

Calibration report

Thursday 24th September, 2020

Device type: Not available
 Device serial number: Not available

Calibration summary

Parameters of this calibration report are listed in Table 1. The wavelength λ_p (in units of nm) of a sensor pixel p can be calculated by the tuning curve polynomial with coefficients $\alpha_0 - \alpha_5$ listed in Table 2:

$$\lambda_p = \sum_{k=0}^5 a_k p^k \quad \text{where } p = 0, 1, \dots, 1023.$$

The calibration error is assessed by independently computing the positions of spectral responses to isolated and sufficiently bright emission lines using the center of gravity (COG) method. The calibration error is given as the RMSE deviation from the true wavelengths of the emission lines.

Table 1: Calibration parameters.

Parameter	Value
Number of detector pixels	1024
First pixel wavelength	385.0
Last pixel wavelength	950.0
Calibration source	HgAr
Number of emission lines	35
Point spread function model	Gaussian
FWHM resolution model order	1
Tuning curve model order	5

Table 2: Calibration results.

Parameter	Value
Average FWHM resolution	2.60 nm
Calibration error	± 0.051 nm
Tuning curve coeff. a_0	3.86375506e+02
Tuning curve coeff. a_1	5.05275746e-01
Tuning curve coeff. a_2	9.36726760e-05
Tuning curve coeff. a_3	-5.74447408e-08
Tuning curve coeff. a_4	6.15690671e-12
Tuning curve coeff. a_5	5.85487385e-15

Fit results

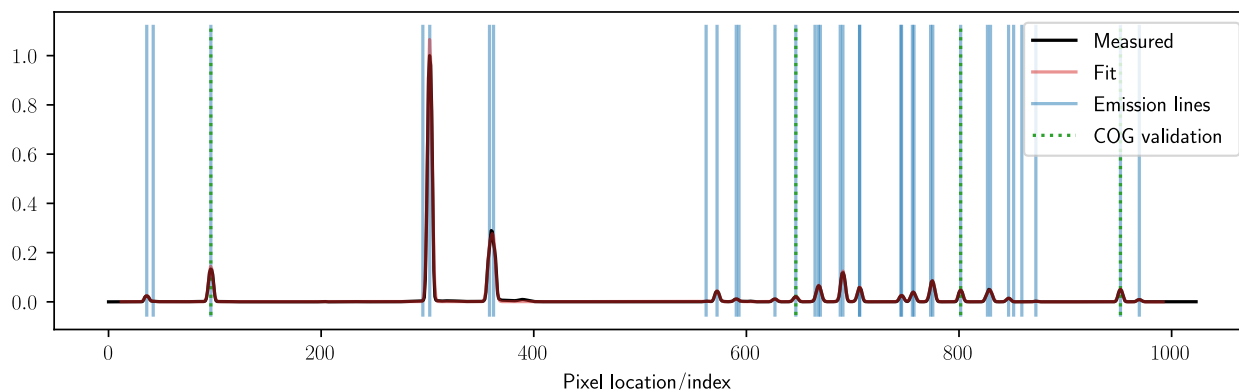


Figure 1: Fit between the measured spectrum and the calibration model.

