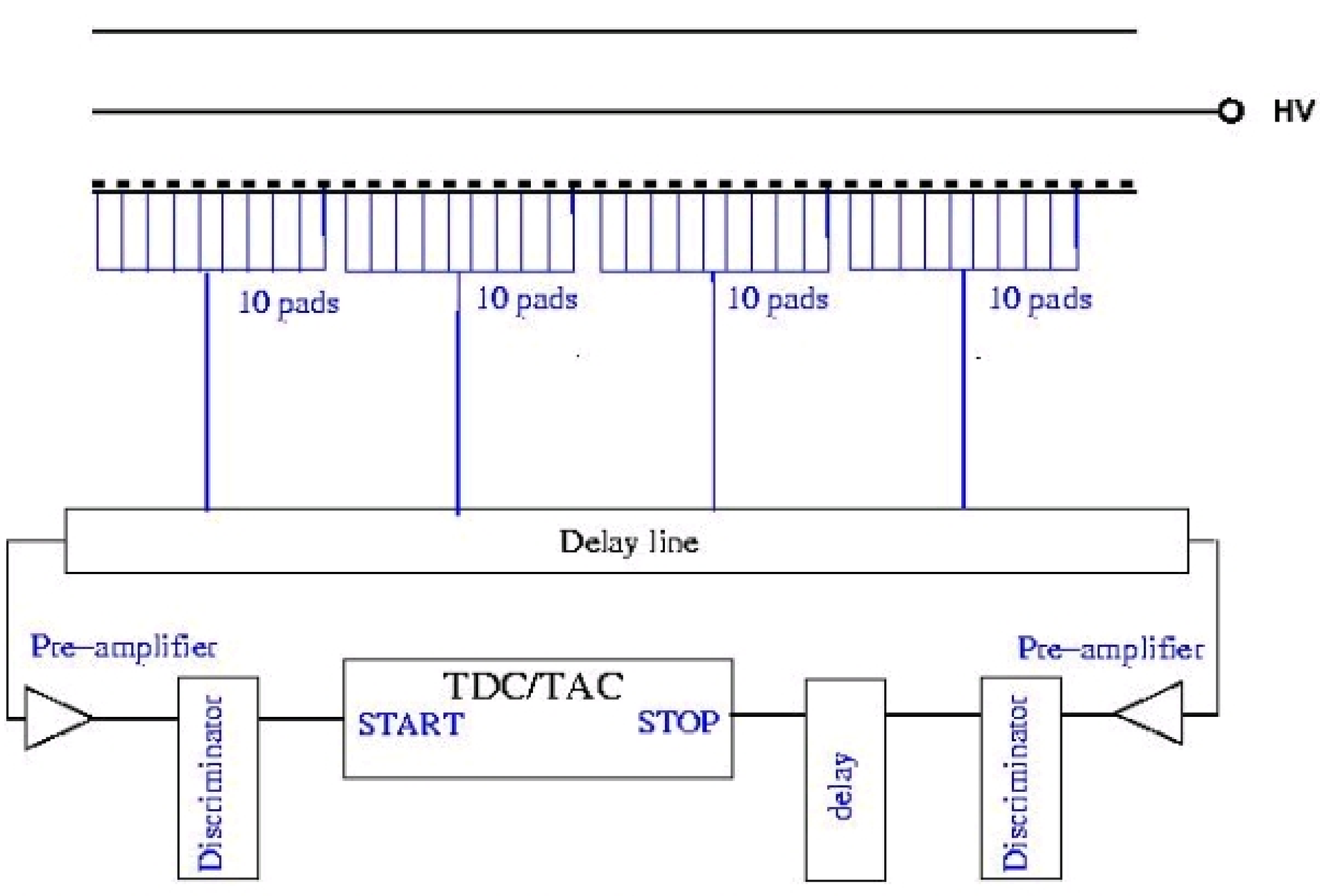


Test of the TDC

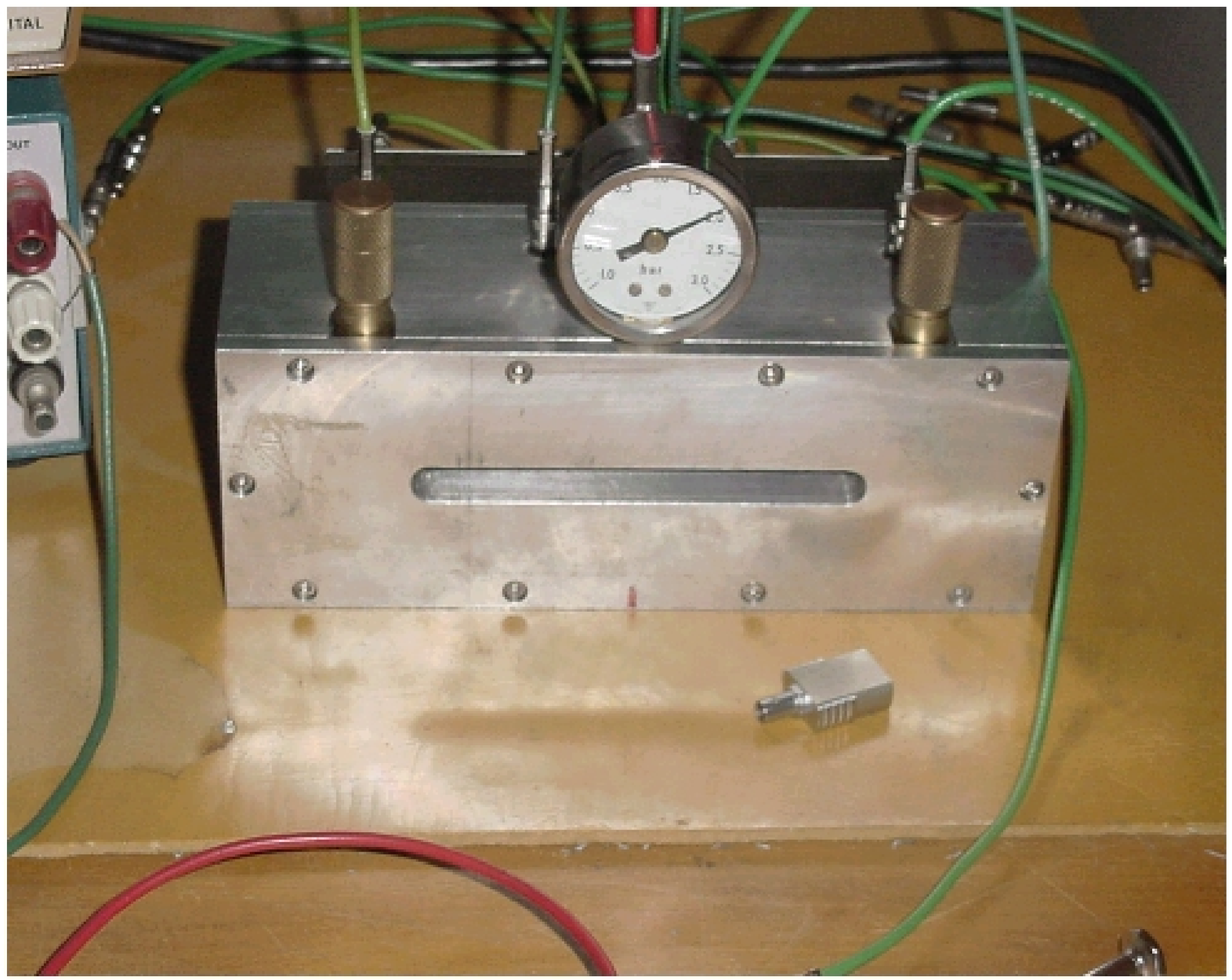


