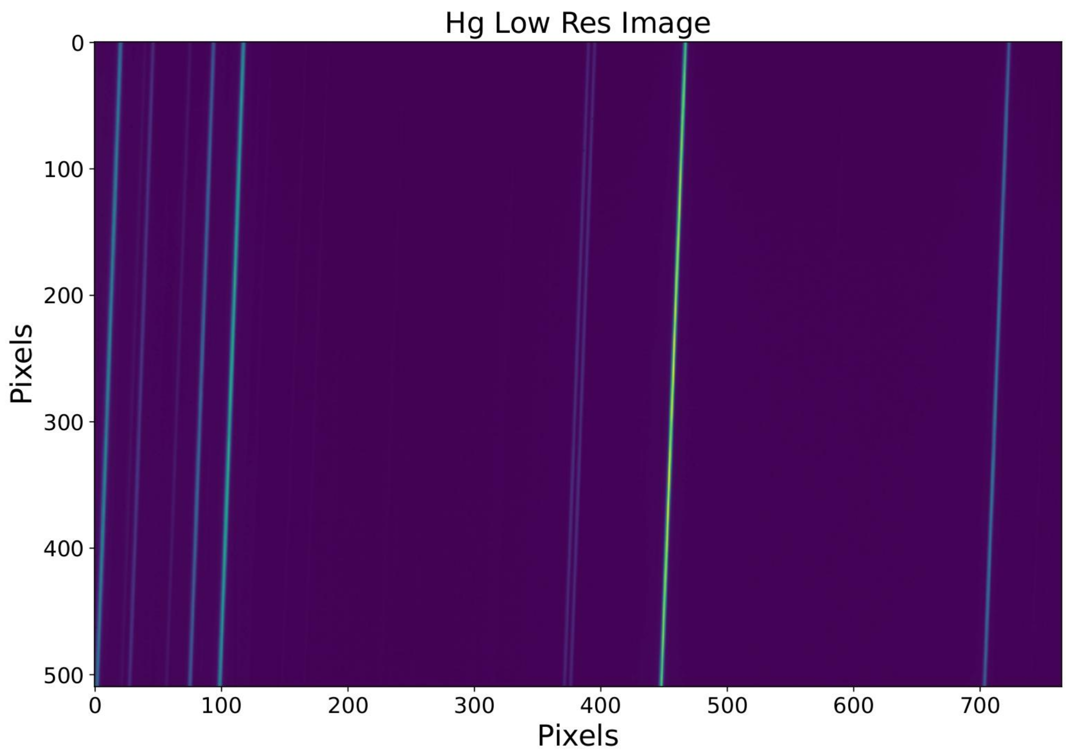


Figure 1: Hg Low Resolution Image. This is an example of what the raw data collected from observation looks like. Some emission lines are already visable. This image already has the dark removed because the spectrometer automatically takes them for each run.

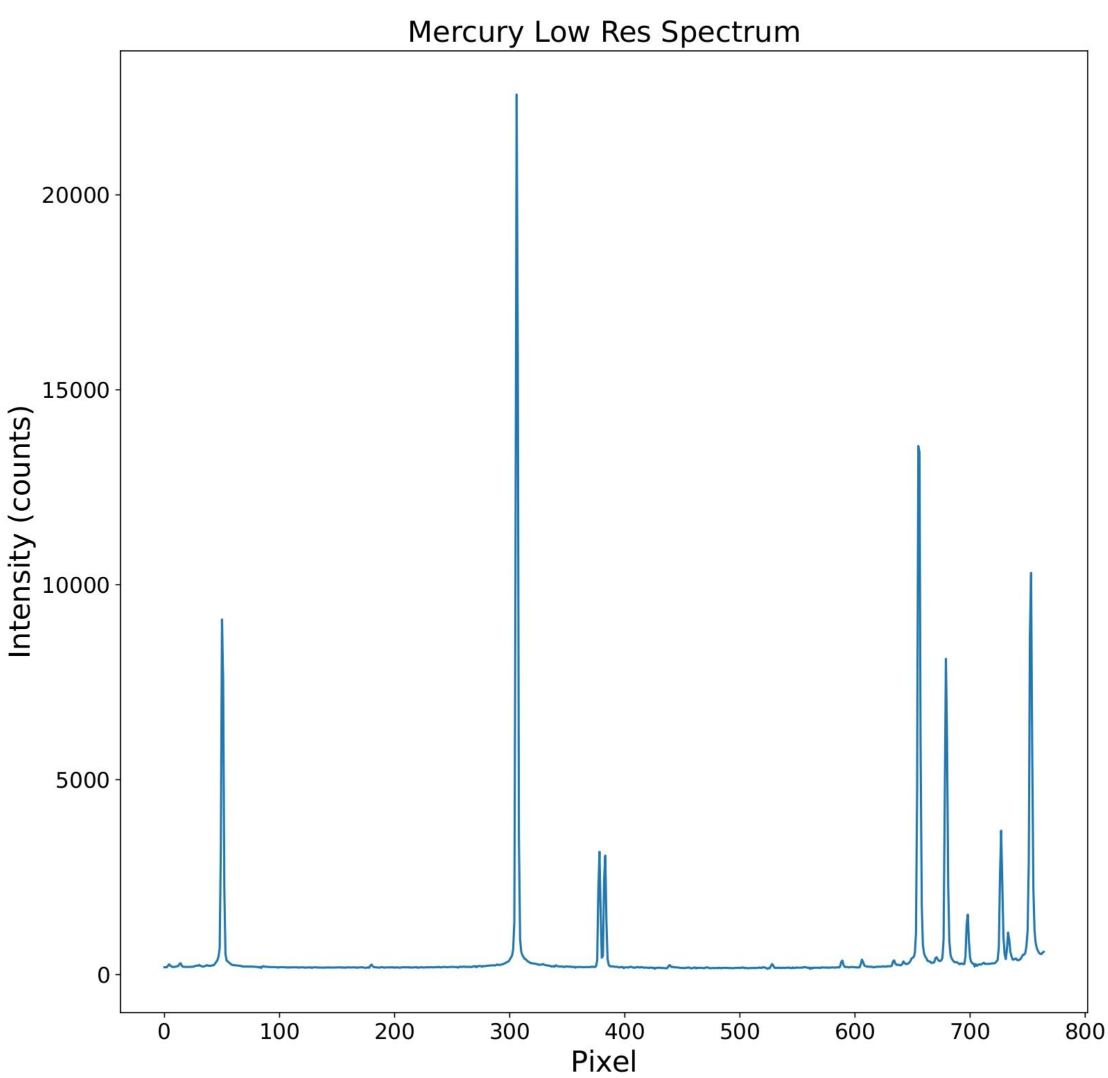


Figure 2: Hg Low Resolution Spectrum. The average of the spectrum in the center rows of the CCD. The emission line are now apparent.

