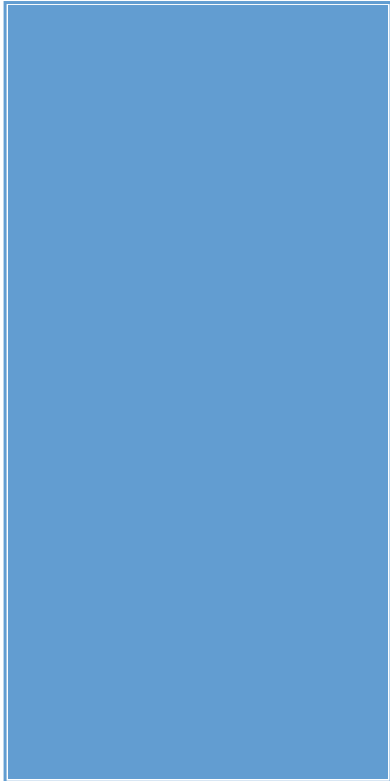


1

StarDICE LED Spectroscopy

Outline

2



1. Extraction
2. LED spectrum overview
3. Results

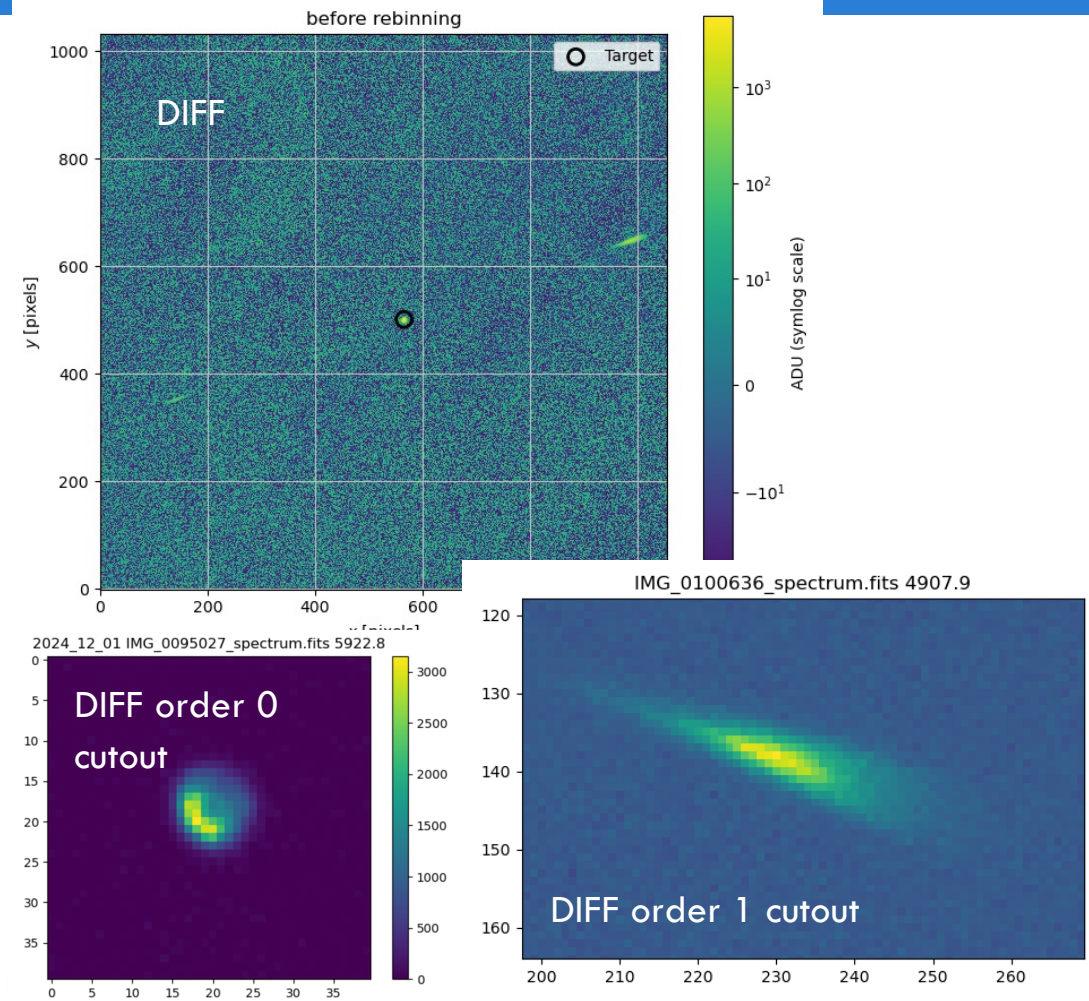
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Extraction

Extraction

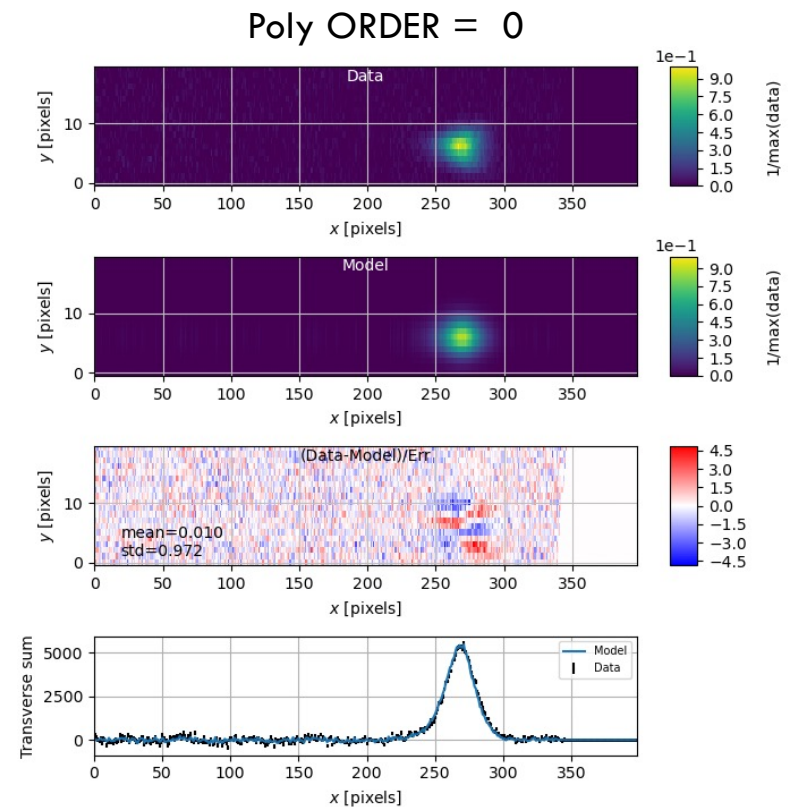
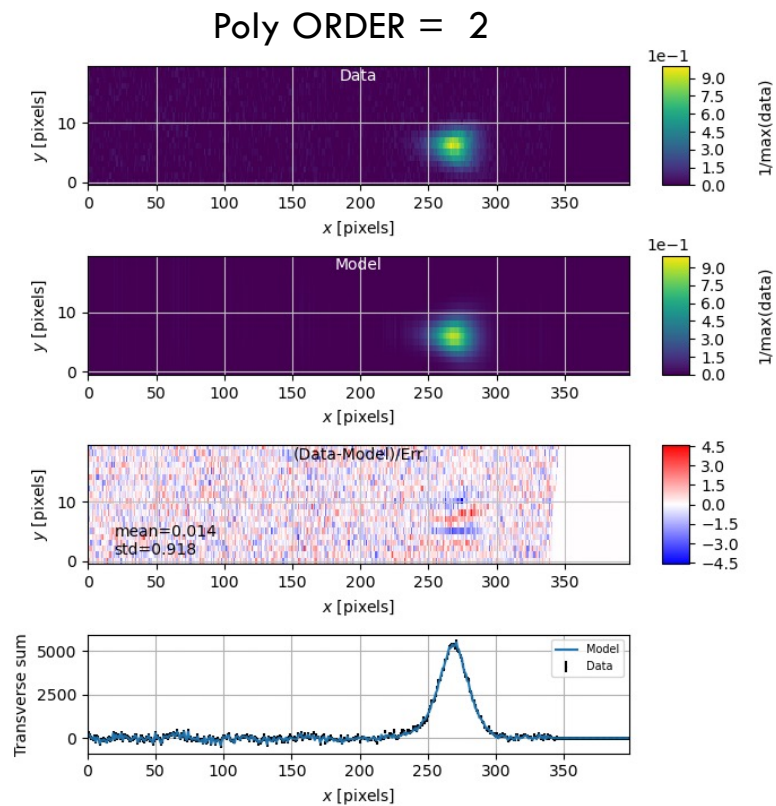
4

