SiPM test stands

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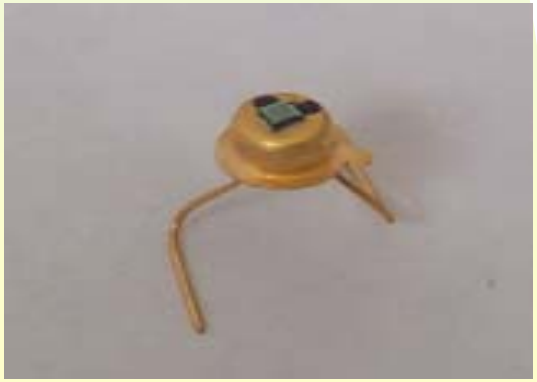
OUTLINES

1. Some introduction
2. Review of test stands.
3. New setup for the SiPM evaluation

Introduction

- Spectral response range 420-800 nm
- Peak sensitivity wavelength 630 nm (SSPM CPTA)
- ε (500 nm) ~ 25%*(0.4-0.6)=12-15 %
- Operating voltage 28-65 Volts
- Dark current ~ 2 μA
- Capacitance ~25 pF
- Gain ~(0.5-2)*10^6
- **Good single electron separation**
- Time response ~ 1-2 ns
- Time resolution < 300 ps



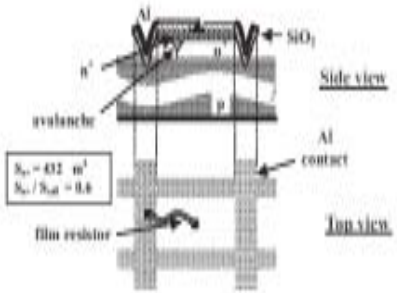
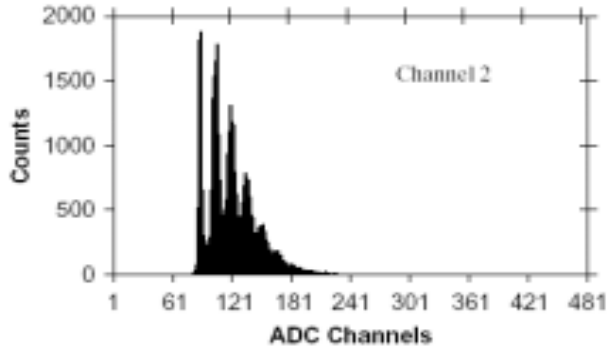
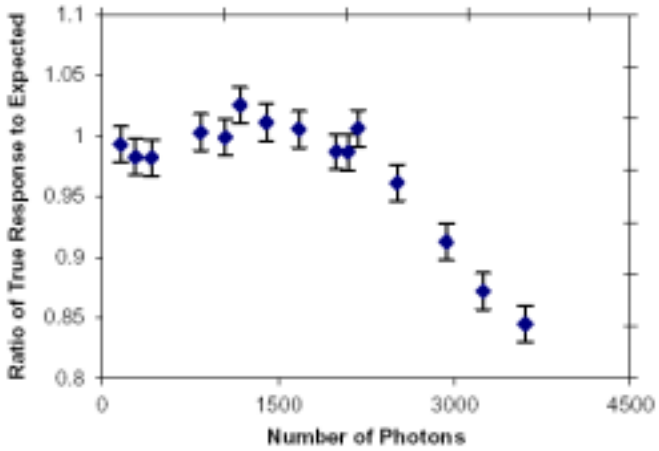


Figure 1. Schematic view of one MRS APD μ-cell.





