

SiPM and Quartz tests at UVA

- Work by James Maxwell, Oscar Rondon
- Goals:
 - test output of quartz with UV sensitive small diameter **CPM: Channel Photo-Multiplier**
 - test response of **SiPM: Silicon Photo-Multipliers** to quartz light
- Purpose: contribute to design of SANE front quartz hodoscope to be built by NSU.

Response of SiPM's to LED light

- J.M. tested 1mm SiPM response to three colors of LED light, reported at 9/2/05 SANE meeting
- Test circuit too noisy for expected small quartz light pulses

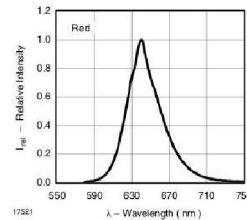


Figure 8. Relative Intensity vs. Wavelength

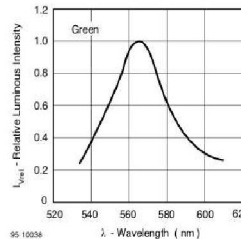


Figure 19. Relative Intensity vs. Wavelength

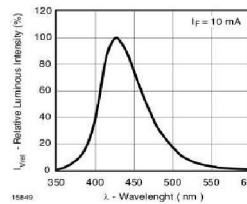
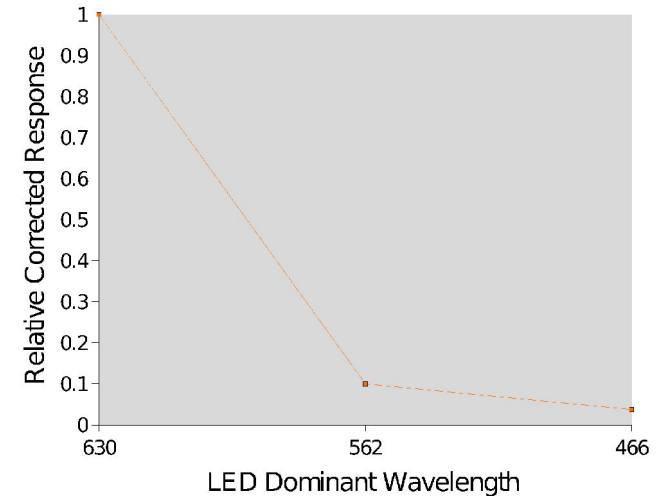


Figure 7. Relative Intensity vs. Wavelength

Corrected SiPM Response Data

Intensity Corrected SiPM Response



Quartz Rod light signals too small to see, SiPM Setup is plagued with noise. A more efficient, shielded circuit should significantly reduce this noise.

Pulse output of 1mm SiPM

- Test circuit was rebuilt for reduced noise
- Checked for shortest signal generator pulse producing an output
- Tens of mV output pulses for ~ 10 ns, ~ 7 V pulse into blue LED
- No response below 10ns



$3 \times 3 \text{ mm}^2$ SiPM

- P. Bosted loaned to UVA 5 3 mm SiPM's purchased by Hall C
- 3 mm SiPM Geiger-mode (reverse bias) voltages range from $\sim -19 \text{ V}$ to $\sim -22 \text{ V}$
- Four devices have photovoltages $\sim 400 \text{ mV}$; one was DOA

