

SENSOR CHARACTERIZATION SERVICING

ABSTRACT

A set-up for the characterization of SiPM, in particularly for Photon Detection efficiency. The wavelength range is between 350-650nm. The method is described in Ref [1].

TECHNOLOGY STAGE

Ready to use.

POSSIBLE APPLICATIONS

- Medical Imaging.
- High-Energy Physics: calorimeters
- Astronomy/Astrophysics
- Astroparticles/ Astrophotometry

INSTRUMENTATIONS

- WaveForm generator AGILENT 3322
- Controlled thermal box ± 0.1 C
- Reference photodetector HAMAMATSU

- source voltage precise & stable Keithley 6487/E
- fiber connection/FC connectors
- Picosecond laser driver Picoquant (PLD 800-D)
- Pulsed light source with collimator PLS450
- Pulsed light source with collimator PLS500
- Filters and Optics

MEASUREMENTS SET-UP

The details of measurement procedure are described in Ref.[1]

In the following only the main guide line are reported, Fig 1.

The light from a Light-Emitting Diode operating in a pulse mode was delivered to an optical filter (± 3 nm). The filtered light was routed to a thermo-stabilized box (± 0.1 C). As reference photodetector has been used a calibrated PhotoMultiplier Tube.

ADVANTAGES

The set-up provides characteristics of SIPM of different firms in same condition without any complex instrumentation. The data analysis procedure is a new method implemented by the

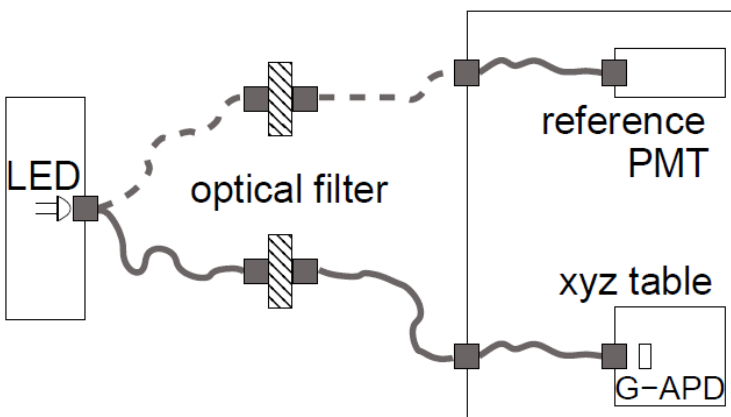


Fig.1 General scheme of
PDE measurement.

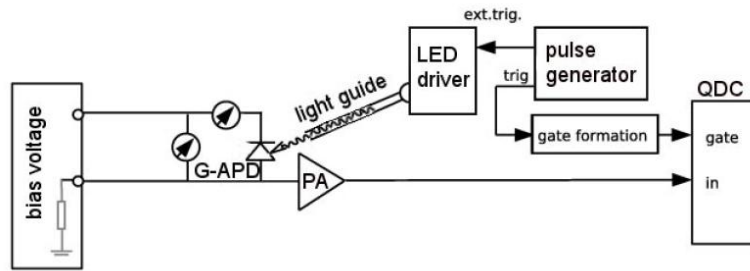


Fig.2 Schematic SIPM readout

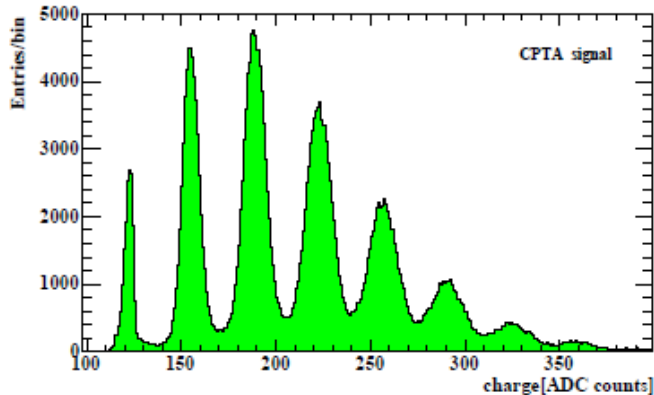


Fig. 3 Signal spectra obtained with CPTA detector by short, low intensity LED at $\lambda = 600 \pm 3\text{nm}$. Each peak corresponds to a number of detected photons.

LIMITATIONS

The servicing in the present set-up is limited to the wave length ranges mentioned above.

REFERENCES

1. Measurements of photon detection efficiency of Geiger-mode avalanche photodiodes (G-APD) S Gentile, F.Meddi, E. Kuznetsova. , Il Nuovo Cimento B 125,08,(2010)
2. Photon detection efficiency of Geiger-mode avalanche photodiodes S Gentile, F.Meddi, E. Kuznetsova. , Proceeding International Linera Collider Workshop 2010, LCWS10 and ILC10, March 26-30, 2010, IHEP, China (arXIV:1006.3263).
3. Measurements of the photon detection efficiency done for Geiger-mode avalanche

photodiodes (G-APD) S Gentile, F.Meddi, E. Kuznetsova (Oct. 2009), Proceeding 11th ICATPP Conference, 5 - 9 October 2009, Villa Olmo, Como, Italy (published by World Scientific Publishing).

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