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## Testing the Viability of Using Channel and Silicon Photomultipliers with Quartz Bar Scintillators

### Channel Photomultiplier:

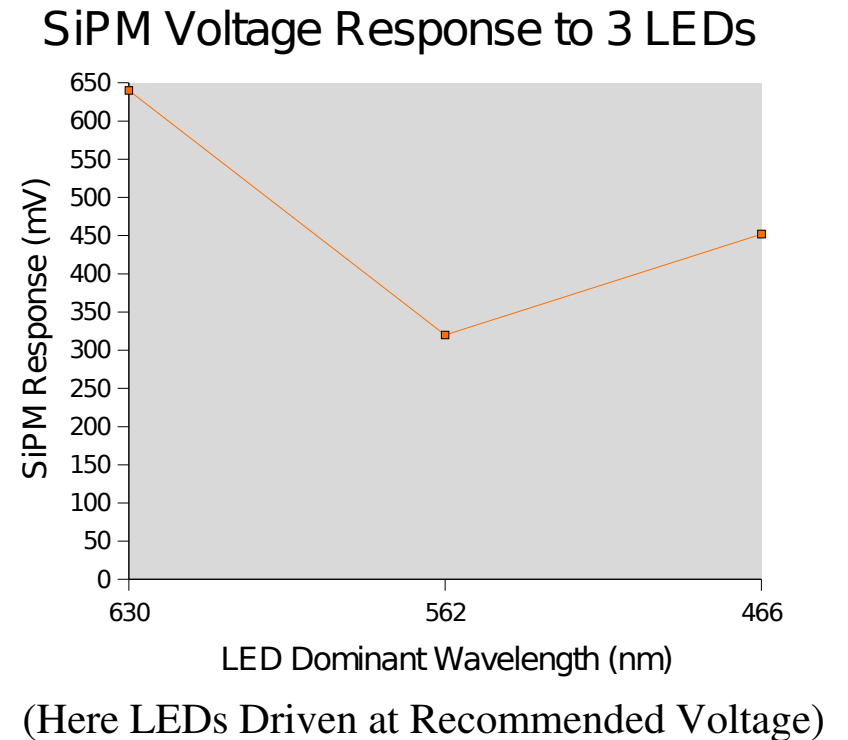
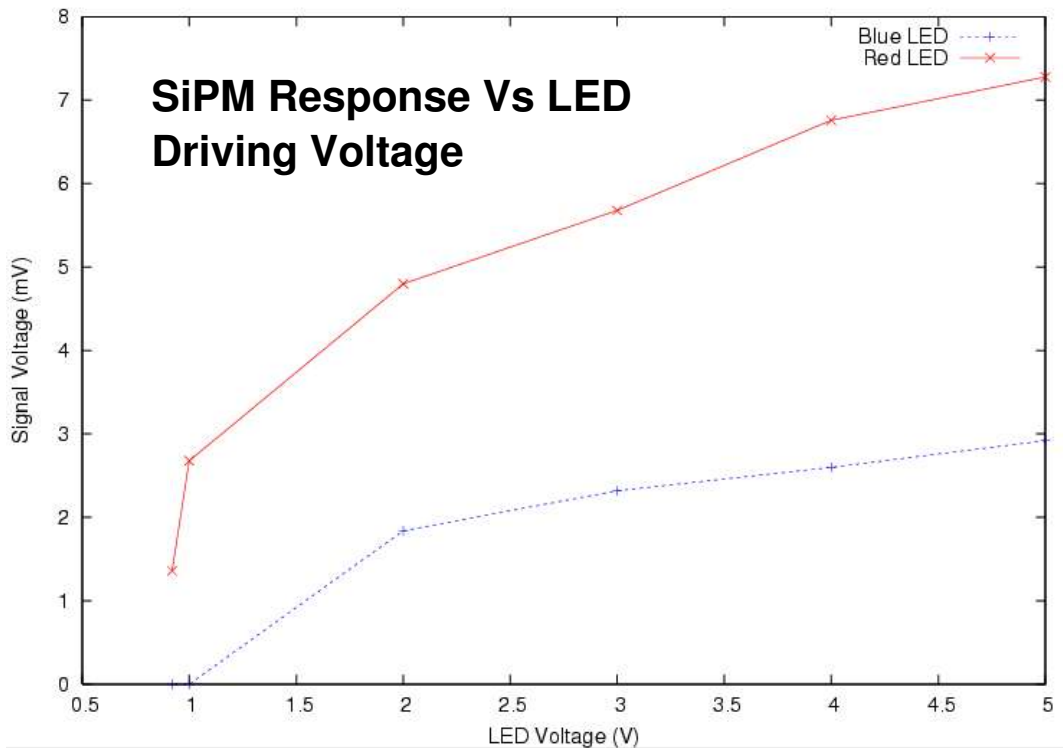
Self Contained PM and  
High Voltage Power  
Supply. Needs Only 5V  
Power, Detects Wide  
Frequency Range.

### Silicon Photomultiplier:

Solid State device on  
simple circuit, 50V Bias.  
Initially LEDs to Test  
Frequency Dependent  
Signal Attenuation.