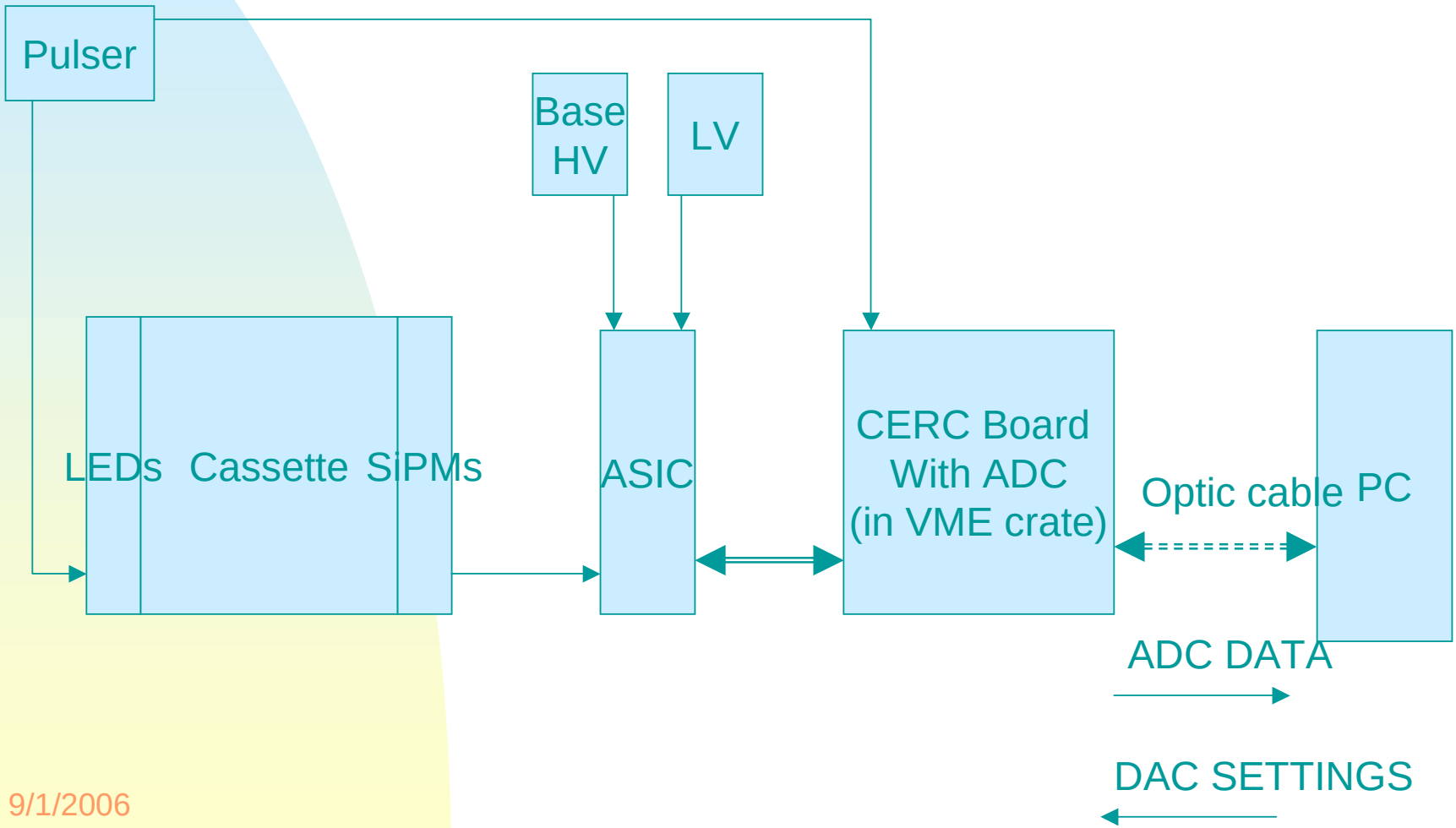
Test stands review

- NIU test stands
- FNAL test beam (test stand)
- Lab 6 (dark box)

NIU test stands

- VME based test stand (Labview). We used to use to test PMT + DHCAL prototype cells on cosmic rays. Software is being modified by Kurt Fransis. Location NIU
- CAMAC test stand (EXCEL based software, Bob Angstadt, DSP controller, QDC model 2249 A partially disassembled). Location NIU
- Test beam test stand (VME based, CALICE), back to business on September 8. Location MTB area. Most advanced !

