

Ay 122a: Astronomical Measurements and Instrumentation

Assignment 2

Due in TA's mailbox at **5pm** on Friday, October 28, 2016

Reading:

Chapter 3-6 of *Introduction to Astronomical Spectroscopy* and the instrument manual:

<http://www.astro.caltech.edu/palomar/observer/200inchResources/dbspoverview.html>

1. Preparing for and During your Observing Run:

- Plot visibility curves for your targets. Use a tool such as: <http://catserver.ing.iac.es/staralt/>
Mark on this the actual time of observation and the actual airmass from the fits header.
- Estimate the S/N in a 900s exposure for a 20 mag source. Use the same assumptions as you did in the third problem of your first assignment except correct for the instrument throughput for DBSP which is 0.12. Now compare to the observed S/N for the observed exposure time and magnitude of the source. Discuss why there could be a discrepancy.
- Instrument setup: Which gratings are you using on the red side and blue side? What are the lines/mm, blaze and tilt angle? What is the corresponding R and wavelength coverage?

2. Data Reduction:

- What is the median bias value that you are subtracting?
- What is the stddev in the pixel-by-pixel sensitivity (i.e. the flat image that you are dividing)?
- What is the RMS in your wavelength solution?
- What is the RMS in the sensitivity function when you ran flux calibration?

3. Data Analysis:

- Classify the supernovae you observed. Compare/contrast to figures in this review article <http://www.annualreviews.org/doi/pdf/10.1146/annurev.astro.35.1.309>
- Identify the most prominent line features (e.g. H or He or Si) in your spectrum. Measure the velocity width and redshift.
- *Extra Credit:* If you are having too much fun with this assignment, guess the phase of the supernova i.e. days since maximum. You may want to cross-match to existing supernova spectra libraries such as SNID or Superfit.