# HIDRA signal vs casisTime: MIP and LED test

https://docs.google.com/document/d/1j4naJYLcq_apt7V6Fn4Tyh3mCR2d2uImZddfkg08e9A/edit#heading=h.llnndg4j1r58

Lorenzo, Seba, Raffaello, Eugenio ecc ecc….

Introduction

- ◆ LYSO signal is fast ~ 100ns.

- ◆ PD is very fast ~ 10ns.

- ◆ If signal depends on casisTime, it is due to the electron

- ◆ Standard configuration: MIP measurement

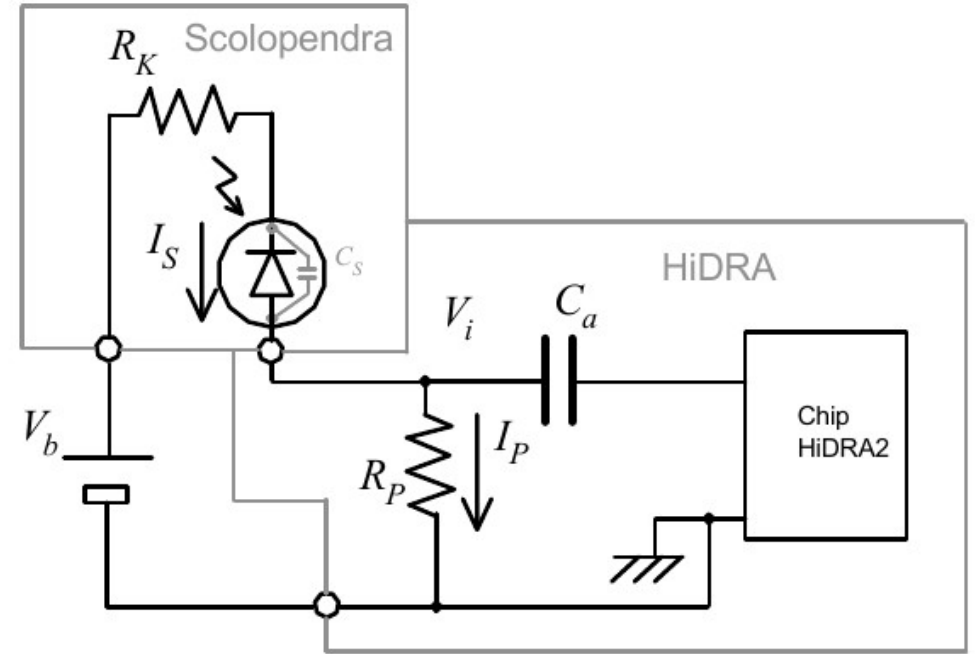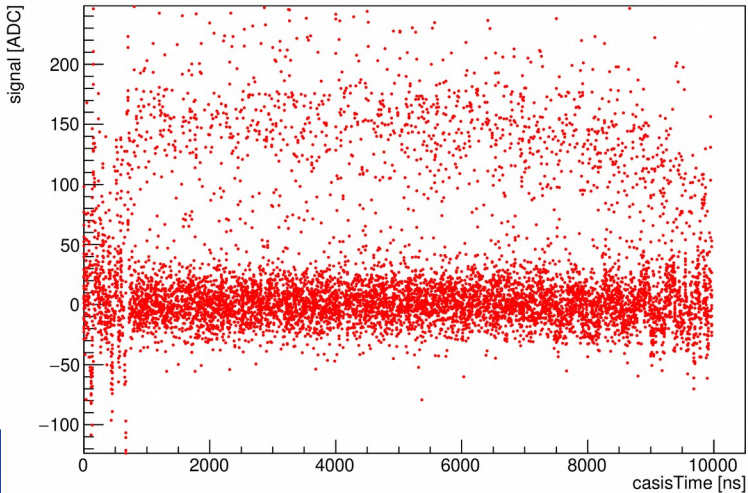MIP and ped. singal, LYSO 2cm, LPD
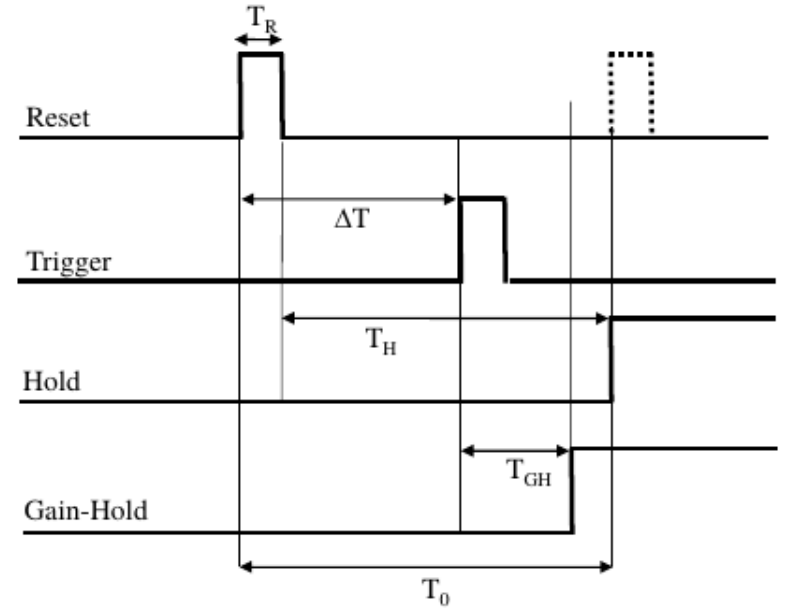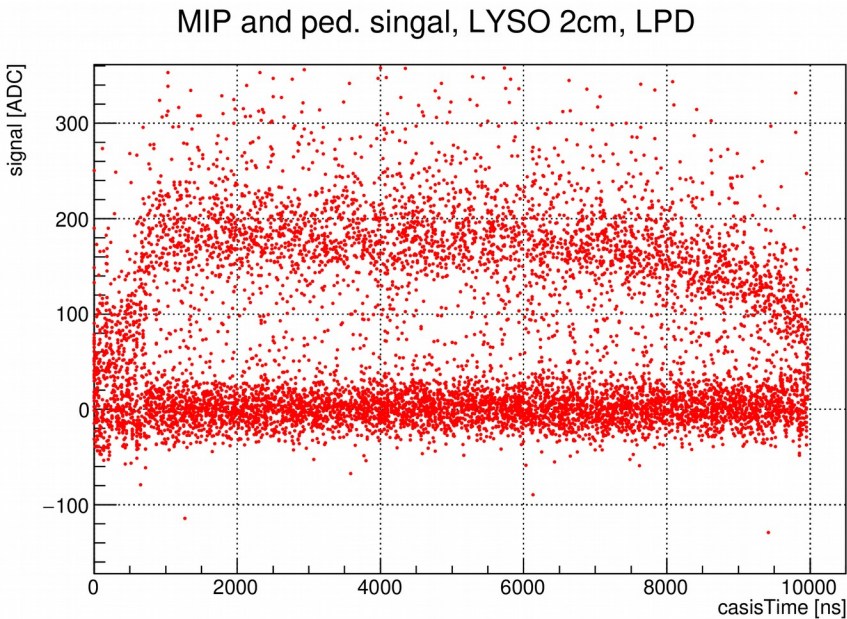
Testing external components

