

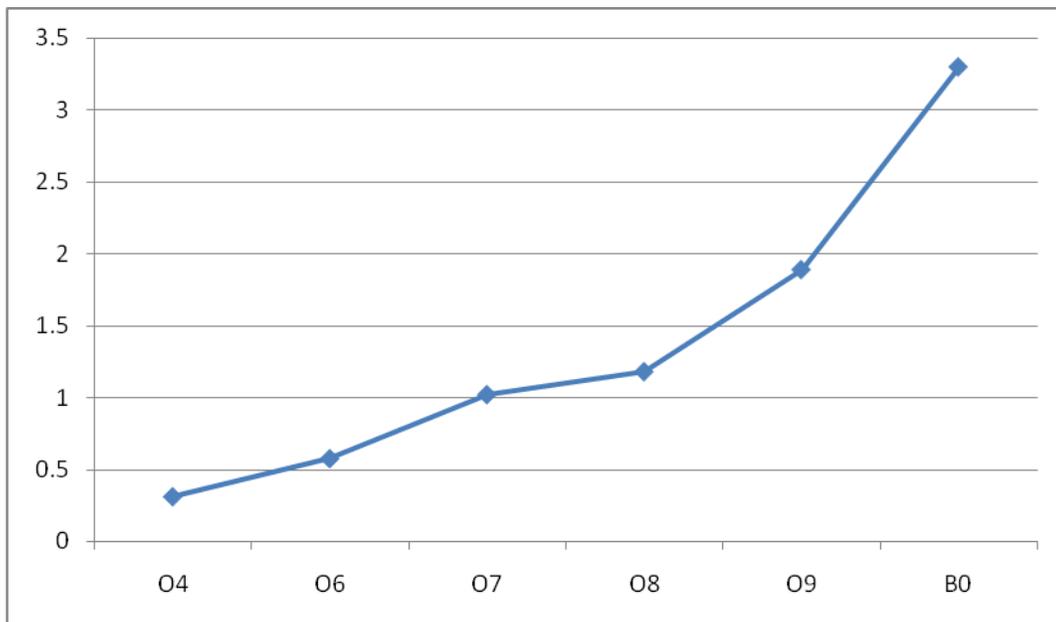
Stellar Classification Using SDSS

Using students' research gathered from over the summer I was able to grasp the concept of Stella Spectra, and replicate their findings of O stars. An overview of Stella Spectra and how to find and classify Spectra can be found with this link.

Summer Research: <http://quarknet.fnal.gov/quarknet-summer-research/QNET2010/Astronomy/>

Throughout my first semester studying spectra I focused on O Stars. The first O Stars I looked at where found within the "Dark Sky Observatory" and the "Steward Observatory"; within these two observatories only the spectra of seven O Stars where found. With these O stars I recreated a graph of their trends using the equivalent width ratio of the wavelengths 4471:4541. This replicated the research gathered by students over the summer.

O Star Trends



After learning the trends of absorption lines for O Stars within the "Dark Sky Observatory" and the "Steward Observatory", I used the information I learned and applied it to spectra found within the SDSS.

To single out O stars within the SDSS I searched for the color and brightness of stars.

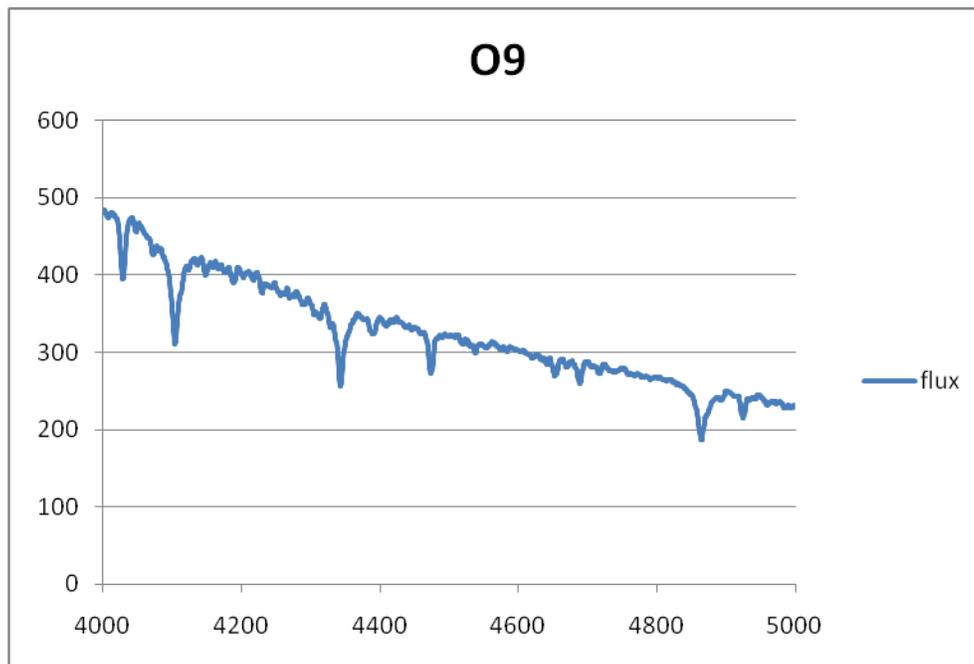
An example of the query I entered into the SQL search is as follows

```
select top 100  
p.plate,p.mjd,p.fiberid,s.psfmag_u-s.psfmag_g as UMG  
from sparams as p,specphoto as s  
where p.specobjid=s.specobjid and s.psfmag_u-s.psfmag_g<1 and s.psfmag_u<18
```