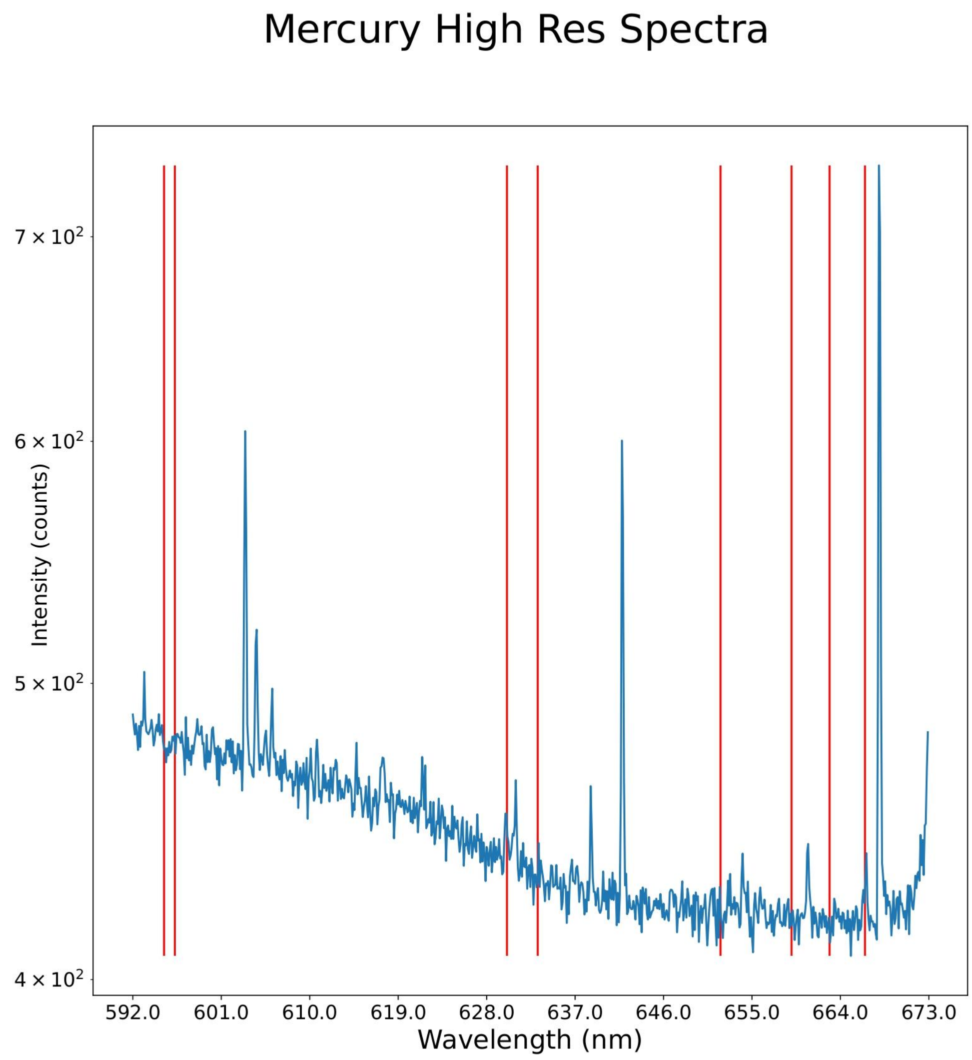
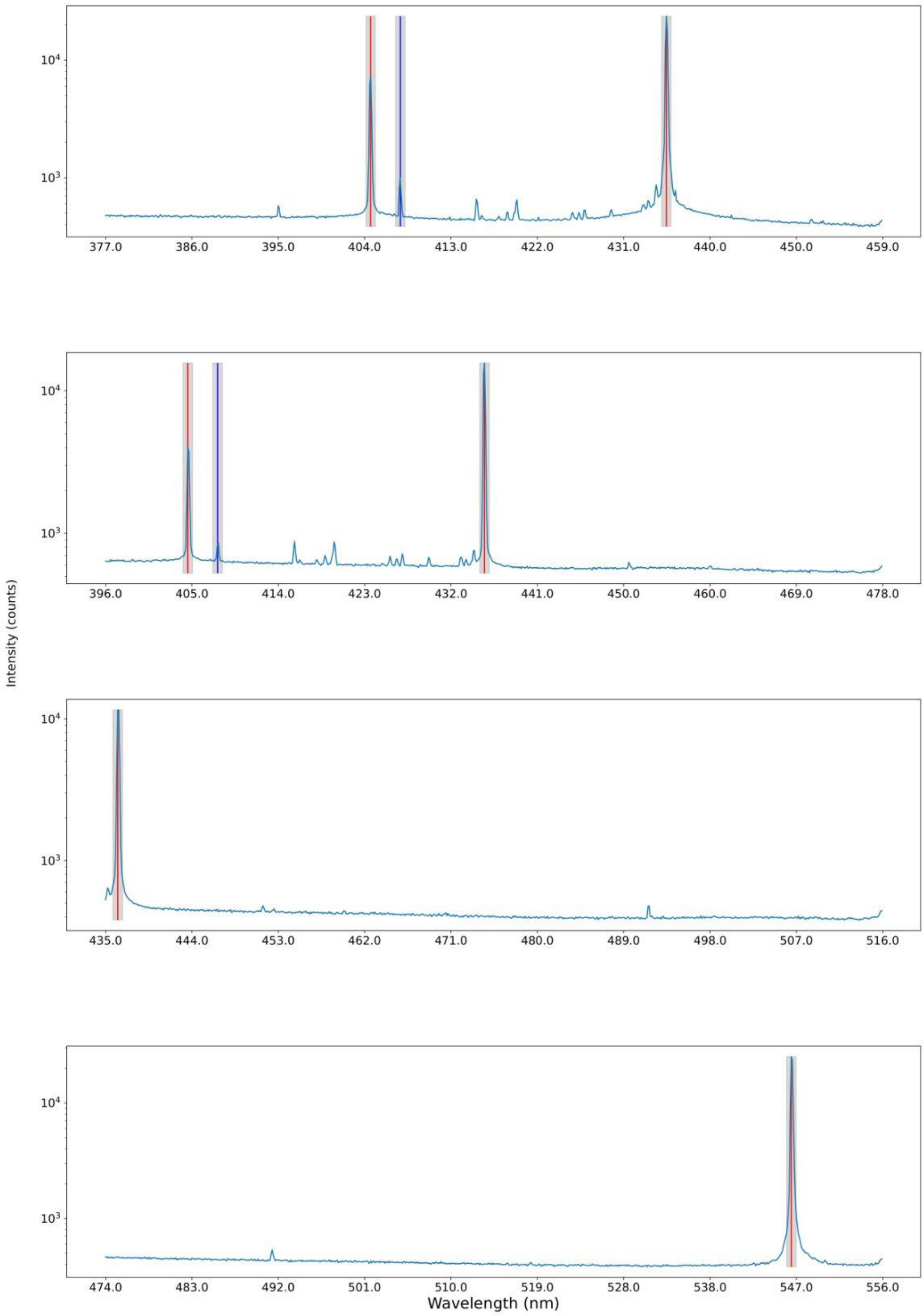


Figure 3: Hg High Resolution Spectrum 592-673 nm: In this range there are no exmission lines for Hg, but the lamp we used is a Hg-Ar lamp, so we can use the argon lines for calibrations. Here we didn't know where the lines were supposed to be but we did know their wavelengths, so using a = 0.107 nm/pix and b = 600 pix we plotted our guesses (the red lines) using pix = (lambda - b) / a. From this we can see that shifting the lines over to the right will make them match up closely with clear peaks so we do that to get a better calibration on the wavelengths.

