testtool-CMOS

July 20, 2022

[1]:
```
%matplotlib inline
```

[2]:
```
import matplotlib.pyplot as plt
```

[3]:
```
# Ignore depreciation and user warnings for this notebook
import warnings
warnings.filterwarnings("ignore")
```

[4]:
```
%run ../tools/echelle.py
cb = Calibrations('../resources/calibration_files')

cb.filenames['orders'] = 'pattern_cmos.txt'
# cb.filenames['sphr'] = 'absolute_cmos.sif'
cb.filenames['sphr'] = 'sphere_CMOS.sif'
cb.filenames['bkgr'] = 'sphere_CMOS_bkg.sif'
cb.filenames['wavelength'] = 'Th_wavelength_CMOS.txt'
```

[5]:
```
cb.start()
```

[6]:
```
%run ../tools/echelle.py

em = EchelleImage('../resources/calibration_files/ThAr_10.0s_16bit.sif',
                  clbr=cb)
```

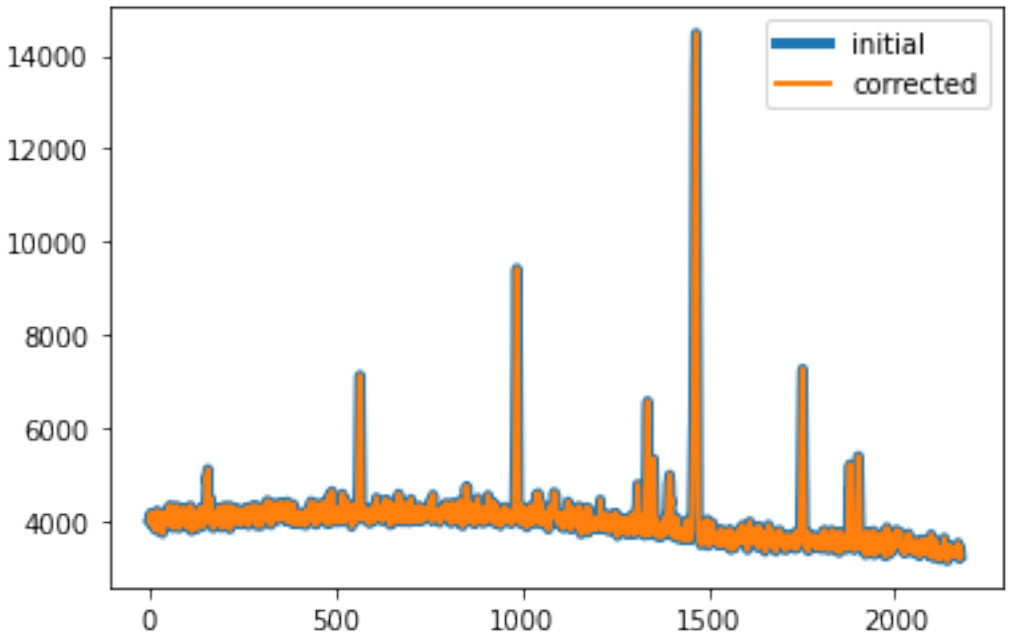
[7]:
```
# Calculate order spectra
em.calculate_order_spectra()
print("Initial order spectra shape:", em.order_spectra.shape)
os_init = em.order_spectra.copy()

# Apply corrections
em.correct_order_shapes()
print("Corrected order spectra shape:", em.order_spectra.shape)
os_corr = em.order_spectra.copy()
```

```
Initial order spectra shape: (1, 29)
Corrected order spectra shape: (1, 29, 2560)
```