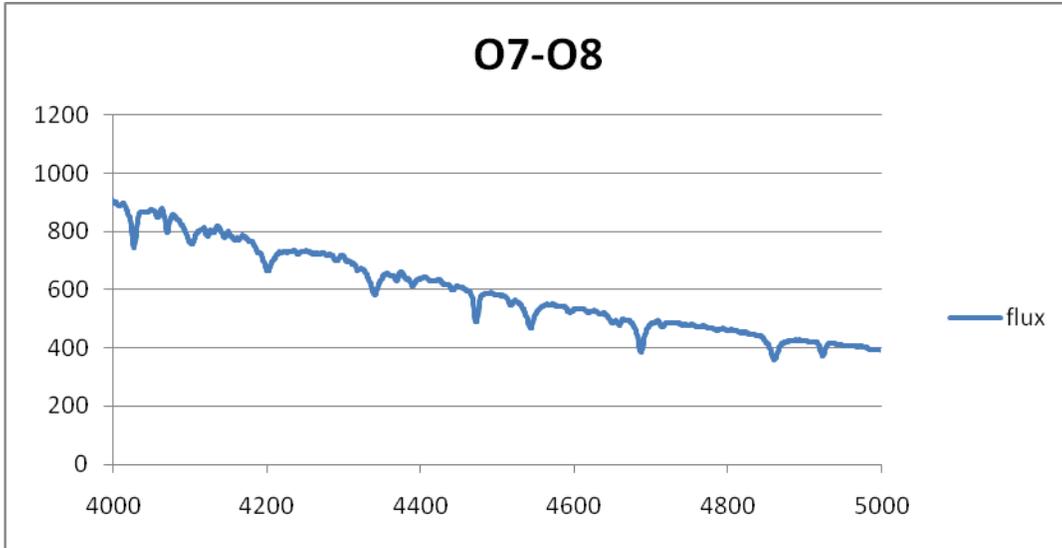
Because O stars are hot stars the value of their UMG will be a small number; this is why in the query above I entered “s.psfmag_u-s.psfmag_g<1” which will give me the spectra of stars which UMG value is less than 1, singling out possible O stars.

My Findings

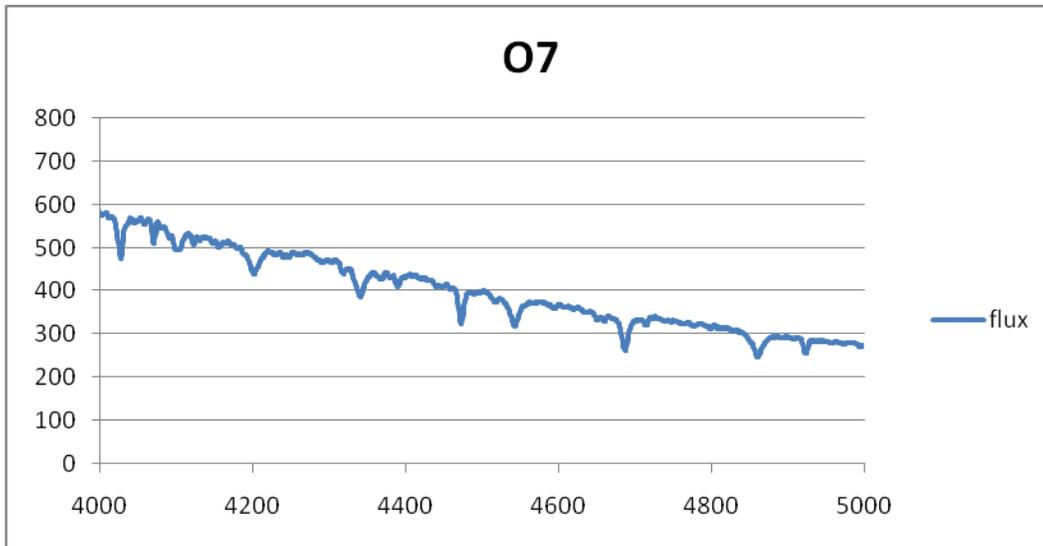
When using the SQL search I found several stars which when plotted their spectra possessed the traits of earlier O stars at wavelength 4471 and 4541. With these stars I calculated their equivalent widths and used the ratio 4471:4541 then plotted them on graph of “O Star Trends” to see what O star they will be classified as.