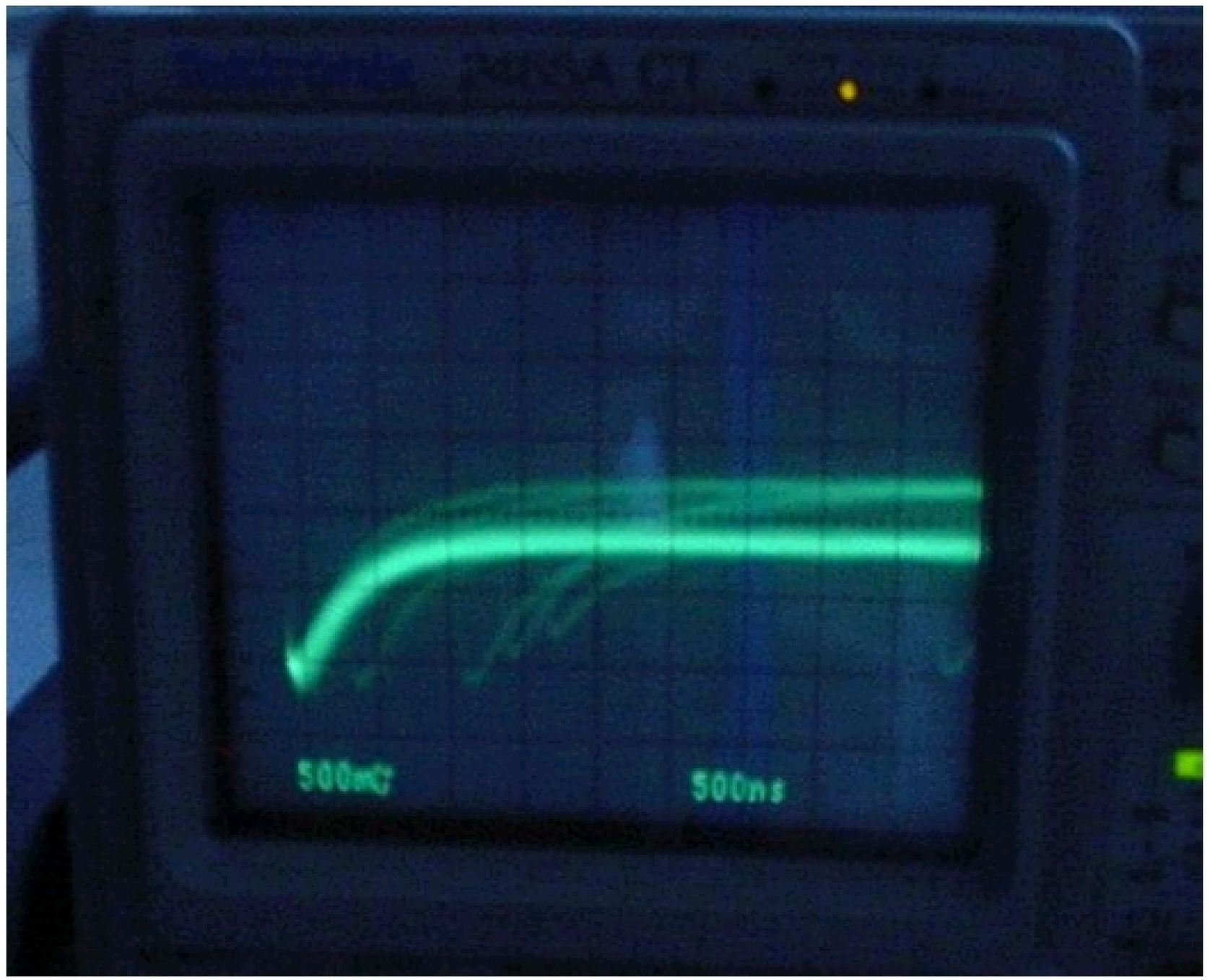
Test with detector

- Gas detector with one wire and 40 cathode pads
- Each 10 pads short- circuited and connected to the delay line