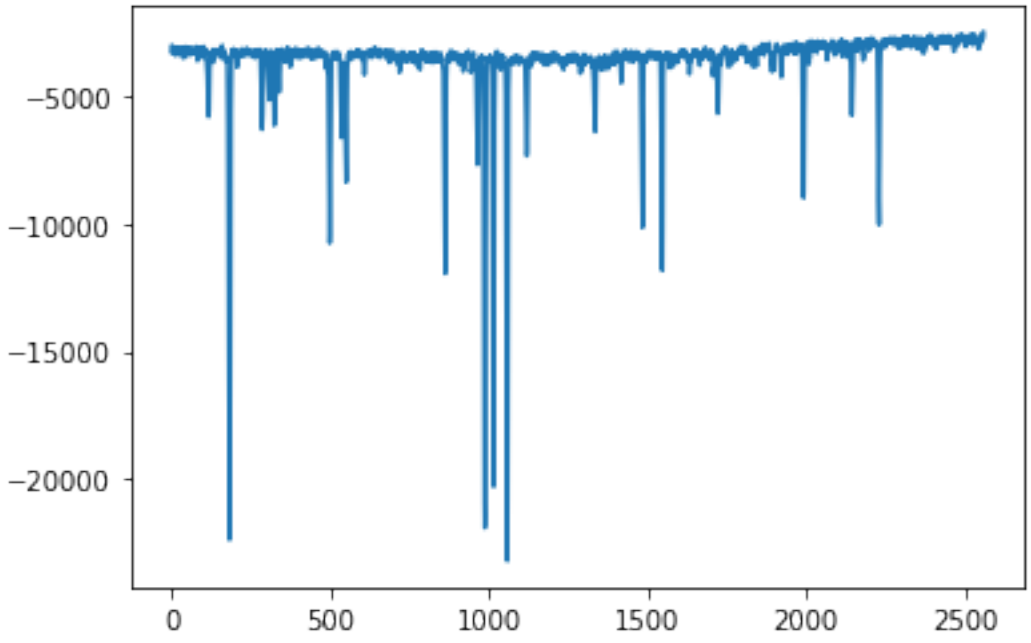
[8]:
```
# Visualise initial vs corrected order spectra
frame = 0  # select a single frame from image
order = 28  # select single order from frame
plt.plot(os_init[frame, order], lw=4, label='initial')
plt.plot(os_corr[frame, order], lw=2, ls='-', label='corrected')
plt.legend()
```

[8]:
```
<matplotlib.legend.Legend at 0x2193b7802b0>
```



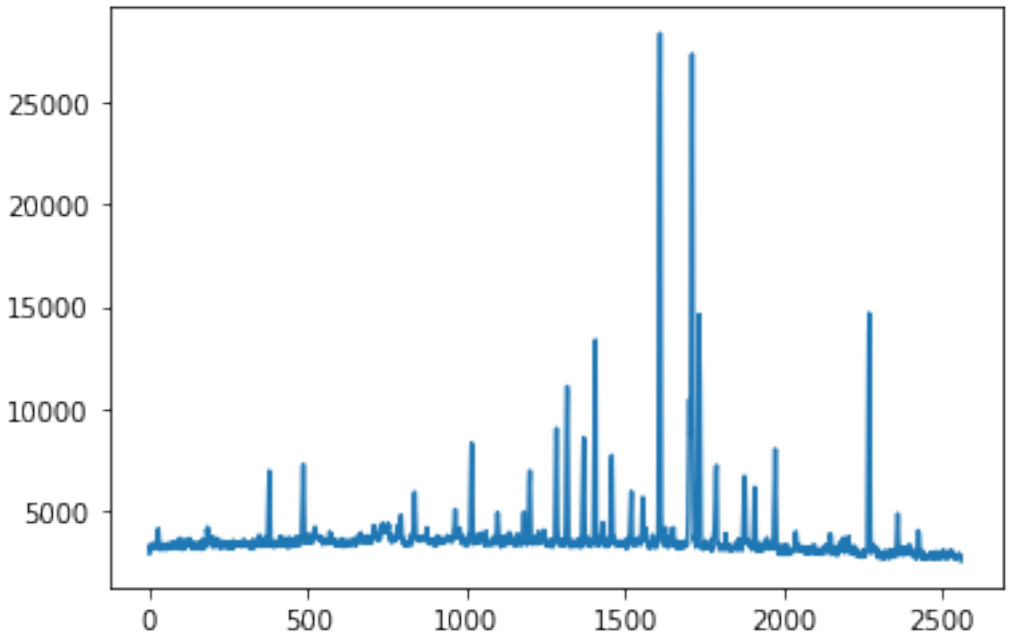
[9]:
```
df = 1
f0 = 1 + df * 2
order = 6
plt.plot((em.order_spectra[f0:f0+df, order, :].sum(axis=0)
          - em.order_spectra[0,order,:] * df) / df, '-')
```

[9]:
```
[<matplotlib.lines.Line2D at 0x2193cdae250>]
```



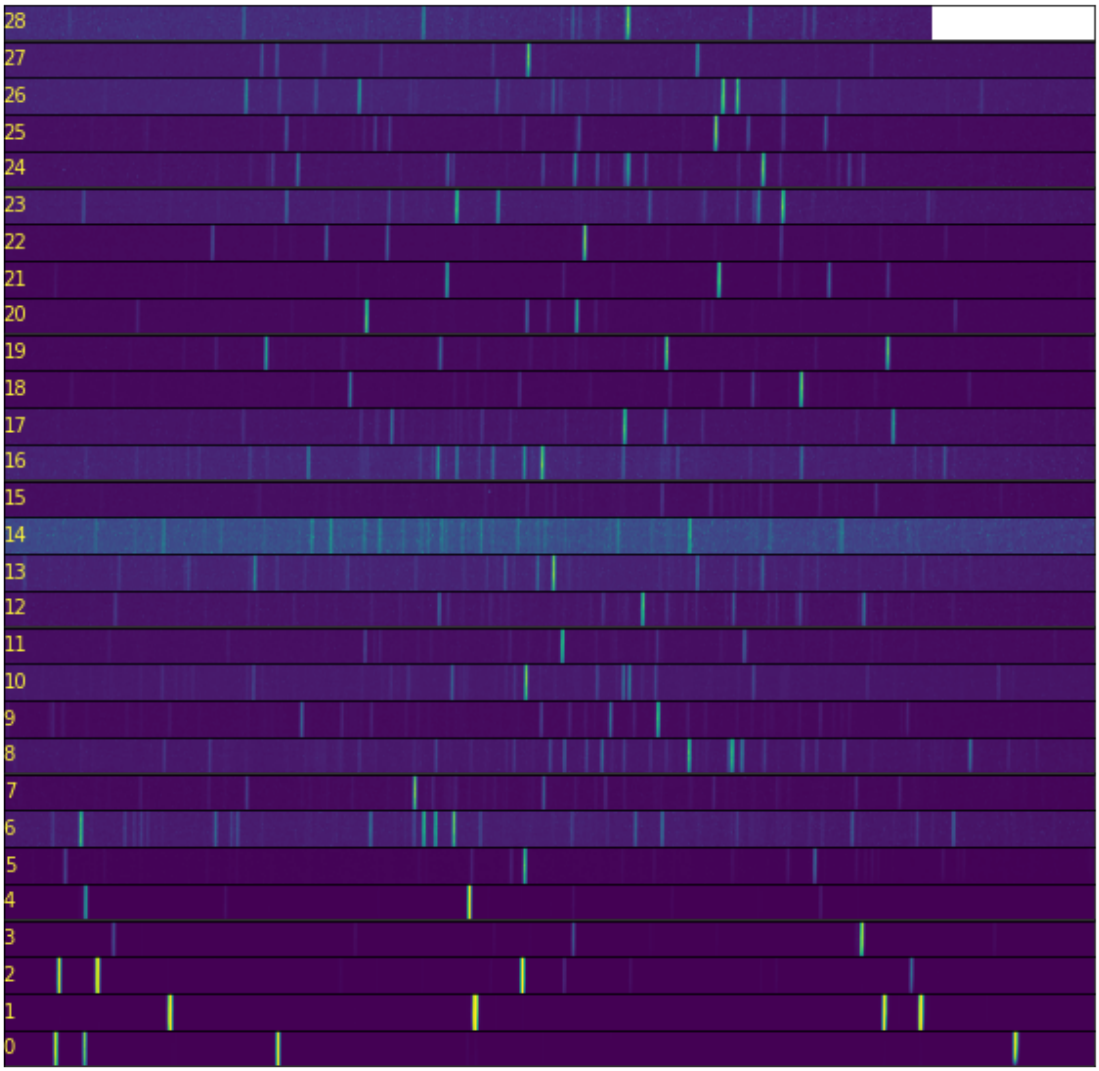
[10]:
```
frame = 0
order = 8
plt.plot(em.order_spectra[frame, order, :])
```