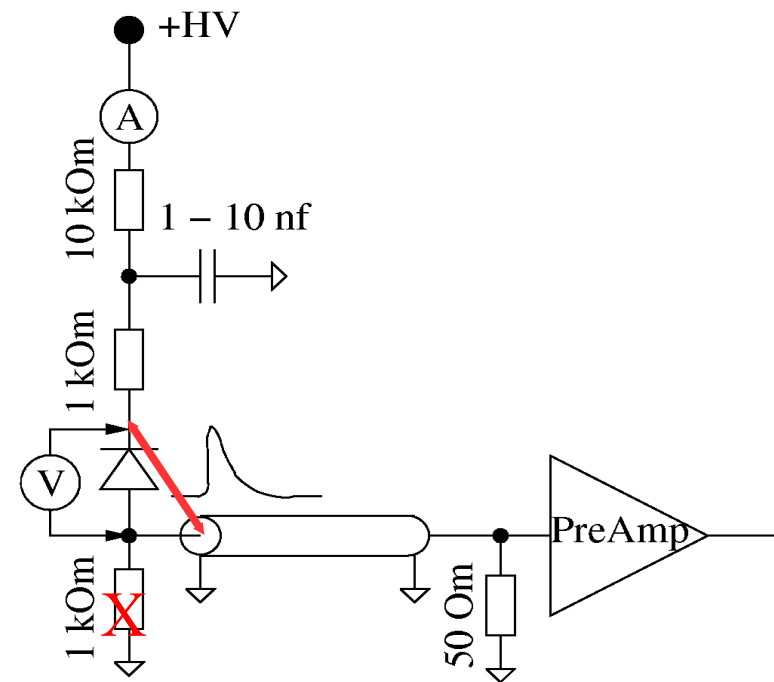
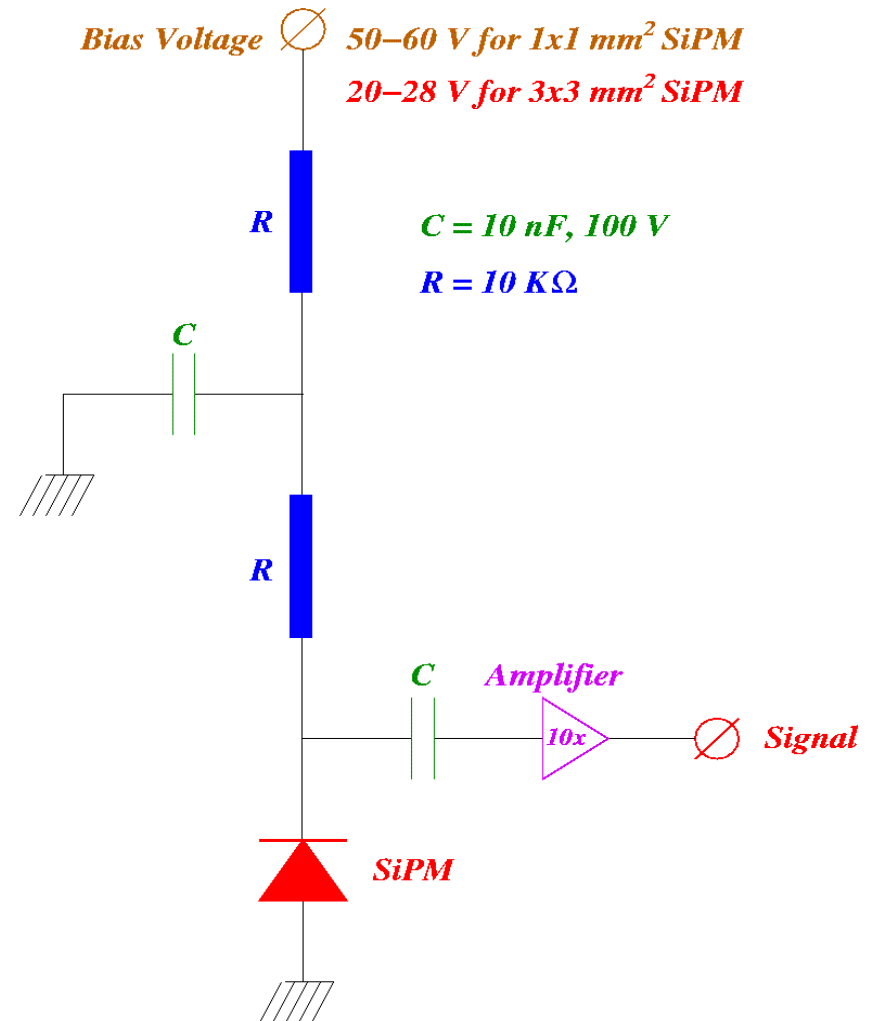