- $DIFF = LEDON - LEDOFF$
- Order0 detected on DIFF and fixed in all the analysis
- Spectractor software to make the spectrogram cutout
- PSF model is Moffat with parameters independent of wavelength
- Spectrum amplitude computed on rotated cutout with transverse PSF fit per CCD column
- A priori wavelength calibration with distance GRISM-CCD 33.30mm
 - ▣ fixed but roughly OK looking at HGAR spectra



Residuals testing PSF dependence with wavelength

5

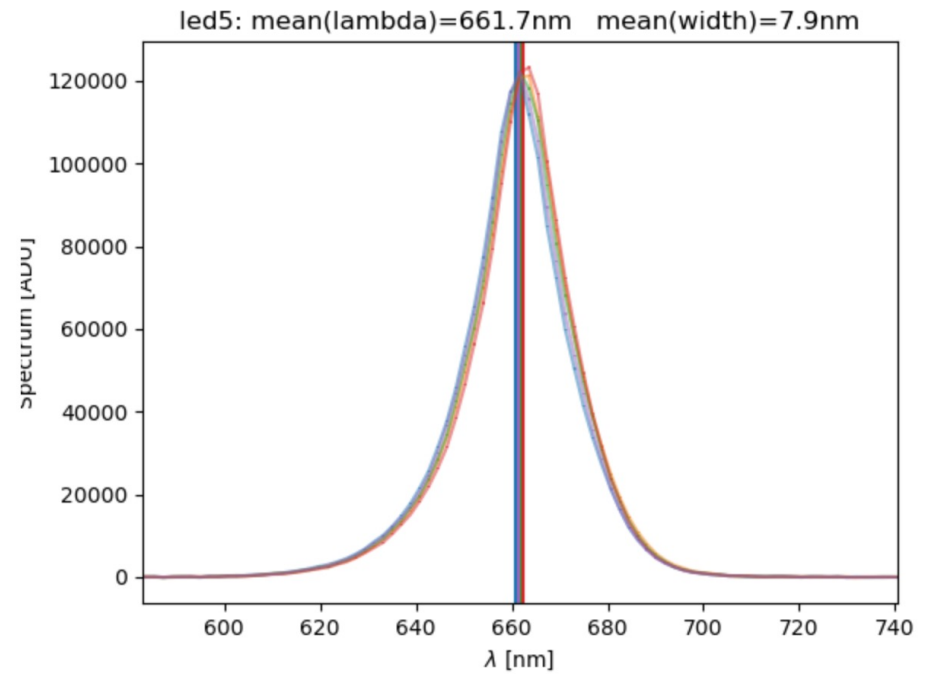
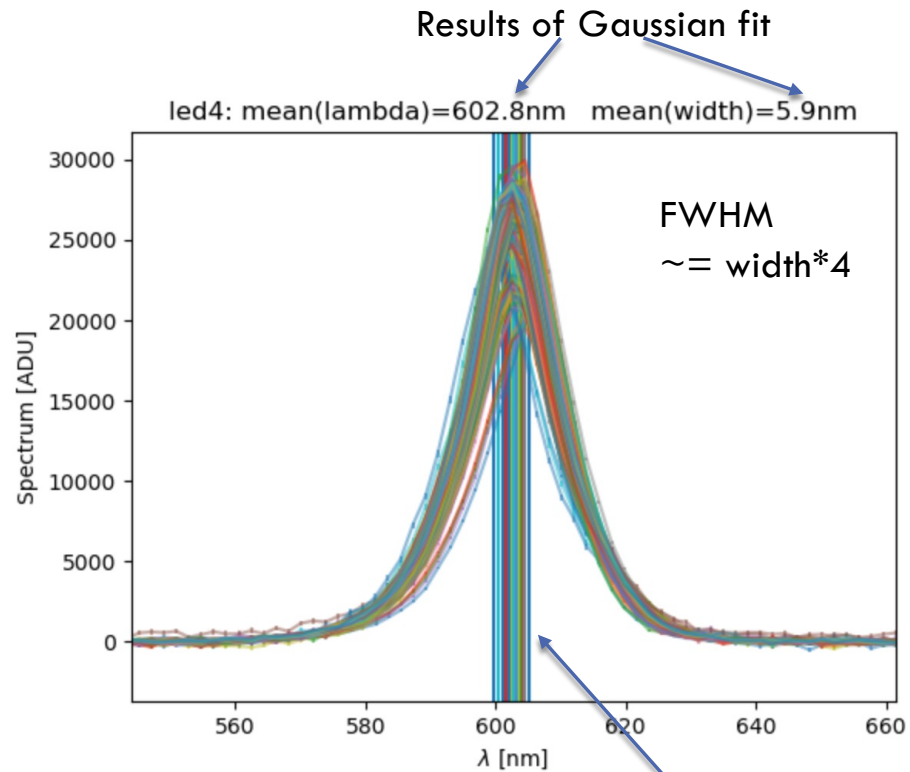


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LED spectrum overview

LED spectrum overview

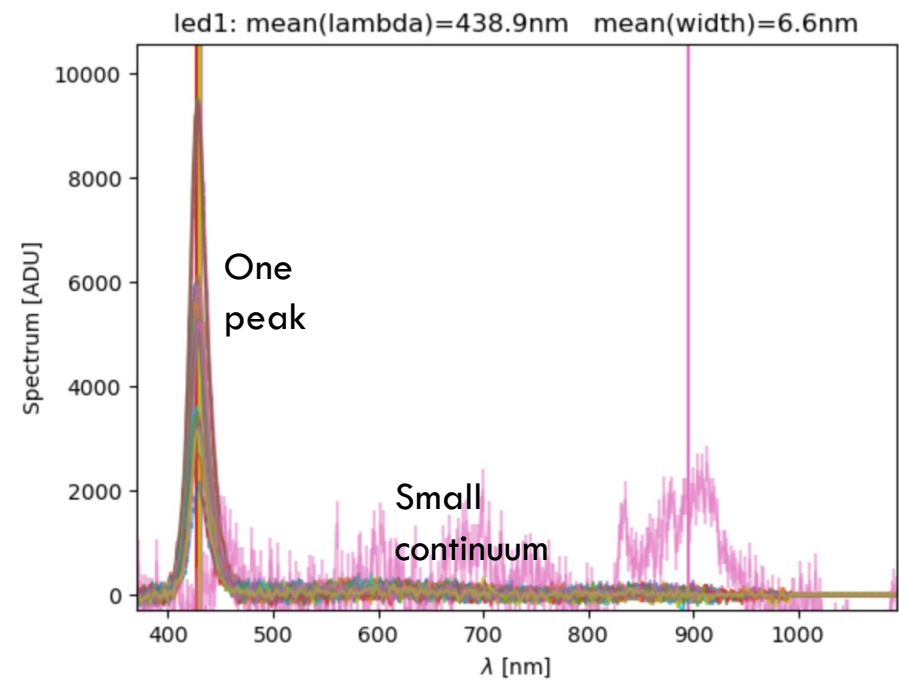
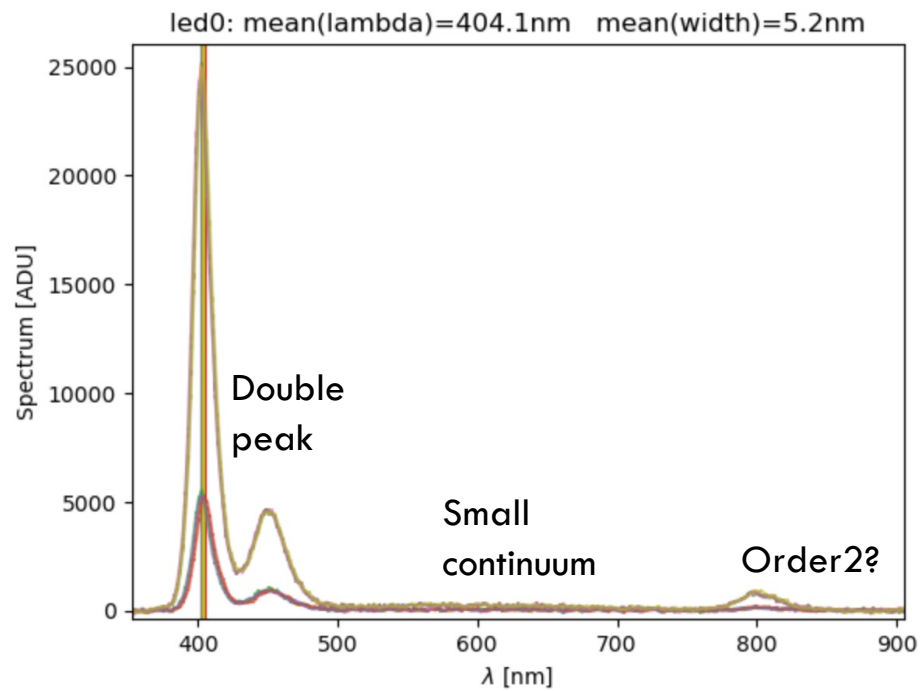
7