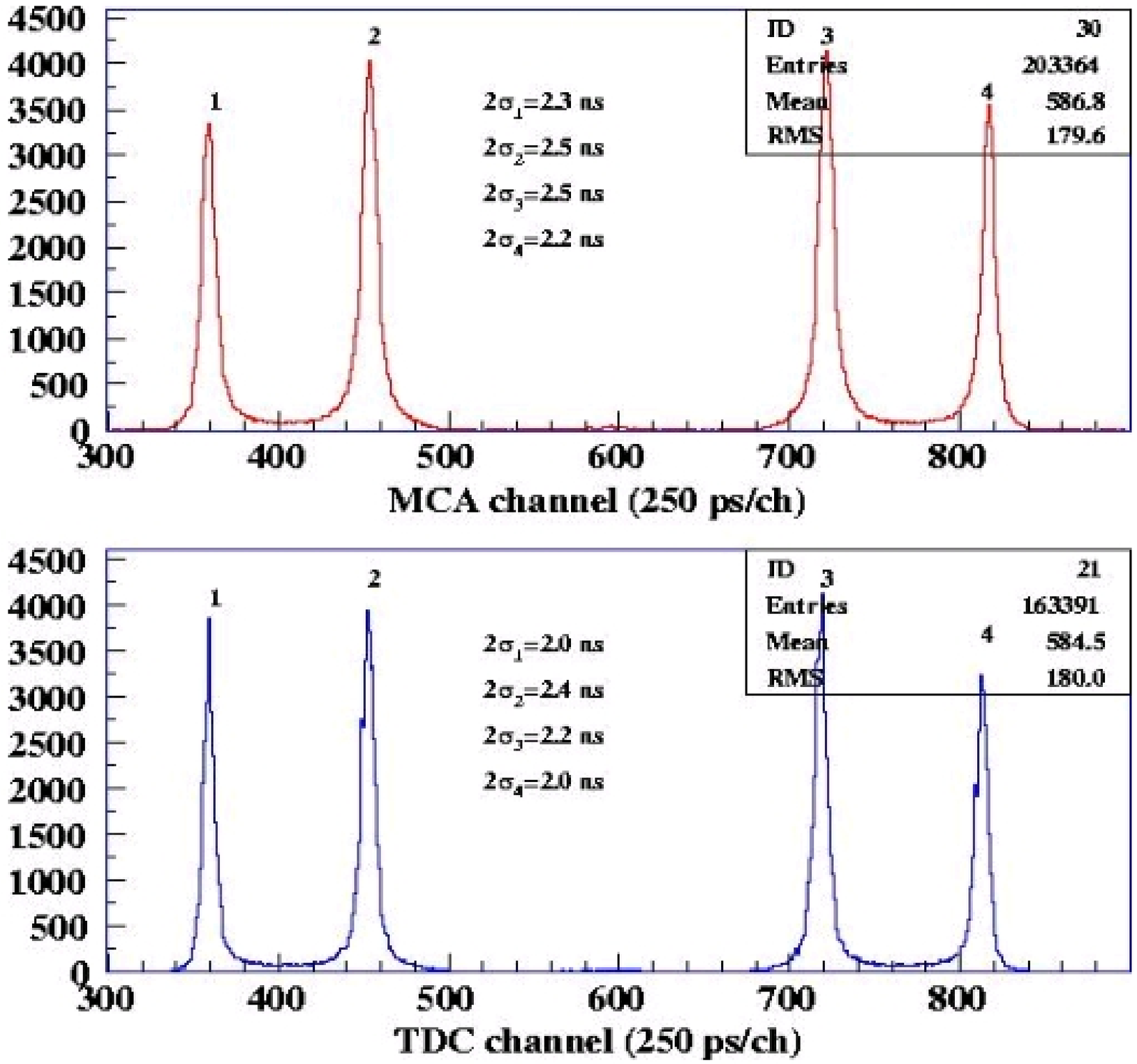
Test with detector





- Delay line inside aluminium box (shielding)

Results of the tests with detector



Pads 1- 10 injected in cell #10
Pads 11- 20 injected in cell #17
Pads 21- 30 injected in cell #34
Pads 31- 40 injected in cell #41

Comments

- The whole setup may be optmized
  - TDC
  - Discriminators
  - Pre- amplifiers
  - Connections

=> better time resolution may be achieved

Next steps

- Tests with the LHCb muon chamber prototype at CBPF
- Design of the test station mechanical enclosure
- Design and production of the electronic circuits
  - Delay line, pre- amplifier, discriminator, digital interface
- Software development (PVSS SCADA?)