Mercury High Res Spectra



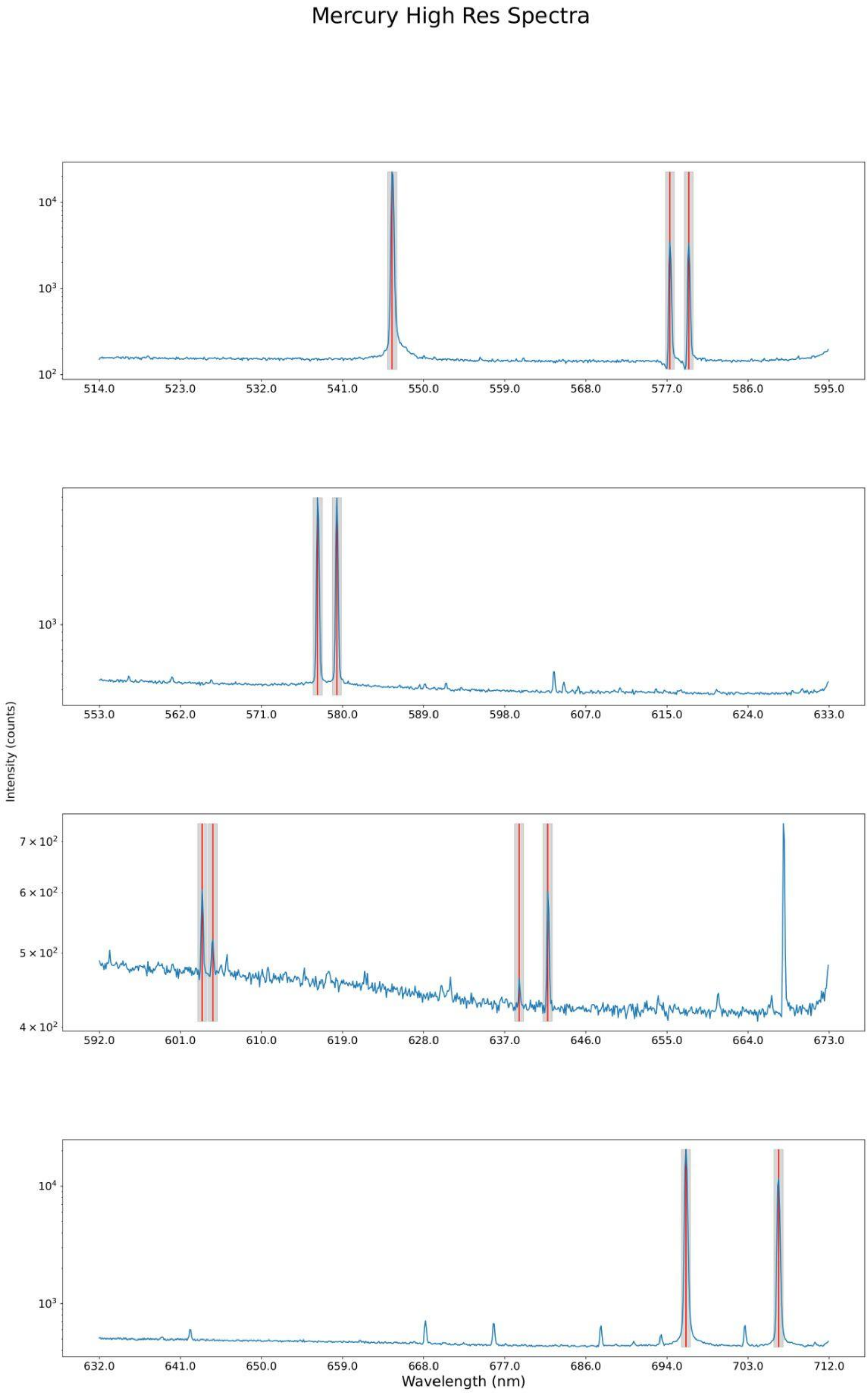


Figure 4: Hg High Resolution Spectra with Determined Lines: Once we identified the lines we can convert these to wavelengths to be used for analyzing the sun data. The gray shaded areas represent the uncertainty of the wavelengths.

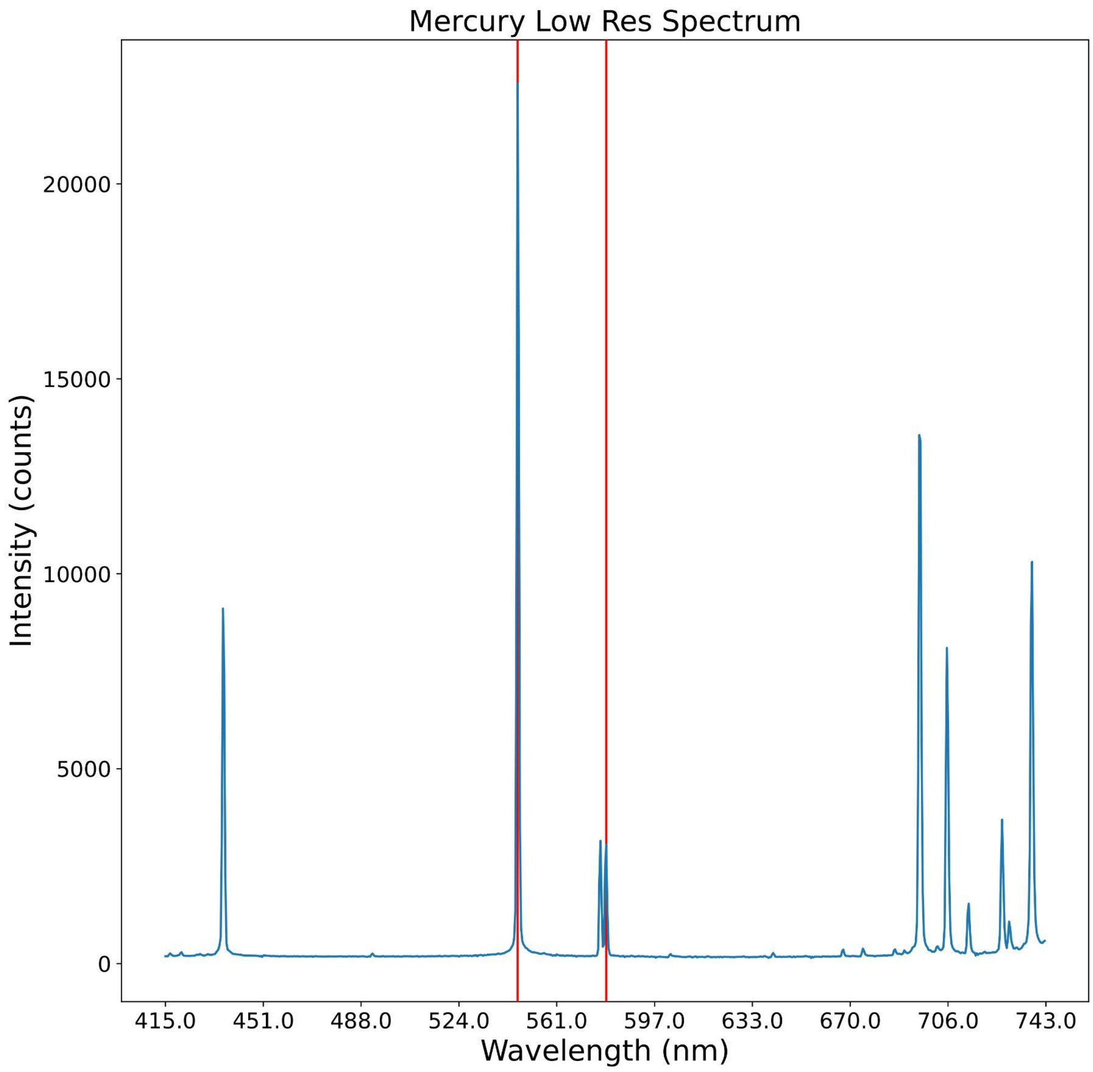
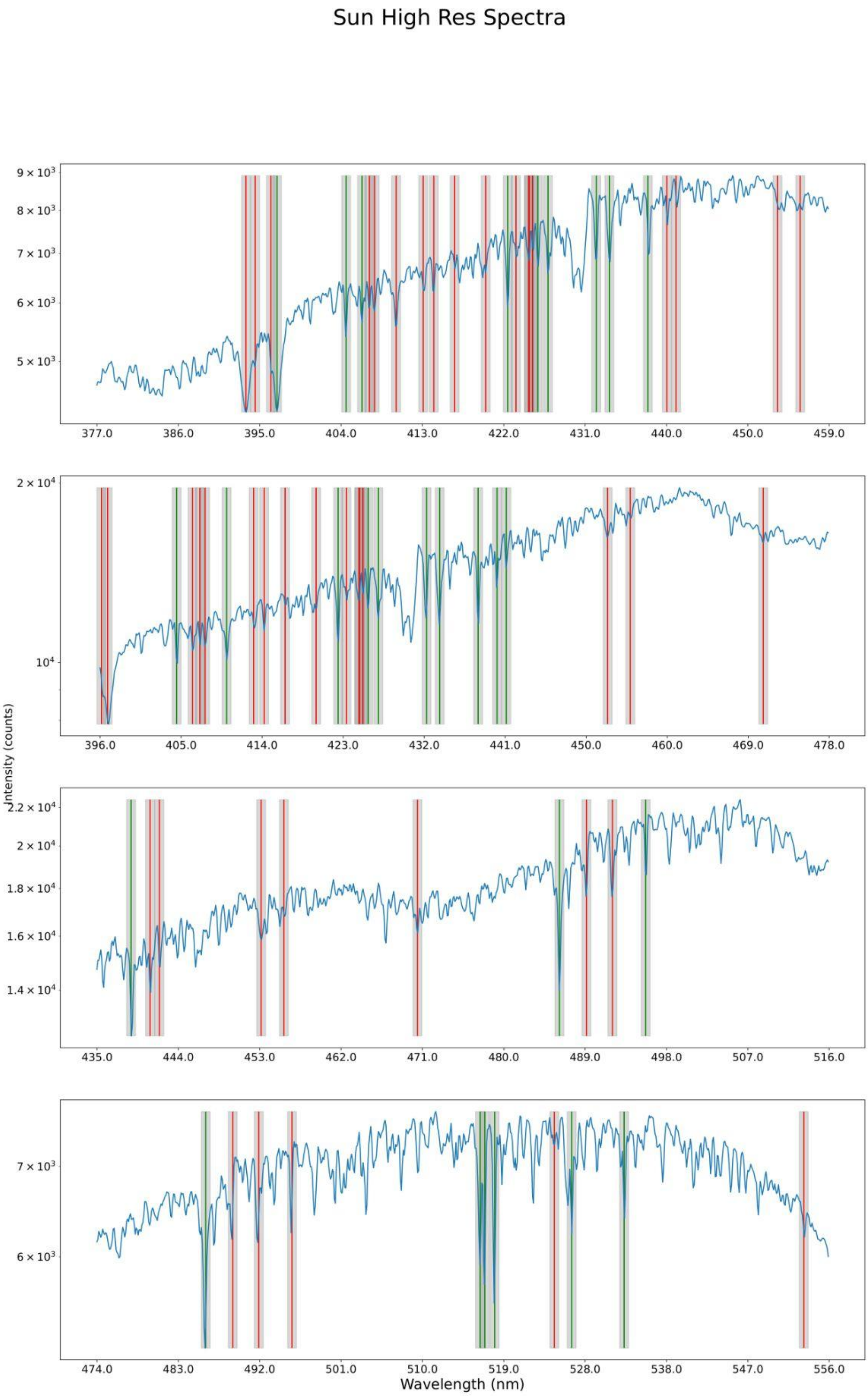