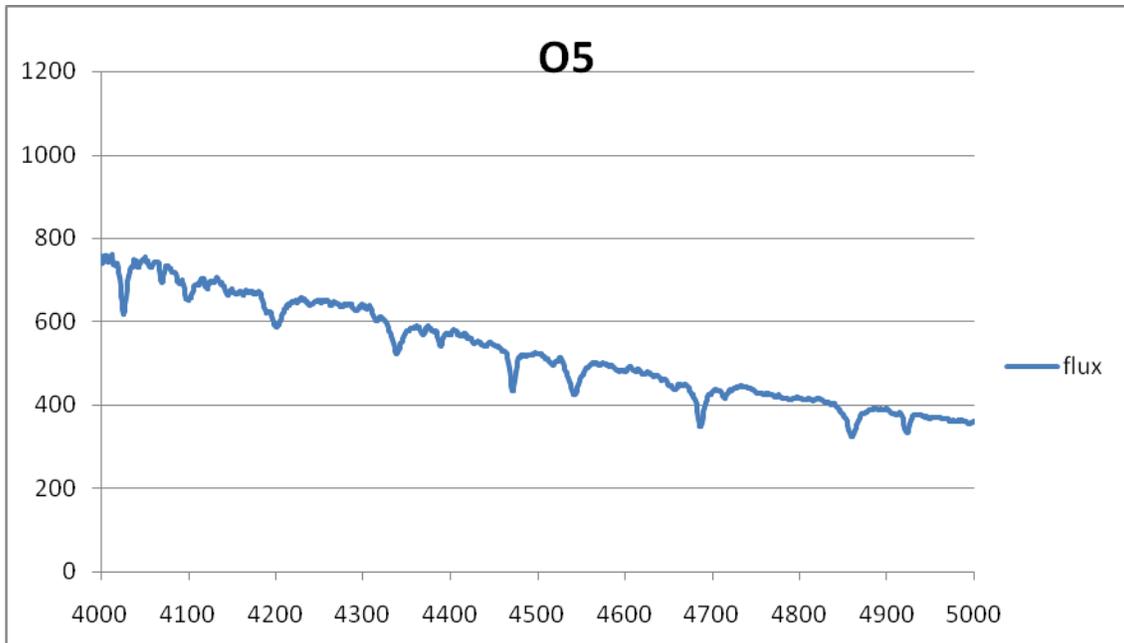
Ratio at 4471 and 4541: **3.17**



Ratio at 4471 and 4541: **1.27**



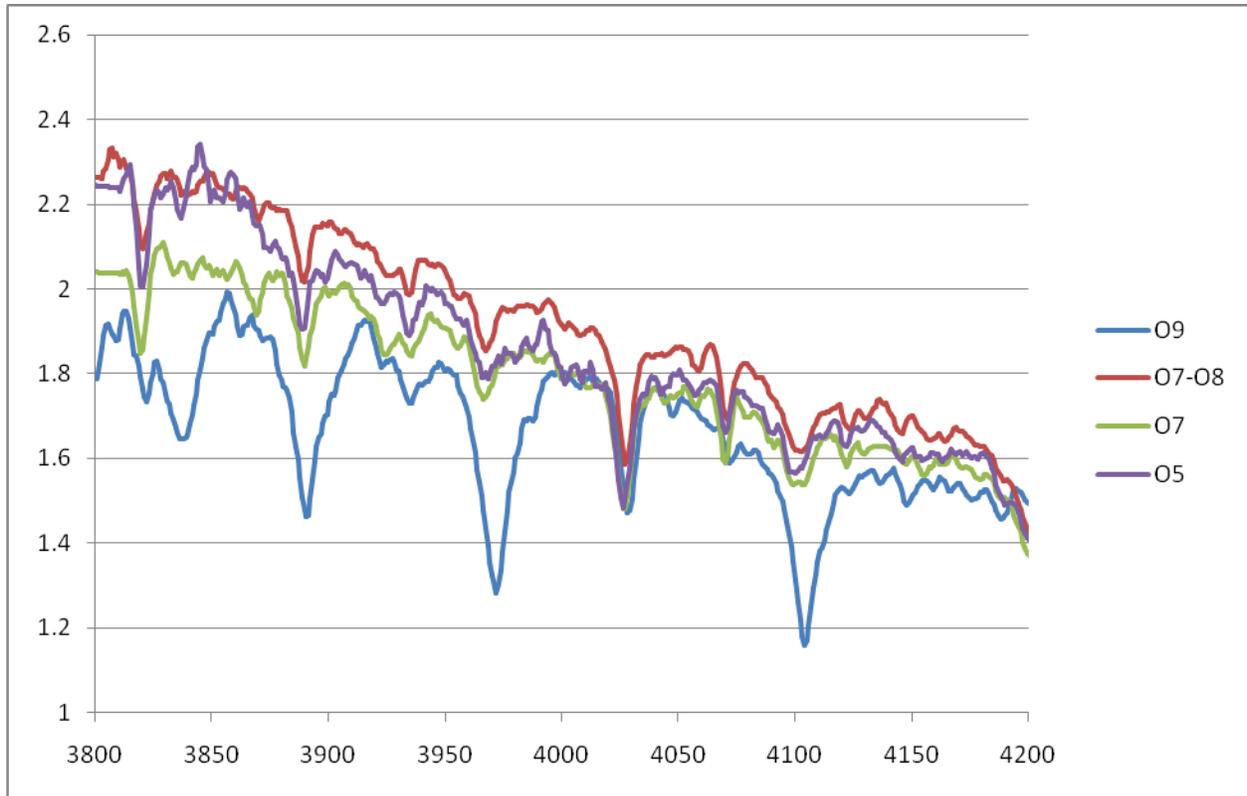
Ratio at 4471 and 4541: **1**



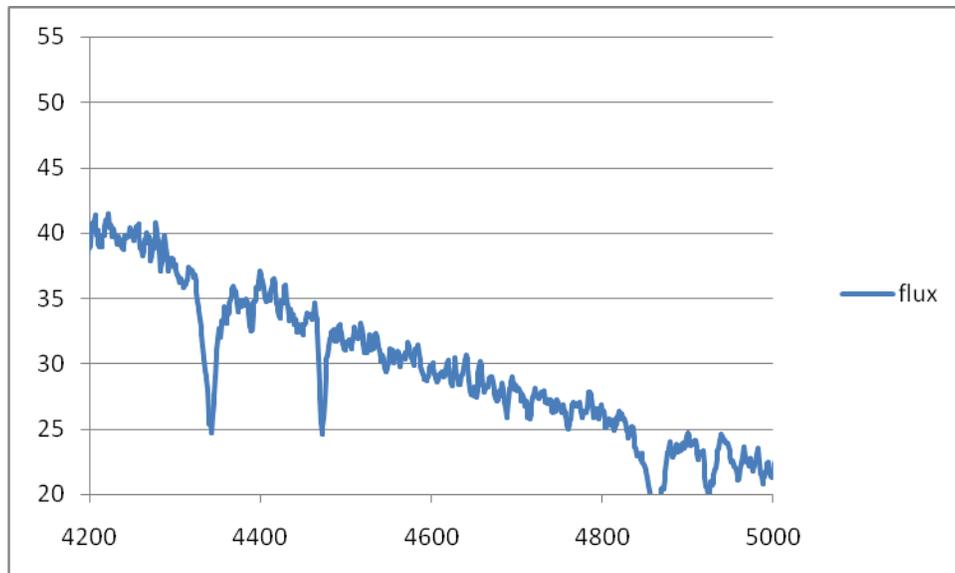
Ratio at 4471 and 4541: **.445**

O Stars			
Star	Plate	MJD	Fiber
O9	293	51994	504
O7-O8	1948	53388	540
O7	1173	52790	358
O5	593	52026	265

(Plates, MJDs and Fibers of O stars above)



In some cases while looking through the stars from my SQL search I came across stars that looked to be O Stars but did not have absorption lines at wavelength 4471 and 4541, or only had absorption lines shown at one of the two wavelengths.



Absorption lines at wavelength 4471 but not at 4541

When absorption lines are not shown at these wavelengths or an absorption line is shown at just one of the wavelengths this could be because the spectra of this star was not taken for a long enough period of time, or because the star just isn't bright enough.

With the research I have gathered about classifying O stars, I believe this information could be used to classify other stars besides O stars within the SDSS, by looking at the trends of absorption lines found when plotting a stars spectra.