Camera System Update

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WILLIAM & MARY

CHARTERED 1693

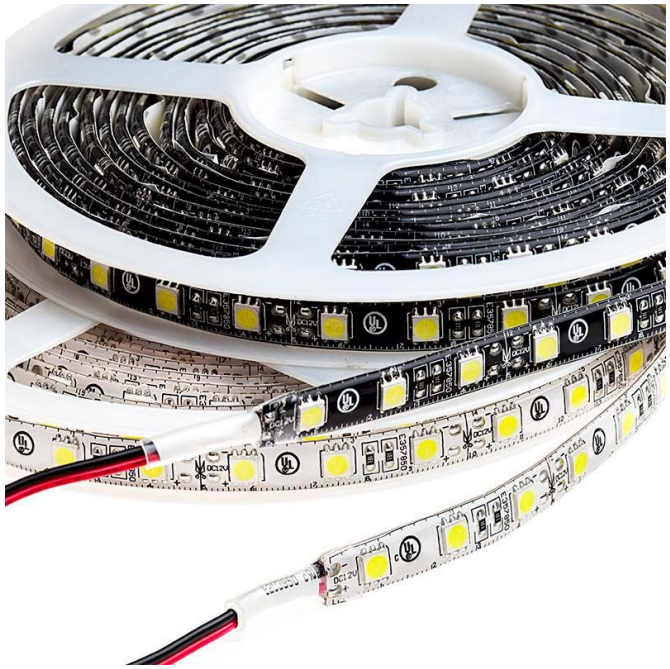
LED lighting tests

- Dual phase prototype uses a simple and bright (300lm/m) white LED
- Concerns raised over the effect of UV / blue light on the TPB film used by the SP photo-sensors
  - Assembly area will have filter to remove $\lambda<510$nm

http://fr.rs-online.com/web/p/products/7736917/

LED tests

- On Friday we ordered a few short lengths of LED tape in different colors
  - Natural, Warm White, Red
  - Amber and yellow coming later in the week
- Very bright: 226 lm/ ft
- Weatherproof
  - ingress protection (IP) 66
  - IP 68 version on order



Outdoor LED Strip Lights - Weatherproof 12V LED Tape Light - 226 Lumens/ft. - Warm White

(10)

Part Number: WFLS-WW30X3-WHT

UPC: 847781078923

Select Strip Finish: White

White ✓ | Black

Select LED Color: Warm 3250K

Whites

Cool 7500K | Natural 5600K | Warm 3250K ✓

Colors

UV (Blacklight) | Blue | Green | Yellow | Amber | Red

Select Length: 19.7in (1.64ft)

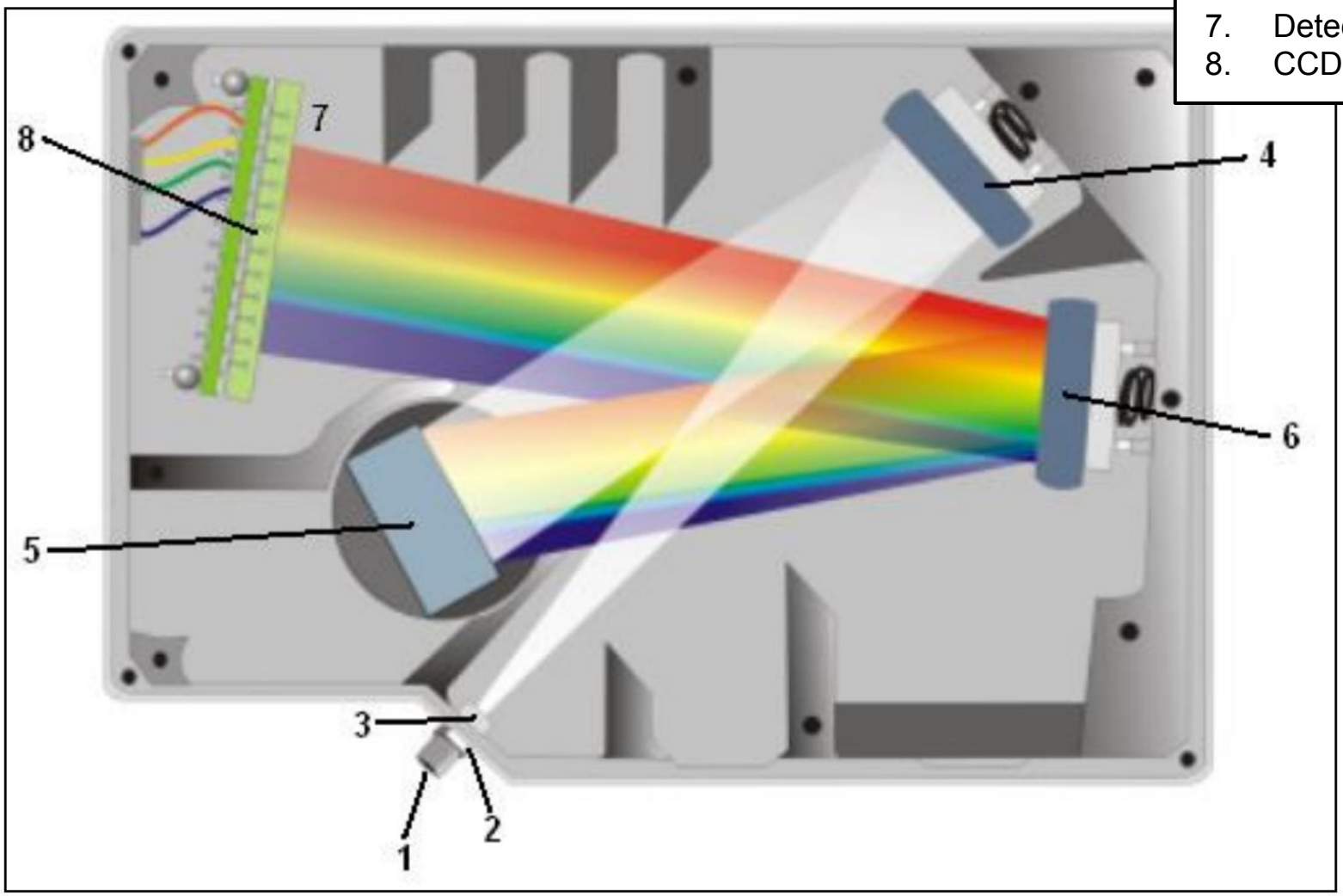
19.7in (1.64ft) ✓ | 39.4in (3.28ft) | 196.9in (16.40ft)