Figure 5: Hg Low Resolution Spectra with Determined Lines: The same thing but only using the two lines we could identify for the low resolution.



Sun High Res Spectra
Intensity (counts)
Wavelength (nm)

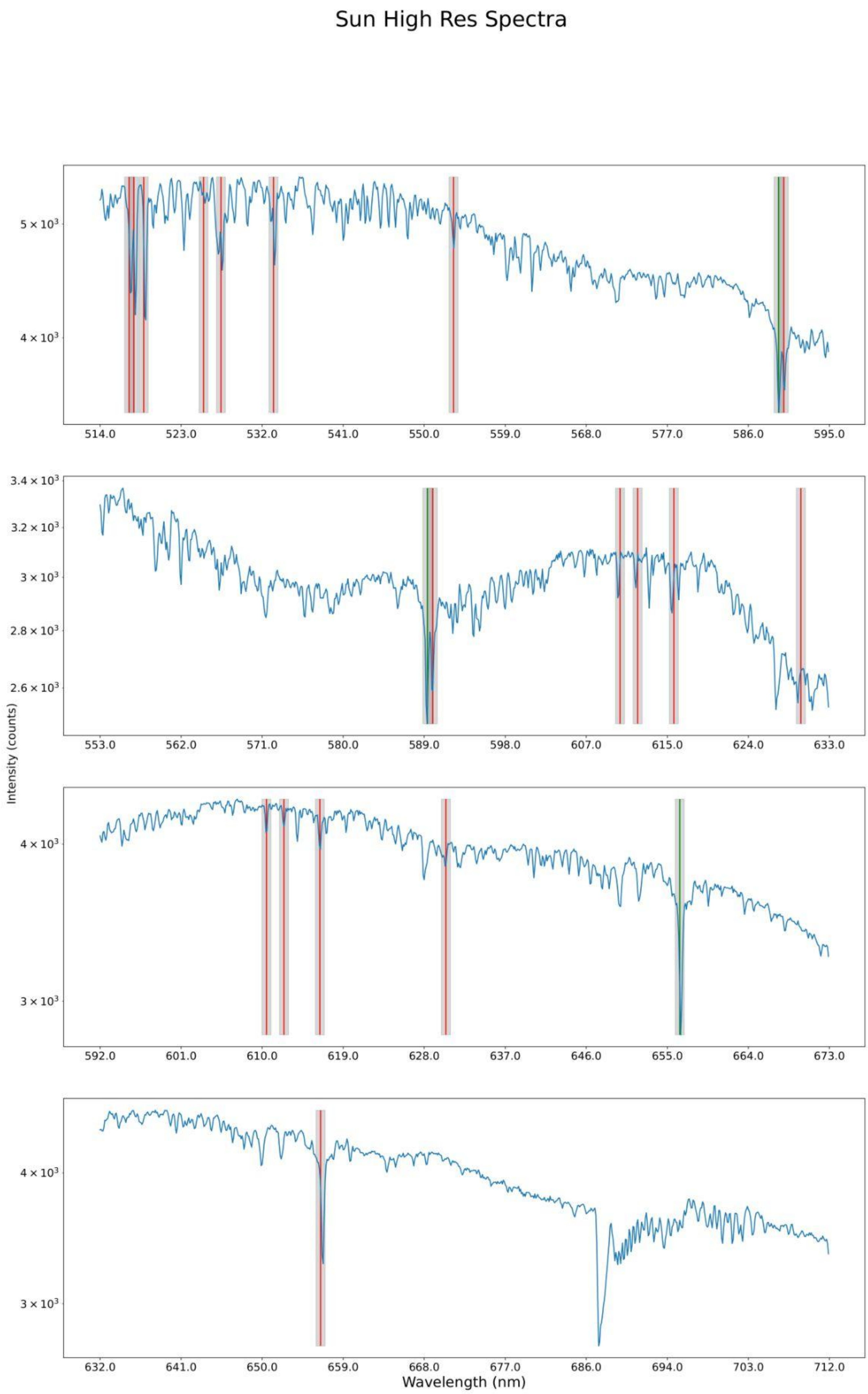
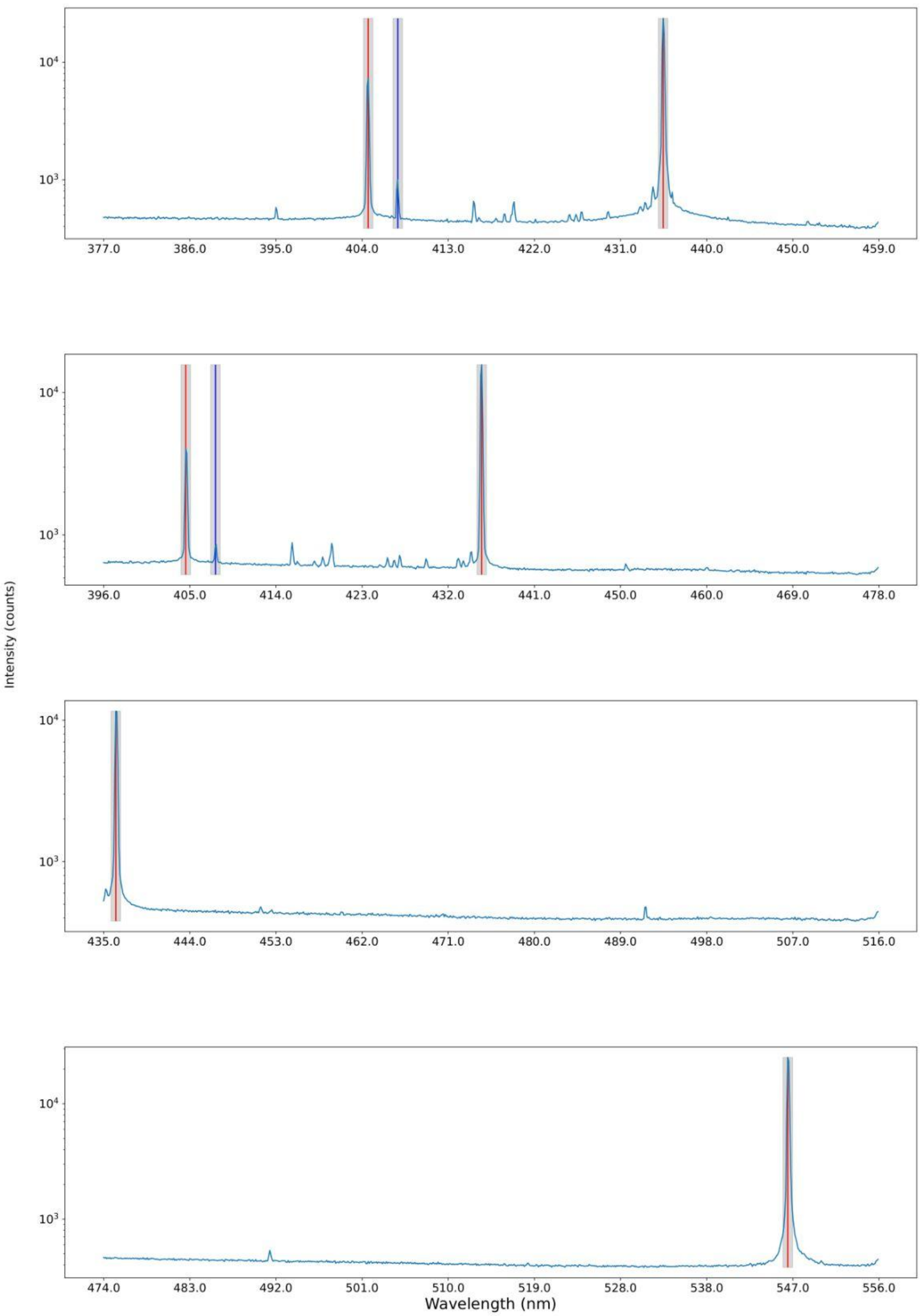