Mean(lambda)
(one per spectrum)

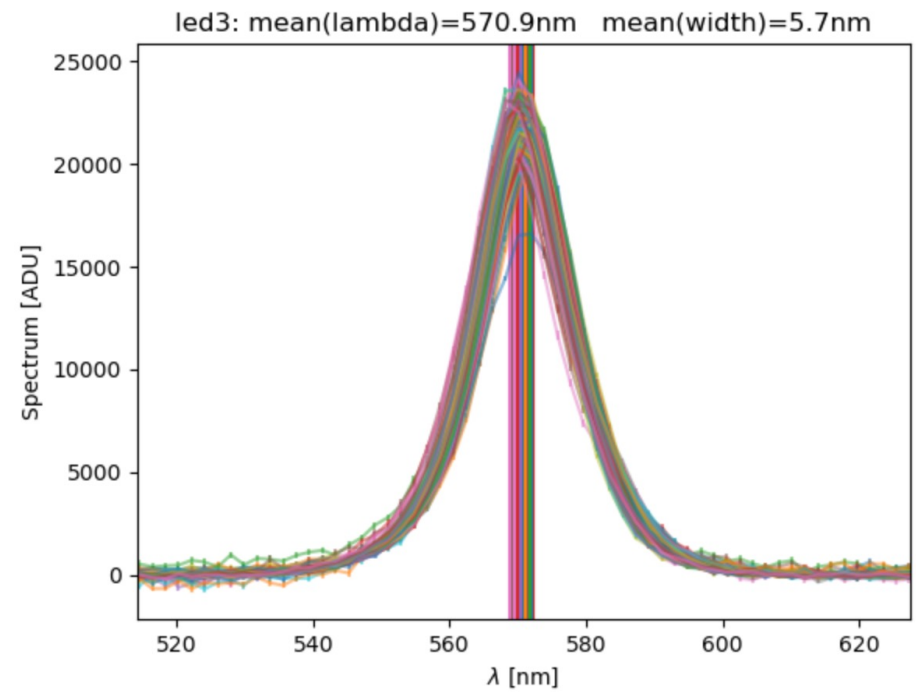
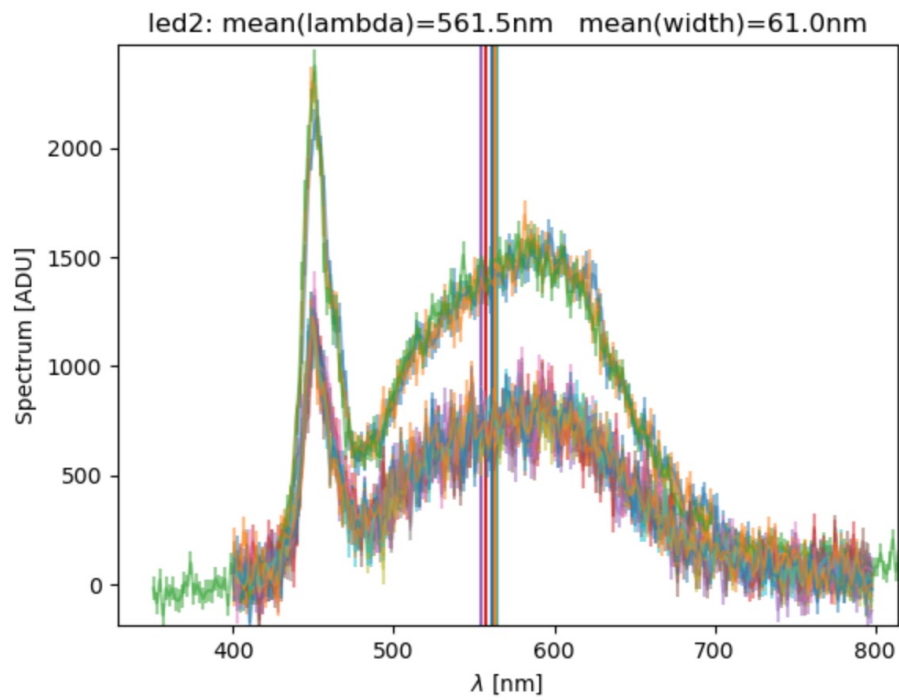
LED spectrum overview

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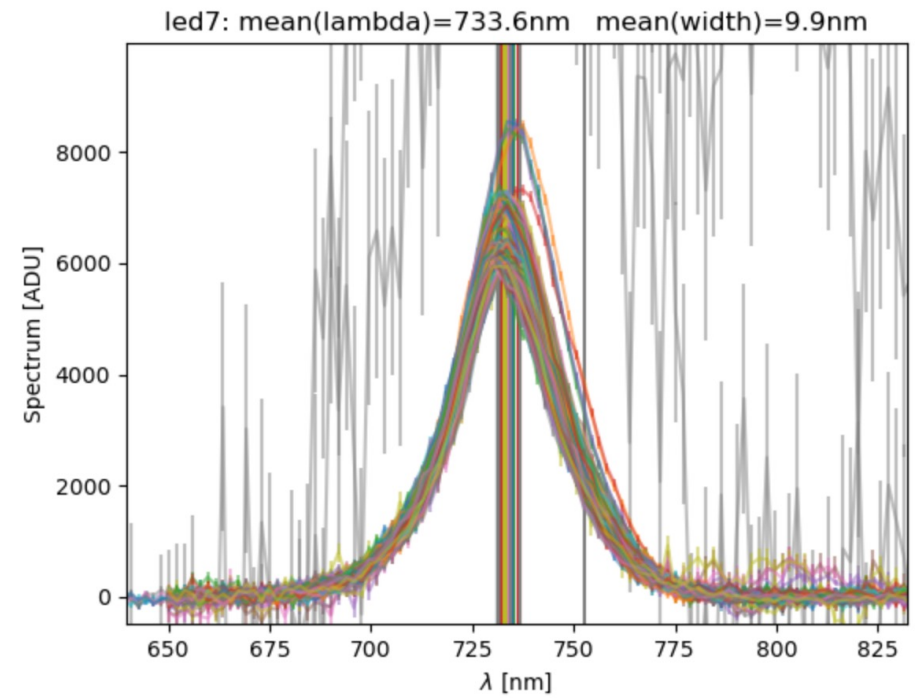
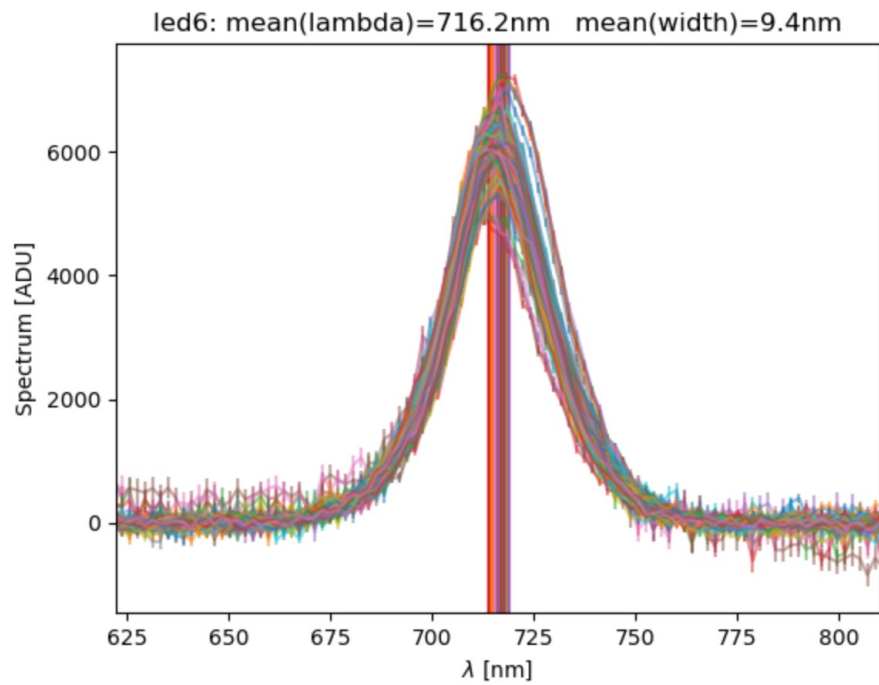
LED spectrum overview

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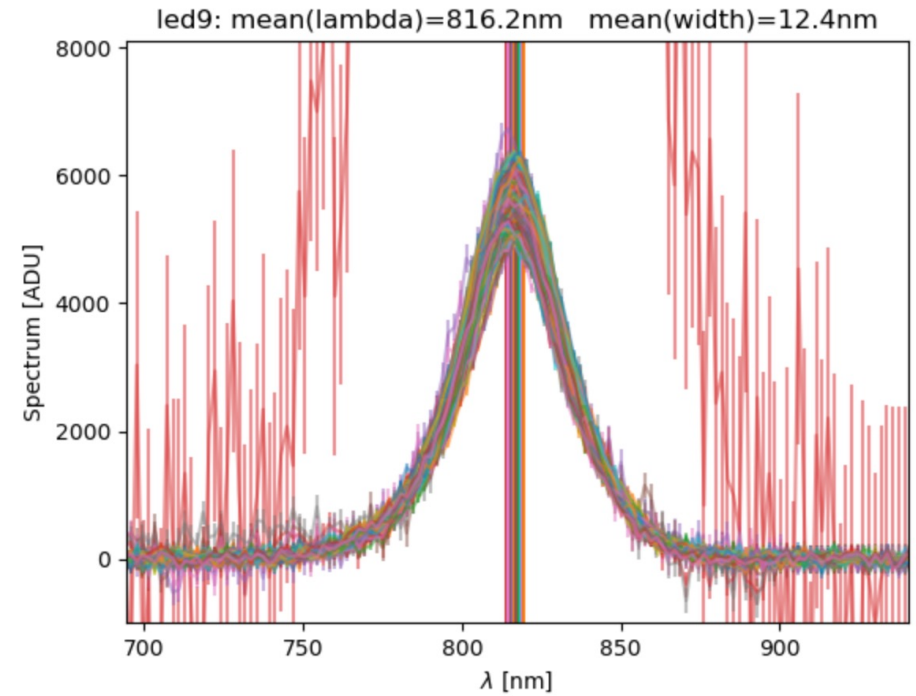
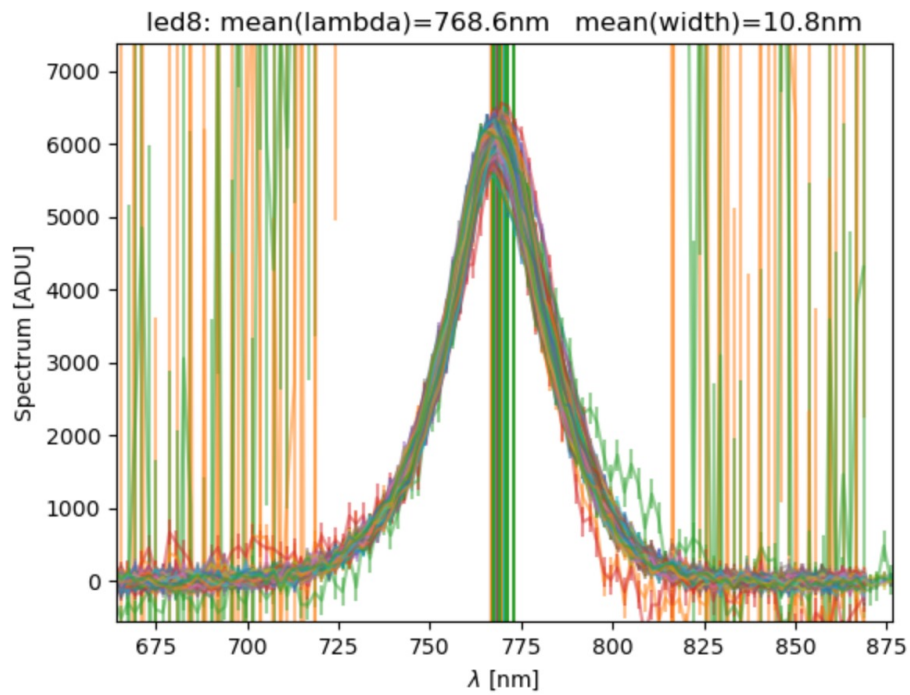
LED spectrum overview

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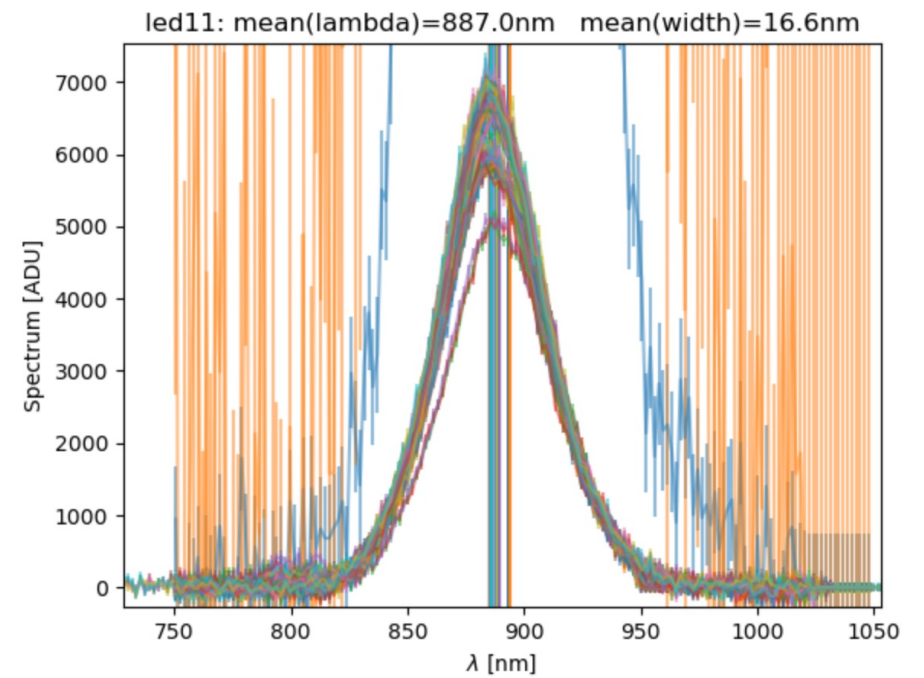
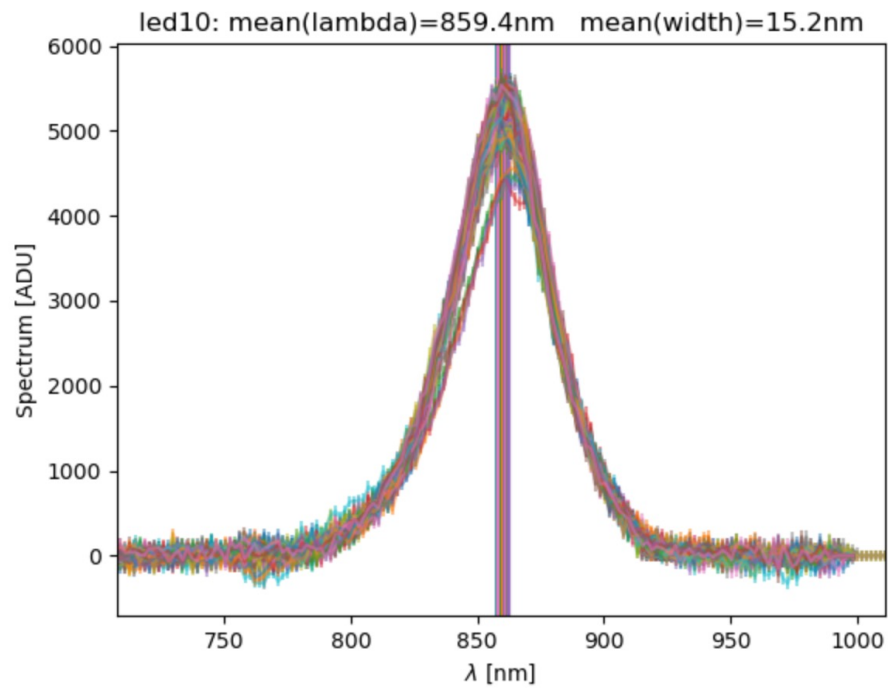
LED spectrum overview