- ◆ Check if the time constant depends on:

  - ● Ca

  - ● Rk

- ◆ MIP measurement shows that Ca has not large impact on the time constant.
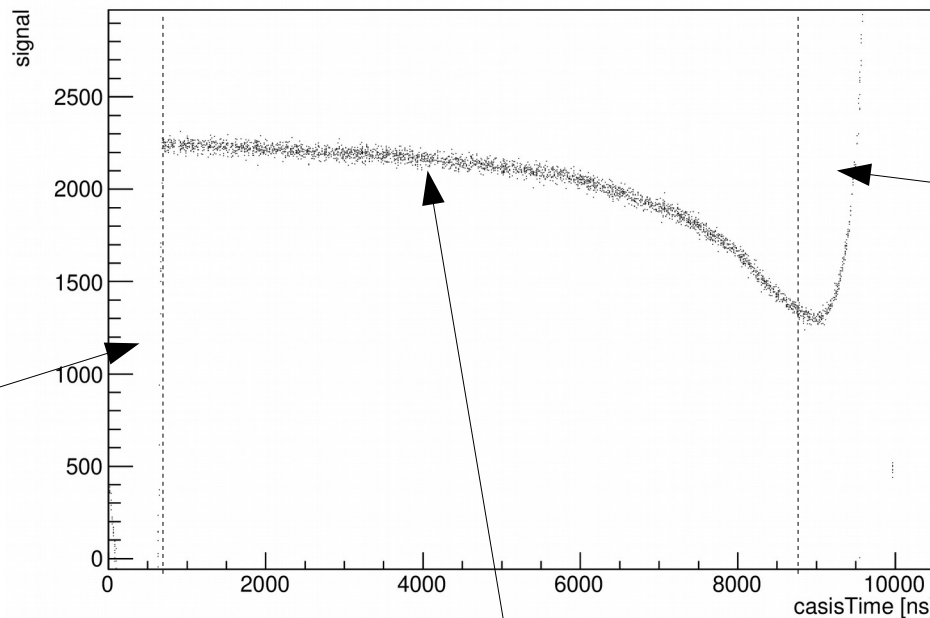
MIP, LYSO 2 cm, Ci = 1nF

