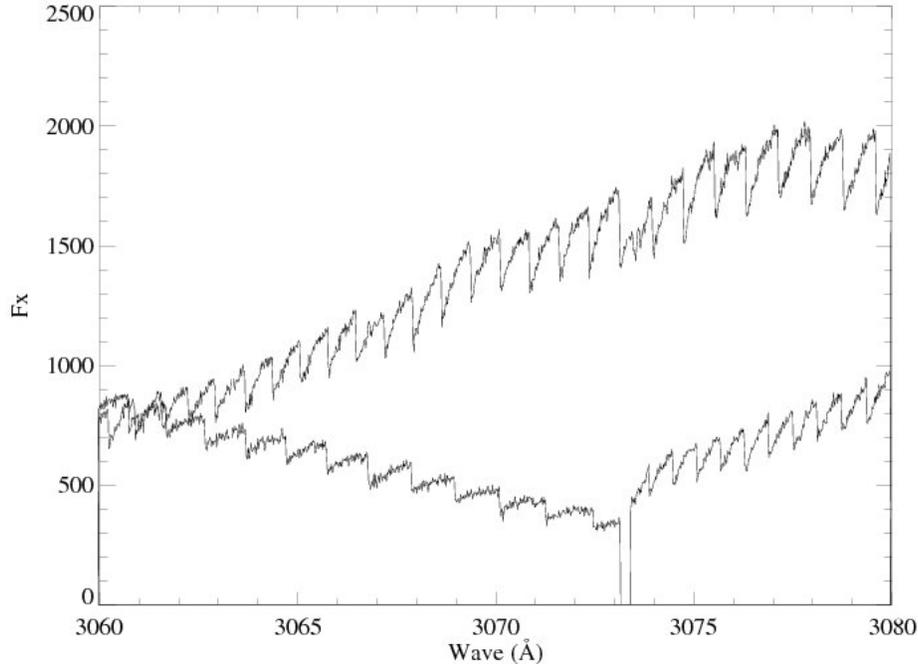
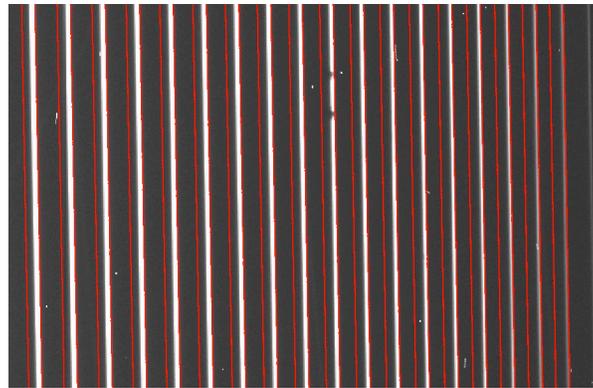


With our Keck HIRES observation we were observing bright O and B stars for the purpose of studying the intervening interstellar clouds.

We processed the data the first time using the IDL pipeline with all the standard routines and did not make any adjustments to any optional parameters. In the shortest wavelength chip, we found that the extracted spectrum was showing a pronounced sawtooth pattern:



Taking a look at the overlay of order traces over the object images revealed that the illumination from the object in the blue chip was at the very edge of the illumination from the trace flats:



As this was the likely cause of the sawtooth pattern (some of the light being cut off in the extraction and the sawtooth coming from the pixelization), we attempted to remedy the problem through shifting the trace flats when processing them with `hires_proc`.

To find the best number of pixels to shift by, we overlaid a shifted trace on top of the object image:  
`hires_chktrflat, hires, setup, chip, XOFF=##, /nostop, /fit`

We determined for our dataset that the “Blue” chip traces needed a shift of 4 pixels and the “Green” chip traces needed a shift of 2 pixels. To apply these shifts we processed the flats again:

```
hires_proc, hires, CHIP=1 , XOFF=4  
hires_proc, hires, CHIP=2 , XOFF=2  
hires_proc, hires, CHIP=3
```

and then continued on again with the reduction from there.

It is likely that the problem occurring in the blue and not the red was due to atmospheric refraction (There are important notes about this in the “user notes” to the new HIRES detector).

Once the data were fully extracted we were unable to detect any residual sawtooth pattern in the data:

