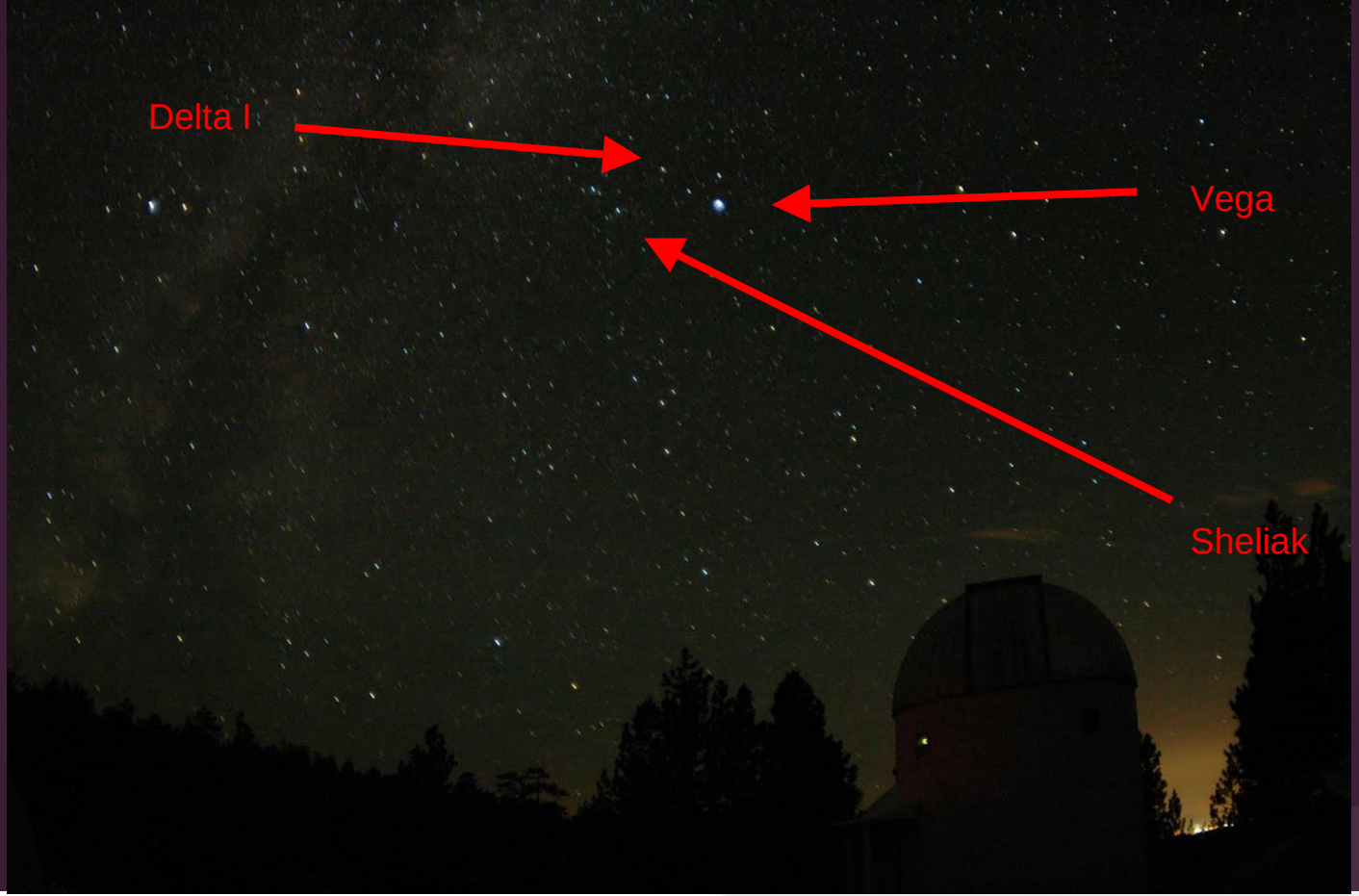
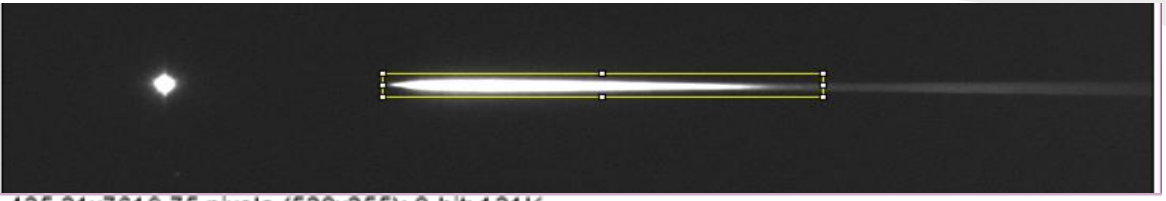
Stellar Spectrum Project
PMO Workshop 2014