Fig. 1

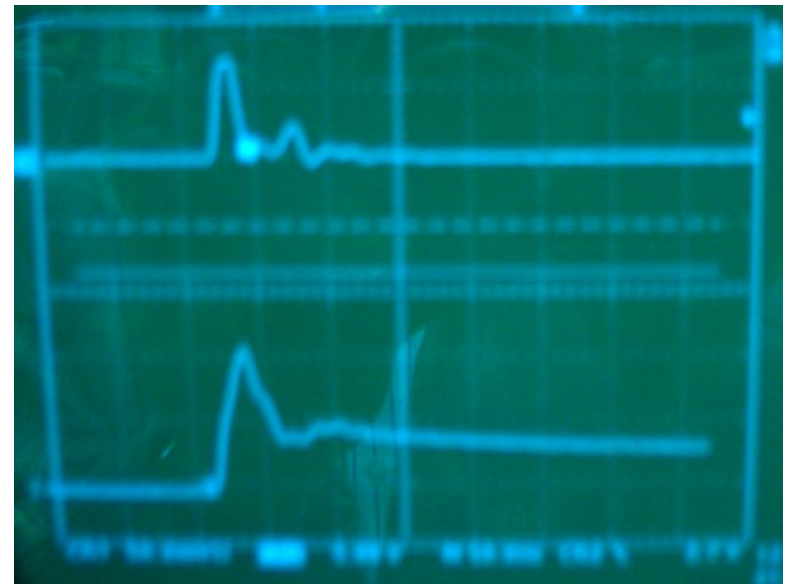
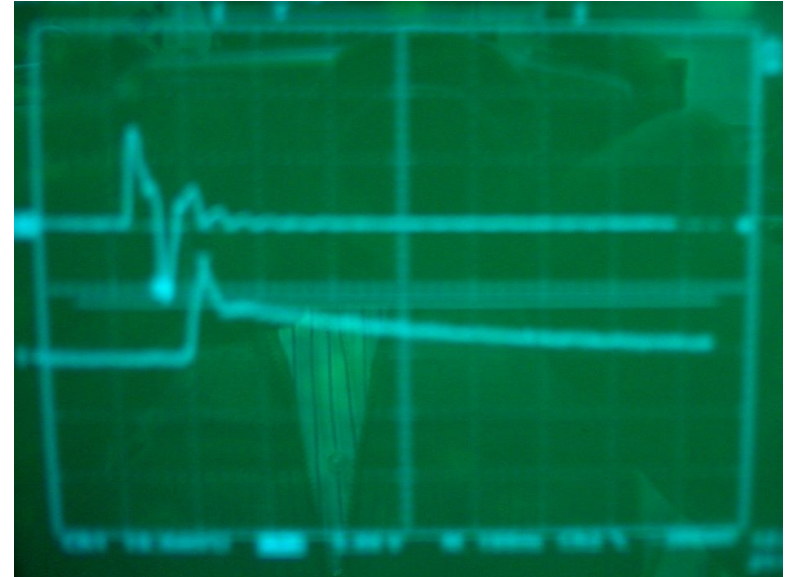
3 × 3 mm² SiPM

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3mm SiPM output

- Minimal tests of response to LED light
 - Device # 10 failed: no signal to $V_{\text{Geiger}} + 2 \text{ V}$
 - Device # 12 responds to red (top) and blue LED light, good ($\sim 3\text{V}$) voltage range.
 - long tail after main peak



Future plans

- Work depends largely on time availability, mainly J. M.'s
- Systematic studies of response to LED light
- Look for quartz light
- In parallel: measure attenuation of quartz light in bars and rods with CPM
 - tested CPM response to quartz rod light with cosmics and Sr-90 source: factor of 100's more counts
 - CPM instability with time under investigation