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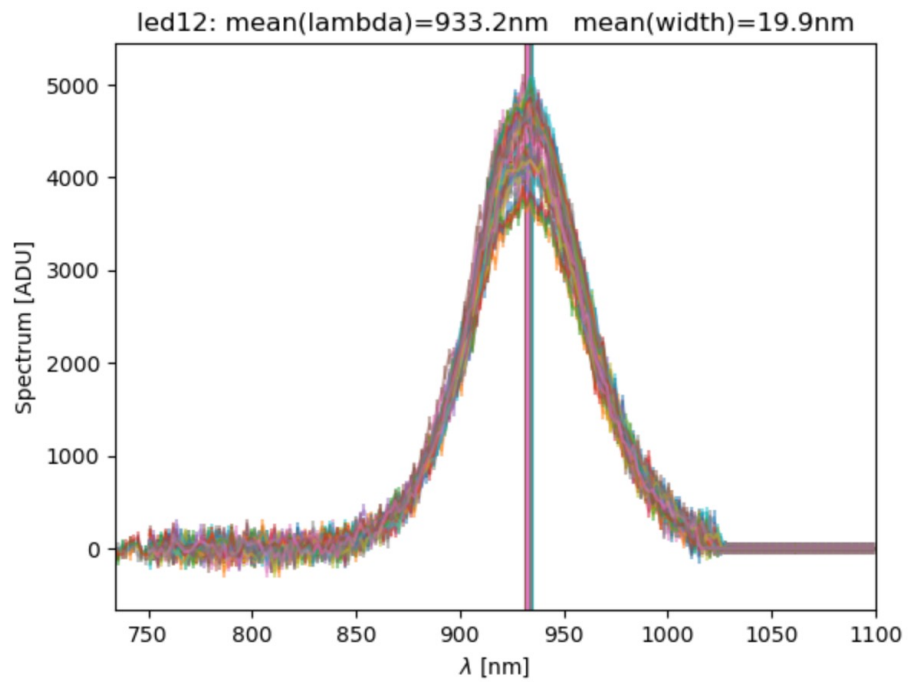
LED spectrum overview

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LED spectrum overview

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LED spectrum overview

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- LED0: 2 blue peaks + long weak continuum and 1 second peak (order 2?)
- LED1: 1 blue peak + long weak continuum
- LED2: white
- Other LEDs: one (nearly) Gaussian peak

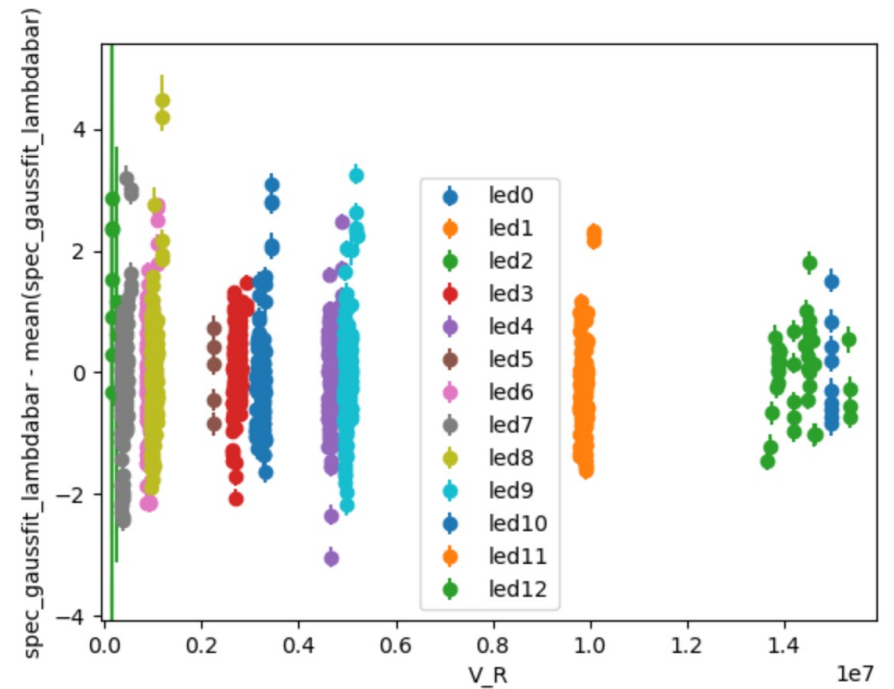
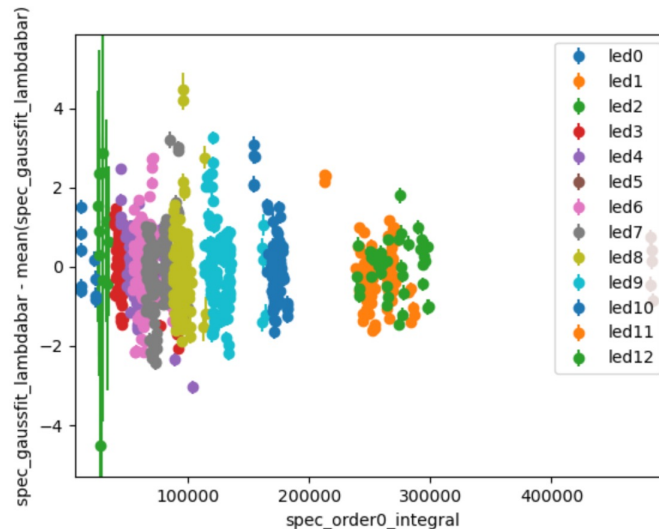
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Results