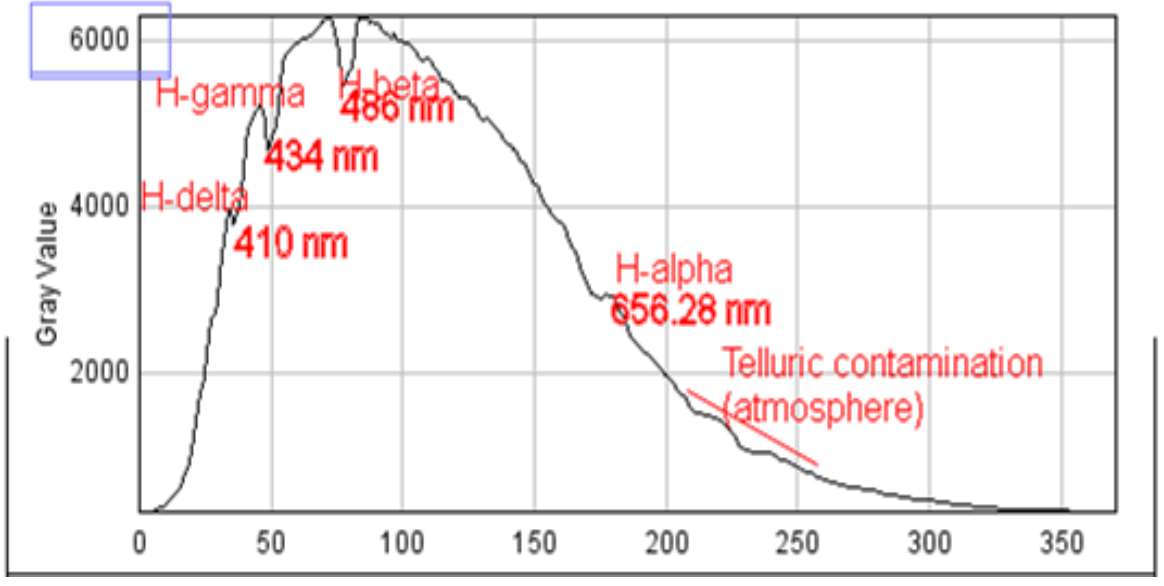


Lyra

Vega Spectrum (from Monday)