[10]: [<matplotlib.lines.Line2D at 0x2193ce039a0>]

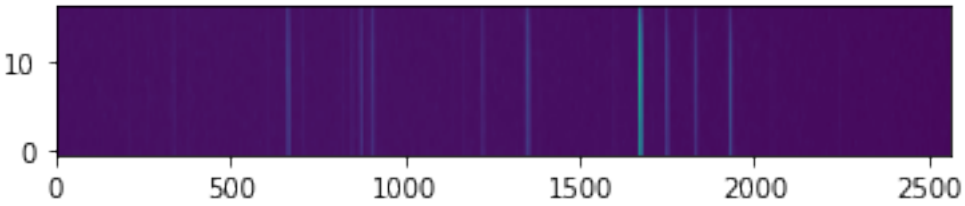


[11]:
```
em.calculate_spectra()
# em.plot_order_image(28,6,20)
```

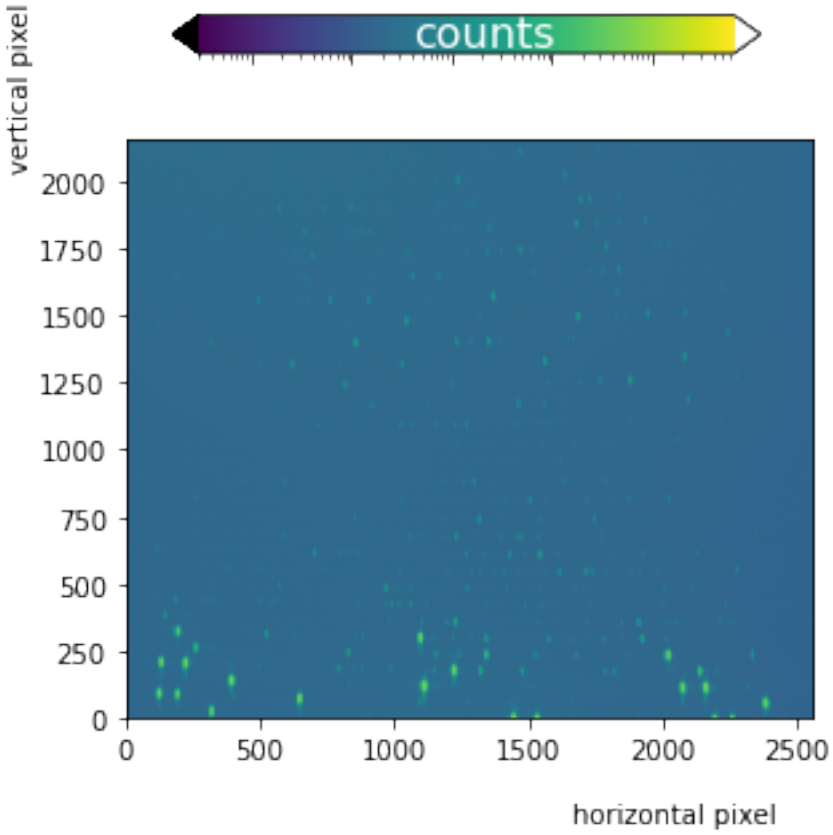
[12]:
```
frame = 0
em.plot_cut_image(frame, 5)
plt.gcf().set_size_inches(10, 10)
# savefig('CMOS_cut.png', dvi=300, pad_inches=0, bbox_inches='tight')
```