Figure 6: Sun High Resolution Spectra with Expected Lines: The main results of this experiment. Using the same labels we found from the Hg calibration we can identify the absorption lines of the Sun. We plotted all lines from Larson [3] which are the expected spectral lines from the Sun. The green lines are the ones that met our criteria for being 10% lower in intensity than the highest point within its errorbars on either side.

Mercury High Res Spectra



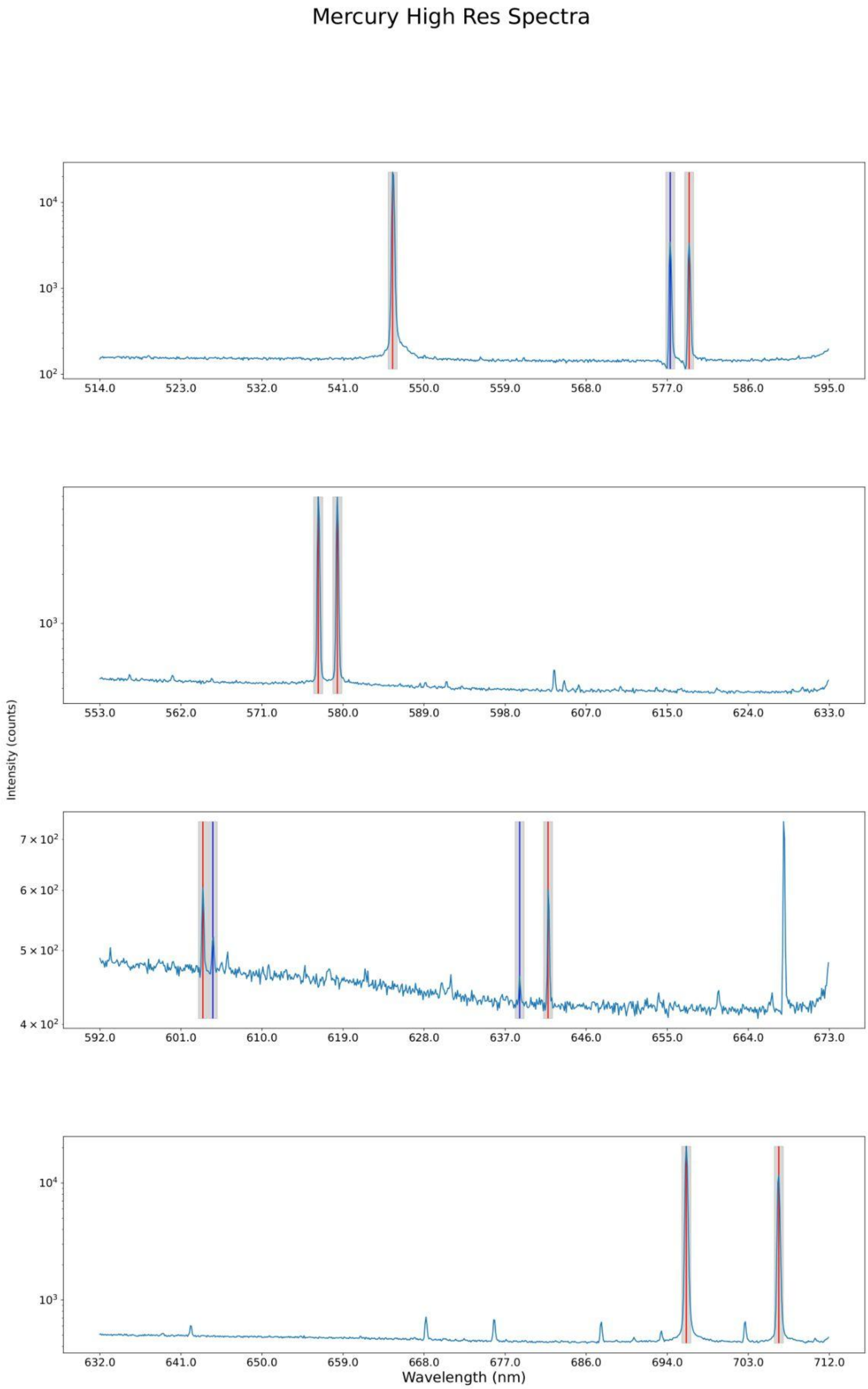
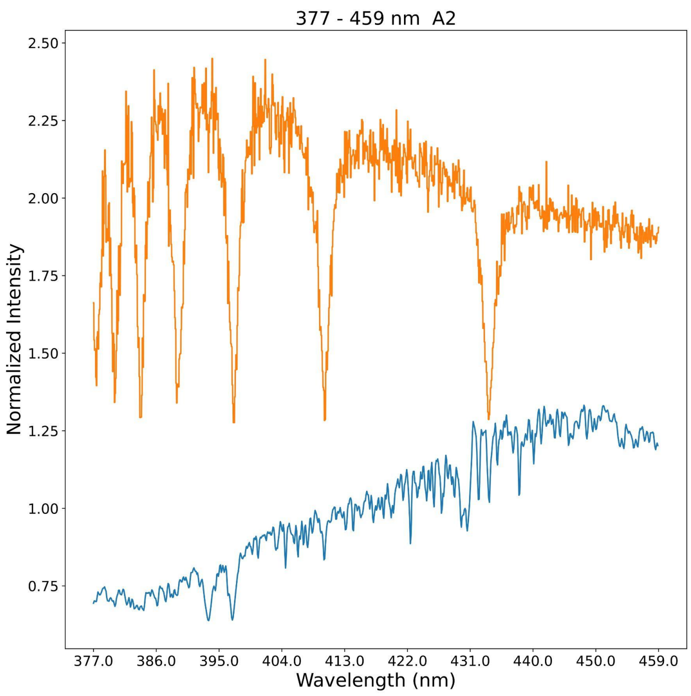
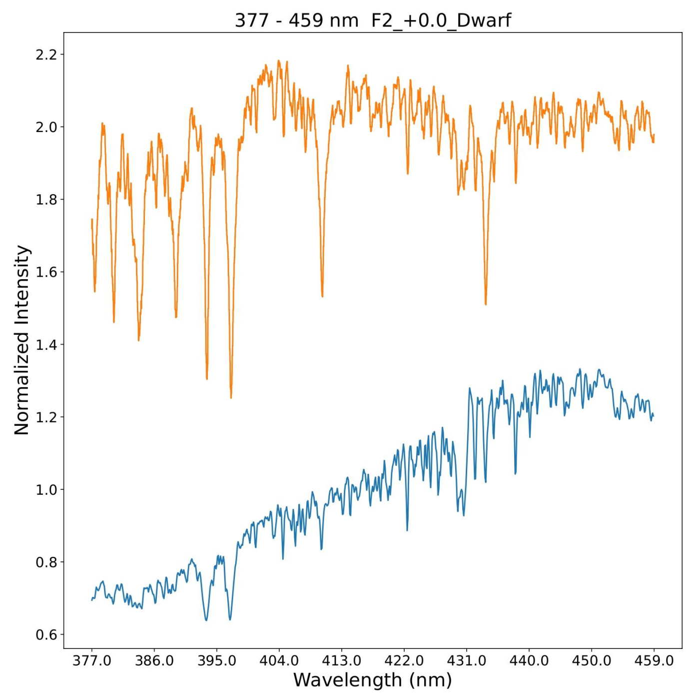
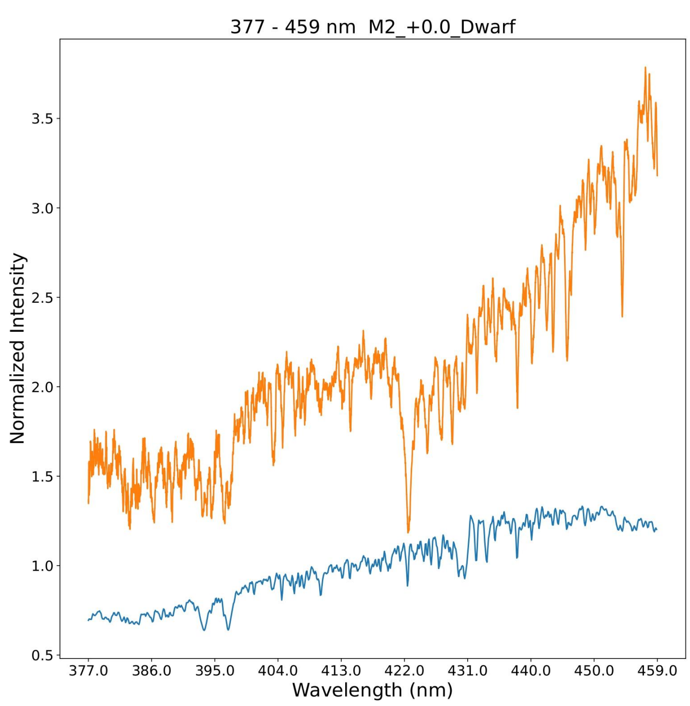
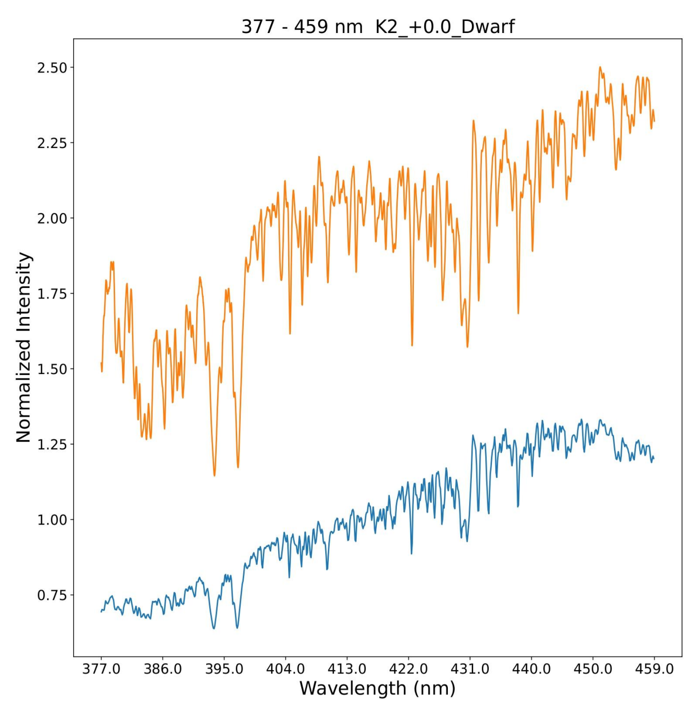