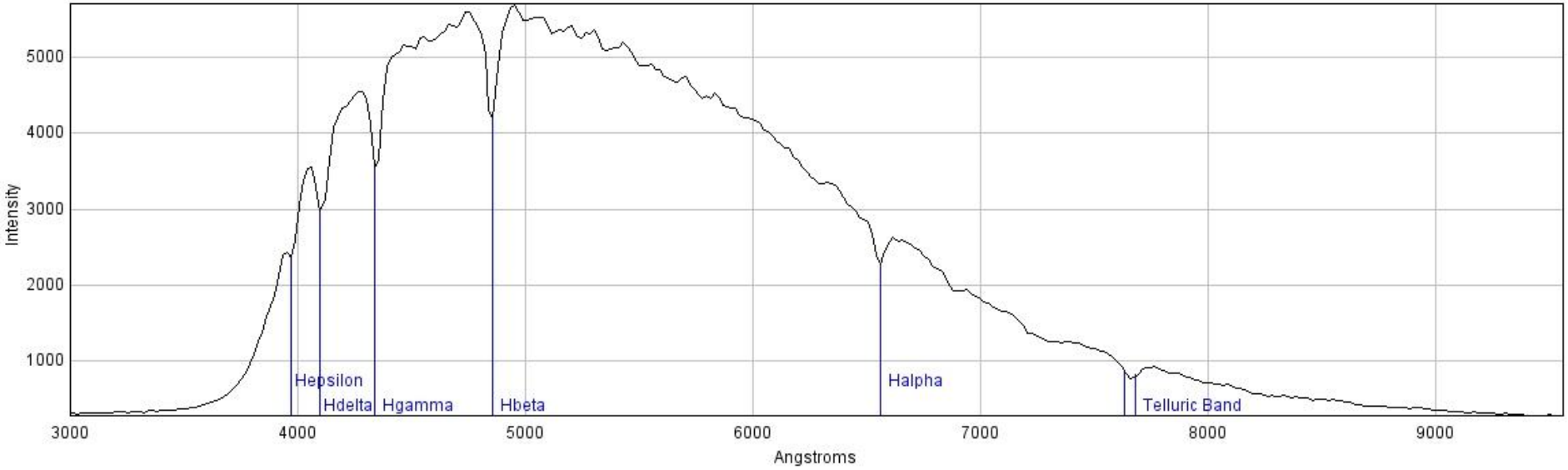


435.31x7619.75 pixels (528x255); 8-bit; 131K

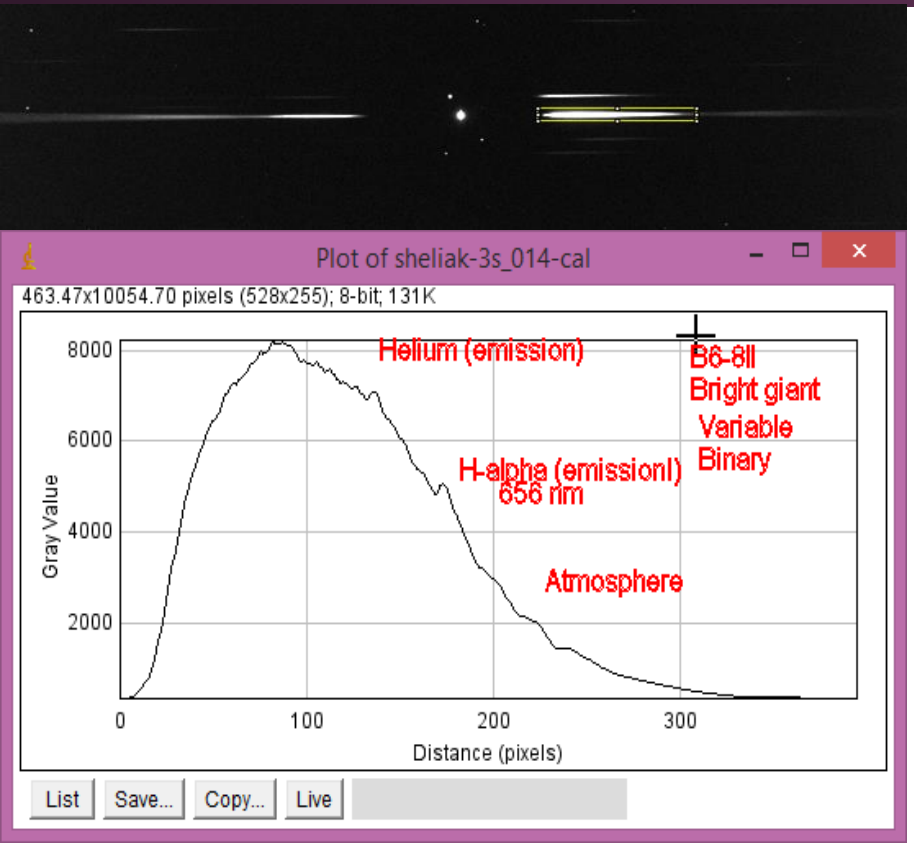


- Spectral type A0V (hottest of the third from the hottest class; dwarf)
- Saw absorption lines, specifically Balmer series (from higher n to n=2; in visible range)
- When focused on star, deepest lines in shorter wavelengths (left of image)
- Note: absorption lines
- Atmospheric contamination - O II

Vega (Wednesday)

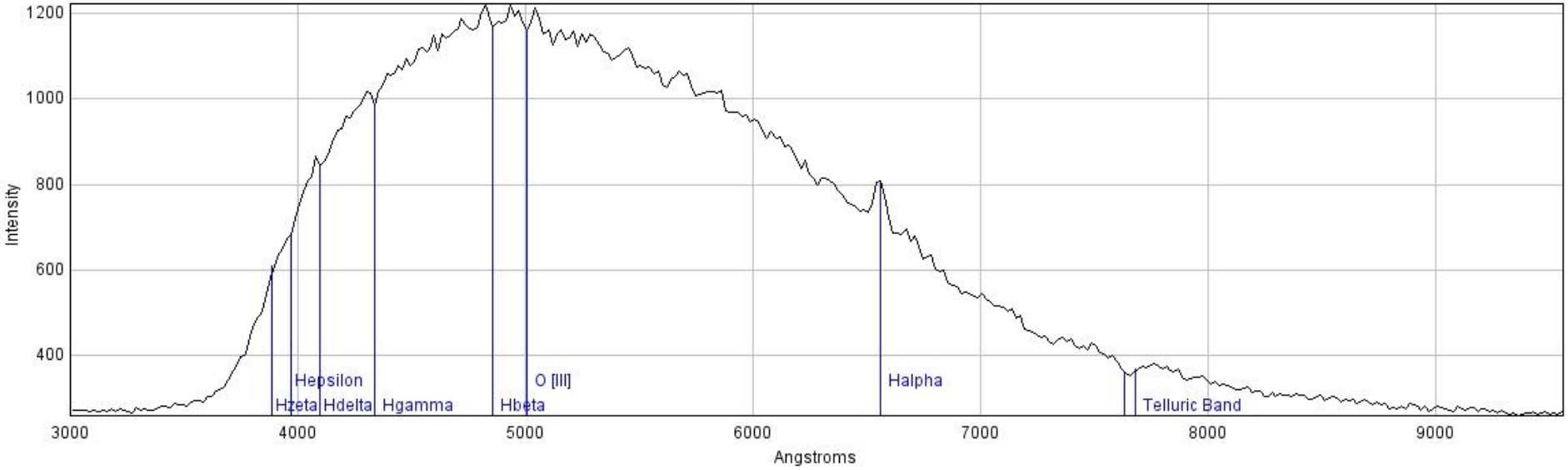


Sheliak (Monday)

