ASTR 3520
Astronomical Observations and Instrumentation II: Spectroscopy
Fall 2007

Lab 4:
Due: 4 December (Tuesday) 2007 (Tuesday in lab)

Purpose:

In this lab, you will be asked to measure the electron density and temperature of a ionized nebula based on spectra obtained with the 24" SBO spectrograph.

Select a bright nebula such as NGC7027 or NGC6884 in Cygnus, NGC6543 in Draco, or the Orion Nebula. You may choose your own target. However, if you can't see it in the eyepiece, its too dim.

Take spectra of the red [SII] lines and the [OIII] lines in the blue. Your exposures times will have to be long … as much as an hour total to get good S/N. Reduce the data and estimate the temperatures and electron densities for your objects.

Given the electron density, a size estimate (based on distance and angular size), estimate the total mass of your nebula. In you write-up, please describe how you estimated (or where you found a reference for) the distance. You should measure (or estimate) the diameter of your objects from your own data… either from the spectrum, or from an image you might want to take.

Assume photo-ionization equilibrium, and estimate the Lyman continuum luminosity of the central star (or stars) in your object.

Possible Target Objects:

NGC 7027
NGC 6884
NGC6543
M42 (Orion Nebula)