Using LED to confirm MIP measurement

◆ Using LED with pulse generator to inject light into a PD

  • HV ~ 1.5 V

  • Pulse width: 300 ns

LED signal vs casisTime
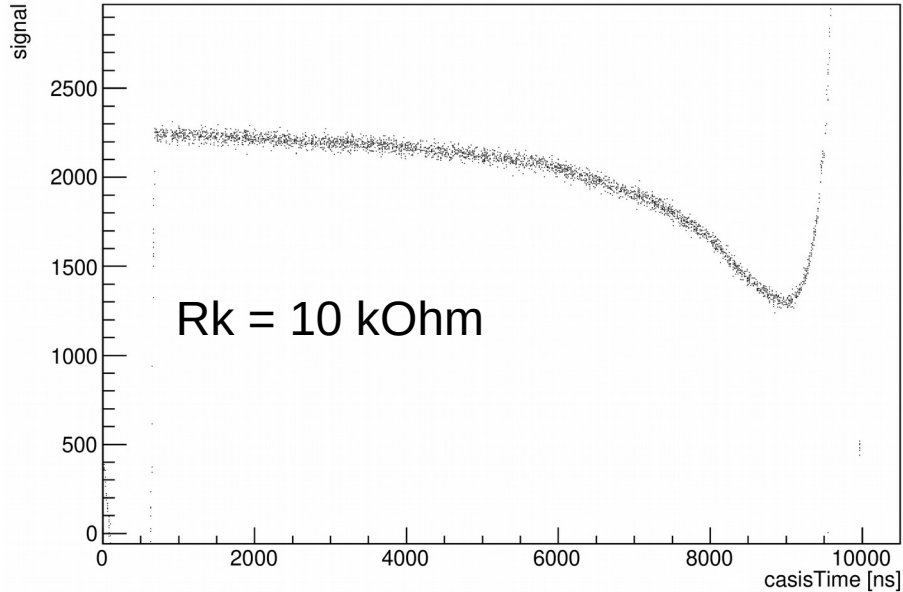
Reset is high, we should reject this time period

Here the test LED is reliable.

Unexpected behaviors due to interference coming form the LED power.