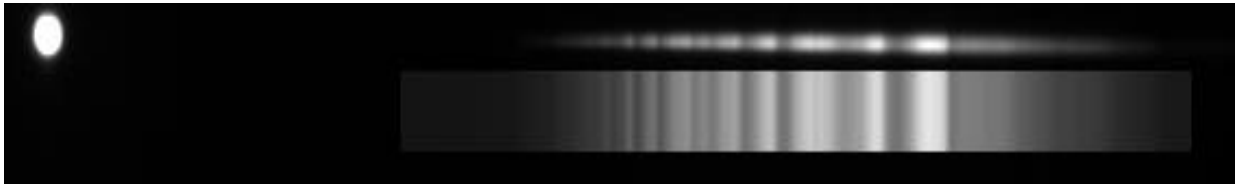


- B6-8II
- Bright giant
- Variable binary
- Be star----emission star
- Emission lines, not absorption
- Someplace farther from star has a bunch of H, He gas that's being heated up by the star and emitting at these wavelengths
- None of the lines are very sharp

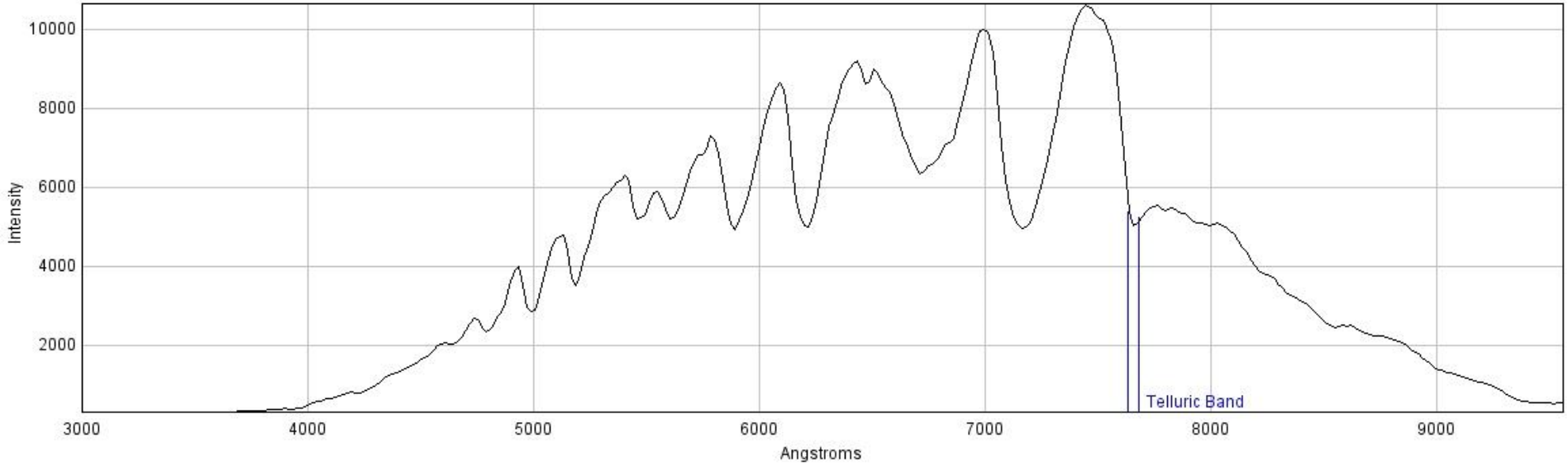
Sheliak (Wednesday)



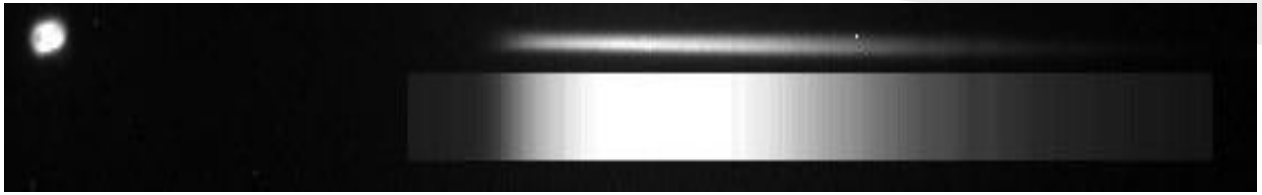
Delta 1 Lyrae (Wednesday)



