

Test bench for GASPARD detectors and electronics

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Outline



- Motivations
- Set up
- Waveform generator
- Qualification of GASPARD detector
- Test of preamplifiers

Motivations



- Develop a protocol to characterize the GASPARD silicon detectors
- Develop a protocol for electronic qualification.



Amplitude of the current signal versus energy for different particules (p,d, t, α)

Set-up



Usually we are doing charge/peak



Waveform Generator





- With only $\boldsymbol{\alpha}$ source there is no shape analysis of the current signal.
- Need of a generator to qualify filtering and electronics.



Qualification of the GASPARD detectors





- Silicon detector from the trapezoïd detector wafer
- The PACI as preamplifier
- A 3α source

Filtering	Energy resolution (keV RMS)
Analog (572 Ortek)	16 ±1
Moving average (109 points)	11 ±1

The energy resolution of the silicon detector is satisfactory.

Test of preamplifiers





Refer to the talk of Jean Jacques.

Conclusion :



- We built an acquisition system with pulse shape analysis tools.
- We used a pulse shape generator to avoid beam test .
- We tested GASPARD silicon and found them to be fine.
- We compared PACI and IPACI and found that the current signal is better for the PACI.

Thank you.

Different filtering

Filtering	Energy resolution (keV RMS)
Analog (572 Ortek)	12 ±1
CR-RC2	15 ±1
Moving average (109 points)	7 ±1

Moving average filtering

- The moving average filtering is equivalent to an analogical low pass filter.
- We recreate each point of the output signal doing the average of a given number of points of the input signal.

CR-RC2 filtering

- The CR-RC2 reproduces numerically the action of the amplifier.



for m=4:1:nbpoints

```
sortie(m) =num0*entree(m)+num1*entree(m-1)+num2*entree(m-2)
+num3*entree(m-3)-den1*sortie(m-1)-den2*sortie(m-2)-den3*sortie(m-3);
```



Experimental set-up