Testing Rk: removing the resistor
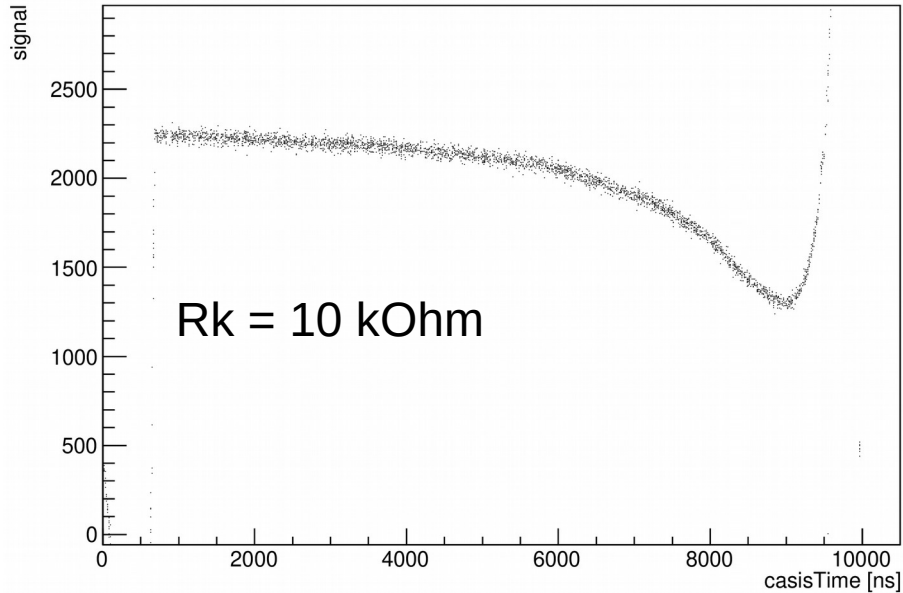
◆ Rk is needed for SiPMs but can be removed with Pds.
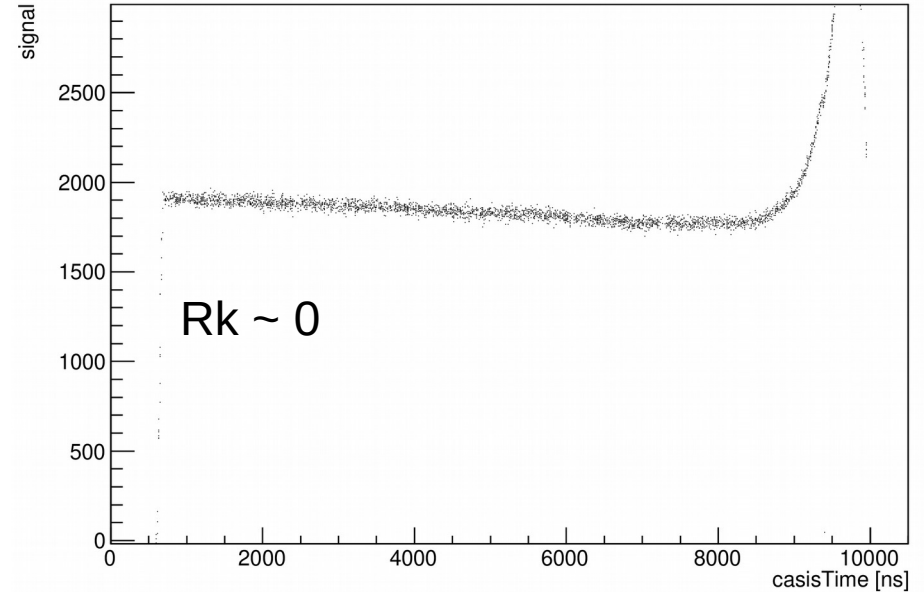
◆ The distribution is flatter but a small dependence with CT remains