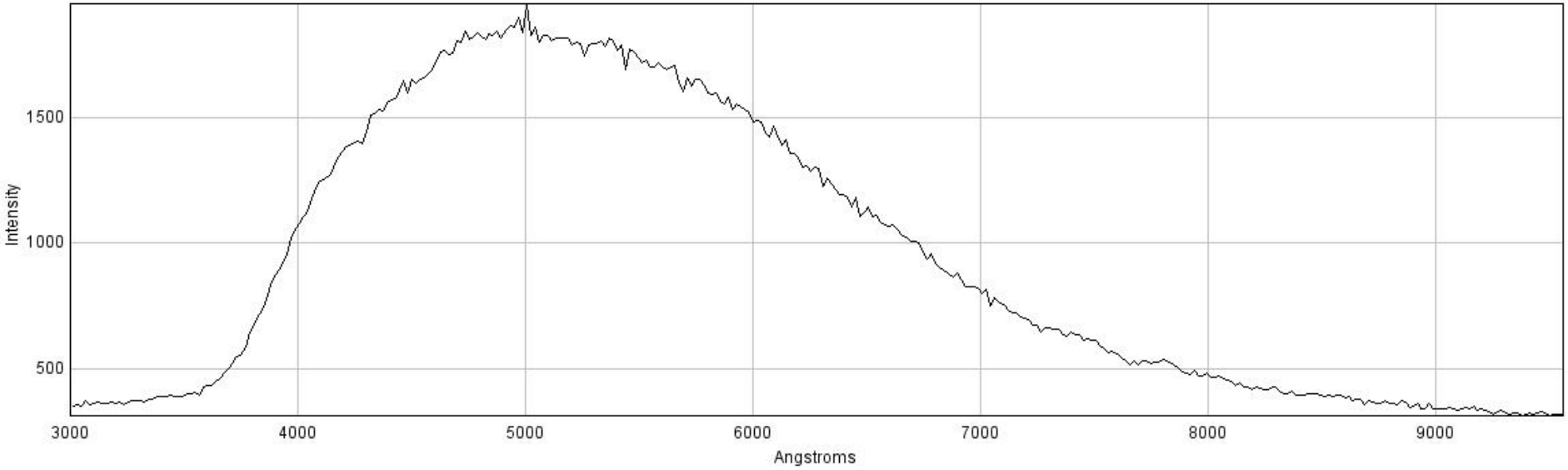
-Spectral Type: B2.5V/K2III
-Surface temperature of 11,000 to 25,000 kelvins
-Part of binary star system Lyra



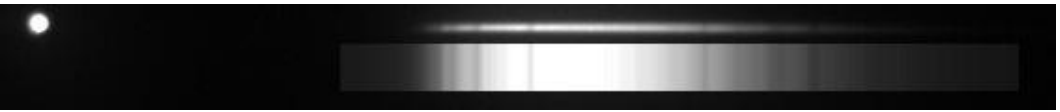
Deneb (Wednesday)



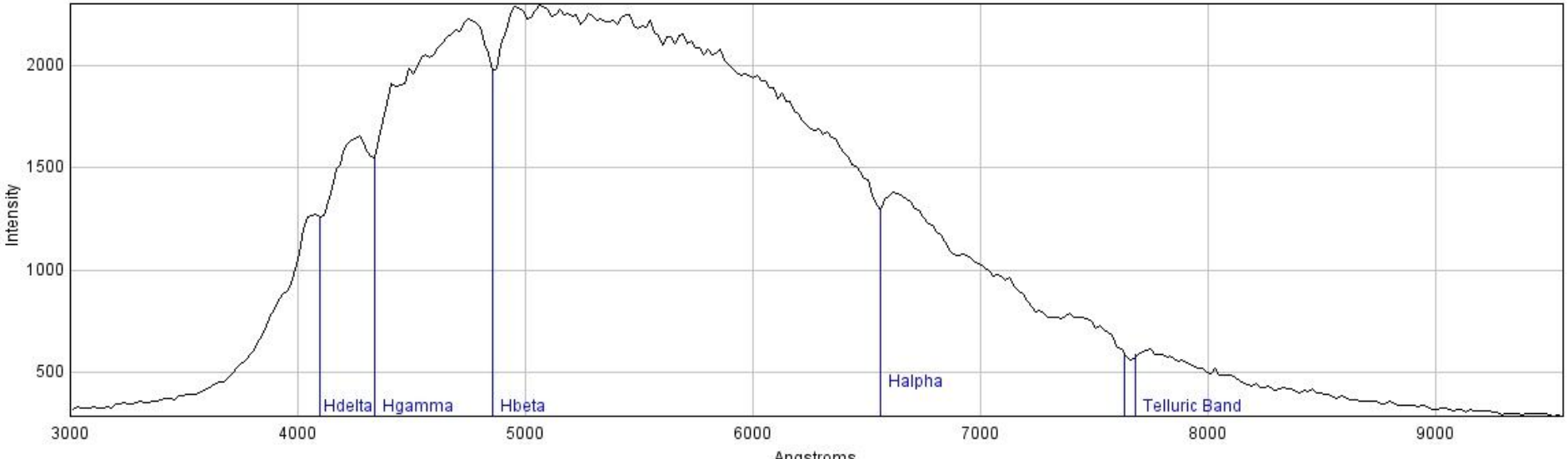
-Spectral Type: A2 1a (super giant)
-Lies at vertex in Summer Triangle
-Also known as Alpha Cygni
Hot , hard to identify any lines--need more data



Altair (Wednesday)



A7 (hot but not super hot) V (main sequence)