Wavelength variability

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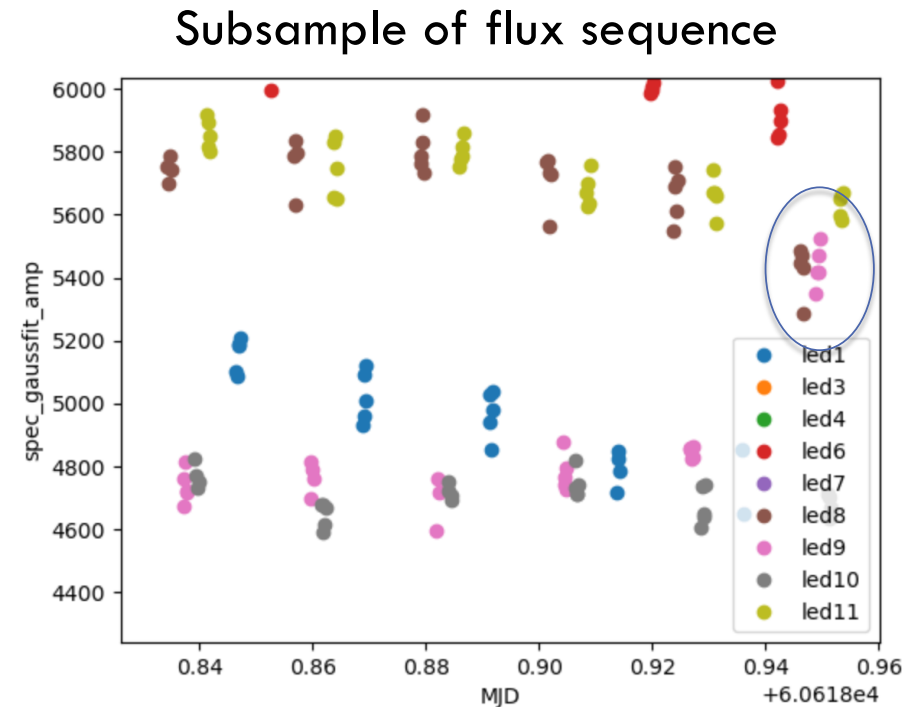
- Spectrum centroid is independent of LED current (or flux, or V_R) better than 1nm
- No obvious variations of the spectrum widths



Flux

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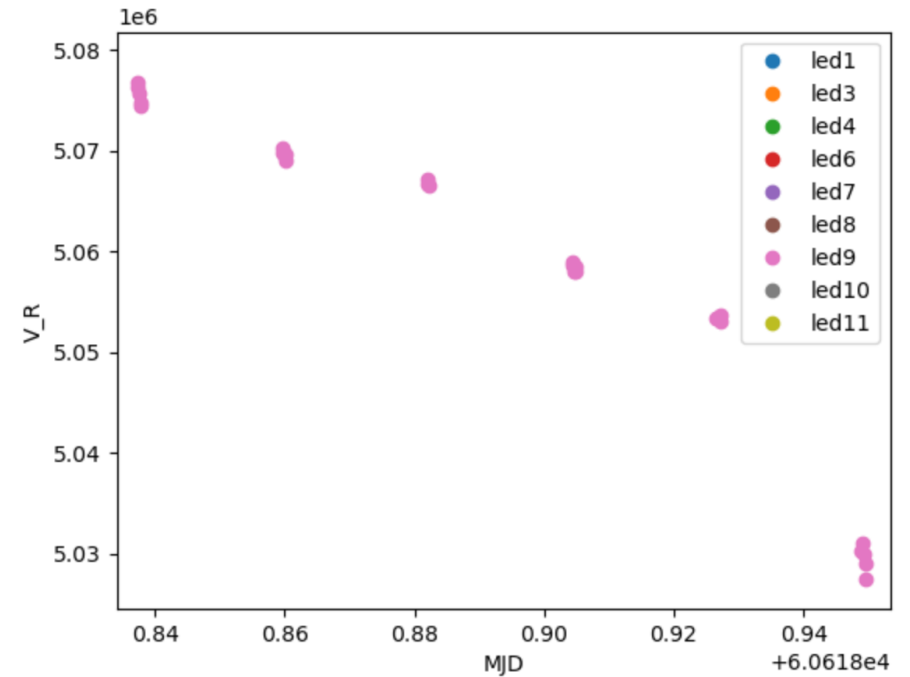
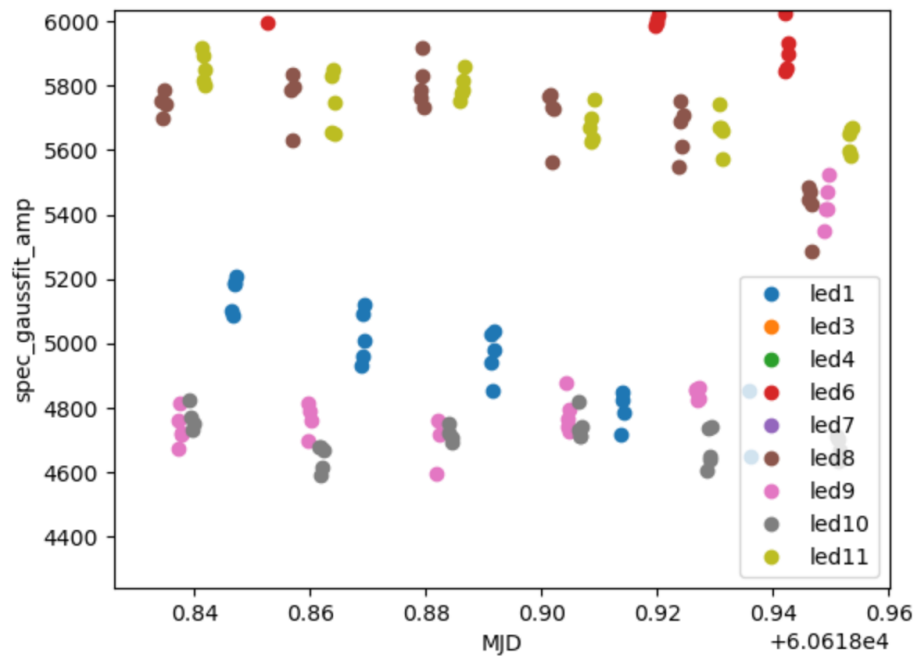
- Flux spectrum metrics:
 - ▣ Fit a Gaussian profile on the LED spectra (spec_gaussian_amp key)
 - ▣ Sum pixels on spectrogram cutouts⇒ Very similar
- Inspection of flux variations of fluxes with time and other parameters:
 - ▣ 5 observations per series, loop on LEDs
 - ▣ Time variations seem smooth in time except for some jumps, but packed by 5