[13]:
```
em.plot_order_image(0, 25, 25)
```

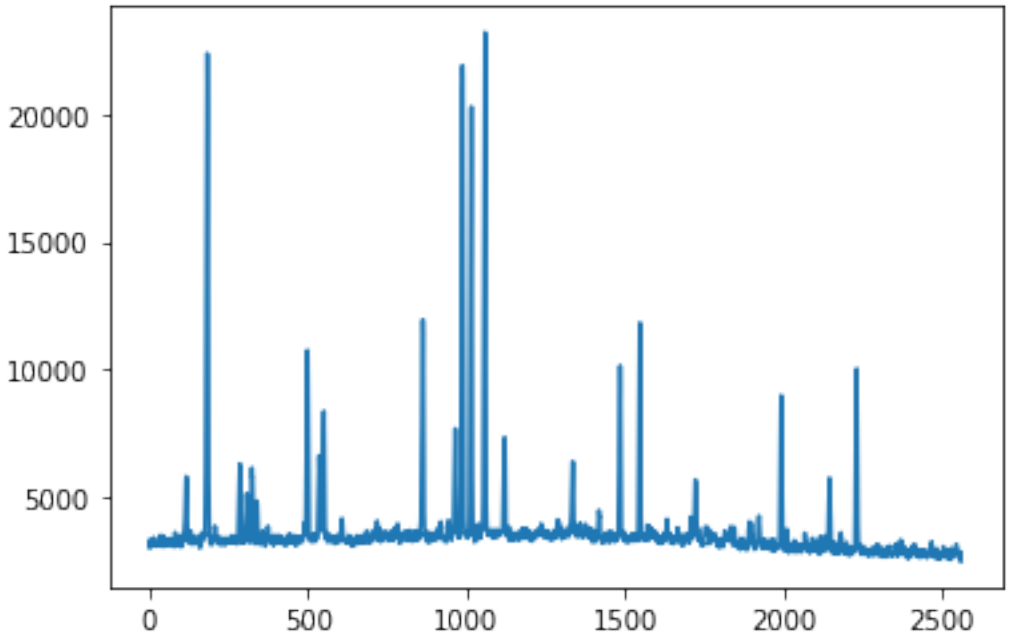


[14]:
```
em.plot_frame(0, scale=10)
```



[15]:
```
plt.plot(em.order_spectra[0, 6, :])
```

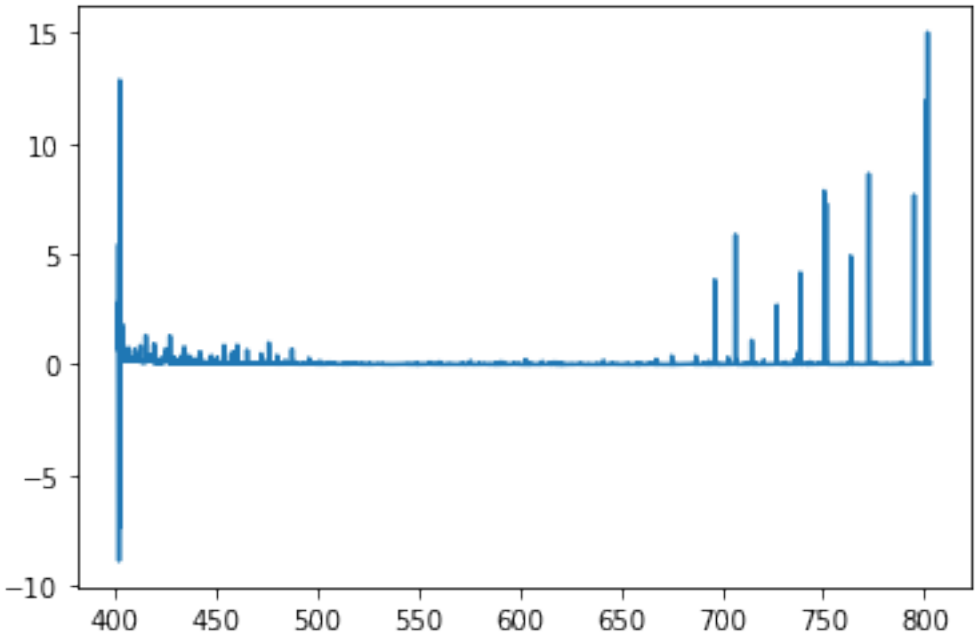
[15]:
```
[<matplotlib.lines.Line2D at 0x2193e4eff10>]
```



[16]:
```
s = Spectrum(em)
```

[17]:
```
frame = 0
x = s.wavelength
y = s.spectra_to_save['wm'][frame]
plt.plot(x, y)
```

[17]: [<matplotlib.lines.Line2D at 0x2193e440b20>]


15
10
5
0
−5
−10
400
450
500
550
600
650
700
750
800