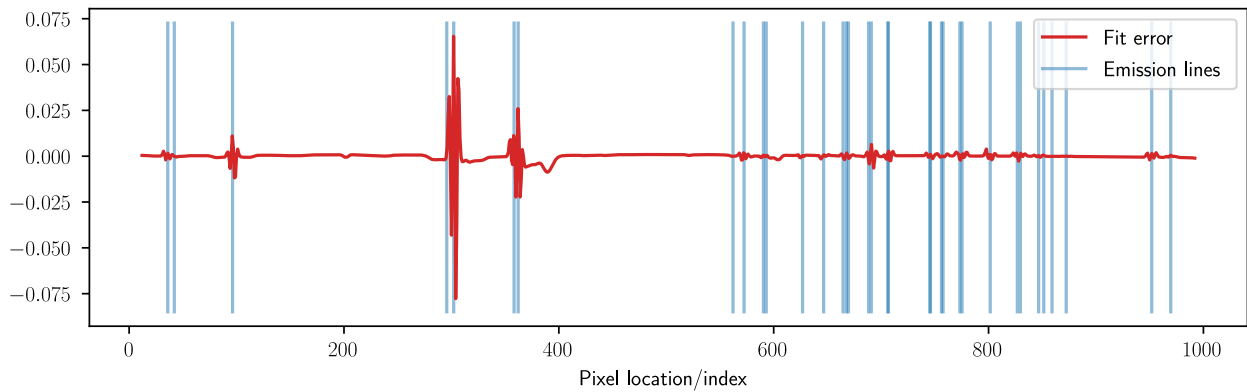


Figure 2: Difference between the measured spectrum and the calibration model,

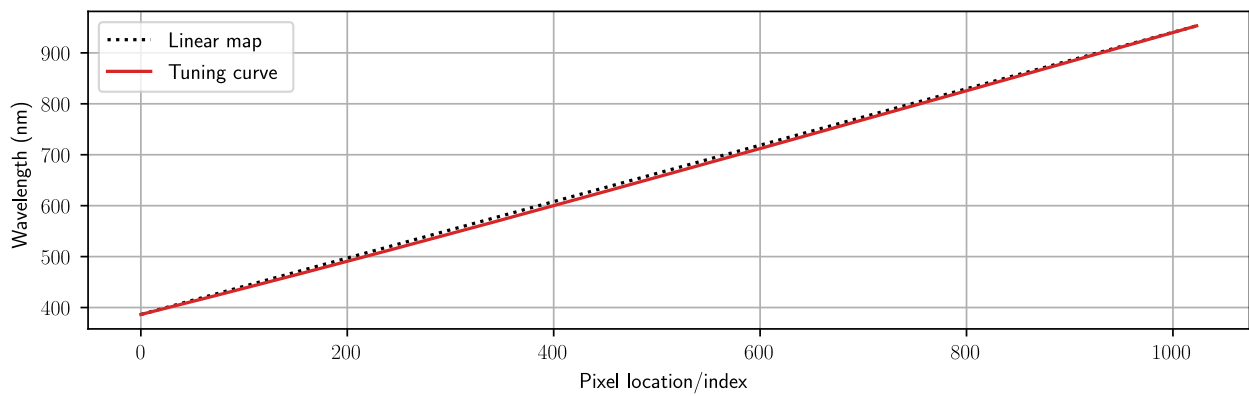


Figure 3: Tuning curve that maps sensor pixel locations to wavelengths.

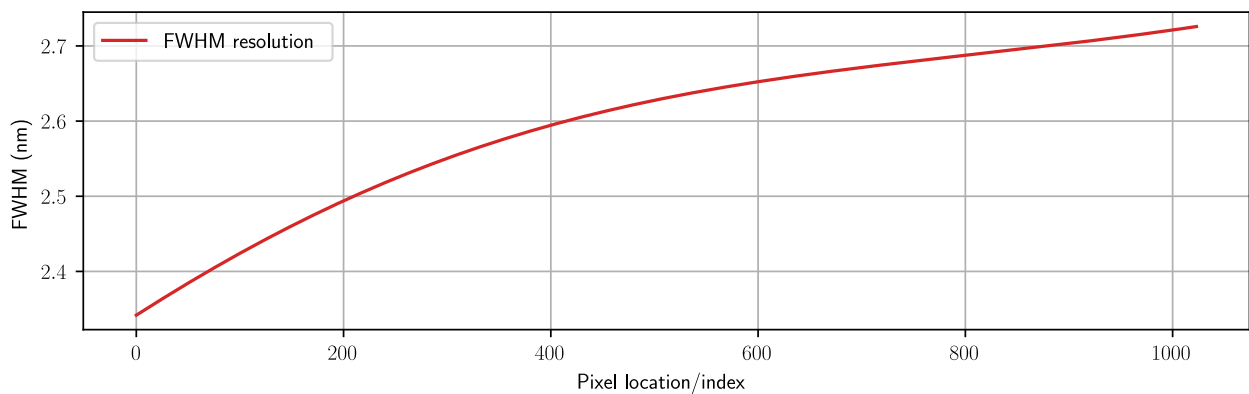


Figure 4: Estimated FWHM resolution of the system.