MTB test stand

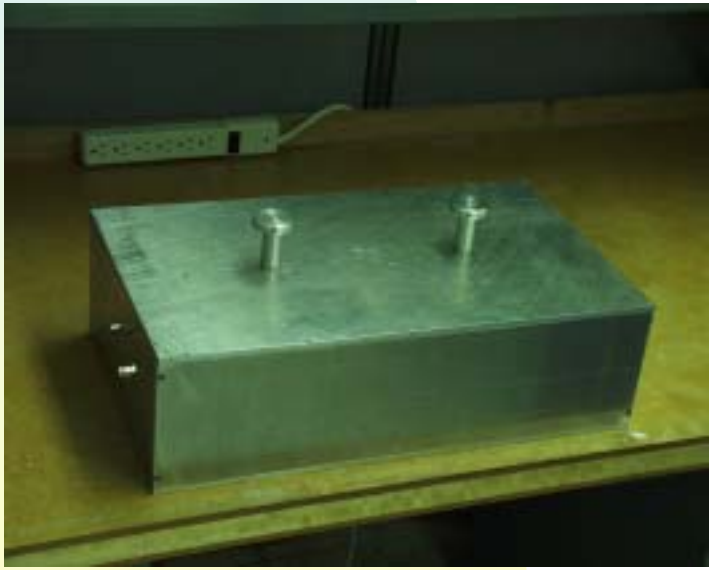


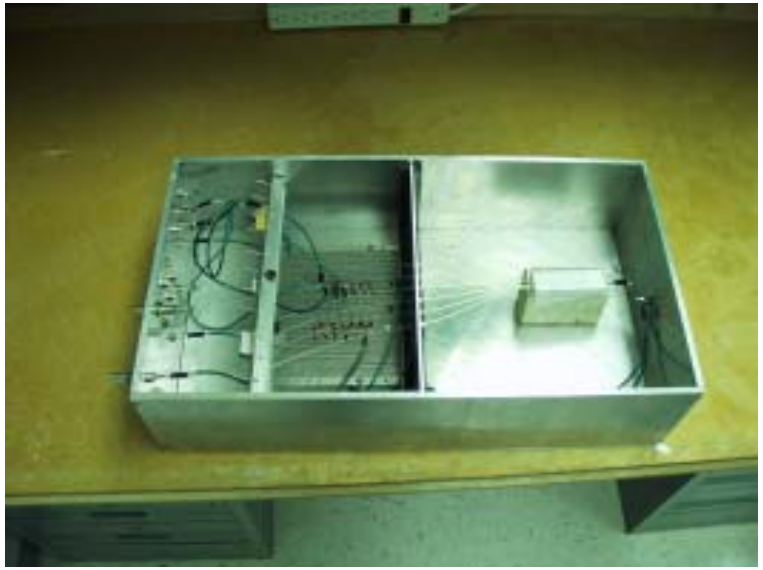
LAB 6 test stand, dark box

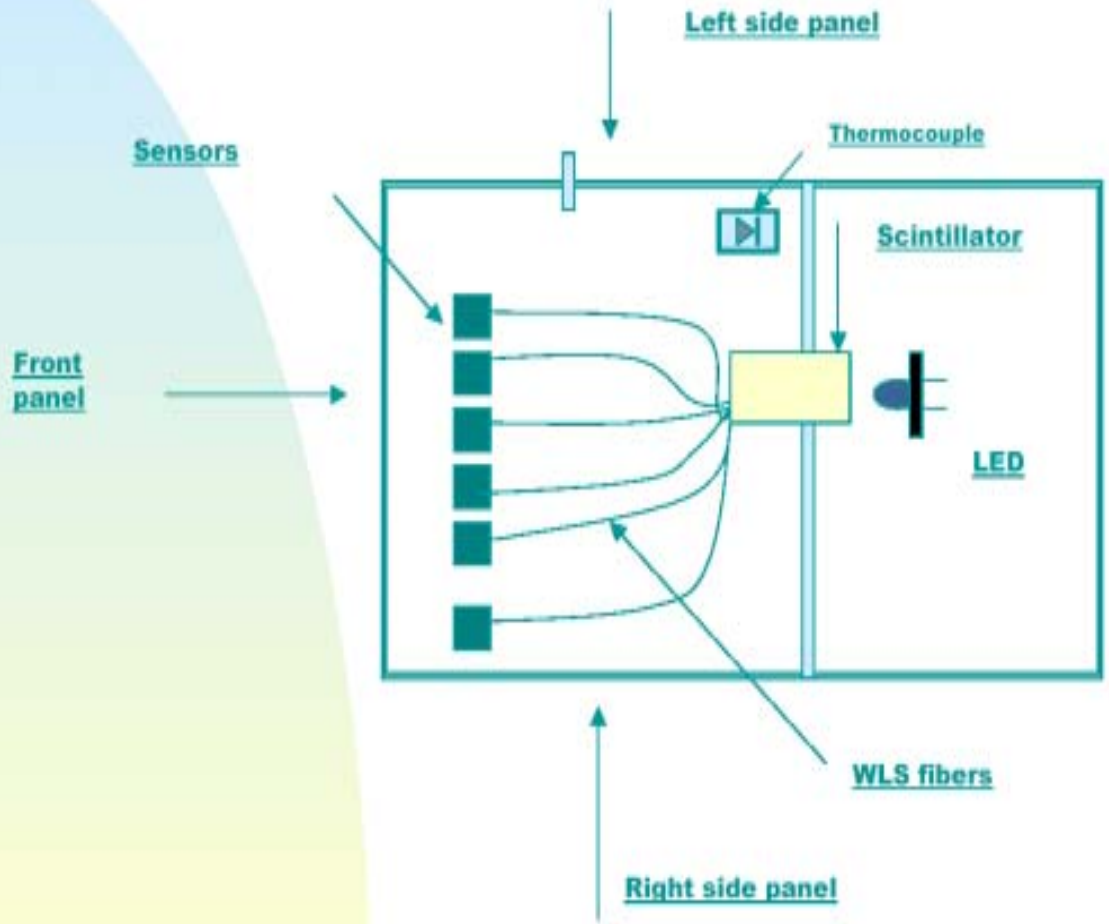
DSP CAMAC controller, EXCEL software, LECroy QVT, PC has been changed recently. Has not been tested so far. It is not a user facility.

