AST325 Project Report

Due: 1200 hrs, Mon. April 14, 2003

Value: 32%

The term report's primary purpose is for you to demonstrate that you understand and are proficient in the techniques (observing and otherwise) taught in the lab component of AST325. The report should consist of several main sections and be 20-30 pages long including figures (which should be relatively abundant). The report should contain/discuss the information outlined below. Some of this discussion will be, at some level, a recap of material which has been given to you during the course; be sure to not simply parrot handouts or IRAF help files - rather, demonstrate that you understand the material! Use references where appropriate, and whenever possible and appropriate, present numerical data in a tabular form.

The report should at minimum be typeset as a simple ASCII text file and preferably typeset using a more sophisticated word-processor. A brief tutorial on Latex (the standard scientific typesetting package) will be given, and a sample file will be handed out. The report format must follow the standard format of a scientific paper, as outlined below. If you are at all confused as to the type of format to follow, look at a few Astrophysical Journal papers. In addition to any figures or tables, which may be embedded in the main body of the report or appended at the end, the report should include the following sections:

(1) Abstract:

Summarize the contents of the report, highlighting important conclusions.

(2) Introduction:

Place the report into a scientific context. The introduction should provide a summary of the scientific motivation for the work presented in the report.

(3) Observing Techniques:

Discuss the observing techniques used, both for photometry and spectroscopy. Outline why the different calibration frames were acquired. Summarize the observing that you did in particular, as well as the general observing program undertaken by the class as a whole.

(4) Data reduction:

Outline the data reduction steps, and the motivation for each step. Discuss the specific data you reduced, outlining any problems encountered in the reduction, and what you did to deal with such problems. Do not simply list the reduction steps - your instructors know what they are! Rather, demonstrate that you understand why the steps were taken, not that you simply remember what they were.

(5) Analysis:

The radial velocities of your reduced spectra will be measured, using "fxcor" or "rvidlines" in IRAF. (Use Alphard = HD81797) as the template). Carefully examine the spectra you have taken of Regulus to check for telluric (i.e. terrestrial atmospheric) absorption. Use the "telluric" task to correct your radial velocity template spectrum.

Save the graphics output of "fxcor" (I will send out an e-mail about parameters to set for this). Reproduce the "fxcor" graphics in the write-up. Examine the errors of your radial velocity determinations. Compute an overall standard deviation.

Compare your H-alpha profile of Regulus with model atmosphere and other published results.

(6) Improvements:

How can the observing component of the course be improved, from a scientific perspective? That is, are there ways to modify the current manner of data acquisition to make it more efficient, less error prone, etc.? Suggest one other possible project which would take advantage of the observational capabilities you used or which will be available in future (e.g. the UTSC 12-inch telescope with imaging CCD. Take a page or two to do this). The suggested project should be both scientifically interesting, and feasible. Some suggestions, to get you started: supernova light curves, asteroid and comet orbits, other types of variable stars, stellar classification (both photometrically and spectroscopically), target-of-opportunity follow-ups etc. Your discussion should include estimates of the amount of observing time required for the stated projects, and a discussion of the difficulty and feasibility of the observations. Bear in mind the approximate magnitude limits of the equoment.

(7) Discussion and Conclusions:

Provide a brief discussion of your results, with reference to the scientific motivations outlined in the introduction. The conclusion should provide a retrospective of the rest of the report.

(8) References:

Fully list all references used in the report. The style should be standard ApJ style - see the Astrophysical Journal for examples.