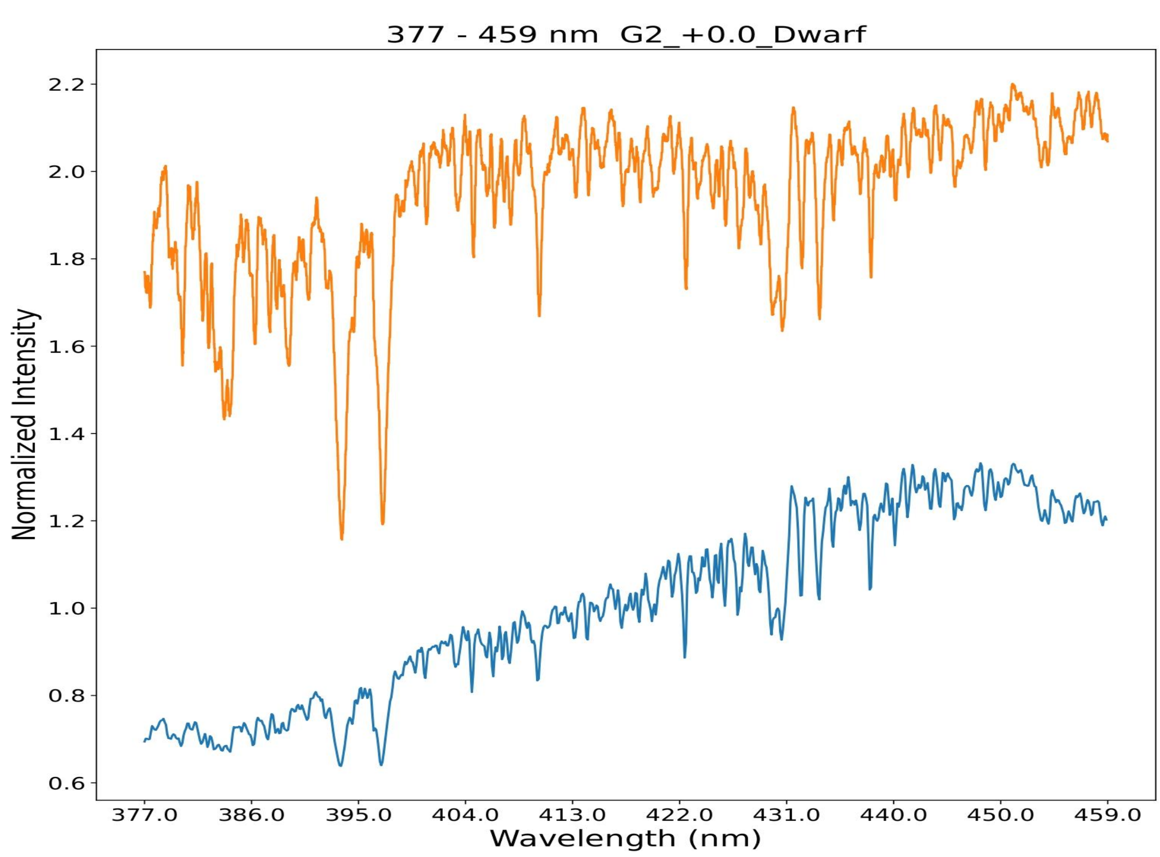
Figure 7: Hg High Resolution Check: This reassures us that our errors are reasonable. The red lines are the ones we used to calculate a and b. The dark blue lines are the extra ones but now when we use our a and b parameters to put them back on, they still are placed near their true value and definitly within the errors.


377 - 459 nm A2
Normalized Intensity
Wavelength (nm)
377.0 386.0 395.0 404.0 413.0 422.0 431.0 440.0 450.0 459.0
0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50


377 - 459 nm F2_+0.0_Dwarf
Normalized Intensity
Wavelength (nm)
377.0 386.0 395.0 404.0 413.0 422.0 431.0 440.0 450.0 459.0
0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2


377 - 459 nm M2_+0.0_Dwarf
Normalized Intensity
Wavelength (nm)
377.0 386.0 395.0 404.0 413.0 422.0 431.0 440.0 450.0 459.0
0.5 1.0 1.5 2.0 2.5 3.0 3.5


377 - 459 nm K2_+0.0_Dwarf
Normalized Intensity
Wavelength (nm)
377.0 386.0 395.0 404.0 413.0 422.0 431.0 440.0 450.0 459.0
0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50


377 - 459 nm G2_+0.0_Dwarf
Normalized Intensity
Wavelength (nm)
377.0 386.0 395.0 404.0 413.0 422.0 431.0 440.0 450.0 459.0
0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2

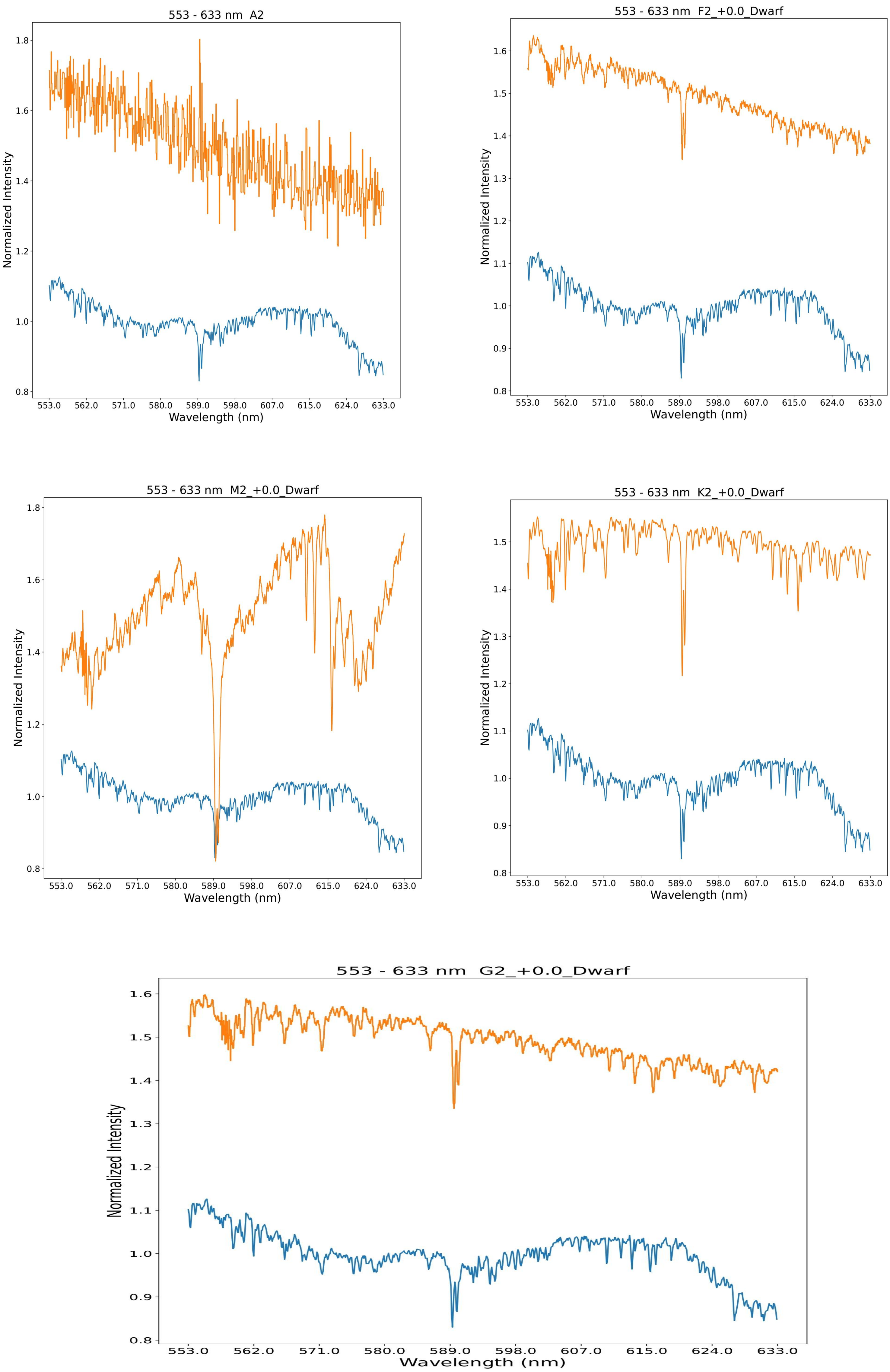


Figure 8: Star Type Comparisons: Our solar spectrum in two wavelength ranges(377-479 nm on 1st page; 553-633 nm on 2nd page) with empirical steller templates from other classes of stars(A2, F2, G2, K2, M2). The Sun is a G2 Dwarf and it does indeed line up with that one almost perfectly.