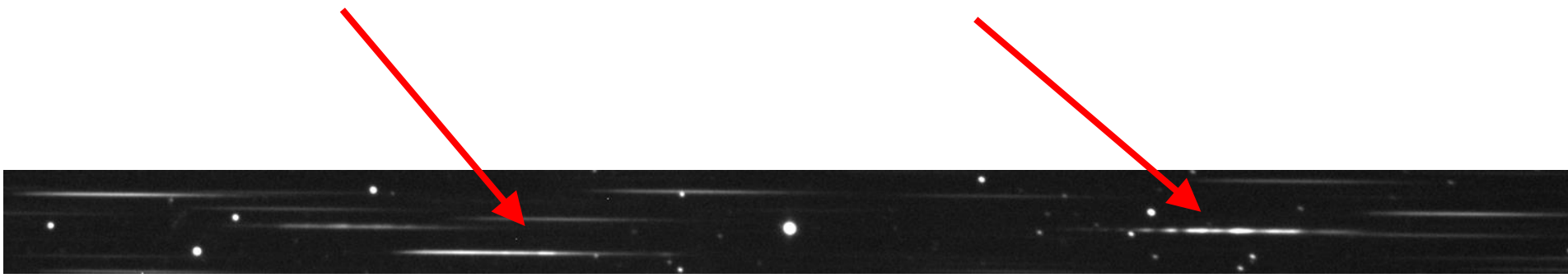


What is a Quasar?

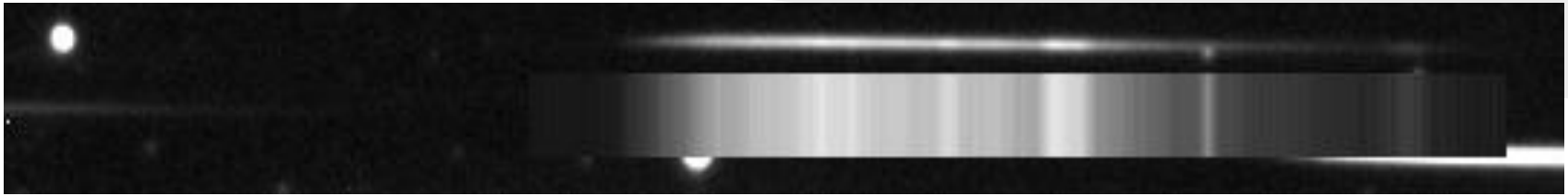
- Galaxy very, very far away with an Active Galactic Nucleus (AGN)
- AGNs are most likely supermassive black holes with accretion disks
- Emitting very large amounts of energy visible and radio spectrum---redshifted
- Quasar---quasi-stellar object (looks like star but is a galaxy)
- Can’t see the rest of the galaxy because the galaxy is dim due to the distance

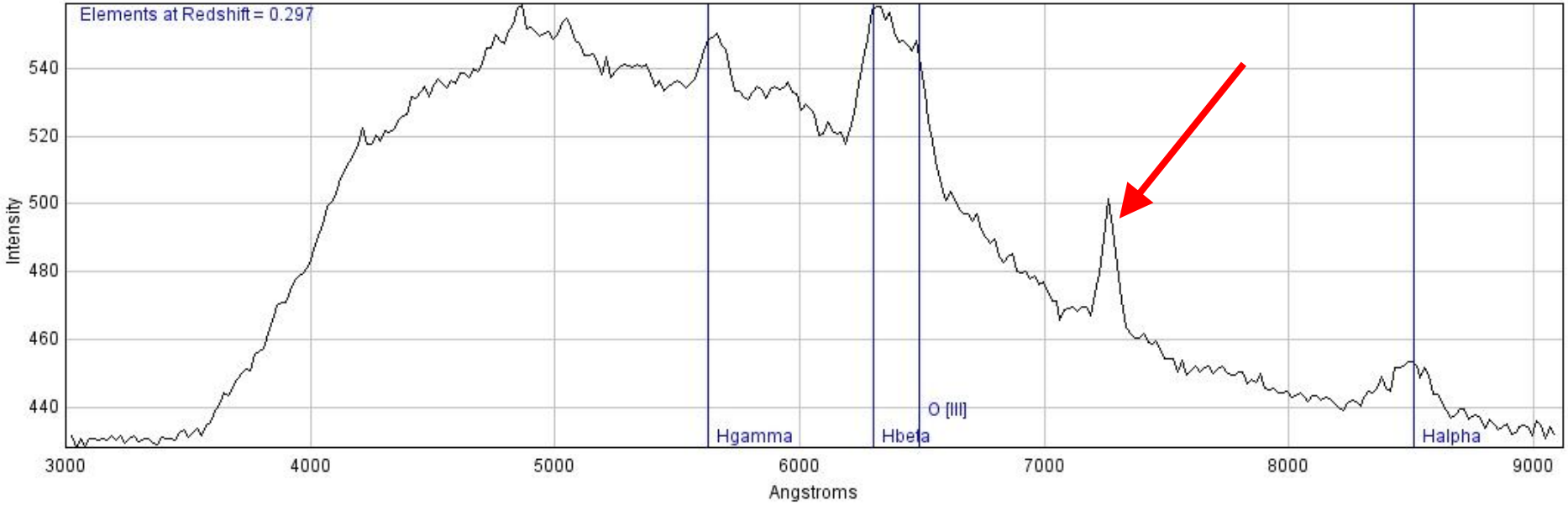
KUV 18217+6419 (Monday)

- Quasar!
- Really faint, but found it
- Bumpy spectrum
- Also found star with bumpy spectrum---why is it more bumpy?