Spectrometer

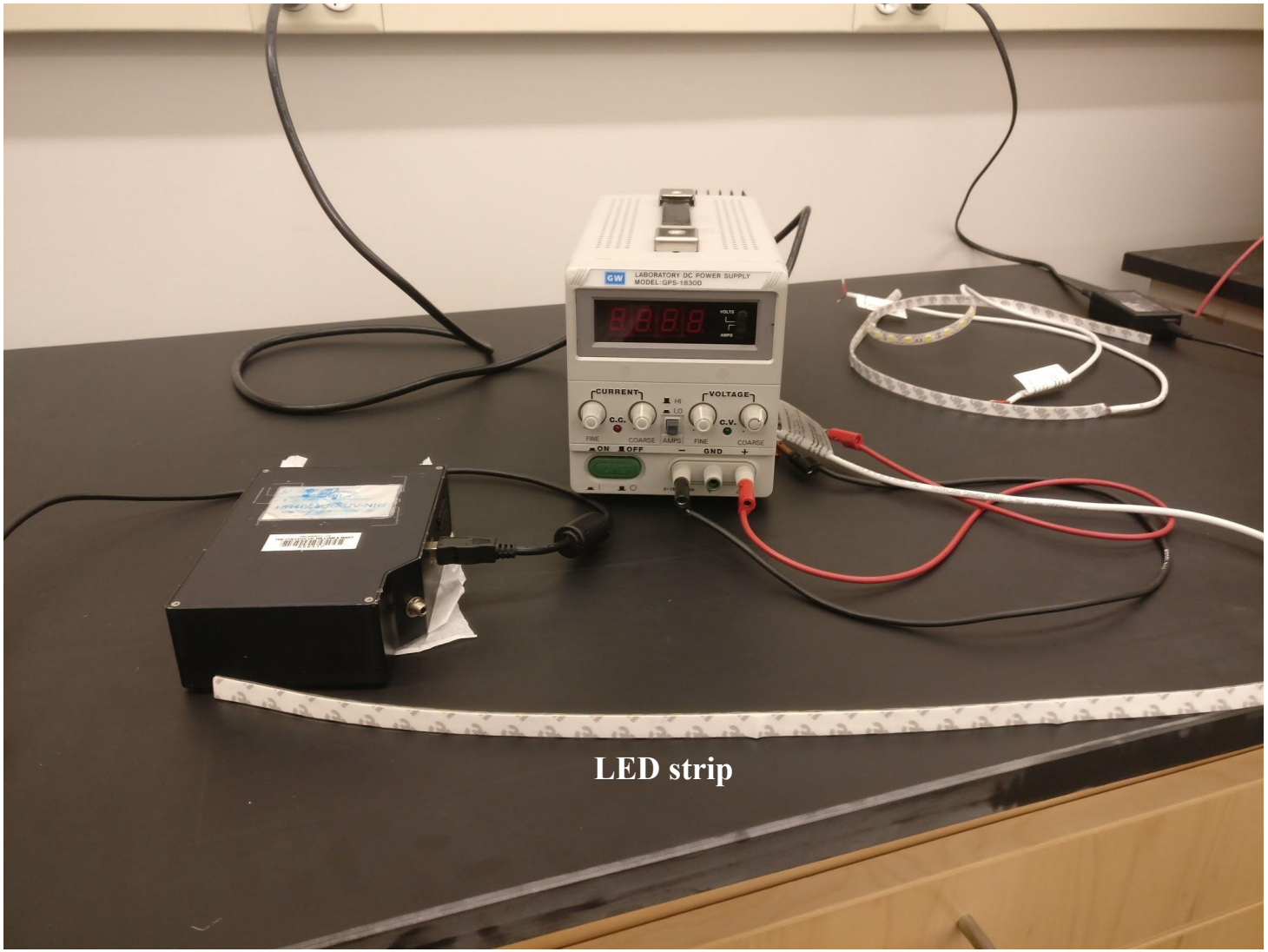
- Ocean Optics HR4000CG-UV-NIR research grade spectrometer
- 200-1000nm

How it works

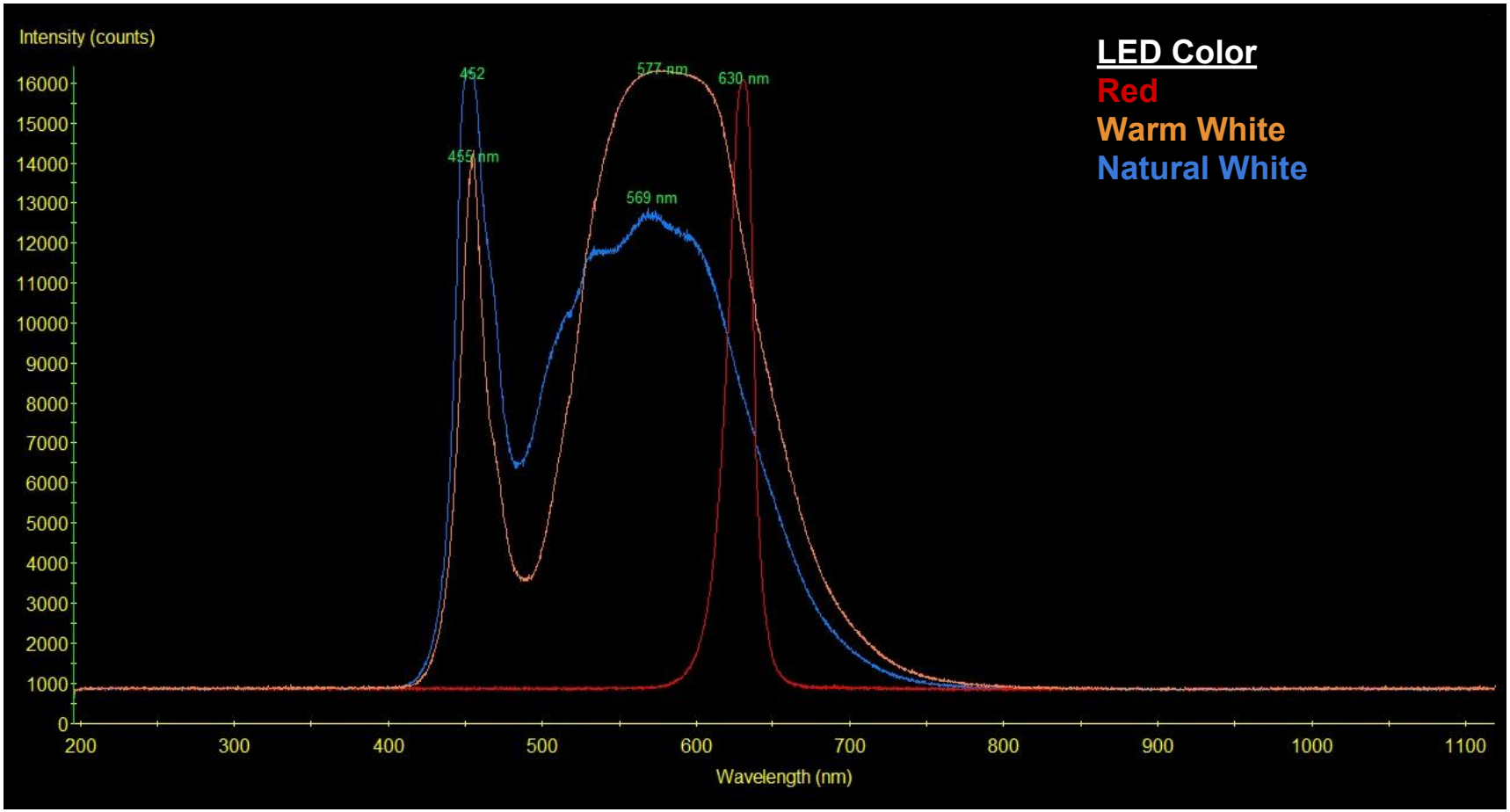
1. SMA connector
2. Slit
3. Filter
4. Collimating mirror
5. Grating
6. Focusing mirror
7. Detector Lens
8. CCD detector



Setup


To computer
LED strip
LABORATORY DC POWER SUPPLY
MODEL GPS-1830D
CURRENT
VOLTAGE
C.C.
C.V.
FINE
COARSE
AMPS
ON
OFF
GND

Results



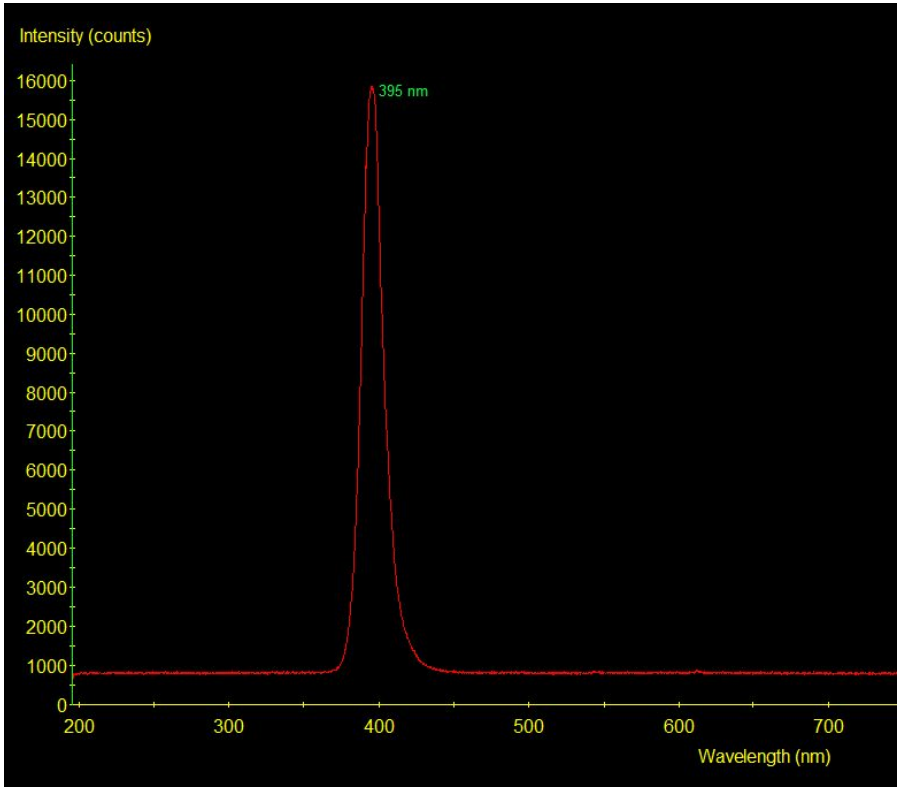
Spectra look reasonable and cutoff around 425nm.

Measurement Issues

- We are working to get a detailed understanding of the spectrometer
- We are shining directly into an SMA fiber port
  - Extracted spectra (relative height of peaks) somewhat dependent on alignment.
  - Saturation effects if we integrate for too long.
  - Will conduct some measurements with neutral density filters and a fixed alignment
- The wavelength dependence of the CC has not been calibrated out
  - But, we can get a relative LED vs LED measurement
  - We are considering doing an actual calibration

Probing the UV range

- Can we detect light in the near UV?
- Bivar LED5-UV-400-30 5mm UV LED
- Reported peak at 400 nm
- Light output: 12 mcd
- Clear signal
- Will try to repeat with a “black lamp”



Conclusions and Future work

- We have the ability to characterize LED spectra
  - White LEDs radiate in the blue but not UV
  - Red LED has a relatively narrow spectrum well above the 510nm cutoff
- Amber and yellow LED strips on order
- Will begin testing in LN2
  - Survival & Spectra
- It seems like we will be able to find something that will work OK.

Backups

Ingress Protection