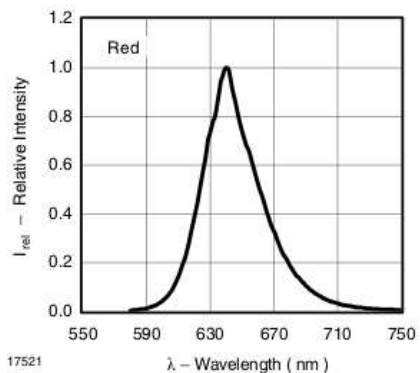
Quartz Rod: GE Quartz, Type 214 Rods, cut to 20 cm

# Initial SiPM Responses to Different Color LEDs



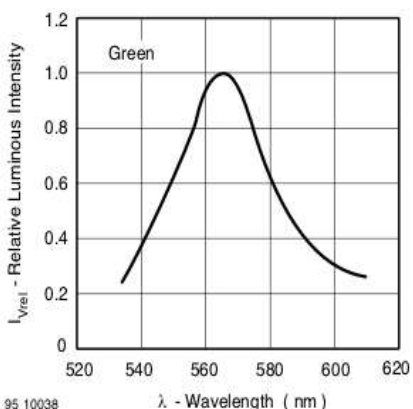
However, Blue, Green and Red LEDs have very different intensities at any given driving voltage, so we'll correct the SiPM response using known intensities at optimal operating voltage.

# Corrected SiPM Response Data



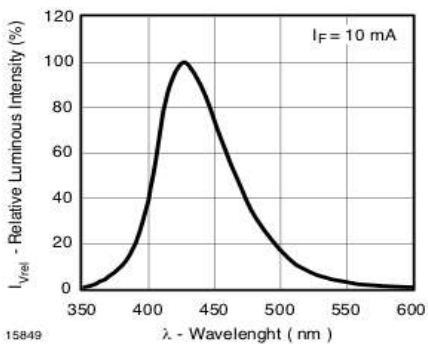
Red LED Spectrum

Figure 8. Relative Intensity vs. Wavelength



Green LED Spectrum

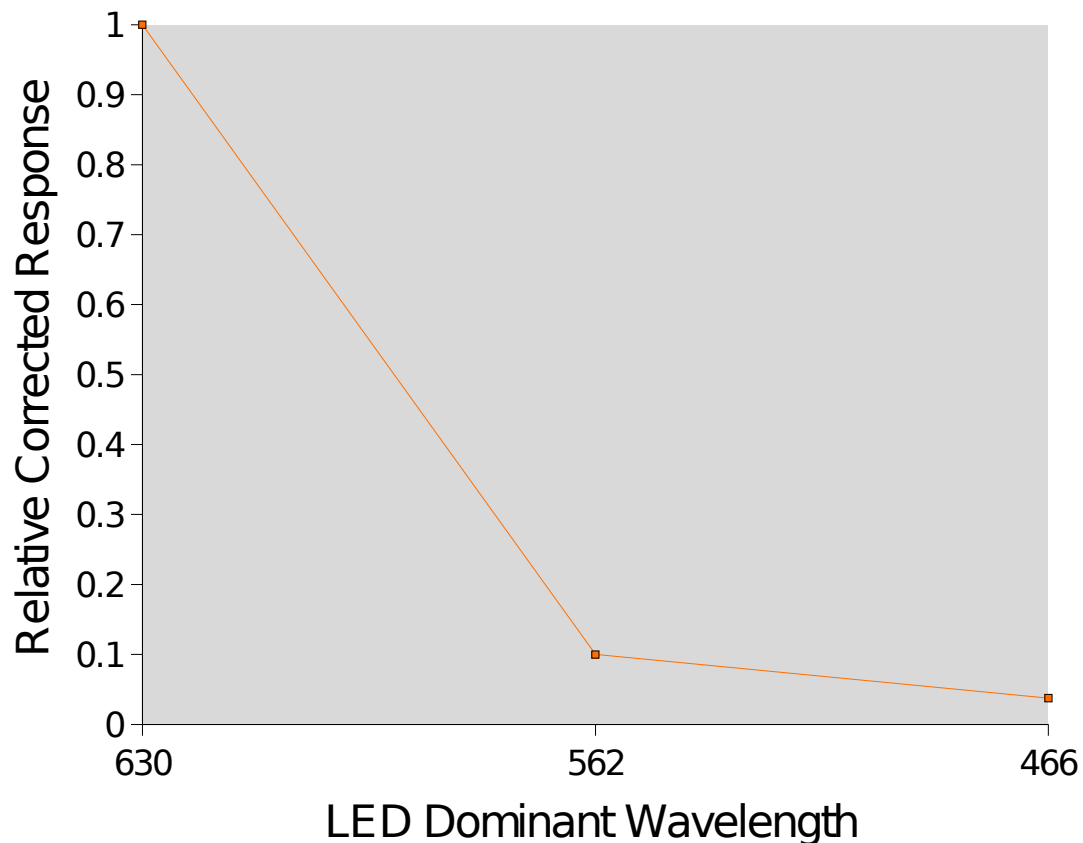
Figure 19. Relative Intensity vs. Wavelength



Blue LED Spectrum

Figure 7. Relative Intensity vs. Wavelength

## 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.

# CPM Set-up and Initial Response Data

- Perkin Elmer CPM, quartz window, response beginning at 200 nm
- Black Box Setup with 20 cm Quartz Rod
- NIM electronic data taking: From CPM to an Amplifier, then to a Discriminator, whose logic pulse is counted by a Scaler, gated using a second Scaler channel with a 60 kHz clock Pulser

## Ambient Background:

6179 counts over 1000 secs

## Background with 20 cm

### Quartz Rod in place:

19502 counts over 1000 secs

Count rates much higher than expected for cosmic ray flux through the quartz rod