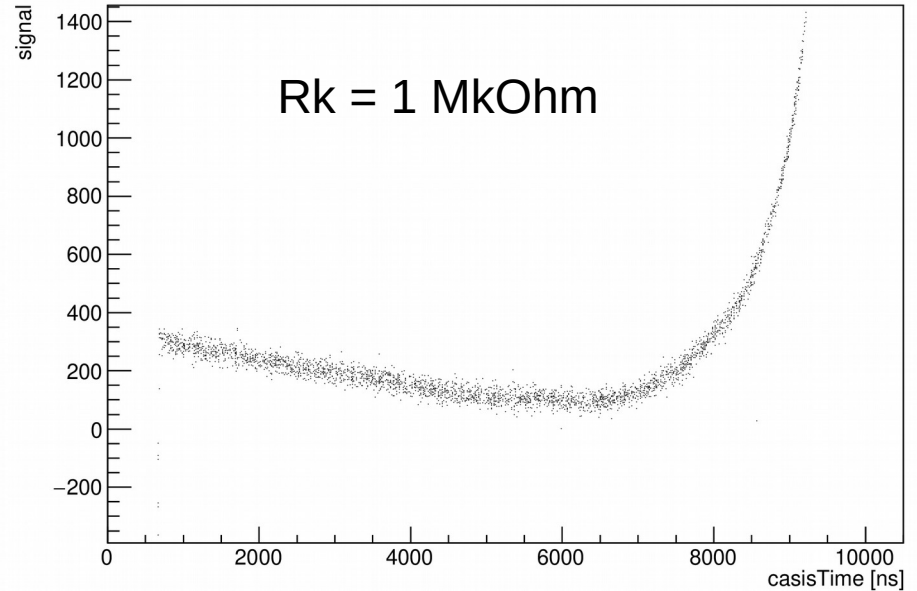# Testing Rk: using 1 MOhm

◆ As expected the problem increases and the signal value strongly decreases!
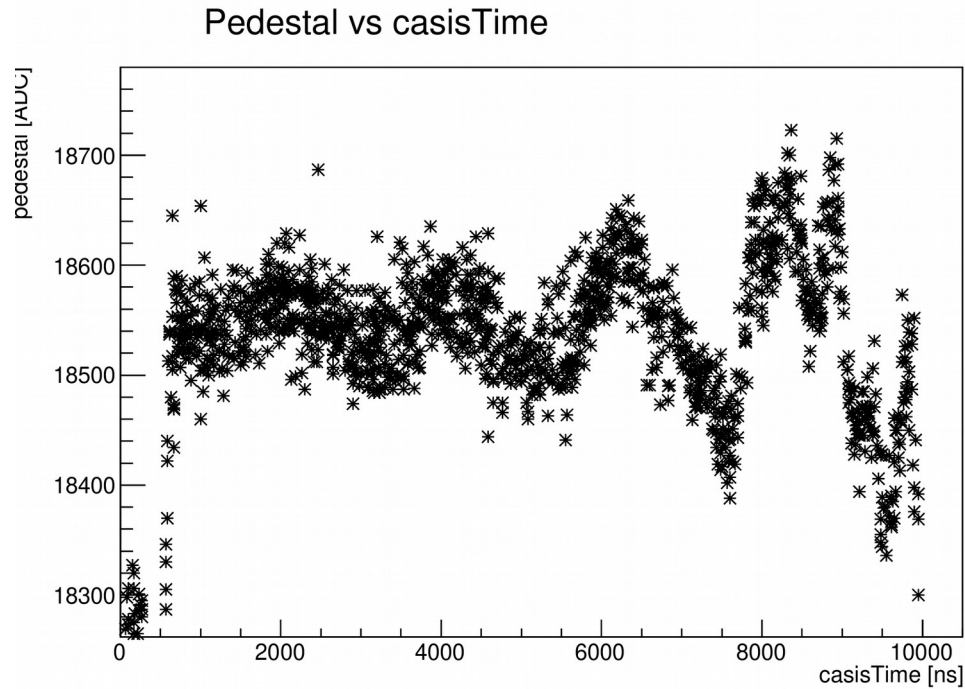

LED signal vs casisTime — Rk = 10 kOhm
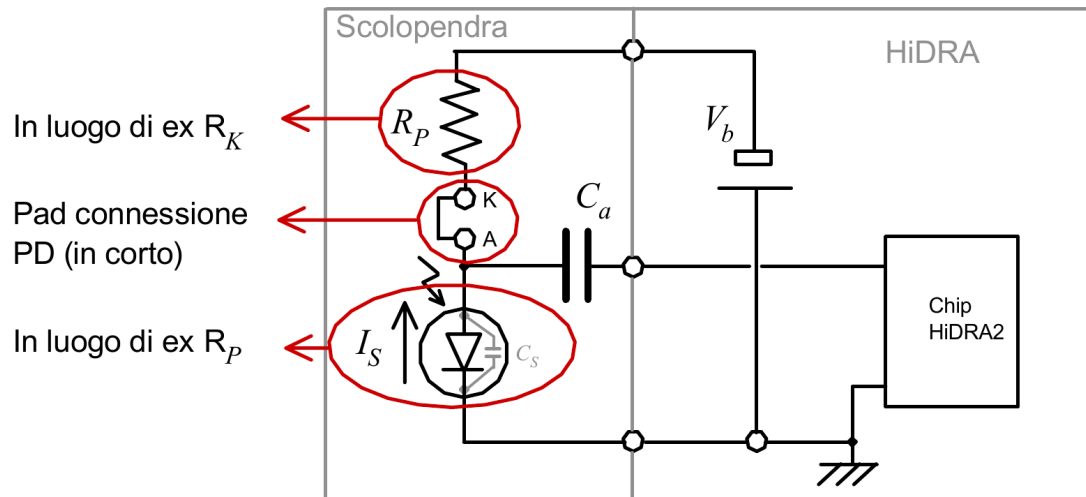

LED signal vs casisTime — Rk = 1 MkOhm

Noise vs casisTime

◆ Pedestal value "oscillates" with the casisTime: this is a known problem.

◆ Testing the pedestal with without Rk:

Pedestal vs casisTime

There is not a sizable improvement in the pedestal distribution

Prospective

◆ The time constant which affect signal vs casisTime is strongly affected by Rk

  ● Even removing Rk a small dependence remains (to be understood)

◆ The noise is not strongly affected by Rk, and the pedestal oscillation is now the main problem regarding the singal/noise.

◆ To be tested: new PD configuration with cathode connected to ground.

In luogo di ex R_K

Pad connessione PD (in corto)

In luogo di ex R_P

Using negative HV