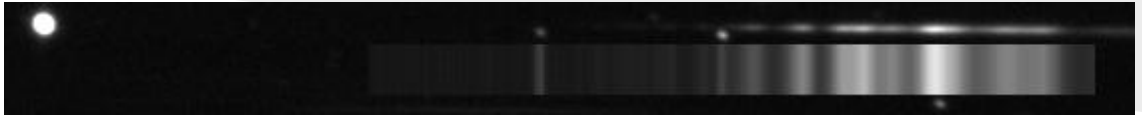
Quasar spectrum (Monday)

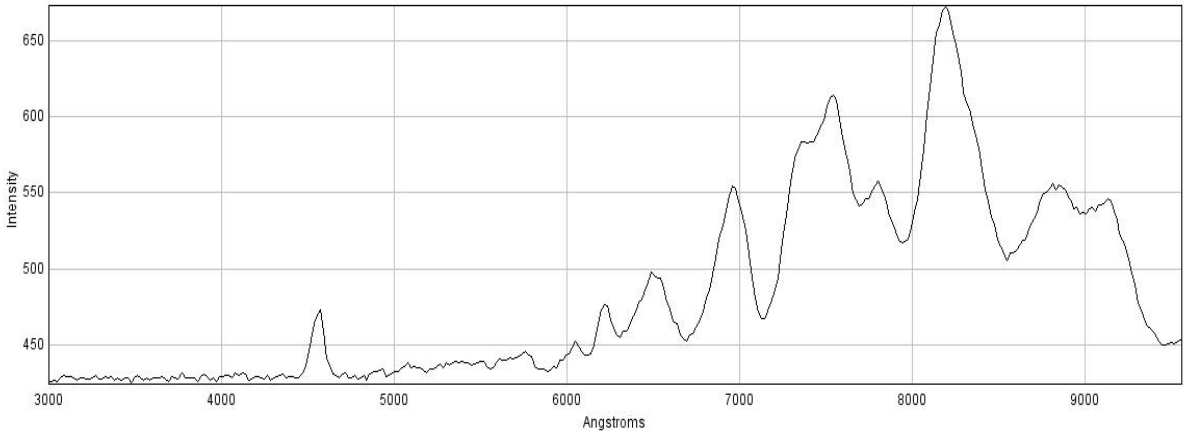




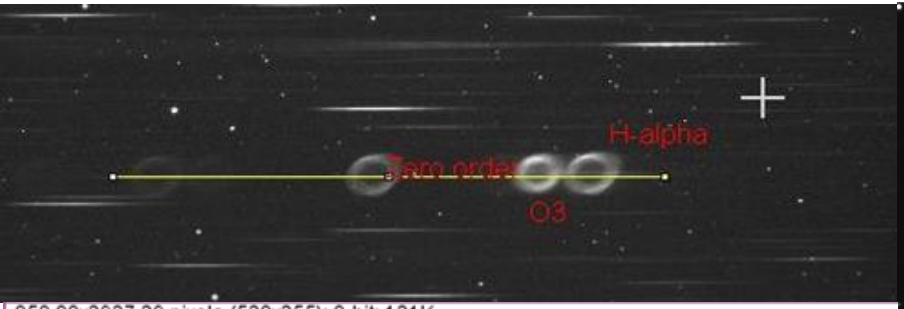
V IY Dra (Monday)

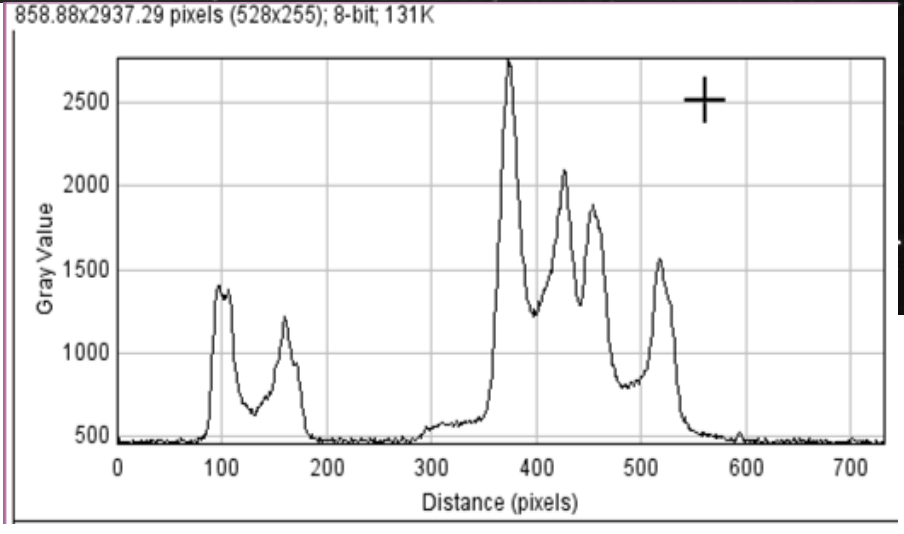
- Lots of bands---molecular stuff
- Molecules can only exist in low-temperature stars; produce a lot of molecule bands
- So this must be a low-temp/infrared star!
- Variable in Draco