Flux

18

- Jumps: likely V_R (+ something else) and sometimes dome azimuth

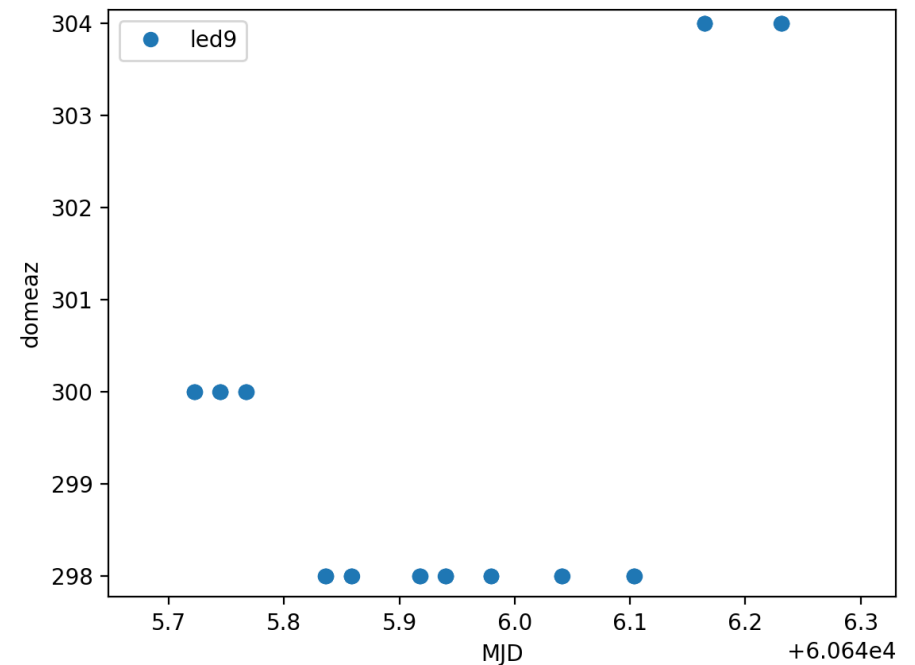
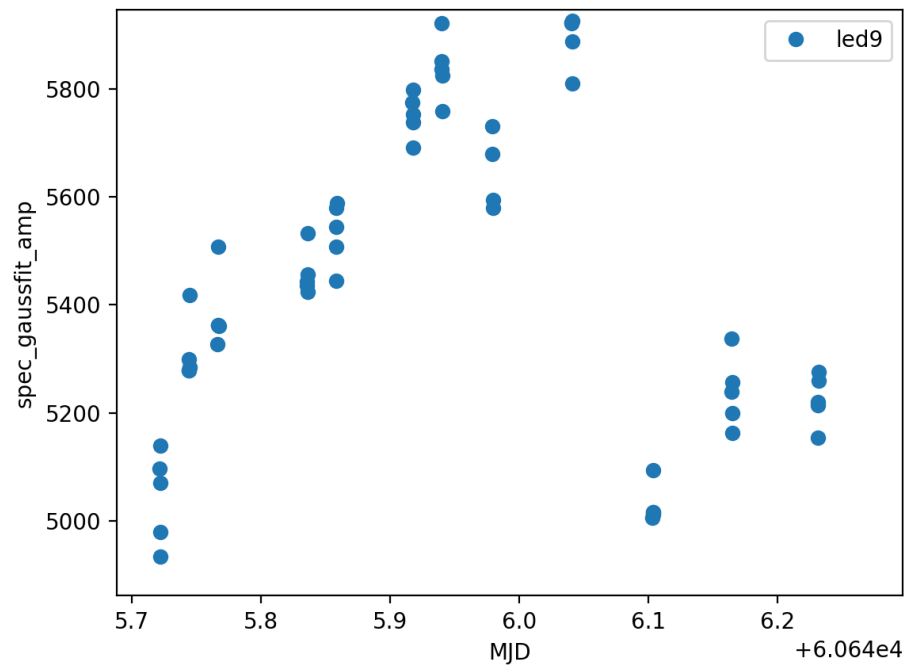


2024_11_04

Flux

19

- Jumps: likely V_R (+ something else) and sometimes dome azimuth

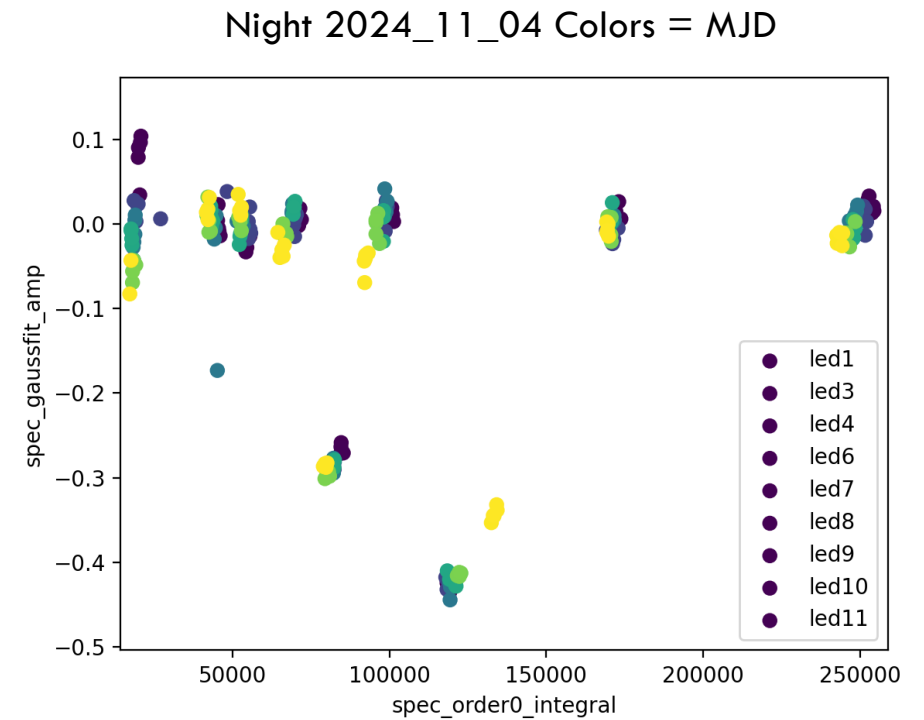


2024_12_01

Flux

20

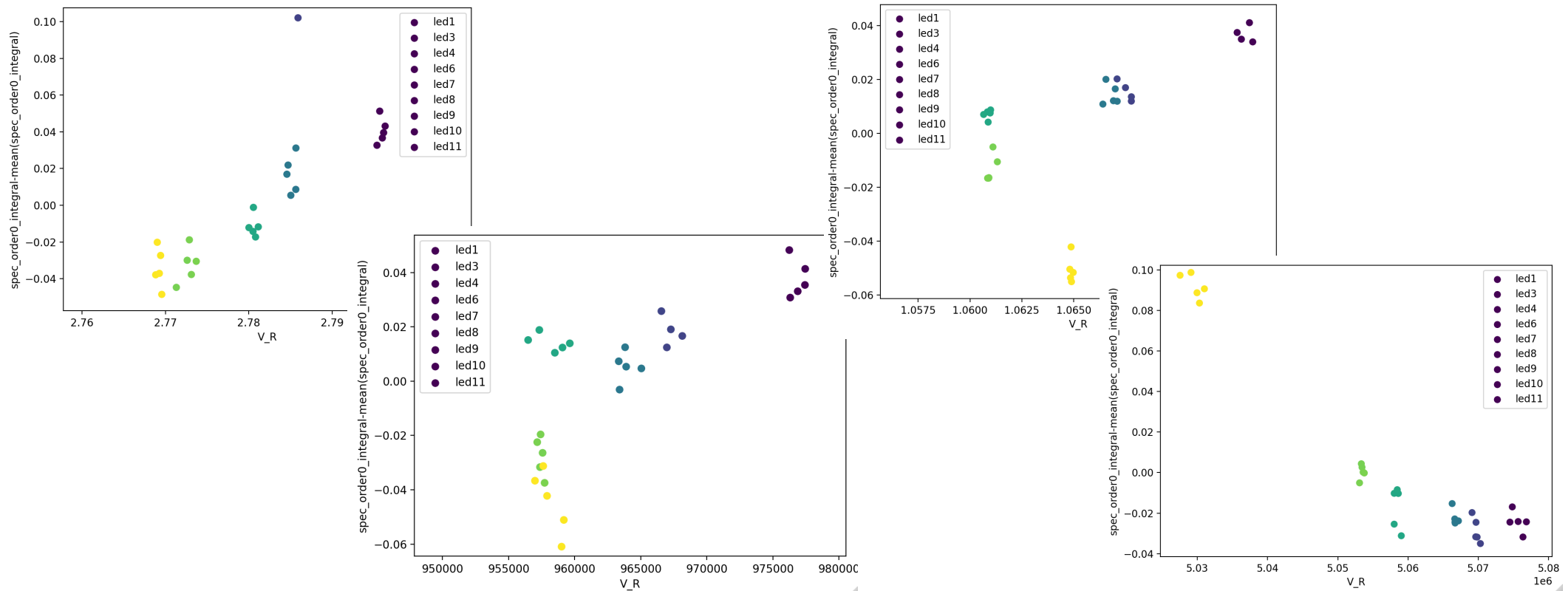
- Good correlation between order 0 cutout integral and spectrum amplitude



Flux vs V_R

21

□ A few examples on some LEDS (night 2024_11_04: no dome motion)



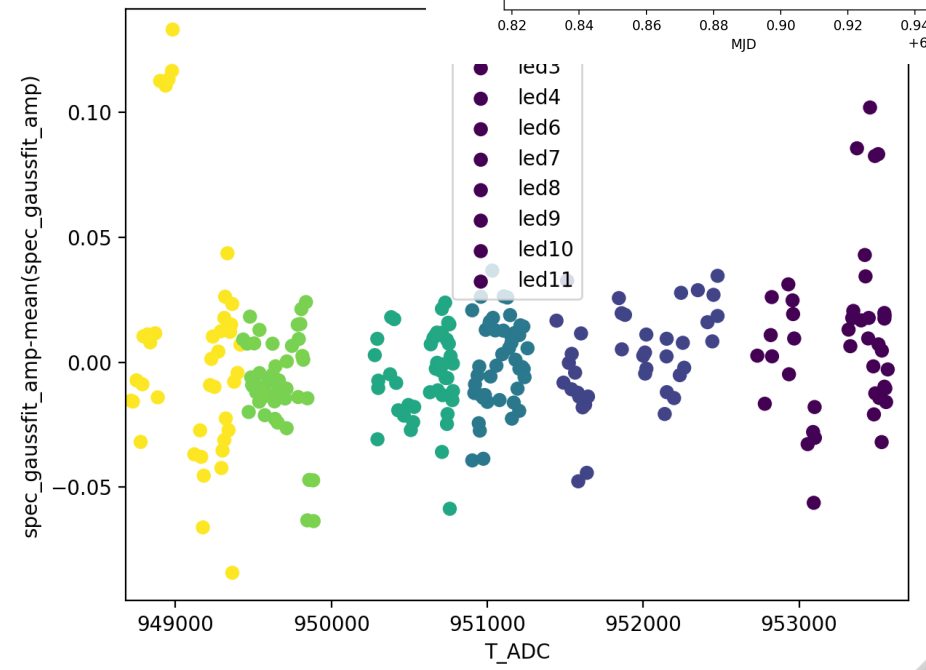
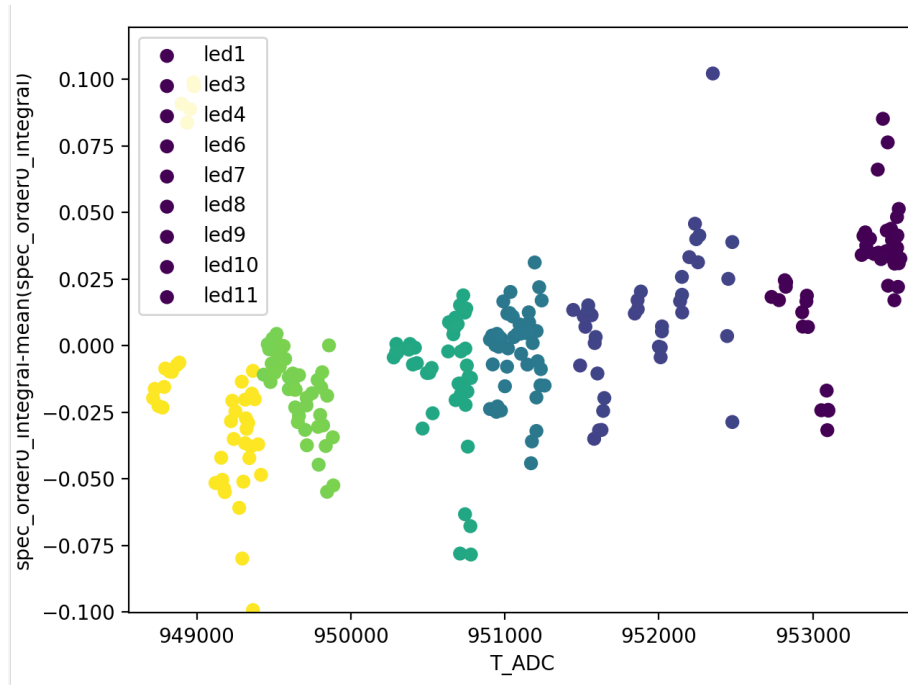
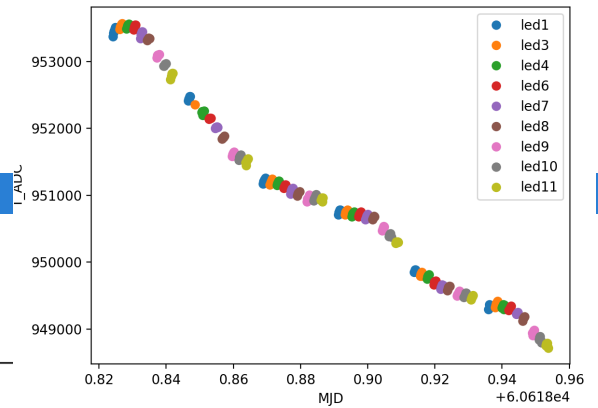
J. Neveu

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Flux vs T_ADC

□ Night 2024_11_04: no dome motion



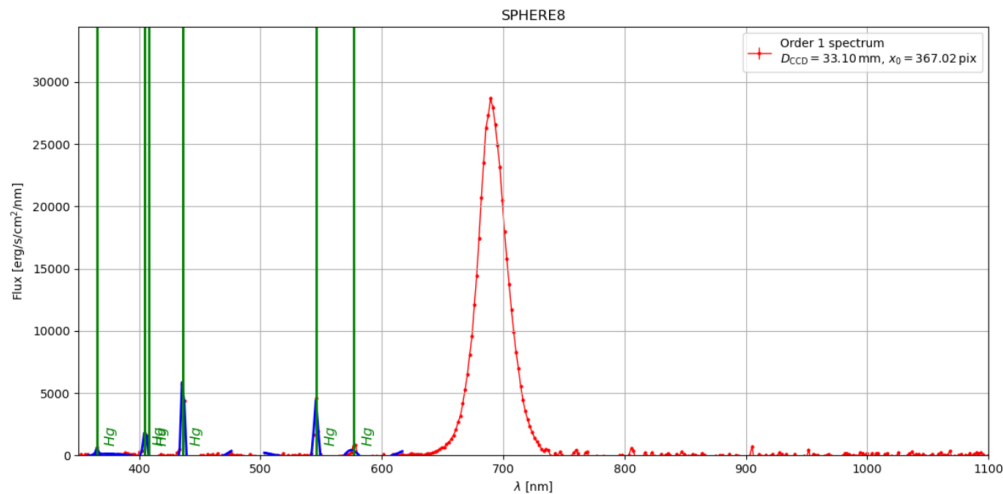
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Spin-off: sphere LEDs

Sphere LED spectra

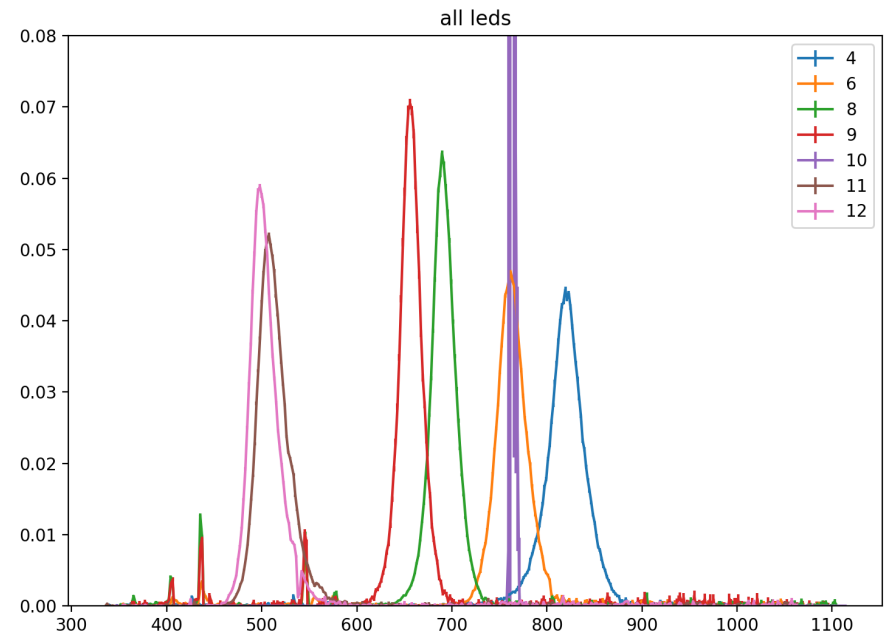
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- A few observations of sphere LEDs
- HG-AR lamp still on: some Hg emission lines to get wavelength calibration
- High SNR, background different



J. Neveu

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