NEW setup for SIPM evaluation

- Leakage current
- Noise counts
- Single electron distribution
- Temperature monitoring
- The work is under way






Left side panel
Thermocouple
Sensors
Scintillator
Front panel
LED
WLS fibers
Right side panel

Dark rate measurements

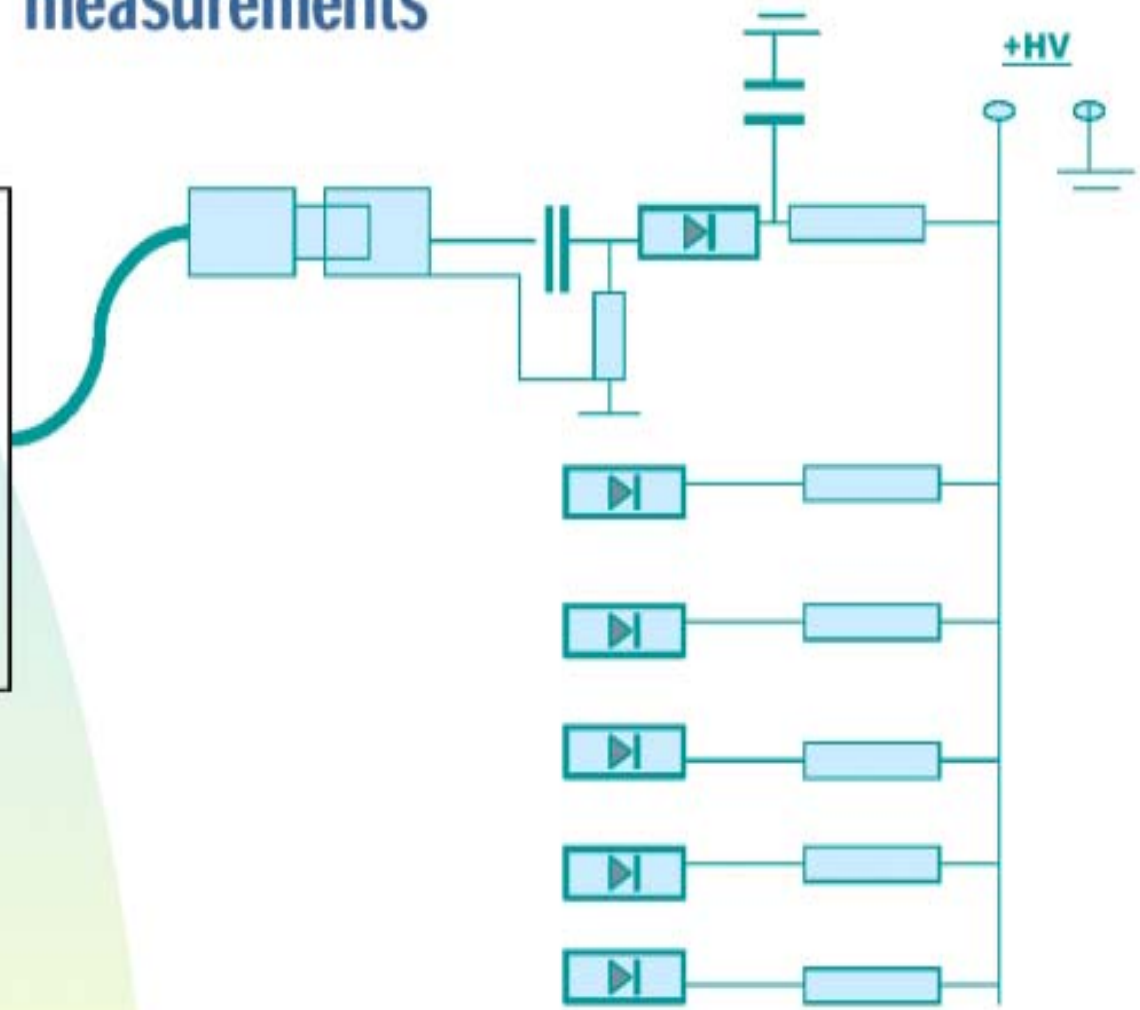
Noise rate + timing measurements that includes :

Amplifier

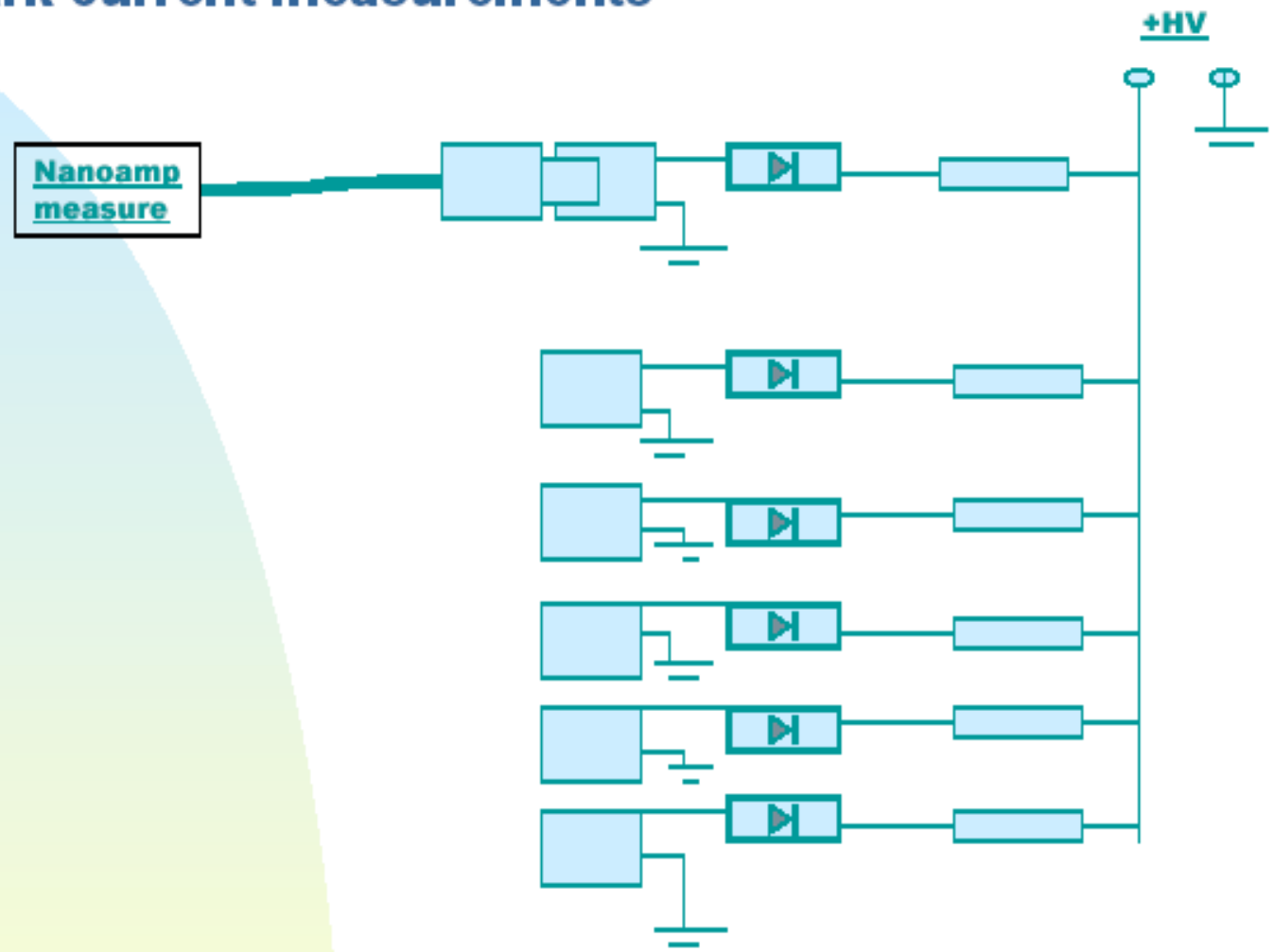
Discriminator

Counter (timer)

Scope



Dark current measurements



Summary

- Two test stands are at working conditions.
- Absolute LY measurements.
- Single electron separation.
- Dark current at the same temperature.
- Dark rate at the same temperature.
- New setup is under way.