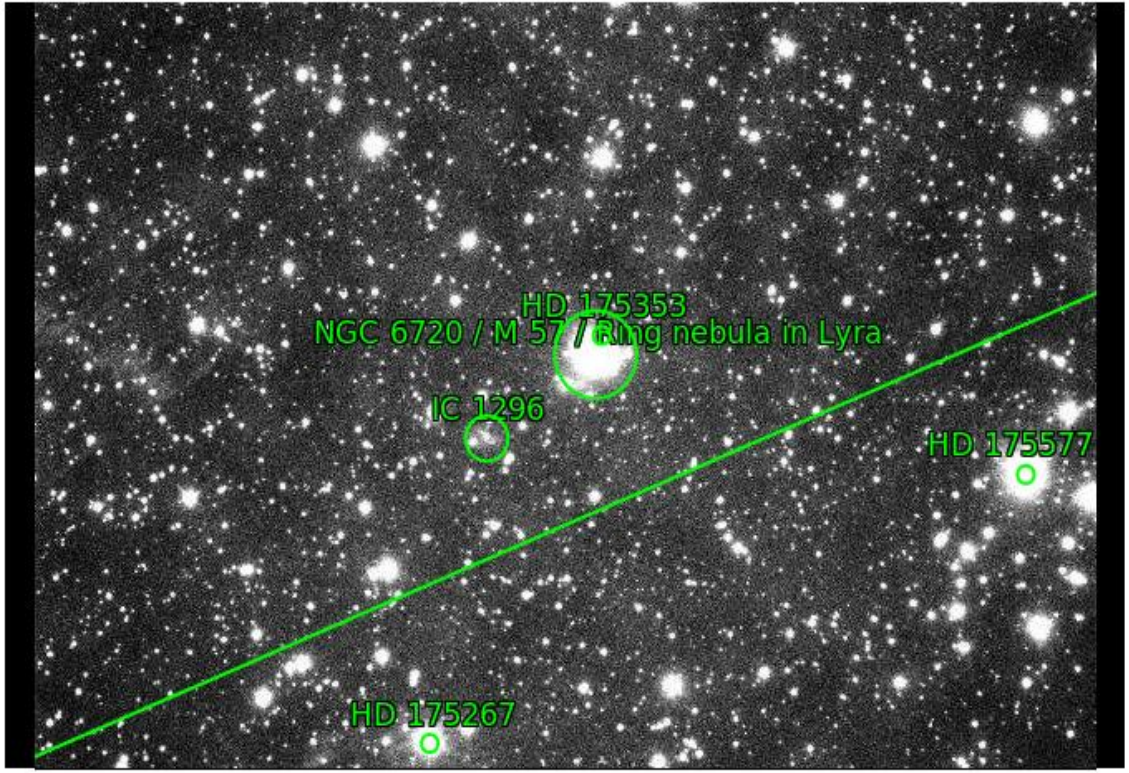
M57---Ring Nebula (Monday)





- Notice O III line----not atmosphere, actually oxygen gas in the nebula

Plate Solved M57!



on 2014-07-28T17:31:00Z
as " M57vf_001.fit " (Submission 328725)
under *Attribution 3.0 Unported*

publicly visible: **yes** | no

Job Status

Job 799611:
Success

Calibration

Center (RA, Dec):	(283.377, 33.043)
Center (RA, hms):	$18^h\ 53^m\ 30.568^s$
Center (Dec, dms):	+33° 02' 35.785"
Size:	32.4 x 21.8 arcmin
Radius:	0.326 deg
Pixel scale:	0.89 arcsec/pixel
Orientation:	Up is -2.36 degrees E of N
WCS file:	wcs.fits
New FITS image:	new-image.fits
Reference stars nearby (RA,Dec table):	rdls.fits

M27---Dumbell Nebula

- Too big---spectrum smeared together with original
- Really big nebula, so sort of expected
- Know it's a nebula not a cluster because it's got a cloudy shape, not multiple lines

NGC 7293---Helix Nebula

- Too big, overlapped
- Located in the constellation Aquarius
- One of the closest to the Earth of all the bright planetary nebulae

NGC 891

- Unbarred spiral galaxy
- Edge on so spectrum would be separate
- But spectrum is smeared out, no distinct lines
- Need a slit to focus on a specific area for detail
- But it’s pretty!

M33---Triangulum Galaxy

- Face on galaxy
- Took spectrum---could see nebula in the galaxy that had distinct images of O III and H-alpha
- Could see separate nebulae + determined composition

M13---Hercules Globular Cluster

- Globular cluster
- Very pretty, but no distinguishing characteristics with low res grating
- Made of stars not gas, but other than that unknown composition