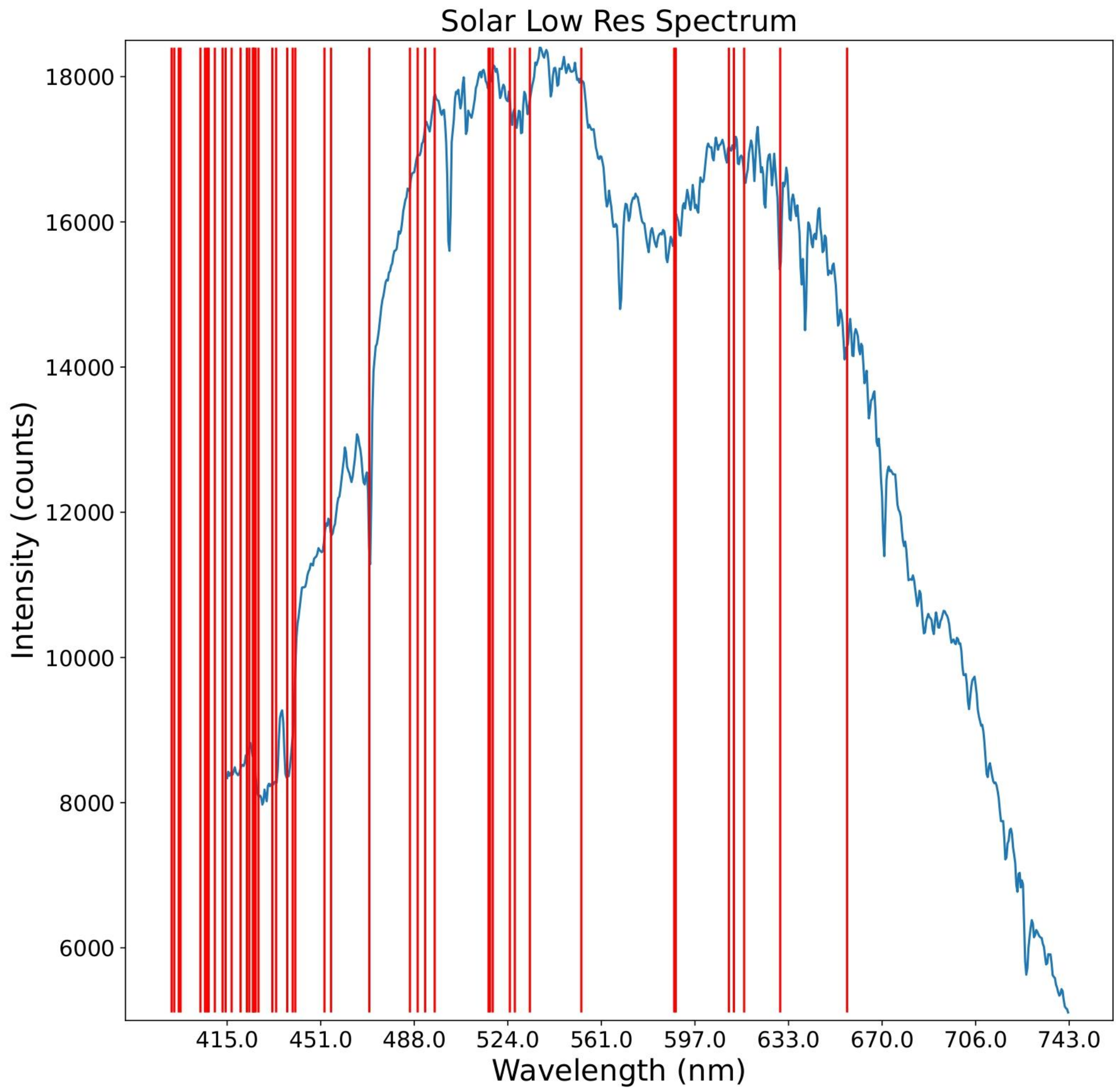


Figure 9: Sun Low Resolution Spectra with Expected Lines: The low resolution solar spectrum with the same spectral lines that are plotted on the high resolution. We can clearly see the effect of the lower resolution. The wavelength range is off from what we expected and spectral lines we had in high resolution are no longer even on our spectra.

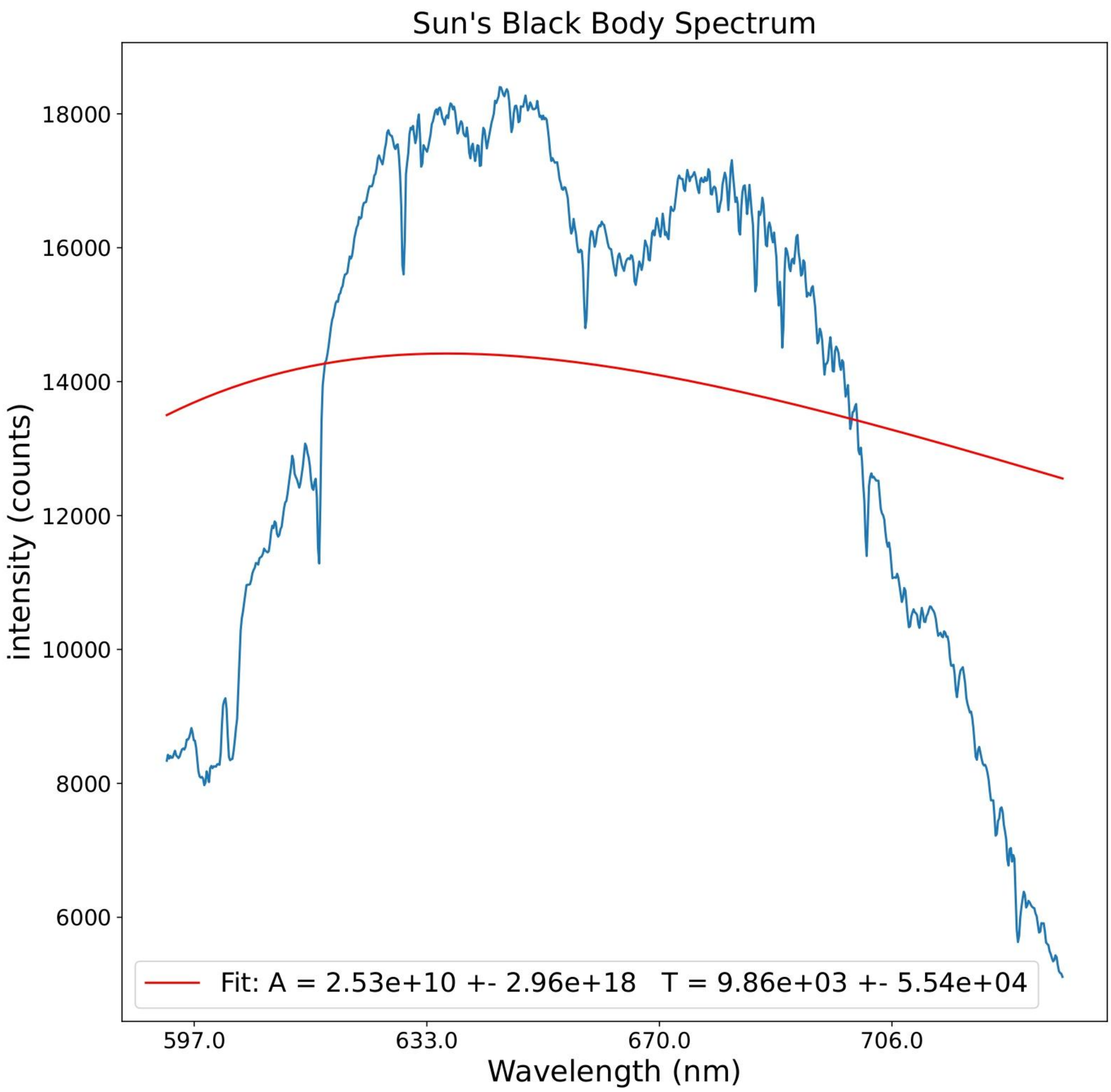


Figure 10: Black Body Spectrum FIt: Fitting the low resolution curve with a the black body spectrum equation. The shape of the curve is correct, but the temperature value is incorrect, however, with the massive errors we are in the range. This ins't meaning ful though because the error is so much larger than the value itself.