

**ASTR 311    STELLAR ASTROPHYSICS**  
**Homework #6**  
**(due 21 Oct 09)**

This is a little open-ended, but everything you do will contribute to your final paper. I want you to use "your" star as a case study to apply everything we are learning in class. Your final paper will be a cumulative case study plus a review of the scientific results for your star.

Starting with the SIMBAD database, identify at least 2 spectral lines that have been used as diagnostics of something physical on your star (i.e. other than its radial velocity or other extrinsic properties).

Locate a Grotrian diagram, transition tables, or other guides to help you answer the following:

- What transitions within the ion are responsible for the observed spectral line? Record and explain everything you can about the energy levels, quantum numbers, term diagram, whether transitions are allowed, etc. What are the oscillator strengths of the transitions?
- What mechanisms contribute substantially to broadening the line profile?

Describe in a paragraph or two (perhaps with a figure or two) how these lines have been used as a diagnostic of physical conditions on your star.